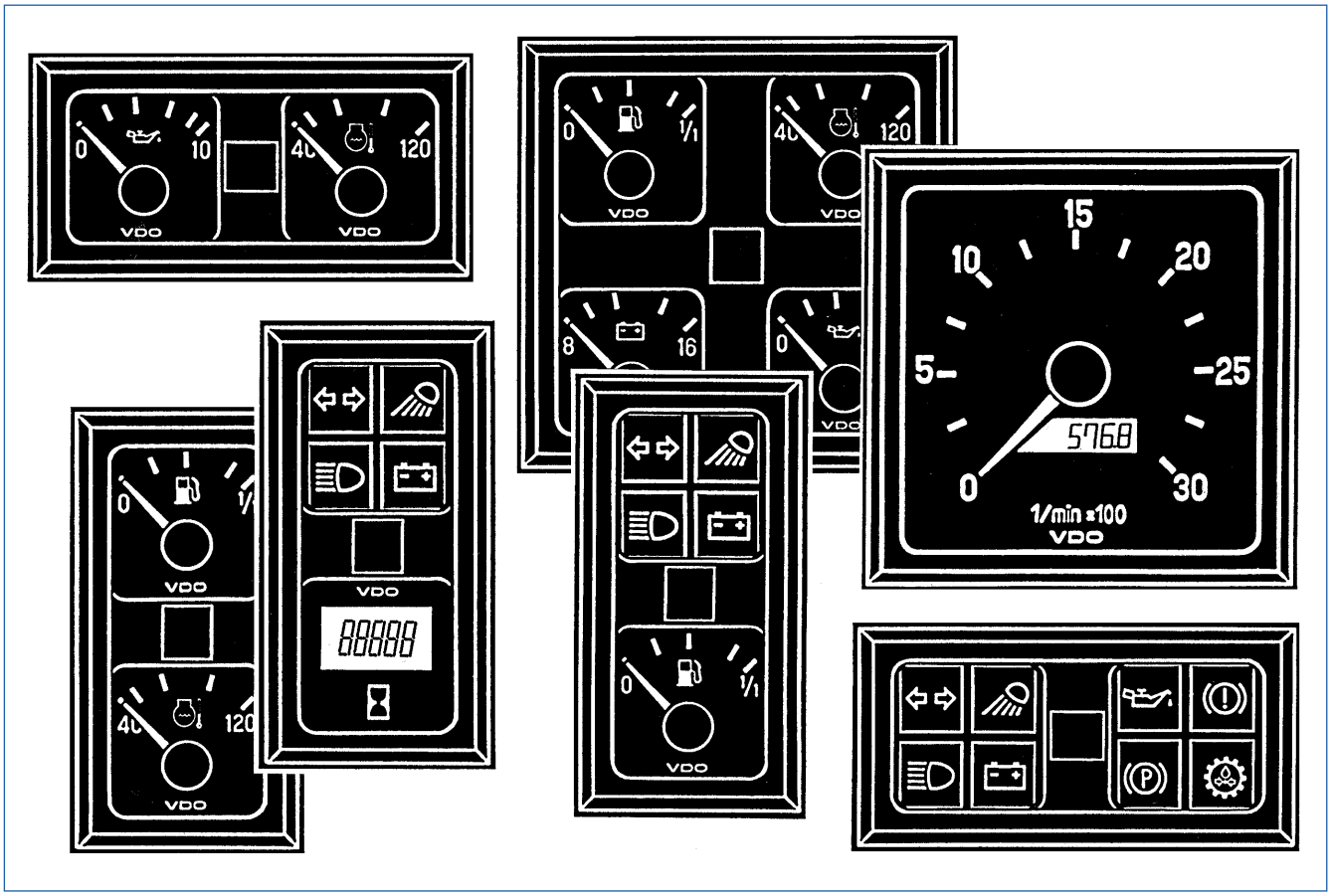
SIEMENS VDO
Automotive



Technical Product Manual

VDO modulcockpit II

Technical Product Manual
VDO modulcockpit II

SIEMENS VDO
Automotive

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Overview Of Chapters

1. General Informations

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1. General Informations

1.1 Description

VDO modulcockpit II

represents a flexible instrument concept embracing extensive warning, monitoring and display functions. With this modular instrumentation packaging system, easy-to-read instrument panels can be made up even for cramped quarters, thanks to the leeway it offers.

Compact Design

Flat-design precision movements have made it possible to reduce the installation depth of the instruments. Thus placement can be managed even in the case of vehicle configurations where space is at a premium.

Innovative Backlighting Technology

Translucent backlighting supremely highlights the information presented. A light guide spreads the internal lighting of the instruments evenly over the dial background from behind. As a result of optical bypassing, only the dial graphics and the pointers are lit up. This type of internal lighting ensures a high-contrast display which is especially pronounced in nighttime use, when it is needed most.

Easy Installation

The modular instrumentation packaging system makes universal siting a reality. Special interlocking clips permit the instruments to be firmly locked together. Blanks are available for plugging instrument cutouts that are to remain temporarily or permanently unused. Even if instruments are inserted on a step-by-step basis, the overall appearance of an installation will not be detracted form.

Technical Data:

Rated voltage:	12 V or 24 V
Operating temperature:	– 25°C ... +70°C
Deviations:	50 mm x 100 mm or 100 mm x 100 mm
Mode of protection:	IP 52 DIN 40 050 from the front
Nominal position:	NL 0 to NL 90, DIN 16257
Finish:	
Housing and frame:	black
Lens:	antiglare treated
Brackets:	zinc-plated and chromatized
Backlighting:	Light bulbs: 12 V 1.2 W or 24 V 1.2 W
Single instrument assemblies (Ke):	
Dial face:	deep-black RAL 9005
Dial imprint:	white RAL 9010, by illumination green translucent
Pointer cap:	deep-black RAL 9005
Pointer arm:	fluorescent flaming red
Indicating symbols (KL):	white RAL 9010 (in warning mode colour field illuminated)
Single instrument assembly, operating hours counter (EBZ):	
Display:	5 digit 7 segments LCD type
Display range:	0.1 hour (6 min.) increment for display range 0000.1 to 9999.9 hours active indication by blinked point

The products are designed to be used in land-bound vehicles or stationary systems only (exception: motorcycles).

1. General Informations

1.2 Final Assembly Instructions

In addition of the VDO modulcockpit II instrument assemblies for which production code numbers have been assigned, customized instrument asemblies can be carried out in workshops by trained technical staff.

In the latter case, the following instructions have to be observed:

Do not use components other than the genuine VDO ones listed in the product manual!

Before assembly, an equalization of potential between the assembly worker and the module (single instrument module, circuit board) must be effected in order to prevent a destruction by a discharge of static electricity.

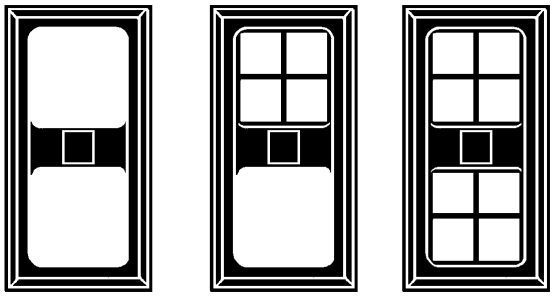
After Workshop assembly, the instruments concerned will have to be marked as follows: Part No., Workshop No., and Date.

Complete VDO modulcockpit II instruments for which production code numbers have been assigned must never be changed in any whatsoever (modified, rebuilt etc.)!

SiemensVDO Automotive AG does not assume any liability or warranty for work which does not comply with above.

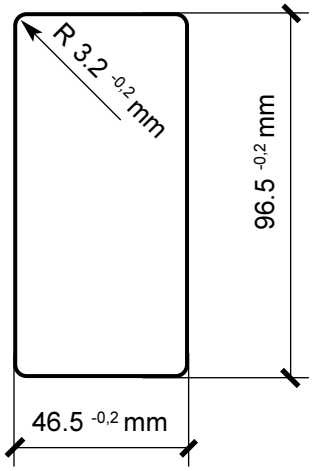
1. General Informations

1.3 Installation Versions

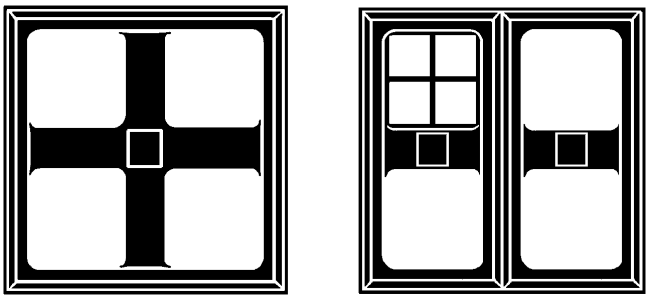


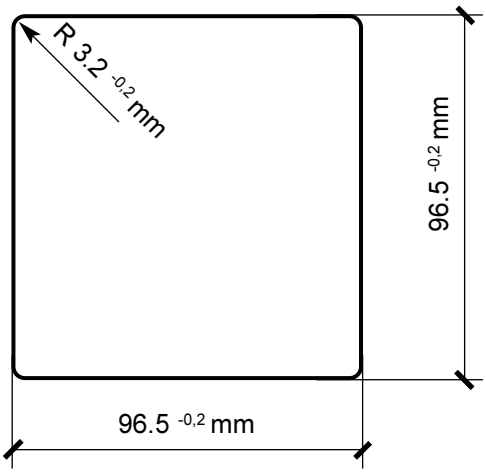
(Examples)

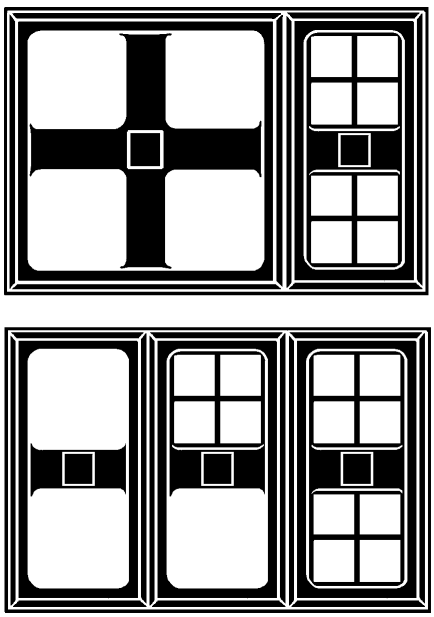
Installation Holes

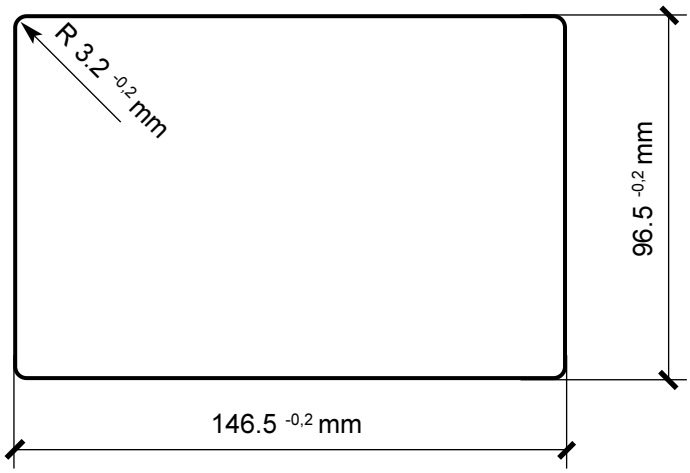


or horizontal





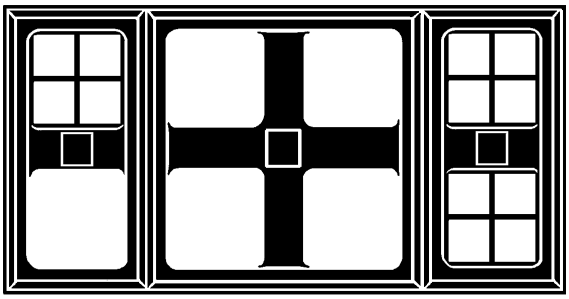


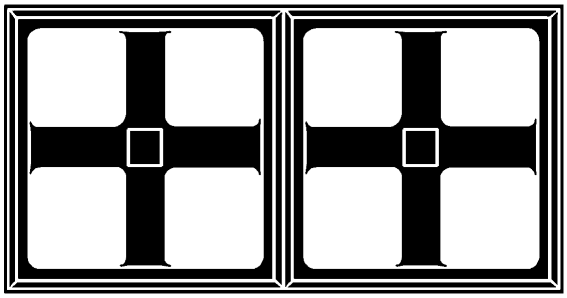


or horizontal

1. General Informations

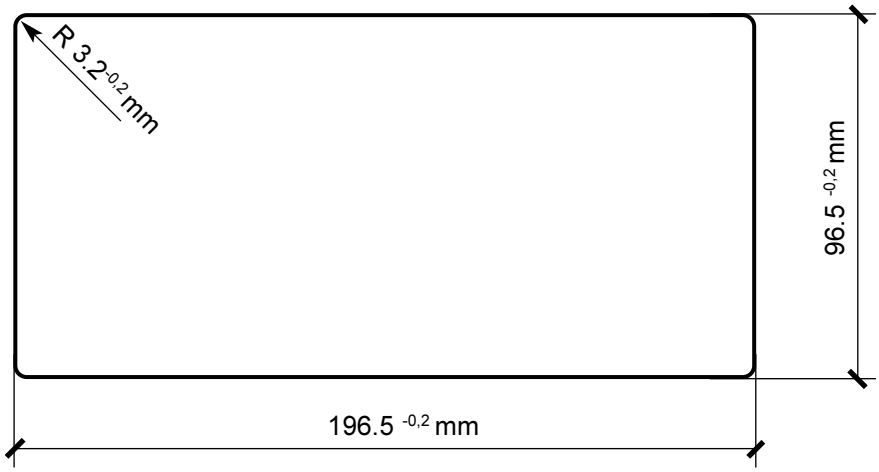
1.3 Installation Versions





(Examples)

Installation Hole



or vertical

1. General Informations

1.4 Safety Instructions

1.4.1 Installation

- The product was developed, manufactured and inspected in compliance with the basis safety requirements of the EC Directives and in accordance with the generally recognised present level of technology. The product must only be used for service in land-bound vehicles (with the exception of motorcycles) or in stationary systems.

Prior to installation of the product, please observe the following instructions:

- For proper installation of the product, basic knowledge of motor vehicle electrical and mechanical equipment is required in order to prevent damage.
- Write down all the data of volatile electronic memories.
- Remove the ignition key from the ignition lock.Then disconnect the minus pole of the battery (including the minus pole of any auxiliary batteries).
  When the minus pole of the batteries are disconnected, all volatile electronic memories lose their input values.
- Failure to disconnect the minus pole of the battery can cause short-circuits in the vehicle electrical system and then result in cable fires, battery explosions and damage to other electronic systems.
- Prior to installation of the product, refer to the motor vehicle registration documents for information on the vehicle type and any special equipment features and refer to the design plans for further information on the positions of fuel, hydraulic, compressed-air and electrical lines.
- Use the product as intended. Do not change or modify.
  Improper use, alteration or modification of the product can result in injuries, property damage or environmental damage or have an effect on safety.

During installation of the product, please observe the following instructions:

- Observe the safety instructions of the manufacturers of the vehicle, system, motor and tools in each instance!
- Select the installation location so that the product and its components:
  - do not affect or hinder any functions of the vehicle or system.
  - are not damaged by any functions of the vehicle or system.
  - do not obstruct the driver's view.
  - are not positioned in locations where the driver and front-seat passenger can strike their heads in case of an accident.
  - are not positioned in the mechanical and electrical airbag area.
  - have sufficient clearance behind the drilled holes or installation opening.
- Do not make drilled holes or installation openings in supporting or stabilising braces or struts!

Following installation of the product, please observe the following instructions:

- Connect the ground cable firmly to the minus pole of the battery.
- Enter / program the values of the volatile memories again.
- Check all (!) vehicle functions.
- When measuring the voltages and currents in the vehicle, only use multimeters or diode testing lamps that are designed to be used for such measurements. The use of conventional testing lamps can cause damage to the control units or other electronic systems.

Special cases:

- Please be extremely careful whenever you must perform any required work on the running motor. Wear suitable working clothes only, since risk of suffering injuries such as bruises or burns exists. If your hair is long, wear a hairnet.

1. General Informations

1.4 Safety Instructions

1.4.2 Electrical Connection

Connect the cables according to the electrical terminal connection diagram.
Incorrect terminal connections can cause in short-circuits!

Safety instructions:

- Danger of short-circuits due to defective connecting points or pinched cables!
  All connections of the voltage supply system must therefore be soft-soldered or provided with weldable joint connectors and sufficiently insulated.
  You may use commercially available standard-type crimp connectors to make other connections.
  Make sure the ground connections are perfectly made!
  Insulate any cable ends that are not required!
- Take the cable diameter into account!
  A reduction of the cable diameter will result in higher current density. This can cause overheating of the affected cable section!
- Cables must be stripped using a wire stripper only. Adjust the wire stripper to prevent any strands from being damaged or cut off!
- Crimped connections must be made using a pair of cable crimping pliers only.
- When installing the cables, use the existing cable conduits and cable harnesses, but do not install the cables parallel to the ignition cables or cables that run over to high-capacity power consumers! Fasten the cables with cable straps or adhesive tape!
- Make sure the cables are not subjected to pulling, pressing or shearing forces!
- If the cables are run through drilled holes, protect the cables by means of rubber sleeves or similar parts.

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2. Components

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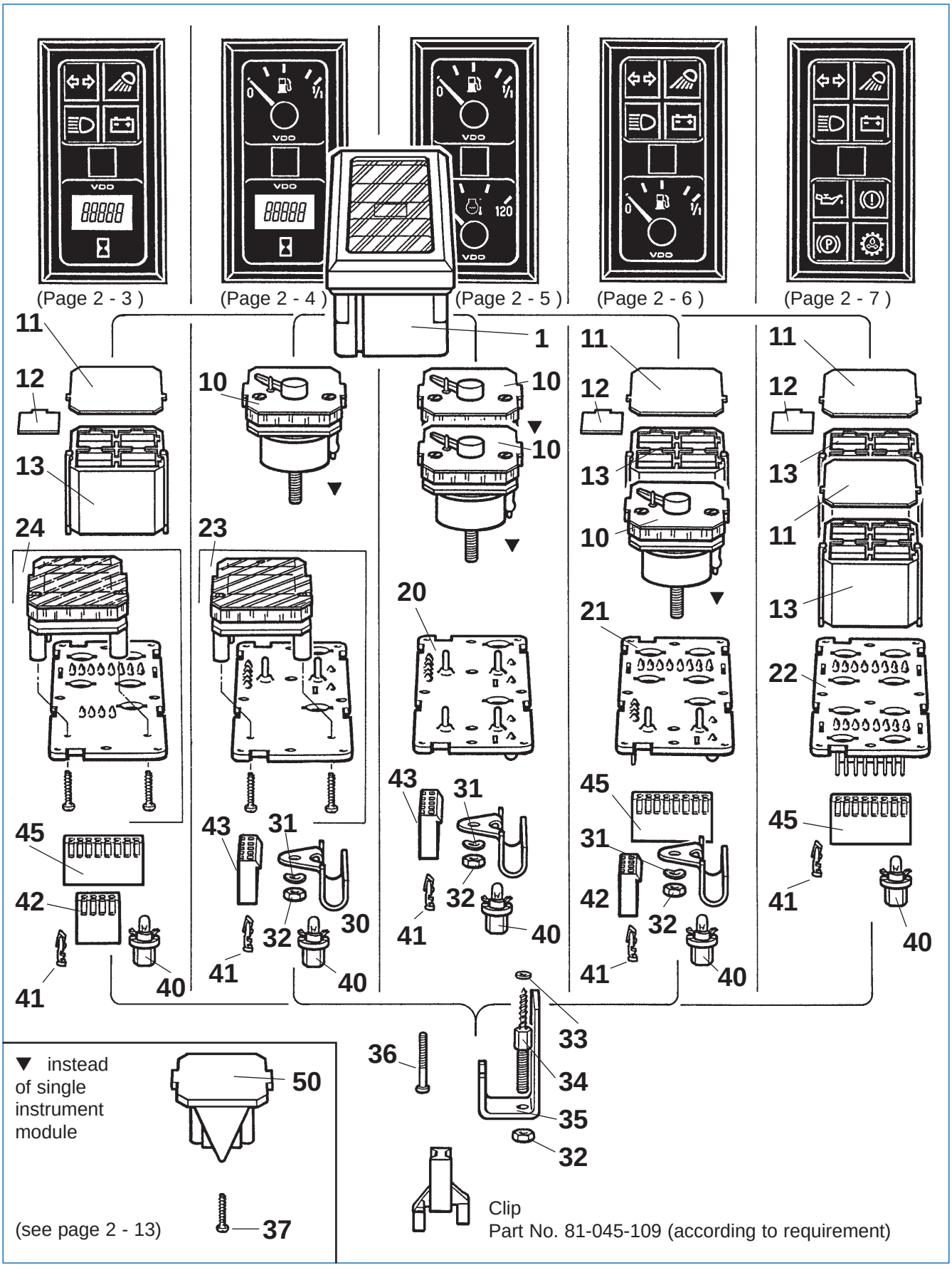
2. Components

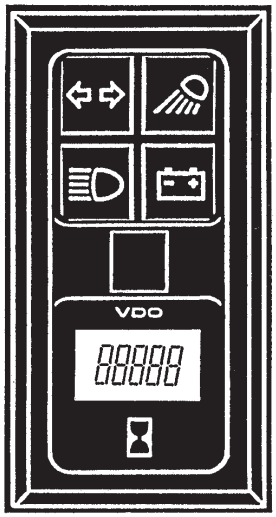
2.1 2 Unit Instrument Module, Vertical



2. Components

2.1 2 Unit Instrument Module, Vertical

(KL + EBZ)
Warning lights + operating hours counter

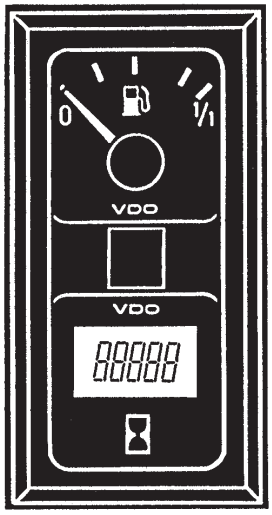


Pos. Page 2 - 2	Designation	Quantity	Part No.
1	Housing assy	1x	X11-395-000-029
11	Dial cover, light	1x	X11-395-000-012
	Dial cover, dark	1x	X11-395-000-059
12	Indicating symbol (KL)	4x	(see chapter 2.7)
13	Light box	1x	X11-395-000-010
24	Circuit board assy 12 V / 24 V (EBZ)	1x	X11-395-000-046
32	Hex nut M4 ISO 4032 (DIN 934)	2x	4-077-003-1161
33	Washer 3.2 DIN 433	2x	4-033-005-1162
34	Screw, 43 mm	2x	21-974-018-1141
35	Bracket	2x	X11-395-000-009
36	Screw, 25 mm	4x	X11-395-000-016
40	Base bulb 12 V 1.2 W	5x	92-171-005
	Base bulb 24 V 1.2 W	5x	92-171-003
41	Connector socket	11x	X11-000-014-005
42	Housing, 4-fold	1x	X11-000-014-001
45	Housing, 8-fold	1x	X11-000-014-004

2. Components

2.1 2 Unit Instrument Module, Vertical

(Ke + EBZ)
Single instrument module
+ operating hours counter



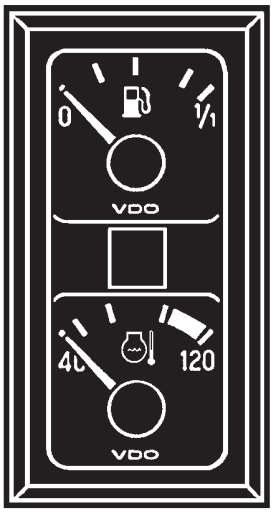
Pos. Page 2 - 2	Designation	Quantity	Part No.
1	Housing assy	1x	X11-395-000-029
10	Single instrument module (Ke)	1x	(see chapter 2.5)
23	Circuit board assy 12 V (EBZ)	1x	X11-395-000-044
	Circuit board assy 24 V (EBZ)	1x	X11-395-000-045
30	Shield	1x	X11-395-000-008
31	Spring washer 4 DIN 137	1x	4-027-003-1162
32	Hex nut M4 ISO 4032 (DIN 934)	3x	4-077-003-1161
33	Washer 3.2 DIN 433	2x	4-033-005-1162
34	Screw, 43 mm	2x	21-974-018-1141
35	Bracket	2x	X11-395-000-009
36	Screw, 25 mm	4x	X11-395-000-016
40	Base bulb 12 V 1.2 W	2x	92-171-005
	Base bulb 24 V 1.2 W	2x	92-171-003
41	Connector socket	5x	X11-000-014-005
43	Housing, 5-fold	1x	X11-000-014-002

2. Components

2.1 2 Unit Instrument Module, Vertical

(Ke + Ke)
Single instrument module
+ single instrument module

Single instrument module:
fuel level gauge, version tubulare type sensor,
only for position **I**.



