

Electrical System Instruments Radio

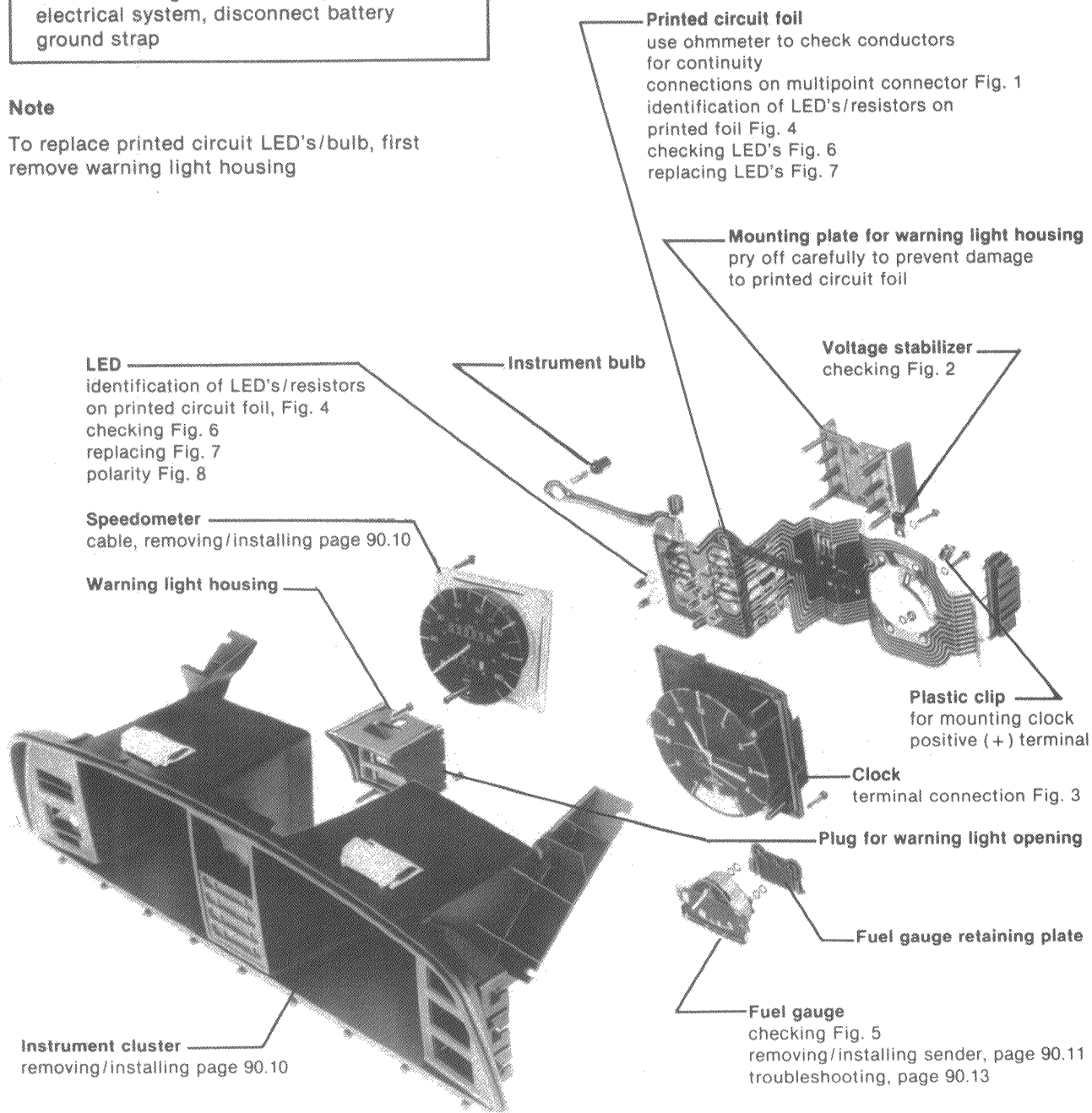
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	<div data-bbox="624 741 743 763">1980-1984</div> <ul style="list-style-type: none"> —Fuel gauge 90.5, 90.9 sender 90.11, 90.12 troubleshooting 90.13 —Instrument cluster with clock 90.2, 90.6 without clock 90.3, 90.7 removing 90.10 —Light emitting diode 90.4, 90.5, 90.8, 90.9 —Multi-point/Clock terminals 90.4, 90.8 —Speedometer cable 90.10, 90.11 calibration (1984) 90.30 —Voltage stabilizer 90.4, 90.8 —Warning light bulbs 90.9 <div data-bbox="1066 741 1185 763">From 1985</div> <ul style="list-style-type: none"> —Coolant temperature display 90.14 troubleshooting 90.21 —Dynamic oil pressure system 90.22 removing 90.23 troubleshooting 90.20 —Fuel gauge 90.14 troubleshooting 90.20 —Instrument cluster with tachometer 90.14 —Light emitting diode 90.18, 90.19 —Multi-point connector 90.18 —Speedometer 90.14 cable 90.18 calibrating 90.30 removing 90.17 —Voltage stabilizer 90.18 —Warning light bulbs 90.18

CAUTION

Before starting to work on any part of electrical system, disconnect battery ground strap

Note

To replace printed circuit LED's/bulb, first remove warning light housing



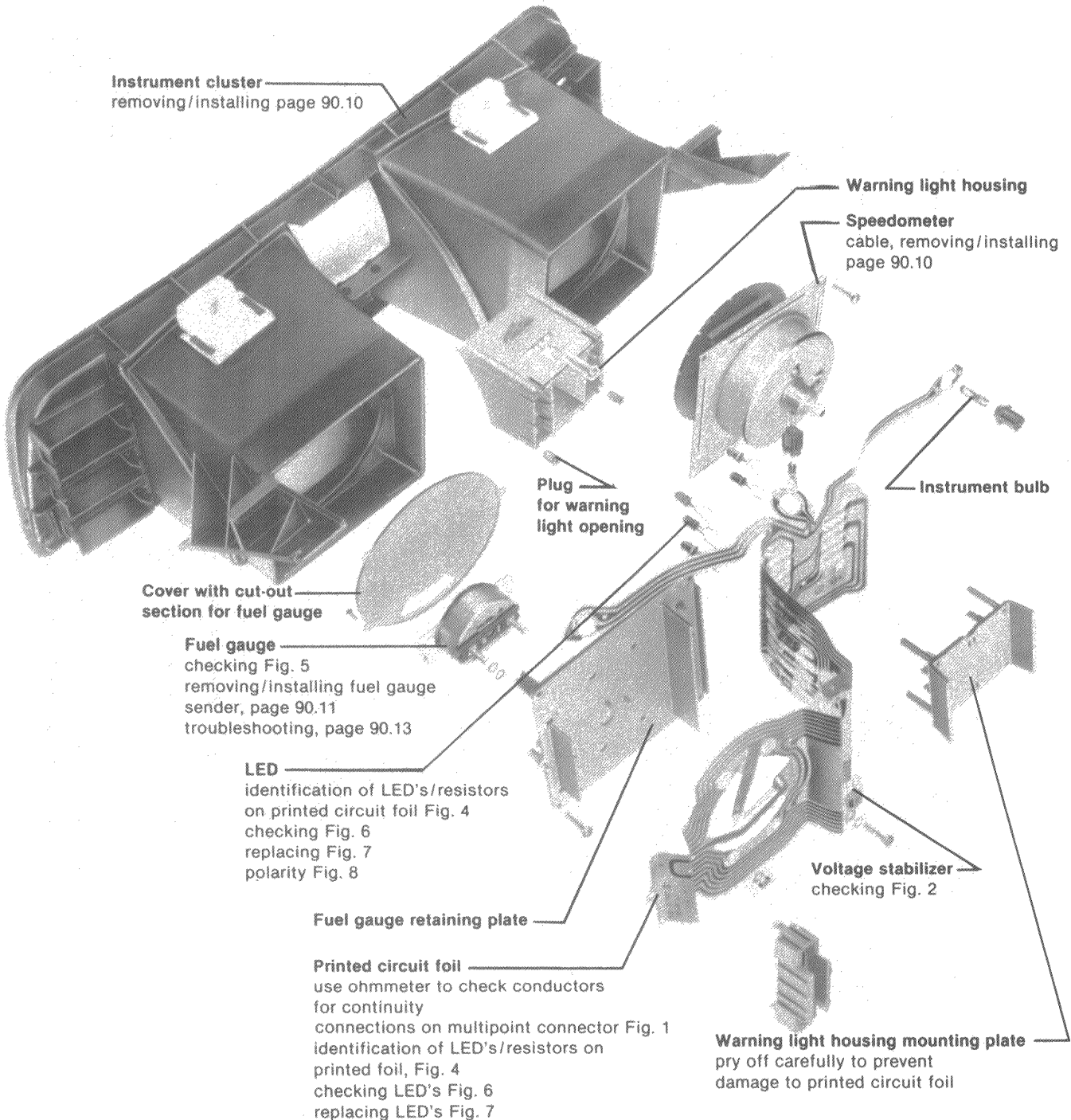
90-313

Note

To replace printed circuit LED's/bulb, first remove warning light housing

CAUTION

Before starting to work on any part of electrical system, disconnect battery ground strap



90-317

1980-1984

USA

Instrument cluster without clock

90.3

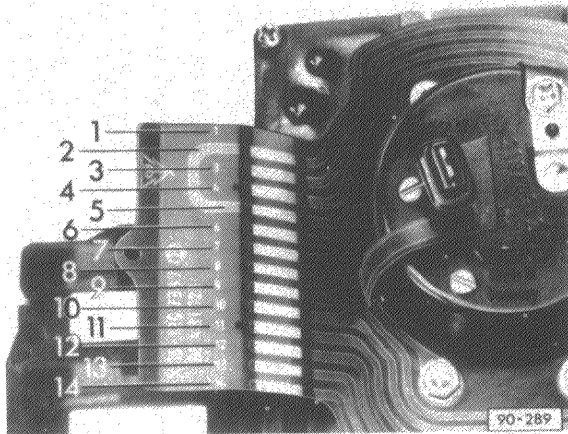


Fig. 1 Multi-point connector terminals

- 1 = vacant
- 2 = ground terminal 31
- 3 = instrument lights
- 4 = high beam terminal 56a
- 5 = ground terminal 31
- 6 = vacant (air-cooled)
coolant temperature gauge (water-cooled, diesel)
- 7 = clock (if not installed, vacant)
- 8 = fuel gauge sender
- 9 = positive terminal 15
- 10 = oil pressure switch
- 11 = EGR or OXS (air-cooled, water-cooled)
glow plug indicator (1983 diesel only)
- 12 = vacant (air-cooled, water-cooled)
glow plug indicator (1982 diesel only)
- 13 = alternator warning light terminal 61 or D+
- 14 = indicator terminal 49a

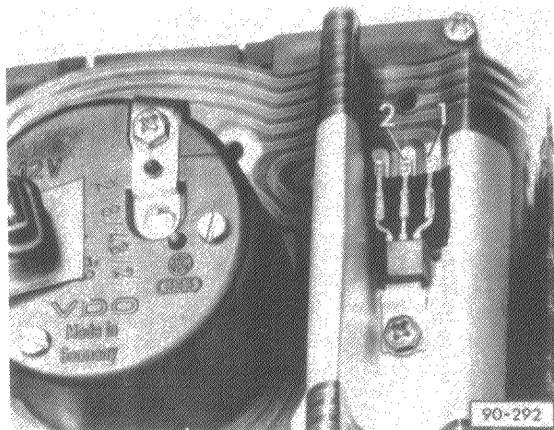


Fig. 2 Voltage stabilizer, checking

- connect voltmeter between positive connection 1 and ground 2
- turn ignition switch **ON**
 - voltage should be approximately 10V
 - if voltage is above 10.5V or below 9.5V, voltage stabilizer is defective and must be replaced

