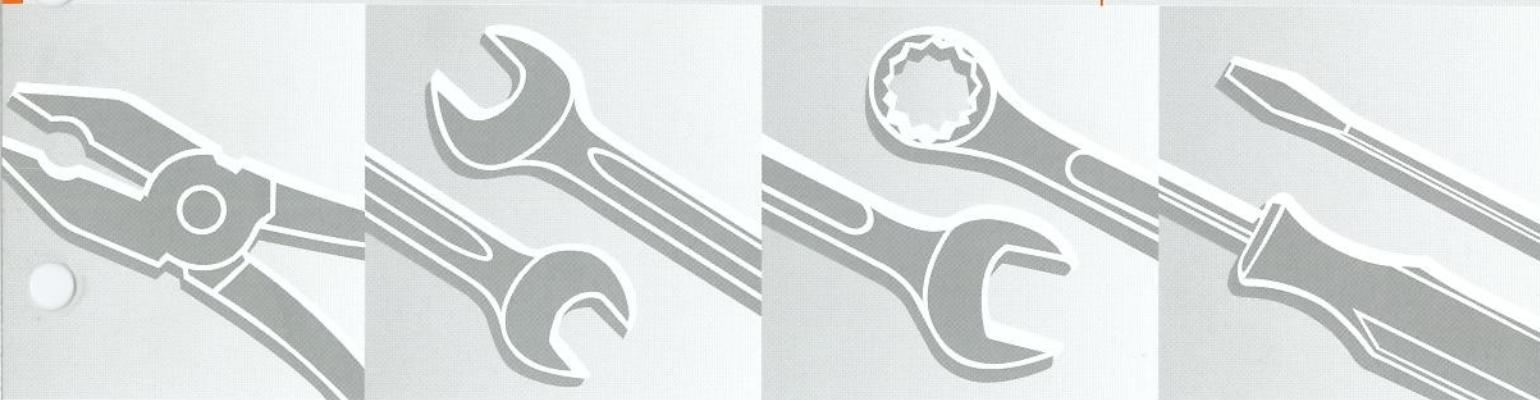


**STIHL**®

## **STIHL TS 460**

1997-12



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Service Manual  
Cutquik TS 460

This Service Manual contains a detailed description of all repair work for the Cutquik TS 460.

You should make use of the illustrated parts lists while carrying out repair work. They show the installed position and the assembly sequence of the assemblies. Microfilmed parts lists are always more up to date than printed lists!

A fault on the machine may have several causes. Consult the "troubleshooting charts" when tracing faults.

Refer to the "Technical Information Bulletins" for engineering changes which have been introduced since publication of this service manual. Technical information is considered to be a supplement to the parts list until publication of a new edition.

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

The STIHL Special Tools manual lists all special servicing tools currently available from STIHL.

Always use original STIHL replacement parts. Original STIHL parts can be identified by the STIHL part number the **STIHL®** logo and the STIHL parts symbol .

The symbol may appear alone on small parts.

**STIHL®**

Andreas Stihl  
D-71336 Waiblingen

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## 1. SPECIFICATIONS

### 1.1 Engine

STIHL single-cylinder two-stroke engine  
with special impregnated cylinder bore

Displacement:	72.4 cm <sup>3</sup>
Bore:	48.0 mm
Stroke:	40.0 mm
Power output:	3.5 kW (4.75 bhp)
Max. permissible speed:	9,600 r.p.m.
Idle speed:	2,500 r.p.m.
Bearings:	Crankshaft supported in heavy-duty deep groove ball bearings, needle cages on small and big ends
Connecting rod length:	70 mm
Rewind starter:	Single pawl system with automatic rope rewind mechanism
Reserve pull on rope rotor:	min. 1/2 turn of rope rotor
Starter rope:	4.5 mm dia., 1000 mm long
Clutch:	Centrifugal clutch without linings
Diameter:	80 mm
Clutch engages at:	3,200 r.p.m.
Crankcase leakage test	
at gauge pressure:	p <sub>ü</sub> = 0.5 bar
under vacuum:	p <sub>ü</sub> = 0.5 bar
Silencing:	Intake air silencer and exhaust muffler

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## 1.2 Fuel System

Carburetor:	All position diaphragm carburetor with integral fuel pump
Standard setting High speed adjusting screw H: Low speed adjusting screw L:	Back off 1 turn Back off 1 turn (starting with the screws tight against their seats)
Carburetor leakage test at gauge pressure: Fuel tank capacity: Fuel mixture:	$p_u = 0.8 \text{ bar}$ $0.95 \text{ l} (950 \text{ cm}^3)$ Regular brand-name gasoline (leaded or unleaded) and STIHL two-stroke engine oil min. 90 RON
Octane number: Mix ratio:	<b>1:50</b> with STIHL two-stroke engine oil 50:1 <b>1:25</b> with other brand-name two-stroke engine oils
Air filter:	Felt prefilter, large main filter (paper filter cartridge) and auxiliary filter

## 1.3 Ignition System

Type:	Electronic magneto ignition (breakerless)
Air gap:	0.2-0.5 mm
Ignition timing:	2.8-3.2 mm B.T.D.C. at 8,000 r.p.m.
Spark plug (suppressed):	Bosch WSR 6 F or NGK BPMR 7 A
Electrode gap:	0.5 mm
Spark plug thread:	M14x1.25
Length of thread:	9.5 mm
Heat range:	200

## 1.4 Cutting Tools

Cutting wheel for stone	300x3.5x20 mm dia
Cutting wheel for steel	300x3.5x20 mm dia
Cutting wheel for stone	300x6.0x20 mm dia
Cutting wheel for asphalt	300x3.5x20 mm dia
Cutting wheel for stone	350x4.0x20 mm dia
Cutting wheel for steel	350x4.0x20 mm dia
Diamond cutting wheel for stone	300x2.6x20 mm dia
Diamond cutting wheel for asphalt	300x3.2x20 mm dia
Cutting depth	approx. 100 mm (for 300 mm dia) approx. 115 mm (for 350 mm dia)

## 1.5 Special Accessories

### 1.5.1 For User

STIHL-Cutquik cart  
Cutting depth limiter  
Wet cutting attachment  
Water attachment

### 1.5.2 For Service

Electrician's repair kit

## 1.6 Tightening Torques

Fastener	Thread size	For component	Torque Nm	Remarks
Spline screw	IS-M5x58x22	Cylinder/crankcase	10.0	
Spline screw	IS-M5x35x22	Crankcase/engine housing	10.0	
Spline screw	IS-M5x20	Spacer flange	7.0	
		Clutch	50.0	
Spline screw	IS-M5x20	Cast arm/engine housing	7.0	
Hexagon nut	M10x1	Starter cup	40.0	
Collar nut	M8x1	Flywheel	25.0	
Spline screw	IS-M5x14	Filter base/engine housing	7.0	
Spline screw	IS-M5x58x35	Connector/carburetor/flange	5.0	
Spline screw	IS-M5x14	Housing cover/engine housing	7.0	1)
Spline screw	IS-M5x20	Ignition module	8.0	1)
Spline screw	IS-M5x20	Fan cover	6.0	
Spline screw	IS-M5x14	Muffler/cylinder	10.0	
Spline screw	IS-M5x35	Muffler/engine housing	10.0	1)
Spline screw	IS-M4x6	Deflector baffle/muffler	3.0	
Spline screw	IS-M5x14	Clamp	4.0	
Spline screw	IS-M4x6	Short circuit wire/ground	3.0	
Spline screw	IS-DG5x24	Handle molding/handle	3.0	
Spline screw	IS-M5x14	Annular buffer/engine housing	7.0	
Spline screw	IS-DG5x24	AV-molding/handle	3.0	
Spline screw	IS-M5x14	Annular buffer/handle tube bracket	7.0	
Spline screw	IS-M5x14	Support/handle tube bracket	7.0	
Spline screw	IS-M5x14	Handle tube/handle tube bracket	7.0	
Spline screw	IS-DG5x24	Handle tube/handle	6.0	
Spline screw	IS-M5x20	Shroud/engine housing	6.0	
Spline screw	IS-M5x20	Carburetor box cover	6.0	
Spline screw	IS-M5x20	Starter cover	6.0	
	M14x1.25	Spark plug	27.5	

1) Washer must be fitted under screw head.

## 2. TROUBLESHOOTING CHARTS

### 2.1 Clutch, Bearing with Guard

Condition	Cause	Remedy
Insufficient frictional contact - clutch slips	Clutch springs stretched or fatigued, spring hooks broken	Fit new springs
Cutting wheel rotates while engine is idling	Engine idle speed too high	Correct at idle speed adjusting screw
	Clutch springs stretched or fatigued, spring hooks broken	Fit new springs
Cutting wheel does not rotate at full throttle	Small V-belt not tensioned	Tension small V-belt
	Clamp damaged	Replace clamp
	Small V-belt torn	Replace small V-belt

### 2.2 Engine

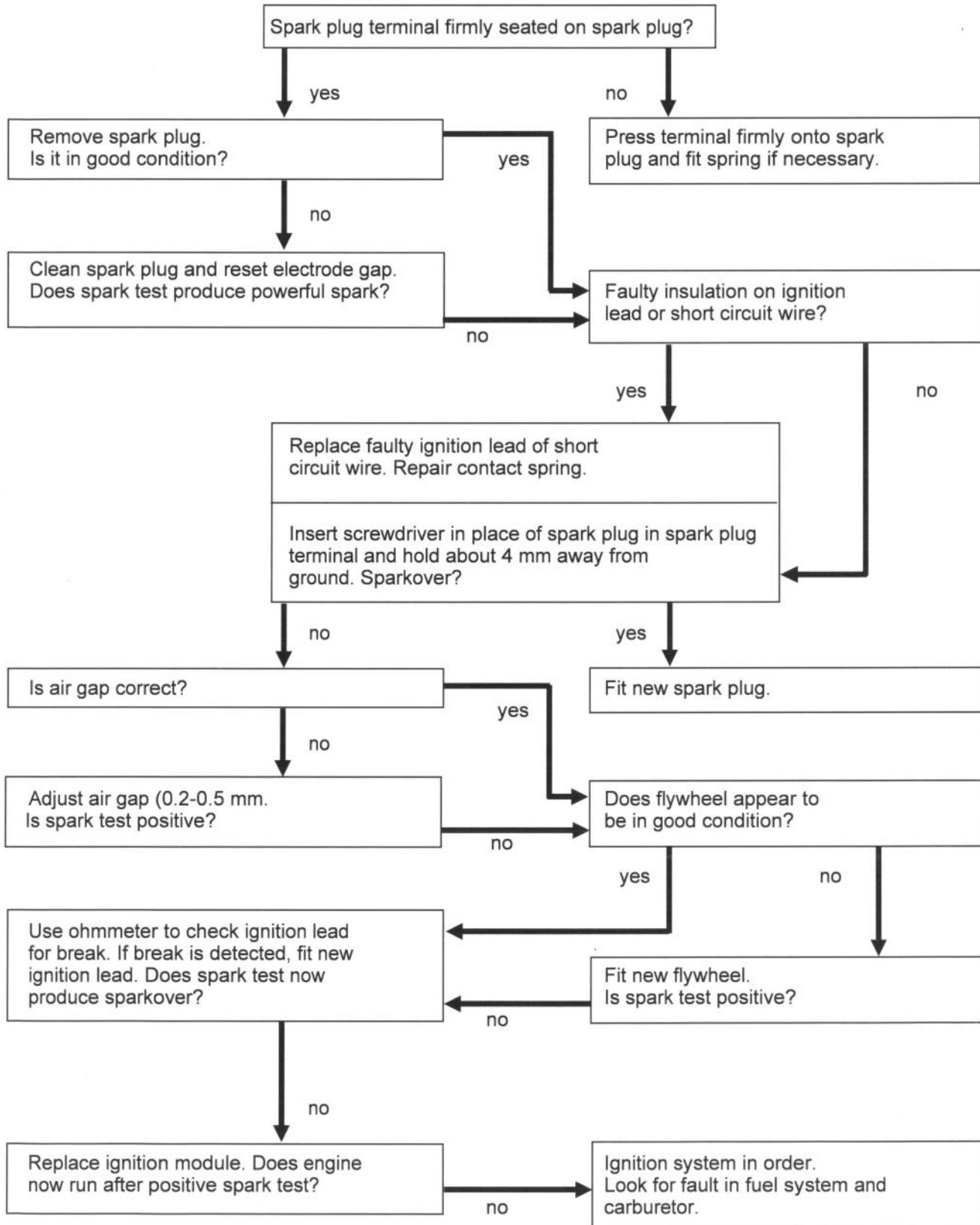
Always check and, if necessary, repair the following parts before looking for faults on the engine:

- Air filter, fuel system, carburetor, ignition system

Condition	Cause	Remedy
Engine does not start easily, stalls at idle speed, but operates normally at full throttle	Oil seals in crankcase damaged	Replace oil seals
	Gaskets on spacer flange leaking	Fit new gaskets
	Cylinder base gasket leaking	Replace gasket
	Crankcase damaged (cracks)	Replace crankcase
Engine does not deliver full power or runs erratically	Secondary air seepage through faulty gasket on spacer flange	Replace gaskets
	Piston rings worn or broken	Fit new piston rings
	Muffler carbonized	Clean the muffler (inlet and exhaust), fit new spark arresting screen
Engine overheating	Insufficient cylinder cooling due to dirty cooling fins	Thoroughly clean cylinder cooling fins

## 2.3 Ignition System

**Warning:** Exercise extreme caution while carrying out maintenance and repair work on the ignition system. The high voltages which occur can cause serious or fatal accidents!



## 2.4 Rewind Starter

Condition	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge - i.e. not vertically	Fit new starter rope
	Normal wear	Fit new starter rope
Rewind spring broken	Spring overtensioned - no reserve when rope is fully extended	Fit new rewind spring
	Very dirty or corroded	Fit new rewind spring
Starter rope can be pulled out almost without resistance (crankshaft does not turn)	Guide peg on pawl or pawl is worn	Fit new pawl
	Spring clip fatigued or broken	Fit new spring clip
	Starter cup worn or damaged	Fit new starter cup
Starter rope is difficult to pull and rewinds very slowly	Starter mechanism is very dirty (dusty conditions)	Thoroughly clean complete starter mechanism
	Lubricating oil on rewind spring becomes viscous at very low outside temperatures (spring windings stick together)	Apply a few drops of kerosine (paraffin) to spring, then pull rope carefully several times until normal action is restored

## 2.5 Fuel System

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 bottom of metering chamber
Poor acceleration	Idle jet "too lean"	Back off low speed adjusting screw slightly (see Carburetor Adjustment)
	Main jet "too lean"	Back off high speed adjusting screw slightly (see Carburetor Adjustment)
	Inlet control lever too low (relative to design position)	Set inlet control lever flush with bottom of metering chamber
	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Compensator hose to manifold is blocked	Clear compensator hose using air pressure; replace manifold if necessary
	Diaphragm gasket leaking Metering diaphragm damaged or shrunk	Fit new diaphragm gasket Fit new metering diaphragm

Condition	Cause	Remedy
Engine will not idle, idle speed too high	Throttle shutter opened too wide by idle speed adjusting screw	Reset idle speed adjusting screw correctly
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 adjusting screw slightly (see Carburetor Adjustment)
	Setting of idle speed adjusting screw incorrect - throttle shutter completely closed	Set idle speed adjusting 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
	Compensator hose to manifold leaks	Seal connections or replace manifold
	Pump diaphragm damaged or fatigued	Fit new Pump diaphragm
	Main jet bores or ports blocked	Clean bores and ports
	Fuel pickup body dirty	Fit new pickup body
	Fuel strainers dirty	Clean fuel strainers

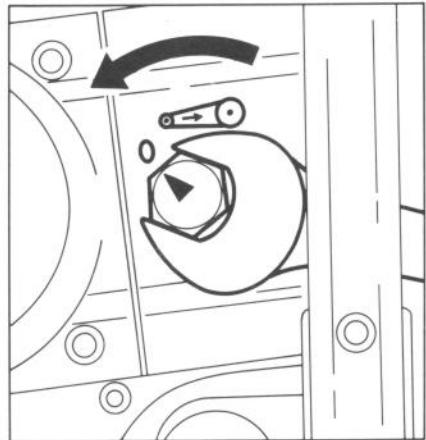
See also 2.2

### 3. CUTTING WHEEL DRIVE ASSEMBLY

#### 3.1 Bearing with Guard

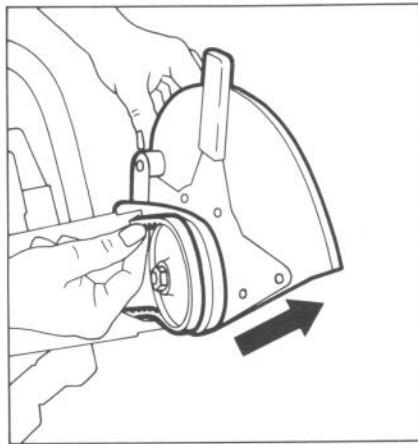
**Top:**  
Relieve tension of V-belt

**Bottom:**  
1 = Guard  
2 = Mounting screws



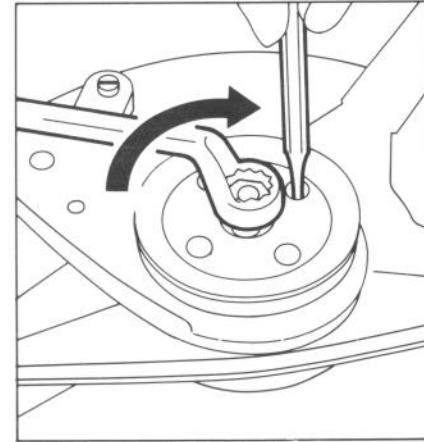
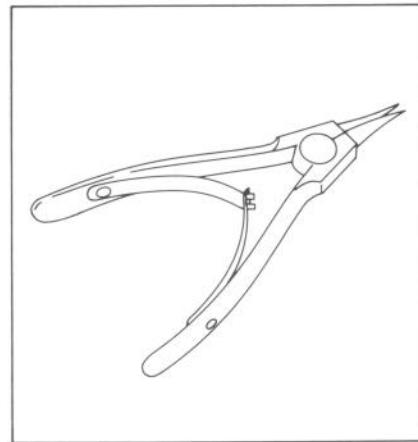
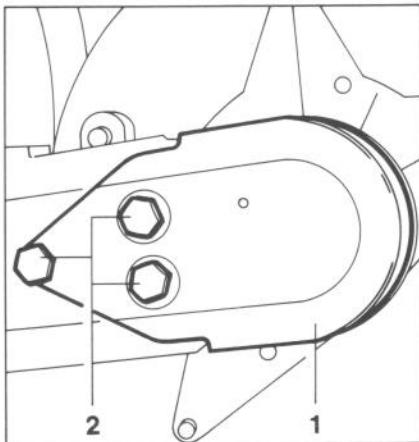
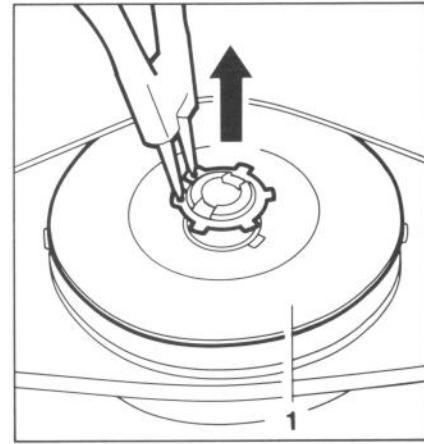
**Top:**  
Removing the bearing

**Bottom:**  
Pliers 0881 611 8200



**Top:**  
Removing the axial clamp ring  
1 = Thrust washer

**Bottom:**  
Unscrewing the nut



- Check axial and radial truth of running; see 3.2.

- Relieve tension of V-belt by turning hexagon nut of clamp counterclockwise until arrow points left (at the "0").

- Unscrew the mounting screws on the bearing and remove the guard.

- Lift the bearing with guard out of the V-belt.

- Draw the axial clamping ring off the shaft.

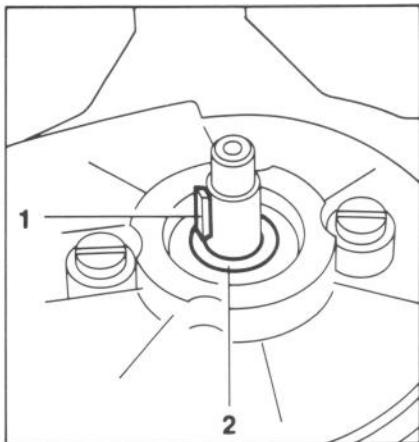
- Remove the thrust washer.

- Lock the V-belt pulley. Unscrew the nut and draw the V-belt pulley off the shaft.

**Important!** The nut has a left-hand thread.

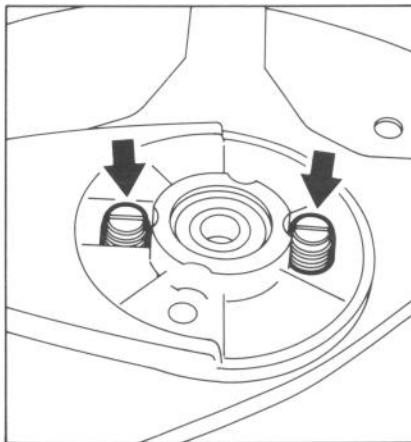
Top:  
1 = Woodruff key  
2 = Washer

Bottom:  
Removing the shaft



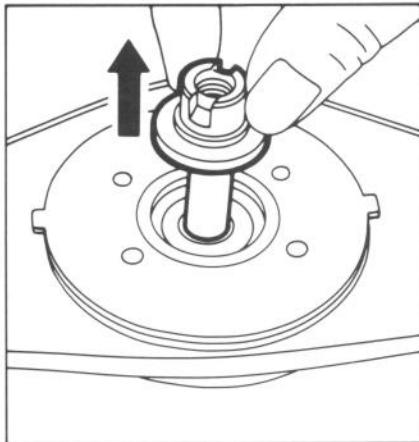
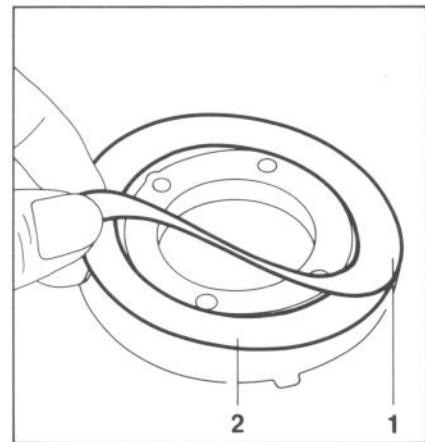
Top:  
Flat head screws

Bottom:  
Removing the flange

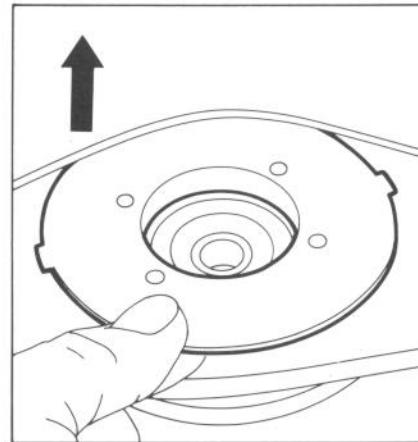


Top:  
1 = Rubber washer  
2 = Disk

Bottom:  
Removing the bearing



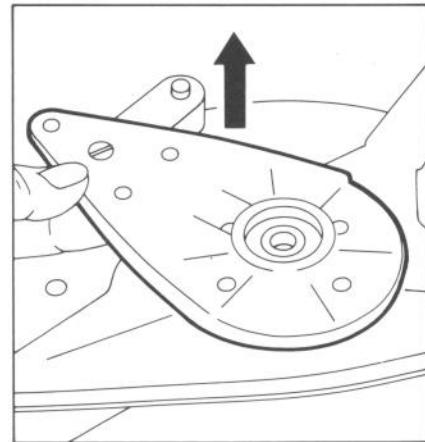
- Remove the woodruff key from the groove in the shaft.
- Remove the washer from the shaft.
- Draw the shaft out of the deep groove ball bearings.



- Unscrew both flat head screws and remove them together with the spring washers.

**Note:** Note the number of spring washers.

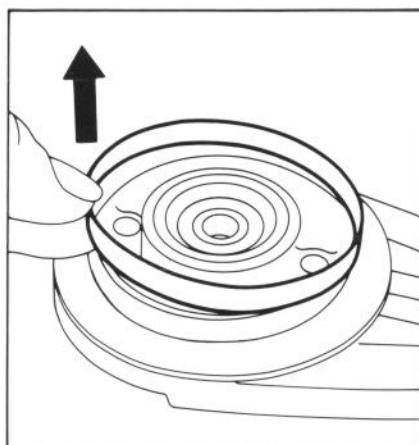
- Remove the flange from the guard.



- Remove the disk and rubber washer from the flange and guard.
- Remove the bearing from the guard.

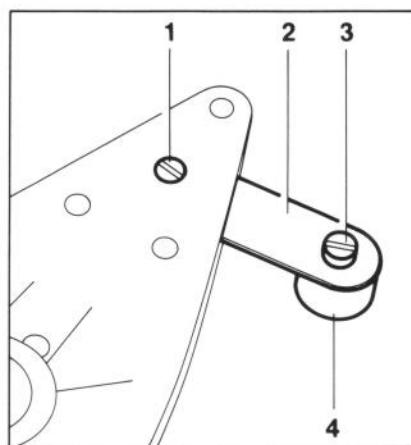
Top:  
Removing the rubber ring

Bottom:  
1 = Rubber washer  
2 = Disk



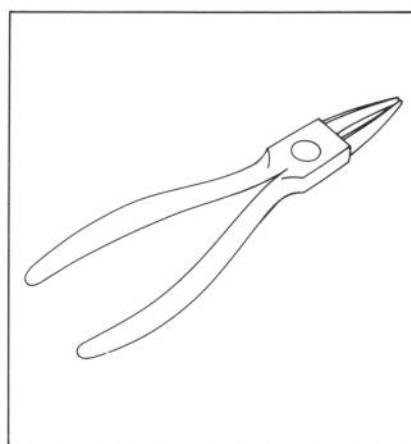
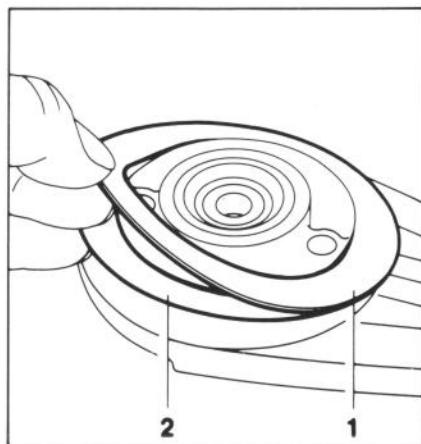
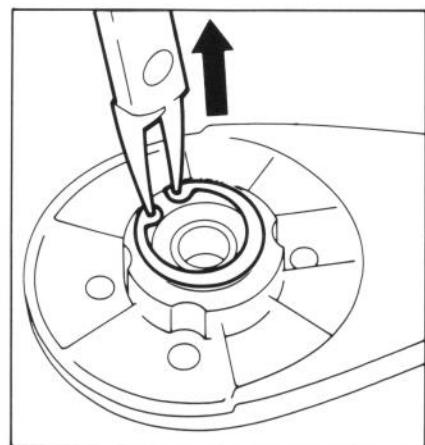
Top:  
1 = Countersunk screw  
2 = Limit stop  
3 = Spline screw  
4 = Rubber vibration buffer

Bottom:  
Pliers 0811 641 8380



Top:  
Removing a circlip

Bottom:  
Pressing out the deep groove ball bearings with drift pin 4119 893 7200



- Remove the rubber ring from the bearing.

- Remove the rubber washer and disk from the bearing.

- Unscrew the countersunk screw and remove the limit stop.

- Unscrew the spline screw in order to replace the rubber vibration buffer.

**Note:** The limit stop and rubber vibration buffer only feature in machines for the USA.

- Remove the circlips from the grooves before removing the deep groove ball bearings.

- Force both deep groove ball bearings and the ring out of the bearing with the drift pin.

Top:  
Flange  
mounting screws

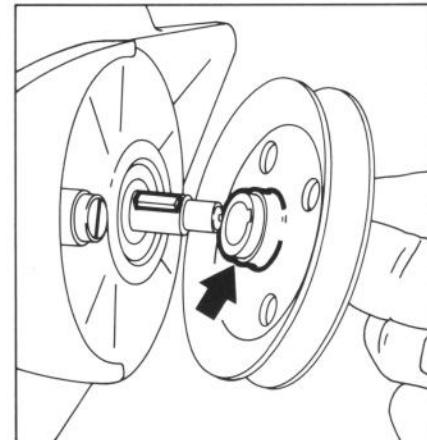
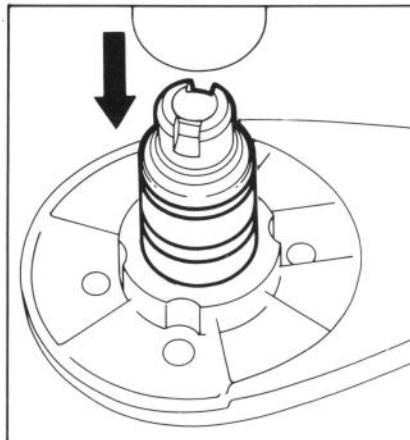
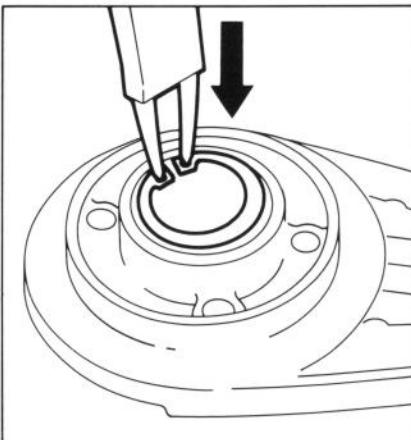
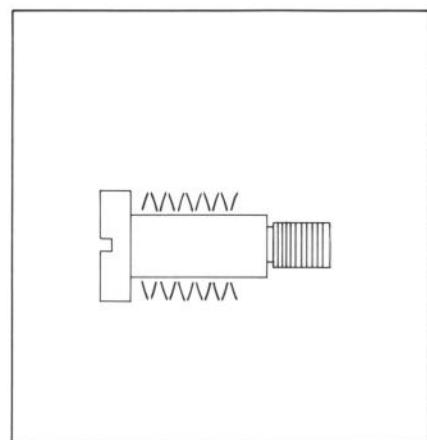
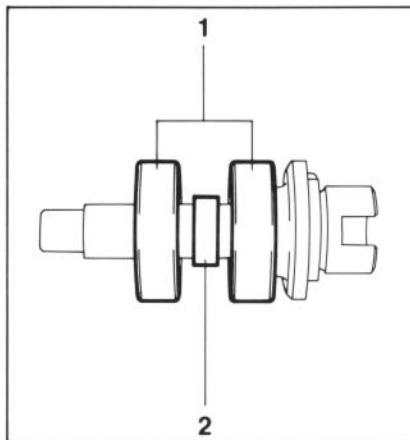
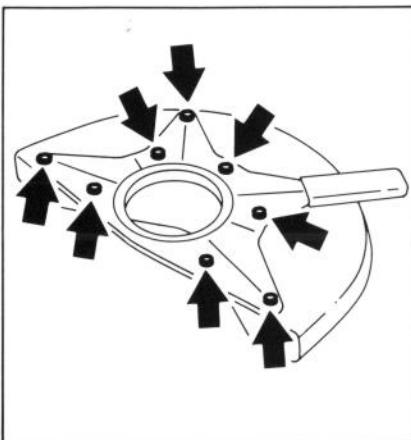
Bottom:  
Fitting the circlip  
with pliers 0811 641 8380

Top:  
1 = Deep groove ball bearing  
2 = Ring

Bottom:  
Pressing in the deep groove ball bearings

Top:  
Correctly positioned spring washers

Bottom:  
Longer collar on the  
V-belt pulley



- UncREW the flange mounting screws and remove the flage from the guard.

The parts are assembled in reverse order.

**Note:** Particular care must be taken when carrying out the following work.

- Place the circlip in one of the bearing grooves.

- Slide the first deep groove ball bearing onto the shaft, then the ring and the second deepgroove ball bearing.

- Position the deep groove ball bearings and press them in with the shaft until they contact the circlip.

- Draw the shaft out of the deep groove ball bearings.
- Place the second circlip in the bearing groove.

- Slide the same number of spring washers onto the flat head screws as were removed during disassembly, as shown in the drawing.

- Slip the V-belt pulley onto the shaft with the longer chamfered edge first and tighten the nut with a torque of 37.5 Nm.

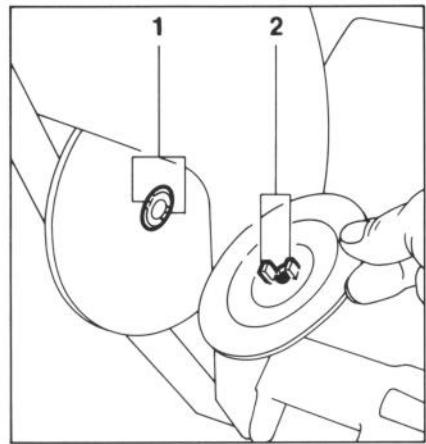
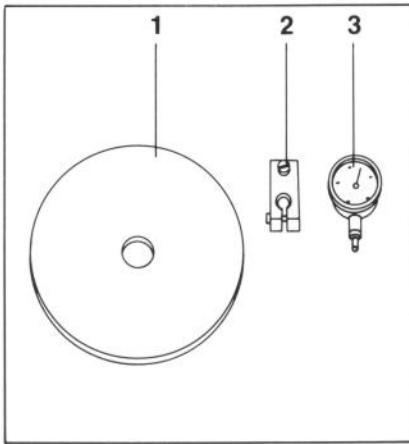
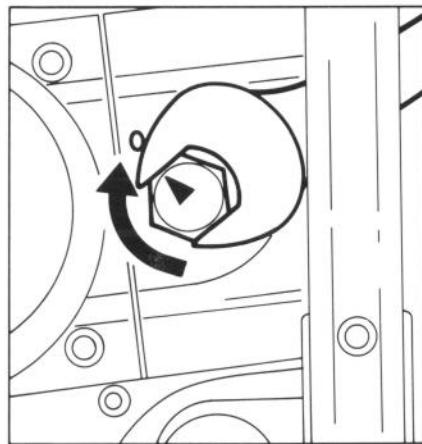
### 3.2 Checking the Axial and Radial Truth of Running

Tightening the V-belt

1 = Test wheel 5910 851 6100  
 2 = Gauge holder  
 5910 850 6000  
 3 = Dial gauge 0000 890 9100

Top:  
 Fitting the test wheel  
 1 = Arresting grooves  
 2 = Arresting lugs

Bottom:  
 Test equipment in position

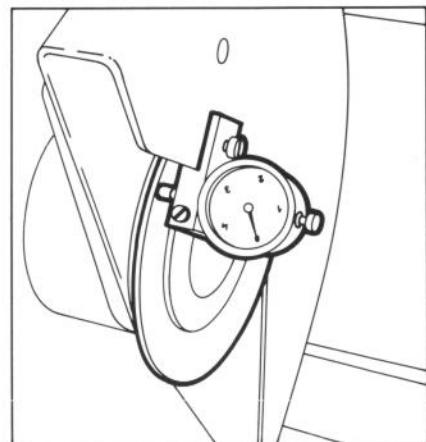


- Place V-belt in V-belt of bearing, position guard and loosely screw in mounting screws.
- Turn hexagon of tensioning device clockwise until spring force is eliminated.
- Tighten all three mounting screws starting with rear screw.

