STIHL®

1. Safety Precautions

If the chainsaw or power tool is started up in the course of repairs or maintenance work, observe all local and country-specific safety regulations as well as the safety precautions and warnings in the owner's manual.

Gasoline is an extremely flammable fuel and can be explosive in certain conditions.

Improper handling may result in burns or other serious injuries.

Warning! Do not smoke or bring any fire or flame near the fuel. All work with fuel must be performed outdoors only. Spilled fuel must be wiped away immediately.

Warning! To avoid the risk of accidents and personl injury, take extreme care when performing adjustments without the cutting tool guard or deflector.

2. Introduction

This service manual contains descriptions of repair and servicing procedures as well as functional diagrams of most carburetors used in STIHL gasoline power tools.

While carrying out repair work you should make use of the latest illustrated parts list of the power tool concerned. It shows the installed positions and the assembly sequence of individual components and assemblies.
Parts lists on microfilm and CD-ROM are always more up to date than printed lists.

A fault on the carburetor may have several causes. Consult the troubleshooting chart - see 6.

Refer to the "Technical Information" bulletins for engineering changes which have been introduced since publication of this service manual. Technical information bulletins also supplement the parts list until an update is issued.

Service manuals and all technical information bulletins describing engineering changes are intended exclusively for the use of STIHL servicing dealers. They must not be passed to third parties.

Symbols are used in the text and illustrations for greater clarity.

The meanings are as follows:

In the descriptions:

- • = Action to be taken as shown in the illustration (above the text)
- - = Action to be taken that is not shown in the illustration (above the text)

In the illustrations:

➡ = Pointer

➡ = Direction of movement

Always use original STIHL replacement parts.
They can be identified by the STIHL part number,
the STIHL® lögo
and the STIHL parts symbol ®.
The symbol may appear alone on small parts.

3. Assignment

Model	Carburetor	Idle system						Part load	Full load		Setting			Equipment		
		dependent	independent	fixed idle jet	preliminary mixture control	balanced	with bypass air screw (LD)	part-load jet	full-load fixed jet	full-load semi-fixed jet	H unlimited adjustment	L unlimited adjustment	H, L with limiter caps	choke shutter in carb	manual fuel pump	Compensator
009 ... 012	C1S-S1		x								x	x				
009, 010, 011	WT-29A		x								x	x				
009, 011	C1S-S1C [2]		x								x	x				
009, 011 [1]	WT-323	x						x	x			x				
017	WT-325A	x						x	x					x		
017	WT-325	x						x	x					x		
019T	C1Q-S37A		x	x	x				x			x		x		
020	WT-15A		x								x	x				
020	C1Q-S32										x	x		x		
020T	C1Q-S16A	x	x							x	x	x		x		
020T [1]	WT-326C	x						x	x			x		x		
020T	WT-326							x	x			x		x		
021 [1]	WT-503	x						x	x			x		x		
021	WT-286A		x								x	x		x	x	
021, 023 [1]	WT-283A	x						x	x			x		x		
021, 023, 025	C1Q-S11		x								x	x		x		
023	WT-215		x								x	x		x		
023	WT-283B	x						x	x			x		x		
023	WT-286A		x								x	x		x	x	
023C	WT-286A		x								x	x		x	x	
023C	WT-498	x						x	x			x		x	x	
023CZ [1]	WT-498A	x						x	x			x		x	x	
023L	WT-360	x						x	x			x		x		
023L [1]	WT-396	x						x	x			x		x		
024	WT-194		x								x	x				
024	WT-110		x								x	x				
024, 026	WT-194		x								x	x				
025	WT-215		x								x	x		x		
025	WT-286A		x								x	x		x	x	
025	WT-396A	x							x			x		x		
025	WT-498A	x						x	x			x		x	x	
025	WT-283B	x						x	x			x		x		
025	WT-313	x						x	x			x		x		
026	WT-426		x							x	x	x				x
026 [1]	WT-493	x						x	x			x				
026 [1]	WT-403A	x						x	x			x				x
026W/Pro	WT-427		x							x	x	x				x
028	WT-16		x								x	x				

Model	Carburetor	Idle system						Part load	Full load		Setting			Equipment		
		dependent	independent	fixed idle jet	preliminary mixture control	balanced	with bypass air screw (LD)	part-load jet	full-load fixed jet	full-load semi-fixed jet	H unlimited adjustment	L unlimited adjustment	H, L with limiter caps	choke shutter in carb	manual fuel pump	Compensator
029	HD-19B	x						x		x	x	x		x		x
029 [1)]	HD-18A	x						x		x			x	x		x
029, 039	HD-5	x						x		x	x	x		x		
034	C3A-S38A	x						x		x	x	x		x		
034	C3A-S38	x						x		x	x	x		x		
034, 036	C3A-S19	x								x	x	x				
036	C3A-S4C		x								x	x		x		
036	C3A-S31D	x						x		x	x	x		x		x
036 [1)]	C3A-S39A	x						x		x			x	x		x
036W	C3A-S27C	x						x		x	x	x		x		x
038	HK-42		x								x	x		x		
038	Bing 48		x								x	x		x		
039	HD-19B	x						x		x	x	x		x		x
039 [1)]	HD-21A	x						x		x			x	x		x
044	HD-10	x						x		x	x	x		x		x
044	HD-11	x						x		x	x	x		x		x
044	HD-15	x						x		x	x	x		x		x
044	C3M-S20		x							x	x	x		x		x
044	C3M-S5G		x								x	x		x		x
044 [1)]	HD-17	x						x		x			x	x		x
044 (SA)	C3M-S21/S12		x							x	x	x		x		x
046	HD-14	x						x		x	x	x		x		x
046 [1)]	HD-16	x						x		x			x	x		x
046 BR	HD-24	x						x		x	x	x		x		x
051, 050, 076	HS-60D		x								x	x		x		
056	HS-118B		x								x	x		x		
056	WJ-4B		x								x	x		x		
064	WJ-48	x						x		x	x	x		x		x
064	WJ-51	x						x		x	x	x		x		x
064	WJ-52	x						x		x	x	x		x		x
064	WJ-65	x						x		x	x	x		x		x
064, 066	WJ-35/41	x						x		x	x	x		x		x
066	WJ-66	x						x		x	x	x		x		x
066	WJ-67	x						x		x	x	x		x		x
066 [1)]	WJ-69	x						x		x			x	x		x
066 BR	WJ-76	x						x		x	x	x		x		x
066 MW	WJ-66	x						x		x	x	x		x		x
070	LB-S9		x								x	x		x		

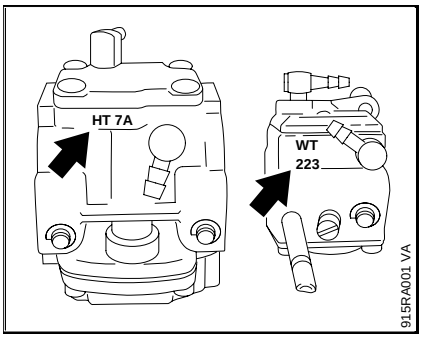
Model	Carburetor	Idle system						Part load	Full load		Setting			Equipment		
		dependent	independent	fixed idle jet	preliminary mixture control	balanced	with bypass air screw (LD)	part-load jet	full-load fixed jet	full-load semi-fixed jet	H unlimited adjustment	L unlimited adjustment	H, L with limiter caps	choke shutter in carb	manual fuel pump	Compensator
070	HL-324A		x								x	x		x		
070, 090	HL-324A		x								x	x		x		
08	HL-166C		x								x	x		x		
084	HT-7A	x						x		x	x	x		x		x
088 [1)]	HT-12A	x						x		x			x	x		x
08S	LA-S8A		x								x	x		x		
08S	IVH8		x								x	x		x		
090	LB-S9		x								x	x		x		
BG 72	WT-253		x								x	x			x	
BG 72 [1)]	WT-330		x										x		x	
BG 75	C1Q-S30C		x	x	x				x						x	
BR 106	C1Q-SK6		x			x	x				x	x		x		
BR 320 [1)]	HD-13A		x										x	x		
BR 320	HD-4B		x								x	x		x		
BR 320 L	WT-230		x								x	x		x		
BR 320 L	WT-230B		x								x	x		x		
BR 320 L [1)]	WT-489		x										x	x		
BR 320 L	WT-331		x										x	x		
BR 320, 400 [1)]	HD-7		x										x	x		
BR 400 [1)]	HD-13A		x										x	x		
BR 400	HD-4B		x								x	x		x		
BR/SR 320, 400	HD-4		x								x	x		x		
BT 106, 108	C1Q-SK5		x			x	x				x	x		x		
BT 360	HL-327E		x								x	x		x		
FC 44 [1)]	WT-327		x										x		x	
FC 72	WT-227F		x								x	x			x	
FC 72 [1)]	WT-329		x										x		x	
FR 106, 108	C1Q-SK5		x			x	x				x	x		x		
FR 108	C1Q-SK5		x			x	x				x	x		x		
FR 108 [1)]	C1Q-SK7		x			x	x						x	x		
FS 106, 108	C1Q-SK5		x			x	x				x	x		x		
FS 120, 300	C1Q-S35B		x			x	x				x	x		x	x	x
FS 120, 300	C1Q-S36D		x	x		x	x		x					x	x	x
FS 160	C1S-S3D		x								x	x		x		
FS 160, 180, 220	C1S-S3C		x								x	x		x		
FS 200, 350	C1Q-S36D		x	x		x	x		x					x	x	x
FS 220	C1S-S3D		x								x	x		x		
FS 25-4	WYL-63/-73	x		x		x			x						x	

Model	Carburetor	Idle system						Part load	Full load		Setting			Equipment		
		dependent	independent	fixed idle jet	preliminary mixture control	balanced	with bypass air screw (LD)	part-load jet	full-load fixed jet	full-load semi-fixed jet	H unlimited adjustment	L unlimited adjustment	H, L with limiter caps	choke shutter in carb	manual fuel pump	Compensator
FS 280	C1S-S3D		x								x	x		x		
FS 280	WT-223		x								x	x		x		
FS 36, 40, 44	WT-160B		x								x	x		x	x	
FS 36, 40, 44 [1]	WT-492A		x							x			x	x	x	
FS 36, 40, 44	WT-327		x										x	x	x	
FS 360, 420	HD-3		x								x	x		x		
FS 400	C1Q-S34C		x	x		x	x		x					x	x	x
FS 450	C1Q-S34C		x	x		x	x		x					x	x	x
FS 500	HD-22		x							x			x	x	x	
FS 500	HD-23		x								x	x		x	x	
FS 550 [1]	HD-22		x							x			x	x	x	
FS 550	HD-23		x							x	x	x		x	x	
FS 65-4	WYL-63			x		x			x						x	
FS 72, 74, 76	WT-227F		x								x	x			x	
FS 72, 74, 76 [1]	WT-393		x										x		x	
FS 75, 80, 85	C1Q-S41A		x	x	x				x						x	
FS 75, 80, 85	WT-447		x								x	x			x	
FS 81, 86 [2]	WT-112		x								x	x		x		
FS 86 [2]	WT-45A		x								x	x		x		
FS 88, FR 88 [1]	WT-367		x										x	x		
FS 88, FR 88 [2]	WT-45A		x								x	x		x		
FS/FR 108 [1]	C1Q-SK7		x			x	x						x	x		
HS 72, 74, 76	WT-264		x								x	x		x	x	
HS 72, 74, 76 [1]	WT-329		x										x		x	
HS 75, 80, 85	C1Q-S42A		x	x	x				x						x	
TS 350	HL-292		x								x	x		x		
TS 350	HL-292G		x								x	x		x		
TS 350 [1]	HL-366A		x							x			x	x		
TS 350	LAS6		x								x	x		x		
TS 360	HL-327D		x								x	x		x		
TS 360	HL-327E		x								x	x		x		
TS 360	LAS7	x									x	x		x		
TS 400	HS-274A	x						x		x	x	x		x		x
TS 400	HS-274D	x						x		x	x	x		x		x
TS 400 [1]	HS-279B	x						x	x			x		x		x
TS 460	HS-262B	x						x		x	x	x		x		x
TS 460 [1]	HS-275A	x						x	x			x		x		x
TS 460	HS-276D	x						x		x	x	x		x		x

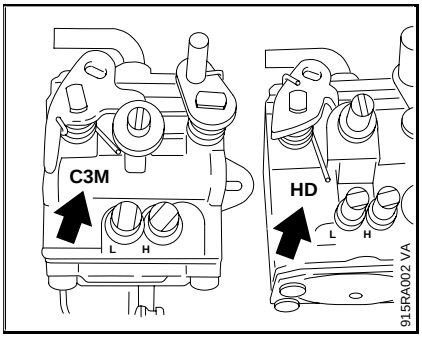
Model	Carburetor	Idle system						Part load	Full load		Setting			Equipment		
		dependent	independent	fixed idle jet	preliminary mixture control	balanced	with bypass air screw (LD)	part-load jet	full-load fixed jet	full-load semi-fixed jet	H unlimited adjustment	L unlimited adjustment	H, L with limiter caps	choke shutter in carb	manual fuel pump	Compensator
TS 510	HS-277A		x								x	x		x		x
TS 510 [1)]	HS-280A	x						x		x			x	x		x
TS 510, 760	HS-212B		x								x	x		x		
TS 760	HS-277A		x								x	x		x		x
TS 760 [1)]	HS-281A	x						x		x			x	x		x

[1)] CARB, EPA
[2)] Accelerator pump

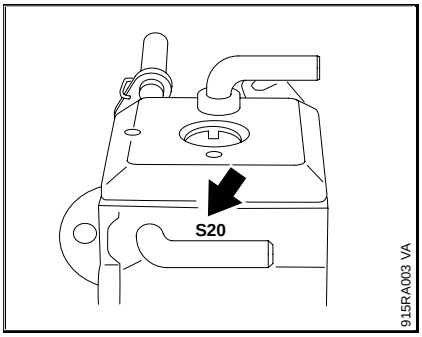
3.1 Designation



The carburetor designation is stamped or printed on the body of some models (e.g. HT-7A or WT-223).



On some models the family designation (e.g. C3M or HD) is integrally cast on the body.



Other identification numbers are stamped on the body of such models (e.g. S 20) or printed (e.g. S36C).

4. Purpose of Carburetor

The carburetor has to mix fuel and air in an optimum ratio for each phase of engine operation. It prepares the mixture for vaporization by breaking it down into fine droplets.

In the carburetor, fuel is atomized but not completely vaporized. The heat necessary to vaporize the fuel is taken from the components the fuel flows through, i.e. primarily the engine. Therefore, complete vaporization does not take place until the mixture reaches the combustion chamber.

The absorption of vaporization heat by the fuel represents a form of cooling for the components that give off the heat. One talks about internal cooling.

The ideal fuel-air ratio (Lambda (λ) = 1) is reached when the composition of the mixture is 14.8 kg air to 1 kg fuel. Fuel burns cleanly at this mixture ratio.
The mixture is combustible between Lambda 0.7 and 1.25.

The mixture ratio deviates from the ideal value depending on the prevailing operating conditions (temperature, humidity, air pressure) and the operating phase (starting, idle, part load, full load).

When the actual mixture ratio deviates from the ideal value, the mixture is said to be either **rich** or **lean**.

A **lean** mixture contains more air.

As there is a lack of fuel, the engine does not produce its full power. Furthermore, the engine overheats because insufficient heat is dissipated to vaporize the fuel. The lack of fresh gas containing oil results in inadequate lubrication and a risk of seizure.

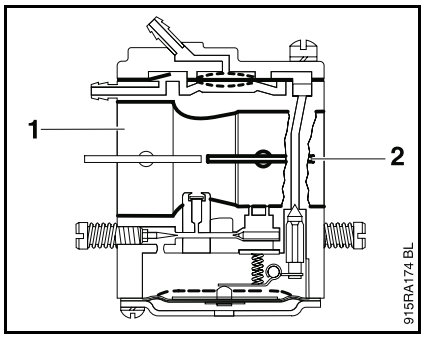
A **rich** mixture contains less air.

Combustion is incomplete. Apart from other effects, unburned fuel is seen as smoke at the exhaust.

A certain amount of oil is added to the fuel for lubrication of the bearings and piston.

5. Construction/ Function

5.1 Fuel Pump



A carburetor consists of a hollow housing which has a special internal contour, i.e. the choke tube (venturi) (1). Engine intake air flows through this venturi. The smaller the cross section of the venturi, the greater the air flow speed and the vacuum created. Fuel jets open into the venturi at various points from which the air-stream draws fuel.

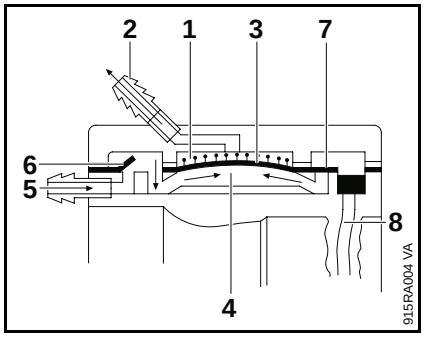
The fuel pump, nozzle or jet systems and metering devices for optimum preparation of the fuel-air mixture are integrated in or mounted on the carburetor.

The flow of air, and thus engine power, is regulated by the throttle shutter (2).

In view of the machine applications, the carburetor must operate trouble-free in all positions. For this reason only all-position diaphragm carburetors with an integral fuel pump are used in STIHL outdoor power tools. Such carburetors have no float.

The fuel pump operates as a completely separate unit even though it is integrated in the carburetor housing.

The fuel pump is controlled by the changes of pressure in the cylinder and crankcase.



Intake process

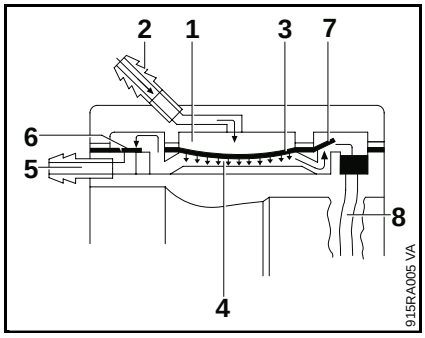
The impulse chamber (1) is connected to the crankcase via the impulse port (2).

Low pressure is created in the crankcase by the upward stroke of the piston. This causes the pump diaphragm (3) to flex. A vacuum is also created in the pump's fuel chamber (4).

Atmospheric pressure in the tank now pushes fuel via the intake fitting (5) and inlet valve (6) into the fuel chamber (4).

The outlet valve (7) is pressed against its seat and closes the passage to the fuel port (8).

Note: The pump inlet and outlet valves are flaps stamped out of the pump diaphragm but still attached to it at one side.



Delivery process

The downward stroke of the piston creates an overpressure which presses the pump diaphragm (3) towards the fuel chamber.

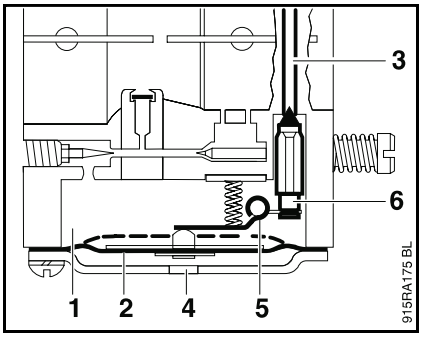
The pump diaphragm therefore reduces the volume of the fuel chamber (4).

Inlet valve (6) is now pressed against its seat and closes the passage to the intake fitting (5). The outlet valve (7) is lifted off its seat and allows a certain amount of fuel to flow into the fuel port (8) which leads to the carburetor inlet valve.

Note: During each complete pump stroke an amount of fuel is delivered which is equivalent to the difference in volume between the two end positions of the pump diaphragm in the fuel chamber.

On machines with a fuel tank mounted lower than the carburetor it is necessary to prime the carburetor with fuel after a prolonged out-of-service period by pulling the starter rope a few times.

This problem can be overcome with a manual fuel pump (see below).



Inlet needle valve

The chamber (1) above the metering diaphragm (2) is filled with fuel through port (3).

Atmospheric pressure is applied to the metering diaphragm through bore (4).
If the machine is equipped with a compensator, the pressure prevailing at the clean side of the air filter acts on the metering diaphragm (see chapter 4.3.4).

When air flows through the venturi, fuel is drawn out of the metering diaphragm chamber, i.e. the volume of fuel is reduced. The metering diaphragm is pushed upwards by atmospheric pressure.

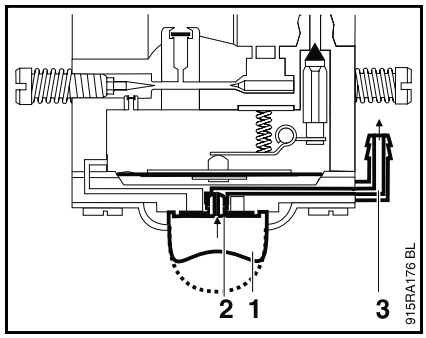
The metering diaphragm (2) applies pressure to the inlet lever (5) and thus lifts the inlet needle (6) off its seat. Fuel now flows from the pump's fuel chamber to the metering diaphragm chamber until the pressure in the metering diaphragm chamber is approximately equal to the pressure applied to the outside of the metering diaphragm.

The metering diaphragm always allows a quantity of fuel to flow which is equal to that which is drawn out of the jets.

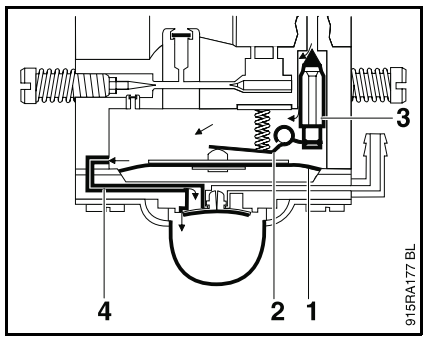
Manual fuel pump

Some carburetors (on power tools) are equipped with an additional **manual fuel pump** for priming the fuel system **prior to starting**.

Note: On chainsaws the manual fuel pump is a separate component, i.e. it is not integrated in the carburetor.

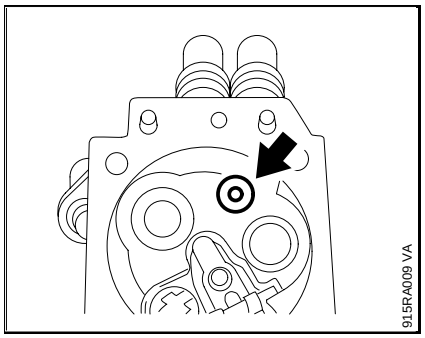


When the pump bulb (1) is depressed, the valve (2) opens and allows air or any fuel in the bulb to flow back to the tank via the fitting (3).



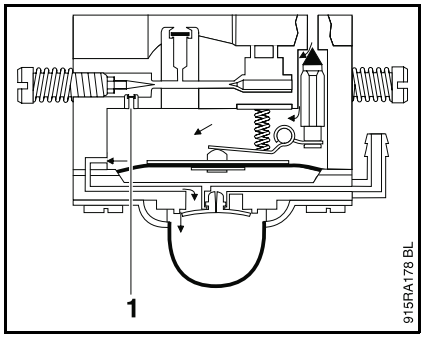
A vacuum is created in the metering diaphragm chamber when the pump bulb is released. This causes the metering diaphragm (1) to be pulled against the inlet control lever (2). The inlet needle (3) opens and fuel then flows from the pump chamber into the metering diaphragm chamber.

Excess fuel pumped into the metering diaphragm chamber passes through the bore (4) to the valve. The valve tabs open and fuel flows into the pump bulb. When the pump bulb is pressed, fuel is pumped back into the tank via valve (2).

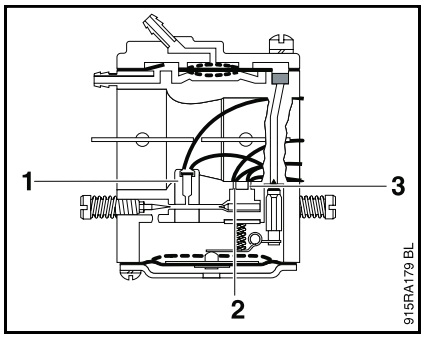


Check valve

A check valve is installed in the metering diaphragm chamber of all carburetors equipped with an additional manual fuel pump.

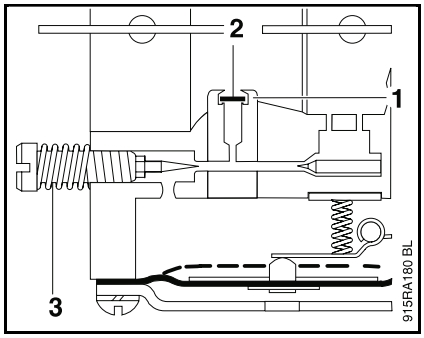


When the manual fuel pump is operated, the check valve (1) closes to prevent air being sucked into the metering diaphragm chamber from the venturi and the idle jet bores. During operation the check valve opens and allows fuel to flow to the main jet and the idle jet bores.



Full load is the operating condition with the throttle shutter wide open.

Fuel is drawn from the main jet (1) and the idle jets (2 and 3).

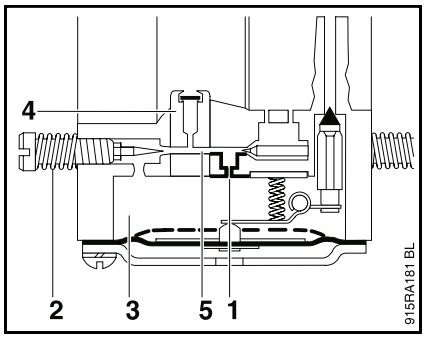


Main jet (valve jet)

The main jet (1) is situated at the narrowest point of the venturi. It is at this point that air flow speed is highest and pressure is lowest.

The main jet is equipped with a check valve (2) to prevent air being sucked into the metering diaphragm chamber at idle speed.

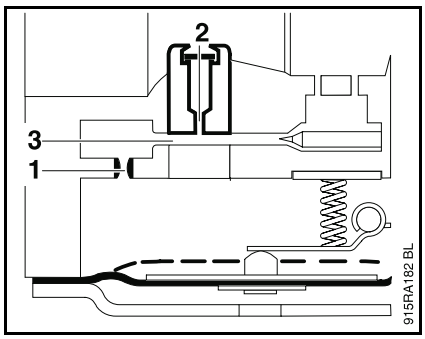
The amount of fuel drawn in by the main jet can be adjusted with the high speed screw (3).



Full-load semi-fixed jet

At full load, a defined quantity of fuel (approx. 80% at H = 1) is always pumped from the metering diaphragm chamber (3) via the full-load semi-fixed jet (1) and through the main jet (4) to the venturi, irrespective of the setting of the high speed screw (2). This means that the change in the composition of the mixture for a given adjustment of the high speed screw is far less than on a carburetor that has no full-load semi-fixed jet.