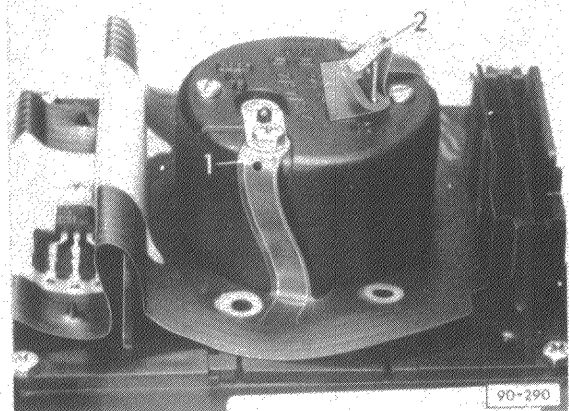


Fig. 3 Clock terminal connections

- place foil 1 under ground terminal of clock

CAUTION

When tightening terminal, do not twist circuit foil or damage to foil may result

- secure terminal 2 with plastic clip

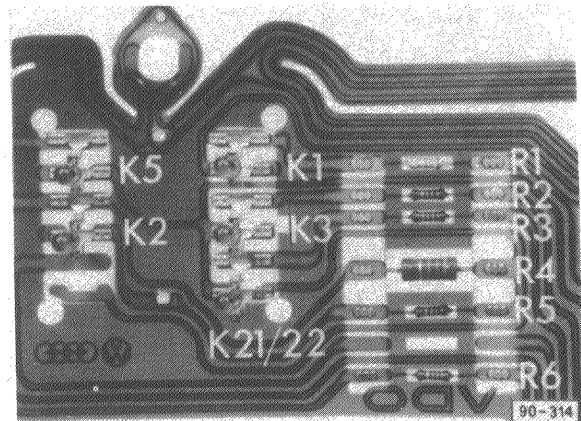


Fig. 4 Identification of LED's/resistors on printed circuit foil

- K1 = LED (red) high beam
- K2 = LED (red) alternator
- K3 = LED (red) oil pressure
- K5 = LED (green) turn indicator
- K21/22 = LED (red) EGR or OXS
- R1 = Resistor for K1 (470Ω)
- R2 = Resistor for K3 (470Ω)
- R3 = Resistor for K21/22 (470Ω)
- R4 = Resistor for voltage stabilizer (150Ω)
- R5 = Resistor for K2 (470Ω)
- R6 = Resistor for K5 (470Ω)

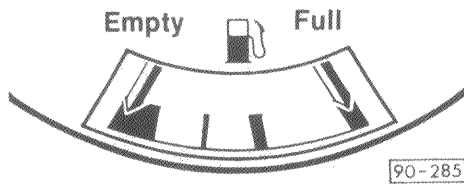


Fig. 5 Fuel gauge, checking

— set tester VW 1301 to following test values:

Tester dial setting	Fuel gauge reading*
55	full
560	empty

*deviation of one needle width to left or right is OK

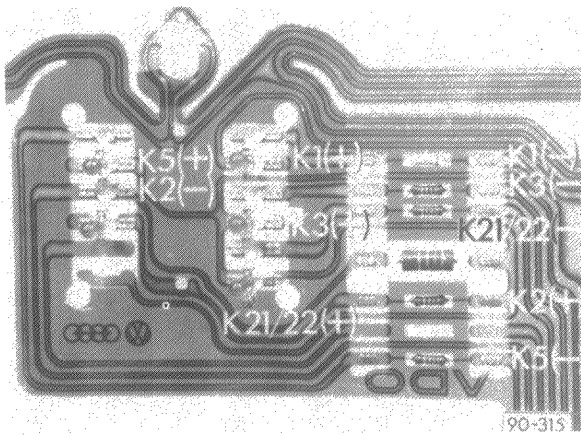


Fig. 6 LED's, checking

- connect battery positive lead to LED K1 (+)
- connect negative battery lead to LED K1 (-).
- repeat this test step consecutively on remaining LED's
 - LEDS must light

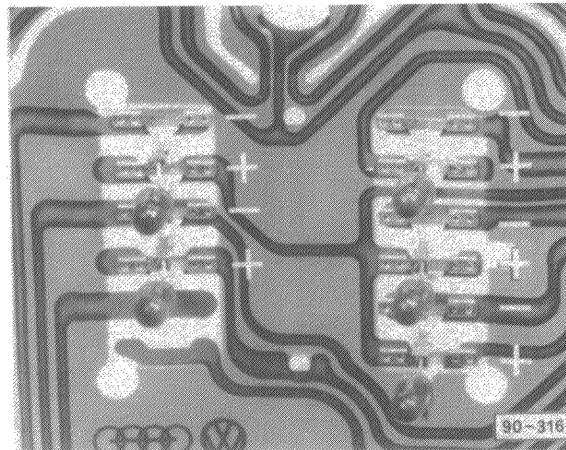


Fig. 7 LED's, replacing

— note polarity of LED's (see Fig. 8) when plugging into printed circuit

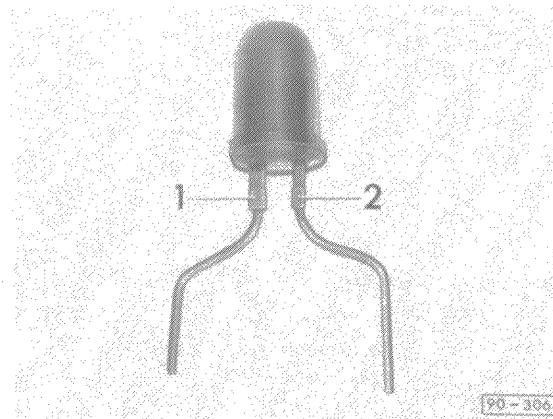


Fig. 8 LED polarity, checking

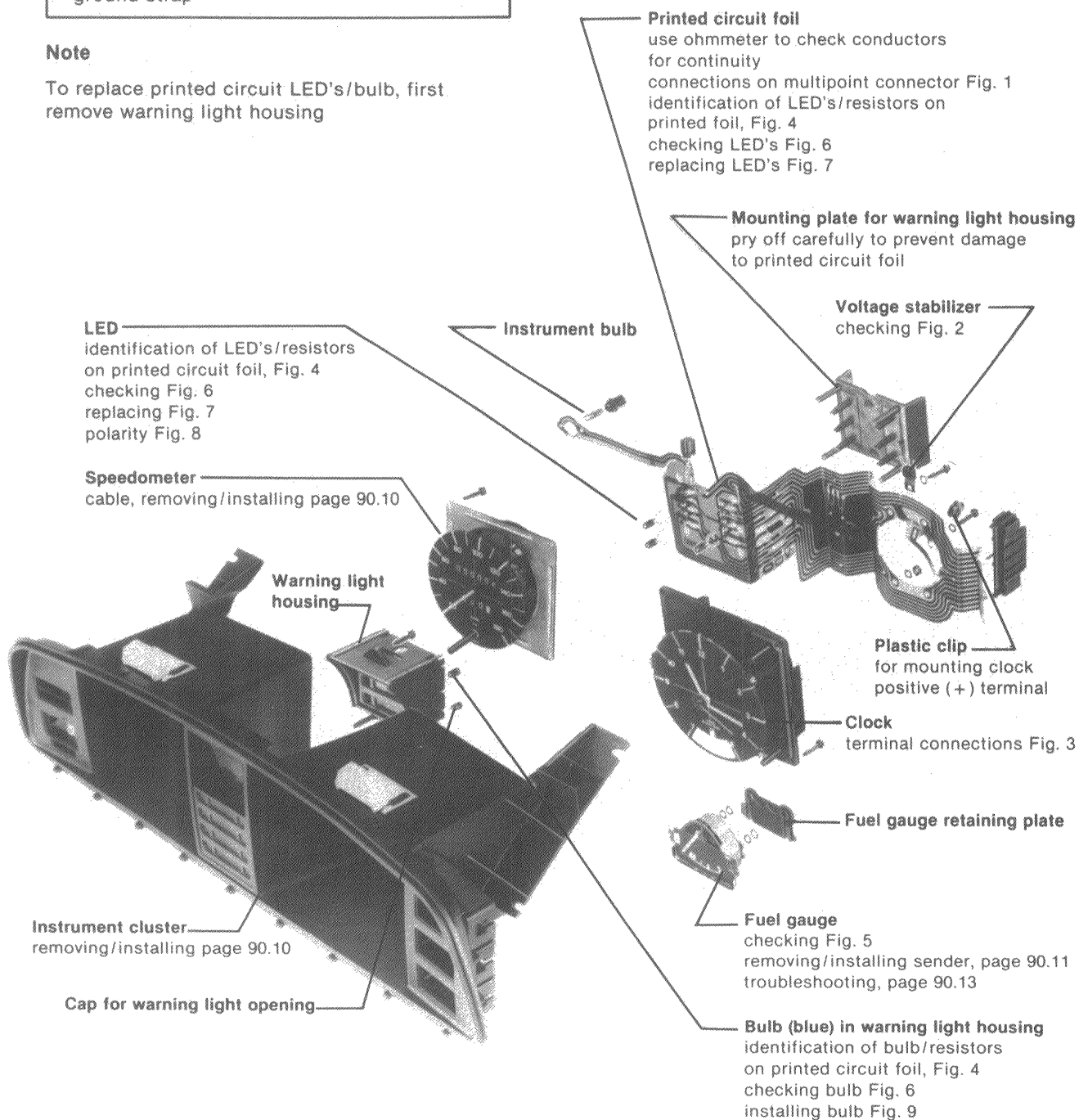
- 1 = negative terminal
- 2 = positive terminal
- negative terminal is slightly wider

CAUTION

Before starting to work on any part of electrical system, disconnect battery ground strap

Note

To replace printed circuit LED's/bulb, first remove warning light housing



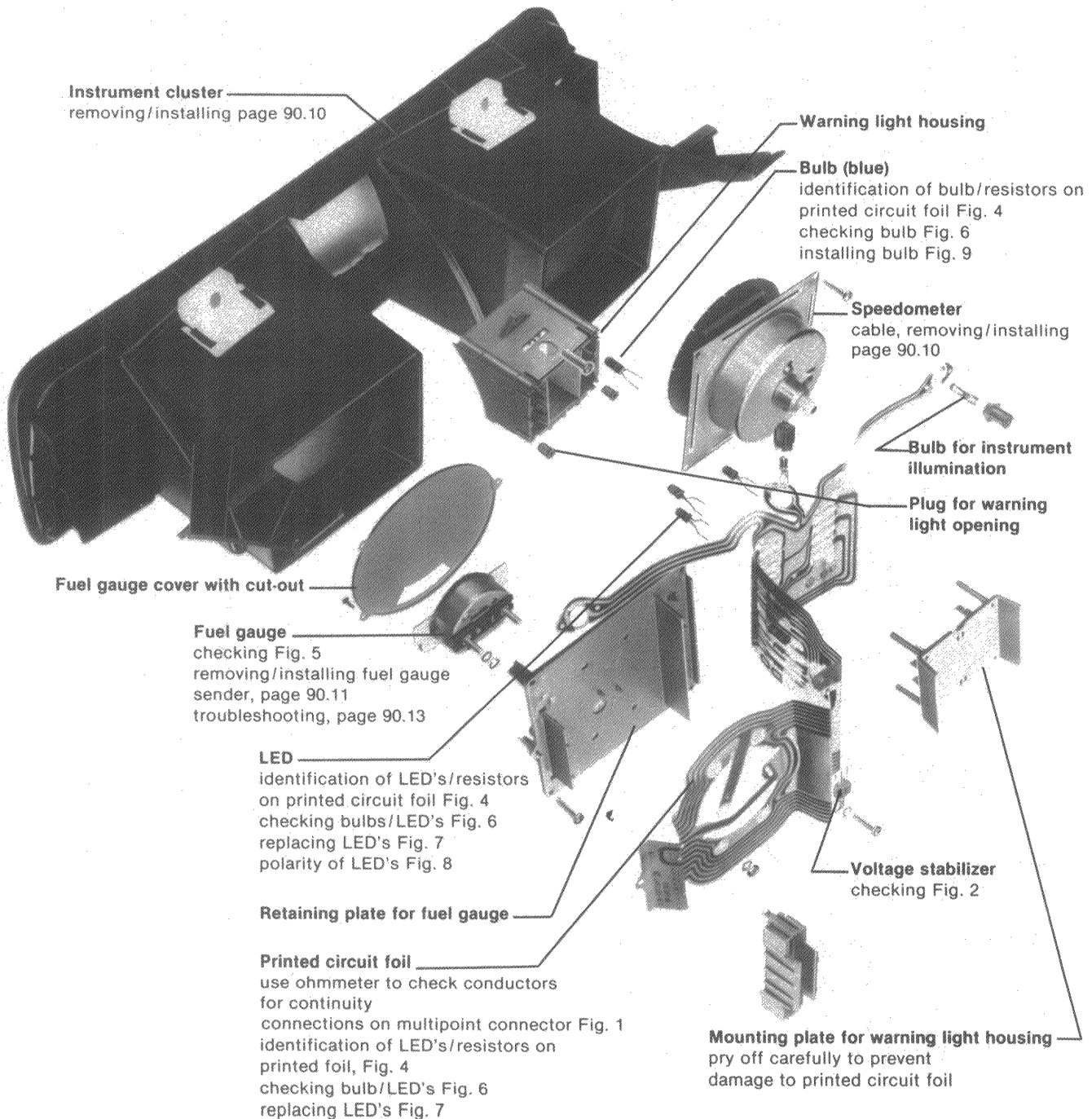
90-286

Note

To replace printed circuit LED's/bulb, first remove warning light housing

CAUTION

Before starting to work on any part of electrical system, disconnect battery ground strap