Since changes in the shaft diameter (due to scoring etc.) can affect the radial truth of running of the cutting wheel, it is normally sufficient to inspect the shaft around the cutting wheel mount.

The axial truth of running, on the other hand, depends on the state of various components and must therefore be determined by measurement.

- Fit the test wheel and then position the thrust washer so that the arresting lugs engage in the arresting grooves in the shaft.
- Tighten the screw.
- Secure the gauge holder with dial gauge to the guard cover so that the axial truth of running can be determined for a diameter of



approx. 130 mm over one full revolution of the wheel. Refer to the table "Test procedure".

- Remove the test equipment after completing the measurement.

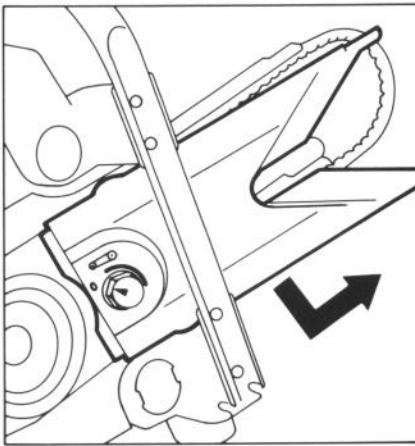
Test procedure	Actual condition	Possible causes	Remedy
<b>Radial truth of running:</b> Visual inspection of the spindle (shaft)	Wear marks or scoring around the cutting wheel mount	Mounting screw loose, use of wrong cutting wheels (diameter of mount $\varnothing > 20$ mm or $> 22$ mm)	Replace the spindle (shaft)
<b>Axial truth of running:</b> Check the axial truth of running with the STIHL test wheel or diamond cutting wheel (over a diameter of 130 mm)	Axial eccentricity $\leq 0,15$ mm  $> 0,15$ mm Damaged or uneven contact surfaces of the thrust washers (especially the inner thrust washer); contact surfaces not plane; genuine STIHL parts have not been used		None  Dirt; thrust washers or cutting wheel fitted incorrectly; application of force when cutting or during transport
	Spindle (shaft) damaged	Incorrect handling, use of force	Replace the spindle (shaft)
	Distinct radial play in the bearing seat → spindle bearing defective	Deep groove ball bearings damaged by exposure to dirt and/or bearing seat worn down at the spindle	Replace the spindles and deep groove ball bearings

## 3.3 V-belt

3.4 V-belt Pulley/  
Clutch Drum

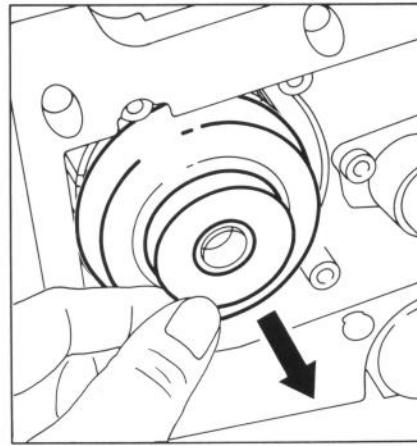
**Top:**  
Removing the cover

**Bottom:**  
Removing the V-belt



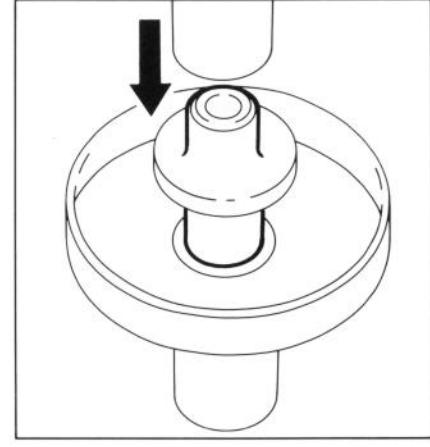
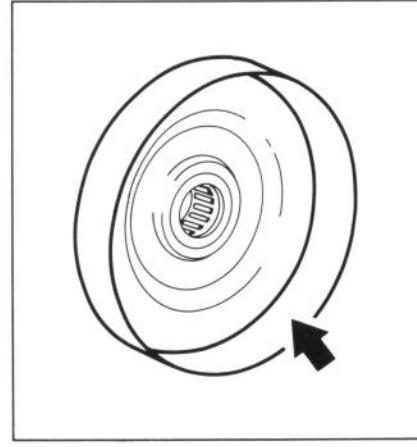
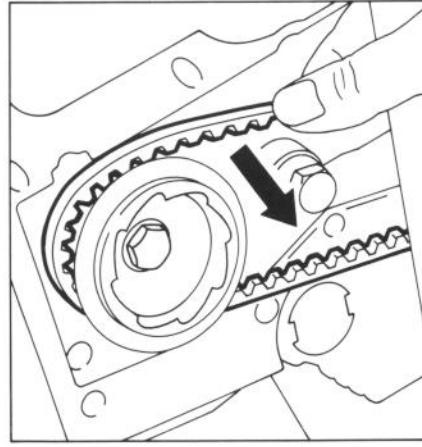
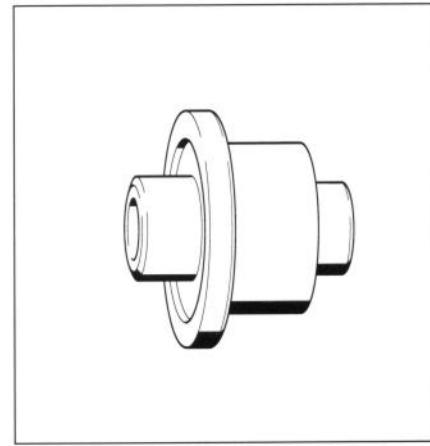
**Top:**  
Removing the V-belt pulley

**Bottom:**  
Friction surface of the clutch drum



**Top:**  
Assembly pin 1119 893 7200

**Bottom:**  
Forcing out the needle sleeve



- Remove the bearing with guard, see 3.1.

- Remove the starter cover, see 7.2.

- Remove the cover.

- Remove the V-belt from the V-belt pulley.

The parts are assembled in reverse order.

- Remove the V-belt, see 3.3.

- Remove the starter cup, see 7.7.

- Draw the V-belt pulley off the crankshaft stub.

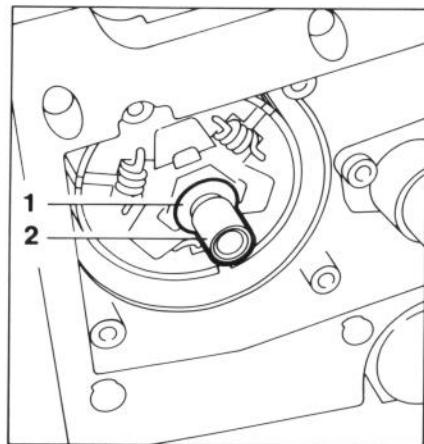
- Check the clutch drum: it must not show any major signs of wear or scoring. Replace the V-belt pulley if necessary.

- Check the needle sleeve and force it off the V-belt pulley from the clutch side using an assembly pin if necessary.

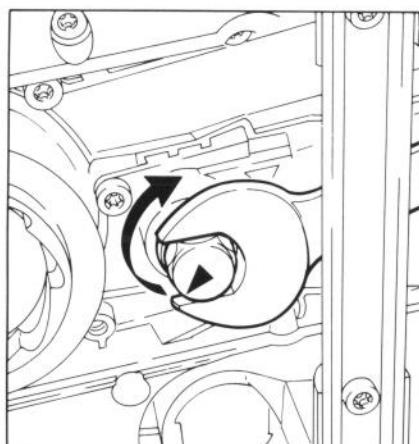
### 3.5 Clamp

Top:  
1 = Wheel  
2 = Bushing

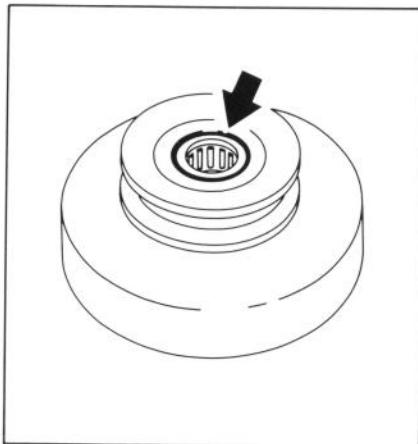
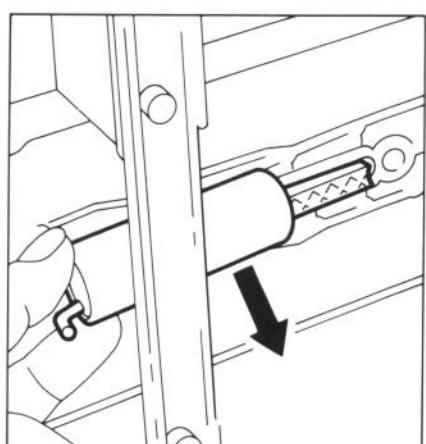
Bottom:  
Properly positioned needle sleeve



Top:  
Relieving tension of the clamp  
Bottom:  
Mounting screws  
of clamp



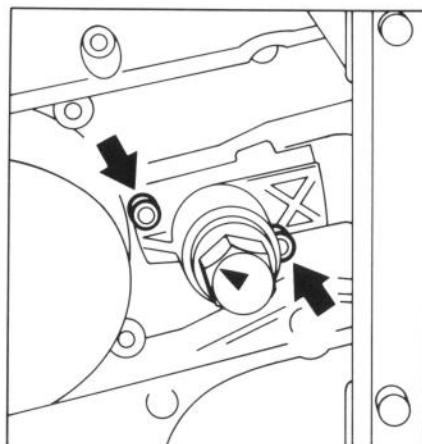
Top:  
Removing the throttle trigger interlock  
Below:  
Attaching the tension rod



- Remove bushing and wheel from crankshaft stub.

The parts are assembled in reverse order.

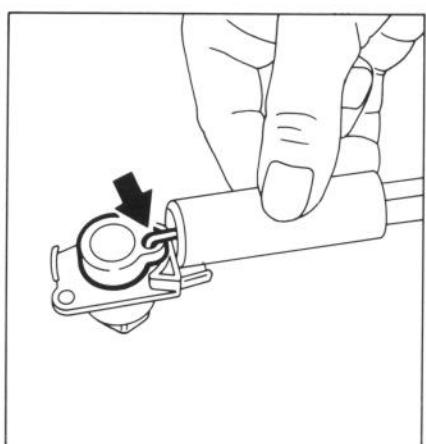
**Note:** Insert assembly pins on thicker, beaded side of needle sleeve and press in from side on which the clutch drum is located until they are flush with the inner edge of the V-belt pulley.



- Remove the V-belt, see 3.3.

- Turn hexagon nut on clamp counterclockwise until inner spring is completely slack.

- Take out clamp mounting screws, remove clamp.



- Remove throttle trigger interlock from recess in housing.

The parts are assembled in reverse order.

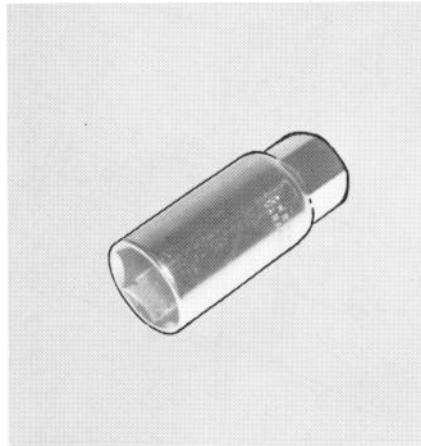
**Note:** Insert hooks of tension rod in hole and put both parts together. Tighten mounting screws to 4.0 Nm.

## 4. CLUTCH

### 4.1 Removing and Disassembly

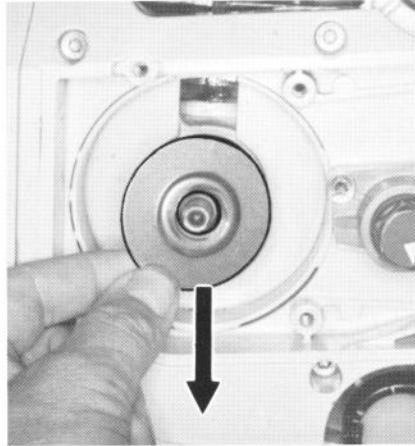
Top:  
Socket 5910 893 5616

Bottom:  
Clutch



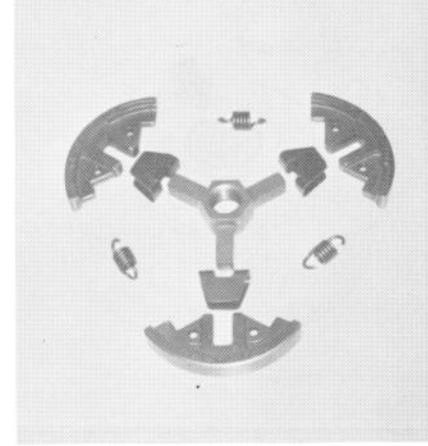
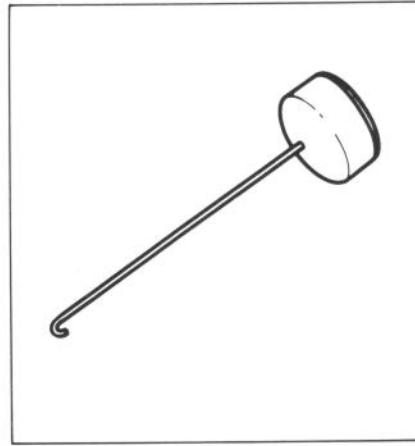
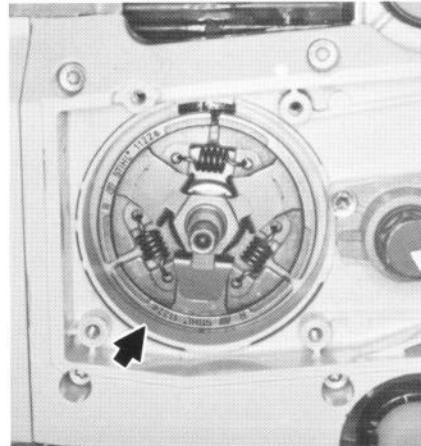
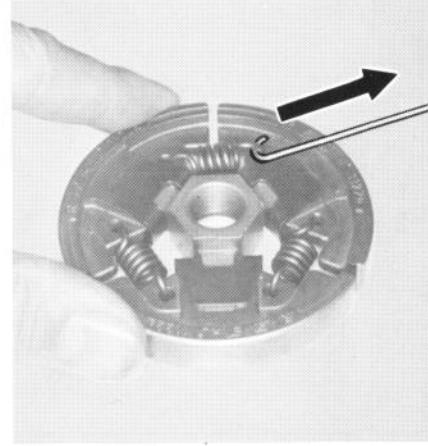
Top:  
Removing the cover washer

Bottom:  
Assembly pin 5910 890 2800



Top:  
Removing a clutch spring

Bottom:  
Component parts of clutch



Troubleshooting charts, see 2.1.

- Remove the V-belt, see 3.4.

- Unscrew clutch from crankshaft stub using socket.

**Caution!** Clutch has a left-hand thread.

- Remove cover washer from crankshaft stub.

- Use assembly hook to remove all the clutch springs.

- Pull the clutch shoes off the carrier.

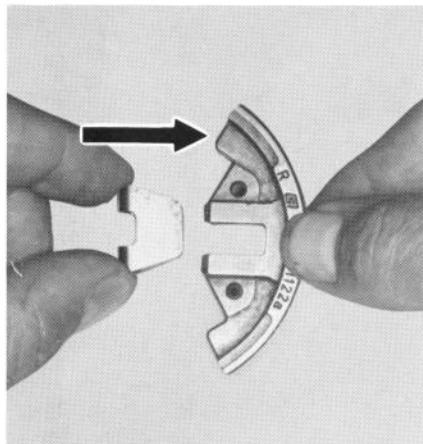
- Pull the retainers off the clutch shoes.

- Clean all parts and stub of crankshaft in white spirit. Replace any damaged or worn parts.

## 4.2 Assembly and Installation

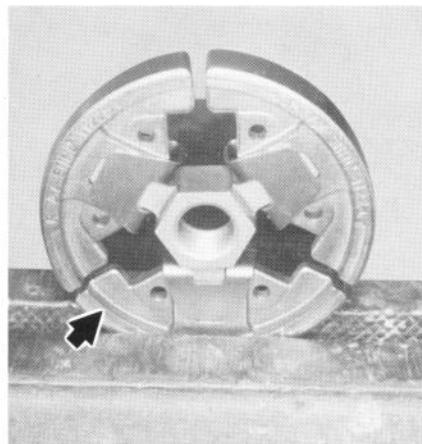
**Top:**  
Fitting retainer on  
clutch shoe

**Bottom:**  
Pushing clutch shoe  
onto carrier

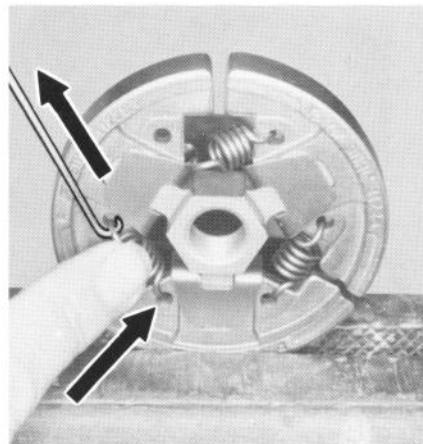
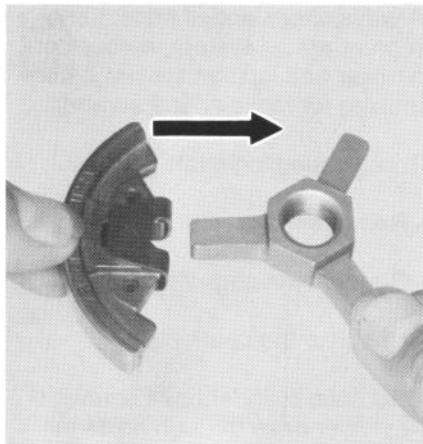
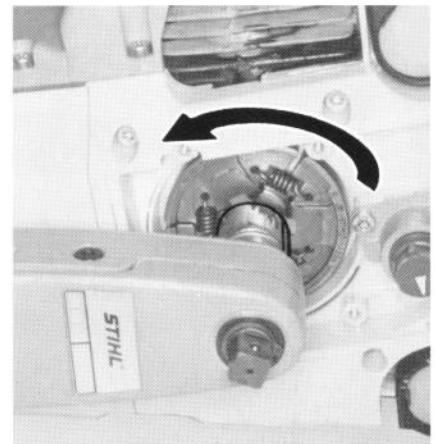


**Top:**  
Clutch clamped in a vise

**Bottom:**  
Attaching clutch springs



Tightening the clutch



- Slide cover washer onto crankshaft stub with convex side facing outward.

- Screw clutch onto crankshaft and torque down to 40 Nm.

- Fit V-belt pulley, see 3.4.

- Fit the retainers onto the clutch shoes.

- Fit the clutch shoes over the arms of the clutch carrier so that the series number, e.g. 1122a, is on the same side as the carrier's hexagon.

- Clamp the clutch, e. g. one of the shoes, in a vise.

- Attach one end of each spring to the clutch shoes by hand.

- Use the other assembly hook to attach the other ends of the springs and press them firmly into the clutch shoes with one finger.

## 5. ENGINE

### 5.1 Removing and Refitting Exhaust Muffler

Top:  
Deflector baffle  
mounting screws

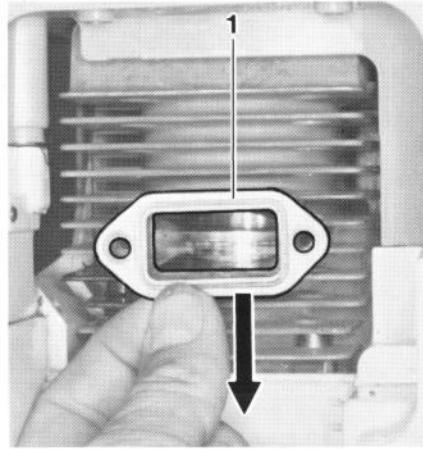
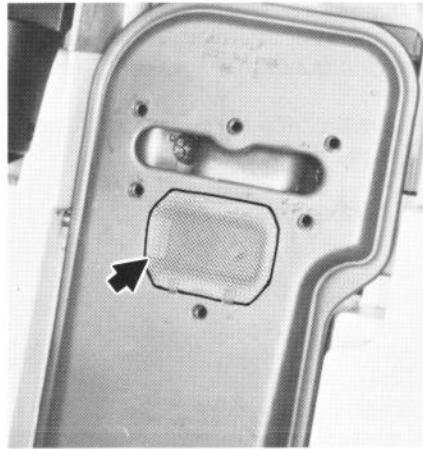
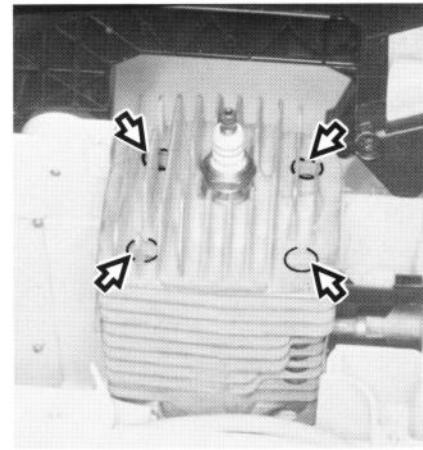
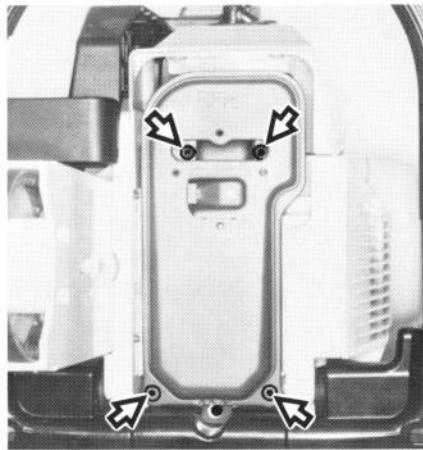
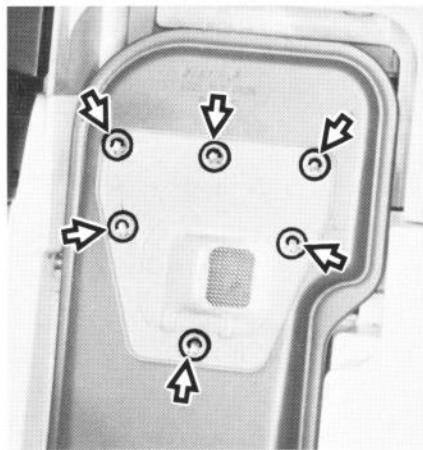
Bottom:  
Spark arresting screen

Top:  
Muffler mounting screws

Bottom:  
Removing gasket  
1 = Bead

## 5.2 Cylinder and Piston

### 5.2.1 Removal



Troubleshooting chart, see 2.2

- Take out the cover plate mounting screws and remove the cover plate.
- Remove the spark arresting screen.
- Clean the spark arresting screen, fit a new one necessary.

- Remove the mounting screws from the muffler and lift the muffler away.

- Remove the gasket.

**Note:** Install new gasket so that its bead points toward the lower muffler. Fit lock washers under lower screws and tighten screws on muffler and deflector baffle to 10.0 Nm and 2.5 Nm respectively.

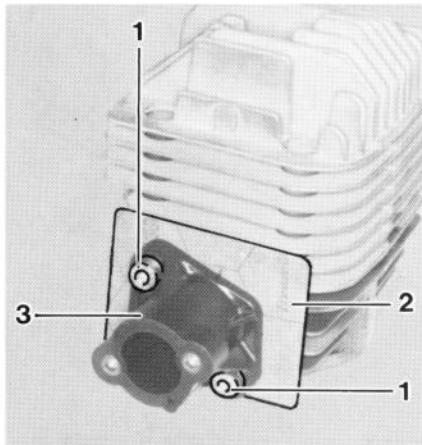
Always check and, if necessary, repair the fuel system, carburetor, air filter and ignition system before looking for faults on the engine.

Troubleshooting chart, see 2.2.

- Remove the muffler, see 5.1.
- Remove the carburetor, see 10.3.
- Unscrew the spark plug.
- Remove cylinder base screws on cylinder base through holes in cylinder.
- Pull the cylinder off the piston.

**Top:**  
1 = Mounting screws  
2 = Gasket  
3 = Spacer flange

**Bottom:**  
Removing the cylinder gasket



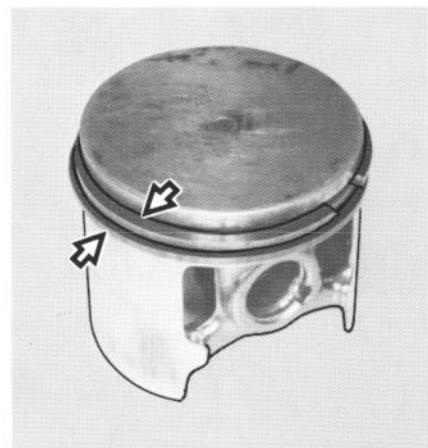
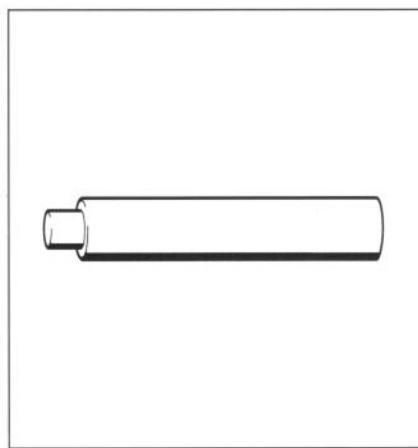
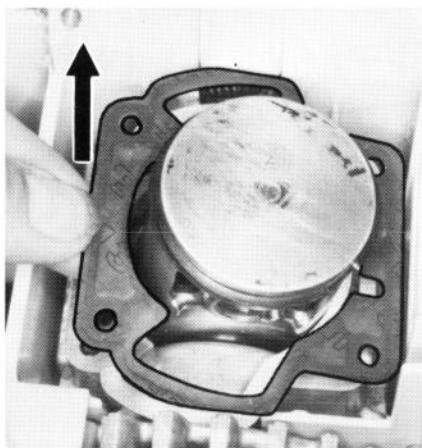
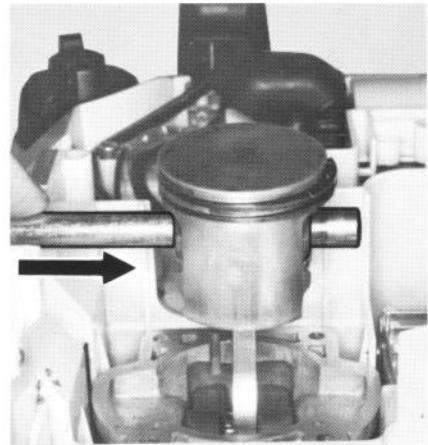
**Top:**  
Removing snap ring

**Bottom:**  
Assembly drift 1108 893 4700



**Top:**  
Pushing out piston pin

**Bottom:**  
Piston rings



- Take out the spacer flange mounting screws. Remove the spacer flange and gasket from the cylinder.
- Inspect the cylinder and replace it if necessary.

**Note:** If a new cylinder has to be installed, always fit the matching piston. Replacement cylinders are only supplied complete with piston for this reason.

- Remove the cylinder gasket.

**Important:** Before removing the piston, decide whether or not the crankshaft has to be removed as well. To remove the starter cup, the clutch and the flywheel, see 7.7, 4.1 and 6.1.5, block the crankshaft by sliding the wooden assembly block between the piston and crankcase.

- Use a scribe or similar tool to ease the hookless snap rings out of the grooves in the piston bosses.

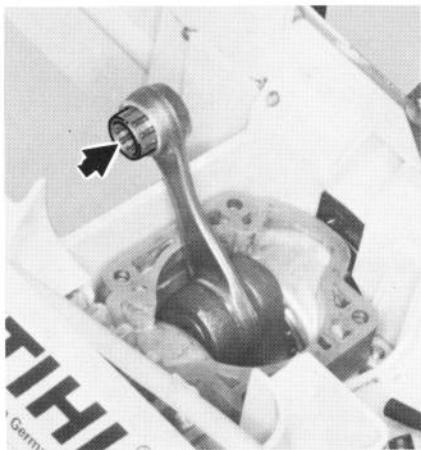
- Now use the assembly drift to push the piston pin out of the piston. If the piston is stuck, tap the end of the drift **lightly** with a hammer if necessary. **Important:** Hold the piston steady during this process to ensure that no jolts are transmitted to the connecting rod. Remove piston and take the needle cage out of the connecting rod.

- Inspect piston rings and replace if necessary, see 5.3.

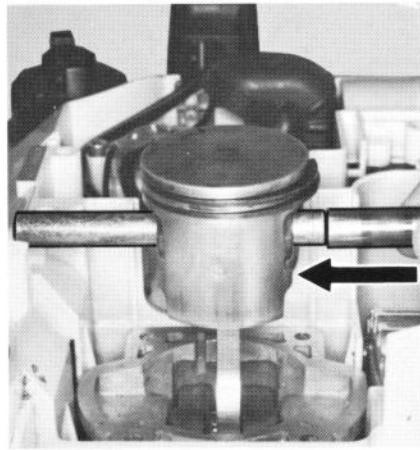
## 5.2.2 Installation

**Top:**  
Needle cage in connecting rod

**Bottom:**  
1 = Arrow on  
piston head  
2 = Fan cover

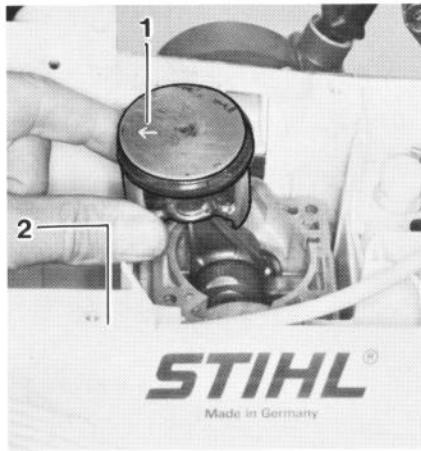
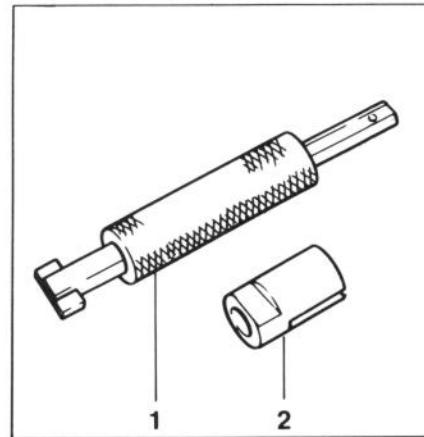


Installing piston pin



**Top:**  
1 = Installing tool 5910 890 2212  
2 = Sleeve

**Bottom:**  
1 = Snap ring (hookless)  
2 = Magnet

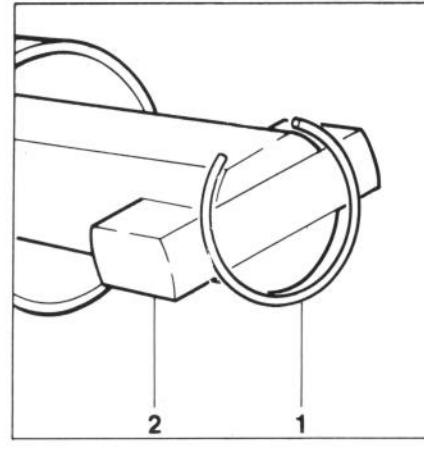


- Heat the piston on an electric heating plate to approx. 60 °C and slip it over the connecting rod so that the arrow on the piston head points to the left (looking at fan cover).
- Push the assembly drift, small diameter first, through the piston and small end (needle cage) and line up the piston.
- Fit the piston pin on the assembly drift and slide it into the piston (the pin slides home easily if the piston is hot).
- Fit the wire snap rings.

**Note:** Use installing tools to fit the snap rings.

- Thoroughly clean the gasket seating surface on the cylinder. Lubricate the needle cage with oil and fit it in the small end.

- Mount spacer flange with new gasket on cylinder, insert screws and tighten to 10 Nm.

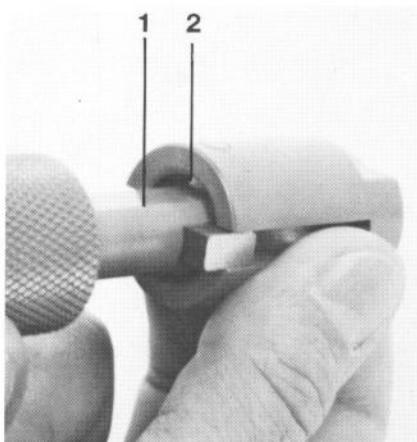


### Use the installing tool as follows:

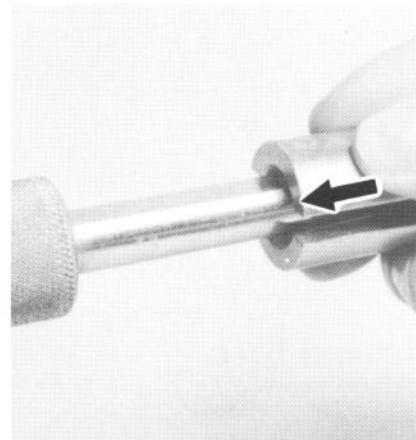
- Remove the sleeve from the tool.
- Attach the snap ring to the magnet so that the snap ring gap is on the flat side of the tool's shank.

**Top:**  
1 = Flat face on tool's shank  
2 = Pin

**Bottom:**  
Pressing in the installing tool until the sleeve butts against the tool's shoulder

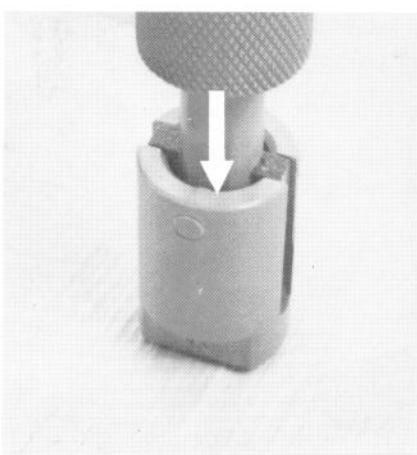
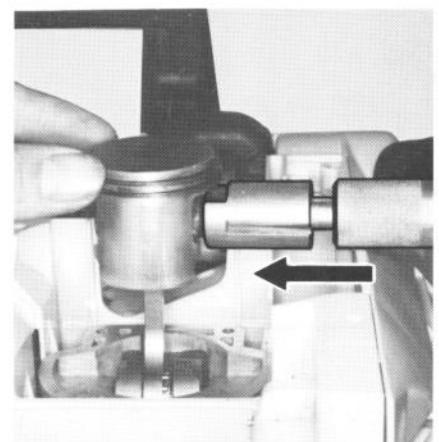


Slipping sleeve on to other end of the shank



**Top:**  
Inserting snap ring in piston boss

**Bottom:**  
Fitting cylinder gasket  
1 = Slot



- Push the large slotted diameter of the sleeve over the magnet and snap ring. Position the sleeve so that the inner pin points toward flat face of tool's shank.

