

Kraftstoffaufbereitung und -regelung

Fuel supply and adjustments

Alimentation et réglage au carburant

Alimentazione di carburante e

regolazione

Alimentación de combustible y reglaje

Bränslesystem

Benzinetoevoer en afstelling

13 Fuel Supply

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Specifications

Fuel supply and regulation

Model	320/6 320/6 A
13 00 . . . Carburetor, general	
Make	DVG (Solex)
Type	Two-stage
Reference	4 A 1
Auxiliary system	TN (heat-sensitive bypass) starting system
Float chamber ventilation	interior vented
DVG number	E 17 603
BMW identification number on type plate	1 266 255
Type plate	rectangular, flat
Color	blue
13 00 . . . Engine idling	
Idle speed	1/min 800 . . . 900
CO content of exhaust at idle speed	% by vol. 0.5 . . . 1.5

Fuel supply and regulation Specifications

Model	320/6 320/6 A	
13 11 . . . Carburetor settings (4 A 1) carburetor No. 1 266 255		
Gap at throttle arm and idle stop – setting of throttle butterfly adjuster –	Stage I	mm (in)
	Stage II	mm (in)
		2.9 ± 0.2 (0.114 ± 0.008)
Spring length with vacuum can in rest position	Stage I	mm (in)
	Stage II	mm (in)
		23 ± 0.3 (0.906 ± 0.012)
Choke butterfly gap	Stage I	mm (in)
	Stage II	mm (in)
		1.2/4.0 ± 0.2 (0.047/0.157 ± 0.008)
Air butterfly gap	Stage I	mm (in)
	Stage II	mm (in)
		0.3 . . . 0.8 (0.012 . . . 0.032)
Fuel level (measured at center)	mm (in)	7 ± 1 (0.276 ± 0.039)
Quantity injected per stroke	cm ³ (fl.oz)	0.5 ± 0.15 (0.176 ± 0.053)
TN (heat-sensitive bypass) starting system at 20° C (68° F) coolant temperature Gap A	mm (in)	2.0 . . . 2.2 (0.079 . . . 0.087)

Specifications

Fuel supply and regulation

Model	320/6 320/6 A	
13 11 . . . Carburetor jets and fittings		
Air venturi diameter	Stage I	mm (in)
	Stage II	mm (in)
Main jet	Stage I	20 (0.79)
	Stage II	—
Air correction jet	Stage I	× 97.5
	Stage II	B 5 ¹⁾
Idle jet	Stage I	90
	Stage II	—
Idle air jet	Stage I	42.5
	Stage II	—
Additional air jet (TM starting system)	Stage I	110
	Stage II	—
Additional fuel jet (TM starting system)	Stage I	100
	Stage II	—
Jet needle	Stage I	57.5
	Stage II	—

Specifications

Fuel supply and regulation

Model		320/6 320/6 A
13 11 . . . Carburetor settings (4 A 1) continued (carburetor number 1266 255)		
Float needle valve diameter	mm (in)	2.5 (0.098)
Choke cover identification number		171
Float weight	g (oz)	6.8 ± 0.35 (0.240 ± 0.012)
13 11 . . . Idle shutoff valve		
Make		Pierburg
No./jet size		PE 20 273/2.5 ± 0.05
Nominal voltage	V	12
Max. permissible voltage	V	16.5
Max. current consumption at 12 V	A	0.25 ± 0.02
13 11 . . . Vacuum regulator		
Make		Pierburg
Type (No.)		PE 20 464

Specifications

Fuel supply and regulation

Model	320/6 320/6 A
1331 . . . Mechanical fuel pump	
Make	Pierburg
Type (No.)	PE
Delivery pressure (gauge)	bar (lb/in ²)
– at intermediate shaft speed	1/min
– at engine speed	1/min
Minimum delivery flow	l (Imp. pints, US quarts)/h
– at intermediate shaft speed	1/min
– at engine speed	1/min
Length of pump plunger	mm (in)
Insulating flange with gasket	mm (in)
1331 . . . Fuel return valve	20 ± 0.15 (0.787 ± 0.006)
Make	Pierburg
Type (No.)	20 439

Specifications

Fuel supply and regulation

Model	Tightening torques	
	320/6	320/6 A
1311 . . . Carburetor		
Carburetor to intake pipe	Nm kpm lb.ft	5.9 . . . 7.85 0.6 . . . 0.8 4.4 . . . 5.8
Idle shutoff valve, max.	Nm kpm lb.ft	4.2 0.43 3.1
1331 . . . Fuel pump		
Fuel pump to cylinder head	Nm kpm lb.ft	5.9 . . . 7.85 0.6 . . . 0.8 4.4 . . . 5.8

Specifications

Fuel supply and regulation

Model	323 i 323 i A *)
1300 . . . Fuel injection system/engine idling	
Bosch fuel injection system	K-Jetronic
Idle speed	1/min 850 . . . 950 . . . *)
CO content of exhaust at idle speed	% by vol. 1.0 . . . 2.0 . . . *)
1351 . . . Mixture regulator (with airflow meter and flow distributor)	
Make	Bosch
Bosch number	0 438 060 025
Airflow meter Make	Bosch
Bosch number	0 438 120 086
Color code	yellow/violet
Flow distributor Make	Bosch
Bosch number	0 438 100 028
Color code	black/red

*) Version for Sweden

Fuel supply and regulation

Specifications

Model	323 i 323 i A *)
13 53 . . . Injectors	
Make	Bosch
Type and Bosch number	EPILKE 6/0 437 502 006
Opening pressure (gauge)	bar (lb/in ²) 3.3 (46.9)
Spray angle	deg. app. 35
13 62 . . . Temperature/time switch	
Make	Bosch
Bosch number	0280 130 220
Nominal voltage	V 12
Switching point	°C (°F) + 35 (+ 95)
13 63 . . . Warming-up regulator (with full-load enrichment)	
Make	Bosch
Bosch number	0 438 140 005
Nominal voltage	V 12
Max. permissible voltage	V 20 (for brief periods)
Operating voltage	V 7 . . . 15

*) Version for Sweden

Specifications

Fuel supply and regulation

Model		323 i 323 i A *)
1363 . . . Additional air slide		
Make		Bosch
Bosch number		0280 140 118
Nominal voltage	V	12
Max. permissible voltage (for short periods)	V	
Operating voltage	V	7 . . . 15
1364 . . . Electric starting valve		
Make		Bosch
Bosch number		0280 170 411
Nominal voltage	V	12
Operating voltage	V	7 . . . 15
Current consumption	W	app. 37
Spraying angle	deg.	app. 80
Operating pressure	bar (lb/in ²)	app. 4.5 (64)

*) Version for Sweden

Specifications**Fuel supply and regulation**

Model		323 i 323 i A *)
Tightening torques		
13 53 . . . Injectors		
Injector collar nut	Nm kpm lb.ft	25 2.5 14.47
13 62 . . . Temperature/time switch		
Temperature/time switch, max.	Nm kpm lb.ft	30 3.0 22.1

*) Version for Sweden

**13 00 054 Engine idling – adjusting/
checking exhaust emissions**

A) Carburetor engine

1) Idle speed

Before performing the work, check that ignition timing is correct and the engine is at normal operating temperature.

Oil temperature should be at least 60°C (140°F).

Take off the air cleaner – 13 71 000.

Attach the air cleaner simulator 13 0 000, using the hose between the air cleaner and the rocker cover.

Connect the BMW digital tester.

Turn screw (1) to adjust engine idle speed to $850 \pm 50/\text{min}$.

Warning: remove the safety keepers (to prevent unauthorized tampering with the settings) using puller 13 1 012. After adjusting idle speed, install new keepers (color blue) with press tool 13 1 017.

2) Exhaust emissions (% CO by volume)

Remove the screw plugs on the exhaust manifolds and insert measuring probes 13 0 020. Connect the exhaust emissions tester to the probes.

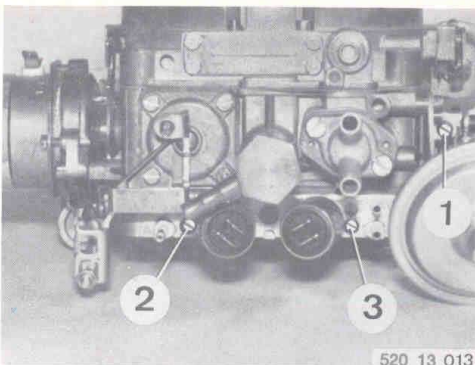
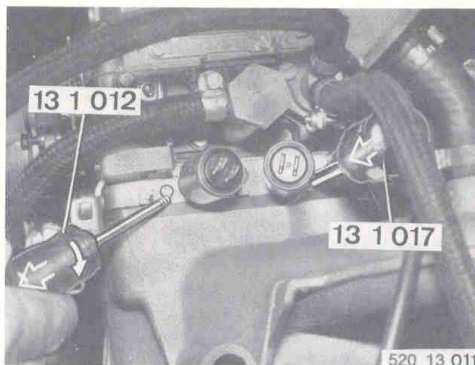
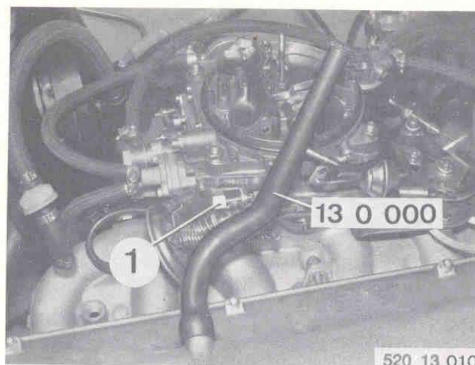
The CO value is measured separately for the front and rear exhaust manifolds.

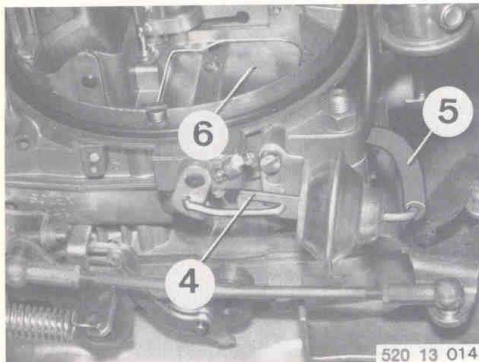
Turn the mixture regulating screws (2 and 3) to adjust the CO content of the exhaust to $1 \pm 0.5\%$ by volume.

Screw (2) = rear exhaust manifold

Screw (3) = front exhaust manifold

If the idle speed changes, correct again at screw (1).





3) Checking operation of stage II damper
Check that the air butterfly moves freely and the throttle butterfly closes correctly.
Run the engine at idle speed.

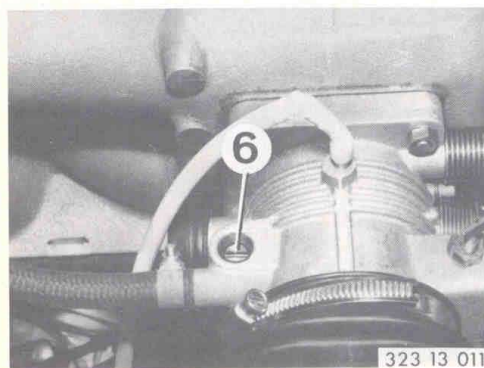
Lever (4) must be pulled against its stop by the diaphragm.

Detach hose (5) ('Matra' clip or similar).

Operate the air butterfly (6) several times.

The diaphragm is in good working order if the lever (4) always returns to the end stop.

Warning: attach the actuating rod with the bend pointing down, or else the accelerator linkage may stick.

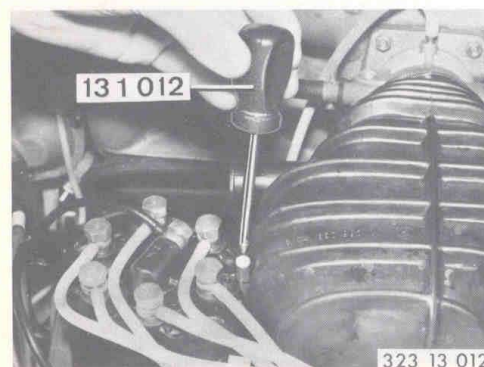


B) Fuel injection engine

– engine at normal operating temperature –

1) Idle speed

Turn screw (6) to adjust engine idle speed to $900 \pm 50/\text{min}$.



2) Adjusting CO content of exhaust

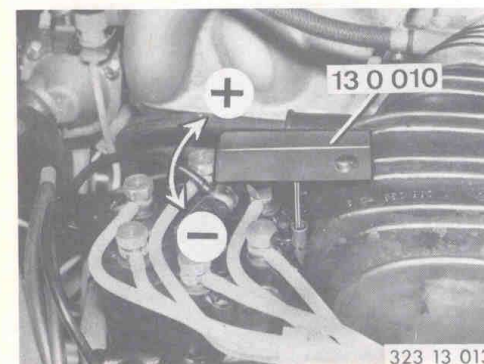
Remove the screw plugs from the exhaust manifolds and insert measuring probes 13 0 020.

Connect the exhaust emissions tester.

Measure the CO content of the exhaust separately at the front and rear manifolds.

Warning: remove the safety keeper (designed to prevent unauthorized tampering with the settings) using puller 13 1 012.

After adjusting engine idling and the CO content of the exhaust, a new keeper must be installed. Use socket head 13 1 018 for this purpose.



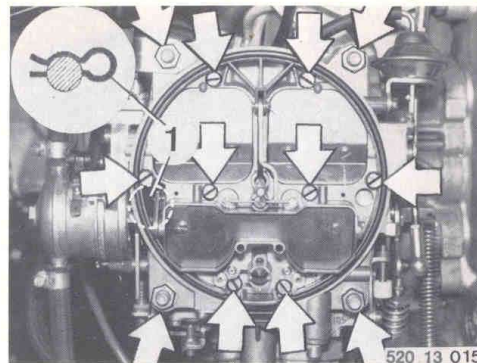
Use adjusting wrench 13 0 010 to set the CO value of the exhaust emissions to $1 \pm 0.5\%$.
After adjustment, remove the wrench and accelerate briefly.

13 11 009 Carburetor – cleaning

Detach the air cleaner – 13 71 000.

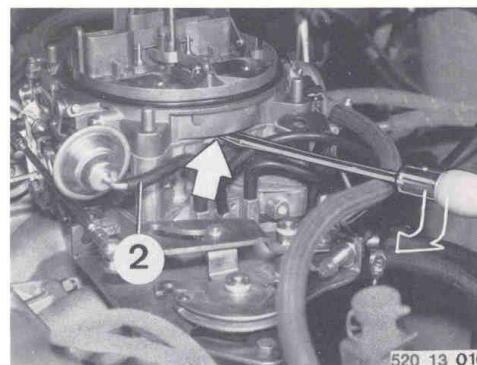
Remove keeper (1) and detach the connecting rod. Unscrew the four nuts and the eight machine screws.