90-284

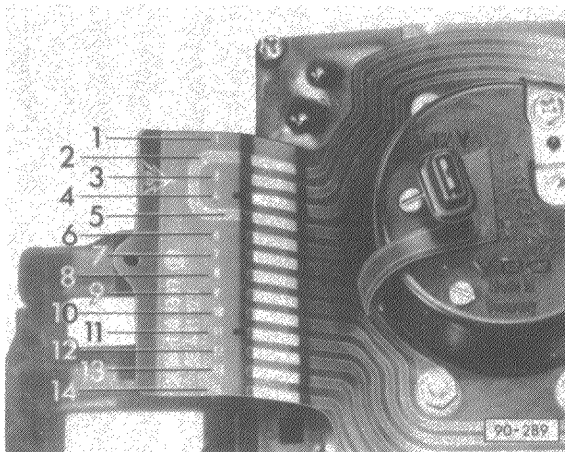


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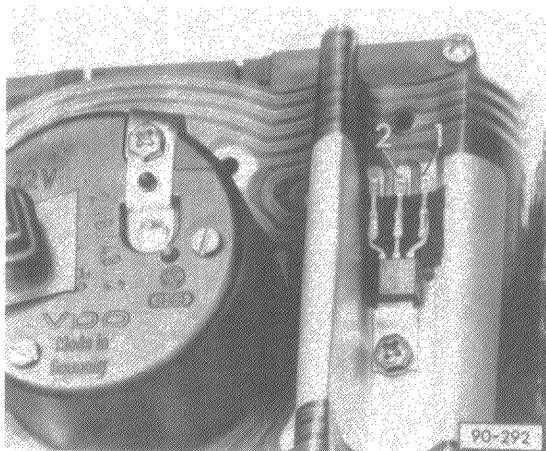


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- connect voltmeter between positive connection 1 and ground 2
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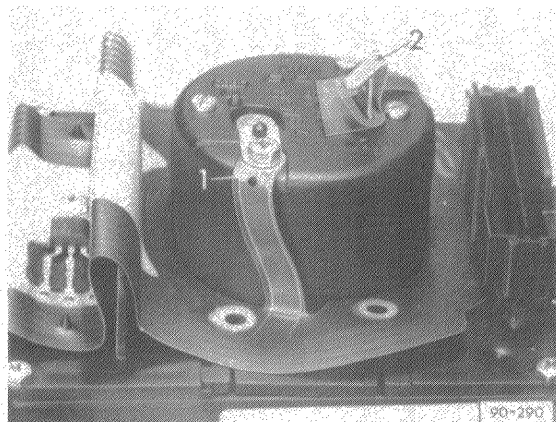


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- place foil 1 under ground terminal of clock

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When tightening terminal, do not twist circuit foil or damage to foil may result

- secure terminal 2 with plastic clip

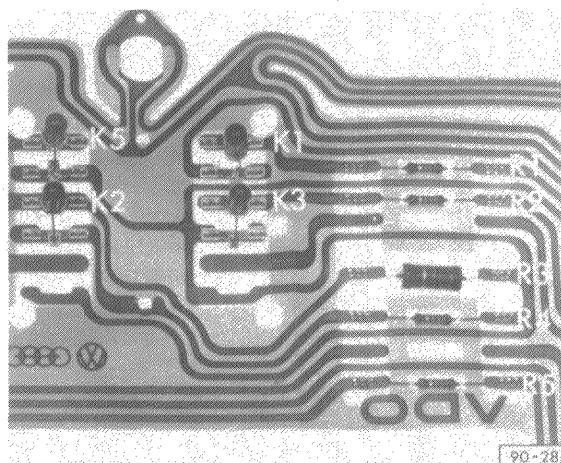


Fig. 4 Identification of LED's/resistors/bulb on printed circuit foil

- K1 = bulb (blue) high beam
- K2 = LED (red) alternator
- K3 = LED (red) oil pressure
- K5 = LED (green) turn indicator
- R1 = Series resistor for K1 (270Ω)
- R2 = Series resistor for K3 (470Ω)
- R3 = Series resistor for alternator pre-exciter circuit (150Ω)
- R4 = Series resistor for K2 (470Ω)
- R5 = Series resistor for K5 (470Ω)

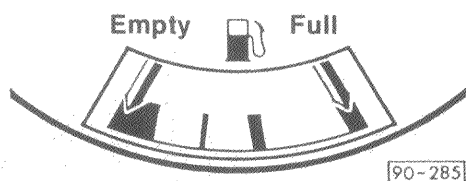


Fig. 5 Fuel gauge, checking

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Tester dial setting	Fuel gauge reading*
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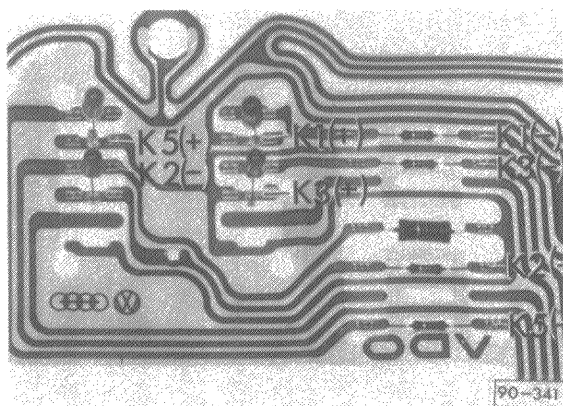


Fig. 6 Bulb/LED's, checking

- connect battery positive lead to LED K1 (+)
- connect negative battery lead to LED K1 (-)
- repeat this test step consecutively on remaining LED's
 - warning lights must light

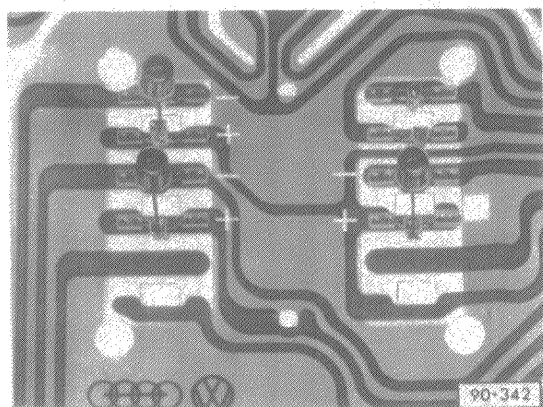


Fig. 7 LED's, replacing

- note polarity of LED's (see Fig. 8) when plugging into printed circuit

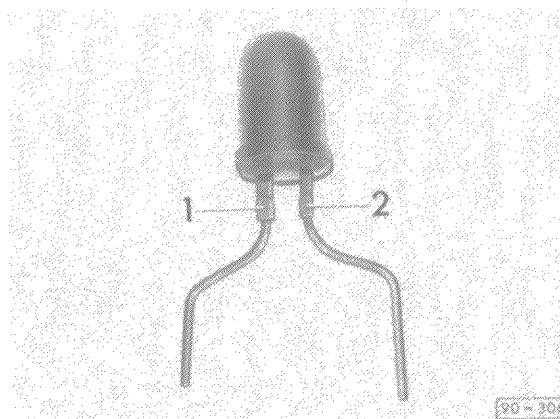


Fig. 8 LED polarity, checking

- 1 = negative terminal
- 2 = positive terminal
- negative terminal is slightly wider

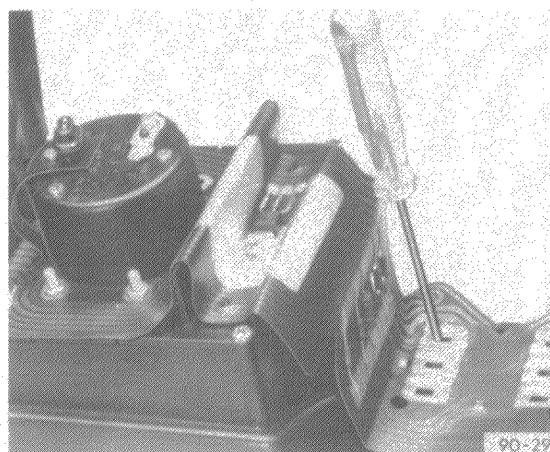


Fig. 9 Bulb in warning light housing, installing

- press blue bulb through slot into guide with screwdriver
 - bulb must be heard to engage (LED's slide freely into guide)

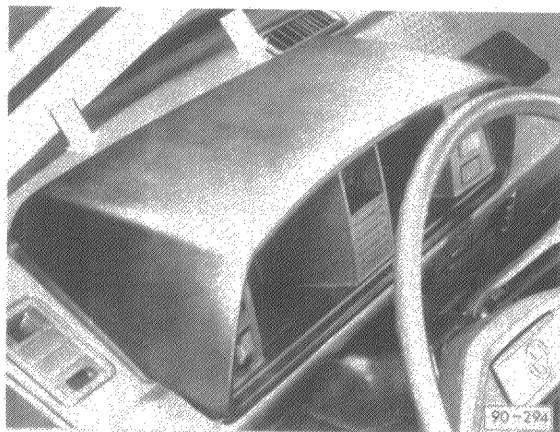
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Instrument cluster, removing/installing

Work sequence

Removing

- disconnect battery ground strap

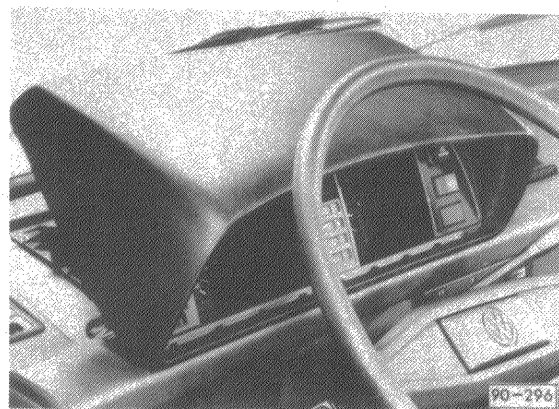


- put fingers into recesses (arrows) and pull up cluster cover



- pull hazard warning switch forward
- pull dual circuit brake/parking brake warning light housing forward (driving direction)
- remove screws (arrow) and instrument cluster

Installing



- insert cover into retaining lugs
- press frame down and tilt cover forward to engage

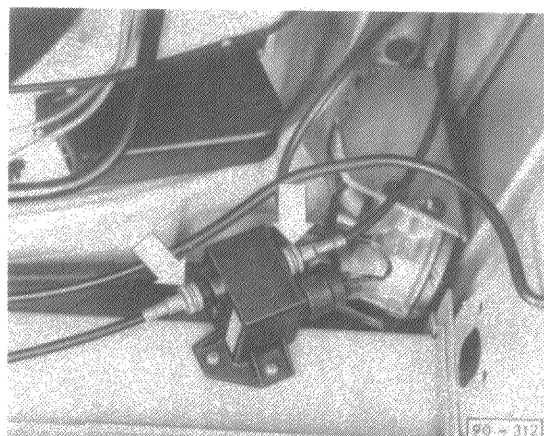
Speedometer cable, removing/installing

Work sequence

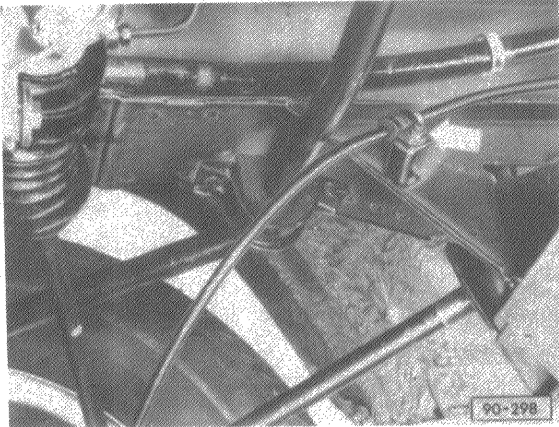
Removing

- disconnect battery ground strap
- disconnect speedometer cable
- remove spare tire