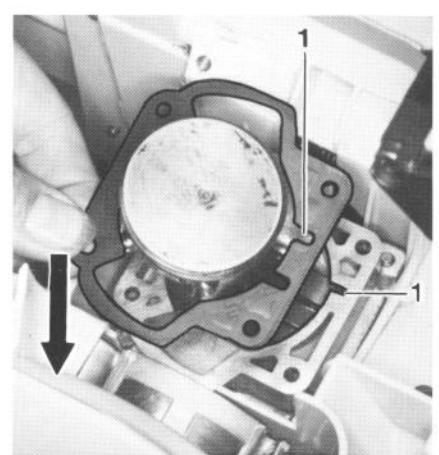
- Stand the installing tool, sleeve downward, on a flat surface (wooden board) and press vertically downwards until the sleeve butts against the tool's shoulder.

- Remove the sleeve and slip it onto the other end of the shank.

**Note:** Inner pin must again point toward flat face of tool's shank.

- Apply installing tool to the piston boss (flat face on shank must point toward piston head), hold the piston steady, center the tool shank exactly and press home until the snap ring slips into the groove.

**Note:** Fit the snap ring so that its gap is on the piston's vertical axis (it must point either up or down).

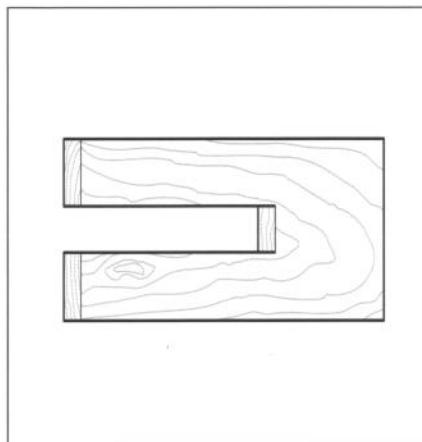


- Repeat the above procedure to fit the other snap ring.

- Fit new cylinder gasket to crankcase so that slot in gasket is positioned over slot in crankcase.

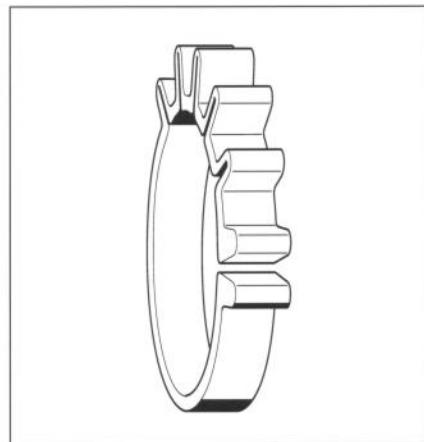
Top:  
Wooden assembly block 1108 893 4800

Bottom:  
Correct position of piston ring

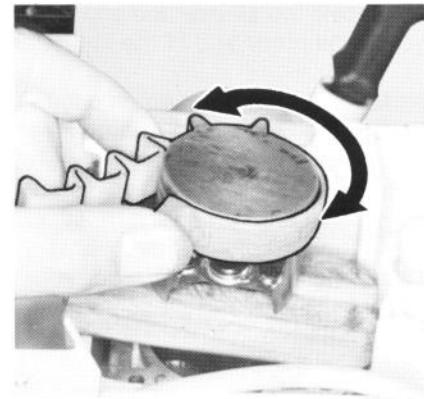
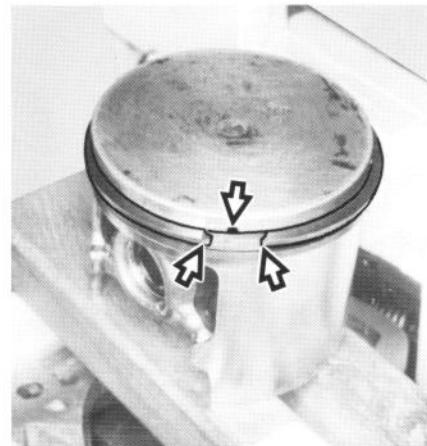
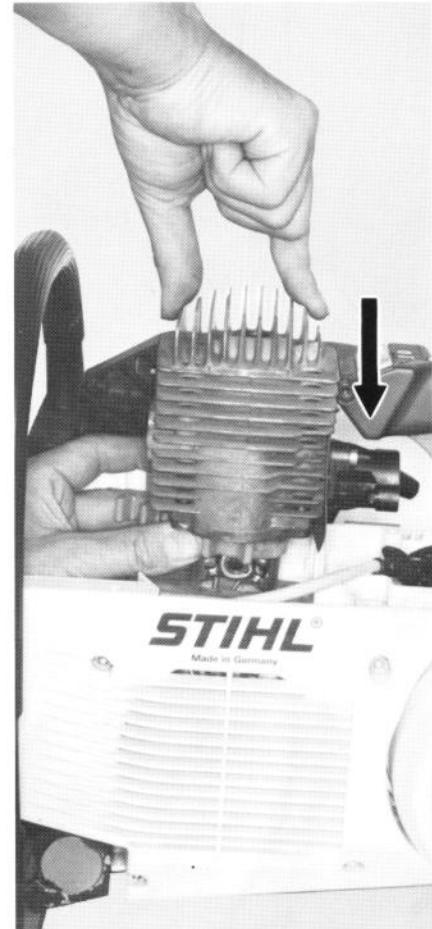


Top:  
Clamping strap 0000 893 2600

Bottom:  
Compressing piston rings  
with clamping strap



Fitting aligned cylinder  
over the piston



- Lubricate piston and piston rings with oil.
- Position the wooden assembly block between the piston and crankcase.
- Rest the piston on the wooden assembly block.
- Position the piston rings so that the radii at the ring gap meet at the fixing pin in the piston groove when the rings are compressed.

- Use the clamping strap to compress piston rings around the piston and check that piston rings are correctly positioned.

- Lubricate inside of cylinder with oil and line it up so that it is positioned as it will be in the installed position (see ill.). It is important to observe this point as the piston rings might otherwise break.

- Slide the cylinder over the piston - the clamping strap is pushed downward as the piston rings slip into the cylinder.

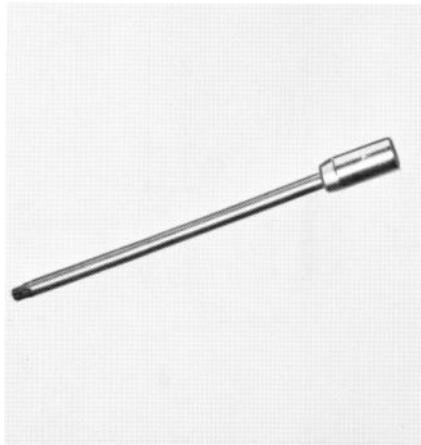
## 5.3 Piston Rings

## 5.4 Crankcase

## 5.4.1 Crankshaft Removal

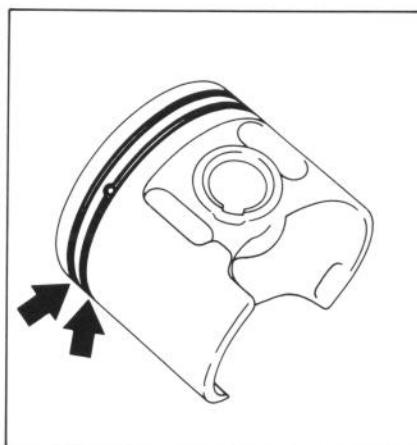
Top:  
Socket 0812 542 2104

Bottom:  
Tightening the cylinder base screws



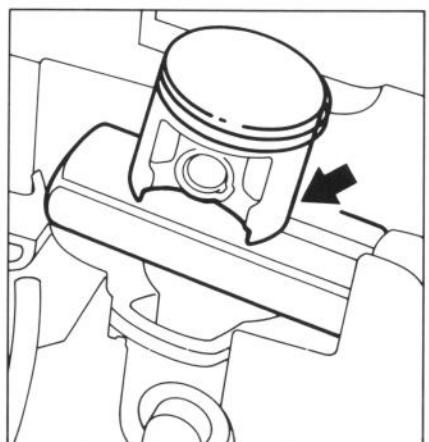
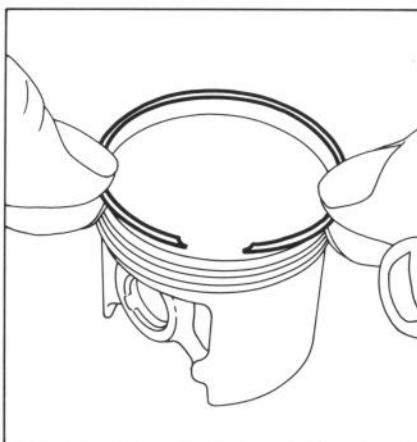
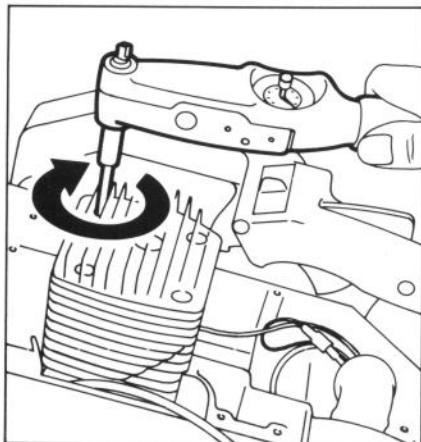
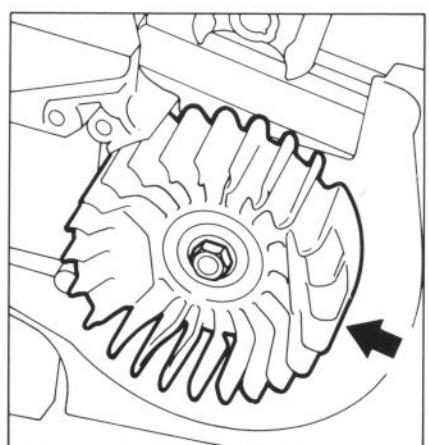
Top:  
Ring grooves in piston

Bottom:  
Mounting the piston rings



Top:  
Flywheel

Bottom:  
Piston fitted on wooden assembly block



- Remove the clamping strap and wooden assembly block.
- Carefully line up the cylinder and the cylinder gasket. Fit cylinder base screws and tighten them alternately to 10 Nm in a diagonal pattern.

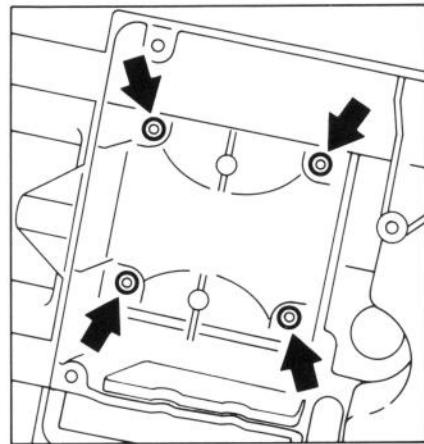
The parts are assembled in reverse order.

- Remove piston, see 5.2.1.
- Remove piston rings from piston.
- Scrape off carbon buildup in grooves using an old piece of piston ring.
- Fit new piston rings in ring grooves so that the chamfers on the ends face the piston head.
- Mount piston, see 5.2.2.

- Remove clutch, see 4.1.
- Remove cylinder, see 5.2.1.
- Remove expansion tank, see 10.9.
- Remove flywheel from crankshaft stub, see 6.1.5.
- Remove piston, see 5.2.1.

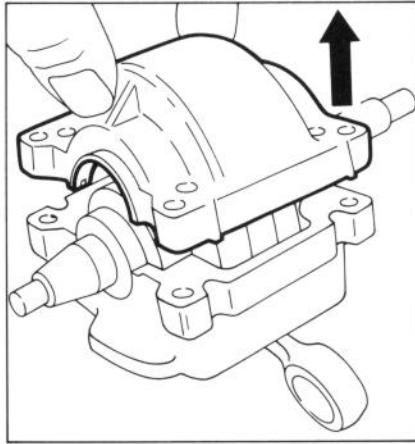
Top:  
Crankcase  
mounting screws

Bottom:  
Removing the crankcase



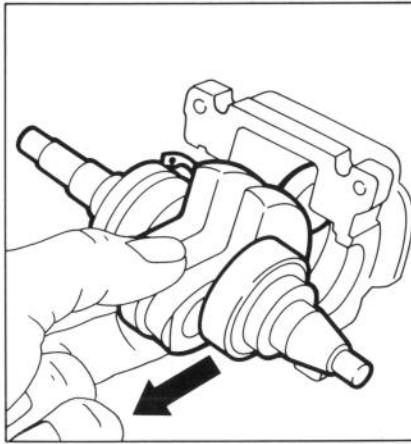
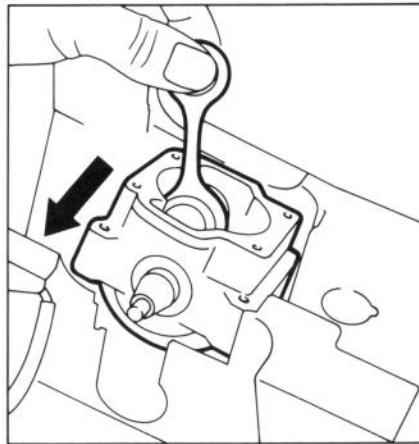
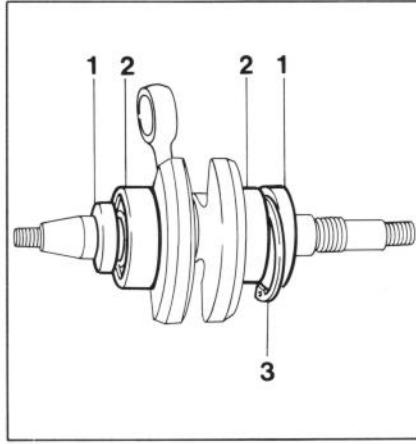
Top:  
Removing the bottom of the crankcase

Below:  
Removing the crankshaft



Top:  
1 = Oil seal  
2 = Ball bearing  
3 = Circlip

Bottom:  
1 = Crankshaft  
2 = Connecting rod

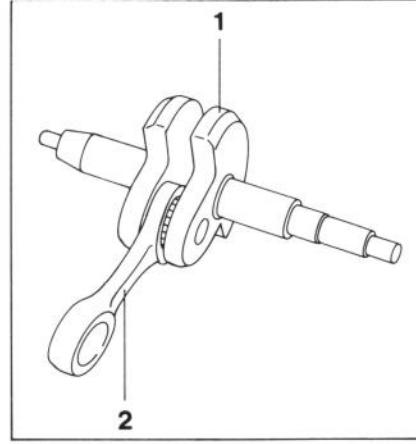


- Remove the crankcase mounting screws.
- Remove the crankcase from the engine housing.

- Remove bottom of crankcase.
- Remove crankshaft from crankcase.
- Remove oil seals, circlip, and ball bearings from crankshaft.

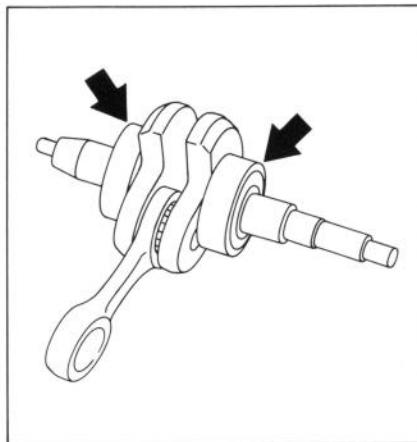
- The crankshaft, connecting rod and needle bearing form an inseparable unit. This means that the crankshaft must always be replaced as a complete unit in the event of any damage to any one of these parts. When fitting a replacement crankshaft always install new oil seals and ball bearings.

- Inspect both halves of the crankcase for cracks and replace if necessary.



## 5.4.2 Installing the Crankshaft

Ball Bearing



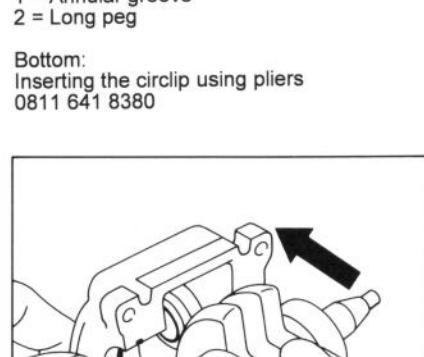
If the old crankcase and bottom of the crankcase are to be reused, remove gasket residue and clean sealing surfaces with standard commercial grease solvent without chlorinated or halogenated hydrocarbons, see 11.2. Sealing surfaces must be absolutely clean to ensure a perfect seal.

- Warm new ball bearing to a temperature of approx. 50 °C and press in as far as stop on crankshaft stub.

- Position crankshaft so that long pin lies on side with surrounding groove.

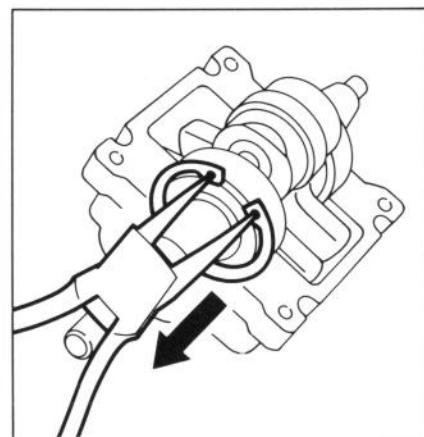
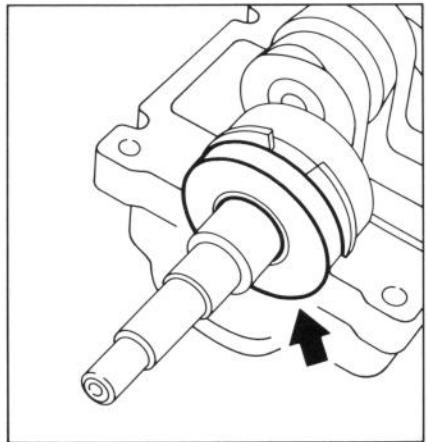
Top:  
Installing the crankshaft  
1 = Annular groove  
2 = Long peg

Bottom:  
Inserting the circlip using pliers  
0811 641 8380



Top:  
Oil seal (clutch side)

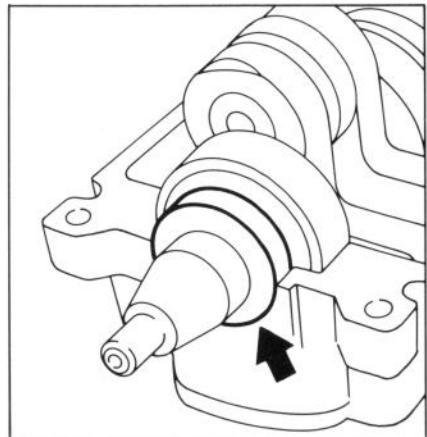
Bottom:  
Oil seal (ignition side)



- Fit circlip into groove of crankcase.

- Fill space between sealing lip and dust lip with lubricating grease, see 11.2.

- Apply a thin coating of sealant to the outer circumference of the oil seal, see 11.2.



- Slide the oil seal onto the crankshaft stub so that the open side faces the ball bearing.

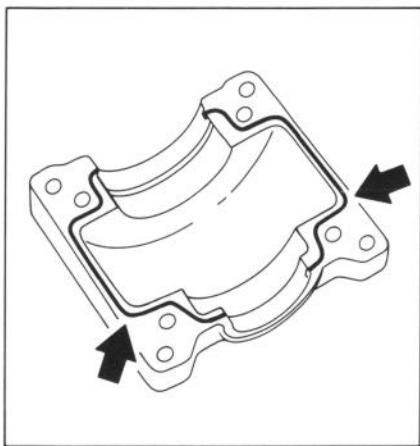
- Press the oil seals into the crankcase until they are flush with the outer edge.

## 5.5 Leakage Testing the Crankcase

**Top:**  
Carburetor and crankcase tester  
1106 850 2905

**Bottom:**  
Vacuum pump 0000 850 3500

Groove in bottom of crankcase



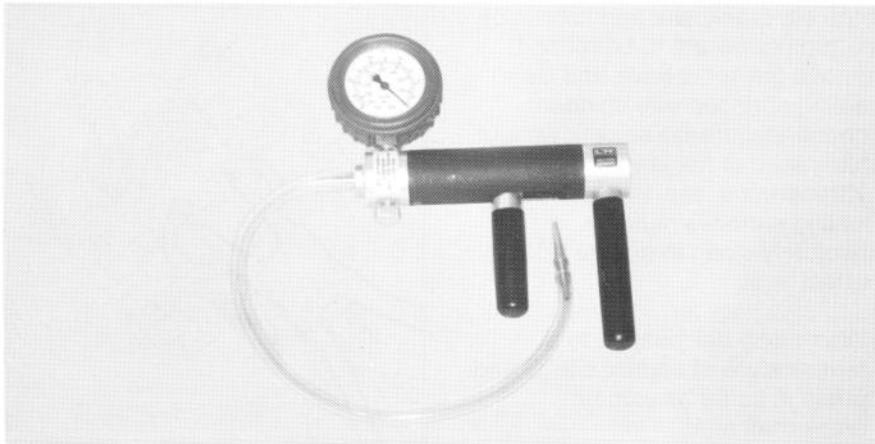
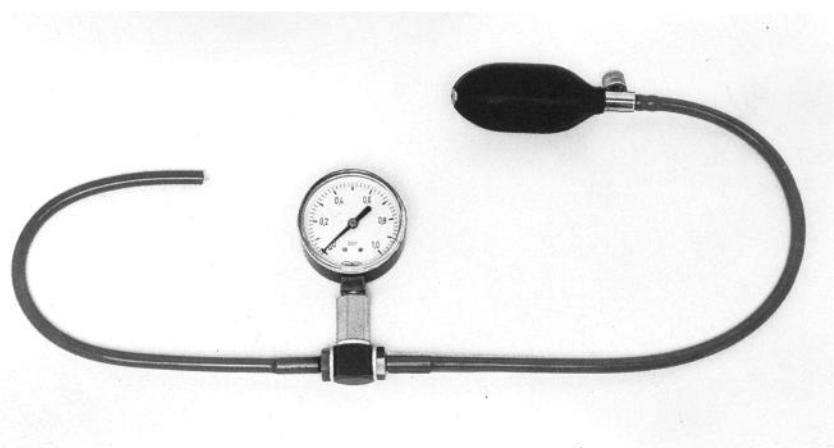
- Apply a thin bead of sealant to groove in bottom of crankcase, see 11.2.

**Note:** Please follow the manufacturer's instructions for using the sealant.

- Fit and press on the bottom of the crankcase.
- Wait approximately one minute, then turn over crankshaft several times.

Installation continues in reverse order of removal.

**Note:** Tighten crankcase mounting screws to 10 Nm.



Defective oil seals and gaskets or cracks in the castings are the usual causes of leaks. Such faults allow supplementary air to enter the engine and thus upset the fuel-air mixture.

This makes adjustment of the prescribed idle speed difficult, if not impossible.

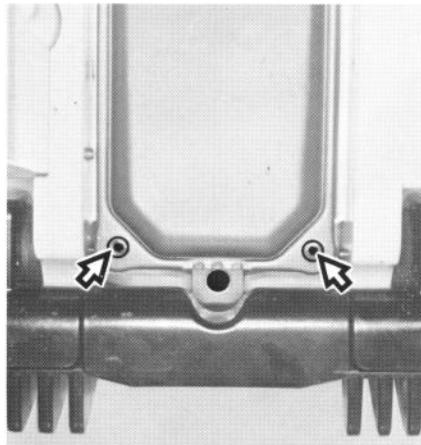
Moreover, the transition from idle speed to part or full throttle is not smooth.

The crankcase can be checked thoroughly for leaks with the carburetor and crankcase tester and the vacuum pump.

## 5.5.1 Preparations

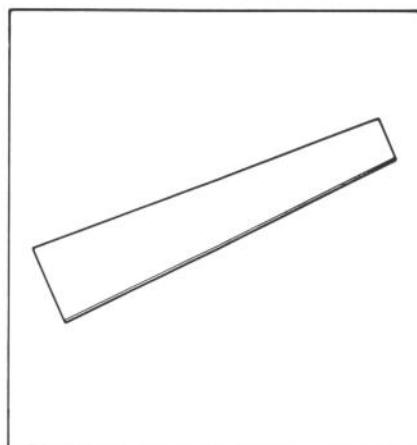
Top:  
Outer mounting screws  
of exhaust muffler

Bottom:  
Inner mounting screws  
of exhaust muffler



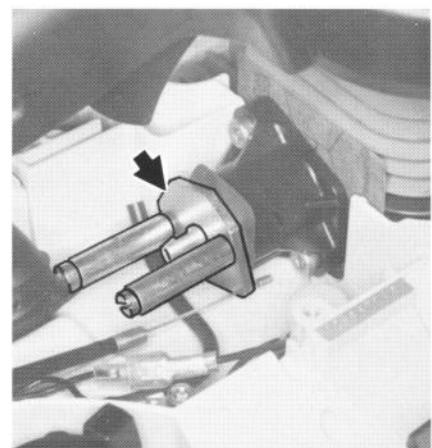
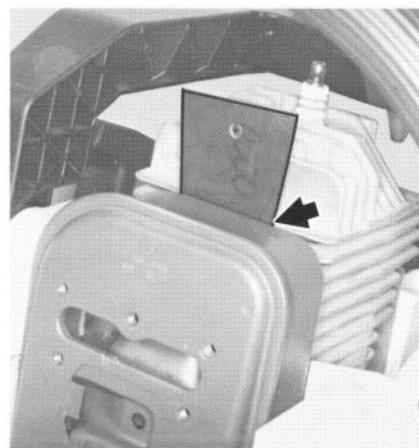
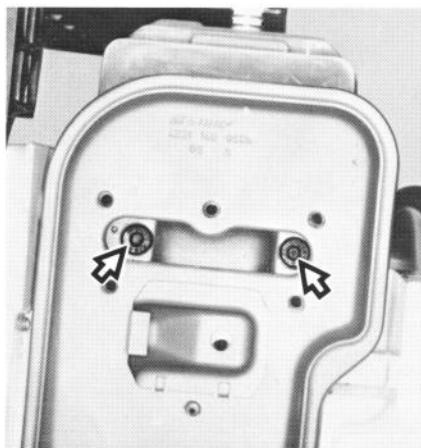
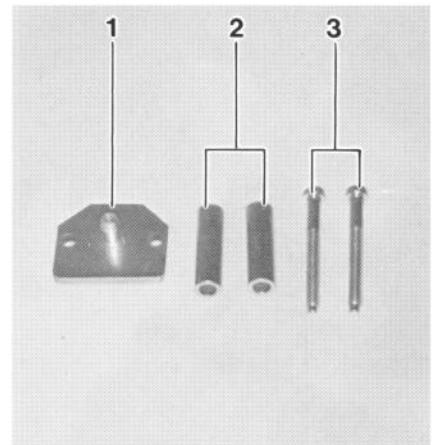
Top:  
Sealing plate 0000 855 8106

Bottom:  
Sealing plate fitted



Top:  
1 = Test flange 1119 850 4201  
2 = Bushings 0000 963 20008  
3 = Screws 9043 319 8100

Bottom:  
Test flange fitted



- Remove the carburetor, see 10.3.
- Remove the deflector baffle from the muffler, then remove the spark arresting screen, see 5.1.
- Remove the outer mounting screws from the muffler.
- Back off the muffler's inner mounting screws half-way.

- Slide the sealing plate between the muffler and the cylinder exhaust port and retighten the inner mounting screws moderately.

**Note:** The sealing plate must completely fill the space between the two mounting screws.

- Set the piston to top dead center (T.D.C.).

- Attach the test flange with bushings and screws to the spacer flange for leakage testing.

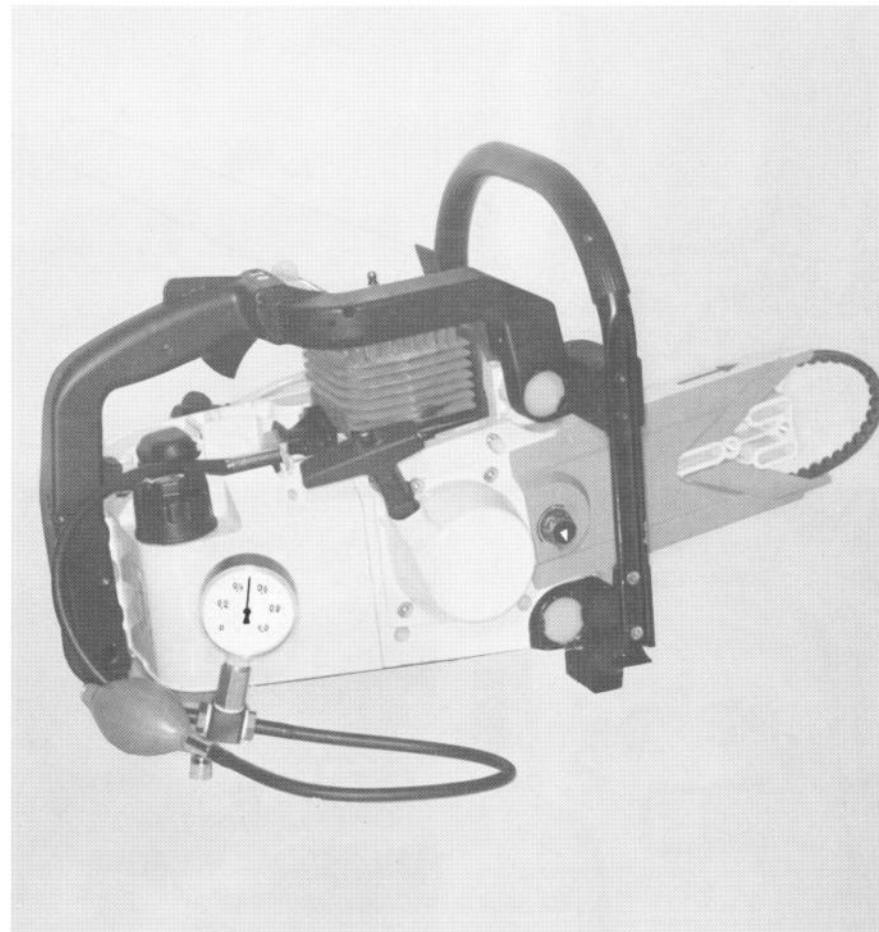
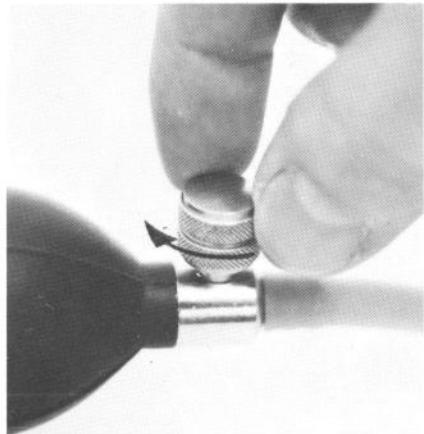
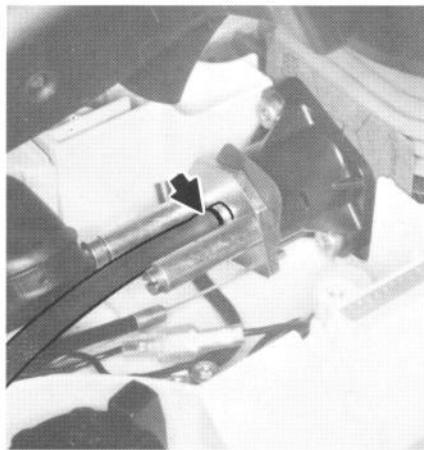
**Important!** A new carburetor gasket must be installed between the test flange and the spacer flange.

## 5.5.2 Pressure Test

**Top:**  
Tester's pressure hose fitted  
on test flange nipple

**Bottom:**  
Closing the vent screw

Pressure testing the crankcase



- Connect tester's pressure hose to nipple on test flange.
- Close the vent screw on the rubber bulb.
- Use rubber bulb to pump air into the crankcase until the gauge indicates a pressure of 0.5 bar. If this pressure remains constant for at least 20 seconds, the crankcase is airtight.

However, if the indicated pressure drops, the leak must be located and the faulty part replaced.

**Note:** To find a leak, coat the suspect area with oil and pressurize the crankcase again. Bubbles will appear if a leak exists.

- Carry out the vacuum test, see 5.5.3.
- After finishing the test, open the vent screw and disconnect the hose.

- Remove the test flange and refit the carburetor, see 10.3.

- Loosen mounting screws on exhaust muffler and pull out sealing plate.

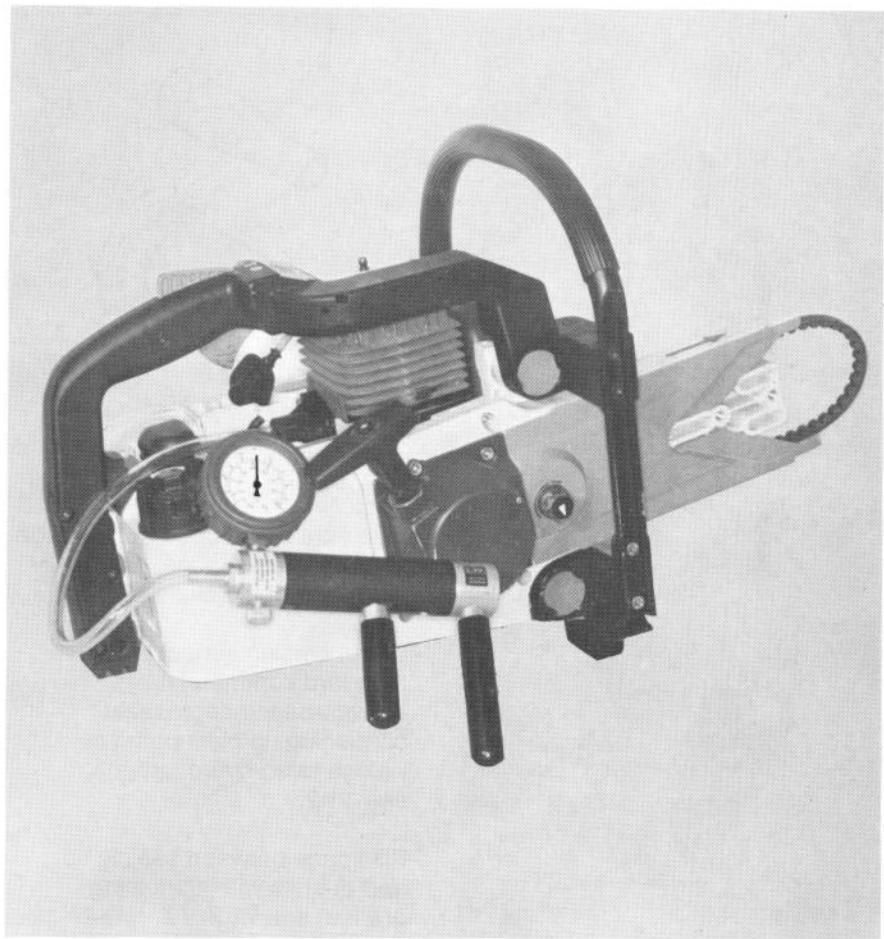
- Insert outer mounting screws and lock washers and tighten all mounting screws to 10.0 Nm.

### 5.5.3 Vacuum Test

1 = Lever  
2 = Vent screw



Testing crankcase for leaks with vacuum pump



Oil seals tend to fail when subjected to a vacuum, i.e. the sealing lip lifts away from the crankshaft during the piston's induction stroke because there is no internal counterpressure.

