Service.

Engine code	DF	DG	EY	SP					

Workshop Manual Volkswagen Transporter 1980▶

34 PICT, 2E3, 2E4 carburettor/ignition system (1.9 litre engine)

July 1991 Edition

VW Service Department.

Service.

List of Workshop Manual Repair Groups

Volkswagen Transporter 1980 ▶

Engine code	DF	DG	EY	SP						

Booklet **34 PICT, 2E3, 2E4 carburettor/ignition system (1.9 ltr. engine) Edition July 1991**

When filing a Technical Bulletin enter the Bulletin No. in the adjacent column.When using the Workshop Manual you can then see at a glance whether Technical Bulletins have been published in respect of the particular Repair Group in which you are looking.

Repair Group	Technical Bulletins					
01 Self diagnosis, Electrical check						
22 Mixture preparation, Carburettor						
28 Ignition system						

Technical Information should always be available to all foremen and mechanics, because their 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.

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Contents

Electrical check

Checking of wiring and components with test box V.A.G 1598

Idling speed stabilisation (2E4 carburetor)

Note:

- Use is to be made for test purposes of the hand multimeter V.A.G 1526 and the diode test lamp V.A.G 1527.
- The specified values stated apply to an ambient temperature range of between 0 and + 40° C.
- If the measured values differ from the specifications, locate fault using current flow diagram.
- If the measured values only differ slightly from the specifications, clean sockets and plugs of testers and test leads, and then repeat the test. Before renewing the respective components, check wires and connections and - particularly in the case of specifications less than 10 ohms - repeat resistance measurement on component.
- Use is to be made for connecting up the testers of the test box V.A.G 1598 with the adapter cable V.A.G 1598-1 and the auxiliary cables from the auxiliary test set V.A.G 1594.

- The contact numbers of the connector and the socket numbers of the test box V.A.G 1598 are identical.

Attention:

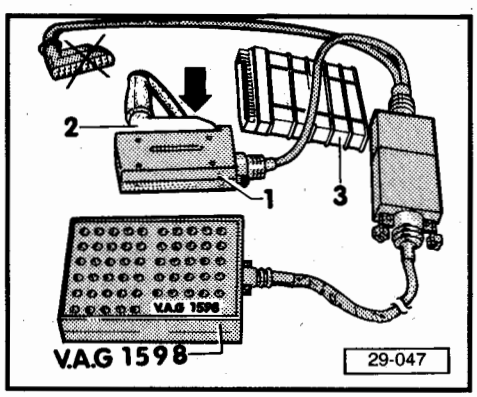
The respective measuring range is to be selected prior to connection of the test leads, so as not to destroy electronic components.

Test prerequisites:

- Battery voltage OK.
- Earth connections OK.

Checks at connector of wiring loom

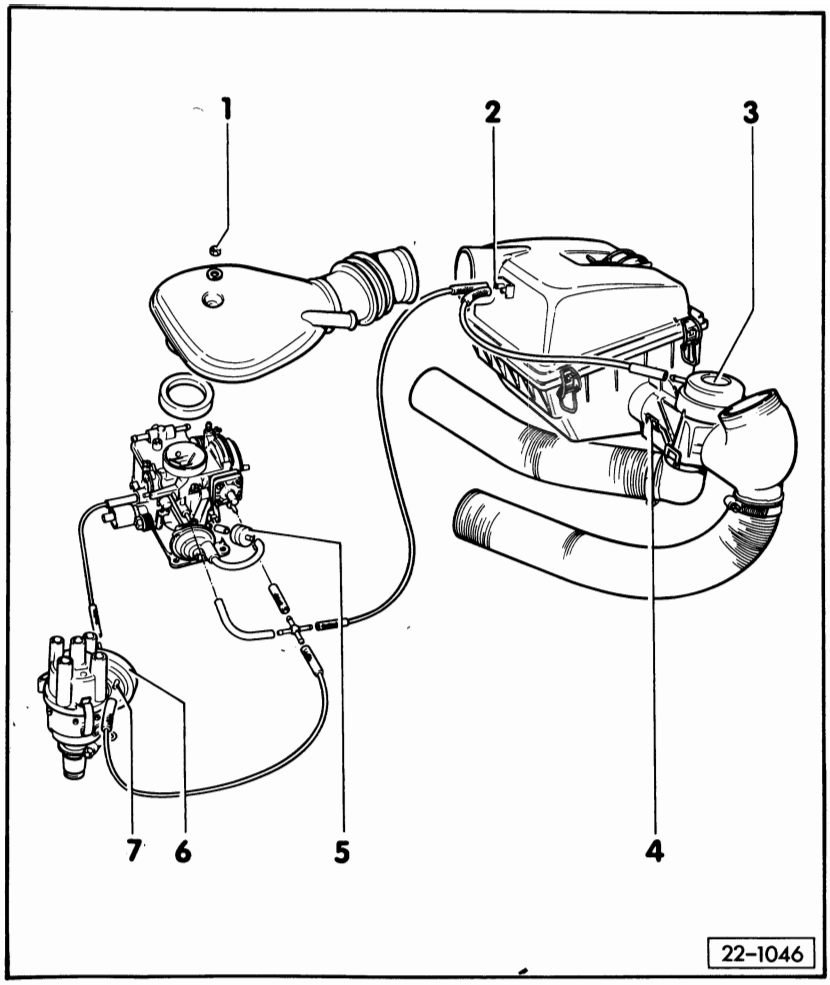
- With ignition switched off, pull connector off control unit for idling speed stabilisation (J142). (The control unit is installed in front of the left-hand taillight).
- Only connect test box V.A.G 1598 with the adapter cable V.A.G 1598/1 -1- to connector of wiring loom -2-. (The control unit remains unused).
- Perform testing in accordance with table ⟶ page 01-3.



Test table

Test step	V.A.G 1598 sockets	Test item	o Test conditions - Add. operations	Specifications
- Measuring range: Select voltage measurement -V-				
1	10 + 2	Voltage supply, control unit (J142) (Term. 15)	- Switch on ignition	approx. battery voltage
2	Bridge 2 + 3	Actuation for current supply relay	---	Relay heard to energize
3	5 + 2	Voltage supply for the control unit via relay J 16 (Term. 30)	o 2 + 3 bridged, relay energized	approx. battery voltage
- Measuring range: Select resistance measurement -ohms-				
4	5 + 9	Vacuum valve	---	max. 1.5 ohms
5	5 + 1	Breather valve	---	max. 1.5 ohms
6	12 + 13 13 + 14	Potentiometer	---	max. 1.5 ohms

Test step	V.A.G 1598 sockets	Test item	o Test conditions - Add. operations	Specifications
7	2 + 4	Throttle valve switch	Operating lever	
			- pressed off switch	max. 1.5 ohms
			- pressed against the switch	infinity ohms
8	2 + 6	Thermoswitch	- Bridge plugs at the thermoswitch	max. 1.5 ohms
9	2 + 7	Air conditioner compressor	---	max. 1.5 ohms
10	2 + 8	Selector lever switch	Selector lever position	
			- N and P	max. 1.5 ohms
			- 1, 2, 3 and R	infinity ohms
11	2 + 15	Pressure switch for PAS	- Bridge plugs at the pressure switch	max. 1.5 ohms
12	11 + term. 7 at plug of TCI-H switch unit	Wire for engine speed signal from the TCI-H switch unit	---	max. 1.5 ohms



Air cleaner and vacuum connections

34 PICT carburetor

Note:

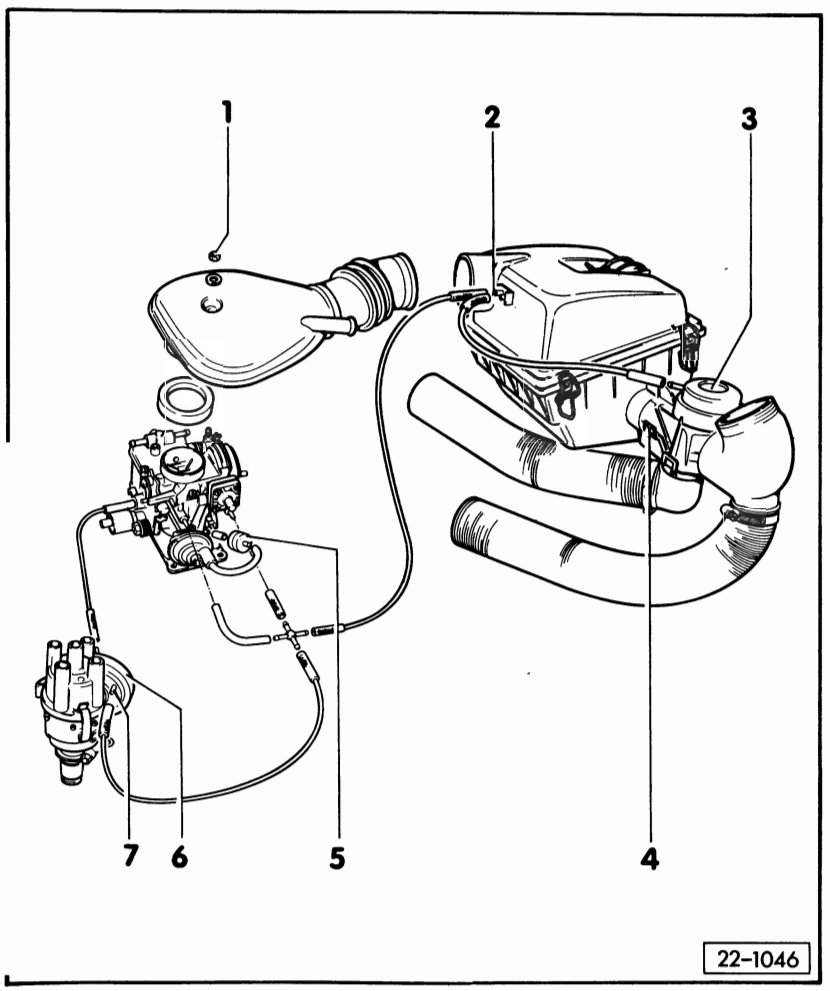
2E3 and 2E4 carburetor
→ page 22-3.

1 - 7 **Nm**
- o Renew self-locking nut

2 - **Temperature regulator**
- o Brass hose connection to vacuum unit
- o Checking → page 22-5

3 - **Vacuum unit**
- o Checking → page 22-5

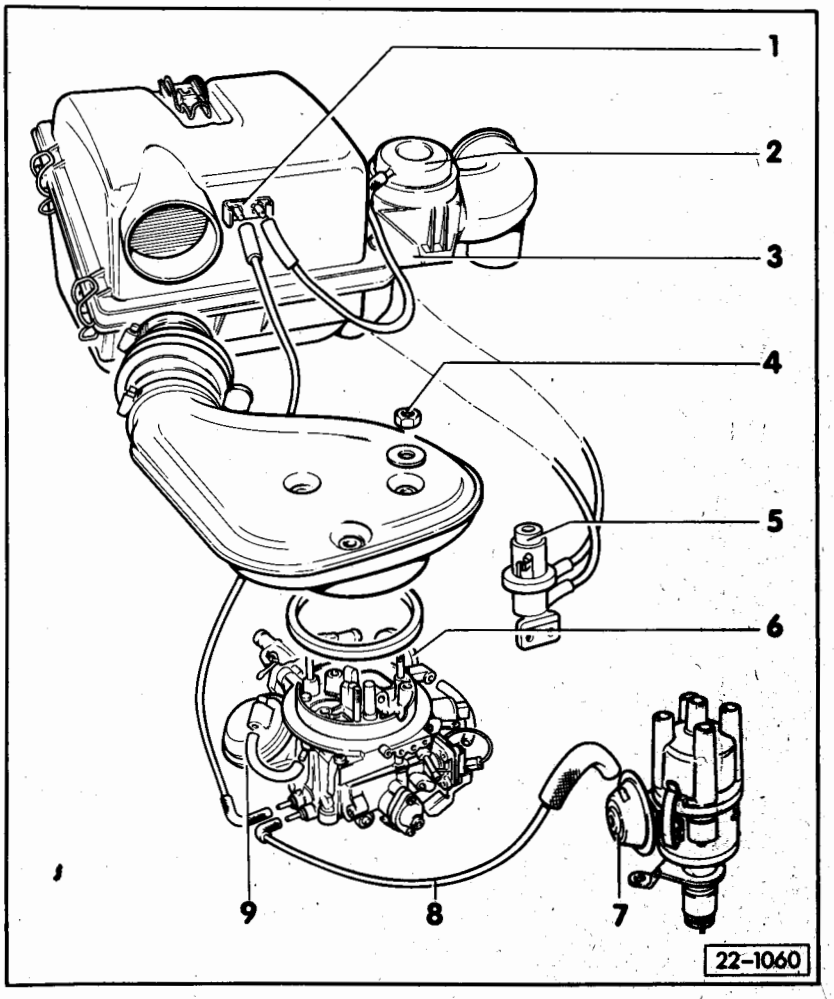
4 - **Control box**
- o Checking → page 22-5



5 - **Delay valve**
- o White connection to carburetor

6 - **Vacuum unit -Advance-**

7 - **Vacuum unit -Retard-**
- o Engine code letters DF only



2E3 and 2E4 carburetor

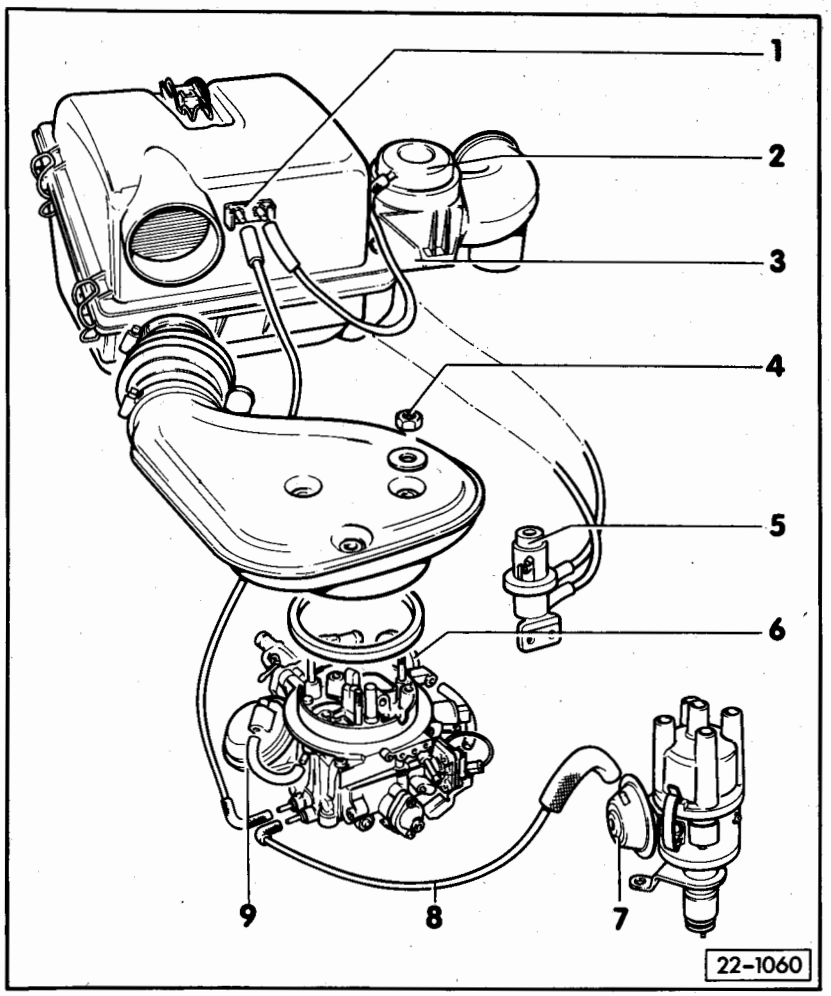
1 - Temperature regulator
- o Brass hose connection to vacuum unit
- o Checking ⟶ page 22-5

2 - Vacuum unit
- o Checking ⟶ page 22-5

3 - Control box
- o Checking ⟶ page 22-5

4 - 7 Nm
- o Renew self-locking nut

5 - Valve for intake air preheating
- o syncro only
- o Valve open: handle turned to left and pulled upwards
- o Valve closed (for driving through water): handle turned to right and pressed downwards

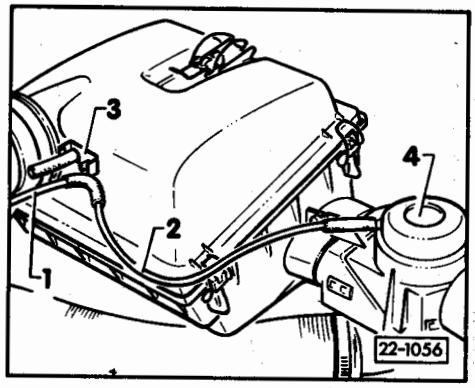


6 - Pull-down unit

7 - Vacuum unit -Advance-

8 - Vacuum hose
- o syncro: positioned above fuel reservoir

9 - Vacuum unit Stage II



Checking intake air preheating

(34 PICT, 2E3 and 2E4 carburetor)

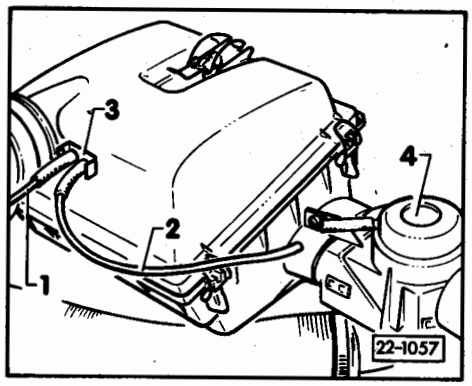
Checking control box/vacuum unit

o Intake air temperature at least 20° C.

o syncro: valve for intake air preheating open.

- Pull hoses -1- and -2- off temperature regulator -3- and join together.

- Pull hose -2- off vacuum unit -4- with engine idling. The flap in the control box must be heard to close.
  Renew control box if this is not the case.



Checking temperature regulator

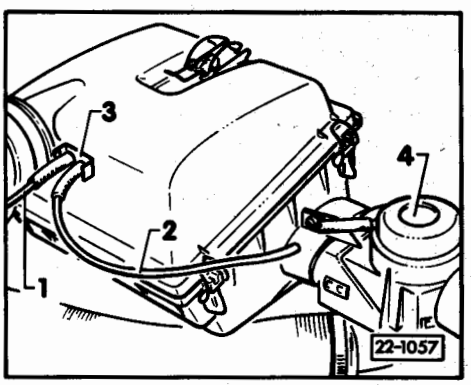
o Intake air temperature at least 20° C.

o syncro: valve for intake air preheating open.

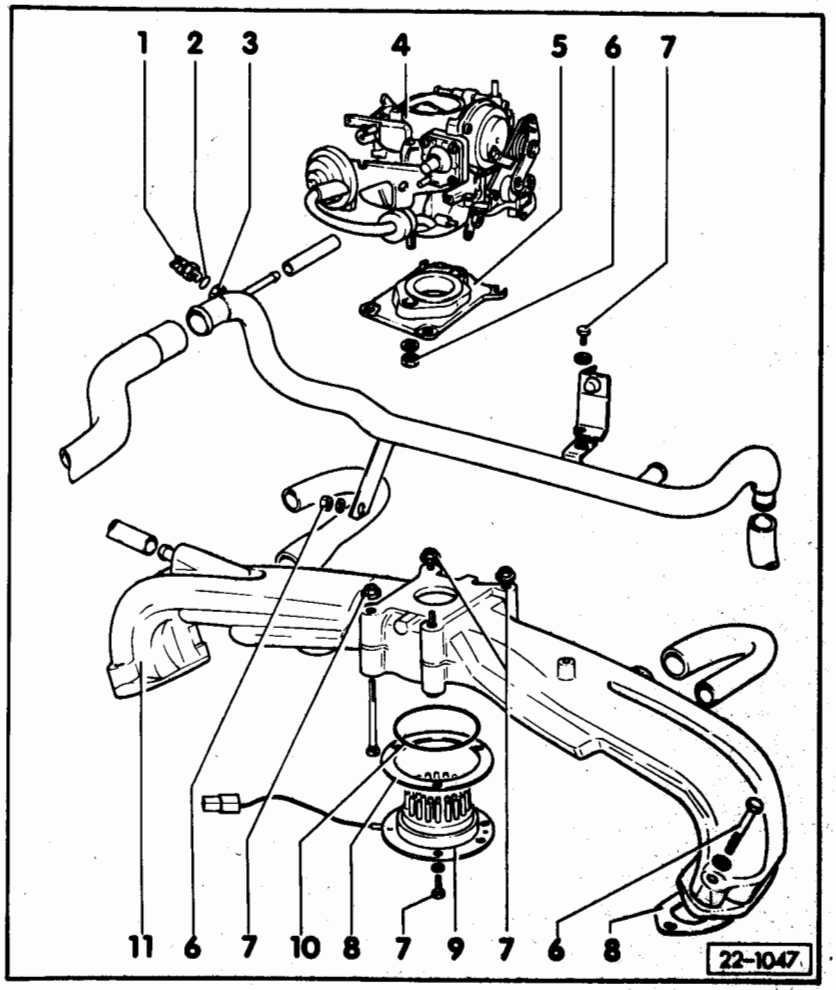
o Control box/vacuum unit OK.

o Hoses -1- and -2- fitted to temperature regulator -3-.

o Before checking, run engine for not longer than five minutes.



- Pull hose -2- off vacuum unit -4- with engine idling. The flap in the control box must be heard to close.
  Renew temperature regulator -3- if this is not the case.



Removing and installing carburetor and intake manifold

Note:

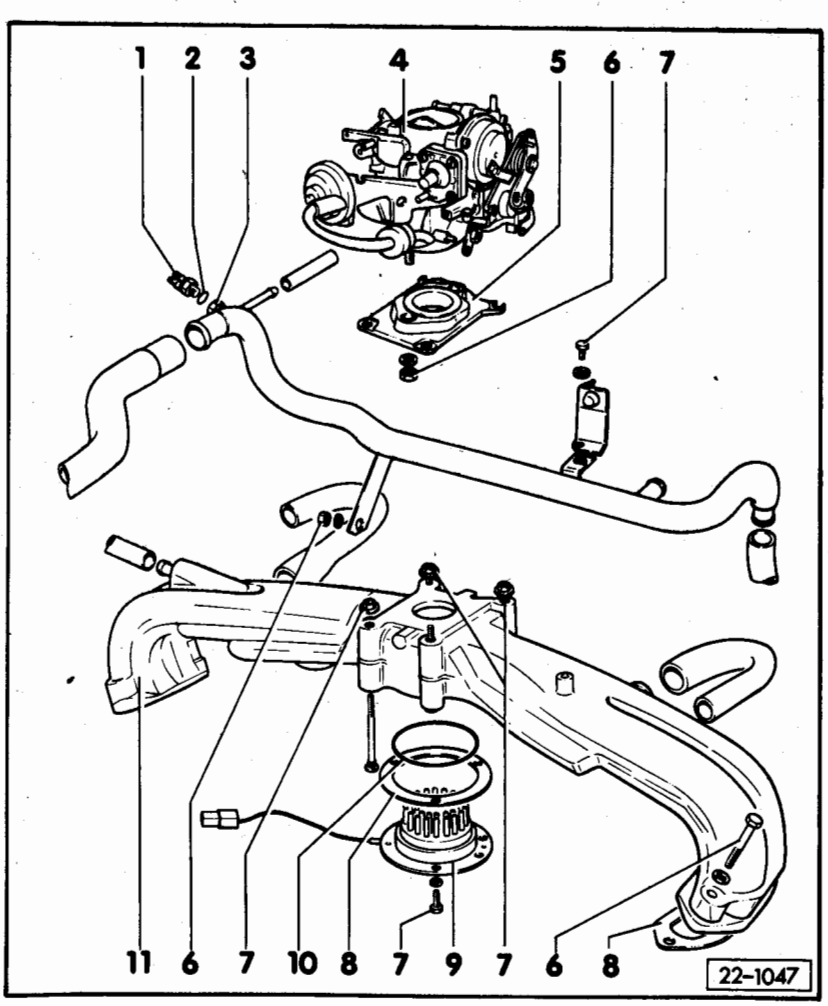
Secure all hoses with hose clamps such that spring clips can also be removed using pliers with engine in situ.

