Service Manual
029 and 039
Chain Saws

As the design concept of these two models is almost identical, the descriptions and servicing procedures in this manual generally apply to both. Differences are described in detail.

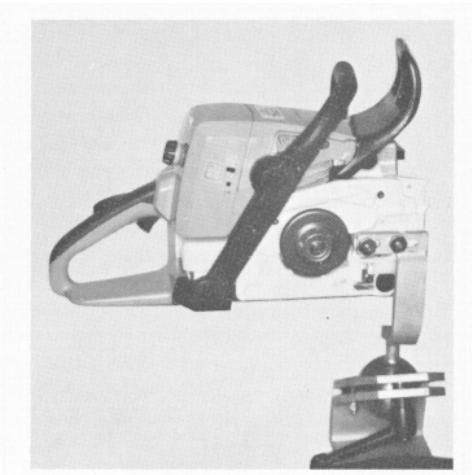
You should make use of the illustrated parts lists while carrying out repair work. They show the installed positions of the individual components and assemblies. Microfilmed parts list are always more up to date than printed lists.

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.

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.

Chain saw on assembly stand



Servicing and repairs are made considerably easier if the saw is mounted on assembly stand 5910 850 3100 or 5910 890 3100. This enables the saw to be swivelled to the best position for the ongoing repair and leaves both hands free.

The saw can be quickly secured to the stand by means of the bar mounting studs and nuts (after removing the sprocket cover).

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®

CONTENTS

1. SPECIFICATIONS

1.1 Engine	029	039
	STIHL single-cylinder two-stroke engine with special impregnated cylinder bore	
Displacement:	54.1 cm^3 (3.3 cu.in)	64.1 cm^3 (3.9 cu. in)
Bore:	45 mm (1.77 in)	49 mm (1.93 in)
Stroke:	34 mm (1.34 in)	34 mm (1.34 in)
Compression ratio:	9.5:1	10:1
Power output:	2.70 kW (3.7 bhp)	3.20 kW (4.4 bhp)
Max. torque:	2.8 Nm (2.1 lb. ft) at 6,500 r.p.m.	3.4 Nm (2.5 lb. ft) at 6,500 r.p.m.
Max. permissible engine speed with bar and chain:	13,000 r.p.m.	13,000 r.p.m.
Mean idle speed:	2,700 r.p.m.	2,700 r.p.m.
Crankshaft:	Three-part, drop forged	Three-part, drop forged
Crankshaft bearings:	2 ball bearings	2 ball bearings
Crankpin dia.:	14.4 mm (0.55 in)	14.4 mm (0.55 in)
Big-end bearing:	Needle cage	Needle cage
Conrod length:	58 mm (2.28 in)	58 mm (2.28 in)
Piston pin diameter:	10 mm (0.39 in)	10 mm (0.39 in)
Small-end bearing:	Needle cage	Needle cage
Rewind starter:	Pawl system with automatic rope rewind mechanism	Pawl system with automatic rope rewind mechanism
Starter rope:	3.5 mm (0.14 in) dia., 960 mm (37.8 in) long	3.5 mm (0.14 in) dia., 960 mm (37.8 in) long
Clutch:	Centrifugal clutch without linings, 76 mm (3.0 in) dia.	Centrifugal clutch without linings, 76 mm (3.0 in) dia.
Clutch engages at:	approx. 3,500 r.p.m.	approx. 3,500 r.p.m.
Crankcage leakage test		
at gauge pressure:	0.4 bar (5.8 psi)	0.4 bar (5.8 psi)
under vacuum:	0.4 bar (5.8 psi)	0.4 bar (5.8 psi)

1.2 **Fuel System** **029 / 039**

Carburetor:	All position diaphragm carburetor with integral fuel pump
Standard setting	
High speed adjusting screw H:	Back off approx. 1 turn
Low speed adjusting screw L:	Back off approx. 1 turn (starting with screws tight against their seats)
Carburetor leakage test at gauge pressure:	0.4 bar (5.8 psi)
Fuel tank capacity:	0.56 L (1 .2 US pt)
Fuel mixture:	Regular brand-name gasoline and brand-name two-stroke engine oil
Mix ratio:	**50:1** with Stihl two-stroke engine oil **25:1** with other brand-name two-stroke brand-name, air-cooled engine oils
Air filter:	Prefilter (coarse filter) bisectional box filter

1.3 **Ignition System**

Type:	Electronic magneto ignition (breakerless) with integral trigger unit
Air gap:	0.15-0.3 mm (0.006-0.012 in)
Ignition timing:	2.0-2.8 mm (0.08-0.10 in) B.T.D.C. at 8,000 r.p.m.
Advance angle:	24.5-29.5° 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 (0.020 in)
Spark plug thread:	M14x1.25
Length of thread:	9.5 mm (0.37 in)
Heat range:	200

1.4 Cutting Attachment

Guide bars:	Rollomatic with sprocket nose Duromatic with stellite-tipped nose
Bar tail:	3003
Bar lengths:	(32, 37, 40, 45, 50 and 63 cm) (13, 15, 16, 18 and 25 in)
Oilomatic chain:	9.32 mm (3/8") Rapid-Micro, Rapid-Super 8.25 mm (0.325") Rapid-Micro, Rapid-Super
Chain sprockets:	7-tooth 3/8" spur sprocket 7-tooth 0.325" spur sprocket 7-tooth 0.325" rim sprocket 8-tooth 0.325" rim sprocket
Chain speed:	21.7 m/s (71 ft/s) at 10,000 r.p.m.
Chain lubrication:	Fully automatic, speed-controlled reciprocating oil pump, no feed at idle speed. Additional manual oil flow control
Oil feed rate (adjustable):	6-15 cm³/min (0.2 - 0.5 fl.oz/min) at 10,000 r.p.m.
Oil tank capacity:	0.33 L (0.7 US pt)

1.5 Special Accessories

1.5.1	**For user**	STIHL repair kit	1127 900 5000
		Starter rope ∅ 3.5x30.5 m	0000 930 2203
		7-tooth 3/8" rim sprocket kit	1125 007 1002
		7-tooth 0.325" rim sprocket kit	1125 007 1001
		8-tooth 0.325" rim sprocket kit	1125 007 1000
		7-tooth 3/8" spur sprocket	1125 640 2000
		7-tooth 0.325" spur sprocket	1125 640 2005
		Spur gear/tensioning screw kit	1127 007 1003
		Elastostart	1128 190 3400
1.5.2	**For service shop**	Carburetor parts kit (Walbro)	1127 007 1060
		Carburetor parts kit (automatic choke)	1127 007 1061

1.6 Tightening Torques

"DG" screws are used in the polymer and light-alloy components of models 029 and 039. When screwed in for the first time, DG screws form a permanent thread in the parts concerned. They can be released and retightened as often as necessary without affecting the strength of the screwed assembly. However, it is essential to **always use a torque wrench** to tighten the screws to the specified torques.

Fastener	Thread size	For component	Torque Nm	(lbf.ft)	Remarks
Spline screw	IS-DG4x15	Chain tensioner cover/ engine housing	3.2	(2.4)	
Spline screw	IS-DG4x15	Chain brake cover/ engine housing	3.2	(2.4)	
Spline screw	IS-DG4x15	Handle housing/handle molding	1.6	(1.2)	
Spline screw	IS-DG4x15	Oil pump	4.0	(3.0)	
Spline screw	IS-DG4x15	Shroud/engine housing	3.2	(2.4)	
Spline screw	IS-DG4x15	Ground wire to cylinder	4.0	(3.0)	
Spline screw	IS-DG5x16	Chain catcher/engine housing	3.5	(2.6)	
Spline screw	IS-DG5x16	Spiked bumper/engine housing	3.5	(2.6)	
Spline screw	IS-DG5x24	Front handle/handle housing	3.5	(2.6)	
Spline screw	IS-DG5x24	Hand guard (l/h) with sleeve	3.5	(2.6)	
Spline screw	IS-DG5x24	Fan housing/engine housing	3.5	(2.6)	
Spline screw	IS-DG5x24	Buffer/front handle	3.5	(2.6)	
Spline screw	IS-DG5x24	Buffer/engine housing	3.5	(2.6)	
Spline screw	IS-DG5x24	Ignition module/engine housing	4.8	(3.5)	
Spline screw	IS-DG6x52	Engine housing/cylinder	11.0	(8.1)	
	M12x1L	Carrier (clutch)	50.0	(37.0)	
Collar stud	DG8x24	Guide bar	16.0	(11.8)	
Collar stud	M10x21	Guide bar/engine pan	30.0	(22.0)	1)
	M14x1.25	Spark plug	25.0	(18.5)	
Hexagon nut	M5	Muffler	9.0	(6.6)	
Hexagon nut	M5	Box filter/carburetor	2.0	(1.5)	
Hexagon nut	M5	Carburetor with box filter	3.2	(2.4)	
Hexagon nut	M8x1	Flywheel	27.5	(20.3)	

Use the following procedure to fit a DG screw in an existing thread:

- Place the DG screw in the hole and rotate it counterclockwise until it drops down slightly.
- Tighten the screw clockwise to the specified torque.

This procedure ensures that the screw engages properly in the existing thread and does not form a new thread.

Remarks:

1) Screw must be secured with adhesive 0786 110 0126 (Loctite 649).

Note: Screws secured with adhesive are easier to release if the adhesive is heated first with a hot air blower (hair dryer). **Exercise caution on polymer components.**

2. TROUBLESHOOTING CHARTS

2.1 Clutch, Chain Drive, Chain Brake and Chain Tensioner

Condition	Cause	Remedy
Saw chain turns at idle speed	Engine idle speed too high	Readjust at idle speed adjusting screw (counterclockwise)
	Spring hooks broken	Fit new springs
Loud noises	Clutch springs stretched or fatigued	Replace all clutch springs
	Needle cage damaged	Fit new needle cage
	Clutch shoe retainer broken	Fit new retainer
	Clutch shoes and carrier worn	Fit new clutch
Chain sprocket wears rapidly	Chain not properly tensioned	Tension chain as specified
Chain wears rapidly	Chain not properly tensioned	Tension chain as specified
	Poor chain lubrication	Check chain lubrication and rectify problem
	Worn chain sprocket	Fit new sprocket
Chain does not stop immediately when brake is activated	Brake spring broken	Fit new brake spring
	Brake band stretched or broken	Fit new brake band

2.2 **Engine**

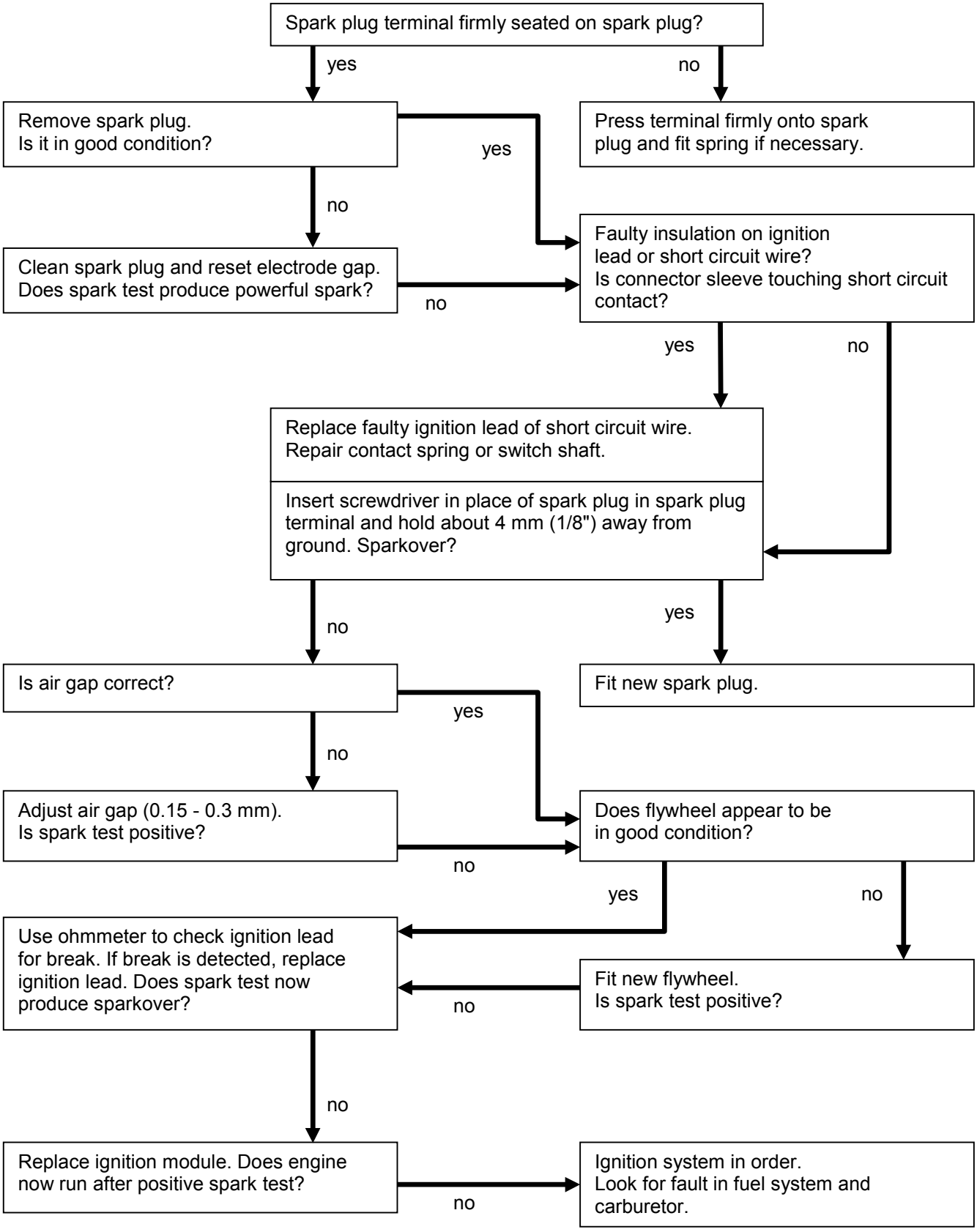
Always check and, if necessary, repair the following parts before looking for faults on the engine:

- 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 between cylinder and engine pan damaged	Replace oil seals
	Manifold leaking	Seal or replace manifold
	Engine pan leaking	Seal engine pan
	Engine pan damaged (cracks)	Replace engine pan
Engine does not deliver full power or runs erratically	Secondary air seepage through poorly mounted or faulty manifold	Mount manifold correctly or replace
	Piston rings leaking or broken	Fit new piston rings
	Muffler carbonized	Clean muffler (inlet and exhaust), replace spark arresting screen (if fitted)
Engine overheating	Insufficient cylinder cooling. Air inlets in fan housing blocked or cooling fins on cylinder very dirty	Thoroughly clean all cooling air openings
	Intake air preheating being used at too high an outside temperature	Move shutter to summer position

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 itself worn	Fit new pawls
	Spring clip fatigued	Fit new spring clip
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 Chain Lubrication

Important: In the event of trouble with the chain lubrication system, always investigate the other possible sources of faults before disassembling the oil pump.

Condition	Cause	Remedy
Chain receives no oil	Oil tank empty	Fill up with oil
	Oil inlet hole in guide bar is blocked	Clean oil inlet hole
	Intake hose or pickup body (strainer) clogged or intake hose ruptured	Wash intake hose and pickup body (strainer) in white spirit and blow out with compressed air; replace if necessary
	Valve in oil tank blocked	Clean or replace valve
	Teeth on pump piston and/or worm worn	Fit new oil pump and/or new worm
Machine losing chain oil	Bore in pump housing worn	Fit new pump housing
Oil pump delivers too little oil	Control screw and/or control edge on pump piston worn	Fit new control screw and/or pump piston
	Bore in pump housing worn	Fit new pump housing

2.6 **Fuel System**

Note: For machines with automatic choke see 11.6.2.

Condition	Cause	Remedy
Carburetor floods; engine stalls	Inlet needle not sealing.	Remove and clean or replace inlet needle,
	Foreign matter in valve seat or cone damaged	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
	Connecting bore to atmosphere blocked	Clean bore
	Diaphragm gasket leaking	Fit new diaphragm gasket
	Metering diaphragm damaged or shrunk	Fit new metering diaphragm
Engine will not idle, idle speed too high	Throttle shutter opened too wide by idle speed adjusting screw	Reset idle speed adjusting screw correctly

Condition	Cause	Remedy
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
	Pump diaphragm damaged or fatigued	Fit new pump diaphragm
	Main jet bores or ports blocked	Clean bores and ports
	Fuel pickup body dirty	Clean pickup body, fit new filter
	Fuel strainers dirty	Clean fuel strainers

See also 2.2

3. CLUTCH, CHAIN DRIVE CHAIN BRAKE AND CHAIN TENSIONER

3.1 Clutch Drum and Chain Sprocket

Top:
Sprocket cover mounting nuts

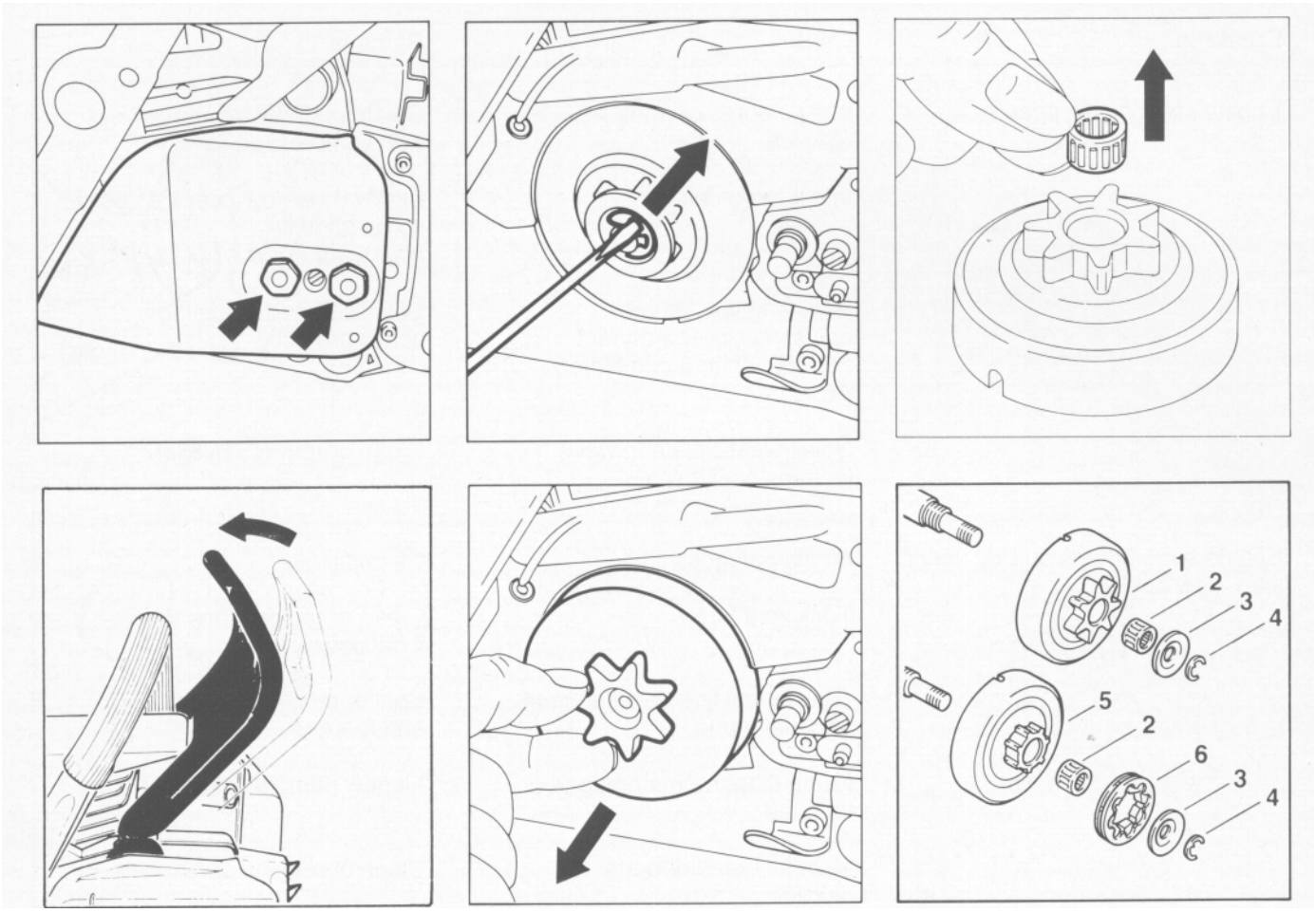
Bottom:
Disengaging chain brake

Top:
Removing E-clip

Bottom:
Removing chain sprocket

Top:
Removing needle cage

Bottom:
Assembly sequence of chain drive
1 = Spur sprocket
2 = Needle cage
3 = Washer
4 = E-clip
5 = Clutch drum (for rim sprocket)
6 = Rim sprocket



- Unscrew sprocket cover nuts and remove the sprocket cover.
- Disengage the chain brake by pulling the hand guard back toward the front handle.
- Pry the E-clip off the crankshaft.

- Remove the washer from the clutch drum or chain sprocket.
- Remove the spur sprocket or rim sprocket with clutch drum.
- Take the needle cage out of the clutch drum or chain sprocket.

Reassemble in the reverse sequence.

Note: Clean stub of crankshaft. Replace the needle cage or wash it in clean white spirit and lubricate with STIHL multipurpose grease, see 12.2.

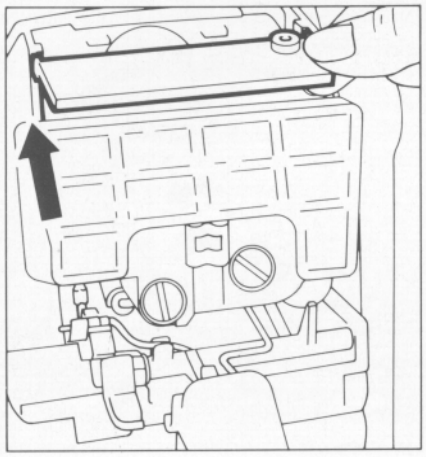
Push clutch drum/chain sprocket onto crankshaft and rotate it until tang of spring on oil pump worm engages the notch in the clutch drum.

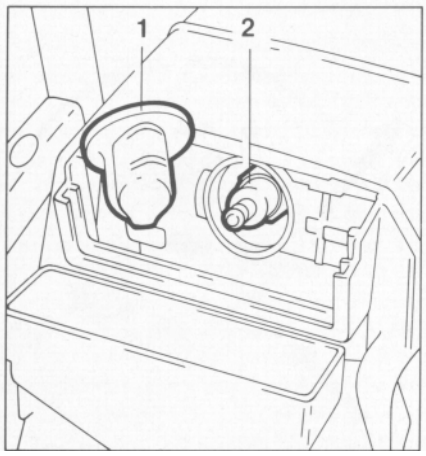
Important: Rim sprocket must be fitted with the chip ejector cavities facing outward.

