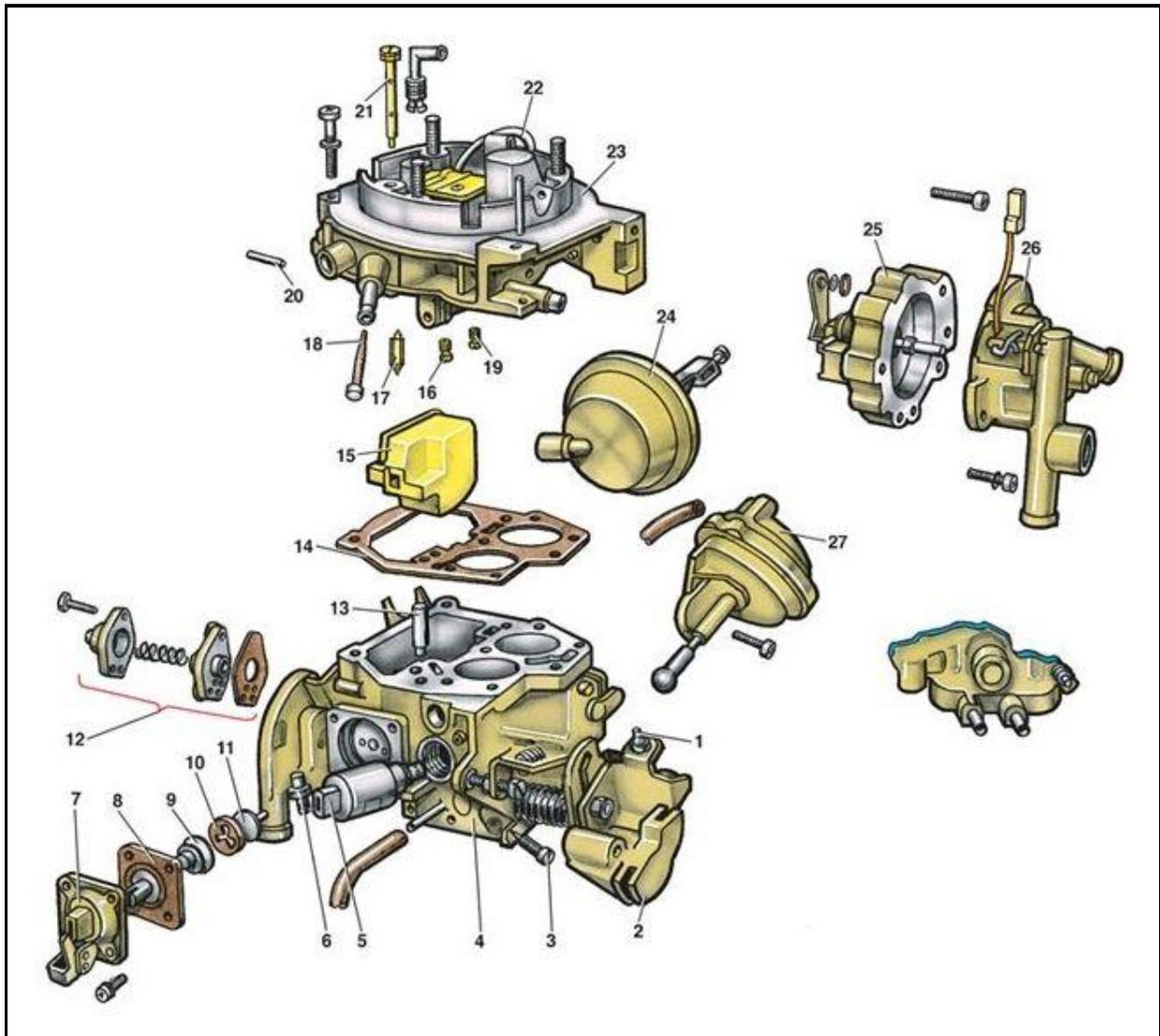


PIERBURG

Carburetor: 2E3



- 1 fast idle adjusting screw
- 2 throttle lever
- 3 fuel mixture adjusting screw
- 4 main body
- 5 idle cut off valve
- 6 stop screw
- 7 accelerator pump cover
- 8 diaphragm
- 9 spring
- 10 valve seat
- 11 valve
- 12 enrichment valve diaphragm
- 13 pump injector
- 14 float chamber gasket

- 15 float
- 16 main jet - primary
- 17 needle valve
- 18 fuel inlet filter
- 19 main jet - secondary
- 20 float axle
- 21 idle jet - primary
- 22 full-load enrichment nozzle
- 23 upper body
- 24 vacuum pull-down
- 25 choke housing
- 26 bi-metal housing assembly
- 27 stage II diaphragm unit

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Maintenance

When necessary, check idle setting and correct, if required. If a setting as specified is not possible or in case of a complaint, check the carburettor according to **Chapter C: Troubleshooting table**. If necessary, remove and repair.

Note: After washing the engine, apply corrosion inhibitor onto carburettor, e.g. by spraying on WD40 or Uni-spray Termal.

