

Workshop Manual Passat 1988 ►

Engine Code letters	PB	PF						

Booklet Digifant ignition and injection system (1.8 ltr. engine)

Edition 05.90

Repair Group Index to Workshop Manual

Volkswagen Technical Site: <http://vwts.ru> <http://vwts.info>

Technical Information should always be available to all foremen and mechanics, because compliance with the instructions given is essential to ensure vehicle roadworthiness and safety. In addition, the normal safety precautions to be observed when working on motor vehicles are also applicable.

002,5105,59,20

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ELECTRICAL CHECK OF DIGIFANT
=====

IGNITION AND FUEL INJECTION
=====

SYSTEM
=====

Notes:

- Use hand multimeter V.A.G 1526 and diode test lamp V.A.G 1527 for the test.
- The specifications given are for an ambient temperature of between 0° and +40°C.
- If the measured values differ from the specifications, locate the faults as per CFD. Before renewing any components, always check wiring and connections and repeat resistance check on component if specifications are $< 10 \Omega$.
- To connect the test instruments, use test box V.A.G 1598 with adapter cable V.A.G 1598-2 and auxiliary cables from adapter set V.A.G 1594.

01-1

- The contact numbers in the plug and the socket numbers in the test box V.A.G 1598 are the same.

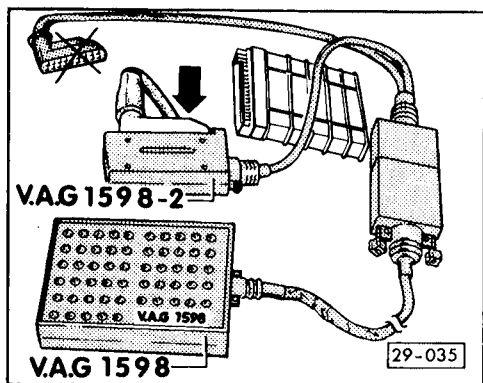
Attention!

To prevent destruction of the electronic components, the appropriate measuring range should be selected before connecting up the measuring cables.

Test prerequisites:

- Battery voltage OK.
- Fuse 18 OK.
- Earth cables of Digifant ignition and fuel injection system OK.
- Fuel pump and fuel pump relay OK, checking-Repair Group 20.

01-2



A - Checking wiring loom connector plug

- With ignition switched off disconnect the plug from the Digifant control unit (J 169) (The control unit is located on right hand side in plenum chamber).

- Using dapter cable V.A.G 1598-2 connect up test box V.A.G 1598 to the wiring loom plug only (control unit remains disconnected).

- Carry out checks as per following table - from page 01-4.

01-3

- Measuring range: Switch to <u>voltage measurement</u> - V -				
Test step	V.A.G 1598 socket	Item tested	● Test conditions - Additional operations	Specified reading
1	13 + 14	Voltage supply for Digifant control unit (J169)	- Ignition switched on	Approx. battery voltage
	14 + 19			
2	12 + 13	Injector wiring (N30 ... N33)*	● Ignition switched on	Approx. battery voltage
3	Bridge 3 + 13	Wire to fuel pump relay (J17)	● Ignition switched on	Fuel pump must be heard running
4	1 + 13	Wire from starter terminal 50	- Operate starter and then switch off ignition	Min. 8 V

* check injector resistance - page 24-58.

• Ignition switched off - Measuring range: Switch to <u>resistance measurement</u> - Ω -				
Test step	V.A.G 1598 socket	Item tested	• Test conditions - Additional operations	Specified reading
5	6 + 10	Coolant temperature sender (G62) -blue-	---	Fig. 1 - page 01-9
6	6 + 9	Intake air temperature sender (G42) in air flow meter	---	Fig. 1 - page 01-9
7	22 + 23	Wires to idling speed stabilisation valve (N71)	---	2 ... 10 Ω
8	6 + 8	Wires to Hall sender (G40)	- Pull off Hall sender plug and bridge all <u>three</u> connections	Max. 0.5 Ω
	6 + 18			
9	4 + contact 1*	Wires to knock sensor (G61)	- Separate connection to knock sensor	Max. 0,5 Ω
	5 + contact 2*			
	7 + contact 3*	◀ 07.89		
	5 + contact 3*	08.89 ◀		

01-5

10	25 + contact 6*	Wire to TCI-H switch unit (N41)	- Pull plug off TCI-H switch unit	Max. 0.5 Ω
11	Only for engine code letters: PF 2 + 13	Wire to Lambda probe (G39)	- Separate connection to Lambda probe and bridge plug contacts 1 + 2	Max. 0.5 Ω
			- Attach Lambda probe plug	$\infty \Omega$
12	16 + 13 only on vehicles with A/C	Wire to A/C compressor	- Separate single-pin connector on plenum chamber and connect green wire to earth (-)	Max. 0.5 Ω

* On plug disconnected from knock sensor/TCI-H switch unit.

01-6

<ul style="list-style-type: none"> ● Ignition switched off - Measuring range: Switch to <u>resistance measurement</u> - Ω - 				
Test step	V.A.G 1598 socket	Item tested	<ul style="list-style-type: none"> ● Test conditions - Additional operations 	Specified reading
<u>Additionally with manual gearbox:</u>				
13	6 + 11	Idling switch (F60) and full throttle switch (F81)	● Throttle valve lever in idling and full throttle positions	Max. 0.5 Ω
			● Throttle valve lever between idling and full throttle position	$\infty \Omega$
14	6 + 17	Potentiometer in air flow meter (G19)	---	0.5 ... 1.0k Ω
	17 + 21		- Move flow meter plate or operate starter	Resistance change

01-7

<u>Additionally with automatic gearbox:</u>				
15	6 + 17	Potentiometer in air flow meter (G19)	- Disconnect 3-pin plug for throttle valve potentiometer (G69)	0.5 ... 1.0 kΩ
	17 + 21		- Move flow meter plate or operate starter	Resistance change
16	17 + contact 1*	Wires for throttle valve potentiometer (G69)	● 3-pin plug for throttle potentiometer disconnected	Max. 0.5 Ω
	11 + contact 2*			
	6 + contact 3*			

Note:

Check wires (contacts 7 and 24) to automatic gearbox control unit (J217) by interrogating automatic gearbox fault memory for - refer to Workshop Manual "Automatic Gearbox 096" (self-diagnosis).

*On detached plug for throttle valve potentiometer

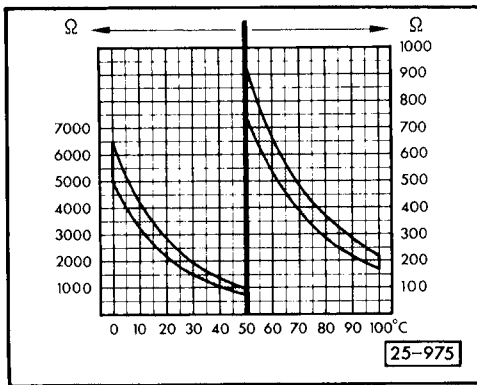
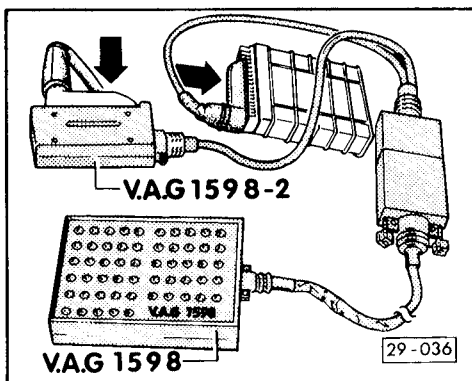


Fig. 1 Resistances curves for intake air sender (G42) and coolant temperature sender (G62)

01-9

B - Checks with Digifant control unit connected

- With ignition switched off connect test box to Digifant control unit (J169) with adapter cable.



Attention!

Carry out checks with particular care. Interchanging the sockets when connecting test appliances or selecting an incorrect measuring range may lead to destruction of the control unit.

- Carry out checks as per following table
- from page 01-11.

01-10

- Measuring range: switch to <u>voltage measurement</u> - V -				
Test step	V.A.G 1598 socket	Item tested	● Test conditions - Additional operations	Specified reading
1*	8 + 6	Voltage supply for Hall sender (G40)	- Switch on ignition	Min. 10 V
- Connect diode test lamp V.A.G 1527 with adapters V.A.G 1594/15 instead of the Multimeter. - Pull plug off central connection for injectors.				
2*	6 + 18	Signal from Hall sender (G40)	- Operate starter	LED must flicker
3*	13 + 25	Ignition/switching function of Digifant control unit (J169)	- Operate starter	LED must flicker
<u>Additionally with automatic gearbox only:</u>				
4	6 + 24	Engine speed signal	- Operate starter	LED must flicker

*These test steps are only to be carried out if the engine does not start.

01-11

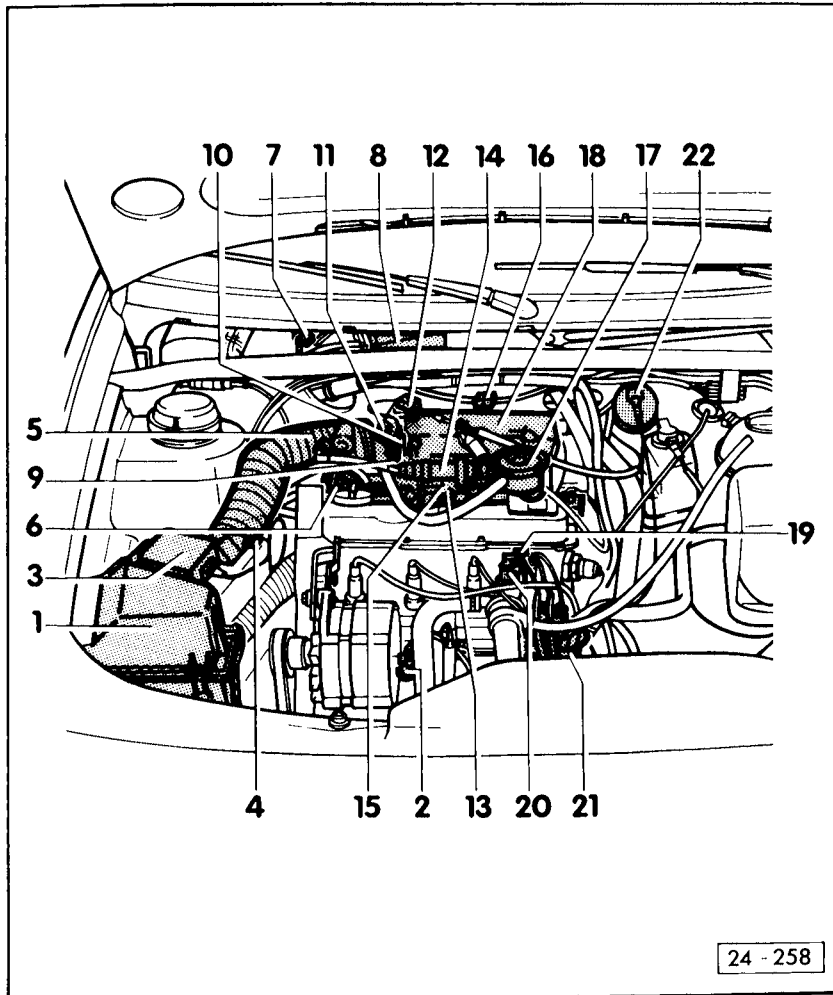
5	6 + 11	Throttle valve potentiometer (G69) with 3-pin plug	- Switch on ignition	0 ... 0.5 V
	11 + 17		● Throttle valve lever in idling and full throttle positions	
			● Throttle valve lever between idling and full throttle positions	4.5 ... 5.0 V
			● Ignition switched on	4.5 ... 5.0 V
			● Throttle valve lever in idling and full throttle positions	
			● Throttle valve lever between idling and full throttle positions	0 ... 0.5 V

01-12

SERVICING DIGIFANT IGNITION
=====
AND FUEL INJECTION SYSTEM
=====

FITTING LOCATIONS - GENERAL VIEW

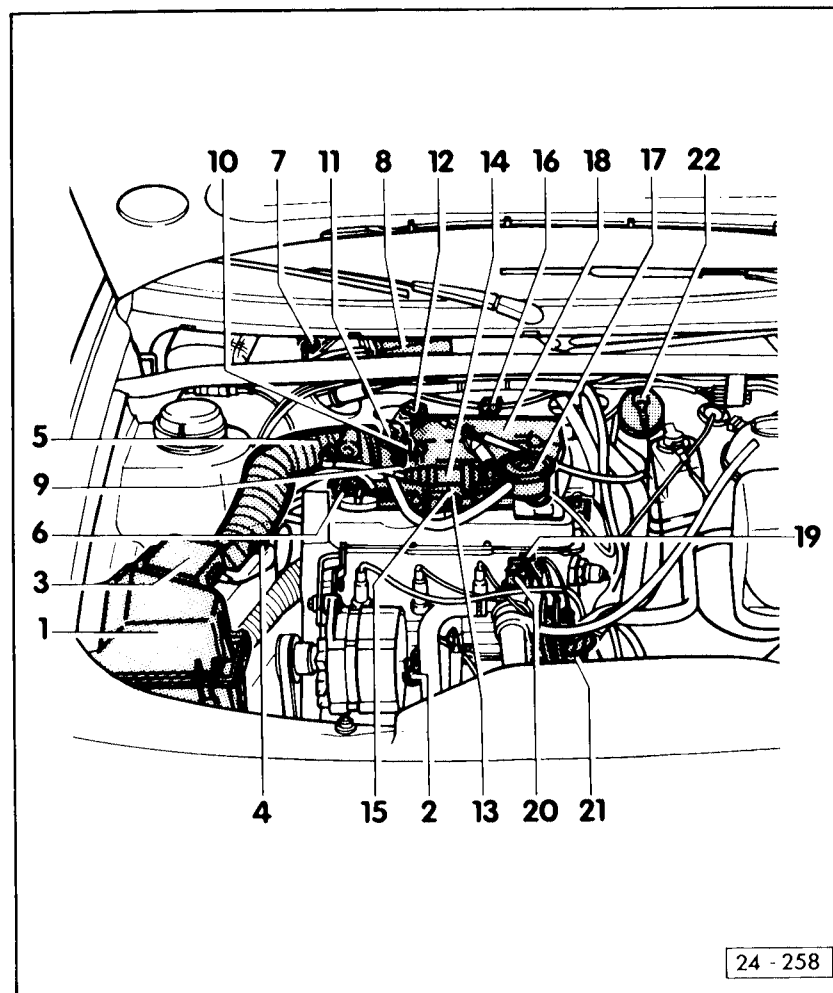
- 1- Air cleaner
- 2- Knock sensor (G61)
- 3- Air flow meter
 - With air-intake temperature sender (G42) and potentiometer (G19)
- 4- CO adjustment screw
- 5- Intake hose
- 6- Fuel pressure regulator
- 7- TCI-H switch unit (N41)
- 8- Digifant control unit (J169)
- 9- Idling adjustment screw



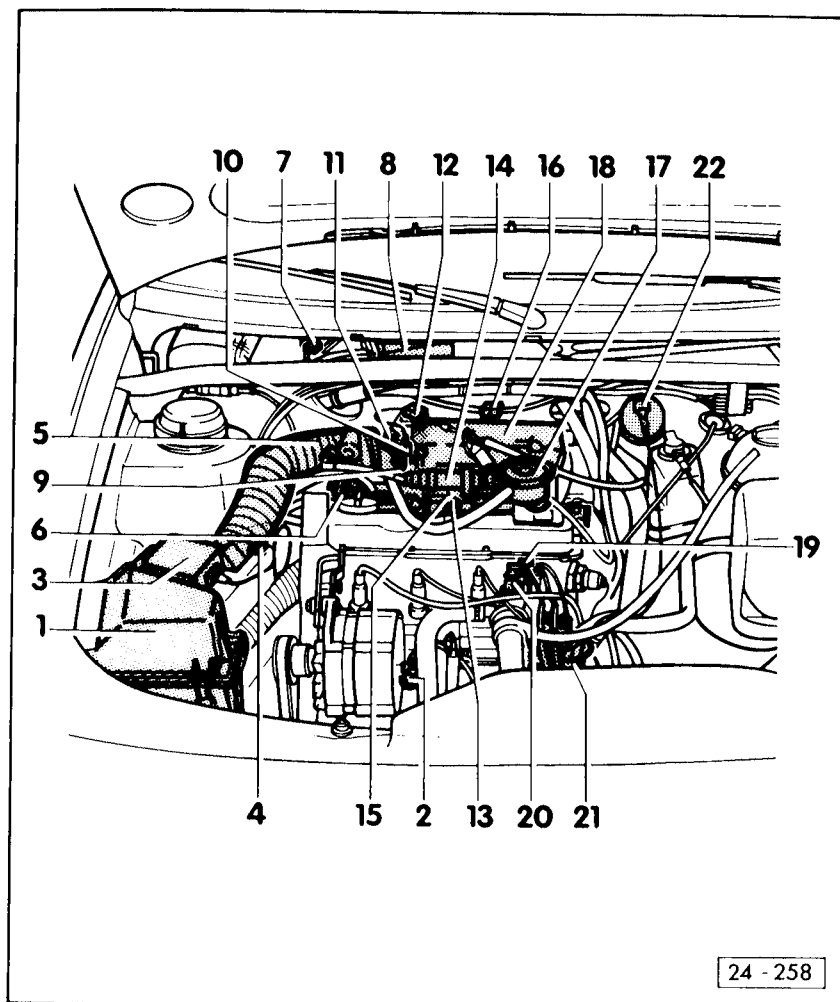
24-1

10- Throttle valve housing

- 11- Idling switch(F60)
 - For vehicles with manual gearbox
 - For vehicles with automatic gearbox:
Throttle valve potentiometer (G69)
- 12- Full throttle switch(F81)
 - For vehicles with manual gearbox
 - For vehicles with automatic gearbox:
Throttle valve potentiometer (G69)
- 13- Injectors(N30 .. N33)
- 14- Idling speed stabilization valve(N71)
- 15- Injector manifold



24-2



- 16- Connector for Lambda probe (G39)
 - For engine code letters: PF
- 17- Pressure control valve for crankcase breather
- 18- Intake manifold
- 19- Temperature sender
 - Black
 - For coolant temperature gauge
- 20- Coolant temperature sender (G62)-blue-
- 21- Ignition distributor
- 22- Ignition coil

24 - 258

24-3

SERVICING FUEL INJECTION PART

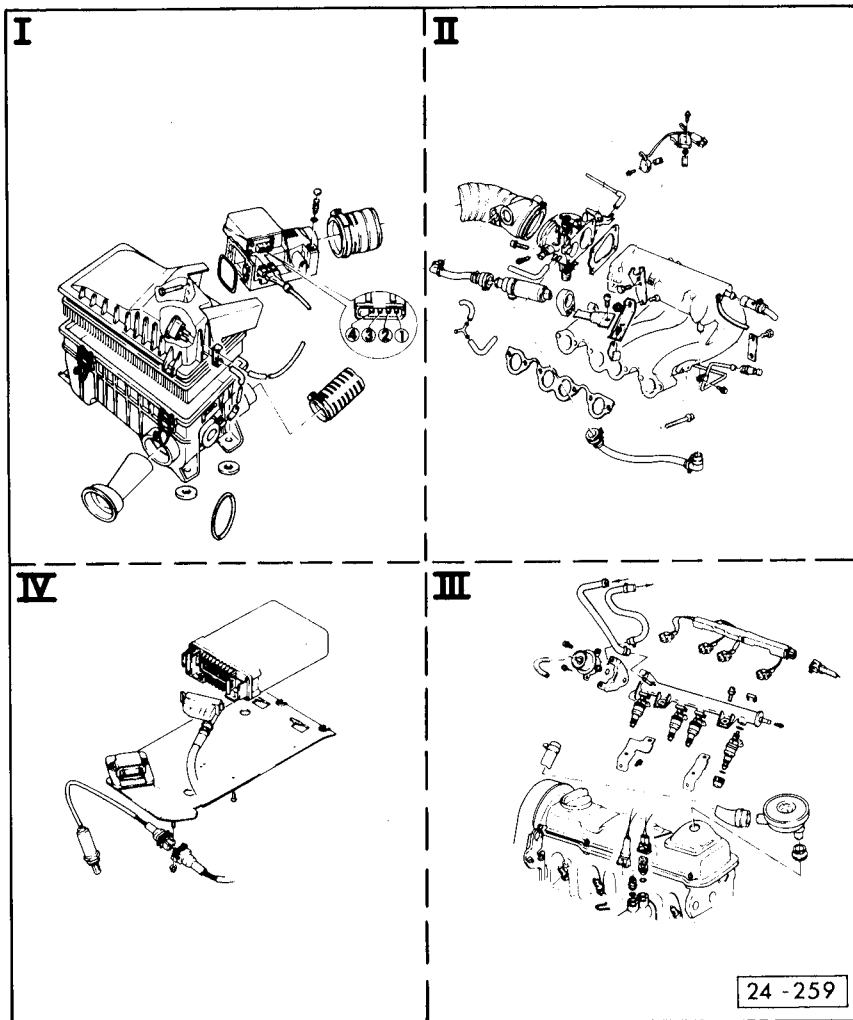
- I - Page 24-7
- II - Page 24-10
- III - Page 24-15
- IV - Page 24-19