3.2 Clutch

Top:
Removing prefilter

Bottom:
1 = Spark plug terminal
2 = Spark plug





Removing and disassembling clutch:

Troubleshooting chart - see 2.1.

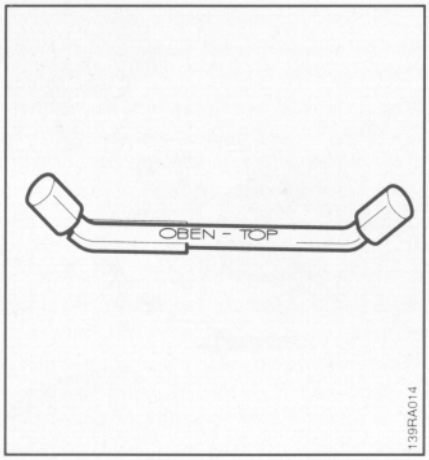
- Remove air filter - see 11.1.

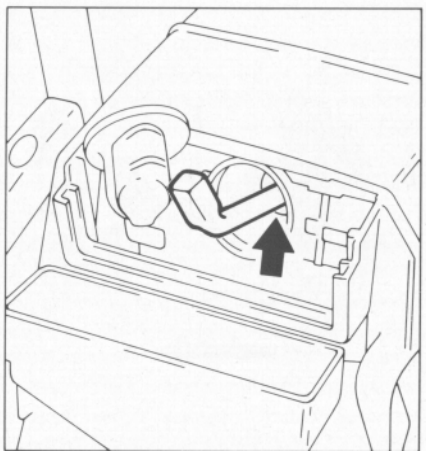
- Pull the prefilter out of the handle housing.

- Pull terminal off the spark plug. Unscrew the spark plug.

Top:
Locking strip 0000 893 5902

Bottom:
Locking strip in position



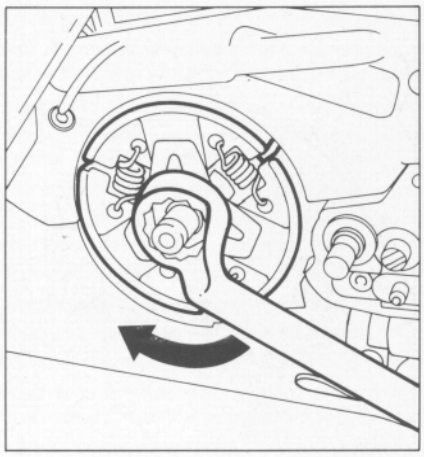


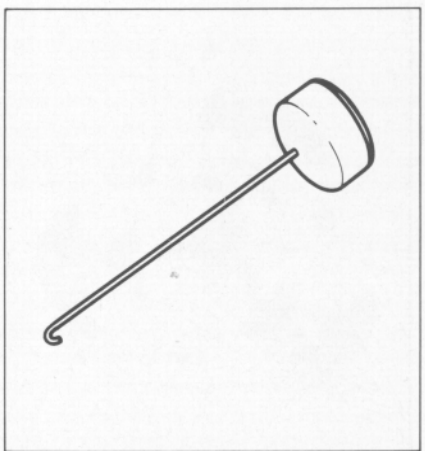
- Push the locking strip into the spark plug hole so that "TOP" or "OBEN" is facing upward.

Important: To avoid the risk of piston damage, use only the specified locking strip.

Top:
Unscrewing the clutch

Bottom:
Assembly hook 5910 890 2800





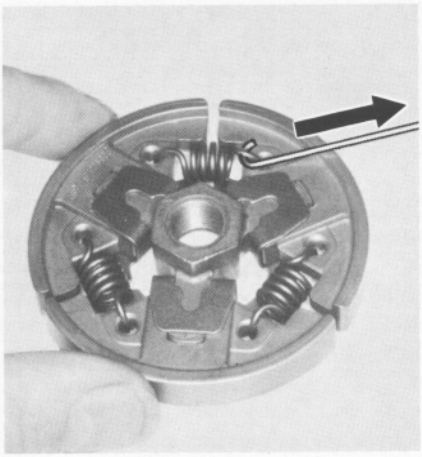
- Remove the clutch drum or chain sprocket, see 3.1.

- Unscrew the clutch from the stub of the crankshaft.

Caution: Clutch has a left-hand thread.

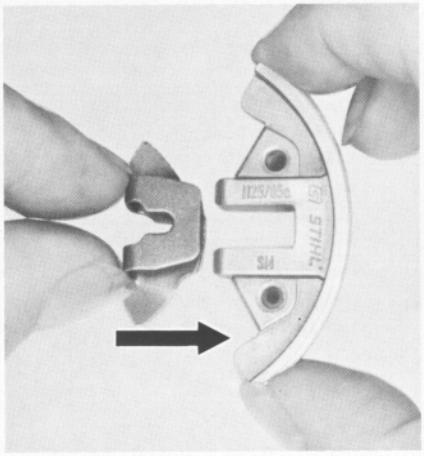
Top:
Removing a clutch spring

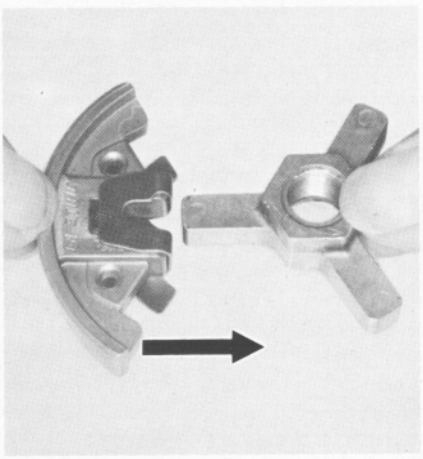
Bottom:
Component parts of clutch



Top:
Fitting retainer on
clutch shoe

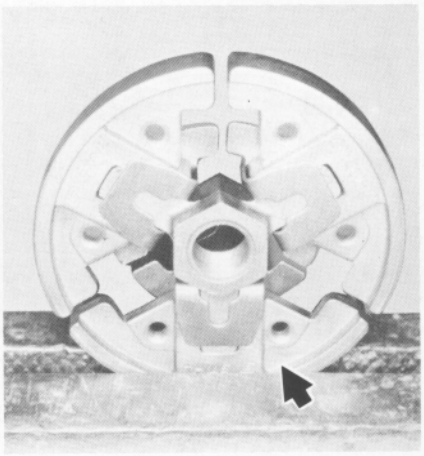
Bottom:
Pushing clutch shoe
onto carrier

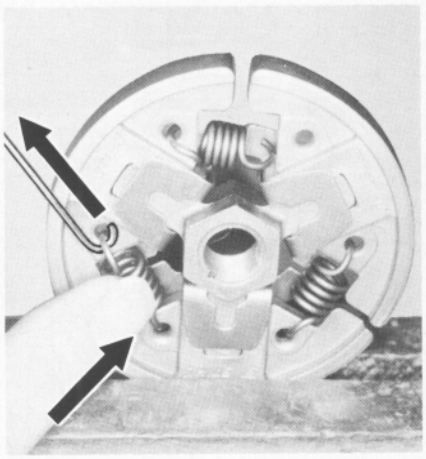




Top:
Clutch clamped in a vise

Bottom:
Attaching clutch springs





- 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.

Assembling and installing the clutch:

- Slip the retainers onto the clutch shoes so that the narrow side is next to the series number, e.g. 1127.
- Fit the clutch shoes over the arms of the clutch carrier so that the series number, e.g. 1127, is on the same side as the carrier's hexagon.

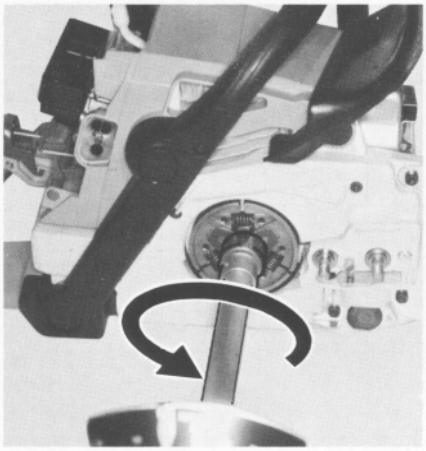
- Clamp the clutch, e.g. one shoe, in a vise.
- Attach one end of each spring to the clutch shoes by hand.
- Use the assembly hook to attach the other ends of the springs and press them firmly into the clutch shoes with one finger.

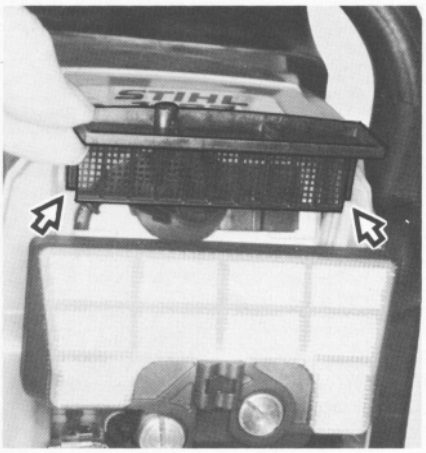
3.3 Chain Brake

3.3.1 Disassembly

Top:
Tightening the clutch

Bottom:
Fitting the prefilter

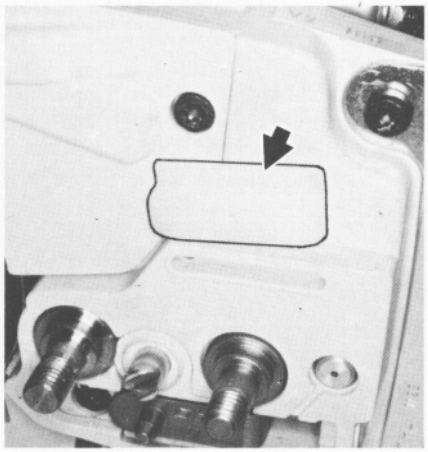


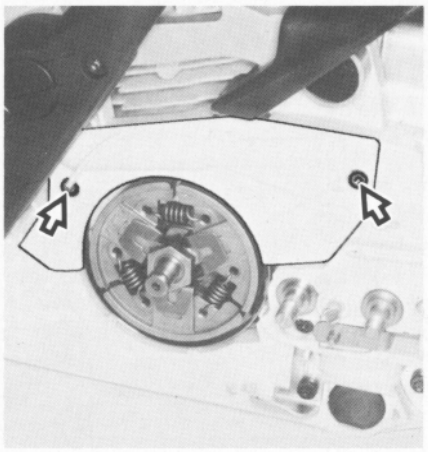


- Screw clutch onto crankshaft and torque down to 50 Nm (37 lbf.ft).
- Install clutch drum or spur sprocket - see 3.1
- Remove locking strip from cylinder. Install spark plug and torque down to 25 Nm (18.5 lbf.ft).
- Install the air filter - see 11.1.
- Fit the prefilter so that its tabs engage the recesses in the handle housing.

Top:
Bumper strip

Bottom:
Cover mounting screws

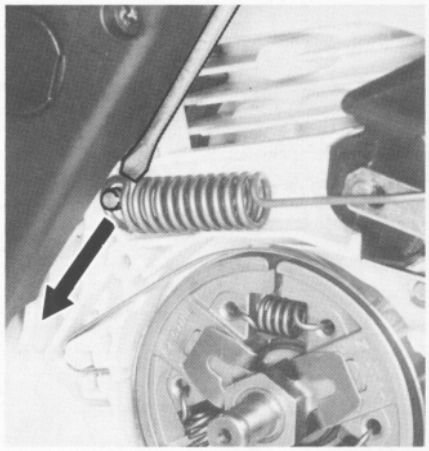


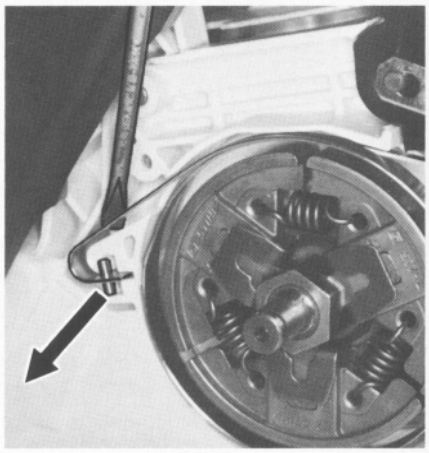


- Remove the clutch drum or spur sprocket - see 3.1.
- Engage the chain brake.
- Remove the upper bumper strip from its seat.
- Remove mounting screws from cover and lift cover away.

Top:
Detaching brake spring

Bottom:
Removing the brake band





- Carefully remove the brake spring from the anchor pin.
- Ease the brake band out of its seat in the engine housing.

Top:
Removing the
brake band

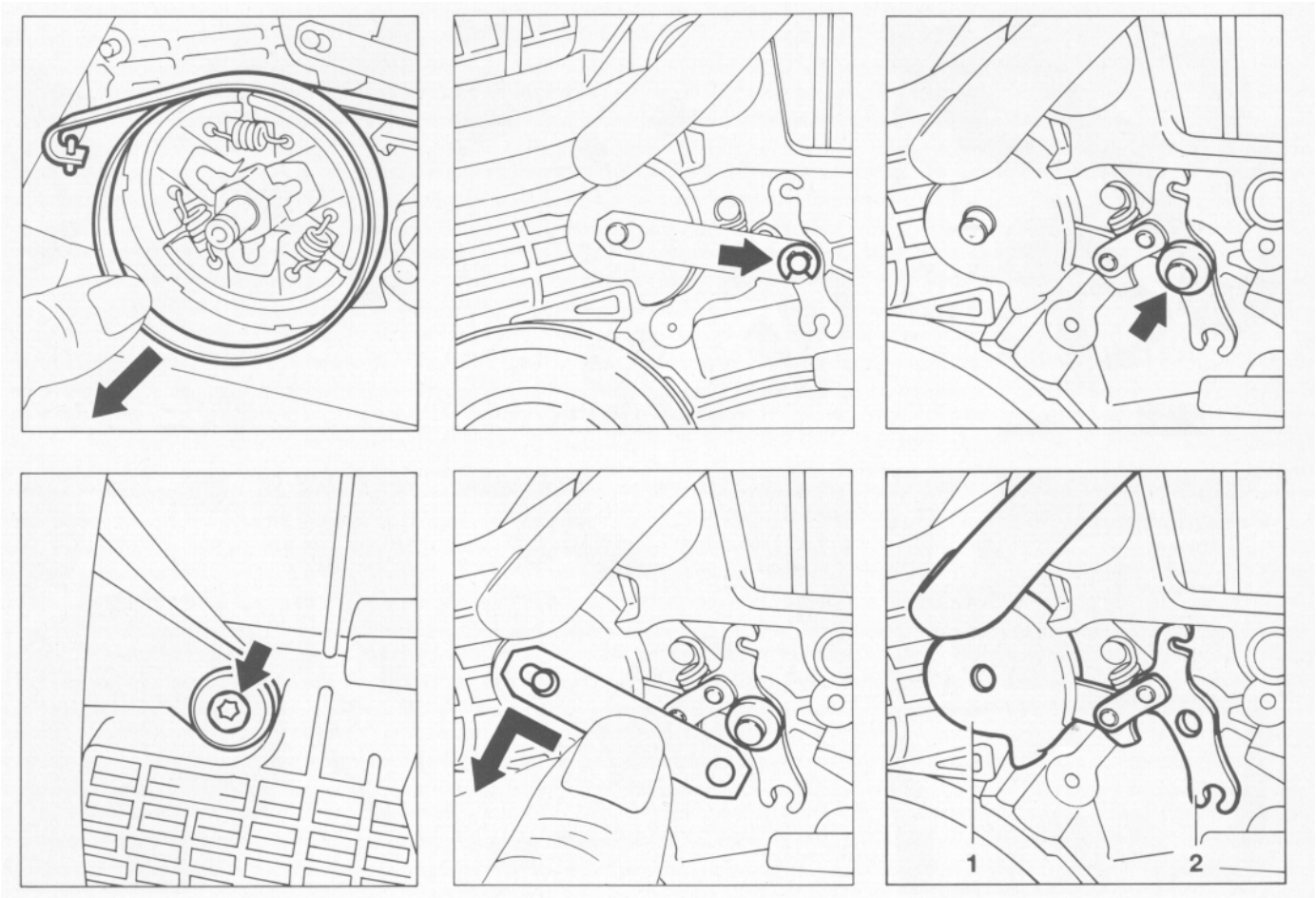
Bottom:
Hand guard mounting
screw

Top:
E-clip on bell crank pivot pin

Bottom:
Removing the link (strap)

Top:
Washer on pivot pin

Bottom:
1 = Hand guard
2 = Bell crank



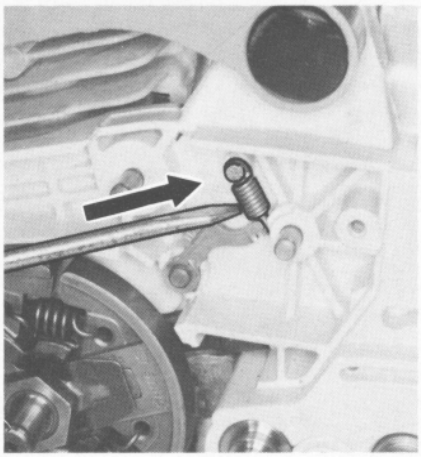
- Remove the brake band from the retaining lug and disconnect it from the bell crank.
- Take out the hand guard mounting screw.

- Pry the E-clip off the bell crank pivot pin.
- Remove the link (strap) from the bell crank pivot pin.
- Slide the link up and take it off the hand guard pivot pin.

- Remove washer from bell crank pivot pin.
- Carefully pull the hand guard and bell crank off their pivot pins and lift them away together.

3.3.2 **Assembly**

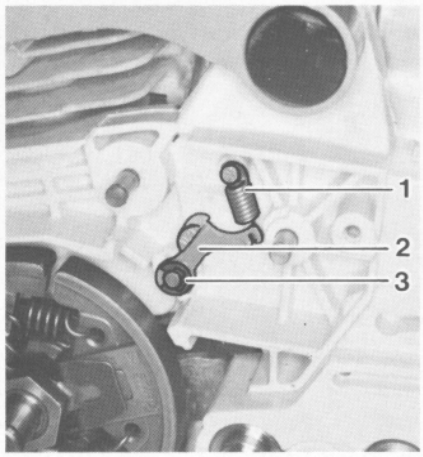
Disconnecting the spring

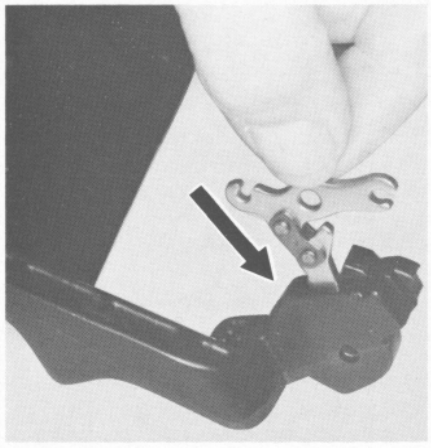


- Remove the E-clip from the cam lever pivot pin.
- Disconnect spring from the cam lever. Pull the cam lever off the pivot pin.
- Remove the spring.
- Clean all disassembled parts in white spirit. Replace any worn or damaged parts.

Top:
1 = Spring
2 = Cam lever
3 = E-clip

Bottom:
Fitting bell crank in hand guard

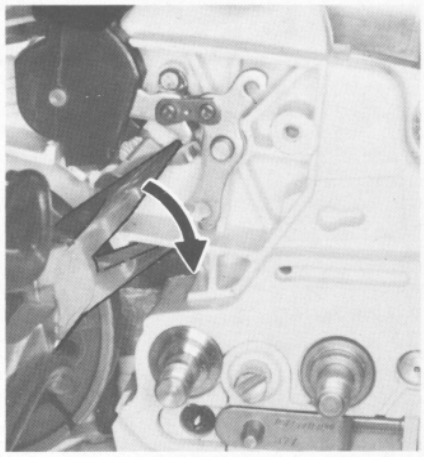


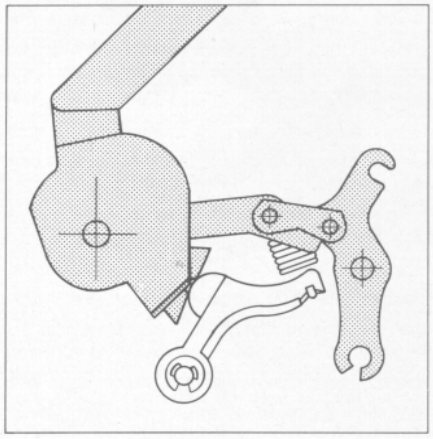


- Push the cam lever onto the pivot pin and secure it with the E-clip.
- Attach the spring to the cam lever, from behind, and push it over the pivot pin.
- Insert the bell crank in the side of the hand guard so that the short arm of the bell crank points up.

Top:
Pressing cam lever downward

Bottom:
Correct installed position of hand guard

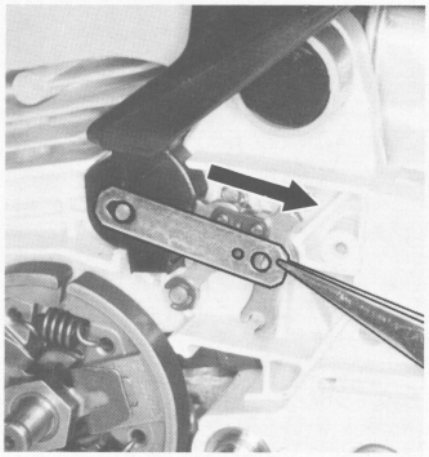


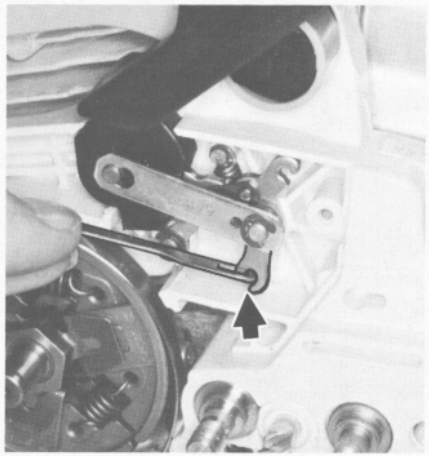


- Position bearing boss of hand guard against the pivot pin and fit the other side of the hand guard over the handle housing.
- Press the cam lever downward and push the hand guard and bell crank onto the pivot pins.