I

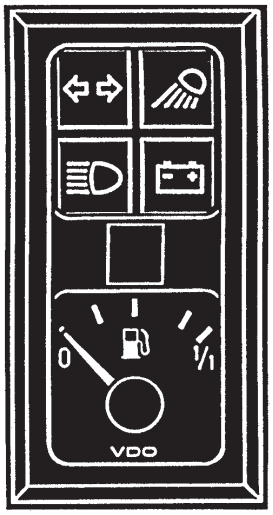
II

Pos. page 2 - 2	Designation	Quantity	Part No.
1	Housing assy	1x	X11-395-000-029
10	Single instrument module (Ke)	2x	(see chapter 2.5)
20	Circuit board assy 12 V	1x	X11-395-000-056
	Circuit board assy 24 V	1x	X11-395-000-057
30	Shield	2x	X11-395-000-008
31	Spring washer 4 DIN 137	2x	4-027-003-1162
32	Hex nut M4 ISO 4032 (DIN 934)	4x	4-077-003-1161
33	Washer 3.2 DIN 433	2x	4-033-005-1162
34	Screw, 43 mm	2x	21-974-018-1141
35	Bracket	2x	X11-395-000-009
36	Screw, 25 mm	4x	X11-395-000-016
40	Base bulb 12 V 1.2 W	2x	92-171-005
	Base bulb 24 V 1.2 W	2x	92-171-003
41	Connector socket	5x	X11-000-014-005
43	Housing, 5-fold	1x	X11-000-014-002

2. Components

2.1 2 Unit Instrument Module, Vertical

(KL + Ke)
Warning lights + single instrument module

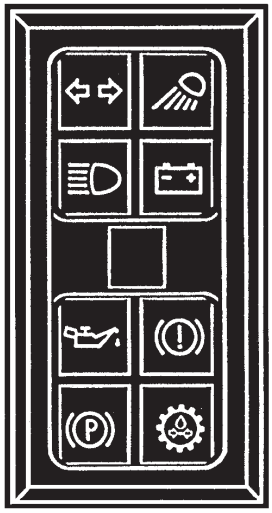


Pos. page 2 - 2	Designation	Quantity	Part No.
1	Housing assy	1x	X11-395-000-029
10	Single instrument module (Ke)	1x	(see chapter 2.5)
11	Dial cover, light	1x	X11-395-000-012
	Dial cover, dark	1x	X11-395-000-059
12	Indicating symbol (KL)	4x	(see chapter 2.7)
13	Light box	1x	X11-395-000-010
21	Circuit board assy 12 V	1x	X11-395-000-041
	Circuit board assy 24 V	1x	X11-395-000-042
30	Shield	1x	X11-395-000-008
31	Spring washer 4 DIN 137	1x	4-027-003-1162
32	Hex nut M4 ISO 4032 (DIN 934)	2x	4-077-003-1161
33	Washer 3.2 DIN 433	2x	4-033-005-1162
34	Screw, 43 mm	2x	21-974-018-1141
35	Bracket	2x	X11-395-000-009
36	Screw, 25 mm	4x	X11-395-000-016
40	Base bulb 12 V 1.2 W	5x	92-171-005
	Base bulb 24 V 1.2 W	5x	92-171-003
41	Connector socket	12x	X11-000-014-005
42	Housing, 4-fold	1x	X11-000-014-001
45	Housing, 8-fold	1x	X11-000-014-004

2. Components

2.1 2 Unit Instrument Module, Vertical

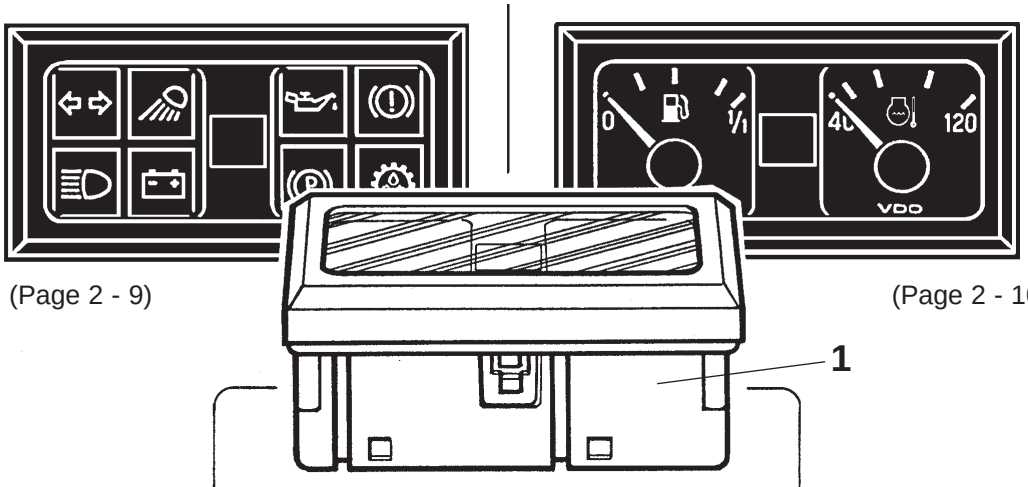
(KL + KL)
Warning lights + warning lights



Pos. Page 2 - 2	Designation	Quantity	Part No.
1	Housing assy	1x	X11-395-000-029
11	Dial cover, light	1x	X11-395-000-012
	Dial cover, dark	1x	X11-395-000-059
12	Indicating symbol (KL)	8x	(see chapter 2.7)
13	Light box	2x	X11-395-000-010
22	Circuit board assy 12 V / 24 V	1x	X11-395-000-043
32	Hex nut M4 ISO 4032 (DIN 934)	2x	4-077-003-1161
33	Washer 3.2 DIN 433	2x	4-033-005-1162
34	Screw, 43 mm	2x	21-974-018-1141
35	Bracket	2x	X11-395-000-009
36	Screw, 25 mm	4x	X11-395-000-016
40	Base bulb 12 V 1.2 W	8x	92-171-005
	Base bulb 24 V 1.2 W	8x	92-171-003
41	Connector socket	16x	X11-000-014-005
45	Housing, 8-fold	2x	X11-000-014-004

2. Components

2.2 2 Unit Instrument Module, Horizontal



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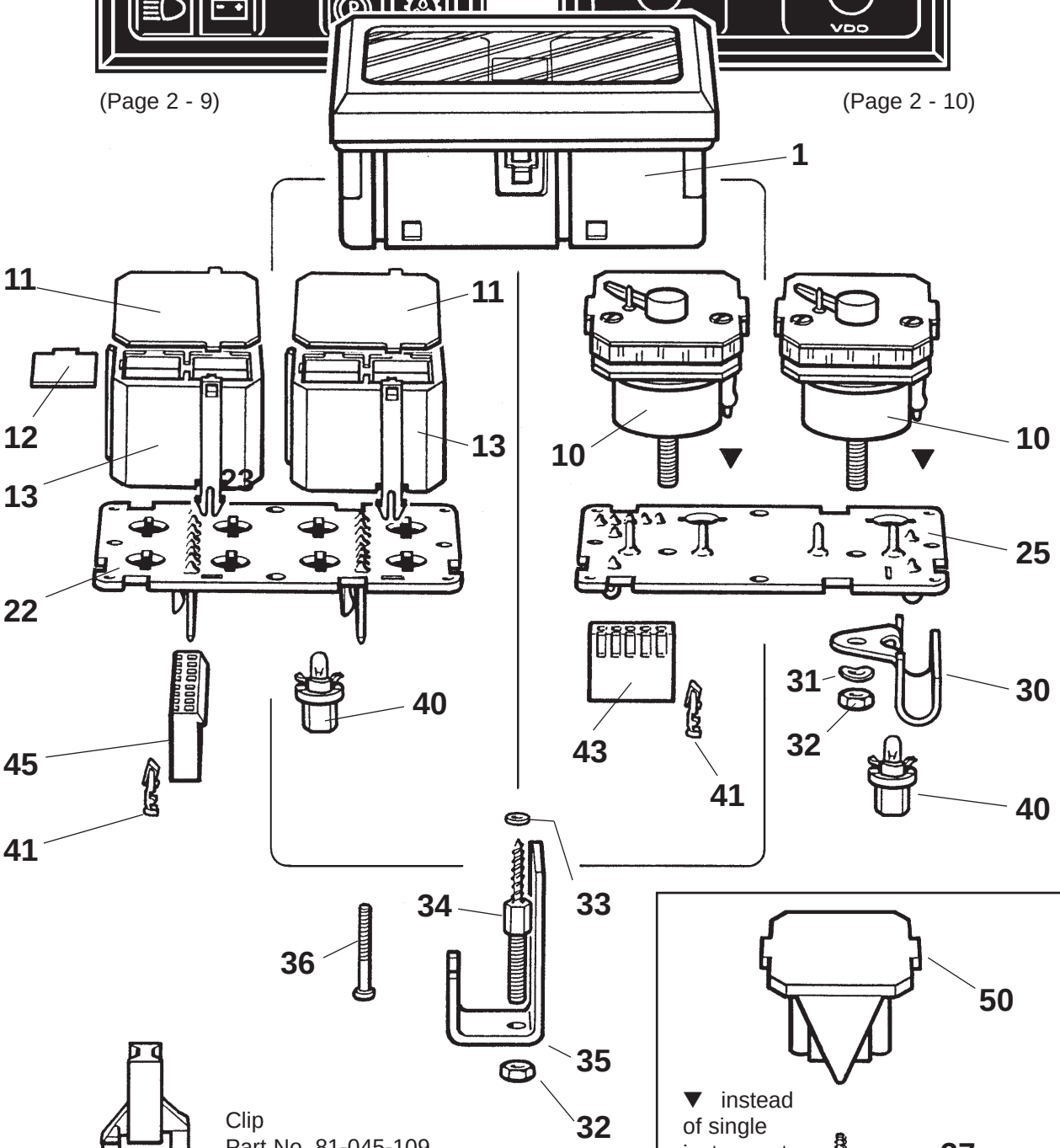


Clip
Part No. 81-045-109
(according to requirement)

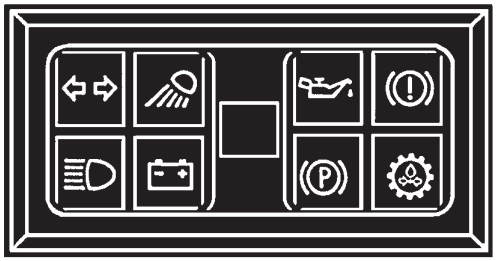
▼ instead of single instrument module

(see page 2 - 13)

2. Components

2.2 2 Unit Instrument Module, Horizontal

(KL + KL)
Warning lights + warning lights

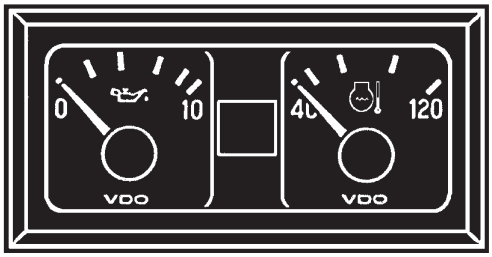


Pos. Page 2 - 2	Designation	Quantity	Part No.
1	Housing assy	1x	X11-395-000-029
11	Dial cover, light	2x	X11-395-000-012
	Dial cover, dark	2x	X11-395-000-059
12	Indicating symbol (KL)	8x	(see chapter 2.7)
13	Light box	2x	X11-395-000-010
22	Circuit board assy 12 V / 24 V	1x	X11-395-000-043
32	Hex nut M4 ISO 4032 (DIN 934)	2x	4-077-003-1161
33	Washer 3.2 DIN 433	2x	4-033-005-1162
34	Screw, 43 mm	2x	21-974-018-1141
35	Bracket	2x	X11-395-000-009
36	Screw, 25 mm	4x	X11-395-000-016
40	Base bulb 12 V 1.2 W	8x	92-171-005
	Base bulb 24 V 1.2 W	8x	92-171-003
41	Connector socket	16x	X11-000-014-005
45	Housing, 8-fold	2x	X11-000-014-004

2. Components

2.2 2 Unit Instrument Module, Horizontal

(Ke + Ke)
Single instrument module + single instrument module



I II

Single instrument module: fuel level gauge, version tubular type sensor, only for position **I** .

Pos. Page 2 - 8	Designation	Quantity	Part No.
1	Housing assy	1x	X11-395-000-029
10	Single instrument module (Ke)	2x	(see chapter 2.5)
25	Circuit board assy 12 V	1x	X11-395-000-037
	Circuit board assy 24 V	1x	X11-395-000-038
30	Shield	2x	X11-395-000-008
31	Spring washer 4 DIN 137	2x	4-027-003-1162
32	Hex nut M4 ISO 4032 (DIN 934)	4x	4-077-003-1161
33	Washer 3.2 DIN 433	2x	4-033-005-1162
34	Screw, 43 mm	2x	21-974-018-1141
35	Bracket	2x	X11-395-000-009
36	Screw, 25 mm	4x	X11-395-000-016
40	Base bulb 12 V 1.2 W	2x	92-171-005
	Base bulb 24 V 1.2 W	2x	92-171-003
41	Connector socket	5x	X11-000-014-005
43	Housing, 5-fold	1x	X11-000-014-002

2. Components

2.3 4 Unit Instrument Module

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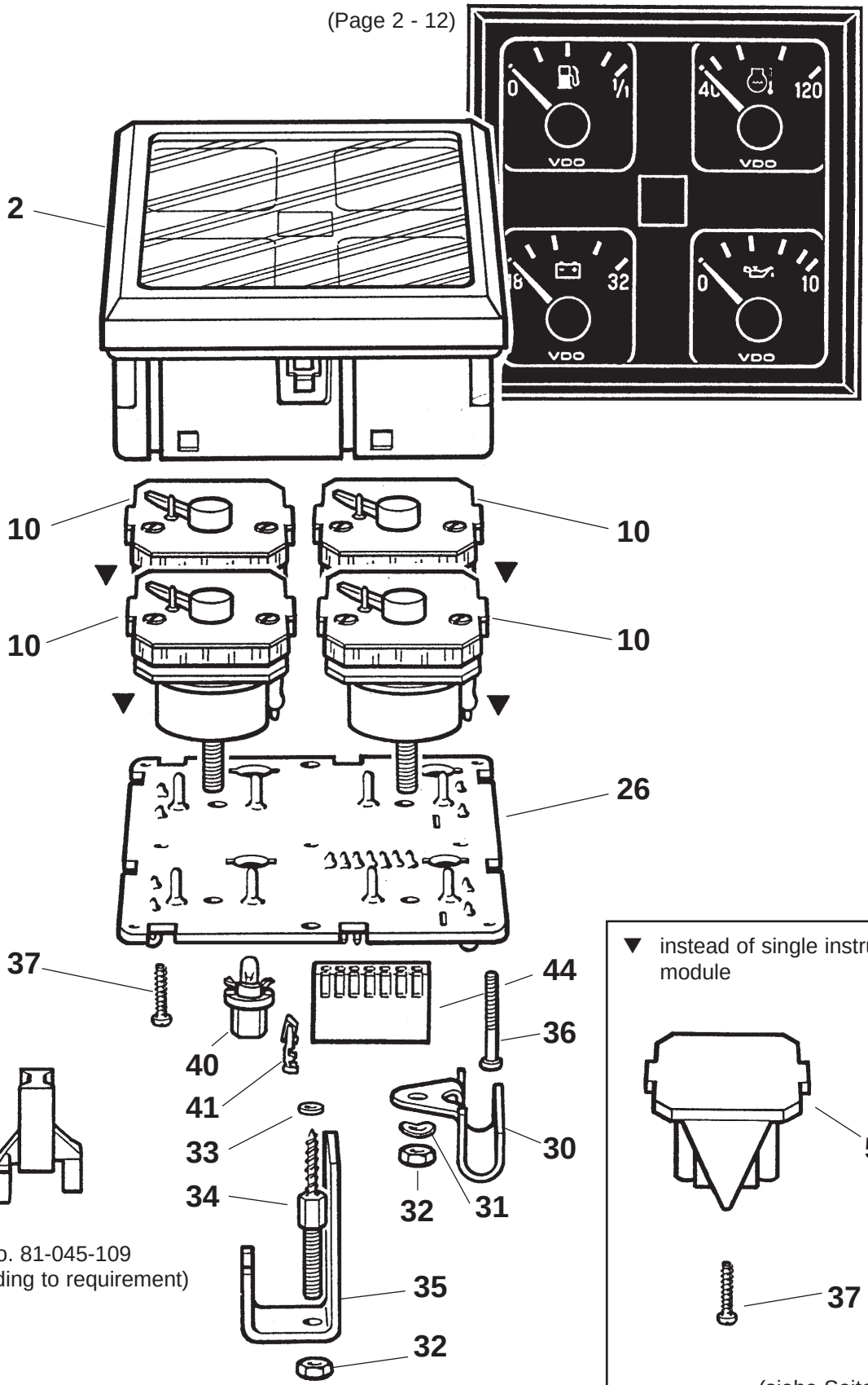


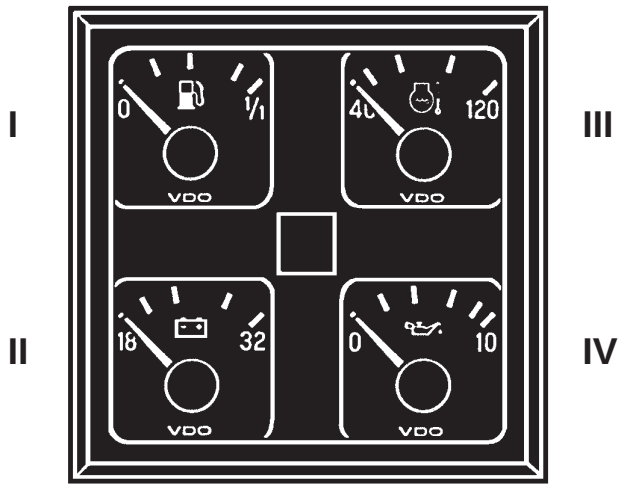
(siehe Seite 2 - 13)

2. Components

2.3 4 Unit Instrument Module

(4x Ke)
4x single instrument module

Single instrument module: fuel level gauge, version tubular type sensor, only for position I .

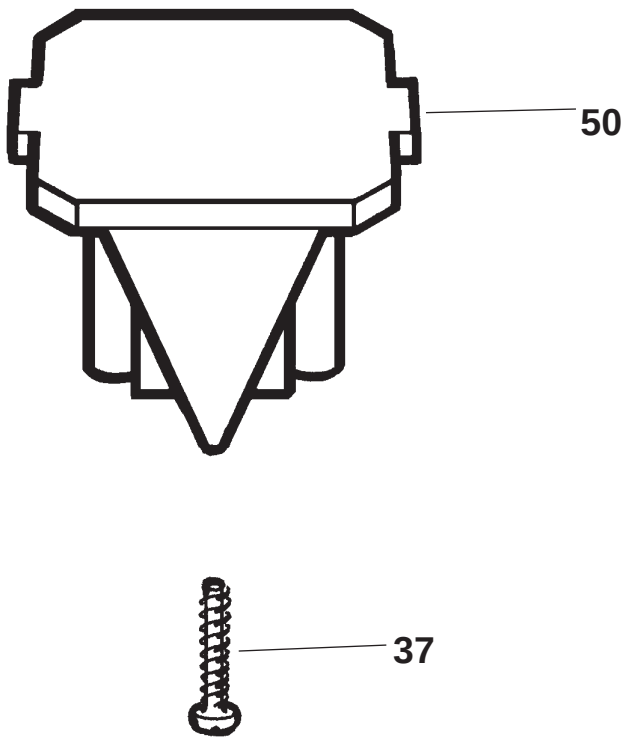


Pos. Page 2 - 2	Designation	Quantity	Part No.
2	Housing assy	1x	X11-395-000-028
10	Single instrument module (Ke)	4x	(see chapter 2.5)
26	Circuit board assy 12 V	1x	X11-395-000-054
	Circuit board assy 24 V	1x	X11-395-000-055
30	Shield	4x	X11-395-000-008
31	Spring washer 4 DIN 137	4x	4-027-003-1162
32	Hex nut M4 ISO 4032 (DIN 934)	6x	4-077-003-1161
33	Washer 3.2 DIN 433	2x	4-033-005-1162
34	Screw, 43 mm	2x	21-974-018-1141
35	Bracket	2x	X11-395-000-009
36	Screw, 25 mm	4x	X11-395-000-016
37	Screw, 14 mm	3x	X11-395-000-015
40	Base bulb 12 V 1.2 W	4x	92-171-005
	Base bulb 24 V 1.2 W	4x	92-171-003
41	Connector socket	7x	X11-000-014-005
44	Housing, 7-fold	1x	X11-000-014-003

2. Components

2.4 Blind Cover, Black

(instead of single instrument module)



Pos.	Designation	Quantity	Part No.
37	Screw, 13 mm	1x	4-109-003-1162
50	Blind cover, black	1x	X11-395-000-014

2. Components

2.5 Single Instrument Modules (Ke)

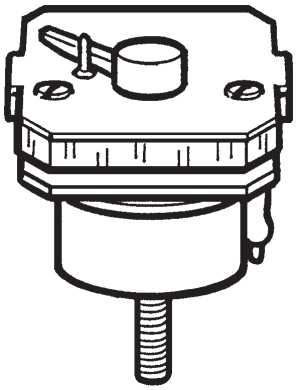
Contents **Page**

2. Components

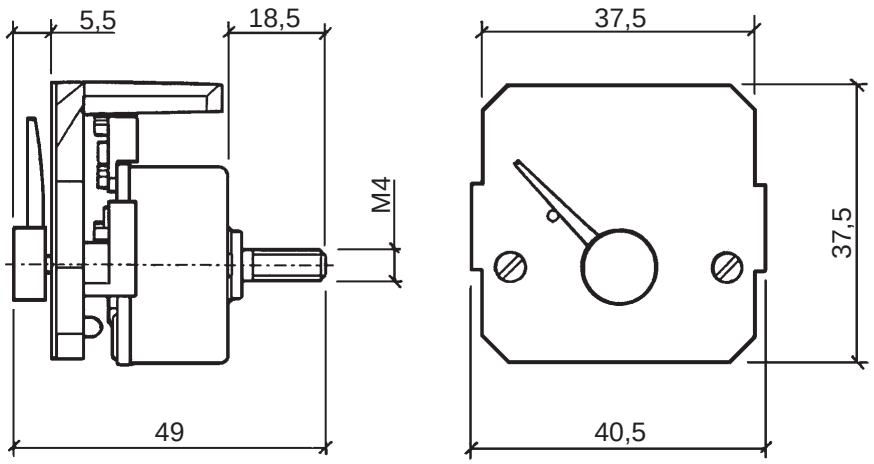
2.5 Single Instrument Modules (Ke)

2.5.1 General Informations

The single instrument modules are indicating instruments for pressure, temperature, level or voltage for variable installation in 2 or 4 unit instrument modules or for installation in 2 unit instrument module (vertical) with operating hours counter.
Analog indication of corresponded measured values when connected to a separate sensor (exception voltmeter).



Dimensions (mm):



Design, Technical Data:

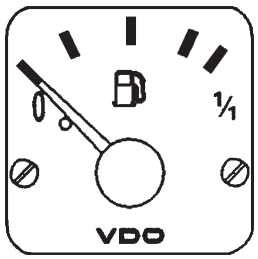
Dial face:	deep-black
Dial imprint:	white, by illumination green translucent
Pointer cap:	deep-black
Pointer arm:	fluorescent flaming red
Rated voltage:	12 V or 24 V
Operating temperature:	– 25 °C to + 70°C

2. Components

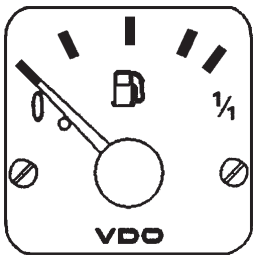
2.5 Single Instrument Modules (Ke)

2.5.2 Fuel Level Gauges ■

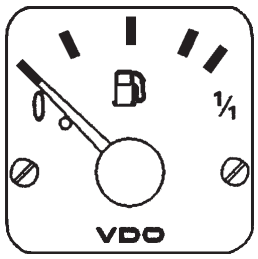
001



002



051



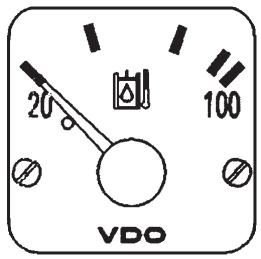
Pos.	Version	Range	Voltage	Resistance	Part No.
001	Lever type sensor	0 ... 1/1	12 / 24 V	3 ... 180 Ω	301-292-980-004C
002	Tubular type sensor	0 ... 1/1	12 / 24 V	60-90 ... 0.5 Ω	301-291-980-003C
051	Lever type sensor	0 ... 1/1	12 / 24 V	240 ... 33 Ω	● 301-292-980-003C
	● = USA (specific version)				

2. Components

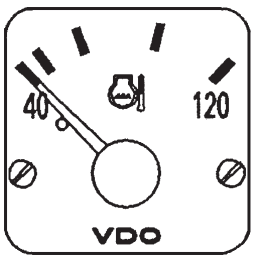
2.5 Single Instrument Modules (Ke)

2.5.3 Temperature Gauges ■

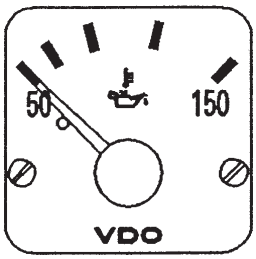
101



102



103



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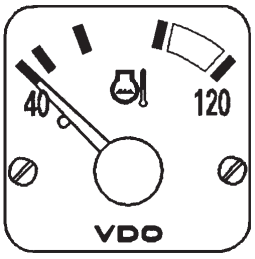

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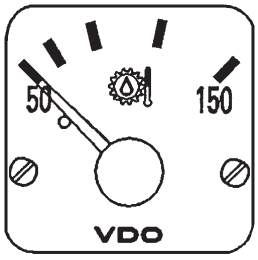

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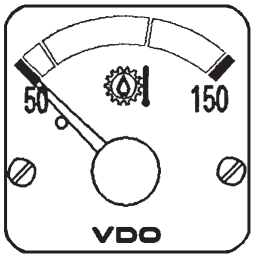

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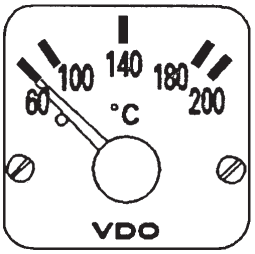
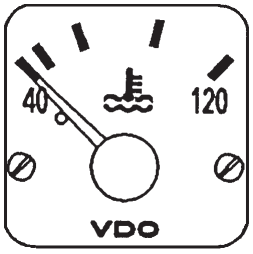
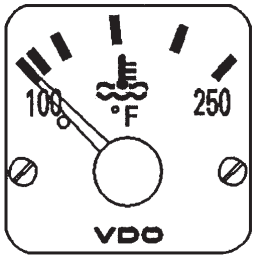


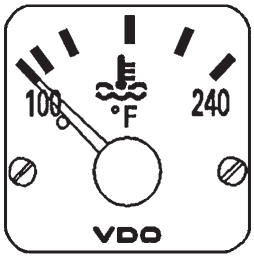
108



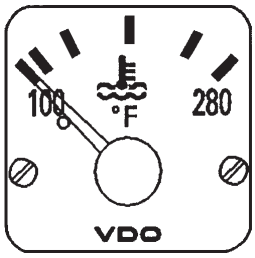
151



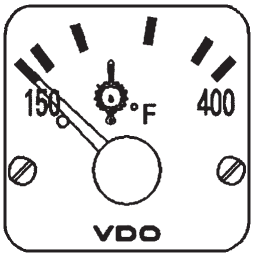
152



153



154



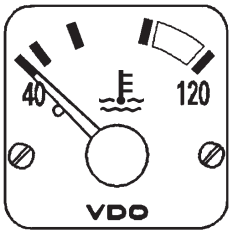
Pos.	Version	Range	Voltage	Resistance	Part No.
101	Hydraulic oil	20 ... 100°C	12 / 24 V	700 ... 38.5 Ω	310-284-980-010C
102	Coolant	40 ... 120°C	12 / 24 V	287.4 ... 22.7 Ω	310-284-980-011C
103	Engine oil	50 ... 150°C	12 / 24 V	332.8 ... 18.6 Ω	310-284-980-012C
104	Coolant	40 ... 120°C	12 / 24 V	287.4 ... 22.7 Ω	310-284-980-013C
105	Transmission oil	50 ... 150°C	12 / 24 V	332.8 ... 18.6 Ω	310-284-980-014C
106	Transmission oil	50 ... 150°C	12 / 24 V	332.8 ... 18.6 Ω	▼ 310-284-980-015C
107	—	60 ... 200°C	12 / 24 V	582 ... 14.3 Ω	310-284-980-016C
108	Coolant	40 ... 120°C	12 / 24 V	287.4 ... 22.7 Ω	310-284-980-017C
151	Coolant	100 ... 250°F	12 / 24 V	287.4 ... 22 Ω	● 310-284-980-006C
152	Coolant	100 ... 240°F	12 / 24 V	384 ... 29 Ω	● 310-284-980-007C
153	Coolant	100 ... 280°F	12 / 24 V	556 ... 31 Ω	● 310-284-980-008C
154	Transmission oil	150 ... 400°F	12 / 24 V	482.5 ... 14.5 Ω	● 310-284-980-009C
	● = USA (specific version)				
	▼ = individual customer version				

2. Components

2.5 Single Instrument Modules (Ke)

2.5.3 Temperature gauges – Phase-out, available as long as stock ◆

104

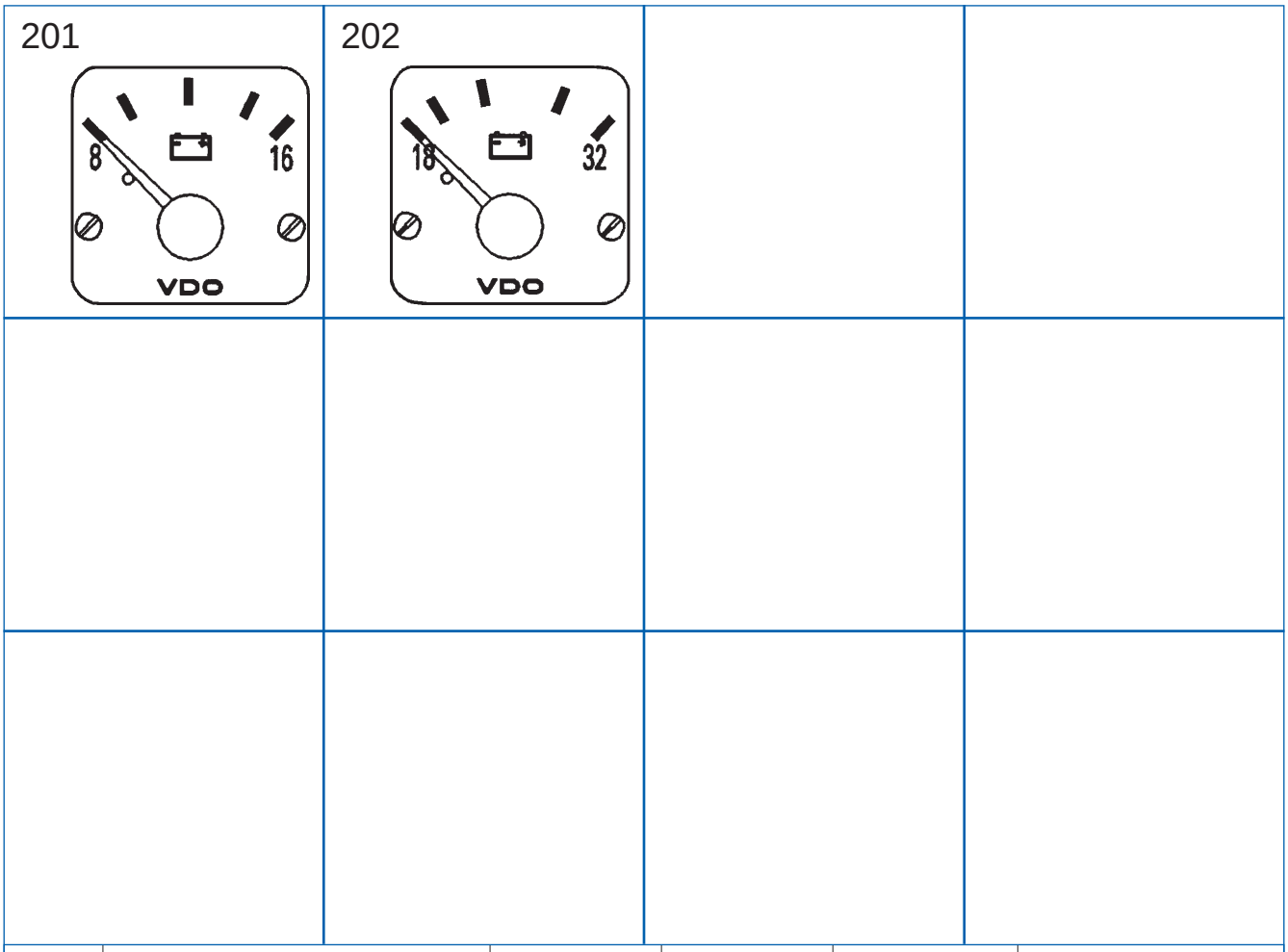


Pos.	Version	Range	Voltage	Resistance	Part No.
104	Coolant ◆	40 ... 120°C	12 / 24 V	287.4 ... 22.7Ω	310-284-980-004C