Electrical check of Digifant ignition and fuel injection system
- Repair Group 01

Servicing ignition part
- Repair Group 28

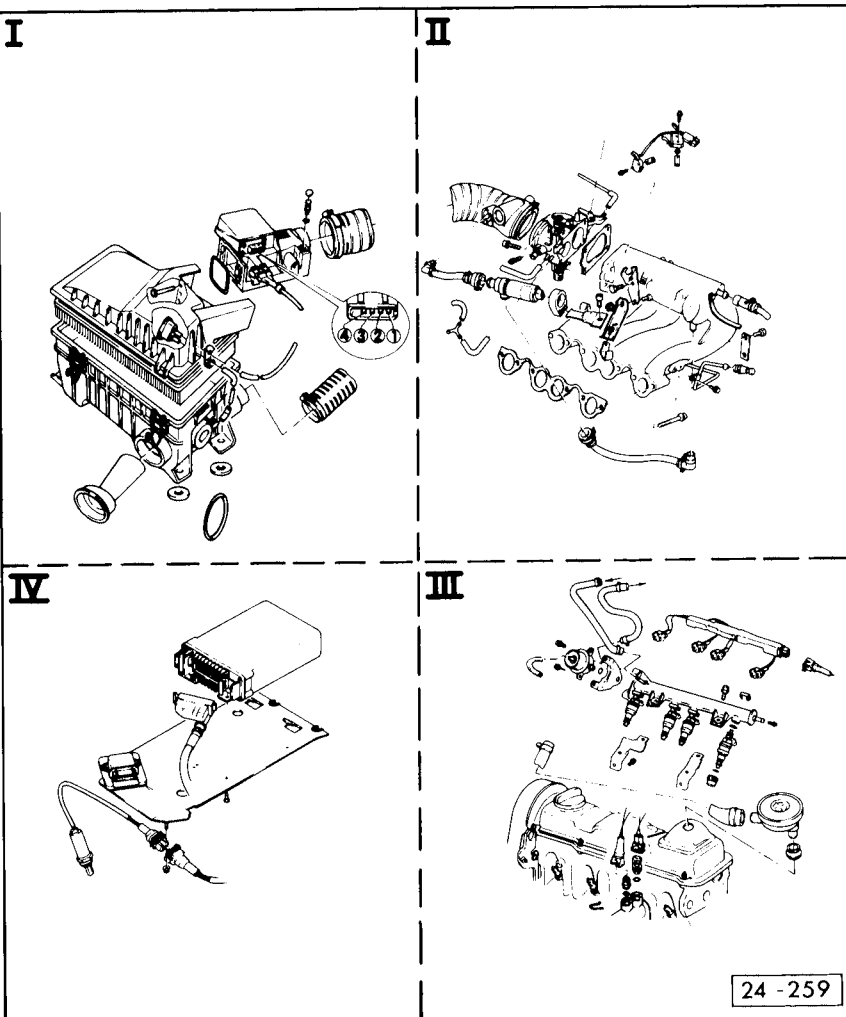
- Technical data - page 24-23
- Safety measures
- page 24-27
- Rules for cleanliness
- page 24-29
- Idling adjustment - page 24-30
- Checking overrun cut-off and full-throttle enrichment
- page 24-41

24-5



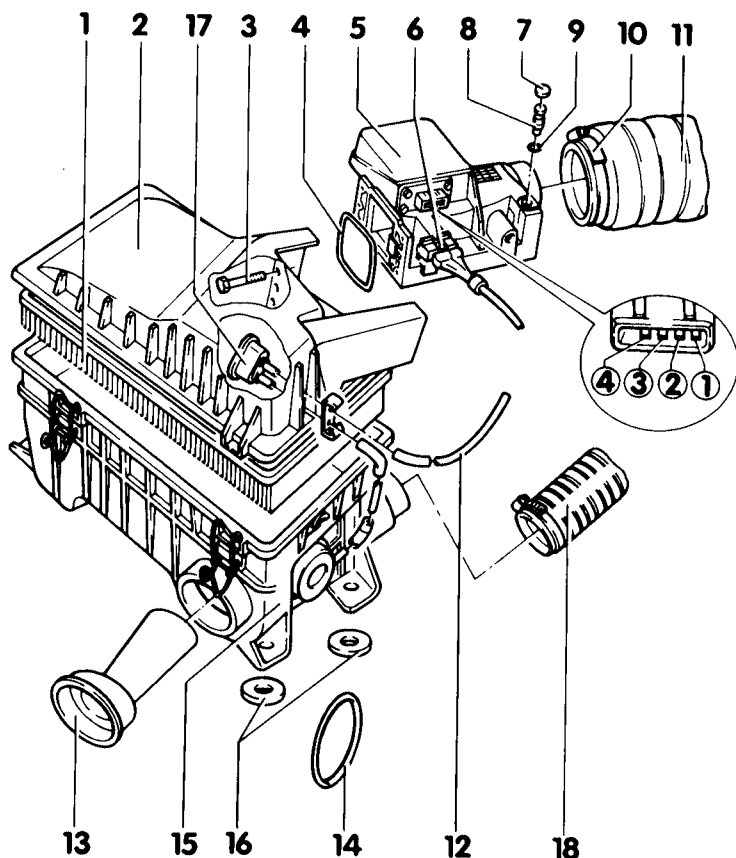
Notes:

- Always renew all gaskets when working on the system.
- All hose connections are either secured with screw-type or spring-type clips.
- Always renew all spring type hose clips.
- A voltage of at least 11.5 V is required to ensure proper component operation.



24-6

I



24-260

1- Air cleaner element

2- Air cleaner - upper part

3- 5 Nm

4- Gasket

5- Air flow meter

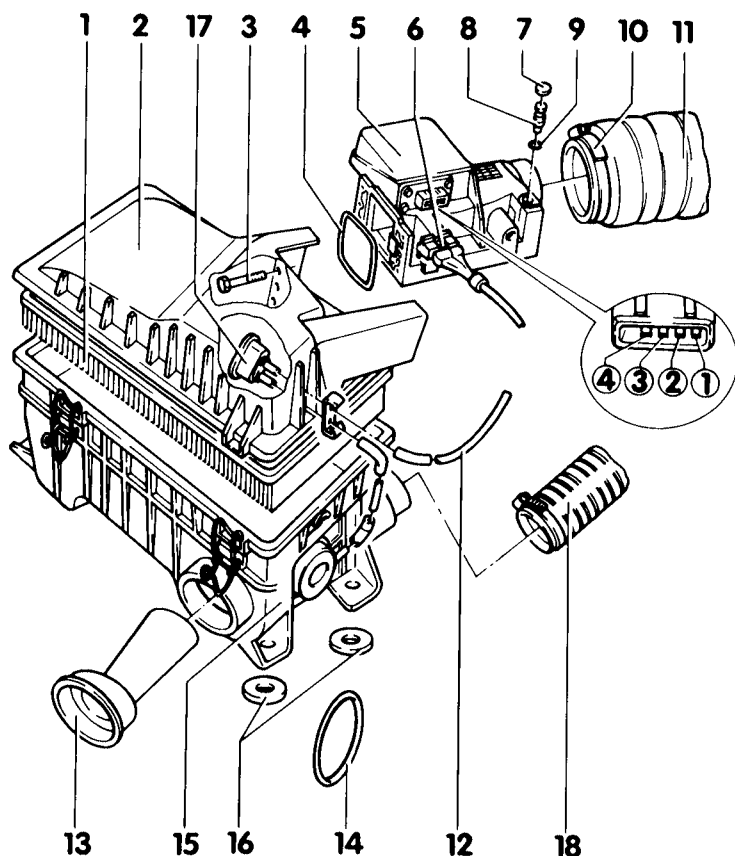
o Measure resistance value for intake air temperature sender (G42) between contacts 1 and 4
See diagram on page 24-26 for specifications.

o Checking potentiometer (G19):
- Measure resistance between contacts 3 and 4.
Specification:
approx. 0.5 ... 1k Ω

- Measure resistance between contacts 2 and 3, moving air flow meter plate at the same time.
Specification:
resistance must change.

24-7

I



24-260

6- Connector

7- Plug

• Remove before carrying out CO adjustment

8- CO adjustment screw

• Idling speed adjustment
- page 24 - 30

9- O-ring

• Renew if damaged

10- Screw-type hose clip

11- Intake hose

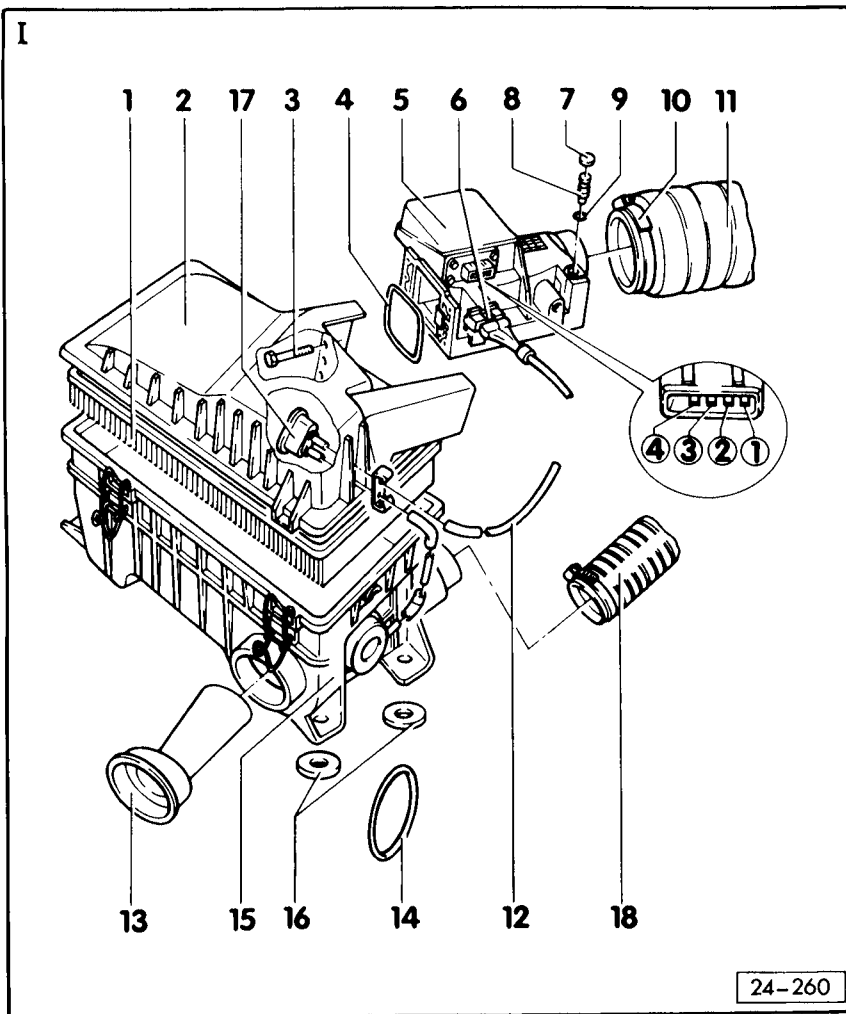
12- Hose

• To Y-piece fuel pressure regulator/throttle valve housing - page 24-14, -24-

13- Air duct

• Note fitting position

24-8



14- Retaining ring

- Fixed to body

15- Air cleaner - Lower part

- Check intake air preheating
- page 24-63

16- Rubber washer

17- Temperature regulator

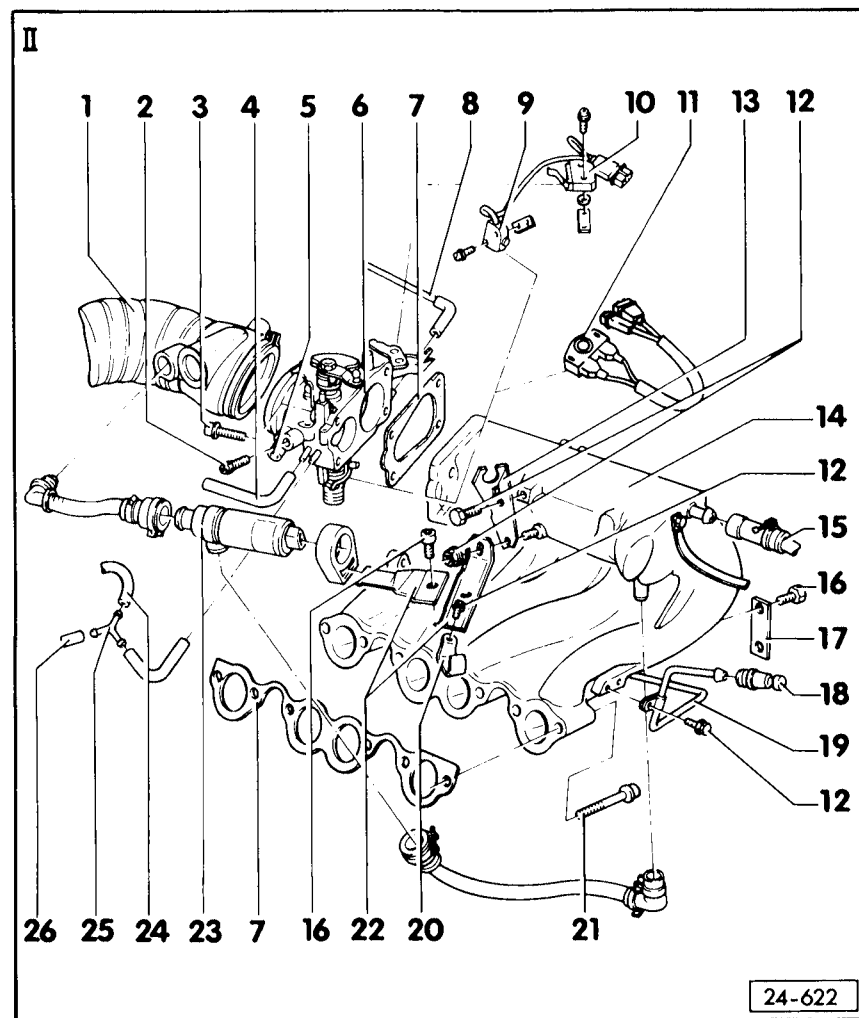
- Position: Brass hose connection
at bottom

- Checking - page 24-64

18- Hose

- To exhaust manifold

24-9



1- Intake hose

2- Idling speed adjustment screw

- Idling speed adjustment
-Page 24-30

- Renew O-Ring if damaged

3- 20 Nm

4- Hose

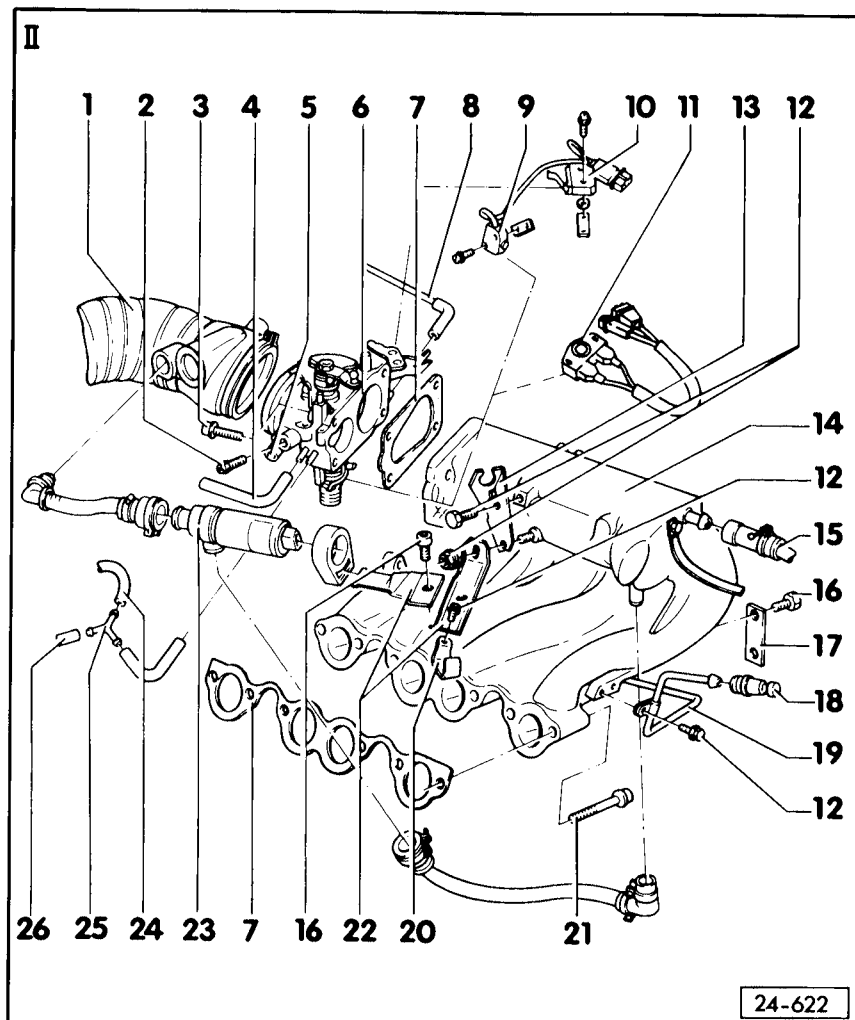
- For engine code letters: PF
otherwise sealing cap

- To activated charcoal filter
cut-off valve, smaller connection

5- Connection

- For crankcase breather hose
- page 24-28, -21-

24-10



- 6- Throttle valve housing
- Basic throttle valve adjustment - page 24-65

7- Gasket

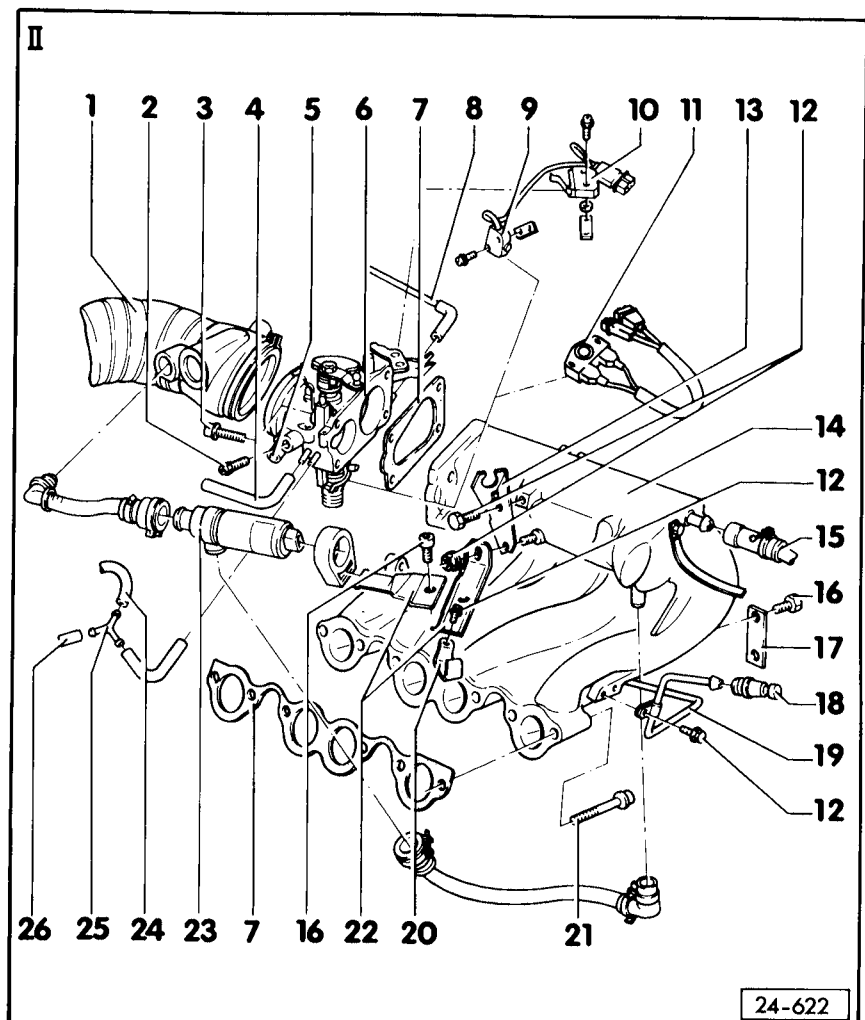
8- Hose

- For engine code letters: PF otherwise sealing cap
- To activated charcoal filter cut-off valve, larger connection