Top:
Fitting the link

Bottom:
Attaching brake band to bell crank

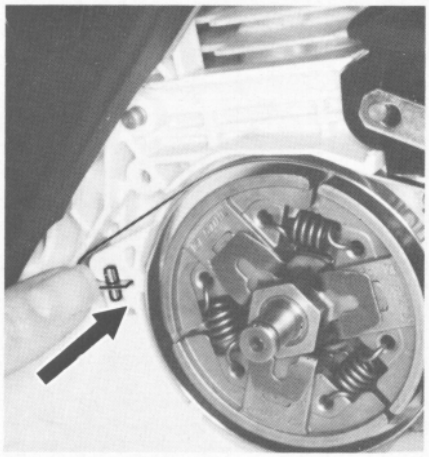


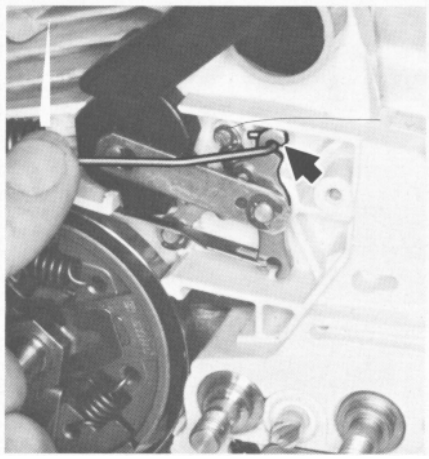


- Fit the washer on the bell crank pivot pin.
- Position the link on the hand guard pivot pin and slide it down until it engages the groove on the end of the pivot pin. Then push link over the bell crank pivot pin and secure it with the E-clip.
- First attach brake band to bell crank and then push it into the engine housing recess.

Top:
Fitting the brake band

Bottom:
Attaching the brake spring



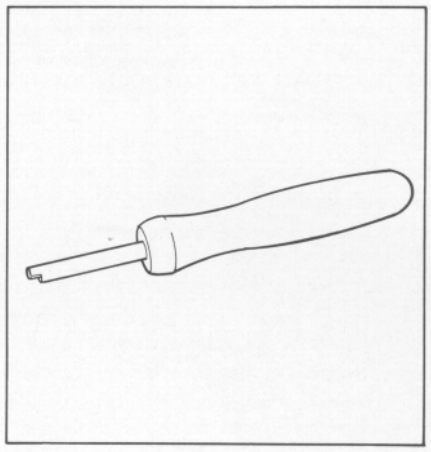


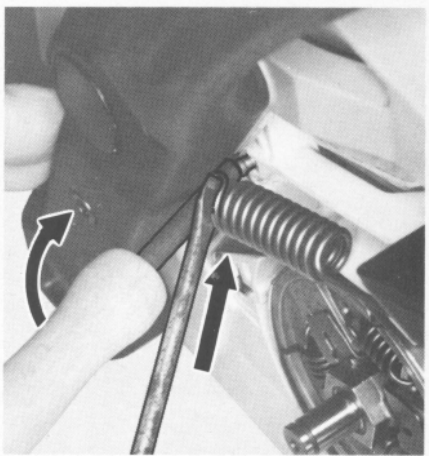
Important: Coat sliding and bearing points with Molykote grease - see 12.2. **Do not** lubricate the brake band.

- Attach the brake spring to the bell crank.
- Use the assembly tool and a screwdriver to attach the brake spring to the anchor pin.

Top:
Assembly tube 1117 890 0900

Bottom:
Attaching brake spring to anchor pin



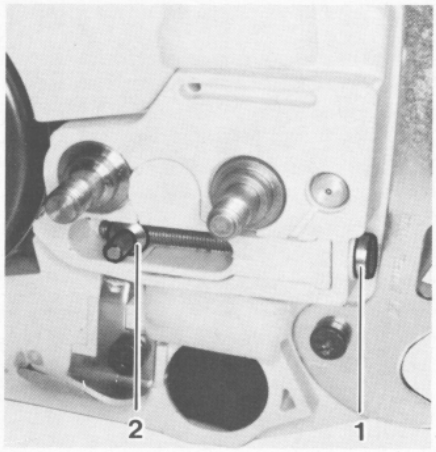


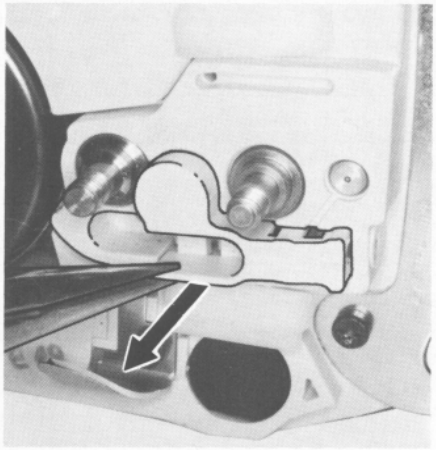
- Slip the bush over the hand guard mounting screw. Fit screw and tighten to 3.5 Nm (2.6 lbf.ft).
- Fit cover for brake band.
- Fit bumper strip in its seat.
- Install the clutch drum or chain sprocket - see 3.1.

3.4 Front Chain Tensioner

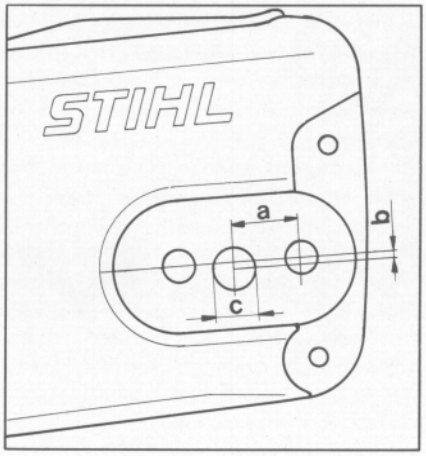
Top:
1 = Adjusting screw
2 = Adjusting nut

Bottom:
Removing cover





a = 19.5 mm (0.77")
b = 1.7 mm (0.07")
c = ∅ 10 mm (0.4")



Note: The front chain tensioner can be converted to a side chain tensioner - see 3.5.

In the case of a coversion from front to side chain tensioner, it is necessary to drill a hole in the sprocket cover to take the peg of the spur gear - see dimensions in illustration.

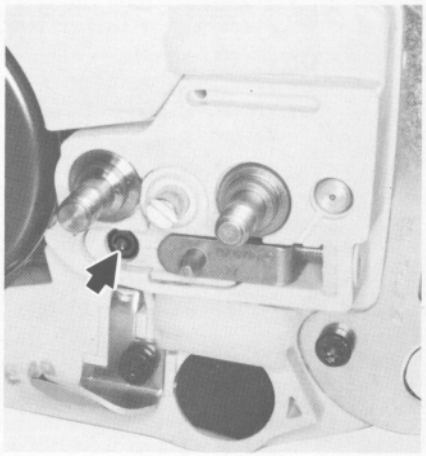
Reverse the above sequence to install the chain tensioner.

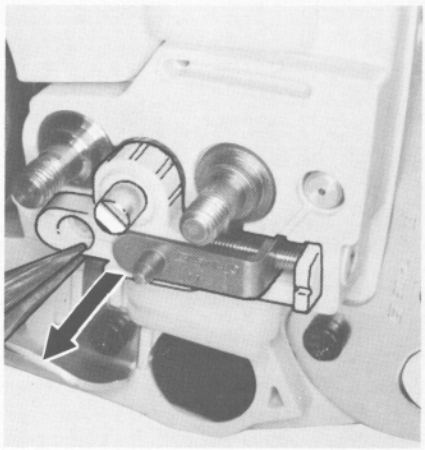
- Remove chain sprocket cover.
- Unscrew the adjusting nut by rotating the adjusting screw.
- Take the adjusting screw out of the cover and housing.
- Pull the cover out of the engine housing.

3.5 Side Chain Tensioner

Top:
Cover mounting screw

Bottom:
Removing the chain tensioner



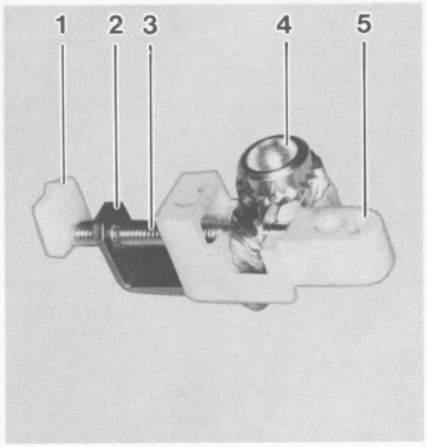


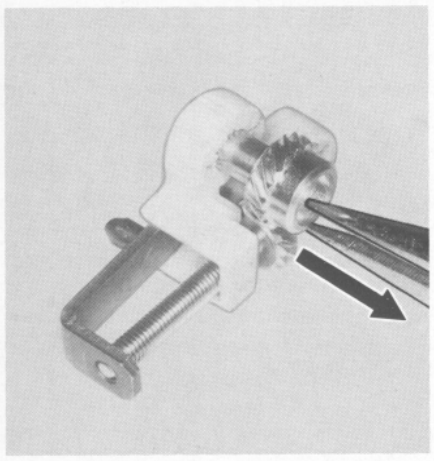
- Remove the chain sprocket cover.
- Take out the cover mounting screw.
- Pull the chain tensioner assembly out of the engine housing.

3.6 Bar Mounting Studs

Top:
1 = Thrust pad
2 = Tensioner slide
3 = Adjusting screw
4 = Spur gear
5 = Cover

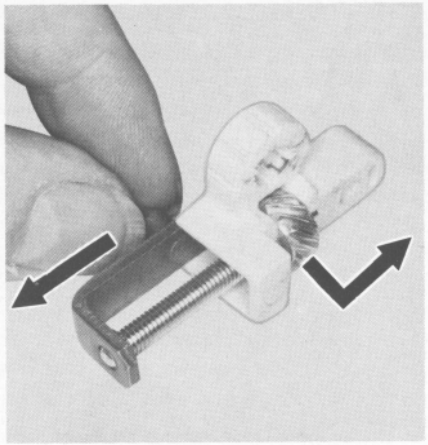
Bottom:
Withdrawing the spur gear





- Take the thrust pad off the adjusting screw.
- Rotate spur gear until the adjusting screw comes is clear of the tensioner slide.
- Pull the spur gear out of the cover.

Removing tensioner slide and adjusting screw

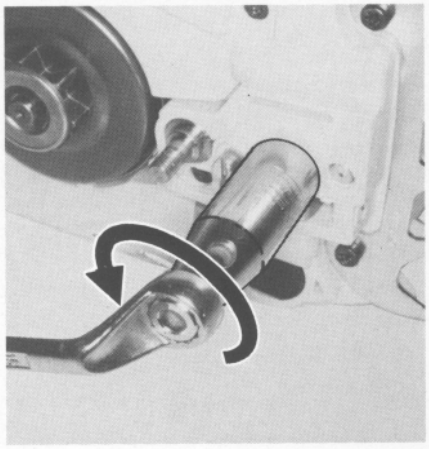


- Pull the tensioner slide off the cover.
- Take the adjusting screw out of the cover.
- Inspect the teeth on the spur gear and adjusting screw. If the teeth are damaged, replace both parts.

Reverse the above sequence to install the chain tensioner.

Note: Coat teeth of adjusting screw and spur gear with grease, see 12.2, before refitting.

Unscrewing collar stud with stud puller 5910 893 0501



- Remove the sprocket cover.
- Push the stud puller over the front collar stud (next to spiked bumper) as far as it will go. Use a 15 mm wrench to unscrew the collar stud counterclockwise.
- Fit the collar stud and torque it down to 16 Nm (11.8 lbf.ft).

Note: The collar stud next to the chain sprocket is installed with Loctite.

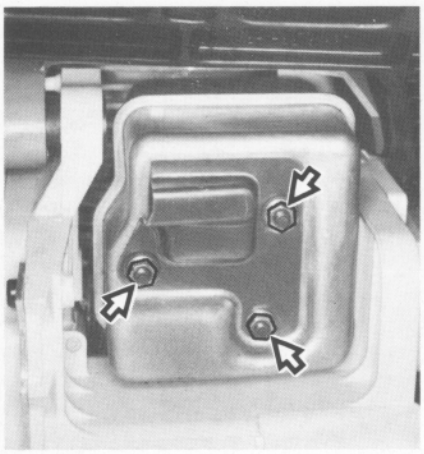
- Remove the muffler - see 4.1.
- Use hot air blower (e.g. hair dryer) to heat engine pan around the collar stud. Then unscrew the collar stud with the stud puller.
- Coat thread of collar stud with Loctite, see 12.2.
- Fit collar stud and torque it down to 30 Nm (22 lbf.ft).
- Install the muffler - see 4.1.

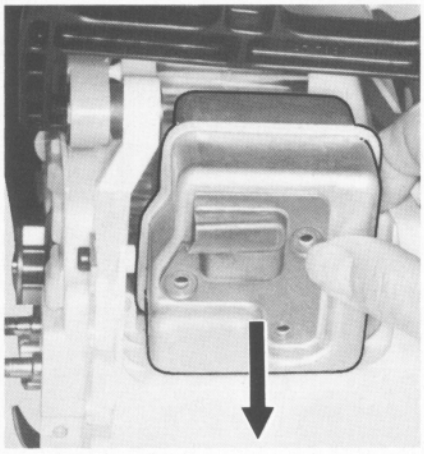
4. ENGINE

4.1 Removing and Refitting Exhaust Muffler

Top:
Flanged locknuts on muffler

Bottom:
Removing the muffler





These machines do not have a conventional crankcase - the engine consists of the cylinder, piston, crankshaft and engine pan.

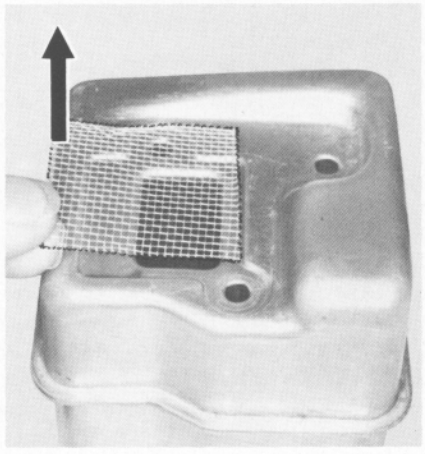
Troubleshooting chart - see 2.2.

- Unscrew flanged locknuts from muffler.

- Remove muffler together with cover.

Top:
Removing the cover

Bottom:
Removing the spark arresting screen



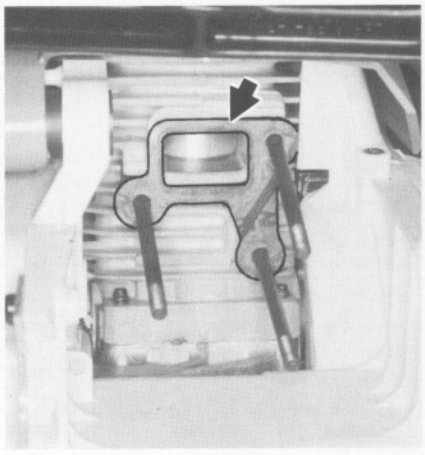
- Remove the cover from the muffler.

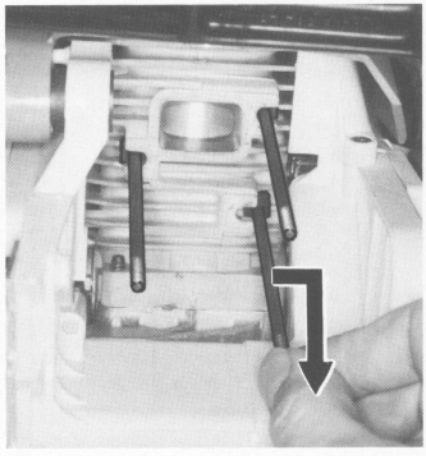
- Remove the spark arresting screen, if fitted, from the muffler.

- Clean the spark arresting screen or fit a new one if necessary.

Top:
Gasket

Bottom:
Removing the screws





- Remove the gasket.

- Take the mounting screws out of their seats on the cylinder.

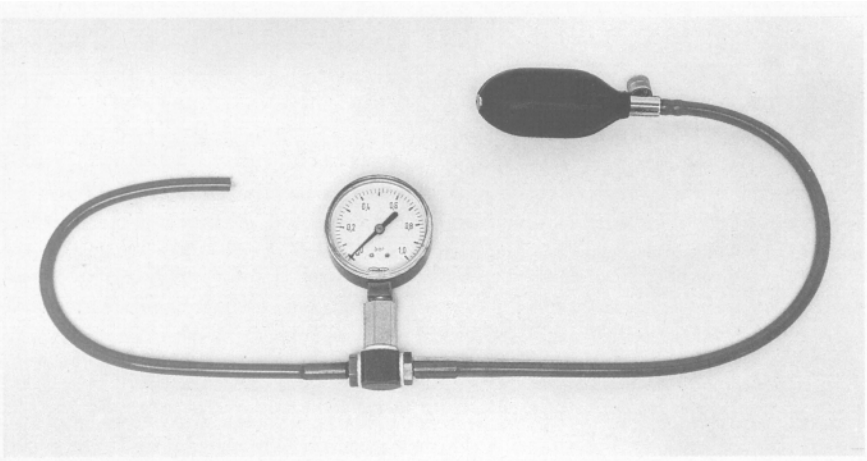
Reassemble in the reverse sequence.

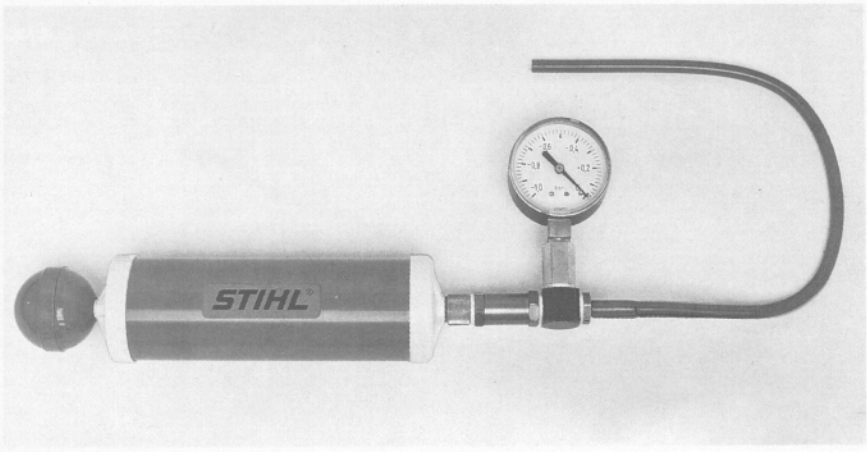
Note: Install a new gasket. Use new flanged locknuts and tighten them down to 8.5 Nm (6.2 lbf.ft).

4.2 Leakage Testing the Engine

Top:
Carburetor and crankcase tester
1106 850 2905

Bottom:
Vacuum pump 0000 850 3500





Defective oil seals and gaskets or cracks in 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.

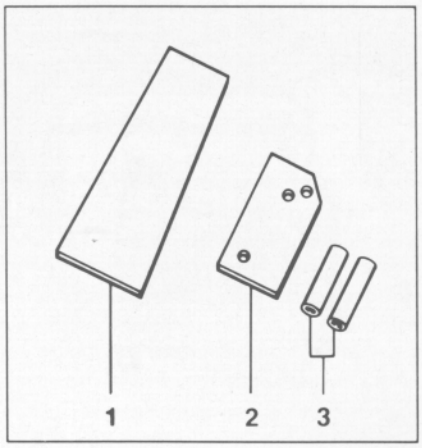
Moreover, the transition from idle speed to part or full throttle is not smooth.

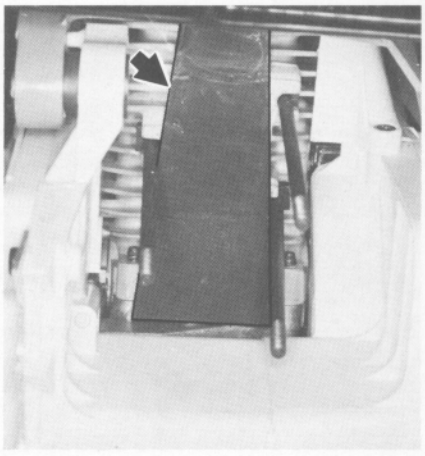
The engine housing can be checked accurately for leaks with the carburetor and crankcase tester and the vacuum pump.

4.2.1 Preparations

Top:
1 = Sealing plate 0000 855 8106
2 = Flange 1123 855 4200
3 = Sleeves 1127 851 8300

Bottom:
Sealing plate between mounting screws





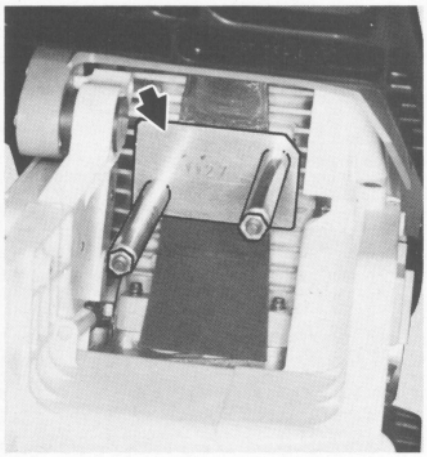
- Remove the muffler - see 4.1.

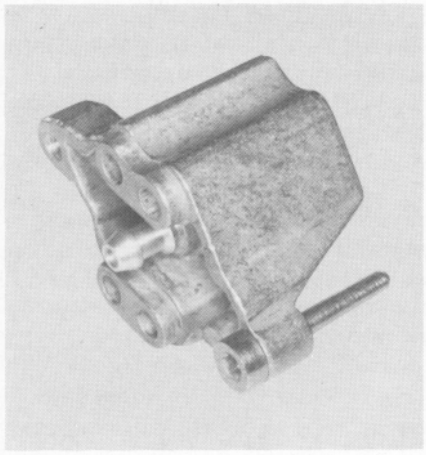
- Position the sealing plate between the mounting screws.

4.2.2 Pressure Test

Top:
Flange 1123 855 4200 fitted in position

Bottom:
Test flange 1128 850 4200





- Fit the flange in place of the muffler.

- Push the sleeves over the mounting screws. Fit the nuts and tighten them firmly.

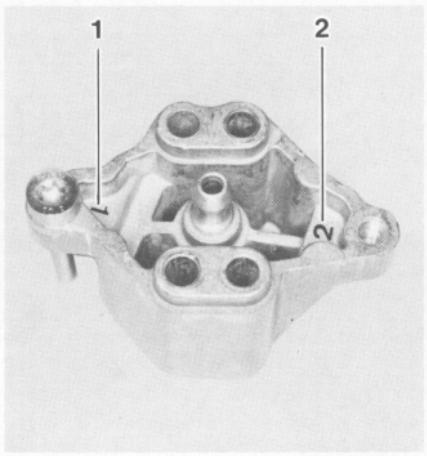
Note: Sealing plate must completely fill the space between the two mounting screws.