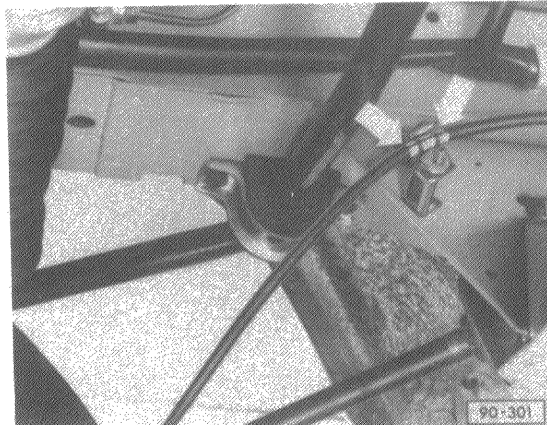
USA only



- disconnect speedometer cables from EGR/oxygen sensor mileage counter (arrows)



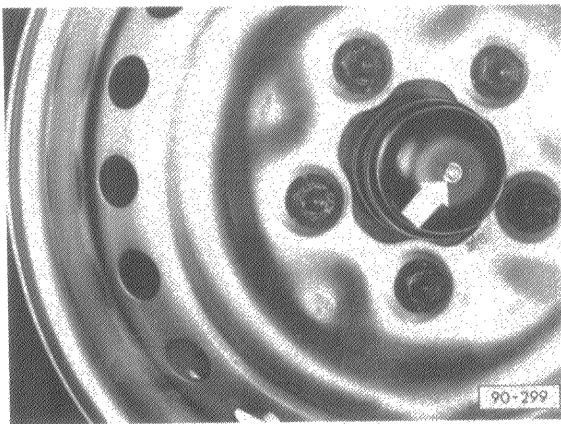
— remove nut from bracket (arrow)



- when installing cable, align marks (arrows) on cable
- after installing circlip on speedometer cable end, seal with silicone seal

CAUTION

To avoid premature cable failure, position cable so it is free of strain or sharp bends. Do not grease connection to speedometer; this could cause needle to stick



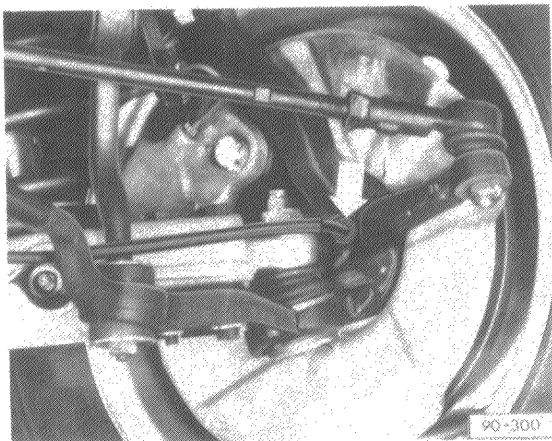
— remove circlip from speedometer cable (arrow)

Fuel gauge sender, removing/installing

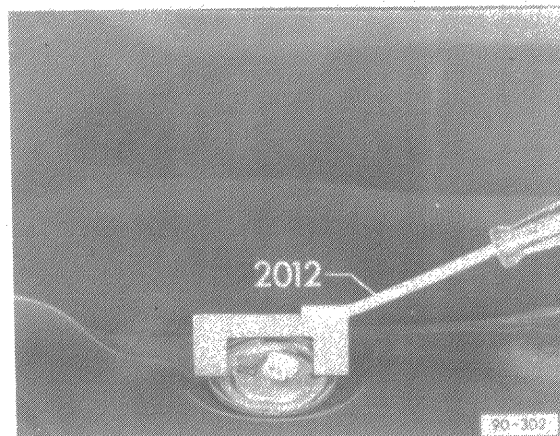
Work sequence

Removing

- disconnect battery ground strap
- remove fuel tank (see Repair Group 20)



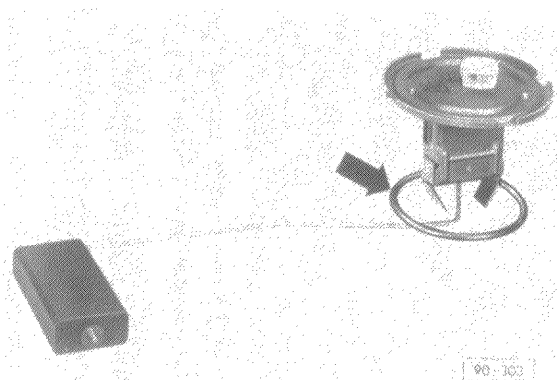
— remove speedometer cable from rubber sleeve in steering knuckle (arrow)



- mark position before removing
- remove sender by turning it counter-clockwise
- go to next page

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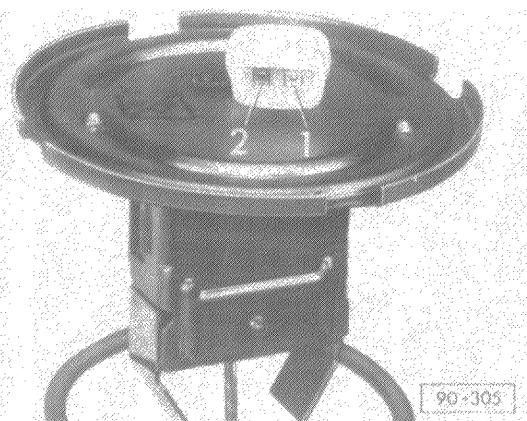
Installing



- coat sealing ring (arrow) with graphite



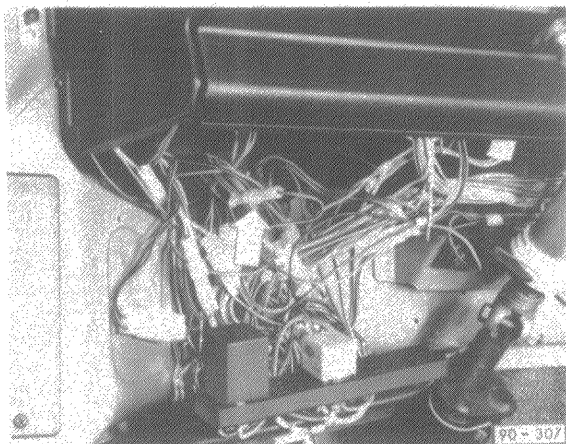
- install sender unit so float is facing driving direction (arrow)
- turn sender unit clockwise to stop



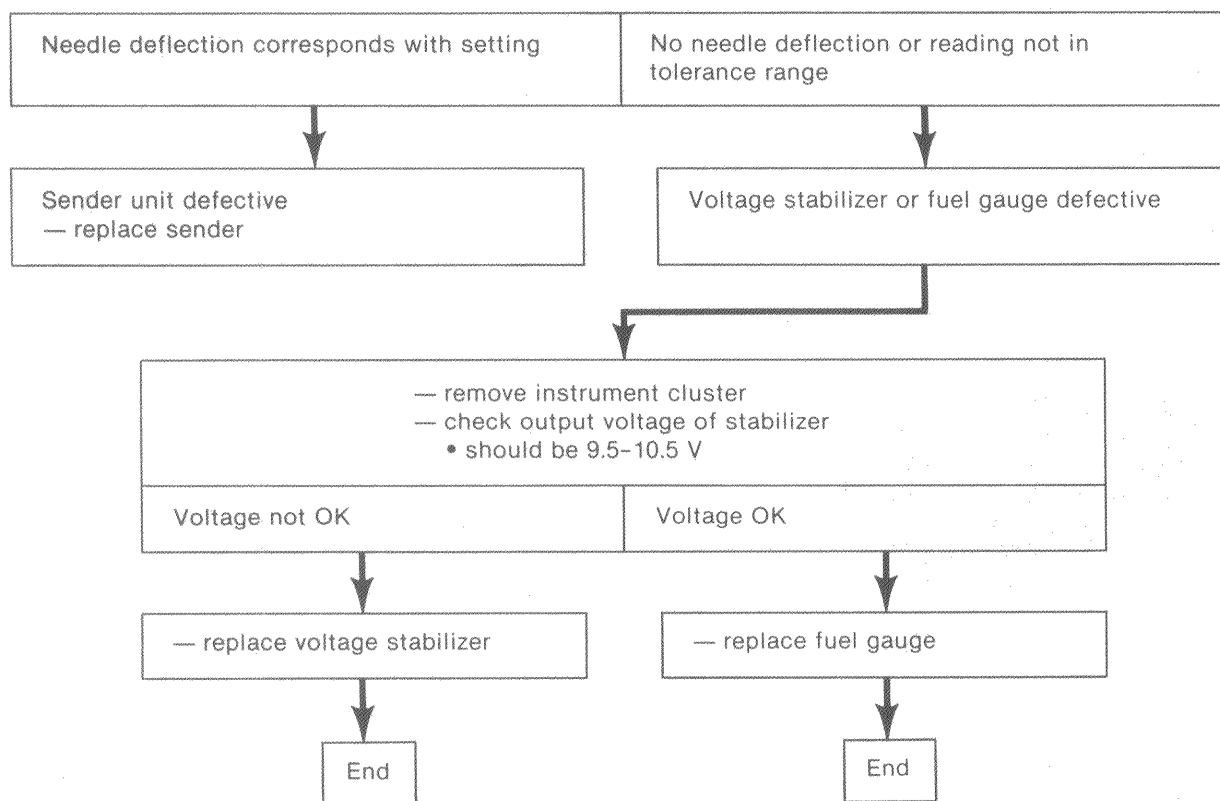
- attach positive and negative wires as shown
 - 1 = fuel gauge connection
 - 2 = ground connection

Fuel gauge, troubleshooting

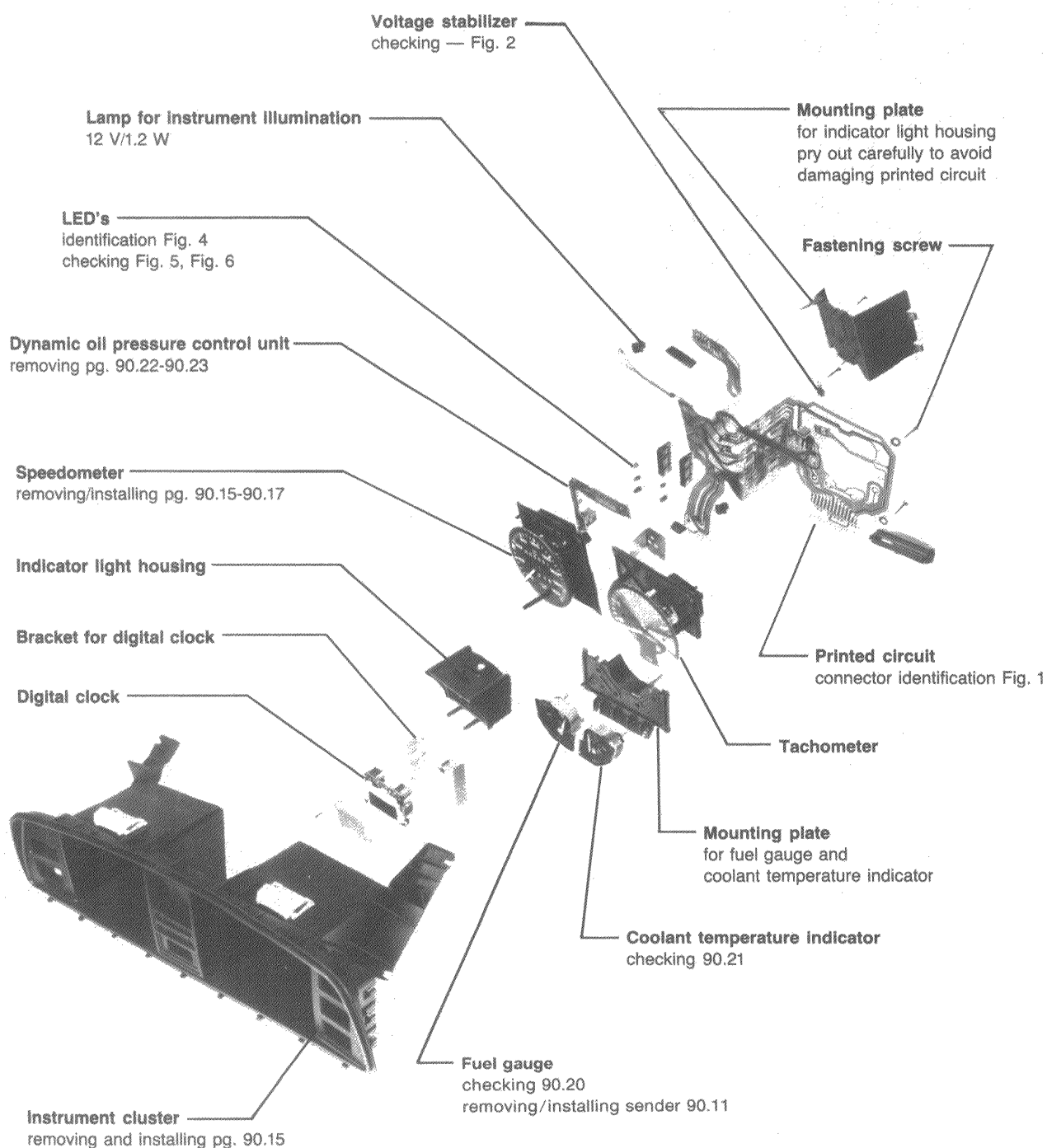
Work sequence



- remove wire connector from fuel gauge sender unit at single plug connection (arrow), or possibly from multi-point plug connection
- connect VW 1301 to ground connection behind instrument cluster and to wire removed from fuel gauge
- start engine and check values (page 90.9)
 - following results may be shown:



Instrument cluster, with tachometer



Instrument cluster, removing/installing

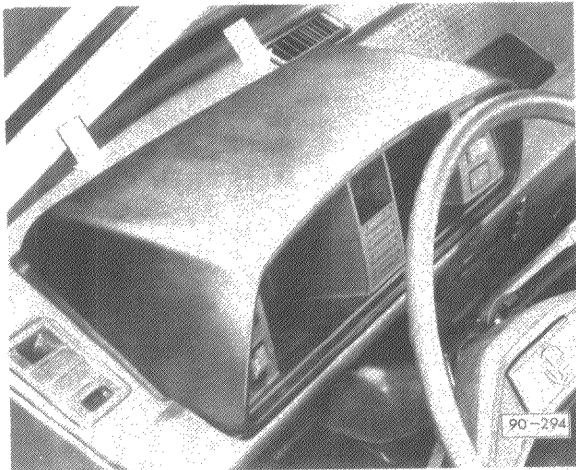
CAUTION

Before starting to work on any part of the electrical system, disconnect battery ground strap

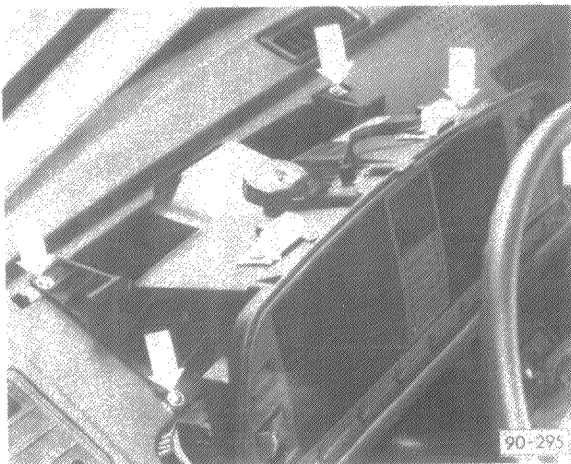
Work sequence

Removing

- disconnect battery ground strap

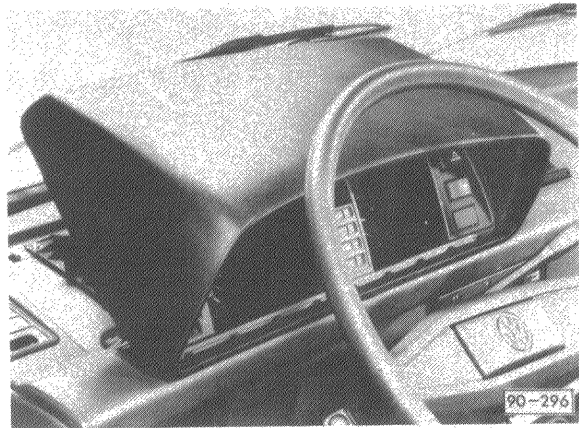


- put fingers into recesses (**arrows**) and pull up cluster cover



- pull hazard warning switch forward
- pull dual circuit brake/parking brake warning light housing forward (driving direction)
- remove screws (**arrows**) and instrument cluster

Installing



- insert cover into retaining lugs
- press frame down and tilt cover forward to engage

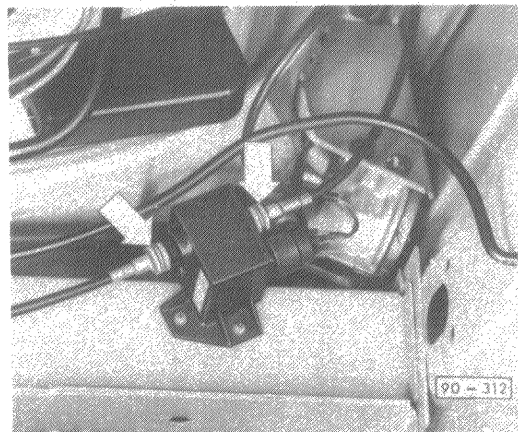
Speedometer cable, removing/installing

Work sequence

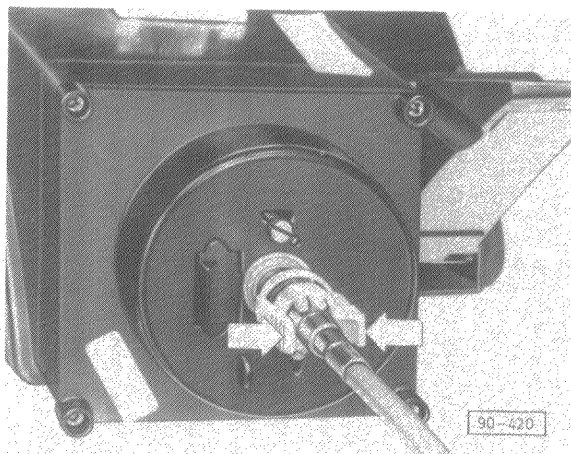
Removing

- disconnect battery ground strap
- disconnect speedometer cable
- remove spare tire

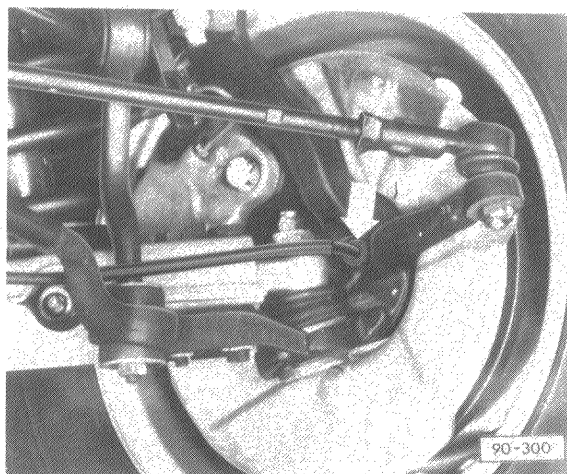
USA only



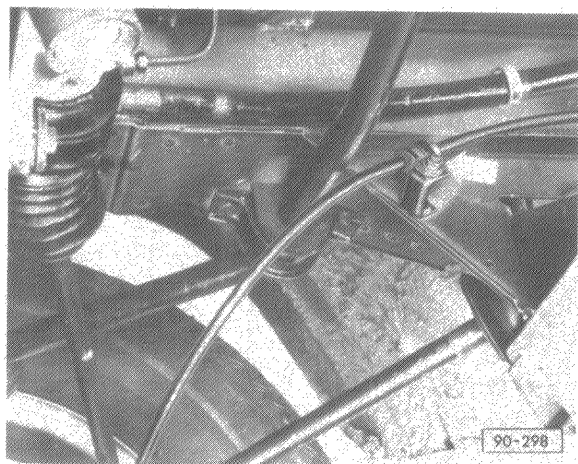
- disconnect speedometer cables from EGR/oxygen sensor mileage counter (**arrows**)



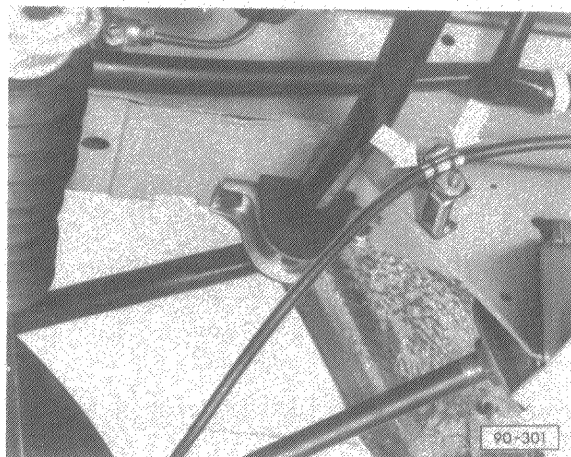
- squeeze tabs together (**arrows**)
- pull cable from speedometer



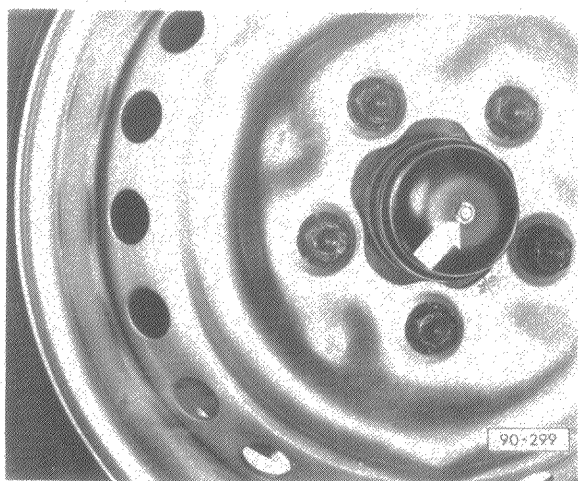
- remove speedometer cable from rubber sleeve in steering knuckle (**arrow**)



- remove nut from bracket (**arrow**)



- when installing cable, align marks (**arrows**) on cable
- after installing circlip on speedometer cable end, seal with silicone seal



- remove circlip from speedometer cable (**arrow**)

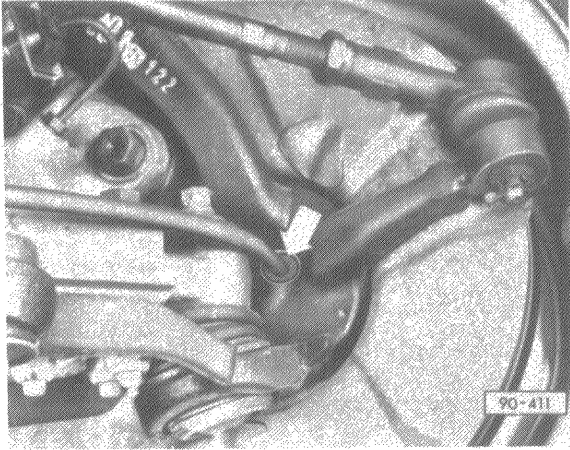
CAUTION

To avoid premature cable failure, position cable so it is free of strain or sharp bends. Do not grease connection to speedometer; this could cause needle to stick.

more

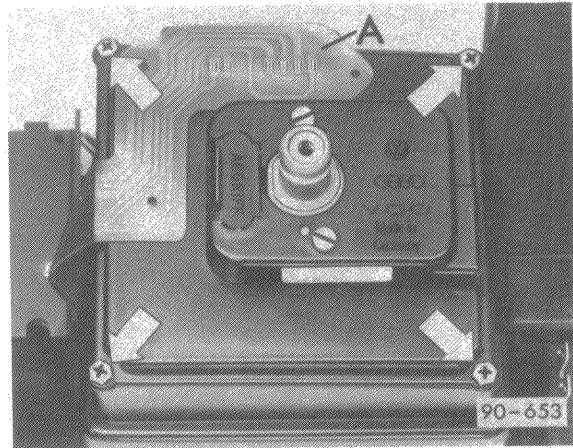
CAUTION

When replacing the drive cable, the rubber sleeve in the steering knuckle must be replaced.