Repair

Remove carburettor, clean externally and disassemble. Clean castings and steel parts in special cleaning bath and rewash with test fuel DIN 51 632. Prior to cleaning remove filter in the fuel inlet, see chapter A.5. Blow out drillings and channels by means of compressed air. Use a repair kit available through the carburettor service outlets for the assembly of the carburettor. Make sure that all moving parts move freely.

Tightening torque for carburettor fixing screws: 7Nm.

Note:

Screws protected by means of tamper-proof caps or protective lacquer may not be adjusted. In case these screws have, nevertheless, been tampered with, perform the setting according to the corresponding chapters. After completion of the setting replace the protections.

A. SETTINGS, carburettor mounted

1. Idle correction

Idle rpm: 800 ± 50 /min.

Idle emission value: 1.0 ± 0.5 % CO

Conditions:

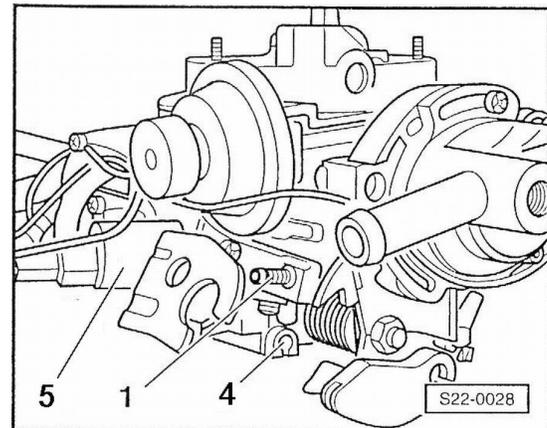
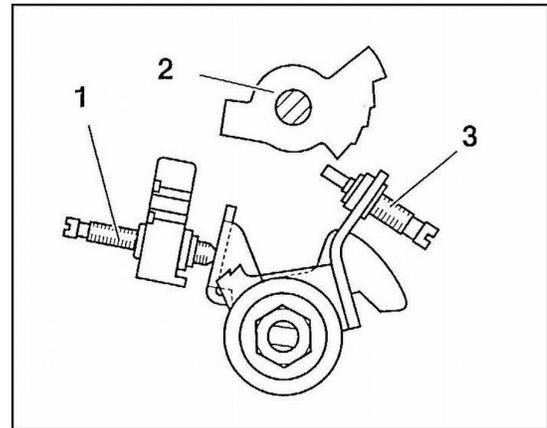
- flawless functioning of the engine
- oil temperature minimum 60°C
- ignition system in good working order
- intake system without leakages
- clean air cleaner mounted
- intake air preheating in good working order
- gas linkage as specified
- electric consumers cut off
- hose for the crankcase ventilation withdrawn and closed to the air cleaner
- engine speed counter and CO-tester connected
- the adjusting screw (3) must not touch the cam (2)
- starter choke not operating

Adjust idle speed by means of throttle plate screw (1). Only then we can correct emission value by means of the mixture control screw (4).

Remark: If this setting is not possible, see chapter "**C. Troubleshooting table**".

2. Idle cut off valve

- Install and remove idle cut off valve (5) only with special tool MP 1-508.

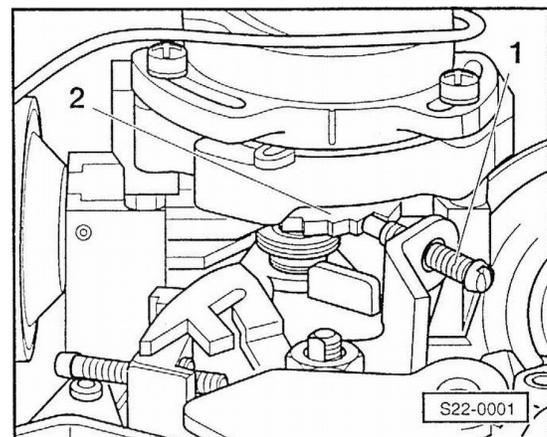


3. Starter device

3.1 Fast idle

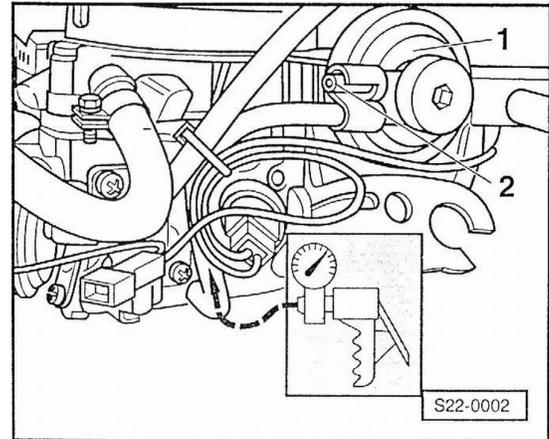
Conditions: engine at normal operating temperature, idle correctly set

- Set adjusting screw (1) on the second step of cam (2).
- Start engine without depressing the accelerator pedal.
- Correct the fast idle to 2300 ± 100 rpm with fully opened choke plate by means of adjusting screw (1).