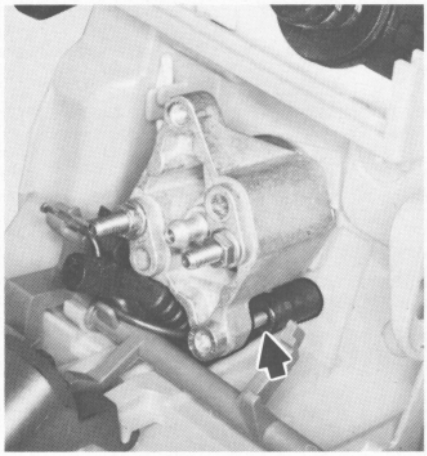
- Remove carburetor - see 11.2.

- Set the piston to top dead center (T.D.C.). This can be checked through the inlet port.

Top:
1 = Bore No. 1
2 = Bore No. 2

Bottom:
Test flange fitted in position
(pin in impulse hose)





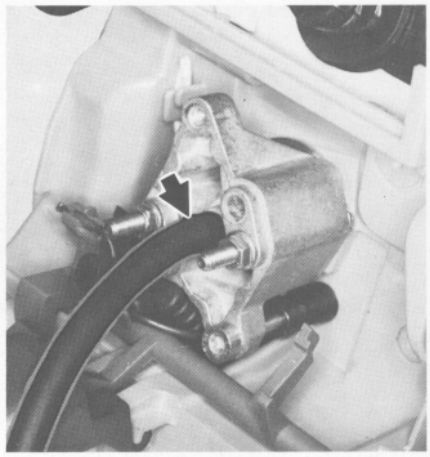
- Check to see that the pin in the test flange is in bore No. 1 and fit it if necessary.

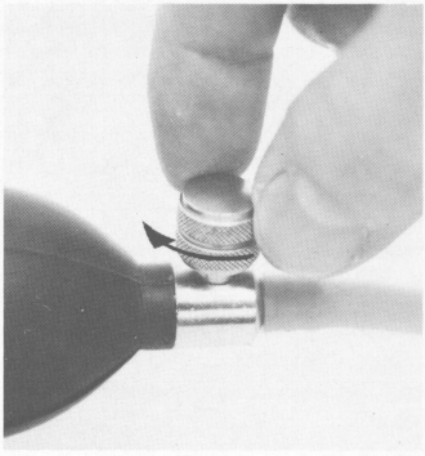
- Fit the test flange in place of the carburetor.

Important: When fitting the test flange, make sure the pin is properly located in the impulse hose.

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

Bottom:
Closing the vent screw





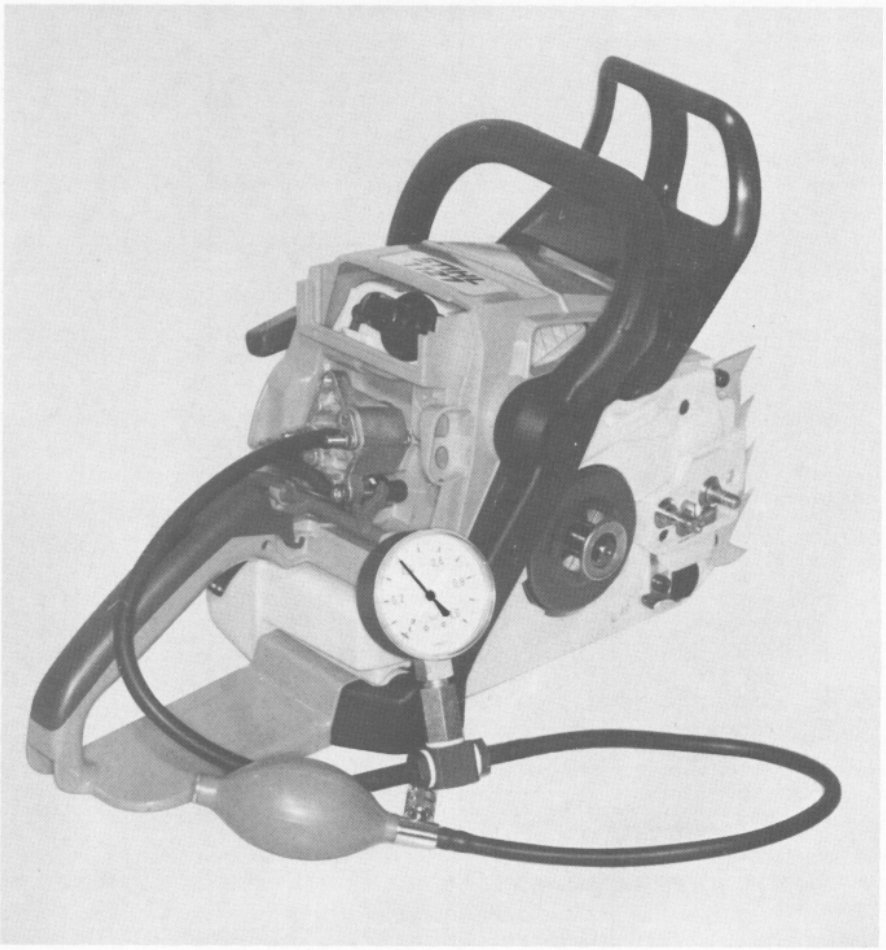
- Connect tester's pressure hose to nipple on test flange.

- Make sure the spark plug is properly tightened down before starting the test.

- Close the vent screw on the rubber bulb.

- Use rubber bulb to pump air into the engine housing until the gauge shows a pressure of 0.4 bar (5.8 psi). If this pressure remains constant for at least 20 seconds, the engine housing is airtight.

Pressure-testing the engine



However, if the indicated pressure drops, the leak must be located and the faulty part replaced. **Note:** Coat the suspect area with oil and pressurize the engine housing again. Bubbles will appear if there is a leak in the oiled area.

- Carry out the vacuum test - see 4.2.3.

- After finishing the tests, open the vent screw and disconnect the hose.

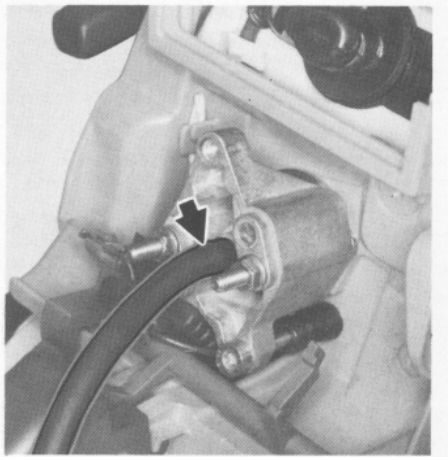
- Remove the test flange and refit the carburetor - see 11.2.

- Remove the flange and sealing plate.

- Refit the muffler - see 4.1.

4.2.3 **Vacuum Test**

Tester's suction hose connected to nipple on test flange



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.

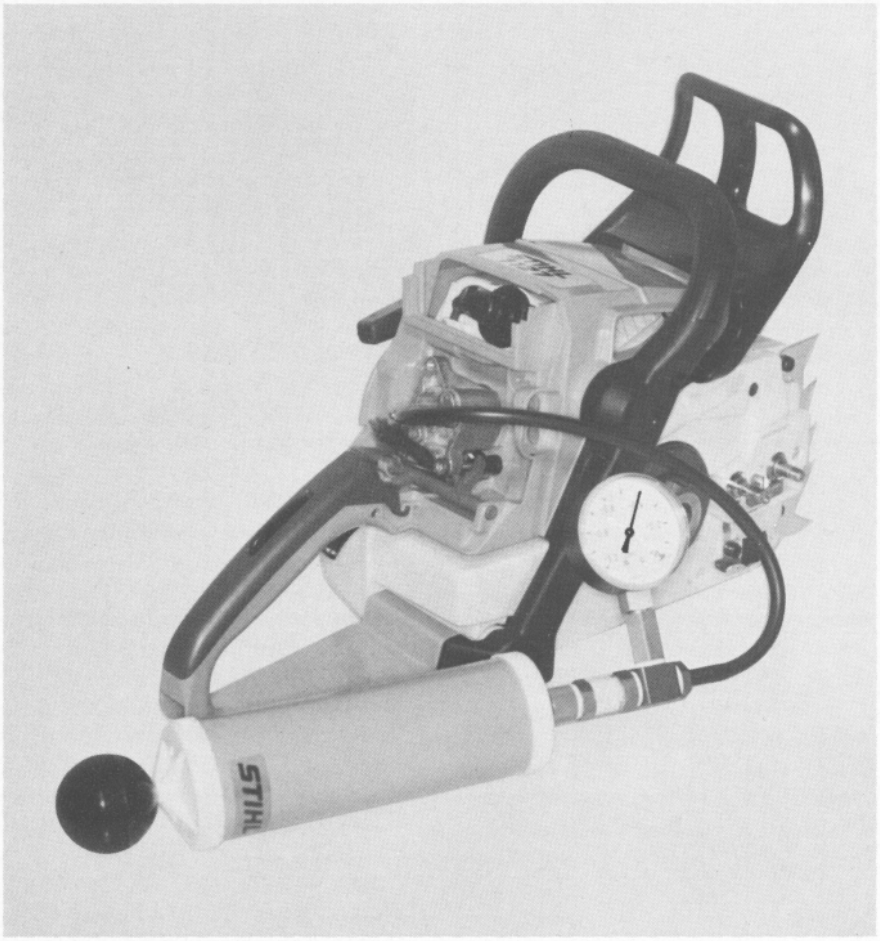
An additional test can be carried out with the vacuum pump to detect this kind of fault. The preparations for this test are the same as for the pressure test - see 4.2.1.

- Connect the vacuum pump's suction hose to test flange nipple.

- Pull out the pump piston several times until the gauge indicates a vacuum of 0.4 bar (5.8 psi).

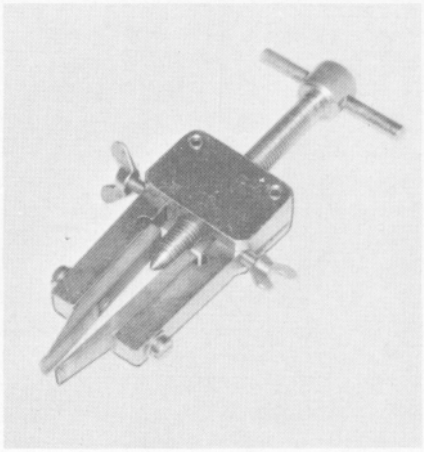
4.3 Replacing the Oil Seals

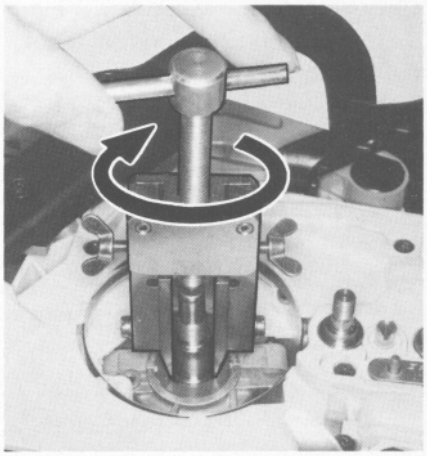
Leakage test with vacuum pump



Top:
Puller 0000 890 4400 with
No. 6 jaws 0000 893 3711

Bottom:
Removing oil seal at
clutch side





Note: When you release the pump piston, the non-return valve automatically seals the suction hose. If the vacuum reading remains constant, or rises to no more than 0.3 bar (4.25 psi) 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 crankcase), the oil seals must be replaced, even if no leaks were detected in the pressure test.

- Remove the test flange and refit the carburetor - see 11.2.

- Remove the flange and sealing plate.

- Refit the muffler - see 4.1.

Note: If oil seals have to be replaced - see 4.3.

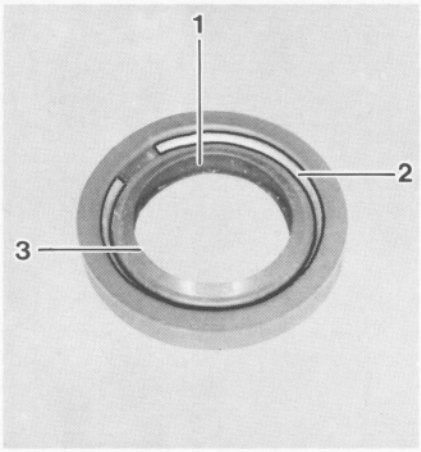
It is not necessary to disassemble the complete engine to replace the oil seals.

Clutch side:

- Remove the oil pump - see 10.3.

- Apply the puller and withdraw the oil seal at the clutch side.

Replacement oil seal
1 = Sealing lip
2 = Clamping ring
3 = Dust lip

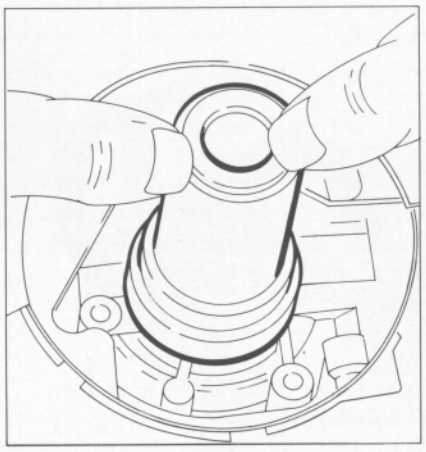


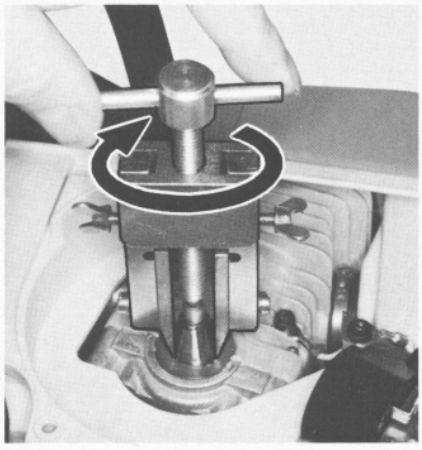
Note: Take care not to damage the crankshaft in the area of the oil seal. If new oil seals have already been installed, use sealing ring puller and No. 3.1 jaws to pull out the clamping ring. Pry the remaining part of the oil seal out of the housing.

- Clean the sealing surface with a solvent-based degreasant containing no CFCs.
- Pack space between sealing and dust lips with grease - see 12.2.
- Apply thin coating of sealant, see 12.2, to outside diameter of the oil seal.
- Slip the assembly sleeve 1122 893 4600 over the end of the crankshaft.
- Position oil seal so that the clamping ring points up. Use the press sleeve to press home the oil seal as far as stop.

Top:
Installing oil seal with press sleeve
1127 893 2400

Bottom:
Removing oil seal at ignition side



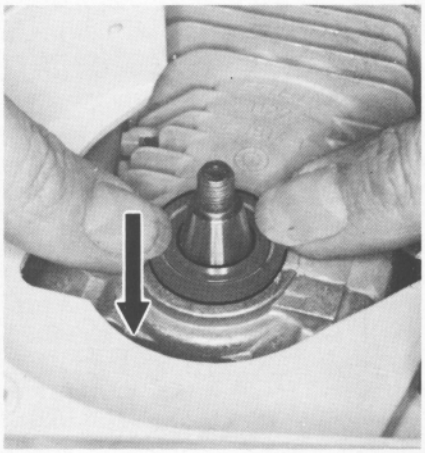


- Wait about one minute and then rotate the crankshaft several times.
- Remove the assembly sleeve.
- Install the oil pump - see 10.3.

Ignition side:

- Remove the flywheel - see 5.1.5.
- Apply the puller and withdraw the oil seal at the ignition side.

Installing oil seal without press sleeve



Note: Remove oil seal with clamping ring as described for clutch side.

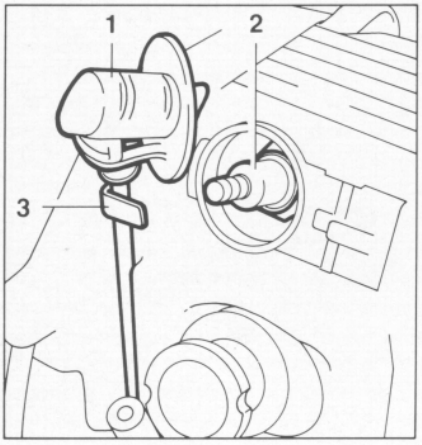
- Clean the sealing surface with a solvent-based degreasant containing no CFCs, and apply thin coating of sealant, see 12.2, to outside diameter of oil seal.
- Pack space between sealing and dust lips with grease - see 12.2.
- Position the oil seal so that the clamping ring points up. Use the press sleeve to to press home the oil seal as far as stop.

Note: If the press sleeve is not available, the oil seals can be pressed into the housing by hand.

- Wait about one minute and then rotate the crankshaft several times.
- Fit the flywheel - see 5.1.5.

4.4 Removing and Installing the Engine

1 = Spark plug terminal
2 = Spark plug
3 = Ignition lead retainer

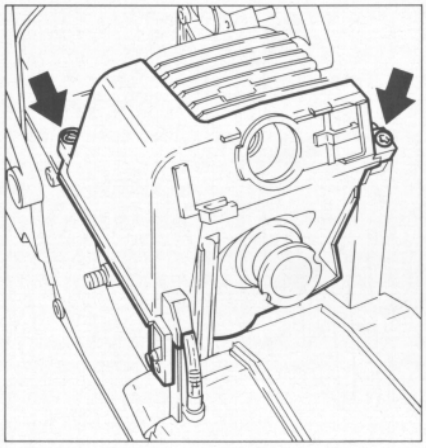


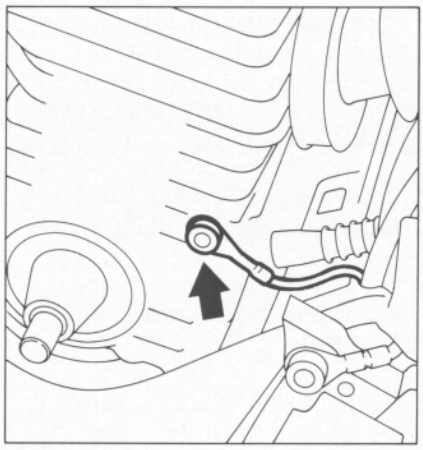
Always check and, if necessary, repair the fuel system, carburetor, air filter and ignition system before looking for faults on the engine.

- Remove handle housing see 8.1.1.
- Remove the flywheel - see 5.1.5.
- Remove the oil pump - see 10.3.
- Remove the muffler - see 4.1.
- Pull the terminal off the spark plug and unscrew the spark plug.
- Remove the ignition lead from the retainer and groove on the cover.

Top:
Cover mounting screws

Bottom:
Ground wire fastening screw

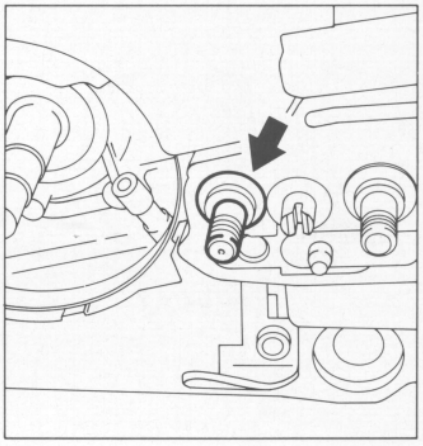


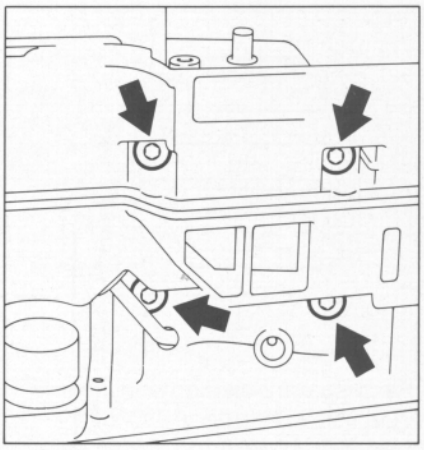


- Take out the cover mounting screws and lift the cover away.
- Remove the ground wire fastening screw from the cylinder.

Top:
Bar mounting stud

Bottom:
Engine housing/engine mounting screws





- Remove the collar stud next to the brake band.

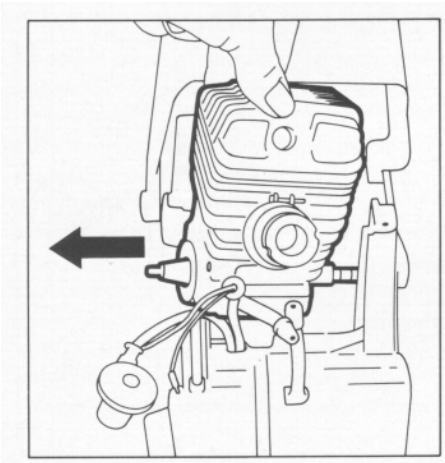
Important: The collar stud is installed with Loctite. Use hot air blower (e.g. hair dryer) to heat engine pan around the collar stud.

- Remove the engine pan mounting screws from the cylinder.

4.5 **Cylinder**

Top:
Removing the engine

Bottom:
Sequence for tightening screws



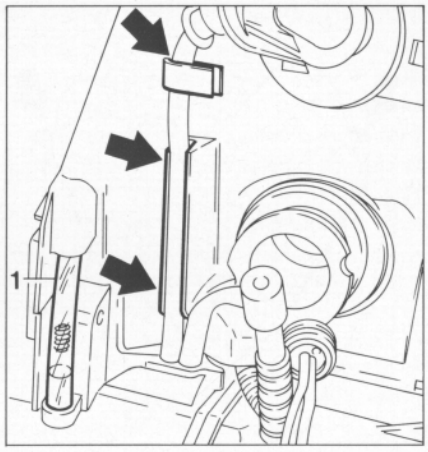
- Lift the engine sideways out of the engine housing.

To replace engine housing - see 11.9.

Assembly is a reversal of the disassembly sequence.

Note: Pay special attention to the following points.