2. Components

2.5 Single Instrument Modules (Ke)

2.5.4 Voltmeters



Pos.	Version	Range	Voltage	Resistance	Part No.
201	12 V	8 ... 16 V	12 V	—	332-305-980-003C
202	24 V	18 ... 32 V	24 V	—	332-305-980-004C

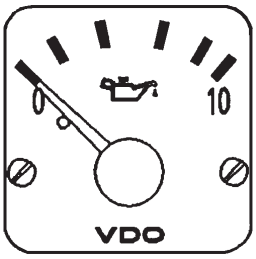
2. Components

2.5 Single Instrument Modules (Ke)

2.5.5 Pressure Gauges ■

301

302



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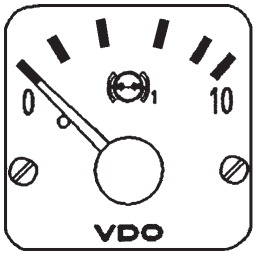

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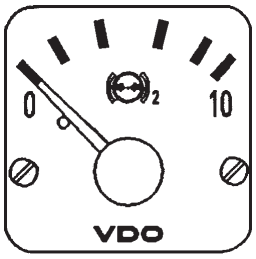
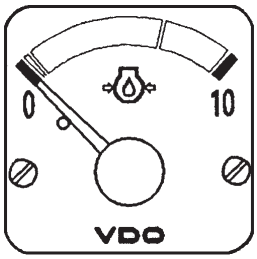


305

306



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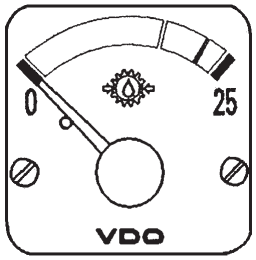

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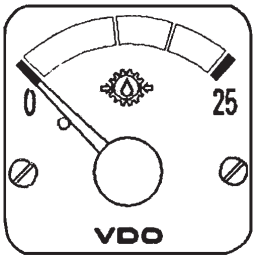


309

310

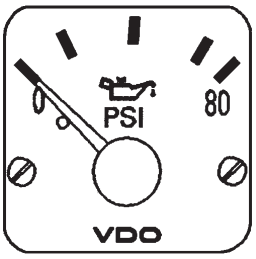
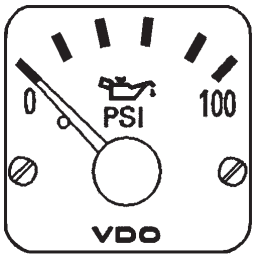
311

Pos.	Version	Range	Voltage	Resistance	Part No.
301	Engine oil	0 ... 5 bar	12 / 24 V	10 ... 184 Ω	350-272-980-010C
302	Engine oil	0 ... 10 bar	12 / 24 V	10 ... 184 Ω	350-272-980-011C
303	Brake pressure 1	0 ... 10 bar	12 / 24 V	10 ... 184 Ω	350-272-980-012C
304	Brake pressure 2	0 ... 10 bar	12 / 24 V	10 ... 184 Ω	350-272-980-013C
305	Transmission oil	0 ... 25 bar	12 / 24 V	10 ... 184 Ω	350-272-980-014C
306	Engine oil	0 ... 10 bar	12 / 24 V	10 ... 184 Ω	▼ 350-272-980-015C
307	Transmission oil	0 ... 25 bar	12 / 24 V	10 ... 184 Ω	▼ 350-272-980-016C
308	Transmission oil	0 ... 25 bar	12 / 24 V	10 ... 184 Ω	▼ 350-272-980-017C
309	Engine oil	0 ... 10 bar	12 / 24 V	10 ... 184 Ω	350-272-980-018C
310	Brake pressure 1	0 ... 16 bar	12 / 24 V	10 ... 184 Ω	350-272-980-019C
311	Brake pressure 2	0 ... 16 bar	12 / 24 V	10 ... 184 Ω	350-272-980-020C
	▼ = individual customer version				

2. Components

2.5 Single Instrument Modules (Ke)

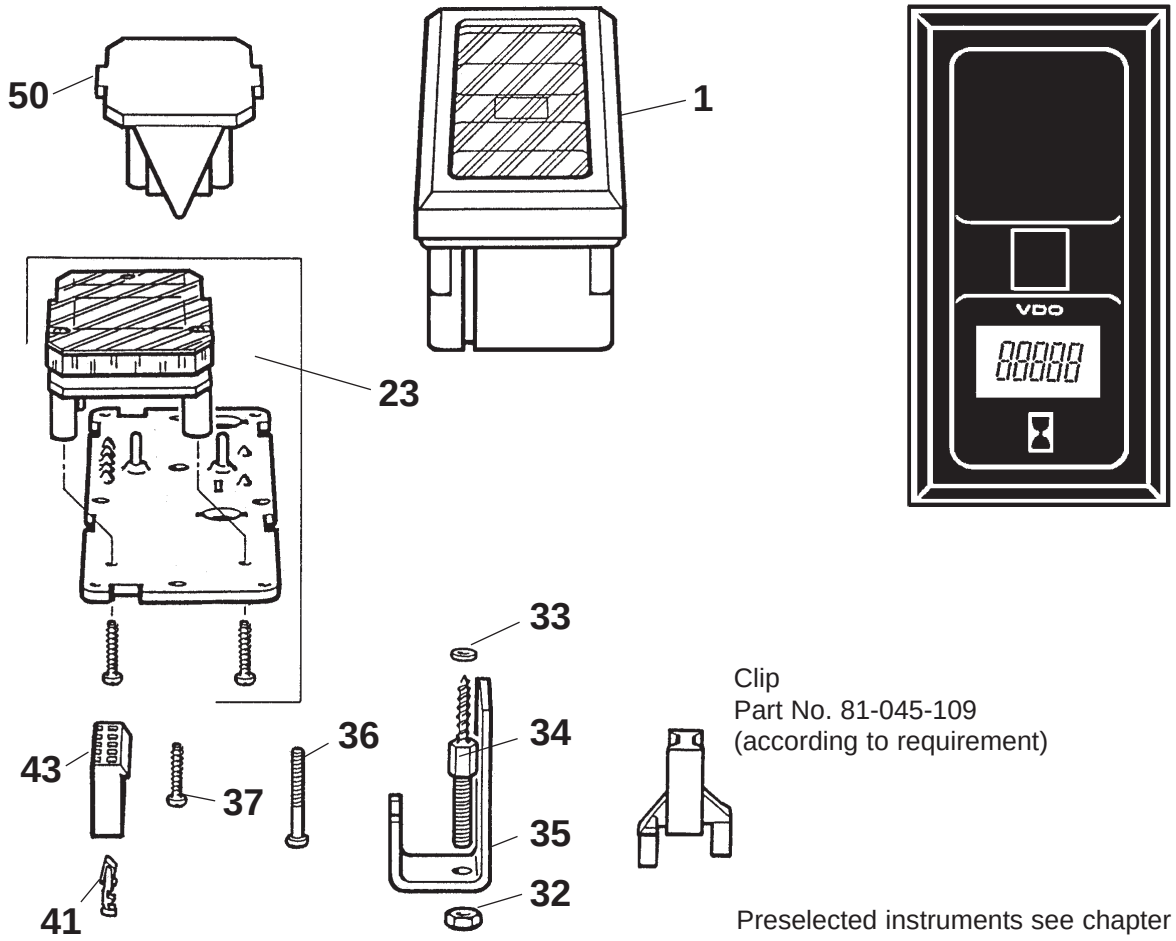
2.5.5 Pressure Gauges ■

352	353	354	
			

Pos.	Version	Range	Voltage	Resistance	Part No.
352	Engine oil	0 ... 80 PSI	12 / 24 V	10 ... 180 Ω	● 350-272-980-007C
353	Engine oil	0 ... 100 PSI	12 / 24 V	240 ... 33,5 Ω	● 350-272-980-008C
354	Engine oil	0 ... 150 PSI	12 / 24 V	10 ... 180 Ω	● 350-272-980-009C
	● = USA (specific version)				

2. Components

2.6 Single Instrument Modules (EBZ)



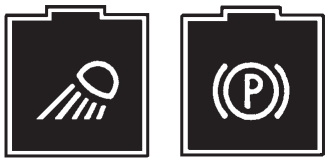
Clip
Part No. 81-045-109
(according to requirement)

Preselected instruments see chapter 4.4
Other changes see chapter 2.1

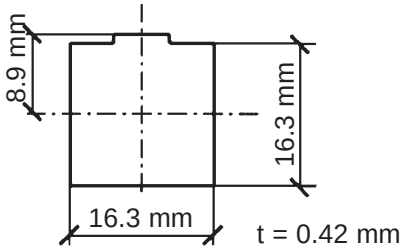
Pos.	Designation	Quantity	Part No.
1	Housing assy	1x	X11-395-000-029
23	Circuit board assy 12 V (EBZ)	1x	X11-395-000-044
	Circuit board assy 24 V (EBZ)	1x	X11-395-000-045
32	Hex nut M4 ISO 4032 (DIN 934)	2x	4-077-003-1161
33	Washer 3.2 DIN 433	3x	4-033-005-1162
34	Screw, 43 mm	2x	21-974-018-1141
35	Bracket	2x	X11-395-000-009
36	Screw, 25 mm	4x	X11-395-000-016
37	Screw, 13 mm	1x	4-109-003-1162
41	Connector socket	5x	X11-000-014-005
43	Housing, 5-fold	1x	X11-000-014-002
50	Blind cover, black	1x	X11-395-000-014

2. Components

2.7 Indicating Symbols (KL)



Front side: symbol, white (RAL 9010)
Rear side: colour field = amber, blue, green or red
Visible area: 14.5 x 14.5 mm
Material: PC foil



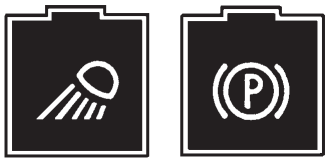
1	2	3	4	5	6	7	8	9	10	11	12
											

13	14	15	30	32	33	34	35	36	38		
											

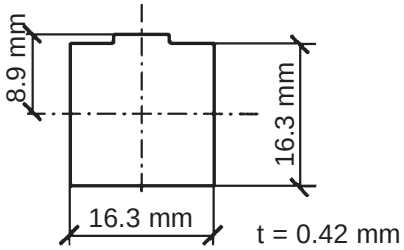
No.	Description		Colour	Part No.
1	Turn signals		green	84-438-532-0001
2	Turn signals, first trailer		green	84-438-532-0002 ●
3	Fuel		amber	84-438-532-0003
4	Diesel pre-heat		amber	84-438-532-0004
5	Rotation beacon	(Replacement No. 0117)	amber	84-438-532-0005 ●
6	Working light		amber	84-438-532-0006
7	Upper beam		blue	84-438-532-0007
8	Battery charging condition		red	84-438-532-0008
9	Oil pressure		red	84-438-532-0009
10	Brake failure		red	84-438-532-0010
11	Parking brake		red	84-438-532-0011
12	Hazard warning		red	84-438-532-0012
13	Transmission oil pressure	(Replacement No. 0109)	red	84-438-532-0013 ●
14	Transmission oil temperature	(Replacement No. 0106)	red	84-438-532-0014 ●
15	Without symbol		red	84-438-532-0015
30	Without symbol		amber	84-438-532-0030
32	Without symbol		grün	84-438-532-0032
33	Without symbol		blue	84-438-532-0033 ●
34	Coolant level		red	84-438-532-0034 ●
35	Oil level		red	84-438-532-0035 ●
36	Oil filter	(Replacement No. 0112)	red	84-438-532-0036 ●
38	Hydraulic oil filter		amber	84-438-532-0038 ●
	● Phase-out, available as long as stock			

2. Components

2.7 Indicating Symbols (KL)



Front side: symbol, white (RAL 9010)
Rear side: colour field = amber, blue, green or red
Visible area: 14.5 x 14.5 mm
Material: PC foil

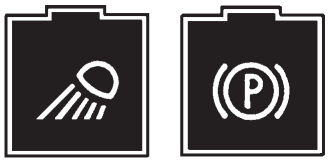


40	42	44	45	46	47	48					
											
72	**73**	**74**	**75**	**78**	**79**	**80**	**82**	**83**	**84**		
			STOP								

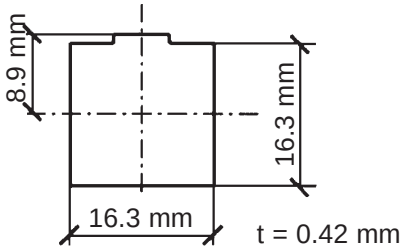
No.	Description	Colour	Part No.
40	Water temperature/coolant temperature	red	84-438-532-0040
42	Hydraulic oil temperature (Replacement No. 0120)	red	84-438-532-0042 ●
45	All wheel drive (no replacement)	amber	84-438-532-0045
46	Arrow up also applicable as arrow left (horizontal) ▼ or as arrow right (vertikal) ▼	green	84-438-532-0046
47	Arrow down also applicable as arrow left (vertikal) ▼ or as arrow right (horizontal) ▼	green	84-438-532-0047
48	Hydraulic oil temperature (Replacement No. 0120)	red	84-438-532-0048 ●
72	Lower beam	green	84-438-532-0072
73	Front fog light	green	84-438-532-0073
74	Interior light	green	84-438-532-0074
75	Fault function warning	red	84-438-532-0075
79	Drive belt (no replacement)	red	84-438-532-0079 ●
80	Differential lock	amber	84-438-532-0080
82	No gear shifting	red	84-438-532-0082
83	Rear door open	amber	84-438-532-0083
84	Power take off	amber	84-438-532-0084
	▼ see page 2-27		
	● Phase-out, available as long as stock		

2. Components

2.7 Indicating Symbols (KL)



Front side: symbol, white (RAL 9010)
Rear side: colour field = amber, blue, green or red
Visible area: 14.5 x 14.5 mm
Material: PC foil

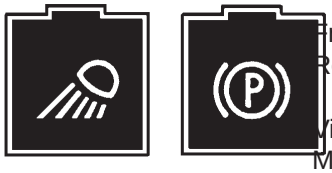


	87	88	89	90	91	92	93	94	95	96	97
	99	100	101	102	103		105	106	107	108	109

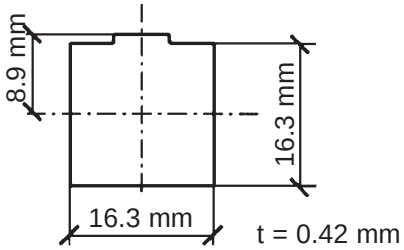
No.	Description		Colour	Part No.
87	Door open	(no replacement)	red	84-438-532-0087 ●
88	Idle raised	(no replacement)	amber	84-438-532-0088 ●
89	Engine room temperature	(no replacement)	red	84-438-532-0089 ●
90	Step/edge warning	(no replacement)	amber	84-438-532-0090 ●
91	Roof ventilator	(no replacement)	green	84-438-532-0091 ●
92	Roof ventilator suck out	(no replacement)	green	84-438-532-0092 ●
93	Bus stop hold	(no replacement)	red	84-438-532-0093 ●
94	Wheel chair		amber	84-438-532-0094
95	E-Gas fault		red	84-438-532-0095
96	Retarder	(no replacement)	green	84-438-532-0096 ●
97	Mirror heat	(no replacement)	green	84-438-532-0097 ●
99	ABS malfunction		amber	84-438-532-0099
100	Oil heater		green	84-438-532-0100 ●
101	ECAS fault		red	84-438-532-0101 ●
102	ECAS level		amber	84-438-532-0102 ●
103	Pram		amber	84-438-532-0103 ●
105	Coolant temperature	(no replacement)	amber	84-438-532-0105 ●
106	Transmission oil temperature		red	84-438-532-0106
107	Engine oil level		red	84-438-532-0107
108	Coolant level		amber	84-438-532-0108
109	Transmission oil temperature		red	84-438-532-0109
	● Phase-out, available as long as stock			

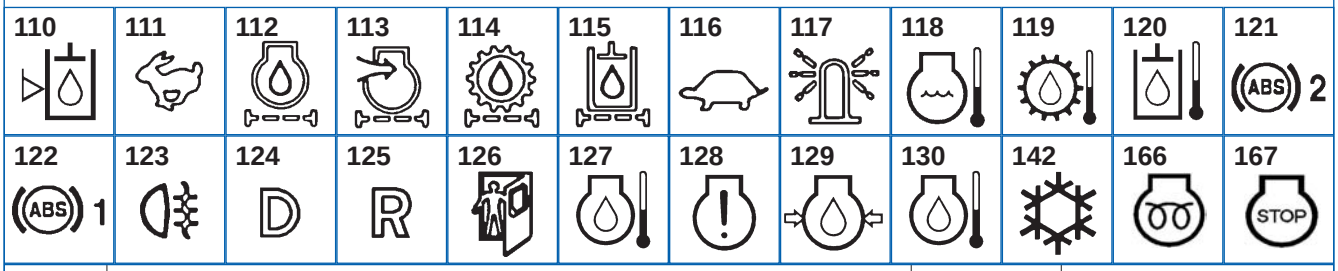
2. Components

2.7 Indicating Symbols (KL)



Front side: symbol, white (RAL 9010)
Rear side: colour field = amber, blue, green or red
Visible area: 14.5 x 14.5 mm
Material: PC foil





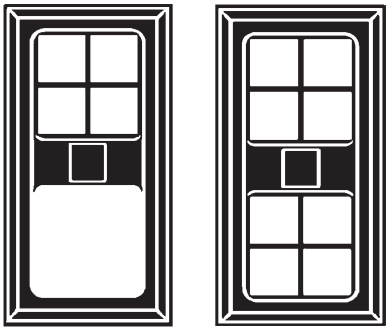
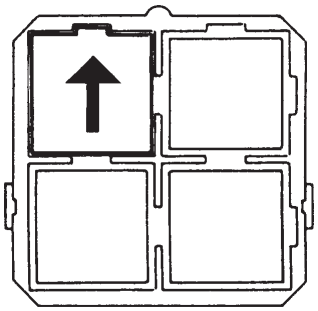
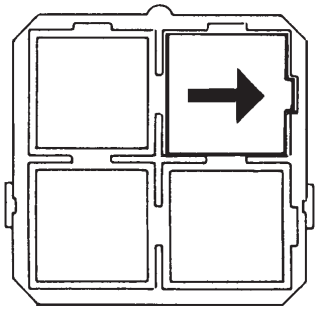
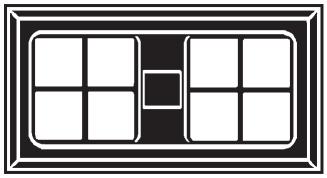
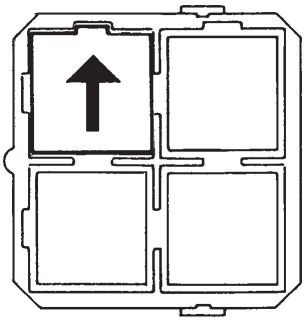
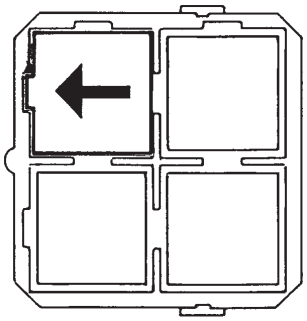
No.	Description	Colour	Part No.
110	Hydraulic oil level	red	84-438-532-0110
111	Fast	green	84-438-532-0111
112	Oil filter	amber	84-438-532-0112
113	Air intake filter	amber	84-438-532-0113
114	Transmission oil filter	amber	84-438-532-0114
115	Hydraulic oil filter	amber	84-438-532-0115
116	Slow	green	84-438-532-0116
117	Rotation beacon	amber	84-438-532-0117
118	Coolant temperature	red	84-438-532-0118
119	Transmission oil temperature	red	84-438-532-0119
120	Hydraulic oil temperature	red	84-438-532-0120
121	ABS second trailer	amber	84-438-532-0121 ●
122	ABS first trailer	amber	84-438-532-0122 ●
123	Rear fog light	amber	84-438-532-0123 ●
124	Gear position (drive)	green	84-438-532-0124 ●
125	Gear position (reverse gear)	amber	84-438-532-0125 ●
126	Jammed door	red	84-438-532-0126 ●
127	Engine oil temperature	red	84-438-532-0127 ●
128	Engine fault function	amber	84-438-532-0128 ●
129	Engine lubrication oil pressure	red	84-438-532-0129
130	Engine oil temperature	red	84-438-532-0130
142	Air condition	red	84-438-532-0142 ●
166	Diesel engine preheat	amber	84-438-532-0166
167	Engine Stop	red	84-438-532-0167
	● Phase-out, available as long as stock		

2. Components

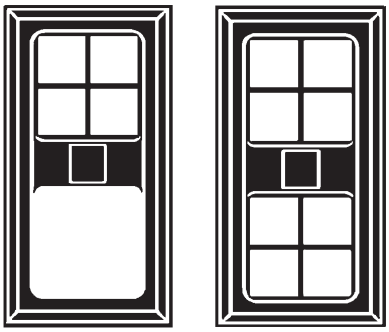
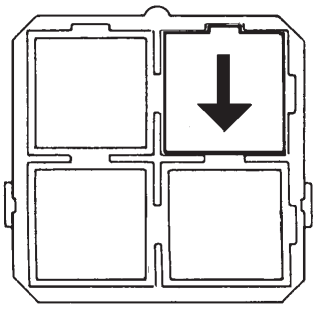
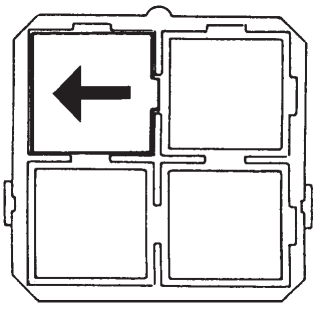
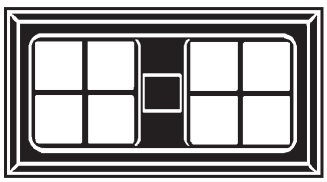
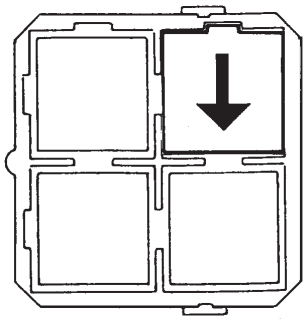
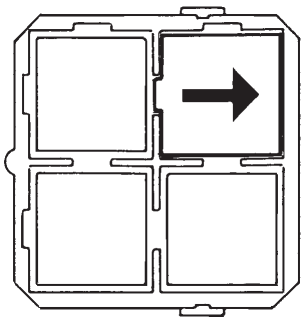
2.7 Indicating Symbols (KL)

Installation versions

Indicating Symbol 84-438-532-0046 (arrow up), green

vertical 	arrow up 	or	arrow right 
horizontal 	arrow up 	or	arrow left 

Indicating symbol 84-438-532-0047 (arrow down), green

vertical 	arrow down 	or	arrow left 
horizontal 	arrow down 	or	arrow right 

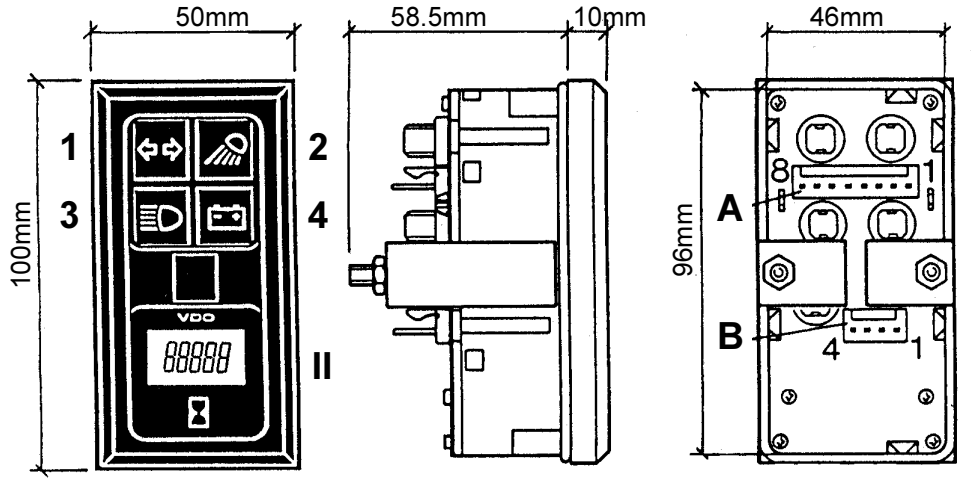
3. Dimensions, Pin Assignment

Contents

3. Dimensions, Pin Assignment

3.1 2 Unit Instrument Module, Vertical

(KL + EBZ) Warning lights + operating hours counter



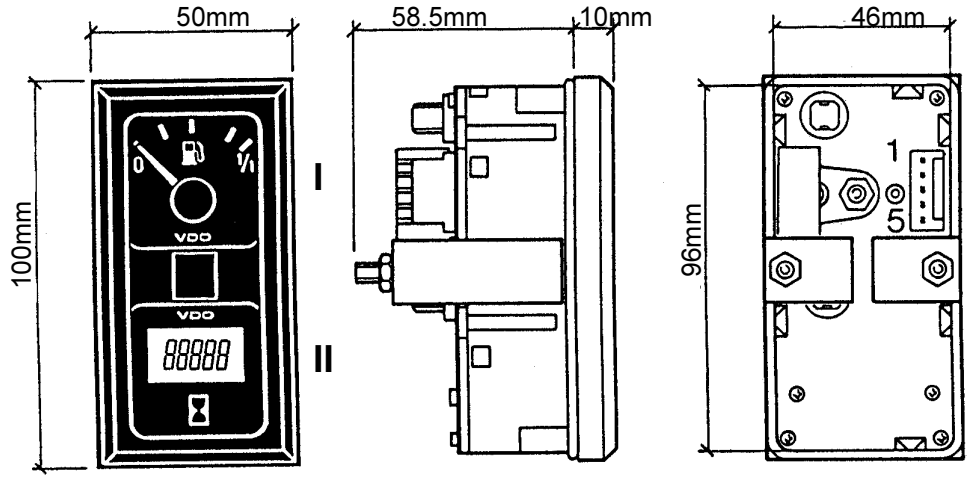
Mounting hole: 46.5mm x 96.5mm

Pin	Assignment — A —	Pin	Assignment — B —
1	Terminal 31 – (ground pos. 3)	1	Terminal 61 + (EBZ pos. II)
2	Terminal 58 + (illumination pos. 3)	2	Terminal 15 + (ignition)
3	Terminal 31 – (ground pos. 1)	3	Terminal 31 – (ground)
4	Terminal 58 + (illumination pos. 1)	4	Terminal 58 + (illumination)
5	Terminal 31 – (ground pos. 2)		
6	Terminal 58 + (illumination pos. 2)		
7	Terminal 31 – (ground pos. 4)		
8	Terminal 58 + (illumination pos. 4)		

3. Dimensions, Pin Assignment

3.1 2 Unit Instrument Module, Vertical

(Ke + EBZ) Single instrument module + operating hours counter



Mounting hole: 46.5mm x 96.5mm

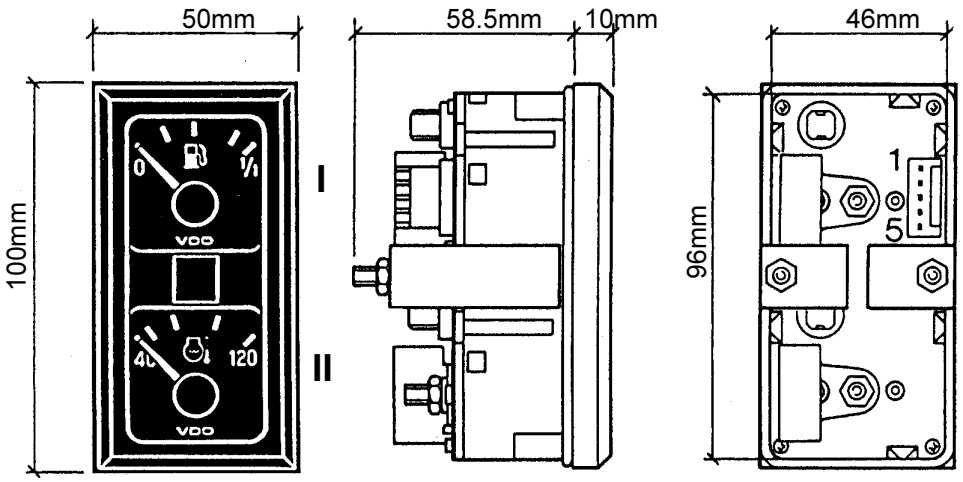
▼ If a voltmeter is installed, the sensor pin must not be energized.