An additional test can be carried out with the vacuum pump to detect this kind of fault. The preparations for this test are the same as for the pressure test, see 5.5.1.

- Connect the vacuum pump's suction hose to test flange nipple.
- Close the pump pistons vent screw.
- Pull out the pump piston several times until the gauge indicates a vacuum of 0.5 bar.

**Note:** If the pressure remains constant or rises to no more than 0.5 bar, within 20 seconds, it can be assumed that the oil seals are in good condition.

However, if the pressure continues to rise (reduced vacuum in the crankcase), the oil seals must be replaced, even if no leaks were detected in the pressure test.

- Upon completion of test, open vent screw again and remove hose.

- Remove test flange and reinstall carburetor, see 10.3.

- Loosen mounting screws on exhaust muffler and pull out sealing plate.

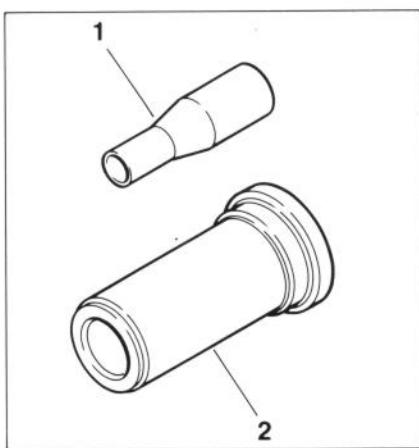
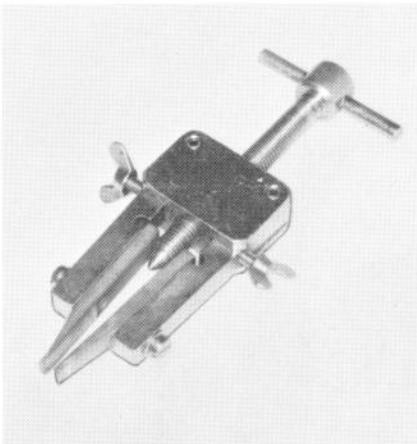
- Insert outer mounting screws with lock washers and tighten all mounting screws to 10.0 Nm.

## 5.6 Replacing the Oil Seals

**Top:**  
Puller 0000 890 4400 with jaws  
0000 893 3711 (with profile 6)

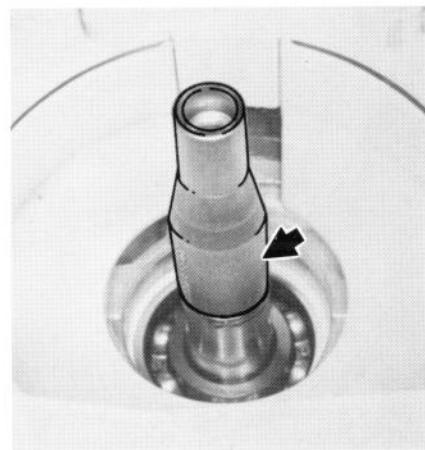
**Bottom:**  
Pulling out oil seal

1 = Assembly sleeve 1122 893 4600  
2 = Press sleeve 1127 893 2400



**Top:**  
Assembly bushing on the crankshaft stub

**Bottom:**  
Pressing in the oil seal with press sleeve



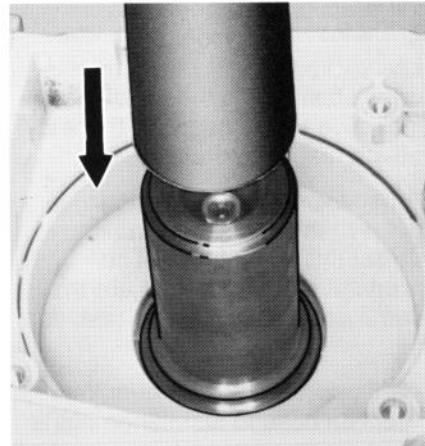
**Note:** When using the puller, make sure that it does not damage the crankshaft surface, especially in the area of the oil seal.

- Clean sealing surfaces with standard commercial, solvent-based degreasant containing no chlorinated or halogenated hydrocarbons, see 11.2.
- Fill space between sealing lip and dust lip with lubricating grease, see 11.2.
- Apply a thin coating of sealant to the outer circumference of the oil seal, see 11.2.
- Slide the assembly bushing onto the crankshaft stub.

It is not necessary to disassemble the complete engine if only the oil seals have to be replaced.

### Clutch side:

- Remove the clutch, see 4.1.
- Apply the puller and pull out the oil seal.

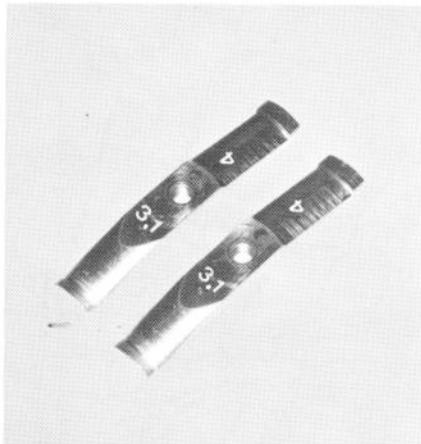


- Slide oil seal over assembly bushing with open side facing crankcase and press it in with press sleeve.
- Wait approx. one minute, then turn over crankshaft several times.
- Remove assembly bushings.
- Install clutch, see 4.2.

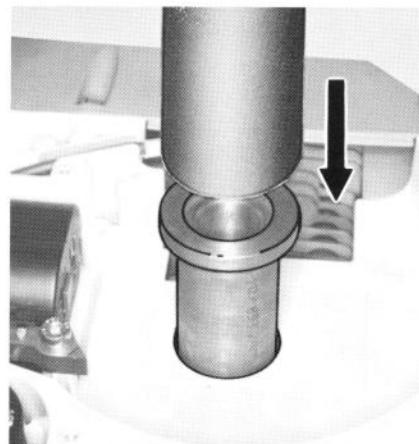
## 5.7 Engine Removal and Installation

Top:  
Jaws 0000 893 3706  
(with profile 3.1 and 4)

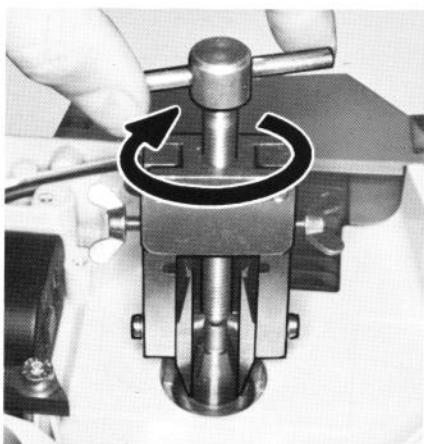
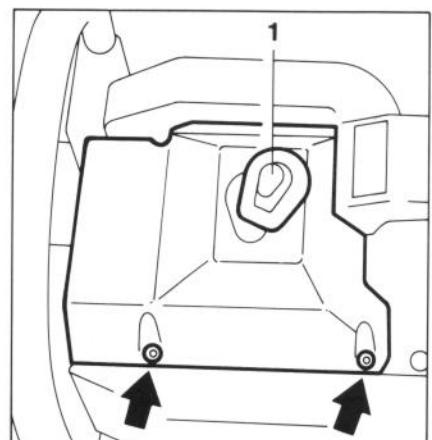
Bottom:  
Removing the oil seal



Pressing in the oil seal  
with press sleeve



Shroud mounting screws (the two screws on the right side are hidden)  
1 = Spark plug terminal



**Note:** When using the puller, make sure that it does not damage the crankshaft surface, especially in the area of the oil seal.

- Clean sealing surface with standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons, see 11.2.
- Fill space between sealing lip and dust lip with lubricating grease, see 11.2.
- Apply a thin coating of sealant to outer circumference of oil seal, see 11.2
- Slide oil seal over crankshaft stub with open side facing crankcase and press it in with the press sleeve.
- Wait approximately one minute, then turn over crankshaft several times.
- Install flywheel, see 6.1.5.

### Ignition side:

- Remove flywheel, see 6.1.5.
- Install jaws with profile 3.1 at the puller.
- Attach the puller and pull out the oil seal.

The engine can be removed from the engine housing without having to remove the carburetor and muffler.

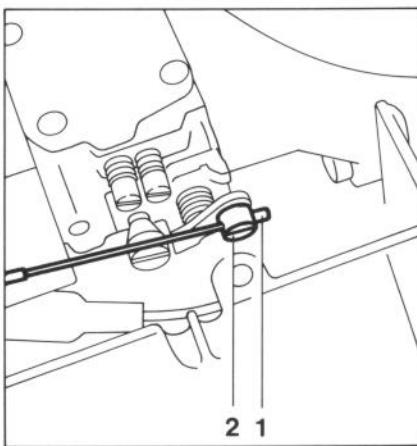
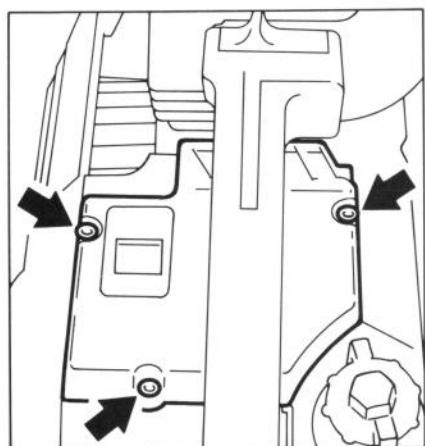
- Remove V-belt, see 3.3.
- Unplug spark plug terminal from spark plug.
- Remove hood mounting screws. Remove hood, press spark plug terminal out of the hood opening.

Top:  
Carburetor box cover  
mounting screws

Bottom:  
Withdrawing the grommet

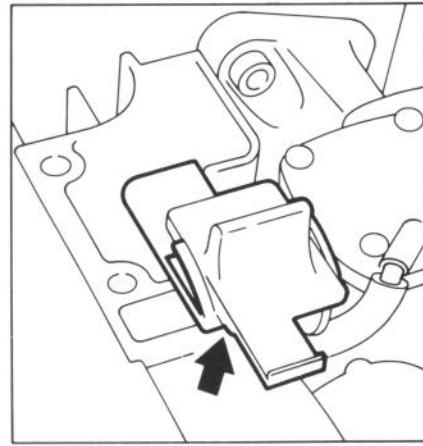
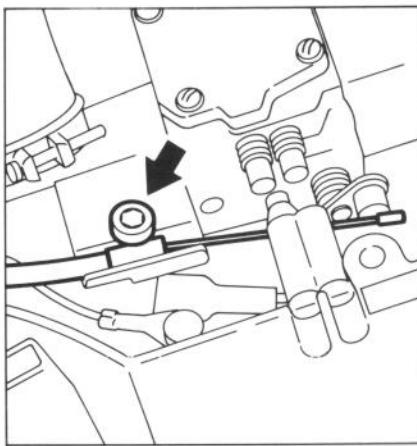
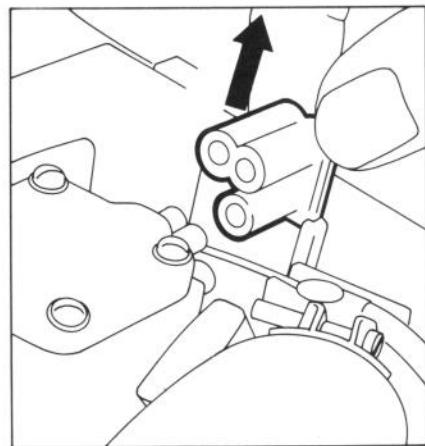
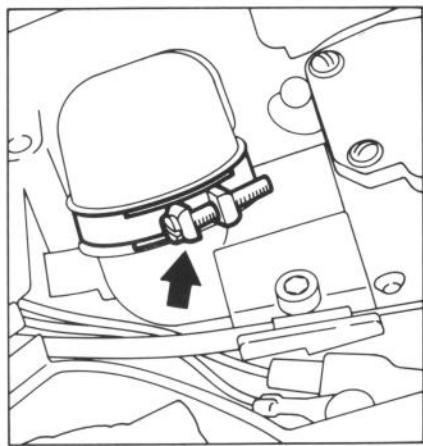
Top:  
1 = Nipple of throttle cable  
2 = Slotted pin

Bottom:  
Throttle cable  
mounting screw



Top:  
Manifold clamp

Bottom:  
Choke shutter



- Remove carburetor box cover mounting screws, remove carburetor box cover.
- Withdraw grommet from mounting in engine housing.

- Disconnect nipple of throttle cable from slotted pin on throttle lever.
- Remove throttle cable mounting screw and press throttle cable out of the machine sideways.

- Loosen screw of manifold clamp and pull manifold off of connector.
- Remove choke shutter from its mounting in engine housing.

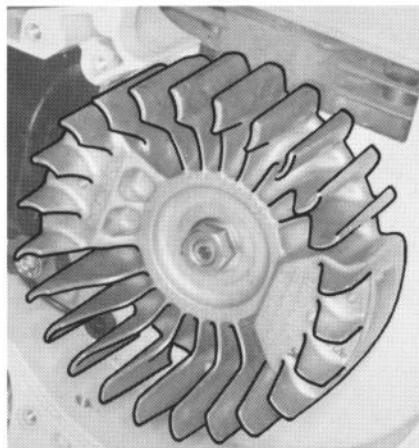
Top:  
Compensator hose

Bottom:  
Outer muffler  
mounting screws



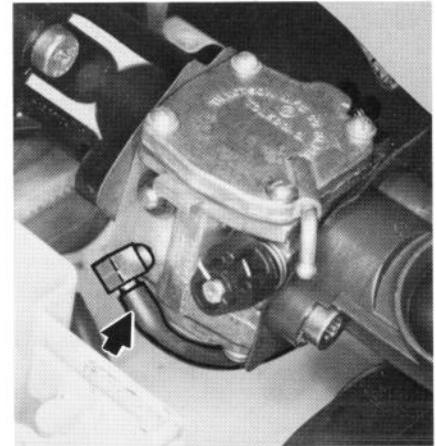
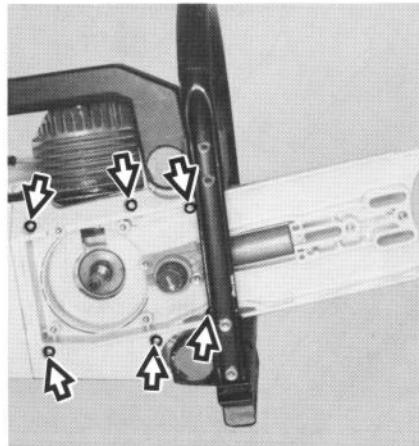
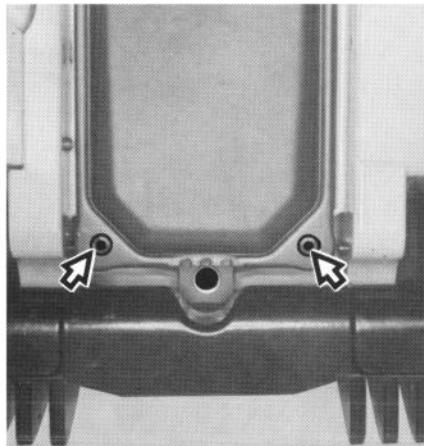
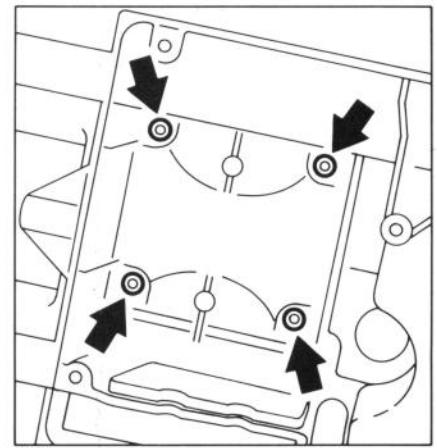
Top:  
Flywheel

Bottom:  
Connecting piece  
mounting screws



Top:  
Crankcase  
mounting screws

Bottom:  
Fuel hose



- Pull compensator hose off of angle connector.
- Remove outer muffler mounting screws.

- Remove flywheel, see 6.1.5.
- Remove clutch, see 4.1.
- Unscrew connecting piece mounting screws, remove connecting piece.

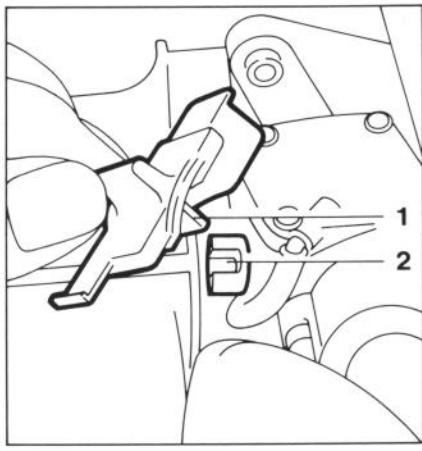
- Remove expansion tank, see 10.9.
- Remove crankcase mounting screws.
- Lift engine slightly and pull fuel hose off of angle connector.

## 5.8 Engine Housing

Removing the engine

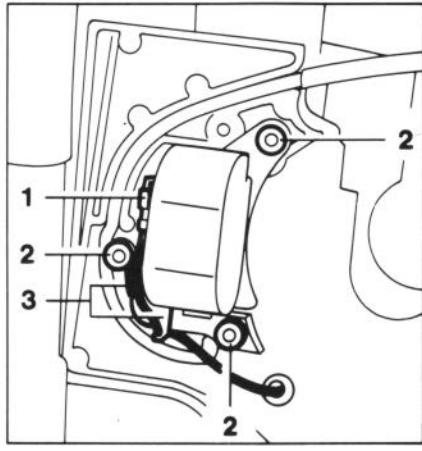
Top:  
1 = Peg  
2 = Choke lever

Bottom:  
Removing the spark  
plug terminal



Top:  
1 = Short circuit wire  
2 = Mounting screws  
3 = Wire holder

Bottom:  
Removing the ignition module  
1 = Mount for ignition lead



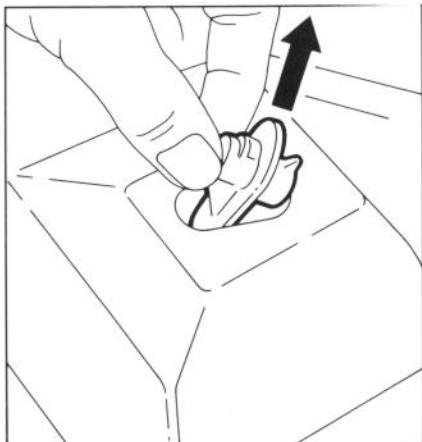
- Lift engine out of engine housing.

The parts are assembled in reverse order.

**Note:** Tighten crankcase mounting screws to 10 Nm.

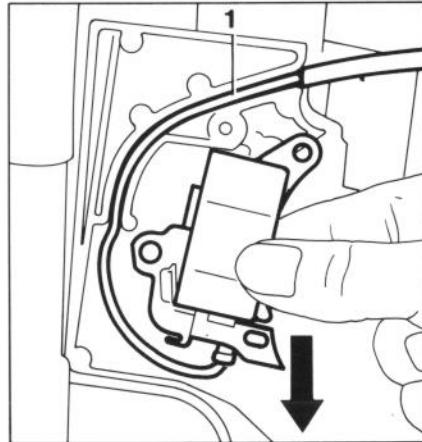
Tighten mounting screws for connecting piece to 10 Nm.

Tighten outer mounting screws of muffler to 10 Nm



Fit choke shutter so that pin  
engages choke lever.

Pull spark plug terminal out of  
shroud opening before mounting  
shroud.



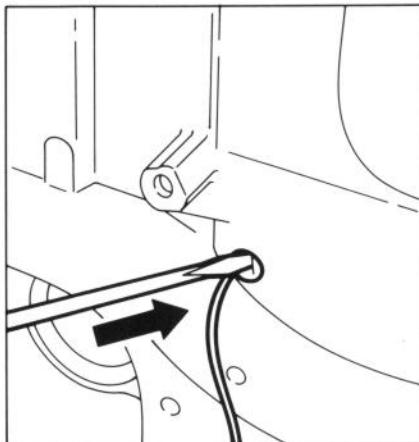
- Remove engine, see 5.7.

- Disconnect short circuit wire from  
connector on ignition module and  
withdraw from wire holder.

- Remove ignition module  
mounting screws. Remove  
ignition module, disconnect  
ignition lead from mounting.

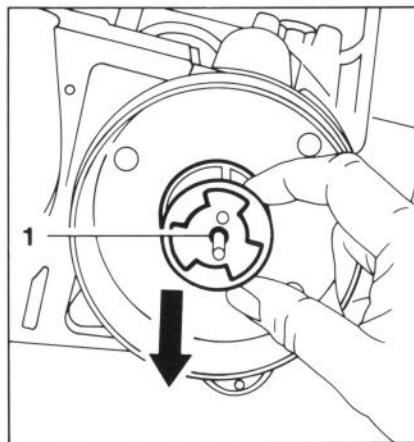
Top:  
Pressing out the grommet

Bottom:  
Main filter



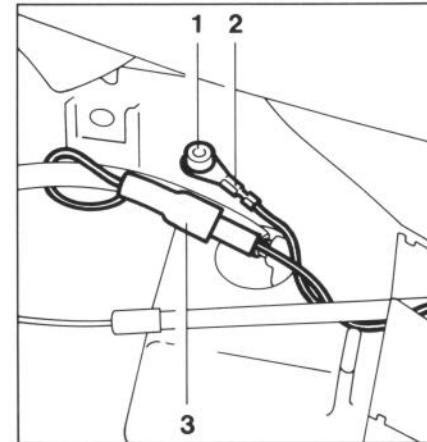
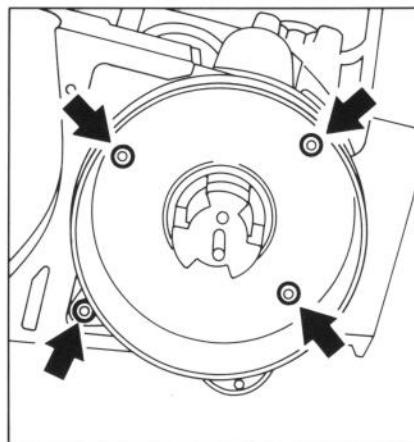
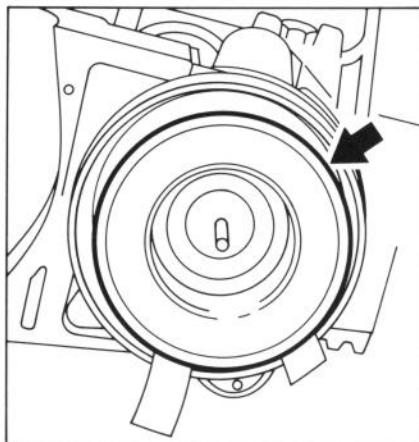
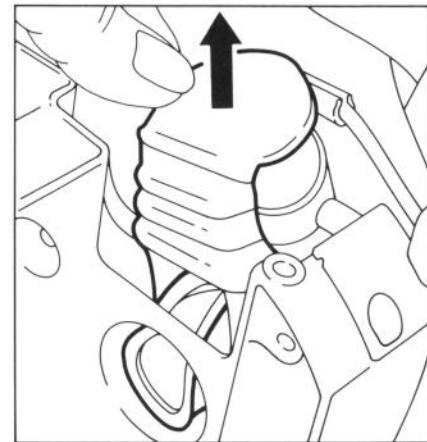
Top:  
Removing the auxiliary filter  
1 = O-ring

Bottom:  
Filter base  
mounting screws



Top:  
Removing the manifold

Bottom:  
1 = Mounting screw  
2 = Ground wire  
3 = Point of separation of short circuit wire



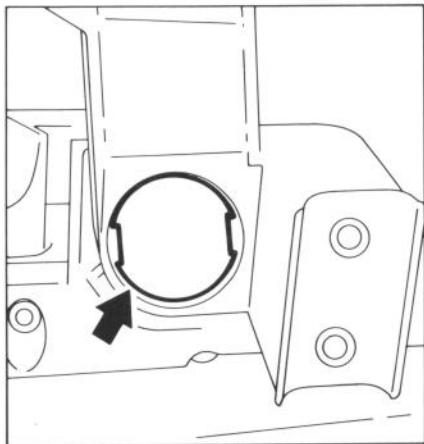
- Remove handle tube bracket, see 9.6.
- Press grommet for short circuit wire out of engine housing and pull out short circuit wire.
- Remove filter cover.
- Remove main filter and prefilter from filter base.

- Remove auxiliary filter from fitting.
- Remove O-ring from locating pin.
- Remove filter base mounting screws, remove filter base.

- Remove manifold from engine housing.
- Unscrew mounting screw of ground wire.
- Pull short circuit wire apart at point of separation.

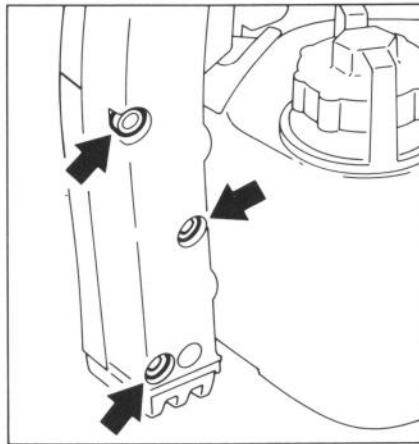
Top:  
Plug

Bottom:  
Annular buffer  
mounting screw



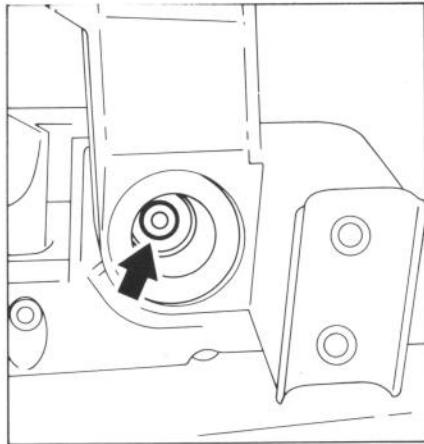
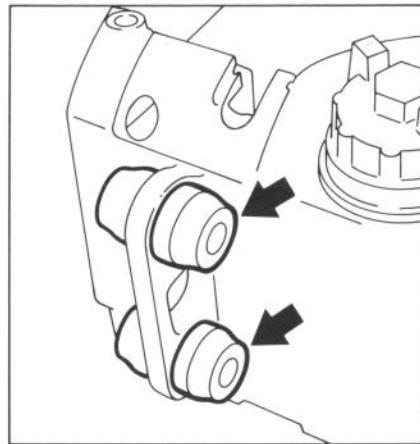
Top:  
AV-molding mounting screws

Bottom:  
AV-molding removal

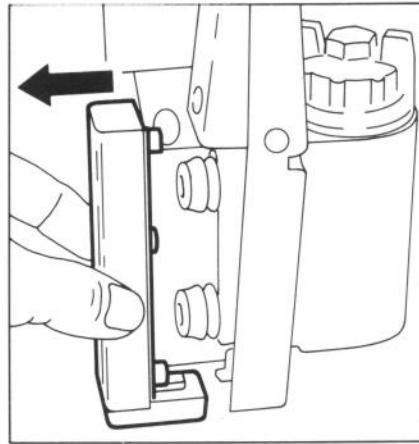


Top:  
Annular buffer

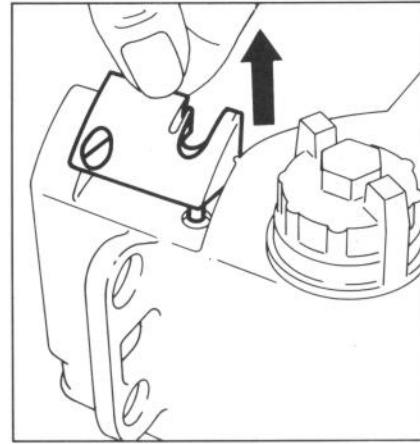
Bottom:  
Removing the  
connecting piece



- Remove plug from annular buffer.
- Unscrew annular buffer mounting screw and remove together with thrust plate.



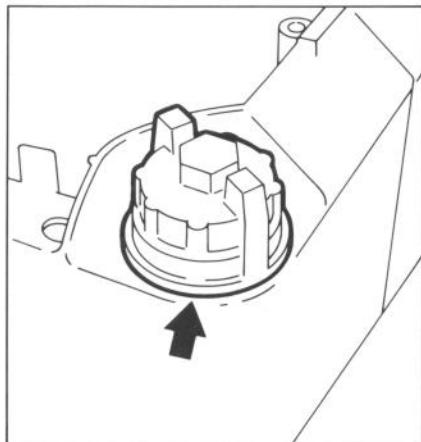
- Unscrew AV-molding mounting screws.
- Remove AV-molding and handle grip.



- Remove plugs from annular buffers.
- Remove annular buffers from mountings in engine housing.
- Pull connecting piece out of engine housing.

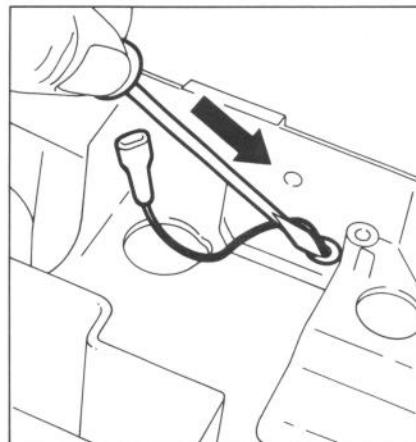
Top:  
Filler cap

Bottom:  
Fuel hose

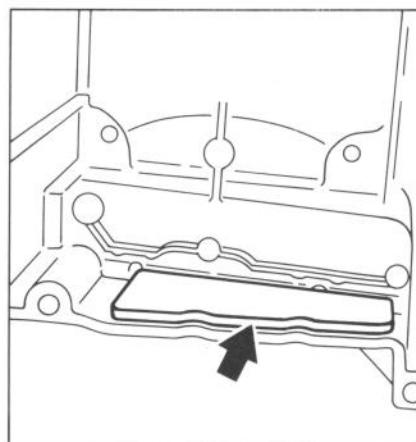
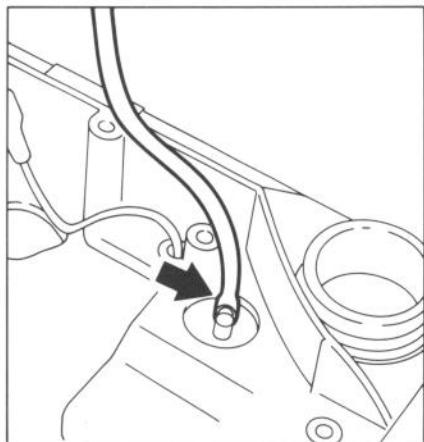
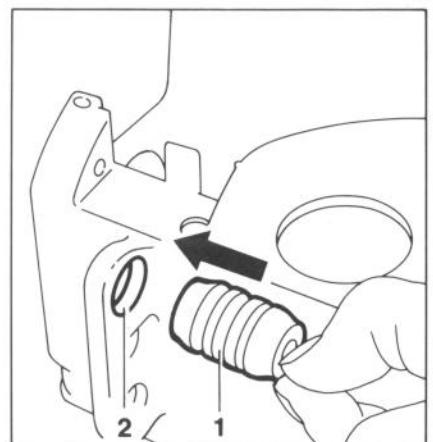


Top:  
Pressing out the grommet

Bottom:  
Washer



Inserting the annular buffer  
1 = Middle groove  
2 = Housing rib



- Unscrew filler cap and pull ring out of filler opening.
- Pry fuel hose off of nipple and pull fuel tank out of engine housing.

- Press grommet out of engine housing and pull out short circuit lead.
- Remove washer from engine housing.

The parts are assembled in reverse order.

**Note:** When using a new engine housing, stamp the machine number on the number plate of the engine housing using 2.5 mm high figure stamps.

Glue the new surface to the engine housing.

Press in the annular buffer until the center nut engages the housing rib.

Press plugs into annular buffers.

Tighten connecting piece mounting screws to 10 Nm.

Run short circuit lead correctly between fuel tank and expansion tank, see 6.1.4.

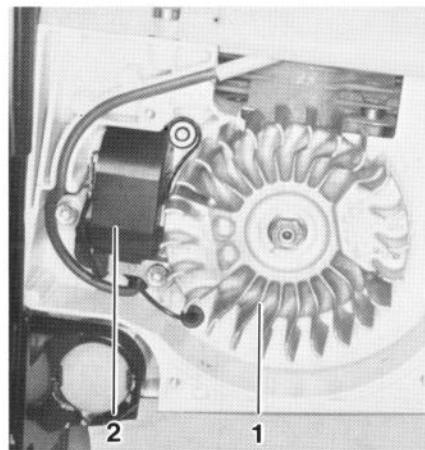
**Caution:** Do not insert connecting piece until tank has been mounted.

Tighten mounting screws of annular buffer on handle grip and AV-molding to 8.0 Nm and 3.0 Nm respectively.

## 6. IGNITION SYSTEM

**Warning:** Exercise extreme caution when carrying out maintenance and repair work on the ignition system. The high voltages which occur can cause serious or even fatal accidents!

1 = Flywheel  
2 = Ignition module



The electronic (breakerless) ignition system basically consists of an ignition module and flywheel and is easily accessible.

### 6.1 Repairing Component Parts

#### 6.1.1 Spark Plug

Top:  
Checking the electrode gap with feeler gauge

Bottom:  
Resetting electrode gap with Bosch spark plug gauge

Troubleshooting on the ignition system should always begin at the spark plug.

In the event of starting difficulties, low engine power, misfiring, etc., unscrew the spark plug and check that it is the approved type. Only the spark plugs listed in the specifications may be used. Other makes of spark plugs are unsuitable because they have long-reach electrodes.



Sooted or carbonized spark plug:

- Use brass wire brush to clean the spark plug and then blow it clear with compressed air.

**Note:** Never use a steel wire brush for this job.

Spark plug with smeared oil:

- Wash the insulator nose with a grease solvent and blow it clear with compressed air.



Electrode gap:

Electrode gap becomes wider as a result of normal erosion.

- Check the electrode gap at regular intervals with a feeler gauge. It should be 0.5 mm.

- Bend the ground electrode as necessary.

**Important:** Always fit a new spark plug if the electrodes are badly eroded.

### Checking the spark plug:

Accurate checking of the spark plug is only possible with a special spark plug tester.

A provisional check can be carried out by fitting a clean spark plug in the spark plug terminal and holding it against ground. There should be a powerful sparkover at the electrodes when you crank the engine with the starter rope.

**Warning:** Do not touch any live parts - contact with high voltage can cause serious or fatal accidents.

**Note:** It is recommended that a new spark plug be fitted in all cases of doubt.

If there is no sparkover even though the spark plug is in good condition, first check the connections.

**Note:** Chafed insulation on the ignition lead or short circuit wire will cause a short circuit to ground. In this case the engine will either not start or only run erratically.

### Installing the spark plugs:

- Clean the spark plug seat and inspect the sealing ring to make sure it is in good condition.

Fit the spark plug and tighten it to 27.5 Nm.