3.2 Check pull-down device as to leakage

- Connect manual vacuum pump as shown and produce a pressure differential of approx. 300 mbar.
- In case of a pressure drop remove leakages.

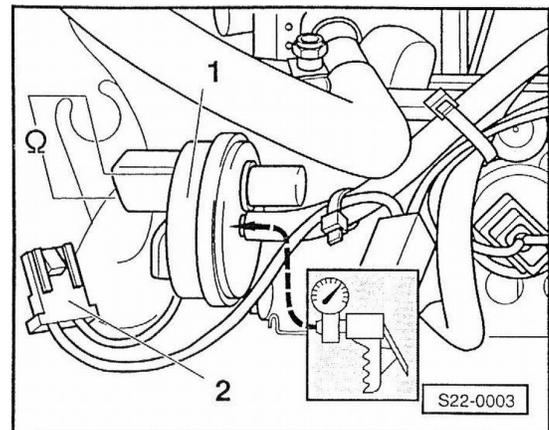


3.3 Thermo-time valve (TTV)

- Heat TTV (1) to about +20°C
- Connect ohmmeter in place of the connector (2)

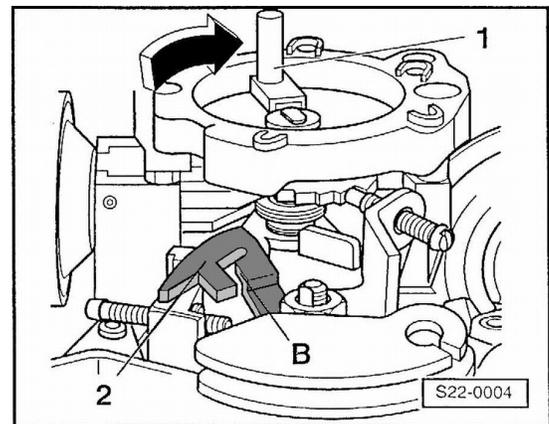
Nominal resistance: 1.9 – 2.6 Ω

- Cool down TTV to 0°C (air spray or refrigerator)
- Connect vacuum pump and operate pump. TTV must be open.
- Switch on ignition. Plug in connector (2) at TTV (1) and continue operating vacuum pump until the switchover time is determined (rise in pressure difference) Switchover time at 0°C is 1.5 – 5.5 seconds.
- Replace TTV if necessary.



3.4 Compulsory opening of starter flap

- Press follower lever (1) slightly in direction of arrow and hold; use a rubber ring if necessary.
- Set throttle lever to full throttle position.
- Check the opening of the starter flap (2.5 ± 1 mm);
- Opening too small: increase size of gap "B" of segment (2) with a screwdriver.
- Opening too large: reduce size of gap "B" of segment (2) with pointed pliers.

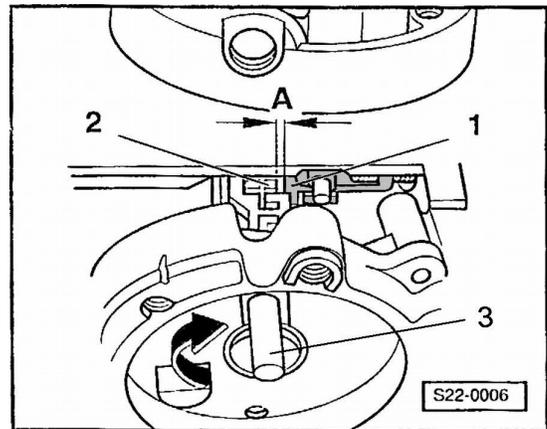


3.5 Choke plate gap

Conditions: pull-down device without leakages, starter cover removed, and starter flap is fully closed.

Gap "A"

- Raise throttle valve, press follower lever (3) in direction of arrow and release throttle valve. Fast idle adjusting screw is positioned on highest step of cam.
- Check gap "A" (0.5 – 1 mm)
- Set play by bending the lever (2).



Gap "a" small

- Connect vacuum pump as shown (but without cap 4) and produce a pressure differential of 110 mbar.
- Push follower lever (3) slightly in direction of arrow and check gap of starter flap.

$$\text{"a" small} = 0.8 \pm 0.2 \text{ mm}$$

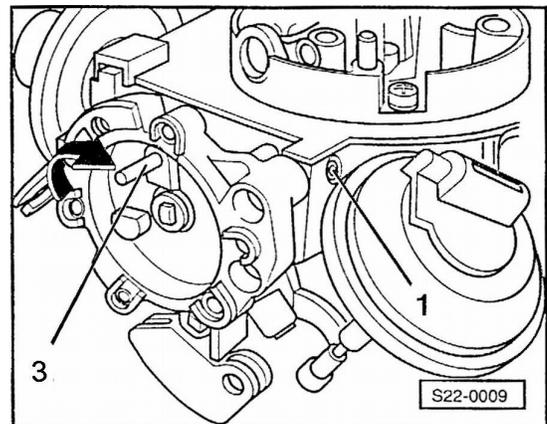
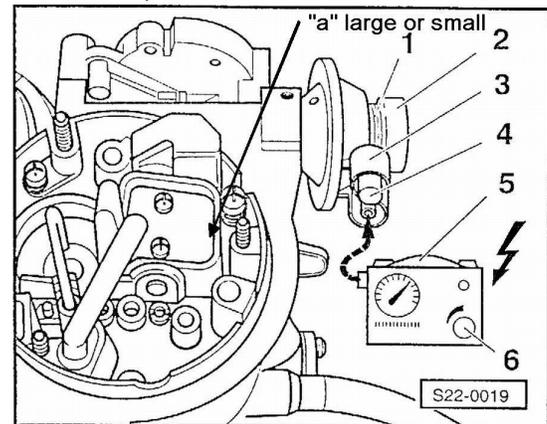
- Set the correct size of gap by turning screwed cap (1).