34 PICT carburetor

1 - Thermoswitch, 10 Nm
- o For intake manifold preheater
- o ▶ 07.85 as illustrated
- o 08.85 ▶ Modified design in thermostat housing
- o Check resistance:
  Below 55° C = 0 ohms
  Above 65° C = infinity ohms

2 - Seal
- o Renew

3 - Coolant pipe
- o ▶ 07.85



4 - Carburetor
- o Removing and installing
  ⟶ Fig. 1
- o Vacuum connections
  ⟶ page 22-1

5 - Intermediate flange
- o Check for cracks and distortion

6 - 20 Nm

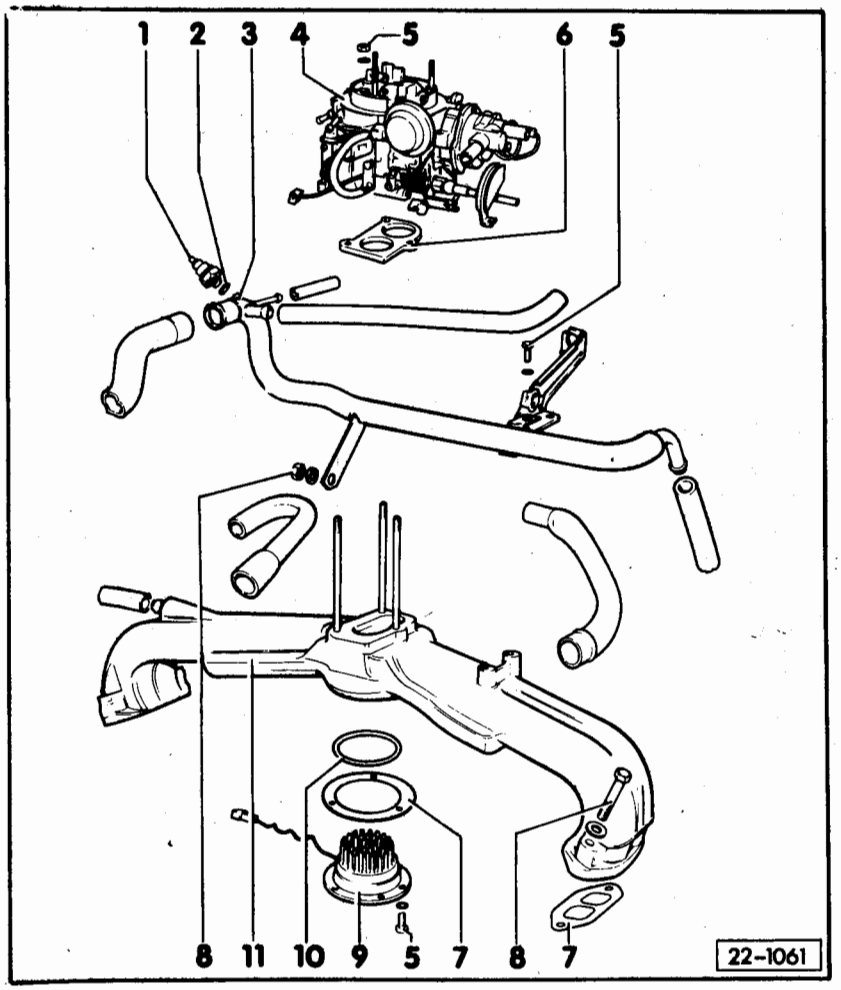
7 - 7 Nm

8 - Gasket
- o Renew

9 - Intake manifold preheater
- o Checking ⟶ Fig. 2
- o Removing and installing
  ⟶ page 22-12

10 - O-ring
- o Renew

11 - Intake manifold



2E3 and 2E4 carburetor

1 - **Thermoswitch, 10 Nm**
- o For intake manifold pre-heater and automatic choke
- o ▶ 07.85 as illustrated
- o 08.85 ▶ Modified design in thermostat housing
- o Check resistance:
  Below 55° C = 0 ohms
  Above 65° C = infinity ohms

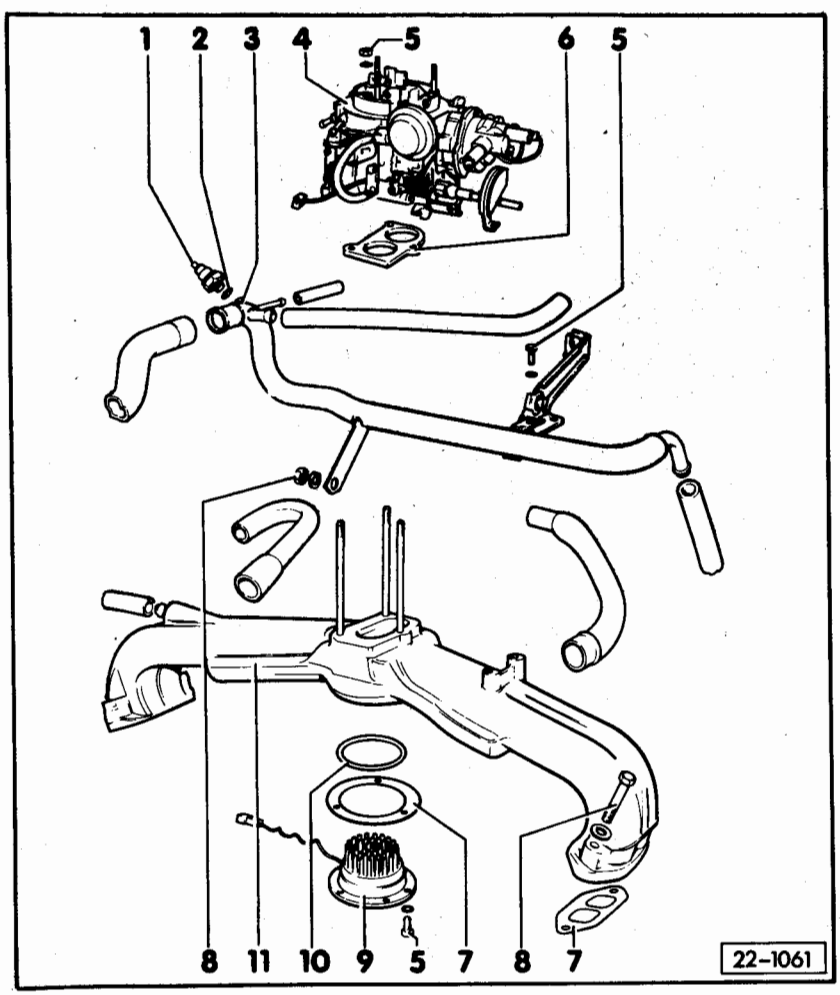
2 - **Seal**
- o Renew

3 - **Coolant pipe**
- o ▶ 07.85

4 - **Carburetor**
- o Vacuum connections
  ⟶ page 22-3

5 - **7 Nm**

6 - **Intermediate flange**
- o Renew if damaged
- o syncro 02.85 ▶
  Flange thickness 50 mm



7 - **Gasket**
- o Renew

8 - **20 Nm**

9 - **Intake manifold preheater**
- o Checking ⟶ Fig. 2
- o Removing and installing
  ⟶ page 22-12

10 - **O-ring**
- o Renew

11 - **Intake manifold**

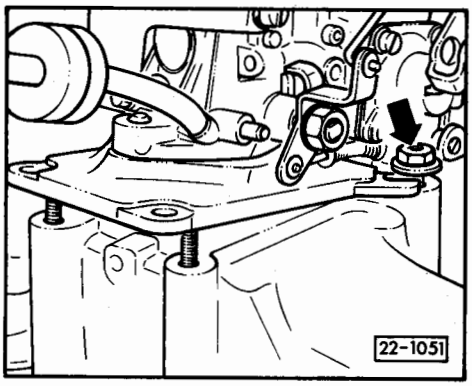


Fig. 1 Removing and installing 34 PICT carburetor

- Loosen front fastening nuts -arrow-.
- Unscrew rear fastening nuts.
- Lift carburetor together with flange and pull to rear.

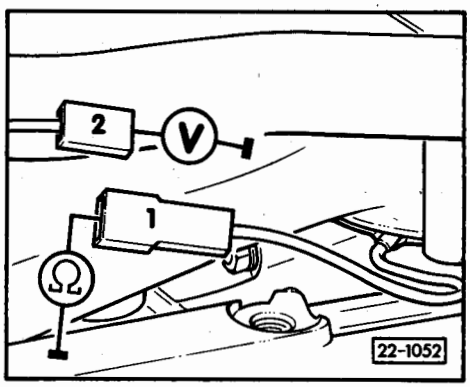


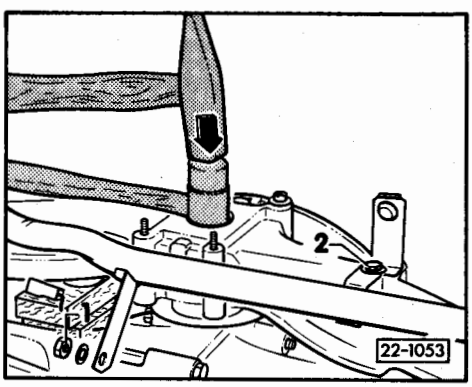
Fig. 2 Checking intake manifold preheater

o Engine cold

- Measure resistance between connecting cable -1- and earth.
  Specification: 0.25 ... 0.50 ohms
  cold resistance
- Measure voltage supply between connecting cable -2- and earth.
  Specification: at least 11.5 V

Removing and installing intake manifold preheater

34 PICT carburetor

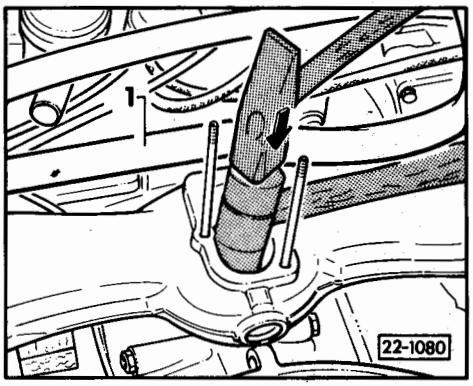


- Remove air cleaner and carburetor.
- ▶ 07.85: Unscrew nut -1- and bolt -2-.
- Remove bolts securing intake manifold to cylinder head.
- Lift intake manifold and unscrew the 3 bolts from the intake manifold preheater.
- Place wooden blocks underneath intake manifold.
- Carefully drive intake manifold preheater out of intake manifold using plastic hammer -arrow-.

Installation takes place in the reverse order.

- Renew gaskets.
- To make fitting easier, coat rubber ring for the intake manifold preheater with coolant.

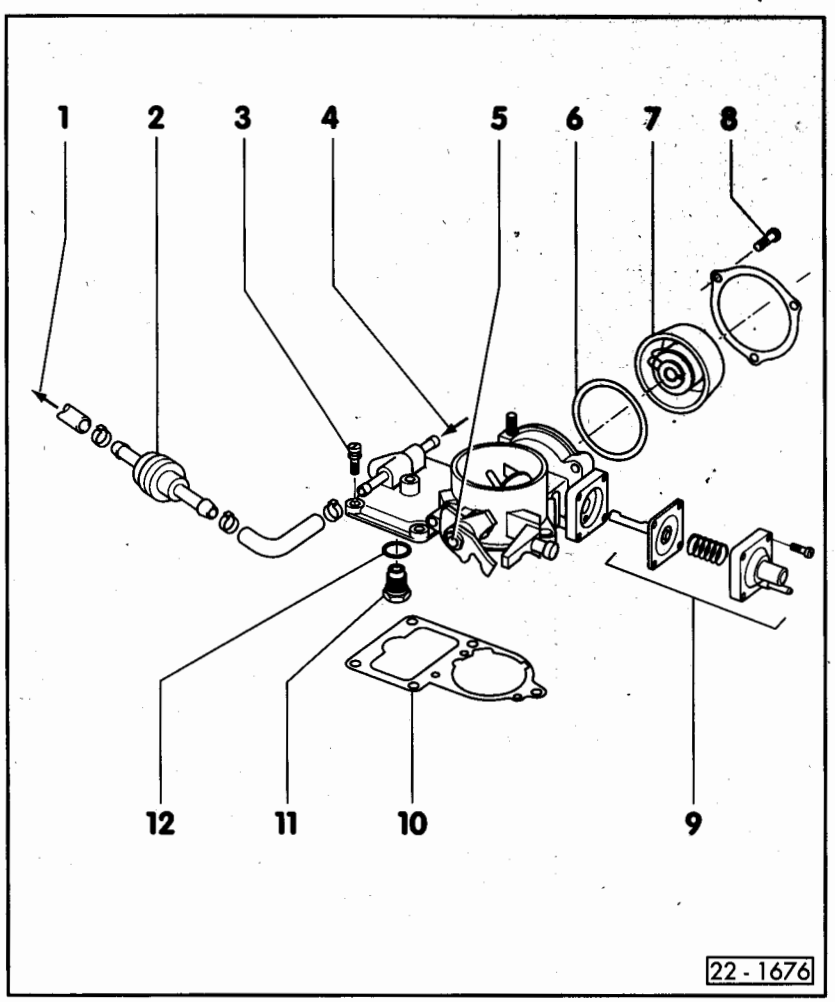
2E3 and 2E4 carburetor



- Unscrew bracket for accelerator cable.
- Remove air cleaner and carburetor.
- ▶07.85: Unscrew securing nuts for coolant pipe -1- at crankcase.
- Remove bolts fastening intake manifold to cylinder head.
- Lift intake manifold and unscrew the 3 bolts from the intake manifold preheater.
- Place wooden blocks under intake manifold.
- Carefully drive intake manifold preheater out of intake manifold using plastic hammer -arrow-.

Installation takes place in the reverse order.

- Renew gaskets.
- To make fitting easier, coat rubber ring for the intake manifold preheater with coolant.

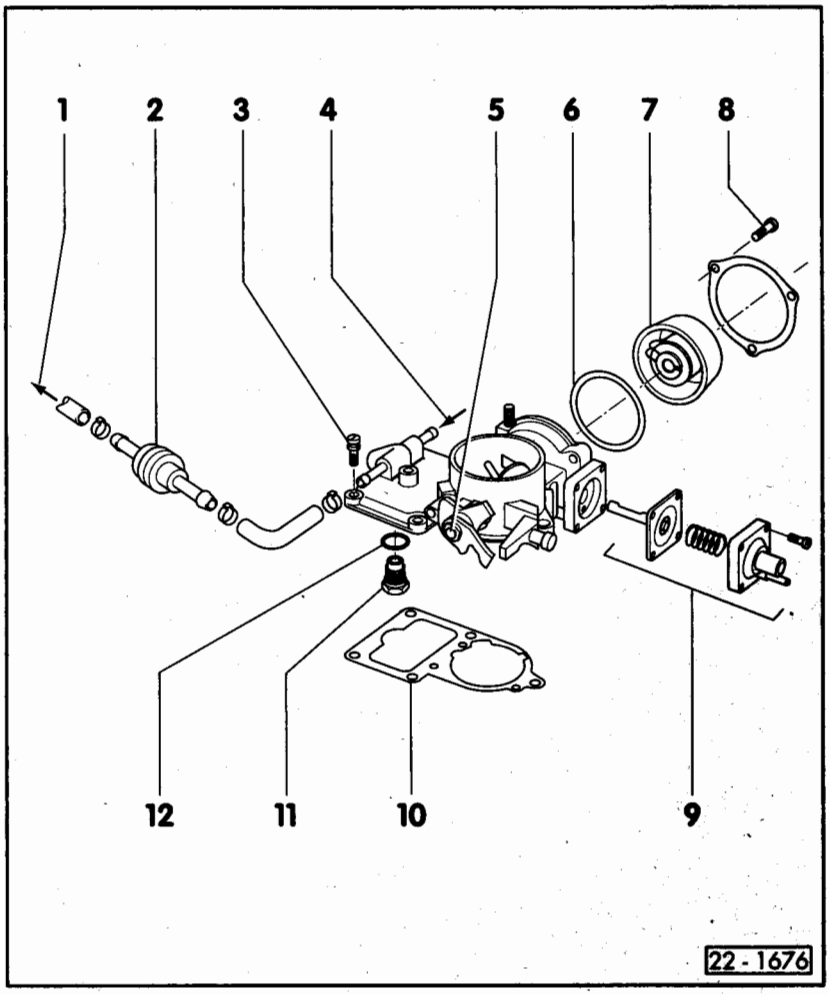


Servicing 34 PICT carburetor

(Engine code letters DF, EY)

Note:

- Always renew seals and gaskets on assembly.
- Hose connections are secured with screw-type or spring clips.
- Adjusting screws are secured with caps, plugs and sealing paint so that adjustment is not possible without destroying the securing element. Always renew the securing element after carrying out repairs or adjustment.
- Lubricate all carburetor joints with G 000 100.
- Carburetor adjustment data → page 22-20
- Jets and settings → page 22-21



Top part of carburetor

1 - To fuel tank

2 - Check valve
- o Arrow must be towards fuel tank

3 - Screws
- o Tighten uniformly

4 - From fuel pump

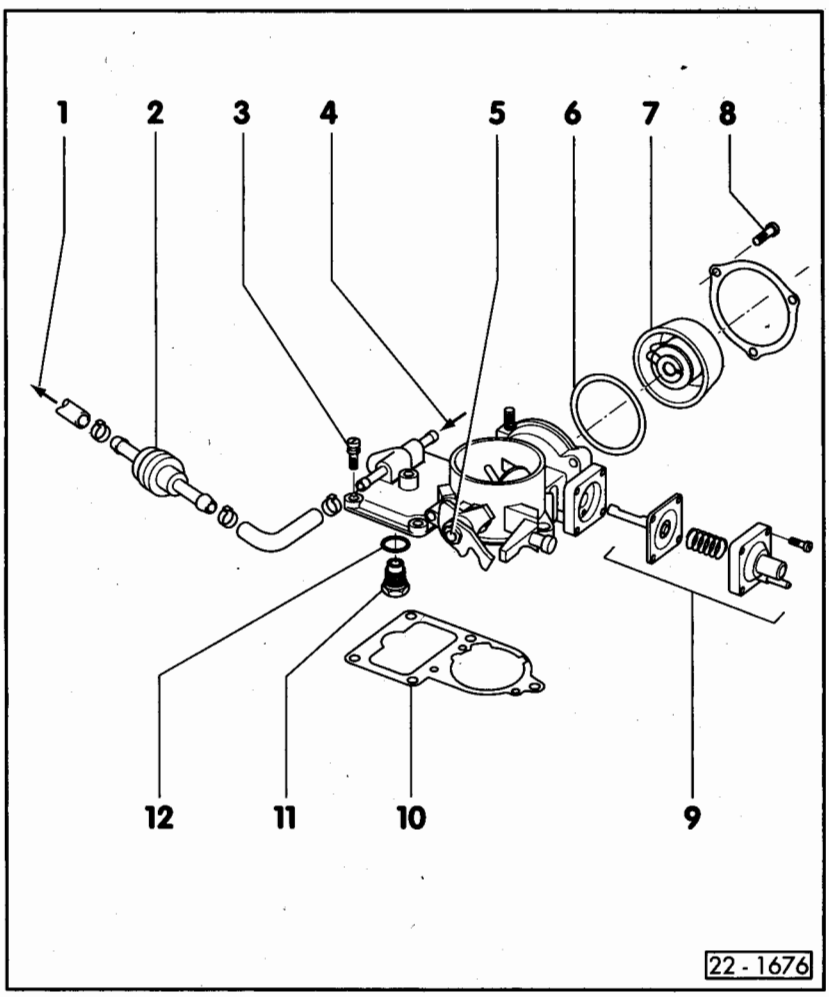
5 - Choke shaft
- o Check for ease of movement

6 - Gasket

7 - Choke cover
- o Marks must be aligned

8 - 5 Nm

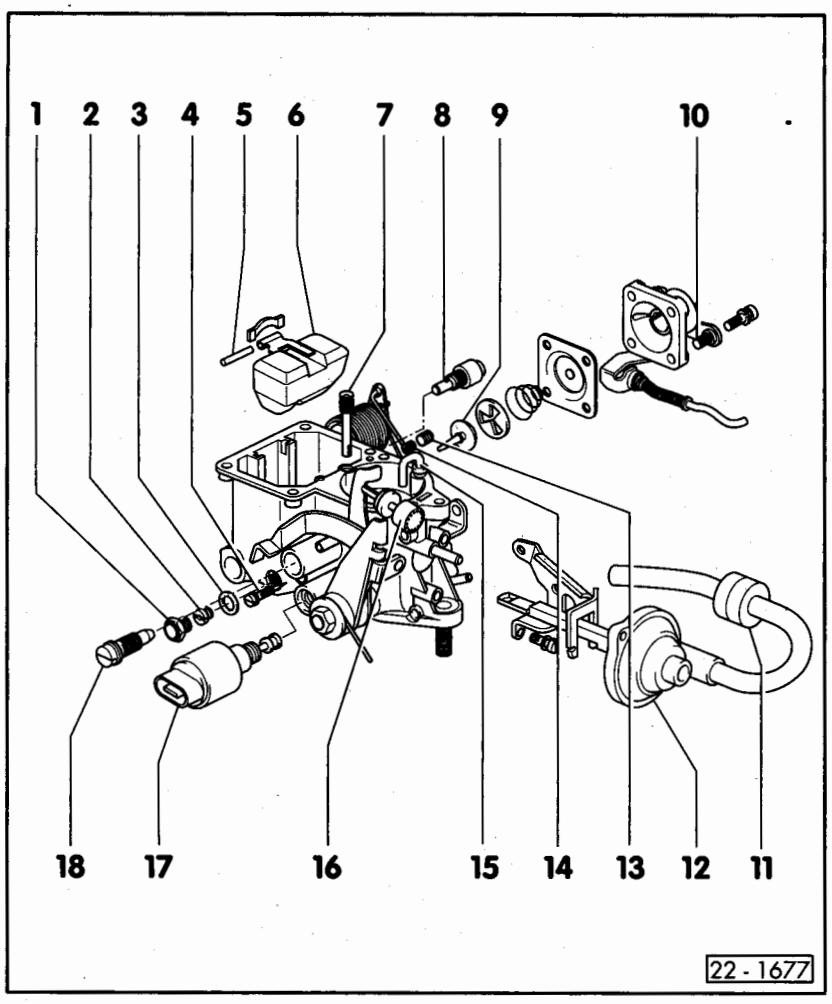
9 - Pull-down unit
- o Adjusting choke gap
→ page 22-26



10 - Gasket
- o Renew
- o Use gasket with same hole pattern

11 - Float needle valve

12 - Washer
- o Check thickness - specified value
→ page 22-21



Bottom part of carburetor

1 - **Screw plug**

2 - **Main jet**

3 - **Seal**
- o Renew

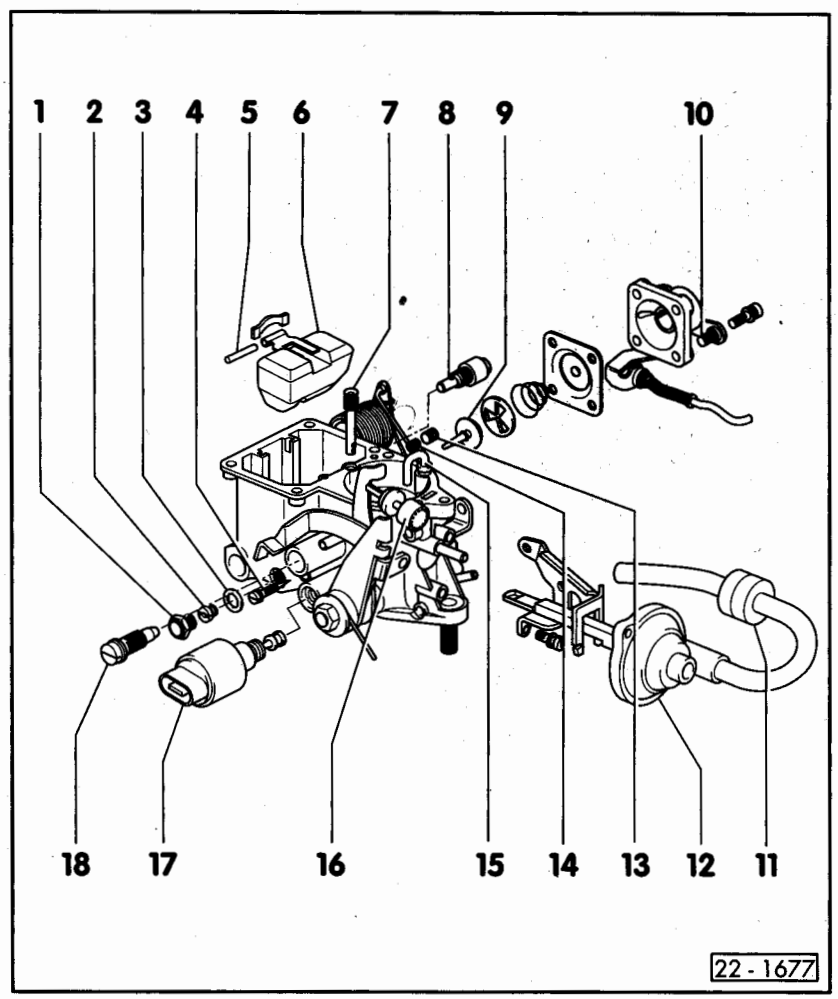
4 - **CO adjusting screw**
- o Adjusting idling speed → page 22-22
- o Check O-ring for damage