9- Idling switch (F60)

- For vehicles with manual gearbox
- Checking and adjusting - Page 24-43
- Switch-on point: 0.20 ... 0.60 mm before idling stop

24-11



- 10- Full throttle switch (F81)
- For vehicles with manual gearbox

- Checking and adjusting - page 24-43
- Switch-on point: $10 \pm 2^\circ$ before full throttle stop

11- Throttle valve potentiometer (G69)

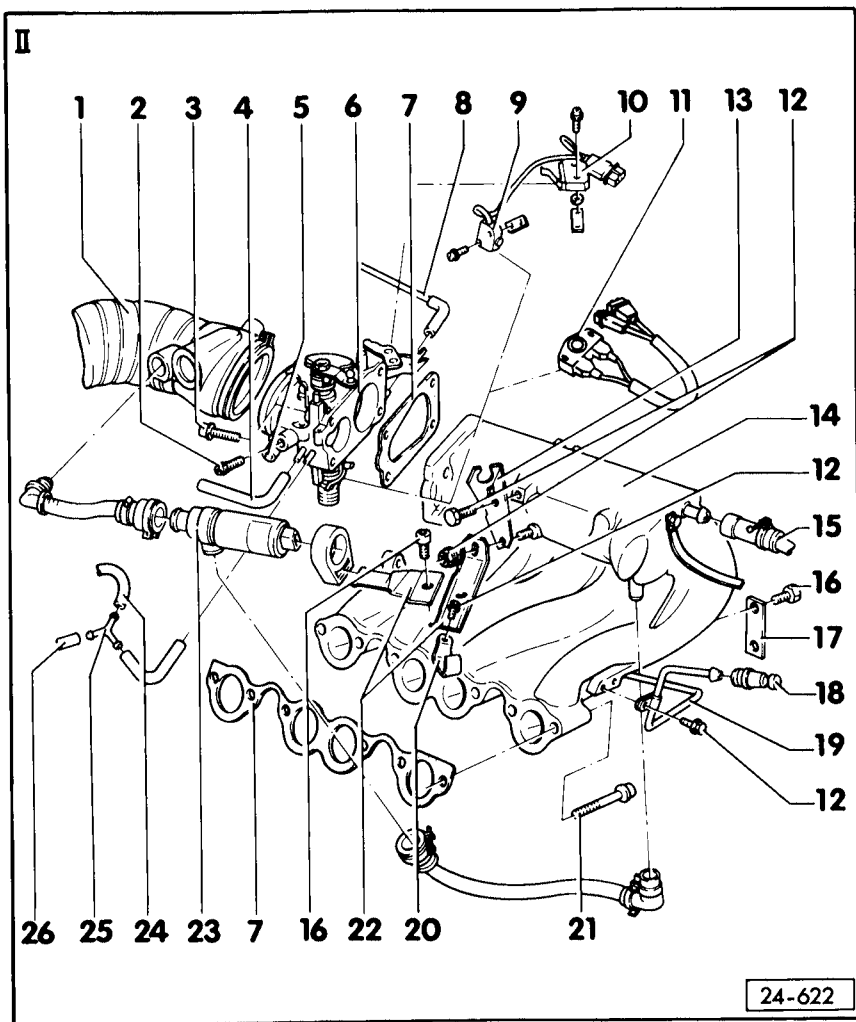
- For vehicles with automatic gearbox
- Checking and adjusting - page 24-48
- Switch-on point: 0.30 ... 0.60 mm before idling stop

12- 10 Nm

13- Bracket

- Adjusting throttle cable - Repair group 20

24-12



14- Intake manifold

15- To brake servo unit

16- 15 Nm

17- Support

- Between intake and exhaust manifolds

18- Sealing cap

19- CO measuring pipe

- For engine code letters: PF

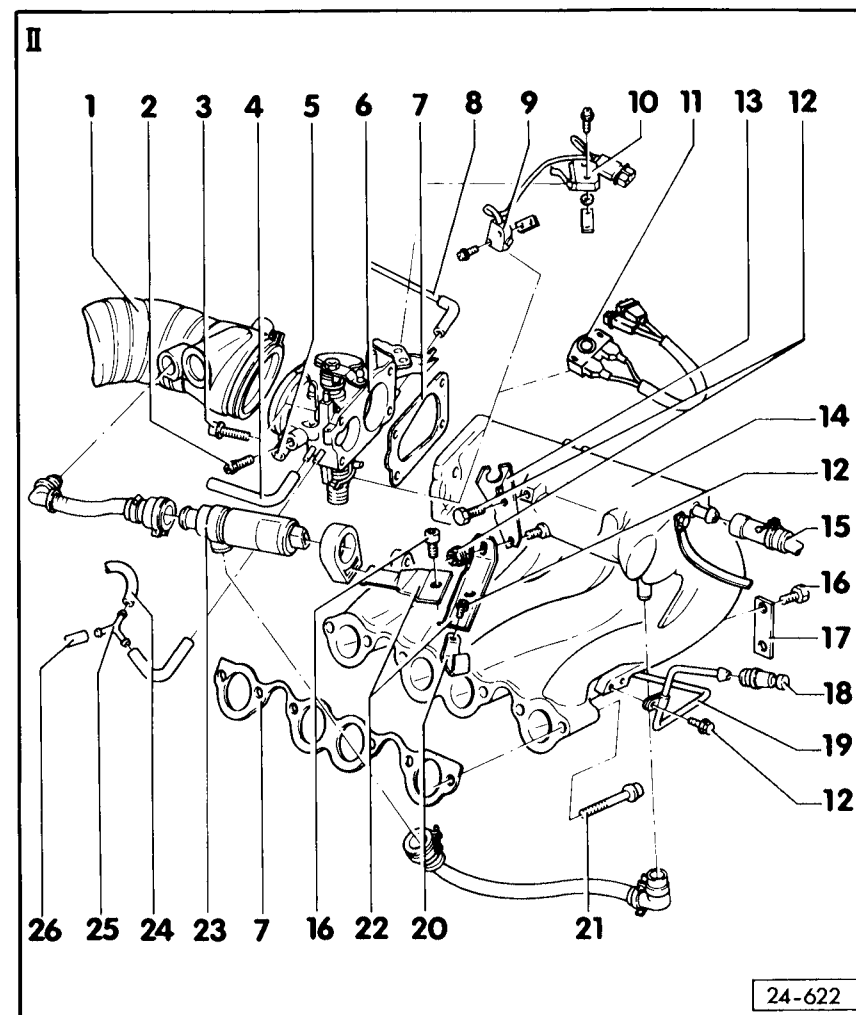
20- Securing bracket

- For crankcase breather pressure regulating valve

21- 25 Nm

22- Support

24-13



23- Idling speed stabilization valve

(N71)

- Specifications - page 24-24

- Checking idling speed stabilization - page 24-35

24- Hose

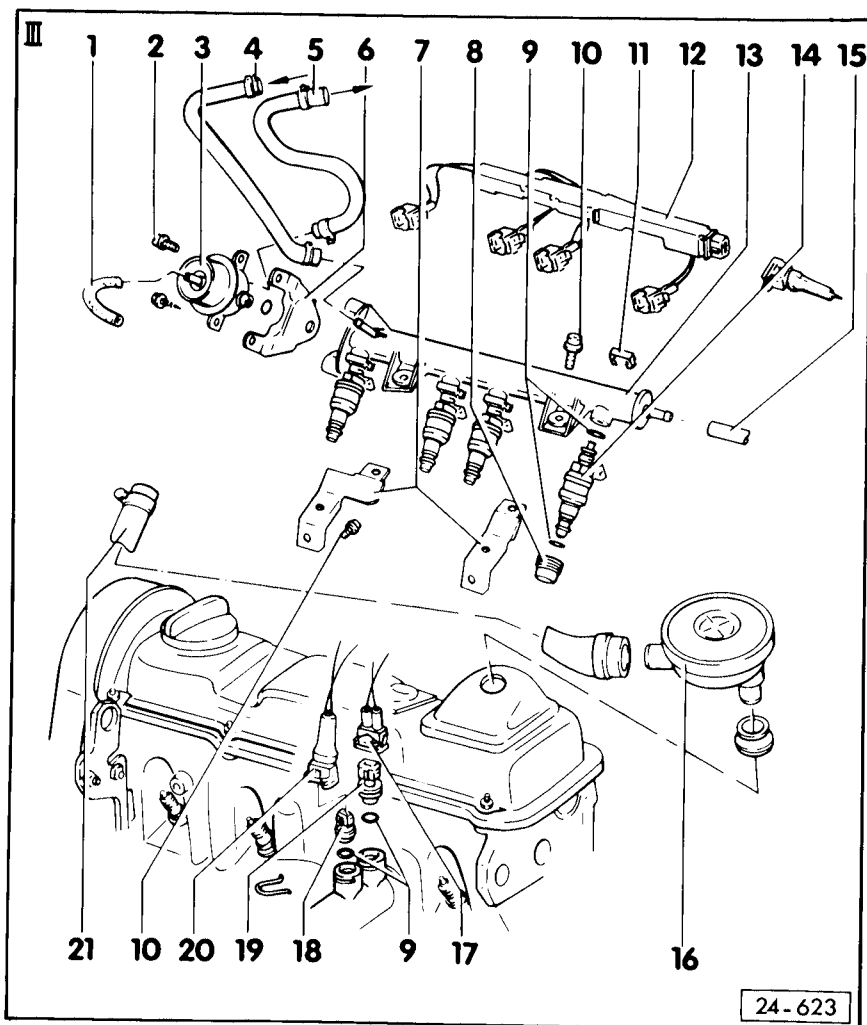
- To air cleaner - upper part -
- page 24-8, -12-

25- Y-piece

26- Hose

- To fuel pressure regulator
- page 24-15, -1-

24-14



1- Hose

- to Y-piece fuel pressure regulator/throttle valve housing
- page 24-14, -26-

2- 15 Nm

3- Fuel pressure regulator

- Checking 24-55

4- Fuel supply line

- Black

5- Return flow line

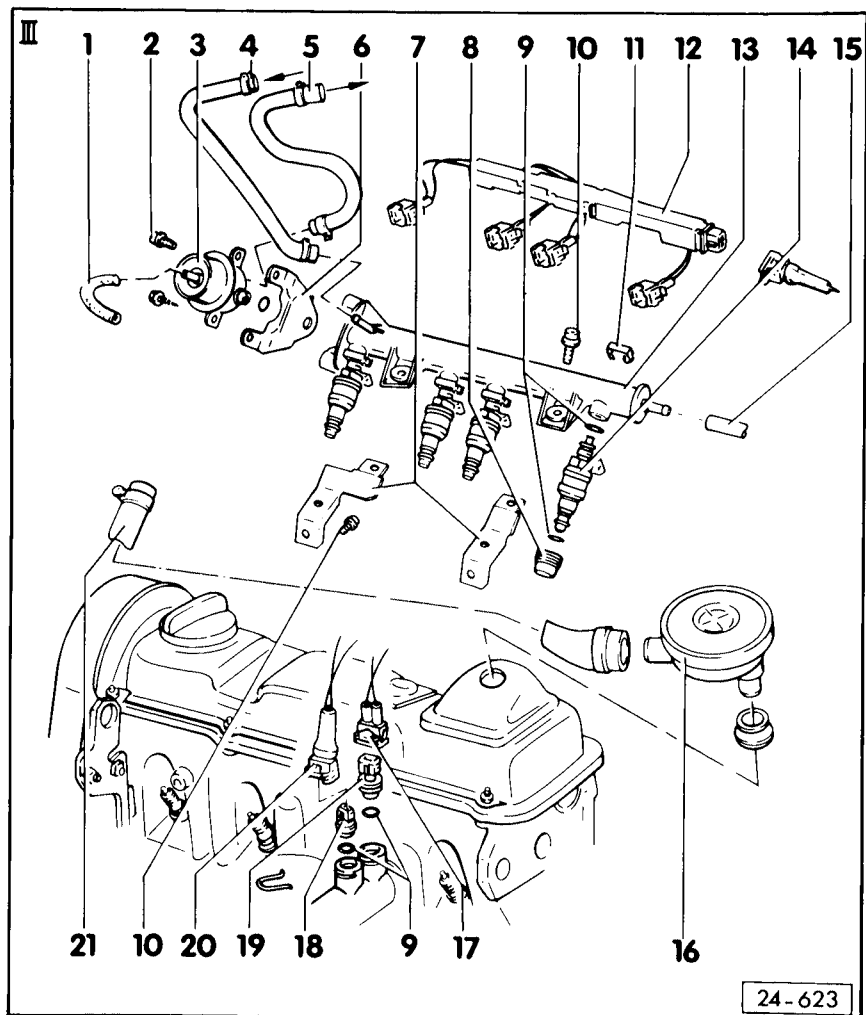
- Blue

6- Bracket

7- Bracket

- For fuel manifold

24-15



8- Injector insert-20 Nm

- Install with D6

9- O-Ring

- Renew if damaged

10- 10 Nm

11- Retaining clip

- Pay attention to correct fitting on injector and fuel manifold

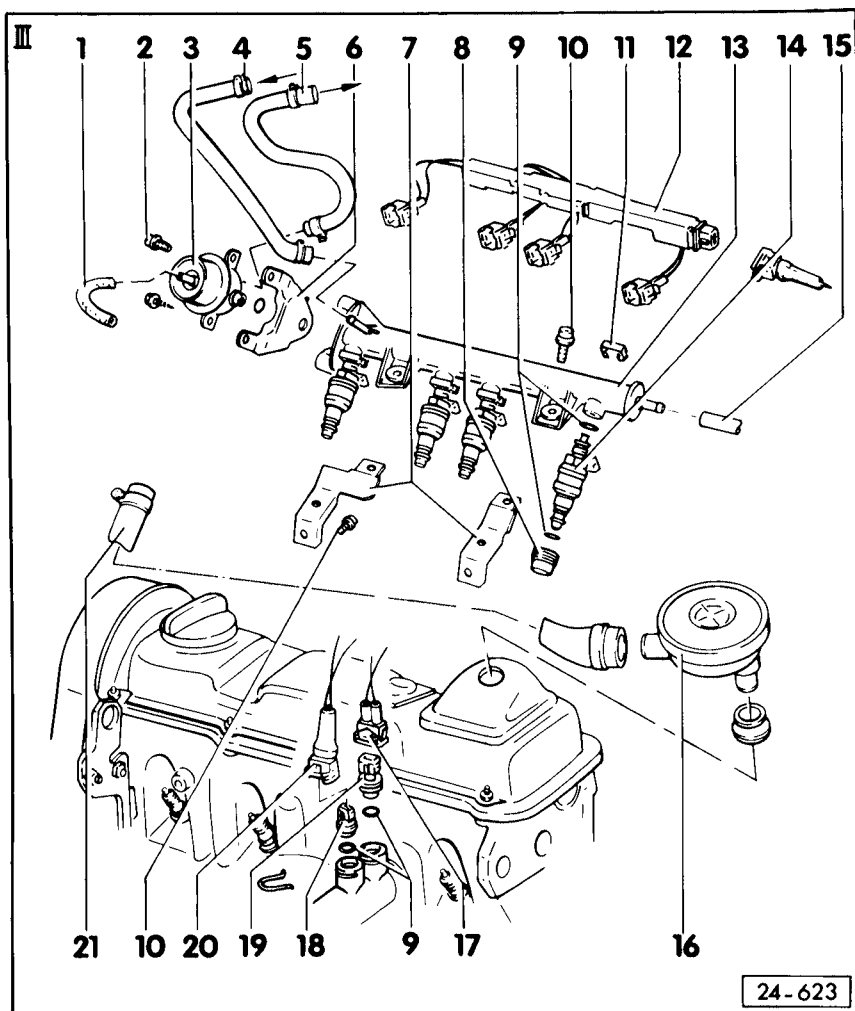
12- Cable guide

13- Fuel manifold

14- Injector (N30 ... N33)

- Checking - page 24-58

24-16



15- Hose

- To pressure switch for fuel pump run-on
- Connecting pressure gauge V.A.G 1318 - page 24-55