The appearance of the spark plugs insulator nose gives valuable information with regard to the effects of various operating conditions:

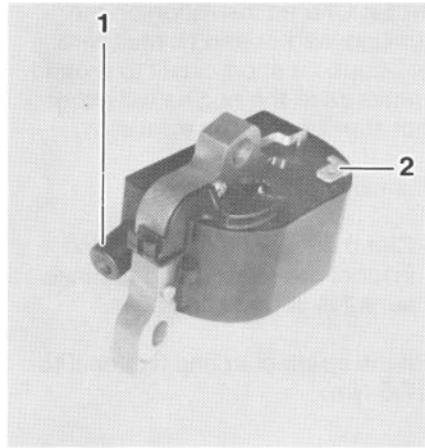
Condition of insulator nose	Meaning
<b>Normal:</b>	Grayish yellow to brown, dry Engine in order; correct spark plug (heat range as specified)
<b>Sooted:</b>	Velvet-like, dull black coating of soot Mixture too rich, lack of air (dirty air filter, choke shutter partly closed), electrode gap too wide, wrong spark plug (heat range too high)
<b>Smeared with oil:</b>	Coating of damp oil carbon and soot Too much oil in fuel mix
<b>Overheated:</b>	Welding beads on insulator nose, pitted electrodes Mixture too lean, spark plug loose, wrong spark plug (heat range too low)

## 6.1.2 Ignition Module

## 6.1.2.1 Ignition Timing

## 6.1.2.2 Removing and Installing

1 = High voltage output  
2 = Connector tag



Ignition timing on the electronic (breakerless) magneto ignition system is fixed at 3.0 mm B.T.D.C. at 8,000 r.p.m. and is not adjustable. However, in view of the permissible tolerances in the electronic circuit, it may vary between 2.8 and 3.2 mm B.T.D.C. at 8,000 r.p.m.

Since there is no mechanical wear in these systems, ignition timing cannot get out of adjustment.

However, an internal fault in the circuit can alter the switching point in such a way that a spark test will still show the system to be in order although timing is outside the permissible tolerance. This will impair engine starting and running behavior.

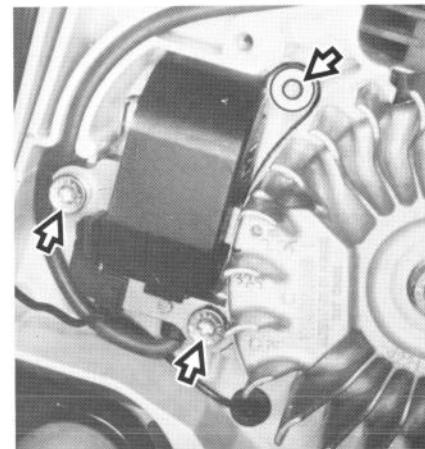
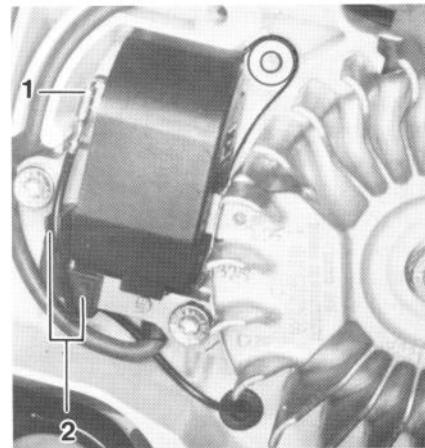
The ignition module accommodates all the components required to control ignition timing. There are two electrical connections on the coil body:

1. the high voltage output
2. the connector tag for the short circuit wire

Accurate testing of the ignition module is only possible with sophisticated test equipment. For this reason it is only necessary to carry out a spark test in the workshop. A new ignition module must be installed if no ignition spark is obtained (after checking that wiring and stop switch are in good condition).

Top:  
1 = Short circuit wire  
1 = Wire retainer

Bottom:  
Ignition module mounting screws

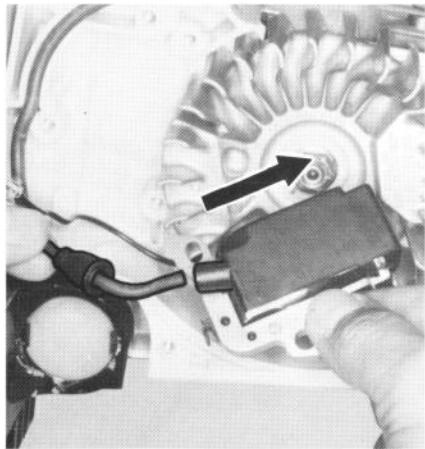


- Remove the fan cover, see 6.1.5.
- Pull the short circuit wire off the ignition module and out of the retainer.
- Remove the ignition module mounting screws.

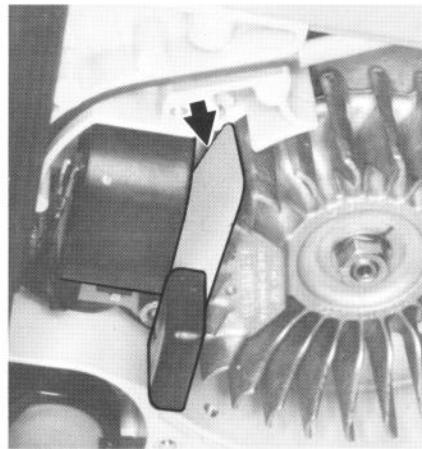
### 6.1.3 Ignition Lead/ Spark Plug Terminal

**Top:**  
Removing the unscrewed  
ignition lead from the high  
voltage outlet

**Bottom:**  
Removing the wire holder

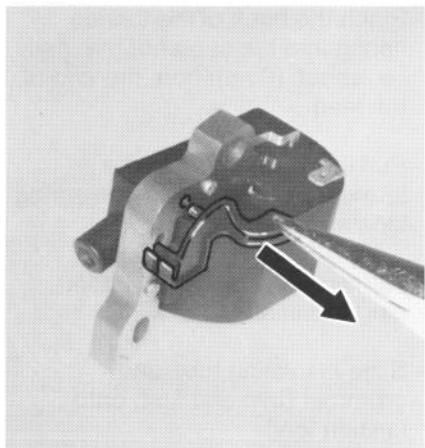
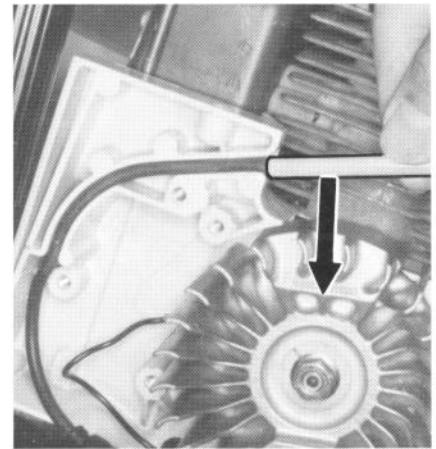


Adjusting gauge 1111 890 6400 positioned  
between the flywheel and the ignition module



**Top:**  
Removal of the ignition lead

**Bottom:**  
1 = Insulating tube  
2 = Grommet



- Remove grommet from high voltage output.
- Unscrew ignition lead from contact pin; to this end, turn ignition module and pull ignition lead out of high voltage output.
- If necessary, press out the pegs of the wire holder and remove the wire holder.

**Note:** Before screwing in the ignition lead, fill the high voltage output with STIHL Multipurpose Grease, see 11.2.

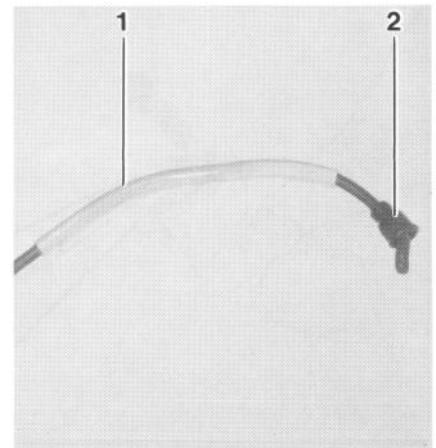
**Caution:** Do not use graphite (Molykote) grease or silicon insulating paste.

- Slide grommet over the high voltage output.
- Fit ignition module and slightly tighten screws.

**Important:** There must be a washer under the head of each screw.

- Slide adjusting gauge between legs of ignition module and magnet poles of flywheel.
- Press ignition module against adjusting gauge, tighten mounting screws to 8.0 Nm.

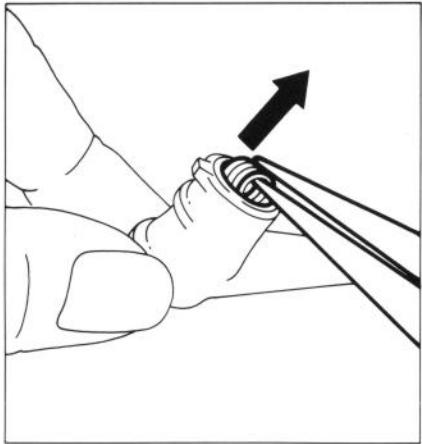
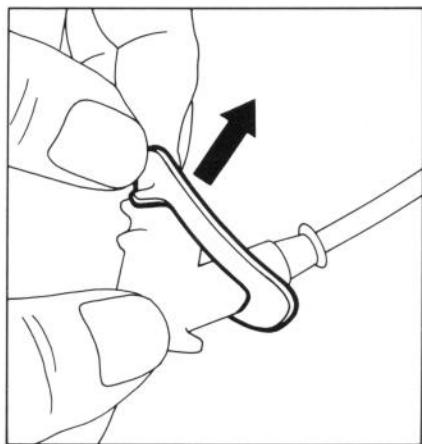
Further assembly is carried out in reverse order.



- Remove shroud, see 6.1.5.
- Remove ignition module, see 6.1.2.2.
- Pull ignition lead out of mounting in engine housing.
- Remove grommet and insulating tube from ignition lead.

Top:  
Removing the dust seal

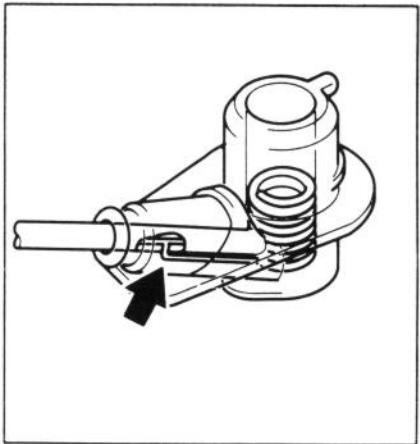
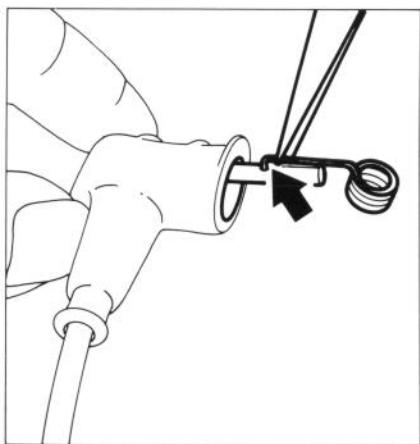
Bottom:  
Removing the torsion spring  
from the spark plug terminal



- Pull the dust seal off the spark plug terminal and slip it down and off the ignition lead.
- Use a suitable pair of pliers to grip the torsion spring and pull it out of the spark plug terminal.
- Unhook the torsion spring from the ignition lead and slip the spark plug terminal off the lead.

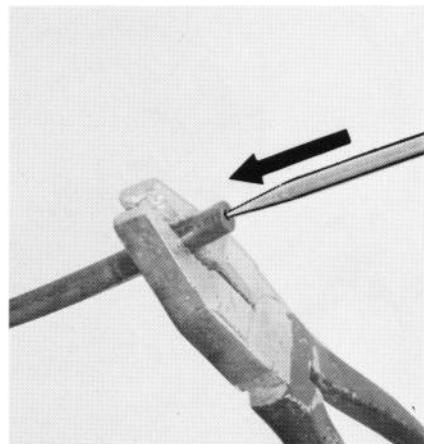
Top:  
Attaching the torsion spring

Bottom:  
Proper positioning of the torsion spring  
in the seat of the spark plug terminal



- Cut new ignition lead to length (see parts list or cut to same length as old lead).
- Coat end of the ignition lead (about 20 mm) with oil.
- Fit spark plug terminal over the ignition lead.
- Use suitable pliers to grip the end of the ignition lead inside the spark plug terminal and pull it out.

Piercing center  
of ignition lead



- Pinch the hook of the torsion spring into the center of the lead, i.e. about 10 mm from the end of the lead.
- Pull the lead back into the terminal so that the torsion spring locates properly inside it.
- Fit the dust seal on the spark plug terminal.
- Slide insulating tube and grommet (thin end first) onto ignition lead.

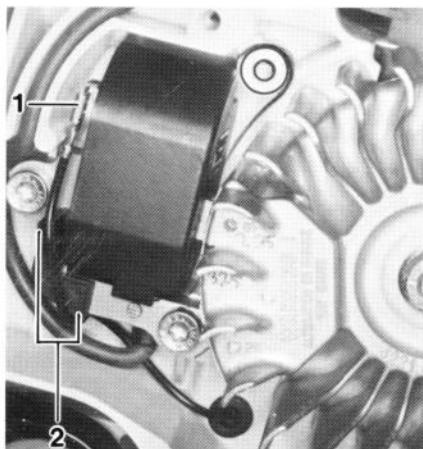
**Note:** Use a pointed tool to pierce the center of the other end of the ignition lead which screws onto the module.

- Mount ignition module, see 6.1.2.2.
- Remove shroud, see 6.1.5.

### 6.1.4 Short Circuit Wire / Ground Wire

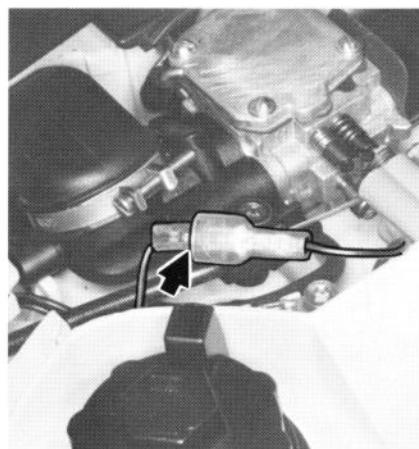
**Top:**  
1 = Short circuit wire  
2 = Wire holder

**Bottom:**  
Grommet



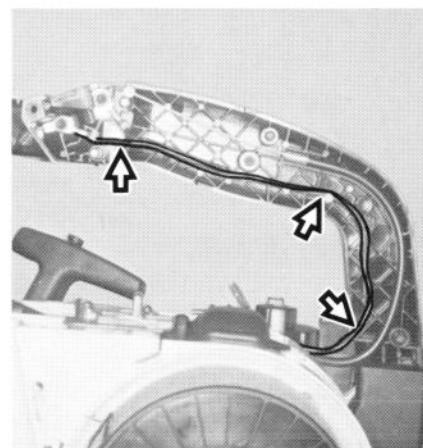
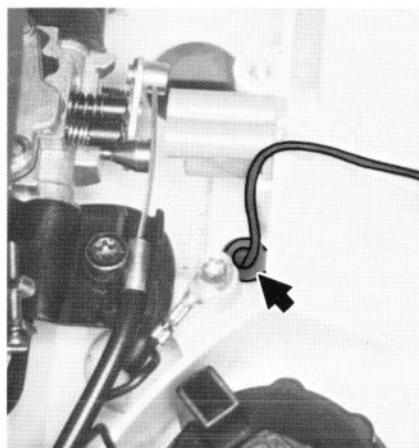
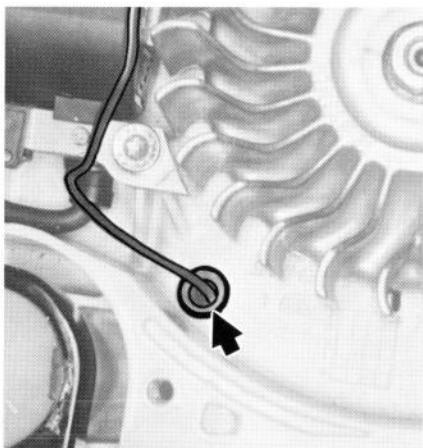
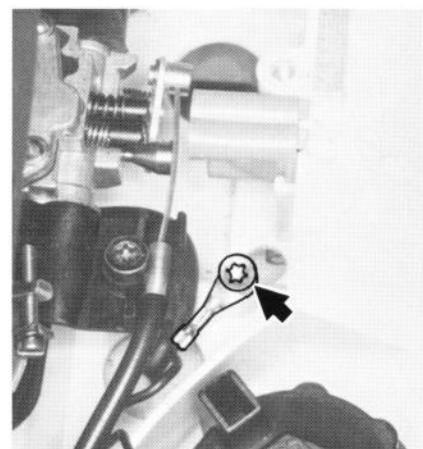
**Top:**  
Separating point of short circuit wire

**Bottom:**  
Grommet



**Top:**  
Ground wire  
Mounting screw

**Bottom:**  
Properly positioned short circuit wire and ground wire



- Remove fan housing, see 6.1.5.
- Remove expansion tank, see 10.9.
- Remove short circuit wire from connection on ignition module and pull wire out of wire holder.
- Press grommet out of engine housing and pull out short circuit wire.

- Pull short circuit wire apart at separation point in carburetor box.
- Pull grommet out of engine housing and remove short circuit wire.
- Unscrew ground wire mounting screw in carburetor chamber.
- Remove fuel tank, see 10.8.

- Remove contact springs, see 9.3.
- Remove short circuit wire and ground wire from handle grip.

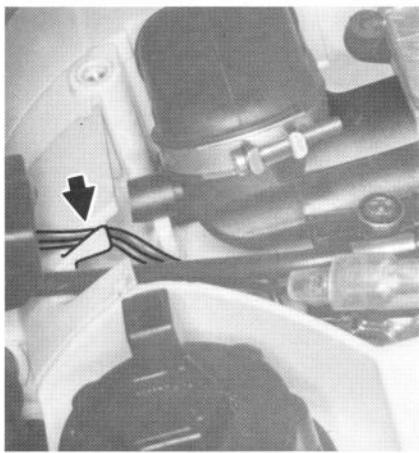
The parts are assembled in reverse order.

**Note:** Position both wires in the handle grip correctly.

### 6.1.5 Flywheel

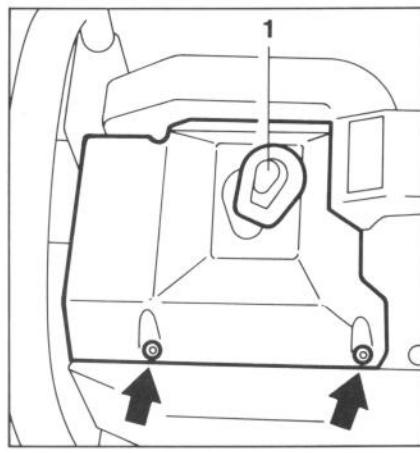
**Top:**  
Short circuit wire and ground wire  
in the slot of the connecting piece

**Bottom:**  
1 = Peg  
2 = Grommet  
3 = Locating Slot



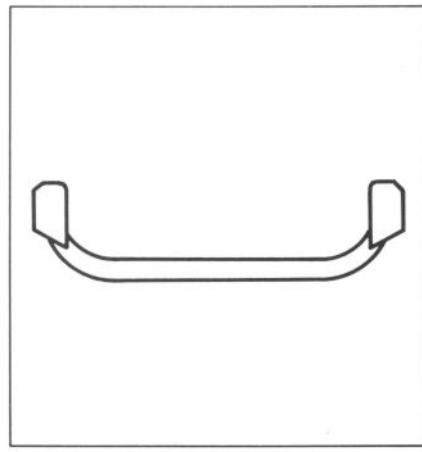
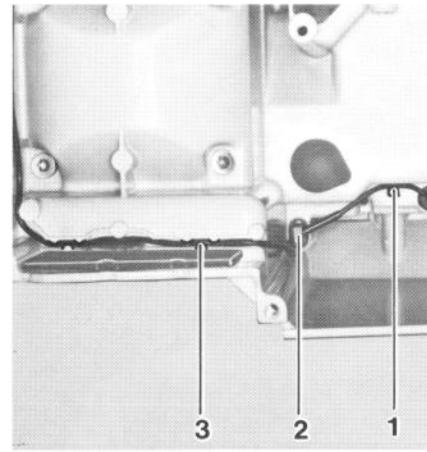
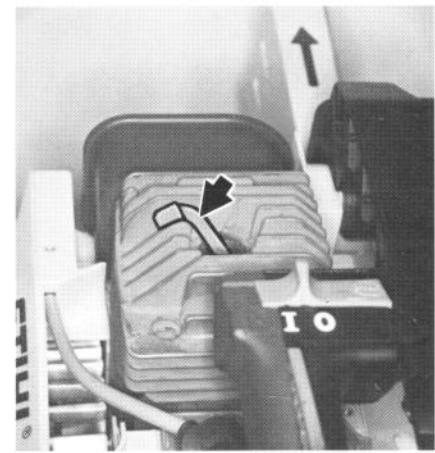
**Top:**  
Shroud mounting screws  
(the screws on the right are hidden)  
1 = Spark plug terminal

**Bottom:**  
Locking strip 4221 893 5900



**Top:**  
Locking strip in the cylinder

**Bottom:**  
Fan cover  
mounting screws



Fit short circuit wire and ground  
wire in the slot in the connecting  
piece.

Fit short circuit wire in the area of  
the expansion tank into the loca-  
ting slot.

Press grommet into mounting and  
lay short circuit wire behind pin.

**Removing the flywheel:**

- Remove spark plug terminal from spark plug.
- Remove shroud mounting screws. Remove shroud, pressing the spark plug terminal out of the opening in the shroud.

- Remove spark plugs and replace  
with locking strip in cylinder to  
block crankshaft.

- Take out the fan cover mounting  
screws and remove the fan cover.



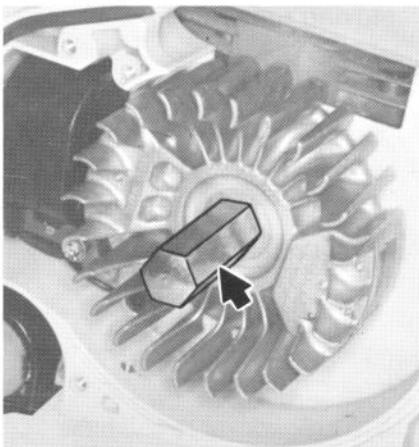
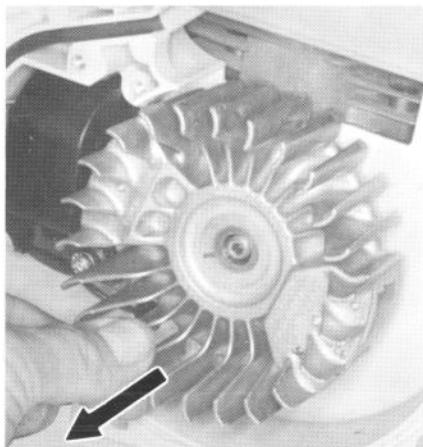
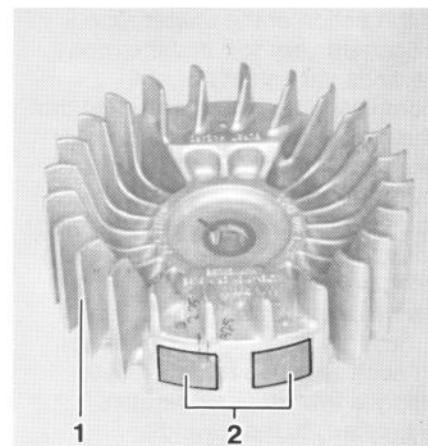
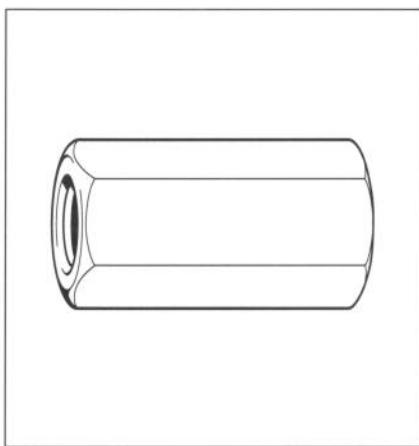
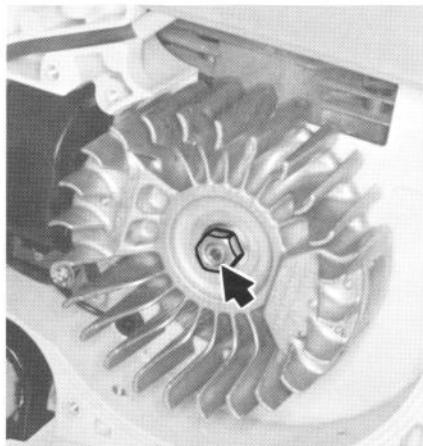
Top:  
Flywheel  
mounting nut

Bottom:  
Removing the flywheel

Top:  
Puller 1116 893 0800

Bottom:  
Puller fitted in position

1 = Flywheel  
2 = Magnet poles



- Rotate the flywheel so that the magnet poles are opposite the ignition module.
- Unscrew the flywheel mounting nut from the crankshaft.
- Remove the flywheel from the crankshaft.

**Note:** If the flywheel cannot be removed by hand, screw the puller onto the crankshaft stub, tap the end of the puller lightly with a hammer to release the flywheel. Unscrew the puller.

- Inspect the condition of the flywheel. If you find any damage (e.g. cracks, broken fan blades), fit a new flywheel.

#### Installing the flywheel:

**Important:** Clean the stub of the crankshaft and the flywheel hub bore with a standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons, see 11.2.

- Fit the flywheel.

- Fit the mounting screw and tighten it down to 25 Nm.

Further assembly is carried out in the reverse order.

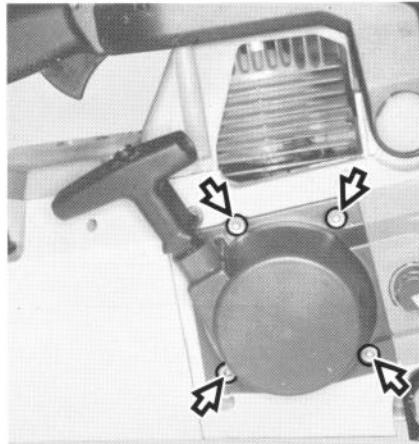
**Note:** Tighten down the fan cover mounting screw to 6.0 Nm.

## 7. REWIND STARTER

## 7.1 Routine Maintenance

## 7.2 Rope Rotor

Starter cover mounting screws



If the action of the starter rope becomes very stiff and the rope rewinds very slowly or not completely, it can be assumed that the starter mechanism is in order but plugged with dirt. At very low outside temperatures the lubricating oil on the rewind spring may thicken and cause the spring windings to stick together. This has a detrimental effect on the function of the starter mechanism. In such a case it is sufficient to apply a few drops of paraffin (kerosine) to the rewind spring.

Then carefully pull out the starter rope several times and allow it to rewind until its normal smooth action is restored.

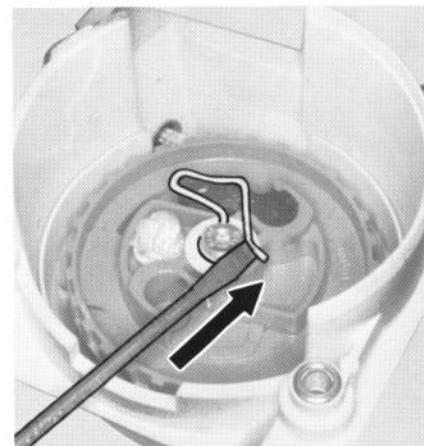
If clogged with dirt or pitch, the entire starter mechanism, including the rewind spring, must be removed and disassembled. Take special care when removing the spring.

Wash all parts in paraffin or white spirit.

Lubricate the rewind spring and starter post with STIHL special lubricant, see 11.2, before installing.

Top:  
Removing spring clip

Bottom:  
Removing the rope rotor from the starter post



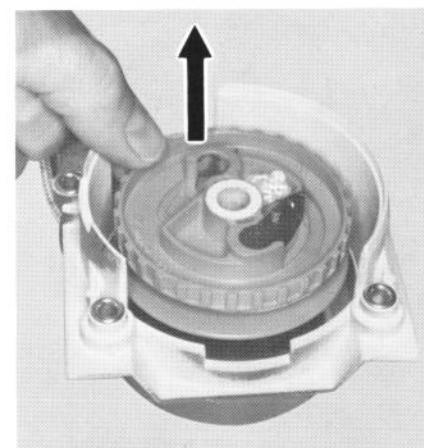
## Removing rope rotor

## Troubleshooting chart - see 2.4.

- Unscrew the starter cover mounting screws and remove the starter cover.

## Relieving tension of rewind spring:

- Pull out the starter rope to a length of approx. 10 cm and hold the rope rotor steady.
- Use a screwdriver to catch the rope between the rope guide bush and the rope rotor and pull it out.
- While still holding the rope rotor steady, take all turns off the rope rotor.
- Pull out the rope with the starter grip and then let go of the rope rotor.



**Note:** The rope rotor will spin back and relieve the tension of the rewind spring. The rewind spring will not be under tension if the starter rope is broken.

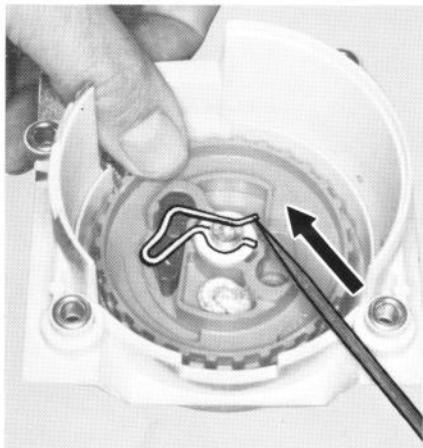
- Use a screwdriver or suitable pliers to carefully remove the spring clip from the starter post.

- Take the washer and rope rotor with pawl off the starter post.
- Take the starter rope off the rope rotor.

- Replace the worn or broken starter rope - see 7.3.

## 7.3 Replacing the Starter Rope

Installing spring clip

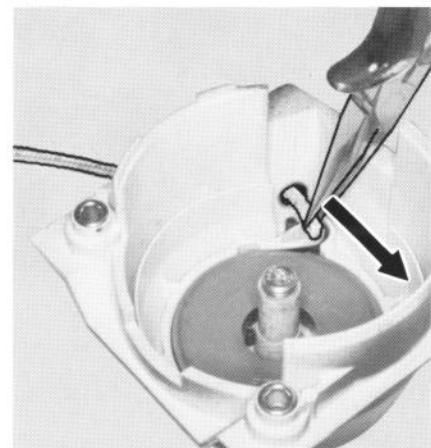
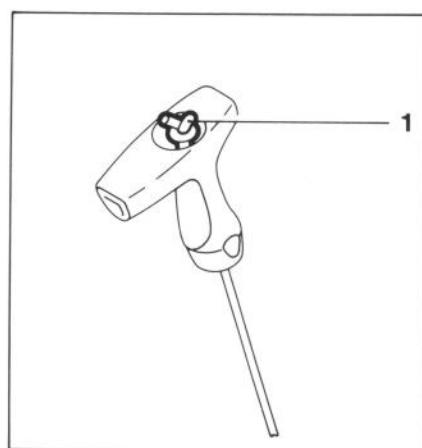


**Top:**  
Threading rope through  
the starter grip  
1 = Special knot

**Bottom:**  
Special knots used

**Top:**  
Threading the starter rope into  
the starter cover (Elastostart)

**Bottom:**  
Threading the starter rope  
through the rope rotor



### Installing rope rotor

- Coat the bore in the rope rotor with STIHL special lubricant - see 11.2. Fit the rotor on the starter post so that the inner spring loop slides into the lug on the rotor.

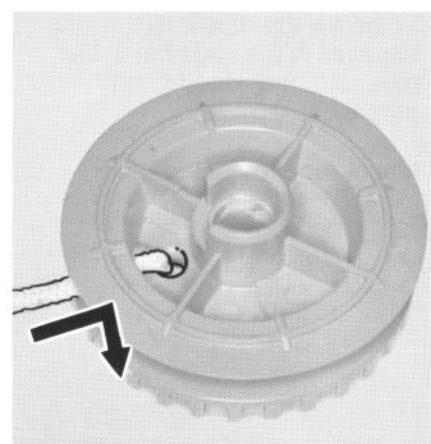
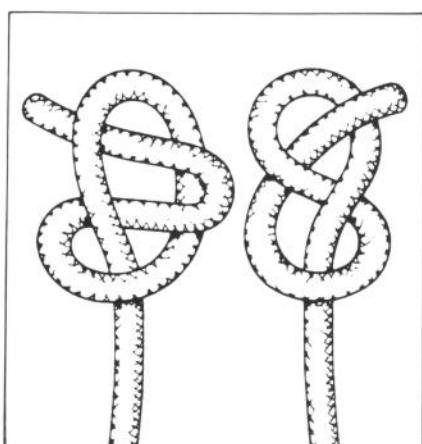
**Note:** Check that the spring loop has engaged by turning the rope rotor slightly counterclockwise and letting it go - it must spin back.

- Fit the washer and install the spring clip in the starter post groove.

**Note:** Make sure the spring clip engages the pawl guide peg and points it in the counterclockwise direction.

- The spring clip must be treated very carefully. If it is bent or twisted during disassembly or assembly, the rewind starter might malfunction.

- Tension the rewind spring - see 7.5.

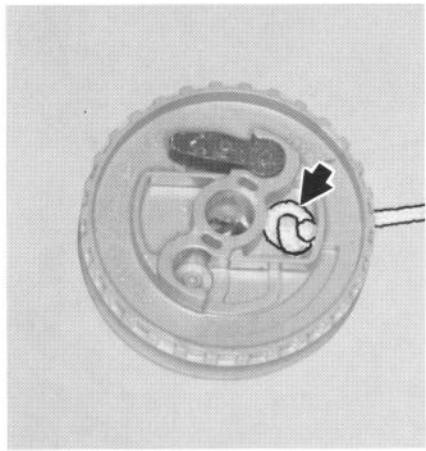


- Remove rope rotor, see 7.2.
- Remove remaining rope from rope rotor and pull off the starter grip.
- Thread new starter rope through starter grip from below and fasten with special knots.

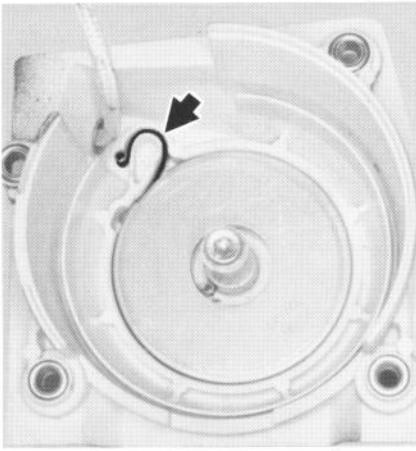
- Thread the other end of the rope from the outside through the rope guide bush in the starter cover.
- Thread end of rope into hole on side of rope rotor, insert in inner hole from below, pull through to top, and fasten using a simple knot.

## 7.4 Replacing the Rewind Spring

Starter rope fastened to the rope rotor with knots

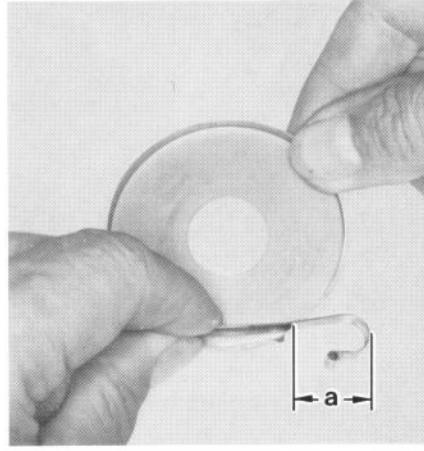


Rewind spring in position



Top:  
Position of anchor loop  
 $a = 20 \text{ mm}$

Bottom:  
Fitting rewind spring with aid of wooden assembly block 1108 893 4800



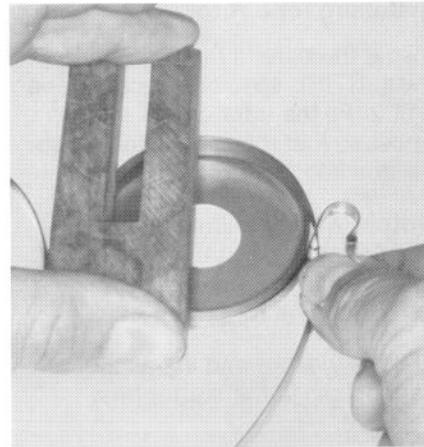
- Withdraw the rope until the knot engages in the chamber in the rope rotor provided for this purpose.
- Mount rope rotor, see 7.2.