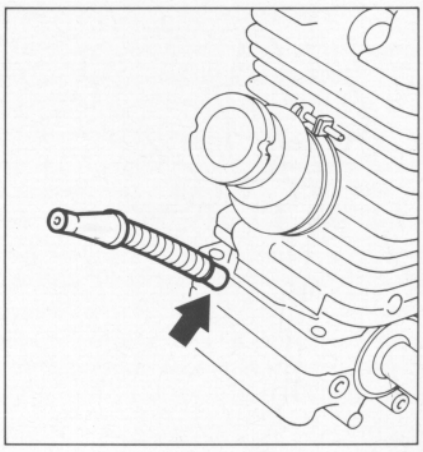
Correct position of ignition lead in cover
1 = Tank vent

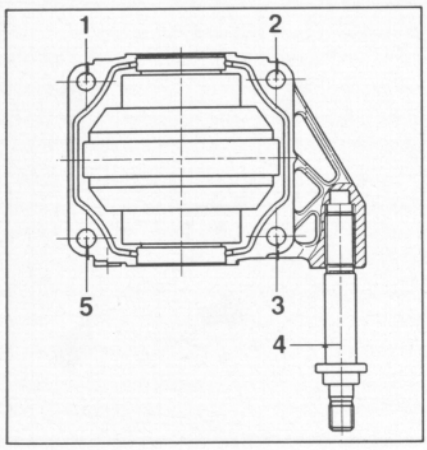


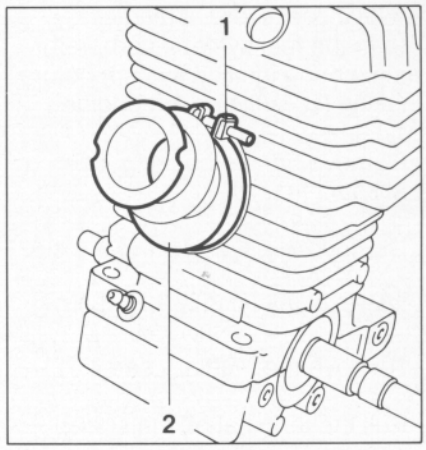
- Fit mounting screw 1 as far as stop.
- Coat thread of collar stud 4 with Loctite - see 12.2.
- Fit collar stud 4 and torque it down to 30 Nm (22 lbf.ft).
- Fit mounting screws 2, 3 and 5 and torque them down to 11 Nm (8 lbf.ft).
- Tighten down mounting screw 1 to 11 Nm (8 lbf.ft).
- Push ignition lead into groove and retainer on cover.
- Push the tank vent into the hole in the cover.

Top:
Impulse hose

Bottom:
1 = Hose clamp
2 = Manifold

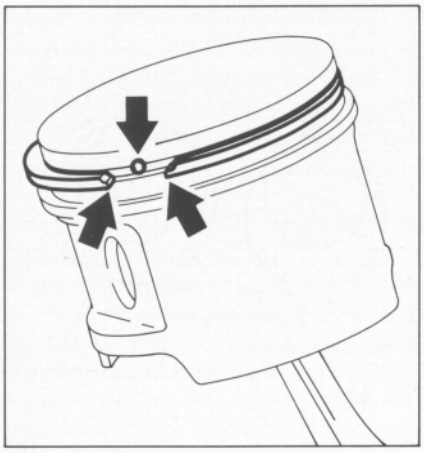






- Remove the engine - see 4.4.
- Pull the impulse hose off the nipple on the cylinder.
- Release the hose clamp on the manifold. Pull the manifold off the intake port.

Correct position of piston rings



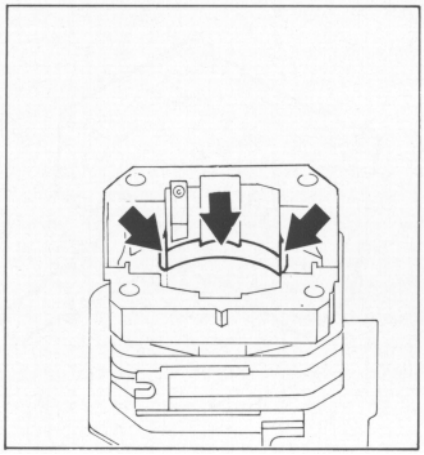
- Pull the engine pan off the cylinder.
- Lift the crankshaft and pull the piston out of the cylinder.
- Inspect the cylinder and replace it if necessary.

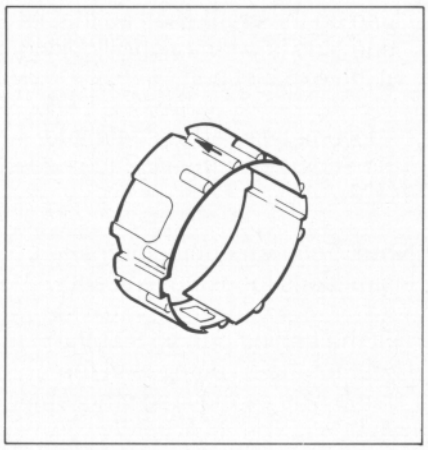
Note: If a new cylinder has to be installed, always fit the matching piston. Replacement cylinders are only supplied complete with piston for this reason.

- Thoroughly clean all residue of sealant from the cylinder and engine pan mating faces.
- Lubricate piston and piston rings with oil.
- 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.

Top:
Inner contour of cylinder

Bottom:
Clamping strap 1127 893 2600

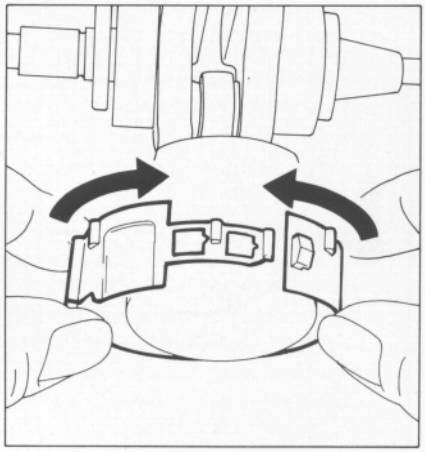


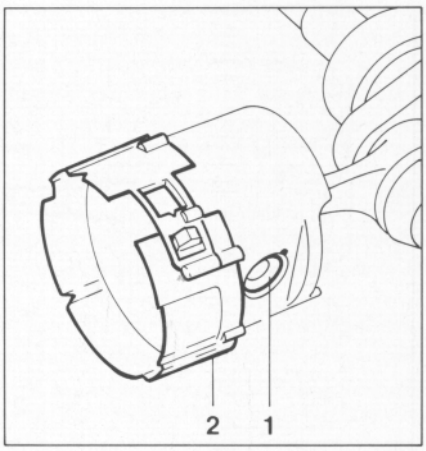


Note: The clamping strap can only be used with cylinders whose inner contour is the same as that shown in the illustration above.

Top:
Fitting clamping strap on piston rings

Bottom:
1 = Piston pin
2 = Channel section on clamping strap

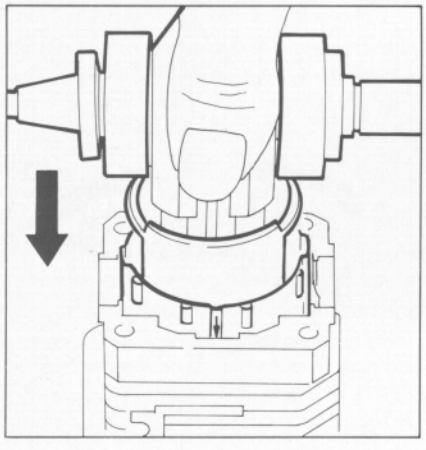


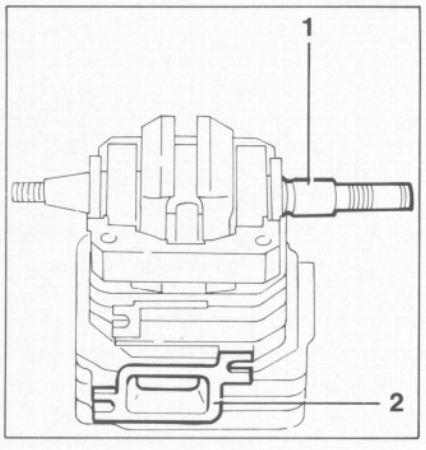


- Use the clamping strap to compress the piston rings around the piston and check that the piston rings are correctly positioned.
- Close the clamping strap and compress it so that the lug engages the square hole.
- Position the clamping strap so that its channel sections line up with the center of the piston pin.

Top:
Fitting the piston

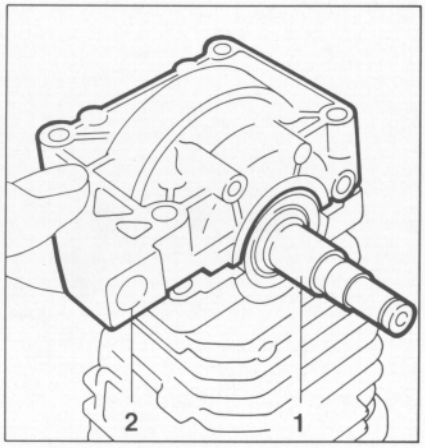
Bottom:
1 = Long crankshaft stub
2 = Exhaust port





- Apply a thin coating of sealant to the outer diameters of the oil seals - see 12.2.
- Position piston with clamping strap in cylinder so that the channel sections on the clamping strap rest on the lands in the cylinder.
- Carefully push the piston into the cylinder. Open the clamping and take it away.

1 = Long crankshaft stub
2 = Tapped hole for bar mounting stud



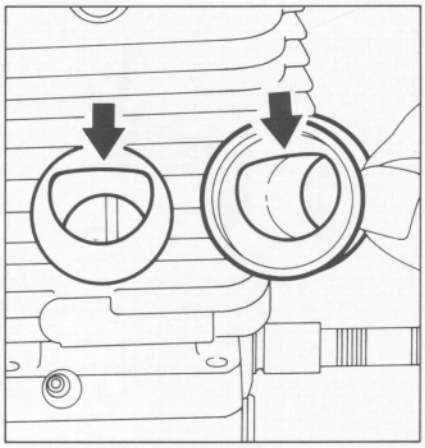
- Line up the crankshaft so that its long stub is on the right - looking at the exhaust port.
- Apply a thin bead of sealant to the engine pan mating face - see 12.2.

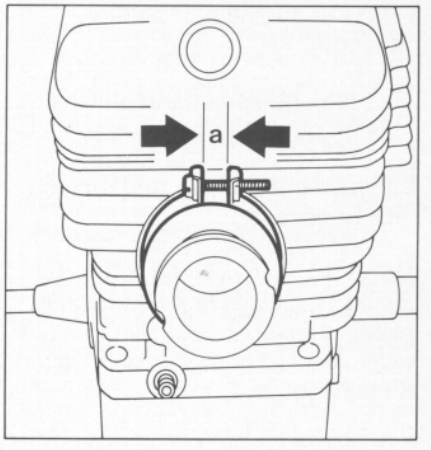
Note: Follow manufacturer's instructions for use of sealant.

- Fit the engine pan so that the seat for the oil pump is at the same side as the long crankshaft stub.
- Push the manifold on to the intake port so that the straight faces of the manifold and intake port are in alignment.

Top:
Straight faces on manifold and intake port

Bottom:
Correct position of hose clamp
a = 8 mm (5/16")



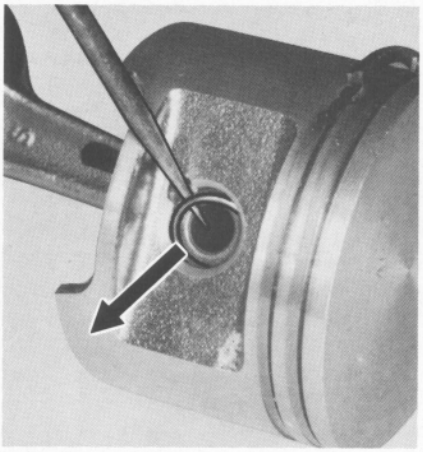


- Fit the hose clamp on the manifold so that its ends point up and the screw head is on the left.
- Tighten the screw until the gap between the two ends of the hose clamp is about 8 mm (5/16").
- Assembly of all other parts is now a reversal of the disassembly sequence.

4.6 **Piston**

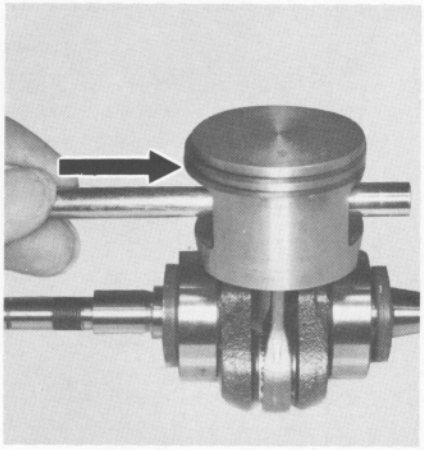
Top:
Removing snap ring

Bottom:
Assembly drift 1110 893 4700



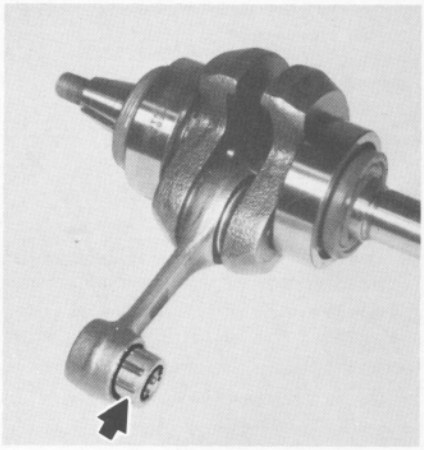
Top:
Pushing out piston pin

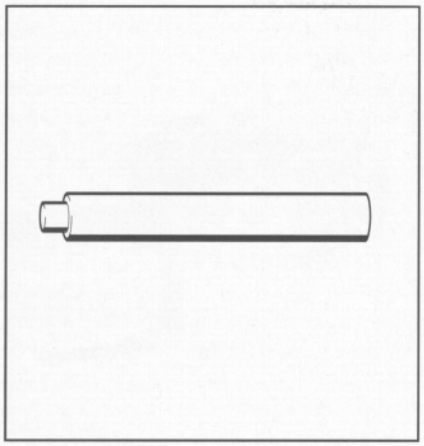
Bottom:
Piston rings
1 = "N" marking on piston head

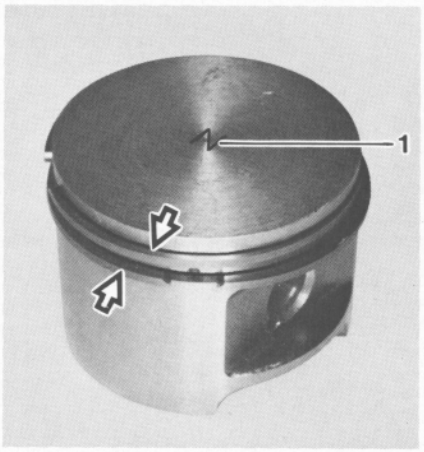


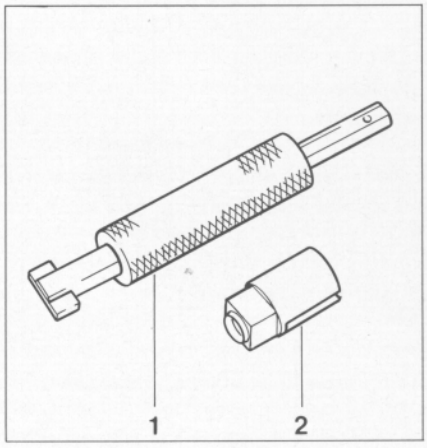
Top:
Needle cage in small end

Bottom:
1 = Installing tool 5910 890 2210
2 = Sleeve









- Pull the piston out of the cylinder - see 4.5.

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

- Use the assembly drift to push the piston pin out of the piston. If the piston pin 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 the piston and take the needle cage out of the connecting rod.

- Inspect piston rings and replace if necessary - see 4.7.

Note: Only special pistons may be installed in low compressions saws (i.e. "N"). The machine numbers of low compression saws have the suffix "N". In addition, the piston head is marked with the letter "N", as in the inside of the piston.

- Lubricate the needle cage with oil and fit it in the small end.

- Fit a snap ring in one piston boss.

Note: Use special installing tool 5910 890 2210 to fit the snap ring.

Top:
Modified sleeve
a = 16 mm ($^{11}/_{16}$")
b = 8 mm ($^{5}/_{16}$")
c = 20 mm ($^{25}/_{32}$")

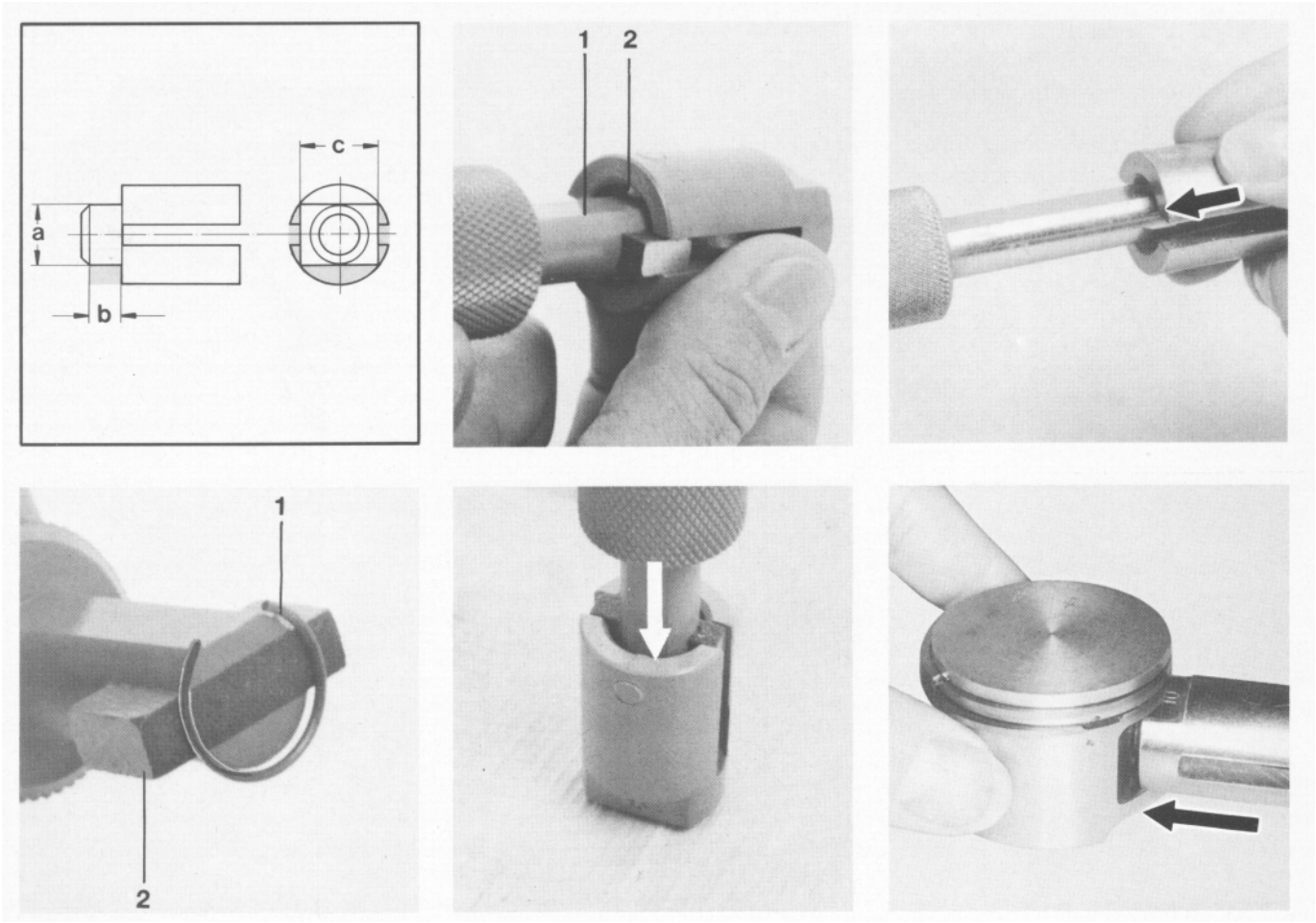
Bottom
1 = Snap ring (hookless)
2 = Magnet

Top:
1 = Flat on end of shank
2 = Pin

Bottom:
Pushing installing tool into sleeve as far as stop

Top:
Slipping sleeve onto other end of shank

Bottom:
Fitting snap ring in piston boss



Owing to the special shape of the piston it is necessary to modify the sleeve of the installing tool as shown in the illustration.

Use the installing tool as follows:

- Remove the sleeve from the tool.

- Attach the hookless snap ring to the magnet so that the snap ring gap is on the flat side of the tool's shank (see illustration).

- Push the slotted diameter of the sleeve over the magnet and snap ring so that the inner pin points at the flat face of the 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.

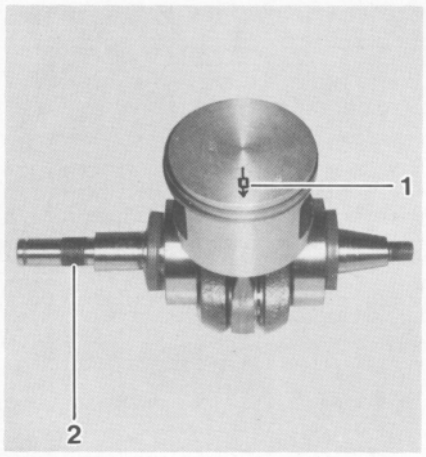
- Remove the sleeve and slip it onto the other end of the shank.

Note: Pin must point toward flat face of tool's shank.

- Apply the installing tool to the piston boss, hold the piston steady, center the tool shank exactly and press home until the snap ring slips into the groove.

4.7 Piston Rings

1 = Mark (arrow)
2 = Long crankshaft stub



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

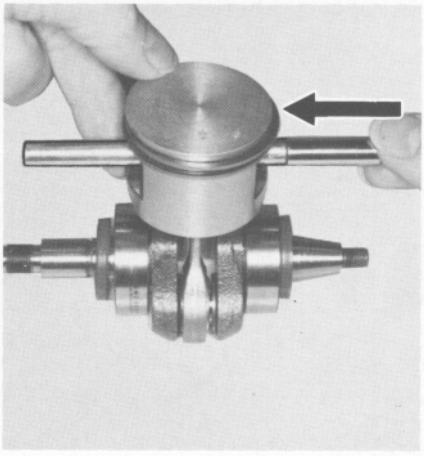
- Heat the piston on an electric heating plate to approx. 60°C (140°F) and slip it over the connecting rod so that the mark (arrow) on the piston head points towards you - the long stub of the crankshaft must be on the left.

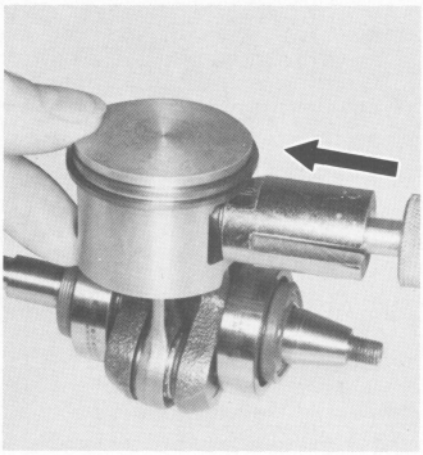
- Push the assembly drift, small diameter first, through the snap ring already fitted, the piston bore and the small end (needle cage). Line up the piston.