5 - **Pin**

6 - **Float**
- o Watch weight → page 22-21

7 - **Air correction jet with emulsion tube**

8 - **Pilot jet**



9 - **Mushroom valve**

10 - **Adjusting screw**
- o Adjusting injection capacity → page 22-25

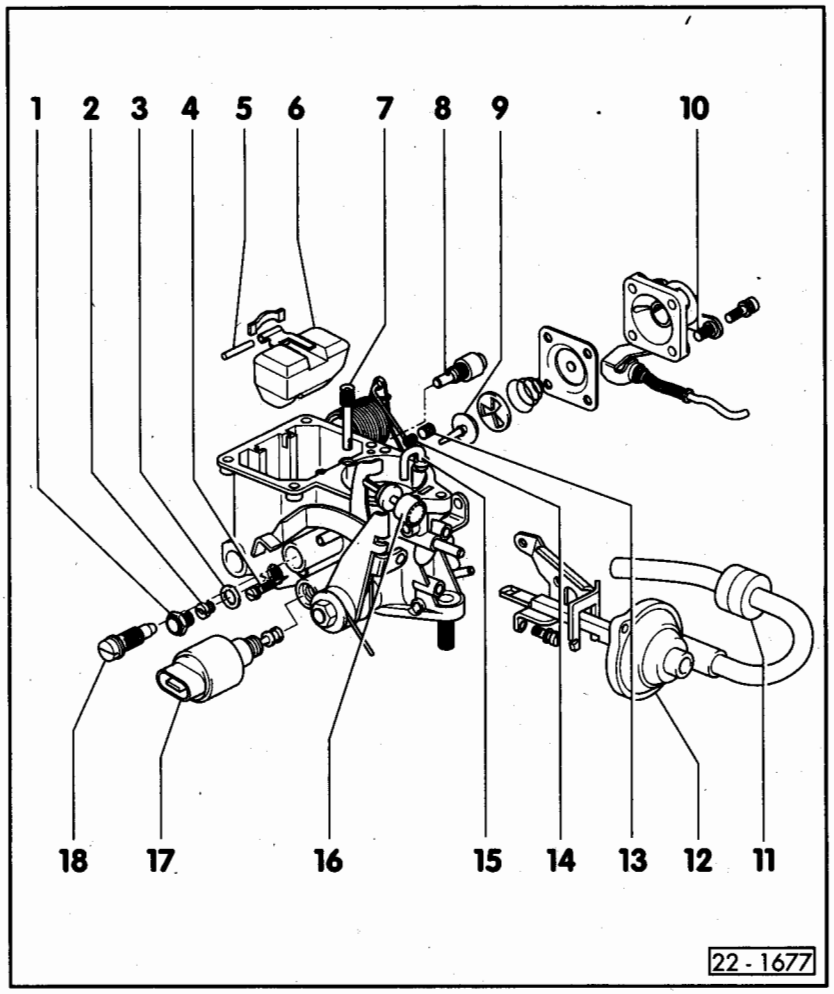
11 - **Delay valve**
- o White connection to carburetor

12 - **Throttle damper**
- o Checking and adjusting → page 22-27

13 - **Screw plug**
- o For auxiliary fuel jet

14 - **Auxiliary fuel jet**

15 - **Injection tube**
- o Checking and adjusting injection capacity → page 22-25
- o Fuel jet must strike collar on discharge arm; bend with normal tools if necessary



16 - Adjusting screw
- o Checking and adjusting cold idle speed
  → page 22-26

17 - Bypass cut-off valve
- o Should click when ignition is switched on
- o When valve is removed, the plunger must first be pushed in about 3 ... 4 mm

18 - Idle adjusting screw
- o Adjusting idle speed
  → page 22-22
- o Check O-ring for damage

Carburetor adjustment data

Engine code letters			DF	EY
Carburetor	Type		34 PICT-5	34 PICT-5
	Part No.		025 129 027 025 129 027 B*)	025 129 027 A
	Modification status		138-1 *)157-1	156-1
Test specs. and settings	Injection capacity	cm^3/stroke	1.3 +/- 0.15	1.3 +/- 0.15
	Choke valve gap	mm	2.8 +/- 0.2	2.8 +/- 0.2
	Cold idle speed	rpm	1900 +/- 100	1900 +/- 100
Idle adjustment[1]	Test specification (DIS connected)	rpm	800 +/- 50	850 +/- 50
	Setting[2] (DIS disconnected[3])	rpm	750 +/- 50	850 +/- 50
	CO content[2]	% by vol.	1.5 +/- 0.5	2.0 +/- 1.0

1) Pay attention to checking and adjustment conditions → page 22-22
2) Current values → "Exhaust gas and idling speed test" binder
3) Plugs pulled off DIS switch unit and joined together

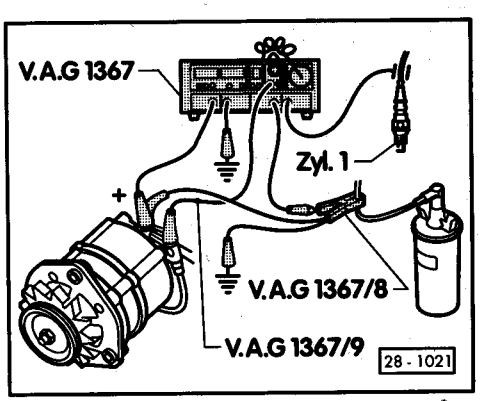
Engine code letters			DF	EY
Carburetor	Type		34 PICT-5	34 PICT-5
	Part No.		025 129 027 025 129 027 B*	025 129 027 A
	Modification status		138-1 *)157-1	156-1
Jets and settings				
	Venturi	mm dia.	26	26
	Main jet		127.5	132.5
	Air correction jet		60 Z	60 Z
	Pilot jet		50	55
	Pilot air jet[1)]		140	140
	Auxiliary fuel jet		45	45
	Auxiliary air jet[1)]		90	90
	Float needle valve	mm dia.	1.5	1.5
	Float weight	g	11 +/- 0.5	11 +/- 0.5
	Washer under float needle valve	mm	0.5	0.5

1) Jet cannot be exchanged

Adjusting idling speed

Checking and adjustment conditions

- o Minimum engine oil temperature 60° C.
- o Crankcase breather hose pulled off and sealed on air cleaner end.
- o Radiator fan must not be in operation.
- o Electrical loads switched off.
- o Choke valve fully open.
- o No leaks in exhaust system.
- o Ignition timing point adjustment OK; checking → page 28-14 for code letters DF and page 28-39 for code letters EY.



Checking and adjusting idling speed and CO content

- Connect up ignition tester V.A.G 1367.
- Connect CO tester V.A.G 1363A to tailpipe.

Attention:

Switch off ignition before connecting up test appliances.

- Check idle speed and CO content.

Test specification:

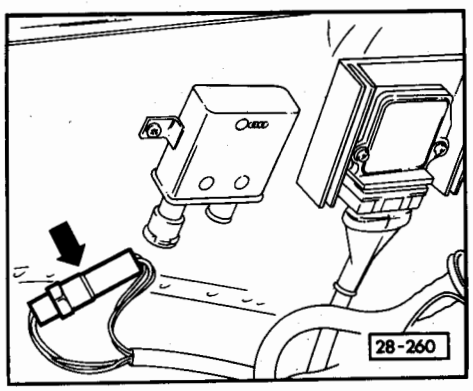
Code letters	Engine speed rpm	CO content % by vol.
DF	750 ... 850[1)]	1.0 ... 2.0
EY	800 ... 900	1.0 ... 3.0

1) DIS connected

In the event of deviation from the specified value:

- Pull plugs off DIS switch unit and join together (DF only).

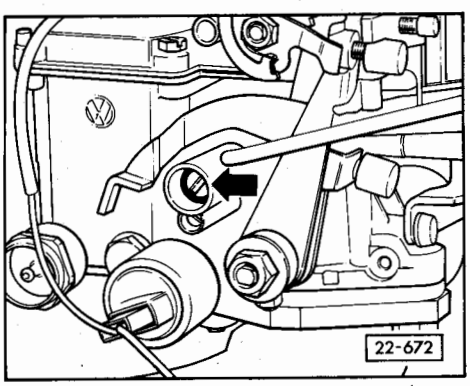
- Adjust idle speed and CO content to setting by alternately turning adjusting screws.



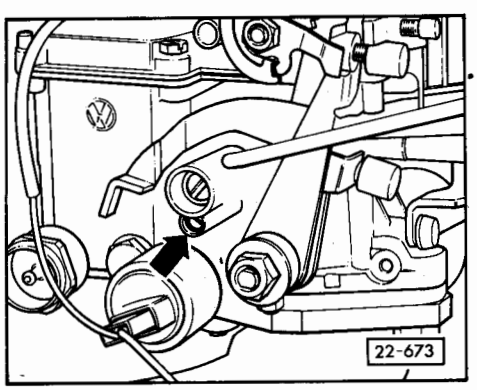
Setting:[1)]

Code letters	Engine speed rpm	CO content % by vol.
DF	750 +/- 50	1.5 +/- 0.5
EY	850 +/- 50	2.0 +/- 1.0

1) Current values ⟶ "Exhaust gas and idling speed test" binder



- Adjust idling speed -arrow-.



- Adjust CO content -arrow-.

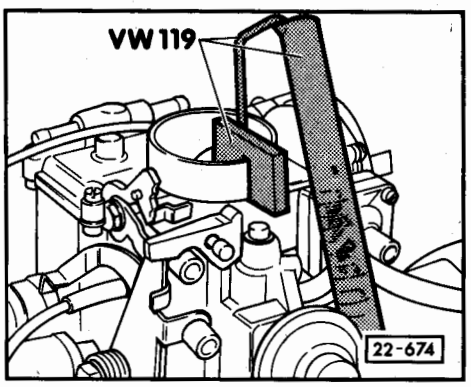
- Connect up DIS and re-check CO content. Correct if necessary.

- Fit new anti-tamper cap on CO adjusting screw.

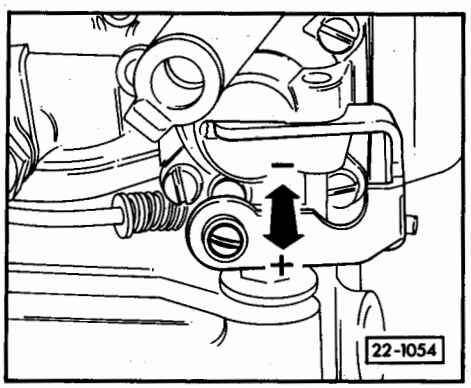
Note:

The crankcase breather hose must be re-connected after the CO content has been adjusted. If the CO level rises afterwards, this does not mean the adjustment is incorrect, but is due to enrichment from oil dilution in the crankcase resulting from frequent stop/start operation.
A long fast drive will reduce the amount of fuel in the oil and the CO content will return to the normal level. At short notice, this can also be done by way of an oil change.

Checking and adjusting amount injected by accelerator pump

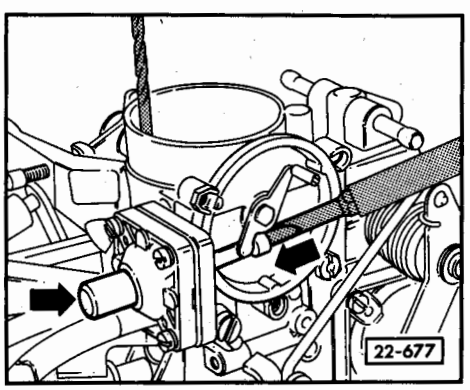


- Run engine to fill the float chamber.
- Open choke valve and fix in position with retainer.
- Push tube over end of injection pipe of carburetor.
- Operate throttle until fuel emerges from tube.
- Hold measuring glass under tube and slowly open the throttle fully 5 times (at least 3 seconds per stroke).
- Divide injected quantity by 5.
  Compare result with specified value and correct where necessary.
  Specification: 1.3 +/- 0.15 cm³/stroke



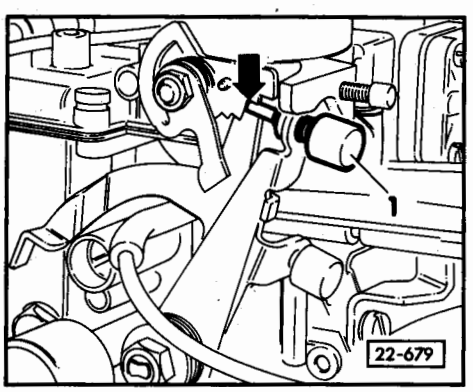
- Adjusting injected quantity:
  + = more
  - = less
- The jet of fuel must strike the collar in the discharge arm, otherwise injection tube must be aligned.

Adjusting choke valve gap



- Partially dismantle automatic choke.
- Close choke valve.
- Press pull rod for vacuum diaphragm with screwdriver in direction of arrow as far as stop.
  Measure gap with twist drill in this position.
  Specification: 2.8 +/- 0.2 mm
- If necessary, adjust choke valve gap at the adjusting screw -arrow-.

Checking and adjusting cold idle speed

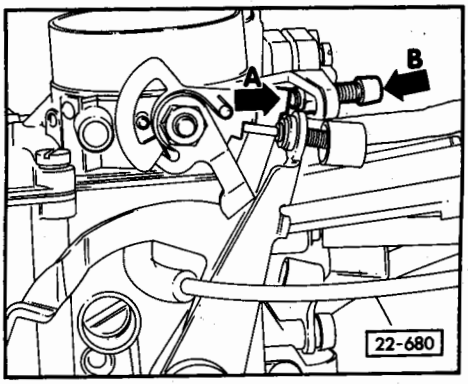


- o Minimum engine oil temperature 60° C.
- o Ignition timing adjustment OK.
- o Idle adjustment OK.
- Set adjusting screw to third step -arrow- with engine running.
- Set speed with adjusting screw -1-.
  Specification: 1900 +/- 100 rpm

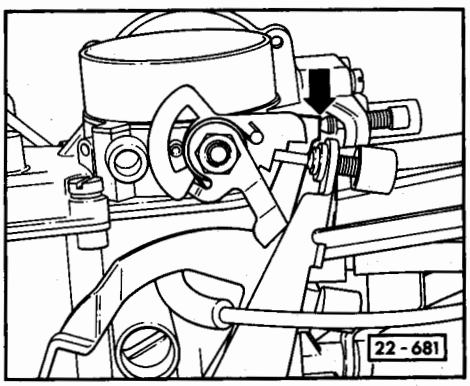
Checking and adjusting throttle damper and delay valve

o Minimum engine oil temperature 60° C.

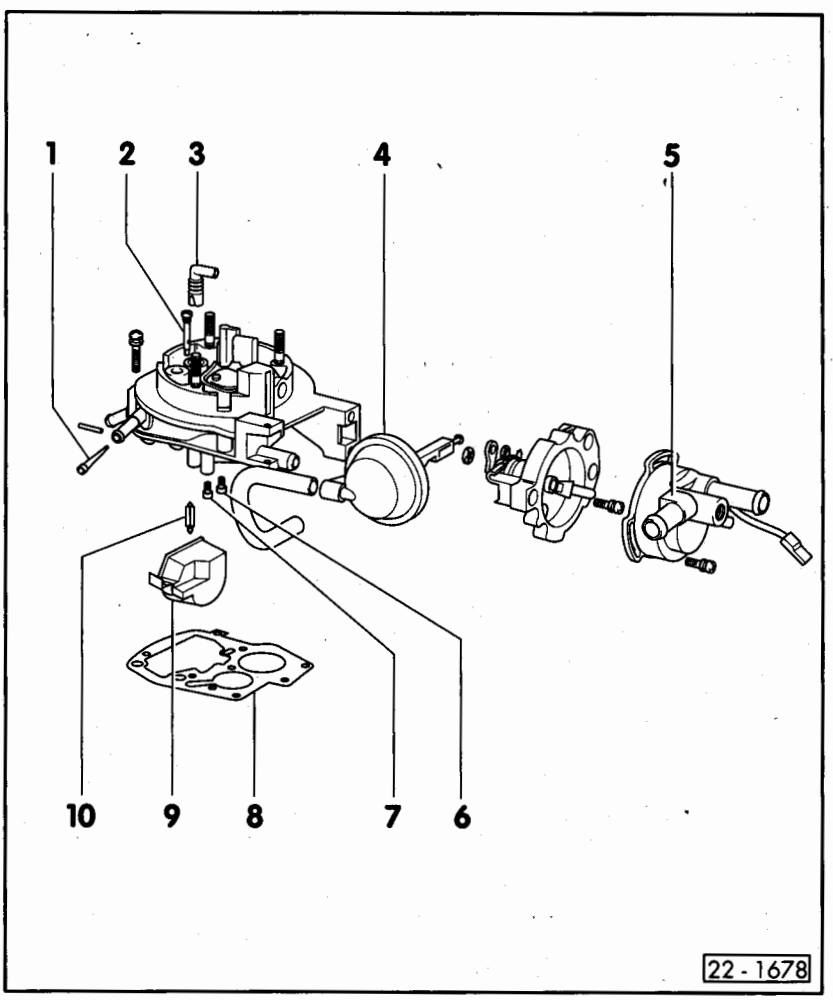
- Run engine at idling speed.



- Press lever against adjusting screw by hand -arrow A-.
- Check speed and, if necessary, remove cap from adjusting screw -arrow B- and adjust speed.
  Specification: 1300 +/- 100 rpm
- When speed is correct, fit new anti-tamper cap on adjusting screw.



- Increase engine speed to approx. 3000 rpm such that the lever of the throttle damper is pulled against the adjusting screw -arrow-.
- Release throttle valve lever.
  Damper lever should now lift slowly off adjusting screw and the throttle valve should be completely closed after approximately 3 seconds.



Servicing 2E3 and 2E4 carburetor

(Engine code letters DG, SP)

Note:

o Always renew gaskets and seals on assembly.

o Hose connections are secured with screw-type or spring clips.

o Adjusting screws are secured with caps, plugs and sealing paint so that adjustment is not possible without destroying the securing element. Always renew the securing element after carrying out repairs or adjustment.

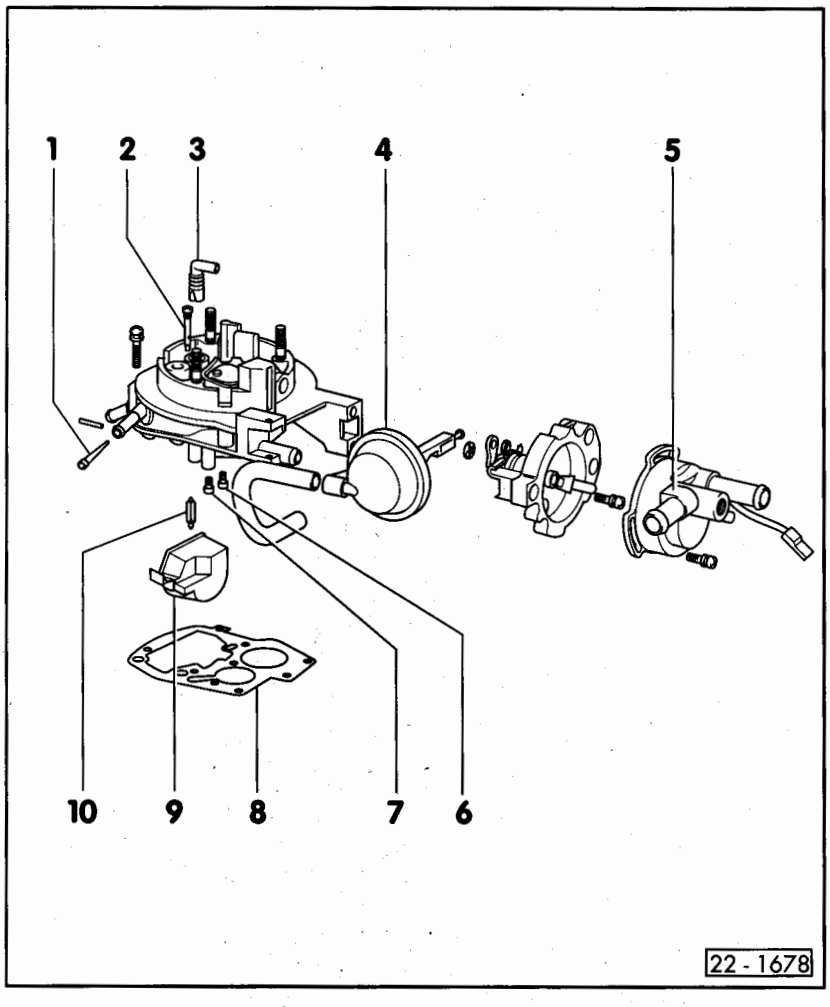
o Lubricate all carburetor joints with MoS_2 grease.

o Idling speed stabilisation components, 2E4 carburetor
→ page 22-33

o Carburetor adjustment data
→ page 22-38

o Jets and settings
→ page 22-40

o Jet layout → Figs. 1 and 2



o Fuel reservoir on syncro
→ Fig. 5

o Basic adjustment of throttle valve, stage II → page 22-58

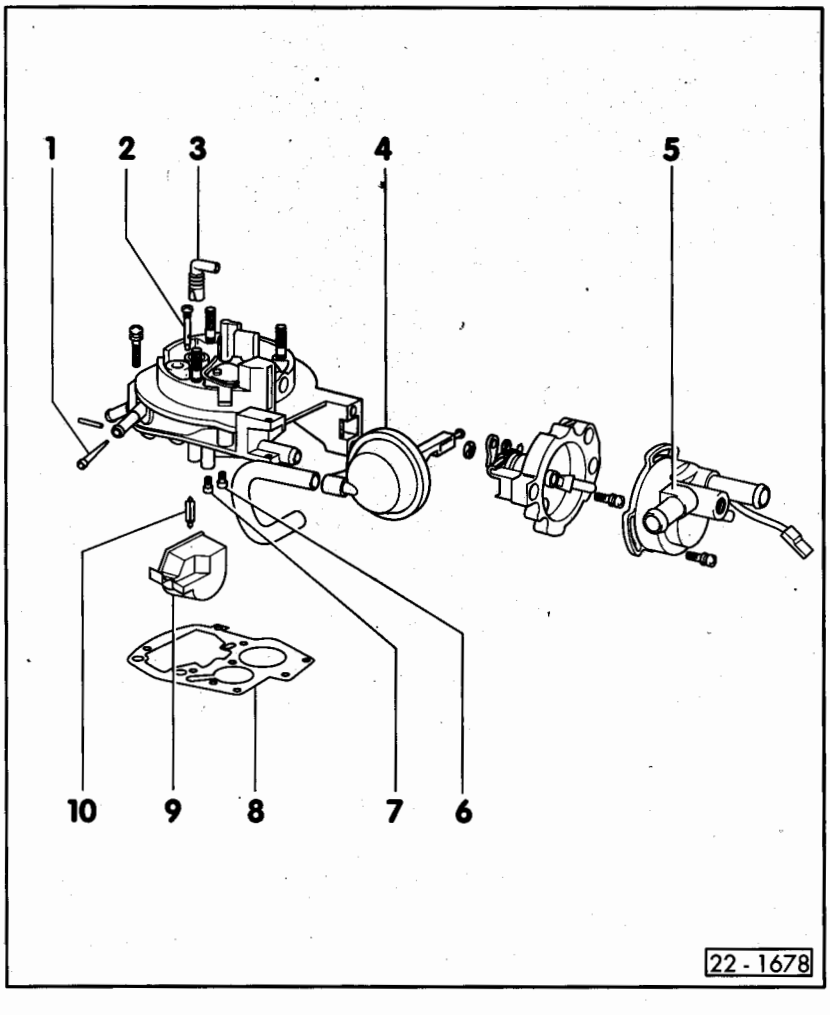
Top part of carburetor

1 - Screen
- o Remove with standard puller for anti-tamper caps (e.g. Hazet 4518-1)

2 - Pilot fuel/air jet
- o → Fig. 1

3 - Breather pipe
- o For float chamber

4 - Pull-down unit
- o Checking operation → page 22-51
- o Checking for leaks → page 22-51
- o Checking and adjusting the choke valve gap → page 22-52



5 - Choke cover
- o Adjusting → Fig. 4
- o Checking: Switch on ignition and connect up test lamp between separated connector. Test lamp must light (coolant temperature below 55° C)