The semi-fixed jet may be installed as a separate component or be integrated as a nozzle bore in the main jet. There is no direct connection between the separate semi-fixed jet and the venturi. It is connected to the main jet via a passage (5).

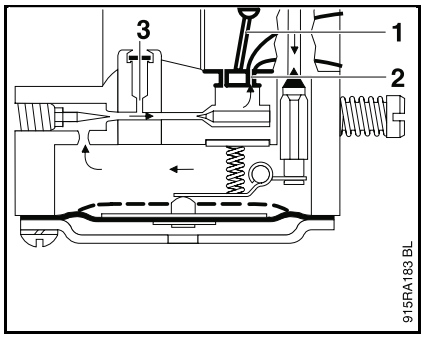


Full-load fixed jet

On carburetors with a full-load fixed jet (1) all the fuel required for full-load operation flows via this jet.

There is no high speed screw. The full-load setting cannot be altered.

Like the semi-fixed jet, the full-load fixed jet may be installed as a separate component or be integrated as a nozzle bore (2) in the main jet. There is no direct connection between the separate fixed jet and the venturi. It is connected to the main jet via a passage (3).



The throttle shutter (1) alters the cross section of the venturi and thus regulates the flow of intake air.

It is operated by the user via the throttle rod.

The idle position of the throttle shutter is adjusted by means of the idle speed screw.
The throttle shutter is almost closed. Air flows through a narrow gap between the throttle shutter and venturi. Fuel is drawn from the primary idle jet (2).
There is only a slight vacuum in the area of the main jet (3) so no fuel flows at this stage.

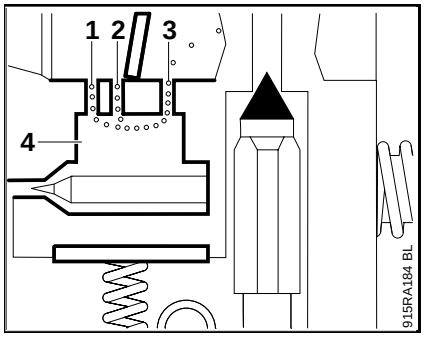
When the throttle shutter is closed there are two bores (secondary idle or bypass) (1 and 2) in front of it and one (primary idle) (3) behind it (viewed in the flow direction).

In this position the air flow in the venturi is very slow and the vacuum is slight. Fuel is drawn only from the primary idle jet at the air gap between the throttle shutter and carburetor body.

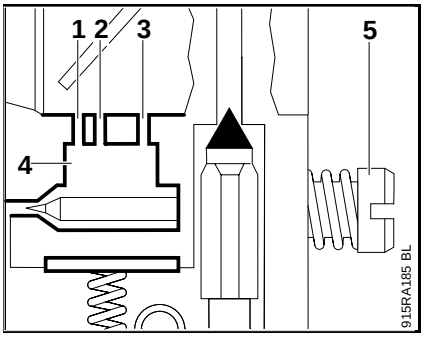
As a result of the difference in pressures (pressure in front of throttle shutter is close to atmospheric pressure), air from the venturi passes through the secondary idle jets (bypass bores) (1 and 2) into the idle chamber (4). This air mixes with the fuel and is drawn out of the primary idle jet (3) as a fuel-air mixture at the low pressure side.

In this process more air is added to the relatively small amount of air which flows through the small notch or hole in the throttle shutter and only the quantity of fuel required for idling is drawn off.

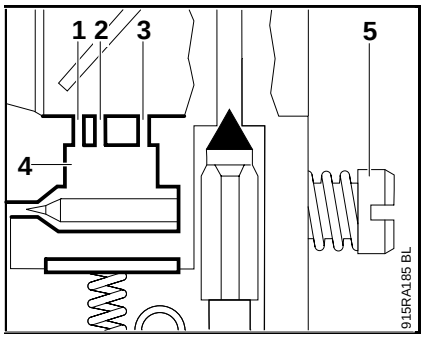
Idle jets - bypass bores



There are two or three idle bores in the area of the throttle shutter.

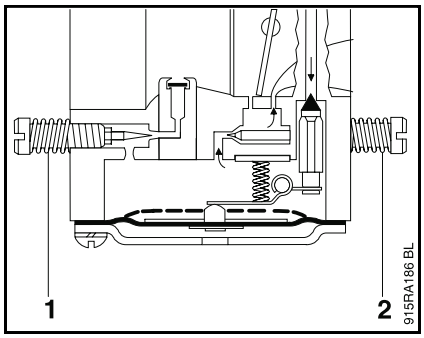


When the throttle shutter is opened the vacuum acts on the area of the secondary idle jets (1 and 2). Fuel is then drawn from these bores as well.



As the quantity of air that flows through the venturi is now greater, this fuel is necessary to enrich the mixture during acceleration.

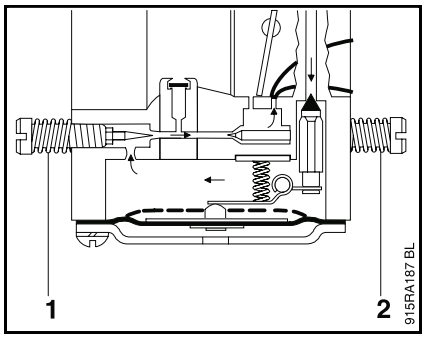
The amount of fuel drawn from idle jets (1, 2 and 3) can be increased or decreased by means of the low speed screw (5) whose pointed tip varies the size of the passage to the idle chamber (4).



Idle system independent of main jet system

In these carburetors the main jet and idle systems are arranged in parallel.
Changes in the idle fuel volume mean a change in the full-load fuel volume. If the idle fuel volume is altered with the low speed screw (2), it is necessary to readjust the high speed screw (1).

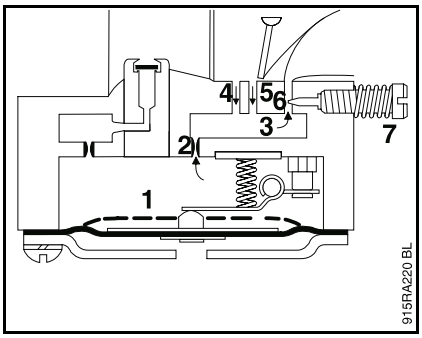
When the idle setting is made leaner, the overall fuel-air mixture becomes leaner too. This increases engine speed as well as the risk of engine damage as a result of overheating.



Idle system dependent on main jet system

In these carburetors the idle system branches off the full-load system after the high speed screw (1). It is not directly connected to the metering diaphragm chamber. Full-load fuel flow is determined by the high speed screw.

Adjusting the low speed screw (2) to change the idle fuel volume does not result in a change to the overall fuel volume.



Idle

In the idle positon, the throttle shutter is situated between the 2nd secondary idle jet (5) and the primary idle jet (6).

The pressure in front of the throttle shutter is close to atmospheric pressure, while the vacuum created by the engine prevails behind the throttle shutter.
Vacuum acts on the idle chamber (3) via the primary idle jet (6). As a result of the pressure differential, air flows from the venturi through the secondary idle jets (4 and 5) into the idle chamber (3).
At the same time, fuel is drawn out of the metering diaphragm chamber (1) and into the idle chamber (3) via the fixed idle jet (2).
A **primary mixture** is created in the idle chamber (3) which is sucked through the primary idle bore (6) into the area at the engine side of the throttle shutter.

The idle air is drawn through a notch or a hole in the throttle shutter and mixes with the primary mixture to form the idle mixture.

The proportion of primary mixture in the idle mixture can be adjusted with the idle screw (7) (primary mixture control).
The machine will run with the basic setting (approx. 1 turn open).
The idle mixture is made richer by opening the idle screw (7) or leaner by closing the screw.
If necessary, the idle speed can be adjusted with the idle speed screw (**LA**).

Transition from idle to part load

When the throttle shutter is opened, vacuum acts on the secondary idle jets (4 and 5).
Fuel is then drawn from all three idle jets (4, 5 and 6).

Transition from part load to full load

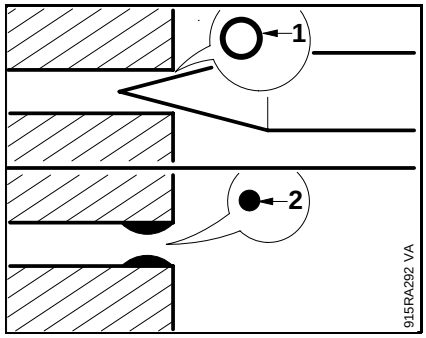
The main jet begins to deliver fuel when the throttle shutter has opened about 20 degrees. The idle and full-load system deliver the optimum amount of fuel to suit given opening conditions when the throttle shutter is opened fully.

Advantages over conventional carburetors

The fixed idle jet (2) limits enrichment for acceleration and the amount of fuel that flows via the idle system during full-load operation. As a result, **the setting of the idle screw (7) has no effect at all on the volume of fuel at full load**.

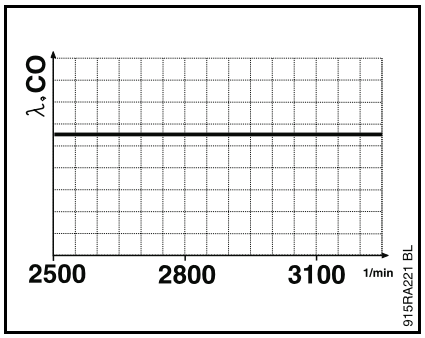
Reduced sensitivity to temperature

Carburetors with fixed idle jets ensure a much steadier idling behavior at low temperatures: Fuel becomes viscous at lower temperatures.



The more viscous the fuel is, the greater the influence the shape of the throttle orifice has on the flow rate.
Conventional adjusting screws create an annular gap (1) at the throttle orifice which can become blocked within a relatively short time.
Fixed jets have a round cross section (2) at the throttle orifice which allows a constant flow of fuel even at low temperatures. A constant fuel flow rate is the precondition for a steady idling behavior.

5.2.4 Carburetor with Balanced Idle System (Fixed Idle Jet and Air Bypass System)



The graph shows the air-fuel ratio (Lambda λ) or the carbon monoxide content (CO) in the exhaust gas plotted against the idle RPM:

Carburetors with a balanced idle system (**BIS**) guarantee an ideal idle mixture at all idle speeds.

Benefits

These carburetors are characterized by:
- Smooth, uniform idle speed
- Good response and acceleration
- Lower emissions under all operating conditions
- Stable adjustment over a wide ambient air temperature range
- Only one adjusting screw makes adjustment simpler.

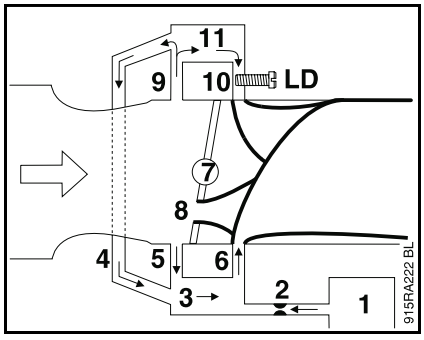
Special features

A fixed idle jet and an **air bypass system** with calibrated bores are typical features of carburetors with a balanced idle system.

The throttle shutter is completely closed in the idle position.

Most of the air required to form the idle mixture flows through the hole in the throttle shutter.
The air required to adjust the idle speed is sucked in via the idle chamber - or air bypass port.

The amount of bypass air can be adjusted with the idle speed screw (**LD screw**).



Low engine idle speed, the LD screw restricts the air bypass port:

The vacuum P_u behind the completely closed throttle shutter (7) causes -
- air to flow through the hole (8) in the throttle shutter
- vacuum P_3 in idle chamber (3) via the primary idle bore (6)
- vacuum P_{11} in air bypass chamber (11) via the bypass port (10).

If pressure P_{11} in air bypass chamber (11) is -
- lower than the atmospheric pressure in front of throttle shutter (7), air flows through bypass port (9) into the air bypass chamber (11)
- greater that pressure P_3 in idle chamber (3), air flows from bypass chamber (11) through the connecting passage (4) to the idle chamber (3).

The idle chamber (3) receives air via the secondary idle bore (5) as well as the connecting passage (4). At the same time, fuel is drawn out of the metering diaphragm chamber (1) via the fixed idle jet (2).

A primary mixture is formed in the idle chamber (3) which is sucked through the primary idle bore (6) into the engine side of the throttle shutter.

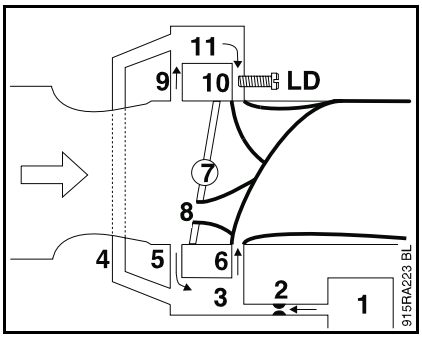
Primary mixture, air from the bypass port (10) and the air which flows through the hole (8) in the throttle shutter mix together to form the idle mixture.

Higher engine idle speed

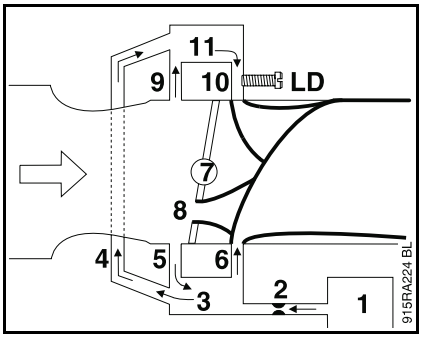
The **LD screw** is turned clockwise to increase idle speed.

Note: The **LD screw** has a left-hand thread in order to retain the familiar directions of rotation for adjustments:
- Rotating the screw clockwise increases engine speed.
- Rotating the screw counterclockwise reduces engine speed.

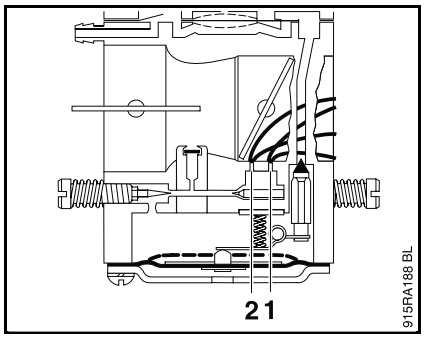
Turning the **LD screw** clockwise reduces the pressure P_{11} in the air bypass chamber (11). This increases the air throughput in bypass port (10). The difference between P_3 and P_{11} becomes smaller so that less air flows through the connecting passage (4) to the idle chamber.



The flow of air in connecting passage (4) stops when P_3 and P_{11} are equal.



Turning the **LD screw** further clockwise reverses the pressure gradient. P_{11} is then lower than P_3 so that primary mixture from the idle chamber (3) is added to the bypass air flowing through bypass ports (9 and 10) via the connecting passage (4).

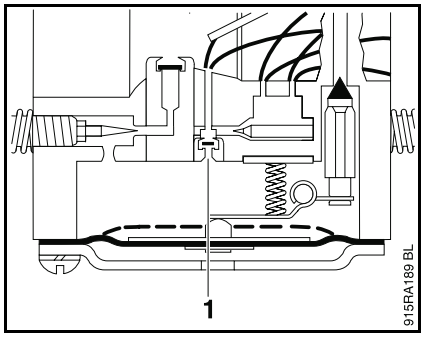


Part load means all stages of engine operation with a partly opened throttle shutter.

Fuel is drawn from the primary idle jet (1) and the secondary idle jet (2).

Part-load fixed jet

When working in the part-load range (e.g. limbing) the throttle shutter is often in a position between idle and full throttle. In this situation the fuel-air mixture may become over-lean ("part-load flat spot") and there is then a **danger of seizure.**

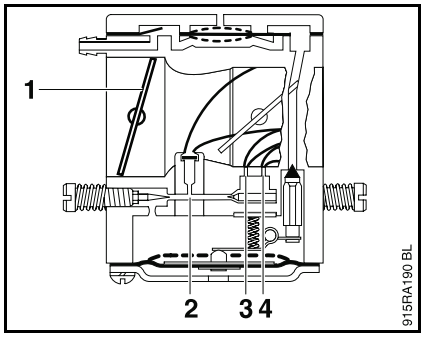


The part-load fixed jet (1), which opens into the venturi between the idle jets and the main jet, prevents the mixture becoming over-lean.

The low pressure causes additional fuel to be drawn off and enrich the fuel-air mixture in response to the throttle shutter position.

Hot start
Compared to engine idle RPM, the speed achieved by cranking the engine on the starter is very low. The gas flow speed and the vacuum in the venturi are therefore limited. Fuel and air mix poorly in this situation.
Moreover, fuel is more sluggish than air. This means than considerably more air than fuel is sucked in, the mixture becomes too lean and does not burn well.

Cold start
During a cold start the problems described for a hot start are further amplified.
Cold components cannot transfer heat to the mixture. As a result, the mixture gasifies poorly and a large proportion of the fuel condenses on the walls of the components it flows through.

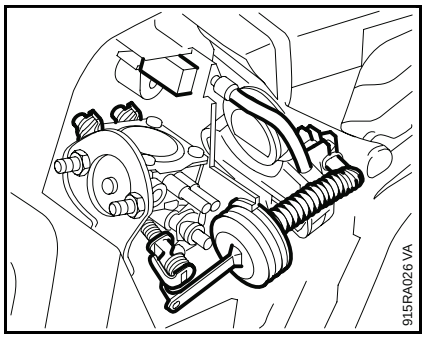


The mixture in the carburetor has to be highly enriched for the cold start: the **choke shutter (1) is closed**.

The full vacuum acts on the idle jets (3 and 4) and main jet system (2) in the metering diaphragm chamber. Fuel is drawn in and mixed only with the air that flows through the notch or hole in the choke shutter.

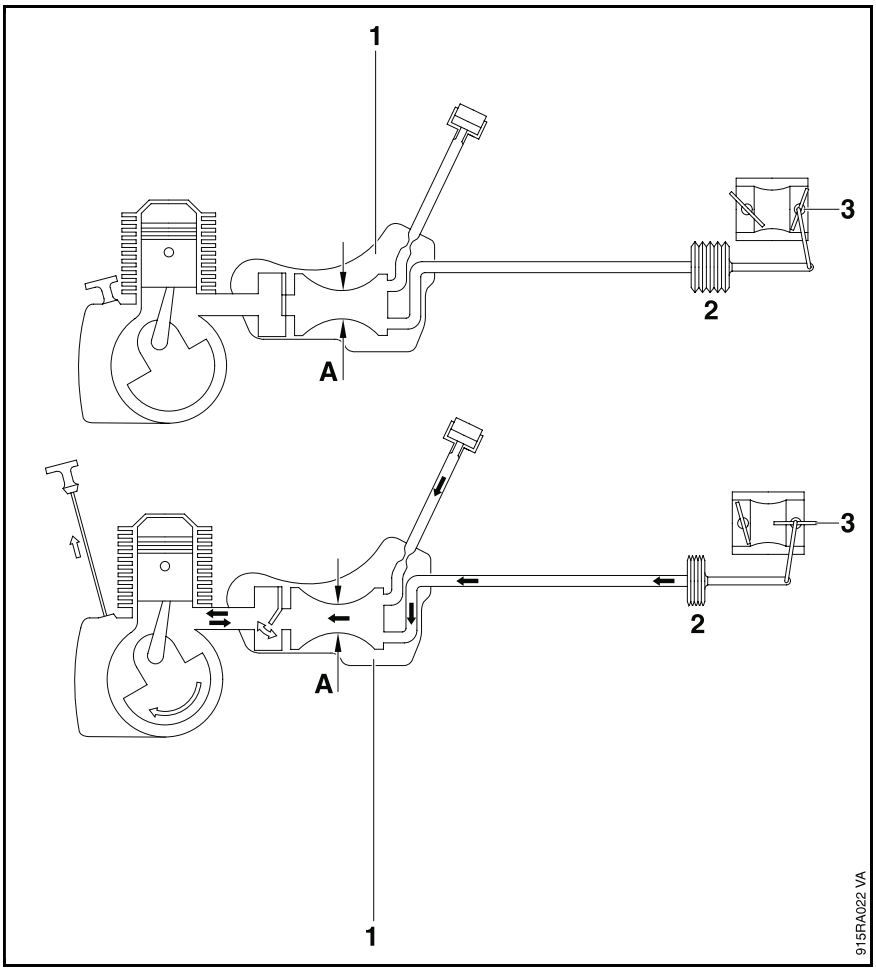
As soon as the engine has fired it is necessary to make the mixture leaner, i.e. open the choke shutter. The heat generated by initial combustion evaporates part of the fuel that had previously settled on the component walls. This has an enriching effect while the engine is warming up.

Note: Once the engine is running, open the choke shutter immediately to avoid an over-rich fuel-air mixture (the engine would otherwise stall again).



Automatic choke

Some machine versions are equipped with an **automatic choke**. It sets the throttle and choke shutters to the correct positions for an optimum mixture. Choke shutter and throttle shutter with bellows and control valve are connected via a lever mechanism on the carburetor.



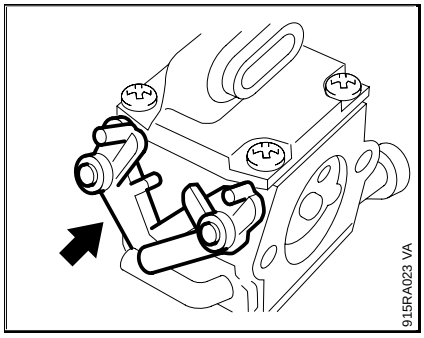
The automatic choke uses cylinder temperature as a parameter. Cross section "A" is changed as a function of cylinder temperature. This, in turn, alters the time required to vent the bellows and thus the opening speed of the choke shutter.

The regular changes in pressure which occur in the crankcase are used to operate the automatic choke.

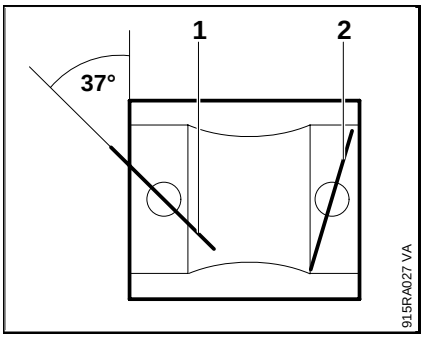
These pressure waves are fed via a hole in the crankcase and through a port in the cylinder to the control valve (1).

The control valve directs the low pressure waves at a predetermined interval to the bellows (2) which contract and thus open the choke shutter (3).

The period for which the bellows open the choke shutter depends on cylinder temperature. It varies between 3.5 seconds on a cold engine to approx. 0.1 seconds on a hot engine.



A lever mechanism connects the choke shutter to the throttle shutter.



The throttle shutter (1) is at an angle of 37 degrees to the carburetor mounting flange just before the choke shutter (2) opens fully. The throttle shutter returns to the idle position when the choke shutter is fully open.

Following a starting attempt, the bellows are filled with air from the carburetor box and returned to the neutral position. The air required to pressurize the bellows is drawn in from the carburetor box via a foam filter, a polymer sintered filter, a hose and control valve.

The pressurizing process is accompanied by a low whistling noise.

A depression is maintained in the bellows while the engine is running, i.e. the bellows are contracted; the choke shutter is open.

Icing can occur in the area of the intake if humidity is high and temperatures are below + 10°C (50°F).

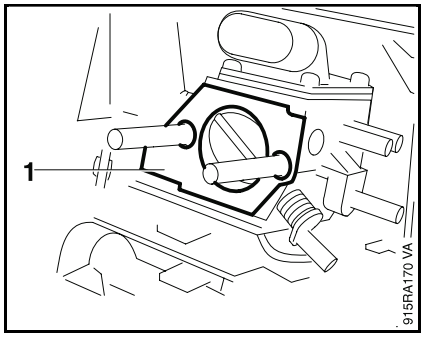
Cause:
Air can absorb a certain amount of moisture. The higher the air temperature the greater its capacity to absorb moisture.

If the engine draws in damp cold air, pressure and temperature drop and so does the ability to absorb moisture. Moisture condenses on the intake passages, especially in the carburetor. This results in ice forming, which blocks the jets and causes engine running problems.

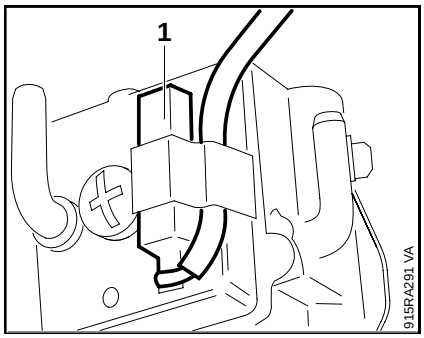
If the air filter is dirty, the air flow rate and pressure in the venturi (Pi) drop.

Carburetor heating

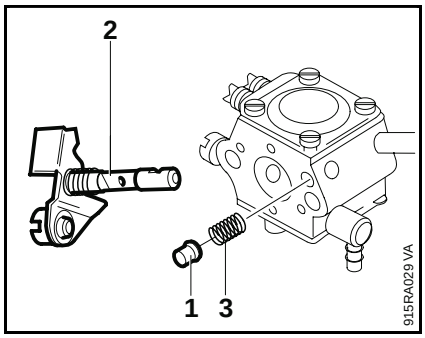
Some models are equipped with an electric carburetor heating system for operation in extremely cold climates, in which the intake air from around the engine is still too cold.



The heating element (1) is positioned on the carburetor mounting studs.



The thermostatic switch (1) is located on the pump end cover. Power supply takes place automatically via the heating generator.



Accelerator pump

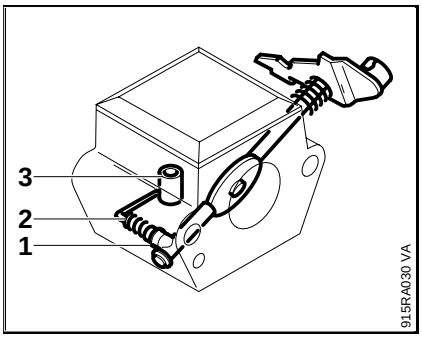
Some carburetors are equipped with an accelerator pump. The piston (1) is located in a bore behind the throttle shaft (2) and is held in its neutral position by a spring (3).

When the throttle shutter is opened quickly for acceleration, the air is able to adapt rapidly to the new flow conditions because of its low mass.

The reaction of the fuel, however, is sluggish by comparison because it first has to be set in motion by the vacuum. This means that a certain time lapses before the fuel has also adapted to the new conditions in the venturi. A flat spot would normally occur because of the over-lean fuel-air mixture.

The accelerator pump offsets this effect.