- push rubber sleeve to stop (**arrow**) with socket wrench
 - sleeve must be flush with steering knuckle
- push cable through rubber sleeve and through dust cap
- fasten circlip on speedometer and seal with sealing material

Speedometer, removing



- remove instrument cluster
- remove printed circuit for dynamic oil pressure system (**A**)
- remove screws (**arrows**)
- remove speedometer

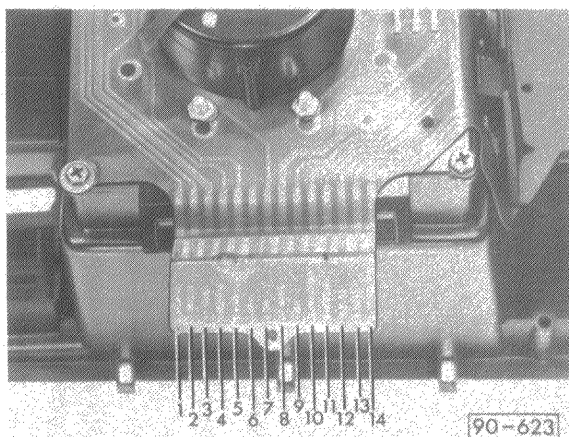


Fig. 1 Wiring of 14 pin connector

- 1 — instrument illumination
- 2 — high beam warning — terminal 56a
- 3 — ground, terminal 31
- 4 — open
- 5 — clock
- 6 — coolant temperature display — to sensor
- 7 — fuel gauge — to sender
- 8 — plus, terminal 15
- 9 — tachometer, terminal 1/W
- 10 — blinker warning, terminal 49a
- 11 — alternator warning, terminal 61
- 12 — open (1985 only)
- 13 — oil pressure warning, 0.9 bar (1986–1987)
- 14 — oil pressure warning, 1.8 bar (1985)
- 15 — oil pressure warning, 0.3 bar (1986–1987)
- 16 — OXS indicator light

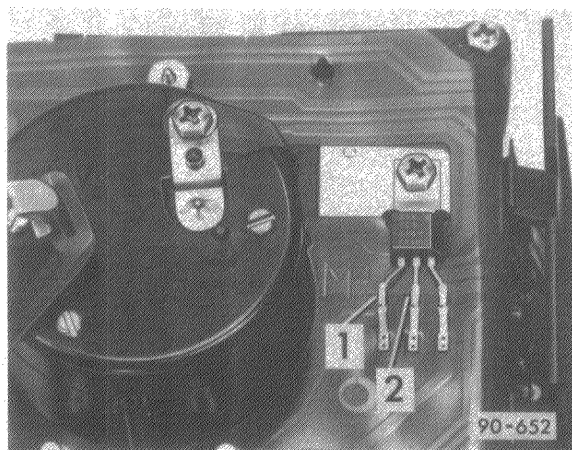


Fig. 2 Voltage stabilizer, checking

- connect voltmeter between positive connection 1 and ground 2
- voltage should be approximately 10V
- if voltage is above 10.5V or below 9.5V, voltage stabilizer is defective and must be replaced

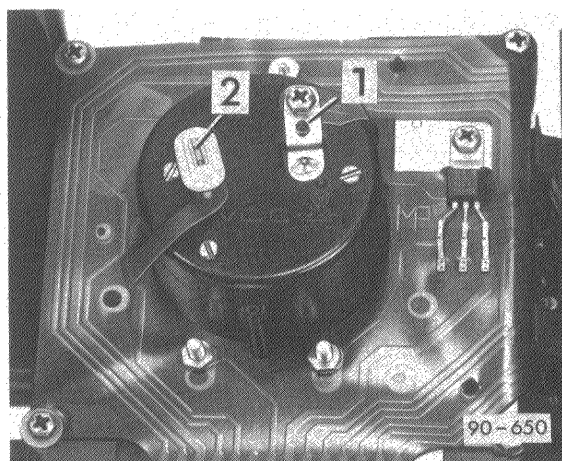


Fig. 3 Clock terminal, connections

- place foil 1 under ground terminal of clock

CAUTION

When tightening terminal, do not twist circuit foil or damage to foil may result

- secure terminal 2 with plastic clip

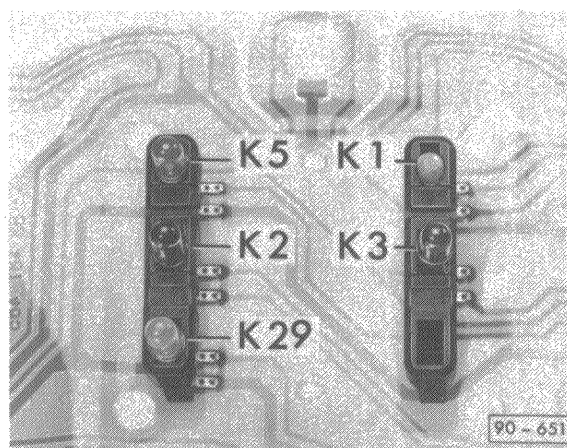


Fig. 4 Identification of LED's/resistors/bulb on printed circuit foil

- K1 = bulb (blue) high beam
- K2 = LED (red) alternator
- K3 = LED (red) oil pressure
- K5 = LED (green) turn indicator
- K29 = LED (yellow) glow plugs

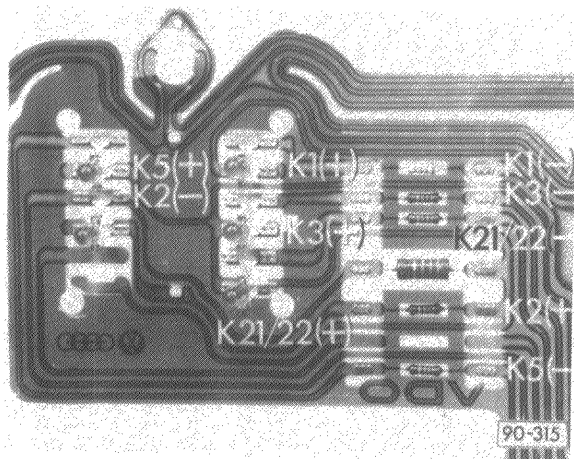


Fig. 5 LED's, checking

- connect battery positive lead to LED K1 (+)
- connect negative battery lead to LED K1 (-).
- repeat this test step consecutively on remaining LED's
 - LED's must light

CAUTION

When replacing LED's do not reverse polarity

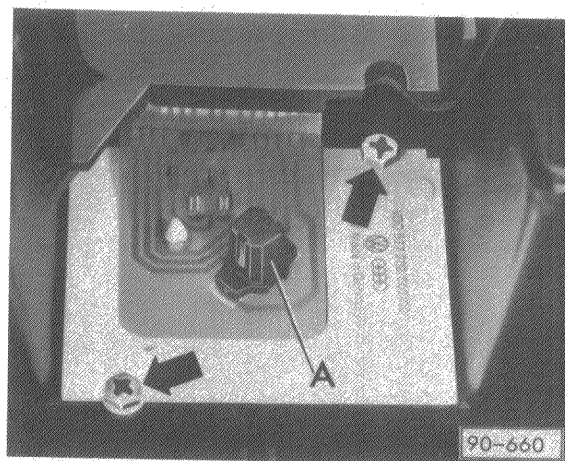


Fig. 7 Digital clock (LED quartz clock), replacing

- remove mounting screws (arrows)
- remove clock light (A)
- remove connector
- remove digital clock

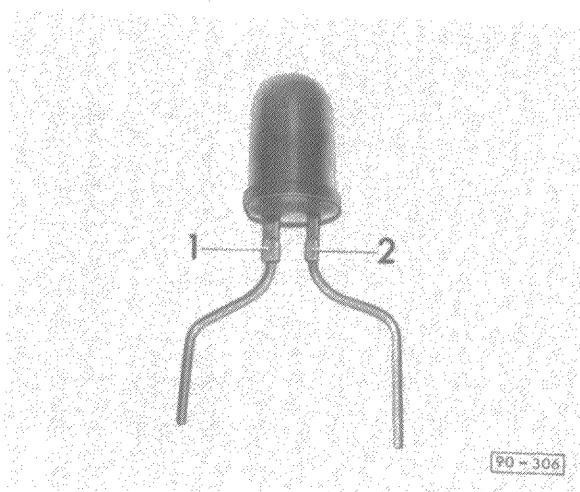
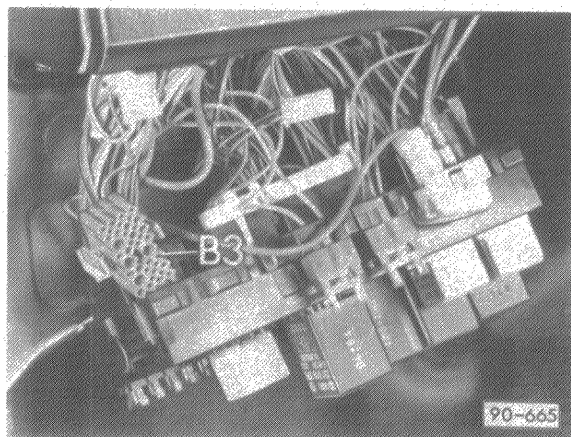


Fig. 6 LED polarity, checking

- 1 = negative terminal
- 2 = positive terminal
- negative terminal is slightly wider

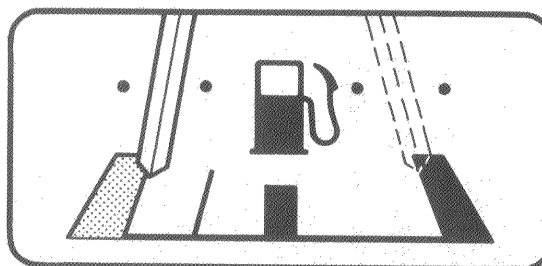
Fuel gauge, troubleshooting

Work sequence



- remove multi-point connector (B) (RED)
- connect tester VW 1301 on ground star behind the instrument panel and on multi-point connector terminal B3
- start engine
- check specified values with VW 1301

Full: 50 Empty: 320



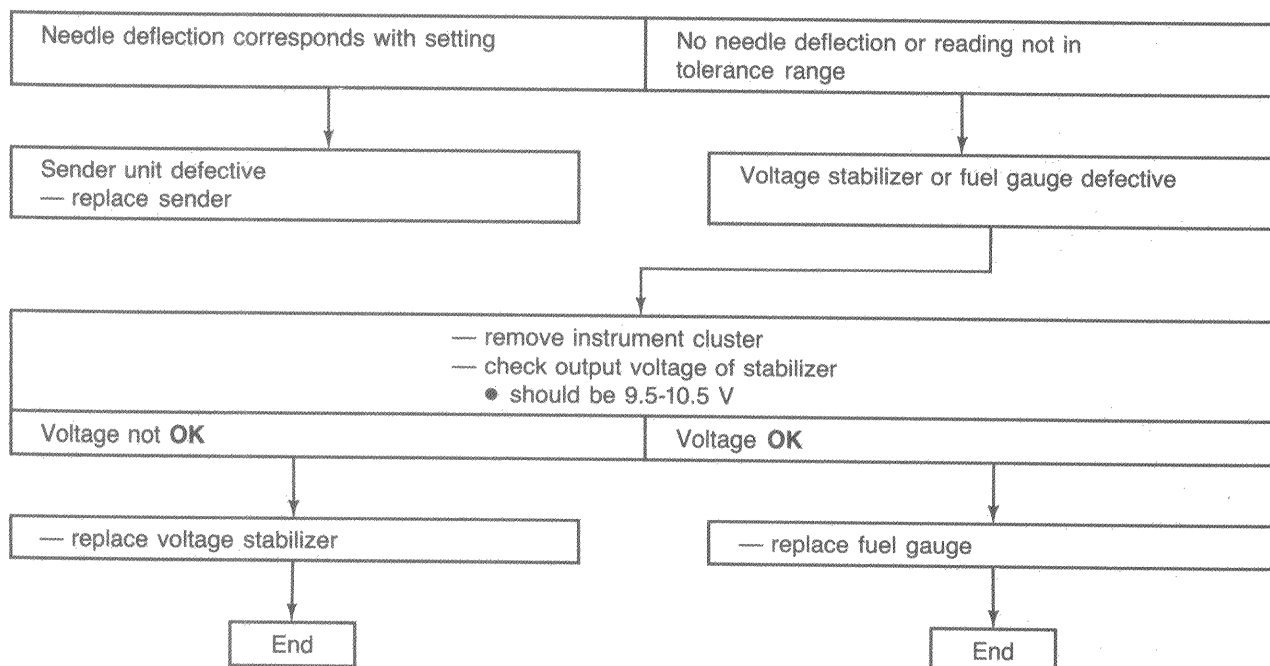
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Fuel gauge, checking

— set tester VW 1301 to following test values:

Test dial setting	Fuel gauge reading*
50	full
320	empty

*deviation of one needle width to left or right is OK

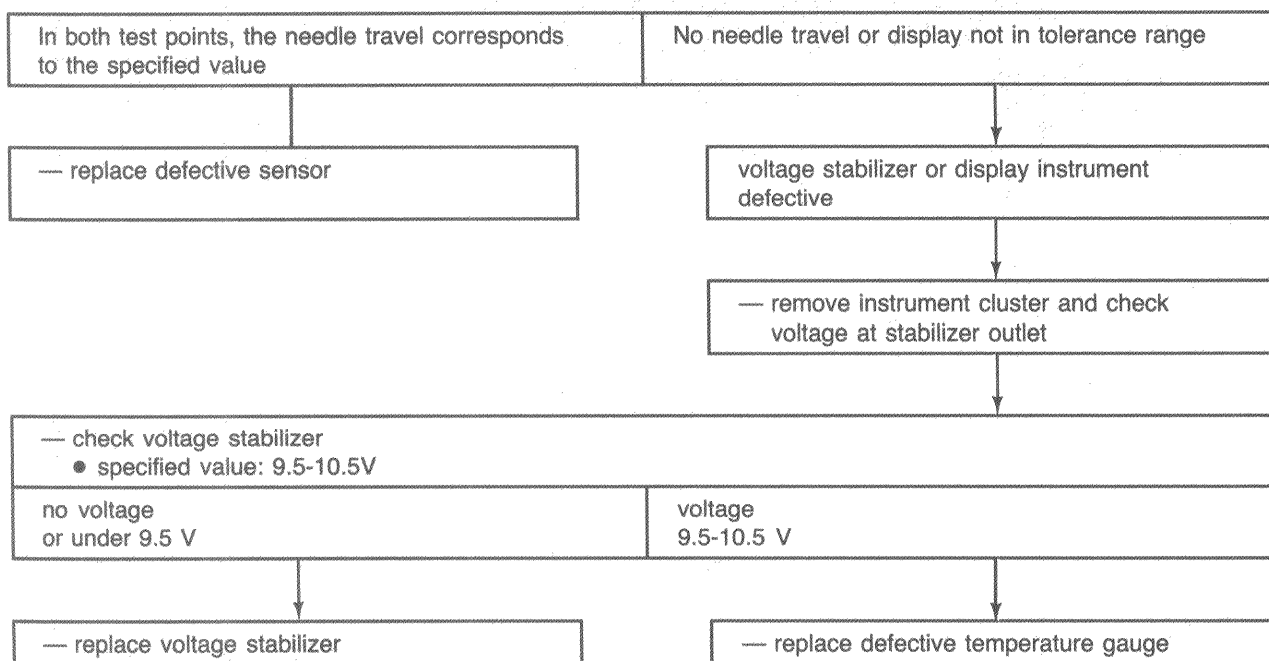
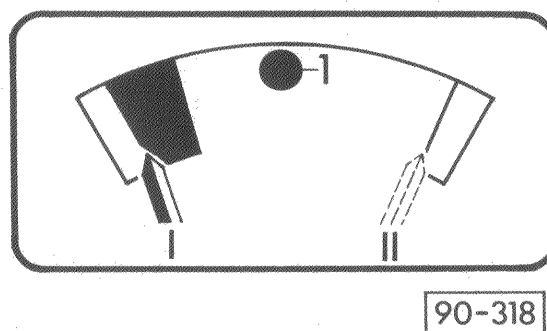
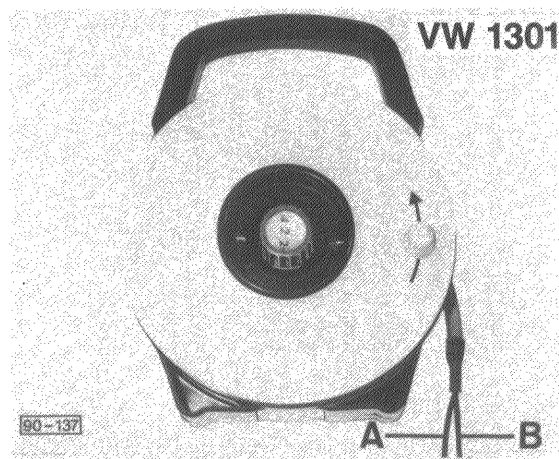


Coolant temperature display, troubleshooting

Test requirement: Battery OK

- remove wire on coolant temperature sensor
- connect tester VW 1301
 - A — to coolant temperature display
 - B — to ground
- switch ignition ON
- set VW 1301 to the following values:
 - 50 — warning range (11), engine too hot
red LED flashes
 - 510 — transition area (1), engine cold
 - permissible deviation, one needle width right or left.

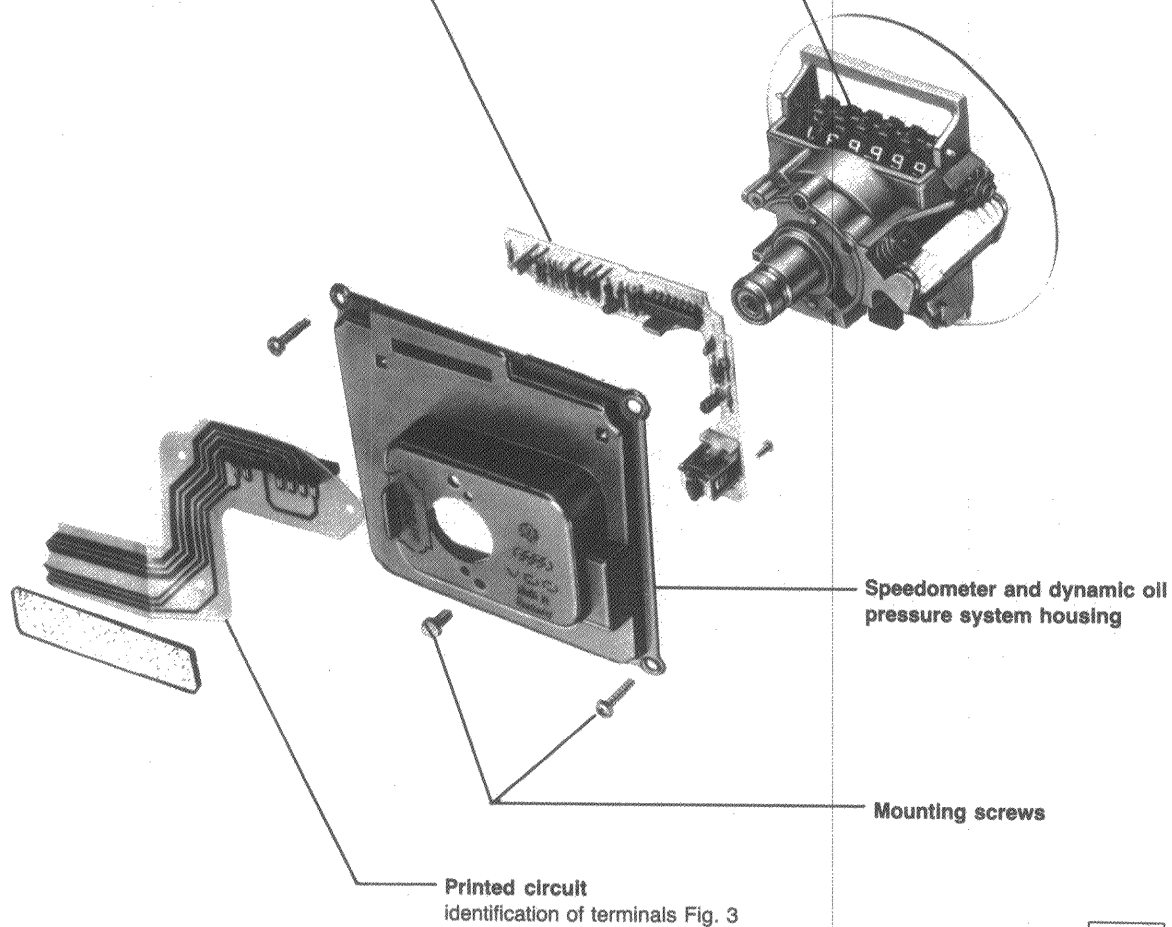
The following results may be obtained:



Dynamic oil pressure warning system

Dynamic oil pressure system
control unit
removing Fig. 2
troubleshooting pg. 90.24

Speedometer



Speedometer and dynamic oil
pressure system housing

Mounting screws

Printed circuit
identification of terminals Fig. 3

90-624

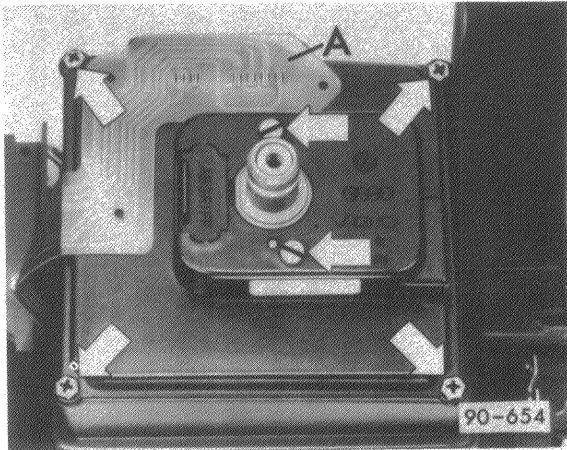


Fig. 1 Speedometer, removing

- remove printed circuit (A) and dynamic oil pressure system connection
- remove mounting screws (arrows)
- remove speedometer

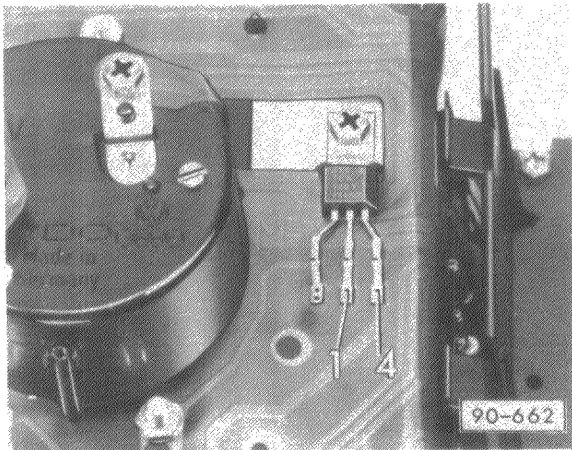


Fig. 2 Control unit for dynamic oil pressure system, removing

- remove screw (1)
- push mounting clips in direction of arrows
- remove dynamic oil pressure control unit

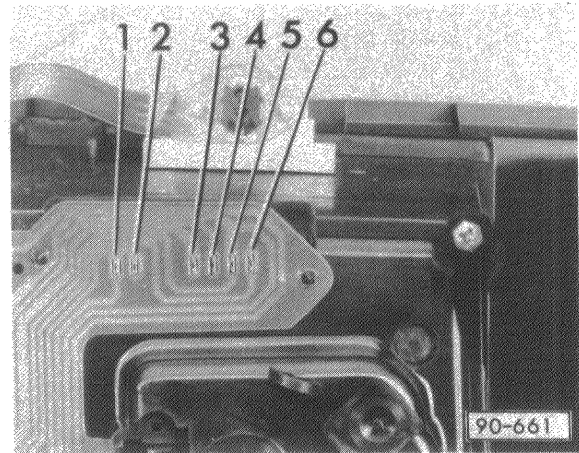


Fig. 3 Dynamic oil pressure control unit, terminal identification

- 1 — oil pressure switch 0.3 bar
- 2 — oil pressure switch 0.9 bar
- 3 — plus
- 4 — oil pressure warning light
- 5 — ground
- 6 — terminal 1

System operation

Test sequence	Operation of flashing LED (red) and buzzer*
engine not running • ignition ON	— LED must flash — buzzer must not sound
engine running less than 2000 rpm • wire on 0.3 bar oil pressure switch pulled off and connected to ground	— LED must flash — buzzer must not sound
engine running more than 2000 rpm • wire on 0.9 bar oil pressure switch pulled off but not connected to ground	— LED must flash — buzzer must sound

Note

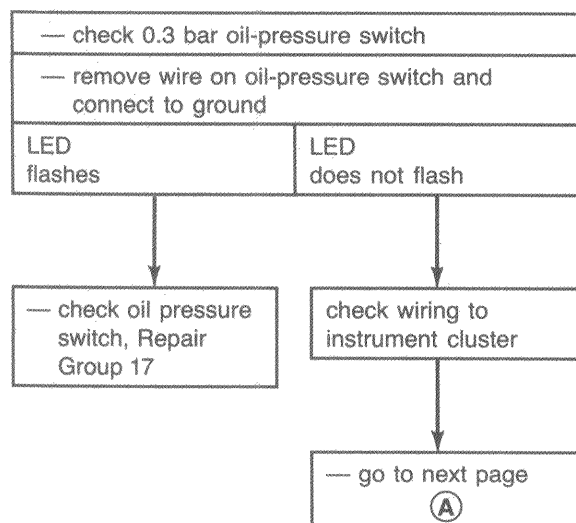
If system is still not operating properly, check by Troubleshooting