When installing: place the holder with the return valve on the pin, and tighten the nuts in a cross-wise sequence to 8 ... 10 Nm (5.9 ... 7.3 ft.lb) torque.



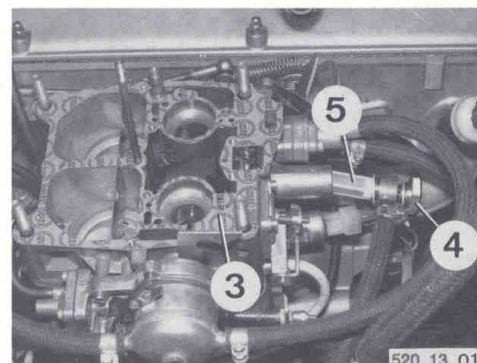
Detach the vacuum hose (2) from the stage II damper.

Press off the carburetor cover with a screwdriver at the point provided.



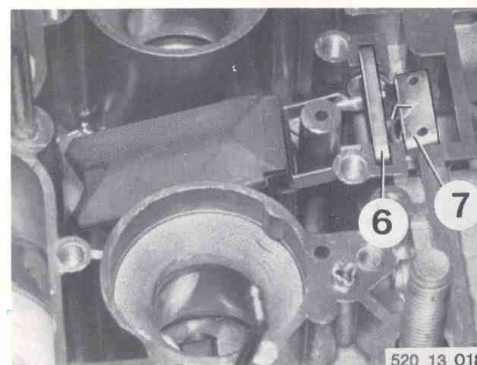
When installing: use a new gasket (3).

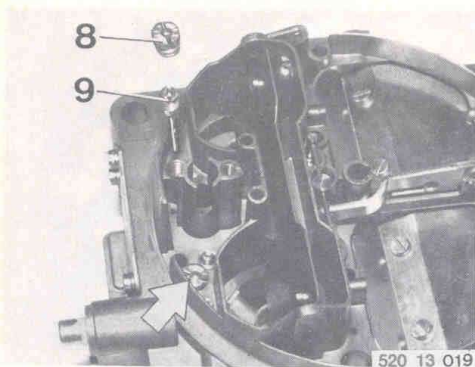
Remove hollow screw (4) with filter (5), and clean the filter.



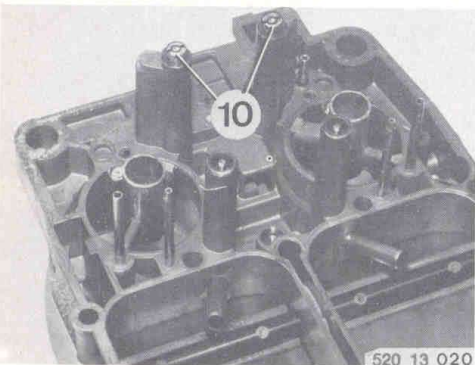
Take out retainer (6), float and float needle valve.

Warning: connect the retaining spring (7) for the float needle valve from the float side.

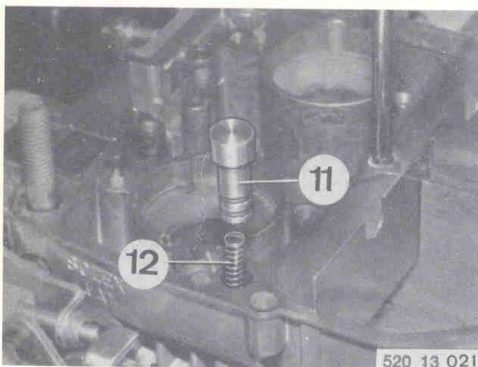




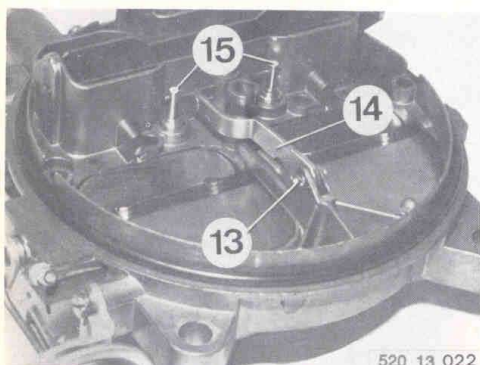
Unscrew and remove idle air jets (8) and idle jets (9).



Clean the two main jets (10).



Lift out plunger (11) and spring (12).



Remove the keeper from pivot (13). Remove pin, lever (14), jet needles (15) for stage II air correction and the plungers.

Warning: mark the correct installed positions of the jet needles.

Blow through all passages and jets with compressed air.

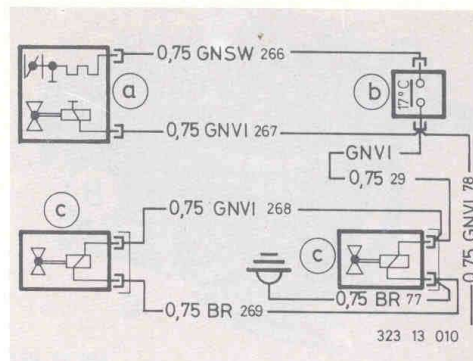
13 11 044 Automatic choke – adjusting

Circuit diagram for cold-start system

a) Automatic choke

b) Coolant temperature switch, 17°C (63°F)

c) Idle cut-off valves

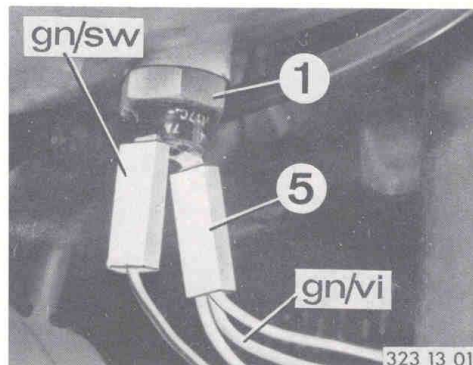


17°C (63°F) heat-sensitive switch

The heat-sensitive switch (1) controls the current supply to the spiral heating element in the choke cover, which is operated when coolant temperature exceeds +17°C (+63°F).

When the ignition is switched on, the green/violet leads (5) must be live.

Heat-sensitive switch (1) is in good working order if the terminal for the green/black leads is not live below a coolant temperature of +17°C (+63°F).



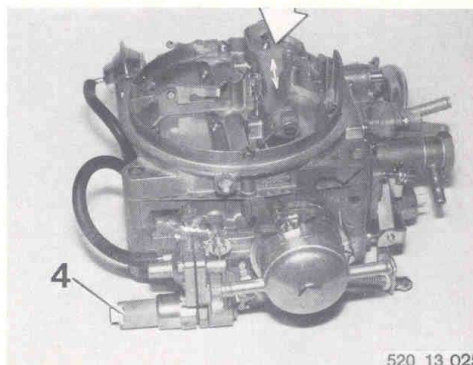
Choke butterfly pulldown

1. Adjust choke butterfly gap 'S 1'.

The ignition should be switched off.

Warning: choke butterfly gap 'S 1' can only be adjusted at temperatures not exceeding +20°C (+68°F). At temperatures above +20°C (+68°F): the servo motor (4) must be cooled.

Check that the choke butterflies can move freely.



Detach the choke cover – 13 11 360.

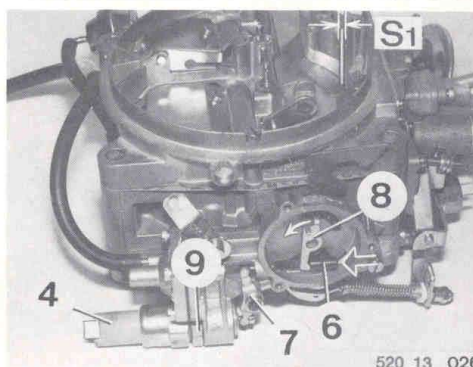
Push the pulldown rod (6) to the left until it is against intermediate lever (7).

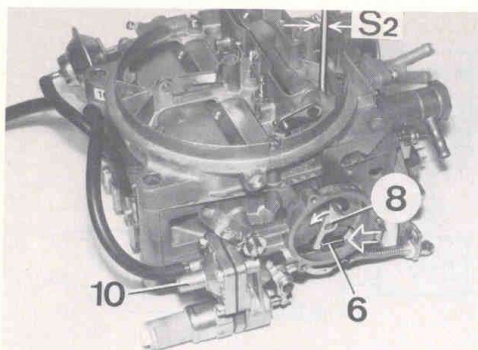
Move lever (8) at the pulldown rod (6) up to its stop.

With a 1.2 mm (0.047 in) twist drill or rod, check choke butterfly gap 'S 1' at the lobe of the butterfly which moves downwards.

The gap should be 1.2 ± 0.1 mm (0.047 ± 0.004 in).

Correct by slackening nut (9) and turning the servo motor (4).





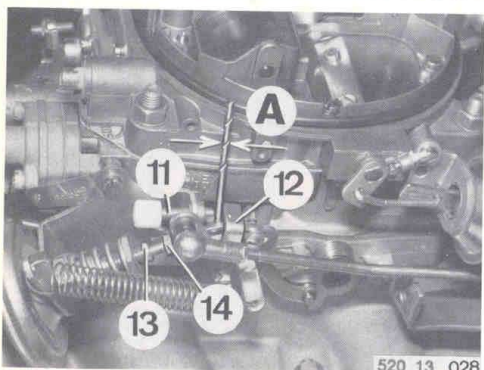
2. Adjust choke butterfly gap 'S2'.

Switch on the ignition.

After approx. 150 s have elapsed, press the pulldown rod (6) to the left until against its stop. Move the lever (8) on the pulldown rod (6) against its stop.

With a 4.2 mm (0.165 in) twist drill or rod, check, choke butterfly gap (S2) at the lobe which moves downwards. The gap must be 4.2 ± 0.1 mm (0.165 \pm 0.004 in).

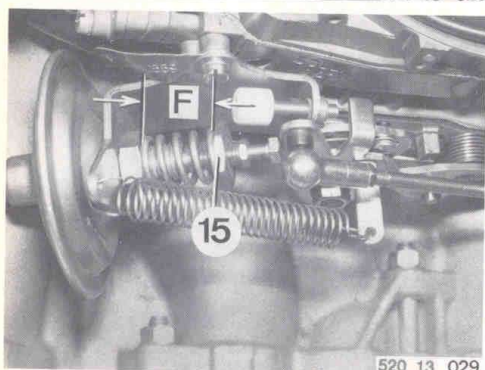
Correct at screw (10).



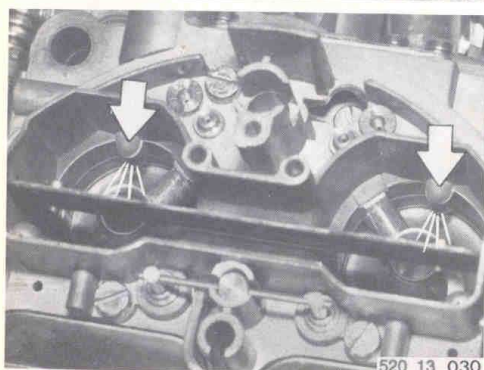
Adjusting the throttle butterfly actuator

Check gap (A) between screw (11) and throttle lever (12). It should be 3.0–0.2 mm (0.118–0.008 in).

To correct, slacken locknut (13) and turn screw (14).



Check spring length (F) = 23 mm (0.91 in) between the nuts, and adjust if necessary at nut (15).



13 11 054 Quantity of fuel injected – checking/adjusting

Take off the air cleaner – 13 71 000.

Actuate the throttle butterfly lever several times.

A spray of fuel should be seen to emerge from the two fuel outlets.

If no fuel is injected:

a) check that the jets at the fuel outlet points are not blocked, and clean the jets if necessary.

b) take off the pump cover.

Check condition of diaphragm and renew if necessary.

Blow through the suction and discharge passages.

When installing: the smaller diameter of the conical spring faces the diaphragm.

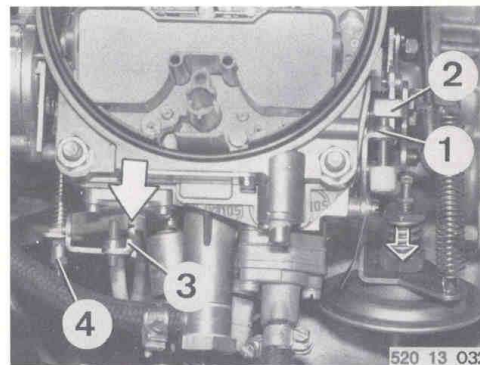


Move the throttle butterfly actuator back until the idle speed stop screw (1) touches lever (2).

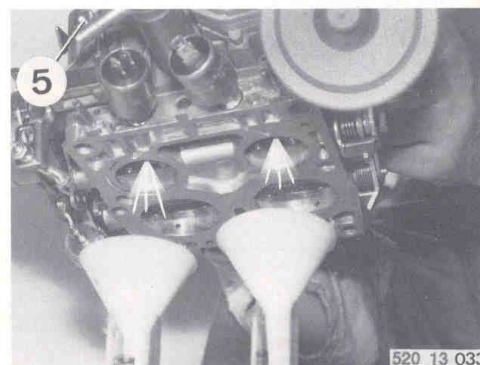
For cars with automatic transmission: obtain a gap of 1 mm (0.04 in) between idle stop screw (1) and lever (2).

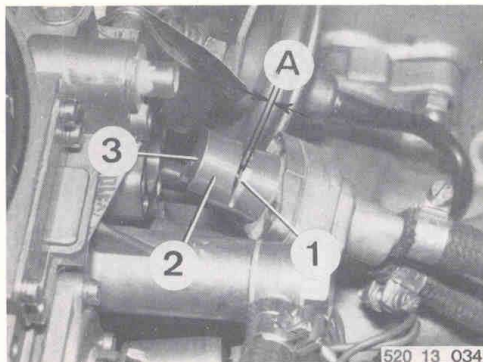
Lever (3) should then just touch the diaphragm plunger.

Correct at nut (4).



To measure the quantity of fuel injected by the accelerator pump, detach the carburetor – 13 11 100. Attach a vessel containing fuel 2 m (6 ft 6 in) above the carburetor, connect it to the carburetor and fill it with the correct grade of fuel. Operate the throttle butterfly lever several times slowly through its full range of movement. Trap the emerging fuel with a funnel and measuring flask. Per stroke and per side, the quantity of fuel should be $0.5 \pm 0.1 \text{ cm}^3$ ($0.176 \pm 0.035 \text{ fl. oz.}$). Adjust the quantity at the stroke limiting screw (5). Tighten screw (5) to reduce the quantity of fuel injected.