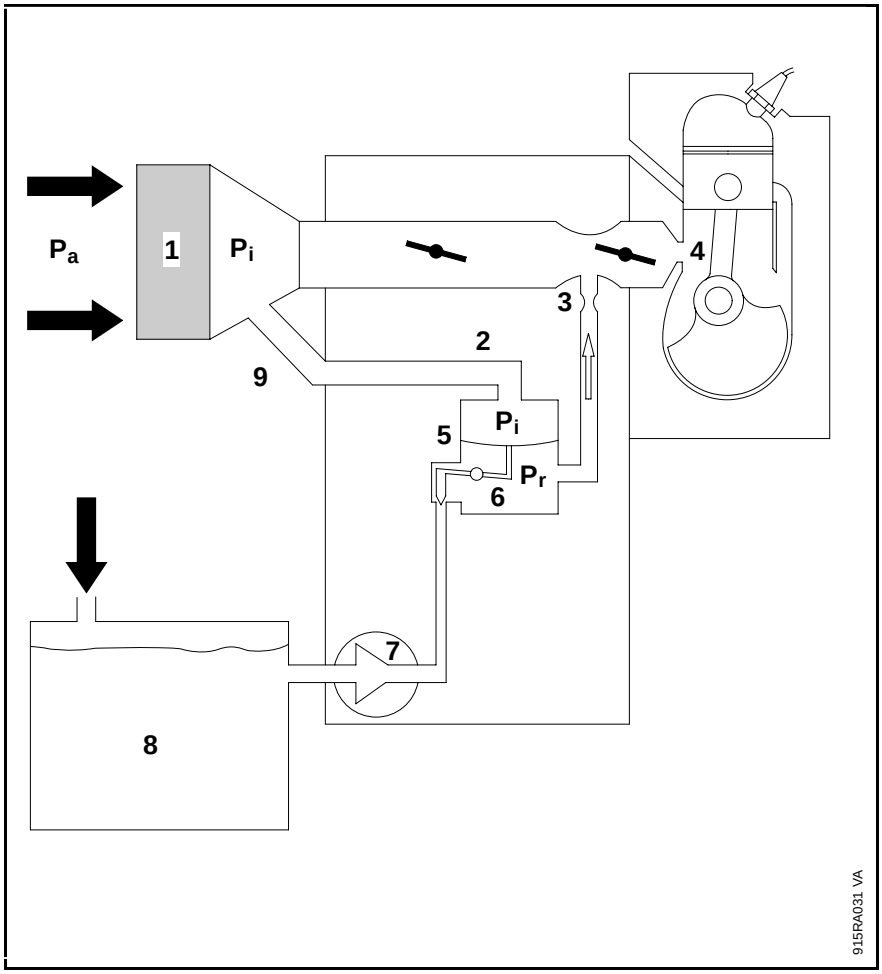
5.3.4 Dirty Air Filter/ Compensator



The accelerator pump's piston (1) is located in a bore behind the throttle shaft. The space below the piston is filled with fuel.

When the throttle is opened, the control face on the throttle shaft pushes the piston inwards. The fuel below the piston is then injected into the venturi via the valve jet (3).

This enriches the fuel-air mixture to ensure a smooth transition without a flat spot during acceleration. When the throttle shaft is turned back, the spring (2) returns the pump piston to its neutral position. A vacuum is created and fresh fuel is drawn from the metering system into the space below the piston.



Compensator

1	Air filter
2	Carburetor
3	Valve jet
4	Cylinder
5	Metering diaphragm
6	Inlet control valve
7	Fuel pump
8	Fuel tank
9	Compensator
P_a	Atmospheric pressure
P_i	Internal pressure
P_r	Pressure in metering chamber

The compensator connects the clean side of the air filter to the fuel metering system in the carburetor. This means that the pressure applied to the metering diaphragm is identical to the internal pressure P_i in the intake - not atmospheric pressure P_a.

In this way fuel feed is dependent on the current internal pressure P_i and the amount of air or oxygen that is actually available.

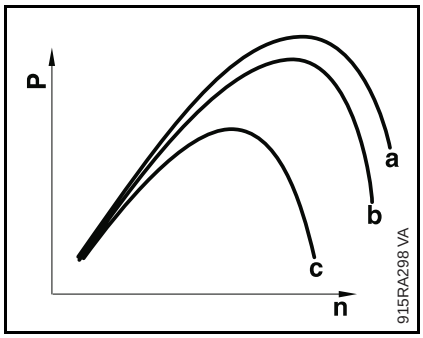
The air flow volume is reduced when the air filter is dirty. This causes the pressure Pi at the clean side of the air filter to drop, and also the pressure applied to the outside of the metering diaphragm. The metering diaphragm moves outwards and the inlet control valve reduces the cross section.

The flow of fuel is reduced so that the mixture cannot become over-rich.

A carburetor equipped with a compensator therefore keeps the fuel content in the mixture constant at all times, irrespective of air filter contamination.
It is no longer necessary to alter the setting of the high speed screw as contamination of the air filter increases.

However, engine power drops as a result of the reduction in air volume and can only be restored to normal by cleaning the air filter. There is no need for any further adjustment after cleaning.

A conversion from a HD (textile) filter to a standard (wire mesh) filter or vice versa does not necessitate readjustment of the mixture either.



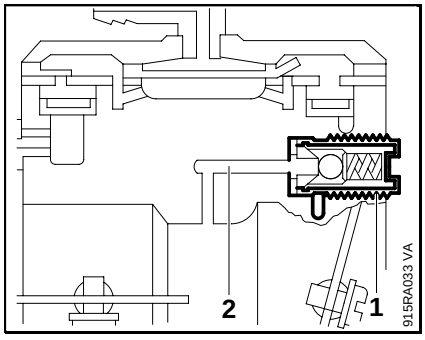
Power curve

P = Power
n = RPM
a = Clean air filter
b = dirty air filter, with compensator
c = dirty air filter, without compensator

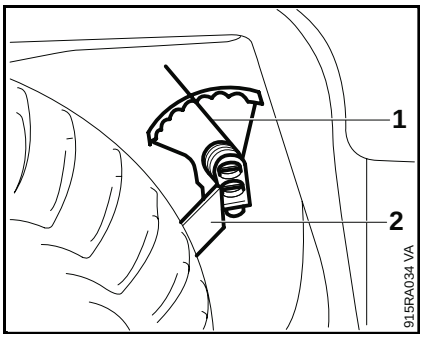
The mixture cannot become overrich. And it is no longer necessary to alter the setting of the high speed screw as contamination of the air filter increases. However, engine power drops due to the reduced quantity of air and fuel. Optimum power can only be restored by cleaning the air filter.

Control valve

Carburetors that are directly flange-mounted to the cylinder (without a resilient manifold to insulate vibrations) may be equipped with a control valve.



This valve (1) opens in response to resonance at a predetermined engine speed. Additional fuel is drawn into the venturi through the passage (2) and the outlet bore. The fuel-air mixture is enriched so that the engine speed cannot increase any further.



Speed governor (vane)

A torsion spring (1) acts via the governor lever and rod to keep the vane (2) in its neutral position (choke shutter is open). As engine speed increases, the force of the cooling airstrean overcomes spring tension and deflects the governor vane. This movement is transmitted to the choke shutter.

When a predetermined limit RPM is reached, the governor vane is deflected to a maximum degree and the choke shutter closes to a point where the richer mixture prevents any further increased in RPM.

Note: The cut-off speed can be adjusted by changing the spring's preload.

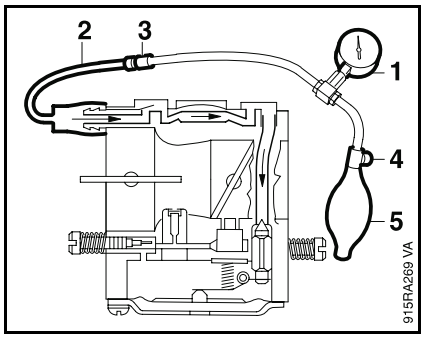
6. Troubleshooting Chart

Condition	Cause	Remedy
Carburetor floods; engine stalls	Inlet needle not sealing. Foreign matter in valve seat or cone damaged	Remove and clean or replace inlet needle, clean fuel tank, pickup body and fuel line if necessary
	Inlet control lever sticking on spindle	Free off inlet control lever
	Helical spring not located on nipple of inlet control lever	Remove inlet control lever and refit correctly
	Perforated disc on diaphragm is deformed and presses constantly against inlet control lever	Fit new metering diaphragm
	Inlet control lever too high (relative to design position)	Set inlet control lever flush with top of body or bottom of metering chamber
Poor acceleration	Idle jet "too lean"	Back off low speed screw slightly
	Main jet "too lean"	Back off high speed screw slightly
	Inlet control lever too low (relative to design position)	Set inlet control lever flush with top of body or bottom of metering chamber
	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Connecting bore to atmosphere blocked	Clean bore
	Diaphragm gasket leaking	Fit new diaphragm gasket
	Metering diaphragm damaged or shrunk	Fit new metering diaphragm

Condition	Cause	Remedy
Engine will not idle, idle speed too high	Throttle shutter opened too wide by idle speed screw	Reset idle speed screw correctly
	Idle speed screw (LD) opened too far	Adjust idle speed screw correctly
	Idle speed screw (LA) opened too far	Adjust idle speed screw correctly
	Machine leaking	Locate and repair leak
Engine stalls at idle speed	Idle jet bores or ports blocked	Clean jet bores and ports with compressed air
	Idle jet "too rich"	Screw down low speed screw slightly
	Setting of idle speed screw incorrect - throttle shutter completely closed	Set idle speed screw correctly
	Setting of idle speed screw (LD) incorrect	Set idle speed screw correctly
	Small plastic plate in valve jet does not close	Clean or renew valve jet
Engine speed drops quickly under load - low power	Air filter plugged	Clean air filter
	Tank vent faulty	Clean or replace tank vent if necessary
	Leak in fuel line between tank and fuel pump	Seal or renew connections and fuel line
	Pump diaphragm damaged or fatigued	Fit new pump diaphragm
	Main jet bores or ports blocked	Clean bores and ports
	Fuel pickup body dirty	Clean pickup body, fit new filter
	Fuel strainers dirty	Clean fuel strainers

7. Servicing

7.1 Leakage Test



The carburetor can be tested for leaks with the carburetor and crankcase tester (1) 1106 850 2905.

- Check the tester for leaks.

The following test values refer to carburetors that have been flushed with fuel and have moist diaphragms. Dry carburetors must not be subjected to pressures of more than 0.35 bar (5 psi).

- Flush dry carburetors with fuel before starting the test.

Carburetors can only seal properly when the fuel passages and all sealing points are wetted with fuel.

The pressure applied during the test must not exceed 1 bar (14.5 psi).

If higher pressures are applied, the control valve will open and allow the pressure to enter the metering chamber and possibly over-stretch the metering diaphragm.

- Push fuel line (2) 1110 141 8600 with nipple (3) 0000 855 9200 onto the carburetor's intake fitting.

- Connect tester's pressure hose to nipple.

- Close vent screw (4) on the rubber bulb (5) and pump air into the carburetor until the pressure gauge shows a reading of approx. 0.8 bar (11.6 psi).

If this pressure remains constant, the carburetor is airtight. However, if it drops, the likely causes are:

The inlet needle is not sealing (foreign matter in valve seat or sealing cone of inlet needle is damaged or inlet control lever sticking).

Check the metering diaphragm for distortion and replace if necessary.

In these cases the carburetor must be serviced.

- After completing the test, open the vent screw and remove the fuel line from the intake fitting.

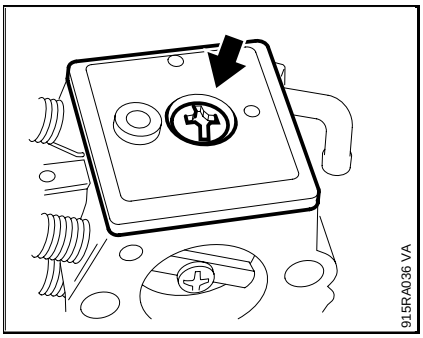
7.2 Cleaning

Carburetor problems are often caused by blocked jets, bores and fuel strainers. Even water droplets, which get into the carburetor with the fuel, can cause trouble. Owing to its high surface tension, water restricts the flow of fuel in the fine jet bores.

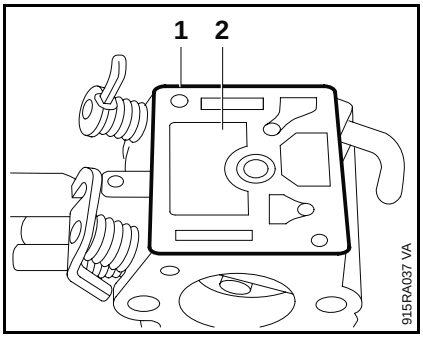
Water droplets may freeze in winter and completely block fuel passages.

To clean the carburetor, strip it down and remove the adjusting screws, jets and inlet needle. Use a brush or a clean leather cloth and fresh fuel to clean the carburetor body. Then blow out all ports and jets with compressed air.

Warning: Never use needles, wires or similar tools or fibrous cloths for cleaning the carburetor or jets.

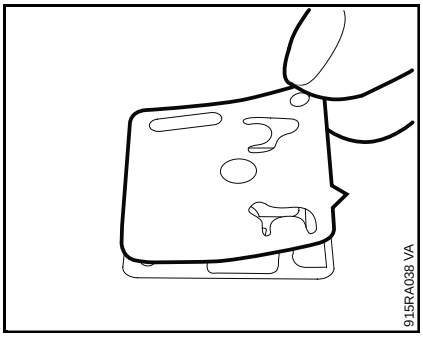


- Take out the screws.
- Remove the end cover.



- Remove the gasket (1) and pump diaphragm (2) from the end cover or carburetor body.

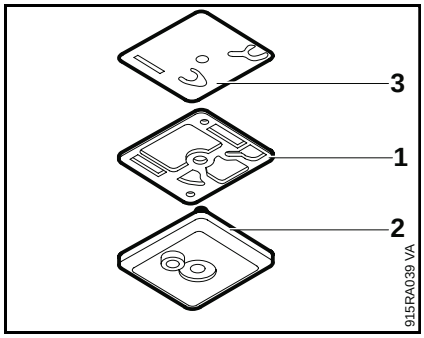
Note: If the gasket and diaphragm are stuck, remove them carefully.



- Carefully separate the diaphragm and gasket.

- Inspect diaphragm and gasket and replace if necessary.

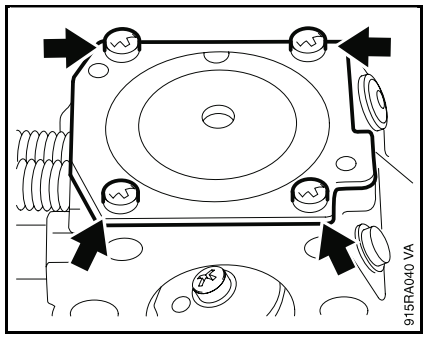
Note: The diaphragm and the inlet and outlet valves are exposed to continuous alternating stresses and the material eventually shows signs of fatigue. The diaphragm distorts and swells and has to be replaced.



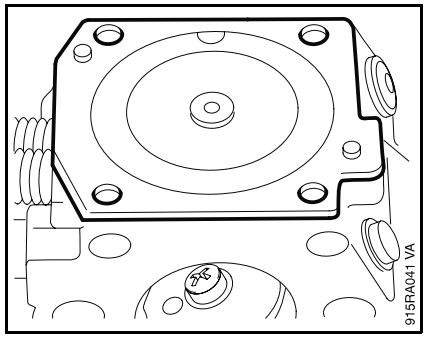
- Place the gasket (1) on the end cover (2).
- Wet the pump diaphragm (3) with fuel and place it on the gasket.
- Fit the end cover on the carburetor body.

Note: Pump diaphragm, gasket and end cover are held in position by the integrally cast pegs on the end cover.

- Insert screw(s) and tighten down securely.

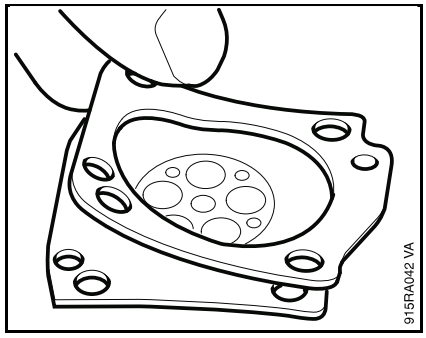


- Take out the screws.
- Remove the end cover.
- For carburetors with manual fuel pump see 7.9.



- Remove metering diaphragm and gasket from carburetor body or end cover.

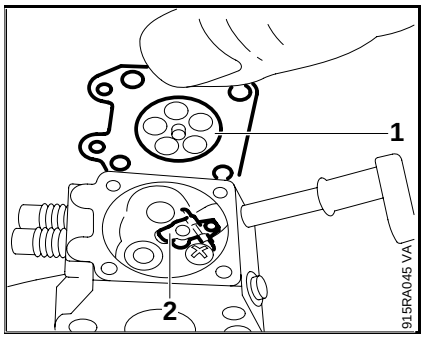
Note: If the gasket and diaphragm are stuck, remove them carefully.



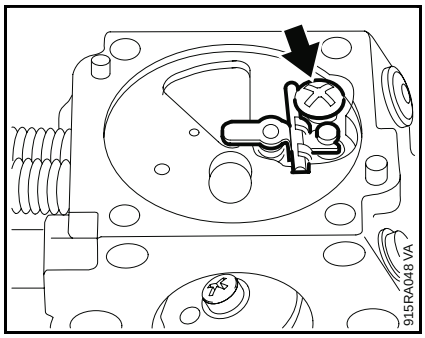
- Carefully separate the diaphragm and gasket.

- Inspect diaphragm and gasket and replace if necessary.

Note: The diaphragm is exposed to continuous alternating stresses and the material eventually shows signs of fatigue. The diaphragm distorts and swells and has to be replaced.



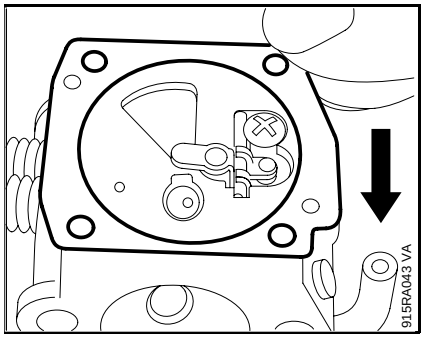
- Fit pump diaphragm so that perforated plate (1) points towards the inlet control lever (2).



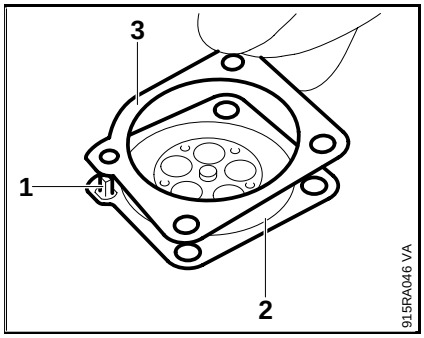
- Remove metering diaphragm - see 7.4.

- Take out the screw.

- Remove inlet control lever with spindle or plate with inlet control lever and gasket. Pull out the inlet needle.

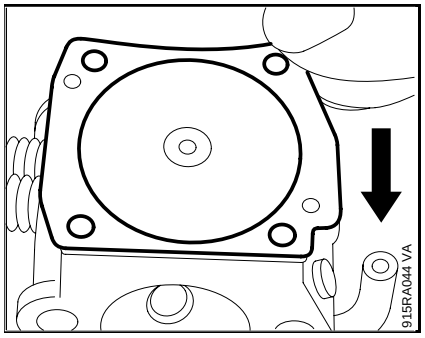


- Place gasket on carburetor body.



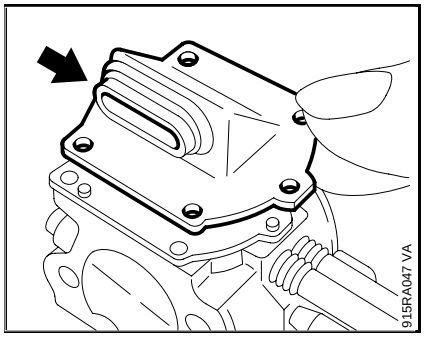
- If the peg (1) is on the end cover, place the metering diaphragm (2) and gasket (3) on the end cover.

- Fit end cover in position.



- Place metering diaphragm on gasket.

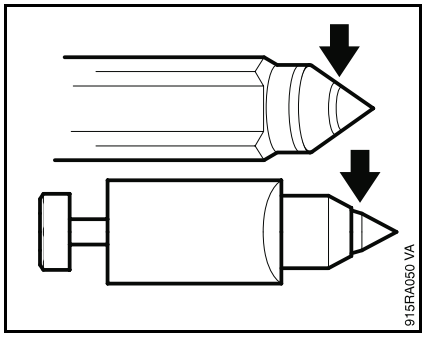
Note: Gasket and metering diaphragm are held in position by the integrally cast pegs.



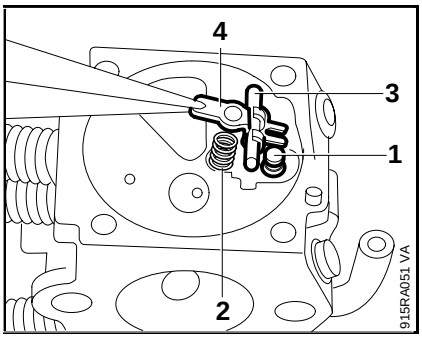
Carburetors with compensator:

- Install end cover with connector.

- Fit screws and tighten down securely.



- If there is an annular indentation on the sealing cone of the inlet needle, it will be necessary to replace the inlet needle because it will no longer seal properly.

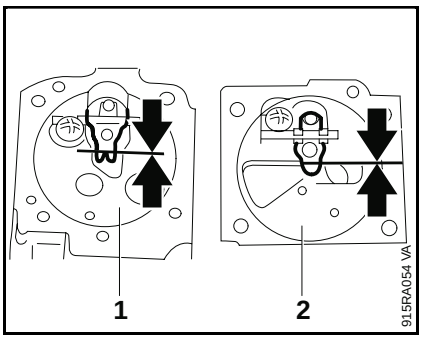


- Fit the inlet needle (1).
- Fit helical spring (2) in the blind hole.
- Insert spindle (3) in the inlet control lever (4).
- Engage clevis of inlet control lever in annular groove on the head of the inlet needle.
- Press down the inlet control lever and secure it with the screw.

Note: Make sure that the helical spring locates on the control lever-'s nipple.

- Check easy action of the inlet control lever.

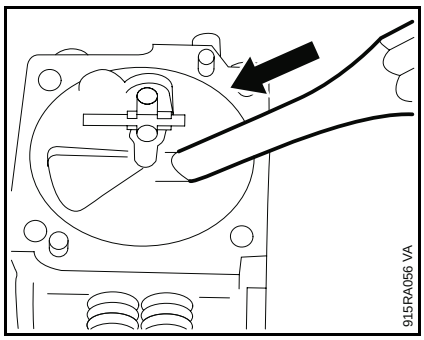
Important: The top of the inlet control lever must be level with the bottom of the metering chamber (1) or the top face of the carburetor body (2).



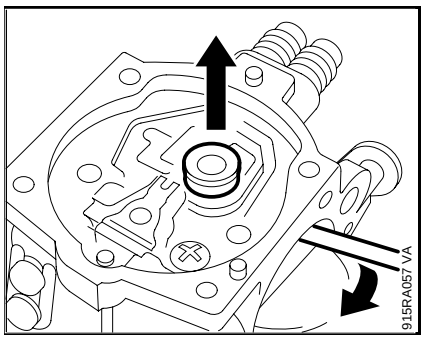
- If this is not the case, the inlet control lever is bent and must be replaced.
- Install metering diaphragm - see 7.4.

If the plate of the check valve in the main jet no longer moves freely, install a new main jet.

- Remove metering diaphragm - see 7.4.

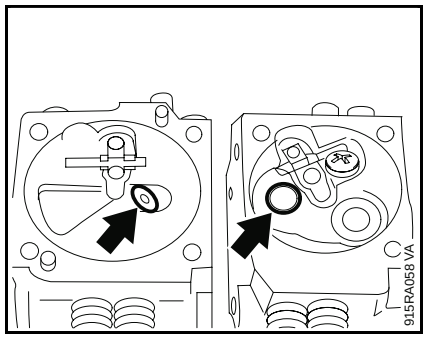


- Use a suitable pin punch to press the main jet out of its seat in the direction of the venturi.



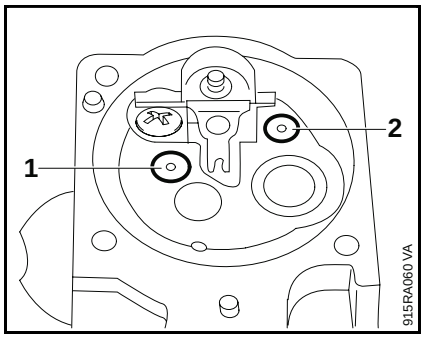
WS-26A carburetor:

- Use a screwdriver to push the valve jet out of its seat from inside the venturi.
- Wash the main jet in white spirit.



- Install the main jet exactly vertical in the bore. Press it home until it is flush with the bottom of the metering chamber.

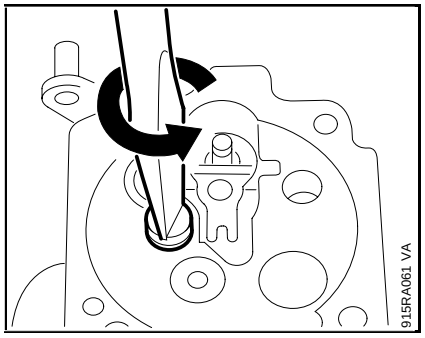
7.7 Full-Load Fixed Jet/ Part-Load Fixed Jet



- Remove metering diaphragm - see 7.4.

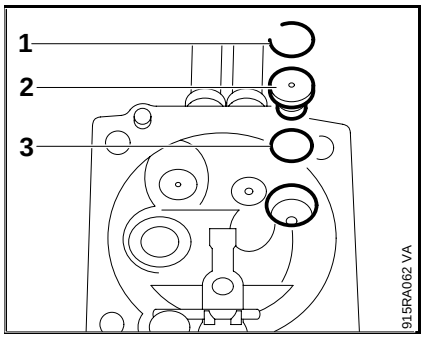
Note: The part-load fixed jet (1) cannot be replaced, it can only be blown clear with compressed air.

- Use a pin punch to press the full-load fixed jet (2) out of its seat in the direction of the venturi.



HS-262B carburetor:

- Unscrew the full-load fixed jet.



HD-5 carburetor:

- Use a scriber to remove the retaining ring (1).

- Tap the carburetor body against a wooden base to remove the full-load fixed jet (2) and 0-ring (3).

- Wash full-load fixed jet in white spirit and blow out with compressed air.