Gap "a" large

- Place cap (4) and produce a pressure differential of 200 mbar.
- Push follower lever (3) slightly in direction of arrow and check gap of starter flap.

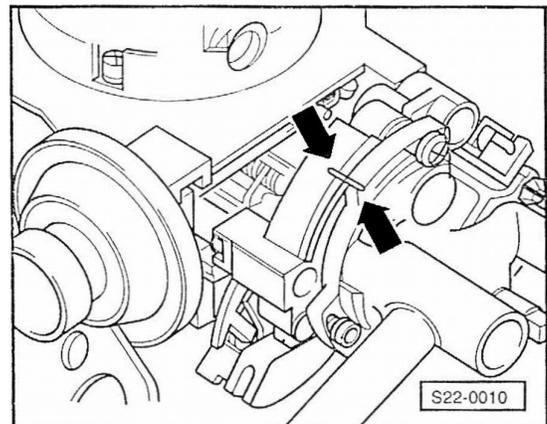
$$\text{"a" large} = 2.0 \pm 0.2 \text{ mm}$$

- Correction by means of adjusting Allen screw (1).



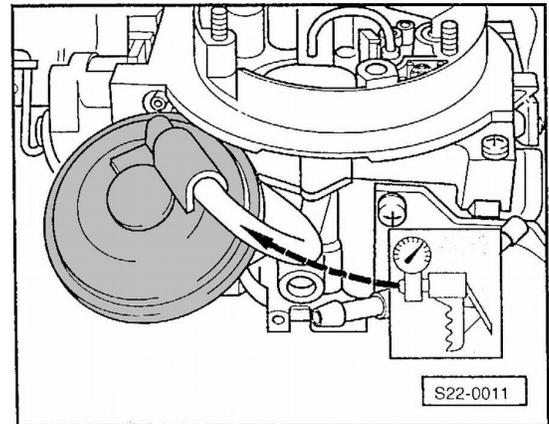
3.6 Starter cover position

- The markings (arrows) must be in line.



4. Stage II diaphragm unit

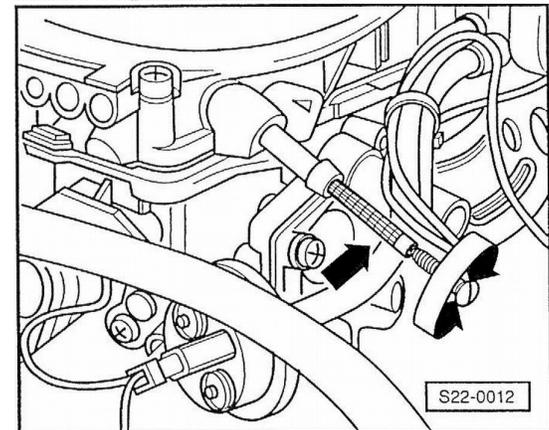
- Connect manual vacuum pump as shown in the illustration and produce a pressure differential.
- In case of a pressure differential drop, the vacuum hose or the diaphragm unit is defective.
- If necessary replace.



5. Filter in the fuel inlet

Prior to cleaning the carburettor remove the filter (arrows).

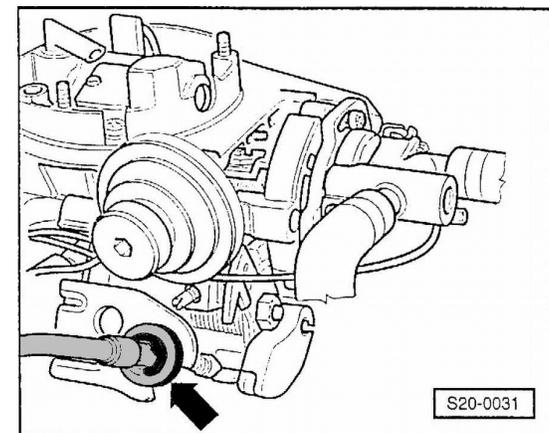
The filter may be withdrawn by means of a screw M3 screwed in approx. 5 mm. Always replace filter.



6. Gas linkage

- Depress accelerator pedal to the full load position. Check full throttle position at the throttle valve lever. Full throttle position must just be reached (clearance maximum 1mm).

- Adjust gas cable by re-positioning the locking device (arrow) at the supporting bracket.