16- Pressure regulator valve

- For crankcase breather

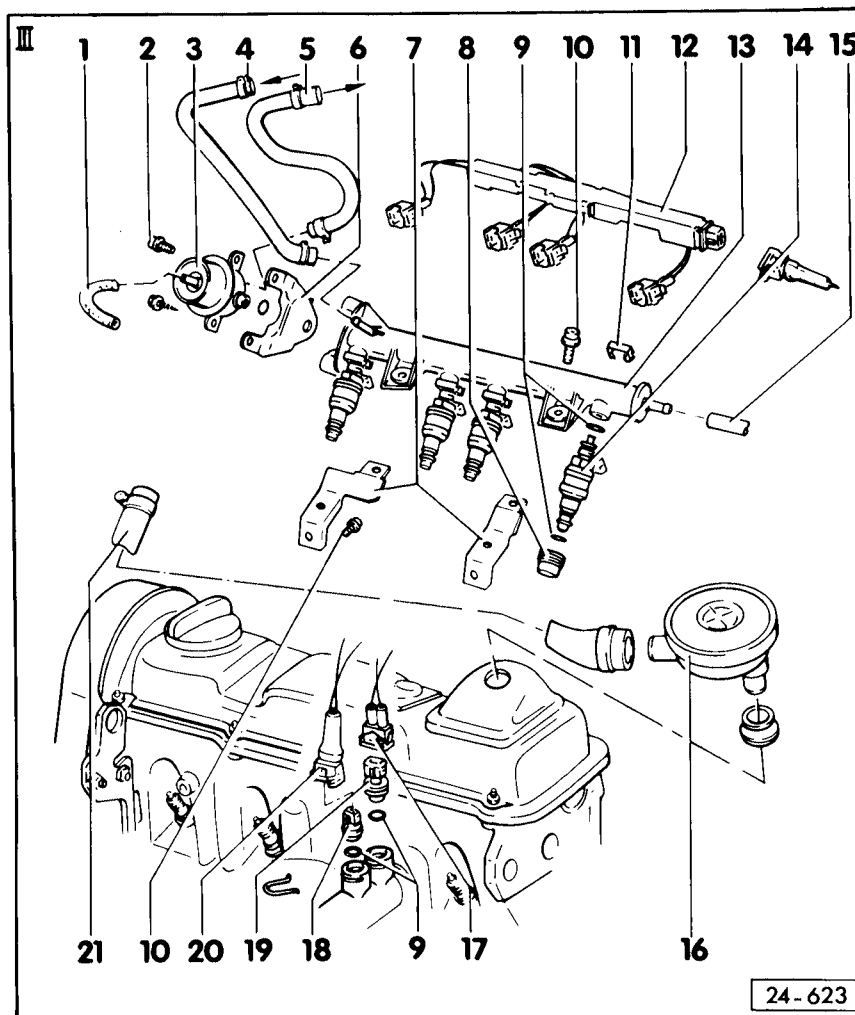
17- Connector plug

- Black
- For coolant temperature gauge

18- Coolant temperature sender

- (G62) - blue-
- Specifications: See diagram page 24-26

24-17



19- Temperature sender

- Black
- For coolant temperature gauge

20- Connector plug

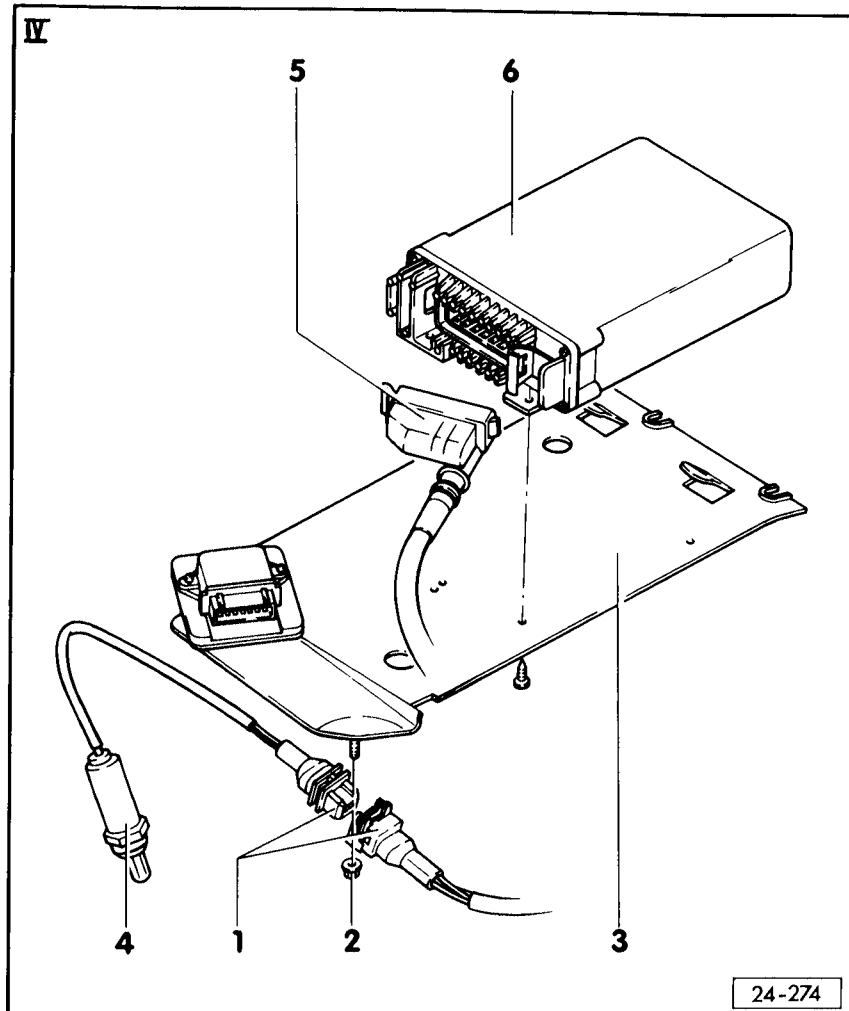
- Blue
- For coolant temperature sender (G62)

21- Hose

- To connection - page 24-10, -5-

24-18

IV



24-274

1- Lambda probe and Lambda probe heater connector

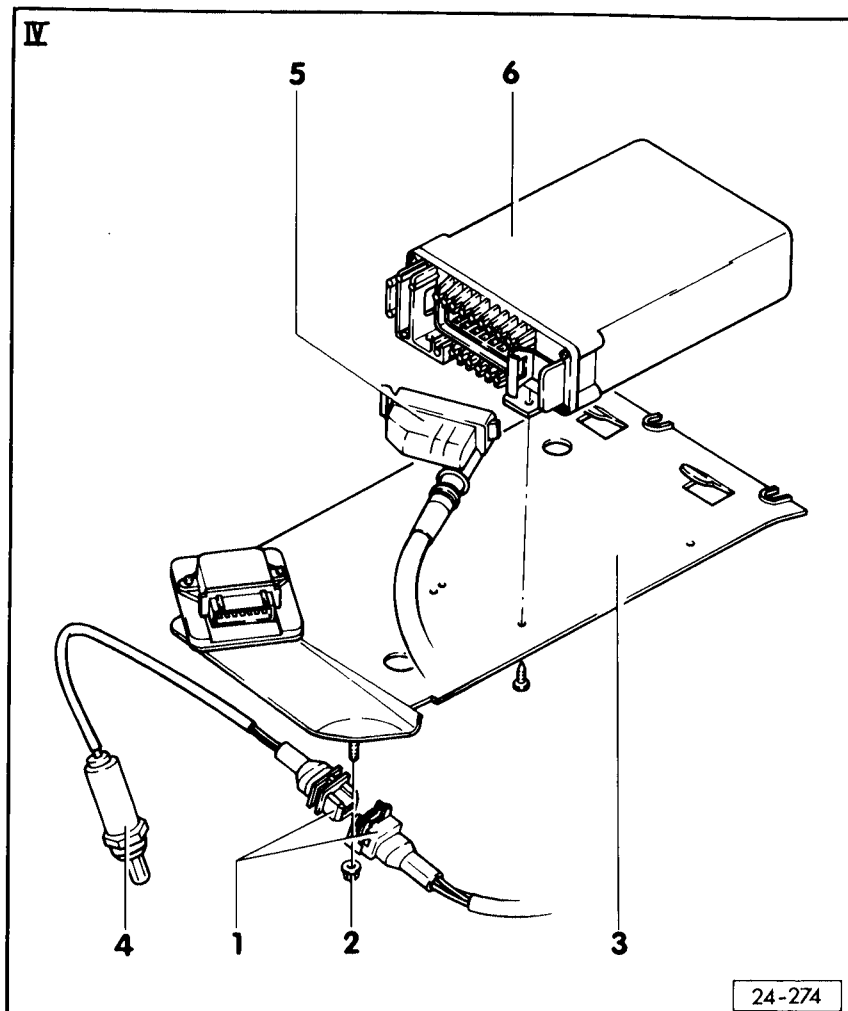
- For engine code letters PF with lambda control
- Colour coding:
 - black: Lambda probe
 - grey: Lambda probe heating
- Voltage supply for Lambda probe heating: approx. battery voltage at connector when engine is running
- Check probe heating for continuity at Lambda probe connector

2- 10 Nm

3- Retaining plate

24-19

IV



24-274

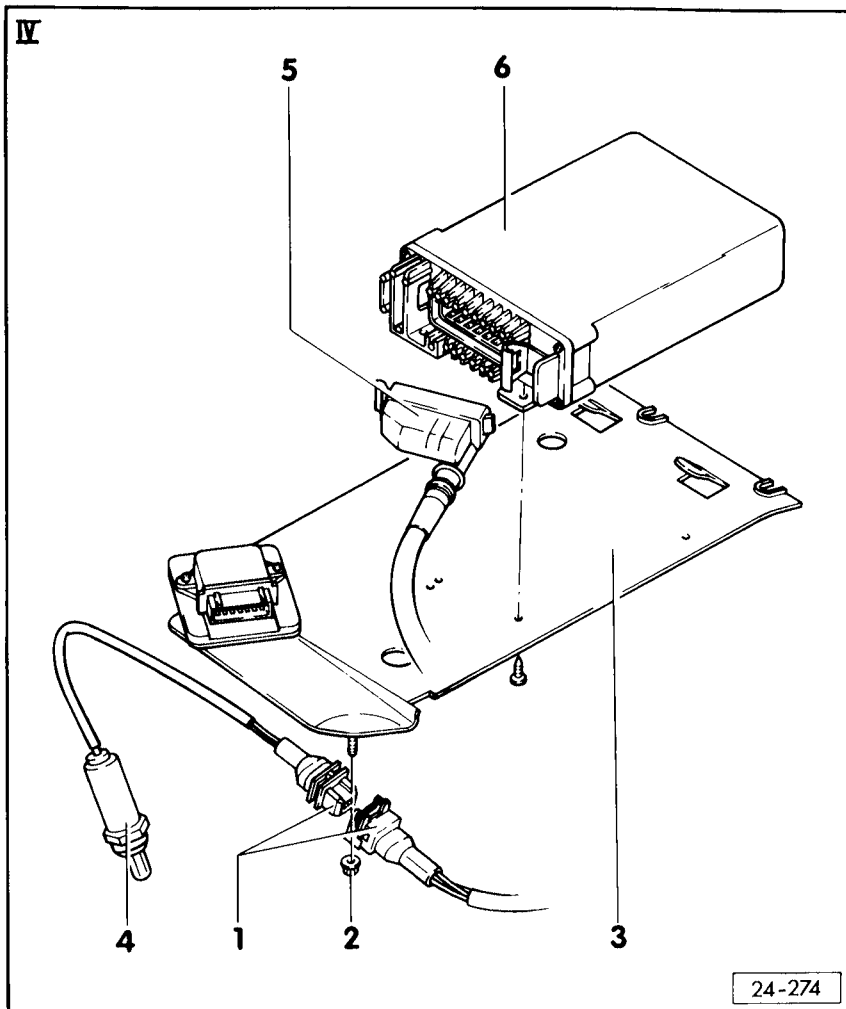
4- Lambda probe (G39) - 50 Nm

- For engine code letters: PF with Lambda regulation
- Location: Catalyst
- Coat thread only with G5; G5 must not be present in the probe body slit area.
- Checking - page 24-38

5- Connector

- Only disconnect or connect plug with ignition switched off.
- To disconnect, disengage spring on control unit.
- Digifant ignition and fuel injection system electrical check. Check A on wiring loom plug connector - page 01-1

24-20



6- Digifant control unit (J169)

- For: fuel injection and ignition system, idling speed stabilization control valve, Lambda regulation (engine code letters: PF)
- Location: in water box on right
- Digifant ignition and fuel injection system electrical check. Check B with Digifant control unit connected
- page 01-1

24-21

TECHNICAL DATA

=====

<u>Engine code letters</u>		<u>PB</u>	<u>PF</u>
<u>Digifant II-Control unit</u>			
Part No.	Manual gearbox	037 905 022 AN	037 906 022 AM
	Automatic gearbox	---	037 906 022 CJ
Governed speed		6500 rpm	
<u>Idling speed adjustment¹⁾</u>			
<u>Idling speed:</u>		950 \pm 50 rpm	
After reconnecting the coolant temperature sender plug		750 ... 850 rpm	
<u>CO content:</u>			
PB		1.0 \pm 0.5 Vol.%	
PF with Lambda control ²⁾		0.7 \pm 0.4 Vol. % ³⁾	
Workshop <u>higher than 300 m</u> above sea level add		0.2 Vol.% for each additional 100 m	

24-23

<u>Idling speed stabilisation</u>		
<u>Resistance at valve</u>		2 ... 10 Ω
<u>Control current</u> ● Plug on coolant temperature sender	disconnected	420 \pm mA, <u>constant</u>
	connected	420 \pm 30 mA, <u>fluctuating</u> (Speed 800 \pm 50 rpm)
● Dependant upon load: Engine cold, power steering, electrical loads and air conditioner switched on		400 ... 1000 mA
<u>Idling switch</u> (Vehicles with manual gearbox) ● Measure at throttle valve lever with feeler gauge		Switch-on point: 0.20 ... 0.60 mm before idling stop
<u>Full throttle switch</u> (Vehicles with manual gearbox) ● Measure with protactor 3084		Switch-on point: 10 \pm 2° before full throttle stop
<u>Throttle valve potentiometer</u> (Vehicles with automatic gearbox) ● Measured with feeler gauge at throttle valve lever		Switch-on point: 0.30 ... 0.60 mm before idling stop

1) Pay attention to checking and adjustment conditions - page 24-30

2) Measured at CO measuring pipe

3) A reading of 0.3 ... 1.1 vol.% will also be obtained at altitudes above 300 m after connecting plug to coolant temperature sender.

<u>Fuel pressure regulator</u>		
<ul style="list-style-type: none"> Fuel pressure at idling speed and with vacuum hose 	connected	approx. 2.5 bar
	disconnected	approx. 3.0 bar
<u>Holding pressure</u>	after 10 minutes	minimum 2.0 bar
<u>Injectors</u>		
<u>Spray formation</u>		identical on all injectors
<u>Resistance:</u>	on valve	15 ... 20Ω
	at connection for all injectors	3.7 ... 5.0Ω = 4 inject. OK 5.0 ... 6.7Ω = 3 inject. OK 7.5 ... 10.0Ω = 2 inject. OK 15.0 ... 20.0Ω = 1 inject. OK
<u>Voltage:</u>		
<ul style="list-style-type: none"> Hall sender OK Check on detached connector for all injectors Operate starter 		Diode flickers

Volkswagen Technical Site: <http://vwts.ru> <http://vwts.info>

24-25

<u>Air flow meter</u>		
<u>Resistance between terminals</u>	3 + 4	0.5 ... 1.0 kΩ
	2 + 3	Resistance changes when flow meter plate is moved
	1 + 4	Resistance dependent upon air flow meter temperature - see Fig. 1
<u>Coolant temperature sender</u>		Resistance - dependent upon coolant temperature see Fig. 1

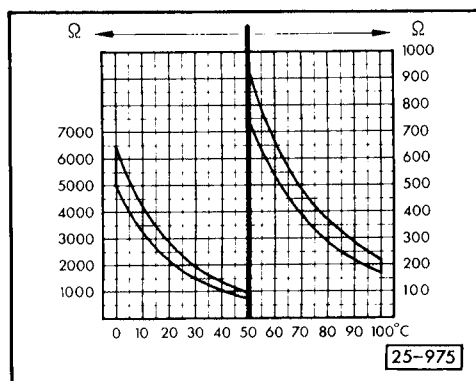


Fig. 1 Resistance curves for intake air temperature sender (G42) and coolant temperature sender (G62)

SAFETY MEASURES

In order to avoid injuries to persons and/or damage to the ignition and fuel injection systems, the following must be noted:

- When the engine is running do not touch or pull off any ignition wiring.
- The ignition must be switched off before any ignition and fuel injection system wiring - and test appliance leads - are disconnected or connected.
- When engine is to be turned at starter speed without starting (e.g. when checking compressions) disconnect the Hall sender plug (distributor).
- Do not connect a condenser to terminal 1(-).

24-27

- Do not replace 1 k Ω rotor arm (marking: R1) with a different type even for radio interference suppression.
- For suppression purposes, only 1 k Ω resistances must be used on the HT leads and 5 k Ω spark plug connectors.

24-28

Important!

When working on the fuel injection system, pay careful attention to the following five points:

- 1 - Thoroughly clean all unions etc. and the adjacent areas before disconnecting.
- 2 - Place parts that have been removed on a clean surface and cover over. Use paper or plastic sheet. Do not use fluffy cloths.
- 3 - Components that have been opened or dismantled must be carefully covered or sealed if the repair cannot be carried out immediately.
- 4 - Only install clean components.
 - Only unpack replacement parts immediately prior to installation.
 - Do not use parts that have been stored loose (for instance in toolboxes etc.).
- 5 - When the fuel system is open:
 - Do not work with compressed air if this can be avoided.
 - Do not move the vehicle unless absolutely necessary.

24-29

IDLING SPEED ADJUSTMENT

Checking and adjustment conditions:

- Minimum engine oil temperature: 80°C.
- Electrical loads switched off. (The radiator fan must not be running when carrying out check and/or adjustment).
- Air conditioner switched off.
- Exhaust system must be free of leaks.
- Ignition timing OK., checking
- page 28-15.
- Idling speed stabilization OK.
(With ignition switched on, the idling speed stabilization valve must vibrate and buzz).

24-30

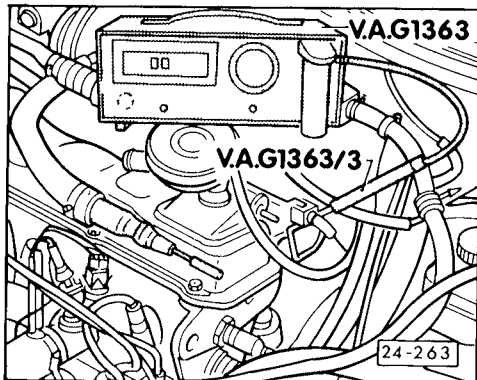
Checking and adjusting idling speed and CO content

- With ignition switched off, connect engine speed tester, e.g.V.A.G 1367
- Connect CO tester, e.g.V.A.G 1363 A.

Engine code letters: PB

- At exhaust tail pipe.

Engine code letters: PF

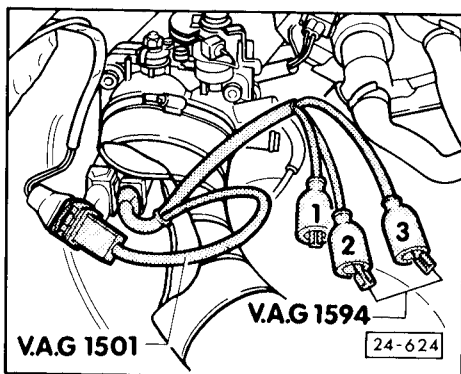


- ◀ - With adapter V.A.G 1363/3 on CO measuring pipe.

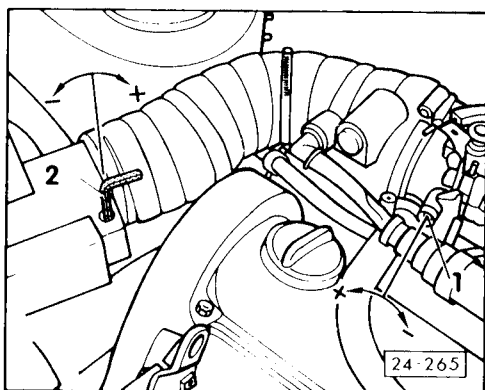
Note:

To avoid measurement errors, adapter must seal on the CO measuring pipe.

24-31



- ◀ - Pull crankcase breather hose off pressure regulating valve -arrow 1- and plug.
- Start engine and run at idling speed.
- After approx. 1 minute pull plug off coolant temperature sender -blue, arrow 2-, give three bursts of throttle (each burst in excess of 3000/rpm) and then let engine idle.



- ◀ - Check idling speed and CO content and if necessary adjust by rotating adjustment screws alternately.

- 1 - Idling speed adjustment screw
- 2 - CO adjustment screw

Specified values: -page 24-23

24-32

- Reconnect coolant temperature sender connector, give three bursts of throttle let engine idle and check idling speed.

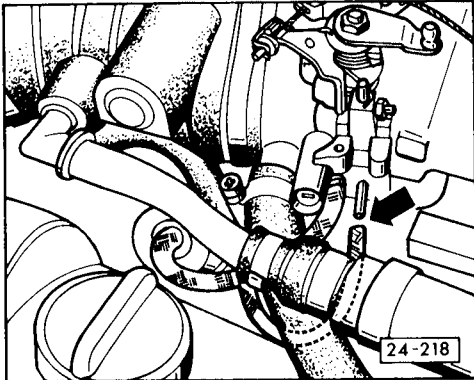
Specification: 750 ... 850 rpm

Otherwise:

- Check and, if necessary, adjust idling switch (vehicles with manual gearbox) or throttle valve potentiometer (vehicles with automatic gearbox)
- page 24-43 or 24-48.
- After correction has taken place, seal CO adjustment screw with new anti-tamper cap.

Only applies to engine code letters PF with Lambda regulation:

Check function of Lambda regulation (coolant temperature sender plug connected).