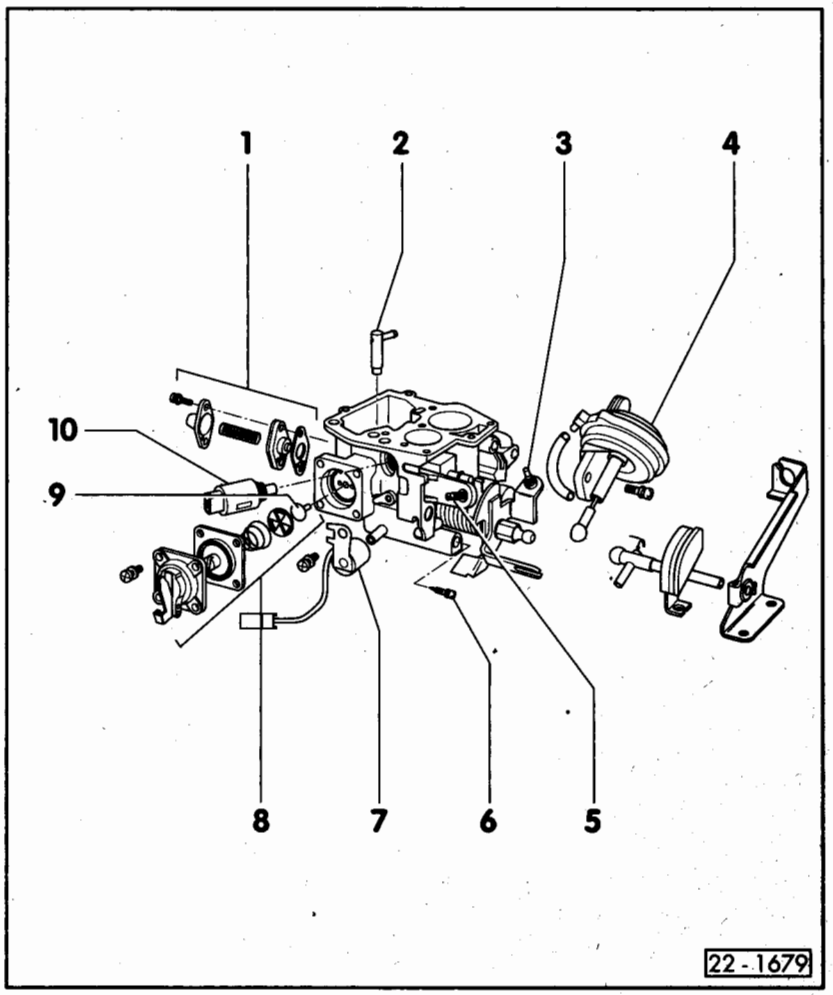
6 - Main jet, stage II
- o → Fig. 2

7 - Main jet, stage I
- o → Fig. 2

8 - Gasket
- o Renew

9 - Float

10 - Float needle



Bottom part of carburetor

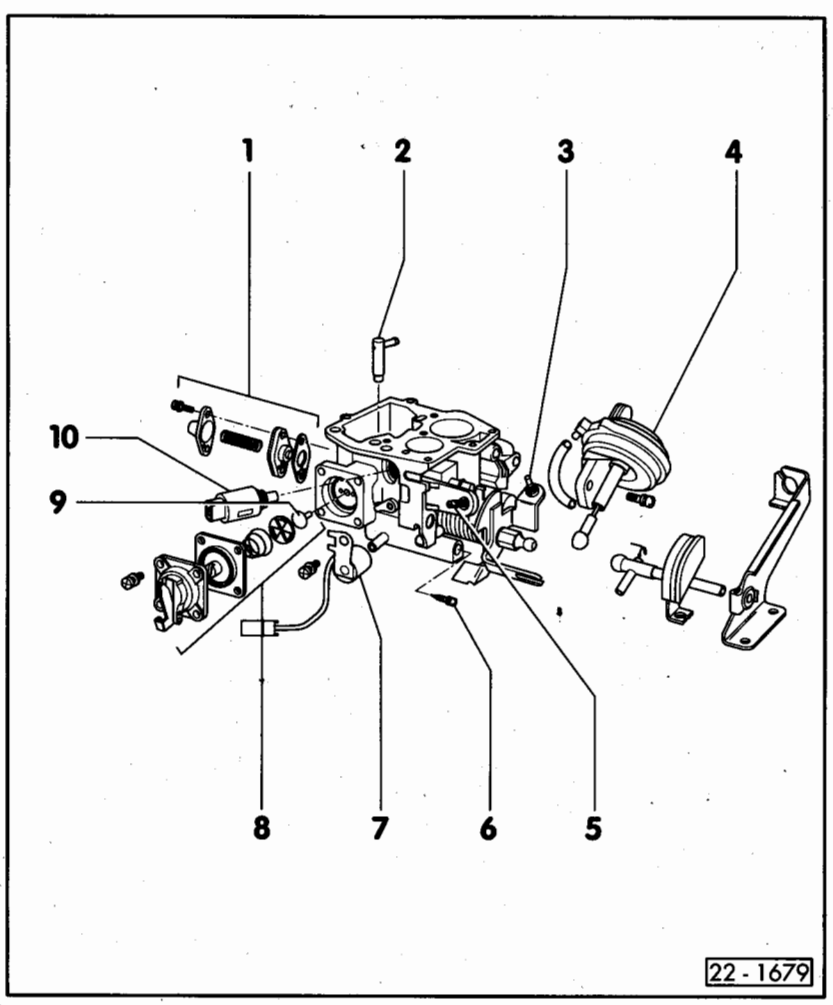
1 - Part-load enrichment valve
- o Do not re-use valve after removal (renew)

2 - Injection tube
- o Installing ⟶ Fig. 3
- o Renew O-ring if damaged

3 - Adjusting screw
- o Checking and adjusting cold idle speed ⟶ page 22-49

4 - Vacuum unit, stage II
- o 2E3 carburetor only
- o Checking for leaks and checking operation ⟶ page 22-53
- o Checking vacuum ⟶ page 22-54

5 - Adjusting screw
- o Only on 2E3 carburetor for idle speed adjustment ⟶ page 22-45
- o Shear screw on 2E4 carburetor (adjustment is not to be changed)



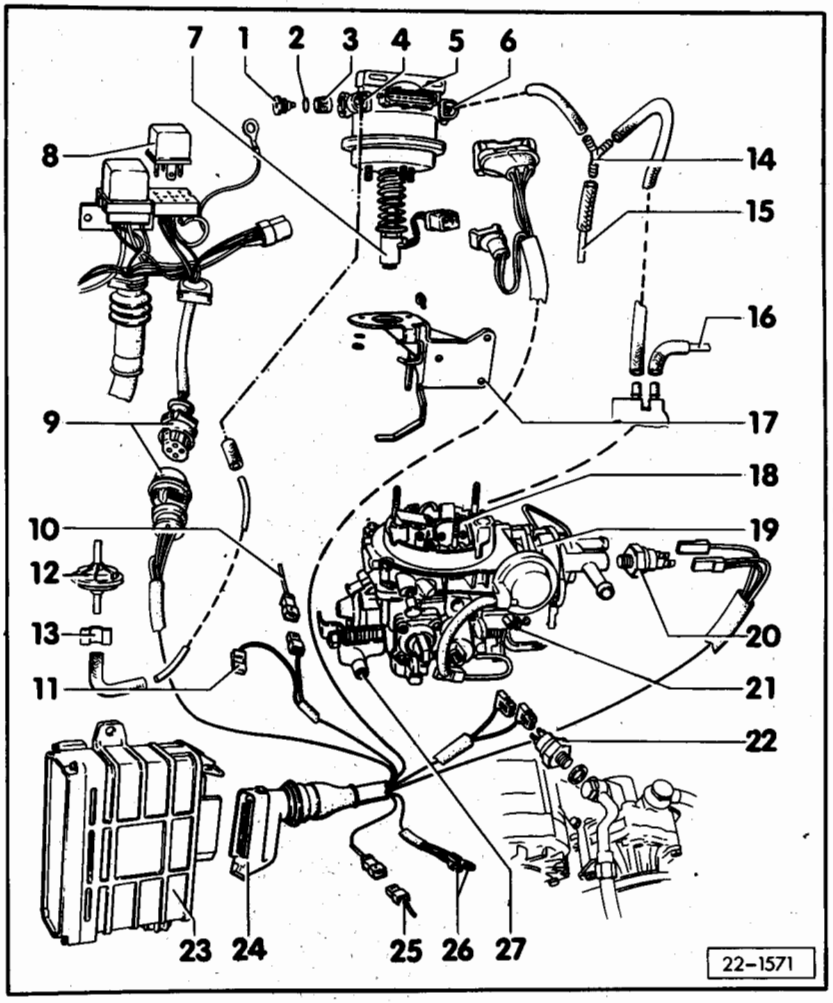
6 - CO adjusting screw
- o Adjusting idle speed ⟶ page 22-45
- o Renew O-ring if damaged

7 - Part-load duct heating
- o Checking ⟶ page 22-57

8 - Accelerator pump
- o Checking and adjusting injection capacity ⟶ page 22-56

9 - Mushroom valve

10 - Idle cut-off valve, 6 Nm
- o Must click when ignition is switched on
- o Use 3064 to remove and install



Servicing components of idling speed stabilisation system

(2E4 carburetor)

Note:

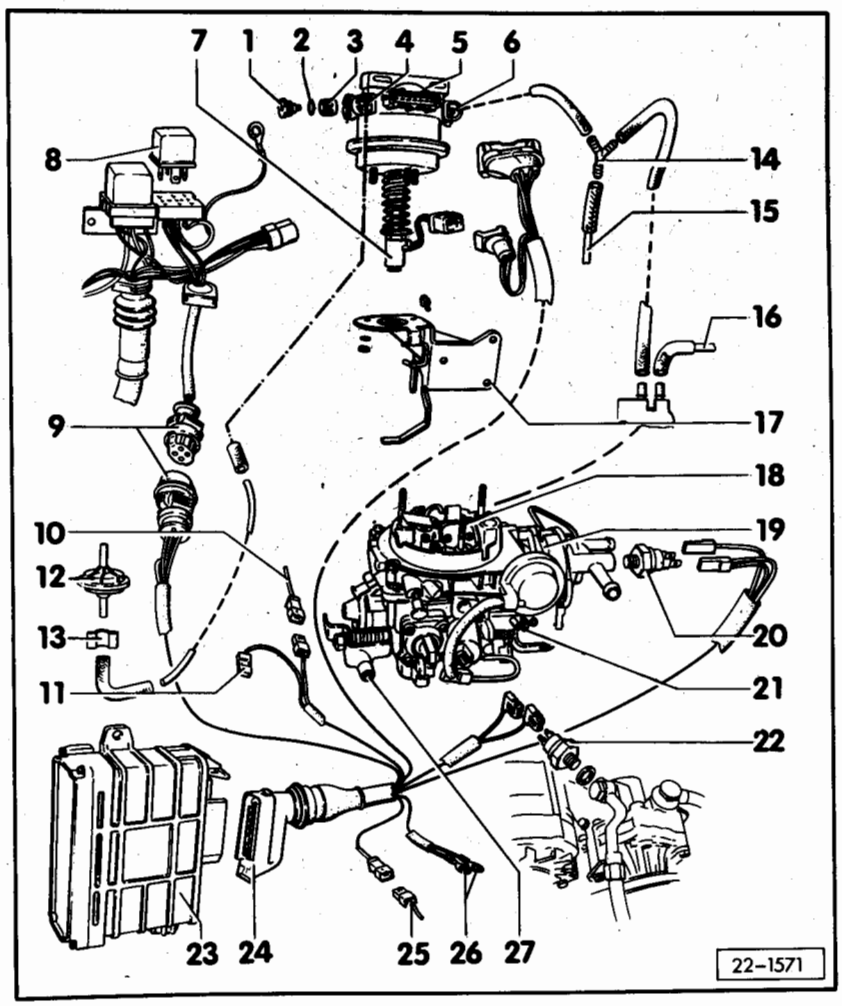
- o Dismantling and assembling carburetor ⟶ page 22-28
- o Electrical check on idling speed stabilisation ⟶ page 01-1

1 - **Cover**
- o Removing: Screw M 4 bolt into tapped hole and pull cover out

2 - **O-ring**
- o Renew if damaged

3 - **Filter**
- o Installation position: must fit on cover -1-

4 - **Breather valve**
- o Checking ⟶ checking throttle valve positioner, page 22-61



5 - **Throttle valve positioner**
- o Checking ⟶ page 22-61

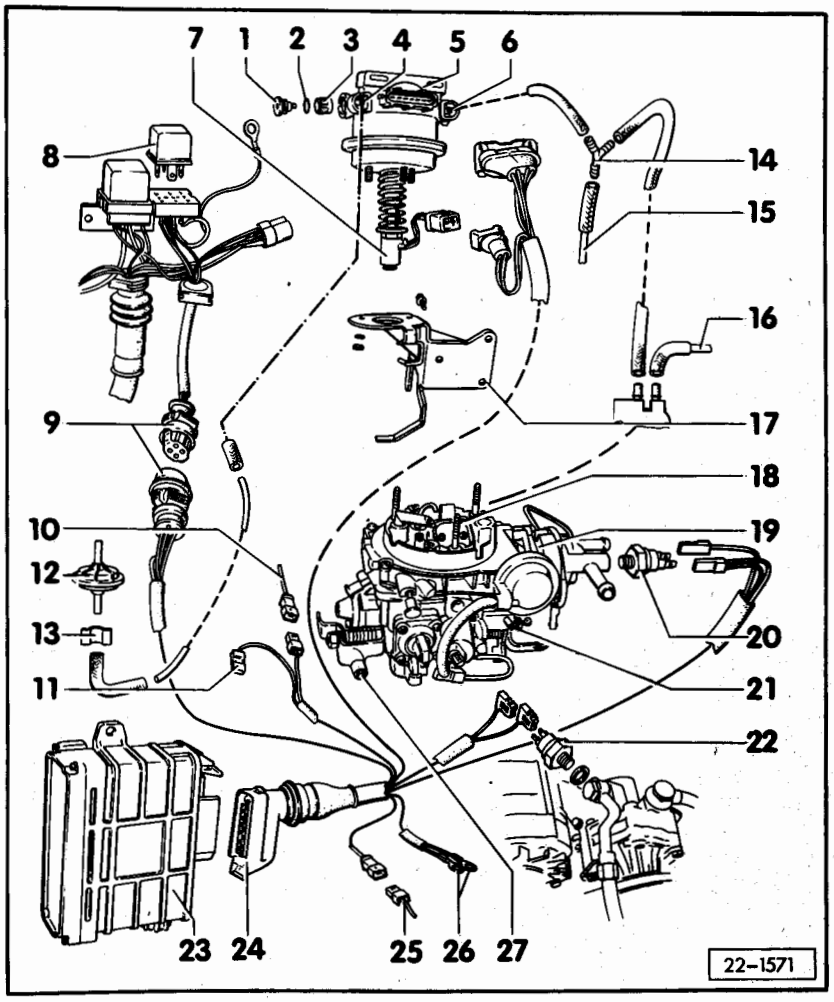
6 - **Vacuum valve**
- o Checking ⟶ checking the throttle valve positioner, page 22-61

7 - **Throttle valve switch**
- o Idling switch
- o Checking ⟶ checking the throttle valve positioner, page 22-61

8 - **Current supply relay**
- o For control unit and throttle valve positioner
- o Checking ⟶ page 01-3

9 - **Connector, 4-pin**
- o To current supply relay
- o On automatic gearbox also to selector lever switch

10 - **Green wire**
- o To TCI-H switch unit, terminal 7



11 - Black/white wire
- o To ignition coil terminal 15

12 - Breather valve filter
- o Location: on control unit bracket
- o When dirty, idling speed too low, renew

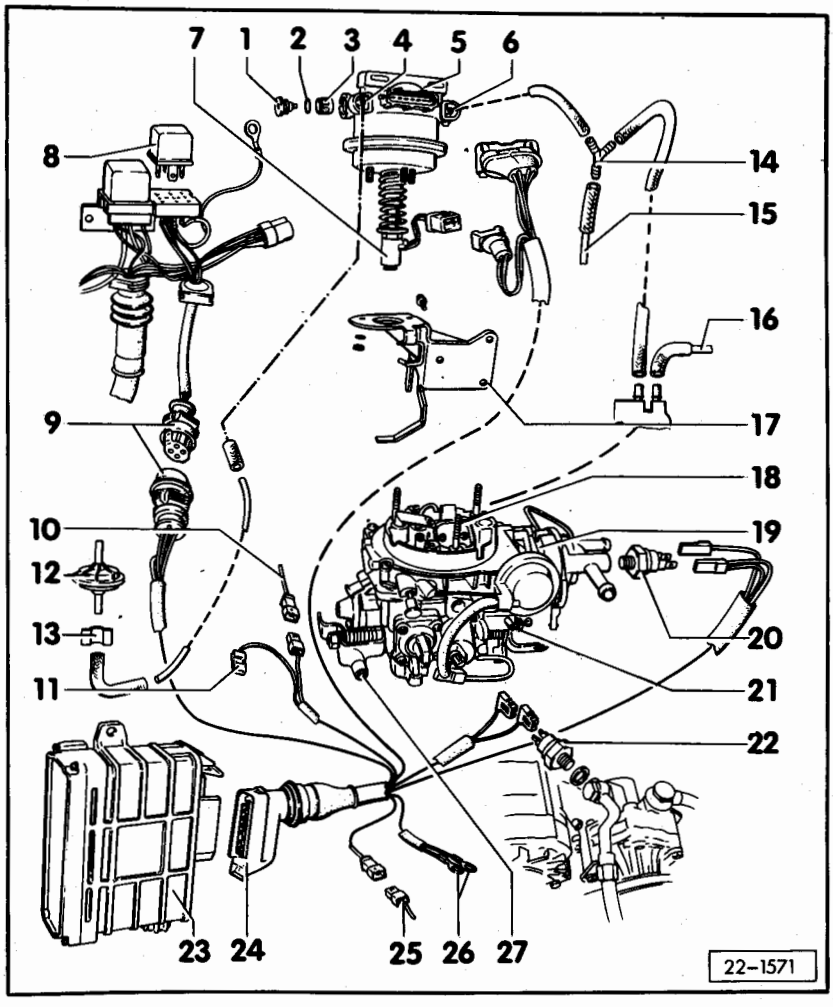
13 - Clip

14 - Branch pipe

15 - Vacuum pipe
- o To distributor
- o On syncro vehicles, the vacuum pipe must be routed over the fuel reservoir on the carburetor

16 - Vacuum pipe
- o To temperature regulator on air cleaner housing

17 - Bracket



18 - Choke valve
- o With flap valve

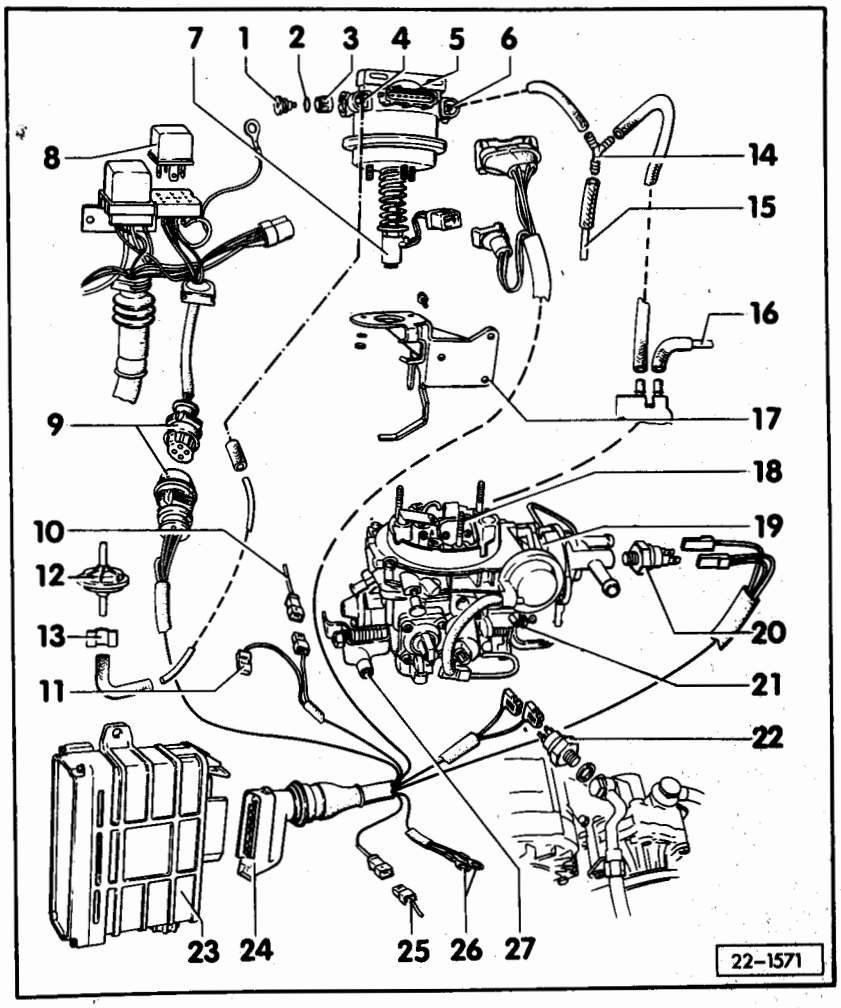
19 - Fast idle cam
- o With cold start detent

20 - Thermoswitch, 15 Nm
- o Below 17° C - throughflow
- o Above 25° C - no throughflow

21 - Shear screw
- o Basic stage I throttle valve adjustment ⟶ page 22-60

22 - Pressure switch - power assisted steering, 15 Nm
- o Check with engine running
- o Steering in straightahead position: no throughflow
- o Steering on lock: throughflow

23 - Idling speed stabilisation control unit
- o To remove, take out left-hand taillight



24 - Connector
- o Only disconnect or connect with ignition switched off
- o To detach, press spring up

25 - Red/blue wire
- o To A/C compressor

26 - Earth wires
- o To cylinder head

27 - Adjustment screw
- o Adjusting distance between throttle valve switch and throttle valve lever ⟶ checking throttle valve switch, page 22-63

Carburetor adjustment data

Code letters (RWD engine)		**DG** 10.82 ▶ 10.85		**DG** 11.85 ▶ 02.87 **SP** 10.86 ▶ 02.87		**DG** 03.87 ▶ **SP** 03.87 ▶	
Carburetor							
Type		2E3		2E3		2E4	
Part No.							
Manual gearbox		025 129 015		025 129 015 H/K[1]		025 129 015 E	
Automatic gearbox		025 129 015 A		025 129 015 J/L[1]		025 129 015 F	
Test specs. and settings		**Stage I**	**Stage II**	**Stage I**	**Stage II**	**Stage I**	**Stage II**
Injection capacity							
Man. g/box	cm³/stroke	1.35 +/- 0.2	-	1.35 +/- 0.2	-	1.35 +/- 0.2	-
Auto. g/box	cm³/stroke	1.00 +/- 0.2	-	1.00 +/- 0.2	-	1.00 +/- 0.2	-
Choke valve gap	mm	3.30 +/- 0.2	-	2.50 +/- 0.2	-	2.50 +/- 0.2	-
Cold idle speed	rpm	2000 +/- 200		2000 +/- 200		3600 +/- 200	
Idle adjustment[2]							
Engine speed[3]	rpm	900 +/- 50		900 +/- 50		850 ... 950[4]	
CO content[3]	% by vol.	1.5 +/- 0.5		1.5 +/- 0.5		1.5 +/- 0.5	

1) Carburetors 025 129 015 K and 025 129 015 L in conjunction with cyclone-type air cleaner

2) Pay attention to checking and adjustment conditions ⟶ page 22-45

3) Current values ⟶ "Exhaust gas and idling speed test" binder

4) Idling speed regulated automatically, not adjustable

Code letters (syncro engine)	DG 02.85 ▶ 10.85	DG 11.85 ▶ 02.87	DG 03.87 ▶
		SP 10.86 ▶ 02.87	SP 03.87 ▶
Carburetor			
Type	2E3	2E3	2E4
Part No.			
Manual gearbox	025 129 015 D	025 129 015 M	025 129 015 G
Automatic gearbox	---	---	---

Test specs. and settings		Stage I	Stage II	Stage I	Stage II	Stage I	Stage II
Injection capacity							
Man. g/box	cm³/stroke	1.35 +/- 0.2	-	1.35 +/- 0.2	-	1.35 +/- 0.2	-
Auto. g/box	cm³/stroke	-		-		-	-
Choke valve gap	mm	3.30 +/- 0.2	-	2.50 +/- 0.2	-	3.30 +/- 0.2	-
Cold idle speed	rpm	2000 +/- 200		2000 +/- 200		3600 +/- 200	
Idle adjustment[1]							
Engine speed[2]	rpm	900 +/- 50		900 +/- 50		850 ... 950[3]	
CO content[2]	% by vol.	1.5 +/- 0.5		1.5 +/- 0.5		1.5 +/- 0.5	

1) Pay attention to checking and adjustment conditions ⟶ page 22-45

2) Current values ⟶ "Exhaust gas and idling speed test" binder

3) Idling speed regulated automatically, not adjustable

Jets and settings

Code letters (RWD engine)	DG 10.82 ▶ 10.85	DG 11.85 ▶ 02.87	DG 03.87 ▶
		SP 10.86 ▶ 02.87	SP 03.87 ▶
Carburetor			
Type	2E3	2E3	2E4
Part No.			
Manual gearbox	025 129 015	025 129 015 H/K[1]	025 129 015 E
Automatic gearbox	025 129 015 A	025 129 015 J/L[1]	025 129 015 F

Jets and settings		Stage I	Stage II	Stage I	Stage II	Stage I	Stage II
Venturi	mm dia.	22	26	22	26	22	26
Main jet		x 102.5	x 110	x 102.5 A	x 110 L	x 102.5 A	x 110 L
optionally		-	-	x 102.5 +	-x 110	-	-
Air correction jet with emulsion tube		50	45	50 +	45 +	50 D	45 F
Pilot fuel/air jet		45/110	-	45/125A	-	45/+125	-
optionally		-	-	45/+125	-	-	-
Full-load enrichment	mm dia.	-	1.1	-	0.5	-	0.5
Pump injection tube							
Manual gearbox	mm dia.	0.45	-	0.45	-	0.45	-
Automatic g/box	mm dia.	0.30	-	0.30	-	0.30	-
Marking on choke cover		256		293		303	