Troubleshooting

Dynamic oil-pressure system light (LED) does not flash when ignition is switched **ON**

check these first:

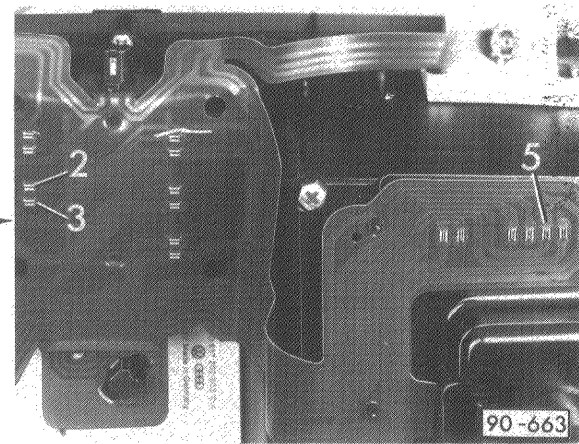
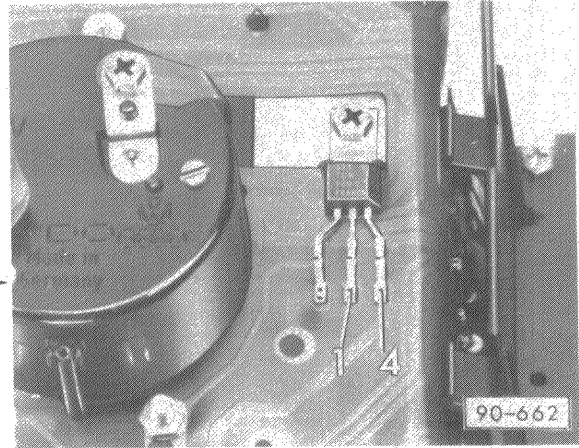
- flashing LED (red) for fuel gauge and coolant temperature gauge is **OK**



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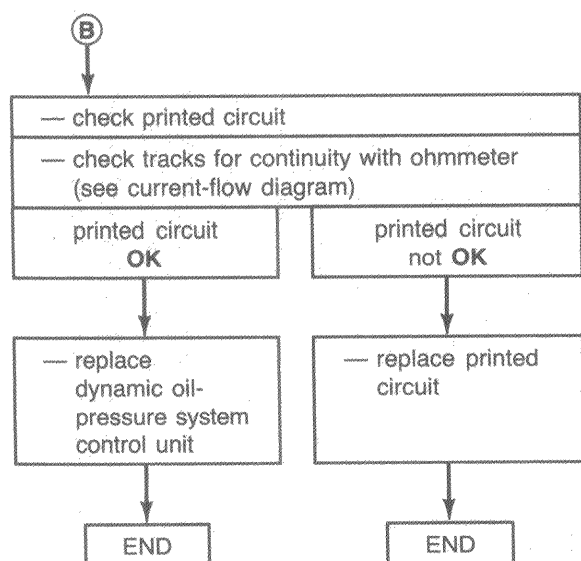
check dynamic oil-pressure system

- remove instrument cluster (for following tests use 12 Volt battery as power source and voltmeter)
- connect battery ground to voltage stabilizer 1 with test probe
- connect battery ground to terminal 5 with test probe
- connect voltmeter to terminals 2 and 3
- connect battery plus to voltage stabilizer 4 with test probe



Test shows	voltmeter reading	possible causes	repair instructions
LED flashing	approx. 8.5 V	Zener diode defective	replace printed circuit and LED
	approx. 5.5 V	track of printed circuit broken	replace printed circuit
LED not flashing	approx. 5.0 V	LED defective	replace LED
	approx. 12.0 V	LED and Zener diode defective	replace printed circuit and LED
	approx. 0.0 V		

Go To
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NEXT PAGE

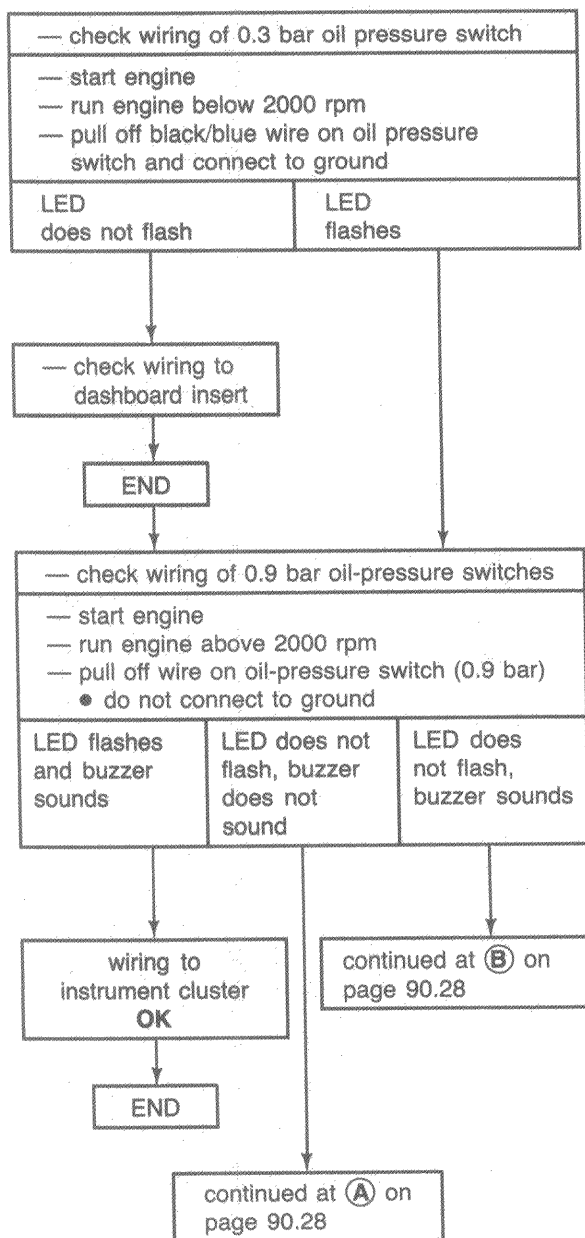


Troubleshooting

LED flashes and buzzer sounds while driving car although oil pressure is correct

Check these first:

- fuel gauge, coolant-temperature gauge, 0.3 bar and 0.9 bar oil-pressure switches are OK



(A)
continued
from page 90.27

check these first:

- voltage from ignition coil terminal 1 present at instrument cluster connector T14/9

voltage from ignition coil terminal 1 is not reaching oil-pressure warning-system control unit

- disconnect battery ground cable
- swing instrument cluster out
 - do not pull off connectors from instrument cluster
- connect battery ground cable
- switch ignition ON
- connect test light at 1

test light does not light up

test light lights up

- replace printed circuit

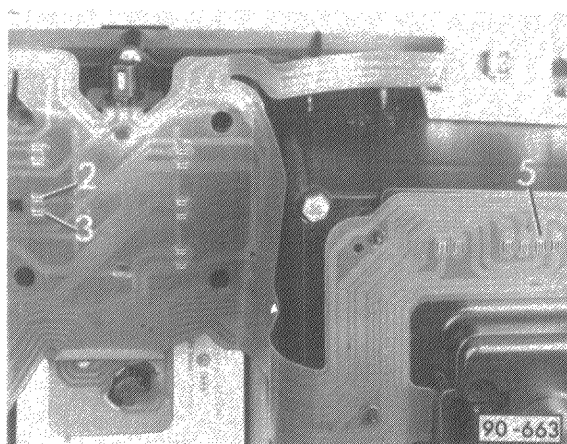
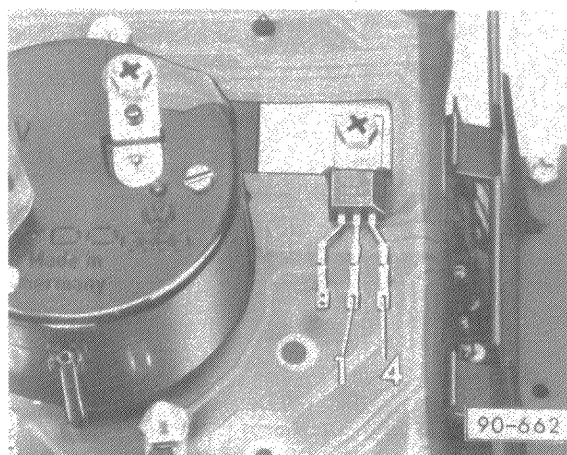
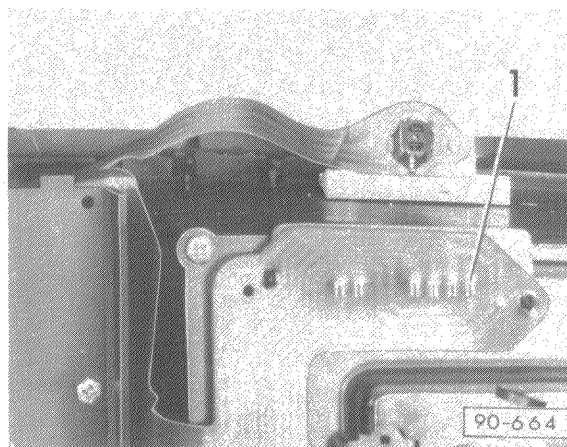
END

(B)
continued
from page 90.27

check dynamic oil-pressure system

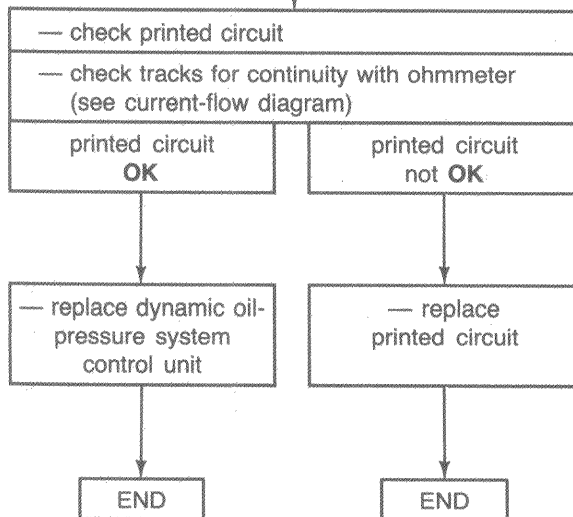
- remove dashboard cluster (for following tests use 12 Volt battery as power source and voltmeter)
- connect battery ground to voltage stabilizer 1 with test probe
- connect battery ground to terminal 5 with test probe
- connect voltmeter to terminals 2 and 3
- connect battery plus to voltage stabilizer 4 with test probe

continued
on page 90.29



continued
from page 90.28

Test shows	voltmeter reading	possible causes	repair instructions
LED flashing	approx. 8.5 V	Zener diode defective	replace printed circuit and LED
	approx. 5.5 V	track of printed circuit broken	replace printed circuit
LED not flashing	approx. 5.0 V	LED defective	replace LED
	approx. 12.0 V	LED and Zener diode defective	replace printed circuit and LED
	approx. 0.0 V		



90 Electrical System-Instruments, Radio

Speedometer head

As of May 1983 the existing regulations (FMVSS 127) concerning vehicle speed indication were cancelled by the Department of Transportation (DOT). Starting May 1983, the only requirement is that the vehicles' speedometer indicate a higher speed than is actually being driven.

Speedometers having European calibration specifications were installed in vehicles for model years 1984 through 1985 (until December 1984 production). These speedometer heads have a basic tolerance of (+) 6.2 miles per hour with an additional (+) 5% of the actual speed driven.

For example:

Actual Speed	50 Miles Per Hour
+ Basic Tolerance	6.2
+ 5% of Actual	2.5

Maximum indicated speed: 58.7 miles per hour*

Speedometers with the former FMVSS 127 calibration are installed starting with December 1984 production. These speedometer heads have a tolerance of (+) 3 miles per hour.

For example:

Actual Speed	50 Miles Per Hour
+ Basic Tolerance	3 Miles Per Hour

Maximum indicated speed: 53 miles per hour*

*Note

It is required that vehicles be equipped with OEM tires and wheels showing only normal tire wear.

Odometer

The odometer reading is independent of the speed indication and is regulated by the Federal Trade Commission (FTC). The tolerance of the odometer indication is (-) 1% to (+) 3.75% of the actual number of miles driven.

Note

The number printed on the speedometer face plate beneath the word MPH shows the number of revolutions required by the speedometer cable multiplied by 100 to travel a distance of 1/100th of a mile (52 feet, 9.5 inches).