13 11 065 Heat-sensitive bypass (TM) starting system – checking/renewing

A) Checking

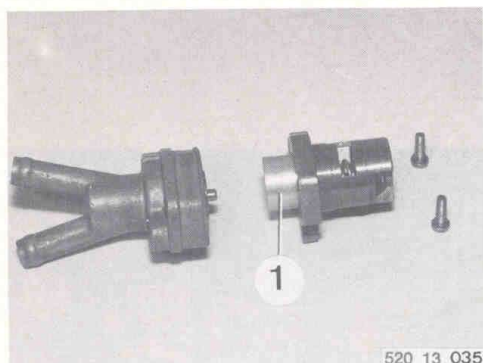
Remove the TM starter assembly.

At a coolant temperature of +20°C (+68°F), there must be a gap (A) = 2.2 ± 0.2 mm (0.087 ± 0.008 in) between plunger (1) and housing (2).

At normal operating temperature, plunger (1) should just have closed the gap.

To check and adjust the TM starting system, cool it to +20°C (+68°F) with water, and adjust the gap (A) with screw (3).

When installing: note correct position, with slot facing up.



B) Renewing TM starter system

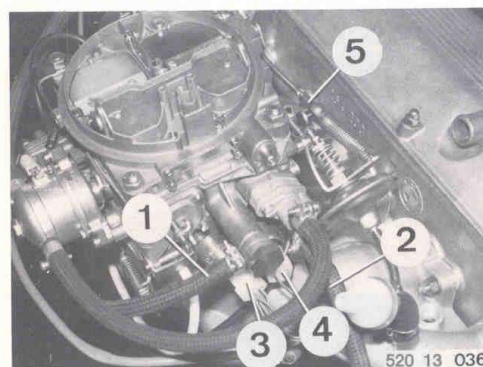
Trouble-shooting:

Engine warm

Plunger (1) sticking – gap remains open
= CO content of exhaust (in % by vol.) very high
= Engine runs on after ignition has been switched off.

Engine cold

Plunger (1) sticking – no air gap
= Engine will not idle



13 11 100 Carburetor – removing and installing

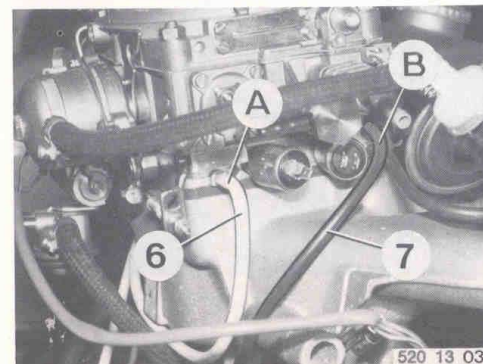
Remove the air cleaner – 13 71 000.

Partly drain the coolant.

Detach fuel hose (1), coolant hose (2), both plugs from idle shutoff valves (3 and 4) and accelerator linkage (5).

When installing: add coolant.

Bleed the cooling system – 17 00 039.



Detach white vacuum hose (6) from connection A and black vacuum hose (7) from connection B.

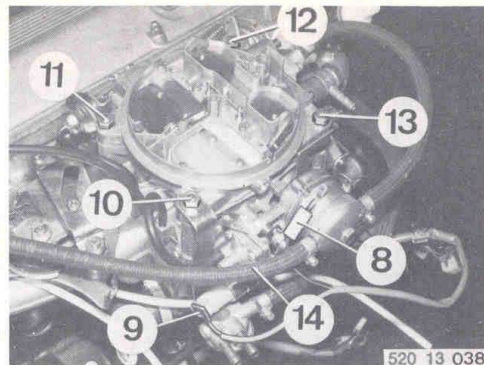
Detach green/black lead (8) from choke body, green/violet lead (9) from servo motor and loosen nuts (10 ... 13).

Take off coolant hose (14).

Take off carburetor.

When installing: tighten nuts (10 ... 13) in a crosswise sequence to 8 ... 10 Nm (5.9 ... 7.3 lb.ft) torque.

Secure retaining bracket for return valve with nut (10).

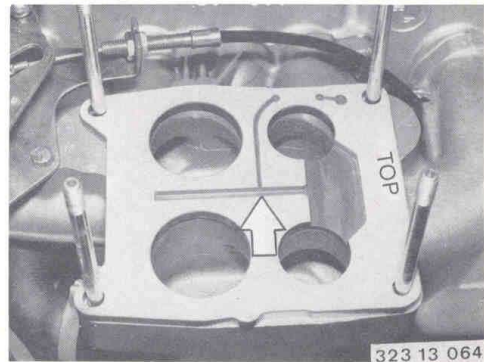


13 11 111 Insulating flange – renewing

Remove carburetor – 13 11 100.

Take off the insulating flange.

When installing: the milled channels face the carburetor.



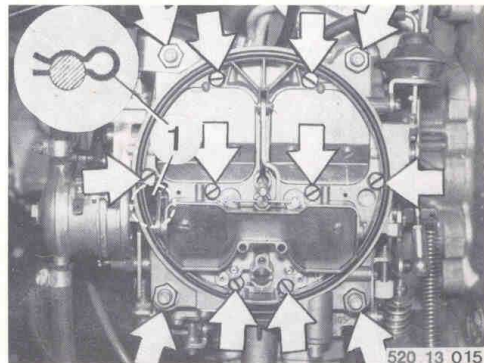
13 11 171 Carburetor cover gasket – renewing

Detach the air cleaner – 13 71 000.

Remove keeper (1) and detach connecting rod.

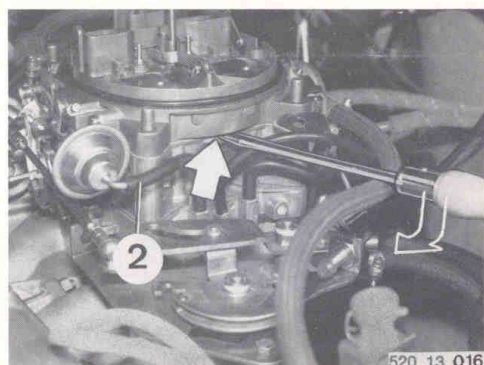
Loosen the 4 nuts and 8 machine screws.

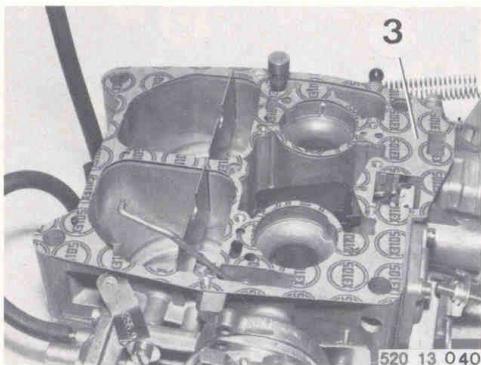
When installing: place holder with return valve on to pin and tighten nuts in a crosswise sequence to 8 ... 10 Nm (5.9 ... 7.3 lb.ft) torque.



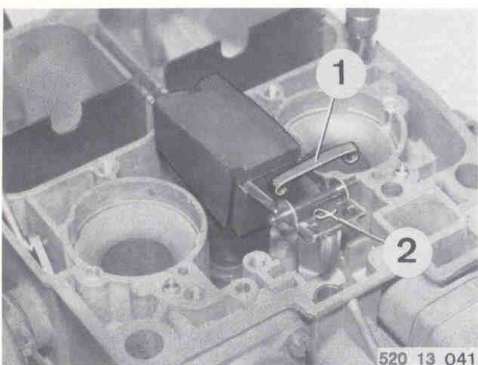
Detach vacuum hose (2) from the stage II damper.

Lever off the carburetor cover at the prescribed point with a screwdriver blade.





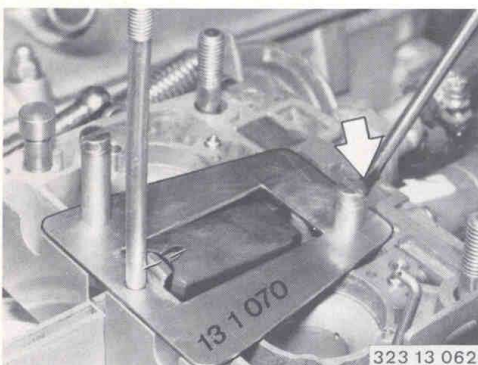
Renew gasket (3).



13 11 241 Float needle valve – renewing

Remove the carburetor cover – 13 11 171.
Lift out the retainer and take out the float with float needle valve.

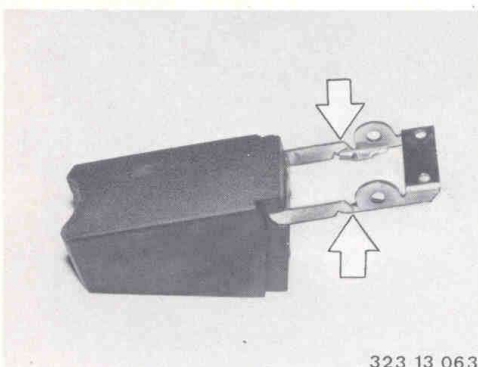
When installing: attach the retaining spring (2) from the float side.



Check fuel level and float setting with gauge 13 1 070.

Screw on the gauge. The float with float needle valve and retainer must be installed. Raise the float until resistance is encountered (float needle cannot move any further).

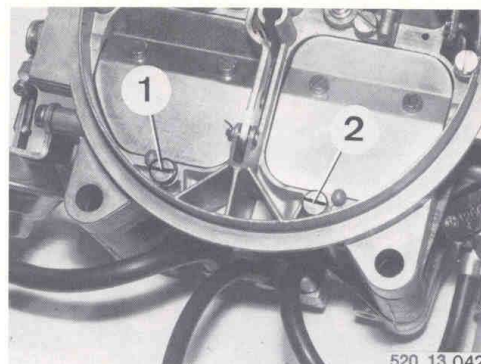
The projection on the gauge should then be in line with the top of the cutout in the float.



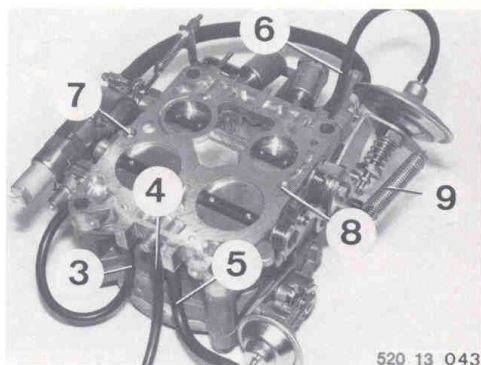
Correct float position by bending at the prescribed point (3).

13 11 278 Bedplate gasket – renewing

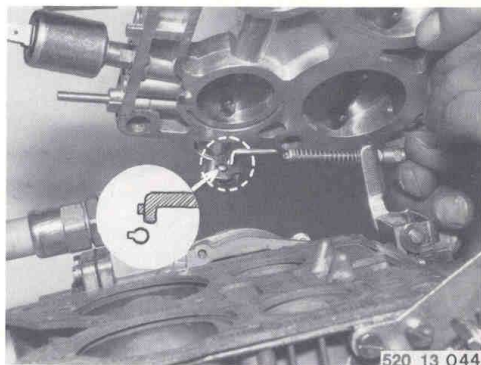
Remove the carburetor – 13 11 100.
Take out machine screws (1) and (2).



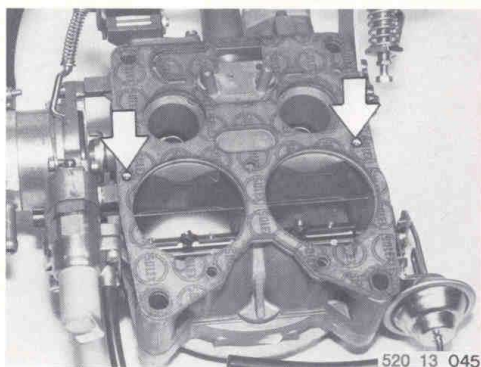
Pull off vacuum hoses (3 ... 6).
Remove screws (7) and (8).
Disconnect spring (9).

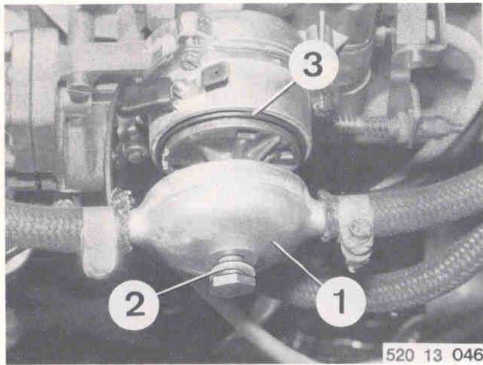


Raise the throttle butterfly section and turn through 180 degrees. Disconnect the accelerator pump linkage.



Renew the gasket.
When installing: the holes must be aligned with the tapped holes.





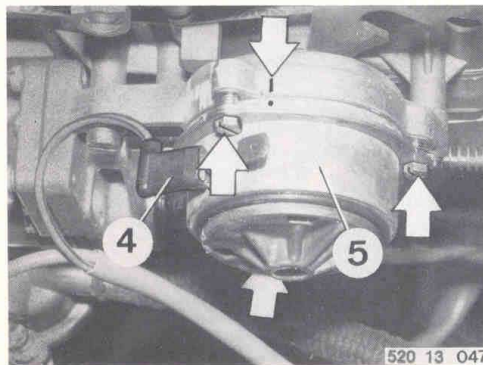
13 11 360 Choke cover/spiral heating element – renewing

Partly drain the coolant.

Detach the water stub pipe (1).

When installing: check condition of sealing washer (2) and O-ring (3) and renew if necessary.

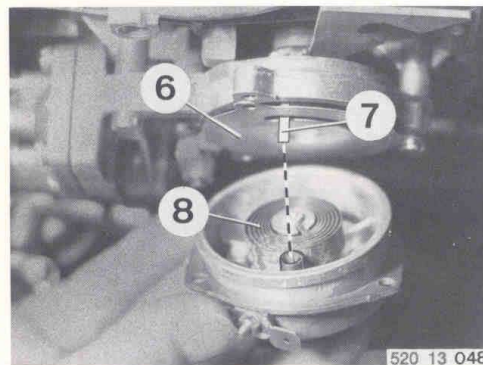
Add coolant and bleed the cooling system – 17 00 039.



Detach lead (4).

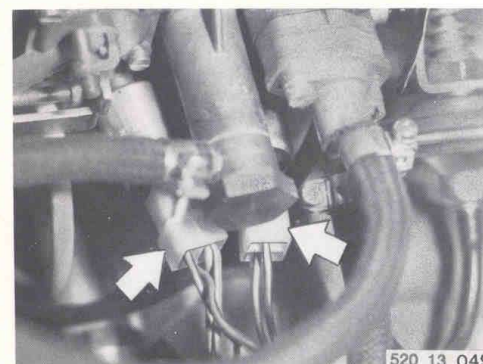
Take off the choke cover (5).