1) Carburetors 025 129 015 K and 025 129 015 L in conjunction with cyclone-type air cleaner

Code letters (syncro engine)	DG 02.85 ▶ 10.85	DG 11.85 ▶ 02.87 SP 10.86 ▶ 02.87	DG 03.87 ▶ SP 03.87 ▶
Carburetor			
Type	2E3	2E3	2E4
Part No.			
Manual gearbox	025 129 015 D	025 129 015 M	025 129 015 G
Automatic gearbox	-	-	-

Jets and settings		**Stage I**	**Stage II**	**Stage I**	**Stage II**	**Stage I**	**Stage II**
Venturi	mm dia.	22	26	22	26	22	26
Main jet		x 100	x 112.5	x 102.5 A	x 110 L	x 102.5 A	x 110 L
optionally		-	-	x 102.5 +	-x 110	-	-
Air correction jet with emulsion tube		50	45	50 +	45 +	50 D	45 F
Pilot fuel/air jet		45/110	-	45/125 A	-	45/+125	-
optionally		-	-	45/+125	-	-	-
Full-load enrichment	mm dia.	-	0.9	-	0.5	-	0.5
Pump injection tube							
Manual gearbox	mm dia.	0.45	-	0.45	-	0.45	-
Automatic g/box	mm dia.	-	-	-	-	-	-
Marking on choke cover		286		293		303	

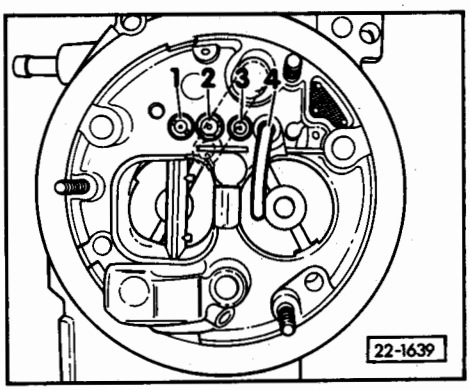


Fig. 1 Jets at top in top part of carburetor

1 - Pilot fuel/air jet

2 - Air correction jet with emulsion tube, stage I (cannot be exchanged)

3 - Air correction jet with emulsion tube, stage II (cannot be exchanged)

4 - Full throttle enrichment tube

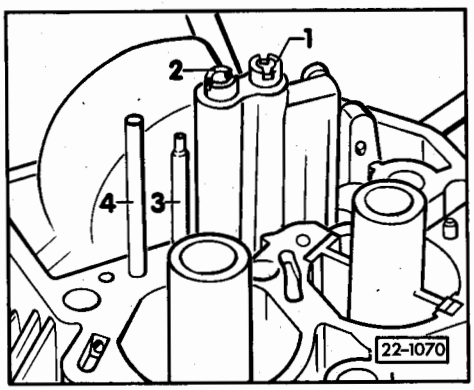


Fig. 2 Jets at bottom in top part of carburetor

1 - Main jet, stage I

2 - Main jet, stage II

3 - Vertical tube for full throttle enrichment

4 - Vertical tube for changeover, stage II

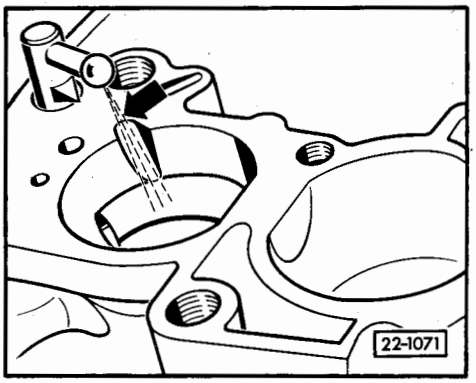


Fig. 3 Installing injection tube

The fuel must be sprayed towards the recess as indicated by the arrow.

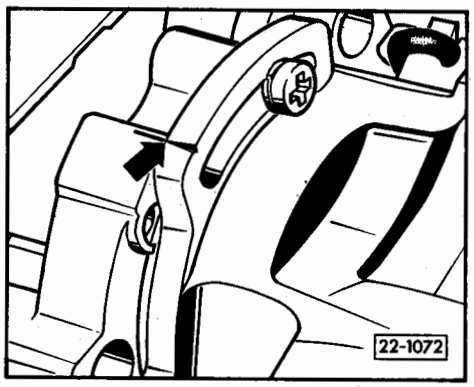


Fig. 4 Adjusting choke cover

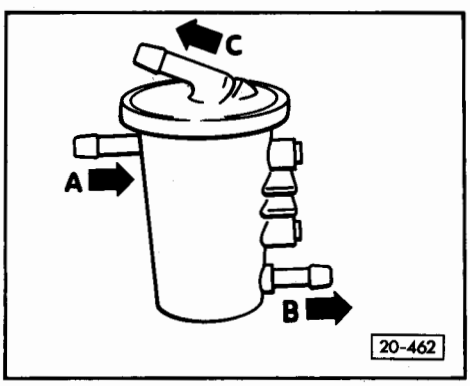


Fig. 5 Fuel reservoir

A fuel reservoir is fitted on the carburetor of the syncro to avoid the formation of gas bubbles.

Connections:

A - From fuel pump

B - To carburetor

C - Return line

Attention:

The vacuum hose for the distributor must be laid over the fuel reservoir, as otherwise the vacuum hose could become full of fuel.

Adjusting idle speed

Checking and adjustment conditions

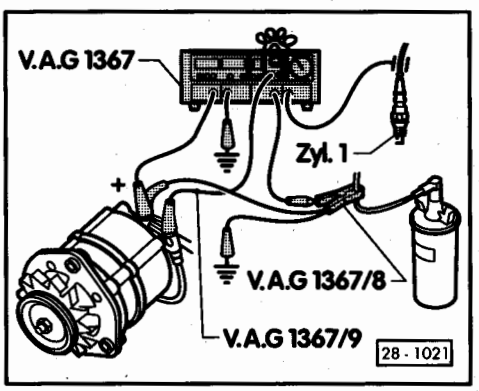
- o Minimum engine oil temperature 60° C.
- o Crankcase breather hose pulled off and sealed on air cleaner end.
- o Radiator fan must not be in operation.
- o Electrical loads switched off.
- o Choke valve fully open.
- o No leaks in exhaust system.
- o Ignition timing adjustment OK; checking → page 28-14.

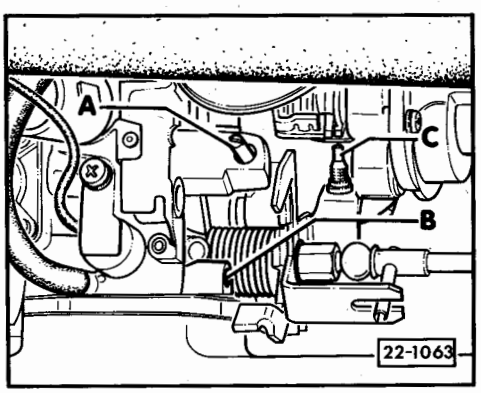
Checking and adjusting idle speed and CO content

- o Hose/hoses at vacuum unit of distributor must be attached.

- Connect up ignition tester V.A.G 1367.
- Connect CO tester V.A.G 1363A to tailpipe.

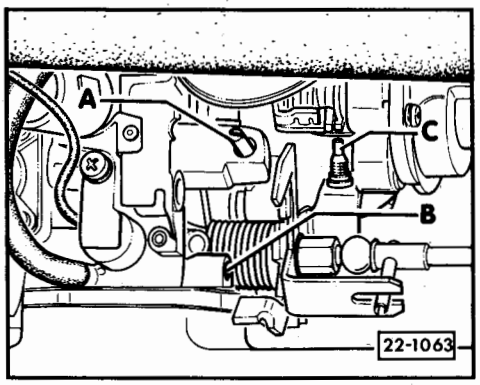
Attention:
Only connect up testers with ignition switched off.





- Check idle speed and CO content.
  With 2E3 carburetor, screw -C- must not make contact with fast idle cam. Turn fast idle cam where necessary.
  Specifications:1)
  Engine speed 900 +/- 50 rpm
  CO content 1.5 +/- 0.5% by vol.

1) Current values → "Exhaust gas and idling speed test" binder



- If necessary, correct idling speed[2] and CO content by alternately turning adjusting screws.

  A - Idle adjusting screw[2]

  B - CO adjusting screw

- When correction has been made, fit new anti-tamper cap to CO adjusting screw.

1) Current values ⟶ "Exhaust gas and idling speed test" binder

2) 2E3 carburetor only.
   Notes on 2E4 carburetor ⟶ page 22-48

Note:

The crankcase breather hose must be re-connected when the CO adjustment has been made. If the CO level rises afterwards, this does not mean that the adjustment is incorrect, but is due to enrichment from oil dilution in the crankcase resulting from frequent stop/start operation.
A long fast drive will reduce the amount of fuel in the oil and the CO content will return to the normal level. At short notice, this can also be done by means of an oil change.

2E4 carburetor only:

Directly after the engine has started, the idling speed is automatically regulated to the following values as a function of the temperature of the thermoswitch at the carburetor:
Below + 17° C approx. 1100 rpm
Above + 25° C 900 +/- 50 rpm

If the prescribed idling speed is not attained or exceeded, the following faults could be present:

Speed below 800 rpm	=	Filter for breather valve of throttle valve positioner clogged ⟶ checking throttle valve positioner, page 22-61.
Speed above 2000 rpm	=	Open circuit to the idling speed stabilisation control unit or insufficient vacuum at vacuum valve of throttle valve positioner.

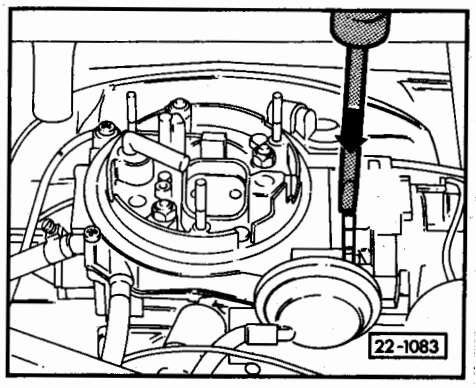
Checking and adjusting cold idle speed

o Minimum engine oil temperature 60° C.

o Ignition timing adjustment OK.

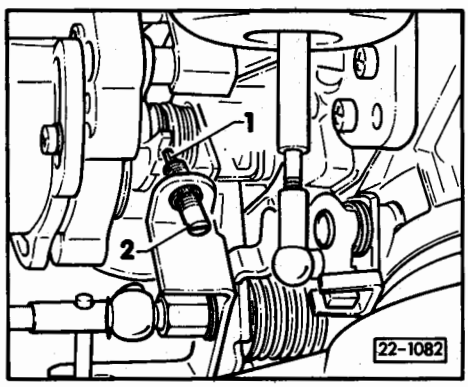
o Idle speed adjustment OK.

- Connect up ignition tester V.A.G 1367.



2E3 carburetor

- Accelerate until engine speed is approx. 2500 rpm. Press down fast idle cam as far as stop -arrow- and release throttle.

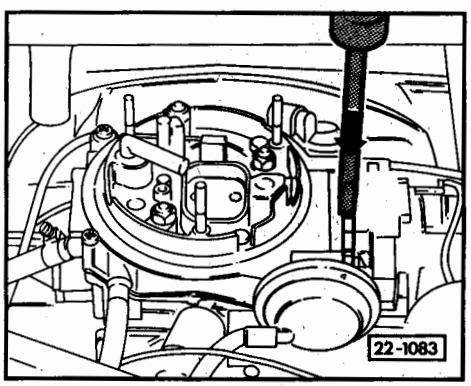


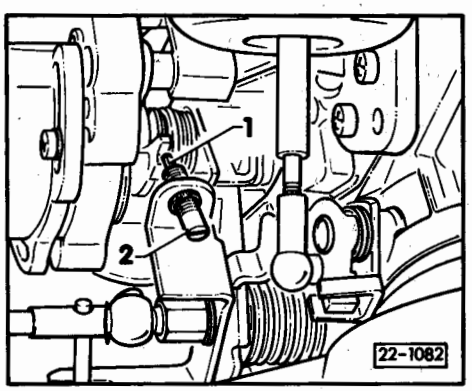
Adjusting screw -2- is at second highest stage of fast idle cam -1-.
Specification: 2000 +/- 200 rpm

- If necessary, adjust cold idle speed to the specified value by means of the screw -2-.

2E4 carburetor

- Accelerate until engine speed is approx. 4000 rpm. Press down fast idle cam -arrow- such that on releasing throttle adjusting screw -2- is at highest stage -1- as shown in Fig. 22-1082.
Specified value: 3600 +/- 200 rpm





- If necessary, adjust cold idle speed to the specified value with adjusting screw -2-.

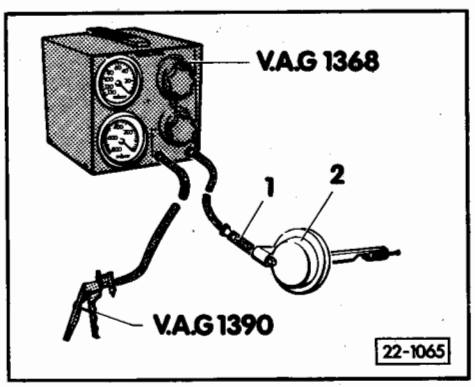
Checking and adjusting pull-down unit

Checking operation

- Remove intake air cowl.
- Run engine at idle speed.
- Close choke valve by hand. If it is easy to close the choke valve down to a gap of approx. 3 mm and if a fair amount of resistance is then felt, the pull-down unit is OK.
  If it is possible to fully close the choke with no resistance, this means that either the diaphragm is torn or that there is a leak in the vacuum system.

Checking pull-down unit for leaks

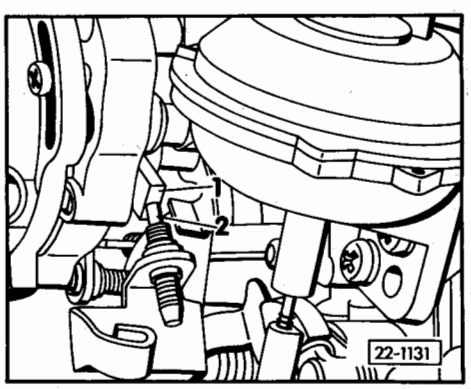
- Disconnect vacuum hose -1- of pull-down unit -2- from carburetor and connect up both vacuum tester V.A.G 1368 and vacuum pump V.A.G 1390.
- Switch vacuum tester to throughflow.
- Generate approx. 300 mbar vacuum with vacuum pump.
- Set vacuum tester such that vacuum is retained on the pull-down unit end.



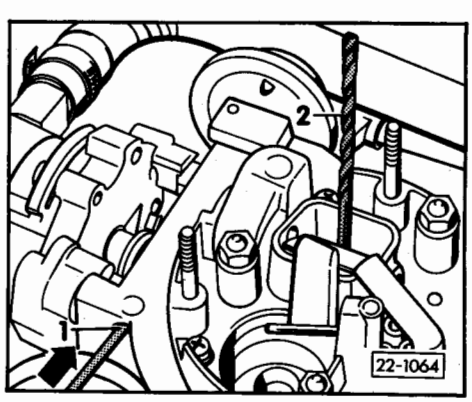
- Set vacuum on tester to 200 mbar. The set vacuum must not drop off within 2 minutes. Otherwise the pull-down unit is to be replaced.

Checking and adjusting choke valve gap

- Remove choke cover.
- Operate throttle valve and turn fast idle cam -1- of cold start device such that adjusting screw -2- is at highest stage of fast idle cam.



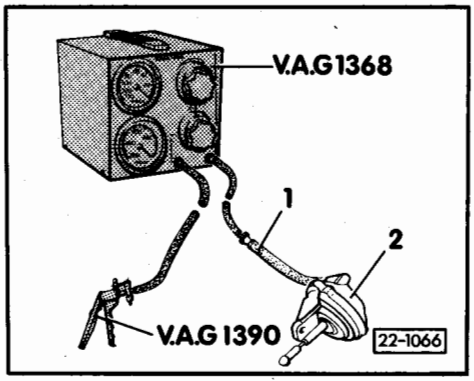
- Press control rod for choke valve at the adjusting screw -1- in direction of pull-down unit -arrow- as far as it will go.
- In this position, check gap with twist drill -2- and adjust if necessary at adjusting screw -1-.



Code letters	Carburetor	Specification (mm)
DG ▶ 10.85	2E3	3.3 +/- 0.2
DG 11.85 ▶ , SP 10.86 ▶	2E3	2.5 +/- 0.2
DG 03.87 ▶ , SP 03.87 ▶	2E4	3.3 +/- 0.2

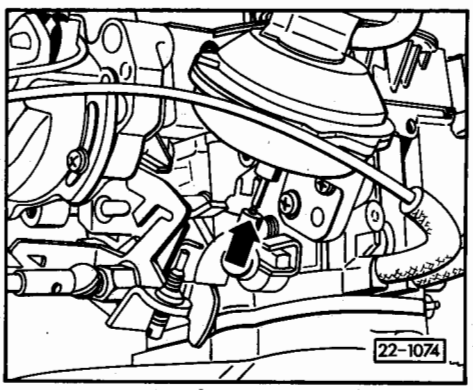
Checking operation of throttle valve, stage II

Checking vacuum unit for leaks



- Detach vacuum hose -1- of vacuum unit stage II -2- from carburetor and connect up both vacuum tester V.A.G 1368 and vacuum pump V.A.G 1390.
- Switch vacuum tester to throughflow.
- Generate approx. 300 bar vacuum with vacuum pump.
- Set vacuum tester such that vacuum is retained on the vacuum unit end.
- Set vacuum on tester to 200 mbar. The set vacuum must not drop off within 2 minutes or the vacuum unit is to be renewed.

Checking operation of vacuum unit



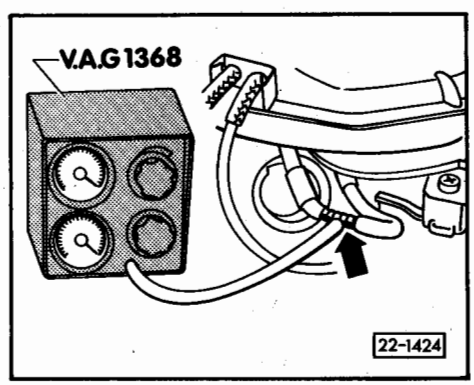
o Leak test OK.

- Place throttle controls in full throttle position at 200 mbar vacuum. The throttle valve of carburetor stage II must be lifted by the vacuum unit linkage -arrow-.

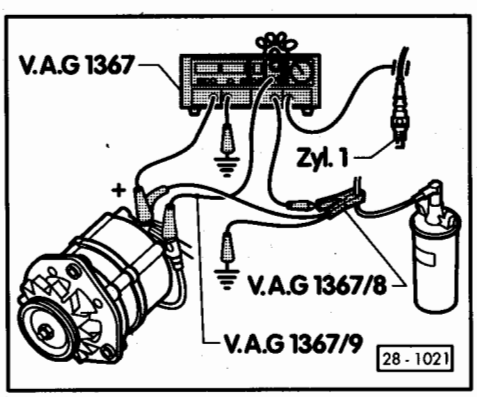
Checking vacuum for vacuum unit, stage II

Note:

The vacuum is measured at full throttle whilst driving or on a roller dynamometer.



- Use T-piece to connect up the vacuum tester V.A.G 1368 between vacuum unit stage II and vacuum connection at bottom part of carburetor.



- Connect up ignition tester V.A.G 1367.
- Place test appliances on passenger's seat and set vacuum tester such that vacuum is retained.

Note:

When laying vacuum hose, make sure that it is not kinked or trapped.

- Measure vacuum at full throttle.

o On roller dynamometer:
  Select load (speed) such that max. 5000 rpm are attained in 2nd gear or in 1st driving range.

o On the road:
  Drive at a constant 3000 rpm in 1st or 2nd gear or in 1st driving range. Then accelerate with full throttle to max. 5000 rpm.

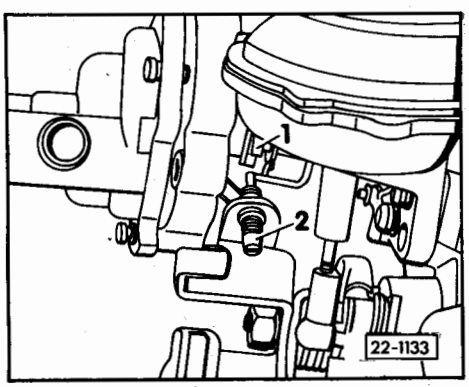
- Read vacuum off tester at 4000 ... 5000 rpm.
  Specified values:
  Large vacuum unit (approx. dia. 65 mm)
  min. 30 mbar
  Small vacuum unit (approx. dia. 50 mm)
  min. 50 mbar

If the specifications are not obtained, check the vacuum hoses and connections for leaks/blockages and renew carburetor if necessary.

Checking and adjusting accelerator pump injection rate

o Carburetor removed.

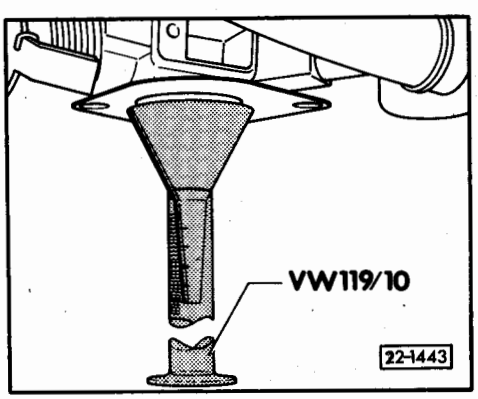
- Turn fast idle cam -1- and hold such that it does not make contact with adjusting screw for the cold idle speed -2-.

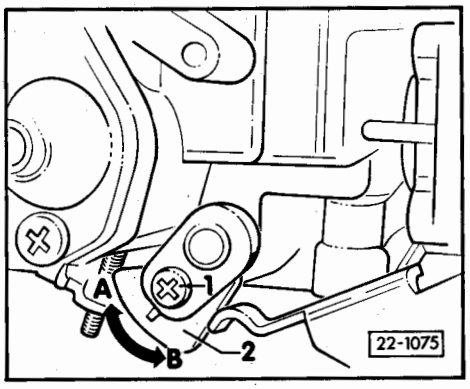


- Hold funnel and measuring glass VW 119/10 beneath carburetor.

- Rapidly open throttle valve lever five times as far as it will go (approx. 1 second/stroke). Allow an interval of approx. 3 seconds between each stroke.

- Read off figure for injected quantity, divide it by five and compare it to the specified value.
  Specified value:
  Manual gearbox 1.35 +/- 0.2 cm^3/stroke
  Automatic gearbox 1.0 +/- 0.2 cm^3/stroke





- Adjust amount injected by loosening the clamping screw -1- and turning the fast idle cam -2-.

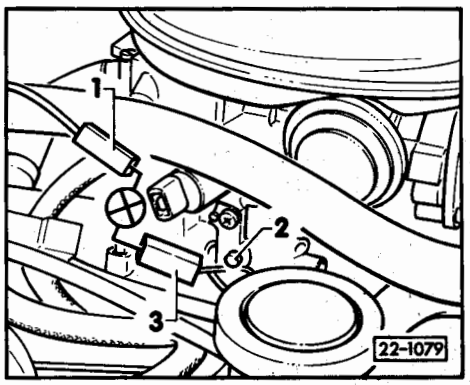
  A - Larger amount

  B - Smaller amount

- Secure clamping screw with paint after adjusting.

Checking part-load duct heating

o Contact surface of heating element must make contact with carburetor (earth connection). Clean the surfaces if necessary.



- Switch on ignition and pull plug -1- off idle cut-off valve.

- Separate connector for heating element -2-.

- Connect test lamp to plugs -1- and -3-.
  Test lamp lights: Heating element OK
  Test lamp does not light: Heating element defective, renew

Basic adjustment of throttle valve, stage II

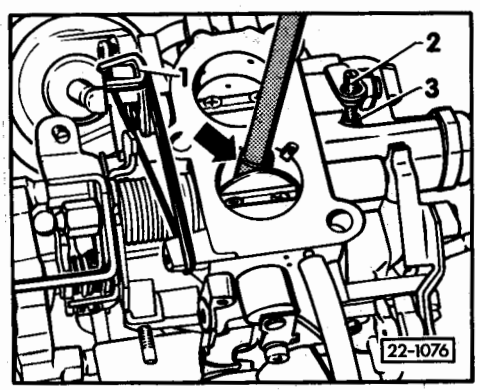
Note:

The limiting screw -2- is set at the factory and must not be moved. If the screw has been turned, adjustment should be carried out as follows.

- Remove carburetor.

- Open throttle valve for stage I and clamp it in position -arrow-.

- Pretension locking lever -1- for throttle valve stage II with rubber ring.