- Fit the piston pin on the assembly drift and slide it into the piston (the piston pin slides home easily when the piston is hot).

Top:
Installing the piston pin

Bottom:
Insetting snap ring with installing tool 5910 890 2210





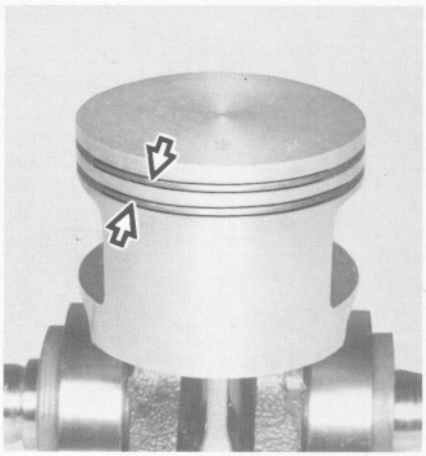
- Use the installing tool 5910 890 2210 to fit the snap ring in the piston boss.

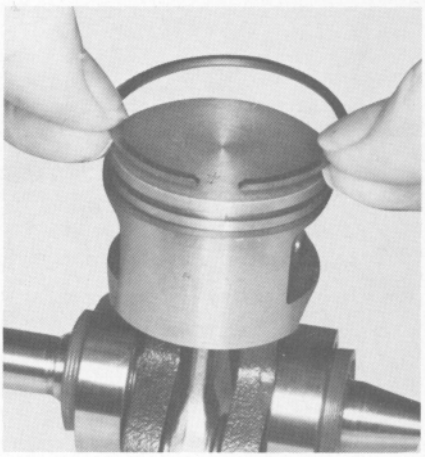
Note: The snap ring must be fitted so that the ring gap is on the piston's vertical axis (it must point either up or down).

- Install the piston - see 4.5.

Top:
Piston ring grooves

Bottom:
Fitting piston ring





- Remove the piston from the cylinder - see 4.5.

- Remove rings from piston.

- Use a piece of an old piston ring to scrape the grooves clean.

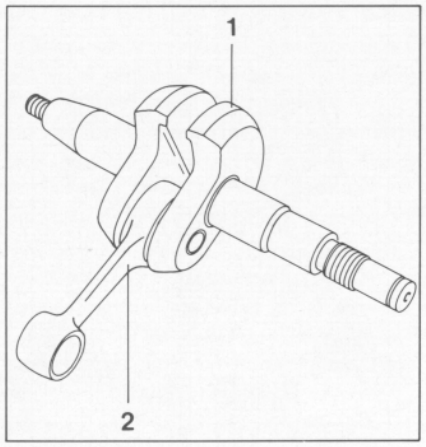
- Install the new piston rings in the grooves so that the radii at the ring gaps face upward.

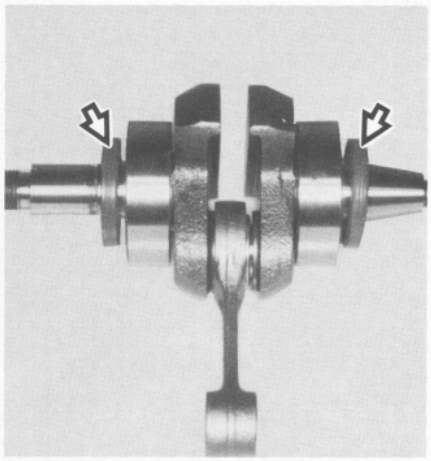
- Install the piston - see 4.5.

4.8 Crankshaft

Top:
1 = Crankshaft
2 = Connecting rod

Bottom:
Oil seals



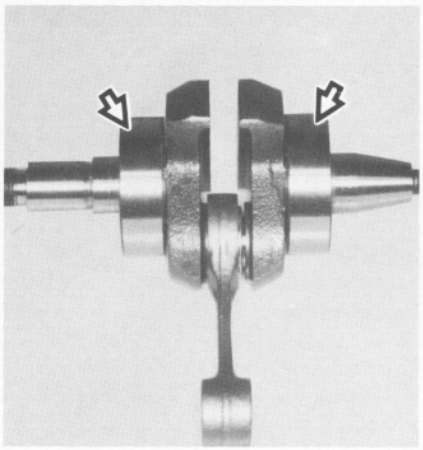


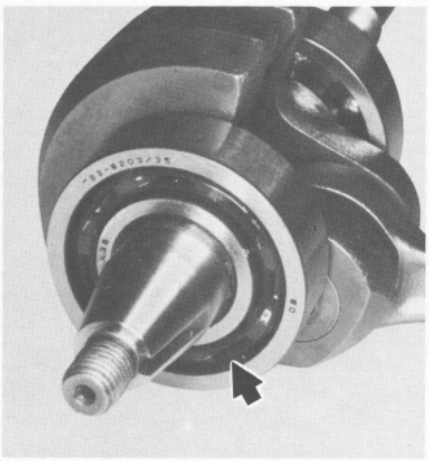
The crankshaft, connecting rod and needle bearing are an inseparable assembly. This means that the crankshaft must always be replaced as a complete unit in the event of damage to any one of these parts.

When fitting a replacement crankshaft, always install new ball bearings and oil seals.

Top:
Ball bearings

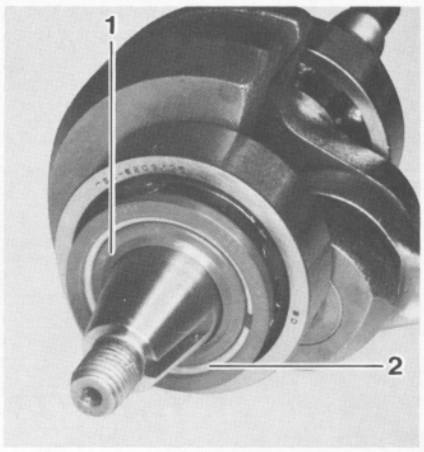
Bottom:
Closed side of ball bearing





- Remove the piston - see 4.6.
- Pull both oil seals off the crankshaft stubs.
- Pull both ball bearings off the crankshaft stubs.
- Note that closed side of ball bearings must face outward when they are installed. Heat new ball bearings to approx. 50°C (120°F) and push them on to the crankshaft stubs as far as stop.

1 = Sealing lip
2 = Clamping ring



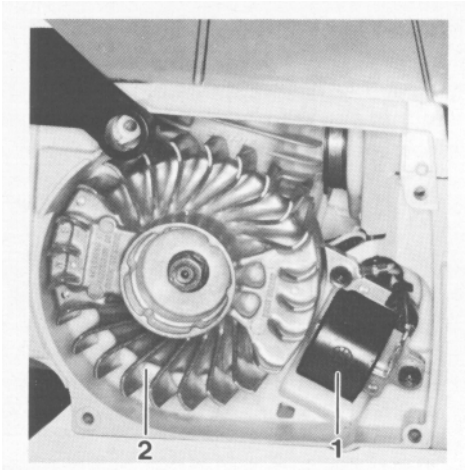
- Pack space between sealing and dust lips of oil seals with grease - see 12.2.
- Apply thin coating of sealant, - see 12.2, to outside diameters of oil seals.
- Slide oil seals on to crankshaft stubs so that the clamping ring points outward (sealing lip also points outward).

Assembly of other parts is a reversal of the disassembly sequence.

5. 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 = Ignition module
2 = Flywheel



STIHL 029 and 039 chain saws are equipped with an electronic (breakerless) magneto ignition system which requires no outside power source (battery or dynamo).

The system basically consists of an ignition module and flywheel and is easily accessible.

5.1 Repairing Component Parts

5.1.1 Spark Plug

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 plug 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 smeared with oil:

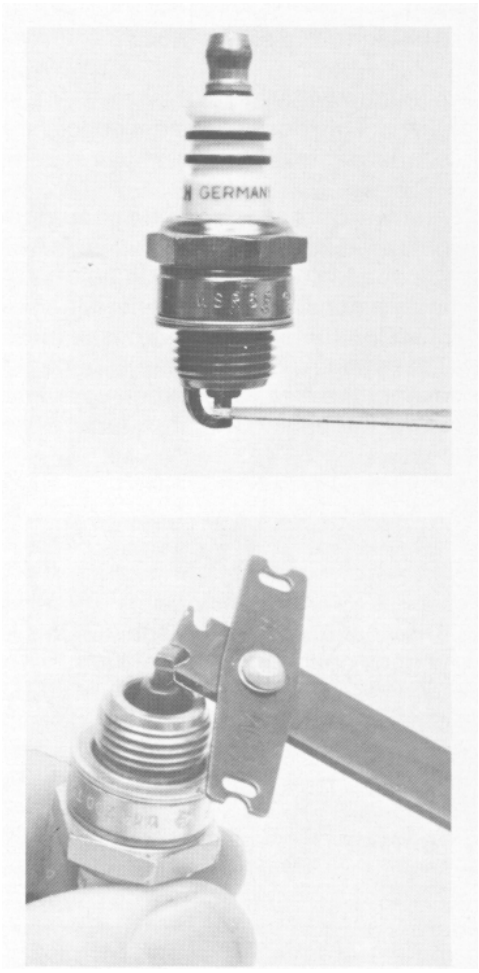
- Wash the insulator nose with a grease solvent and blow it clear with compressed air.

Electrode gap:

Electrode gap becomes wider as a result of normal erosion.

Top:
Checking electrode gap with feeler gauge

Bottom:
Resetting electrode gap with Bosch spark plug gauge



- Check the electrode gap at regular intervals with a feeler gauge. It should be 0.5 mm (0.02").

- 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. Set the Master Control to the "RUN" position. 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 with either not start or only run erratically.

Installing the spark plug:

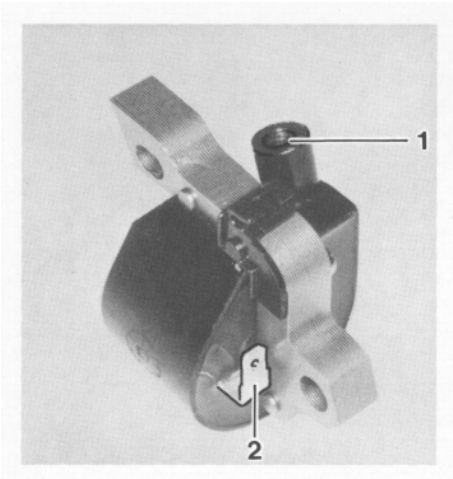
- Clean the spark plug seat and inspect the sealing ring to make sure it is in good condition.
- Fit the spark plug and tighten it to 25 Nm (18.5 lbf.ft).

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

Condition of insulator nose		Meaning
Normal:	Grayish yellow to brown, dry	Engine in order; correct spark plug (heat range as specified)
Sooted:	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)
Smeared with oil:	Coating of damp oil carbon and soot	Too much oil in fuel mix
Overheated:	Welding beads on insulator nose, pitted electrodes	Mixture too lean, spark plug loose, wrong spark plug (heat range too low)

5.1.2 Ignition Module

1 = High voltage output
2 = Connector tag



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 tags for the short circuit wires

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).

5.1.2.1 Ignition Timing

Ignition timing on the electronic (breakerless) magneto ignition system is fixed at 2.4 mm (0.095") B.T.D.C. at 8,000 r.p.m. and is not adjustable.

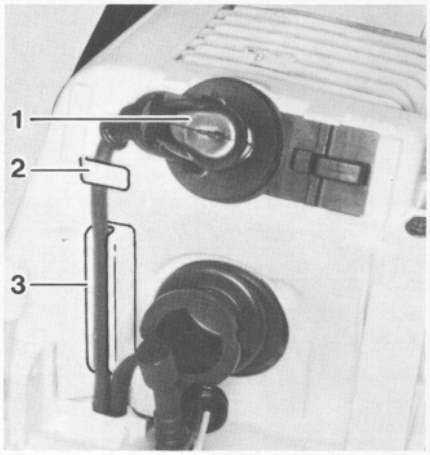
However, in view of the permissible tolerances in the electronic circuit, it may vary between 2.0 and 2.8 mm (0.080" and 0.11 ") B.T.D.C. at 8,000 r.p.m.

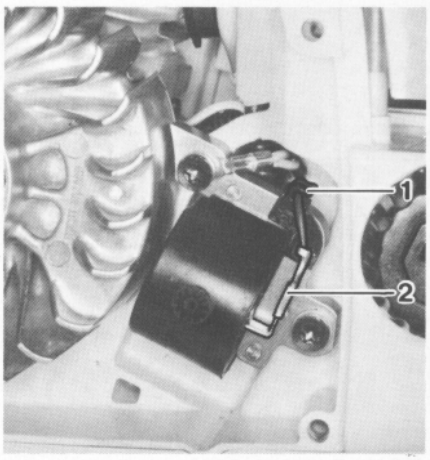
Since there is no mechanical wear in these systems, ignition timing cannot get out of adjustment. However, an internal fault in the circuit can alter the switching point in such a way that a spark test will still show the system to be in order although timing is outside the permissible tolerance. This will impair engine starting and running behavior.

5.1.2.2 Removing and Installing

Top:
1 = Spark plug terminal
2 = Ignition lead retainer
3 = Groove

Bottom:
1 = Lead retainer
2 = Short circuit wire

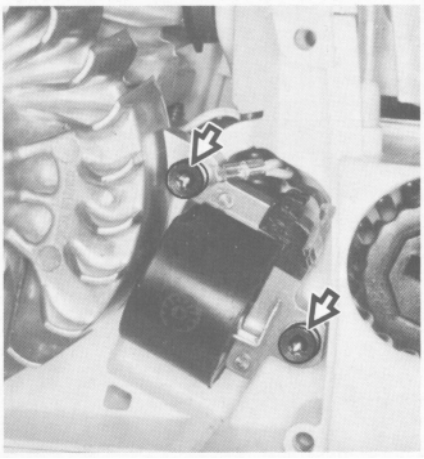


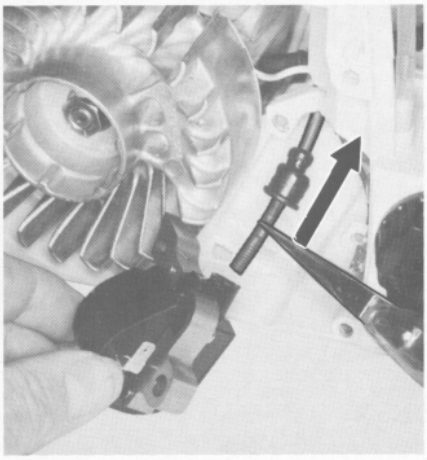


- Remove handle housing - see 8.1.1.
- Pull terminal off the spark plug.
- Remove the ignition lead from the retainer and groove on the cover.
- Pull the short circuit wire off the tag on the ignition module and remove it from the lead retainer.

Top:
Ignition module mounting screws

Bottom:
Pulling the unscrewed ignition lead out of ignition module





Remove the ignition module mounting screws.

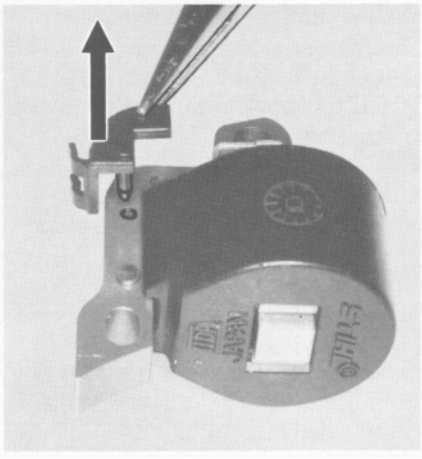
Pull the ignition module forward and push back the grommet on the high voltage output.

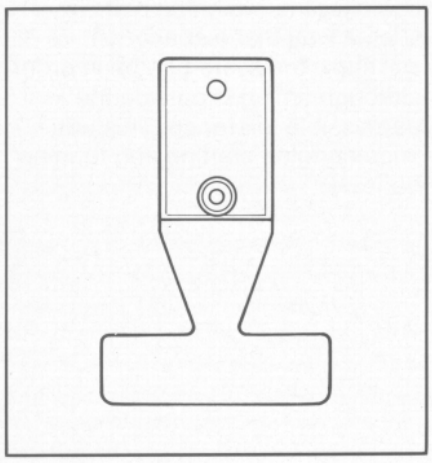
Unscrew the ignition lead from the contact pin and pull it out of the ignition module.

If necessary, ease the peg of the lead retainer out of its seat and remove the retainer.

Top:
Removing lead retainer

Bottom:
Setting gauge 1127 890 6400





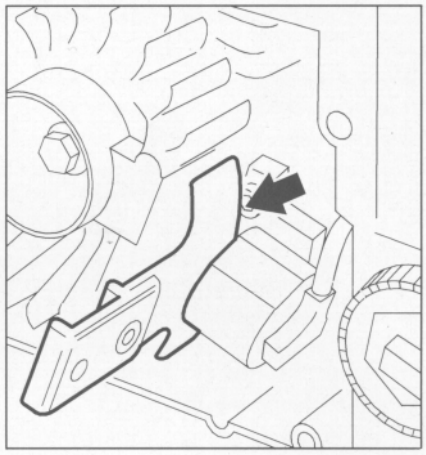
Note: Before fitting the ignition lead, pack the high voltage output with STIHL multipurpose grease – see 12.2.

Important: Do not use graphite grease (Molykote) or silicone insulating paste for this job.

- Push the grommet over the ignition module's high voltage output.

- Place the ignition module in position, fit screws but do not tighten down yet.

Setting gauge fitted between flywheel and ignition module



Important: Secure ground wire with upper screw and fit a washer on the lower screw.

- Slide the setting gauge between the arms of the ignition module and the flywheel magnets.

- Press the ignition module against the flywheel and tighten down the mounting screws to a torque of 4.8 Nm (3.5 lbf.ft).

Important: Tighten the upper screw first.

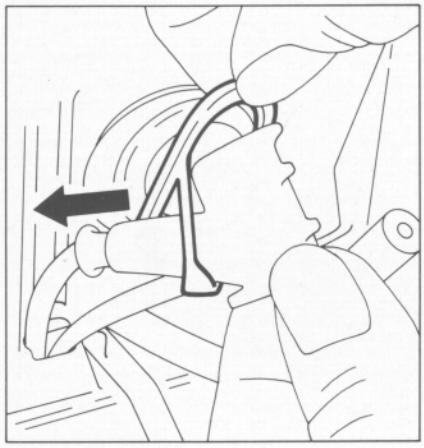
- Remove the setting gauge and use a feeler gauge to check the air gap. It should be 0.15 - 0.3 mm (0.006 - 0.012").

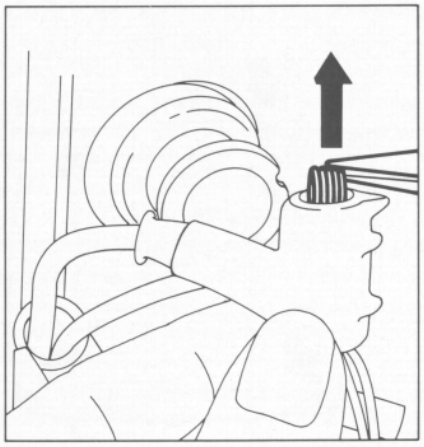
Assembly of the remaining parts is now a reversal of the disassembly sequence.

5.1.3 **Spark Plug Terminal**

Top:
Removing dust seal

Bottom:
Pulling leg spring out of spark plug terminal





- Remove handle housing - see 8.1.1.
- Pull terminal off the spark plug and remove the ignition lead from the retainer.
- Pull the dust seal off the spark plug terminal and push it down the ignition lead.
- Use a suitable pair of pliers to grip the leg spring and pull it out of the spark plug terminal.

Fitting dust seal

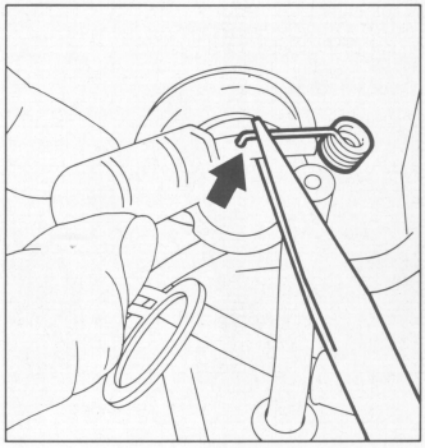
- Unhook the leg spring from the ignition lead and slip the spark plug terminal and dust seal off the lead.
- Slip the dust seal over the ignition lead.
- Coat end of the ignition lead with oil (about 20 mm/3/4").
- Fit spark plug terminal over the ignition lead.
- Use suitable pliers to grip the end of the ignition lead inside the spark plug terminal and pull it out.

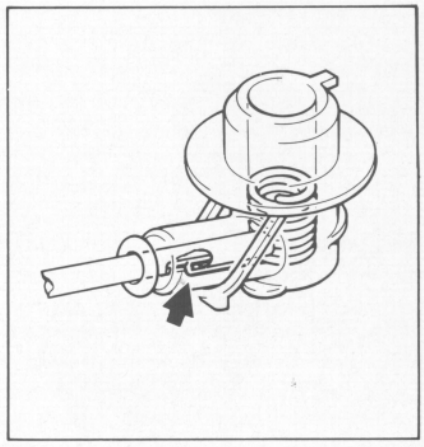
Pinch the hook of the leg spring into the center of the lead, i.e. about 10 mm (3/8") from the end of the lead.

- Pull the lead back into the terminal so that the leg spring locates properly inside it (see illustration).

Top:
Fitting the leg spring

Bottom:
Correct position of leg spring in spark plug terminal



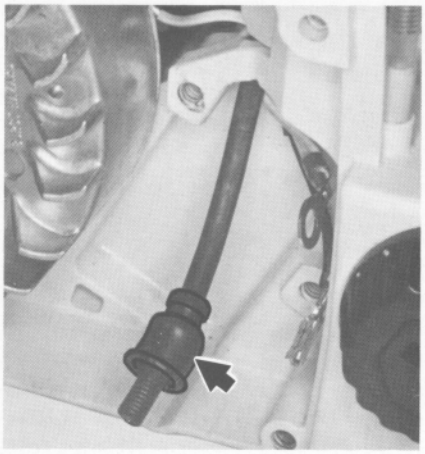


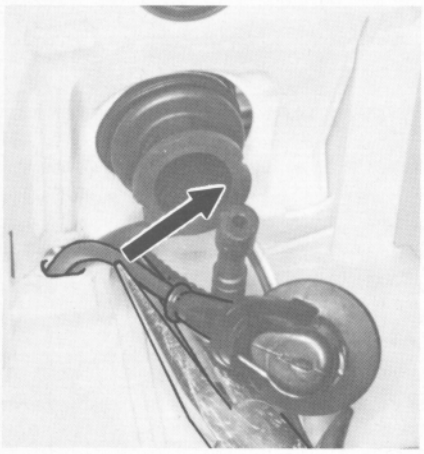
- Fit the dust seal over the spark plug terminal.
- Fit the terminal on the spark plug. Push the ignition lead into the retainer and groove on the cover.
- Fit the handle housing - see 8.1.1.