Note: Replace damaged full-load fixed jet.

- Install full-load fixed jet exactly vertical in the bore. Press it home until it is flush with the bottom of the metering chamber.

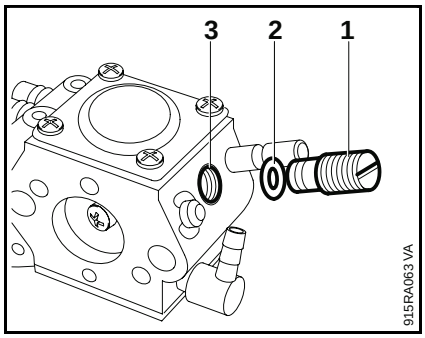
HD-5 carburetor:

- Fit a new 0-ring in the bore.

- Press home the fixed jet (flat side up) as far as stop and secure in position with retaining ring.

- Install metering diaphragm - see 7.4.

7.8 Control Valve



WT-227E and WT-264 carburetors:

- Remove the manual fuel pump - see 7.9.

- Unscrew the control valve (1).

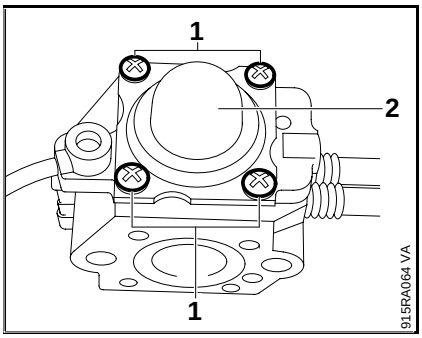
- Take the copper washer (2) out of the bore (3).

- Fit a new copper washer in the bore for the control valve.

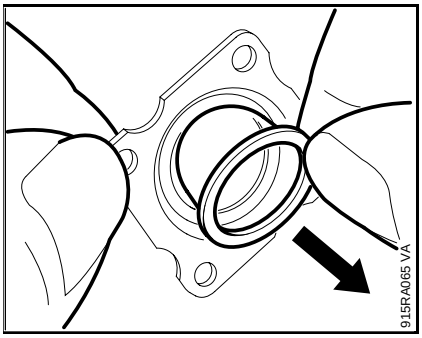
- Screw in new control valve about 2 full turns.

- Coat the thread that still projects from the carburetor body with Loctite - see 8.2.

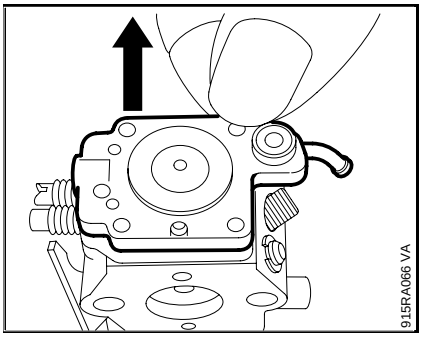
- Carefully screw home control valve as far as stop and tighten down to 4 Nm (3.0 lbf.ft).



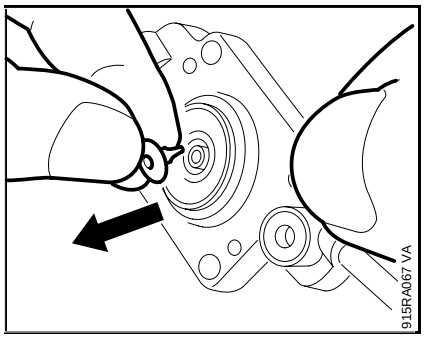
- Take out screws (1).
- Remove end cover with pump bulb (2).



- Remove the pump bulb.



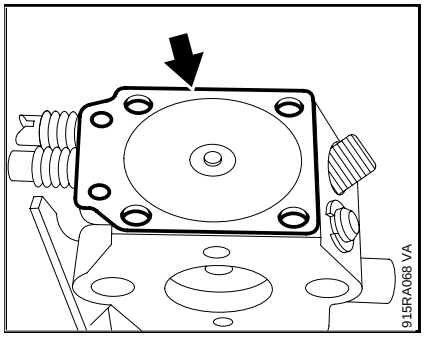
- Remove the flange.



- Take valve out of flange.

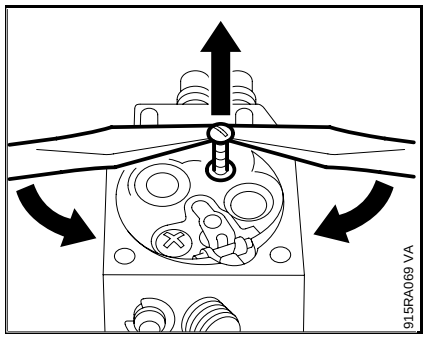
- Check valve and replace if necessary.

Note: If the circuit for filling the metering chamber is malfunctioning, if the valve is dirty, distorted or damaged, install a new valve.



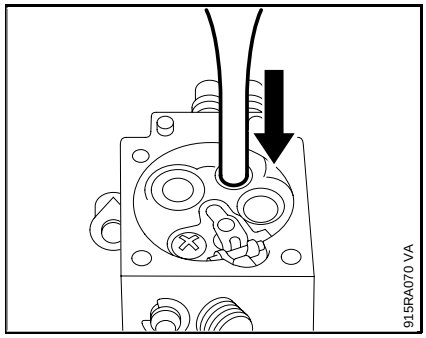
- Check metering diaphragm and sealing ring and replace if necessary - see 7.4.

Assemble in the reverse sequence.



- Remove metering diaphragm - see 7.4.

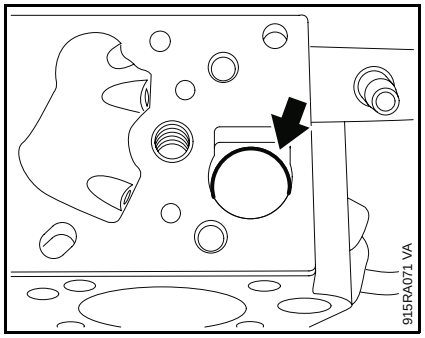
- Fit a 2.5x13 mm self-tapping screw in the check valve's bore and use it to pull out the check valve.



- Use a 4 mm (approx. 5/32") pin punch to press the check valve squarely into the metering chamber as far as stop.

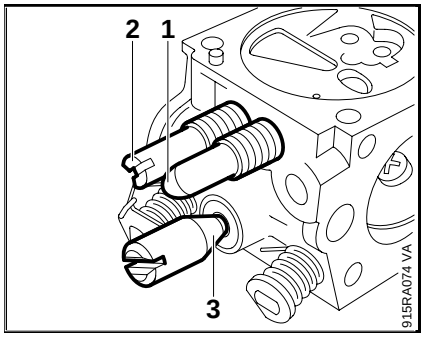
- Install metering diaphragm - see 7.4.

- Remove pump diaphragm - see 7.3.
- Remove inlet needle - see 7.5.
- Remove valve jet - see 7.6.
- Remove full-load fixed jet, if fitted - see 7.7.
- Remove check valve, if fitted - see 7.10.

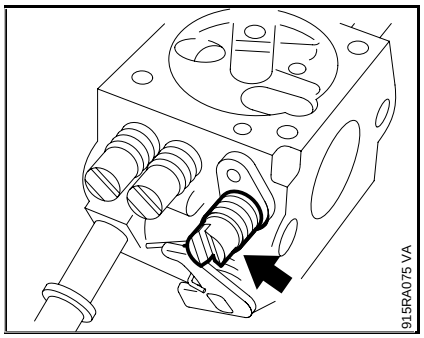


- Use a scriber to pry out fuel strainer and then clean it.

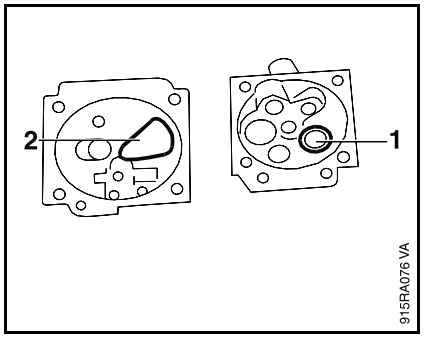
Important: Always replace a damaged fuel strainer.



- Take out the high speed screw (1), low speed screw (2) and, if fitted, the idle speed screw (3).



Caution: Idle speed screw (LD) has a left-hand thread.

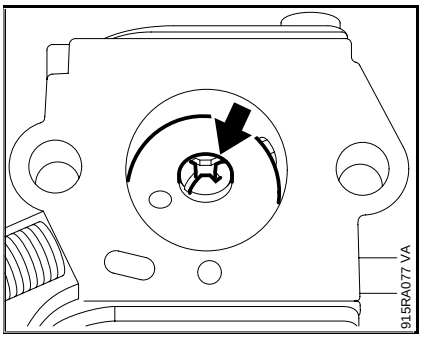


- Use a pin punch to press the center of the sealing plug (1) or sealing plate (2) until it buckles and can be taken out.

Important: The sealing plug or sealing plate is destroyed during removal.

- Wash the carburetor body in fresh white spirit and blow all ports and bores clear with compressed air.
- To replace the carburetor body, remove the throttle shaft and, if fitted, the choke shaft - see 7.12 and 7.13.
- Place the new sealing plug or plate in the bore with its convex side facing up.
- Use a large pin punch to apply light pressure until the sealing plug or plate is flat.
- Secure new sealing plate or plug with Loctite - see 8.2. (Apply Loctite to gap between carburetor body and sealing plate or plug.)

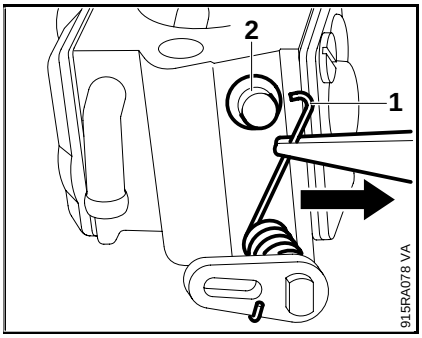
Assemble all other parts in the reverse sequence.



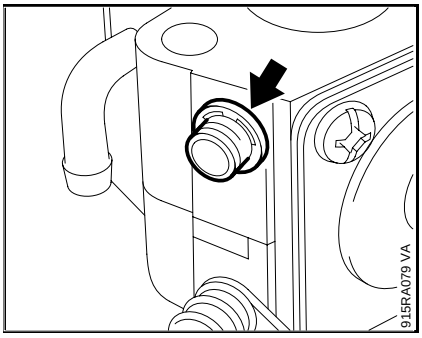
- For carburetors with automatic choke see 7.15.1.

• Take out the screw.

- Remove the throttle shutter or pull it out of the throttle shaft.

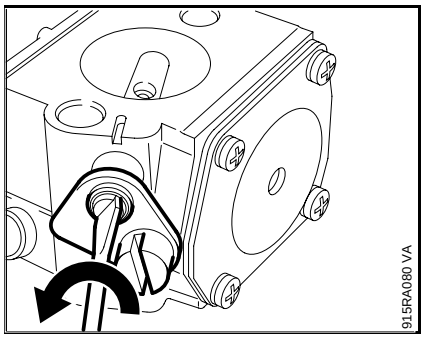


• On C1Q-S11G, detach torsion spring (1) from groove in throttle shaft (2).



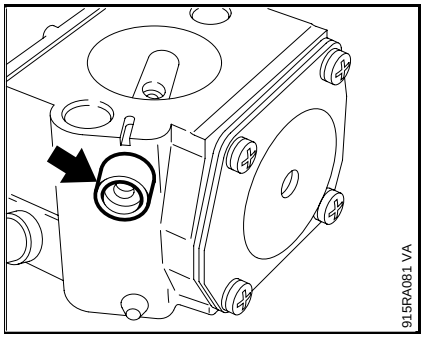
• Remove the E-clip.

- Take off the washer, if fitted.

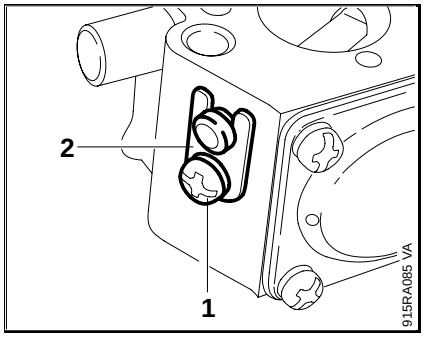


• On some carburetors, remove the screw from the lever.

- Remove the lever.

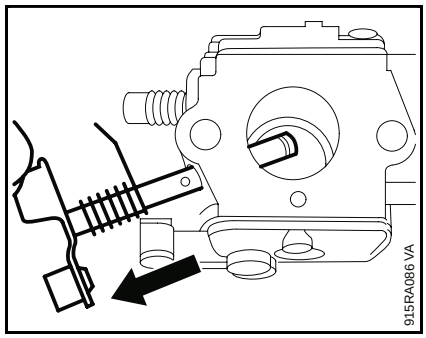


• Remove spacer sleeve.



• On some carburetors, take out the screw (1).

• Pull the clip (2) off the throttle shaft.

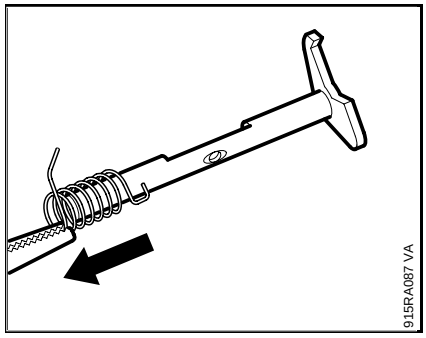


• Carefully withdraw the throttle shaft.

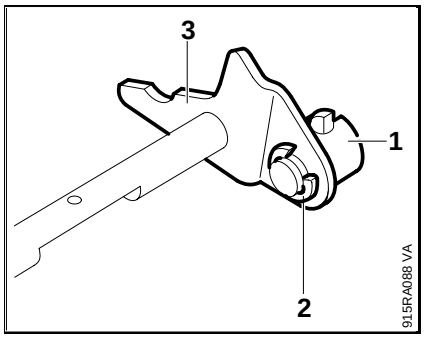
- Check for excessive play which may be a source of secondary air.

- For carburetors with accelerator pump see 7.14.

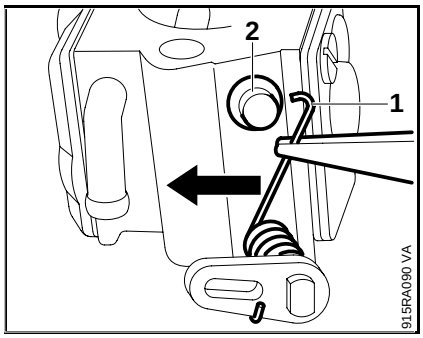
- On some carburetors it is necessary to remove the pump end cover before withdrawing the throttle shaft - see 7.3.



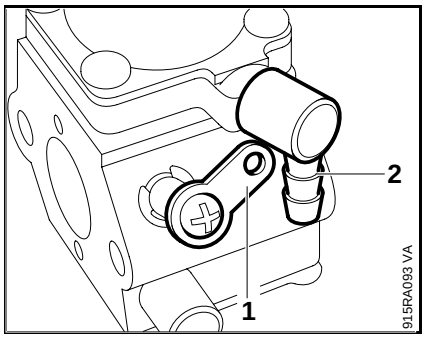
• Pull off the torsion spring.



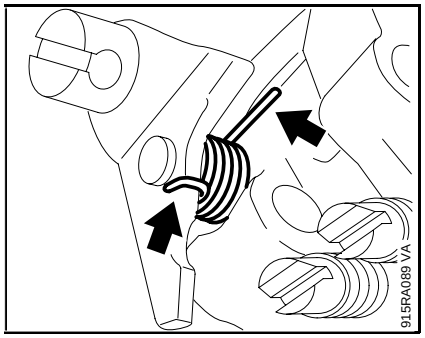
- On throttle shafts with a slotted pin (1), remove the E-clip (2).
- Take slotted pin out of the lever (3).



- On C1Q-S11G, attach torsion spring (1) to groove in throttle shaft (2).



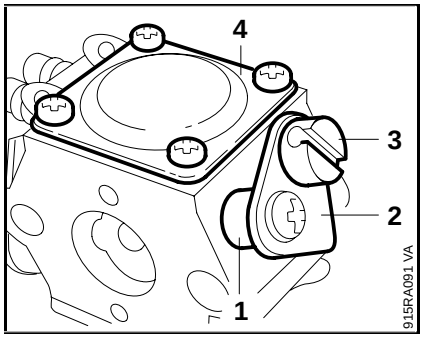
- On WT-253, fit lever (1) so that it points towards intake fitting (2).



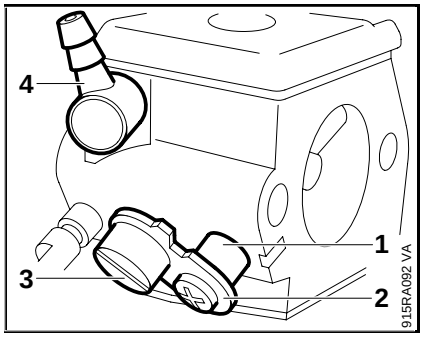
- After pushing home the throttle shaft, check that torsion spring is correctly positioned.

Note: The illustration shows the WT-227F carburetor. The position of the torsion springs on other carburetors is similar.

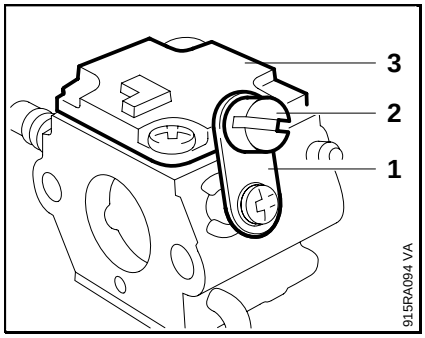
- Install throttle shutter so that its entire circumference locates against the wall of the venturi.
- Coat screw with Loctite, see 8.2, and tighten down securely.
- Fit E-clip or clip in the groove.
- Secure clip with screw.



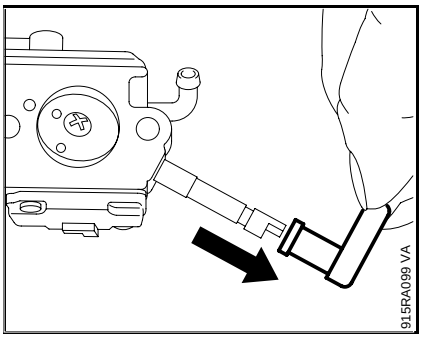
- On WT-230, push spacer sleeve (1) into position.
- Fit lever (2) so that the slotted pin (3) points towards metering chamber end cover (4).



- On HD-3A, fit the spacer sleeve (1).
- Fit lever (2) so that slotted pin (3) points towards intake fitting (4).

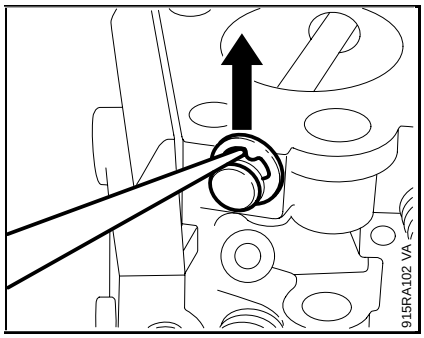


- On C1Q-SK6, fit lever (1) so that slotted pin (2) points towards the metering chamber end cover (3).

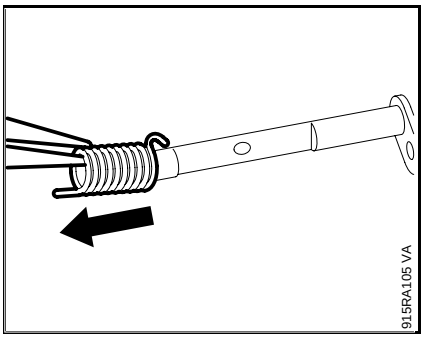


- For carburetors with automatic choke see 7.15.1.

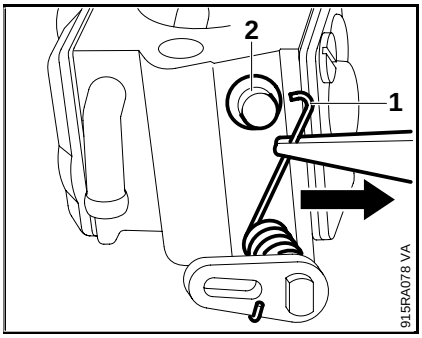
• Pull off the lever, if fitted.



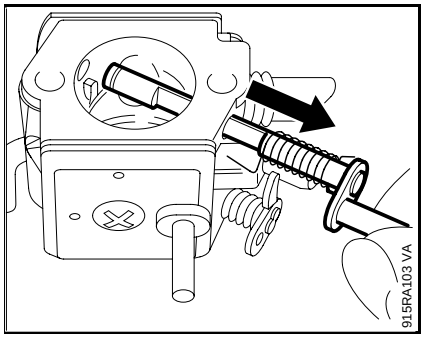
• Remove the E-clip, if fitted.



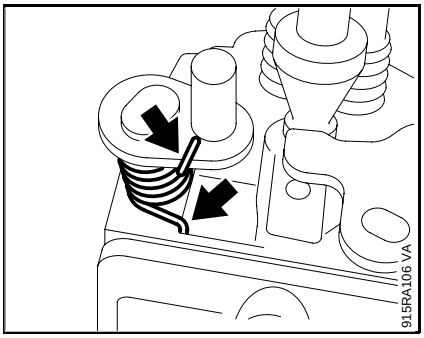
• Remove the torsion spring.



• On C1Q-S11G, detach torsion spring (1) from groove in throttle shaft (2).

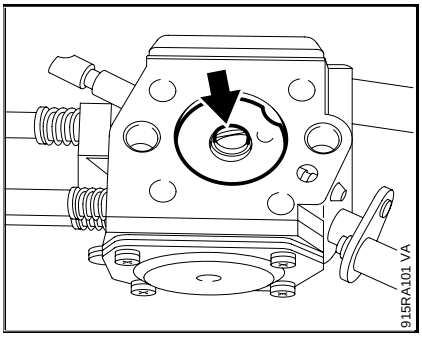


• Withdraw the choke shaft **with** torsion spring.



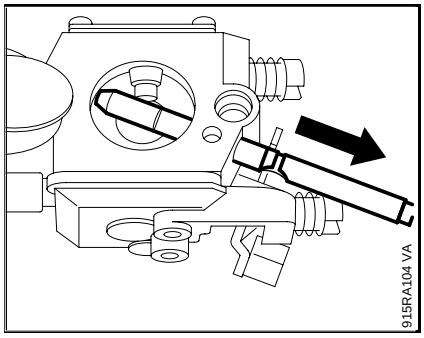
- Fit the torsion spring.

• After fitting the choke shaft, check that the torsion spring is correctly positioned.



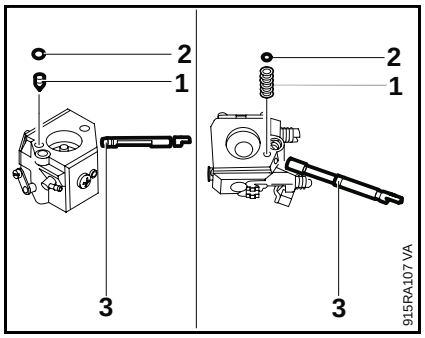
• Take out the screw.

- Remove the choke shutter or pull it out of the choke shaft.

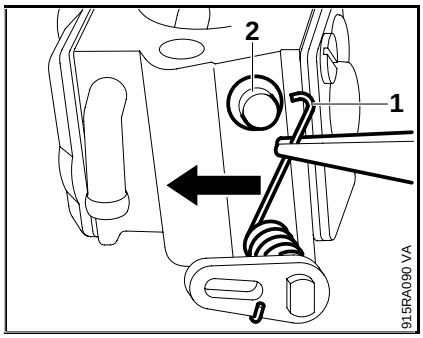


• Carefully withdraw choke shaft **without** torsion spring so that the ball does not pop out and be lost.

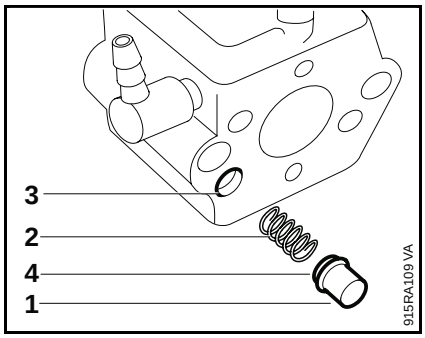
- Take out the ball and spring.



- On choke shafts without torsion spring, fit the spring (1) and ball (2).
- Push home the choke shaft until the ball engages the groove (3).
- Install choke shutter so that its entire circumference locates against the wall of the venturi.
- Fit screw with Loctite, see 8.2, and tighten down securely.
- On choke shafts with torsion spring, fit the E-clip.

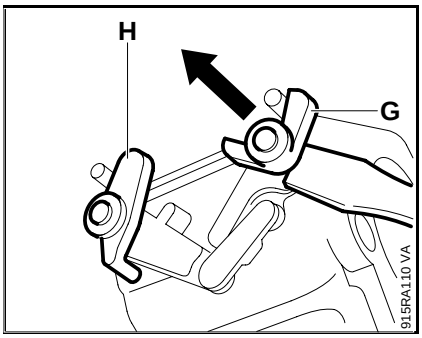


- On C1Q-S11G, attach torsion spring (1) to groove in throttle shaft (2).
- Refit the lever, if removed.



- Remove the throttle shaft - see 7.12.
- Knock the pump piston (1) and spring (2) out of the bore (3).
- Take the sealing ring (4) off the pump piston.
- Inspect pump piston and spring and replace if necessary.
- Fit new sealing ring (4) in groove of pump piston (1).
- Place spring (2) in the bore (3).
- Fit pump piston (1) in the bore, closed end facing outward.
- Install throttle shaft - see 7.12.
- Press down the pump piston so that throttle shaft can be pushed home.

7.15 Lever Mechanism on Carburetors with Automatic Choke



Removal:

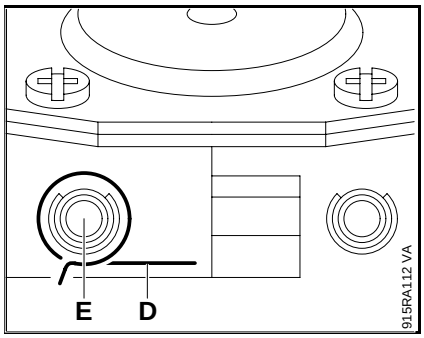
- Carefully pry bell crank "G" and lever "H" off the shafts.

- Remove the lever system from the shafts.