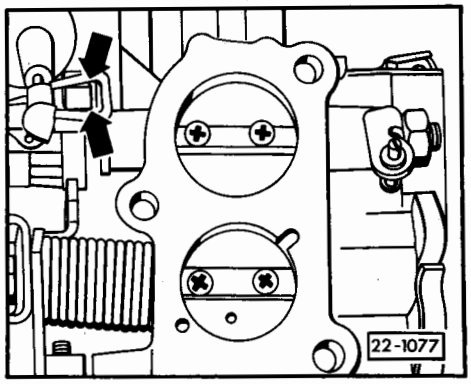
- Unscrew limiting screw -2- until there is a gap between the limiting screw and the stop -3-.

- Screw in limiting screw -2- until it contacts the stop -3-.

Note:

In order to find the exact stop point of the limiting screw, place a thin sheet of paper between the limiting screw and the stop. The stop point can be determined by constantly moving the paper and simultaneously screwing in the limiting screw.

- When this point is reached, turn the screw a further 1/4 turn.
- Secure limiting screw with paint.
- Check play at locking lever -arrows- with throttle valves closed.
  Specified value: 0.4 +/- 0.15 mm on either side
- If necessary, adjust play to the specified value by bending the sides.
- Install carburetor, adjust idle speed and CO content ⟶ page 22-45.



Basic adjustment of throttle valve, stage I

(2E4 carburetor only)

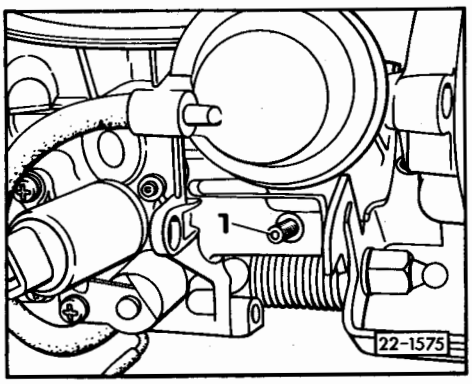
Note:

The limiting screw -1- (shear screw) is set at the factory and must not be moved. If screw has been turned, adjustment should be carried out as follows.

- Remove throttle valve positioner.
- Turn out limiting screw -1- with pliers until there is a gap between limiting screw and stop at throttle valve lever.
- Screw in limiting screw -1- until it contacts stop.

Note:

In order to find the exact stop point of the limiting screw, place a thin sheet of paper between limiting screw and stop. The stop point can be determined by constantly moving the paper and simultaneously screwing in the limiting screw.



- When this point is reached, turn the screw a further 1/4 turn.

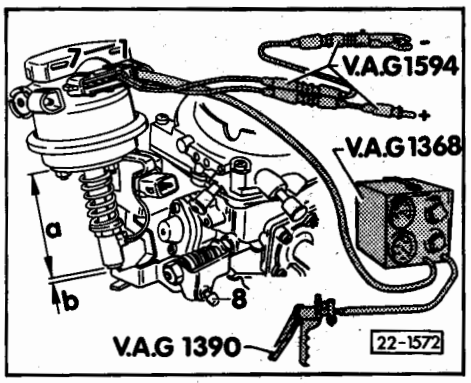
- Secure limiting screw with paint.

Checking throttle valve positioner

(2E4 carburetor only)

- Pull connector, breather hose and vacuum hose off throttle valve positioner.

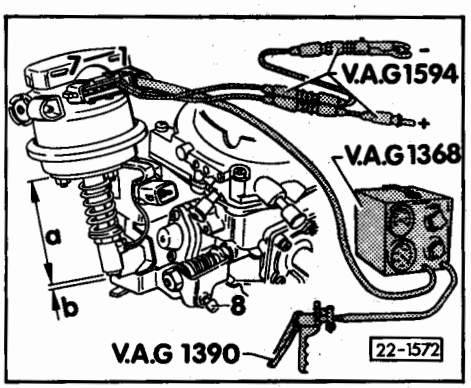
- Connect up vacuum tester and vacuum pump to the vacuum connection on the vacuum valve.



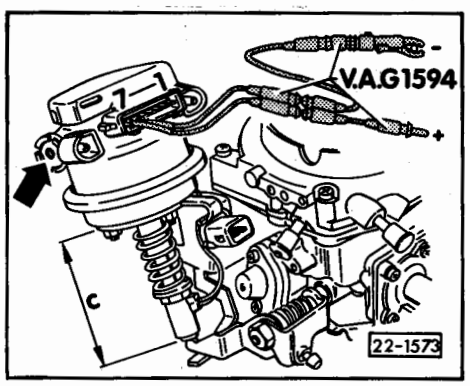
- Connect test cables from V.A.G 1594 to contacts 1 and 2 on the throttle valve positioner and one cable to earth (-).

- At the same time, generate at least 400 mbar with vacuum pump and touch the positive terminal at the alternator with the second cable until the plunger of the positioner is fully retracted.
  Plunger length a = 55 +/- 0.5 mm

- The plunger must remain pulled in for at least one minute or the throttle valve positioner is to be renewed.



- With the plunger fully in, check the gap -b- between throttle valve lever and throttle valve switch and adjust if necessary with the adjustment screw -8-.
  Gap b = 0.8 +/- 0.4 mm



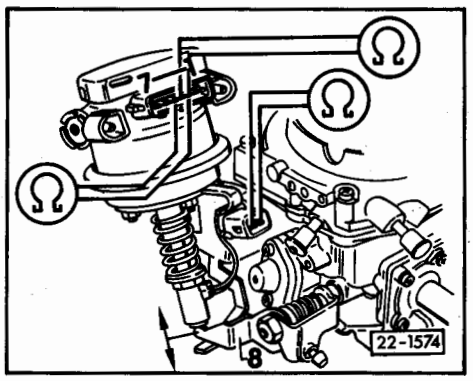
- Change test cables at throttle valve positioner from contacts 1 and 2 to 6 and 7 and touch terminal (+) at alternator with free cable until plunger is fully extended.
  Plunger length c = 72 +/- 0.5 mm

The plunger must be fully extended in max. 1 sec.

If this is not the case:

o Breather valve filter -arrow- dirty; clean or renew.

o Throttle valve positioner defective; renew.



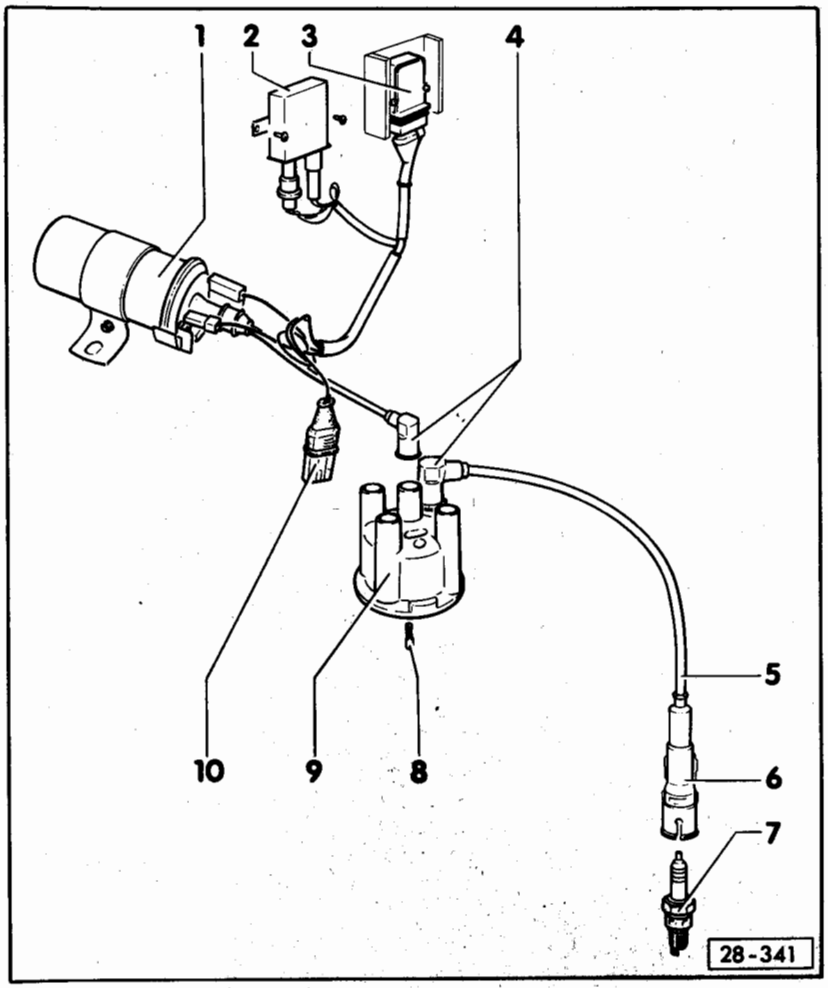
- Use hand multimeter V.A.G 1526 to measure resistance at the following contacts:

  Potentiometer:
  3 and 4 = max. 1.5 ohms
  3 and 5 = max. 1.5 ohms

- If not, renew throttle valve positioner.

  Throttle valve switch:
  Operating lever -8- pushed off switch = max. 1.5 ohms
  Pressed against switch = infinity ohms

- If not, renew throttle valve positioner.



Repairing TCI-H ignition system

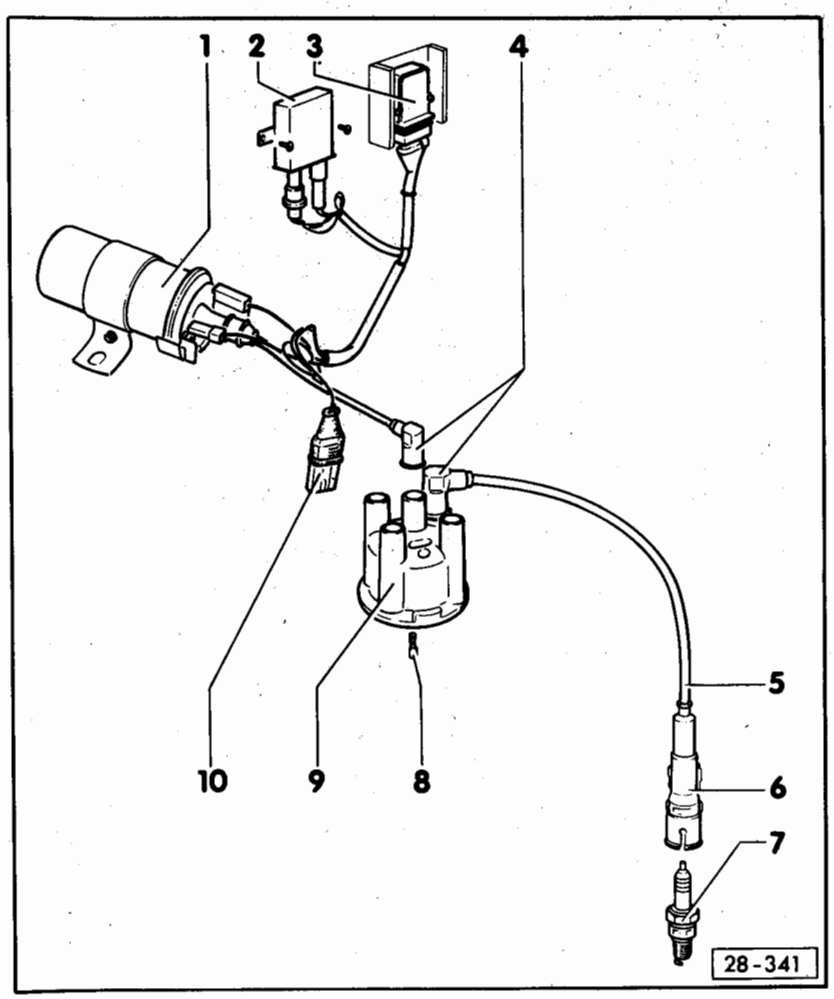
Note:

- o Note safety precautions ⟶ page 28-7
- o Adjustment data ⟶ page 28-8
- o Spark plugs ⟶ page 28-9
- o Distributor data ⟶ page 28-10
- o Components marked with * are fitted with M4 ignition cable connections. The two versions are not mutually interchangeable.

Part I

1 - Ignition coil*

- o Green sticker
  Primary resistance:
  0.52 ... 0.76 ohms
  (between term. 1 and 15)
  Secondary resistance:
  2.4 ... 3.5 k ohms
  (between term. 15 and 4)



- o Grey sticker
  Primary resistance:
  0.6 ... 0.8 ohms
  (between term. 1 and 15)
  Secondary resistance:
  6.9 ... 8.5 k ohms
  (between term. 15 and 4)

2 - DIS idle stabilising unit

- o Engine code letters DF only
- o Before adjusting idle speed and ignition timing point, pull connectors off and join them together
- o Checking ⟶ page 28-28

3 - TCI-H transistorized ignition unit

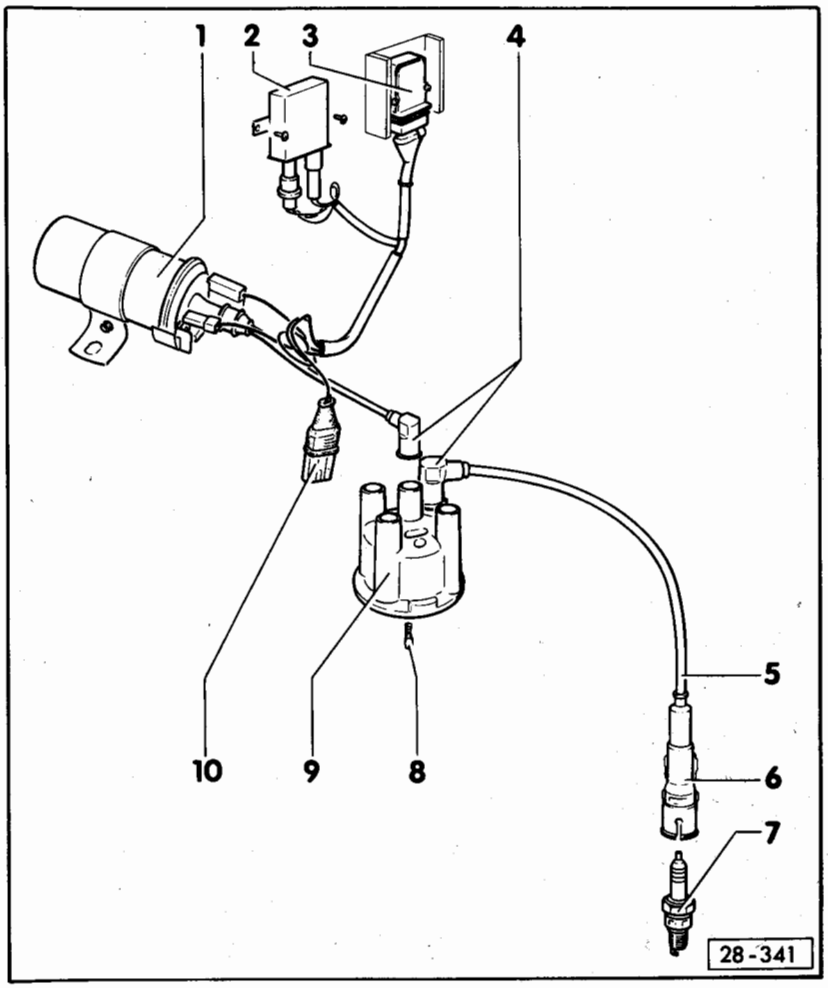
- o Checking ⟶ page 28-24

4 - Suppression plug*

- o 0.6 ... 1.4 k ohms

5 - Ignition leads*

- o Check for continuity



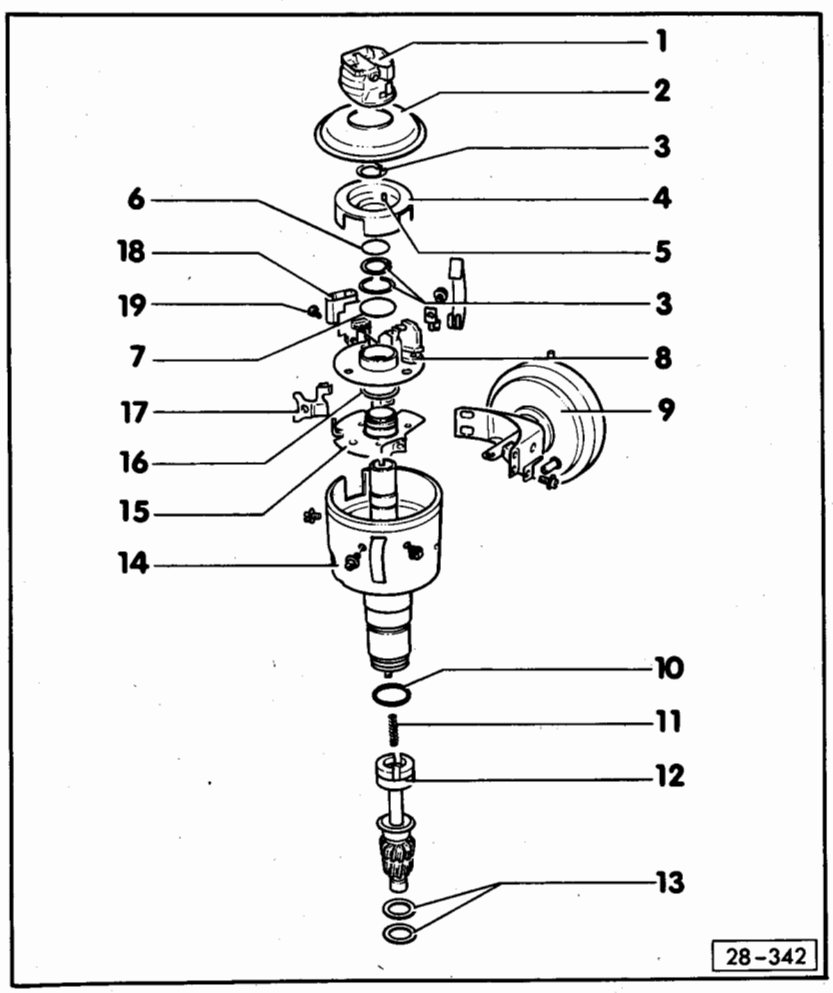
6 - Spark plug connector*
- o 4 ... 6 k ohms

7 - Spark plug, 20 Nm
- o Type and electrode gap → page 28-9

8 - Carbon brush with spring
- o Check for wear, damage and ease of movement

9 - Distributor cap*
- o Check for cracks and signs of tracking
- o Check contact wear
- o Clean before installing

10 - Connector



Part II

1 - Rotor arm
- o Identification: R1
- o 0.6 ... 1.4 k ohms

2 - Dust cap

3 - Circlip

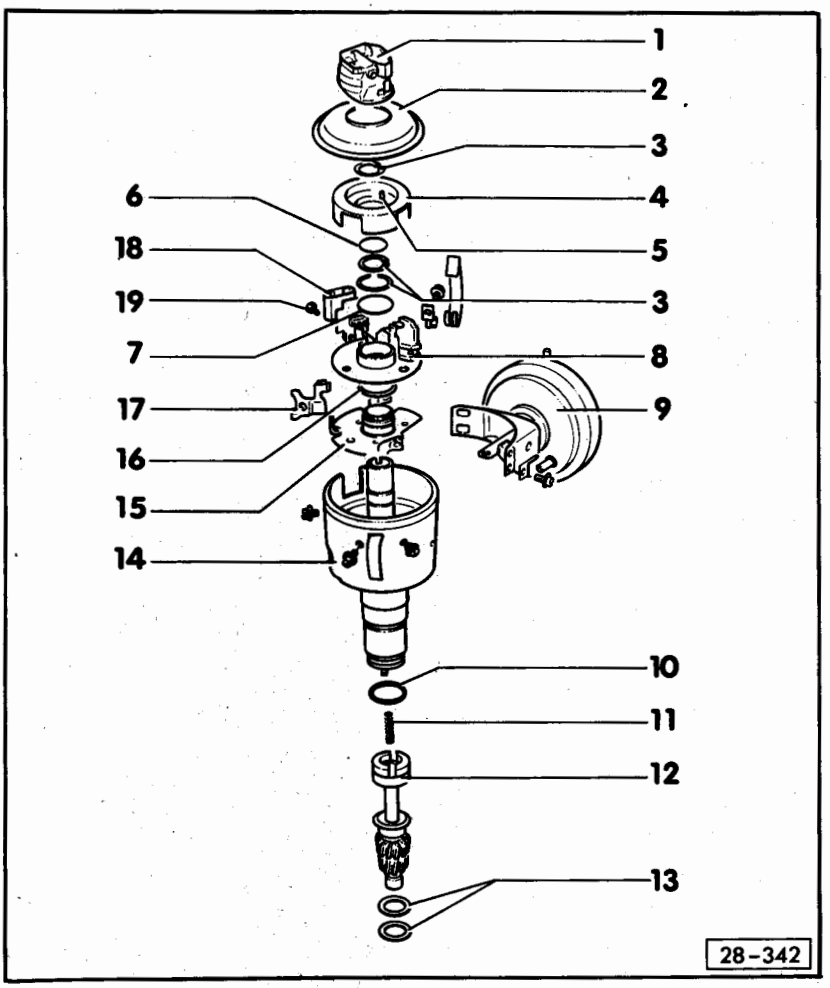
4 - Cover
- o Removing and installing → page 28-13

5 - Pin

6 - Spring washer(s)

7 - Washer(s)
- o No. of washers: Hall sender free of play and easy to turn

8 - Hall sender
- o Apply thin coat of grease to bearing surfaces
- o Checking → page 28-27



9 - **Vacuum unit**
- o Checking for leaks
  → page 28-18
- o Checking advance
  → page 28-19
- o Checking retard
  → page 28-21

10 - **Sealing ring**
- o Renew

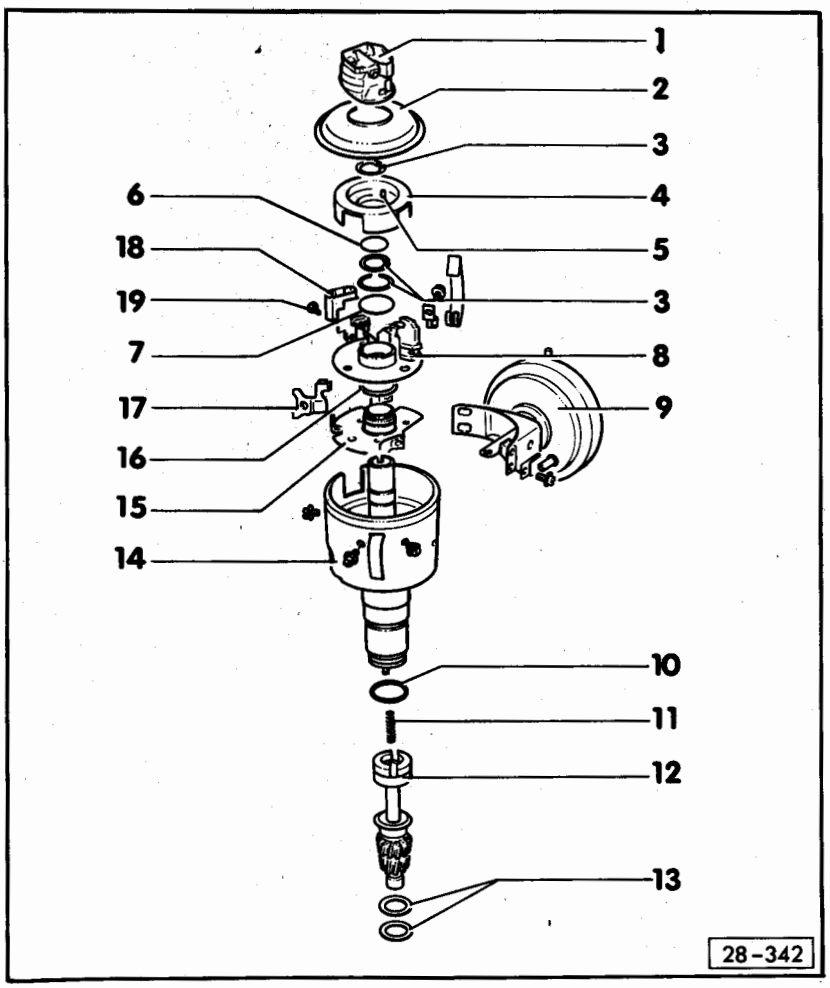
11 - **Spring**

12 - **Distributor drive shaft**
- o Removing and installing
  → page 28-11

13 - **Thrust washers**
- o Install with screwdriver and align

14 - **Distributor**
- o Installing → page 28-12
- o Checking → page 28-16
- o Checking and adjusting ignition timing point
  → page 28-14

15 - **Base plate**



16 - **Washer**

17 - **Magnet**

18 - **Connection piece**

19 - **Retainer**

Safety precautions for TCI-H ignition system

In order to prevent personal injury and/or damage to the TCI-H ignition system, the following is to be observed when working on vehicles which feature a TCI-H system:

- Ignition must be switched off before disconnecting or connecting ignition system leads - including high-tension leads - and test appliance leads.
- If the engine is to be turned at starter speed without starting, for example when checking the compression, pull high-tension lead (terminal 4) out of distributor and earth it.
- Vehicles on which a defect on the ignition system exists or is suspected may only be towed with the plug on the TCI-H unit pulled out.
- Do not connect a capacitor to terminal 1 (-).
- Do not replace 1 k ohm rotor arm (marking: R1) with a different version even to eliminate radio interference.
- When suppressing interference, only resistors with 1 k ohm and spark plug connectors from 1 to 5 k ohms may be used on the high-tension leads.