When installing: the marks on the choke cover and the choke body must be opposite each other.



When installing: the raised side of the depression in the intermediate plate (6) faces the carburetor.

Connect the actuating lever (7) and bimetallic spring (8).



13 11 391 Idle valve – renewing

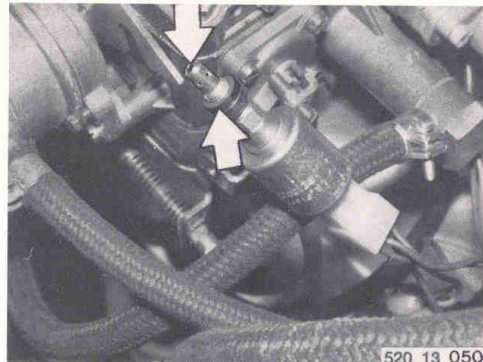
With the ignition switched on, the plugs for the green/yellow leads must be live.

Brown lead = earth (ground).

Pull off the plugs, then re-attach.

The idle valve is in good working order if a clicking sound can be heard.

Unscrew and remove the idle valve.
Warning: do not damage the conical sealing face.
A loose idle valve will cause misfiring and running on.
Check the gasket and renew if necessary.



520 13 050

2.73

13-11/11

2.74

13-11/11

Trouble-shooting – Solex 4 A 1 carburetor

The following conditions must be fulfilled before this trouble-shooting table can be used:

1. Normal compression in all cylinders
2. Valve clearances adjusted to specified values
3. Dwell angle and ignition timing to specification
4. All ignition system components in good working order

Fault	Cause	Remedy
Poor cold starting	Choke butterfly not closing	Free or adjust choke butterfly Servo motor sticking: renew
	Defective bimetallic spring in choke cover	Renew choke cover
	Choke cover out of adjustment	Adjust choke cover correctly
	Throttle butterfly not advanced sufficiently	Adjust throttle butterfly positioner
	Cold start mixture enrichment supply blocked	Clean carburetor
	Vacuum retard can operating	Renew thermo-valve (heat-sensitive valve)
	Choke butterfly setting incorrect	Adjust choke butterfly correctly
	Throttle butterfly positioner defective	Renew throttle butterfly positioner
Engine starts when cold but will not run	Choke butterfly does not move to 'S 2'	No power supply to servo motor Defective servo motor: renew
	TN (heat-sensitive bypass) starting system not working	Blow through air connection jet via TN starting system with compressed air Adjust TN gap to 2.0 ... 2.4 mm (0.079 ... 0.094 in) at 20 °C (68 °F)
	Pulldown diaphragm leaking	Renew pulldown diaphragm or seal housing
	Automatic choke jammed or incorrectly adjusted	Adjust automatic choke
	Vacuum hoses porous/leaking	Renew vacuum hoses

Fault	Cause	Remedy
Extremely irregular running or stalling during warming-up	Choke butterfly gap 'S 2' too large	Set 'S 2' to 4.2 mm (0.165 in)
1. Fuel-air mixture too weak	Preload at choke butterfly absent or too low	Set choke cover to mark, or renew
	Temperature switch in intake pipe defective (circuit closed below 17°C/63°F)	Renew temperature switch
	TN starting system not supplying any mixture	Blow through the TN fuel jet
	TN starting system supplying too little mixture	Check plunger setting and adjust if necessary at 20°C (68°F) to 2.0 . . . 2.4 mm (0.08 . . . 0.09 in)
	Ignition retarded below +17°C (+63°F) – coolant temperature switch operating	Renew thermo-valve (heat-sensitive valve)
2. Fuel-air mixture too rich	Basic idle setting too lean	Set idle mixture for both groups of cylinders to 1 ± 0.5% CO by volume (with engine at normal operating temperature)
	Intake air system leaking	Seal intake system
	Choke butterflies sticking	Free choke butterflies
	Choke butterfly gap too small at idle speed	Adjust choke butterfly gap 'S 1' to 1.2 mm (0.047 in)
	Pulldown diaphragm leaking	Renew pulldown diaphragm or seal housing
	Pulldown mechanism or choke butterfly system sticking	Free these items
	Choke butterfly gap 'S 2' too small	Adjust 'S 2' to 4.2 mm (0.165 in)
	Defective automatic choke heating	Check power supply, renew choke cover if necessary
	Temperature switch in intake pipe not opening circuit above 17°C (+63°F)	Renew temperature switch in intake pipe
	Basic idle settings differ too widely	Set idle speed CO content of exhaust to 1 ± 0.5% by volume at both cylinder groups (engine at normal operating temperature)

Fault	Cause	Remedy
Poor idling	Idle shutoff valve defective or inoperative	Repair supply lead
	Electric lead defective	
	Internal fault in idle shutoff valve	Renew idle shutoff valve
	Idle fuel jets blocked	Clean idle fuel jets with compressed air from the top, through the idle air jets
	Leaks at vacuum cans	Check spray, trace and remedy leaks
	Leak at intake pipe vacuum connections	
	Leak at carburetor gasket	
	Leak at intake pipe	
	Blocked TN (heat-sensitive bypass) starting system jets	Blow through TN system with compressed air from front and below
	Float needle valve dirty or defective	Clean valve, renew if necessary Check set of seals, renew if necessary
Idle speed too high	Choke butterfly sticking	Free choke butterfly
	Spiral heating element burnt out	Renew choke cover
	Defective temperature switch	Renew temperature switch
	Actuating linkage or throttle butterfly lever stiff to move	Free linkage or lever
	Throttle butterfly opened too far by positioner	Adjust positioner to 3.0 mm (0.118 in)
	Excessive spring preload at butterfly positioning spring	Adjust length of butterfly positioning spring to 23.0 mm (0.91 in)
	Vacuum hoses leaking	Check for leaks by spray test, and remedy
	TN (heat-sensitive bypass) starting system not cutting out	Remove TN starting system housing when hot and check that plunger covers control slot.
	Control plunger not completely covering control slot	Adjust TN plunger at +20°C (+68°F) to 2.0 ... 2.4 mm (0.08 ... 0.09 in); renew TN starting system if necessary
	No hot water preheating at TN (heat-sensitive bypass) starting system (passage blocked)	Clean water passage
	Stage II throttle butterfly not closing Linkage stiff to move	Free linkage
	Carburetor and insulating flange not correctly centered	Align carburetor and insulating flange centrally

Fault	Cause	Remedy
Poor transition from idle to stage I part load	<p>Accelerator pump injection volume not adjusted correctly</p> <p>Fuel passages blocked</p> <p>Diaphragm defective</p> <p>Severe difference in basic idle mixture settings, or settings too rich</p> <p>Uncontrolled air entry from pre-atomizer</p> <p>Fuel level too low</p>	<p>Adjust injected volume</p> <p>Blow through passages with compressed air</p> <p>Renew diaphragm</p> <p>Set idle speed CO content for both cylinder groups to $1.0 \pm 0.5\%$ by volume (engine at normal operating temperature)</p> <p>Seal the pre-atomizer</p> <p>Adjust fuel level</p>
Poor transition from part load to full throttle	<p>Leak at stage II vacuum can damper</p> <p>Air butterfly for stage II sticking</p> <p>Stage II jet needles sticking</p> <p>Transition passages blocked</p> <p>Broken torsion spring for stage II air butterfly</p>	<p>Check vacuum can for leaks and renew if necessary</p> <p>Free butterfly</p> <p>Free levers and needles</p> <p>Blow through passages from the top with compressed air</p> <p>Renew torsion spring</p>
High fuel consumption	<p>Choke butterfly sticking</p> <p>Transfer linkage stiff</p> <p>Heating element burned out</p> <p>Temperature switch defective</p> <p>Stage II air butterfly sticking</p> <p>Broken stage II air butterfly torsion spring</p> <p>Intake air preheat control flap sticking in warm-air position</p> <p>Defective thermo-element</p>	<p>Free choke butterfly</p> <p>Free transfer linkage</p> <p>Renew choke cover</p> <p>Renew temperature switch</p> <p>Free butterfly</p> <p>Renew torsion spring</p> <p>Free control flap</p> <p>Renew thermo-element</p>
Engine 'hunts' (irregular idle speed)	<p>Butterfly positioner out of adjustment</p> <p>Idle mixture setting too weak</p> <p>Leaks on intake side</p>	<p>Adjust butterfly positioner</p> <p>Adjust to richer idle mixture</p> <p>Trace leaks by spray test and eliminate</p>

Fault	Cause	Remedy
Lack of power at full throttle	Throttle butterflies stiff Stage II throttle butterfly release not working	Free throttle butterflies Release is controlled by automatic choke. Check operation and renew any defective parts Blow through fuel supply with compressed air
	Fuel supply blocked	
	Fuel supply leaking Fuel pump defective	Renew defective hoses and unions Renew defective parts; install an exchange pump if necessary
	Fuel tank vent blocked	Blow through vent line with compressed air

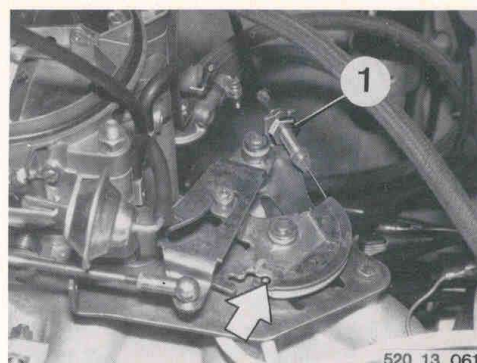
13 21 065 Torsion spring for throttle actuating linkage – renewing

Unscrew nut (1) for accelerator cable, and detach cable.

When installing: adjust accelerator cable – 35 41 421.

On cars with automatic transmission: remove the throttle position cable.

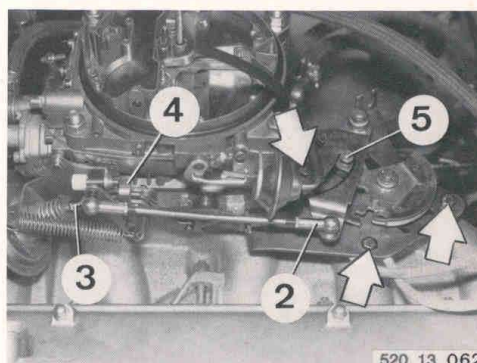
When installing: adjust throttle position cable – 24 00 004.



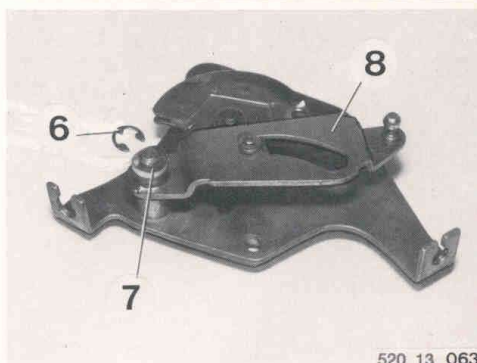
Detach the connecting rod (2). Unscrew the retaining bolts and take out the throttle actuating mechanism.

When installing: press back the throttle butterfly positioner (3) until the throttle lever (4) is touching the stop bolt.

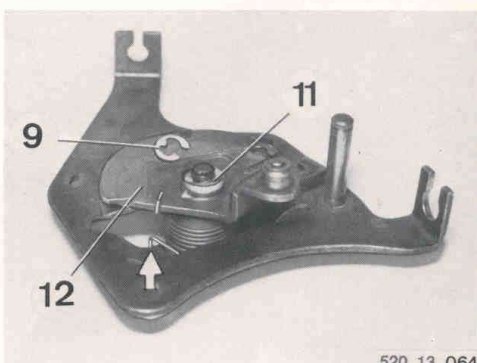
With the connecting rod (2) re-attached, move the throttle actuating mechanism along its slots until roller (5) is touching the contact face of the gate. In this position, tighten the retaining bolts.

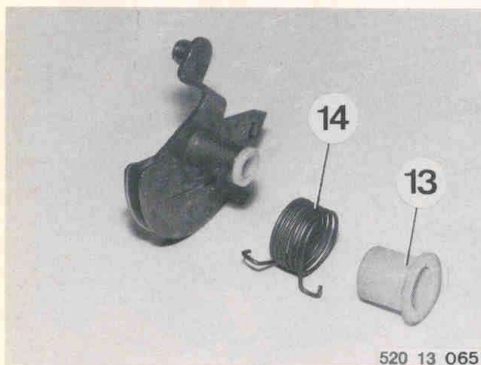


Remove keeper (6) and take off corrugated washer (7) and lever (8).



Take out keeper (9). Disconnect the spring at the bottom. Take off corrugated washer (11) and lever (12).





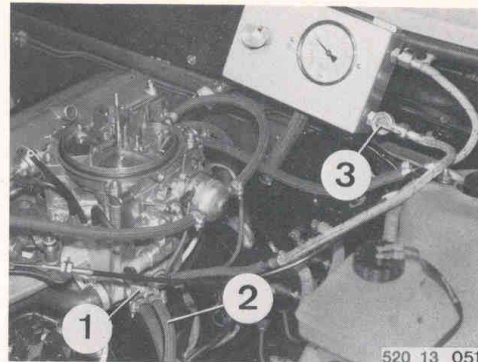
Take off bushing (13) and spring (14).

13 31 009 Fuel pump pressure/float needle valve – checking

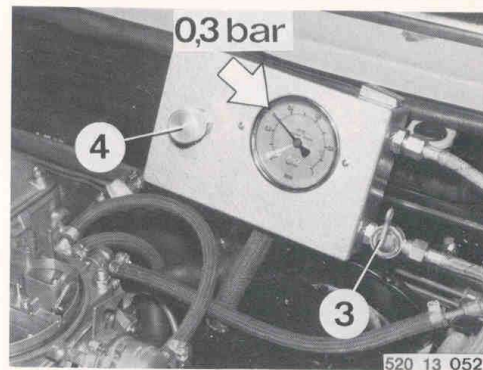
Connect the tester between the fuel return valve (1) and the carburetor.

Disconnect the return line (2) with a 'Matra' clip or similar. Open the shutoff tap (3).

The fuel pump is in good working order if max. pump pressure at 3000/min is 0.29 bar (4.1 lb/in²).

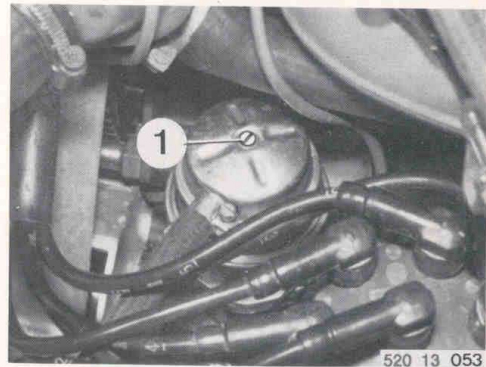


Run the engine briefly, then switch off. Close shutoff tap (3) and increase fuel pressure to 0.3 bar (4.27 lb/in²) at rotary knob (4). The float needle valve is in good working order if the pressure does not drop.