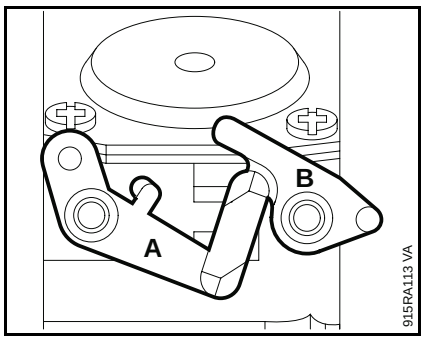
- Take the torsion spring off the throttle shaft.

Installation:

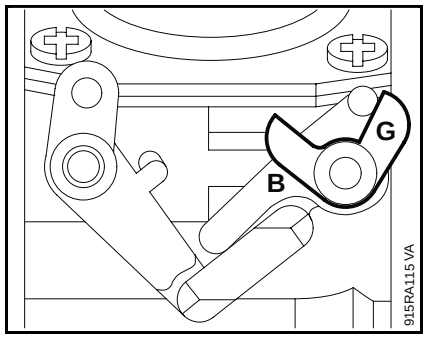
Note: Bell crank "G" and lever "H" have to be pressed onto the shafts. To do this, clamp the carburetor body in position so that the pressure used to install the levers is transmitted to the carburetor body via a short part of the shaft and the retaining ring. This procedure ensures that the shaft is not loaded beyond its buckling strength.



- Fit the torsion spring "D" on the throttle shaft "E" so that its bent end points away from the carburetor.

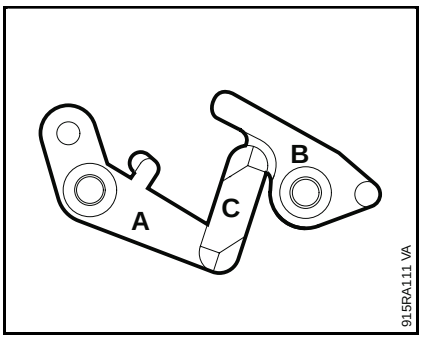


- Push lever "A" on to the throttle shaft and, at the same time, lever "B" on to the choke shaft.

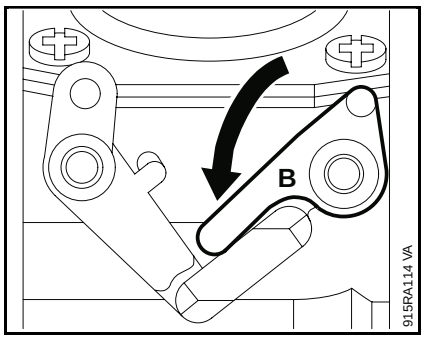


- Fit the bell crank "G" (with flat face pointing to lever "B") over the choke shaft so that the pin on lever "B" is between the arms of bell crank "G".

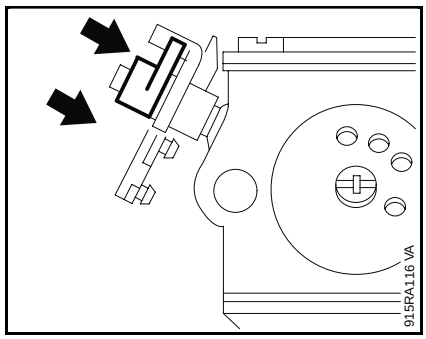
- Rotate bell crank counterclockwise until its right arm butts against the pin on lever "B".



- Carefully push the link "C" into position to connect levers "A" and "B".

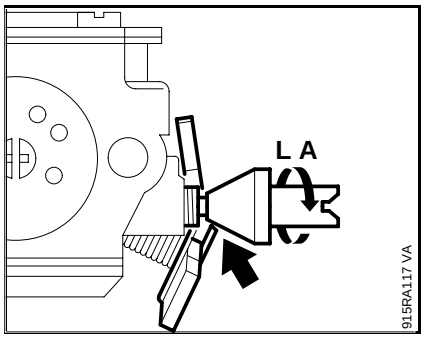


- Rotate lever "B" on choke shaft counterclockwise as far as stop.

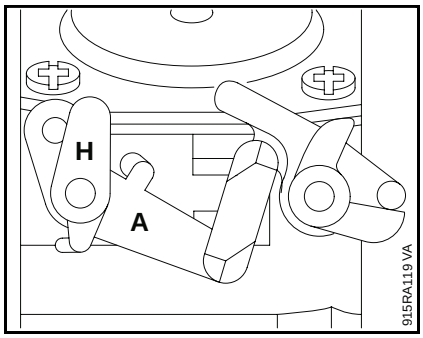


- With the bell crank in this position, carefully press it on to the choke shaft.

Caution: Take care not to bend the choke shaft.



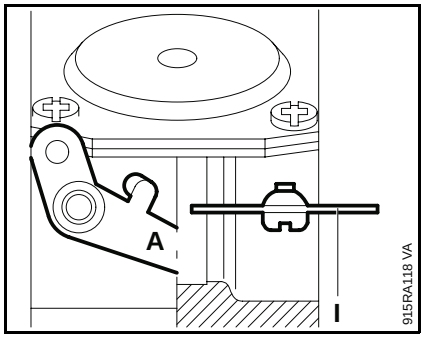
- Turn the idle speed screw "LA" counterclockwise until the throttle shaft is clear of the taper on the idle speed screw.



- Fit lever "H" on the throttle shaft and rotate it counterclockwise until it butts against the pin on lever "A".

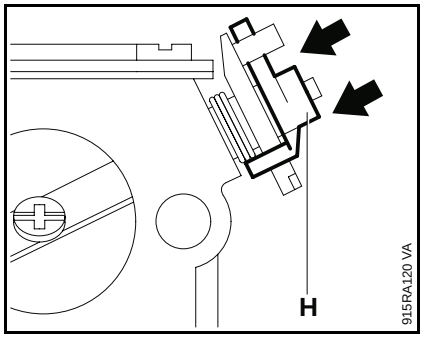
- Open the choke shutter by slowly turning the right-hand end of the choke shaft. The throttle shutter must jump to the closed position just before the choke shutter is fully open.

Note: This is accompanied by a definite clicking sound.



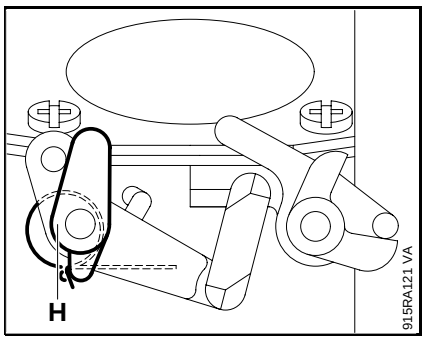
- Open the choke shutter "I" and hold it steady in that position.
- Swing lever "A" counterclockwise as far as stop.

Important: The choke shutter must be held open for the next two operations.

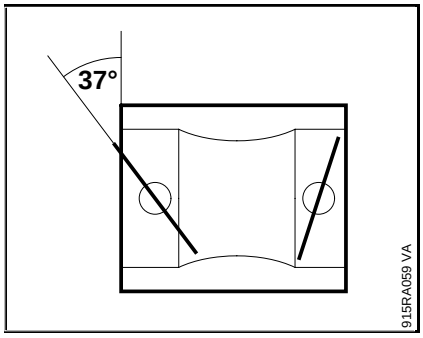


- Press lever "H" on to the throttle shaft.

Caution: Take care not to bend the throttle shaft.

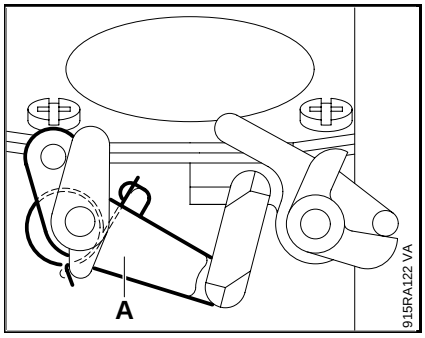


- Attach bent end of torsion spring to pin on lever "H".

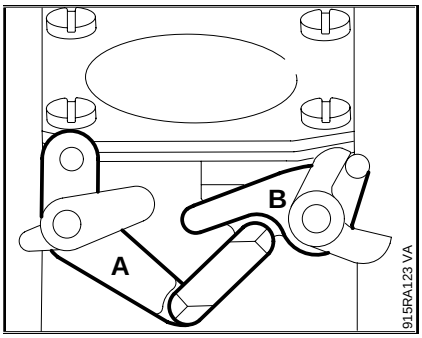


Installed positions of levers:

- In the idle position the choke shutter must be closed and the throttle shutter at an angle of 37 degrees to the carburetor mounting face.



- Push the straight end of the torsion spring between the carburetor body and pin on lever "A" and locate it behind the lever's pin.



Checking installed position of torsion spring:

- Open throttle and choke shutters simultaneously and hold them steady.

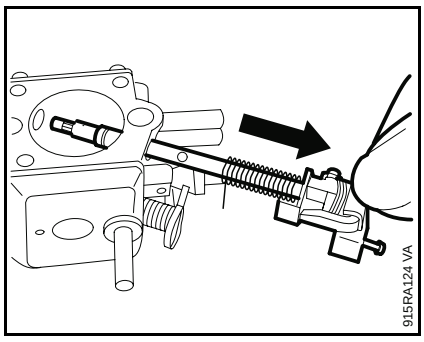
- The torsion spring must move levers "A" and "B" into the positions shown in the illustration.

- Remove lever mechanism - see 7.15.

- Remove the throttle shaft - see 7.12.

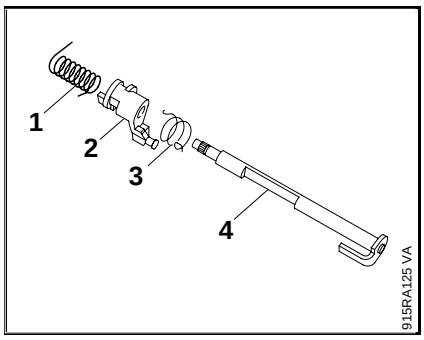
Note: The throttle shaft is longer than on carburetors without automatic choke.

- Remove the choke shutter - see 7.13.



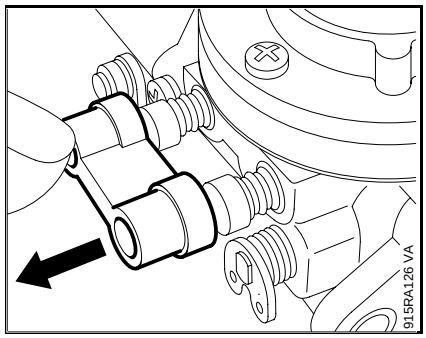
- Ease the E-clip off the choke shaft.

- Pull out the choke shaft.

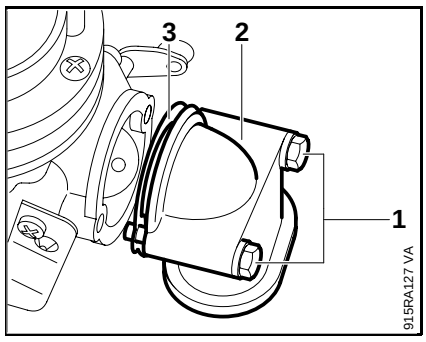


- Remove torsion spring (1), choke lever (2) and torsion spring (3) from the choke shaft (4).

Install in the reverse sequence.

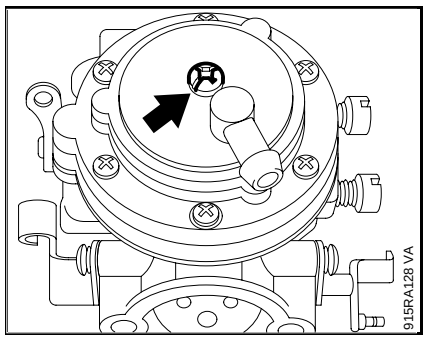


- Slip the grommet, if fitted, off the carburetor adjusting screws.



- Remove screws (1) from intake manifold, if fitted.

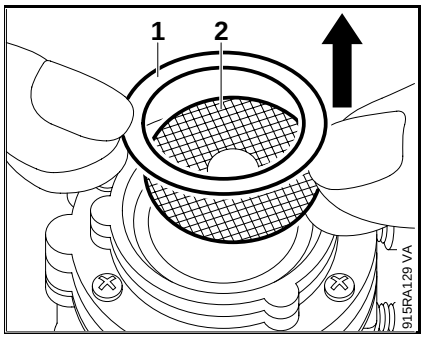
- Remove the intake manifold (2) and gasket (3).



- Mark position of intake fitting relative to fuel pump body.

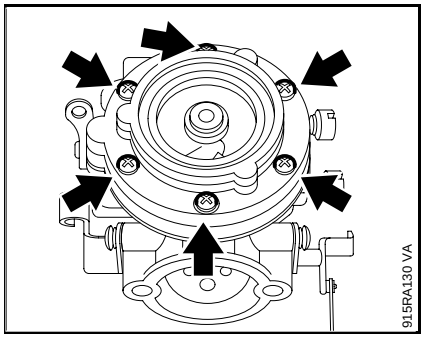
- Take out the screw.

- Remove the end cover.



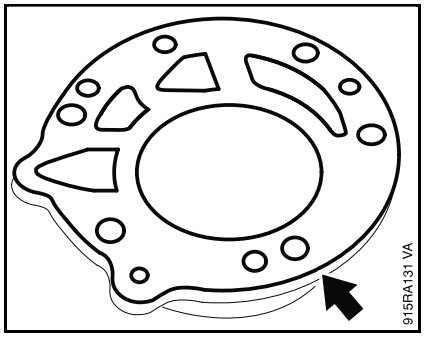
- Take out the gasket (1) and fuel strainer (2).

- Clean the fuel strainer.



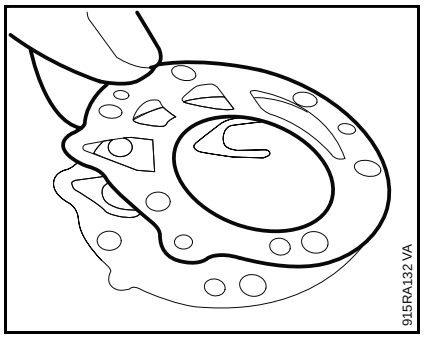
- Take out the screws.

- Remove fuel pump body.



- Remove pump diaphragm and gasket.

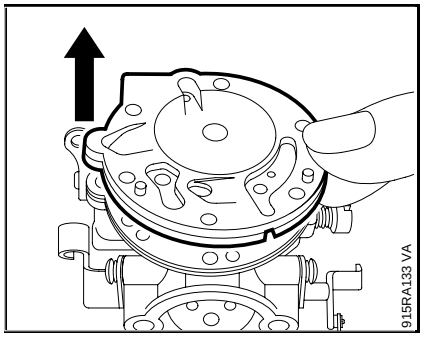
Note: If diaphragm and gasket are stuck, remove them carefully.



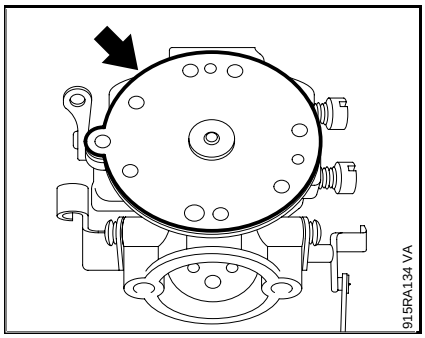
- Carefully separate the diaphragm and gasket.

- Inspect diaphragm and gasket and replace if necessary.

Note: The diaphragm and the inlet and outlet valves are exposed to continuous alternating stresses and the material eventually shows signs of fatigue. The diaphragm distorts and swells and has to be replaced.

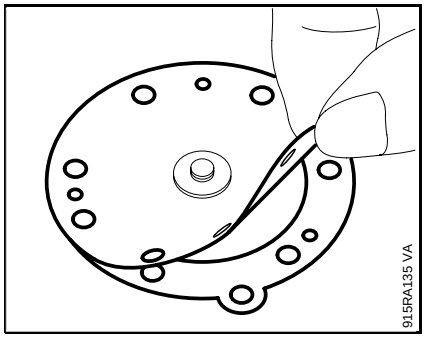


- Remove diaphragm cover.



- Remove the metering diaphragm and gasket from the carburetor body or diaphragm cover.

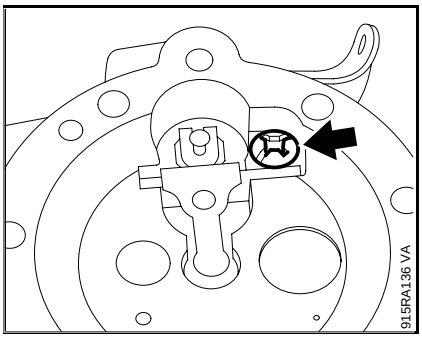
Note: If the gasket and diaphragm are stuck, remove them carefully.



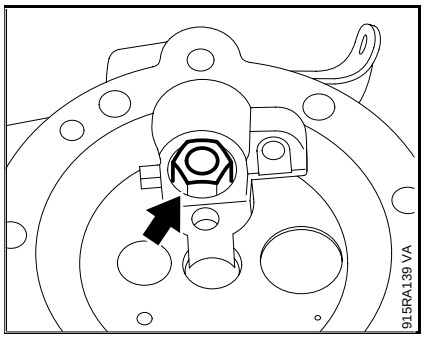
- Carefully separate the diaphragm and gasket.

- Inspect diaphragm and gasket and replace if necessary.

Note: The diaphragm is exposed to continuous alternating stresses and the material eventually shows signs of fatigue. The diaphragm distorts and swells and has to be replaced.

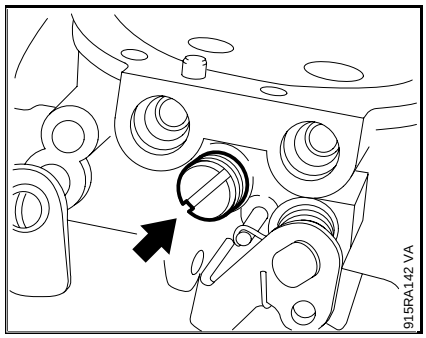


- Take out the screw.



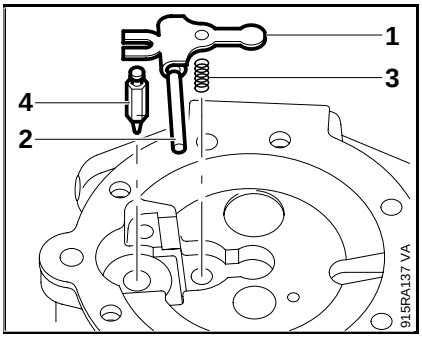
- Use a thin-walled 8mm socket wrench to unscrew the valve body.

- Take out the gasket.

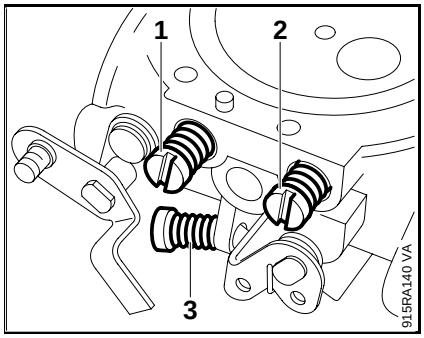


- On HL-327D, unscrew the control valve.

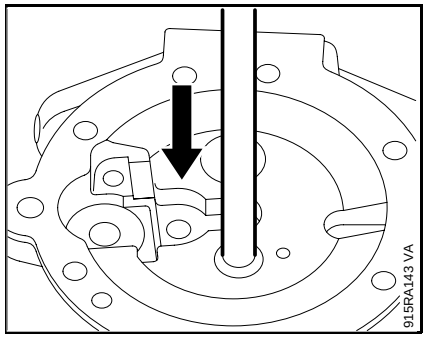
- Take the copper washer out of the bore.



- Remove inlet control lever (1) with spindle (2).
- Remove the helical spring (3).
- Pull out the inlet needle (4).

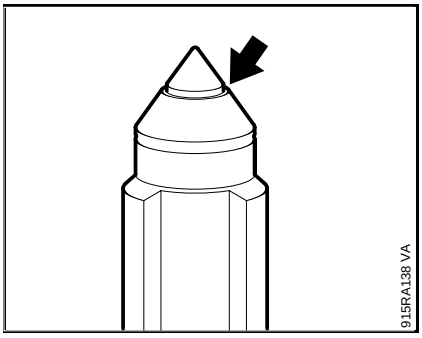


- Unscrew the high speed screw (1), low speed screw (2) and idle speed screw (3).

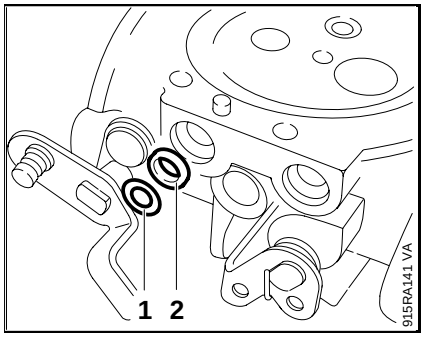


- Use a 5 mm (approx. 3/16") pin punch to press the valve jet out of its seat in the direction of the venturi.

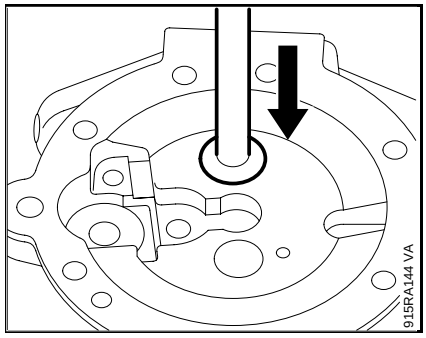
- Wash valve jet in white spirit.



- If there is an annular indentation on the sealing cone of the inlet needle, it will be necessary to replace the inlet needle because it will no longer seal properly.



- Remove washer (1) and 0-ring (2) from the carburetor body or the adjusting screws.



- Apply a 3 mm (1/8") pin punch to the center of the sealing plug and press down until it buckles and can be taken out.

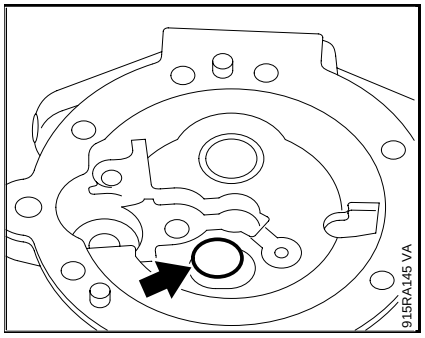
- Wash the carburetor body and all serviceable parts in fresh white spirit and blow clear with compressed air, paying special attention to the bores and ports.

- To replace the carburetor body, remove the throttle shaft and choke shaft - see 7.16.1 and 7.16.2.

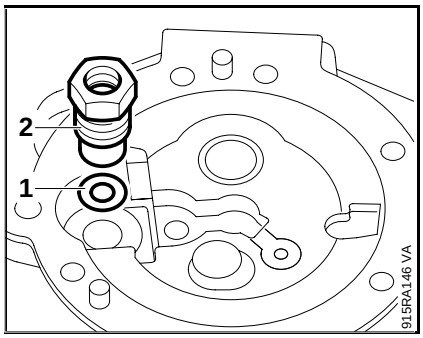
- Place the new sealing plug in the bore with its convex side facing up.

- Use a 8 mm (5/16") pin punch to apply light pressure until the sealing plug is flat.

- Secure new sealing plug with Loctite - see 8.2. (Apply Loctite to gap between carburetor body and sealing plug.)

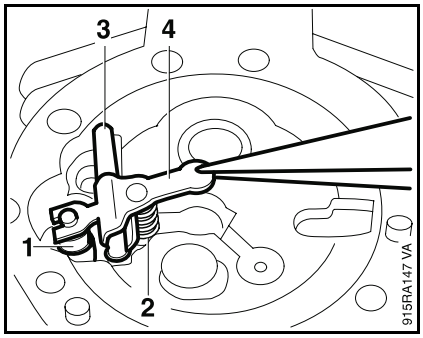


- Install the valve jet exactly vertical in the bore. Press it home until it is flush with the bottom of the metering chamber.



- Fit a new gasket (1).

- Fit valve body (2) and tighten down securely.



- Insert inlet needle (1).

- Fit helical spring (2) in blind hole.

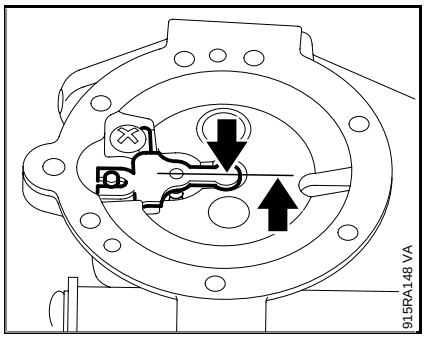
- Fit spindle (3) in inlet control lever (4).

- Engage clevis of inlet control lever in annular groove on the head of the inlet needle.

- Press down the inlet control lever and secure it with the screw.

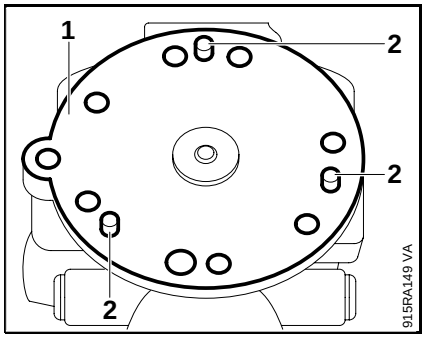
Note: Make sure that the helical spring locates on the control lever's nipple.

- Check easy action of the inlet control lever.



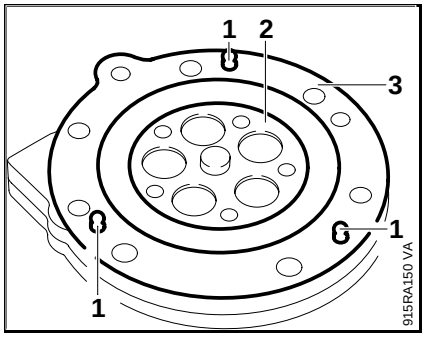
Important: The top of the inlet control lever must be level with the bottom of the metering chamber.

- If this is not the case, the inlet control lever is bent and must be replaced.

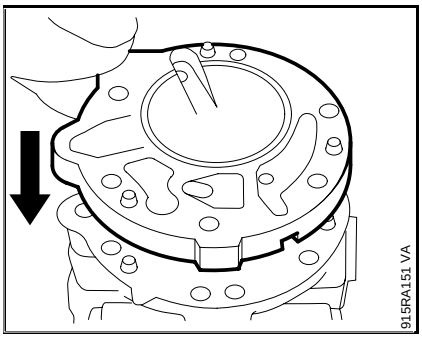


- Fit the gasket and metering diaphragm (1).