5.1.4 Ignition Lead

Top:
Grommet

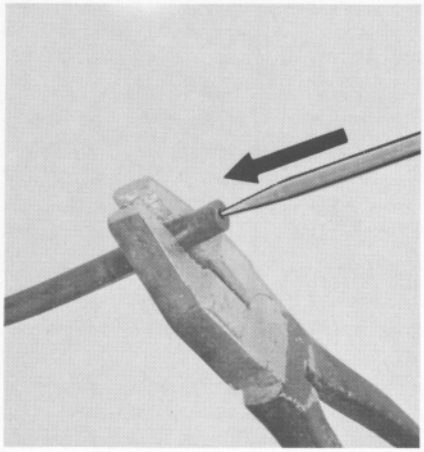
Bottom:
Pulling ignition lead out of tank housing





- Remove ignition module - see 5.1.2.2.
- Pull the grommet off the ignition lead.
- Pull the ignition lead out of the hole in the tank housing.
- Remove the spark plug terminal - see 5.1.3.

Piercing center of ignition lead



- Cut new ignition lead to length (see parts list or cut to same length as old lead).

Reassembly is a reversal of the disassembly sequence.

Note: Use a pointed tool (awl or gimlet) to pierce the center of the other end of the ignition lead which screws into the module.

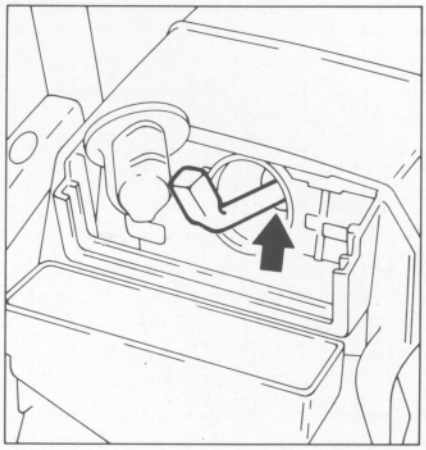
Note: Before fitting the ignition lead, pack the high voltage output with STIHL multipurpose grease – see 12.2.

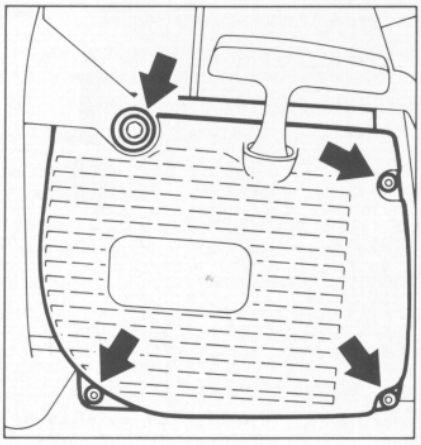
Important: Do not use graphite grease (Molykote) or silicone insulating paste for this job.

5.1.5 Flywheel

Top:
Locking strip 0000 893 5902 in cylinder

Bottom:
Fan housing mounting screws



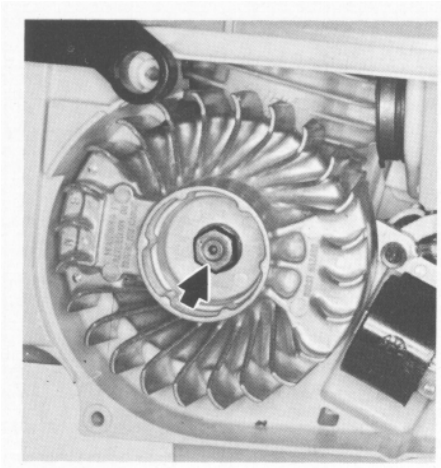


Removing the flywheel:

- Block piston with locking strip - see 3.2.
- Take out the fan housing mounting screws and remove the fan housing.

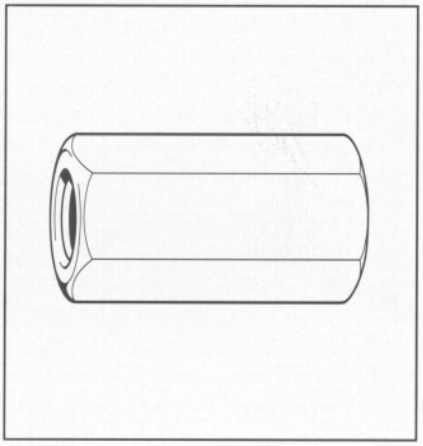
Top:
Flywheel mounting nut

Bottom:
Removing the flywheel

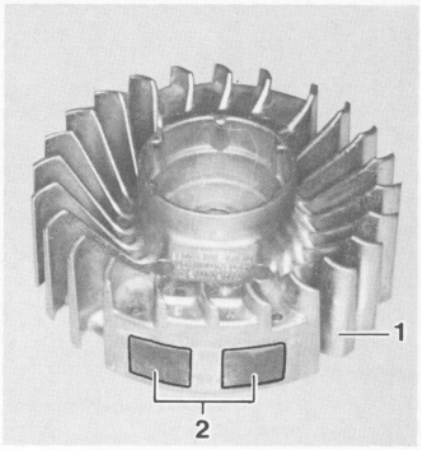


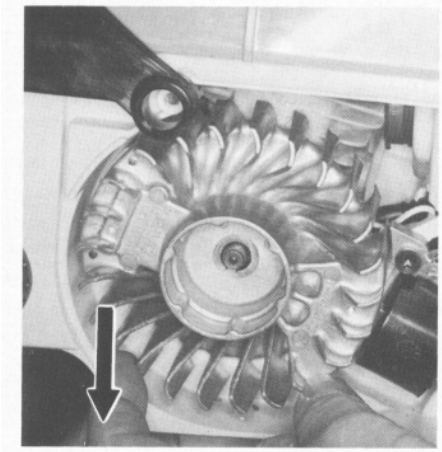
Top:
Puller 1116 893 0800

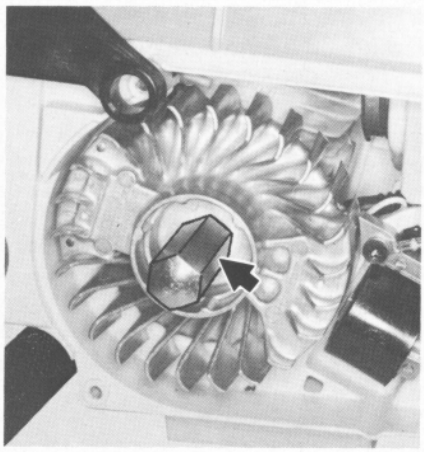
Bottom:
Puller fitted in position



1 = Flywheel
2 = Magnet poles







- Rotate the flywheel so that the magnet poles are opposite the ignition module.

- Unscrew flywheel mounting nut from the crankshaft.

- Pull the flywheel off 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:

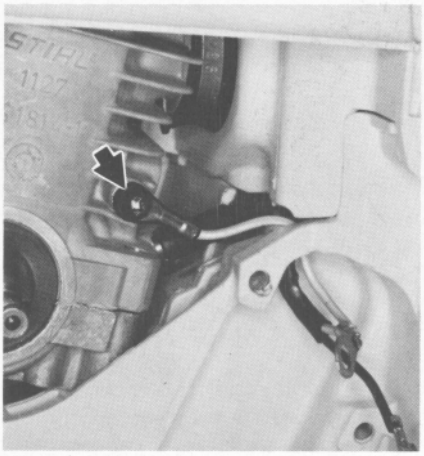
Important: Clean the stub of the crankshaft and the flywheel hub bore with a standard commercial, solvent-based degreasant containing no CFCs. Fit the flywheel and tighten mounting nut to 27.5 Nm (20 lbf.ft).

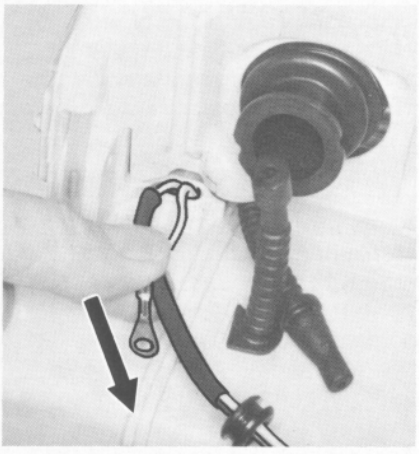
Assembly of the remaining parts is now a reversal of the disassembly sequence.

5.1.6 Short Circuit Wire/ Ground Wire

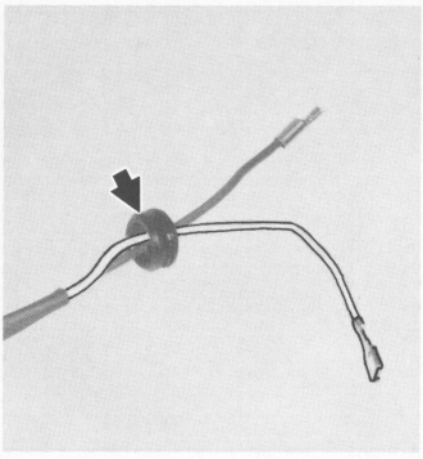
Top:
Ground wire fastening screw

Bottom:
Withdrawing short circuit wire and ground wire





Grommet



- Pull the short circuit and ground wires out of the hole in the engine housing.

- Pull the grommet off the short circuit and ground wires.

Installation is a reversal of the removal sequence.

- Remove handle housing - see 8.1.1.

  Remove the flywheel - see 5.1.5.

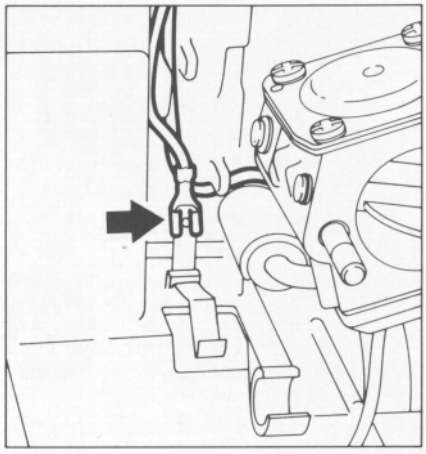
- Remove the ignition module -see 5.1.2.2.

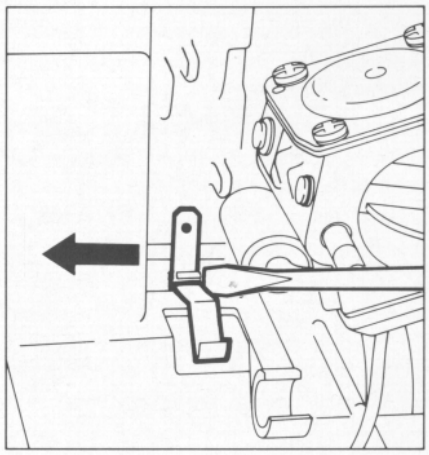
- Remove the ground wire fastening screw from the cylinder.

5.1.7 Contact Spring

Top:
Ground wire terminal

Bottom:
Removing contact spring





- Remove the air filter - see 11.1.

- Remove the switch shaft - see 9.1.

- Pull the ground wire terminal off the contact spring.

- Ease the contact spring out of its seat in the handle housing.

Installation is a reversal of the removal sequence.

6. REWIND STARTER

6.1 Routine Maintenance

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.

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

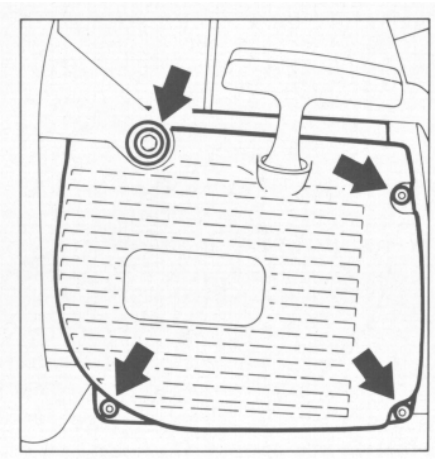
If clogged with dirt or pitch, the entire starter mechanism, including the rewind spring, must be removed and disassembled. Take special care when removing the spring.

Wash all parts in paraffin or white spirit.

Lubricate the rewind spring and starter post with STIHL special lubricant, see 12.2, before installing.

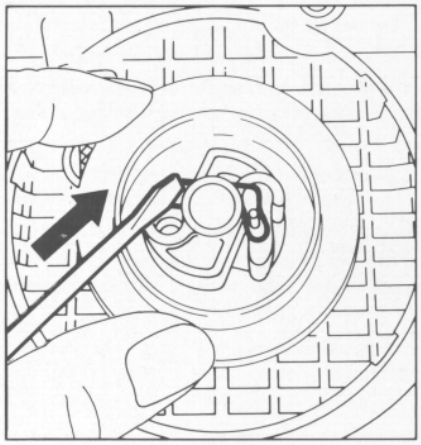
6.2 Rope Rotor/Pawl

Fan housing mounting screws



Top:
Removing spring clip

Bottom:
Pulling rope rotor off the starter post.



Removing rope rotor:

Troubleshooting chart - see 2.4.

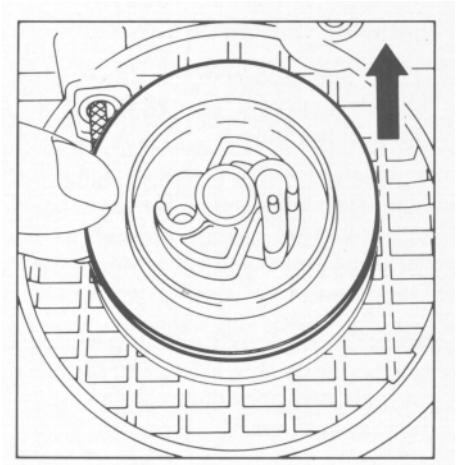
The fan housing has to be removed for access to the starter mechanism.

Relieving tension of rewind spring:

- Pull out the starter rope to a length of approx. 5 cm (2 - 3 in) and hold the rope rotor steady.
- Take two turns of the rope off the rotor.
- Pull out the starter grip and 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.

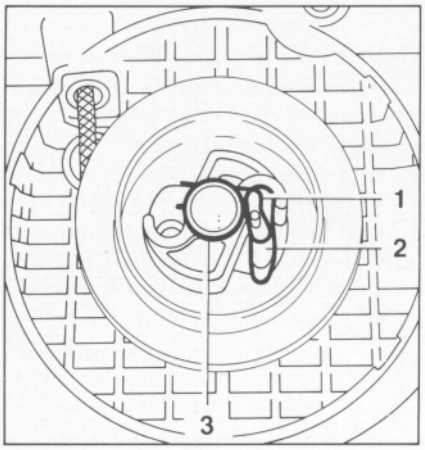
- Remove the starter rope from the rotor.



- Use screwdriver or suitable pliers to carefully remove the spring clip from the starter post.
- Take the washer and rope rotor and with pawl off the starter post.
- If necessary, remove the pawl from the rope rotor.
- Replace the worn or broken starter rope - see 6.3.

6.3 Replacing the Starter Rope

1 = Spring clip
2 = Pawl
3 = Washer



Installing the rope rotor:

- Lubricate guide peg on pawl with graphite grease, see 12.2, and then fit the pawl.

- Coat the bore in the rope rotor with STIHL special lubricant - see 12.2. 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 and letting it go - it must spin back.

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

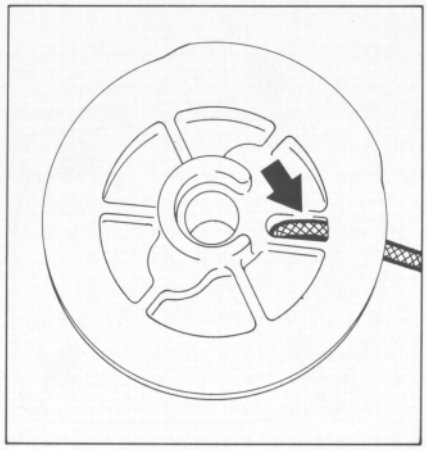
Note: Make sure the spring clip engages the pawl guide peg and points it in the clockwise direction.

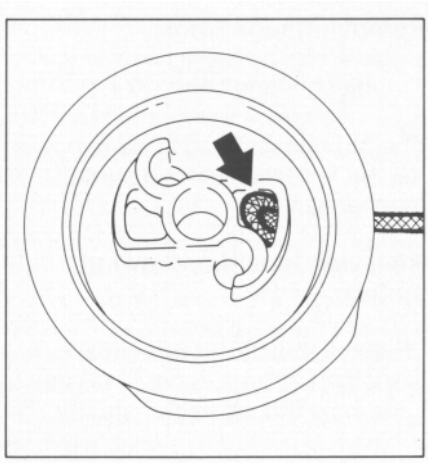
- The spring clip must be treated very carefully. If it is bent or twisted during disassembly or assembly, the rewind starter might malfunction.

- Tension the rewind spring – see 6.5.

Top:
Correct position of starter rope in rope rotor

Bottom:
Starter rope secured in rope rotor with knot





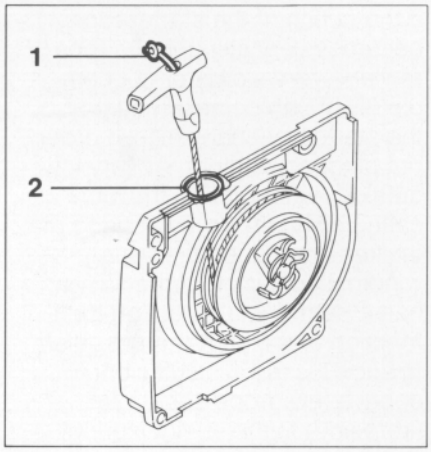
- Remove the rope rotor - see 6.2.

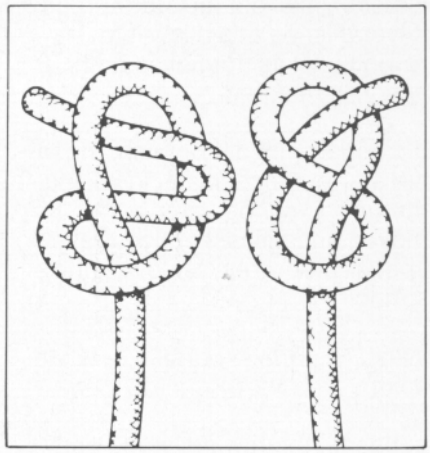
- Remove the remaining rope from the rope rotor. Thread end of new rope (3.5 mm (0.14") dia., 960 mm (37.8") long) through the rotor and secure it with a simple overhand knot.

- Pull the rope back into the rotor so that it locates in the recess.

Top:
1 = Special knot
2 = Rope guide bush

Bottom:
Special knots used



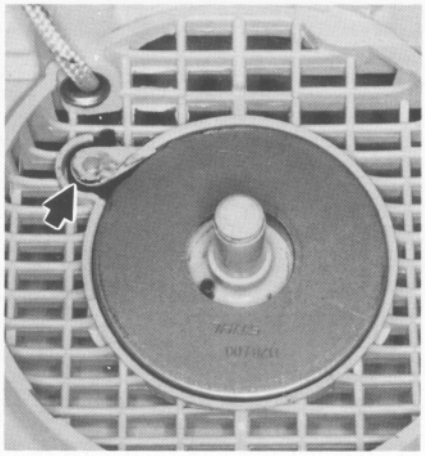


- Thread the other end of the rope through the guide bush from inside the fan housing and through the bottom of the starter grip. Secure with one of the special knots shown.

- Install the rope rotor - see 6.2.

6.4 Replacing the Rewind Spring

Rewind spring in position



- Remove the rope rotor, see 6.2. Take out the spring housing. Use pliers to remove any remaining pieces of spring from the fan housing.

- 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.

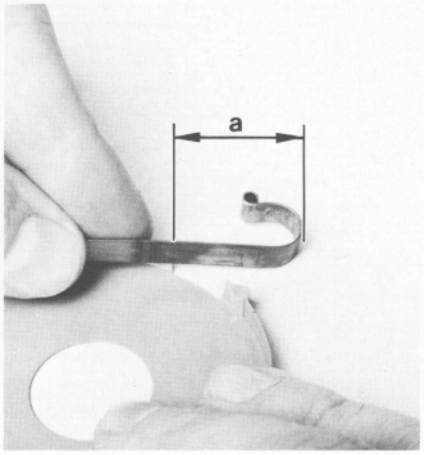
- Position the rewind spring with spring housing (bottom plate must face up) in the fan housing. Engage the anchor loop over the lug in the starter cover.

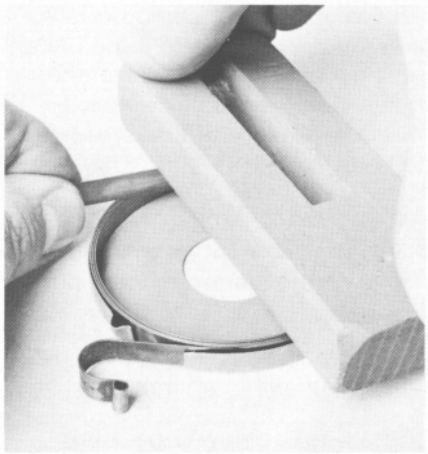
Caution: The rewind spring can pop out and uncoil during installation.

- If the rewind spring has popped out, refit it as follows:

Top:
Position of anchor loop a = 20 mm (3/4")

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





- Position anchor loop about 20 mm (3/4") from the edge of the spring housing.

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

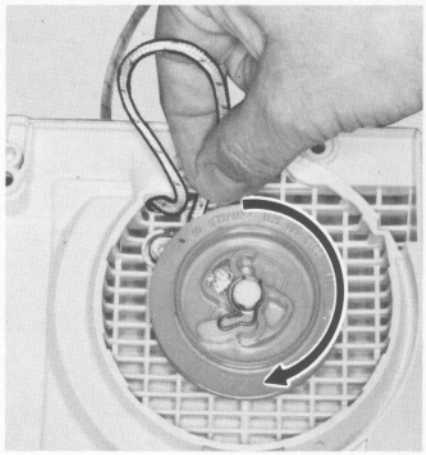
Note: The wooden assembly block can be placed over the spring housing to simplify refitting.