Pin	Assignment
1	Terminal 58 + (illumination)
2	Terminal 15 + (ignition)
3	Terminal 31 – (ground)
4	Sensor (Ke pos.I) ▼
5	Terminal 61 + (EBZ pos.II)

3. Dimensions, Pin Assignment

3.1 2 Unit Instrument Module, Vertical

(Ke + Ke) Single instrument module + single instrument module



Mounting hole:
46.5mm x 96.5mm

Circuit board assy:

12 V = X11-395-000-056
24 V = X11-395-000-057

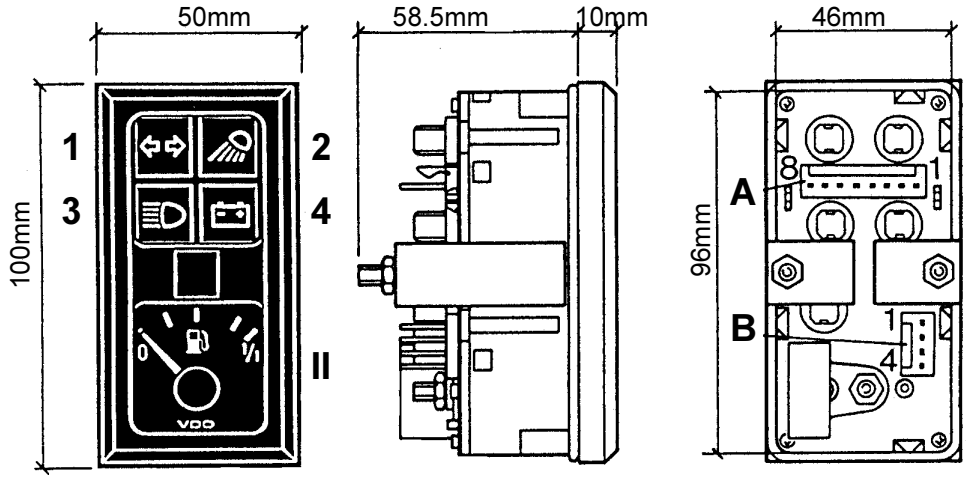
Pin	Assignment
1	Terminal 58 + (illumination)
2	Sensor (Ke pos.I) ▼
3	Terminal 31 – (ground)
4	Sensor (Ke pos.II) ▼
5	Terminal 15 + (ignition)

▼ If a voltmeter is installed, the corresponding sensor pin must not energized.

3. Dimensions, Pin Assignment

3.1 2 Unit Instrument Module, Vertical

(KL + Ke) Warning lights + single instrument module



Mounting hole: 46.5mm x 96.5mm

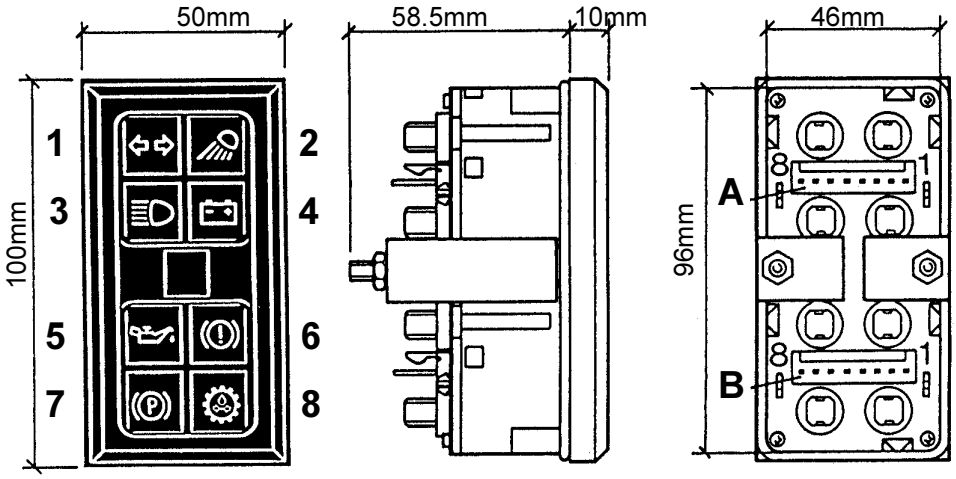
▼ If a voltmeter is installed, the sensor pin must not be energized.

Pin	Assignment — A —	Pin	Assignment — B —
1	Terminal 31 – ground pos. 3)	1	Terminal 58 + (illumination)
2	Terminal 58 + (illumination pos. 3)	2	Terminal 15 + (ignition)
3	Terminal 31 – (ground pos. 1)	3	Terminal 31 – (ground)
4	Terminal 58 + illumination pos. 1)	4	Sensor (Ke pos. II) ▼
5	Terminal 31 – (ground pos. 2)		
6	Terminal 58 + (illumination pos. 2)		
7	Terminal 31 – (ground pos. 4)		
8	Terminal 58 + (illumination pos. 4)		

3. Dimensions, Pin Assignment

3.1 2 Unit Instrument Module, Vertical

(KL + KL) Warning lights + warning lights



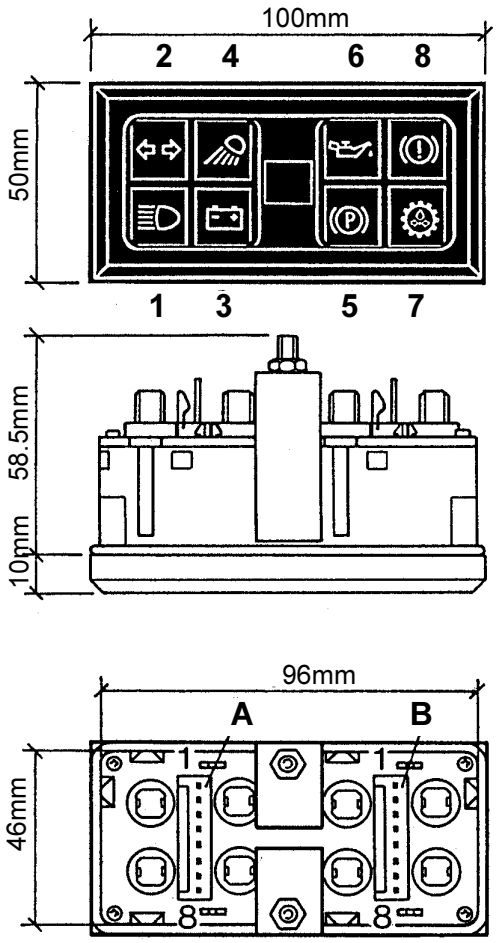
Mounting hole: 46.5mm x 96.5mm

Pin	Assignment — A —	Pin	Assignment — B —
1	Terminal 31 – (ground pos. 3)	1	Terminal 31 – (ground pos. 7)
2	Terminal 58 + (illumination pos. 3)	2	Terminal 58 + (illumination pos. 7)
3	Terminal 31 – (ground pos. 1)	3	Terminal 31 – (ground pos. 5)
4	Terminal 58 + (illumination pos. 1)	4	Terminal 58 + (illumination pos. 5)
5	Terminal 31 – (ground pos. 2)	5	Terminal 31 – (ground pos. 6)
6	Terminal 58 + (illumination pos. 2)	6	Terminal 58 + (illumination pos. 6)
7	Terminal 31 – (ground pos. 4)	7	Terminal 31 – (ground pos. 8)
8	Terminal 58 + (illumination pos. 4)	8	Terminal 58 + (illumination pos. 8)

3. Dimensions, Pin Assignment

3.2 2Unit Instrument Module, Horizontal

(KL + KL) Warning lights + warning lights



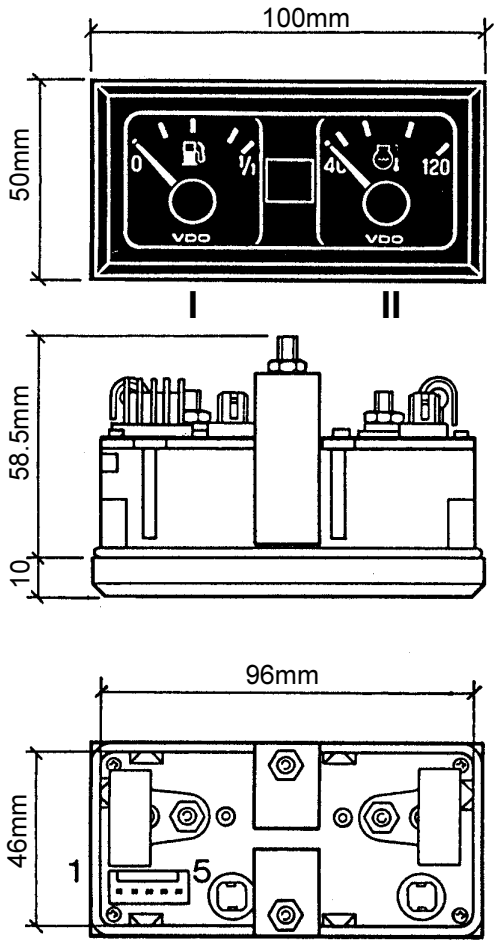
Mounting hole: 46.5mm x 96.5mm

Pin	Assignment	— A —	— B —
1	Terminal 31 – (ground)	Pos. 3	Pos. 7
2	Terminal 58 + (illumination)	Pos. 3	Pos. 7
3	Terminal 31 – (ground)	Pos. 1	Pos. 5
4	Terminal 58 + (illumination)	Pos. 1	Pos. 5
5	Terminal 31 – (ground)	Pos. 2	Pos. 6
6	Terminal 58 + (illumination)	Pos. 2	Pos. 6
7	Terminal 31 – (ground)	Pos. 4	Pos. 8
8	Terminal 58 + (illumination)	Pos. 4	Pos. 8

3. Dimensions, Pin Assignment

3.2 2 Unit Instrument Module, Horizontal

(Ke + Ke) Single instrument module + single instrument module



Mounting hole: 46.5mm x 96.5mm

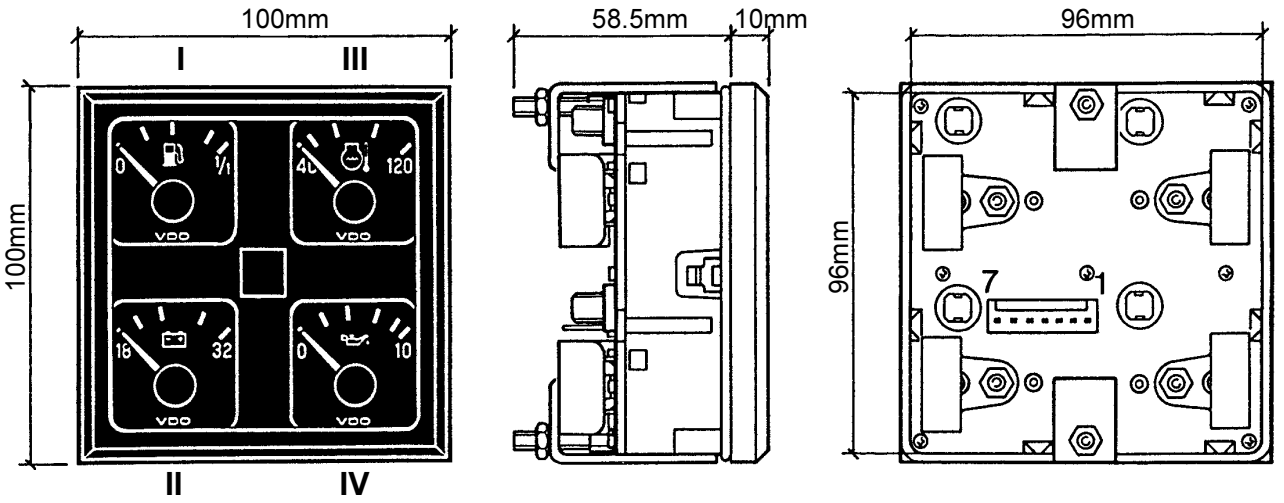
▼ If a voltmeter is installed, the corresponding sensor pin must not be energized.

Pin	Assignment
1	Terminal 58 + (illumination)
2	Terminal 15 + (ignition)
3	Terminal 31 – (ground)
4	Sensor (Ke pos. I) ▼
5	Sensor (Ke pos. II) ▼

3. Dimensions, Pin Assignment

3.3 4 Unit Instrument Module

(4x Ke) 4x single instrument module



Mounting hole: 96.5mm x 96.5mm

Circuit board assy:

12 V = X11-395-000-054
24 V = X11-395-000-055

Pin	Assignment		Pin	Assignment	
1	Sensor (Ke pos. II)	▼	5	Sensor (Ke pos. III)	▼
2	Sensor (Ke pos. I)	▼	6	Sensor (Ke pos. IV)	▼
3	Terminal 31 – (ground)		7	Terminal 58 + (illumination)	
4	Terminal 15 + (ignition)				

▼ If a voltmeter is installed, the corresponding sensor pin must not be energized.

4. Preselected Instrumentation

Contents Page

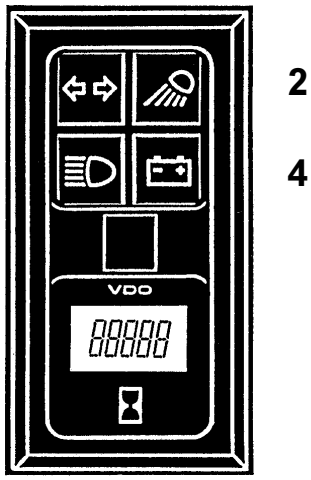
Operating instructions for electronic speedometer (Copy)
See enclousures TU00-0777-0010502 page 1 and 2.

4. Preselected Instrumentation

4.1 2 Unit Instrument Module, Vertical (KL + EBZ)

Warning lights + operating hours counter

Rated voltage:	12 V or 24 V
Dimensions, pin assignment:	see chapter 3.1
Operating temperature:	– 25°C ... + 70°C
Storage temperature:	– 30°C ... + 70°C (up to + 85°C for 1h max.)
Mode of protection:	IP 52 DIN 40 050 from the front
Nominal position:	NL 0 to NL 90, DIN 16257
Finish:	
Housing and frame:	black
Lens:	antiglare treated
2 brackets:	zinc-plated and chromatized
Backlighting:	5 base bulbs: 12 V 1.2 W or 24 V 1.2 W
Indicating symbols (KL):	white RAL 9010 (in warning mode colour field illuminated)
Operating hours counter (EBZ):	
Display:	5 digit 7 segments LCD type
Display range:	0.1 hour (6 min.) increment for display range 0000.1 to 9999.9 hours



Indicating Symbols (KL) 84-438-532-00..								Voltage	Part No.
Pos. 1		Pos. 2		Pos. 3		Pos. 4			
31		04		08		09		12 V	110-008-984-001G
42		30	amber	07		15	red	24 V	X10-110-984-001 ▼
120		30	amber	108		15	red	24 V	X10-110-984-002 ▼

▼ individual customer version

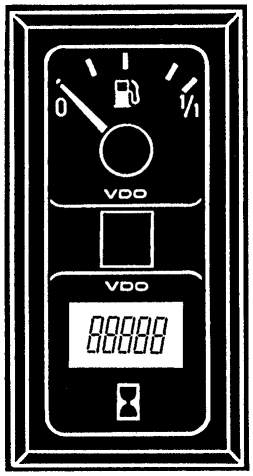
4. Preselected Instrumentation

4.2 2 Unit Instrument Module, Vertical (Ke + EBZ)

Single instrument module + operating hours counter

Rated voltage:	12 V or 24 V
Dimensions, pin assignment:	see chapter 3.1
Operating temperature:	– 25°C ... + 70°C
Storage temperature:	– 30°C ... + 70°C (up to + 85°C for 1h max.)
Mode of protection:	IP 52 DIN 40 050 from the front
Nominal position:	NL 0 to NL 90, DIN 16257
Finish:	
Housing and frame:	black
Lens:	antiglare treated
2 brackets:	zinc-plated and chromatized
Backlighting:	2 base bulbs: 12 V 1.2 W or 24 V 1.2 W
Single instrument modules (Ke):	see chapter 2.5
Finish:	
Dial face:	deep-black RAL 9005
Dial imprint:	white RAL 9010, by illumination green translucent
pointer cap:	deep-black RAL 9005
Pointer arm:	fluorescent flaming red
Operating hours counter (EBZ):	
Display:	5 digit 7 segments LCD type
Display range:	0.1 hour (6 min.) increment for display range 0000.1 to 9999.9 hours

I



Single Instrument Module (Ke Pos.I)				Voltage	Part No.
Blind cover	X11-395-000-014	black		24 V	110-008-983-001G
Pressure gauge	350-272-980-010C		5 bar	12 V	110-008-983-002G
Fuel level gauge	301-292-980-004C			12 V	110-008-983-003G
Pressure gauge	350-272-980-011C		10 bar	24 V	110-008-983-004G
Fuel level gauge	301-291-980-003C			12 V	110-008-983-005C

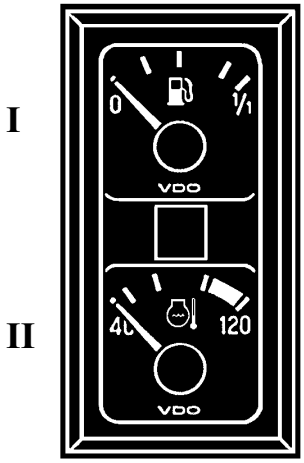
Lever type sensor Tubular type sensor

4. Preselected Instrumentation

4.3 2 Unit Instrument Module, Vertical (Ke + Ke)

Rated voltage:	12 V or 24 V
Dimensions, pin assignment:	see chapter 3.1
Operating temperature:	– 25°C ... + 70°C
Storage temperature:	– 30°C ... + 70°C (up to + 85°C for 1h max.)
Mode of protection:	IP 52 DIN 40 050 from the front
Nominal position:	NL 0 to NL 90, DIN 16257
Finish:	
Housing and frame:	black
Lens:	antiglare treated
2 brackets:	zinc-plated and chromatized
Backlighting:	2 base bulbs: 12 V 1.2 W or 24 V 1.2 W
Single instrument modules (Ke):	see chapter 2.5
Finish:	
Dial face:	deep-black RAL 9005
Dial imprint:	white RAL 9010, by illumination green translucent
Pointer cap:	deep-black RAL 9005
Pointer arm:	fluorescent flaming red

Single instrument module + single instrument module



Single Instrument Module (Ke Pos.I)	Single Instrument Module (Ke Pos.II)	Voltage	Part No.
301-292-980-004C	310-284-980-011C 120 °C	24 V	110-008-981-014C
350-272-980-012C 1 10 bar	350-272-980-013C 2 10 bar	12 V	110-008-981-015C
310-284-980-011C 120 °C	350-272-980-011C 10 bar	12 V	110-008-981-017C
301-291-980-003C	310-284-980-013C ▲ 120 °C	12 V	110-008-981-021C
301-291-980-003C	310-284-980-014C 150 °C	24 V	X10-110-981-001 ▼
301-291-980-003C	X11-395-000-014C black	24 V	X10-110-981-002 ▼
310-284-980-012C 150 °C	350-272-980-014C 25 bar	24 V	X10-110-981-008 ▼
301-291-980-003C	310-284-980-011C 120 °C	24 V	X10-110-981-009 ▼
310-284-980-014C 150 °C	350-272-980-018C bar 10 bar	24 V	X10-110-981-010 ▼
350-272-980-012C 1 10 bar	350-272-980-013C 2 10 bar	24 V	X10-110-981-011 ▼

Lever type sensor Tubular type sensor

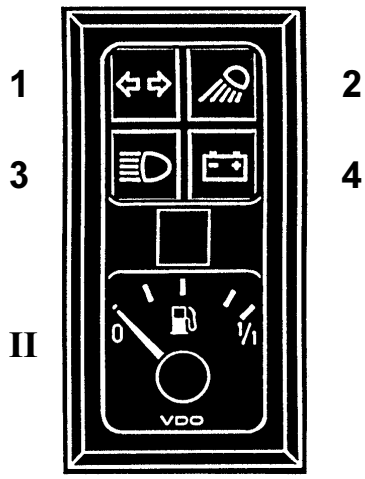
▲ With red w arning field ▼ Individual customer version

4. Preselected Instrumentation

4.4 2 Unit Instrument Module, Vertical (KL + Ke)

Warning lights + single instrument module

Rated voltage:	12 V or 24 V
Dimensions, pin assignment:	see chapter 3.1
Operating temperature:	– 25°C ... + 70°C
Storage temperature:	– 30°C ... + 70°C (up to + 85°C for 1h max.)
Mode of protection:	IP 52 DIN 40 050 from the front
Nominal position:	NL 0 to NL 90, DIN 16257
Finish:	
Housing and frame:	black
Lens:	antiglare treated
2 brackets:	zinc-plated and chromatized
Backlighting:	2 base bulbs: 12 V 1.2 W or 24 V 1.2 W
Single instrument modules (Ke):	see chapter 2.5
Finish:	
Dial face:	deep-black RAL 9005
Dial imprint:	white RAL 9010, by illumination green translucent
Pointer cap:	deep-black RAL 9005
Pointer arm:	fluorescent flaming red
Indicating symbols (KL):	white RAL 9010, (in warning mode colour field illuminated)



Single Instrument Module (Ke Pos.I)	Indicating Symbols (KL) 84-438-532-00.. Pos. 1	Pos. 2	Pos. 3	Pos. 4	Voltage	Part No.
X11-395-000-014 black	127	79	113	—	12 V	110-008-982-003C ▼
310-284-980-011C 120 °C	08	09	40	10	12 V	110-008-982-004C
301-291-980-003C	01	02	04	07	12 V	110-008-982-005C
X11-395-000-014 black	01	79	06	07	12 V	X10-110-982-001 ▼

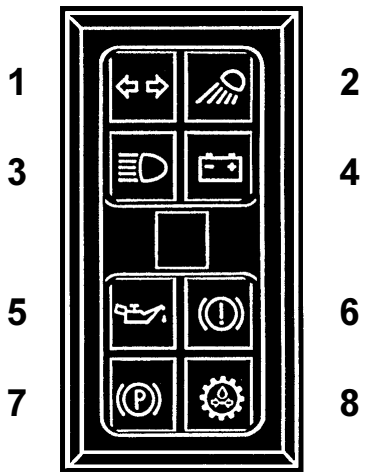
▼ Individual customer version Tubular type sensor

4. Preselected Instrumentation

4.5 2 Unit Instrument Module, Vertical (KL + KL)

Warning lights + warning lights

Rated voltage:	12 V or 24 V
Dimensions, pin assignment:	see chapter 3.1
Operating temperature:	– 25°C ... + 70°C
Storage temperature:	– 30°C ... + 70°C (up to + 85°C for 1h max.)
Mode of protection:	IP 52 DIN 40 050 from the front
Nominal position:	NL 0 to NL 90, DIN 16257
Finish:	
Housing and frame:	black
Lens:	antiglare treated
2 brackets:	zinc-plated and chromatized
Backlighting:	8 base bulbs: 12 V 1.2 W or 24 V 1.2 W
Indicating symbols (KL):	white RAL 9010 (in warning mode colour field illuminated)



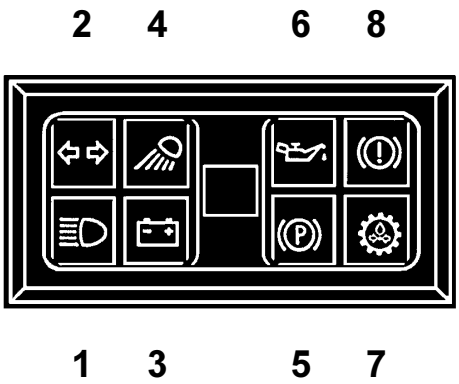
Indicating Symbols (KL) 84-438-532-00..								Voltage	Part No.
Pos. 1	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8		
01	06	07	08	09	10	11	13	12 V	113-000-980-001G
01	06	07	08	09	10	11	13	24 V	113-000-980-002G
03	09	04	08	01	86	07	11	12 V	113-000-980-008G ■
01	09	12	08	10	11	06	07	12 V	113-000-980-010G ■
01	02	07	06	08	10	09	31	12 V	113-000-980-014C
without indicating symbols								12 V	113-000-980-003C
without indicating symbols								24 V	113-000-980-004C
01	90	01	04	101	95	102	88	24 V	X10-113-000-004 ▼
09	07	118	01	119	101	08	11	24 V	X10-113-000-005 ▼
98 S	98 S	98 S	98 S	87	87	30 amber	15 red	24 V	X10-113-000-006 ▼
03	113	108	04	109	126	10	95	24 V	X10-113-000-007 ▼
97	96	123	100	102	124 D	88	125 R	24 V	X10-113-000-008 ▼
01	02	07	06	08	10	09	31	12 V	X10-113-000-009 ▼
127	118	119	108	15 red	15 red	15 red	15 red	24 V	X10-113-000-010 ▼
119	09	10	11	112	113	08	03	12 V	X10-113-000-011 ▼
01	07	118	108	08	09	10	11	24 V	X10-113-000-013 ▼

▼ Individual customer version ■ USA (specific version)

4. Preselected Instrumentation

4.6 2 Unit Instrument Module, Horizontal (KL + KL)

Warning lights + warning lights



Rated voltage:	12 V or 24 V
Dimensions, pin assignment:	see chapter 3.2
Operating temperature:	– 25°C ... + 70°C
Storage temperature:	– 30°C ... + 70°C (up to + 85°C for 1h max.)
Mode of protection:	IP 52 DIN 40 050 from the front
Nominal position:	NL 0 to NL 90, DIN 16257
Finish:	
Housing and frame:	black
Lens:	antiglare treated
2 brackets:	zinc-plated and chromatized
Backlighting:	8 base bulbs: 12 V 1.2 W or 24 V 1.2 W
Indicating symbols (KL):	white RAL 9010 (in warning mode colour field illuminated)

Indicating Symbols (KL) 84-438-532-00..								Voltage	Part No.
Pos. 1	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8		
07	01	11	10	47	46	48	38	12 V	113-000-980-007G
115	110	108	107	04	08	09	120	24 V	113-000-980-009C
40	VK (150 1371)	09	75 STOP	04	01	10	07	12 V	113-000-980-013C ▼
without indicating symbols								12 V	113-000-980-003C
without indicating symbols								24 V	113-000-980-004C
91	92	97	100	123	96	99	03	24 V	X10-113-000-001 ▼
11	10	09	89	118	108	106	08	24 V	X10-113-000-002 ▼
94	87	103	07	98 S	98 S	98 S	98 S	24 V	X10-113-000-003 ▼
31	01	10	08	11	09	13	04	24 V	X10-113-000-012 ▼