13 31 019 Fuel pump – cleaning

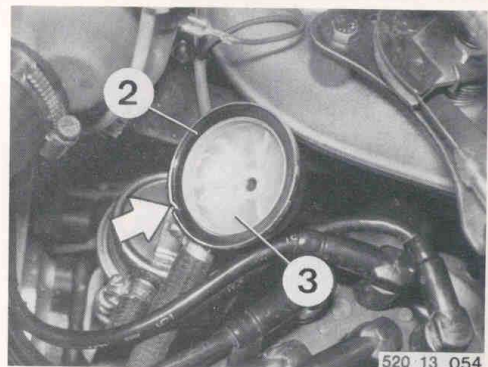
Take out screw (1).

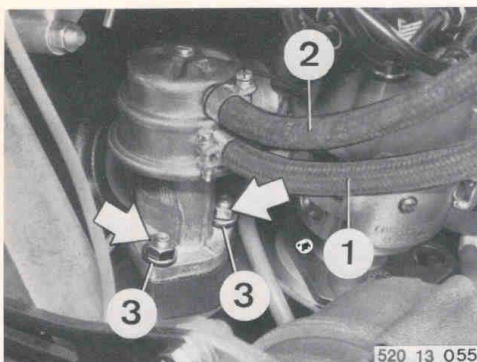


Remove cover with sealing ring (2) and strainer (3).

Clean the strainer.

When installing: the projection must locate in the pump body.





13 31 030 Fuel pump – renewing A) Carburetor engine

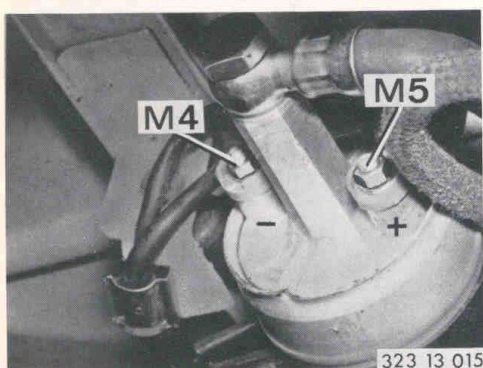
Take off fuel hoses (1) and (2).

1 Hose to return valve

2 Hose to fuel tank

Unscrew the fuel pump.

Transfer the insulating bushings (3) to the new pump.



B) Fuel injection engine

Unscrew the electric leads.

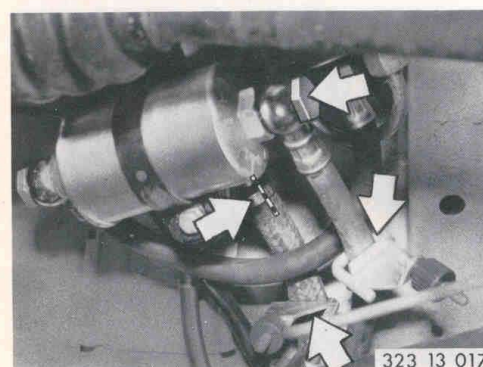
When installing:

+ connection = M 4 nut, green/yellow lead

- connection – M 5 nut, brown lead



Remove the three retaining nuts.



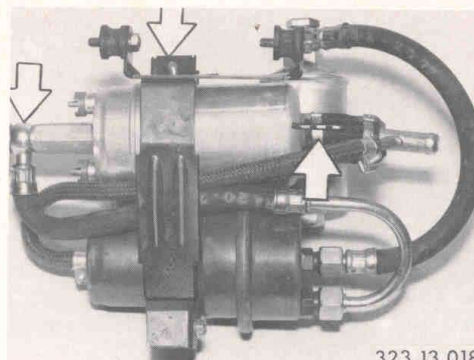
Close off the feed and return hoses with suitable clips.

Cut open the hose clip or unscrew the hose.

When installing: use new hose clip.

Take out the pump with mounting.

Detach pump from mounting plate.
When installing: use new crimp-pattern hose clip.

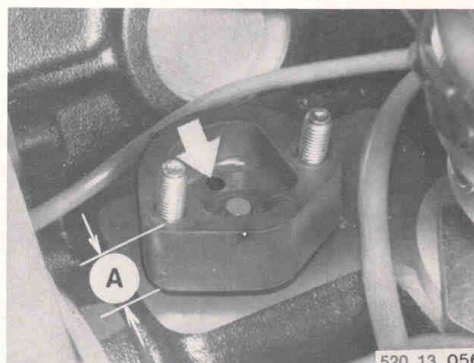


323 13 018

13 31 041 Insulating flange – renewing

Remove the fuel pump – 13 31 030.
Do not alter the thickness (A)¹⁾ of the insulating flange.

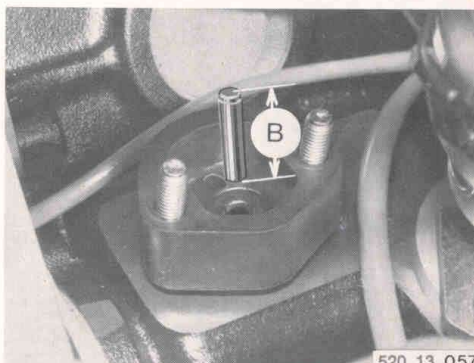
When installing: the oil return hole faces the crankcase.



520 13 056

13 31 051 Pump plunger – renewing

Remove the fuel pump – 13 31 030.
Note correct length (B)¹⁾ of pump plunger.
Any change in pump plunger length will alter the fuel pump pressure¹⁾.

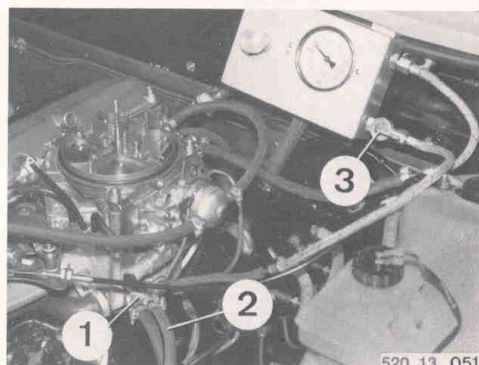


520 13 057

13 31 071 Fuel return valve – checking

Connect the tester between the fuel return valve (1) and the carburetor.
Detach the return line (2) and hold a vessel under the union to trap escaping fuel.
The shutoff tap (3) must be open.
Start the engine.

The fuel return valve is in good working order if fuel emerges from the union (2) from a pressure of 0.2 bar (2.84 lb/in²) upwards.



520 13 051

¹⁾ See specifications

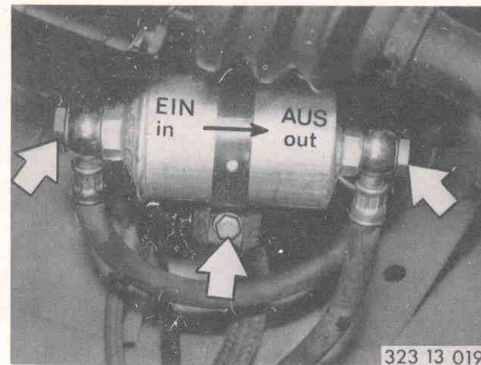
13 32 051 Fuel filter – renewing

Renew the fuel filter every 30 000 km (approx. 20 000 miles).

Detach the hose unions and clip.

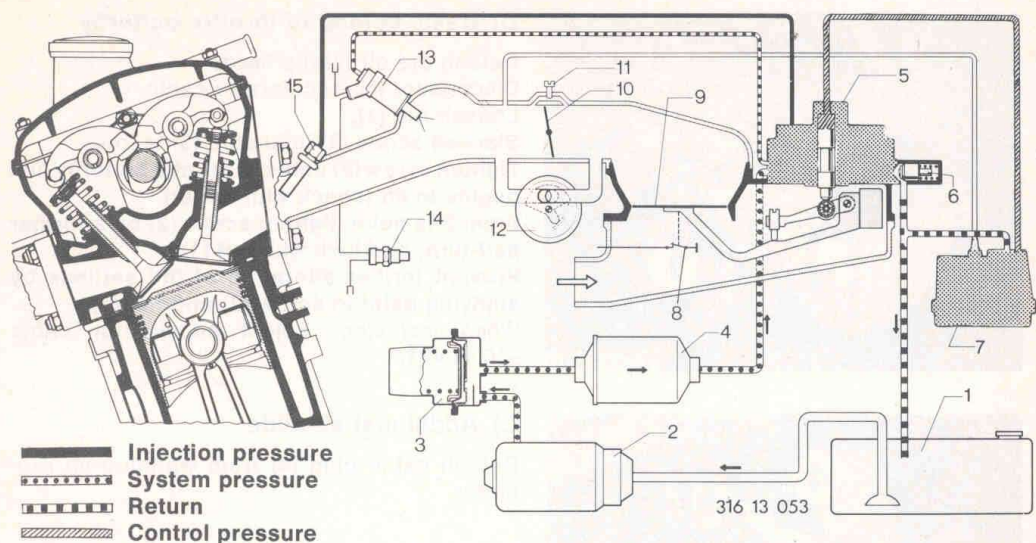
When installing: Note correct direction of flow (union at right is for outlet flow).

Use only genuine spare parts. In addition to the paper element, the filter housing contains a fluff trap.



Circuit diagram for transistorized ignition and K-Jetronic fuel injection

- | | | | |
|----|----------------------------|---|---|
| 19 | Coil | c | Warming-up regulator |
| 20 | Distributor | d | Additional air slide |
| 22 | Engine plug | e | Diode relay |
| 27 | Starter | f | Fuel pump relay |
| a | Heat-sensitive time switch | g | Transistorized coil ignition (TSZ) control unit |
| b | Starting valve | h | Resistors |

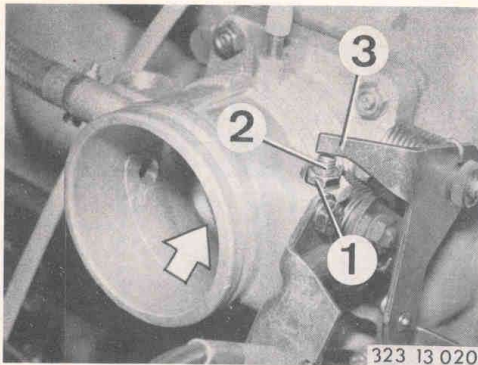


- | | | |
|-----------------------------|-------------------------|-------------------------------|
| 1 Fuel tank | 7 Warming-up regulator | 13 Starting valve |
| 2 Fuel delivery pump | 8 Safety switch | 14 Heat-sensitive time switch |
| 3 Pressure reservoir | 9 Baffle plate | 15 Injectors |
| 4 Fuel filter | 10 Throttle butterfly | |
| 5 Fuel flow distributor | 11 Idle adjusting screw | |
| 6 System pressure regulator | 12 Additional air slide | |

13 50 009 Fuel injection system – checking operation

A) Visual inspection with engine stopped

Rectify visible leaks on the fuel system by renewing or sealing the parts concerned. Inspect the vacuum system for loose or porous hoses and unions, good condition of starting valve, injector and intake pipe seals and gaskets, and rectify any faults detected. Any uncontrolled air source drawn into the engine will not be measured by the airflow meter. As a result, the mixture will be weakened and the engine will not idle smoothly.



B) Basic setting of throttle butterfly

Detach the air intake hood.

Disconnect the accelerator cable.

Loosen nut (1).

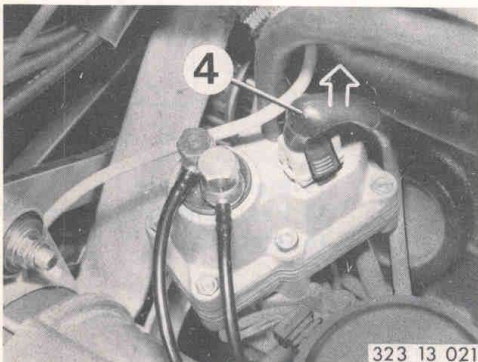
Slacken screw (2) until stop (3) is free.

Tighten screw (2) until the throttle butterfly just begins to lift (check with finger).

From this point, tighten screw (2) by a further half-turn, and lock with nut (1).

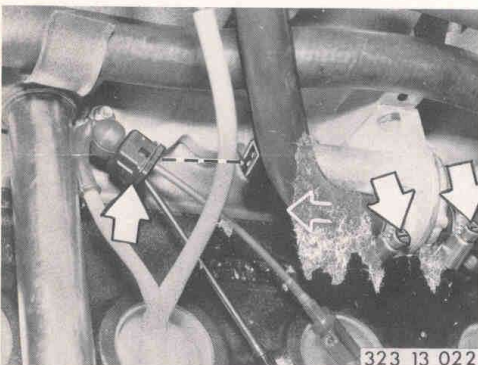
Prevent further alteration of the settings by applying paint to screw (2) and nut (1).

When installing: adjust accelerator cable -35 41 421.



C) Additional air slide

Detach cable plug (4) from warming-up regulator.



Detach both hoses from the additional air slide.

When the engine is cold – at approx. +20°C (68°F) – the shutoff slide will have half-opened the air passage.

Switch on the ignition and operate the starter. Power should be present at the green/yellow lead in plug (5).

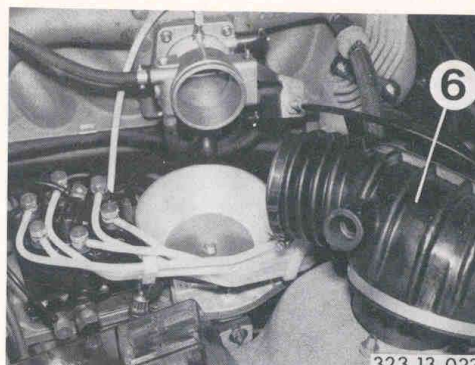
Connect plug (5).

Attach both hoses to the additional air slide. Connect the plug to the warming-up regulator. With the engine running, the shutoff slide should have completely closed the air passage after approx. 5 minutes.

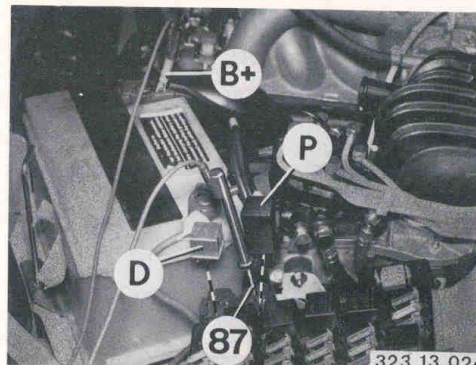
If the air passage remains open even after the valve has been tapped lightly, the additional air slide must be renewed.