Adjustment data

Engine code letters		DF 10.82 ▶	DG 10.82 ▶ 10.85	DG 11.85 ▶ ,SP 10.86 ▶
Distributor	Part No.	025 905 205 B 025 905 205 G[1]	025 905 205 C 025 905 205 J[1]	025 905 205 Q
Ignition timing point[2] [3]	Test spec.	3 ... 7° after TDC	3 ... 7° before TDC	3 ... 7° before TDC
	Setting	5 +/- 1° after TDC	5 +/- 1° before TDC	5 +/- 1° before TDC
	Mark	⟶ Fig. 1	⟶ Fig. 1	⟶ Fig. 1
Engine speed[3]	rpm	750 +/- 50	900 +/- 50[4]	900 +/- 50[4]
Vacuum hoses[3]		Attached	Detached[4]	Detached[4]
Idle stabilisation switch unit		Plugs pulled off and joined together	---	---
Governed speed	rpm	4650 ... 5550	5250 ... 5550	5250 ... 5550
Firing order		1 - 4 - 3 - 2	1 - 4 - 3 - 2	1 - 4 - 3 - 2

1) With M4 ignition lead connections

2) Pay attention to checking and adjustment conditions ⟶ page 28-14

3) Current values ⟶ "Exhaust gas and idling speed test" binder

4) After speed drop, increase speed to specified value by opening throttle

Spark plugs

Engine code letters		DF 10.82 ▶ ,DG 10.82 ▶ ,DG 11.85 ▶ ,SP 10.86 ▶	
Spark plugs[1]	Coil sticker	green	grey
	VW/Audi	101 000 005 AB, 101 000 001 AC, 101 000 007 AB	101 000 006 AC, 101 000 002 AB, 101 000 000 AB
	Manufacturers' designations	W 7 DTC, 14-7 DTU, N 7 BYC	W 7 DCO, 14-7 DUO, N 7 YCX
	Electrode gap	0.7 ... 0.9 mm	0.7 ... 0.8 mm
	Tightening torque	20 Nm	20 Nm

1) Current values ⟶ "Exhaust gas and idling speed test" binder

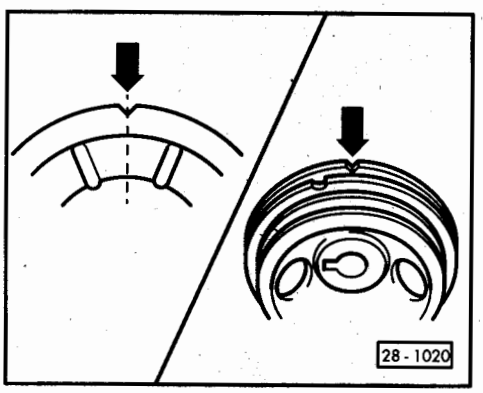


Fig. 1 Ignition timing mark

Distributor data

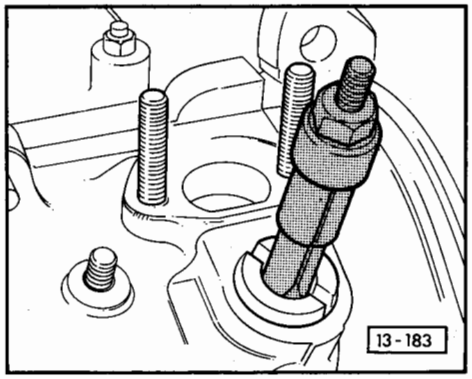
Engine code letters		DF 10.82 ▶	DG 10.82 ▶ 10.85	DG 11.85 ▶ SP 10.86 ▶
Distributor	Part No.	025 905 205 B 025 905 205 G	025 905 205 C 025 905 205 J	025 905 205 Q
Centrifugal advance[1]				
Start	rpm	1500 ... 1700	1500 ... 1700	1050 ... 1160
	rpm	2400	2400	2400
	degrees	6 ... 10	10 ... 14	13 ... 17
End	rpm	3800	4200	4200
	degrees	20 ... 24	24 ... 28	24 ... 28
Vacuum advance				
Start	mbar	160 ... 240	150 ... 220	150 ... 220
	mmHg	120 ... 180	113 ... 165	113 ... 165
End	mbar	370 ... 380	310 ... 330	310 ... 330
	mmHg	278 ... 285	229 ... 237	233 ... 248
	degrees	14 ... 18	12 ... 16	12 ... 16
Vacuum retard				
Start	mbar	120 ... 240	---	---
	mmHg	90 ... 180	---	---
End	mbar	300 ... 360	---	---
	mmHg	225 ... 270		
	degrees	8 ... 12		

1) Speed = engine speed

Removing and installing distributor drive shaft

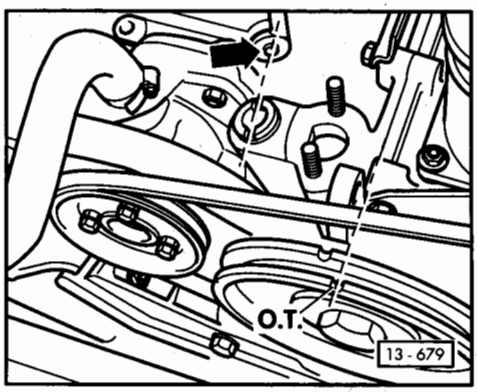
Removing

- Remove fuel pump.
- Remove distributor drive shaft with normal extractor 14.5 ... 18.5 mm dia. (e.g. with KUKKO 21/2).



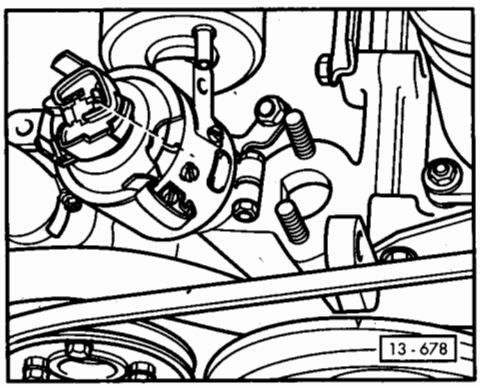
Installing

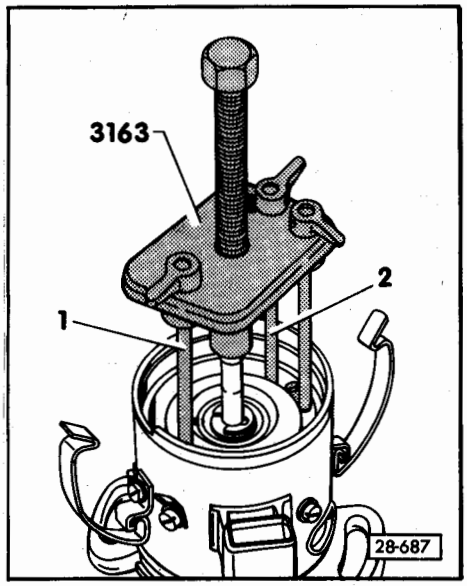
- Set crankshaft to TDC on No. 1 cylinder.
- Insert drive shaft so that the offset slot in the head of the distributor drive shaft is pointing towards the tapped hole or the screw -arrow-. The small segment faces the coolant pump.
- Install spacer spring.



Installing distributor

- Set crankshaft to TDC on No. 1 cylinder.
- Turn rotor arm until it is pointing towards mark for No. 1 cylinder on the distributor housing.
- Insert distributor.
- Clean distributor cap and check for cracks, signs of tracking and tightness.
- Adjust ignition timing ⟶ page 28-14.





Removing and installing rotor plate

- Insert hooks -1- and -2- of puller as shown and remove rotor plate.

Note:

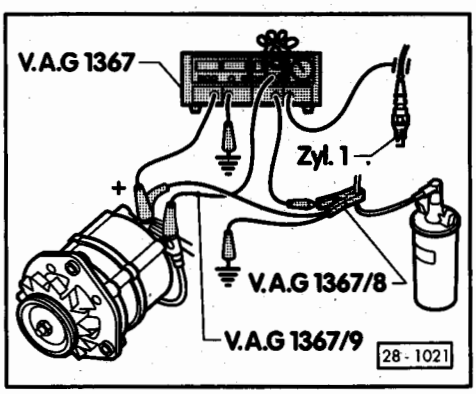
o When pulling off the rotor plate, make sure that locking pin does not fall into the distributor.

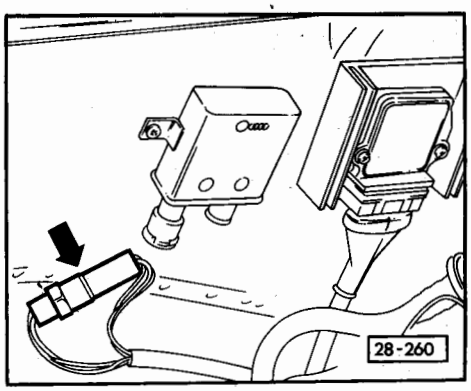
o Following installation, check the freedom of movement of the rotor plate by turning distributor shaft. The rotor plate is to be renewed if it is bent.

Checking and adjusting ignition timing

o Minimum engine oil temperature 60° C.

- Connect up ignition tester V.A.G 1367.





Engine code letters DF

- Pull plugs off idle stabilising unit and join them together -arrow-.

- Check idling speed and adjust if necessary.
  Setting: 750 +/- 50 rpm

- Check and, if necessary, adjust the ignition timing.

  With TDC sender:
  The ignition timing point is indicated directly on the tester.
  Test specification: 3 ... 7° after TDC
  Setting: 5° after TDC

With stroboscopic lamp:
Notch on belt pulley must be in line with joint on crankcase.

Engine code letters DG, SP

- Detach hose from vacuum unit.
- Accelerate until speed is 900 +/- 50 rpm.
- Check and, if necessary, adjust the ignition timing.

With TDC sender:
The ignition timing point is indicated directly on the tester.
Test specification: 3 ... 7° before TDC
Setting: 5° before TDC

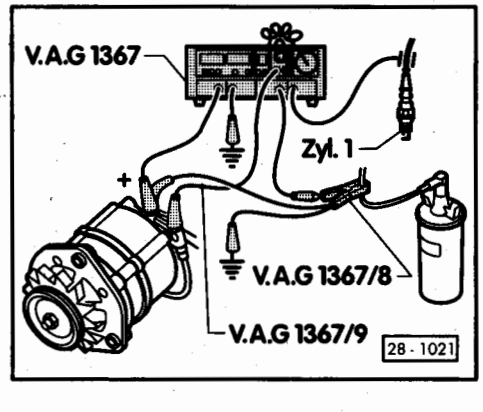
With stroboscopic lamp:
Notch on belt pulley must be in line with joint on crankcase.

- Decelerate and attach hose for vacuum unit.
Speed: 900 +/- 50 rpm
Ignition timing point: 17 ... 21° before TDC

Checking distributor

o Minimum engine oil temperature 60° C.

A - Checking centrifugal advance with TDC sender
(Specified values ⟶ page 28-10)



- Connect up ignition tester V.A.G 1367.
- Pull vacuum hose(s) off vacuum unit of the distributor.
- Pull plugs off idle stabilising unit and join them together (if present).
- Start engine.
- Set engine speed to approx. 900 rpm.
- Note down advance angle indicated = basic value.
- Slowly increase engine speed.
Start of advance is indicated by a greater number of degrees.
- Increase engine speed to next test speed.

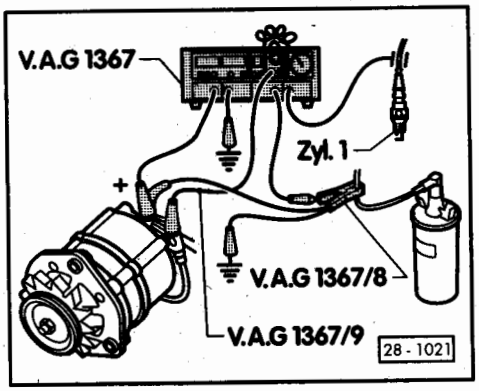
- Read off advance angle on tester.
- Calculate centrifugal advance angle:

  Advance angle read off
  - Basic value noted down
  = Centrifugal advance angle

- Repeat test at other test speeds.

B - Checking centrifugal advance with stroboscopic lamp
(Specified values ⟶ page 28-10)

- Connect up ignition tester V.A.G 1367.
- Pull vacuum hose(s) off vacuum unit of distributor.
- Pull plugs off idle stabilising unit and join together (if present).
- Start engine.
- Set engine speed to approx. 900 rpm.



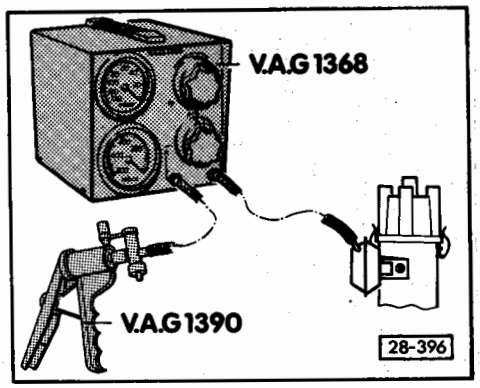
- Direct flashes onto notch on belt pulley and note down advance angle = basic value.
- Slowly increase engine speed. The start of advance is indicated by movement of the notch.
- Increase engine speed to next test speed, "bring notch back" and read off the advance angle.
- Calculate centrifugal advance angle:

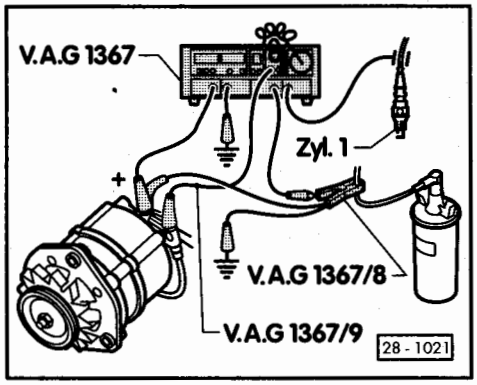
  Advance angle read off
  - Basic value noted down
  = Centrifugal advance angle

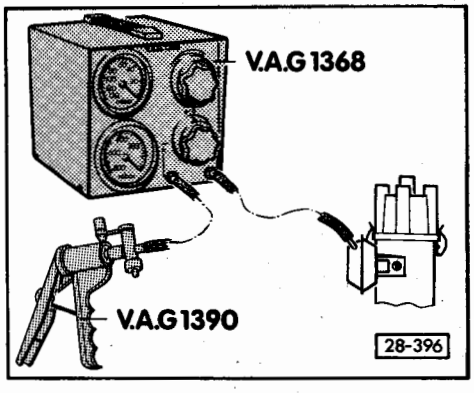
- Repeat test at other test speeds.

C - Checking vacuum unit for leaks

- Connect vacuum tester and vacuum pump to vacuum unit "advance" or "retard".
- Switch tester to throughflow.
- Use vacuum pump to generate vacuum of approx. 500 mbar.







- Set tester such that vacuum is retained on the vacuum unit end.

- Set vacuum on tester to 450 mbar. The vacuum may drop off by a maximum of 10% in 1 minute. Otherwise the vacuum unit or hose is leaking.

D - Checking vacuum advance angle
(Specified values ⟶ page 28-10)

- Connect up ignition tester V.A.G 1367.

- Pull vacuum hose off vacuum unit "retard" and seal it off (if applicable).

- Pull plugs off idle stabilising unit and join together (if present).

- Connect vacuum tester and vacuum pump to vacuum unit "advance".

- Switch tester to throughflow.

- Start engine.

- Set engine speed to approx. 900 rpm.

- Testing with:

TDC sender	**Stroboscopic lamp**
Note down advance angle indicated = basic value	Check and adjust ignition timing point if appropriate

- Use vacuum pump to generate vacuum until the ignition timing point starts to move.

- Read off vacuum value and compare it to the test specification for start of advance.

- Further increase vacuum as far as the test specification for end of advance.

- If necessary, reduce engine speed to a level of approx. 900 rpm.

Checking with TDC sender:

- Read off advance angle and calculate vacuum advance:

Advance angle read off
- Basic value noted down
= Vacuum advance angle

- Further increase vacuum. The ignition timing point must not move any further.

Checking with stroboscopic lamp:

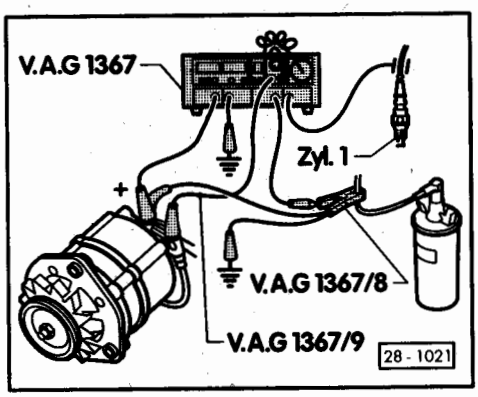
- "Bring notch back" to ignition timing point mark.

Advance angle indicated
= Vacuum advance angle

- Further increase vacuum. The ignition timing point must not move any further.

E - Checking vacuum retard angle
Engine code letters DF
(Specified values ⟶ page 28-10)

- Connect up ignition tester V.A.G 1367.



- Pull vacuum hose off vacuum unit "retard" and seal it off.

- Pull plugs off idle stabilising unit and join together.

- Start engine.

- Pull off vacuum hose at vacuum unit "advance".

- Check ignition timing point. Set 5° after TDC if necessary.

- Pull off vacuum hose at vacuum unit "retard".

Checking with TDC sender:

- Add 5° to the advance angle indicated. Compare this value to the specified value for the end of advance.

Checking with stroboscopic lamp:

- "Bring notch back" and compare advance angle indicated to specified value for end of advance.

Checking TCI-H ignition system

Checking with TCI tester V.A.G 1451

- Perform testing in accordance with operating instructions for test appliance.

Checking with digital multimeter V.A.G 1315 A/ hand multimeter V.A.G 1526 and auxiliary cables from V.A.G 1594

Note:

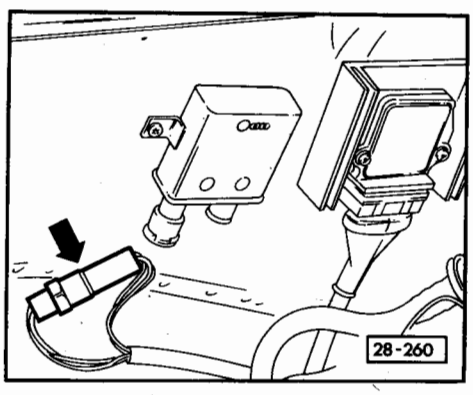
- o In view of the fact that the design internal impedance of the measuring instruments and the ambient temperature have a major effect on the measured values, use is to be made for test purposes of the digital multimeter V.A.G 1315 A or the hand multimeter V.A.G 1526.
- o The specified values stated apply to an ambient temperature range of between 0 and 40° C.

Attention:

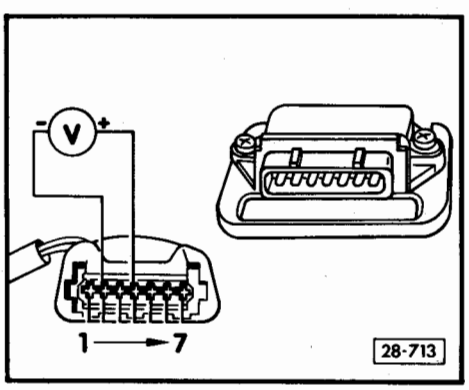
The voltage range -V- is to be selected on the multimeter before connecting up the test cables to prevent destruction of the electronic components.

Checking TCI-H switch unit

- o Ignition coil OK.



- Pull plugs off DIS unit and join together -arrow-.



- Connect up multimeter between contacts 4 and 2 on plug.
- Switch on ignition.
  Specified value: approx. battery voltage
- If this is not the case, the open circuit is to be located and eliminated using the CFD.
- Switch off ignition.

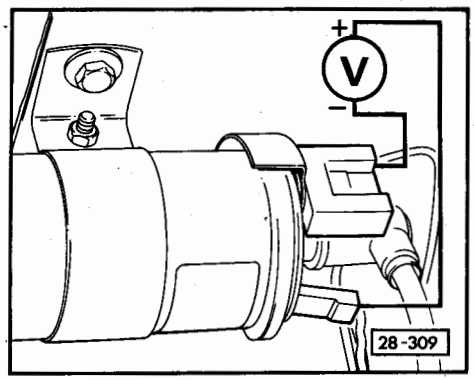
- Reconnect plugs to TCI-H switch unit.

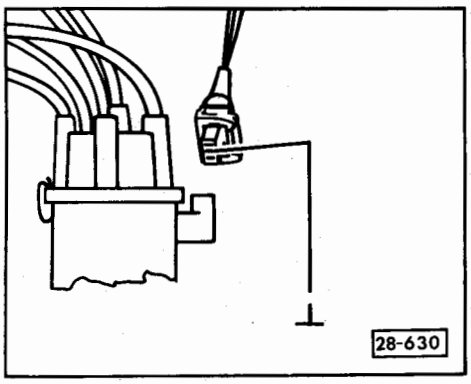
- Pull connectors off Hall sender (distributor).

- Connect up multimeter between terminal 1 (-) and terminal 15 (+) of ignition coil.

- Switch on ignition.
  Specified value:
  At least 2 volts; must drop to 0 after 1 ... 2 seconds.

- If this is not the case, renew TCI-H switch unit and check ignition coil to see whether sealing compound has oozed out. Likewise renew if necessary.





- Briefly connect centre wire of connector at distributor to earth.

  The voltage value indicated must briefly increase to at least 2 volts.

- If this is not the case, locate and eliminate open circuit in centre wire/renew the switch unit.

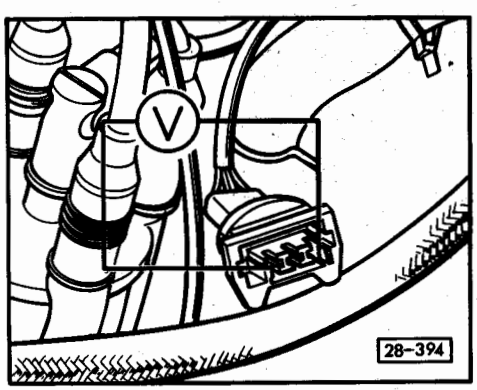
- Switch off ignition.

- Connect up multimeter to outer contacts of plug of Hall sender (distributor).

- Switch on ignition.
  Specified value: at least 5 volts

Note:

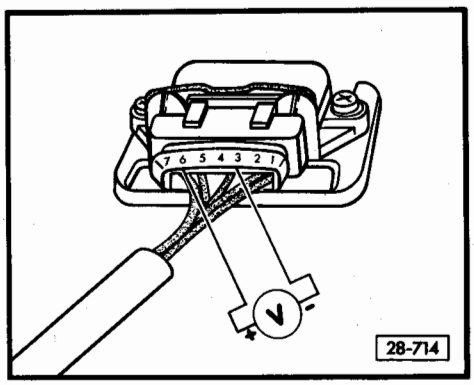
If the defect is present despite the specified values being obtained, the TCI-H switch unit should be renewed, or the open circuit between the plug of the Hall sender and switch unit is to be located and eliminated.



Checking Hall sender

- o TCI-H switch unit OK.
- o Ignition coil OK.
- o Wire between TCI-H switch unit and distributor OK.
- o Connectors and connection parts on distributor, Hall sender and TCI-H switch unit OK.
- o Plugs pulled off DIS unit and joined together.

- Pull high-tension lead terminal 4 out of distributor and earth it. Use auxiliary cable if necessary.
- Detach rubber grommet from connector on switch unit.
- Use auxiliary cables from V.A.G 1594 to connect up multimeter between contacts 6 and 3 on attached plug for the TCI-H switch unit.



- Switch on ignition.
- Turn engine slowly by hand in direction of rotation and watch reading on the measuring instrument.
  Specified value:
  Voltage must alternate between 0 and at least 2 V.
- If this is not the case, renew Hall sender.

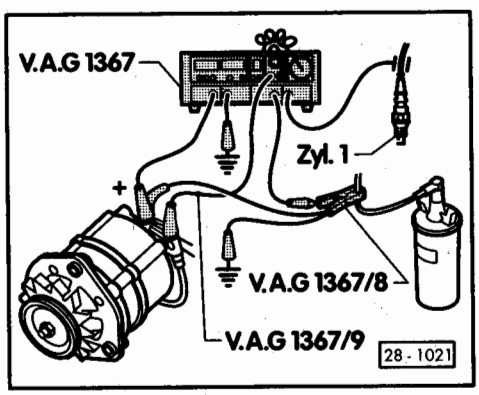
Checking DIS switch unit

(Engine code letters DF)

Note:

In the event of starting difficulties or misfiring, pull plugs off DIS switch unit, join them together and start engine.
If this remedies the defect, check that the contact pins and sleeves of both plugs are in the correct position; they must not be damaged or pushed back. Otherwise renew the DIS switch unit.