7. Intake air preheating

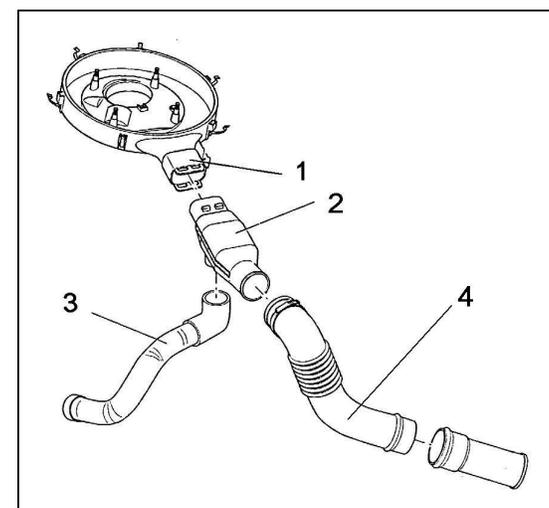
Intake air preheating is regulated by an air flap and a spring (inside 2) which is operated by an expansion element (inside 1).

When the engine is cold (less than about 15°C), the air flap must seal off the cold air port completely allowing warm air to come from the exhaust shield through flexible pipe (3).

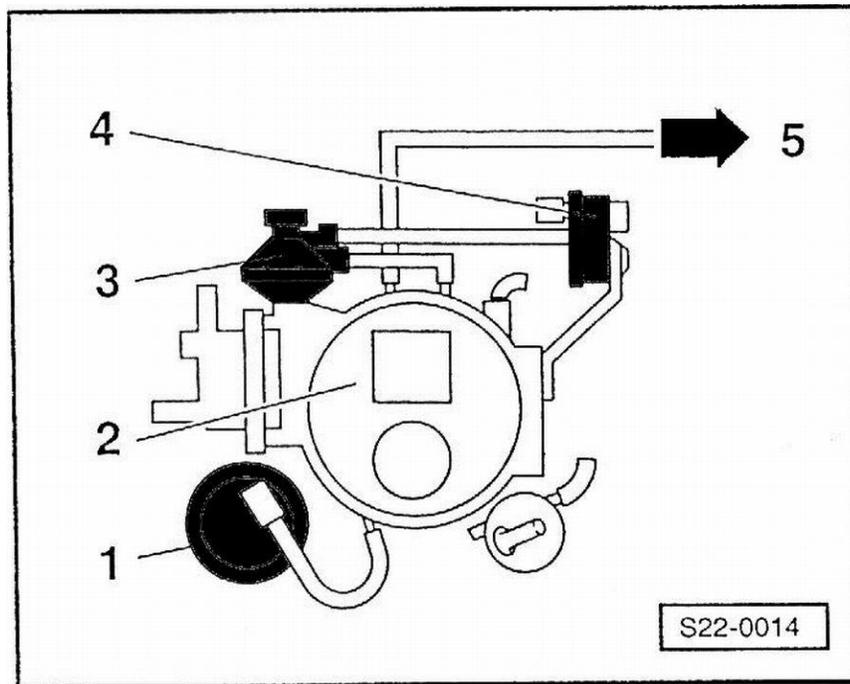
- Cool down with refrigerant spray.

When the engine is warm, the warm air port must be closed and so cold air can come from pipe (4).

If this position is not reached, the fault is at the expansion element.



8. Connection diagram, vacuum hoses



1 stage II diaphragm unit
2 carburettor
3 vacuum pull-down

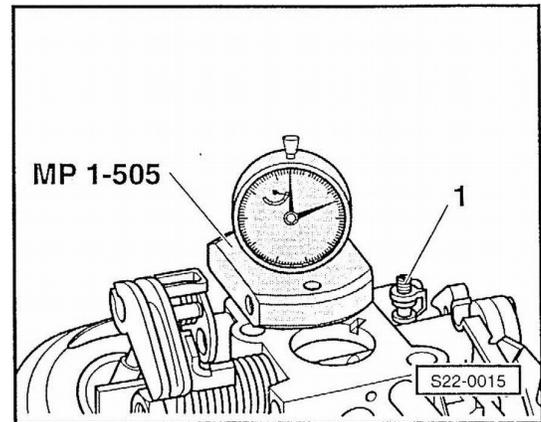
4 thermo-time valve
5 pipe to brake servo

B. SETTINGS, carburettor removed

Below mentioned measuring and test devices may be purchased from the local general agent.

1. Setting of stage II throttle valve

- Slacken throttle valve stop screw (1) sufficiently so that it is no longer making contact.
- Fit on measuring device MP 1-505 and set throttle valve stop screw to size 0.08 ± 0.02 mm.