- Remove the rope rotor, see 7.2. Take out the spring housing. Use pliers to remove any remaining pieces of the spring from the starter cover.

- The rewind spring is supplied ready for installation with the spring housing. It should be lubricated with a few drops of STIHL special lubricant before installation, see 11.2.

- Position the rewind spring with spring housing (bottom plate must face up) in the fan housing. Engage the anchor loop over the lug in the starter cover.

**Important:** If the rewind spring pops out and uncoils during installation, it must be refitted in the spring housing as follows:



- Position anchor loop about 20 mm from the edge of the spring housing.

- Refit the rewind spring in the spring housing in the clockwise direction, starting outside and working inwards.

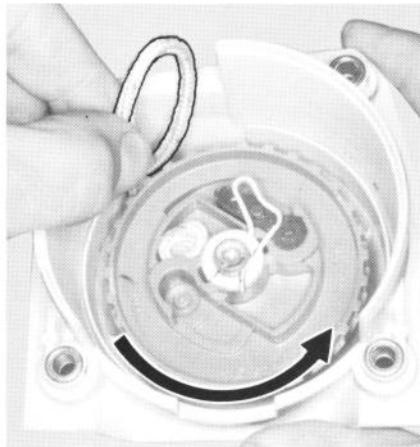
**Note:** The wooden assembly block can be placed over the spring housing to simplify refitting.

- Install the rope rotor - see 7.2.

## 7.5 Tensioning the Rewind Spring

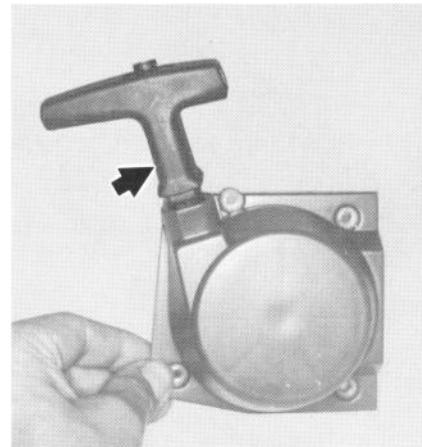
Top:  
Tensioning rewind spring

Bottom:  
Straightening twisted rope



- Grip the rope between the rope rotor and fan housing, pull it out and make a loop.
- Grip the rope **close** to the rotor and use it to turn the rope rotor six full turns in counterclockwise direction.
- Hold the rope rotor steady.
- Pull out the rope with the starter grip and straighten it out.

Grip on starter cover



- Hold the starter grip firmly to keep the rope tensioned.
- Let go of the rope rotor and slowly release the starter grip.

**Note:** The rewind spring is correctly tensioned when the starter grip sits firmly in the rope guide bush without drooping to one side. If this is not the case, tension the spring by one additional turn.

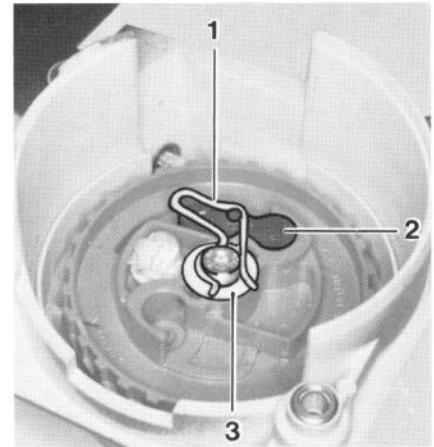
When the starter rope is fully extended, it must still be possible to rotate at least another half turn before maximum spring tension is reached. If this is not the case, pull the rope out, hold the rope rotor steady and take off one turn of the rope.

**Do not overtension the rewind spring as this will cause it to break.**

- Refit the starter cover.

## 7.6 Pawl

1 = Spring clip  
2 = Pawl  
3 = Washer

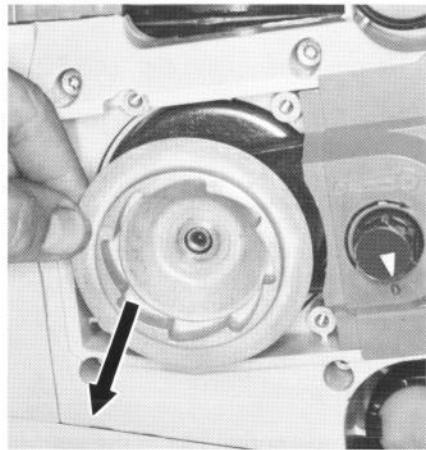
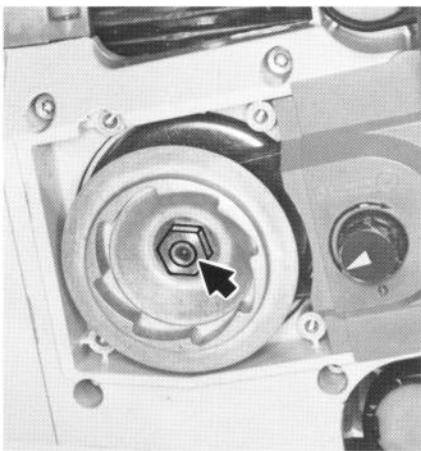


- Remove the starter cover.
- Remove the spring clip, see 7.2.
- Note:** Do not pull the rope rotor off the starter post.
- Pull the pawl out of the rope rotor.
- Coat peg of new pawl with graphite grease, see 11.2, and fit it in position.
- Check that washer is fitted on starter post.
- Install the spring clip in the starter post groove.
- Note:** Make sure the spring clip engages the pawl guide peg and points it in the anticlockwise direction.
- The spring clip must be treated very carefully. If it is bent or twisted during disassembly or assembly, the rewind starter might malfunction.
- Refit the starter cover.

## 7.7 Starter Cup

Top:  
Starter cup  
mounting nut

Bottom:  
Starter cup removal



- Remove starter cover, see 7.2.
- Use locking strip to block pistons, see 6.1.5.
- Remove mounting nut of starter cup.
- Remove starter cup.

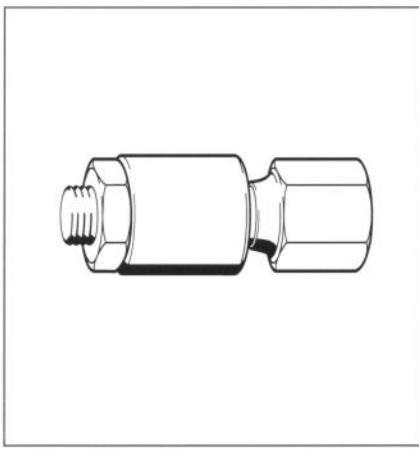
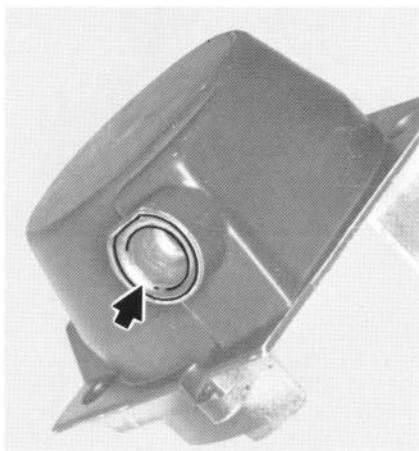
The parts are assembled in reverse order.

**Note:** Tighten nut to 40 Nm.

## 7.8 Replacing the Starter Rope Guide Bush

Top:  
Rope guide bush

Bottom:  
Installing tool 0000 890 2201



The wear on the guide bush is accelerated by the starter rope being pulled sideways. The wall of the guide bush eventually wears through and becomes loose.

- Remove the starter cover.
- Remove the rope rotor, see 7.2.
- Remove rope from rope rotor and pull it out of the rope guide bush.

Flaring the new rope guide bush



- Use a suitable tool to pry the old bush out of the starter cover.

**Installing the new rope bush:**

- Place the new bush in its seat in the starter cover.
- Insert the screw spindle of the installing tool through the bush from inside the housing.
- Fit the thrust sleeve and the hexagon nut.
- Tighten down the hexagon nut until the bush is firmly seated.

**Note:** The installing tool flares the lower end of the rope bush.

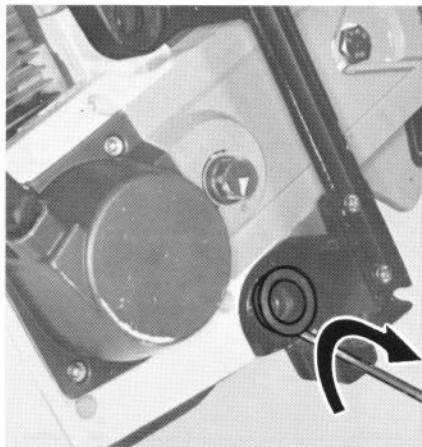
- Thread the starter rope back onto the rope rotor and reattach, see 7.3.
- Refit the rope rotor - see 7.2.
- Fit the starter cover.

## 8. AV HANDLE SYSTEM

### 8.1 Repair

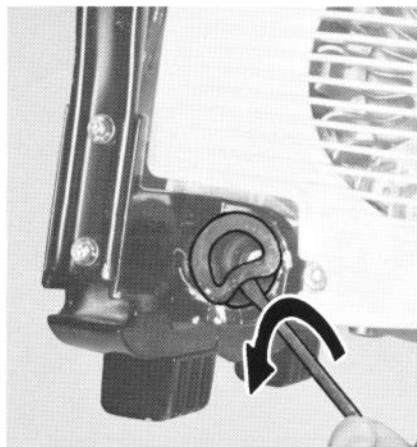
**Top:**  
Prying out the annular buffer  
(starter side)

**Bottom:**  
Fitting annular buffer  
1 = Annular groove



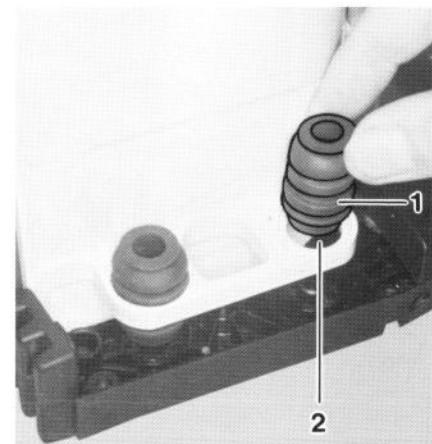
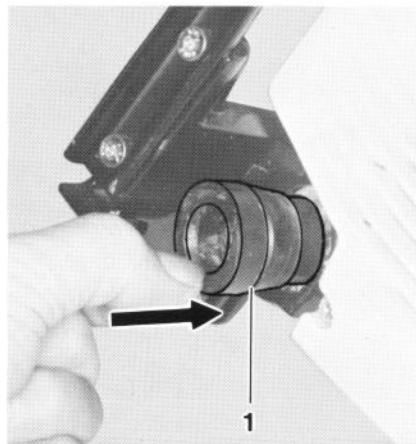
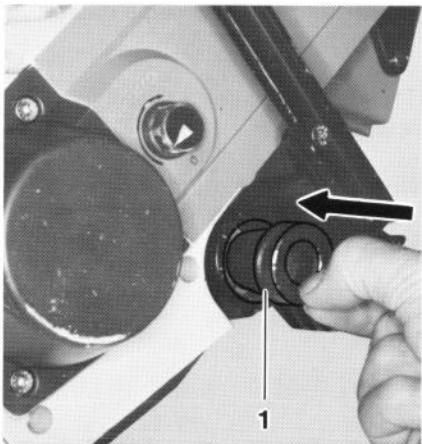
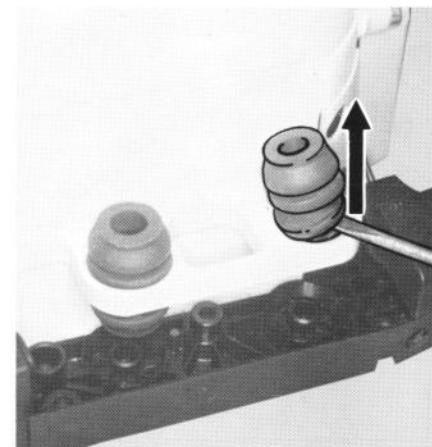
**Top:**  
Prying out the annular buffer  
(ignition side)

**Bottom:**  
Inserting the annular buffer  
1 = Annular groove



**Top:**  
Prying out the rear annular buffer

**Bottom:**  
Inserting the rear annular buffer  
1 = Central groove  
2 = Housing rib



The engine housing, handle and handle tube are connected by vibration damping rubber buffers. Damaged rubber buffers (annular buffers) must always be replaced in sets.

- Unscrew the annular buffer mounting screw - see 9.6 and 9.7.
- Pry the annular buffers out of their seats at the starter side.

- Press new annular buffer into the handle grip or support until the annular groove engages the rib.

- Pry out annular buffer at the ignition side.

- Press new annular buffer into support until annular groove engages rib.

- Remove AV-molding, see 9.7.

- Pry stoppers out of rear annular buffers and annular buffers out of mountings in engine housing.

- Press in new annular buffers until middle groove engages housing rib.

Further assembly is carried out in reverse order.

## 9. Throttle Control

### 9.1 Throttle Trigger, Throttle Trigger Interlock

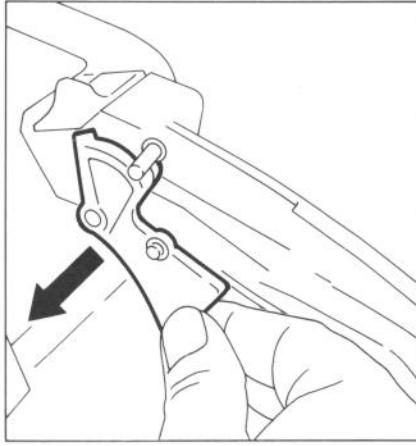
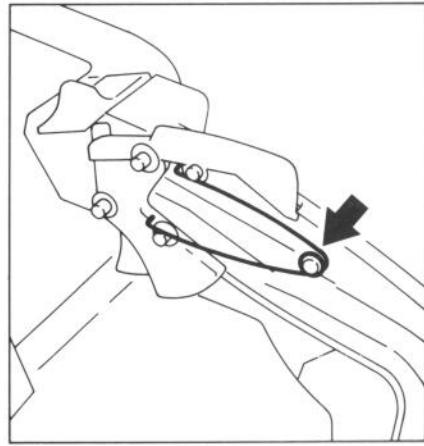
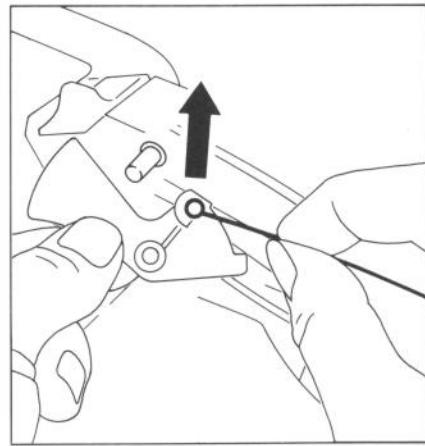
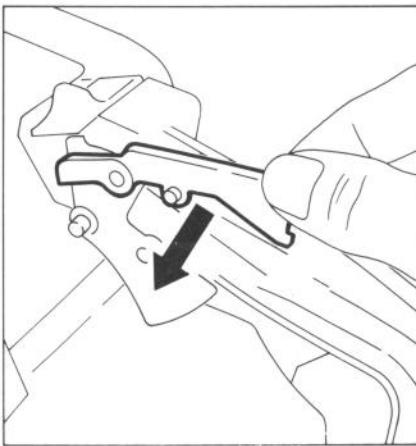
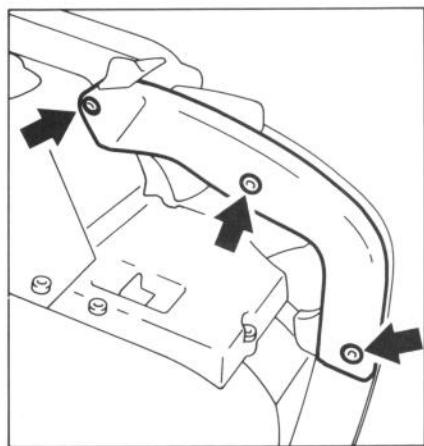
**Top:**  
Mounting screws  
of handle molding

**Bottom:**  
Torsion spring

**Top:**  
Removing the throttle interlock

**Bottom:**  
Removing the throttle trigger

Detaching throttle cable  
from throttle trigger



- Unscrew mounting screws of handle molding, remove handle molding.
- Disconnect torsion spring from throttle trigger and throttle interlock and remove from pin.

- Remove throttle interlock from pin.
- Remove throttle trigger from pin.

- Detach nipple of throttle cable from throttle trigger.

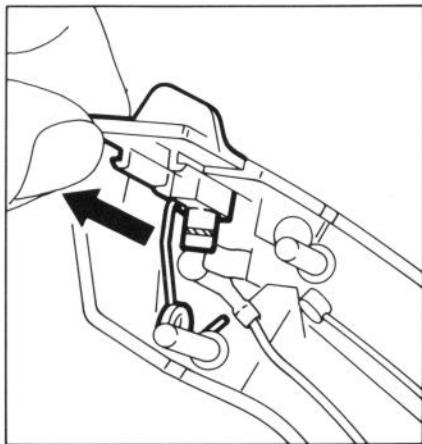
The parts are assembled in reverse order.

**Note:** Tighten mounting screws of handle molding to 3.0 Nm.

## 9.2 Slide Control

Top:  
Withdrawing the slide control

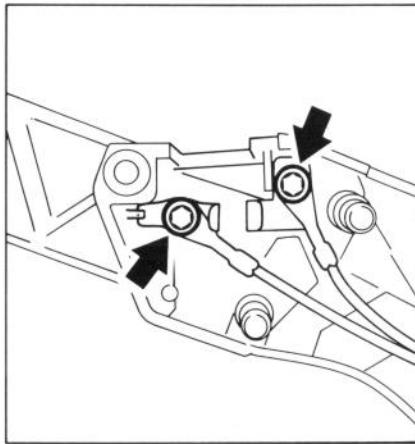
Bottom:  
Properly positioned torsion spring



## 9.3 Contact Springs

Top:  
Contact spring  
mounting screws

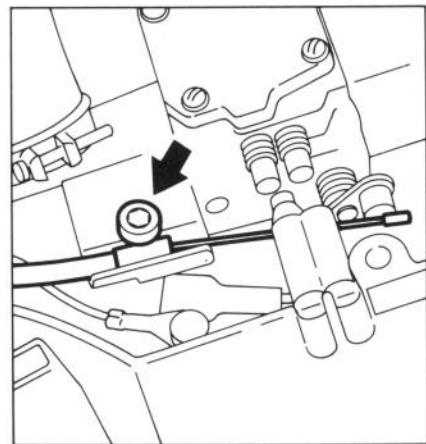
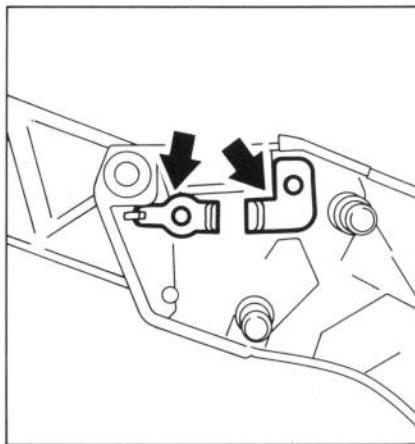
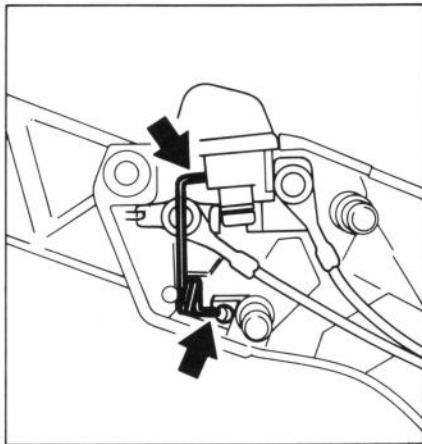
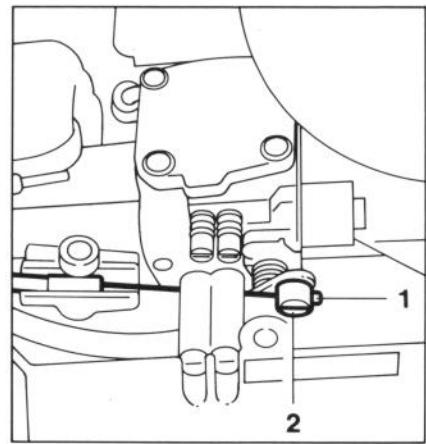
Bottom:  
Properly positioned contact springs



## 9.4 Throttle Cable

Top:  
1 = Nipple of throttle cable  
2 = Slotted pin

Bottom:  
Throttle cable  
mounting screw



- Remove throttle trigger, see 9.1.
- Remove slide control and torsion spring from handle grip.
- Insert longer, angled end of torsion spring in slot in slide control.
- Mount slide control and press torsion spring into mount in handle grip.
- Mount throttle trigger, see 9.1.

- Remove slide control, see 9.2.
- Unscrew contact spring mounting screws, remove contact springs.
- Insert contact springs.
- Screw in screws with short circuit and ground wires and tighten to 2.0 Nm

- Remove carburetor box cover, see 10.3.
- Disconnect nipple of throttle cable from slotted pin on throttle lever.
- Remove mounting screw of throttle cable.

## 9.5 Handle Bar

## 9.6 Handle Tube Bracket

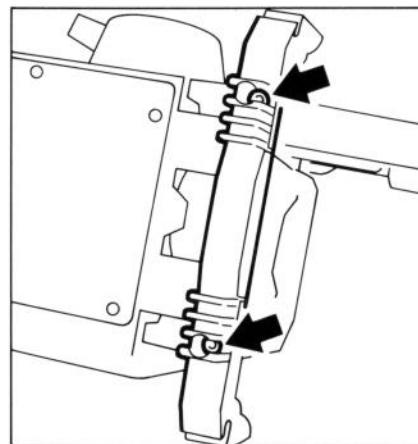
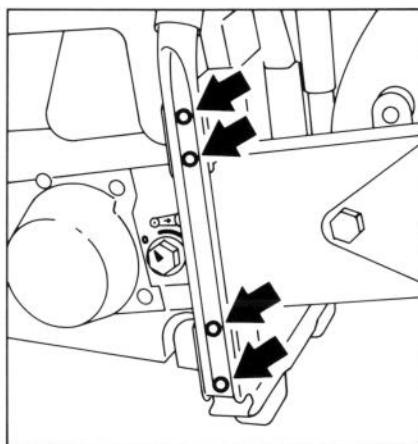
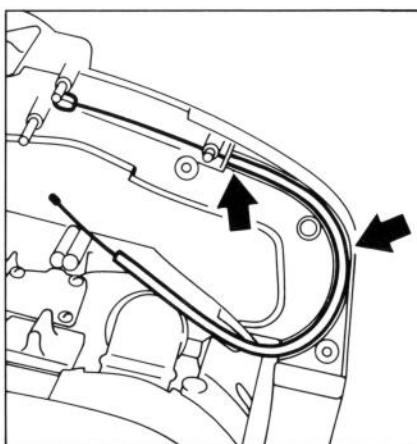
Throttle Cable in handle grip

Top:  
Handle bar mounting screws  
(right)

Bottom:  
Handle bar mounting screws  
(left)

Top:  
Support mounting screws

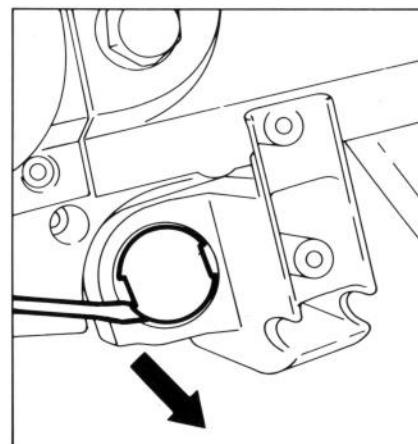
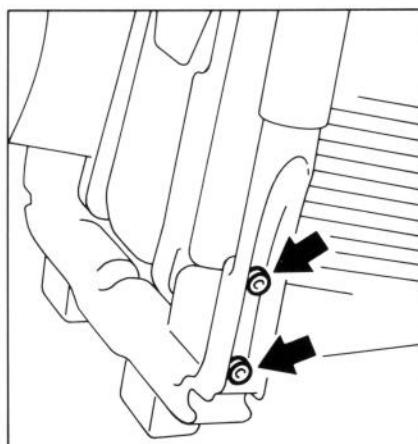
Bottom:  
Prying out the stopper



- Remove throttle trigger, see 9.1.

- Remove throttle cable from mount in handle grip.

The parts are assembled in reverse order.



- Unscrew handle bar mounting screws from handle grip and handle tube bracket.

- Unscrew handle bar mounting screws from handle tube bracket, remove handle bar.

- Mount handle bar, screw in screws and tighten to 8.0 Nm.

- Remove handle bar, see 9.5

- Unscrew support mounting screws, remove support.

- Pry stopper out of annular buffer.

## 9.7 Handle Bar

**Top:**  
Removing the mounting screw

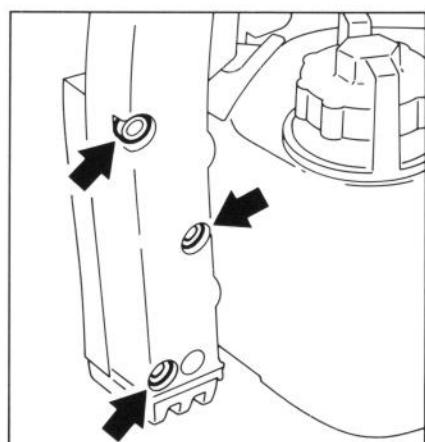
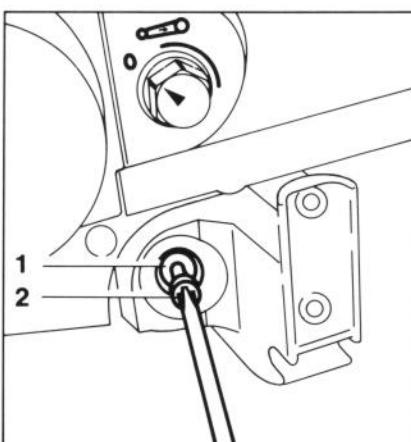
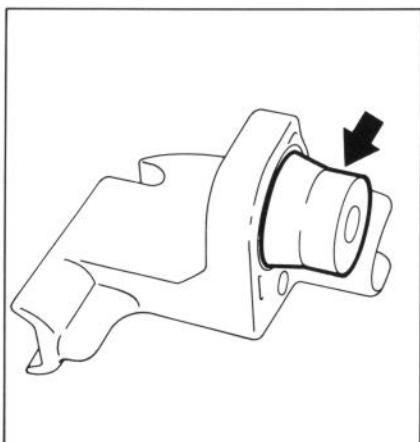
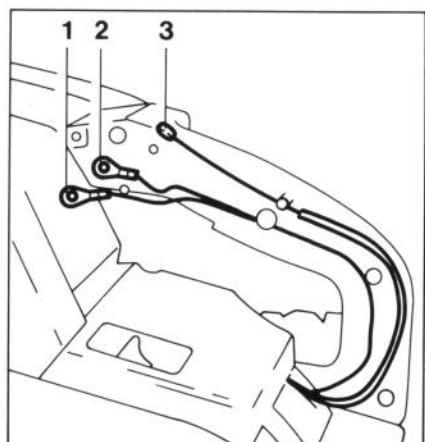
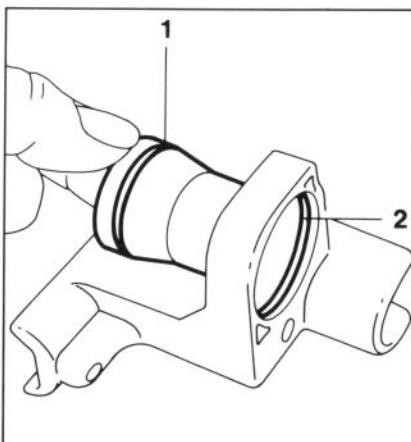
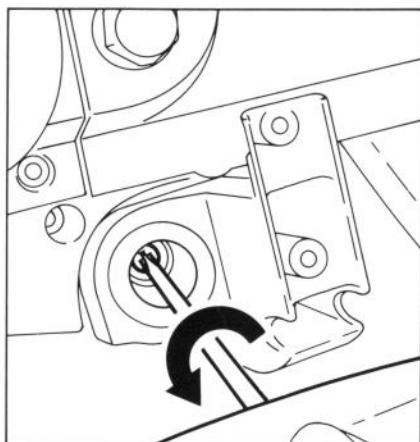
**Bottom:**  
Annular buffer

**Top:**  
1 = Annular groove  
2 = Annular rib

**Bottom:**  
1 = Pressure plate  
2 = Mounting screw

**Top:**  
1 = Short circuit wire  
2 = Ground wire  
3 = Throttle cable

**Bottom:**  
AV-molding  
mounting screws



- Unscrew mounting screw of annular buffer.

- Remove handle tube bracket.

**Note:** Follow the same procedure in removing the handle tube bracket on the other side.

- Press annular buffer out of handle tube bracket.

The parts are assembled in reverse order.

**Note:** Press in annular buffers until annular groove engages annular rib on handle tube bracket.

Insert pressure plates in annular buffer. Screw in screw and tighten to 8.0 Nm.

- Remove contact springs, see 9.3.

- Pull short circuit and ground wires and throttle cable out of handle grip.

- Unscrew mounting screws for AV-molding, remove AV-molding.

Top:  
Rubber vibration buffer at AV-molding

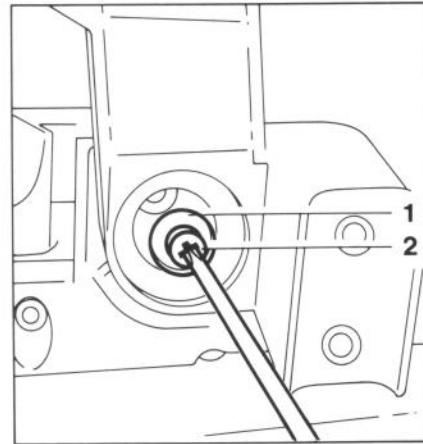
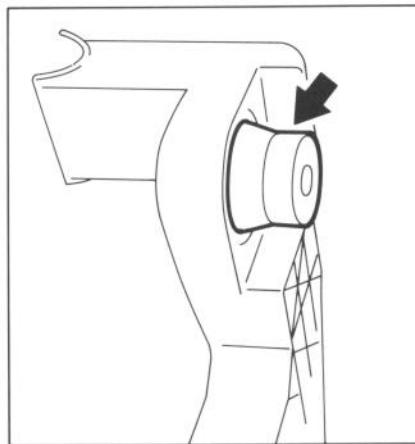
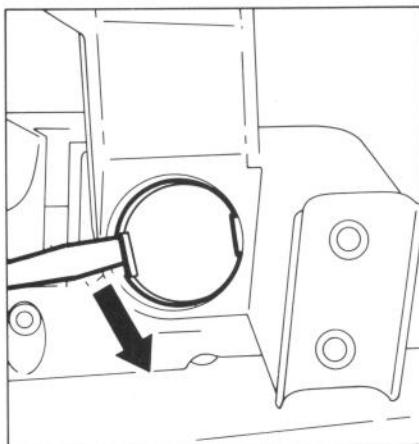
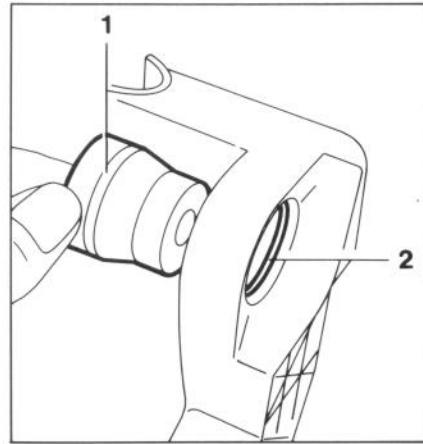
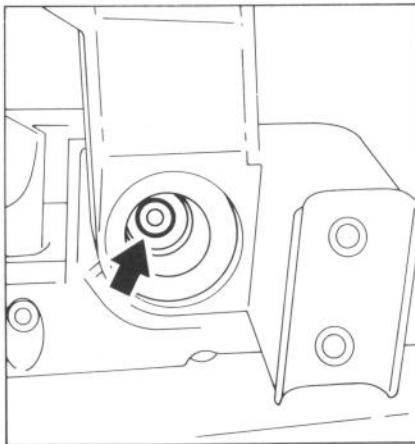
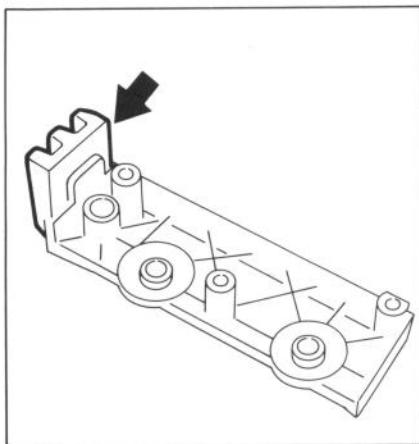
Bottom:  
Prying out the stopper

Top:  
Annular buffer  
mounting screw

Bottom:  
Annular buffer

Top:  
1 = Annular groove  
2 = Annular rib

Bottom:  
1 = Pressure plate  
2 = Mounting screw



- Remove rubber vibration buffer from handle grip or AV-molding.
- Remove handle bar, see 9.5.
- Pry stopper out of annular buffer.

- Unscrew annular buffer mounting screw.
- Remove handle grip
- Press annular buffer out of handle grip.

The parts are assembled in reverse order.

**Note:** Press annular buffer in until annular groove engages annular rib on handle grip.

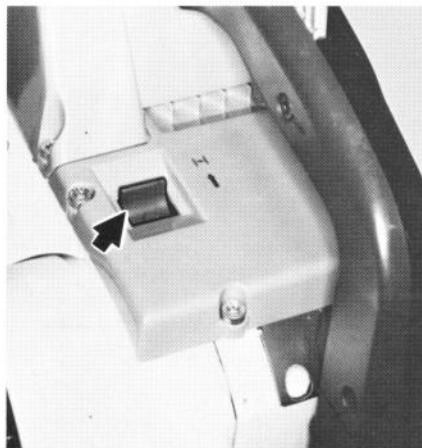
Insert pressure plates in annular buffers, screw in screws and tighten to 8.0 Nm

Tighten AV-molding mounting screws to 3.0 Nm.