- ◀ - Pull hose off fuel pressure regulator on throttle valve housing and hold pipe closed. The CO content must increase for a brief period and then drop off again (regulation).
-

24-33

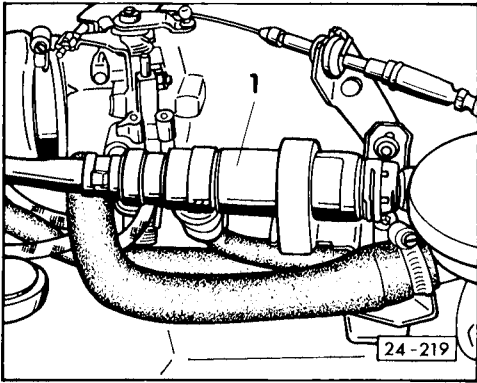
Note:

Once the idling speed has been adjusted, the crankcase breather hose must be reconnected. If the CO content now increases, this is not due to incorrect adjustment, but to enrichment from oil dilution in the crankcase resulting from frequent stop/start operation.

A long, fast drive on an open road will reduce the fuel content in the oil and the CO content will return to normal. At short notice, this can be done by carrying out an oil change.

CHECKING IDLING SPEED STABILIZATION

1st. Check (function)



- ◀ - Switch on ignition.
The idling speed stabilization valve (N71)
-1- must vibrate and buzz.

If OK continue with second check - page 24-36.

Otherwise:

- Switch off ignition.
- Disconnect plug from valve -1- and use hand multimeter V.A.G 1526 and auxiliary cables from V.A.G 1594 to measure valve resistance.

Specification: $2 \dots 10\Omega$

If specification is not OK, renew valve.

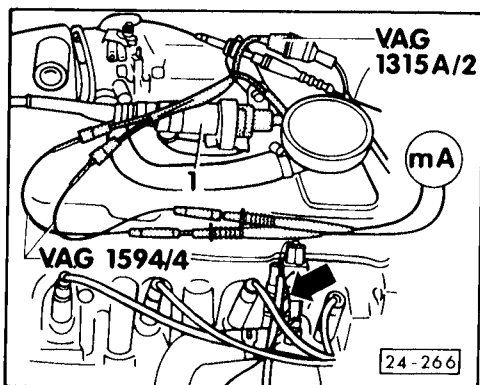
If specification is OK, attach plug to valve. Locate and eliminate open circuit in valve wiring - page 01-1, check A - test step 7, or renew Digifant control unit (J169).

24-35

2nd. Check (regulation)

Test conditions:

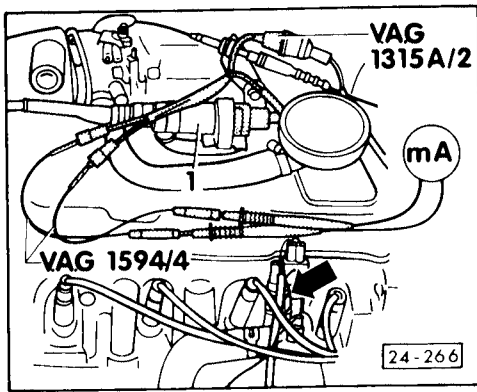
- Engine oil temperature = minimum 80°C
- Coolant temperature sender (blue) OK, checking - page 01-1, check A - test step 5.
- Idling speed OK, checking - page 24-30.
- Intake air system free of leaks.



- ◀ - Connect hand multimeter V.A.G 1526 with measuring cable V.A.G 1315 A/2 and auxiliary cables from V.A.G 1594 to idling stabilization valve -1-.
- Start engine and run at idling speed.
- After approx. 1 minute give three bursts of throttle (in excess of 3000 rpm) and measure control current at idling speed (800 ± 50 rpm).

Specification: approx. 420 ± 30 mA
fluctuating

24-36



- ◀ - Pull plug off coolant temperature sender (blue).

Specification: approx. 420 ± 30 mA
constant

When test conditions are maintained and specifications are not OK, renew Digifant control unit (J169).

Note:

The control current for idling speed stabilisation is dependent upon the load on the engine during idling. Due to the following loads, the control current can vary between 400 and 1000 mA:

- Engine cold
- Air conditioner switched on
- Electrical consumers switched on
- Power assisted steering: steering on lock

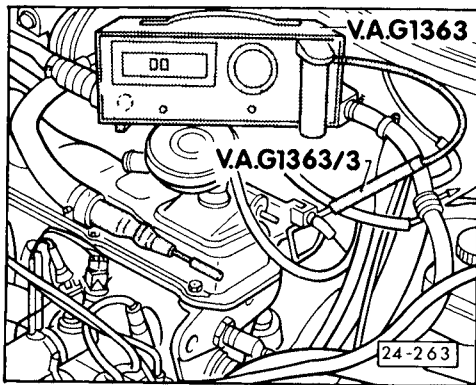
24-37

CHECKING LAMBDA PROBE AND
LAMBDA REGULATION

Engine code letters: PF

Test conditions:

- Minimum engine oil temperature = 80°C .
- Idling speed adjustment OK, checking - page 24-30.
- Exhaust system between catalyst and cylinder head free of leaks.
- Coolant temperature sender plug (blue) connected.
- Voltage supply for Lambda probe heating OK, checking - page 24-19.

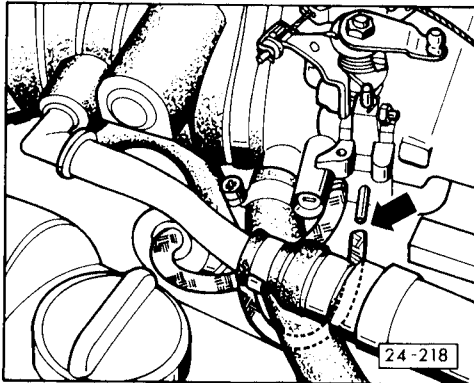


- ◄ - Connect CO tester, e.g. V.A.G 1363A with adapter V.A.G 1363/3 to CO measuring pipe.

Note:

To avoid measurement errors, adapter must seal on CO measuring pipe.

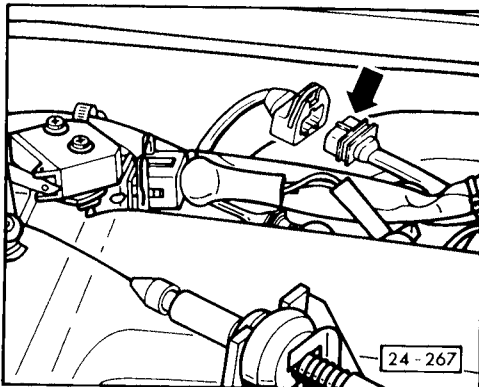
- Start engine and run at idling for at least 2 minutes.
- Read off and note CO content.



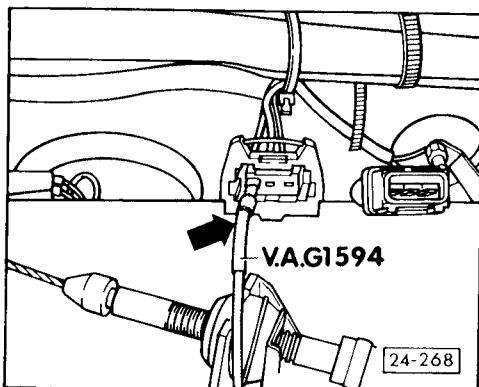
- ◄ - Pull hose off fuel, pressure regulator on throttle valve housing and hold pipe closed -arrow-. The CO content must increase for a brief period and then drop off to the noted value (regulation).

If the CO content does not drop off again:

24-39



- ◄ - Separate connector between Lambda probe and probe heating -arrow-.



- ◄ - Using auxiliary cables from V.A.G 1594 -arrow- alternately connect Lambda probe control unit wire (black wire) to earth (-) and battery positive (+). The CO content must increase and/or decrease.

CO content changes:

- Renew Lambda probe (G39).

CO content does not change:

- Locate and eliminate open circuit in wiring to control unit -page 01-1, check A - test step 11, or renew Digifant control unit (J169).

CHECKING OVERRUN CUT-OFF AND FULL THROTTLE ENRICHMENT

Test conditions:

- Minimum engine oil temperature: 80 °C

Vehicles with manual gearbox:

- Idling and full throttle switches OK, checking - page 24-43.

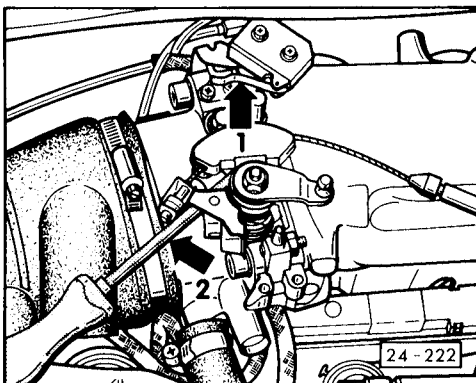
Vehicles with automatic gearbox:

- Throttle valve potentiometer OK, checking - page 24-48.

Note:

In the following test, the overrun cut-off is checked. If this function is OK, the full throttle enrichment is also OK.

24-41



Vehicles with manual gearbox

- Run engine at idling speed.

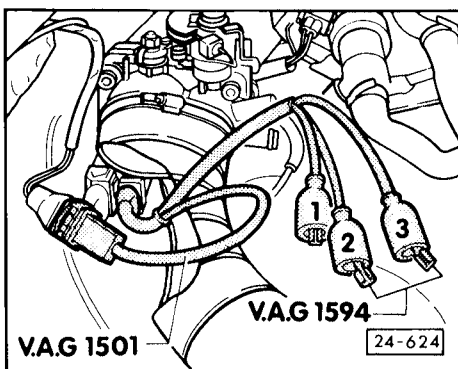
- ▶ - Operate full throttle switch by hand:
 - arrow 1- and by opening throttle
 - arrow 2- hold speed at approx. 2000 rpm.

Engine speed must fluctuate (engine surges, overrun cut-off operating).

Vehicles with automatic gearbox

- ▶ - Separate throttle valve potentiometer (G69) 3-pin connector and connect to the terminals of measuring cable V.A.G 1501.
- Bridge test connections -2- and -3- of the measuring cable with auxiliary cables from V.A.G 1594.
- Start engine and by opening throttle, hold speed at approx. 2000 rpm.

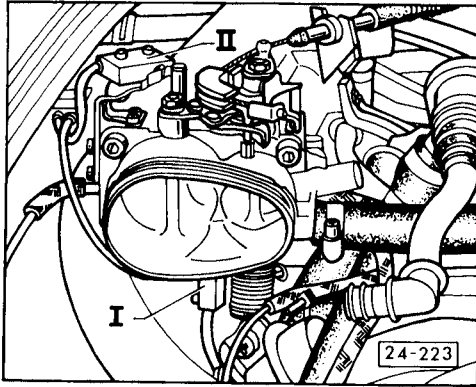
Engine speed must fluctuate (engine surges, overrun cut-off operating).



24-42

CHECKING AND ADJUSTING IDLING
AND FULL THROTTLE SWITCHES

Vehicles with manual gearbox



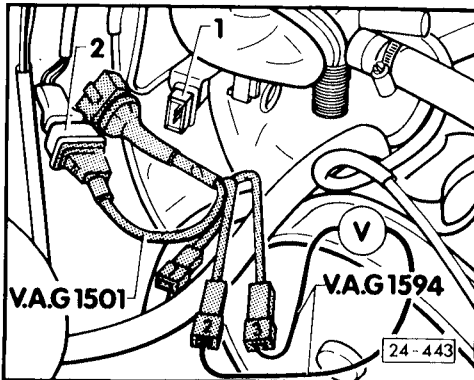
- ▶ - The idling switch -I- supplies the Digifant control unit with the information - throttle valve closed - for:
 - Cutting off injection on overrun.
 - Idling speed stabilization.
 - Ignition timing control during idling (DIS function) and on overrun.

The full throttle switch -II- supplies the Digifant control unit with the information - throttle valve fully opened - for:

- Injection quantity for full throttle enrichment.

24-43

Checking voltage supply on disconnected
plug -2-

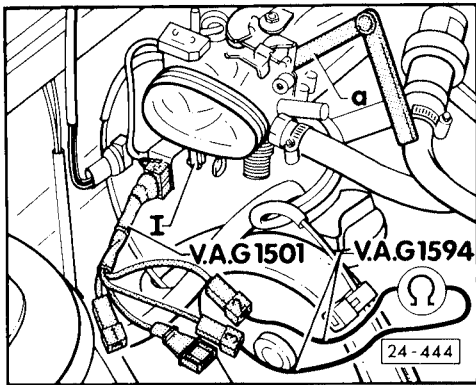


- ▶ - Pull idling and full throttle switch plug -2- off connector -1-.
- Connect measuring cable V.A.G 1501 to plug -2-.
- Set hand multimeter V.A.G 1526 to measuring range voltage measurement -V- and connect to test connections -2- and -3- using auxiliary cables from V.A.G 1594.
- Switch on ignition and measure voltage.

Specification: approx. 5 V

- Otherwise, switch off ignition, insert plug -2- in connection -1-.
- Locate and eliminate open circuit in wiring to control unit - page 01-1, check A - test step 13, or renew Digifant control unit (J169).

24-44



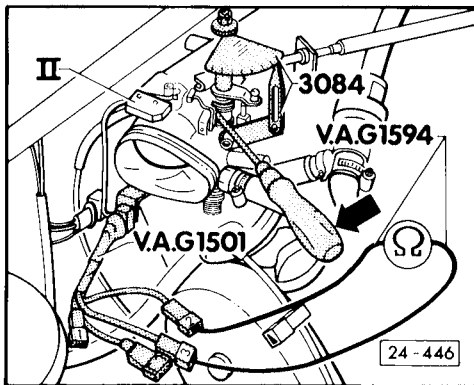
Checking and adjusting idling speed switch (F60)

- ▶ - Connect measuring wire V.A.G 1501 to idling and full-throttle switch.
- Switch hand multimeter V.A.G 1526 to resistance measuring range and connect to test connections -2- and -3- of measuring cable V.A.G. 1501 using auxiliary cables from V.A.G 1594. Check switch for continuity.
- Open throttle valve and close slowly again, checking the switch-on point (continuity) of idling speed switch -I- with a feeler gauge at throttle valve lever stop at the same time.

Specification: Switch-on point gap
 $a = 0.20 \dots 0.60 \text{ mm}$
 before idling speed stop.

- If necessary, adjust switch-on point gap -a- by moving the idling speed switch -I-.
- Dimension -a- is the result if the lugs on the switch housing are just touching the stop.

24-45



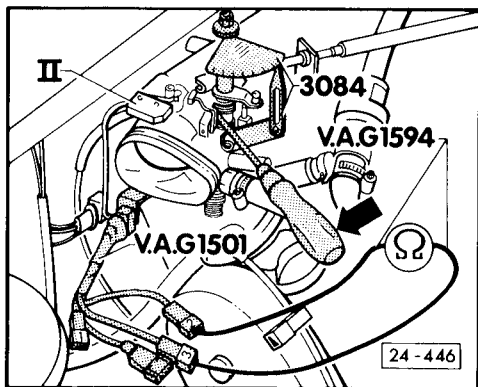
Checking and adjusting full throttle switch (F81)

- Hand multimeter connected up as for idling switch check.

- ▶ - Secure needle of protractor 3084 to throttle valve housing, or using a rubber band to the throttle cable bracket.
- Screw degree disc to throttle valve shaft (1st stage), and if necessary, remove throttle valve lever securing nut.
- Press throttle valve lever to full throttle stop using a screwdriver and position the degree disc to 0.
- Close throttle valve by about 20° and then slowly press in the direction of full throttle stop again -arrow-, until full throttle switch -II- switches on (continuity).

Specification: $10 \pm 2^\circ$
 before full throttle stop.

24-46



- ◀ - If necessary adjust switch-on point by moving the full throttle switch -II-. The throttle valve lever roller must rest against the sloping part of the full throttle switch lever.
- Fully depress accelerator pedal and check whether the full throttle position is being attained.

24-47

CHECKING AND ADJUSTING THROTTLE VALVE POTENTIOMETER

Vehicles with automatic gearbox

Note:

On vehicles with automatic gearbox two potentiometers are installed together on the throttle valve housing. Two wires extend from the potentiometers. The wire with the 4-pin plug goes to the control unit (J217) for the automatic gearbox. The check for the automatic gearbox potentiometer is carried out by interrogating the "Automatic gearbox 096" (self-diagnosis).

The wire with the 3-pin plug goes to the Digifant control unit (J169).

The control unit receives the following information via this wire:

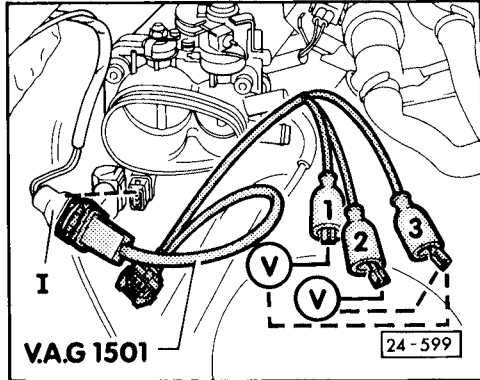
Throttle valve closed

- Fuel injection cut-off on overrun
- Idling speed stabilization
- Ignition control during idling (DIS function)

Throttle valve fully open

- Injection quantity for full throttle enrichment

Checking the voltage on detached 3-pin plug for throttle valve potentiometer



- ▶ - Separate 3-pin connector for throttle valve potentiometer (G69) and connect measuring cable V.A.G 1501 to plug -I-.

24-49

- Switch hand multimeter V.A.G 1526 to voltage measurement range -V- and connect to test connections -1- and -3- using auxiliary cables from V.A.G 1549.

- Switch on ignition and measure voltage.

Specification: 4.5 ... 5 V

- Connect hand multimeter to test connections -2- and -3-.

Specification: 4.5 ... 5 V

- Otherwise switch off ignition, attach plug -I- to connection.

- Locate and eliminate open circuit in wiring to control unit -page 01-1, check A - test step 16, or renew Digifant control unit (J169).

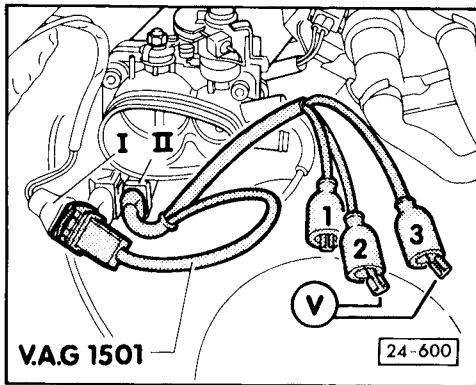
24-50

Checking throttle valve potentiometer (G69)

Note:

Do not carry out resistance check.
This can lead to destruction of the
electronic components in the potentiometer.

- Voltage on 3-pin plug OK, checking
- see Page 24-49.



- ◀ - Connect up measuring cable V.A.G 1501 to plugs -I- and -II-.
- Using aux. wires from V.A.G 1594 connect up hand multimeter V.A.G 1526 to the test connections -2- and -3- of the measuring cable.
- Switch on ignition and at the following throttle valve lever positions check the voltage:

Idling and full throttle stop

Specification: 0 ... 0.5 V

between idling and full throttle stop

Specification: 4.5 ... 5 V

24-51

- Check the throttle valve potentiometer switching point with feeler gauge between throttle valve lever and lower stop screw.

Specification: Switching point 0.30 ... 0.60 mm before idling stop.

If specifications are not met, adjust throttle valve potentiometer.

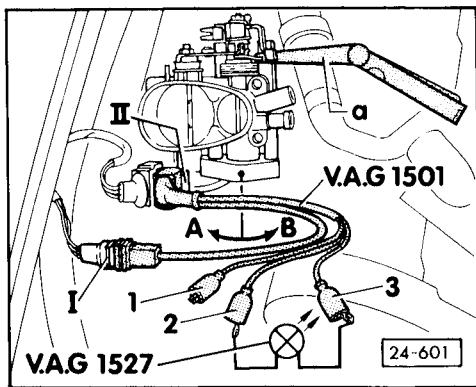
Adjusting throttle valve potentiometer (G69)

- Voltage at 3-pin plug OK, checking - Page 24-49.

- Remove throttle valve housing from intake manifold.

Tighten potentiometer securing screws until the potentiometer can just be rotated by hand.