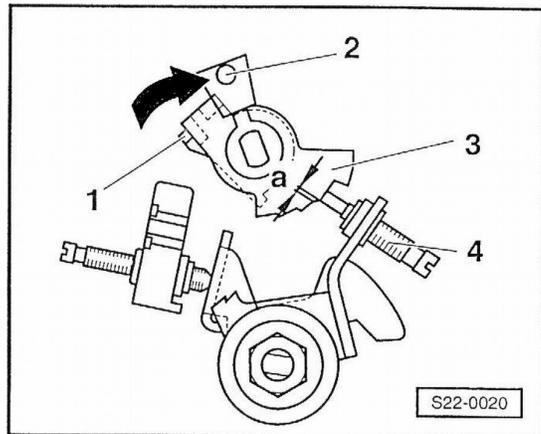


2. Position of the cam

Condition: choke plate gap already verified and set as specified.

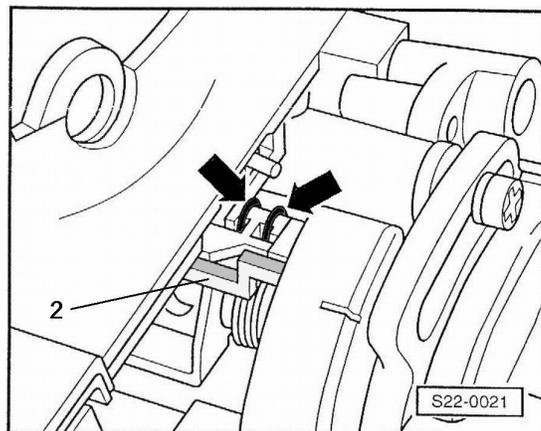
- Remove starter cover.
- Place adjusting screw (4) on highest step of cam (1).
- Produce pressure differential in the vacuum pull-down with pull-down upper connection sealed.
- Open throttle plate, push entrainment lever (2) lightly in direction of arrow and again close throttle plate. The adjusting screw (4) must rest in the distance "a" on the 2nd highest step of the cam (1).

$$"a" = 0 + 0.1 \text{ mm}$$



Correct size "a" by bending the lever (2).

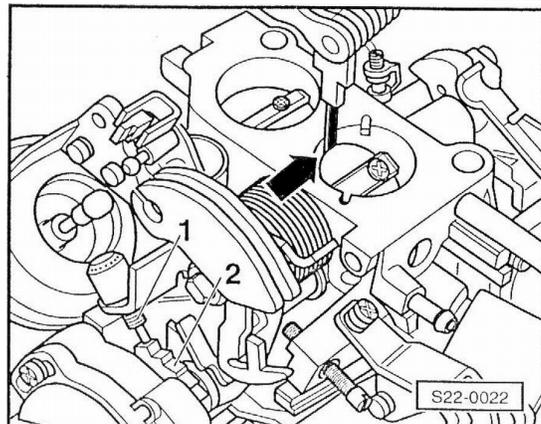
Important: Make sure that the return springs are in the correct position (see arrows).



3. Cold starting device, throttle plate gap

- Place adjusting screw (1) on the highest step of the cam (2).
- Measure throttle plate gap (arrow) and set to 1 mm by means of the adjusting screw (1).

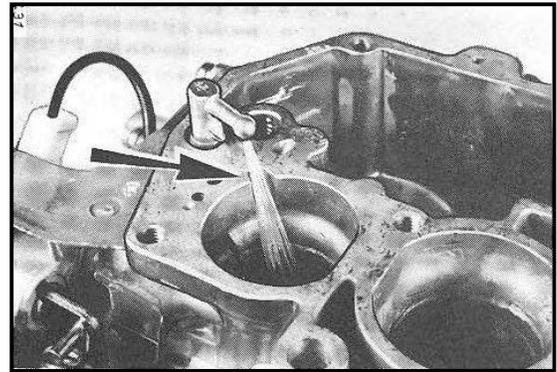
Remark: Check fast idle rpm after installation of the carburettor, if necessary correct, see chapter A.3.1.



4. Accelerator pump

4.1 Direction of the injection spray

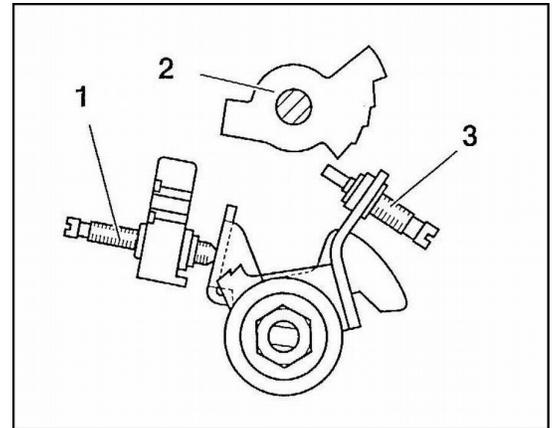
- Remove carburettor cover.
- Insert injector tube (by pressfitting) so that the fuel spray is in the direction of the recess (arrow).