## 10. Fuel System

### 10.1 Air Filter

Choke trigger



Top:  
Hexagon cap nut

Bottom:  
Removing the prefilter



Top:  
Main filter

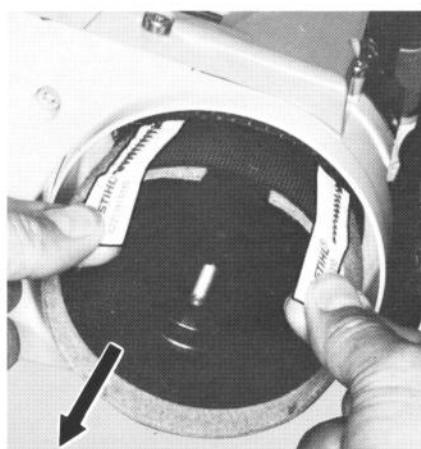
Bottom  
Removing the auxiliary filter  
1 = O-ring



Dirty filters cause decreased engine performance, increase fuel consumption, and make starting more difficult.

**The air filter must be cleaned whenever engine performance begins to suffer.**

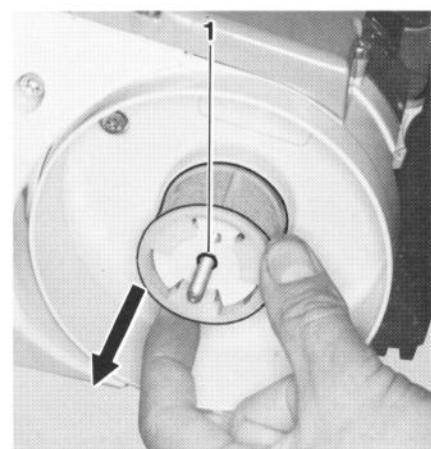
- Before removing filter, close choke shutter to prevent dirt and grime from entering carburetor, to this end, press choke trigger forward.
- Loosen hexagon cap nut of filter cover and remove filter cover.
- Remove coarse dirt from area surrounding filter and inside of filter cover.
- Detach prefilter from main filter.
- Dry wet prefilter, then firmly knock out or blow out dirt and grime.



**Note:** If dirt and grime cannot be eliminated in this way, then a new prefilter must be used.

- Remove main filter from filter base.

**Note:** Dirty main filters should be replaced, in which case the auxiliary filter should be replaced at the same time.



- Remove auxiliary filter from the mount, tap gently to release dirt and grime, and wash in clean, nonflammable cleaning solution (e.g., warm, soapy water).

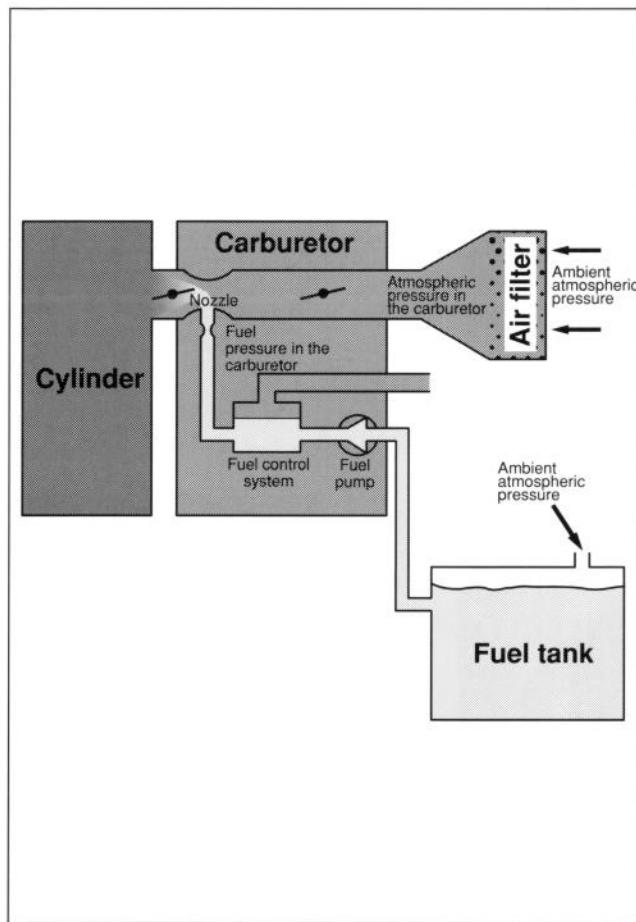
**Note:** Replace auxiliary filters with damaged flock immediately.

- Inspect O-ring on locator pin, replace if necessary.

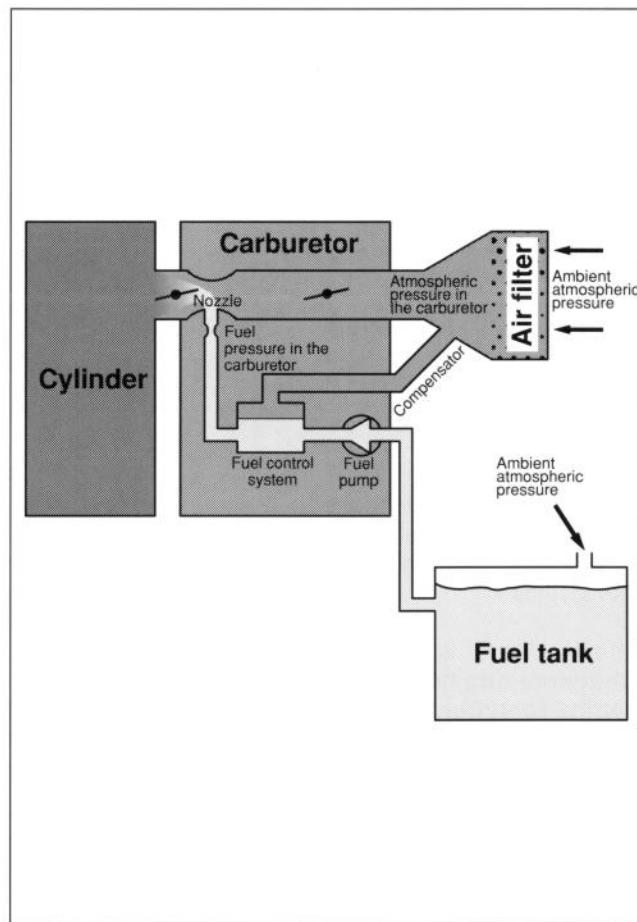
The parts are assembled in reverse order.

## 10.2 Structure and Function of the Carburetor with Compensator

Carburetor without compensator



Carburetor with compensator



The carburetor with compensator maintains a constant fuel ratio during carburation regardless of how dirty the air filter is. The pressure on the clean side of the air filter and at the metering diaphragm is constant.

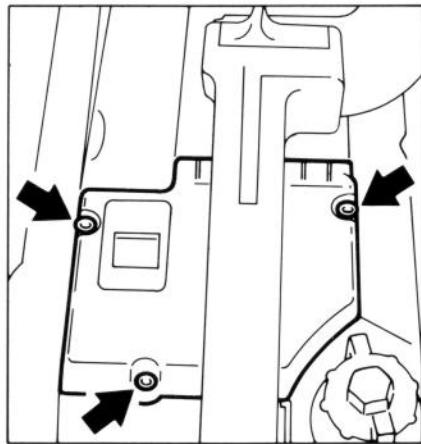
The manifold for the air filter is equipped with a hose. When fitted to the connectors on the cover on the regulator side, it forms the connection between the metering diaphragm chamber and the clean side of the air filter.

When the air filter is dirty, the quantity of air is reduced. This, however, causes a drop in pressure not only in the venturi of the carburetor, but at the outside of the metering diaphragm as well. The metering diaphragm moves upward, the inlet needle closes partially, thus reducing the flow of fuel.

The combustion mix can no longer become too rich; it is no longer necessary to readjust the high speed adjusting screw as the filter becomes dirtier. Performance is reduced, however, due to reduced volume of air. Optimum performance can only be regained by cleaning the air filter.

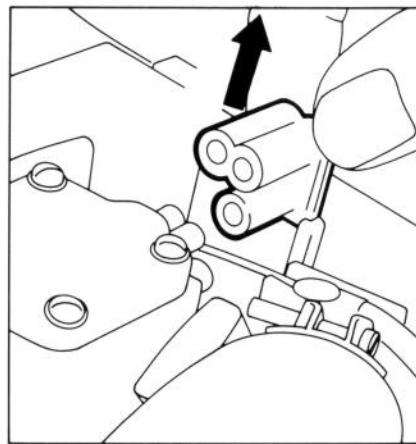
### 10.3 Removing and Installing the carburetor

Carburetor box cover fastening screws



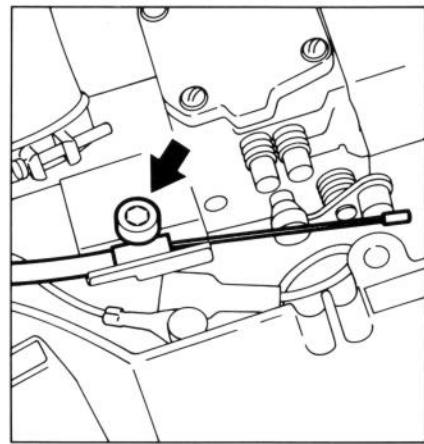
Top:  
Removing the grommet

Bottom:  
1 = Nipple of throttle cable  
2 = Slotted pin



Top:  
Throttle cable mounting screw

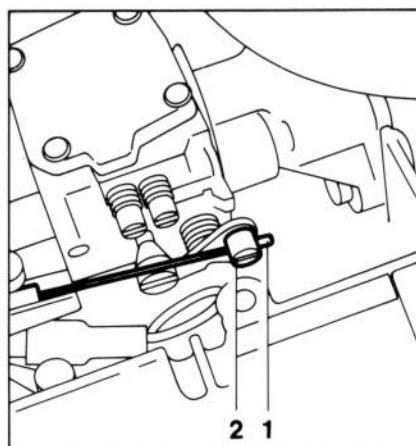
Bottom:  
Clamp on manifold



The all-position diaphragm carburetor consists of a fuel pump and the actual carburetor. Although the fuel pump shares a common housing with the carburetor, it operates as a completely separate and independent unit.

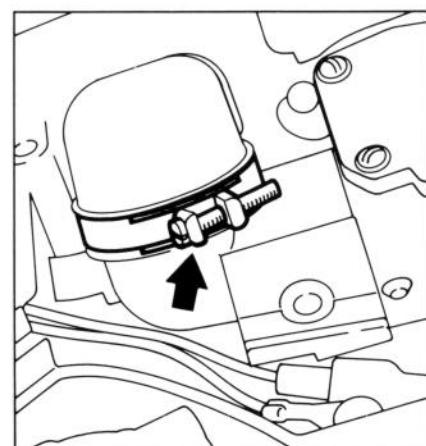
Troubleshooting chart - see 2.5.

- Unscrew carburetor box mounting screws, remove carburetor box cover.



- Remove grommet from mount in engine housing.

- Detach nipple of throttle cable from slotted pin at throttle lever.

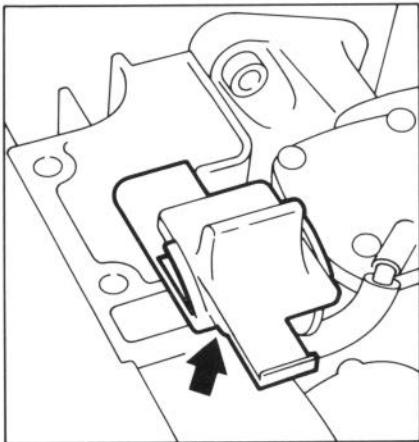


- Unscrew throttle cable mounting screw and press throttle cable to the side out of the machine.

- Loosen screws on manifold clamp and remove manifold from connector.

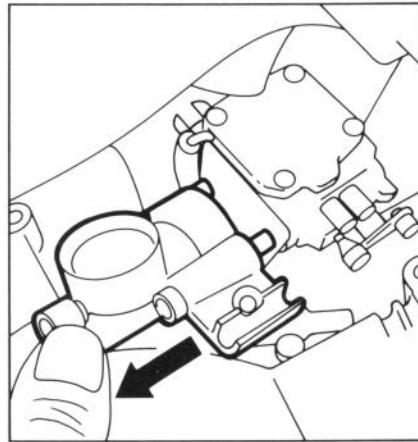
Top:  
Choke knob

Bottom:  
Unscrewing the carburetor  
mounting screws  
1 = Mounting screws  
2 = Opening in connecting piece



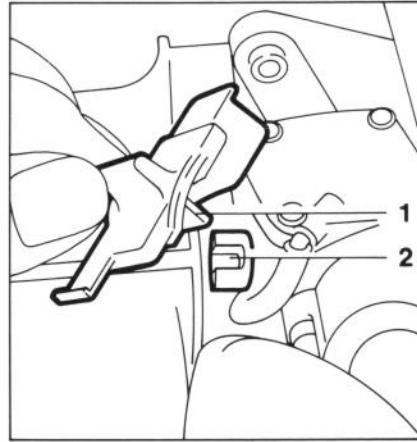
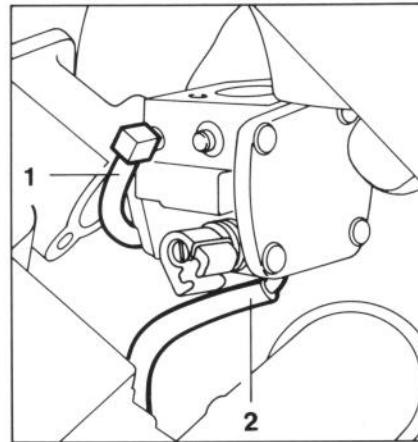
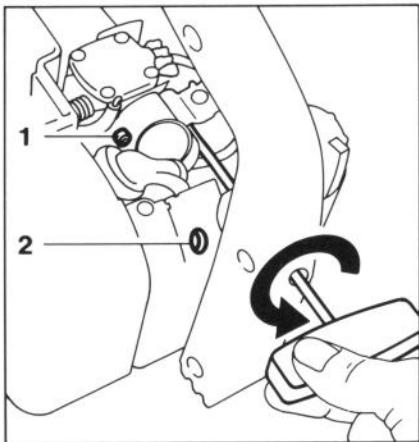
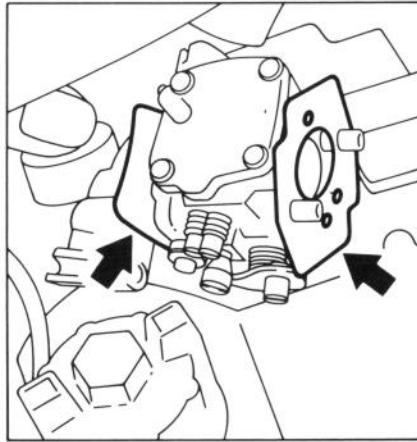
Top:  
Removing the connector

Bottom:  
1 = Fuel hose  
2 = Compensator hose



Top:  
Gaskets

Bottom:  
1 = Pin  
2 = Choke lever



- Remove choke knob from mount in engine housing.
- Remove carburetor mounting screws through openings in handle grip and connecting piece.

- Lift the carburetor and connector slightly and remove the connector and mounting screws from the carburetor.
- Disconnect fuel hose and compensator hose from angle connectors.

The parts are assembled in reverse order.

**Note:** Slide new gaskets over mounting screws on both sides of carburetor.

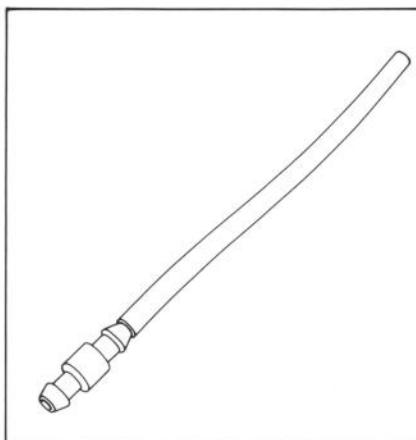
Tighten mounting screws to 5.0 Nm.

Fit choke shutter so that pin engages choke lever.

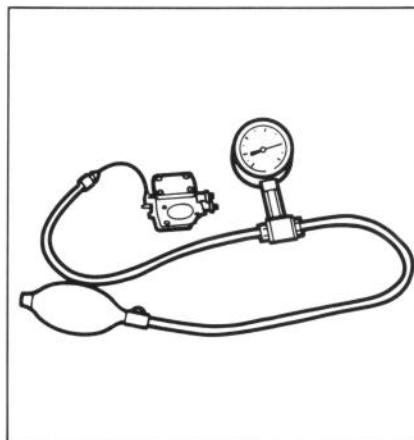
## 10.4 Leakage Testing the Carburetor

Top:  
Nipple 0000 855 9200  
fitted in fuel line 1110 141 8600

Bottom:  
Fuel hose fitted on carburetor's elbow connector



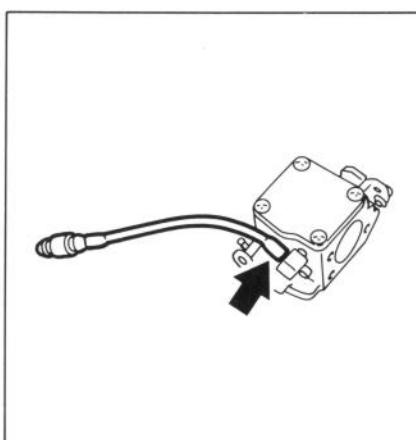
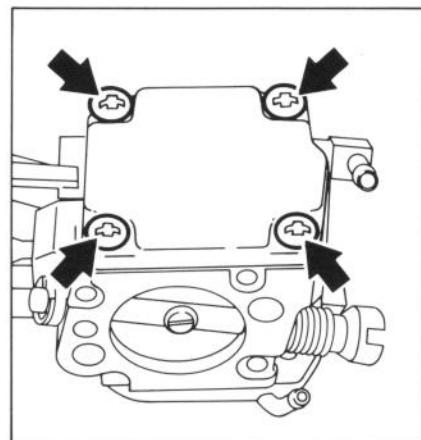
Pressure testing carburetor with carburetor/crankcase tester 1106 850 2905



## 10.5 Servicing the Carburetor

Top:  
Fastening screws on fuel pump end cover

Bottom:  
Fuel pump end cover with gasket



- Push the nipple into the tester's pressure hose.
- Close the vent screw on the rubber bulb and pump air into the carburetor until the pressure gauge shows a reading of approx. 0.8 bar.

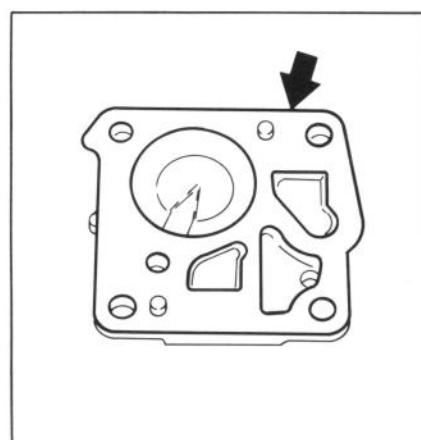
If this pressure remains constant, the carburetor is airtight. However, if it drops, there are two possible causes:

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

In either case the carburetor must be removed and serviced.

The carburetor can be tested for leaks with the carburetor and crankcase tester.

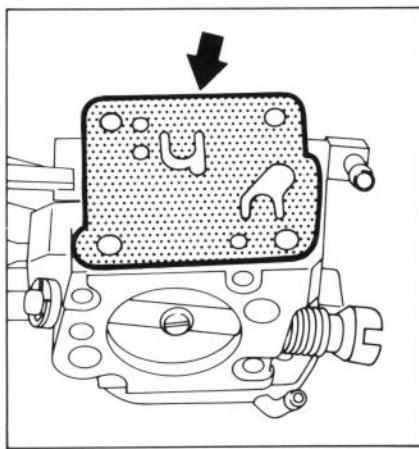
- Remove the carburetor, see 10.3
- Push the fuel line onto the carburetor's elbow connector.



It is advisable to check the servability of the fuel pump whenever the carburetor is removed for repair.

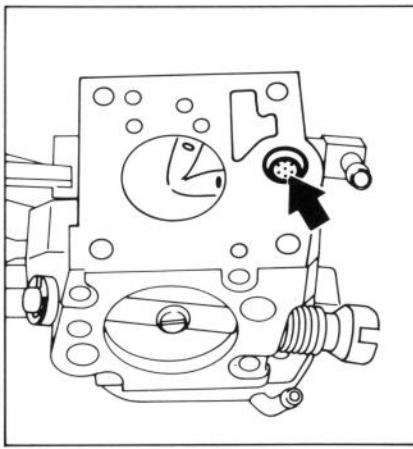
- Remove the carburetor - see 10.3.
- Unscrew the fuel pump end cover and remove the gasket and pump diaphragm.

Pump diaphragm on carburetor body



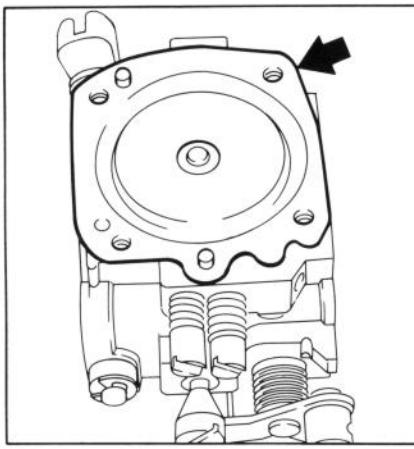
Top:  
Fuel strainer in carburetor body

Bottom:  
Mounting screws of metering chamber end cover



Top:  
Metering diaphragm with gasket on carburetor

Bottom:  
Separating gasket and diaphragm

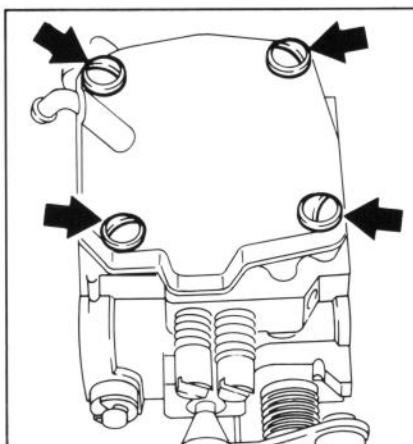


**Note:** The diaphragm and gasket often stick to the cover or carburetor body. If this is the case, take particular care when separating them.

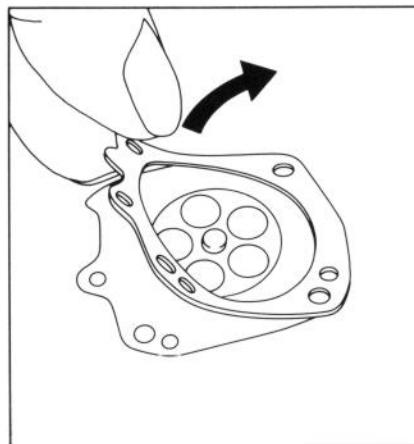
- If the fuel strainer in the pump side of the carburetor body is dirty, use a scriber to remove it and then clean it.

**Important:** If the fuel strainer is damaged, fit a new one.

In such a case the fuel pickup body should also be inspected and replaced if necessary - see 10.7.



- To disassemble the carburetor, take out the screws of the metering chamber end cover and lift away the cover.

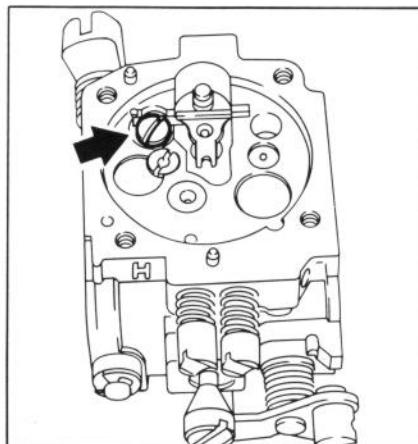


- Remove the metering diaphragm and gasket from the carburetor body or the cover.
- Carefully separate the diaphragm and gasket.

**Note:** The diaphragms are the most delicate parts of the carburetor. They are subjected to continuous alternating stresses and the material eventually shows signs of fatigue, i.e. the diaphragms distort and swell. Check and replace if necessary.

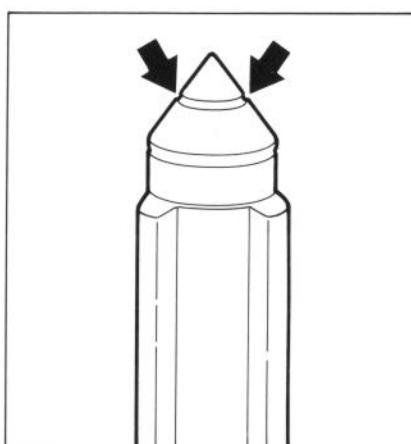
**Top:**  
Oval head countersunk  
screw on control lever spindle

**Bottom:**  
1 = Oval head countersunk screw  
2 = Inlet control lever  
3 = Spindle  
4 = Helical spring  
5 = Inlet needle



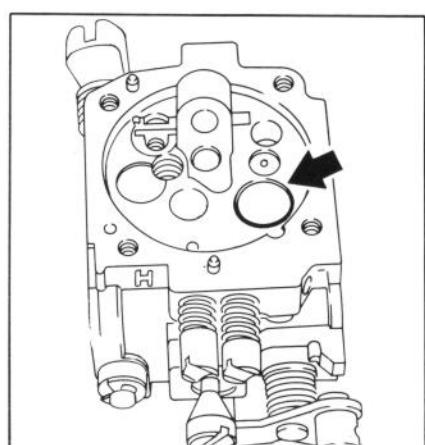
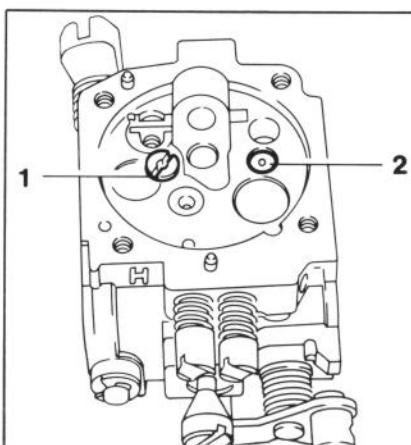
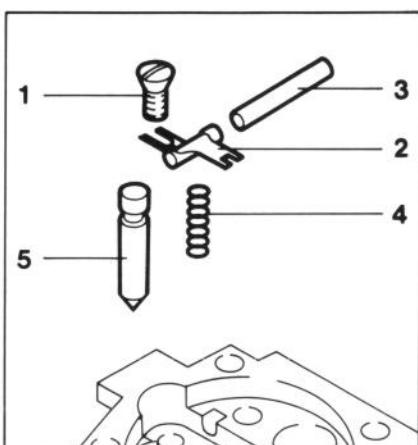
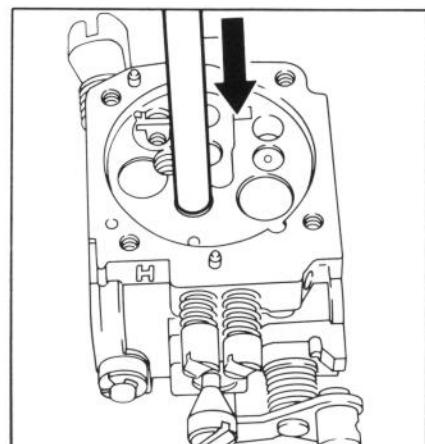
**Top:**  
Damaged inlet needle

**Bottom:**  
1 = Full throttle fixed jet  
2 = Part throttle fixed jet



**Top:**  
Pressing out valve jet

**Bottom:**  
Sealing plug



- The inlet needle valve is located in a recess in the metering diaphragm chamber. Remove the oval head countersunk screw.

- Remove the inlet control lever with spindle, helical spring and inlet needle.

**Note:** 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. This is indicated by constant flooding of the carburetor even though the needle is clean.

- Remove full throttle fixed jet from metering chamber.

**Note:** The part throttle fixed jet cannot be removed, but rather only blown through.

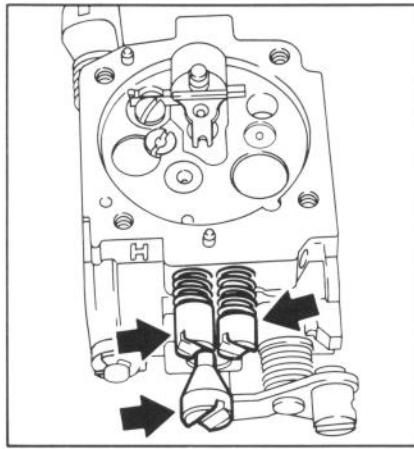
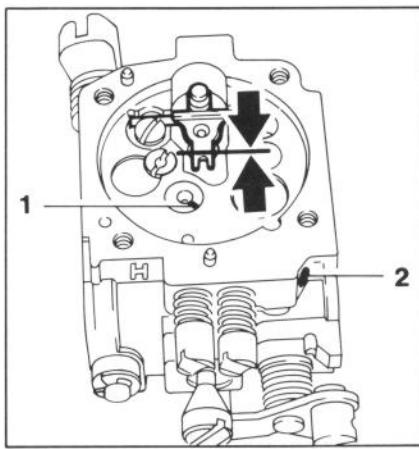
- Use a 5 mm dia drift to press the valve jet out of its seat and wash it in white spirit.

- Remove the sealing plug from the metering chamber.

**Caution:** The sealing plug is destroyed during removal. It should, therefore, only be removed if a replacement is available.

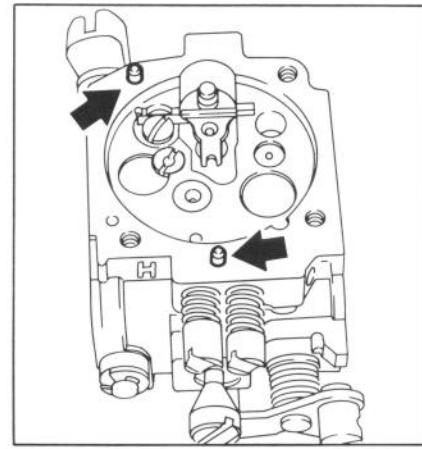
1 = Identification on valve jet  
 2 = Idle jet port  
 Proper positioning  
 of inlet control lever

Carburetor adjusting screws



Top:  
 Locating pegs on housing

Bottom:  
 Locating pegs on  
 fuel pump end cover



- Remove the carburetor adjusting screws.

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

- Fit valve jet in precisely vertical position in hole and turn so that identification faces idle jet port. Press in valve jet until it is flush with underside of metering chamber.

- Screw in full throttle fixed jet.

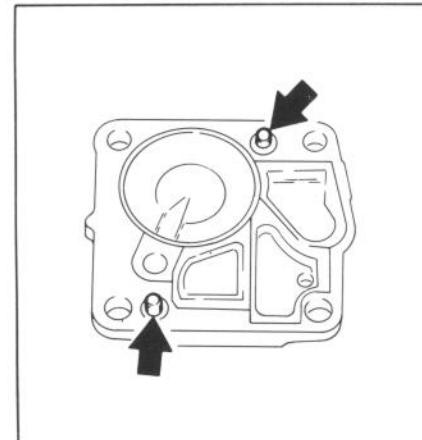
- Fit the inlet needle and the helical spring in their respective bores. Insert spindle in the inlet control lever, engage clevis in annular groove on head of the inlet needle and tighten down the oval head countersunk screw. Make sure that the helical spring locates on the control levers nipple.

**Important:** The top of the inlet cover lever must be level with the bottom of the metering chamber. If necessary, use suitable pliers to carefully bend the lever.

- Check easy action of the inlet control lever.

- Fix newly installed seal plug with Loctite, see 11.2. (Fill gap between housing and seal plug with Loctite.)

- Refit the carburetor adjusting screws.

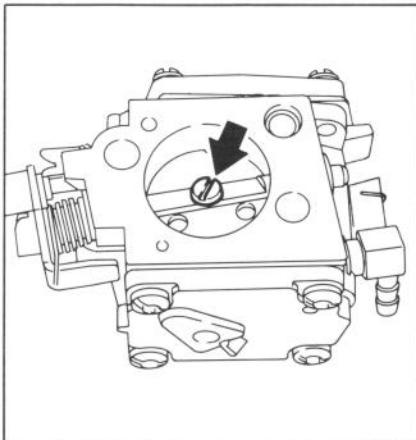


- Fit gasket, metering diaphragm, and end cover, whereby the metering diaphragm and the gasket are fixed by the integrally cast pegs on the carburetor body.

- Insert the fuel strainer at the pump side. Fit the pump diaphragm, gasket and end cover and tighten down securely. The pump diaphragm and gasket are held in position by the integrally cast pegs on the end cover.

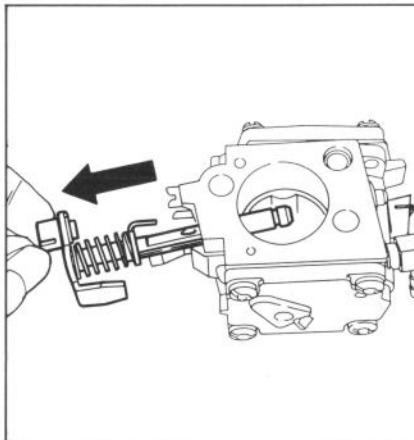
Top:  
Throttle shutter  
fastening screw

Bottom:  
1 = Washer  
2 = Circlip



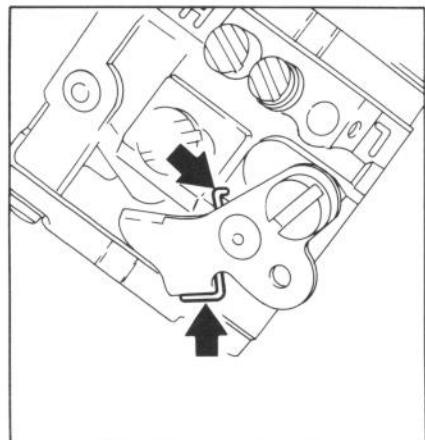
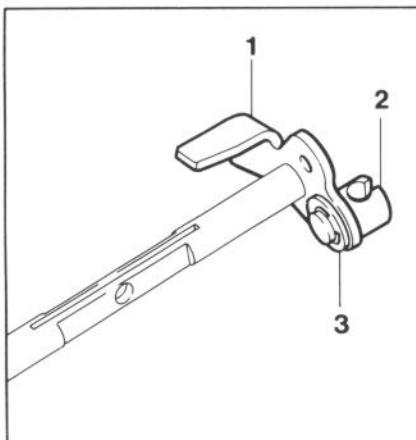
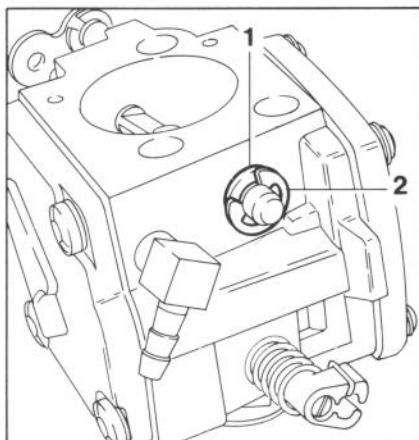
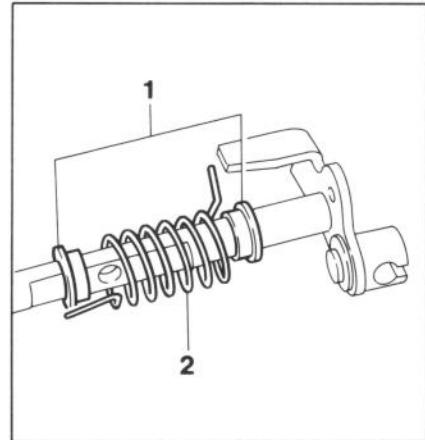
Top:  
Removing the throttle shaft

Bottom:  
1 = Lever on the throttle shaft  
2 = Slotted pin  
3 = Circlip



Top:  
1 = Bushing  
2 = Torsion spring

Bottom:  
Properly positioned torsion spring



### Removing the throttle shaft:

- Unscrew the throttle shutter fastening screw.
- Use suitable pliers to pull the throttle shutter out of the carburetor.
- Press circlip off of throttle shaft and remove washer.