24-52



- - Connect up measuring cable V.A.G 1501 to plugs -I- and -II-.
- Using aux. cables from V.A.G 1594 connect up diode test lamp V.A.G 1527 to test connections -2- and -3- on measuring cable.
- Turn potentiometer as far as stop in direction -arrow B-.
- Switch on ignition, LED in V.A.G 1527 lights up.
- Insert feeler gauge $a = 0.40 \text{ mm}$ between throttle valve lever and lower stop screw.
- Turn potentiometer slowly in direction -arrow A- until LED just goes out.

24-53

- Tighten potentiometer screws and check adjustment (switching point).

Specification: Switching point gap
 $a = 0.30 \dots 0.60 \text{ mm}$
 before idling stop

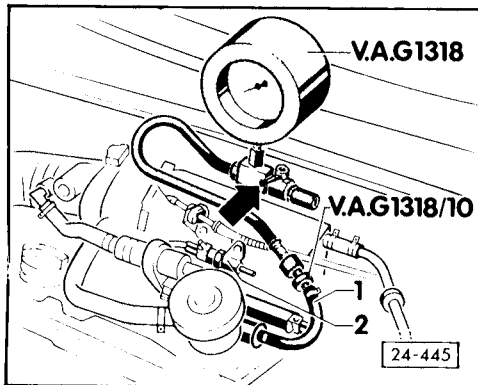
Note:

After adjusting the potentiometer the system must be brought into the basic setting with the fault reader V.A.G 1551. See Workshop Bulletin "Automatic gearbox 096" (self-diagnosis).

CHECKING FUEL PRESSURE REGULATOR AND HOLDING PRESSURE

The fuel pressure regulator governs fuel pressure in relation to intake manifold pressure at throttle valve assembly.

- To prevent fuel spray cover pressure pipe between fuel manifold and fuel pump run-on pressure switch with a rag.

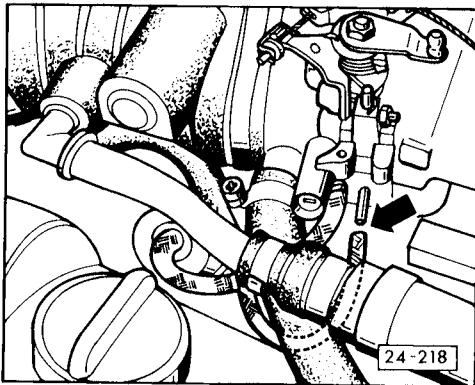


- ▶ - Pull hose -1- off pressure switch -2- and catch escaping fuel.
- Connect pressure gauge V.A.G 1318 to detached hose -1- with adapter V.A.G 1318/10.

Attention!

The stop cock on the pressure gauge must be closed (lever) -arrow- at right angles to direction of flow.

24-55



- Start engine and run at idling speed.
- Measure fuel pressure.

Specification: approx. 2.5 bar

- ▶ - Pull hose off fuel pressure regulator on throttle valve housing -arrow-. The fuel pressure must increase to

approx. 3.0 bar.

- Switch off ignition.
- Check for leaks and holding pressure by watching pressure drop on gauge.

After 10 minutes there must still be a minimum pressure of 2 bar.

24-56

If the holding pressure drops below 2 bar:

- start engine and switch ignition off after pressure has built up. At the same time, crimp the return flow hose -blue- tightly together and watch pressure drop on gauge.

If the pressure does not drop, the fuel pressure regulator is defective.

If pressure drops again:

- Pipe connections are leaking.
- Fuel manifold O-rings are leaking.
- Injectors are leaking.
- Fuel pump non-return valve is leaking.
- Pressure gauge (stop cock) is leaking.

Note:

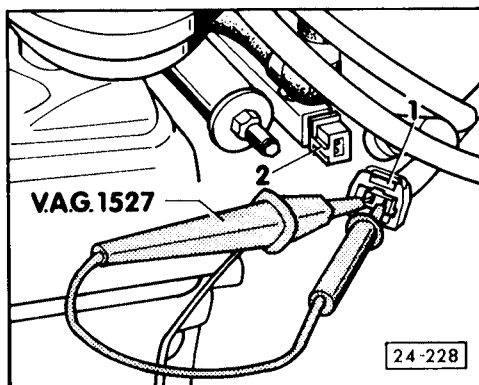
Before removing the pressure gauge drain off fuel at pressure gauge.

24-57

CHECKING INJECTORS

Checking voltage supply and resistance

- Hall sender OK, checking - page 28-20, check B.



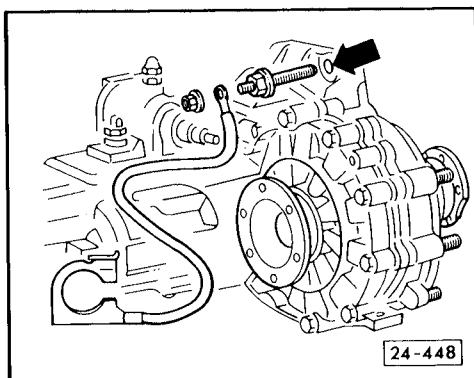
- ◀ - Check voltage supply for all injectors on plug - 1 - using diode test lamp V.A.G 1527 and auxiliary cables from V.A.G 1594.

- Operate starter.

Diode must flicker

Diode permanently lit:

- Renew earth wire from battery to gearbox and Digifant control unit.



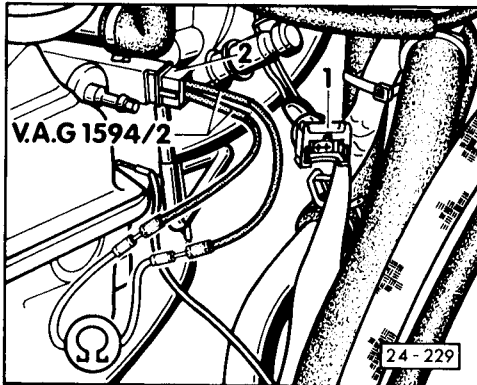
- ◀ - To secure the earth wire use a new securing bolt -arrow-.

Diode does not light up or flicker:

- Push plug - 1 - onto connection - 2 -.

24-58

- Locate and eliminate open circuit in injector (N30 ... N33) wiring to control unit (J169) - page 01-1, check A, test step 2, or renew Digifant control unit (J169).



- ▶ - Check resistance on connection -2- for all injectors using hand multimeter V.A.G 1526 and auxiliary cables from V.A.G 1594.

Specification: 3.7 ... 5.0Ω
(all 4 injectors OK)

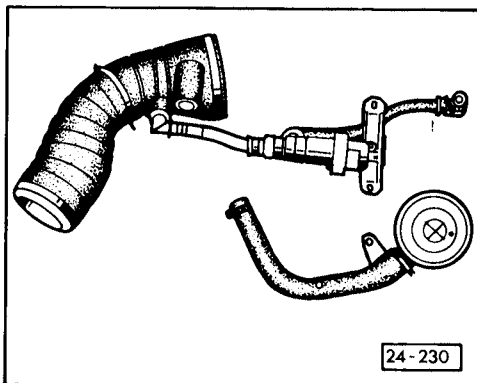
Note:

3 injectors OK = 5.0... 6.7Ω
2 injectors OK = 7.5...10.0Ω
1 injector OK = 15.0...20.0Ω

- If the resistance at connection -2- is greater than 5Ω, lever off wiring conduit from fuel manifold retainer and carry out individual checks on connecting plugs and injectors.

Specification:
1 injector 15...20Ω
Connector max. 0.5Ω

24-59



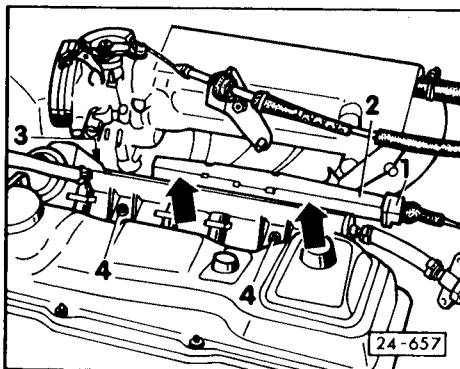
Checking spray formation and sealing

- Pull HT lead from ignition coil and connect to earth using auxiliary cable from V.A.G 1594, or disconnect plug from TCI-H switch unit.

- ▶ - Remove intake hose with idling speed stabilisation valve and bracket and crankcase breather pressure regulating valve.

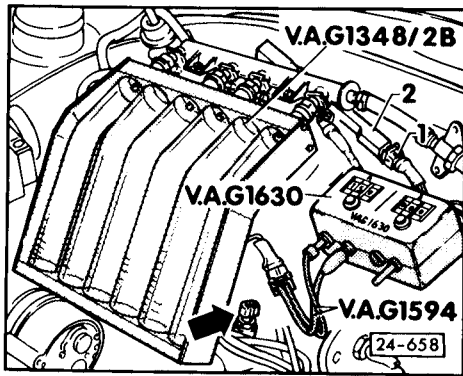
- Remove fuel pump run-on pressure switch with bracket from intake manifold.

- Remove throttle valve housing.



- ▶ - Pull plug -1- off wiring conduit connection -2-.
- Lever wiring conduit -2- off fuel manifold retainers -arrows-.
- Remove fuel manifold securing bolts -3- and -4-.

24-60



- ◀ - Pull injectors complete with injector manifold and wiring conduit away from cylinder head and insert in openings of measuring appliance V.A.G 1348/2 B.
- Pull plug off coolant temperature sender -blue, arrow-.
- Set digital potentiometer V.A.G 1630 to 15 k Ω
- Using auxiliary cable from V.A.G 1594 connect the coolant temperature sender plug to V.A.G 1630.

Note:

The double adapter V.A.G 1490 with the 15 k Ω side connected to the coolant temperature sender plug can be used instead of V.A.G 1630

- Attach plug -1- to connection on wiring conduit -2-, operate starter for a few seconds and check spray formation.

The spray formation should be the same on all injectors.

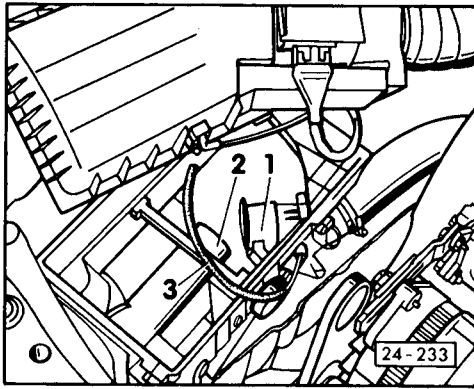
24-61

- Pull off plug -1-, switch on ignition for approx. 5 secs. and check injectors for leaks.

No more than 2 drops per minute may leak per injector.

Note:

When reinstalling the injectors ensure that the O-rings are not damaged.



CHECKING INTAKE AIR PREHEATING

- Pull vacuum pipe off temperature regulator.

- ▶ - Separate upper part of air cleaner from lower part, remove air cleaner element and place upper part on mudwing as shown.
- Check position of regulating flap in air cleaner lower part.

The flap must close off the warm air opening -1-.

- Using an adapter hose -3- extend the length of the vacuum unit pipe and by sucking check the freedom of movement of regulating flap and function of vacuum unit.

Flap must close off cold air opening -2-.

- Run engine at idling speed, push extension tube -3- onto brass pipe and check temperature regulator.

24-63

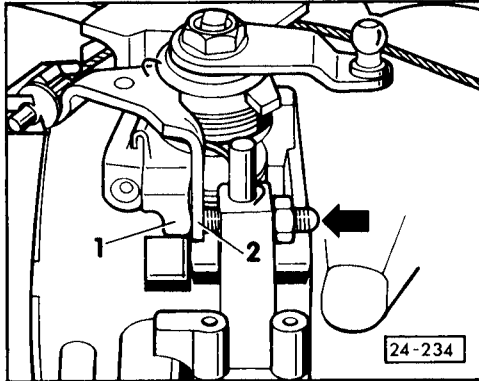
The regulator flap position after max. 20 secs., dependent upon the temperature of the temperature regulator:

below 20°C = Cold air opening closed
 above 30°C = Warm air opening closed
 between 20°C and 30°C
 = Cold and warm air openings open.

BASIC THROTTLE VALVE SETTING

Note:

The limiting screw is set at the factory and must not be altered. However, if the screw should be turned accidentally readjust as follows.



- ◀ - Screw limiting screw -arrow- out until a gap exists between lever -1- and stop lever -2-.
- Screw limiting screw back in until the lever -2- just makes contact with lever -1-.

Note:

To determine the exact point of contact, place a thin piece of paper between levers -1- and -2-. By continually moving the paper to and fro, and at the same time turning the limiting screw in, the exact point of contact can be determined.

24-65

- From this point, turn screw in a further half turn.
- Check and, if necessary, adjust idling switch (vehicles with manual gearbox) or throttle valve potentiometer (vehicles with automatic gearbox) - page 24-43 or 24-48.
- Check idling adjustment, and if necessary adjust idling and CO content - page 24-30.

24-66

SERVICING DIGIFANT IGNITION
=====

SERVICING IGNITION PART

Notes:

- Electrical check of Digifant ignition and fuel injection system - Repair group 01
- Servicing injection part - Repair group 24
- Adjustment data, spark plugs - page 28-9
- Safety measures - page 28-11

1- H.T. lead

- Check for continuity

2- Suppression connector

- 0.6 ... 1.4 k Ω

3- Screen cap

- For radio suppression

4- Distributor cap

- Check for cracks, signs of tracking

- Check contact wear

- Clean before fitting

5- Carbon brush with spring

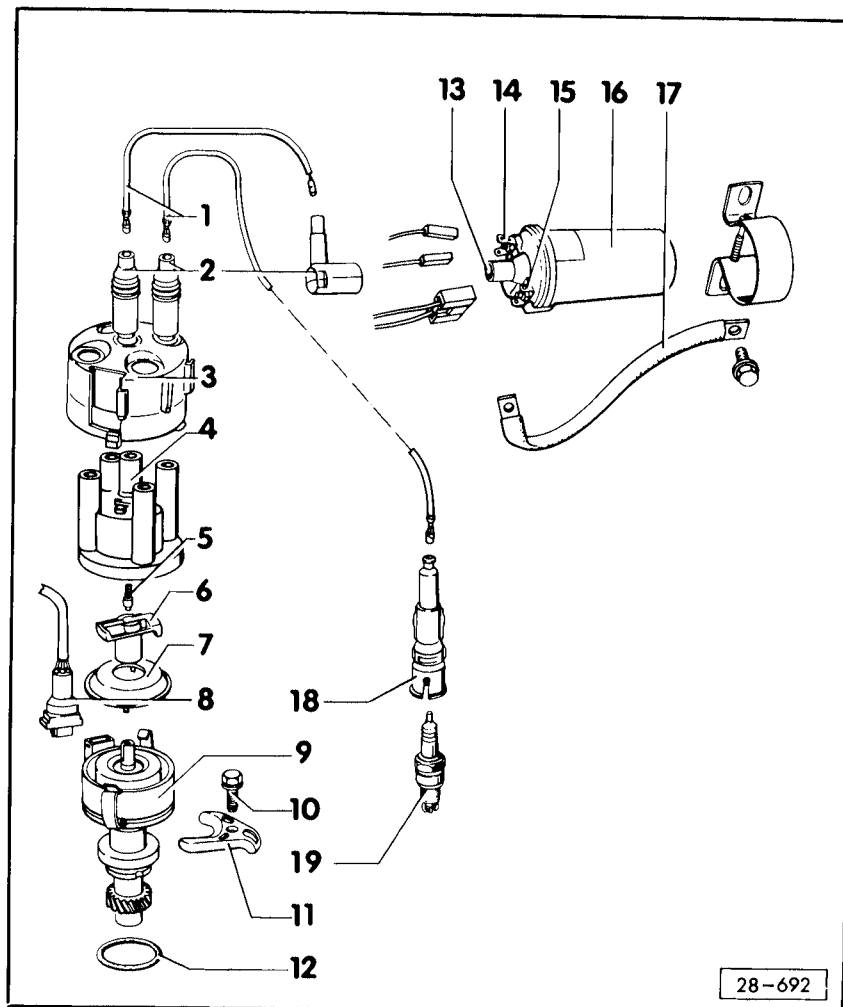
- Check for wear, damage and freedom of movement

6- Rotor arm

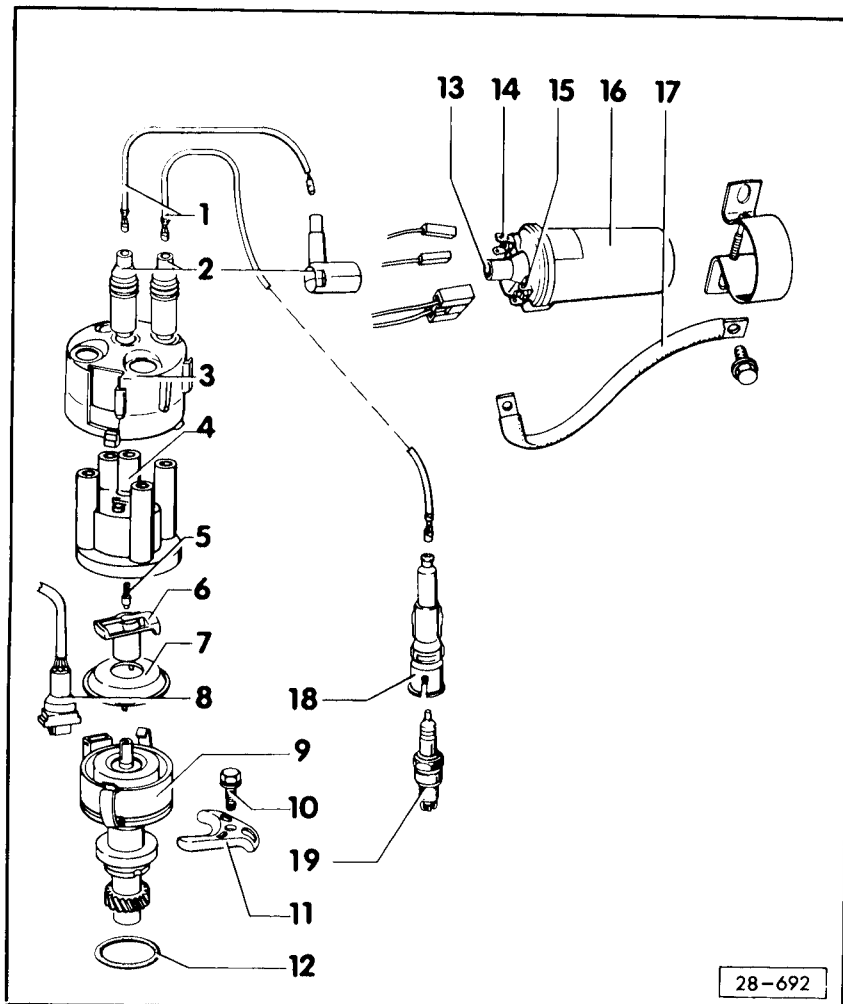
- Identification: R1

- 0.6 ... 1.4 k Ω

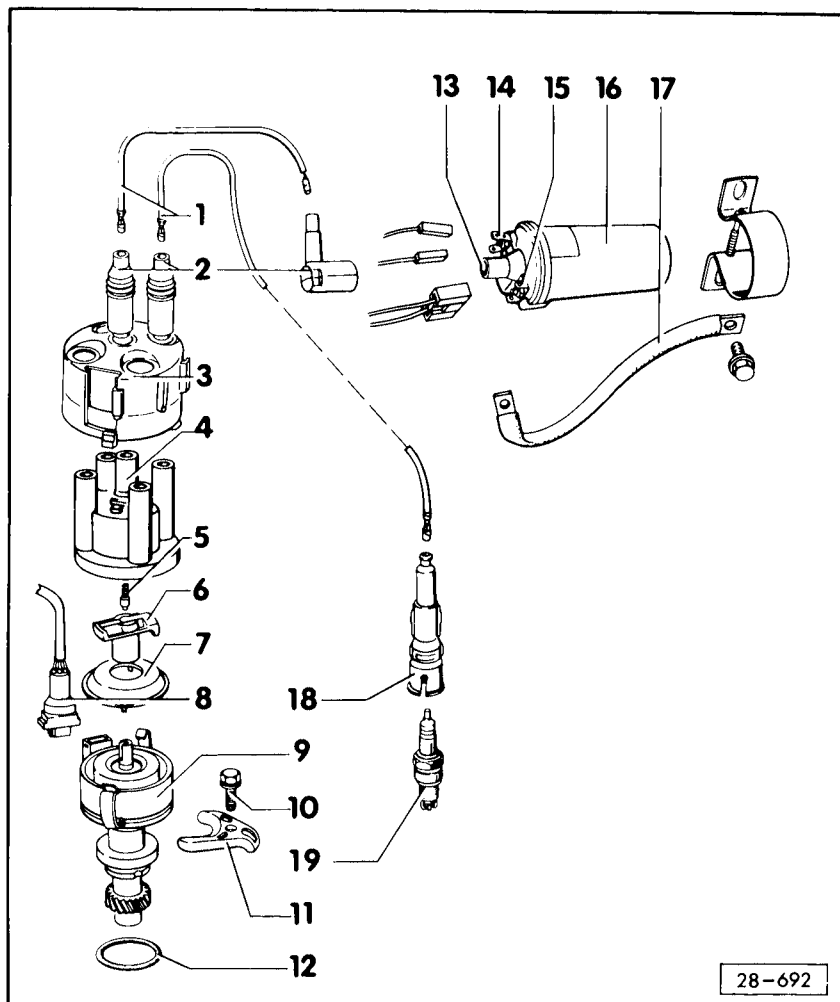
7- Protective cap



28-1



28-2



8- Connector plug

- Press wire clip to detach

9- Distributor

- Installing - page 28-13
- Checking and adjusting ignition timing - page 28-15
- Checking Hall sender - page 28-20, Check B.