▼ Individual customer version

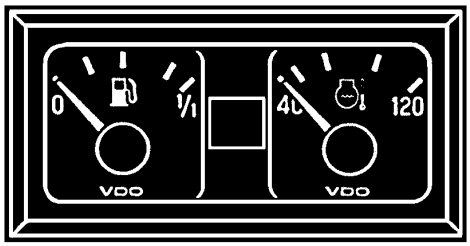
4. Preselected Instrumentation

4.7 2 Unit Instrument Module, Horizontal (Ke + Ke)

Rated voltage:	12 V or 24 V
Dimensions, pin assignment	see chapter 3.2
Operating temperature:	– 25°C ... + 70°C
Storage temperature:	– 30°C ... + 70°C (up to + 85°C for 1h max.)
Mode of protection:	IP 52 DIN 40 050 from the front
Nominal position:	NL 0 to NL 90, DIN 16257
Finish:	
Housing and frame:	black
Lens:	antiglare treated
2 brackets:	zinc-plated and chromatized
Backlighting:	2 base bulbs: 12 V 1.2 W or 24 V 1.2 W
Single instrument modules (Ke):	see chapter 2.5
Finish:	
Dial face:	deep-black RAL 9005
Dial imprint:	white RAL 9010, by illumination green translucent
Pointer cap:	deep-black RAL 9005
Pointer arm:	fluorescent flaming red

Single instrument module + single instrument module

I II



Single Instrument Module (Ke Pos.I)	Single Instrument Module (Ke Pos.II)	Voltage	Part No.
301-291-980-003C	310-284-980-011C 120 °C	12 V	110-008-981-002G
310-284-980-012C 150 °C	350-272-980-014C 25 bar	24 V	110-008-981-004G
X11-395-000-014 black	332.305/980/003 C 16 V	12 V	110-008-981-016C
301-292-980-004C	X11-395-000-014 black	12 V	110-008-981-018C
350-272-980-012C 10 bar	350-272-980-013C 10 bar	24 V	X10-110-981-003 ▼
350-272-980-010C 5 bar	310-284-980-011C 120 °C	24 V	X10-110-981-005 ▼
301-292-980-004C	310-284-980-014C 150 °C	24 V	X10-110-981-006 ▼

Lever type sensor Tubular type sensor

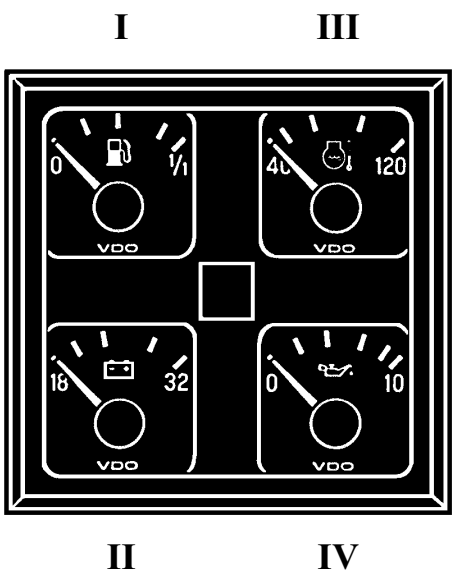
▼ Individual customer version

4. Preselected Instrumentation

4.8 4 Unit Instrument Module (4x Ke)

Rated voltage:	12 V or 24 V
Dimensions, pin assignment:	see chapter 3.3
Operating temperature:	– 25°C ... + 70°C
Storage temperature:	– 30°C ... + 70°C (up to + 85°C for 1h max.)
Mode of protection:	IP 52 DIN 40 050 from the front
Nominal position:	NL 0 to NL 90, DIN 16257
Finish:	
Housing and frame:	black
Lens:	antiglare treated
2 brackets:	zinc-plated and chromatized
Backlighting:	4 base bulbs: 12 V 1.2 W or 24 V 1.2 W
Single instrument modules (Ke):	see chapter 2.5
Finish:	
Dial face:	deep-black RAL 9005
Dial imprint:	white RAL 9010, by illumination green translucent
Pointer cap:	deep-black RAL 9005
Pointer arm:	fluorescent flaming red

4x single instrument module



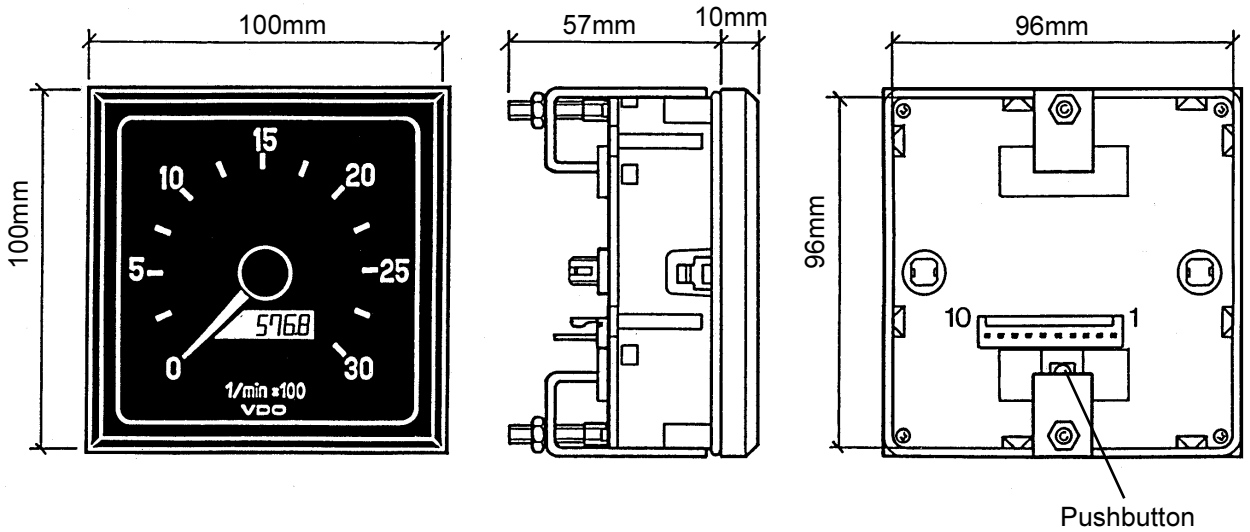
Pos.	Single Instrument Modules (Ke)	Pos.	Single Instrument Modules (Ke)	Voltage	Part No.
I	301-292-980-004C	III	310-284-980-011C 120 °C	24 V	110-008-980-013C
II	332-305-980-004C 32 V	IV	350-272-980-011C 10 bar		
I	301-291-980-003C	III	310-284-980-013C 120 °C ▲	24 V	110-008-980-018C ▼
II	X11-395-000-014 black	IV	350-272-980-015C 10 bar ▲		
I	310-284-980-015C 150 °C	III	350-272-980-012C 1 10 bar	24 V	110-008-980-019C ▼
II	350-272-980-016C 25 bar	IV	350-272-980-013C 2 10 bar		
I	310-284-980-011C 120 °C	III	350-272-980-011C 10 bar	24 V	X10-110-980-002 ▼
II	350-272-980-012C 1 10 bar	IV	350-272-980-013C 2 10 bar		
I	301-292-980-004C	III	350-272-980-010C 5 bar	24 V	X10-110-980-003 ▼
II	X11-395-000-014 black	IV	310-284-980-017C 120 °C		
I	301-292-980-004C	III	350-272-980-010C 5 bar	24 V	X10-110-980-004 ▼
II	350-272-980-018C **bar** 10 bar	IV	310-284-980-017C 120 °C		
I	301-291-980-003C	III	310-284-980-011C 120 °C	24 V	X10-110-980-005 ▼
II	332-305-980-004C 32 V	IV	350-272-980-011C 10 bar		

Lever type sensor Tubular type sensor

▲ With w arning field(s) ▼ Individual customer version

4. Preselected Instrumentation

4.9 Electronic Tachometer With Operating Hours Counter



Mounting hole: 96.5 x 96.5mm

Pin assignment:

Pin 1	Terminal 31– (ground)
Pin 2	Signal + (sensor / term. 1 / term. W)
Pin 3	Not connected
Pin 4	Signal – (sensor)
Pin 5	Pull up, open collector sensor (connected with pin 2)
Pin 6	Terminal 15 +
Pin 7	Not connected
Pin 8	Terminal 58 + (illumination)
Pin 9	Not connected
Pin 10	Terminal 30 + (permanent positive pole)

4. Preselected Instrumentation

4.9 Electronic Tachometer With Operating Hours Counter

Rated voltage:	12 V ... 24 V
Operating voltage:	10 V ... 31 V
Signal input:	Universal (terminal W, terminal 1, inductive sensor)
Pulses:	Selectable via pushbutton at the rear of the housing from 0.5 pulses/revolution to 399.99 pulses/revolution (depends on input signal)
Operating temperature:	– 25°C ... + 70°C
Storage temperature:	– 30°C ... + 70°C (up to + 85°C for 1h max.)
Mode of protection:	IP 52 DIN 40 050 from the front (EN 60 529, IEC 529)
EMC:	89/336 EEC, 95/54 EEC
Nominal position:	NL 0 to NL 90, DIN 16257
Current consumption:	< 100 mA (without illumination) Standby < 0,1 mA
Operating hours counter:	LCD, max. 999999.9 hours
Finish:	
Housing and frame:	black
Lens:	antiglare treated
2 brackets:	zinc-plated and chromatized
Dial face:	deep-black
Dial imprint:	white, by illumination green translucent
Pointer cap:	deep-black
Pointer arm:	fluorescent flaming red

Backlighting:
2 base bulbs: 24 V 1.2W

Measuring Range	Part No.	Measuring Range	Part No.
0 - 2000 min-1	333-251-980-009C ◆ ▼	0 - 4000 min-1	333-251-980-004C
		0 - 4000 rpm	333-251-980-006C ■
0 - 3000 min^{-1}	333-251-980-003C		
0 - 3000 min-1 with colour fields	333-251-980-007C ▼		
0 - 3000 rpm	333-251-980-005C ■		

▼ Individual customer version ■ USA (specific version) ◆ 2 base bulbs: 12V 1.2W

4. Preselected Instrumentation

4.9 Electronic Tachometer With Operating Hours Counter

Setting

Four possible settings are available for the electronic tachometer with operating hours counter.

Two possible calibrations:

Function “SELECt” - Enter the stroke number and the number of cylinders for vehicles with gasoline engine (two-stroke or four-stroke) when connecting to terminal 1 of the ignition coil (ignition systems having only one ignition coil).

Not apply for vehicles with diesel engines.

Function “PULSE” - Enter a known number of pulses per revolution for:

Inductive sensor,

Generator sensor,

Connection to terminal W of the alternator on vehicles with diesel engines,

Terminal 1 of ignition coil (ignition systems having one or nore ignition coils) for vehicles with gasoline engine (two-stroke or four-stroke).

Two possible fine adjustments of the engine speed indication:

Function “AdJUSt” - Fine adjustment of engine speed indication (continuous pointer adjustment)

or

Function “A” - Fine adjustment of engine speed indication (pointer adjustment in percentage steps).

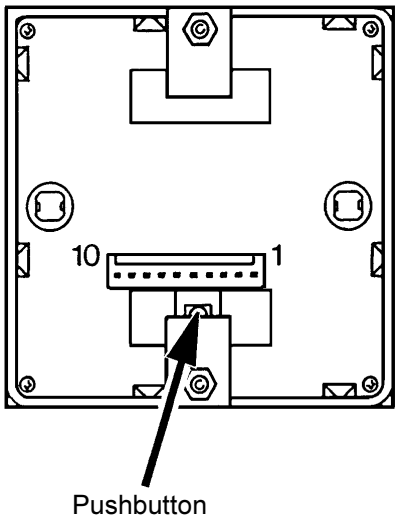
4. Preselected Instrumentation

4.9 Electronic Tachometer With Operating Hours Counter

Setting

Selection of the functions: “SELECt”, “PULSE” or “AdJUSt”

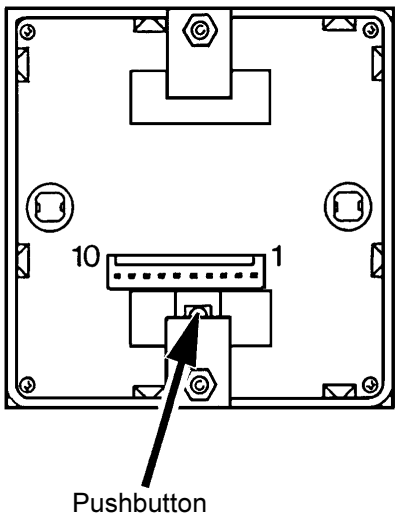
Push the pushbutton on instrument back and hold, then switch the operating voltage (ignition) on. The display alternates between “SELECt”, “PULSE” and “AdJUSt”. A function is selected by releasing the pushbutton at the corresponding display.

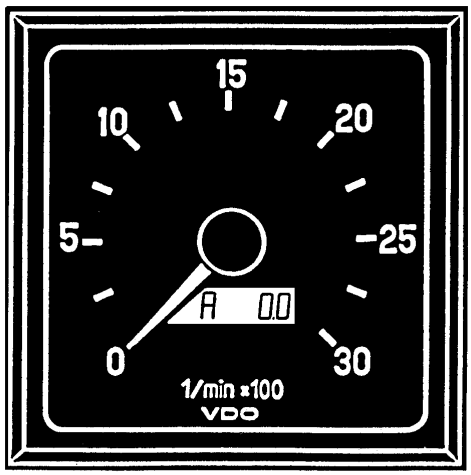


SELECt PULSE AdJUSt

Selection of the function: “A”

Switch operating voltage (ignition) on, then push the pushbutton at instrument back. The display shows „A 0.0“.





A 0.0

4. Preselected Instrumentation

4.9 Electronic Tachometer With Operating Hours Counter

Setting

Function “SELECt”

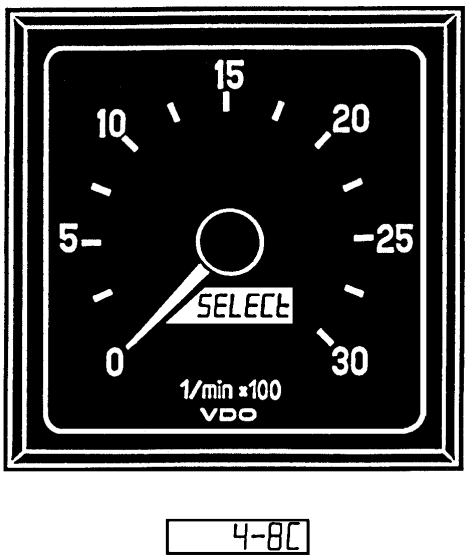
After selection of the function “SELECt” the display shows “4 - 8 C” (four-stroke, 8 cylinders) for instance after about 3 seconds.

Push the pushbutton and hold. The display shows the possible settings for:

Four-stroke, 1, 2, 3, 4, 5, 6, 8, 12 cylinders (example: “4 - 8 C” = four-stroke, 8 cylindres),

Two-stroke, 1, 2, 3, 4 cylinders (example: “ 2 - 3 C” = two-stroke, 3 cylinders).

Release the pushbutton when the corresponding stroke and cylinder numbers are attained. The calibration is completed if the display thereafter changes to operating hours counter.



4. Preselected Instrumentation

4.9 Electronic Tachometer With Operating Hours Counter

Setting

Function “PULSE”

After selection of the function “PULSE” the display shows “P 14.50” for instance (14.50 pulses per revolution) after about three seconds, with the digit before the last flashing. Start entering the known pulse number per revolution. The flashing digit is changed by pushing the button (adjustable number of pulses revolution: 0.50 to 399.99). After entry of the number of pulses per revolution the display changes to operating hours counter mode. The calibration is completed.

Selecting the function “PULSE” again displays the entered number of pulses per revolution for checking. The display shows the number of pulses per revolution, and the digits, starting with the last digit, start flashing in a sequence.

The number of pulses per revolution can be calculated with the following formula if it is not known:

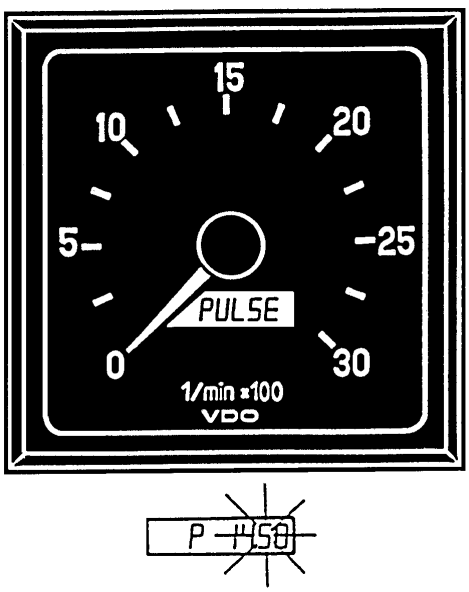
Conventional ignition system:

$$\frac{\text{Pulses}}{\text{Revolution}} = \frac{\text{2 x number of cylinders}}{\text{Number of stroke x number of ignition coils}}$$

↓

(two-stroke or four-stroke)

or if can be obtained from the engine manufacturer.



4. Preselected Instrumentation

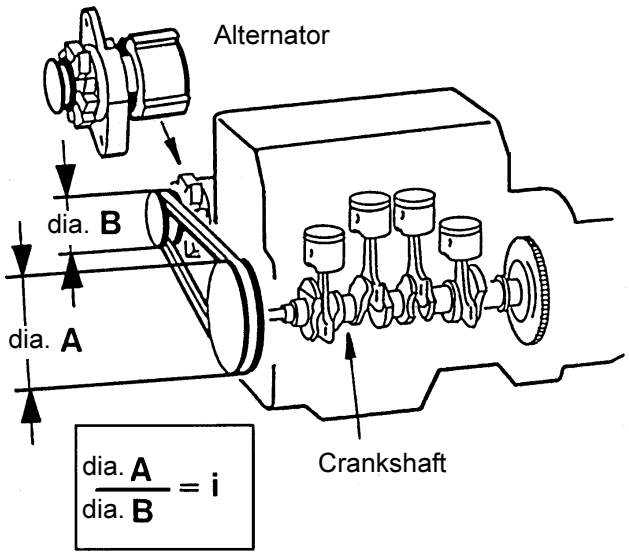
4.9 Electronic Tachometer With Operating Hours Counter

Setting

Function “PULSE”

Diesel Engine Setting

The following formula can be used to calculate an unknown pulse ratio, which is then set as described on page 4 - 17.



Example:
dia. A = 280 mm
dia. B = 132 mm

$i = \frac{280}{132} = 2.12$

i x 6 is the pulse ratio

Pulses per revolution
Number of alternator pole pairs
2.12 x 6 = 12.72
= 13 pulses per revolution

Calculate the pulse ratio as follows if the frequency (Hz) is known, and not the pulse ratio:

$\frac{\text{Hz x 60 sec.}}{\text{full scale speed}} = \text{pulses/revolution}$

Example 1733 Hz:

$\frac{1733 \times 60}{8000} = 12.99 = 13 \text{ pulses/revolution}$

Formula for frequency (Hz):

$\frac{\text{pulses/turn x full scale speed}}{60 \text{ sec.}} = \text{Hz}$

Example:

$\frac{13 \times 8000}{60} = 1733 \text{ Hz}$

4. Preselected Instrumentation

4.9 Electronic Tachometer With Operating Hours Counter

Setting

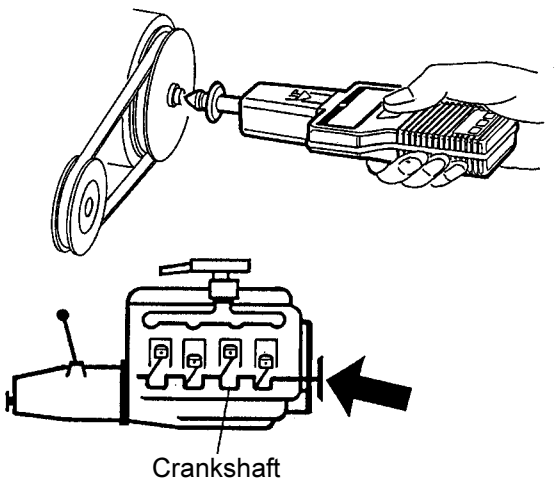
Function “AdJUSt” – fine adjustment of engine speed indication (continuous pointer adjustment)

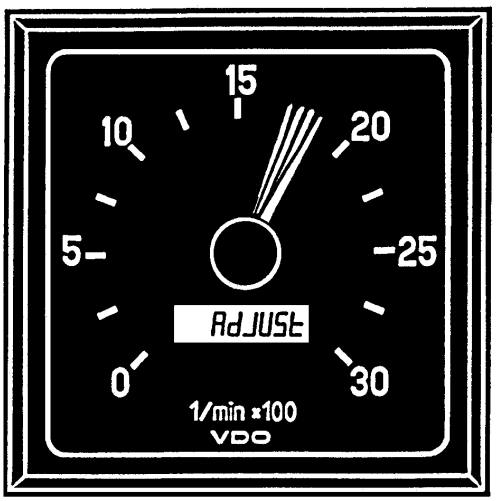
This function permits fine engine speed indication adjustment between 30% and 100% of the indicating range only. Use a reference tachometer (hand-held tachometer) to compare the speed indications.

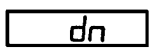
The adjustment must be made by two persons, one of them adjusting the instrument, the other one using the hand-held tachometer.
Measure the engine speed at the crankshaft stub of the engine with the hand-held tachometer.
Be very careful! Do not wear loose clothing!

The selection of function “AdJUSt” alternately displays “UP” or “dn” (down).

Holding the button down with the “UP” display increments the pointer position (in the same way it will decrement if “dn” is displayed). Initially the rate of change is quite low, permitting a very precise adjustment. Shortly releasing the button will repeat the process. The rate of pointer position change increases when button is held down. Release the button when the pointer indication matches the reference indication. The display changes to operating hours counter mode, fine adjustment is completed .







4. Preselected Instrumentation

4.9 Electronic Tachometer With Operating Hours Counter

Setting

Function “A” – fine adjustment of engine speed indication (pointer adjustment in percentage steps)

This function can be used for fine adjustment of the engine speed indication over the entire indicating range in angular steps of 0.5 degrees. Use a reference tachometer (hand-held tachometer) to compare the speed indications..

The display shows “A 0.0” when the function “A” is selected.

Push and hold the pushbutton to change the pointer deflection in a range of - 20 % to + 20 % in steps of 0.5 %. These step are shown by the display:
Example in the plus range: „A 10.5“,
Example in the minus range: „A - 10.5“.
Plus and minus change if the pushbutton is shortly released.
Release the pushbutton when the desired percentage is attained. The display returns to the operating hours counter mode. Fine adjustment has been completed.

Calculation of the percentage value:
Find the difference between the tachometer display and the reference speed indication. Calculate the precentage and enter the corresponding value.

Percentage formula:

$$\pm\ \% = \frac{\text{Difference between tachometer reading and reference reading} \times 100}{\text{Tachometer reading}}$$

Example for the plus range:

Tachometer reading = 1800 RPM
Reference speed reading = 2000 RPM
Difference = + 200 RPM

$$+\ \% = \frac{200 \times 100}{1800} = + 11.11\ \%$$

Percentage for fine adjustment: „A 11.0“

Example for the minus range:

Tachometer reading = 2200 RPM
Reference speed reading = 2000 RPM
Difference = – 200 RPM

$$-\ \% = \frac{200 \times 100}{2200} = - 9.09\ \%$$

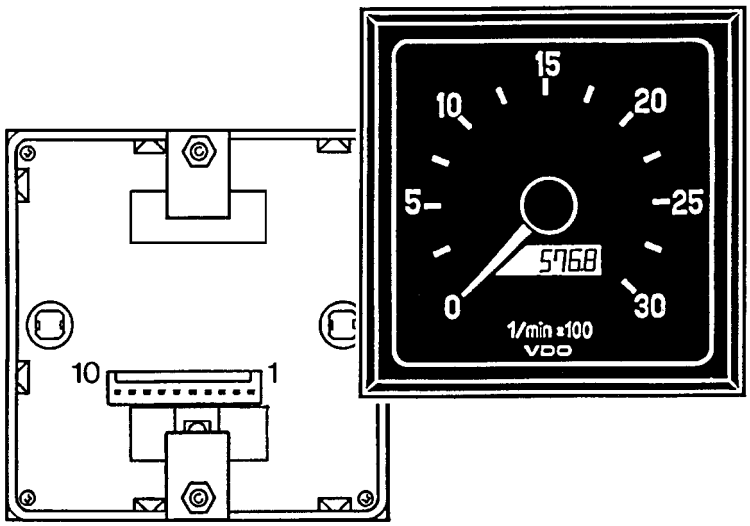
Percentage for fine adjustment: „A – 9.0“

4. Preselected Instrumentation

4.9 Electronic Tachometer With Operating Hours Counter

Engine speed display

When the ignition is switched off, the pointer will return to the zero position.
Then the instrument will automatically get turned off.



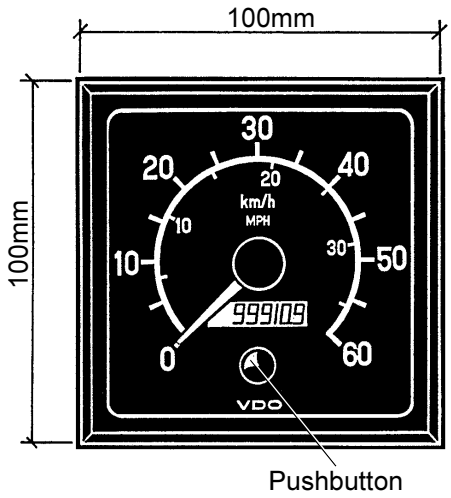
Operating hours display

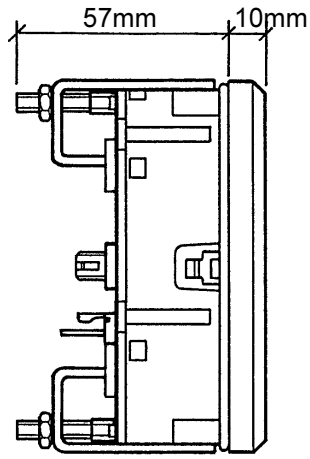
The display shows operating hours up to “999999.9” max.. This display cannot be adjusted.

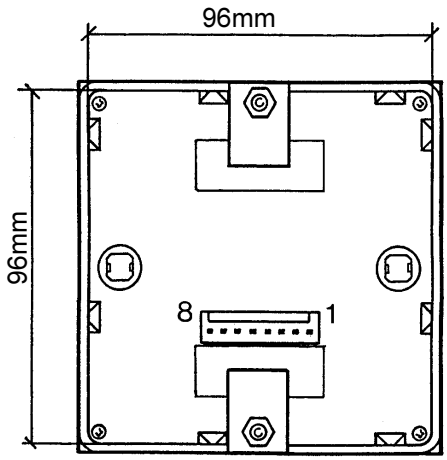
Operating hours remain stored after the operating voltage is switched off.

4. Preselected Instrumentation

4.10 Electronic Speedometer







Mounting hole: 96.5 x 96.5mm

Pin assignment:

Pin 1	Terminal 31– (ground)
Pin 2	Signal + (sensor)
Pin 3	Sensor V+ (+ 12 V out sensor supply)
Pin 4	Signal – (sensor)
Pin 5	Pull up, open collector sensor (to connect wth pin 2)
Pin 6	Terminal 15 +
Pin 7	Not connected or PWM output (speed signal)
Pin 8	Terminal 58 + (illumination)

Rated voltage:	12 V ... 24 V
Operating voltage:	10 V ... 31 V
Signal input:	Universal (hall-effect sensor, inductive sensor, blocking oscillator sensor)
Pulses:	Selectable from 500 pulses/km or mile to 400000 pulses/km or mile (depends on input signal)
Operating temperature:	– 25°C ... + 70°C
Storage temperature:	– 30°C ... + 70°C (up to + 85°C for 1h max.)
Mode of protection:	IP 52 DIN 40 050 from the front (EN 60 529, IEC 529)
EMC:	89/336 EEC, 95/54 EEC
Nominal position:	NL 0 to NL 90, DIN 16257
Current consumption:	< 100 mA (without illumination)
LCD indication:	Total distance: max. 999999.9 Partial distancee: max. 9999.9
Finish:	
Housing and frame:	black
Lens:	antiglare treated
2 brackets:	zinc-plated and chromatized
Dial face:	deep-black
Dial imprint:	white, by illumination green translucent
Pointer cap:	deep-black
Pointer arm:	fluorescent flaming red

Backlighting:
2 base bulbs: 24 V 1.2W

4. Preselected Instrumentation

4.10 Electronic Speedometer

Measuring Range	Special feature	Part No.
0 - 60 km/h, 0 - 37 MPH	—	437-260-980-001C
0 - 60 km/h, 0 - 37 MPH	with PWM output (speed signal)	437-809-980-004C
0 - 125 km/h, 0 - 77 MPH	—	437-260-980-002C
0 - 125 km/h, 0 - 77 MPH	with PWM output (speed signal)	437-809-980-005C
0 - 85 mph	— ■	437-260-980-003C
0 - 85 mph	with PWM output (speed signal) ■	437-809-980-006C

■ USA (specific version)

PWM = pulse with modulated signal

The electronic speedometer should be installed by a VDO-Kienzle workshop or an authorized specialized workshop.