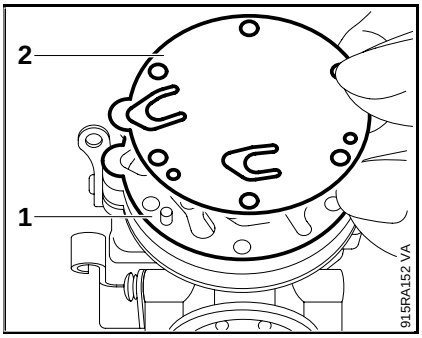
Note: They are held in position by the integrally cast pegs (2) on the carburetor body.



- On the LA-S8A, the locating pegs (1) are on the diaphragm cover. Therefore, the metering diaphragm (2) and gasket (3) should be fitted on the diaphragm cover.

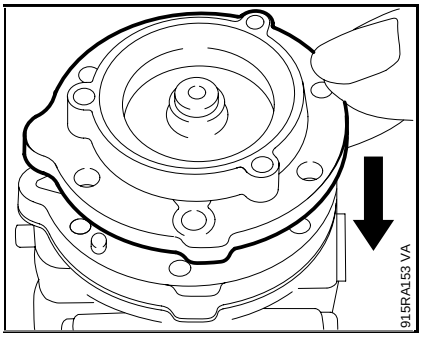


• Fit the diaphragm cover.



• Fit the gasket (1) and pump diaphragm (2).

Note: The gasket and pump diaphragm are held in position by the integrally cast pegs on the diaphragm cover.



• Fit the fuel pump body.

- Fit screws and tighten them down alternately in a diagonal pattern.

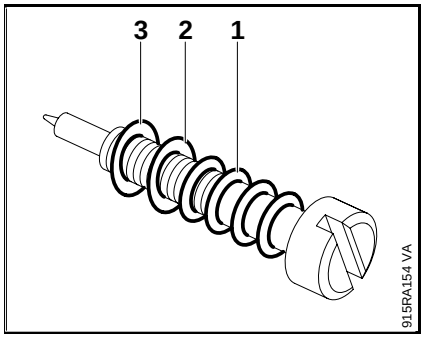
- Fit fuel strainer and gasket in the fuel pump body.

Note: Always replace a damaged fuel strainer.

- Fit the end cover.

- Line up the intake fitting according to mark made prior to disassembly.

- Fit screw and tighten down securely.



• Slip spring (1), washer (2) and new 0-ring (3) over high speed and low speed screws.

- Carefully screw high speed and low speed screws down onto their seats and then back them off one full turn.

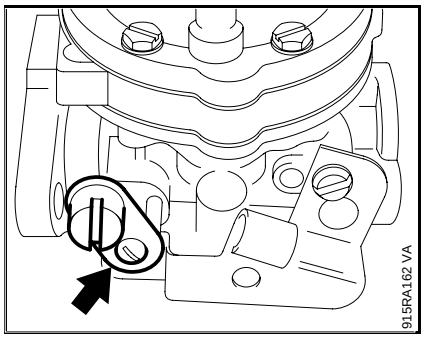
- Fit idle speed screw.

- On HL-327D, fit new copper washer in bore for control valve.

- Screw in new control valve about 2 full turns.

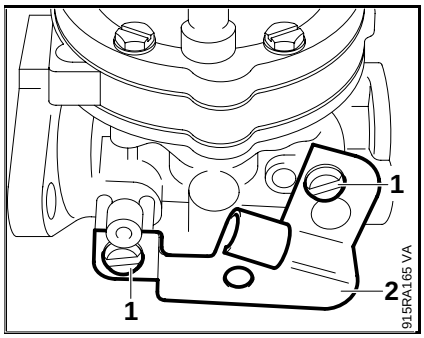
- Coat the thread that still projects from the carburetor body with Loctite - see 8.2.

- Screw home control valve and tighten down to 4 Nm (3.0 lbf.ft).



• Take out the screw.

- Remove lever or throttle lever.



• Remove screws (1) from cable guide (2), if fitted.

- Lift away cable guide.

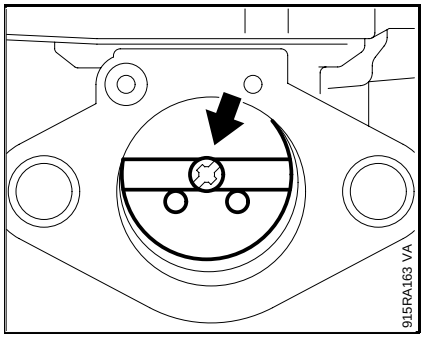
- Install throttle shutter so that its entire circumference locates against the wall of the venturi.

- Fit screw with Loctite, see 8.2, and tighten down securely.

- Fit clip in the groove.

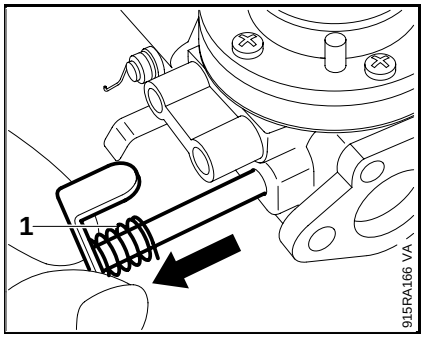
- Insert screw and tighten down firmly.

- Install cable guide, if fitted.



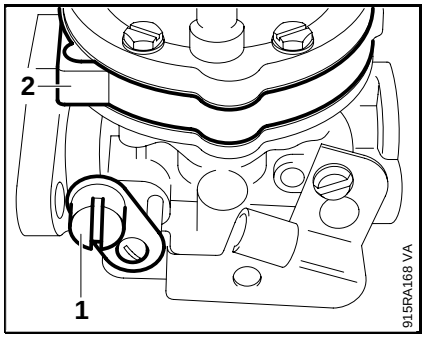
• Take out the screw.

- Pull the throttle shutter out of the throttle shaft.



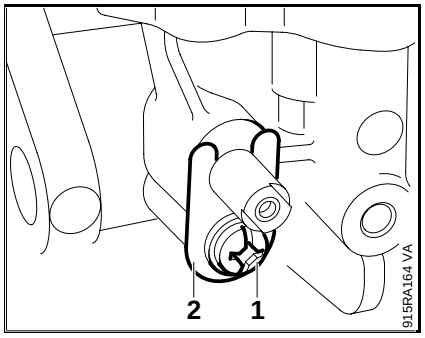
• Pull out the throttle shaft.

• Remove the torsion spring (1).



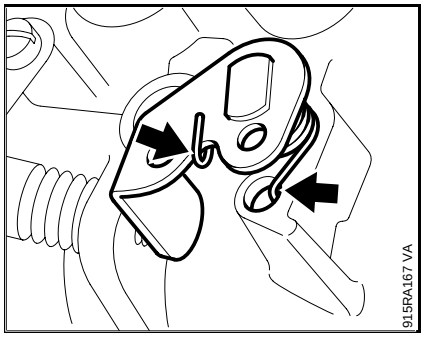
• On HL-327D, fit lever so that the slotted pin (1) points towards diaphragm cover (2).

- Insert screw and tighten down firmly.

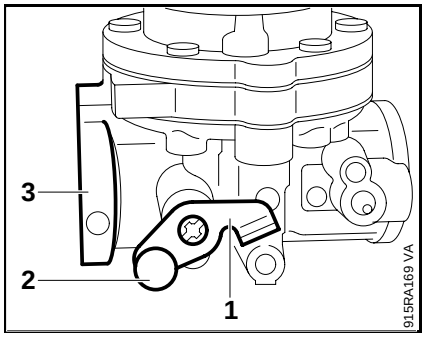


• Take out the screw (1).

• Pull off the clip (2).

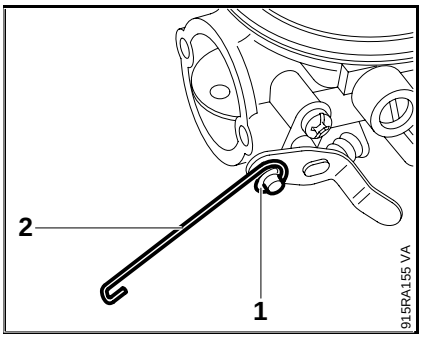


• After pushing home the throttle shaft, check that torsion spring is correctly positioned.



• On LA-S8A and HL324A, fit throttle lever (1) so that round end (2) point downwards to connecting flange (3).

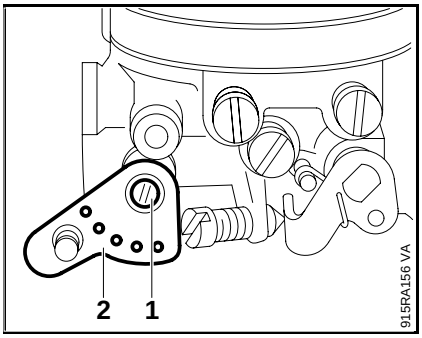
- Insert screw and tighten down firmly.



- Remove the intake manifold, if fitted - see 7.16.

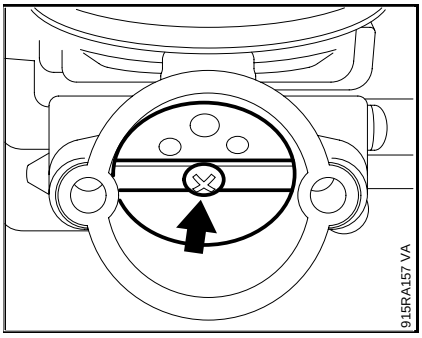
• Ease the E-clip (1) off the governor rod (2), if fitted.

- Remove the governor rod.



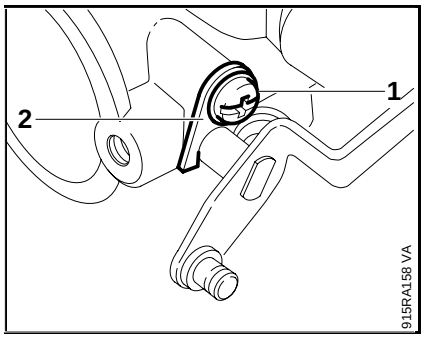
• On LA-S8A and HL327D, take out the screw (1).

• Remove the governor lever (2).



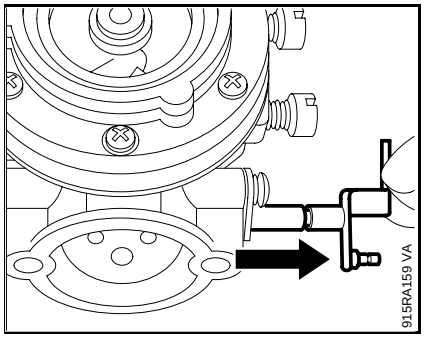
• Take out the screw.

- Pull the choke shutter out of the choke shaft.



• On HL-327D and HL-324A, take out the screw (1).

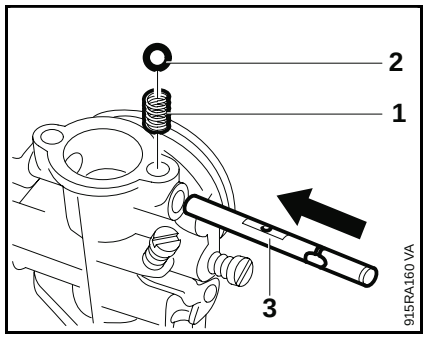
• Pull off the clip (2).



• Withdraw the choke shaft.

Note: On HL-327D, carefully withdraw choke shaft so that the ball does not pop out and be lost.

- Slide choke shaft into the carburetor from the adjusting screw side.

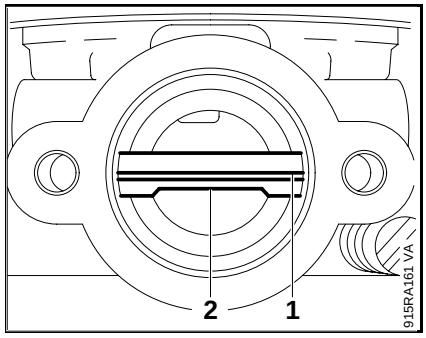


Note: On HL-327D, fit the spring (1) and ball (2).

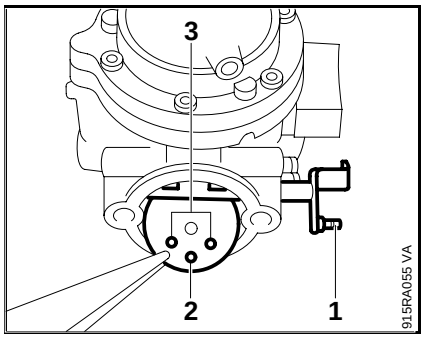
• Push home the choke shaft until the ball engages the groove (3).

- Fit clip in groove in choke shaft.

- Secure clip with screw.



• On LA-S8A and HL327D, rotate choke shaft so that slot (1) is horizontal and the flat side (2) points down.

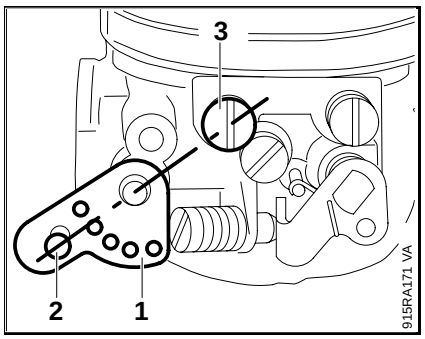


- On HL-324A, rotate choke shaft so that the pin (1) points forward.

- Fit the choke shutter so that the hole (2) points forward and the indentations (3) face the end cover.

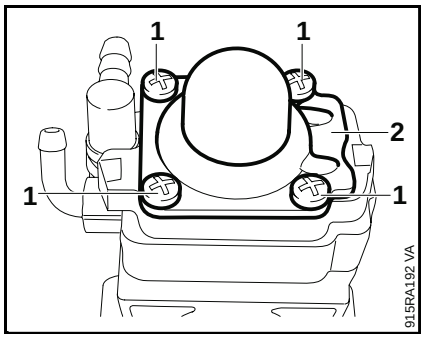
- Fit screw with Loctite, see 8.2, and tighten down securely.

- On LA-S8A and HL327D, close the choke shutter.



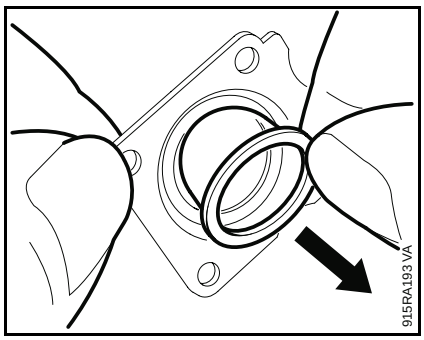
- Fit governor lever (1) so that the pin (2) lines up with the center of the high speed screw (3).

- Fit screw and tighten down securely.

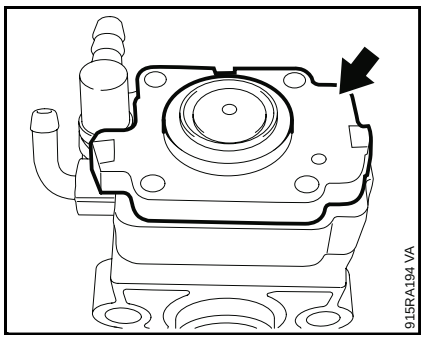


- Take out the screws (1).

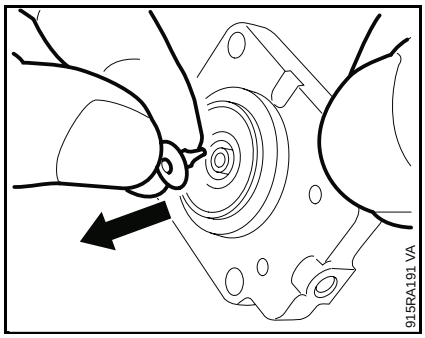
- Remove the end cover (2) with cap.



- Pull out the cap.



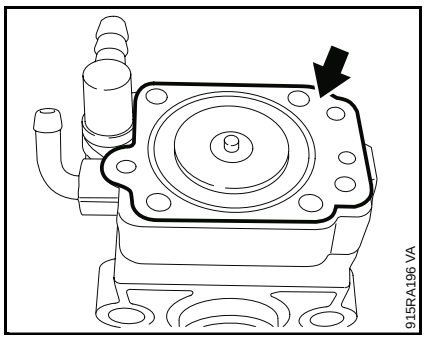
- Remove the flange.



- Take valve out of flange.

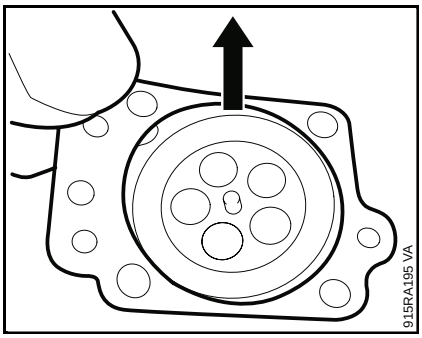
- Check valve and replace if necessary.

Note: If the circuit for filling the metering chamber is malfunctioning, if the valve is dirty, distorted or damaged, install a new valve.



- Remove metering diaphragm and gasket.

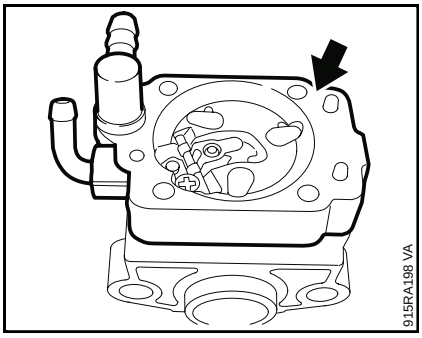
Note: If the gasket and diaphragm are stuck, remove them carefully.



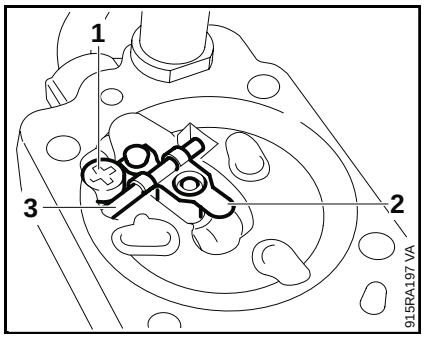
- Carefully separate the diaphragm and gasket.

- Inspect diaphragm and replace if necessary.

Note: The diaphragm is exposed to continuous alternating stresses and the material eventually shows signs of fatigue. The diaphragm distorts and swells and has to be replaced.

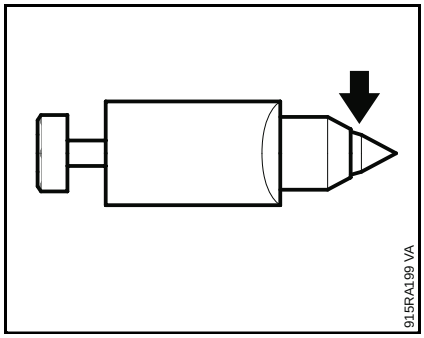


- Remove pump housing.



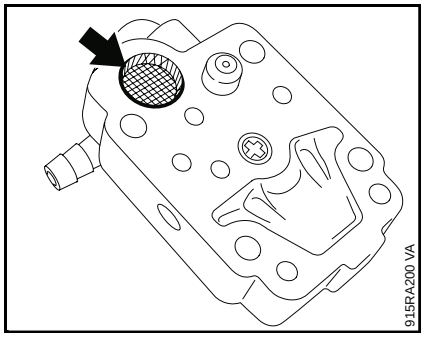
- Remove the screw (1).

- Remove inlet control lever (2) with spindle (3) and spring.



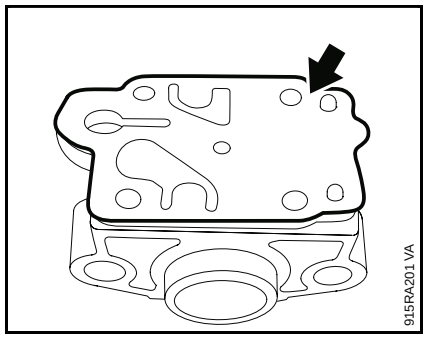
- Pull out the inlet needle.

- If there is an annular indentation on the sealing cone of the inlet needle, it will be necessary to replace the inlet needle because it will no longer seal properly.



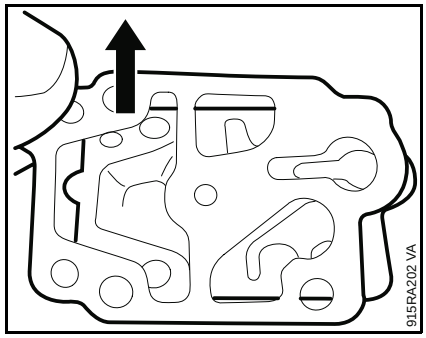
- Use a scriber to pry out fuel strainer and then clean it.

Important: Always replace a damaged fuel strainer.



- Remove gasket and pump diaphragm.

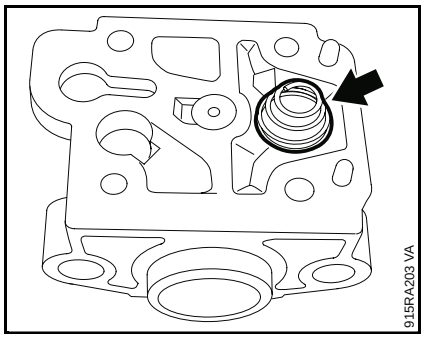
Note: If gasket and diaphragm are stuck, remove them carefully.



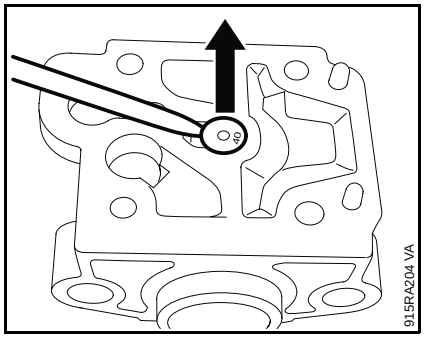
- Carefully separate the diaphragm and gasket.

- Inspect diaphragm and replace if necessary.

Note: The diaphragm is exposed to continuous alternating stresses and the material eventually shows signs of fatigue. The diaphragm distorts and swells and has to be replaced.

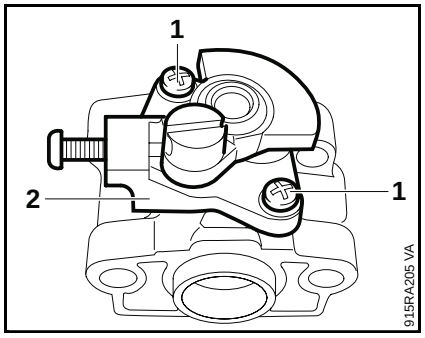


- Remove the spring.



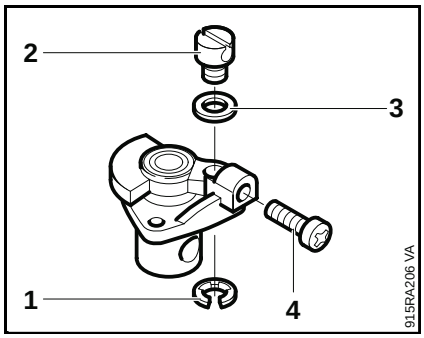
- Use a scriber to carefully ease the main jet out of its seat.

- Remove the sealing ring.



- Take out the screws (1).

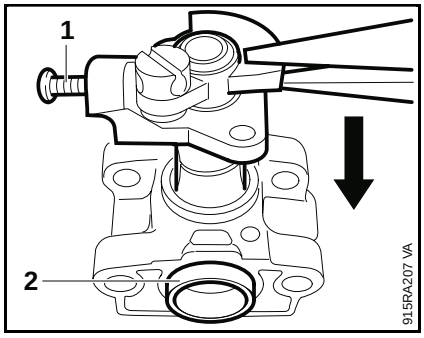
- Pull out the control valve (2).



- If necessary, pry off the retaining ring (1) and pull out the slotted pin (2) with washer (3).

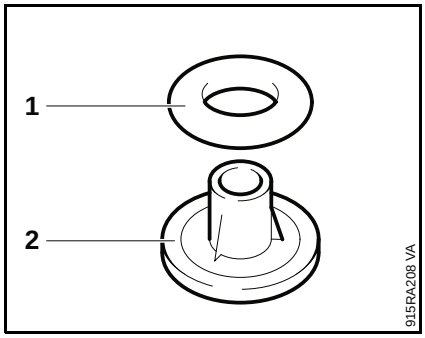
- Take out the idle speed screw (4).

- Wash the carburetor body and all serviceable parts in fresh white spirit and blow clear with compressed air, paying special attention to the bores and ports.



- Install the control valve so that the idle speed screw (1) points to the left - viewed from stub (2).

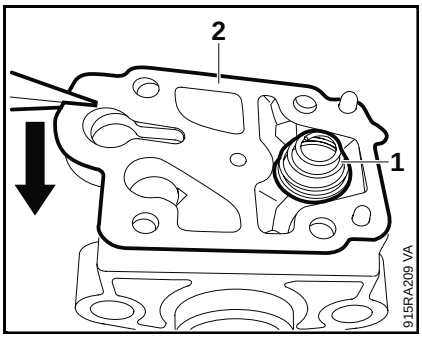
- Insert screws and tighten down securely.



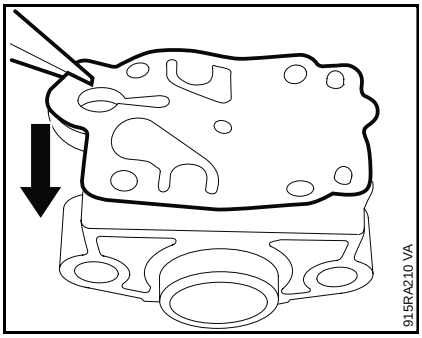
- Slip 0-ring (1) over the main jet (2).

- Press main jet into carburetor seat as far as stop.

Note: Check size of main jet (number on main jet):
40 = WYL-63
36 = WYL-73

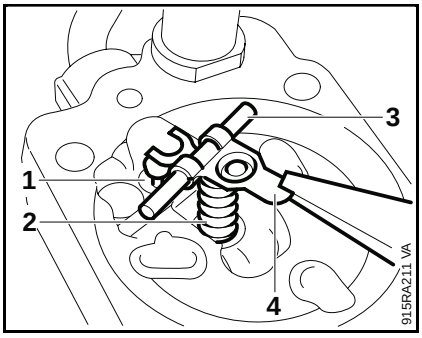


- Fit the spring (1).
- Fit a new gasket (2).



- Place pump diaphragm on the gasket.

Note: Gasket and pump diaphragm are held in place by the integrally cast pegs.