4.2 Injection volume

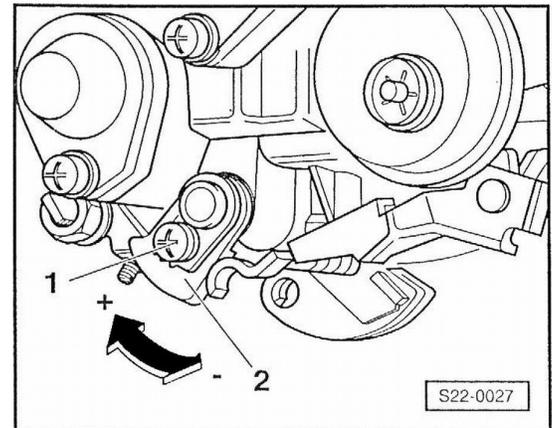
Conditions: during the measurement the float chamber must have normal level, i.e. fuel must flow in. Start of injection must occur immediately the throttle valve is operated.

- Use carburettor testing device.
- Close fuel return connection if provided.
- Turn cam (2) and hold so that the adjusting screw (3) no longer rests on it.
- Completely open and close uniformly throttle plate 10 times (approx. 1 s per stroke). Waiting time between strokes: approx. 3 seconds.



- Divide fuel quantity by 10 and compare with the nominal value ($0.326 \pm 0.078 \text{ cm}^3$).
- Correct injection volume by loosening clamping screw (1) and turning cam (2).

In direction + injection volume larger
In direction - injection volume smaller

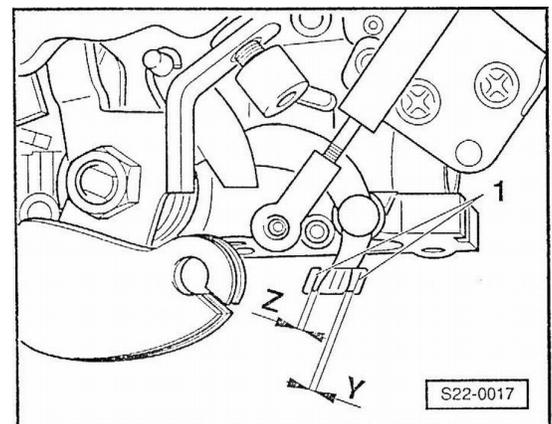


5. Release and positive return of stage II

Condition: Throttle plate stage I in idle position.

- Adjust distances "Y" and "Z" by bending the fork (1). Measure at the narrowest location.

Y (mm)	Z (mm)
$0,8 \pm 0,3$	$0,4 \pm 0,3$

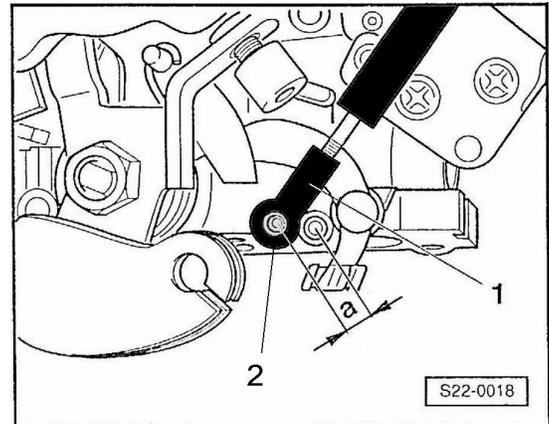


6. Second stage pull rod

- Detach ball joint (2) and check size “a” (pre-stress)

$$a = 0.5 - 2.0 \text{ mm}$$

- Correct size a by screwing or unscrewing pull rod (1).

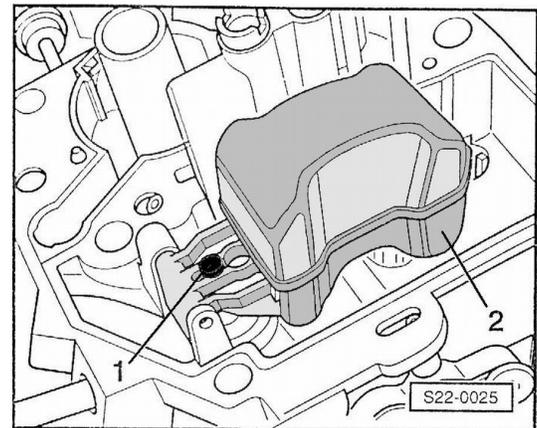


7. Float / Float level

- Take off top part of the carburettor.

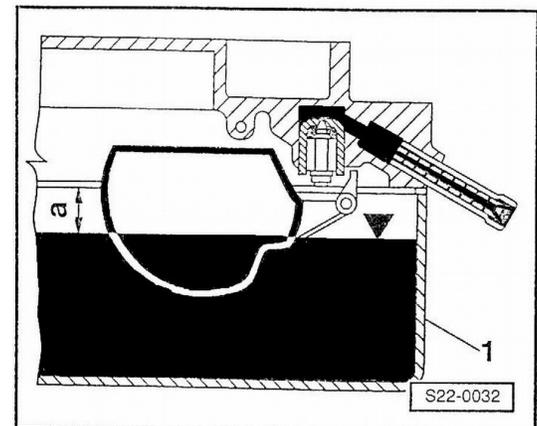
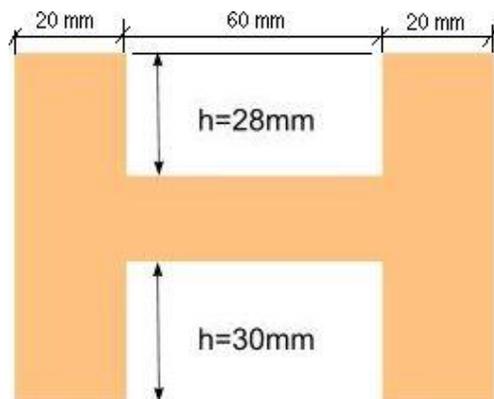
The float level is not adjustable. It will automatically result if an acceptable float is used. At the occasion of a general rework the float weight has to be checked.