A pushbutton in the front lens is provided for setting and operation of the instrument.

4. Preselected Instrumentation

4.10 Electronic Speedometer

Setting

3 alternatives can be used for setting the instrument:

2 options for pulse/distance ratio setting:

Function “AUtOCL” - automatic calibration by driving a measuring distance (1 km or 1 mile)

Function “PULSE” - enter a known pulse/distance ratio.

1 possibility for fine adjustment of the speed indication:

Function “AdJUSt” - calibration using a reference speed indication (roller test bench).

Note: Respect the tolerances per directive 75/443/EEC when calibrating the speed indication.

1. The vehicle is tested at the following speeds:
   40 km/h, 80 km/h and 120 km/h or 80 % of the maximum speed specified by the manufacturer if it is lower than 150 km/h.

2. The error limit of the instrument used for the measurement of the effective vehicle speed shall not exceed ± 1.0 %.

3. If a measuring track is used, it shall be level and dry, and have a sufficiently non-skid surface.

4. The displayed speed shall never be lower than the effective speed. At the speed specified under 1. and at the intermediate values the difference of speed V1 displayed by the speedometer and effective speed V2 shall have the following relation:

$$0 \leq V1 - V2 \leq \frac{V2}{10} + 4 \text{ km/h}.$$

Or see your national laws (directives).

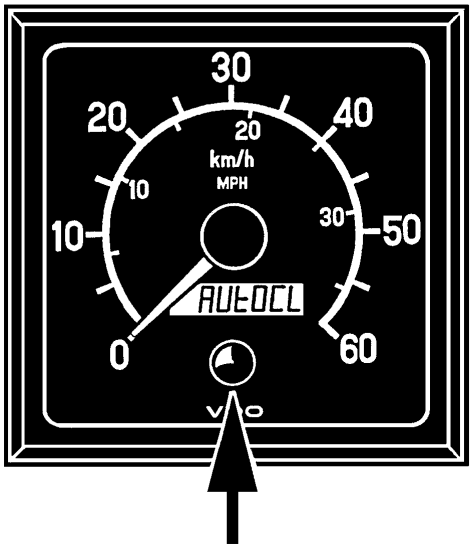
4. Preselected Instrumentation

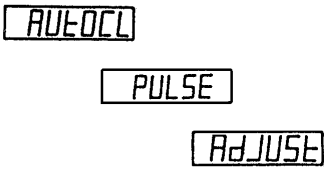
4.10 Electronic Speedometer

Setting

Selection of the functions “AUtOCL”, “PULSE” or “AdJUSt”

Push the pushbutton in front lens and keep pushed. Switch the ignition (operating voltage) on. The display alternates between “AUtOCL”, “PULSE” and “AdJUSt” at 2 seconds interval. Select a function by releasing the pushbutton when this function is displayed.





4. Preselected Instrumentation

4.10 Electronic Speedometer

Setting

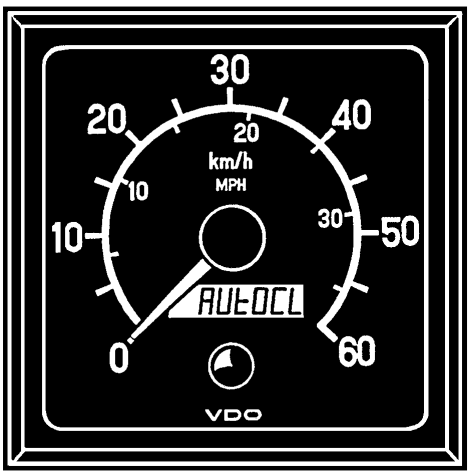
Function “AUtOCL”

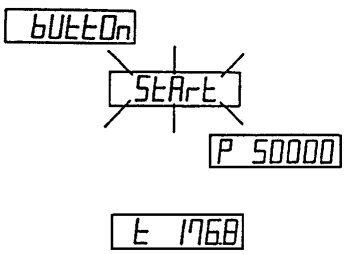
After selection of the function **“AUtOCL”** the display changes to “bUttOn” after three seconds:

Ask the passenger to do the calibration!
No speed is displayed during the measuring drive!

Start the vehicle and drive to measuring track. Exactly at the beginning to the track push the pushbutton shortly, the display flashes “StArt”. Drive the test track with as constant a speed as possible. Exactly at the end of the measuring track again shortly push the pushbutton. The determined pulse/distance ratio is displayed if it is between 500 and 399990 pulses (e. g. P 50000, wich corresponds to pulse/distance ratio 50000). The calibration is completed if the display changes to total or partial distance display.

Repeat the calibration if the display flashes “F00” (no pulses). The sequence is the same as described above.





4. Preselected Instrumentation

4.10 Electronic Speedometer

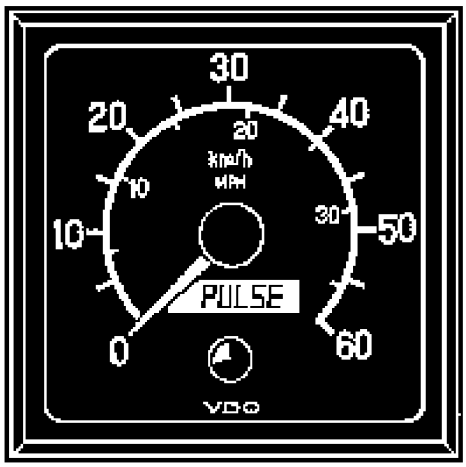
Setting

Function “PULSE”

After selection of the function **“PULSE”** the display shows “P 50000”, for instance, after three seconds, with the digit before the last one flashing start entering the pulse/distance ratio immediately. The flashing digit is changed by pushing the pushbutton (adjustable pulse/distance ratio 500 to 399990). After entry of the pulse/distance ratio the display changes to total or partial distance display, the calibration is completed.

A new setting is required if the digit before the last one is flashing in the display after pulse/distance ratio setting. The sequence is the same as described above.

The function “PULSE” can be used to check the pulse/distance ratio stored by automatic calibration (function “AUtOCL”). The stored pulse/distance ratio is displayed (e. g. P 50000), and the digits start flashing, beginning with the digit before the last one.



4. Preselected Instrumentation

4.10 Electronic Speedometer

Setting

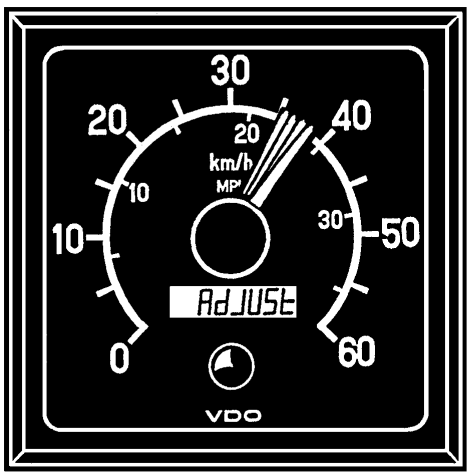
Function “AdJUSt”

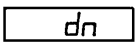
After selection of the function “AdJUSt” the display alternates between “UP“ and “dn” (down) after three seconds.

Only use this function on the roller test bench! The fine adjustment is only possible between 30 % and 100 % of the indicating range. No pulse/distance ratio counting takes place during fine adjustment.

Pushing and holding the pushbutton when “UP” is displayed increases the pointer indication (“dn” will lower it accordingly). Initially the change of the indication will be very slow for a very precise adjustment. Releasing the pushbutton for a short time repeats the cycle. The rate of pointer indication change increases when the pushbutton is held for a longer time. Release the pushbutton when the pointer indication corresponds to the reference speed. After 1 minute the display shows total or partial distance. Fine adjustment has been completed.

A wrong pulse/distance ratio entry (function “PULSE”) exists if the display starts flashing during fine adjustment. The pulse/distance ratio is either below 500 or above 399990. Repeat the calibration with the function “PULSE”.





4. Preselected Instrumentation

4.10 Electronic Speedometer

Operation

Shortly pushing the pushbutton alternates the total distance display (e. g. 99910.9) with the partial distance display (e. g. t 176.8).

The total distance function counts the total mileage in kilometers or miles up to 999999.9 max.. This display cannot be reset.

max. 9999999

The partial distance function counts the mileage in kilometers or miles up to „t9999.9“. This display is reset to „t0.0“ by pushing the pushbutton (during 2 seconds approximately).

Pushing the pushbutton during 2 seconds when total distance is displayed will also reset the partial distance to „t0.0“.

t 176.8

t 0.0

max. t99999

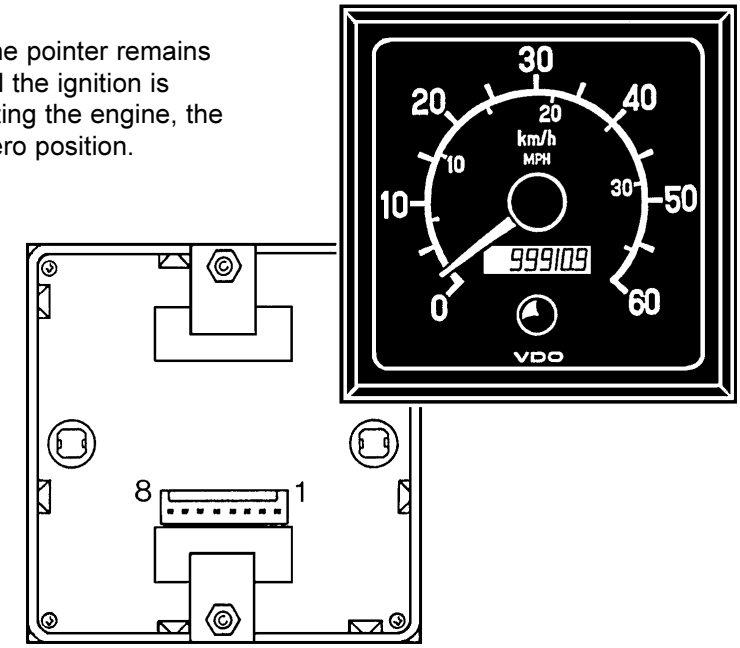
The partial distance and the total distance remain stored after the operating voltage is switched off.

4. Preselected Instrumentation

4.10 Electronic Speedometer

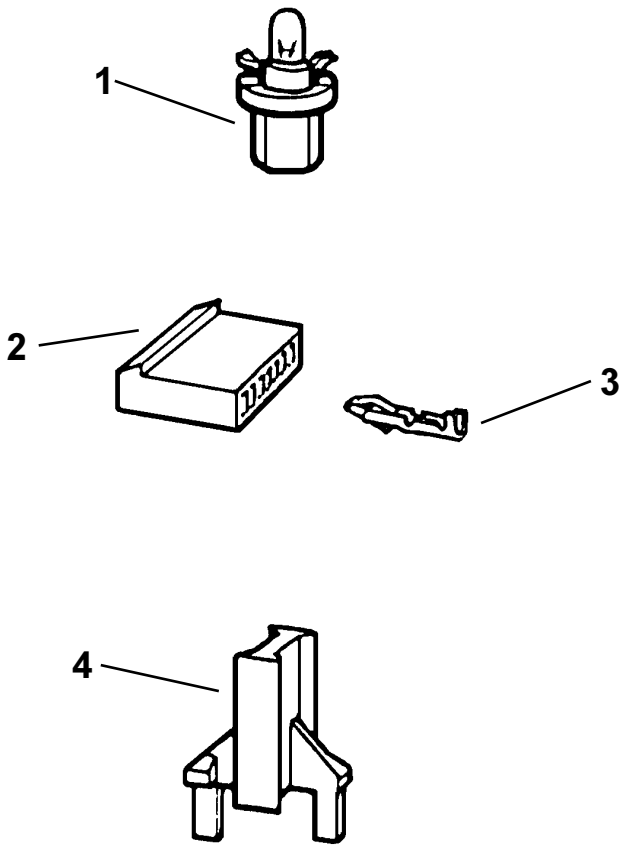
Speed display

When ignition is switched off, the pointer remains at the last speed indicated, until the ignition is switched on again, without starting the engine, the pointer will then return to the zero position.



4. Preselected Instrumentation

4.11 Replacement Parts And Accessories



Pos.	Designation	Part No.
1	Base bulb (12 V 1.2 W)	92-171-005
	Base bulb (24 V 1.2 W)	92-171-003
2	Connector housing 4-fold	X11-000-014-001
	Connector housing 5-fold	X11-000-014-002
	Connector housing 7-fold	X11-000-014-003
	Connector housing 8-fold	X11-000-014-004
	Connector housing 10-fold	X11-725-002-008
3	Connector socket	X11-000-014-005
4	Clip	81-045-109

VDO cockpit vision, VDO cockpit international, VDO modulcockpit II

Operating Instructions For Electronic Speedometer

SIEMENS VDO
Automotive

1. Setting

3 alternatives can be used for setting the instrument:

2 options for pulse/distance ratio setting:

Function **'AUtOCL'**- automatic calibration by driving a measured distance (1 km or 1 mile)

Function **'PULSE '**- enter a known pulse/distance ratio

1 possibility for fine adjustment of the speed indication:

Function **'AdJUSt '**- calibration using a reference speed indication (roller test bench)

Note: Respect the tolerances per directive75/443/EEC when calibrating the speed indication. A reference to them is made in § 57 StVZO, chapter 4, requirements, states:

4.3.5 The vehicle is tested at the following speeds: 40 km/h, 80 km/h and 120 km/h or 80% of the maximum speed specified by the manufacturer if it is lower than 150 km/h.

4.3.6 The error limit of the instrument used for the measurement of the effective vehicle speed shall not exceed ± 1 %.

4.3.6.1 If a measuring track is used, it shall be level and dry, and have a sufficiently non-skid surface.

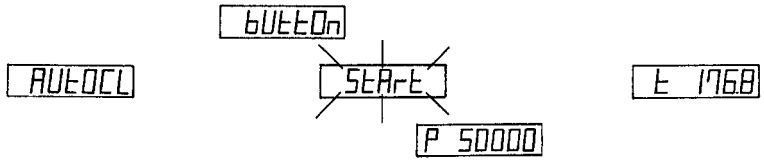
4.4 The displayed speed shall never be lower than the effective speed. At the speed specified under 4.3.5. and at the intermediate values the difference of speed V1 displayed by the speedometer and effective speed V2 shall have the following equation:

$$0 \leq V1 - V2 \leq \frac{V2}{10} + 4 \text{ km/h}$$

1.1 Selection Of The Functions

Push button in front lens and hold in. Switch the ignition (operating voltage) on. The display alternates between 'AUtOCL', 'PULSE' and 'AdJUSt' at 2 seconds interval. Select a function by releasing the push button when this function is displayed.

1.2 Function 'AUtOCL'



After selection of the function **'AUtOCL'** the display changes to 'bUttOn' after 3 seconds:

Ask a passenger to assist with the calibration!
No speed is displayed during the measuring drive!

During the drive exactly at the beginning of the measuring track (1 km or 1 mile) push the button briefly, the display flashes 'StArt'. Drive the test track with as constant a speed as possible. Exactly at the end of the measuring track again briefly push the button. The determined pulse/distance ratio is displayed if it is between 500 and 399990 pulses (e.g. 'P 50000', which corresponds to pulse/distance ratio 50000). The calibration is completed if the display changes to total or partial distance display.

Repeat the calibration if the display flashes 'F00' (no pulses). The sequence is the same as described above.

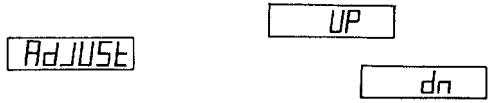
1.3 Function 'PULSE'

After selection of the function **'PULSE'** the display shows 'P 50000', for instance, after 3 seconds, with the digit before the last one flashing start entering the pulse/distance ratio immediately. The flashing digit is changed by pushing the button (adjustable pulse/distance ratio 500 to 399990). After entry of the pulse/distance ratio the display changes to total or partial distance display, the calibration is completed.

A new setting is required if the digit before the last one is flashing in the display after pulse/distance ratio setting. The sequence is the same as described above.

The function 'PULSE' can be used to check the pulse/distance ratio stored by automatic calibration (function 'AUtOCL'). The stored pulse/distance ratio is displayed (e.g. 'P 50000'), and the digits start flashing, beginning with the digit before the last one.

1.4 Function 'Adjust'



After selection of the function **'AdJUSt'** the display alternates between 'UP' or 'dn' (up/down) after 3 seconds.

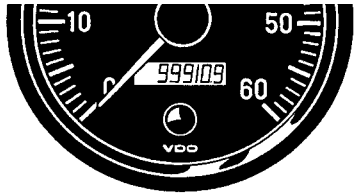
Only use this function on the roller test bench!
The fine adjustment is only possible between 30% and 100% of the indicating range. No pulse/distance ratio counting takes place during fine adjustment.

Pushing and holding the button when 'UP' is displayed increases the pointer indication ('dn' will lower it accordingly). Initially the change of the indication will be very slow for a very precise adjustment. Releasing the button for a short time repeats the cycle. The rate of pointer indication change increases when the button is held for a longer time. Release the button when the pointer indication corresponds to the reference speed. After 1 minute the display shows total or partial distance. Fine adjustment has been completed.

A wrong pulse/distance ratio entry (function 'PULSE') exists if the display starts flashing during fine adjustment. The pulse/distance ratio is either below 500 or above 399990. Repeat the calibration with the function 'PULSE'.

2. Operation

max. 999999.9



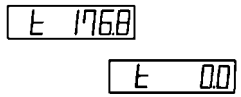
Briefly pushing the button alternates the total distance display (e.g. '99910.9') with the partial distance display (e.g. 't 176.8').

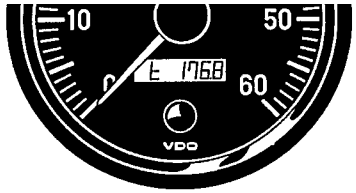
The total distance function counts the total mileage in kilometers or miles up to 999999.9 max.. This display cannot be reset.

The partial distance function counts the mileage in kilometers or miles up to "t9999.9'.
This display is reset to 't0.0' by pushing the button (for 2 seconds approximately).

Pushing the button for 2 seconds when total distance is displayed will also reset the partial distance to 't0.0'.

max. t9999.9





Trip and total distances remain stored after the operating voltage is switched off.

3. Speed Display

Note:

When ignition is switched off, the pointer remains at the last speed indicated, until the ignition is switched on again, without starting the engine, the pointer will then return to the zero position.

Technical Product Manual

VDO modulcockpit II

5. Testing Instructions

Contents **Page**

PWM = pulse with modulated signal

Technical Product Manual

VDO modulcockpit II

5. Testing Instructions

5.1 4Unit Instrument Module

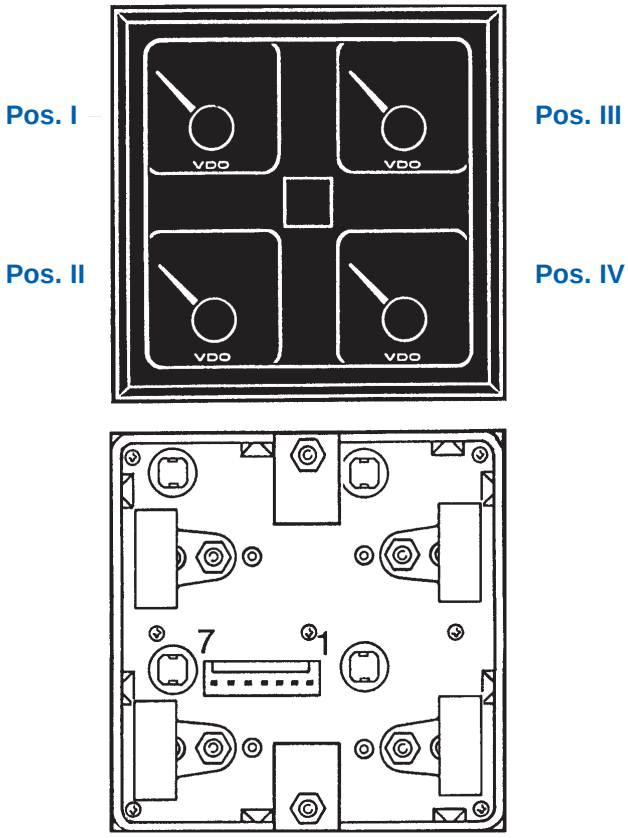
(4x Ke) 4x Single Instrument Module 110-008-980-. . .

Preselected instrumentation see chapter 4.8

Test accessories:

1x power supply
1x test cable No. 3 (7 pins) *
1x measuring cable *
1x resistor decade
List: technical data (chapter 5.9)

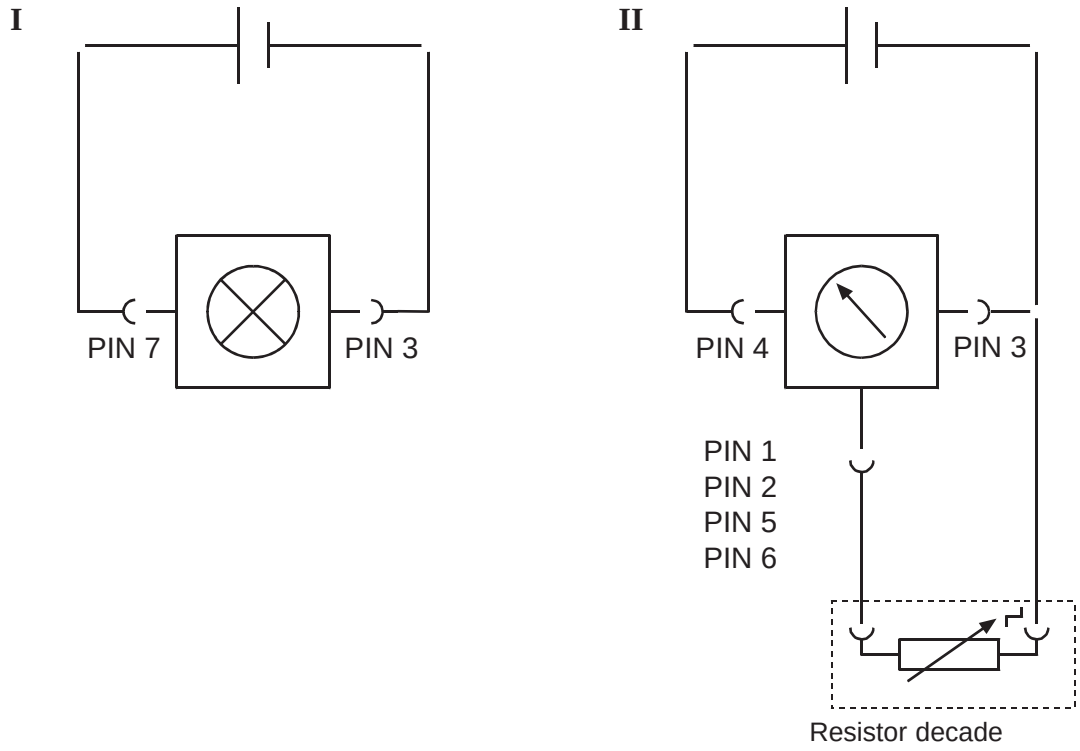
* contained in test cables kit X12-019-100-100



Pin assignment:

PIN 1 Single instrument module sensor pos. II
2 Single instrument module sensor pos. I
3 Ground
4 + 12 V (for 12 V instrument)
+ 24 V (for 24 V instrument)
5 Single instrument module sensor pos. III
6 Single instrument module sensor pos. IV
7 Plus illumination

Test circuit diagram:



5. Testing Instructions

5.1 4Unit Instrument Module

(4x Ke) 4x Single Instrument Module 110-008-980-. . .

Test method description:

Basic settings:	12 V instruments	➠	14V
	24 V instruments	➠	28V

Test of the illumination

Connect the cluster instrument per test circuit diagram I with the test cable No. 3.

Test of the movement

Connect the cluster instrument per test circiut diagram II with the test cable No. 3 and the measuring cable.

The indication can be tested with the resistor decade used for sensor simulation. The chapter 5.9 gives tables of the single instrument modules (Ke) with information about display, comparison resistors and tolerances.

Check the system voltage before switching the power supply on. An overvoltage can lead to the destruction of the instrument or of the illumination.

The sensor line is not needed to test a voltmeter (single instrument module); the test voltages are set at the power supply.

On pressure and fuel level indicators for lever-type sensors the pointer will have full deflection if the resistor decade is not connected.