D) Mixture regulator

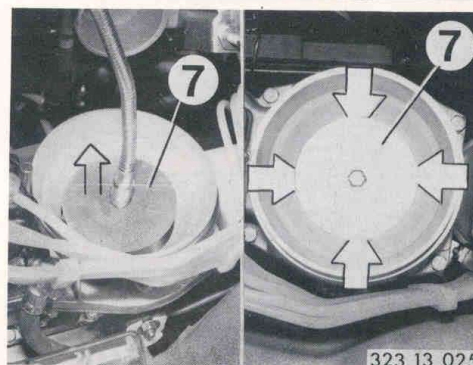
Detach the intake air scoop (6) from the mixture regulator and the throttle butterfly section.



Pull out the diode relay (D) and pump relay (P). Connect contact 87 from the pump relay base to B+ (the fuel pump will run).



With the fuel pump still running, raise the baffle plate (7) by hand or with a magnet slowly. The resistance must be the same over the entire range of movement. Slowly lower the baffle plate again and then pull up immediately a second time. The resistance should be felt immediately. If any free travel is detected, the plunger must be sticking. There should be no resistance when the baffle plate is lowered rapidly.



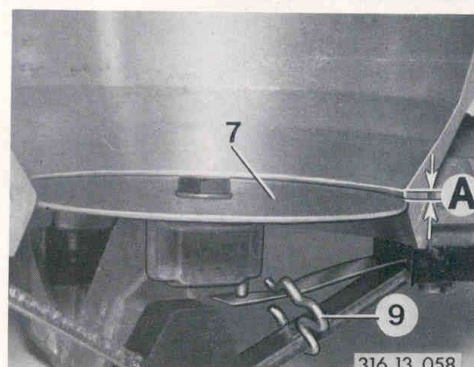
The baffle plate (7) should be flush with the start of the tapered section of the air venturi, or max. 0.5 mm (0.02 in) deeper.

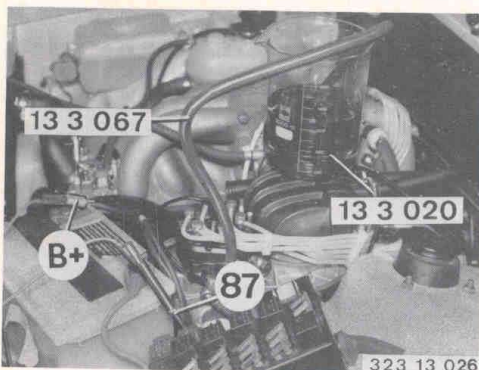
To correct, detach mixture regulator from intermediate housing and bend the shaped spring (9) accordingly.

Baffle plate (7)

too high – engine will run on

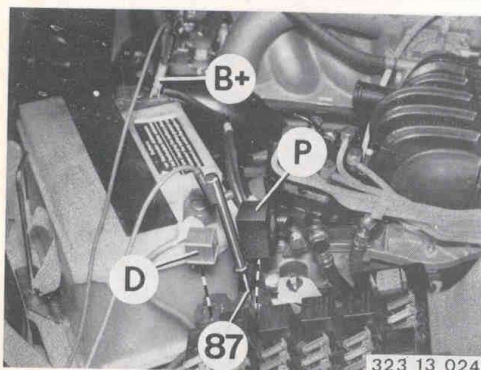
too deep – poor cold or warm starting



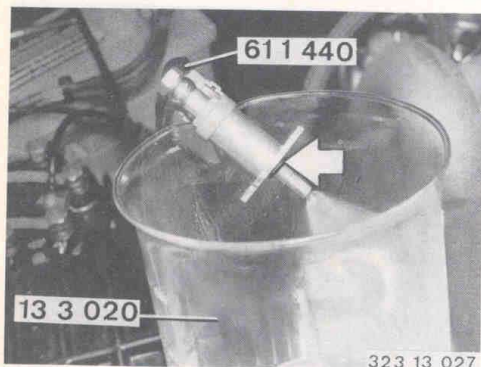


E) Checking electric fuel pump delivery volume

Detach the return line from the flow distributor. Connect hose 13 3 067 and place in measuring flask 13 3 020.

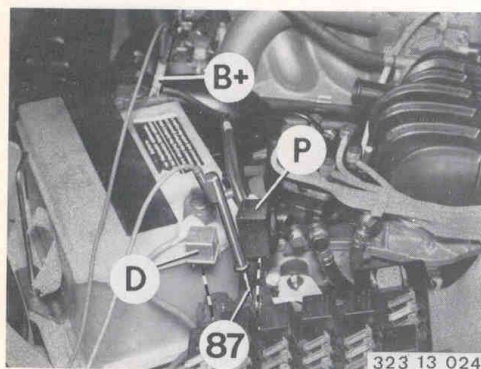


Pull out diode relay (D) and pump relay (P). Connect contact 87 on the pump relay base with B+ (the fuel pump will run). The pump should deliver approx. 750 cm³ (264 fl. oz) within 30 s. Tank must be filled to half capacity at least.



F) Checking operating and leakage of starting valve

Remove the starting valve. The fuel line remains attached. Hold the starting valve in measuring flask 13 3 020. Connect lead 61 1 440 to the starting valve and to B+ and earth (ground). When installing: check condition of O-ring and renew if necessary.

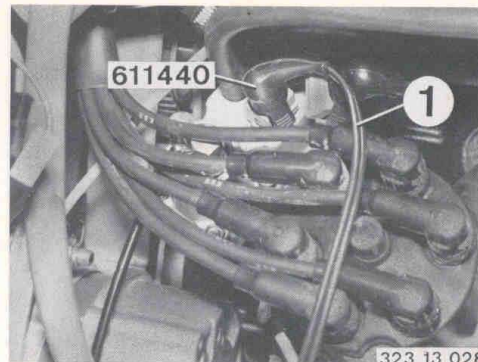


Take out diode relay (D) and pump relay (P). Connect contact 87 on pump relay base with B+ (the fuel pump will run). The cold start valve must deliver a fuel spray. Detach the plug from the cold start valve and dry its jet. No fuel must drip from the cold start valve within 1 minute.

G) Checking electrical operation of warming-up regulator

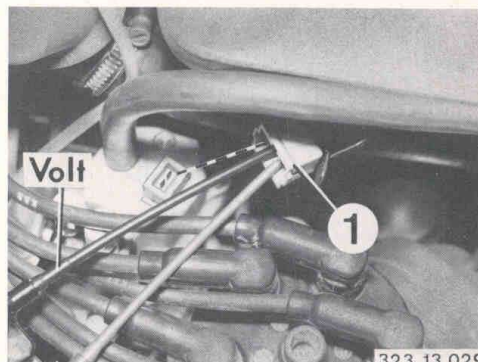
Detach plug (1) from warming-up regulator, and connect lead 61 1 440.

Connect an ohmmeter to the terminals of the heater winding, and check for open circuit in the heater element.



Connect a voltmeter to the warming-up regulator plug (1).

With the engine running, the minimum voltage should be 11.5 V.

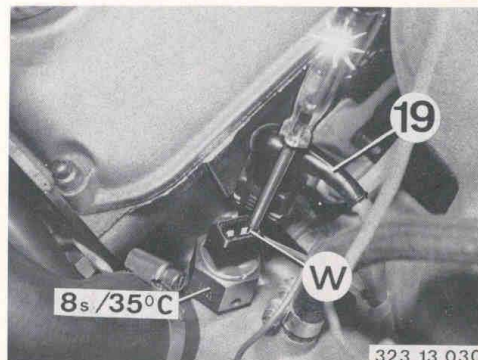


H) Checking temperature-time switch

The thermo-time switch controls the opening time of the cold start valve in relation to coolant temperature.

The opening time of max. 8 s and the cutout temperature of 35°C (95°F) are stamped on the hexagon of the valve.

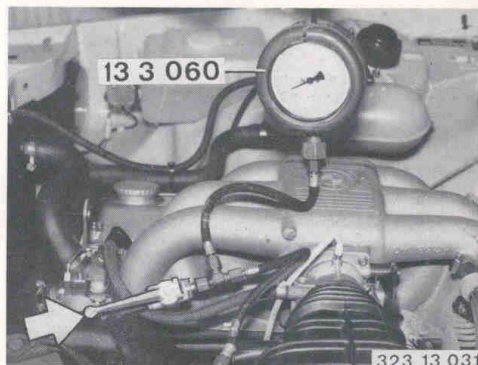
Detach cable plug (19). Connect the test lamp to battery + and to connection W in the thermo-time switch. The test lamp must burn brightly at coolant temperatures below +35°C (+95°F). The test lamp should remain out at temperatures above +35°F).

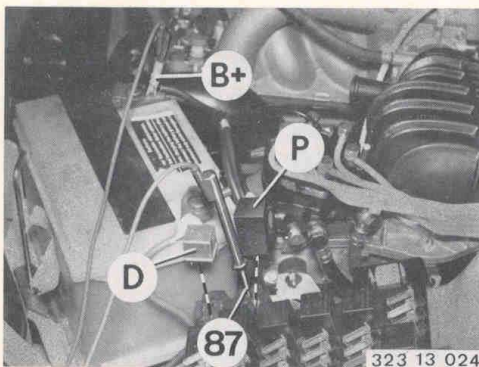


I) Control pressure (engine cold)

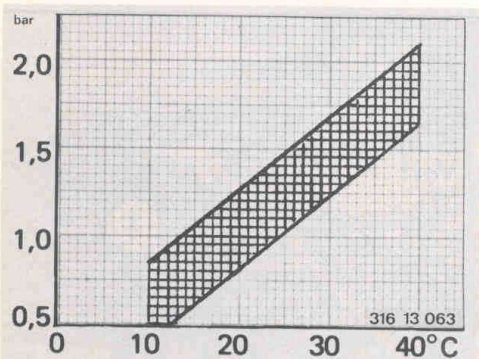
Test if cold or warm starting present difficulties.

Install pressure gauge 13 3 060 between the control pressure line and the flow distributor. Use adapters 13 3 065 and 13 3 066. Open the two-way valve.

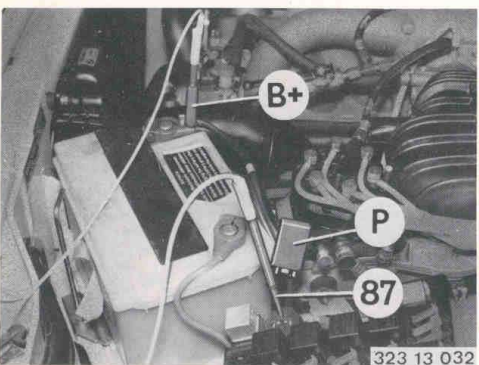




Take out diode relay (D) and pump relay (P). Connect contact 87 from the pump relay base with B+ (the fuel pump will run). Read off the control pressure at gauge 13 3 060.



The control pressure depends on coolant temperature, and can be seen on the graph. Desired value too low – warming-up regulator defective. Desired value too high – inadequate fuel return flow – warming-up regulator defective. Deviations: renew warming-up regulator. Check fuel return line for blockage.



K) Control pressure (engine warm)

Detach pump relay (P). Connect terminal 87 at pump relay base to B+ (fuel pump runs, warming-up regulator operational).



The two-way is open. Read off the control pressure (warm engine) at pressure gauge 13 3 060.

Start the engine and read off pressure at idle speed.

Engine stopped = 2.7... 3.1 bar (38.4... 44.1 lb/in²)

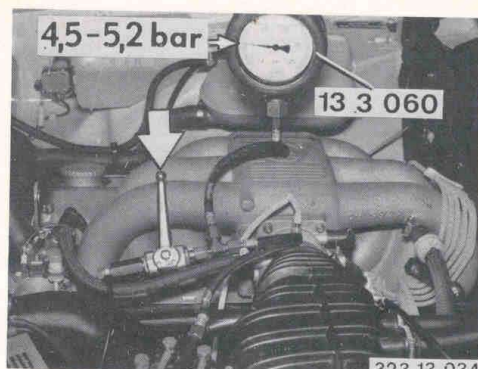
Engine idling = 3.4... 3.8 bar (48.4... 54.0 lb/in²).

If these values are not obtained, install an exchange warming-up regulator. Check the vacuum hose between the warming-up regulator and the intake pipe.

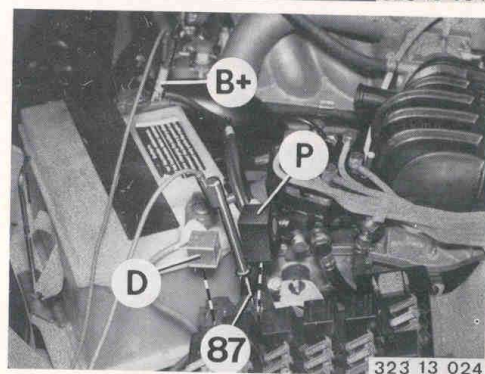
L) System pressure – engine warm or cold –

Before testing: fuel pump and filter must be in good working order.

Pressure gauge 13 3 060 is connected and the two-way valve closed.



Pull out diode relay (D) and pump relay (P). Connect terminal 87 at the pump relay base with B+ (the fuel pump will run). Desired value for system pressure: 4.5... 5.2 bar (64.0... 74.0 lb/in²).



System pressure too low

- leaking fuel lines/unions
- fuel filter severely blocked
- engine running on
- fuel pump¹⁾ delivery rate inadequate
- system pressure incorrectly adjusted

Alteration in pressure (bar, lb/in²)

0.06 (0.85)

0.3 (4.27)

shim washer thickness (10)

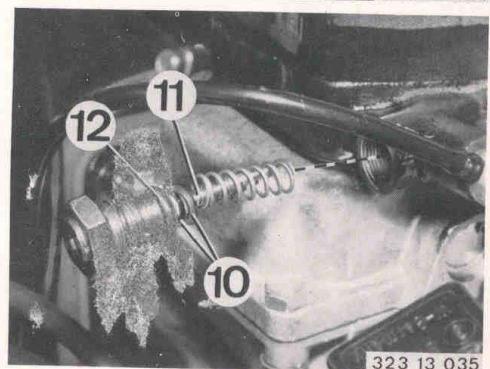
0.1 mm (0.004 in)

0.5 mm (0.020 in)

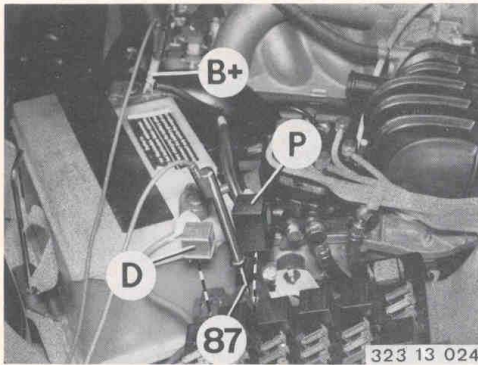
System pressure too high

- inadequate fuel return flow
- system pressure regulator incorrectly adjusted
- plunger (11) sticking

Adjust system pressure to 4.7... 4.9 bar.