- Check weight of float ($5.85 \pm 0.1 \text{ g}$)
- Replace if faulty.



$a = 9.5 \pm 1 \text{ mm}$ inside the float chamber (1).

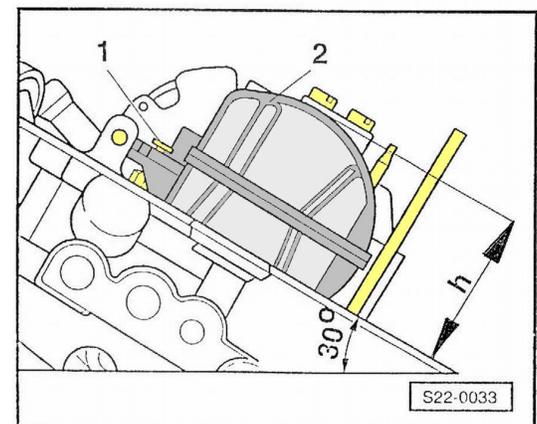
This is measured through one of the vents,



Conditions: no gasket on the cover and float (2) must not press the valve pin (1) when measuring the height.

$$h = 29 \pm 1 \text{ mm}$$

This is measured using a template made of cardboard or aluminum in the shape of letter H.



C. TROUBLESHOOTING TABLE

COMPLAINTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Cold starting (firing)	•	•					•		•								•				•	
Stabilization of engine run (stalling after cold starting)		•	•	•			•										•					
Cold idle (rpm too high/ too low)		•			•	•	•	•		•	•						•					
Cold drive away, transition cold (response bad, bucking)		•	•	•	•			•		•	•		•				•					
Choke does not switch off completely or too late		•		•	•																	
Warm starting (starting time more than 5 seconds)									•			•			•	•	•					•
Idle (rough, too high, too low)										•	•		•		•	•	•					
Idle rpm or CO too high (not adjustable)						•				•			•				•					
Transition during acceleration (bucking)										•	•		•				•				•	
Transition at high rpm (to stage II)													•							•	•	
Exhaust detonations during deceleration										•	•						•				•	
Power (too small, misfiring at full load)														•		•	•	•	•	•		
Excessive fuel consumption		•			•					•	•			•	•	•					•	•
Cause probability {high number = high probability}	1	6	2	3	4	2	3	2	2	6	7	1	3	4	3	3	9	1	2	5	2	1

	CAUSE	REMEDY	CHAPTER
1	Choke plate does not completely close	Adjust choke device/check bimetal spring	A.3
2	Choke plate or linkage hard moving or jamming	Assure free movement	
3	Choke plate gap incorrect	Adjust	A.3.5
4	Pull-down device leaks or defective	Check, if necessary replace parts	A.3.2
5	Starter heating, intake manifold pre-heater and thermo-switch not working properly, cooling water flow disturbed	Check heating coil, thermo-switch and contact breaker points; check cooling water flow	A.3.3
6	Cam jams; wrong position; return springs defective	Assure free movement and reset respectively, if necessary replace carburettor cover	B.2
7	Cold starting device, throttle plate gap incorrect	Set fast idle and throttle plate gap respectively	A.3.1 & B.3
8	Bypass bi-metal coil heating defective	Check TTV element, if necessary replace	A.3.3
9	Idle cut off valve does not open	Check, if necessary replace	A.2
10	Idle setting incorrect	Correct	A.1
11	Idle fuel air jet clogged	Clean, if necessary replace	
12	Fuel evaporates (engine excessively rich)	Hold accelerator pedal in full load position and start; for a trial change fuel quality	
13	Injection volume	Check, if necessary set	B.4.2
14	Enrichment valve defective	Replace	
15	Float needle valve leaks	Clean valve, if necessary replace needle	
16	Float defective, level incorrect	Replace float	B.7
17	Erroneous air on gaskets, hoses or flange	Replace gaskets	
18	Throttle plates do not completely open	Correct gas linkage	A.6
19	Stage II diaphragm unit leaks	Replace	A.4
20	Jet setting not as specified	Replace jets	
21	Operating fault	Start according to instructions	
22	Operating conditions	Consumption measurement, explain to client	

NOTE

Conditions for the application of this table are:

- good functioning of the engine (timing. valves, and so on)
- ignition system and its setting as specified
- intake system without leakages
- acceptable exhaust system
- correct control of the intake air preheating
- clean air cleaner
- correct fuel pressure to the carburettor