5. Testing Instructions

5.2 2Unit Instrument Module

(2x Ke) 2x Single Instrument Module 110-008-981-. . .

vertical

Preselected instrumentation
see chapter 4.3 and 4.7

Test accessories:

1x power supply
1x test cable No. 2 (5 pins) *
1x measuring cable *
1x resistor decade
List: technical data (chapter 5.9)

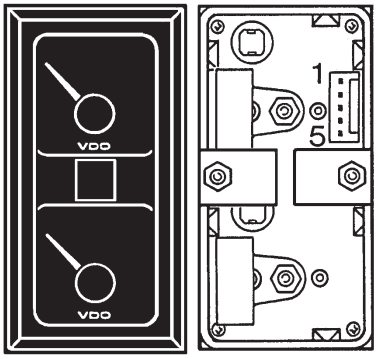
* contained in test cables kit X12-019-100-100

Pin assignment:

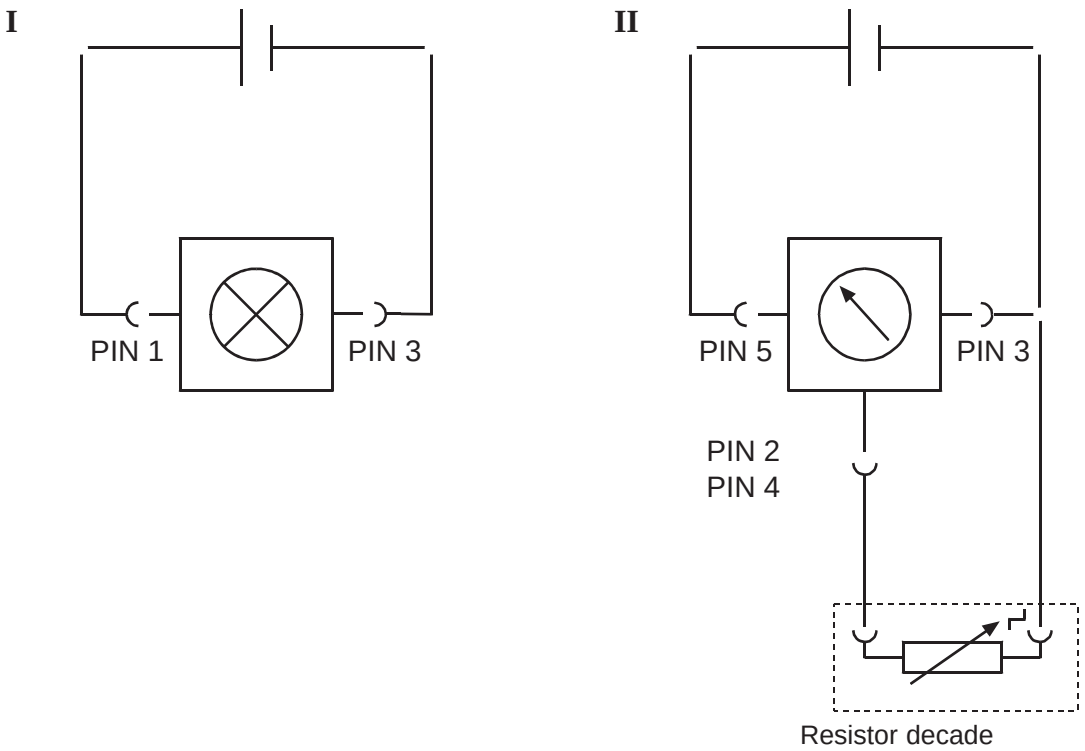
PIN 1 Plus illumination
2 Single instrument module sensor pos. I
3 Ground
4 Single instrument module sensor pos. II
5 + 12 V (for 12 V instrument)
+ 24 V (for 24 V instrument)

Pos. I

Pos. II



Test circuit diagram:



5. Testing Instructions

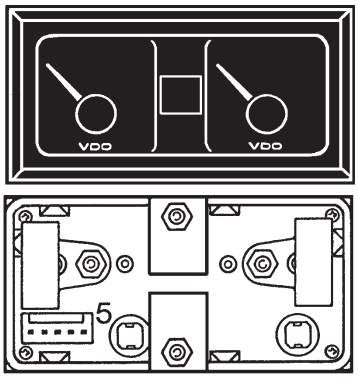
5.2 2Unit Instrument module

(2x Ke) 2x Single Instrument Module 110-008-981-. . .

horizontal

Preselected instrumentation
see chapter 4.3 and 4.7

Pos. I



Pos. II

Test accessories:

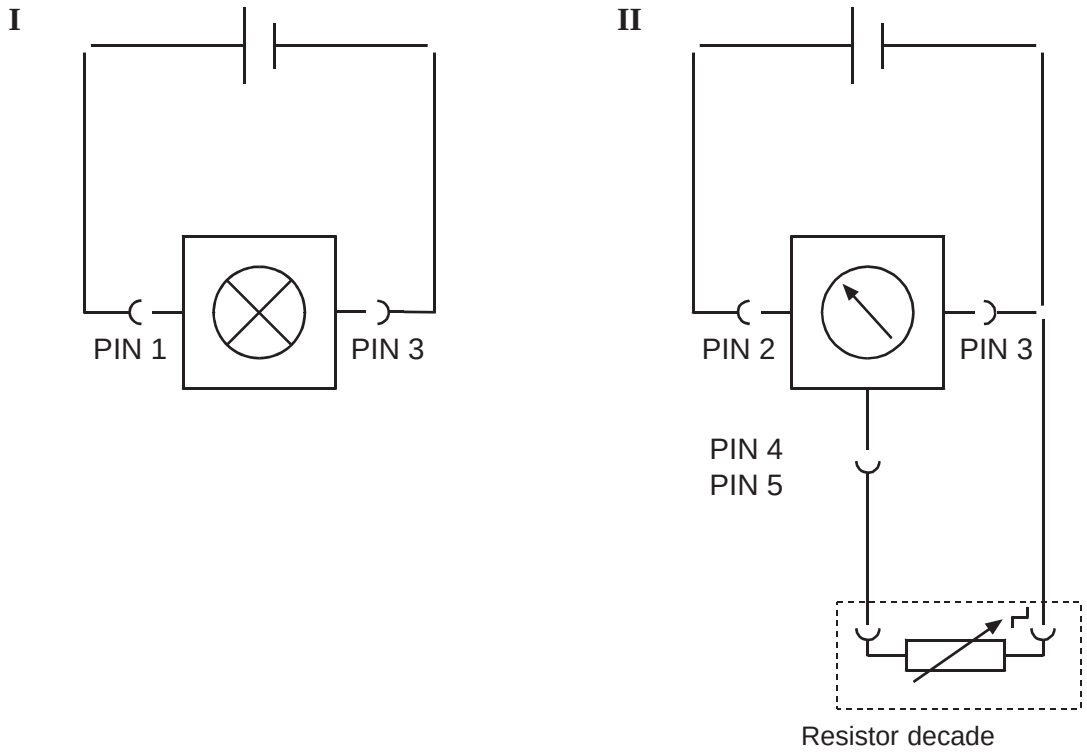
1x power supply
1x test cable No. 2 (5 pins) *
1x measuring cable *
1x resistor decade
List: technical data (chapter 5.9)

* contained in test cables kit X12-019-100-100

Pin assignment:

PIN 1 Plus illumination
2 + 12 V (for 12 V instrument)
+ 24 V (for 24 V instrument)
3 Ground
4 Single instrument module sensor pos. I
5 Single instrument module sensor pos. II

Test circiut diagram:



5. Testing Instructions

5.2 2Unit Instrument Module

(2x Ke) 2x Single Instrument Module 110-008-980-021

vertical

Preselected instrumentation
see chapter 4.3 and 4.7

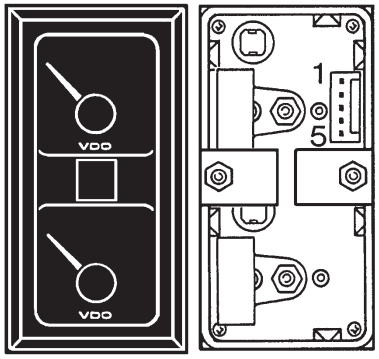
Test accessories:

1x power supply
1x test cable No. 2 (5 pins) *
1x measuring cable *
1x resistor decade
List: technical data (chapter 5.9)

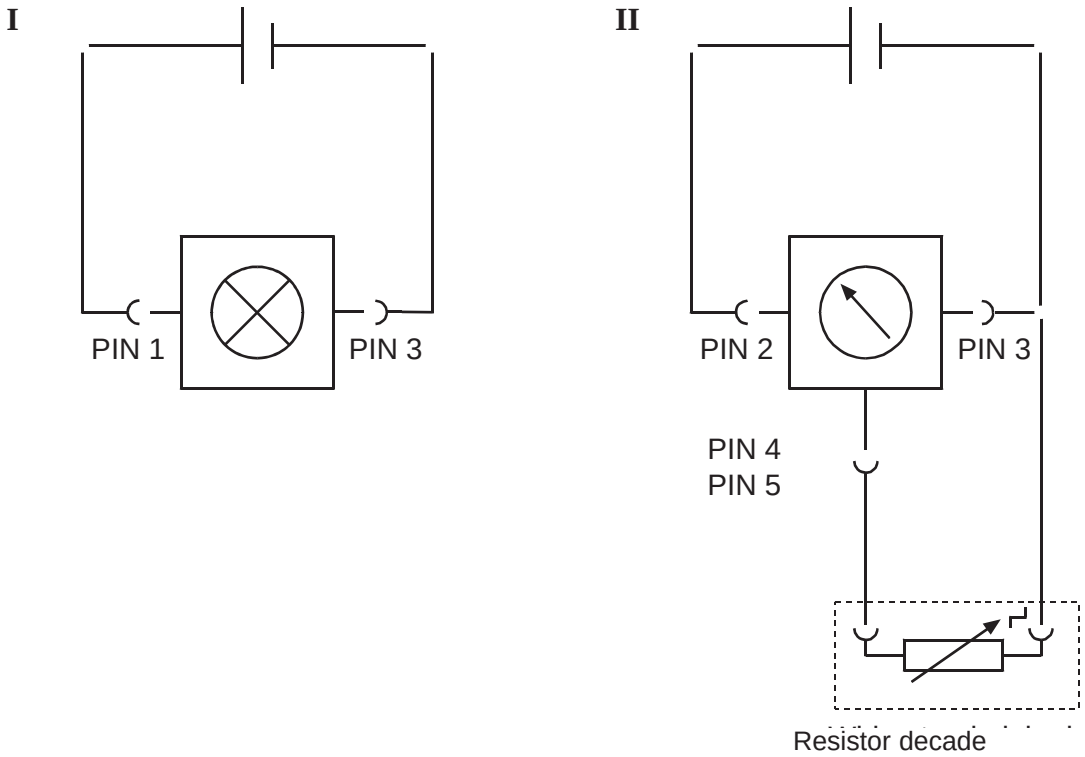
* contained in test cables kit X12-019-100-100

Pin assignment:

PIN 1 Plus illumination
2 Single instrument module sensor pos. I
3 Ground
4 Single instrument module sensor pos. II
5 + 12 V (for 12 V instrument)
+ 24 V (for 24 V instrument)



Test circuit diagram:



5. Testing Instructions

5.2 2Unit Instrument Module

(2x Ke) 2x Single Instrument Module 110-008-981-. . .

Test method description:

Basic settings:	12 V instruments	➠	14V
	24 V instruments	➠	28V

Test of the illumination

Connect the cluster instrument per test circuit diagram I with the test cable No. 2.

Test of the movement

Connect the cluster instrument per test circuit diagram II with the test cable No. 2 and the measuring cable.

The indication can be tested with the resistor decade used for sensor simulation. The chapter 5.9 gives tables of the single instrument modules (Ke) with information about display, comparison resistors and tolerances.

Check the system voltage before switching the power supply on. An overvoltage can lead to the destruction of the instrument or of the illumination.

The sensor line is not needed to test a voltmeter (single instrument module); the test voltages are set at the power supply.

On pressure and fuel level indicators for lever-type sensors the pointer will have full deflection if the resistor decade is not connected.

5. Testing Instructions

5.3 2Unit Instrument Module (KL + Ke) Warning Lights + Single Instrument Module 110-008-982-...

Preselected instrumentation see chapter 4.4

Test accessories:

1x power supply
1x test cable No. 1 (4 pins) *
1x test cable No. 4 (8 pins) *
1x measuring cable *
1x resistor decade
List: technical data (chapter 5.9)
* contained in test cables kit X12-019-100-100

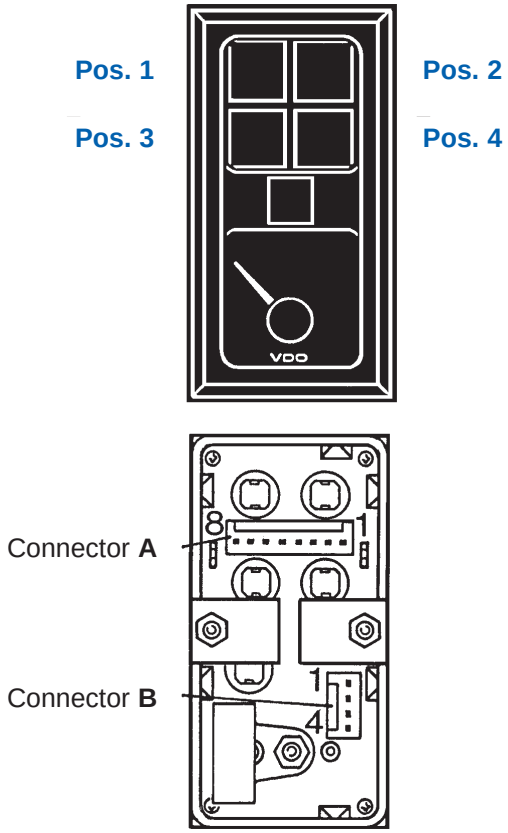
Pin assignment:

Connector **A**

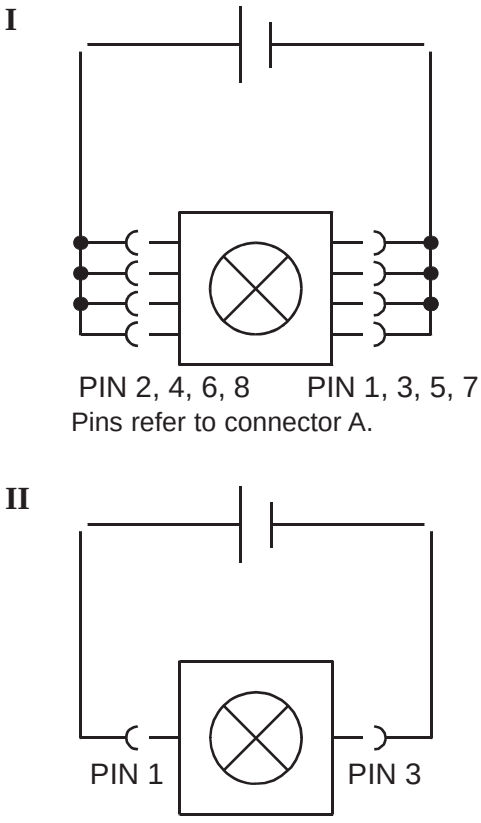
PIN 1 Ground pos. 3
2 Plus illumination pos. 3
3 Ground pos. 1
4 Plus illumination pos. 1
5 Ground pos. 2
6 Plus illumination pos. 2
7 Ground pos. 4
8 Plus illumination pos. 4

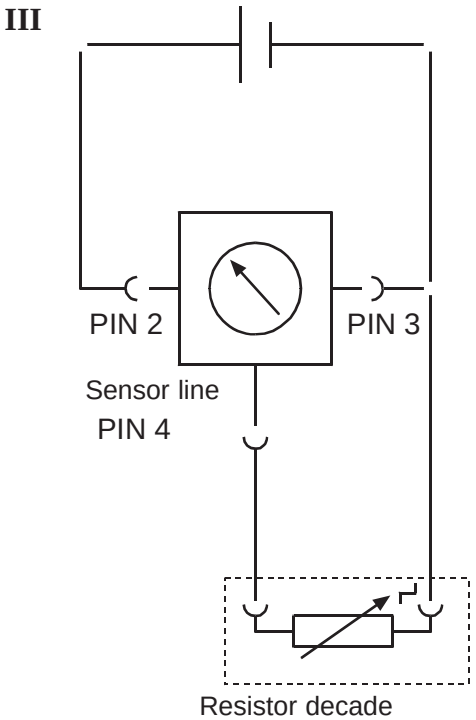
Connector **B**

PIN 1 Plus illumination
2 + 12 V (for 12 V instrument)
+ 24 V (for 24 V instrument)
3 Ground
4 Single instrument module sensor



Test circuit diagram:





5. Testing Instructions

5.3 2Unit Instrument Module (KL + Ke) Warning Lights + Single Instrument Module 110-008-982-...

Test method description:

Basic settings:	12 V instruments	➠	14V
	24 V instruments	➠	28V

Test of warning lights

Connect the cluster instrument per test circuit diagram I with the test cable No. 4.

Test of illumination

Connect the cluster instrument per test circuit diagram II with the test cable No. 1.

Test of the movement

Connect the cluster instrument per test circuit diagram III with the test cable No. 1 and the measuring cable.

The indication can be tested with the resistor decade used for sensor simulation. The chapter 5.9 gives tables of the single instrument modules (Ke) with information about display, comparison resistors and tolerances.

Check the system voltage before switching the power supply on. An overvoltage can lead to the destruction of the instrument or of the illumination.

The sensor line is not needed to test a voltmeter (single instrument module); the test voltages are set at the power supply.

On pressure and fuel level indicators for lever-type sensors the pointer will have full deflection if the resistor decade is not connected.

5. Testing Instructions

5.4 2Unit Instrument Module

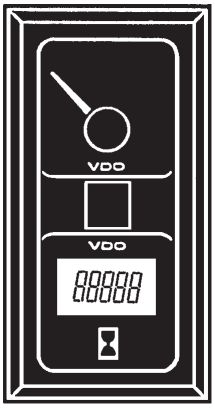
(Ke + EBZ) Single Instrument Module + Operating Hours Counter 110-008-983-...

Preselected instrumentation see chapter 4.2

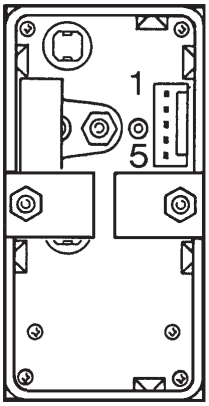
Test accessories:

1x power supply
1x test cable No. 2 (5 pins) *
1x measuring cable *
1x resistor decade
List: technical data (chapter 5.9)

* contained in test cables kit X12-019-100-100



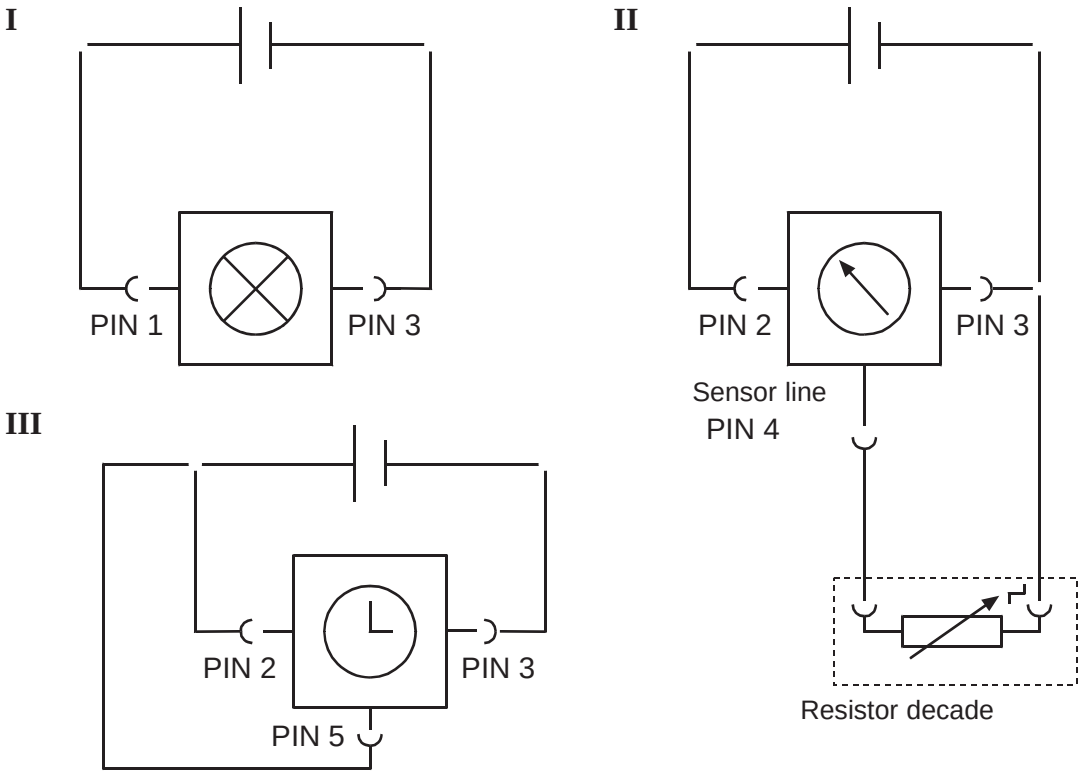
EBZ



Pin assignment:

PIN 1 Plus illumination
2 + 12 V (for 12 V instrument)
+ 24 V (for 24 V instrument)
3 Ground
4 Single instrument module sensor
5 + 12 V EBZ (for 12 V instrument)
+ 24 V EBZ (for 24 V instrument)

Test circuit diagram:



5. Testing Instructions

5.4 2Unit Instrument Module

(Ke + EBZ) Single Instrument Module + Operating Hours Counter 110-008-983-...

Test method description:

Basic settings:	12 V instruments	➠	14V
	24 V instruments	➠	28V

Test of illumination

Connect the cluster instrument per test circuit diagram I with the test cable No. 2.

Test of the movement

Connect the cluster instrument per test circuit diagram II with the test cable No. 2 and the measuring cable.

The indication can be tested with the resistor decade used for sensor simulation. The chapter 5.9 gives tables of the single instrument modules (Ke) with information about display, comparison resistors and tolerances.

Check the system voltage before switching the power supply on. An overvoltage can lead to the destruction of the instrument or of the illumination.

The sensor line is not needed to test a voltmeter (single instrument module); the test voltages are set at the power supply.

On pressure and fuel level indicators for lever-type sensors the pointer will have full deflection if the resistor decade is not connected.

Test of the electronic operating hours counter (EBZ)

Connect the cluster instrument per test circuit diagram III with the test cable No. 2.

The time unit count cannot be erased.

5. Testing Instructions

5.5 2Unit Instrument Module

(KL + EBZ) Warning Lights + Operating Hours Counter 110-008-984-. . .

Preselected instrumentation see chapter 4.1

Test accessories:

1x power supply
1x test cable No. 1 (4 pins) *
1x test cable No. 4 (8 pins) *
1x resistor decade
List: technical data (chapter 5.9)
* contained in test cables kit X12-019-100-100

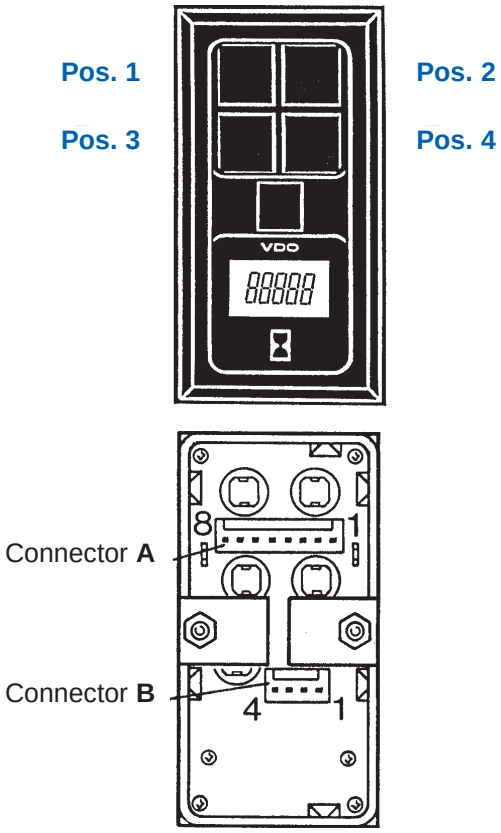
Pin assignment:

Connector **A**

PIN 1 Ground pos. 3
2 Plus illumination pos. 3
3 Ground pos. 1
4 Plus illumination pos. 1
5 Ground pos. 2
6 Plus illumination pos. 2
7 Ground pos. 4
8 Plus illumination pos. 4

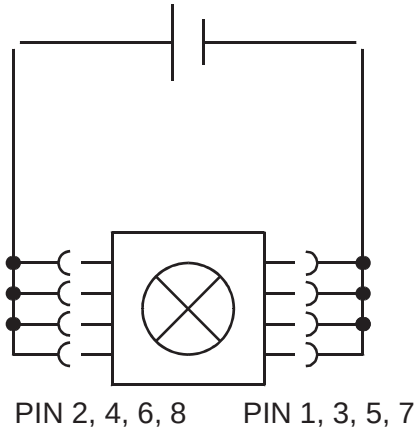
Connector **B**

PIN 1 + 12 V EBZ (for 12 V instrument)
+ 24 V EBZ (for 24 V instrument)
2 + 12 V (for 12 V instrument)
+ 24 V (for 24 V instrument)
3 Ground
4 Plus illumination



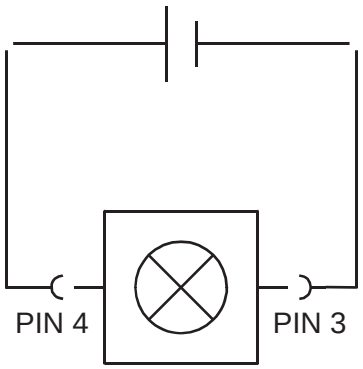
Test circuit diagram:

I

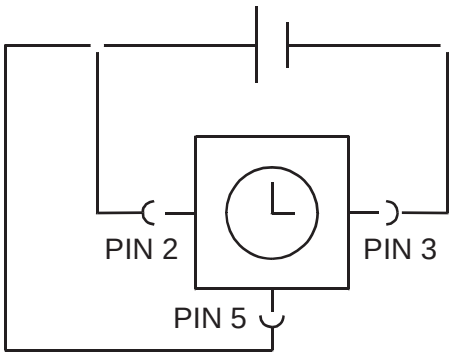


Pins refer to connector A.

II



III



5.5 2Unit Instrument Module

(KL + EBZ) Warning Lights + Operating Hours Counter 110-008-984-. . .

Test method description:

Test of warning lights

Connect the cluster instrument per test circuit diagram I with the test cable No. 4.

Test of illumination

Connect the cluster instrument per test circuit diagram II with the test cable No. 1.

Test of the electronic operating hours counter (EBZ)

Connect the cluster instrument per test circuit diagram III with the test cable No. 1.

The time unit count cannot be erased.

5. Testing Instructions

5.6 2Unit Instrument Module
(KL + KL) Warning Lights + Warning Lights 113-000-980-. . .

Preselected instrumentation see chapter 4.5 and 4.6

Test accessories:

1x power supply
1x test cable No. 4 (8 pins) *
1x resistor decade
List: technical data (chapter 5.9)
* contained in test cables kit X12-019-100-100

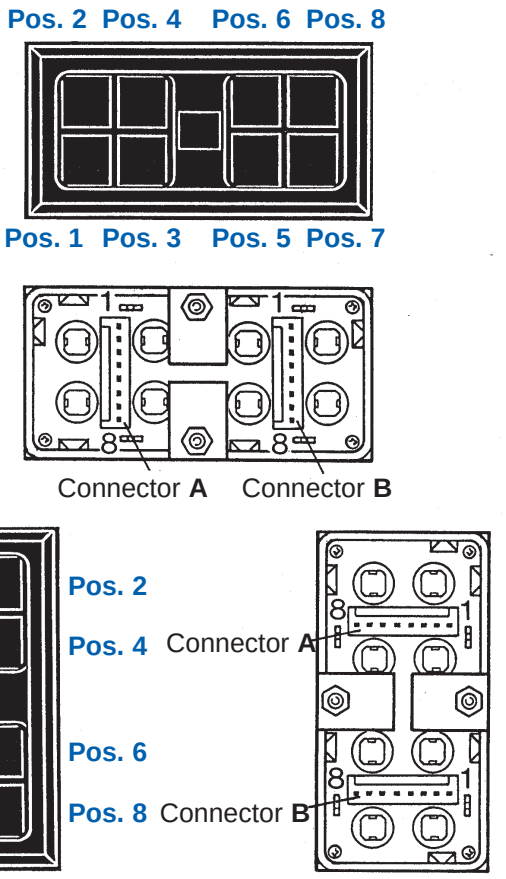
Pin assignment:

Connector **A**

PIN	1	Ground pos. 3
	2	Plus illumination pos. 3
	3	Ground pos. 1
	4	Plus illumination pos. 1
	5	Ground pos. 2
	6	Plus illumination pos. 2
	7	Ground pos. 4
	8	Plus illumination pos. 4

Connector **B**

PIN	1	Ground pos. 7
	2	Plus illumination pos. 7
	3	Ground pos. 5
	4	Plus illumination pos. 5
	5	Ground pos. 6
	6	Plus illumination pos. 6
	7	Ground pos. 8
	8	Plus illumination pos. 8

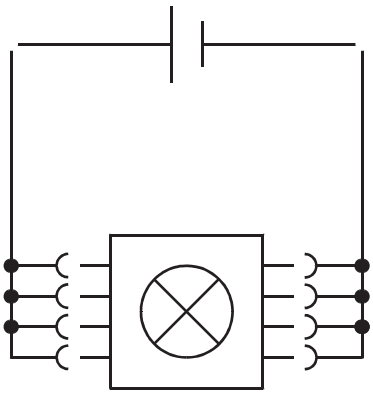


Test method description:

Test of warning lights

Connect the cluster instrument with test cable No. 4 per test circuit diagram to connector A to test the first four warning lights. After the test connect cable to connector B to test the remaining four warning lights.

Test circuit diagram:



PIN 2, 4, 6, 8 PIN 1, 3, 5, 7
Pins refer to connector A and B.