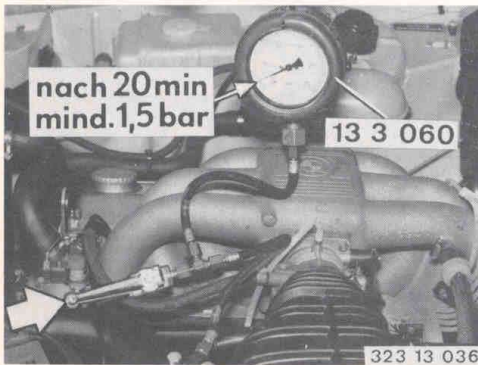


¹⁾ See specifications



M) Shutoff pressure/leakage test –
engine allowed to cool for at least 30 minutes –

Pull out diode relay (D) and pump relay (P).
Connect contact 87 at the pump relay base with
B+ until pressure does not rise any further.
Pressure gauge 13 3 060 is in circuit.



Two-way valve is open.
Shutoff pressure must not drop below 1.5 bar
(21.3 lb/in²) within 20 minutes.

Premature pressure drop:

- leak at rubber sealing ring (12) in system pressure regulator
- leak at warming-up regulator or supply line
- leaking check (non-return) valve in fuel pump
- leak at pressure reservoir.

Remove pressure gauge 13 3 060.

Adjust engine idling and check CO content of
exhaust – 13 00 054.

11 Troubleshooting Chart – Drive Belt Drive Mechanism and Ignition System

1. Engine does not start when cold

2. Engine does not start when warm

3. Poor cold starting

4. Poor warm starting

5. Erratic idling – vibration during warm-up phase

6. Erratic idling – vibration when engine is warm

7. Engine backfires

8. Engine detonates in exhaust system

9. Engine misfires when car is being driven

10. Engine power output low

11. Engine runs on

12. Fuel consumption too high

13. CO content of exhaust too high at idle speed

14. CO content of exhaust too low at idle speed

15. Idle speed too high, cannot be adjusted

Use of this trouble shooting chart assumes:

- 1) Normal compression in all cylinders
- 2) Valve clearances correctly adjusted
- 3) Dwell angle and ignition timing correct
- 4) All ignition system components in good working order
- 5) Safety circuit (see circuit diagram, page 13-32/2) is working correctly

Cause:															For remedy, see:	
X	X														1. Electric fuel pump not running	13 50 009 Section E
X	X	X	X	X			X								2. Poor contact at electric fuel pump	13 50 009 Section I
X		X		X											3. Control pressure (cold) out of tolerance	13 50 009 Section K
				X	X		X	X					X		4. Control pressure (warm) too high (cutout point)	13 50 009 Section C
			X		X		X						X		5. Control pressure (warm) too low (cutout point)	13 50 009 Section D
														X	6. Additional air valve not closing	13 50 009 Section F
X	X			X											7. Additional air valve not opening	13 50 009 Section G
X		X													8. Starting valve not opening (below 35°C, 95°F)	13 50 009 Section H
X	X	X	X	X	X		X	X	X						9. Starting valve leaking	13 50 009 Section I
				X	X	X	X						X		10. System pressure out of tolerance	13 50 009 Section J
				X	X									X	11. Baffle plate stop out of adjustment	13 50 009 Section K
X	X	X	X	X	X		X	X	X						12. Baffle plate or control plunger stiff	13 50 009 Section L
				X	X										13. Vacuum system leaking	13 50 009 Section M
X	X	X	X	X	X		X	X	X						14. Complete fuel system leaking	13 50 009 Section N
	X	X	X	X	X					X					15. Injector(s) leaking, opening pressure too low	13 53 700 Section O
				X	X						X				16. Idle mixture (basic setting) too rich	13 00 054 Section P
				X	X							X			17. Idle mixture (basic setting) too lean	13 50 009 Section Q
										X					18. Throttle butterfly not opening fully	13 50 009 Section R
X	X	X	X										X		19. Heat/time switch not closing	13 50 009 Section S
X	X	X	X											X	20. Heat/time switch remains closed too long	13 50 009 Section T
X	X	X													21. Plunger in full-load setting	13 50 009 Section U
X	X	X	X				X								22. Defective diode relay	For circuit diagram, Section V

Trouble shooting chart – BMW 323i with K-Jetronic fuel injection system

1. Engine does not start when cold														
2. Engine does not start when warm														
3. Poor cold starting														
4. Poor warm starting														
5. Erratic idling – vibration during warm-up phase														
6. Erratic idling – vibration when engine is warm														
7. Engine backfires														
8. Engine detonates in exhaust system														
9. Engine misfires when car is being driven														
10. Engine power output low														
11. Engine runs on														
12. Fuel consumption too high														
13. CO content of exhaust too high at idle speed														
14. CO content of exhaust too low at idle speed														
15. Idle speed too high, cannot be adjusted														
Cause:														
x	x													1. Electric fuel pump not running
x	x	x	x	x	x			x						2. Poor contact at electric fuel pump
x		x		x										3. Control pressure (cold) too low
					x	x		x	x				x	4. Control pressure (warm) too low
			x		x		x				x	x		5. Control pressure (warm) too high
													x	6. Additional air valve not closed
x		x		x										7. Additional air valve not closed
x		x												8. Starting valve not opening
x	x	x	x	x	x		x		x		x	x		9. Starting valve leaking
					x	x	x	x			x	x	x	10. System pressure out of tolerance
					x	x							x	11. Baffle plate stop out of adjustment
x	x	x	x	x	x			x	x	x		x		12. Baffle plate or control plate defective
					x	x	x					x	x	13. Vacuum system leaking
x	x	x	x	x	x			x	x			x	x	14. Complete fuel system leakage
	x	x	x	x	x						x			15. Injector(s) leaking, opening too late
					x		x				x	x		16. Idle mixture (basic setting) too rich
					x	x							x	17. Idle mixture (basic setting) too lean
									x					18. Throttle butterfly not opened
x	x	x	x									x		19. Heat/time switch not closed
	x	x	x									x		20. Heat/time switch remains open
x		x												21. Plunger in full-load setting
x	x	x	x					x						22. Defective diode relay

fuel injection system

Use of this trouble shooting chart assumes:

- 1) Normal compression in all cylinders
- 2) Valve clearances correctly adjusted
- 3) Dwell angle and ignition timing correct
- 4) All ignition system components in good working order
- 5) Safety circuit (see circuit diagram, page 13-32/2) is working correctly

se
warm

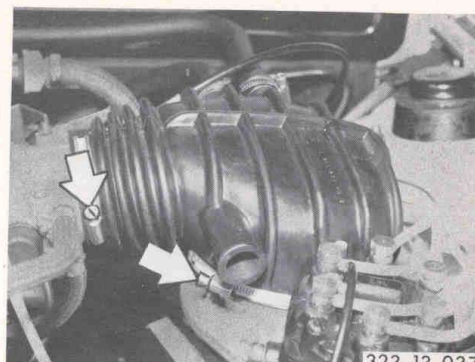
stem
s being driven
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otion too high
nt of exhaust too high at idle speed
content of exhaust too low at idle speed
Idle speed too high, cannot be adjusted

		For remedy, see:	
1.	Electric fuel pump not running	13 50 009	Section E
2.	Poor contact at electric fuel pump		
3.	Control pressure (cold) out of tolerance	13 50 009	Section I
4.	Control pressure (warm) too high (cutout point)	13 50 009	Section K
5.	Control pressure (warm) too low (cutout point)		
6.	Additional air valve not closing	13 50 009	Section C
7.	Additional air valve not opening		
8.	Starting valve not opening (below 35°C, 95°F)	13 50 009	Section F
9.	Starting valve leaking		
10.	System pressure out of tolerance	13 50 009	Section L
11.	Baffle plate stop out of adjustment	13 50 009	Section D
12.	Baffle plate or control plunger stiff		
13.	Vacuum system leaking	13 50 009	Section A
14.	Complete fuel system leaking	13 50 009	Section M
15.	Injector(s) leaking, opening pressure too low	13 53 700	
16.	Idle mixture (basic setting) too rich	13 00 054	
17.	Idle mixture (basic setting) too lean		
18.	Throttle butterfly not opening fully	13 50 009	Section B
19.	Heat/time switch not closing	13 50 009	Section H
20.	Heat/time switch remains closed too long		
21.	Plunger in full-load setting	13 50 009	Section D
22.	Defective diode relay	For circuit diagram, see page 13-32/2	

13 51 011 Mixture regulator – renewing

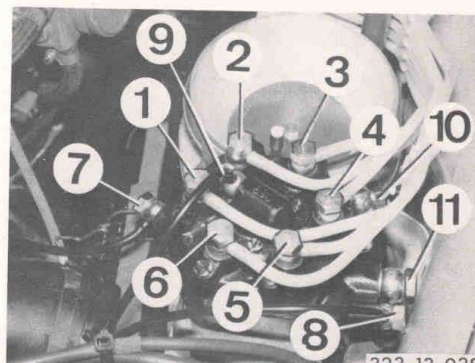
Take off the intake air scoop.



Detach the connections at the fuel flow distributor.

- 1–6 to injectors
- 7 to cold start valve
- 8 and 9 to warming-up regulator sensor
- 10 to fuel filter (feed)
- 11 Return

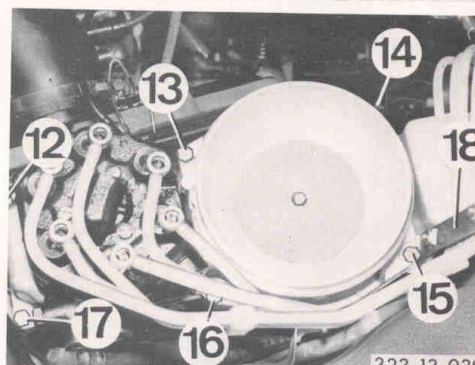
When installing: use new sealing washers.



Remove bolts (12... 17).

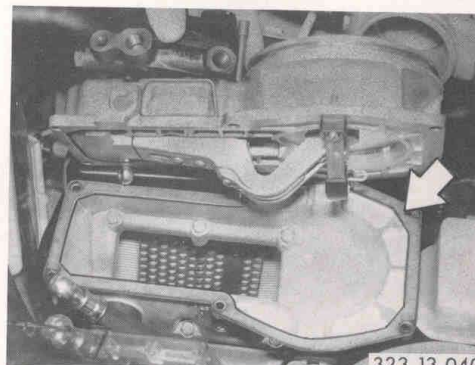
Bolts (12) and (13) have no nuts.

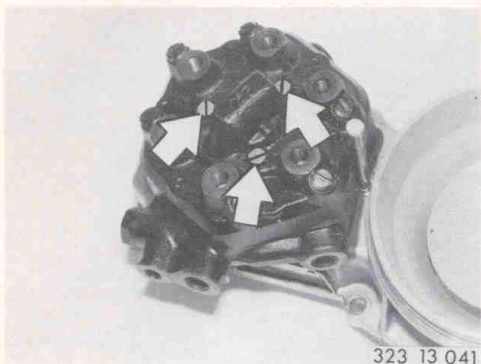
When installing: secure holder (18) with bolt (15).



Take out the mixture regulator.

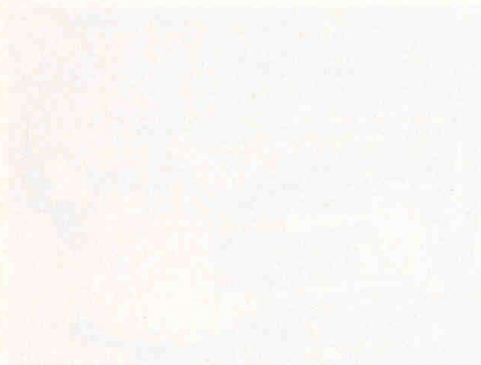
When installing: renew gasket.





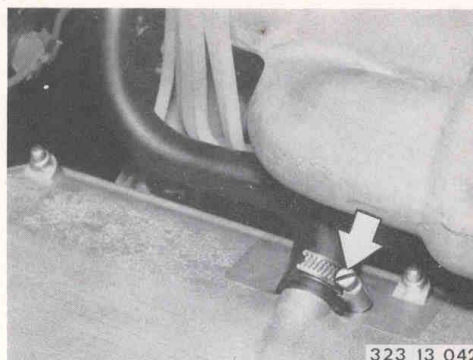
The volumetric fuel flow distributor (19) is secured to the mixture regulator by three machine screws.
Adjust engine idling – 13 00 054.

323 13 041

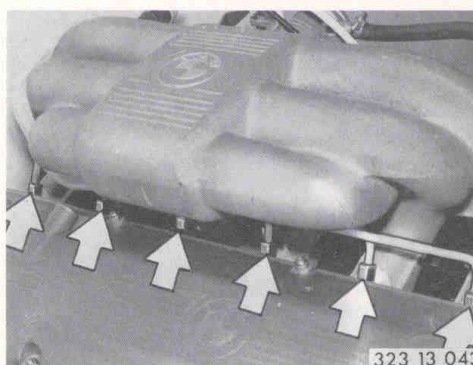


13 53 100 Injectors – removing and installing

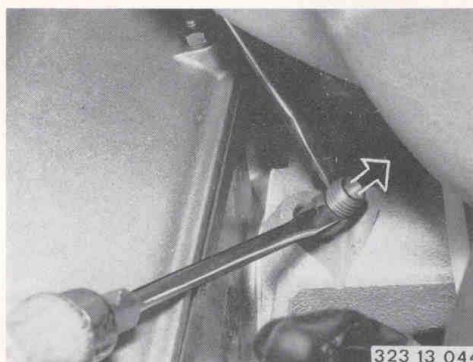
Detach the breather hose.



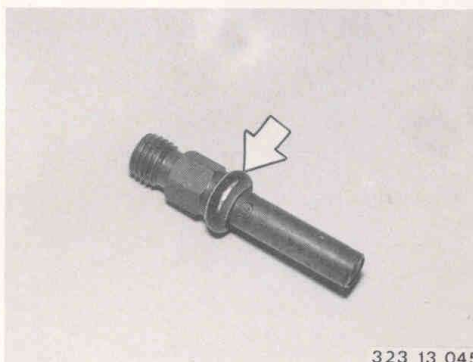
Detach the injector pipes.

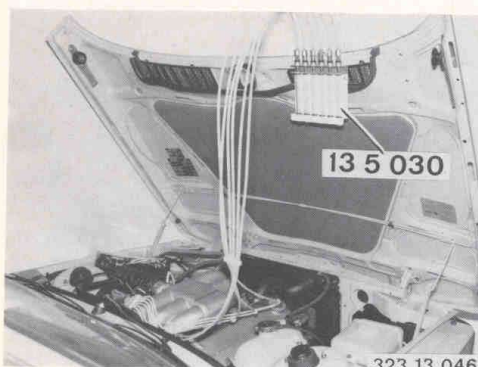


Unscrew the injectors. If necessary, lever out with two screwdrivers.