- Connect up ignition tester V.A.G 1367.

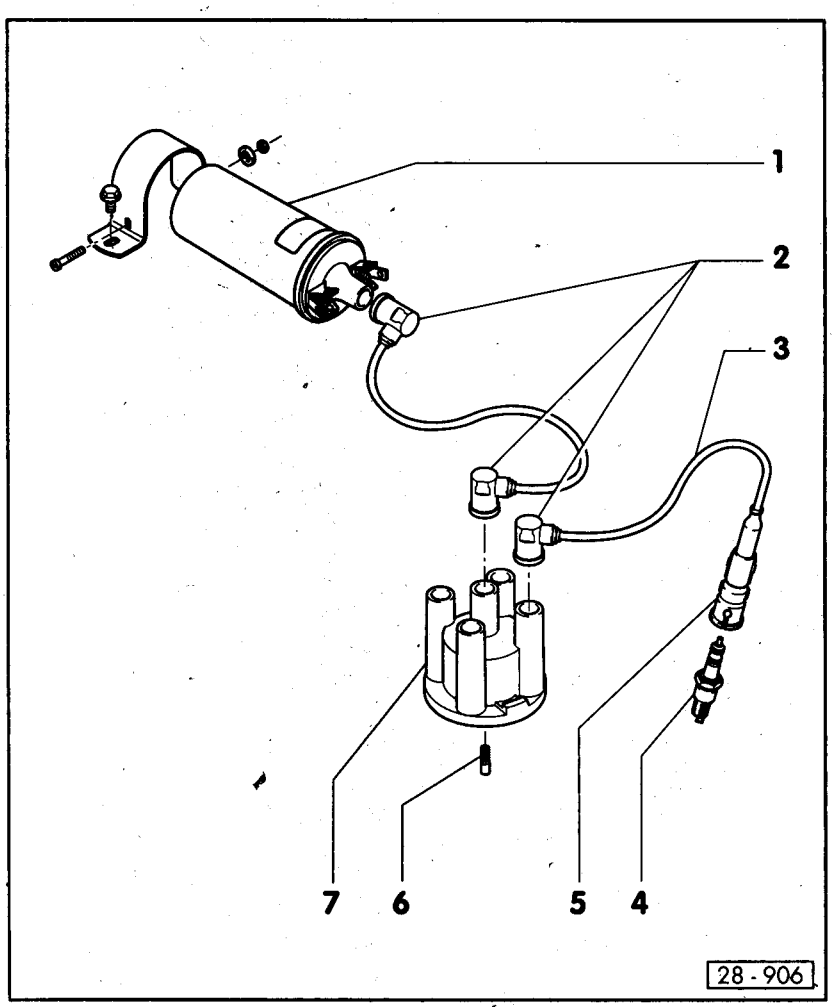


- Fully apply hand brake.

Attention:

For safety reasons, there must not be anyone in front of the vehicle whilst carrying out test procedure.

- Start engine and briefly increase engine speed (burst of throttle).
- Actuate foot brake.
- Allow engine to idle; read off and note down ignition timing point.
- Engage 4th gear and slowly allow the clutch to bite.
- Ignition timing point must be advanced as the engine speed drops below 840 rpm.
- If this is not the case, renew the DIS switch unit.



Repairing breaker-triggered ignition system

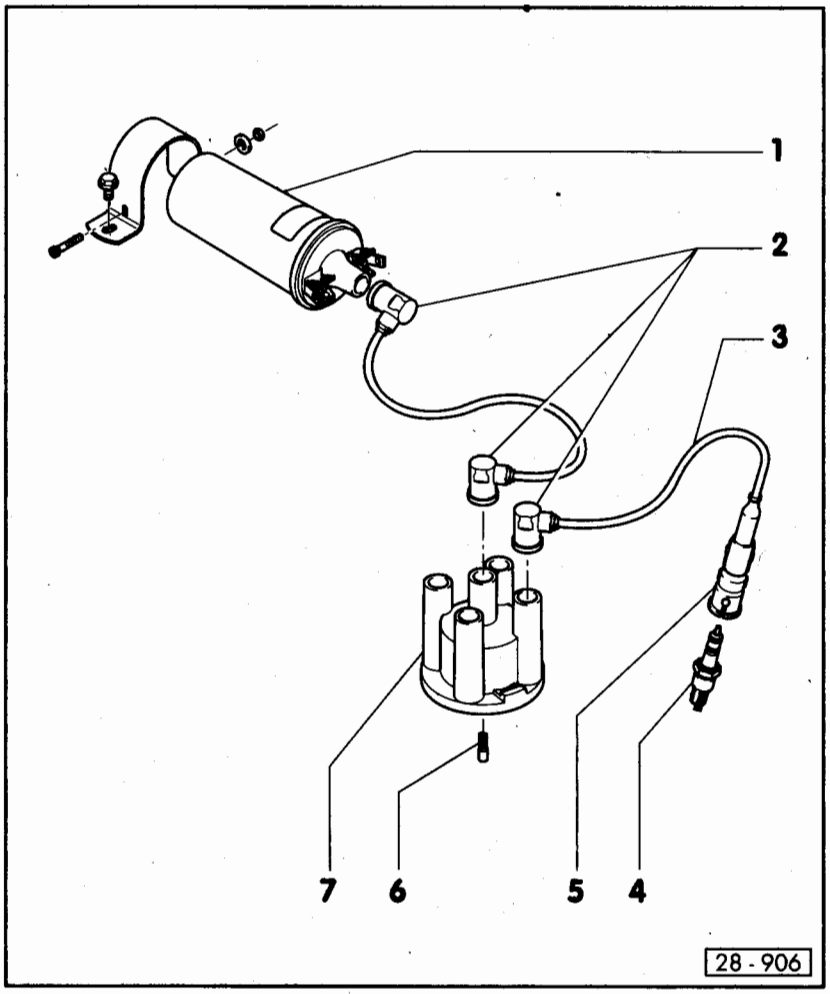
Note:

- o Adjustment data ⟶ page 28-34
- o Spark plugs ⟶ page 28-35
- o Distributor data ⟶ page 28-36
- o Components marked with * are fitted with M4 ignition cable connections. The two versions are not mutually interchangeable.

Part I

1 - Ignition coil*
- o Primary resistance: 1.7 ... 2.1 ohms (between term. 1 and 15)
- o Secondary resistance: 7 ... 12 k ohms (between term. 1 and 4)

2 - Suppression plug*
- o 0.6 ... 1.4 k ohms



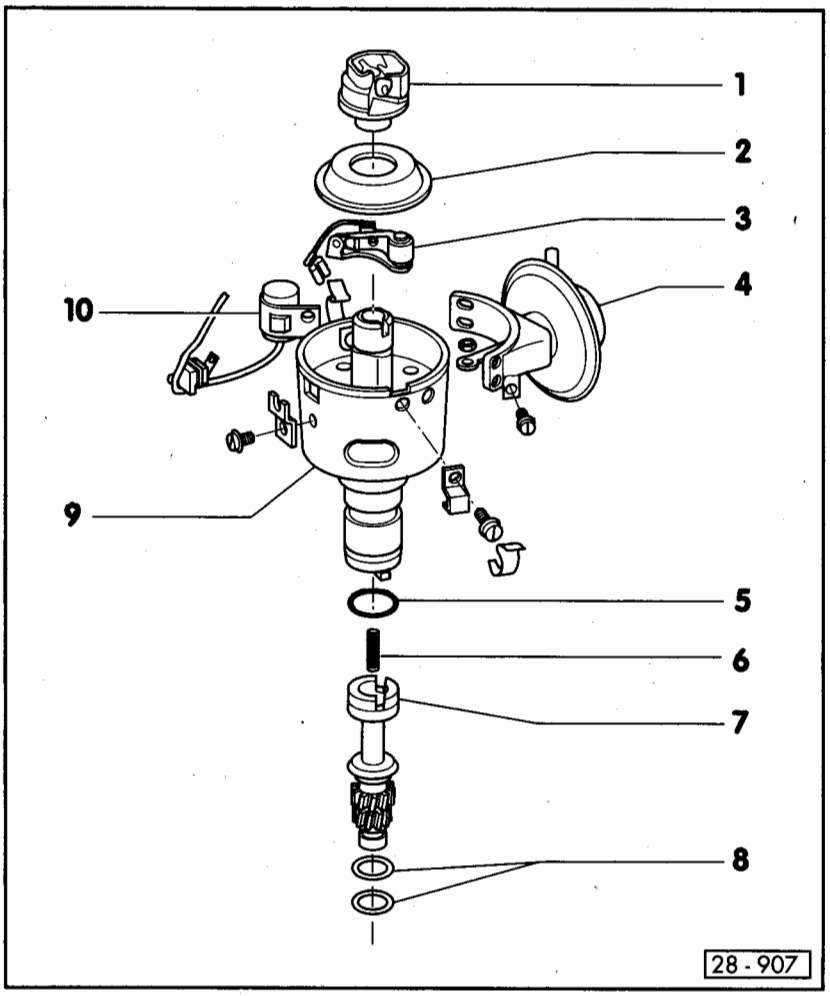
3 - Ignition leads*
- o Check for continuity

4 - Spark plug, 20 Nm
- o Type and electrode gap
  → page 28-35

5 - Spark plug connector*
- o 4 ... 6 k ohms

6 - Carbon brush with spring
- o Check for wear, damage and ease of movement

7 - Distributor cap*
- o Check for cracks and signs of tracking
- o Check contact wear
- o Clean before installing



Part II

1 - Rotor arm
- o Not marked
- o 4 ... 6 k ohms

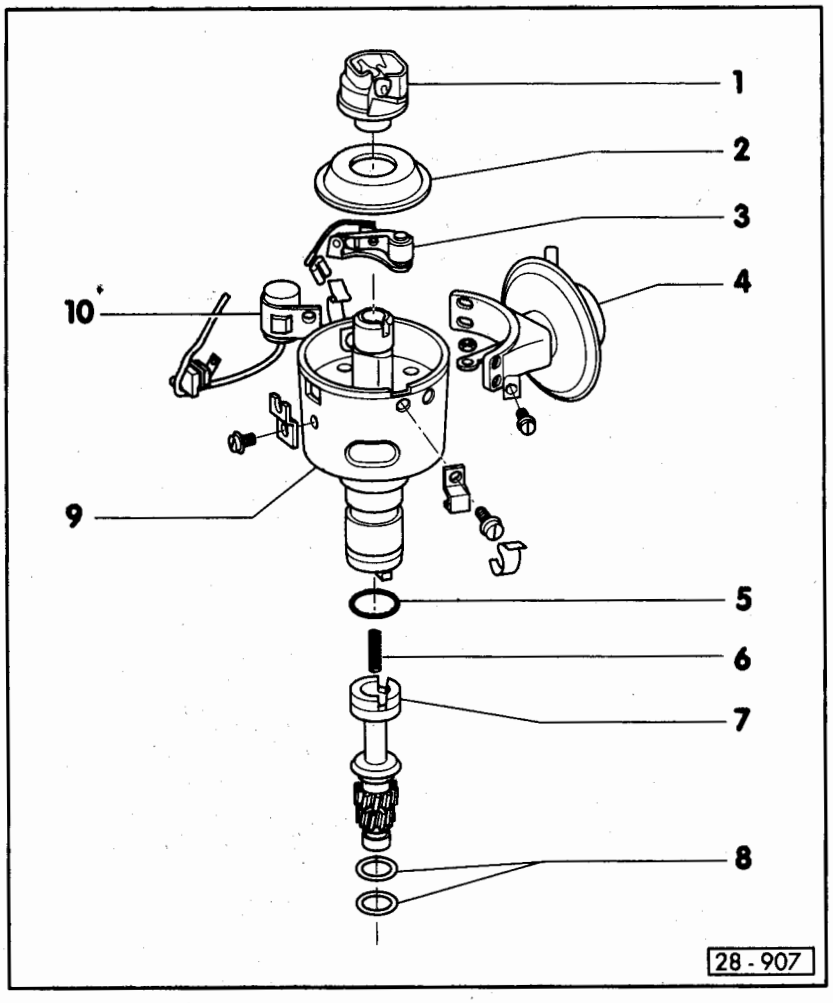
2 - Dust cap

3 - Contact breaker point
- o Coat cam surface, plastic cam follower on contact side and bearing pin with multi-purpose grease
- o Adjust dwell angle
  Specified value:
  47 +/- 3° (53 +/- 3%)

4 - Vacuum unit
- o Checking for leaks
  → page 28-42
- o Checking spark control
  → page 28-43

5 - Sealing ring
- o Renew

6 - Spring



7 - Distributor drive shaft
- o Removing and installing → page 28-37

8 - Thrust washers
- o Install with screwdriver and align

9 - Distributor
- o Installing → page 28-38
- o Adjusting ignition timing point → page 28-39
- o Checking centrifugal advance → page 28-40

10 - Ignition capacitor

Adjustment data

Engine code letters		**KY** 10.82 ▶ 07.89
Distributor	Part No.	025 905 205 E 025 905 205 H[1)]
Ignition timing point[2) 3)]	Test spec.	3 ... 7° before TDC
	Setting	5 +/- 1° before TDC
	Mark	→ Fig. 1
Engine speed[3)]	rpm	850 +/- 50
Vacuum hose		Detached
Dwell angle	Setting	47 +/- 3° (53 +/- 3%)
	Wear limit	42 ... 58° (47 ... 64%)
Governed speed	rpm	4650 ... 5550
Firing order		1 - 4 - 3 - 2

1) With M4 ignition lead connections

2) Pay attention to checking and adjustment conditions → page 28-39

3) Current values → "Exhaust gas and idling speed test" binder

Spark plugs

Engine code letters		EY 10.82 ▶ 07.89
Spark plugs[1]		
	Manufacturers' designations	W 7 C, 14-7 C, N 288, W 7 CC, 14-7 CU
	Electrode gap	0.6 ... 0.8 mm
	Tightening torque	20 Nm

1) Current values ⟶ "Exhaust gas and idling speed test" binder

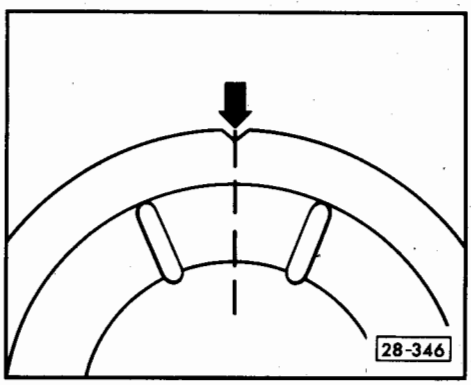


Fig. 1 Ignition timing mark

Distributor data

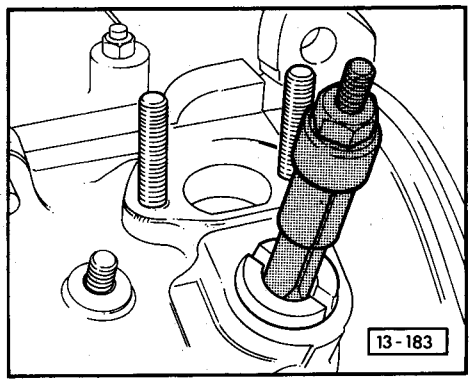
Engine code letters		EY 10.82 ▶ 07.89
Distributor	Part No.	025 905 205 E 025 905 205 H
Centrifugal advance[1]		
Start	rpm	1400 ... 1600
	rpm degrees	2400 13 ... 18
End	rpm degrees	3400 26 ... 30
Vacuum advance		
Start	mbar mmHg	180 ... 220 135 ... 165
End	mbar mmHg degrees	290 ... 310 218 ... 233 12 ... 16

1) Speed = Engine speed

Removing and installing distributor drive shaft

Removing

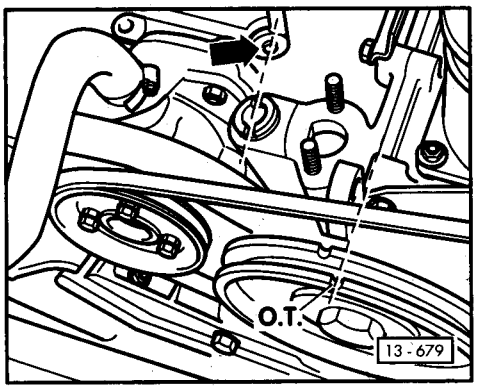
- Remove fuel pump.



- Remove distributor drive shaft with a normal extractor 14.5 ... 18.5 mm dia. (e.g. with KUKKO 21/2).

Installing

- Set crankshaft to TDC on No. 1 cylinder.

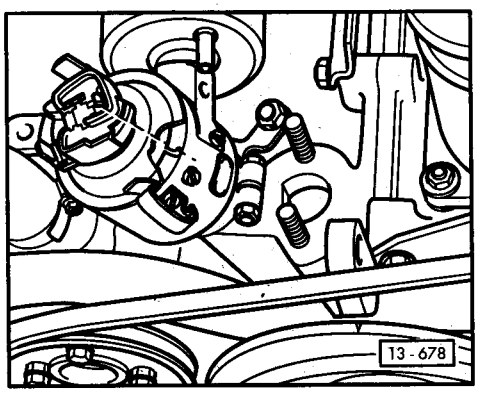


- Insert drive shaft such that offset slot in head of distributor drive shaft is pointing towards tapped hole or screw -arrow-. The small segment faces the coolant pump.

- Install spacer spring.

Installing distributor

- Set crankshaft to TDC on No. 1 cylinder.

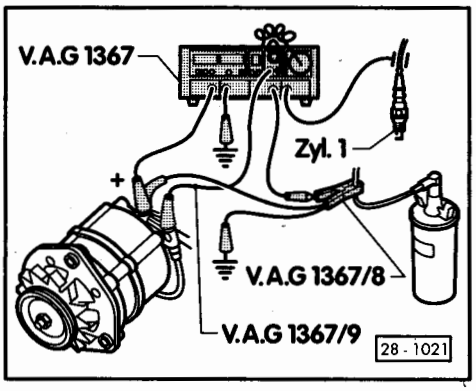


- Turn rotor arm until it is facing mark for No. 1 cylinder on distributor housing.

- Insert distributor.

- Clean distributor cap, check for cracks, signs of tracking and tightness.

- Adjust ignition timing.



Adjusting ignition timing

o Minimum engine oil temperature 60° C.

- Connect up ignition tester V.A.G 1367.

- Check and, if necessary, adjust dwell angle.
  Setting: 47 +/- 3° (53 +/- 3%)
  Wear limit: 42 ... 58° (47 ... 64%)

- Check and, if necessary, adjust idling speed.
  Specified value: 850 +/- 50 rpm

- Pull vacuum hose off distributor.

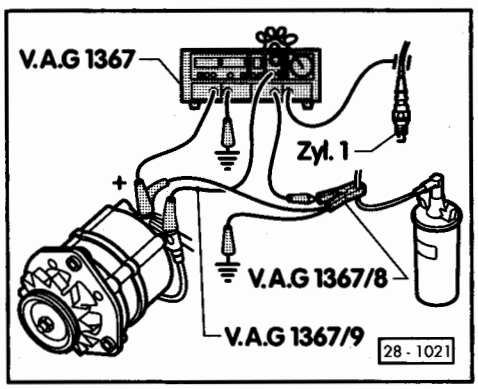
- Check and, if necessary, adjust the ignition timing point.

With TDC sender:

The ignition timing point is indicated directly on the tester.
Test specification: 3 ... 7° before TDC
Setting: 5° before TDC

With stroboscopic lamp:

Notch on belt pulley must be in line with joint on crankcase.



Checking distributor

o minimum engine oil temperature 60° C.

A - Checking centrifugal advance with TDC sender
(Specified values ⟶ page 28-36)

- Connect up ignition tester V.A.G 1367.

- Start engine and run it at idling speed.
  Specified value: 850 +/- 50 rpm

- Pull vacuum hose off vacuum unit.

- Check and, if necessary, adjust the ignition timing.

- Note down advance angle indicated = basic value.

- Slowly increase engine speed.
  Start of advance is indicated by greater number of degrees.

- Increase engine speed to next test speed.

- Read advance angle off tester.

- Calculate centrifugal advance angle:

  Advance angle read off
  - Basic value noted down
  = Centrifugal advance angle

- Repeat test at other test speeds.

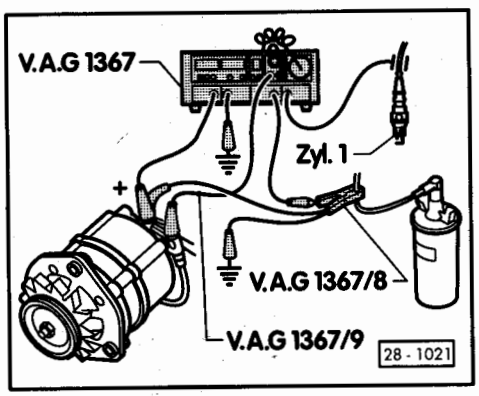
B - Checking centrifugal advance with stroboscopic lamp
(Specified value ⟶ page 28-36)

- Connect up ignition tester V.A.G 1367.

- Start engine and run it at idle speed.
  Specified value: 850 +/- 50 rpm

- Pull vacuum hose off vacuum unit.

- Check and, if necessary, adjust ignition timing.



- Slowly increase engine speed.
  The start of advance is indicated by movement of the notch.

- Increase engine speed to next test speed; "bring notch back" and read off the advance angle.

- Repeat test at other test speeds.

C - Checking vacuum unit for leaks

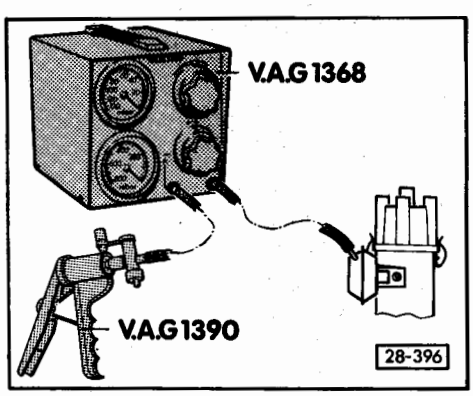
- Connect up vacuum tester and vacuum pump to vacuum unit "advance".

- Switch tester to throughflow.

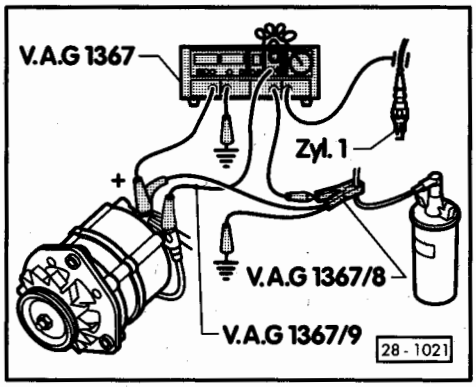
- Use vacuum pump to generate approx. 500 mbar vacuum.

- Set tester such that vacuum is retained on vacuum unit end.

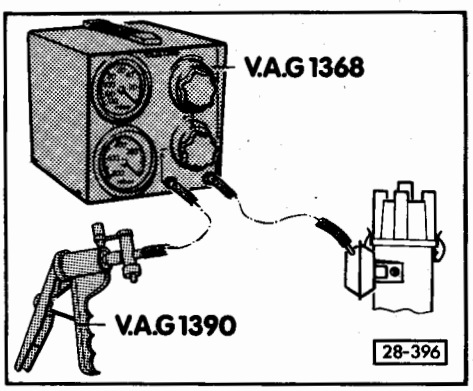
- Set vacuum on tester to 450 mbar. The vacuum must not drop off by more than 10% in 1 min. Otherwise there is a leak in the vacuum unit or hose.



D - Checking vacuum advance angle
(Specified value ⟶ page 28-36)



- Connect up ignition tester V.A.G 1367.
- Pull vacuum hose off vacuum unit of the distributor and seal it off.



- Connect up vacuum tester and vacuum pump to vacuum unit "advance".
- Switch tester to throughflow.
- Start engine and run it at idling speed.
  Specified value: 850 +/- 50 rpm

- Checking with:

TDC sender	**Stroboscopic lamp**
Note down advance angle indicated = basic value	Check and adjust ignition timing point if appropriate

- Use vacuum pump to generate vacuum until the ignition timing point starts to move.
- Read off vacuum value and compare to the test specification for the start of advance.
- Further increase vacuum as far as test specification for the end of advance.
- If necessary, decrease engine speed to below 1400 rpm.

Checking with TDC sender:

- Read off advance angle and calculate vacuum advance:

	Advance angle read off
-	Basic value noted down
=	Vacuum advance angle

- Further increase vacuum. The ignition timing point must not move any further.

Checking with stroboscopic lamp:

- "Bring notch back" to the ignition timing point mark.

Advance angle indicated
= Vacuum advance angle

- Further increase vacuum. Ignition timing point mark must not move any further.