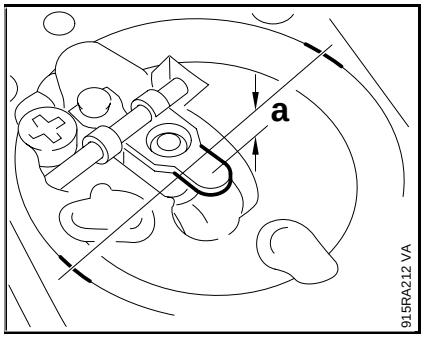
- Fit the inlet needle (1).
- Fit helical spring (2) in the blind hole.

- Insert spindle (3) in the inlet control lever (4).

- Engage clevis of inlet control lever in annular groove on the head of the inlet needle.

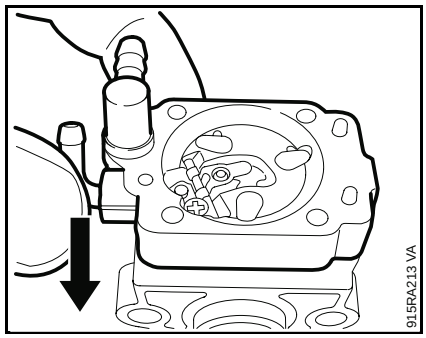
- Press down the inlet control lever and secure it with the screw.

Note: Make sure that the helical spring locates on the control lever's nipple.

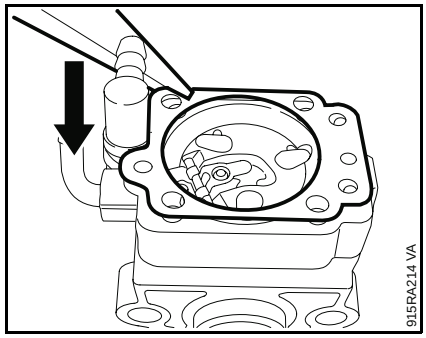


Important: Measure distance "a" between upper edge of inlet control lever and pump housing. It must be 1.5 mm (0.06").

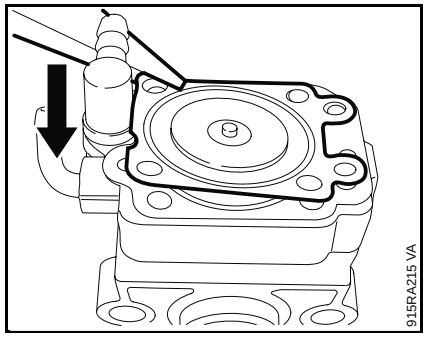
- If the distance more or less than specified, the inlet control lever is bent and must be replaced.



- Fit the pump housing.

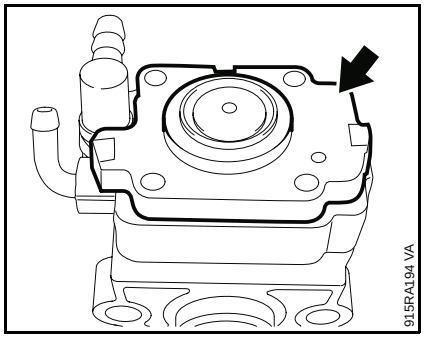


- Fit a new gasket.



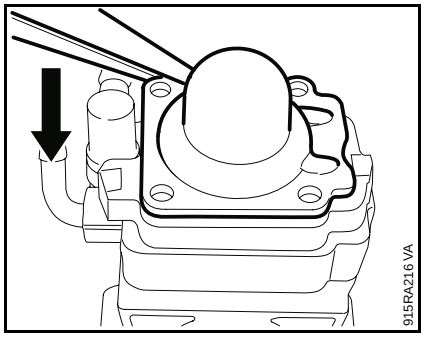
- Fit diaphragm on the gasket so that perforated plate points towards the inlet control.

Note: Gasket und pump diaphragm are held in place by the integrally cast pegs.



- Insert the valve in the flange.

• Fit the flange in position.



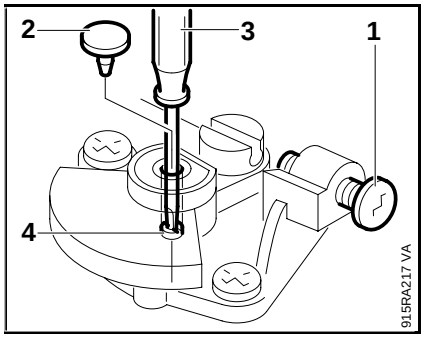
- Fit the cap in the end cover.

• Fit the end cover.

- Insert screws and tighten down securely.

Adjusting idle speed and idle mixture

Note: If either the carburetor or the control valve has been replaced, it will be necessary to adjust idle jet needle in the control valve.



• Set the idle speed to 3100 ± 200 rpm with the idle speed screw (1).

Note: Use a tachometer.

• Pull plug (2) out of the control valve.

- Start the engine.

• Use a small screwdriver (3) to rotate the idle jet needle (4) clockwise or counterclockwise until maximum engine speed is reached.

- From that position, turn the idle jet needle one eight turn counter clockwise to reduce engine speed by 200 - 500 rpm.

- Remove the screwdriver and once more set idle speed to 3100 ± 200 rpm with the idle speed screw.

Note: Adjustment of maximum engine speed is not necessary because it is determined by the main jet.

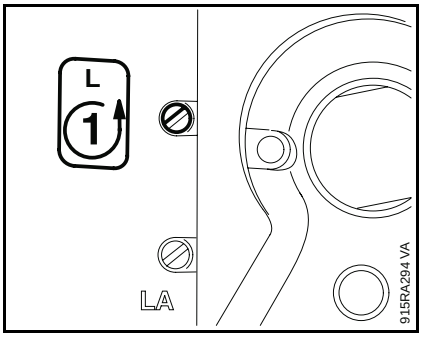
- Fit plug in the control valve.

WT-283B, WT-323, WT-325A, WT-326C, WT-360, WT-396, WT-403A, WT-493, WT-498A, WT-503

These carburetors have a fixed jet in place of a high speed adjusting screw (H screw).

Maximum engine speed is preset and no longer adjustable. It is only possible to correct idling speed within certain limits.

These carburetors guarantee an optimum fuel-air mixture in all operating conditions.



Standard setting

To readjust the carburetor, start with the standard setting.

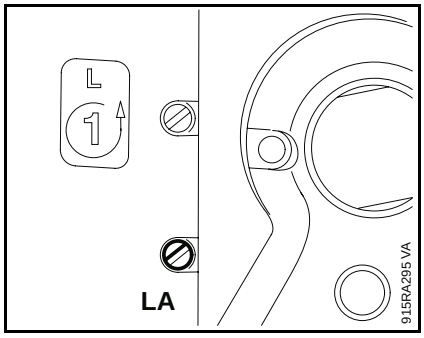
- Carefully screw down the low speed screw **(L)** clockwise until it is against its seat. Then back it off one full turn counterclockwise.

- Check chain tension.

- Check air filter and clean if necessary.

- Check spark arresting screen and clean or replace if necessary.

- Start the engine and allow it to warm up.



Adjusting idle speed

- A correction at the low speed screw (**L**) usually necessitates a change in the setting of the idle speed screw (**LA**).

Note: Turn screws very slowly and carefully - even slight movements produce a noticeable change in engine running behavior.

Engine stops while idling:

- Check standard setting.

- Turn idle speed screw clockwise until the chain begins to run - then turn it back one quarter turn.

Chain runs while engine is idling:

- Check standard setting.

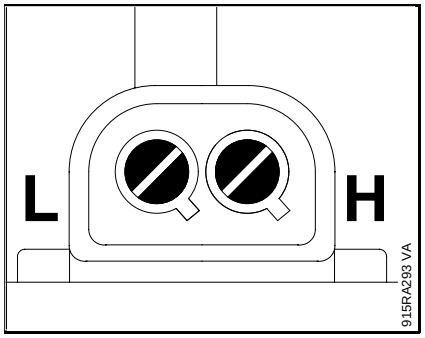
- Turn the idle speed screw counterclockwise until the chain stops running - and then turn it about another quarter turn in the same direction.

Erratic idling behavior, poor acceleration - even though low speed screw (L) is one turn open:

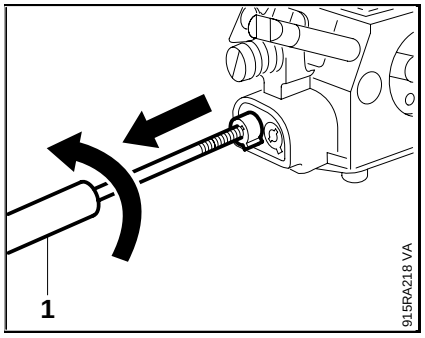
- Idle setting is too lean.

- Turn the low speed screw (**L**) counterclockwise until the engine runs and accelerates smoothly.

HD-13A, HD-16, HD-17, HD-18A, HD-21A, HD-22, WY-69, WT-329, WT-330, WT-367, WT-393, WT-489, WT-492, WJ-69



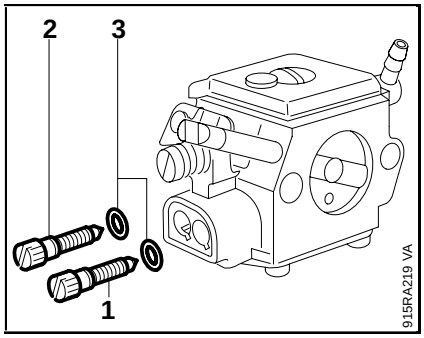
- Turn the cap to line up the lug with the slot.



- Screw puller (1) 5910 890 4500 into cap counterclockwise until it comes off the the head of the adjusting screw (left-hand thread).

Note: Limiter caps are damaged during removal. They must not be used again.

- If necessary, take out the low speed and high speed screws.



- Carefully screw high speed screw (1) and low speed screw (2) with sealing rings (3) down onto their seats.

- Refer to flow chart for carburetor adjustment - see 7.21.

Preparations

- Check air filter and clean if necessary.

- Inspect spark arresting screen and clean or replace as necessary.

On blowers:

- Fit blower tubes and nozzles.

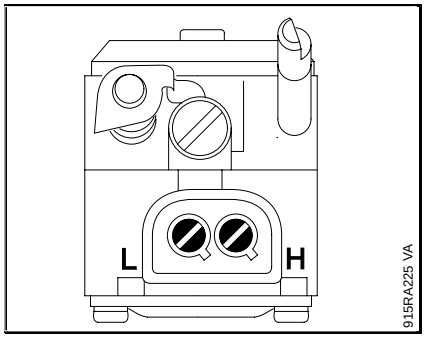
On hedge trimmers:

- Clean and oil cutting blades.

One brushcutters:

- Mount STIHL Autocut or Polymatic cutting head.

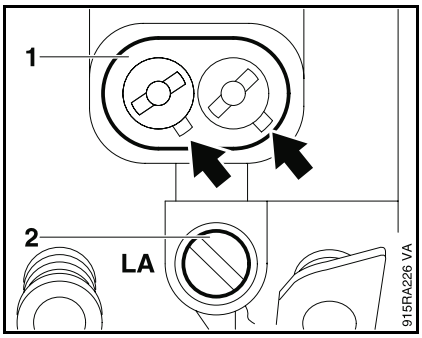
- Adjust line length so that it extends as far as limiter blade on deflector.



Basic setting (all models)

- Starting with the adjusting screws (**H**) and (**L**) firmly against their seats, open them by the number of turns specified below.

Model	H	L
BR 320 L	1.5	4
BR 320, 400	2	2.5
FC 44	4	
FS 36, 40, 44	1.5	4
FS 72, 74, 76		
FS 88		
FS 550	1	1
HS 72, 74, 76		
BG 72		
MS 044, 046	1	1
MS 029, 039	1	1
MS 066	1	1



MS 029/039 and MS 044/046

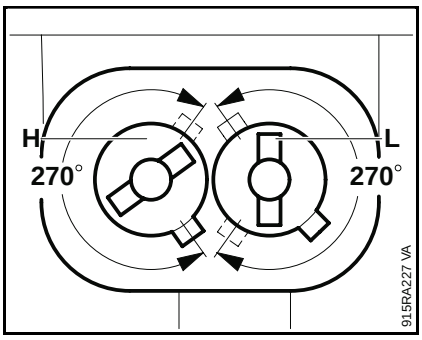
Fitting limiter caps

- Insert the new caps in the bores, making sure the lugs are correctly positioned (arrows).
- Push the caps on to the adjusting screws until they are flush with the insert (1).

Adjusting idle speed

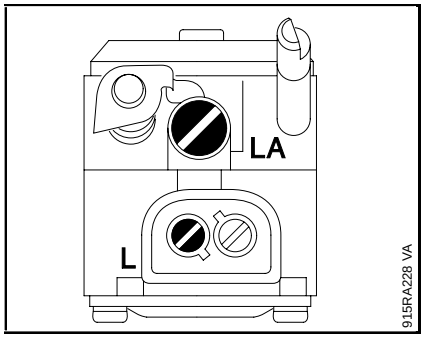
Note: Use a tachometer.

- Set idle speed to 2800 rpm (029/039) or 2500 rpm (044/046) with the idle speed screw (2).



- Corrections are now possible only within a range of 270 degrees because the integrally molded stops in the bores limit any further adjustment.
- This enables the mixture to be made leaner, if necessary, for operation at high altitudes and prevents it being enriched beyond the emission limits specified by EPA.

BR 320 L, BR 320, 400, FC 44, FS 36, 40, 44, FS 72, 74, 76, FS 88, FS 550, HS 72, 74, 76, BG 72

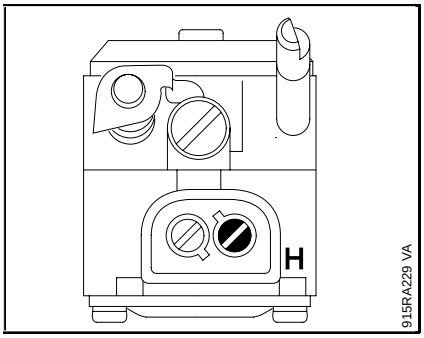


Adjusting idle speed

- Refer to flow chart for carburetor adjustment - see 7.21.
- Use the low speed screw (**L**) to set maximum idle speed.
- Turn low speed screw (**L**) counterclockwise until engine speed drops about 300 rpm.
- Use the idle speed screw (**LA**) to set engine speed as specified below.

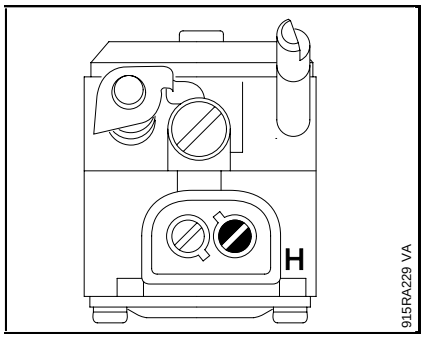
Model	RPM
BR 320 L	3100
BR 320, 400	3100
FC 44	3100
FS 36, 40, 44	3100
FS 72, 74, 76	2800
FS 88	
FS 550	
HS 72, 74, 76	
BG 72	

Full-load setting



On blowers:

- Running at full load, turn high speed screw (**H**) slowly clockwise until maximum engine speed is reached.
- Turn high speed screw (**H**) counterclockwise until engine speed drops about 100 rpm.



On brushcutters (with cutting head and deflector fitted):

- Running at full load, turn high speed screw (**H**) slowly clockwise until no further increase in engine speed is achieved within a speed range of 6500 - 8500 rpm.

Note: If the required speed range is not reached, adjust the length of the nylon line until it is.

- Turn high speed screw (**H**) counterclockwise until engine speed drops about 100 rpm.

On edgers:

- Running at full load, turn high speed screw (**H**) slowly clockwise until engine speed of 9000 rpm is exceeded.

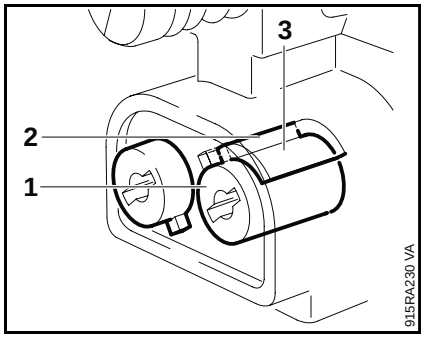
- Turn high speed screw (**H**) counterclockwise until an engine speed of about 8000 rpm is reached.

- Turn high speed screw (**H**) one half turn clockwise (leaner).

Checking running behavior

- Open the throttle several times to check that engine accelerates smoothly.

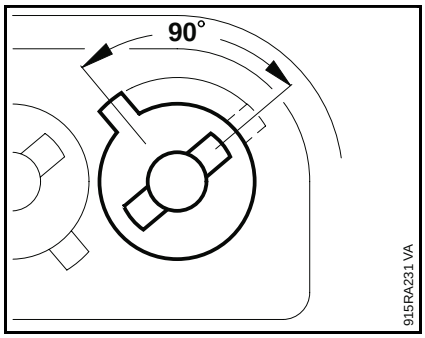
- Engine must run uniformly at idle speed.



Fitting limiter caps

- Fit cap (1) on adjusting screw so that the integrally molded lug (2) locates in the gate (3) in the bore.

- Push caps into bores until they are flush with the carburetor body.



- Corrections are now possible only within a range of 90 degrees because the integrally molded stops in the bores limit any further adjustment.

- This enables the mixture to be made leaner, if necessary, for operation at high altitudes and prevents it being enriched beyond the emission limits specified by EPA.

7.19 Standard Setting on Zama Carburetors
7.19.1 Fixed Jet Carburetors

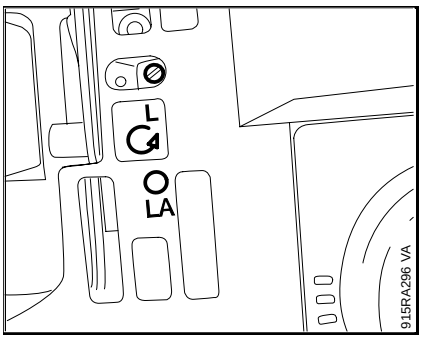
C1Q-S30C, C1Q-S37A, C1Q-S41, C1Q-S42, C1Q-S34B, C1Q-S36B

These carburetors have a fixed jet in place of a high speed adjusting screw (H screw).

C1Q-S34B and C1Q-S36B carburetors (FS 300...450) have no low speed screw (L screw).

Maximum engine speed is preset and no longer adjustable. It is only possible to correct idling speed within certain limits.

These carburetors guarantee an optimum fuel-air mixture in all operating conditions.



Standard setting

To readjust the carburetor, start with the standard setting.

- Carefully screw down the low speed screw (**L**) clockwise until it is against its seat. Then back it off one full turn counterclockwise.

- Mount an approved cutting tool.

If cutting head is fitted:

- Adjust nylon line to correct length. **Each** line must extend as far as limiter blade on the deflector.

- On **HS 75, 80, 85**, check cutting blades and clean if necessary (they must be clean, move freely and not be warped).

- Check air filter and clean if necessary.

- Inspect spark arresting screen and clean or replace as necessary.

- Start the engine and allow it to warm up.

Adjusting idle speed

Engine stops while idling:

- Check standard setting.

- Turn idle speed screw (**LA**) clockwise until the cutting head begins to rotate - then turn it back one half turn.

- On **HS 75, 80, 85**, use the idle speed screw (**LA**) to set idle speed to 2800 rpm.

Cutting head rotates while engine is idling:

- Check standard setting.

- Turn the idle speed screw (**LA**) counterclockwise until the cutting head stops rotating - and then turn it about another half turn in the same direction.

Engine accelerates poorly or stops after idling for long period:

- Check standard setting.

- Turn low speed screw (**L**) one quarter turn counterclockwise.

- Use idle speed screw (**LA**) to set engine speed to 2800 rpm, repeat both settings if necessary.

Engine stops while being swung, during transition from full load to idle or idles erratically:

- Check standard setting.

- Turn low speed screw (**L**) one eight turn clockwise.

- Use idle speed screw (**LA**) to set engine speed to 2800 rpm, repeat both settings if necessary.

HS 75, 80, 85
Cutting blades run while engine is idling:

- Use idle speed screw (**LA**) to set engine speed to 2800 rpm.

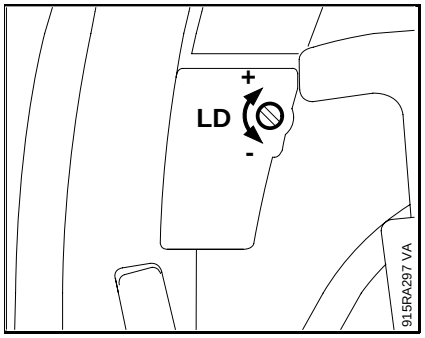
- Turn idle speed screw (**LA**) counterclockwise until cutting blades stop running – and then turn it about another half turn in the same direction.

Cutting tool rotates when engine is idling:

- Turn idle speed screw (**LD**) counterclockwise until cutting tool stops rotating – and then turn it about another full turn in the same direction.

C1Q-SK7, C3A-S39A

FS 300...450



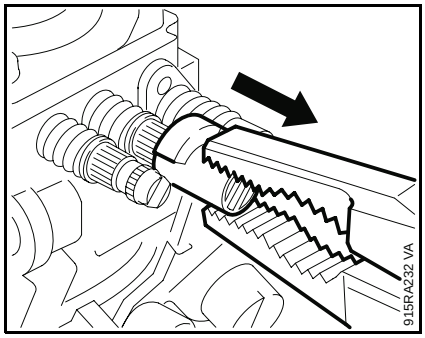
- Set idle speed correctly with the idle speed screw (**LD**). The cutting tool must not rotate.

Adjusting idle speed

Engine stops while idling:

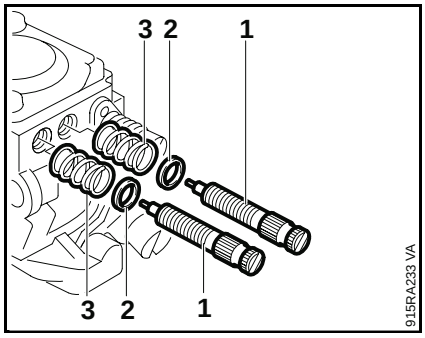
- Turn the idle speed screw (**LD**) clockwise until the engine runs smoothly. The cutting tool must not rotate.

C1Q-SK7

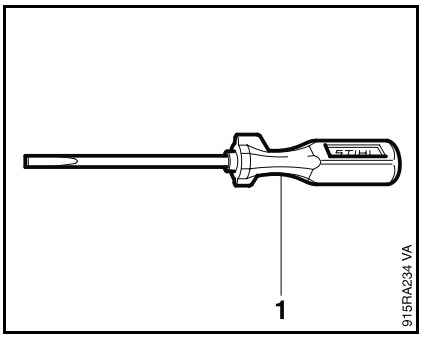


- Pull the cap off the adjusting screw.

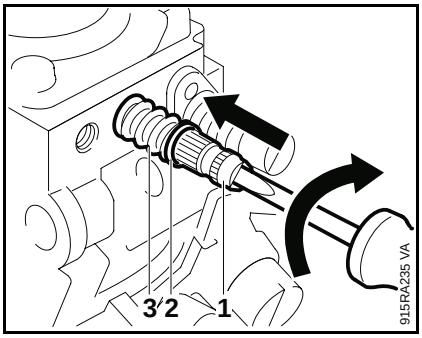
Note: Limiter caps are damaged during removal. They must not be used again.



- If necessary, take out the adjusting screws (1) with washers (2) and springs (3).



Note: Use screwdriver (1) 5910 890 2305 or 0000 890 2300 to install the adjusting screws and adjust the carburetor.



Installation

- Carefully screw the adjusting screw (1) with washer (2) and spring (3) down onto its seat.

- Refer to flow chart for carburetor adjustment - see 7.21.

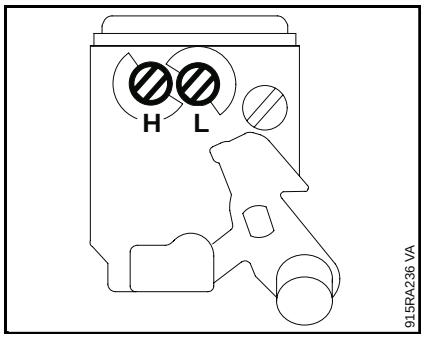
Preparations

- Check air filter and clean if necessary.

- Inspect spark arresting screen and clean or replace as necessary.

- Mount STIHL Autocut or Polymatic cutting head.

- Adjust line length so that it extends as far as limiter blade on deflector.



Basic setting

Note: Use a tachometer.

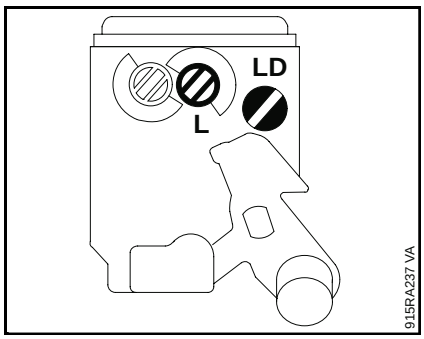
- Starting with the adjusting screws (**H**) and (**L**) firmly against their seats, open each screw two full turns.

- Start the engine.

- Carry out full-load setting.

Warning! Observe safety precautions - see 1.

Adjusting idle speed

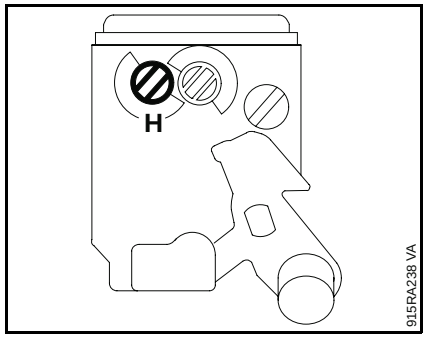


- Use the low speed screw (**L**) to set the maximum idle speed.

- Turn low speed screw (**L**) counterclockwise until engine speed drops about 300 rpm.

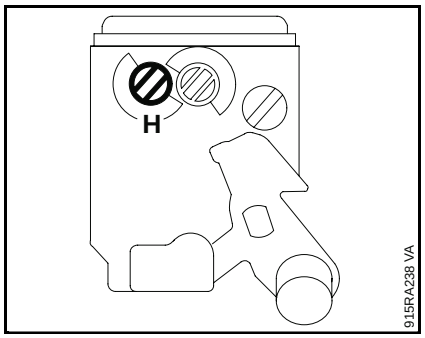
- Use the idle speed screw (**LD**) to set engine speed to 2800 rpm.

Full-load setting



- Running at full load, turn high speed screw (**H**) slowly clockwise until no further increase in engine speed is achieved within a speed range of 6500 - 8500 rpm.

Note: If the required speed range is not reached, adjust the length of the nylon line until it is.



- Turn high speed screw (**H**) counterclockwise until engine speed drops about 100 rpm.