When installing: renew the rubber rings and coat with 'Vaseline' or similar before inserting.





13 53 700 Injected quantity differences – checking

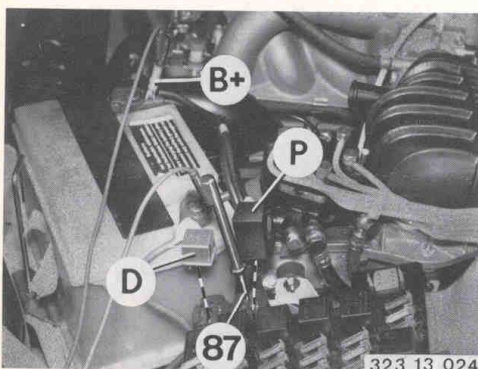
This test should only be performed if the compression in all cylinders is satisfactory, but the engine still runs very irregularly.

Remove the injectors – 13 53 100.

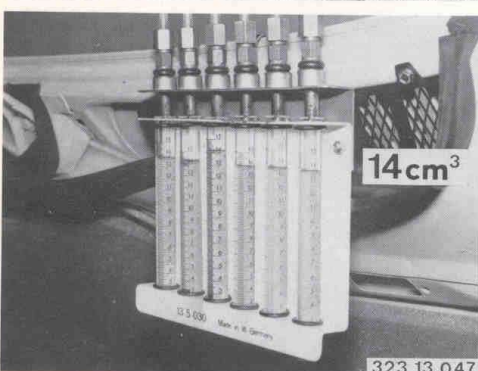
Connect the injectors pipes and the lines to the 13 5 030 tester with threaded adapters 13 5 012.

Suspend the tester from the engine compartment lid.

Attach the injectors to the lines and insert into the measuring flasks.



Pull out diode relay (D) and pump relay (P). Connect contact 87 from the pump relay base with B+ (the fuel pump will run).



Take off the air intake scoop.

Raise the baffle plate until the measuring flasks are full.

Empty the measuring flasks.

Next, raise the baffle plate until the 14 cm³ mark is reached in one measuring flask.

The difference between the flows to each cylinder must not exceed 15%.

If the difference is greater than 15%:

interchange a normal-delivery injector with the one having the worst delivery rate.

If the quantity delivered through the injector which was previously normal now also drops severely, the mixture regulator (fuel flow distributor) must be causing the fault.

If, however, the previously normal injector still delivers the correct quantity of fuel, and the suspect injector remains faulty, the injector should be renewed.

13 54 051 Throttle butterfly return springs – renewing

Disconnect the accelerator cable.

When installing: adjust the accelerator cable – 35 41 421.

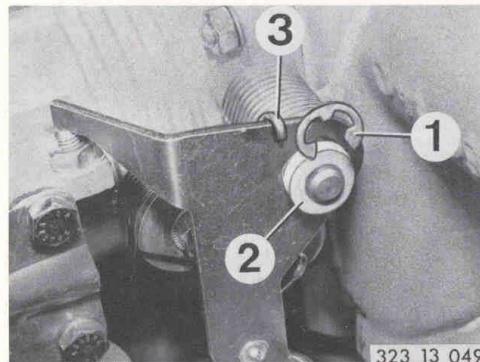
Remove keeper (1).
Take off corrugated washer (2).
Disconnect spring (3).
When installing: Pull up spring (3) with a hook or similar, and attach.

Take off lever (4) with bushing (5).
When installing: attach the linkage (6). Grease the pivots with 'Longterm'.

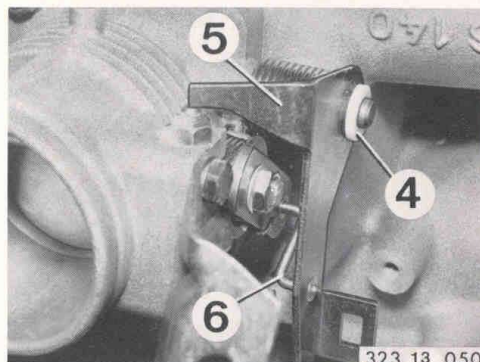
Take off spring (3).
Unscrew nut (7).
Detach spring (8).
When installing: pull up spring (8) with a hook or similar, and attach.



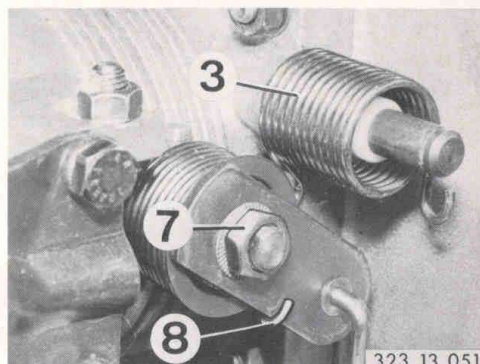
323 13 048



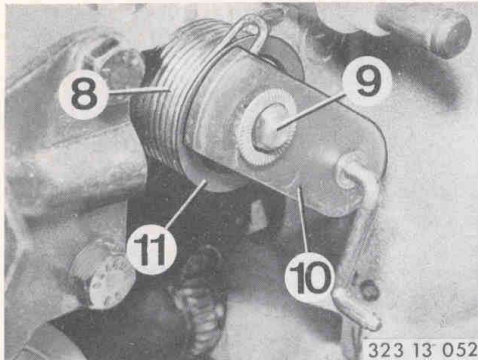
323 13 049



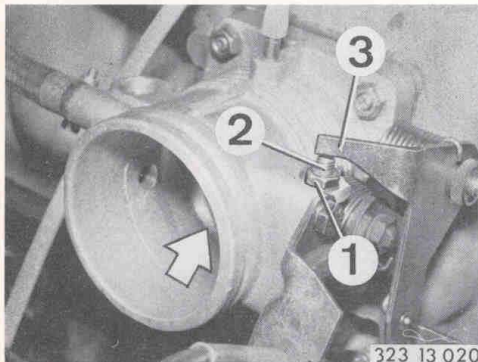
323 13 050



323 13 051



Take off serrated washer (9), lever (10), sleeve (11) and spring (8).



Adjust throttle butterfly.

Take off the intake air scoop. Disconnect the accelerator cable. Loosen nut (1). Unscrew bolt (2) until it is clear of stop (3). Then tighten bolt (2) until the throttle butterfly just begins to lift (check movement with finger). From this point, tighten bolt (2) by a further half-turn, and lock with nut (1). Prevent subsequent movement of bolt (2) and nut (1) with paint.

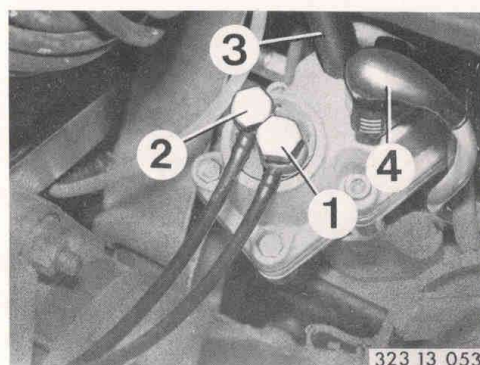
When installing: adjust engine idling and check exhaust emissions – 13 00 054.

13 63 050 Warming-up regulator – removing and installing

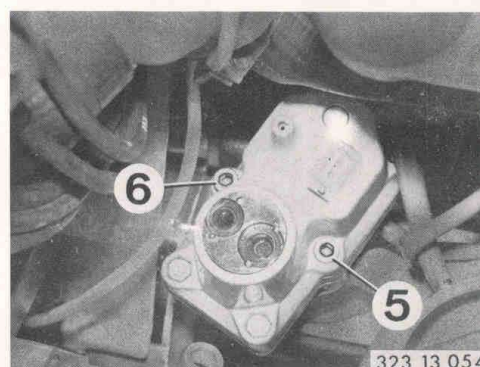
Remove projecting tube.



**Take off distributor cap.
Detach line (1) – feed and line (2) – return.
Pull off vacuum hose (3) and plug (4).**

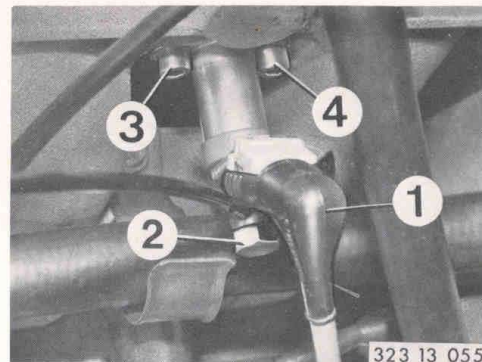


**Unscrew retaining bolts (5) and (6).
Take out the warming-up regulator.**

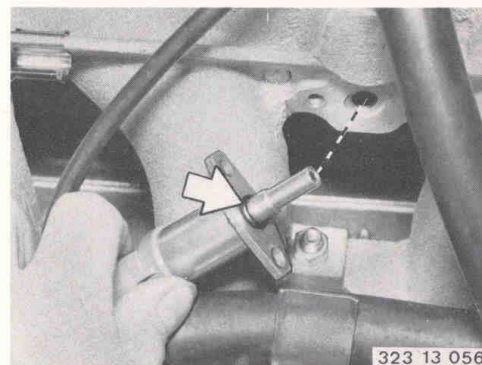


13 64 030 Starting valve – removing and installing

**Pull off plug (1).
Detach fuel line (2).
Remove retaining bolts (3) and (4).**



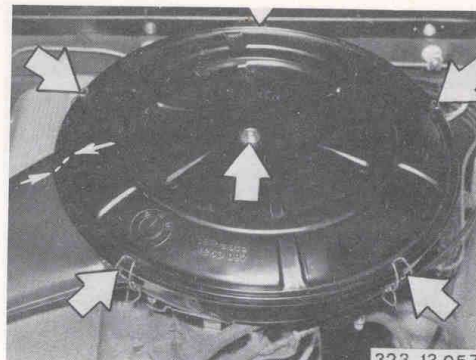
**When installing: renew O-ring.
For operating and leakage check, see
13 50 009 Section F.**



13 72 001 Air cleaner element – renewing

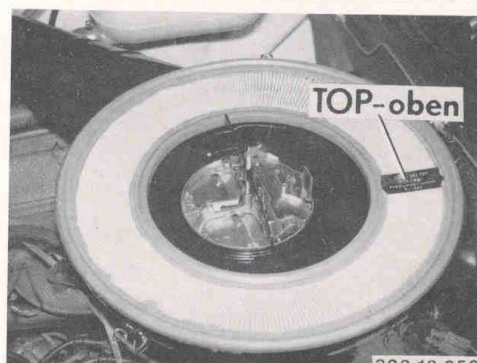
A) Carburetor engine

Open the snap fasteners and unscrew the nut.
When installing: the arrows on the cover and on the housing must coincide.



323 13 057

Take out the air cleaner element.
The air cleaner element must be renewed every 15 000 km (app. 10 000 miles).



323 13 058

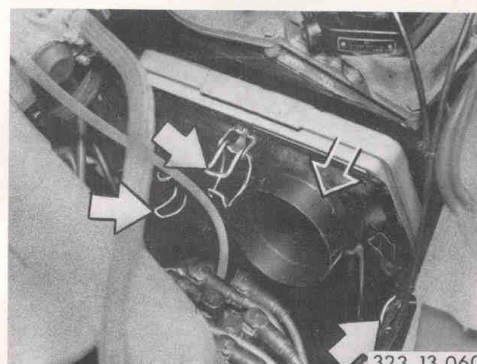
B) Fuel injection engine

Detach the projecting tube.
Detach the fuel line to the cold start valve.

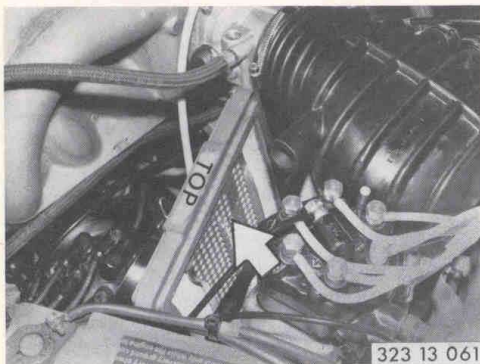


323 13 059

Open the snap fasteners.
Hinge up the air cleaner cover towards the engine.



323 13 060



Pull the air cleaner element out upwards.
When installing: note correct position. The 'TOP' marking should be uppermost and the perforated plate side facing the mixture regulator.

The air cleaner element must be renewed every 15 000 km (app. 10 000 miles).

13 73 004 Intake air preheat flap valve – adjusting

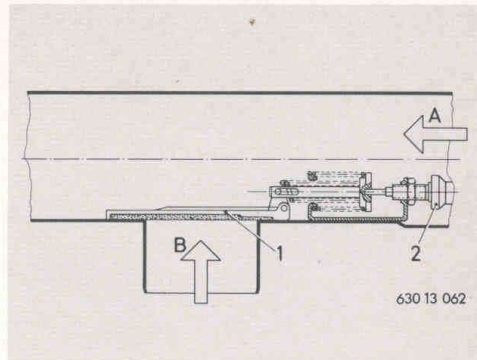
The intake air preheat system is controlled automatically by element (2).

To check and adjust the flap valve, the air cleaner must be removed – 13 71 000.

Place the cold air stub pipe with actuating element in a water bath at $+15^{\circ}\text{C}$ ($+59^{\circ}\text{F}$) for approx. 5 minutes.

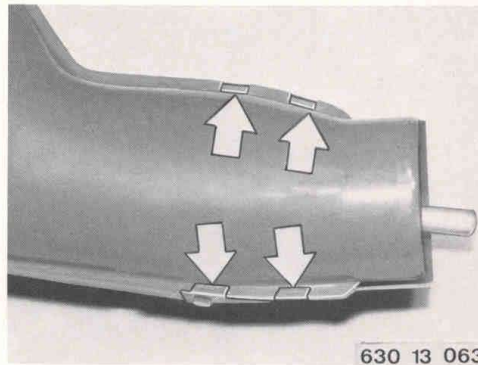
At $+15^{\circ}\text{C}$ ($+59^{\circ}\text{F}$), the flap valve (1) should just close the pre-heated air supply (B).

Below $+8^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ($+46^{\circ}\text{F} \pm \text{approx. } 2^{\circ}\text{F}$), the flap valve (1) must completely close the cold air intake (A).



To adjust the flap valve, the lower cold air entry stub pipe with actuating element must be removed.

Bend up the sheet metal lugs.



Loosen nut (3) and adjust the actuating element (2) as shown in Fig. 1.

Check that flap valve (1) moves freely; grease and free the pivot points if necessary.