- Carefully pull throttle shaft out of carburetor.

- Remove torsion spring and bushings.
- Press circlip off of slotted pin, remove slotted pin from throttle shaft lever.

- Slide bushings and torsion springs onto throttle lever.

**Note:** Slide bushings on so that in each case the end with the smaller diameter faces the torsion spring.

- After sliding in the throttle shaft, make sure that the torsion springs are positioned properly.

**Top:**  
Mounting the throttle shutter  
1 = Round notch  
2 = Notches

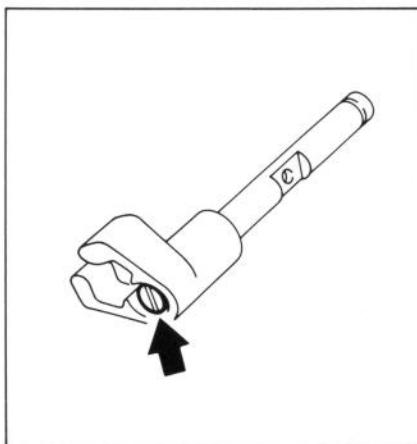
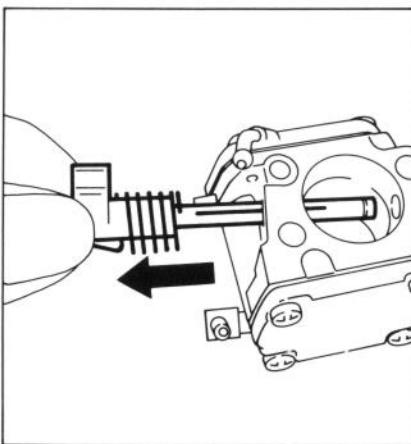
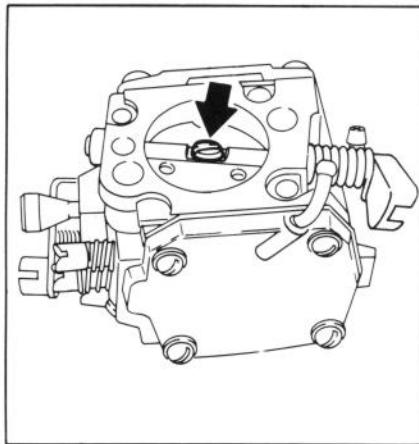
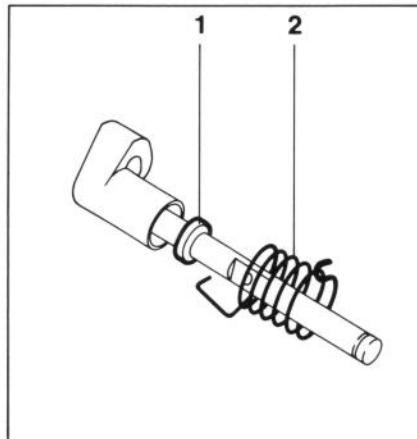
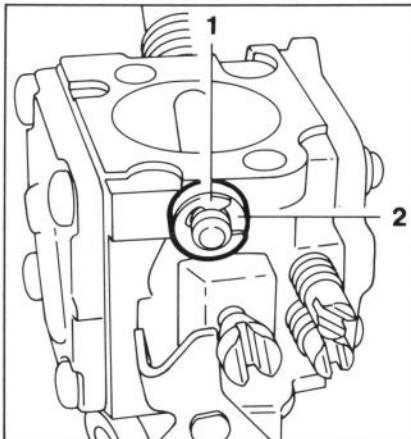
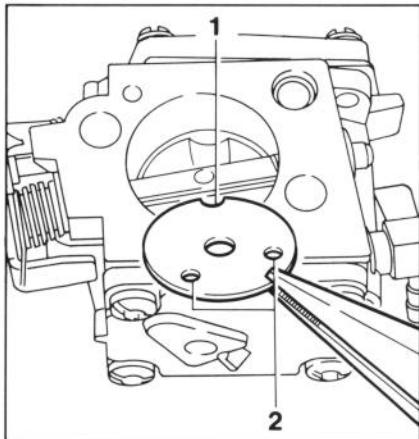
**Bottom:**  
Choke shutter mounting screws

**Top:**  
1 = Circlip  
2 = Ring

**Bottom:**  
Removing the choke shaft

**Top:**  
1 = Gasket  
2 = Torsion spring

**Bottom:**  
Choke lever mounting bolt



- Mount throttle shutter with round notch toward control-side end cover and other notches facing inward.
- Screw in mounting screw using Loctite, see 11.2., and tighten.

- Press circlip off of choke shaft.
- Remove ring and gasket.
- Remove choke shaft from carburetor.

- Remove torsion spring and gasket.
- Unscrew choke lever mounting screw, remove choke lever.

### Removing the choke shaft

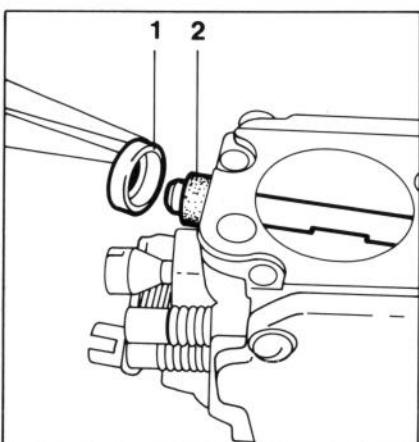
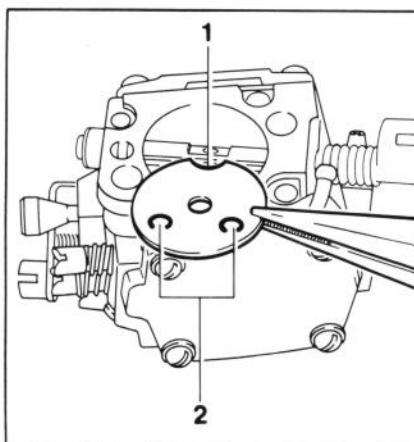
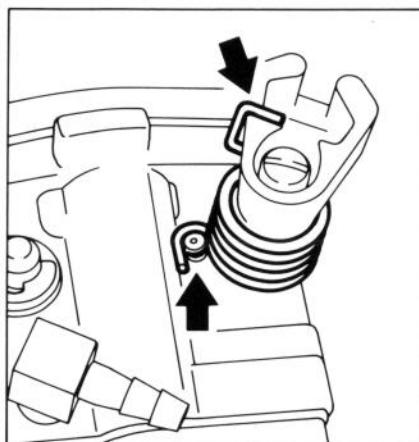
- Unscrew choke shutter mounting screws, remove choke shutter.

## 10.6 Carburetor Adjustment

Top:  
Properly positioned torsion spring

Bottom:  
1 = Ring  
2 = Gasket

Fitting the choke shutter  
1 = Round notch  
2 = Notches



- Fit new gasket in choke lever.
- Following insertion of choke shaft, make sure that torsion springs are positioned properly.
- Slide new gasket over choke shaft.
- Slide ring on with open side facing gasket.
- Press circlip into groove of choke shaft.
- Fit choke shutter with round notch facing pump-side end cover and other notches facing outward.
- Screw in mounting screw using Loctite, see 11.2., and tighten.

The ignition system is equipped with an electronic maximum engine speed limiter. Unlike machines equipped with ordinary ignition systems, the maximum engine speed cannot be made to exceed a predetermined maximum r. p.m. by adjusting the carburetor.

Likewise, the machine cannot be adjusted by hand for "maximum performance". Extremely lean carburetor settings yield neither higher rpms nor increased power, but instead increase the risk of engine damage.

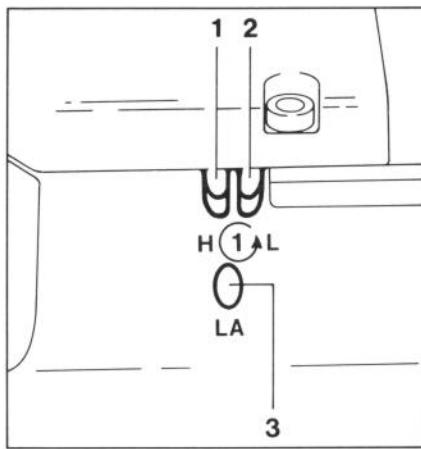
The carburetor has a **standard setting** when it leaves the factory.

This is the optimum setting of the high speed adjusting screw for the barometric pressure and climatic conditions at the factory (300m above sea level). It ensures maximum engine performance, fuel efficiency and the highest possible reliability.

#### Standard setting

If the carburetor has to be adjusted from scratch, first carry out the standard setting to obtain a starting point for the fine tuning.

Adjusting screws  
on carburetor  
1 = High speed adjusting screw  
2 = Low speed adjusting screw  
3 = Idle speed adjusting screw



- Carefully screw in both adjusting screws clockwise until they are hard against their seats.

Now make the following adjustments:

**H** = High speed adjusting screw backed off 1 full turn

**L** = Low speed adjusting screw backed off 1 full turn

When used at high altitudes (mountains) or near sea level, a minor correction **may** be necessary.

- Check the air filter and clean it if necessary.

- Adjust idle speed correctly (cutting wheel must not rotate).

- Start the engine.

- Warm up the machine.

Turn the high speed adjusting screw (**H**) and low speed adjusting screw (**L**) clockwise for leaner mixture at high altitudes or counterclockwise for richer mixture at sea level. Turn screws very slowly and carefully - even slight adjustments produce a noticeable change in engine running behavior.

#### Adjusting engine idle speed

#### Cutting wheel rotates while engine is idling

Turn the idle speed adjusting screw (**LA**) counterclockwise until the cutting wheel stops rotating.

#### Engine stops while idling

Turn the idle speed adjusting screw (**LA**) clockwise until the engine runs smoothly.

#### Erratic idling behavior, poor acceleration

Idle setting too lean. Turn the low speed adjusting screw (**L**) counterclockwise until the engine runs and accelerates smoothly.

#### Exhaust smokes at idle speed

Idle setting too rich. Turn the low speed adjusting screw (**L**) clockwise until the engine speed drops - and then turn it back stepwise until the engine accelerates smoothly when the throttle is opened.

Fuel filler cap



The diaphragm pump draws fuel out of the tank and into the carburetor via the fuel hose. Any impurities mixed with the fuel are retained by the pickup body (filter). The fine pores of the filter eventually become clogged with minute particles of dirt. This restricts the passage of fuel and results in fuel starvation.

**Important:** In the event of trouble with the fuel supply system, always check the fuel tank and pickup body first. Clean the fuel tank if necessary.

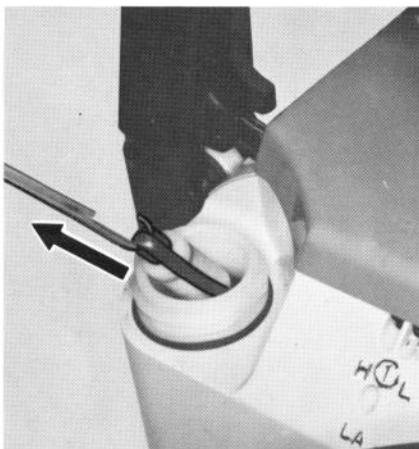
#### Cleaning the fuel tank:

- Unscrew the filler cap and drain the tank.
- Pour a small amount of clean gasoline into the tank.
- Close the tank and shake the Cutquik vigorously.
- Open the tank again and drain it.

## 10.8 Fuel Tank

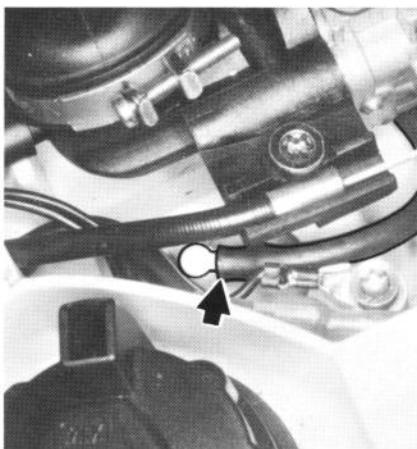
**Top:**  
Removing pickup body with assembly hook 5910 893 8800

**Bottom:**  
Pulling pickup body off hose



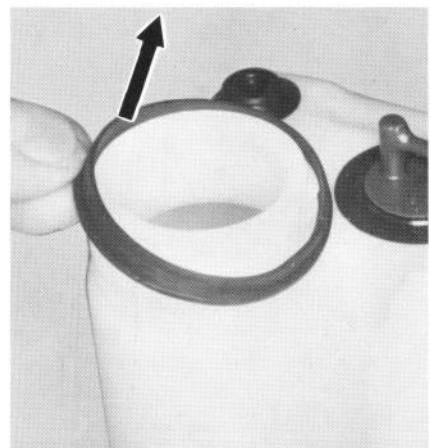
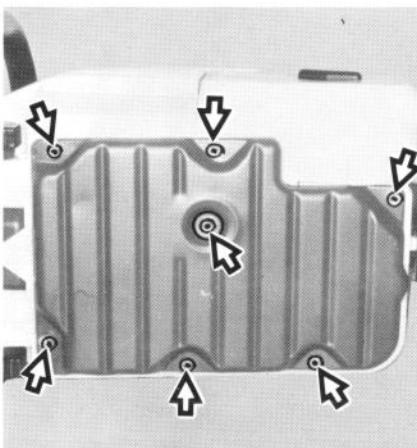
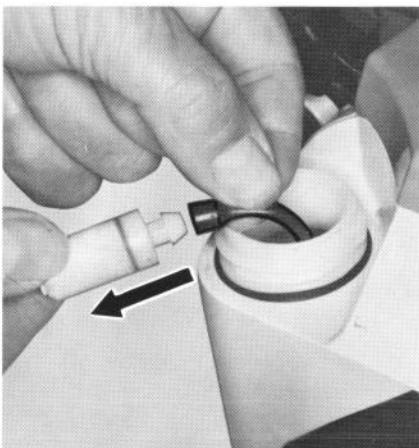
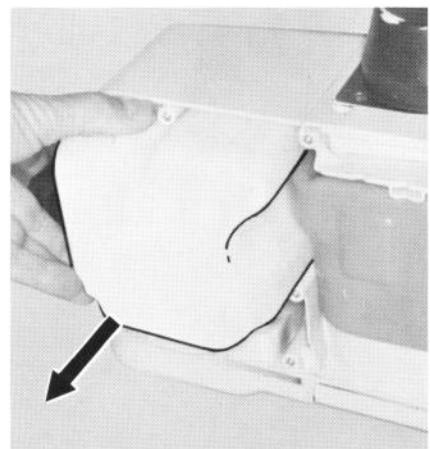
**Top:**  
Fuel Hose

**Bottom:**  
Housing cover mounting screws



**Top:**  
Removing the fuel tank

**Bottom:**  
Removing the rubber ring



### Removing and refitting pickup body:

- Use the special assembly hook to pull the pickup body out through the filler neck.

**Note:** During removal, make sure that the fuel hose is not subjected to too much stretching.

- Remove pickup body from fuel hose and replace pickup body.

The parts are assembled in reverse order.

- Remove carburetor box cover, see 10.2.

- Remove fuel hose from connector on fuel tank.

- Unscrew filler cap and pull ring out of fuel tank filler opening.

- Unscrew housing cover mounting screws, remove housing cover.

- Remove fuel tank from engine housing.

- Remove rubber ring from threaded connector of fuel tank.

Top:  
Removing the tank vent grommet

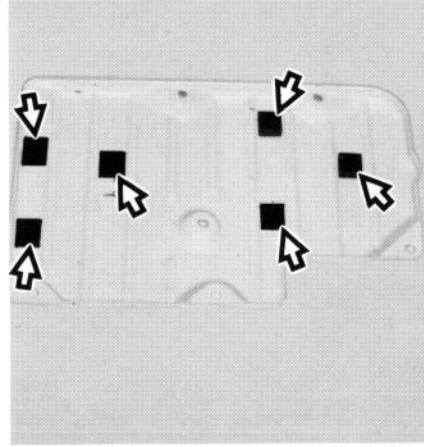
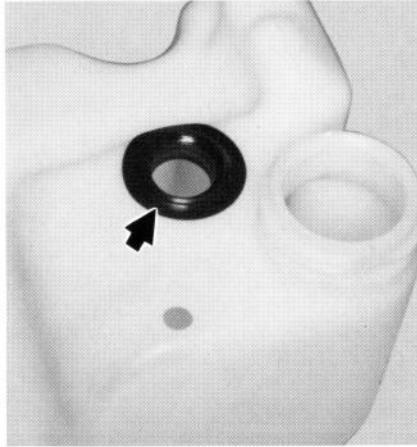
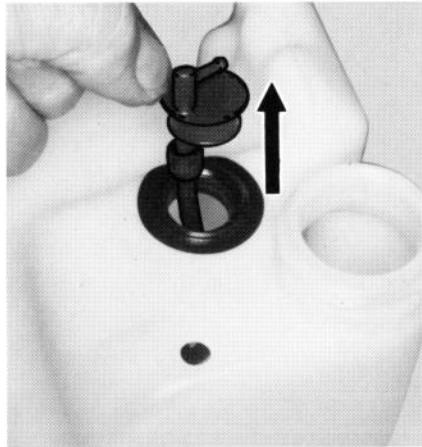
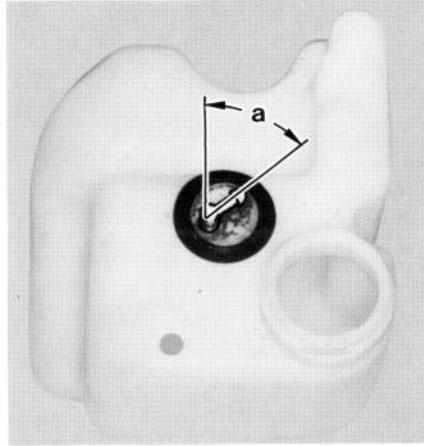
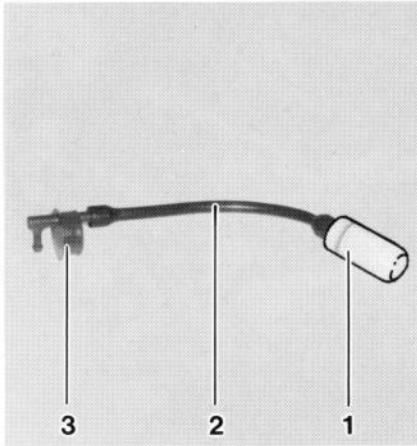
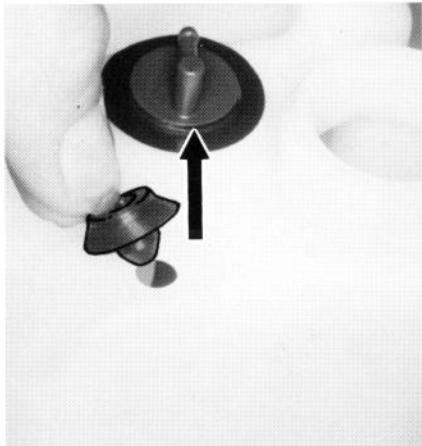
Bottom:  
Removing the elbow

Top:  
1 = Pickup body  
2 = Hose  
3 = Elbow

Bottom:  
Grommet

Top:  
Properly positioned elbow  
 $a = 65^\circ$

Below:  
Washers



- Remove grommet for the connectors of the elbow.
- Remove elbow from grommet and remove, together with hose and pickup body, from fuel tank.

- If necessary, remove hose with pickup body from elbow.
- Remove grommet from fuel tank.
- Remove washers from fuel tank.

The parts are assembled in reverse order.

**Note:** Position elbow as shown in diagram.

Inspect washers on housing cover, if necessary, glue new ones to the places provided.

Tighten housing cover mounting screws to 6.0 Nm.

## 10.9 Expansion Tank

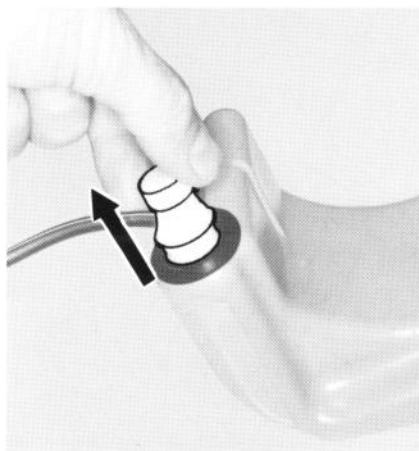
Top:  
Vent hose

Bottom:  
Removing the expansion tank



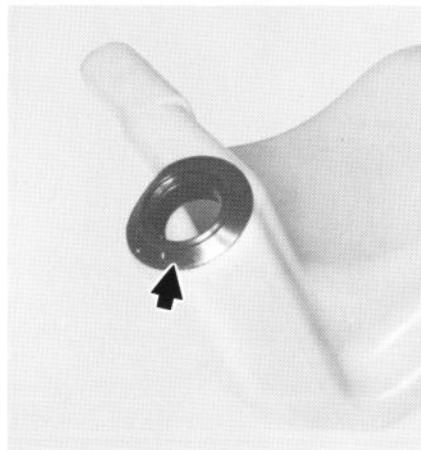
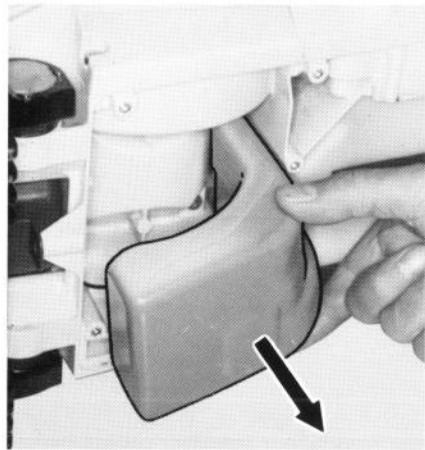
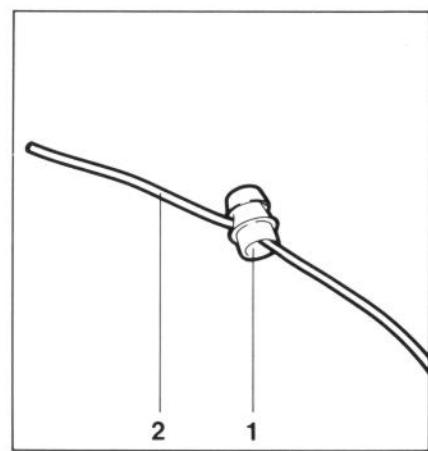
Top:  
Removing the tank vent

Bottom:  
Grommet



## 10.10 Tank Vent

1 = Tank vent  
2 = Vent hose



- Remove carburetor box cover, see 10.3.
- Disconnect vent hose from connector on connecting piece.
- Remove housing cover, see 10.8.
- Remove expansion tank from engine housing.

- Remove tank vent from expansion tank.
- Remove grommet from opening.

The parts are assembled in reverse order.

**Note:** Inspect and, if necessary, glue down new washer between expansion tank and engine housing.

Correct operation of the carburetor is only possible if atmospheric pressure and internal fuel tank pressure are equal at all times. This is ensured by the tank vent.

**Important:** In the event of trouble with the carburetor or the fuel supply system, always check and clean the tank vent.

**Note:** Equalization of pressure in both directions takes place via valve in tank vent.

- Remove tank vent from expansion tank, see 10.9.
- Remove vent hose from tank vent.

Top:  
Cap

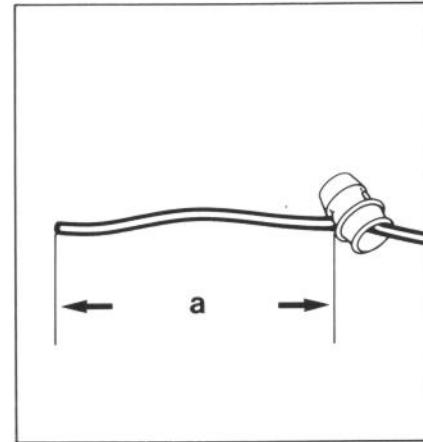
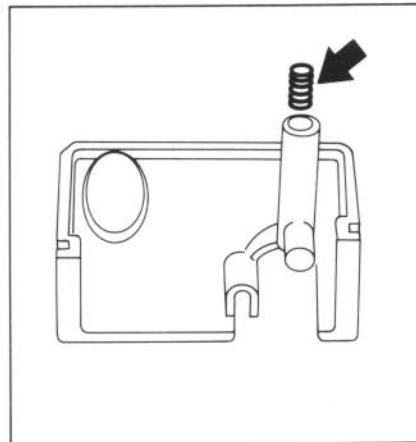
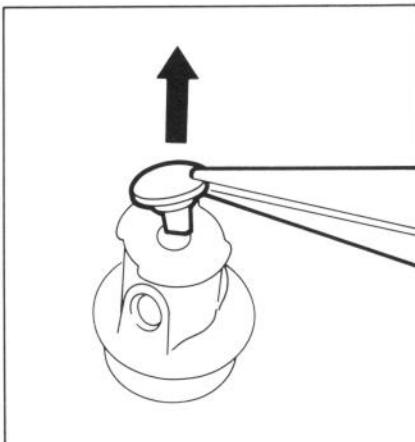
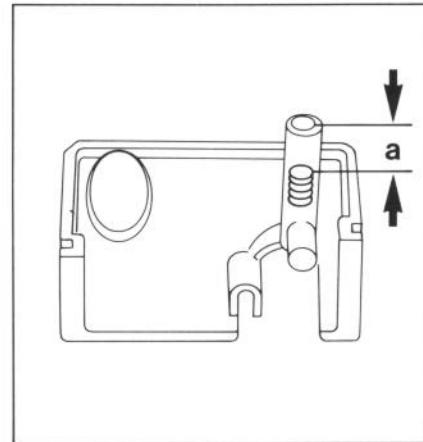
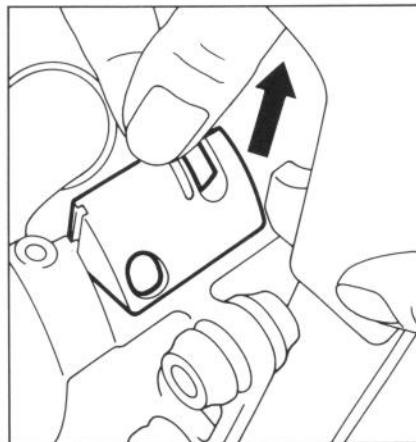
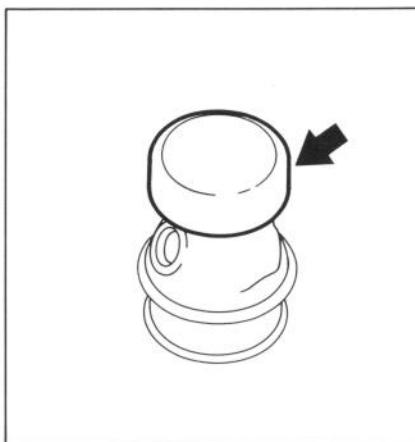
Bottom:  
Removing the valve

Top:  
Removing connecting  
piece

Bottom:  
Vent insert

Top:  
Mounted vent insert  
a = approx. 6 mm

Bottom:  
Mounted vent hose  
a = approx. 140 mm



- Press cap off of tank vent.
- Remove valve from tank vent.
- Detach throttle cable from carburetor, see 9.4, and lay aside.
- Remove AV-molding, see 9.7.
- Remove short circuit wire and ground wire from slot in connecting piece and lay aside.

- Push handle grip somewhat to the side and pull out connecting piece.
- Unscrew vent insert from connecting piece.
- Wash all parts in clean white spirit and blow through thoroughly with pressurized air.

The parts are assembled in reverse order.

**Note:** Screw in vent insert to a depth of approx. 6 mm.

Pull vent hose into tank until it extends approx. 140 mm out of hole on the side.

**Caution:** Press connecting piece in carefully, so that connector does not break off in grommet during assembly.

## 10.11 Manifold

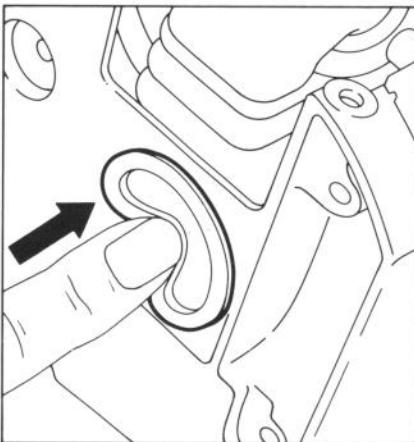
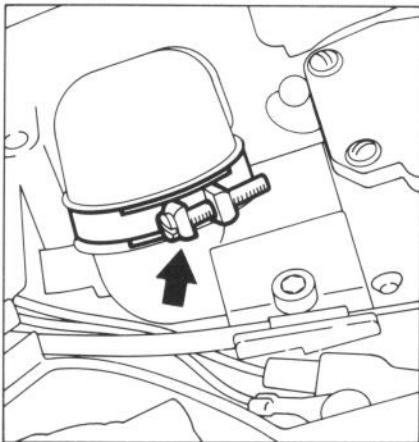
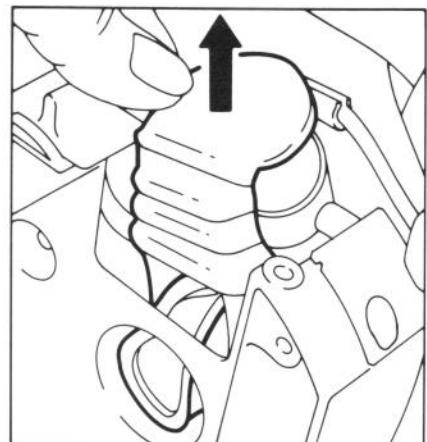
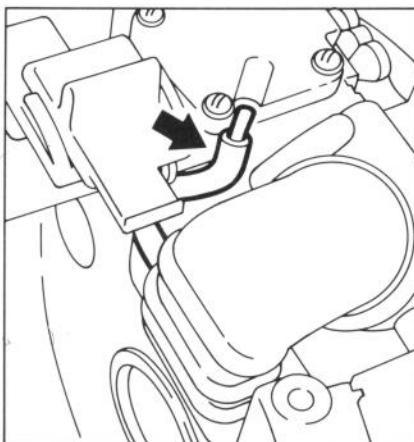
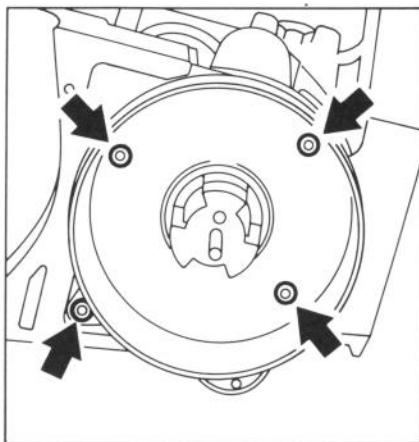
Top:  
Filter base mounting  
screws

Bottom:  
Clamp

Top:  
Hose

Bottom:  
Pressing out the manifold

Removing the manifold



- Remove fan housing, see 6.1.5.

- Remove air filter, see 10.1.

- Remove filter base mounting  
screws, remove filter base.

- Loosen screw on clamp, remove  
manifold from connector and  
remove clamp.

- Disconnect hose from connector  
on carburetor end cover.

- Press manifold collar out of  
engine housing.

- Remove manifold from engine  
housing.

The parts are assembled in  
reverse order.

**Note:** Tighten filter base mounting  
screws to 6.0 Nm.

## 11. Special Servicing Tools and Aids

## 11.1 Special Servicing Tools

No.	Part Name	Part No.	Application
1	Locking strip	4221 893 5900	Blocking crankshaft
2	Press sleeve	1127 893 2400	Fitting oil seal
3	Assembly sleeve	1122 893 4600	Protecting oil seal at clutch side
4	Puller	0000 890 4400	Removing oil seals
5	- Jaws (No. 3.1 + 4)	0000 893 3706	
6	- Jaws (No. 6)	0000 893 3711	
7	Puller	1116 893 0800	Removing flywheel
8	Crimping tool	5910 890 8210	Attaching connectors to electrical wires
9	Assembly drift	1108 893 4700	Fitting piston pin
10	Clamping strap	0000 893 2600	Compressing piston rings
11	Wooden assembly block	1108 893 4800	Fitting piston
12	Carburetor and crankcase tester	1106 850 2905	Testing carburetor and crankcase for leaks
13	- Nipple	0000 855 9200	
14	- Fuel line	1110 141 8600	
15	Vacuum tester	0000 850 3501	Testing crankcase for leaks
16	Sealing plate	0000 855 8106	Sealing exhaust port for leakage test
17	Test flange	1119 850 4200	For leakage test
18	- Bushings	0000 963 1008	
19	- Screws	9043 319 8100	
20	Setting gauge	1111 890 6400	
21	Socket, 13 mm	5910 893 5608	Setting air gap between ignition module and flywheel
22	Socket, 17 mm	5910 893 5610	Nut for flywheel
23	Socket, 21 mm long	5910 893 5616	Nut for starter cup
24	Torque wrench	5910 890 0301	Removing and installing clutch
		5910 890 0302	Screwed joints (0.5 to 18 Nm)
25	Torque wrench	5910 890 0311	
		5910 890 0312	Screwed joints (6 to 80 Nm)
26	Screwdriver bit I-5x120x6.3	0812 542 2104	1) For spline screws
27	Assembly hook	5910 893 8800	Removing pickup bodies
28	Installing tool	5910 890 2212	Fitting hookless snap rigs in piston
29	Assembly hook	5910 890 2800	Detaching springs from the clutch shoes
30	Installing tool	0000 890 2201	Flaring rope guide bush

1) This version is equipped with an opto-acoustical signal device.

No.	Part Name	Part No.	Application
31	T-handle screwdriver QI-5x150	5910 890 2400	For all IS screws
32	Pliers A 10	0811 611 8200	Outer circlip on the pressure plate
33	Pliers C 19	0811 641 8380	Inner circlip on the spindle bearing and on the crankshaft
34	Test wheel	5910 851 6100	Testing axial truth of running of the cutting wheel mount
35	Gauge holder	5910 850 6000	Testing axial truth of running
36	Dial gauge	0000 890 9100	Testing axial truth of running
37	Press arbor	1119 893 7200	Installation and removal of the needle sleeves in the V-belt pulley
38	Press arbor	4119 893 7200	Removal of the deep groove ball bearings in the spindle bearing

## 11.2 Servicing Aids

No.	Part Name	Part No..	Application
1	Lubricating grease	0781 120 1111	Oil seals, needle sleeve in the V-belt pulley
2	High-strength threadlocking (Loctite 270)	0786 111 1109	Throttle shutter fastening screw, sealing plug
3	Standard commercial, solvent-based degreasant containing no chlorinated or halogenated hydrocarbons		Cleaning crankshaft stub
4	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in rope rotor
5	Ignition lead HTR (10m)	0000 930 2251	
6	Electrician's repair kit	0000 007 1013	
7	Dirko sealant, 100g (3 1/2 oz)	0783 830 2120	Crankcase sealing faces, oil seals
8	Graphite grease		Peg on starter pawl
9	STIHL multipurpose grease	0781 120 1109	High voltage connection on ignition module

**englisch / english**

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