10- 25 Nm

11- Clamp

12- Seal

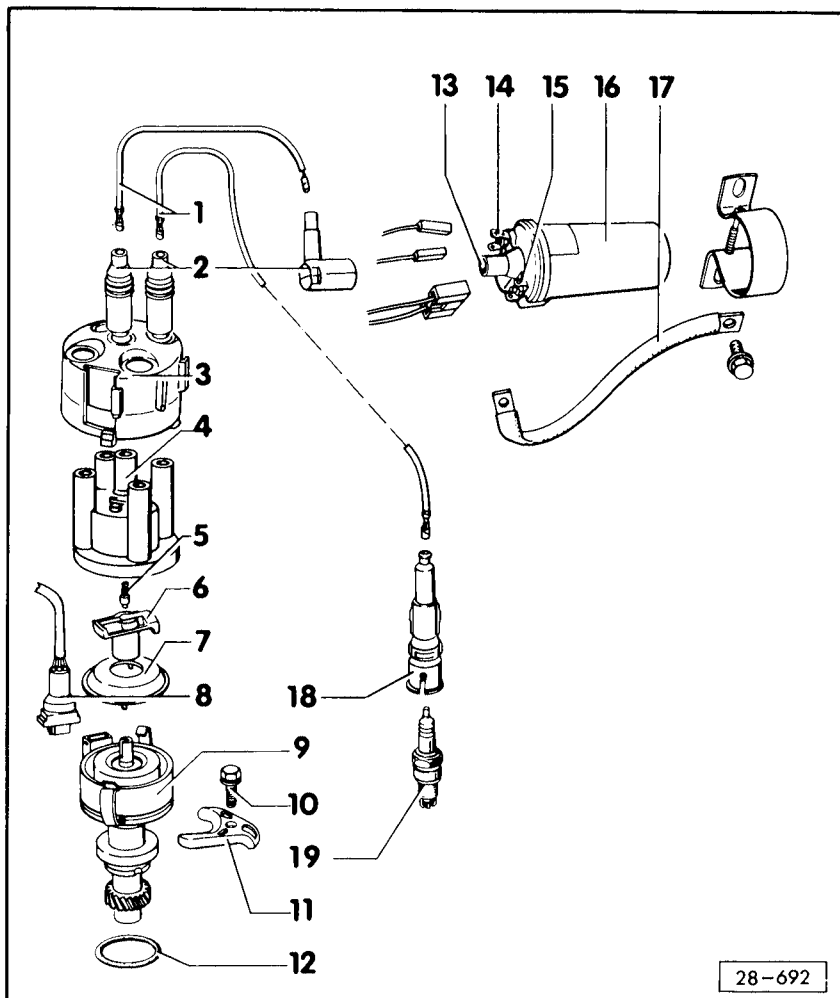
- Renew

13- Terminal 4

14- Terminal 15(+)

15- Terminal 1(-)

28-3



16- Coil

- Primary winding resistance:
Green sticker:
0.52 ... 0.76 Ω
Grey sticker:
0.60 ... 0.80 Ω
(between terminals 1 and 15)
- Secondary winding resistance:
Green sticker:
2.4 ... 3.5 k Ω
Grey sticker:
6.9 ... 8.5 k Ω
(between terminals 4 and 15)

17- Earthing strap

- To intake manifold

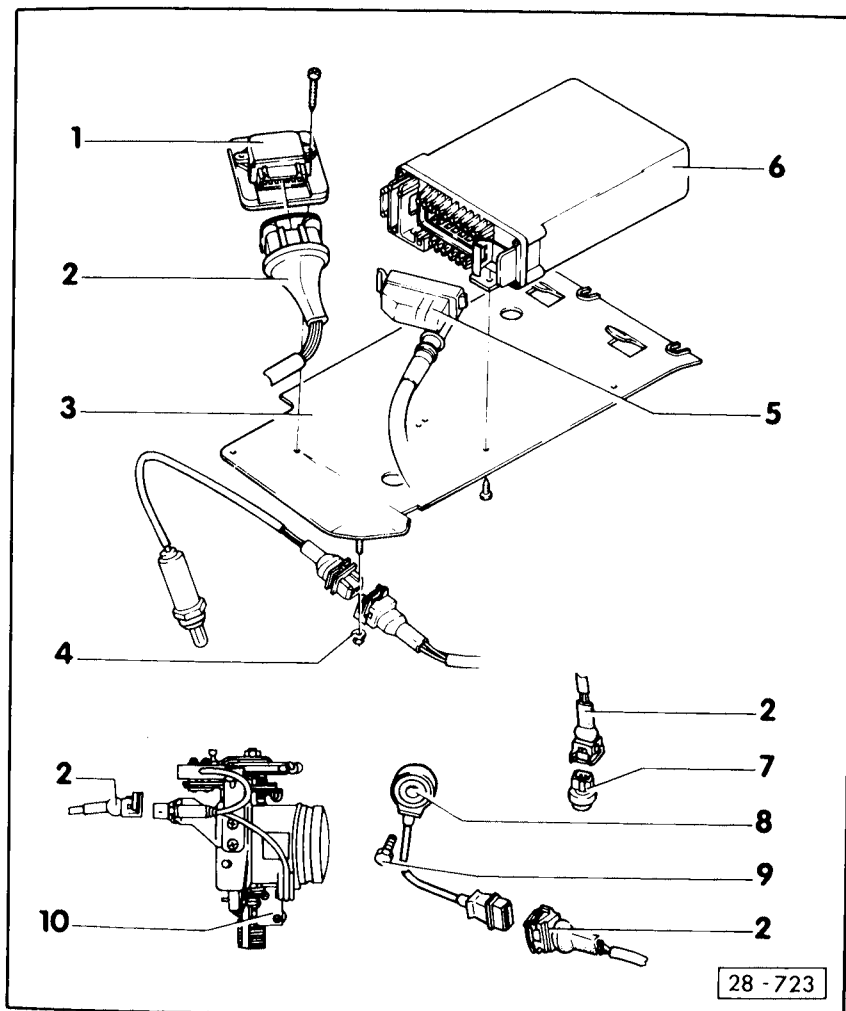
18- Spark plug connector

- 4 ... 6 k Ω

19- Spark plug

- 20 Nm
- Type and electrode gap - page 28-9

28-4



1- TCI-H switch unit (N41)

- Checking - page 28-20, Check A

2- Connector plug

- Press wire clip to detach

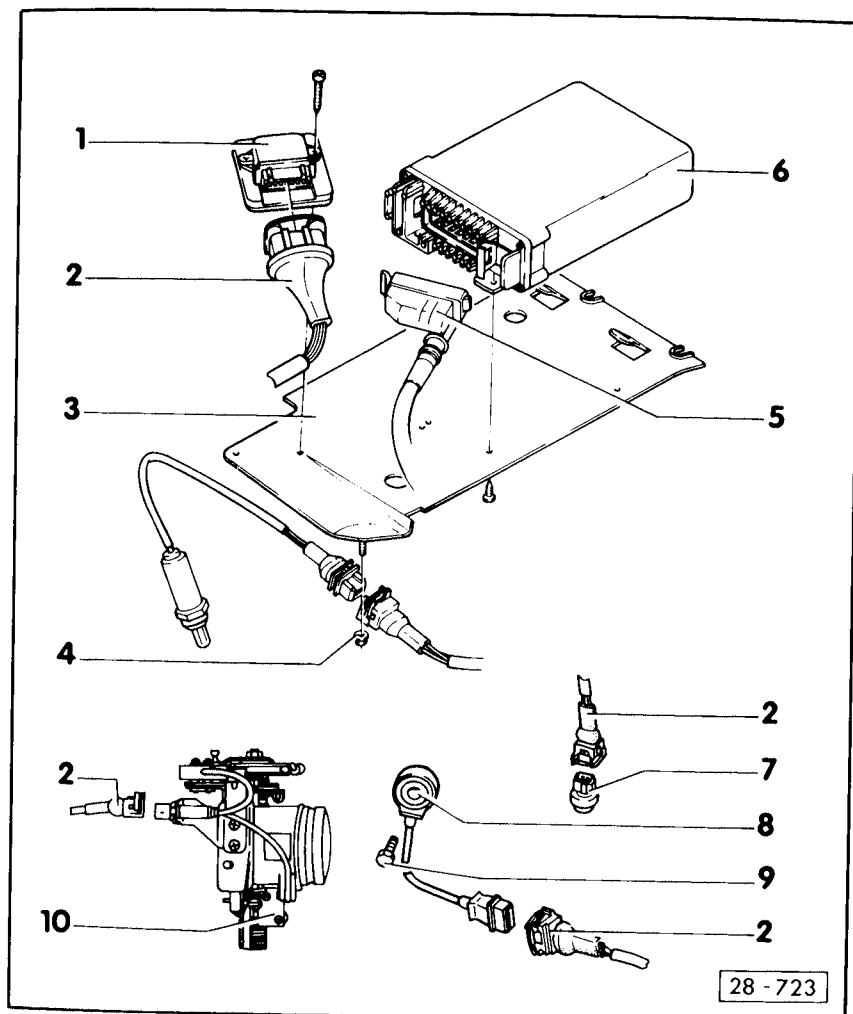
3- Retainer plate

4- 10 Nm

5- Connector plug

- Only disconnect or connect plug with ignition switched off
- To detach, disengage retaining spring from control unit
- Digifant ignition and injection system electrical check, check A on wiring loom plug - page 01-1

28-5



6- Digifant control unit (J169)

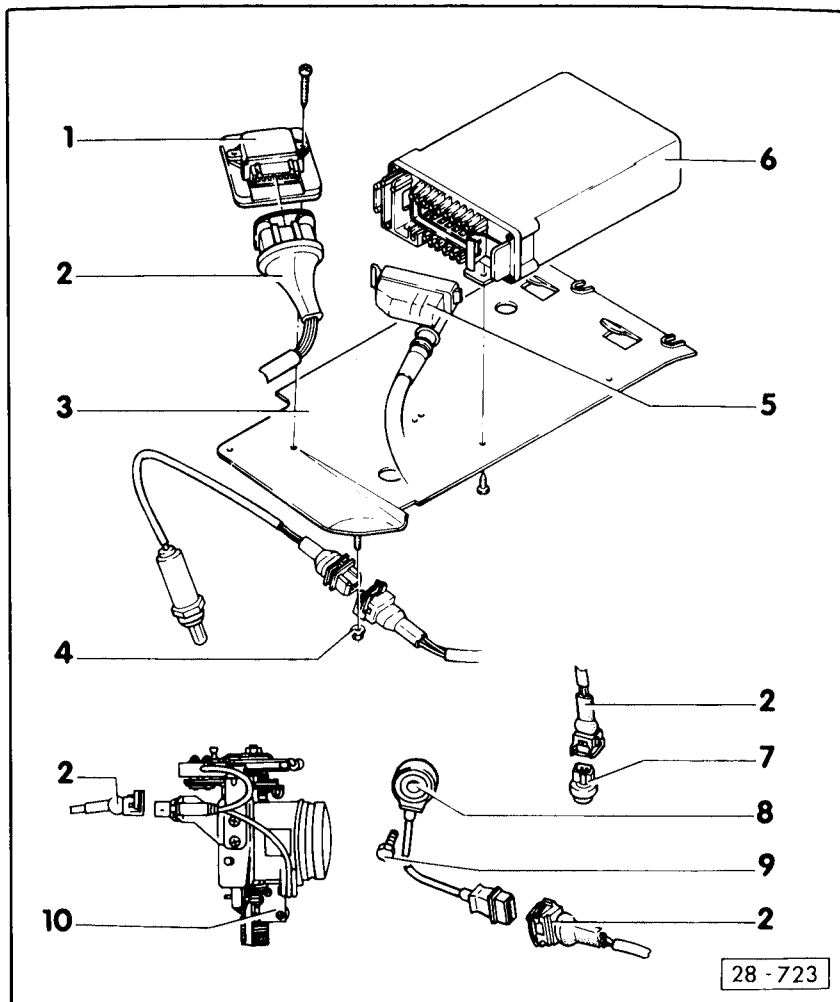
- Location: in water box, right

- Checking ignition timing control and knock sensor - Page 28-17
- Checking ignition/switching function of Digifant control unit, - page 28-20, check C
- Digifant ignition and fuel injection system electrical check, check B with Digifant control unit connected - page 01-1

7- Coolant temperature sender (G62) - blue-

- For Digifant ignition and fuel injection system, on coolant connection
- Checking - see graph - page 24-26

28-6



28 - 723

8- Knock sensor (G61)

- On cylinder block

- Checking - page 28-17

9- 15 ... 25 Nm

- Tightening torque influences knock sensor function

10- Idling switch (F60)

- For vehicles with manual gearbox (for Digifant ignition and fuel injection system)
- Checking and adjusting - page 24-43
- Vehicles with automatic gearbox
 - Throttle valve potentiometer (G69) for Digifant ignition and fuel injection system
 - Checking and adjusting - page 24-48

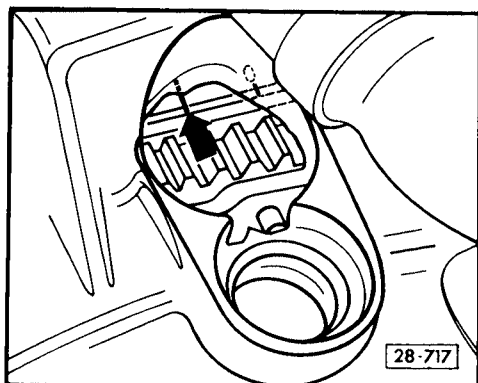
ADJUSTMENT DATA, SPARK PLUGS

<u>Code letters</u>		<u>PB</u>	<u>PF</u>
<u>Digifant II - Control unit</u>			
Part No.	Manual gearbox	037 906 022 AN	037 906 022 AM
	Automatic gearbox	---	037 906 022 CJ
<u>Ignition timing</u> ¹⁾	Test value	4...8° before TDC	
	Setting value	6 ± 1° before TDC	
	Marking	Fig. 1	
	Speed	2000 ... 2500 rpm	
<u>Ignition spark control</u> ²⁾		2300 rpm	
		30 + 3° spark control + ignition timing point	
<u>Governed speed</u>		6500 rpm	
<u>Firing order</u>		1 - 3 - 4 - 2	

- 1) Engine oil temperature 80°C, coolant temperature sender plug (blue) disconnected
2) Engine oil temperature 80°C, coolant temperature sender plug (blue) connected

28-9

<u>Spark plugs</u>			
Tightening torque: <u>20 Nm</u>	Sticker on coil	green	grey
	VW/Audi	101 000 005 AB 101 000 001 AC	101 000 006 AC 101 000 002 AB 101 000 000 AB
	Manufacturers designation	W7DTC 14-7 DTU N7BYC	W7 DCO 14-7 DUO, N7 YCX
Spark plug gap		0.7 ... 0.9 mm	0.7 ... 0.8 mm



◀ Fig. 1 Ignition timing point mark

SAFETY MEASURES

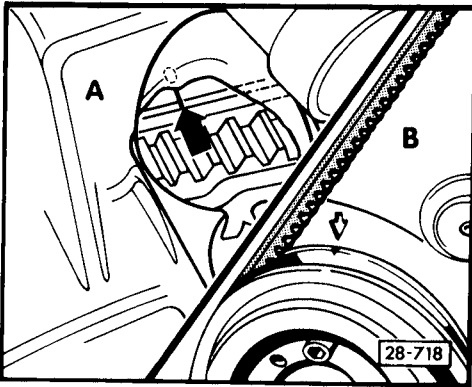
In order to avoid injuries to persons and/or damage to the ignition and fuel injection systems, the following must be noted:

- When the engine is running do not touch or pull off any ignition wiring.
- The ignition must be switched off before any ignition and fuel injection system wiring - and test appliance leads - are disconnected or connected.
- When engine is to be turned at starter speed without starting (e.g. when checking compressions) disconnect the Hall sender plug (distributor).
- Do not connect a condenser to terminal 1(-)

28-11

- Do not replace 1 k Ω rotor arm (marking: R1) with a different type even for radio interference suppression.
- For suppression purposes only 1 k Ω resistances must be used on the HT leads and 5 k Ω spark plug connectors.

28-12



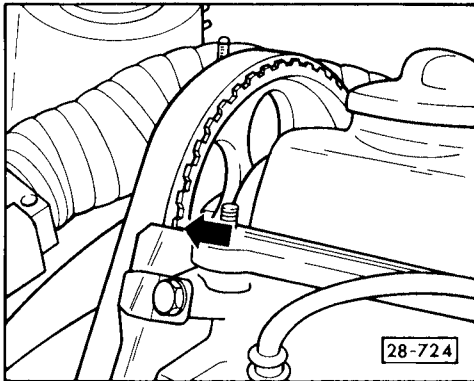
INSTALLING DISTRIBUTOR

◀ A - Engine in vehicle

- Bring flywheel/drive plate to TDC No. 1 cylinder.

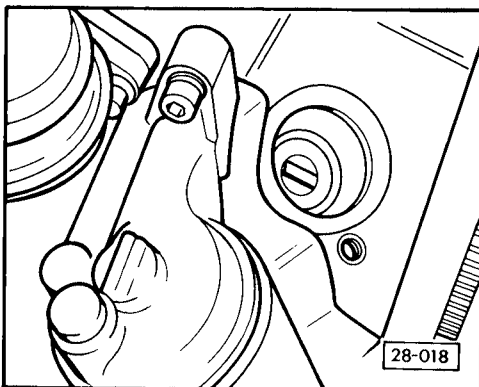
B - Engine removed from vehicle:

- The mark on the vibration damper(belt pulley) must align with arrow on the toothed belt guard.

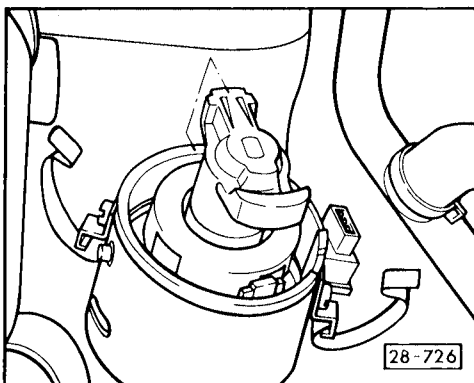


- ◀ - Mark on camshaft sprocket must align with cylinder head cover.