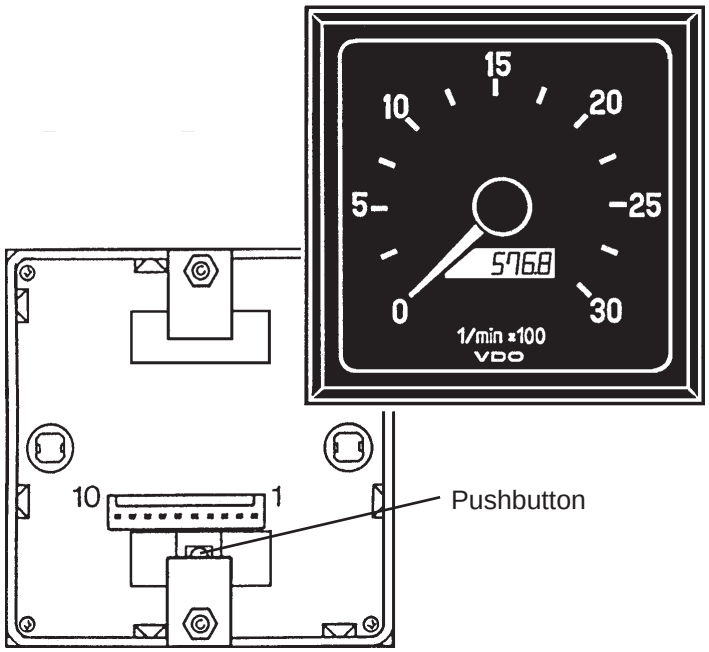
Technical Product Manual

VDO modulcockpit II

5. Testing Instructions

5.7 Electronic Tachometer
With Operating Hours Counter 333-251-980-. . .

Preselected instrumentation see chapter 4.9



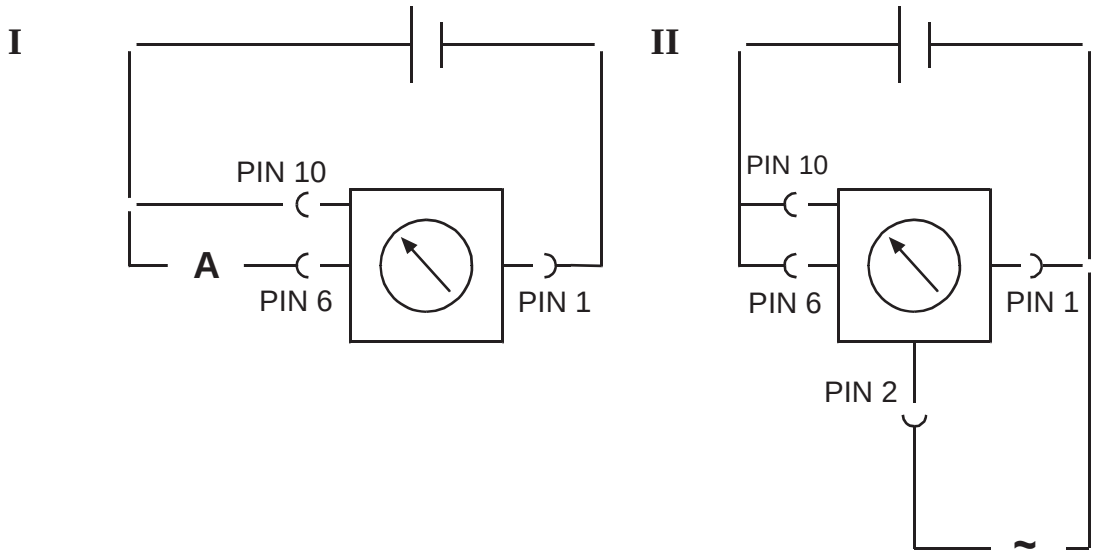
Test accessories:

1x power supply
1x test cable with 10-pole connector housing (see page 5-23)
1x measuring cable *
1x frequency generator
1x ammeter
* contained in test cables kit X12-019-100-100

Pin assignment:

PIN 1 Ground
2 Sensor signal input
6 + 10 V to + 31 V
8 Plus illumination
10 Permanent positive pole 12V/24 V

Test circuit diagram:



Test method description:

Basic settings:	12 to 24 V instruments	➡	U = 18 ± 2 V
	Cycle + number of cylinders	➡	4 – 4C
	Function “A”	➡	A 0.0

Current consumption measurement

Connect the instrument per test circuit diagram II with the test cable with 10-pole connector housing and the measuring cable.

Value range: 12 to 24 V instruments ➡ I = 52 ± 5.2 mA

5.7 Electronic Tachometer With Operating Hours Counter 333-251-980-. . .

Test method description:

Test of operating hours counter

Connect the instrument per test circuit diagram II with the test cable with 10-pole connector housing and the measuring cable.

After connection of the operating voltage the display shows the operating hours. The operating hours are counted and displayed if, in addition, an engine speed signal is connected.

The comma flashes once per second at engine speeds above 400 rpm.

The time unit count cannot be erased.

Test of pointer position: test of the zero point

Connect the instrument per test circuit diagram I with the test cable with 10-pole connector housing.

Check the pointer position after connection of the operating power. The deviation shall not exceed ± 1 degree of angle.

Test of pointer position: test of full scale deflection

Connect the instrument per test circuit diagram II with the test cable with 10-pole connector housing and the measuring cable.

Connect a square wave signal with a frequency calculated with the follwing formula to pin 4 of the connector. The amplitude can have any value between 1 and 10 V.

Formula for number of pulses per revolution:

$$\left(\frac{\text{pulses}}{\text{revolution}}\right) = \frac{\text{2 x number of cylinders}}{\text{cycles x number of ignition coils}}$$

Formula for the frequency:

$$f_{max} = \frac{\left(\frac{\text{pulses}}{\text{revolution}}\right) \text{x scale-end speed}}{60} \; [Hz]$$

Example:

Tachometer with scale-end at 3000 rpm, 4 cylinders 4-cycle engine, 1 ignition coil

$$\frac{\text{pulses}}{\text{revolution}} = \frac{2 \text{ x } 4}{4 \text{ x } 1} = 2$$

$$f_{max} = \frac{2 \text{ x } 3000}{60} = 100 \text{ Hz}$$

5. Testing Instructions

5.8 Electronic Speedometer 437-260-980-. . .
Electronic Speedometer With PWM Output 437-809-980-. . .

Preselected instrumentation see chapter 4.10

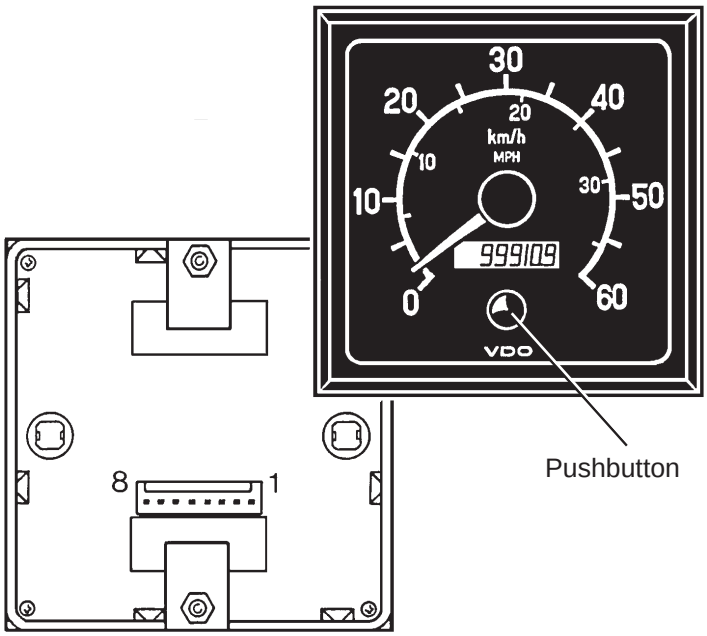
Test accessories:

1x power supply
1x test cable No. 4 (8 pins) *
1x measuring cable *
1x frequency generator
1x ammeter
1x voltmeter

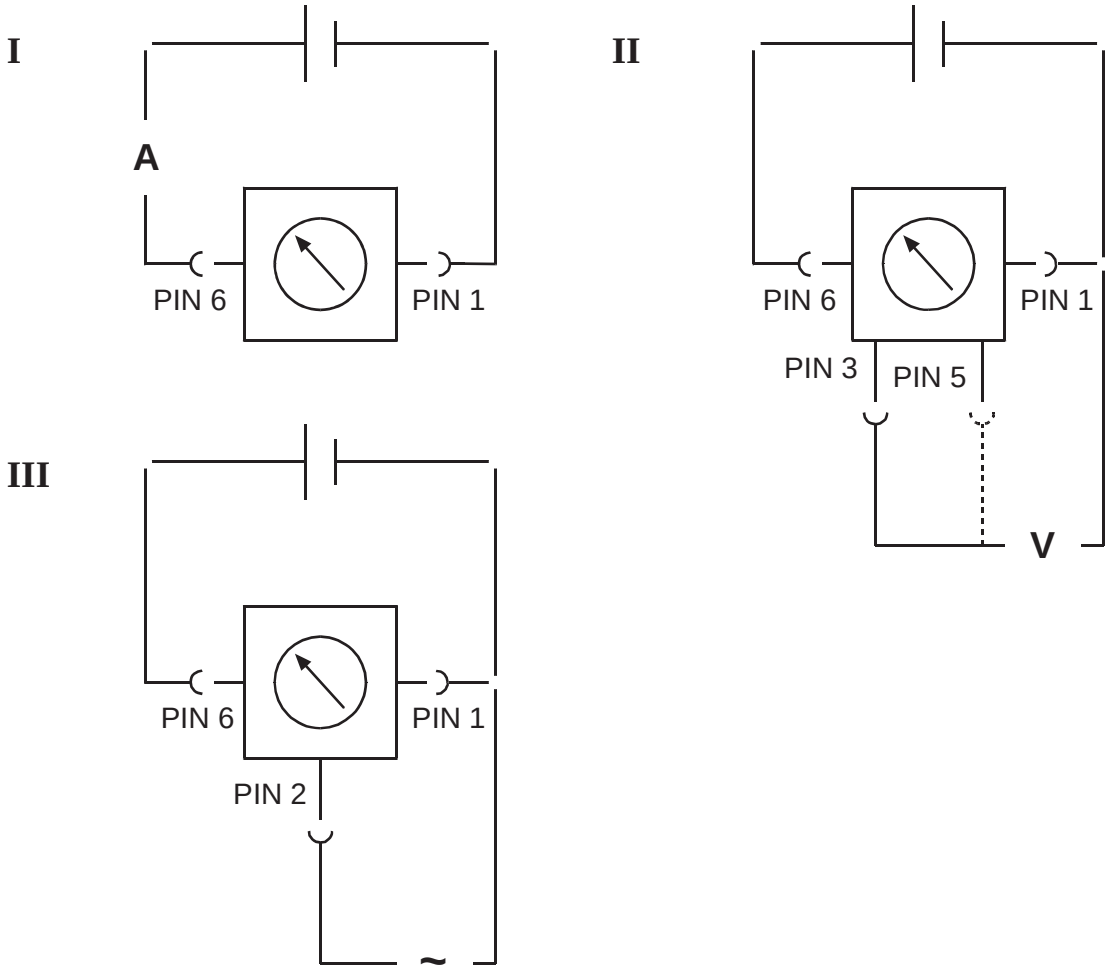
* contained in test cables kit X12-019-100-100

Pin assignment:

PIN 1 Ground
2 Sensor signal input
3 + 12 V for sensor
5 + 12 V for open collector sensor
6 + 10 V to + 31 V
8 Plus illumination



Test circuit diagram:



PWM = pulse with modulated signal

5. Testing Instructions

5.8 Electronic Speedometer 437-260-980-. . .
Electronic Speedometer With PWM Output 437-809-980-. . .

Test method description:

Basic settings:	12 to 24 V instruments ➠	U = 18 ± 2 V

Current consumption measurement

Connect the instrument per test circuit diagram I with the test cable No. 4.

Value range: 12 to 24 V instruments ➠ I = 52 ± 5.2 mA

Test of outputs pin 3 and pin 5

Connect the instrument per test circuit diagram II with the test cable No. 4 and the measuring cable.

Value range: 12 to 24 V instruments ➠ U = 14.5 ± 2 V

Odometer test

Connect the instrument per test circuit cable III with the test cable No. 4 and the measuring cable.

Connect a square wave signal with a frequency corresponding to the maximum speed range and the distance/pulse number to pin 8. The formula for the calculation of the maximum square wave signal frequency can be found under pointer position test (full scale deflection). The amplitude can have any value between 1 and 10 V.

After connection of the operating voltage the display will show the total mileage or the trip distance. Set fequency generator to 0 Hz and slowly increase the speed until the odometer starts counting (e. g. at 60 km/h; 1 minute = 1 kilometer).

⚠ It is not possible to erase the total mileage count.

Test of pointer position: test of the zero point

Connect the instrument per test circuit diagram III with the test cable No. 4 and the measuring cable.

Switch the operating voltage on and check the pointer deviation. The deviation shall not exceed ± 1 degree of angle.

Test of pointer position: test of full scale deflection

Connect the instrument per test circuit diagram III with the test cable No. 4 and the measuring cable.

$$f_{max} = \frac{\text{speed x distance/pulse number (K)}}{3600}\ [Hz]$$

5.8 Electronic Speedometer 437-260-980-. . .
Electronic Speedometer With PWM Output 437-809-980-. . .

Test of pointer position: test of speed indication

Test at 40 km/h, 80 km/h and 120 km/h or 80% of full pointer deflection if this value is less than 150 km/h .

Connect the instrument per test circuit diagram III with the test cable No. 4 and the measuring cable.

$$f_{max} = \frac{\text{speed x distance/puse number (K)}}{3600}\ [Hz]$$

Respect the tolerances per directive 75/443/EEC or your national laws (directives) when testing the speed indication.

The directive 75/443/EEC says that the following relation must exist between the indicated speed (on the speedometer) and the effective speed (per test installation):

v_1 = indicated speed v_2 = effective speed

$$0 \le v_1 - v_2 \le \frac{v_2}{10} + 4 \text{ km/h.}$$

Example:

Speedometer with full scale deflection 300 km/h, distance/pulse number (K) = 6000 pulses/km

$$f_{max} = \frac{\text{speed x distance/pulse number (K)}}{3600}\ [Hz]$$

The maximum tolerance of this speedometer (at full scale deflection = 500 Hz) is:

$$[v_1 - 300 \le \frac{300}{10} + 4\ km/h] = [v_1 - 300 \le +\ 34\ km/h]$$

Fuel Level Gauges

Fuel level gauge (lever type sensor) 12/24V 301-292-980-004C

Indicating tolerance ± 3.6 angular degrees over the entire range.
Measurement at decreasing filling level.

Indication	0	1/4	1/2	3/4	1/1
Comparison resistance ( )	3	45	85	138	180
Pointer deflection angle	0	17.2	41.2	73.8	88.8

Fuel level gauge (tubular type sensor) 12/24V 301-291-980-003C

Indicating tolerance ± 3.6 angular degrees over the entire range.
Measurement decreasing filling level.

Indication	0	1/4	1/2	3/4	1/1
Comparison resistance ( )	60-90				0.5
Pointer deflection angle	0	22	44	66	87.4

Temperature Gauges

Temperature gauge (hydraulic) — 12/24V — 310-284-980-010C

Indicating tolerance ± 3.6 angular degrees over the entire range.
Measurement at increasing temperature.

Indication (°C)	20	40	60	80	100
Comparison resistance ( )	700	287.4	134	69.1	38.5
Pointer deflection angle	0	28.66	69.33	83.33	90.66

Temperature gauge (oil) — 12/24V — 310-284-980-012C / 12/24V — 310-284-980-014C / 12/24V — 310-284-980-015C

Indicating tolerance ± 3.6 angular degrees over the entire range.
Measurement at increasing temperature.

Indication (°C)	50	80	100	120	150
Comparison resistance ( )	322.8	112.5	62.2	36.5	18.6
Pointer deflection angle	0	27.8	29.6	56.8	88.1

Temperature gauge (water) — 12/24V — 310-284-980-011C / 12/24V — 310-284-980-013C / 12/24V — 310-284-980-017C

Indicating tolerance ± 3.6 angular degrees over the entire range.
Measurement at increasing temperature.

Indication (°C)	40	60	80	100	120
Comparison resistance ( )	287.4	134	69.1	38.5	22.7
Pointer deflection angle	0	8.3	25.8	58	88.2

Temperature gauge (water) — 12/24V — 310-284-980-004C ▽

Indicating tolerance ± 3.6 angular degrees over the entire range.
Measurement at increasing temperature.

Indication (°C)	40	60	80	100	120
Comparison resistance ( )	287.4	134	69.1	38.5	22.7
Pointer deflection angle	0	10	29.8	61.5	90

Temperature gauge (60-200°C) — 12/24V — 310-284-980-016C

Indicating tolerance ± 3.6 angular degrees over the entire range.
Measurement at increasing temperature.

Indication (°C)	60	100	140	180	200
Comparison resistance ( )	482	165	50.8	25.7	14.3
Pointer deflection angle	0	11.9	43.9	78.9	88.9

▽ phase-out (available as long as stock)

5.9 List:

Technical Data — Single Instrument Modules (Ke)

Voltmeters

Voltmeter (8V-16V) — 12V — 332-305-980-003C

Indication	8V	10V	12V	14V	16V
Tolerance	± 0.85V	± 0.6V	± 0.5V	± 0.5V	± 0.75V
Pointer deflection angle	0	16.8	44.1	70.8	87.6

Voltmeter (8V-16V) — 12V — 332-305-980-001C ▽

Indication	8V	10V	12V	14V	16V
Tolerance	± 0.85V	± 0.6V	± 0.5V	± 0.5V	± 0.75V
Pointer deflection angle	0	17	40	71	90

Voltmeter (18V-32V) — 24V — 332-305-980-004C

Indication	18V	21V	24V	28V	32V
Tolerance	± 1.5V		± 1.2V		±1.5V
Pointer deflection angle	0	13.1	33.6	66.4	88

▽ **phase-out (available as long as stock)**

Pressure Gauges

Pressure gauge — **12/24V** — **350-272-980-010C**

Indicating tolerance ± 3.6 angular degrees over the entire range.
Measurement at decreasing pressure.

Indication (bar)	0	1	2	3	4	5
Comparison resistance ( )	10	48	82	116	151	184
Pointer deflection angle	0	13.4	30.6	53	74.2	87.4

Pressure gauge — **12/24V** — **350-272-980-011C**
12/24V — **350-272-980-012C**
12/24V — **350-272-980-013C**
12/24V — **350-272-980-015C**

Indicating tolerance ± 3.6 angular degrees over the entire range.
Measurement at decreasing pressure.

Indication (bar)	0	2	4	6	8	10
Comparison resistance ( )	10	52	88	124	155	184
Pointer deflection angle	0	15.2	34.3	58.3	76.1	87.4

Pressure gauge — **12/24V** — **350-272-980-014C**
12/24V — **350-272-980-016C**
12/24V — **350-272-980-017C**

Indicating tolerance ± 3.6 angular degrees over the entire range.
Measurement at decreasing pressure.

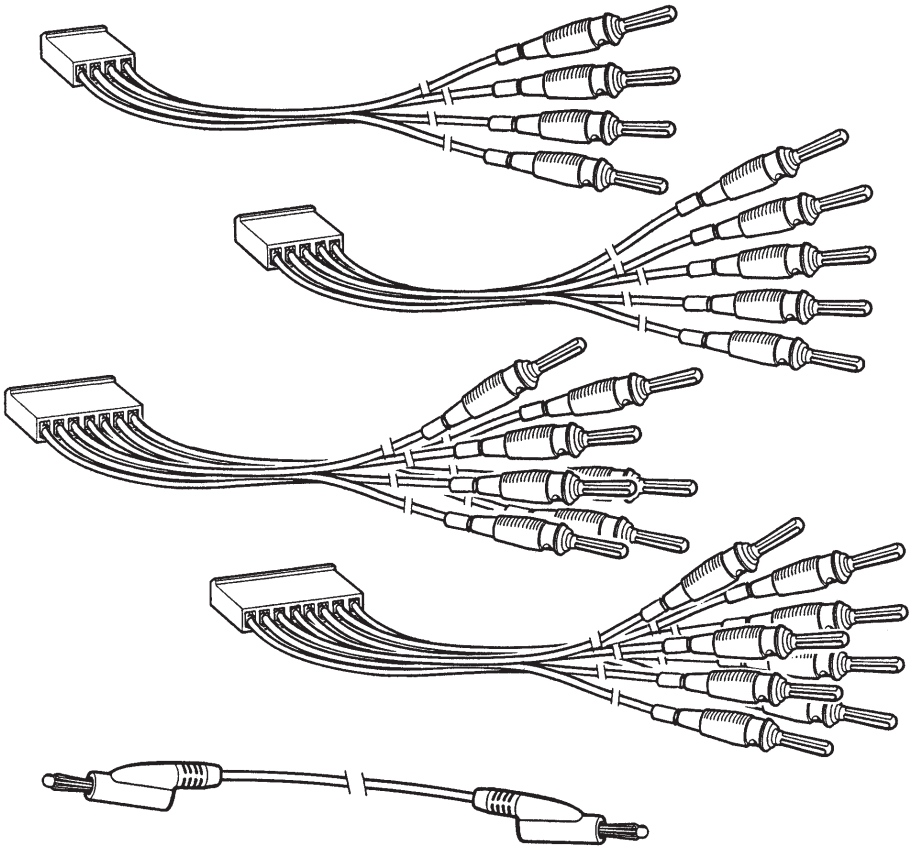
Indication (bar)	0	5	10	15	20	25
Comparison resistance ( )	10	53	92	125	155	184
Pointer deflection angle	0	15.6	36.8	58.9	76.1	87.4

5. Testing Instructions

5.10 Test Accessories, Programming Accessories

Test Cables Kit **Part No.: X12-019-100-100**

consisting of:
1 test cable No. 1 (4 pins)
1 test cable No. 2 (5 pins)
1 test cable No. 3 (7 pins)
1 test cable No. 4 (8 pins)
1 measuring cable

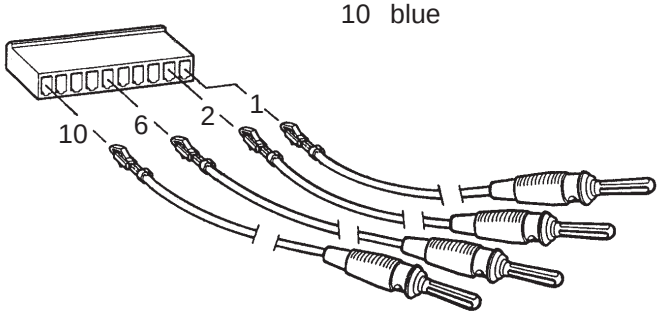


Note:

For test of the electronic tachometer with operating hours counter, which is connected with pin 10 (permanent positive pole 12V/24V), a test cable with 10-pole connector housing must be manufactured.

Connect four variegated wires (dia. 0.75 mm^2, 750 mm long) with always a connector socket (part No. X11-000-014-005) and always a commercial available cluster plug..
Put in the connector sockets in the 10-pole connector housing (part No. X11-725-002-008) on 1, 2, 6 and 10.
The connector sockets must engage with an audible click.
(see chapter 5.7)

1 black
2 green
6 red
10 blue



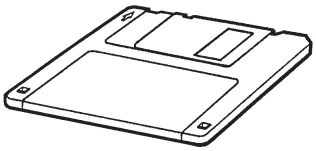
5. Testing Instructions

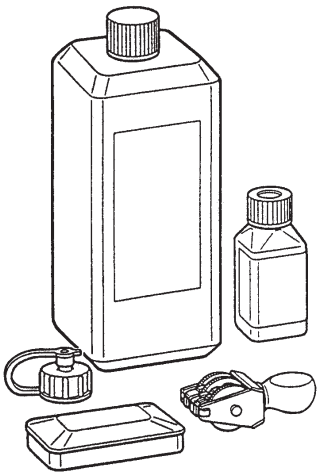
5.10 Test Accessories, Programming Accessories

Software

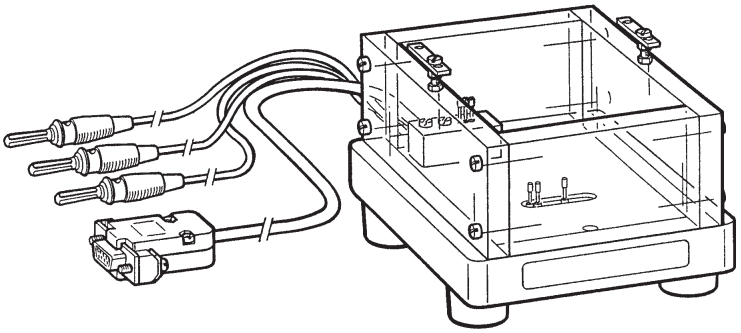
System requirements:

MS-DOS compatible PC,
processor 386SX or better,
mathematical coprocessor (recommended),
MS-DOS 5.0 or more recent,
one serial port COM 1 or COM 2,
one parallel port LPT1 (recommended),
3.5“ diskette drive,
1 MB hard disk capacity,
380 kB free memory,
mouse (recommended).





Software package (full version): diskette, support with current supply wire and individual workshop stamp set (on request)



Programming of all elctronic tachometers with operating hours counter and electronic speedometers of the VDO modulcockpit II serie.

The following parameters can be changed with this software:

- Measuring range
- Frequency or distance/pulse ratio
- Disable programming by pushbutton
- Operating hours (tachometer)
- Total distance (speedometer)
- Electronic operating hours counter threshold
- Pointer zero position

A diagnosis, storage and documentation of data sets is possible in addition. The use is simplified by an online help system.

Software package: diskette and support with current supply wire (on request)

Programming of all electronic tachometers with operating hours counter and electronic speedometers of the VDO modulcockpit II serie.

The following parameters can be changed with this software:

- Frequency or distance/pulse ratio
- Operating hours (tachometer)
- Total distance (speedometer)

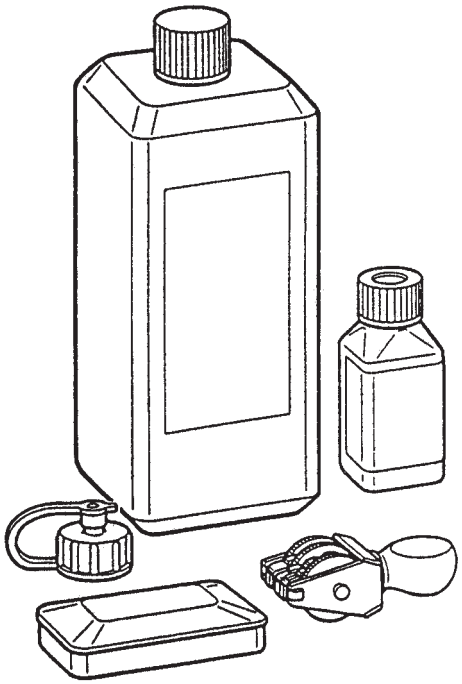
A diagnosis, storage and documentation of data sets is possible in addition. The use is simplified by an online help system.

5.10 Test Accessories, Programming Accessories

Workshop stamp kit

part No.: X12-015-005-001

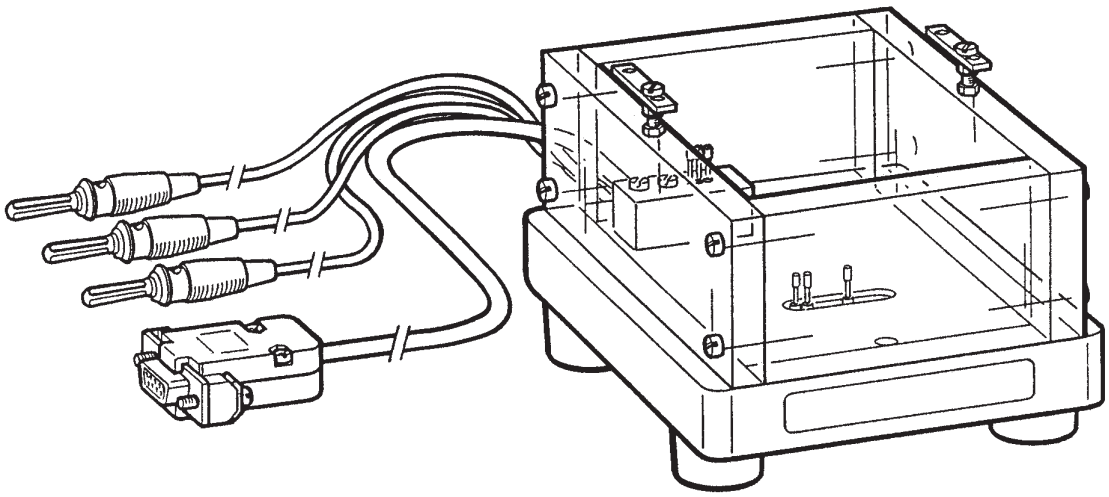
consisting of:
1 individual workshop stamp (tapes stamp)
lettering size 3mm
1 ink-pad
1 special endorsing ink R9
green, 50 ml
1 solvent and thinner for
special endorsing ink R9, 250 ml



Support with current supply wire

part No.: X12-012-080-001

for all electronic tachometers with operating hours counter and electronic speedometers



Technical Product Manual

VDO modulcockpit II

Change View

Date	Chapter-Page	Comment
0400	—	New issue! Supersedes Technical Product Maual VDO Instruments Chapter C VDO modulcockpit II (TU00-0777-0000002)
0501	2 - 26	*new:* 84-438-532-0130 to - 0133
	2 - 27, 2 - 28	*new:* complete
	2 - 24	*new:* Pos. 46 + 47: arrow left, arrow right
0601	2 - 26, 2 - 27	*removed:* 84-438-532-013 to 0133, *removed page 2 - 27:* -0135 to -0141, 84-438-532-0143
	2 - 26	*new:* 84-438-532-0142
	2 - 27	2 - 27 *was* 2 - 28
0801	4-11	*new:* 333-251-980-009C ◆ ▼
	5-20	*new:* 310-284-980-016C
0704	2-4 - 2-6, 2-10, 2-12	Spring washer 4-027-003-1162 *was* 4-026-003-1162
0904	5 - 6	*new:* Instrument added, 110-008-981-021