Checking running behavior

- Open the throttle several times to check that engine accelerates smoothly.

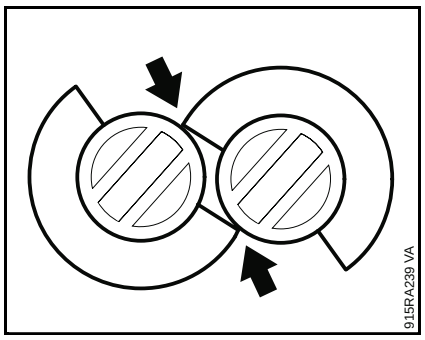
- Engine must run uniformly at idle speed.

Fitting limiter caps

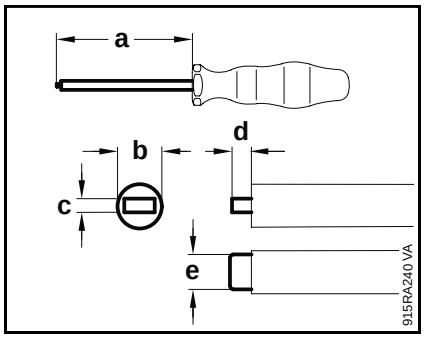
- Shut off the engine.

Identification of caps:

High speed screw = red
Low speed screw = white

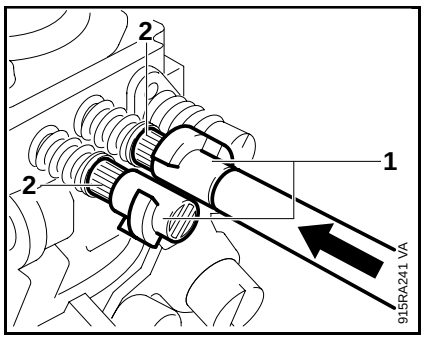


- Slip both caps together over the adjusting screws in the position shown.

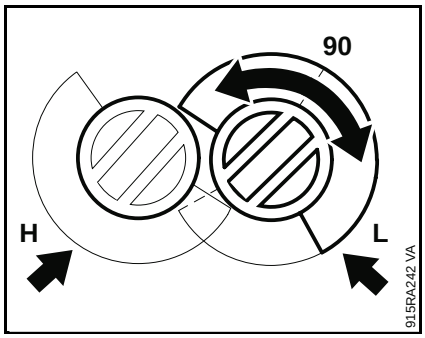


- Use a standard commercial screwdriver to make up an installing tool to push the caps on to the adjusting screws.

a = ≥ 75.0 mm
b = 5.6 mm
c = 1.0 mm
d = 1.5 mm
e = 4.0 mm



- Use the installing tool to carefully push the caps (1) one after another on to the adjusting screws (2).

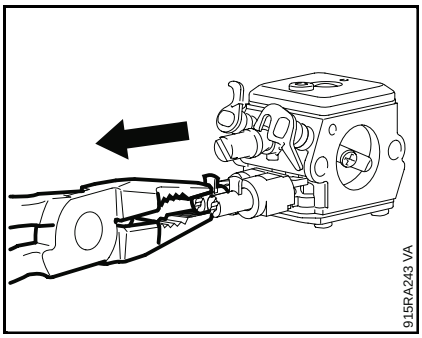


- The integrally molded stop operates when the cap is fixed in position.

- The stop limits the adjustment range of the screw to 90 degrees.

- However, it allows a correction to the setting if the engine runs unsatisfactorily after extreme changes in altitude, humidity or outside temperature.

- Emissions always remain below the limits set by CARB.

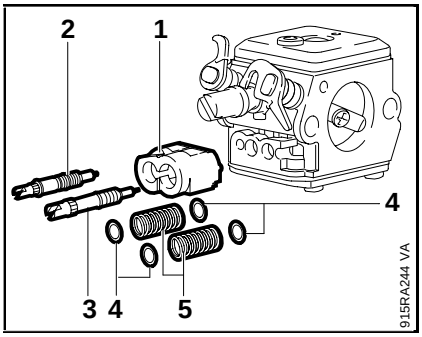


C3A-S39A

- Pull the cap off the adjusting screw.

Note: Limiter caps are damaged during removal. They must not be used again.

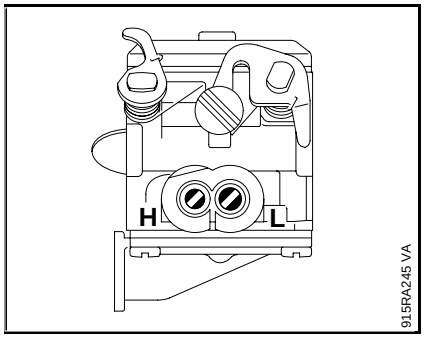
- If necessary, take out the adjusting screws with springs and washers and remove the retainer.



Installation

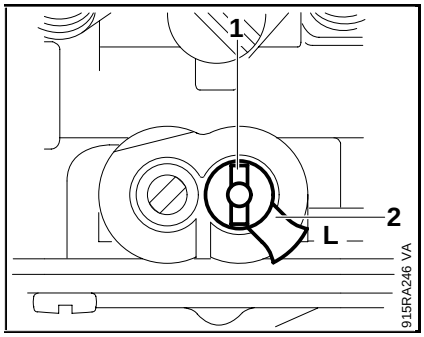
- Fit the retainer (1).

- Carefully screw the high speed screw (2) and low speed screw (3) with washers (4) and springs (5) down onto their seats.



Basic setting

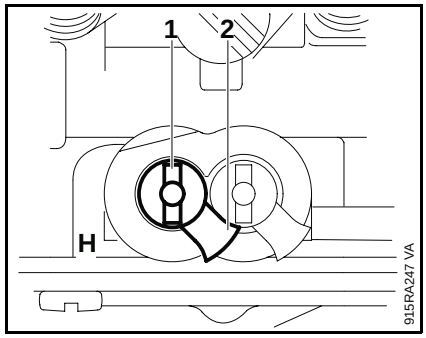
- Starting with the adjusting screws (**H**) and (**L**) firmly against their seats, open them one full turn.



Fitting limiter caps

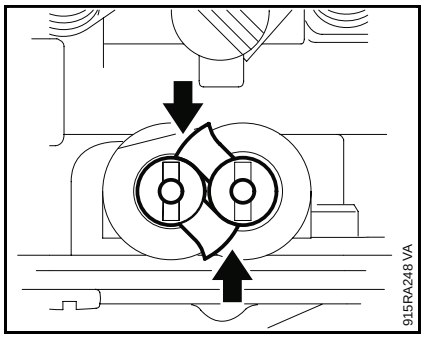
Note: Use new caps.

- First push the white cap on to the low speed screw so that the slot (1) is vertical and stop (2) points to the bottom right.

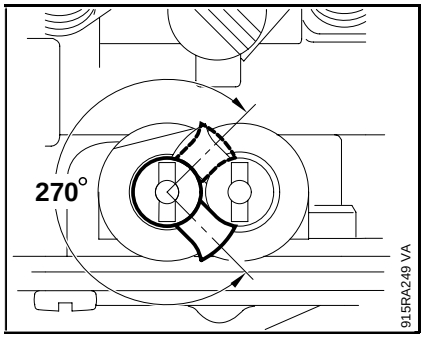


- Push the red cap on to the high speed screw so that the slot (1) is vertical and the stop (2) points to the bottom right (rich stop).

- Push the caps on to the adjusting screws until they snap into position.



- The two stops limit the range of adjustment.



- Corrections are now possible only within a range of 270 degrees.

- This enables the mixture to be made leaner, if necessary, for operation at high altitudes and prevents it being enriched beyond the emission limits specified by EPA.

Adjusting idle speed

Note: Use a tachometer.

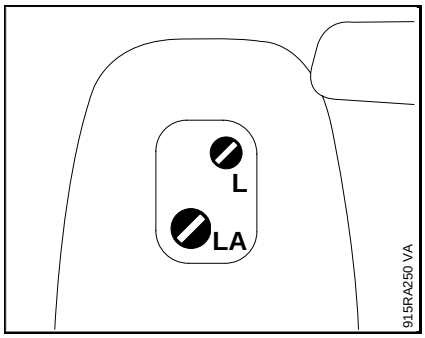
- Use idle speed screw (**LA**) to set engine speed to 2800 rpm.

HS-275A, HS-279B

These carburetors have a fixed jet in place of a high speed adjusting screw (H screw).

Maximum engine speed is preset and no longer adjustable. It is only possible to correct idling speed within certain limits.

These carburetors guarantee an optimum fuel-air mixture in all operating conditions.



Standard setting

To readjust the carburetor, start with the standard setting.

- Carefully screw down the low speed screw (**L**) clockwise until it is against its seat. Then back it off one full turn counterclockwise.

- Check air filter and clean if necessary.

- Inspect spark arresting screen and clean or replace as necessary.

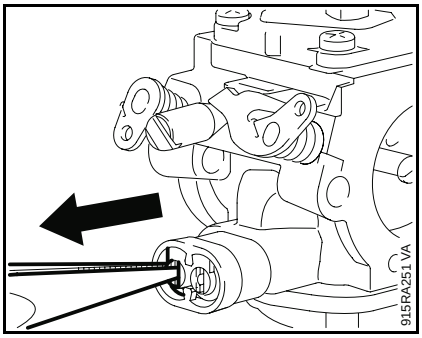
- Start the engine and allow it to warm up.

Adjusting idle speed

Note: Use a tachometer.

- Use idle speed screw (**LA**) to set engine speed to 2500 rpm.

HL-366A, HS-280A, HS-281A, HT-12A

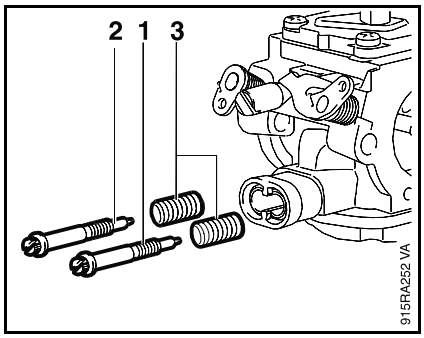


HT-12A

- Pull cap off the adjusting screw.

Note: Limiter caps are damaged during removal. They must not be used again.

- If necessary, take out the adjusting screws with springs.



- Carefully screw low speed screw (1) and high speed screw (2) with springs (3) down onto their seats.

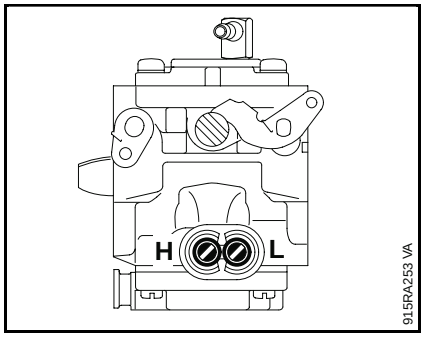
Preparations

- Check air filter and clean if necessary.

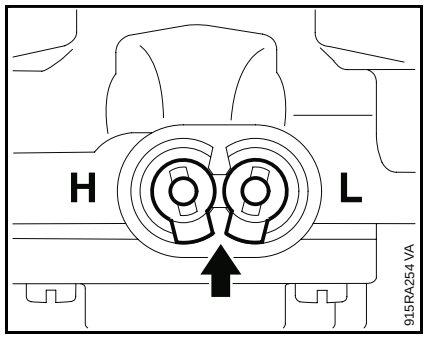
- Inspect spark arresting screen and clean or replace as necessary.

- Check chain tension and adjust if necessary.

Basic setting



- Starting with the adjusting screws (**H**) and (**L**) firmly against their seats, open the high speed screw (**H**) one full turn and the low speed screw (**L**) seven eights of a turn.

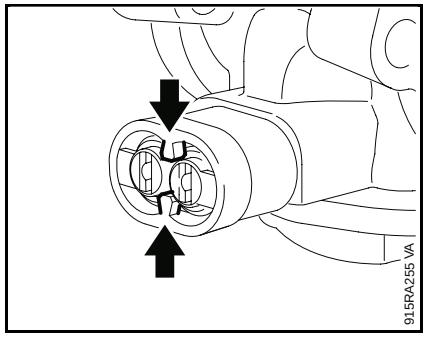


Fitting limiter caps

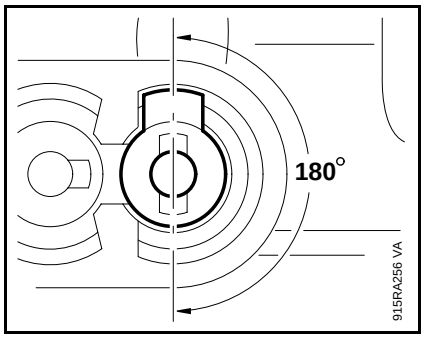
Note: Use new caps.

- Fit cap for high speed screw so that it is against 'rich' stop and cap for low speed screw so that its is against 'lean' stop.

- Push the caps on to the adjusting screws until they are flush with the molding.



- The two lugs on the molding limit the range of adjustment.

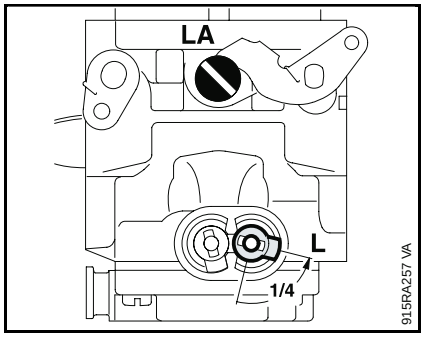


- Corrections are now possible only within a range of 180 degrees.

- This enables the mixture to be made leaner, if necessary, for operation at high altitudes and prevents it being enriched beyond the emission limits specified by EPA.

Adjusting idle speed

Note: Use a tachometer.



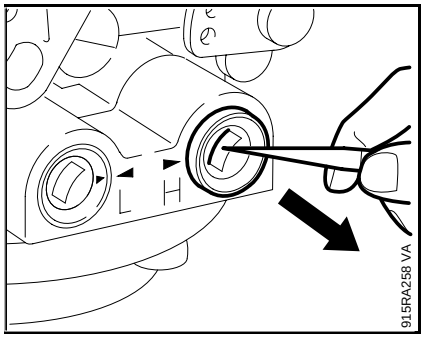
- Turn low speed screw (**L**) one quarter turn counterclockwise.

- Use idle speed screw (**LA**) to set engine speed to 2500 rpm.

Checking running behavior

- Open the throttle several times to check that engine accelerates smoothly.

- Engine must run uniformly at idle speed.



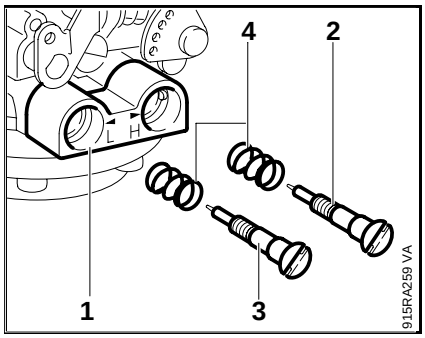
HL-366A

- Use a scriber to ease the caps and rings out of the module.

Note: Limiter caps and rings are damaged during removal. They must not be used again.

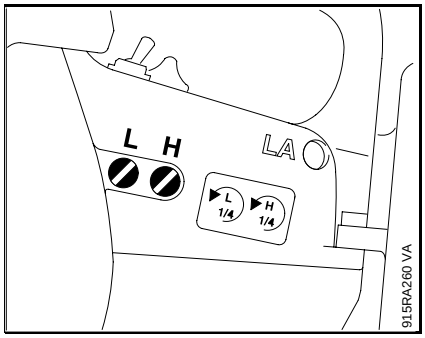
- If necessary, take out the adjusting screws with springs.

- Remove the module.



- Place module (1) in position.

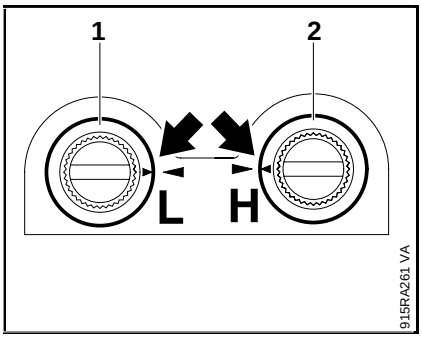
- Carefully screw high speed screw (2) and low speed screw (3) with springs (4) into module as far as stop.



Basic setting

- Starting with the high speed screw (**H**) and low speed screw (**L**) firmly against their seats, open them one and a half turns.

H = L = 1.5.



Fitting rings and limiter caps

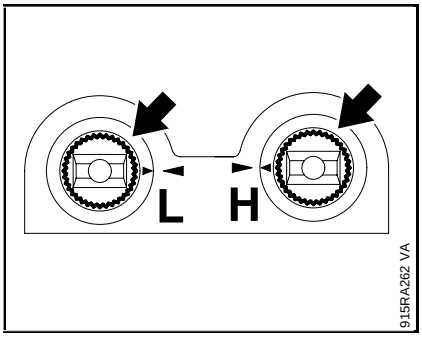
Note: Use new rings and caps.

- Fit the blue ring (1) over the low speed screw (**L**) so that the markings line up.

- Press the ring home until it is flush with the module.

- Fit the red ring (2) over the high speed screw (**H**) so that the markings line up.

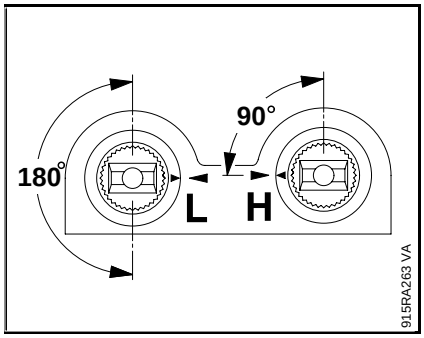
- Press the ring home until it is flush with the module.



- Align and fit caps so that the cap's flattened lug projects exactly into the slot in the adjusting screw.

Important: The positions of the rings and adjusting screws must not be altered while aligning and fitting the caps.

- Use carburetor screwdriver to push caps into the rings until they snap into position.



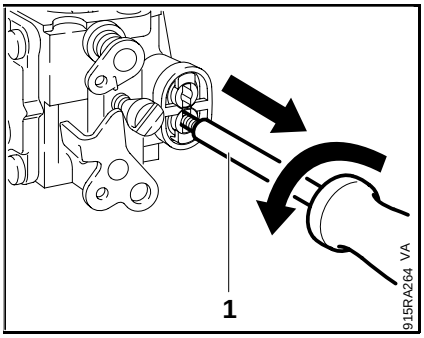
- Corrections are now possible on the low speed screw within a range of 180 degrees and on the high speed screw within a range of 90 degrees.

- This enables the mixture to be made leaner, if necessary, for operation at high altitudes and prevents it being enriched beyond the emission limits specified by EPA.

Adjusting idle speed

Note: Use a tachometer.

- Use idle speed screw (**LA**) to set engine speed to 2500 rpm.



HS-280A, HS-281A

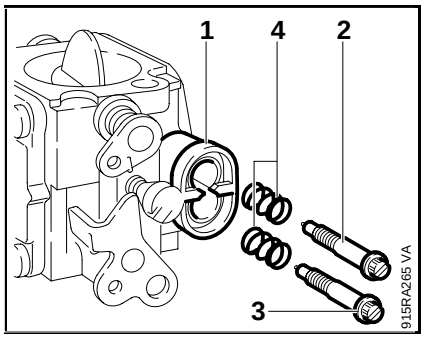
- Turn caps counterclockwise as far as stop.

- Screw puller (1) 5910 890 4500 into cap counterclockwise until it comes off the the head of the adjusting screw (left-hand thread).

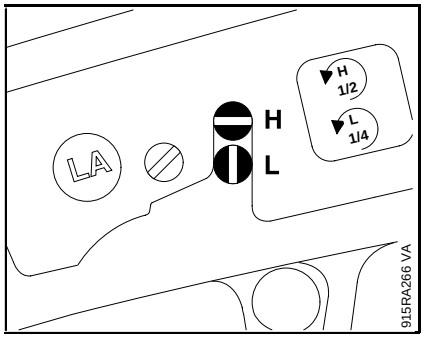
Note: Limiter caps are damaged during removal. They must not be used again.

- If necessary, take out the low speed and high speed screws.

- Remove the module.

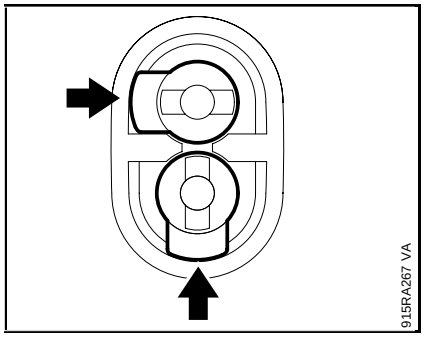


- Place module (1) in position.
- Carefully screw high speed screw (2) and low speed screw (3) with springs (4) into module as far as stop.



Basic setting

- Starting with the high speed screw (**H**) and low speed screw (**L**) firmly against their seats, open them one turn.

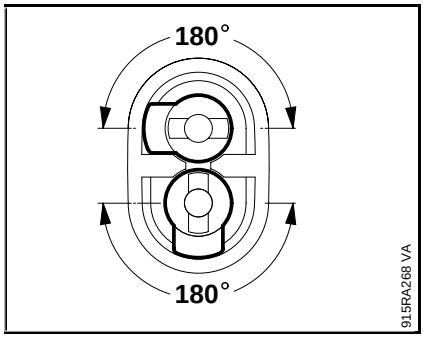


Fitting limiter caps

Note: Use new caps.

- Insert caps in the bores so that the lug on the high speed screw points to the left and the lug on the low speed screw points downwards.

- Push the caps on to the adjusting screws until they are flush with the module.



- Corrections are now possible only within a range of 180 degrees.

- This enables the mixture to be made leaner, if necessary, for operation at high altitudes and prevents it being enriched beyond the emission limits specified by EPA.

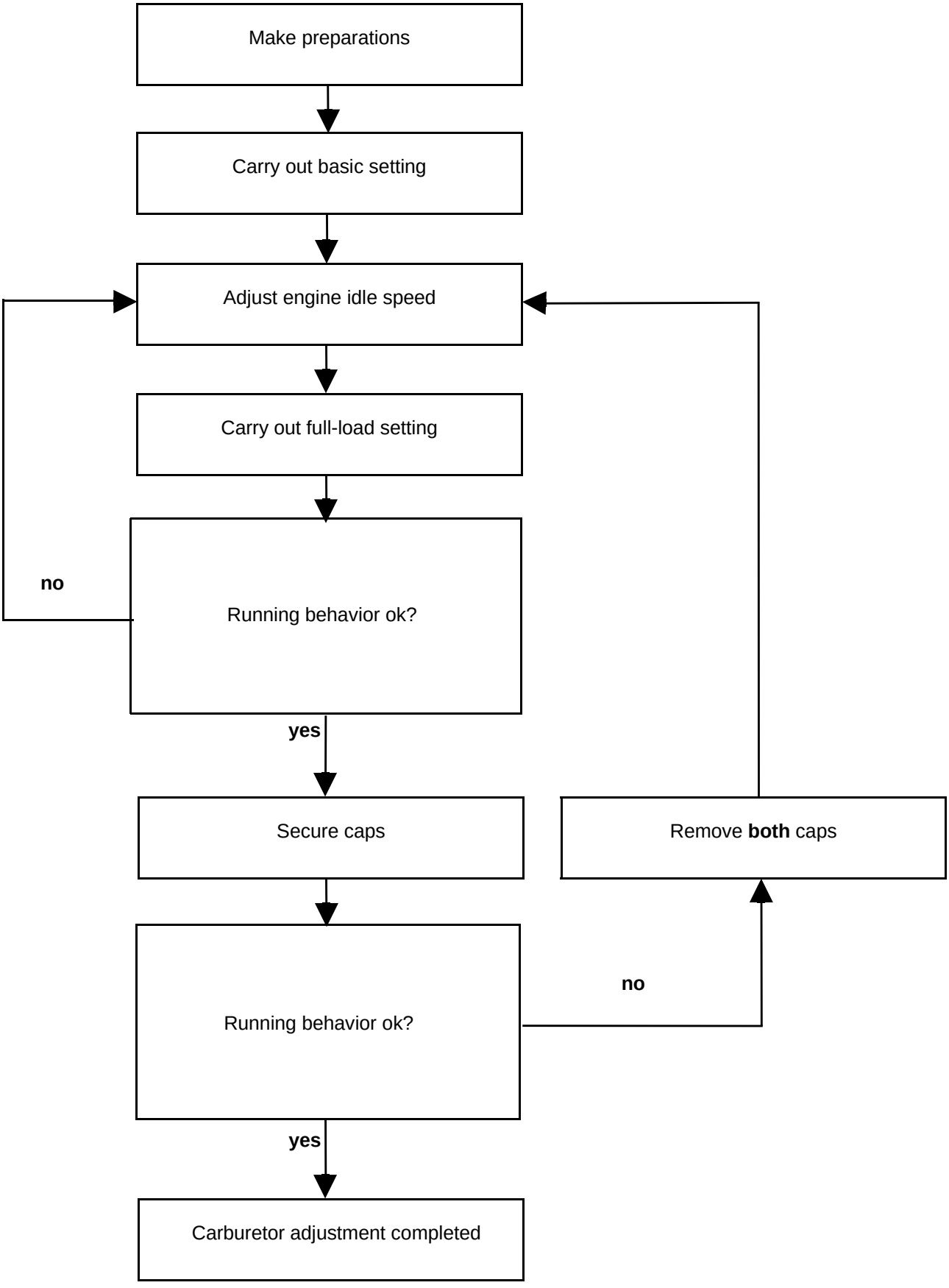
Adjusting idle speed

Note: Use a tachometer.

Use idle speed screw (**LA**) to set engine speed to 1800 rpm.

7.21 Flow Chart

HD-13A, HD-16, HD-17, HD-18A, HD-21A, HD-22, WY-69, WT-329, WT-330, WT-367, WT-393, WT-489, WT-492, WJ-69, C1Q-SK7, C3A-S39A



8. Special Servicing Tools and Aids

8.1 Special Servicing Tools

No.	Part Name	Part No.	Application
1	Carburetor and crankcase tester	1106 850 2905	Testing carburetor for leaks
2	- Fuel line	1110 141 8600	
3	- Nipple	0000 855 9200	
4	Puller	5910 890 4500	Removing caps [1)]
5	Screwdriver or	5910 890 2305 000 890 2300	Installing carb adjusting screws, adjusting carburetor

8.2 Servicing Aids

No.	Part Name	Part No.	Application
1	White spirit		Cleaning all components
2	Medium-strength adhesive (Loctite 242)	0786 111 1101	Control valve, sealing plug, sealing plate, screw for throttle and choke shutters

[1)] only carbs with limiter caps