28-13



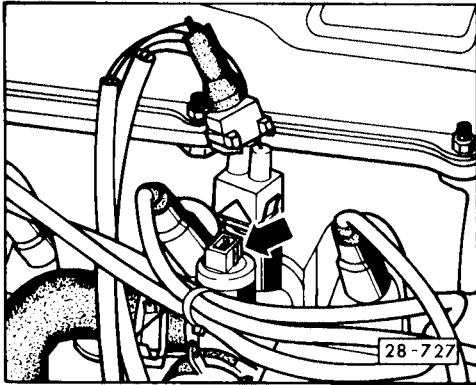
- ◀ - Bring oil pump drive tongue parallel to the crankshaft.



- ◀ - Position rotor arm so that it points to the No.1 cylinder mark on the distributor housing.
- Install distributor.
- Before fitting, clean distributor cap and check for cracks and signs of tracking and, renew if necessary.
- Adjust ignition timing - page 28-15.

CHECKING AND ADJUSTING IGNITION TIMING

- Minimum engine oil temperature 80°C.
- Connect up engine speed and ignition tester, e.g. V.A.G 1367 with ignition switched off.
- Start engine and run at idling speed.



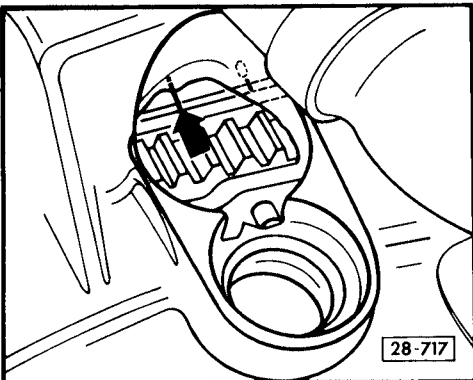
- ◀ - Pull plug off coolant temperature sender (G62) -blue- and check ignition timing at 2000... 2500 rpm.

With TDC sender:

The ignition firing point is indicated directly on the test appliance.

Specification: 4...8° before TDC.

28-15

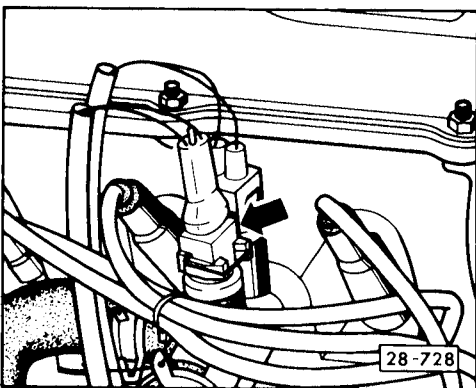


With stroboscope:

- Direct at ignition timing notch.

- If necessary, adjust ignition timing point by turning the distributor.

Setting figure: $6 \pm 1^\circ$ before TDC



- ◀ - Attach plug to coolant temperature sender (G62) -blue- give three bursts of throttle, allow engine to idle and check idling speed.

Specification: 750 ... 850 rpm

- If necessary, correct idling adjustment
- page 24-30.

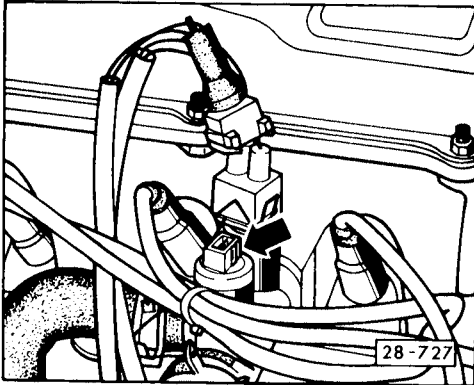
28-16

CHECKING IGNITION TIMING CONTROL AND KNOCK SENSOR

Note:

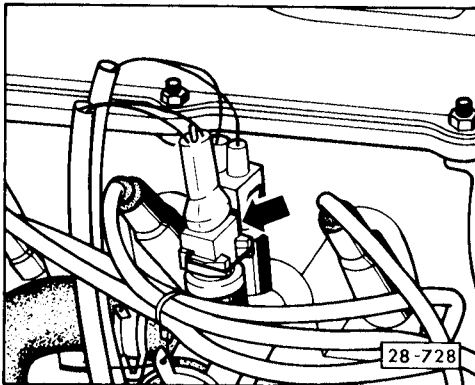
The engine must be restarted, if during the following test, alterations have to be made at the knock sensor (plug connection, tightening torque) while the engine is running:

- Minimum engine oil temperature 80°C.
- With ignition switched off, connect ignition timing and engine speed tester, e.g.V.A.G 1367.
- Start engine and run at idling speed.



- ◀ - Pull plug off coolant temperature sender (G62) -blue- and check, and note, ignition timing at 2300 rpm.

28-17



- ◀ - Reconnect plug to coolant temperature sender (G62) - blue - and check ignition timing at 2300 rpm.

The ignition timing point must move into the "advance" direction by $30 \pm 3^\circ$ in excess of noted value.

If the ignition timing point only moves about $20 \pm 3^\circ$ in excess of noted value, check which defect is present at knock sensor.

- Slacken off knock sensor (G61) securing screw and tighten to 20 Nm

or

- locate and eliminate open circuit between knock sensor (G61) and control unit (J169) - page 01-1, check A -test step 9.

If OK:

- Renew knock sensor (G61).

28-18

If the same value is measured for the ignition timing point, at 2300 rpm, with coolant temperature sender (G62) -blue- plug disconnected and connected:

- Locate and eliminate open circuit between coolant temperature sender (G62) - blue - and control unit (J169) - page 01-1, check A - test step 5.

If OK:

- Renew Digifant control unit (J169).

28-19

CHECKING IGNITION PART OF DIGIFANT SYSTEM

Checking with TCI test appliance V.A.G 1451

- Carry out check as per test appliance operating instructions.

Checking with hand multimeter V.A.G 1526

Notes:

- To carry out the check the hand multimeter V.A.G 1526 is to be used.
- The readings given are applicable for an ambient temperature of between 0° ... + 40°C.
- If the readings measured deviate from the specified readings check wiring as per CFD for open circuit before renewing component.
- To connect up the test appliance use aux. cables from V.A.G 1594.

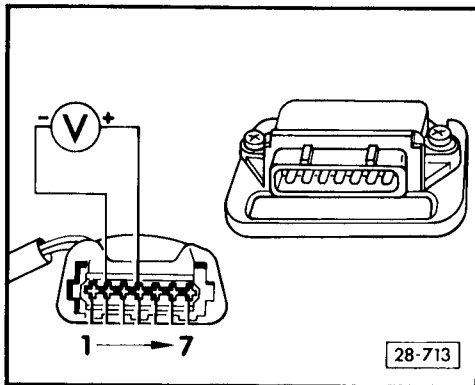
28-20

Attention!

The respective measuring range is to be set before connecting the test leads to prevent destruction of the electronic components.

A - Checking TCI-H switch unit (N41)

- Check that ignition coil is OK - page 28-4
- Detach connector from TCI-H switch unit.



- ◀ - Connect hand multimeter between contacts 4 and 2 in connector using auxiliary cables from V.A.G 1594.

- Switch ignition on.

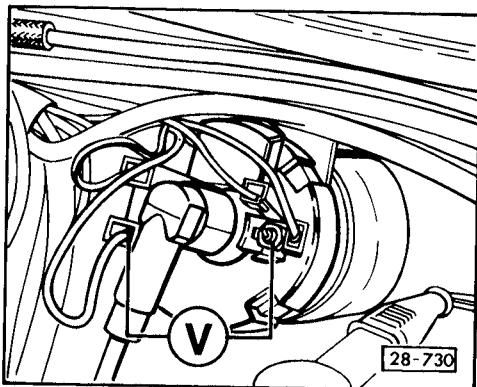
Specification:
Approx. battery voltage.

- Switch off ignition.

Volkswagen Technical Site: <http://vwts.ru> <http://vwts.info>

28-21

- Re-connect plug at TCI-H switch unit.
- Pull connecting plug off Digifant control unit (J169).

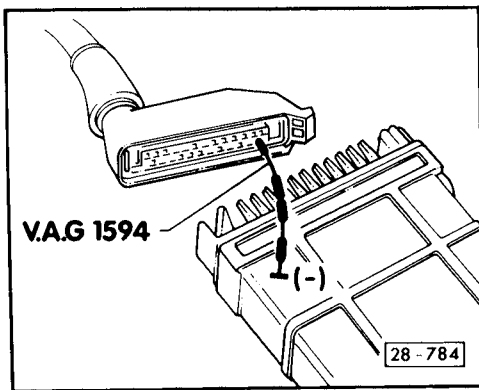


- ◀ - Connect up hand multimeter between terminal 1 (-) and terminal 15 (+) on the coil using aux. cables, (if necessary reposition double connector on coil (terminal 1) to ensure that only the wire to the engine wiring loom is connected).

- Switch on ignition.

Specification:
At least 2 volts, must drop
to 0 after approx. 1...2 seconds.

Otherwise renew TCI-H switch unit and check whether sealing compound has escaped from the ignition coil. If necessary, renew coil as well.



- ◀ - Touch contact 25 of connecting plug to earth (-) using aux. cable from V.A.G 1594. The displayed voltage figure must increase briefly to a minimum of 2 V.
- Switch off ignition.
- Reconnect plug to Digifant control unit.

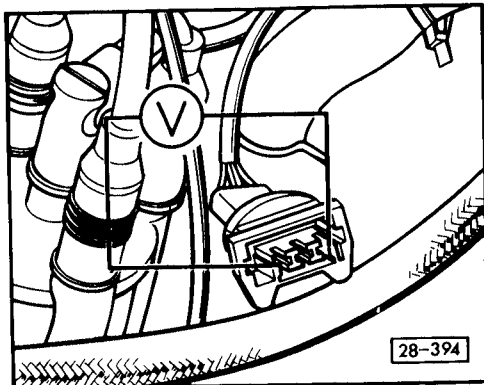
B - Checking Hall sender (G40)

- o Electrical check of Digifant system OK - page 01-1.

Note:

Check with test box V.A.G 1598, see page 01-1, check B.

28-23



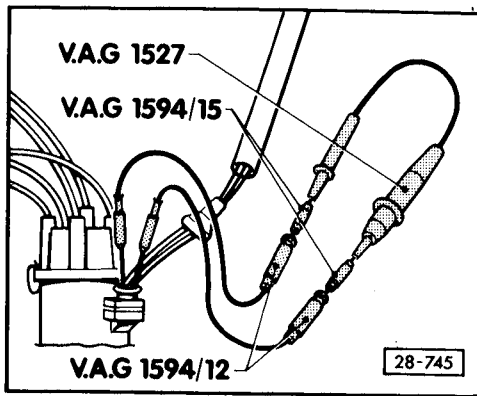
Checking voltage supply

- ◀ - Pull plug off Hall sender (distributor) and connect up hand multimeter to the outer plug contacts with aux. cables V.A.G 1594/1.
- Switch on ignition,
Specified reading: Min. 10V
if necessary renew Digifant control unit (J169).
- Switch off ignition.

Checking function

- Pull plug off multiple connection for injectors (on fuel distributor).

28-24



- ◄ - Pull off Hall sender plug rubber boot and connect plug to Hall sender.
- Connect up diode test lamp V.A.G 1527 to the centre and one of the outer connections on the Hall sender plug using aux. cables from V.A.G 1594.
- Operate starter.

LED must flicker

if necessary renew distributor.

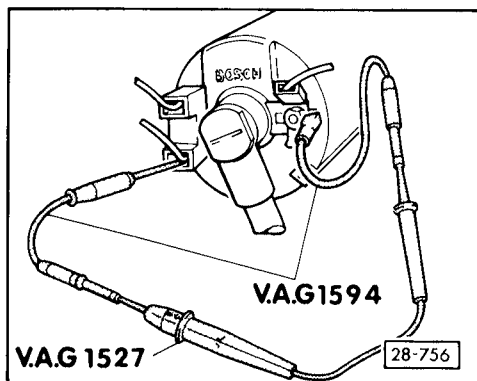
C - Checking ignition/switching function of Digifant control unit (J169)

- Pull plug off multiple connection for injectors on intake manifold.
- Coil OK.
- Hall sender OK.
- Electrical check of Digifant system OK - page 01-1.

28-25

Note:

Checking with test box. V.A.G 1598, see page 01-1, check B.

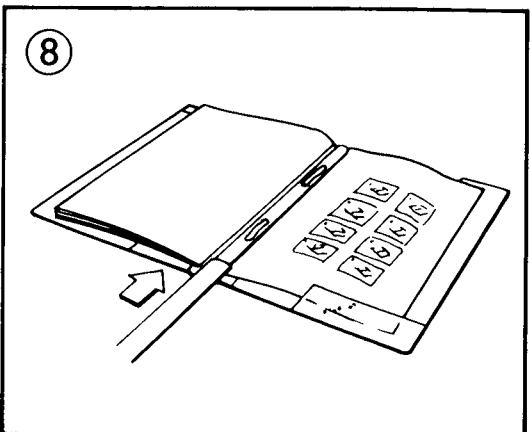
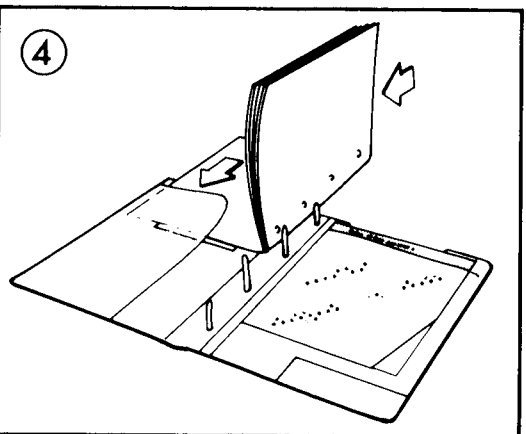
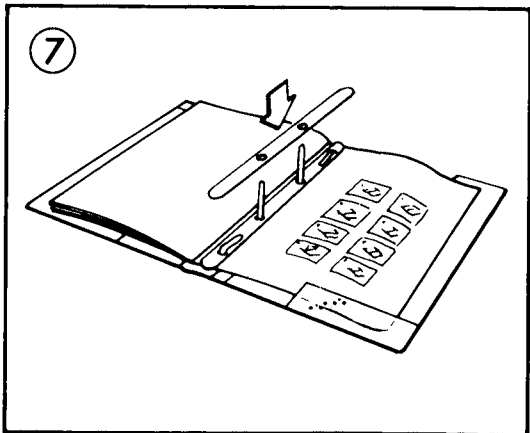
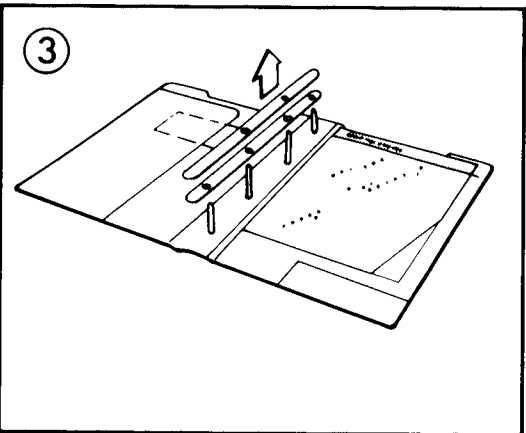
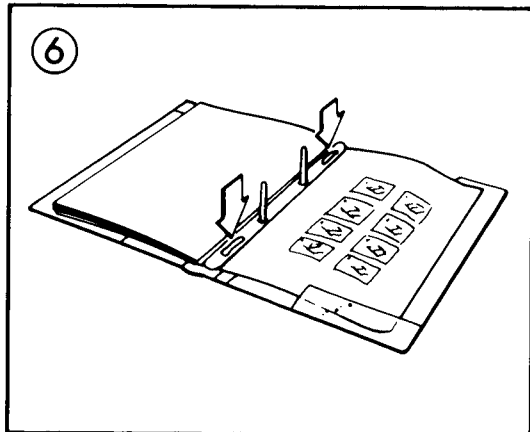
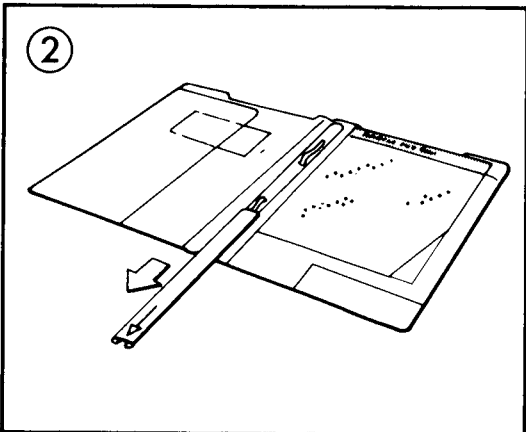
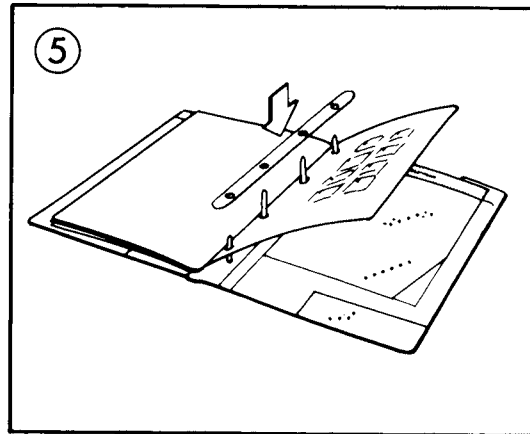
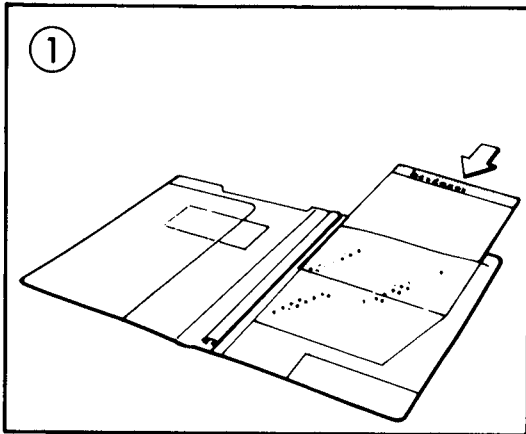


- ◄ - Connect up diode test lamp V.A.G 1527 to coil terminals 15 and 1 with aux. cables.
(If necessary reposition double connector on coil so that only the wire to the engine wiring loom is connected.)
- Operate starter.

LED must flicker

if necessary renew control unit (J169).

28-26



Workshop Bulletin to Workshop Manual

Passat 1988 ►

Engine code	PB	PF									
Booklet Digifant ignition and injection system (1,8 litre engine) Edition 05.90											

Mark the following lines in repair group list

01, 24

with bulletin no.

1

Models affected: all

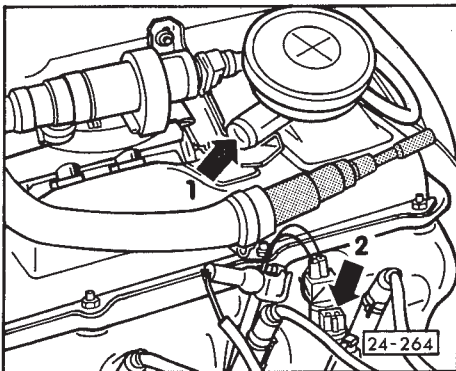
Subject:	Bulletin page	Booklet page
Correction to Workshop Manual		
A – Electrical check of Digifant ignition and injection system Test conditions for test step 2 added	1	01–4
B – Adjusting idling speed Figure 24–624 does not correspond to the text in Workshop Manual. Appropriate figure ⇒ Seite 2	2	24–32

A:

Test step	V.A.G 1598 socket	Item tested	• Test conditions – Additional operations	Specified reading
2	12 + 13	Injector wiring (N 30 ... N 33)*	• Ignition switched on – Remove fuse18 – Bridge sockets 3 + 13	Approx. battery voltage

*) Check injector resistance ⇒ page 24–58

1



B:

◀ This figure and not figure 24–624 corresponds to the text on page 24–32 of the Workshop Manual .

2