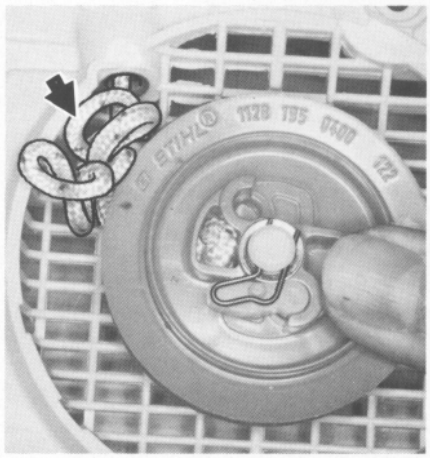
- Install the rope rotor - see 6.2.

6.5 Tensioning the Rewind Spring

Top:
Tensioning the rewind spring

Bottom:
Straightening twisted rope





- Make a loop in the starter rope.

- Grip the rope **close** to the rotor and use it to turn the rope rotor six full turns clockwise.

- Hold the rope rotor steady.

- Pull out the rope with the starter grip and straighten it out.

6.6 Replacing the Starter Rope Guide Bush

Grip on fan housing

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

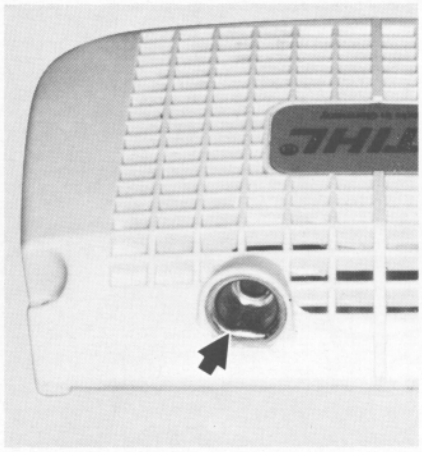
Note: The rewind spring is correctly tensioned when the starter grip sits firmly in the rope guide bush without drooping to one side. If this is not the case, tension the spring by one additional turn.

When the starter rope is fully extended, it must still be possible to rotate the rope rotor 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 fan housing.

Rope guide bush



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

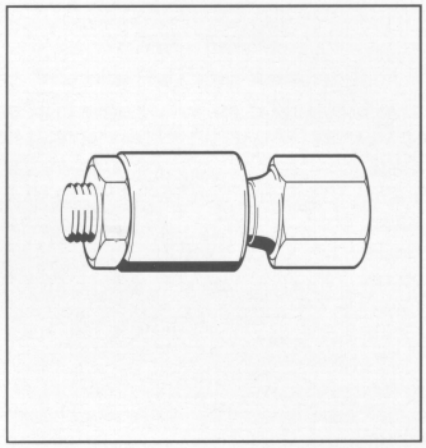
- Remove the fan housing.
- Remove the rope rotor, see 6.2, take off the starter grip and pull out the rope.
- Use a screwdriver to pry the old bush out of the fan housing.

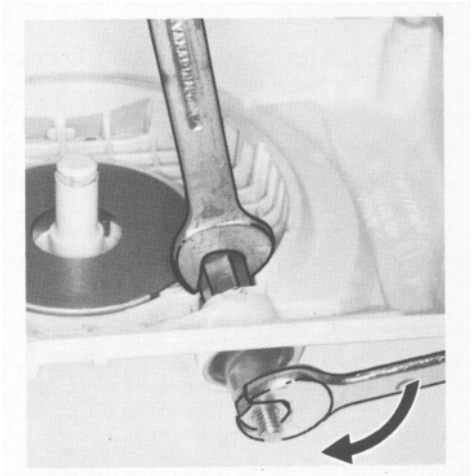
Installing the new rope bush:

- Place the new bush in its seat in the fan housing.
- Insert the screw spindle of the installing tool through the bush from inside the housing.
- Fit the thrust sleeve, tapered end first, and the hexagon nut.

Top:
Installing tool 0000 890 2201

Bottom:
Flaring the new rope guide bush





- Tighten down the hexagon nut until the bush is firmly seated.

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

- Refit the starter rope and starter grip.
- Install the rope rotor - see 6.2.
- Tension the rewind spring - see 6.5.
- Fit the fan housing.

7. AV HANDLE SYSTEM

7.1 Repair

Top:
Removing annular buffer from front handle

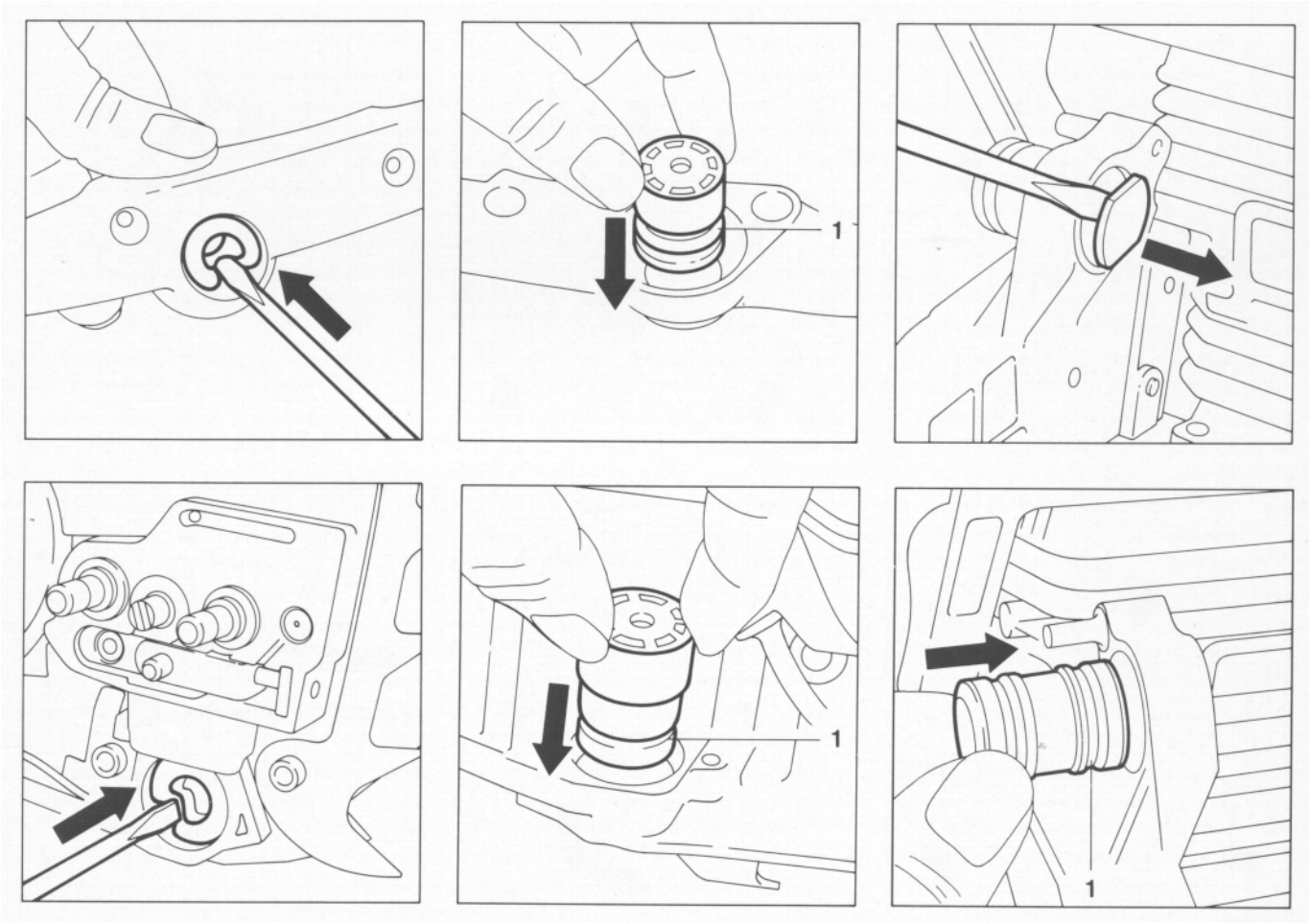
Bottom:
Removing lower annular buffer from engine housing

Top:
Fitting buffer in front handle
1 = Groove

Bottom:
Fitting buffer in engine housing
1 = Groove

Top:
Removing plug

Bottom:
Fitting buffer in engine housing
1 = Groove



Rubber anti-vibration buffers are installed between the handle housing and engine housing. Damaged rubber buffers (annular buffers) must always be replaced.

- Remove the front handle – see 8.1.
- Remove both annular buffers from the front handle.
- Push the lower annular buffer out of the engine housing.
- Push the annular buffer into the front handle (from inside) until its groove engages over the housing rib.
- Push the lower annular buffer into the engine housing until its groove engages over the housing rib.

Note: To replace the upper annular buffer it is necessary to remove the exhaust muffler and handle housing, see 4.1 and 8.1.1.

- Pry the plug out of the upper annular buffer. Remove upper annular buffer from the engine housing.
- Push the annular buffer into the engine housing from outside until its annular groove engages over the edge of the housing.

Assembly is now a reversal of the disassembly sequence.

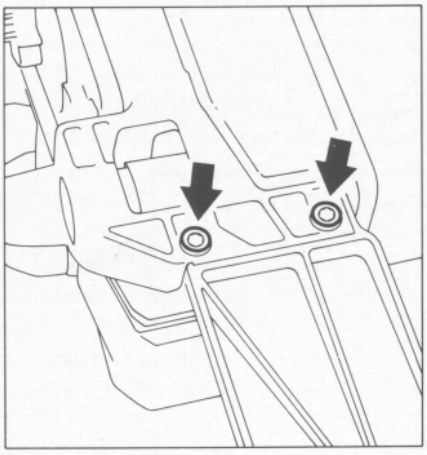
8. HANDLE HOUSING

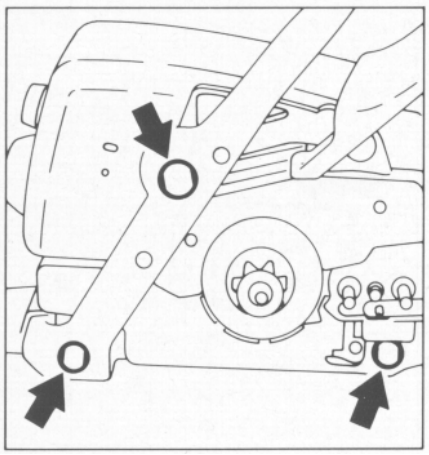
8.1 Front Handle

8.1.1 Removing and Installing Handle Housing

Top:
Lower mounting screws on front handle

Bottom:
Plugs

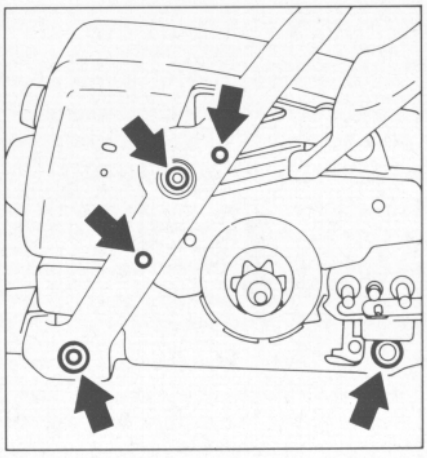


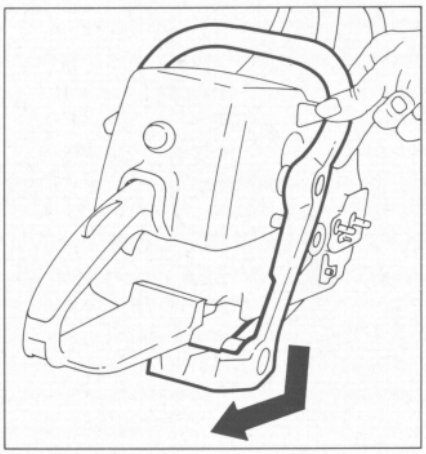


- Take the lower mounting screws out of the front handle.
- Remove the plugs from the annular buffers on the front handle.

Top:
Front handle mounting screws

Bottom:
Removing the front handle



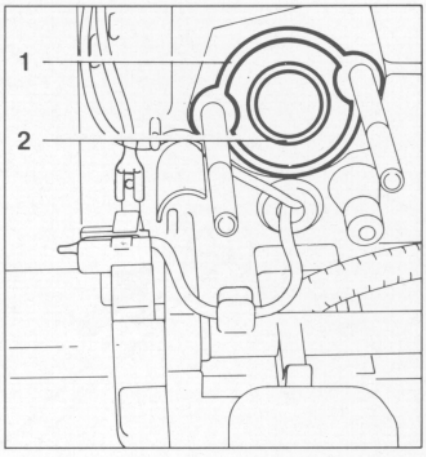


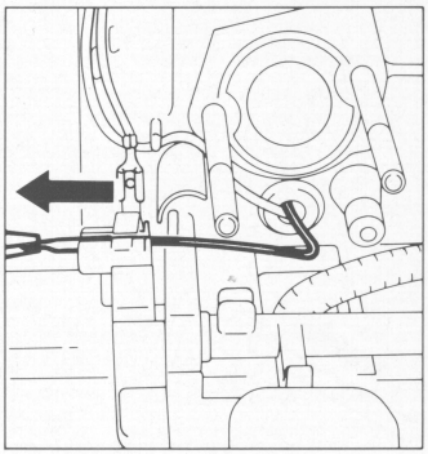
- Take out the front handle mounting screws.
- Pull the front handle down and off the handle housing, and then take it away to the rear.

Assemble in the reverse sequence.

Top:
1 = Washer
2 = Sleeve

Bottom:
Withdrawing short circuit wire





- Remove the front handle – see 8.1.
- Remove the carburetor – see 11.2.
- Slip the washer off the mounting studs and take the sleeve out of the manifold.
- Pull the short circuit wire's connector sleeve out of the switch shaft.

Top:
Ground wire

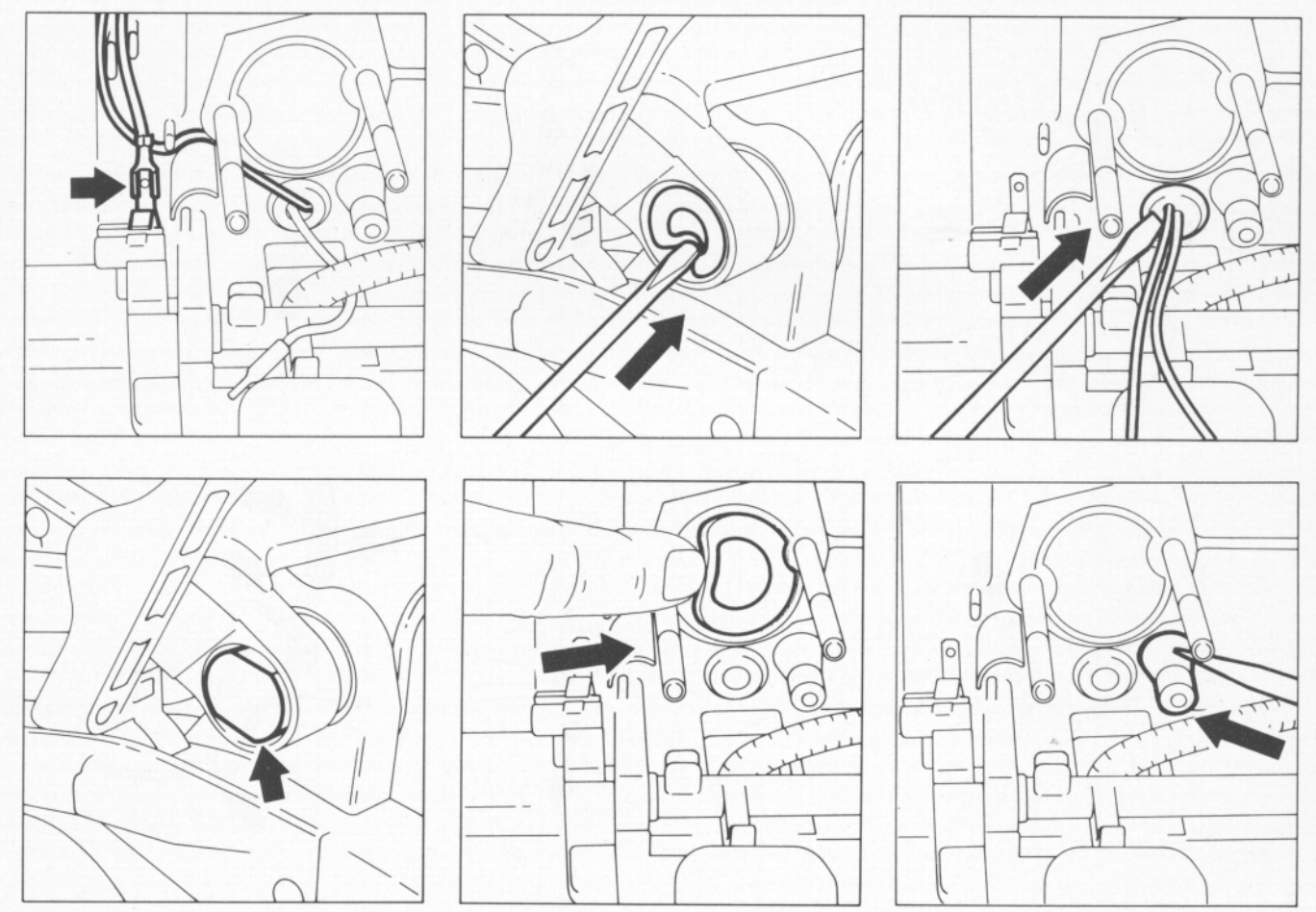
Bottom:
Plug

Top:
Removing annular buffer

Bottom:
Removing handle housing and pushing out manifold at same time

Top:
Removing grommet

Bottom:
Removing the impulse hose



- Pull the ground wire off the contact spring.
- Ease the plug out of the annular buffer on the hand guard.

- Push the annular buffer out of the engine housing.
- Pull the handle housing slightly forward and push the manifold through the handle housing opening at the same time.

- Ease the grommet for the ground and short circuit wires out of the handle housing.
- Remove the impulse hose from the handle housing.
- Remove the handle housing and pull the ground and short circuit wires out of the bore at the same time.

Assembly is a reversal of the disassembly sequence.

Top:
1 = Bore for impulse hose
2 = Grommet for ground and short circuit wires
3 = Impulse hose
4 = Fuel hose

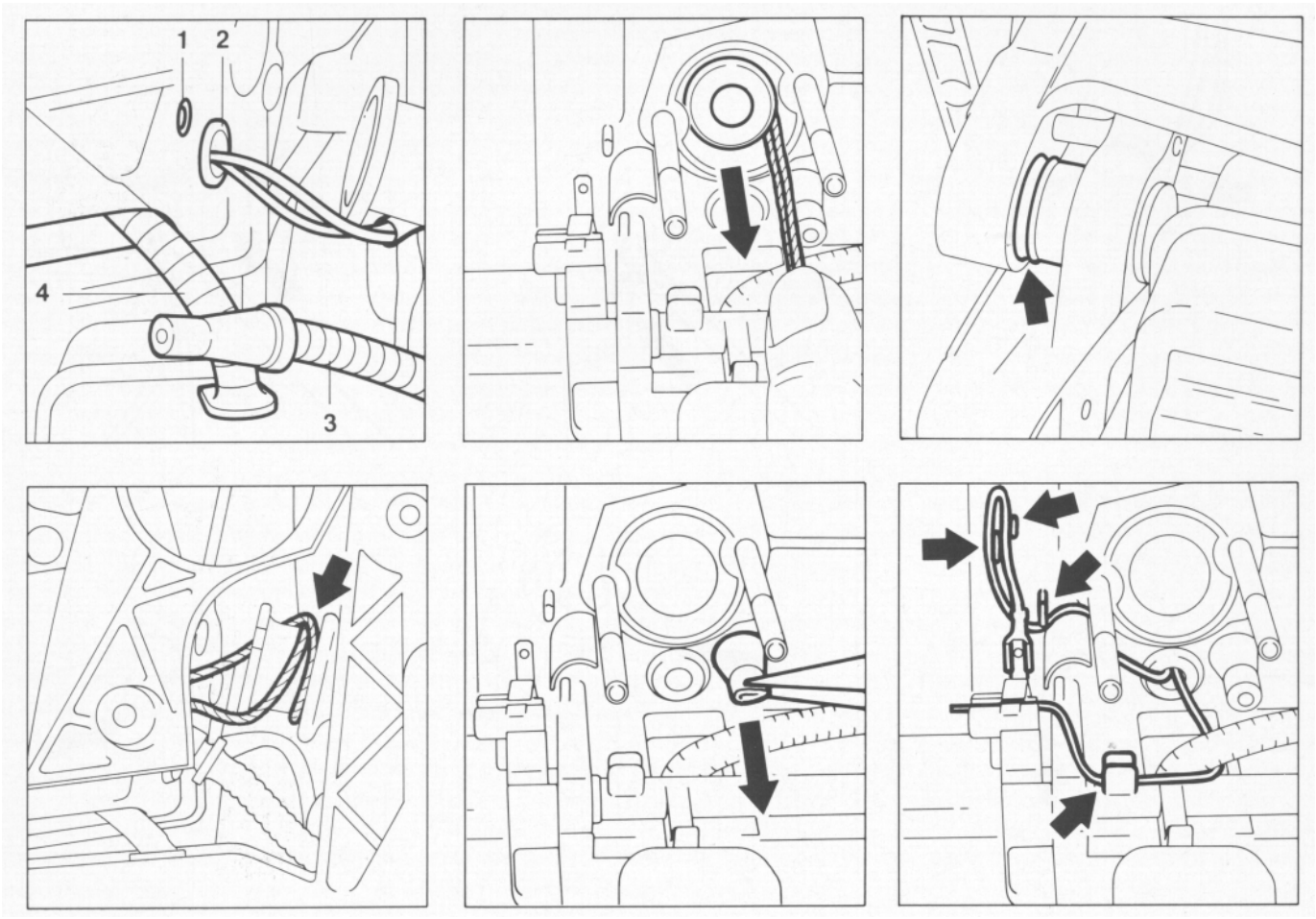
Bottom:
String around manifold

Top:
Pulling manifold into handle housing intake opening

Bottom:
Pulling impulse hose into position

Top:
Annular groove

Bottom:
Correct position of ground and short circuit wires



Note: Pay special attention to the following points.

- Place the handle housing in position and thread the ground and short circuit wires through the bore. Fit the grommet in the bore.

- Position impulse hose in bore and pass the fuel hose through the lower slot.

- Wind a piece of string (about 15 cm / 6" long) around the back of the manifold flange and pass the ends through the intake opening.

- Press the intake opening of the handle housing against the manifold and pull the ends of the string outward at the same time. The manifold flange is pulled through the handle housing intake opening without being damaged.

- Pull the impulse hose outward is until its bead is in front of the housing.

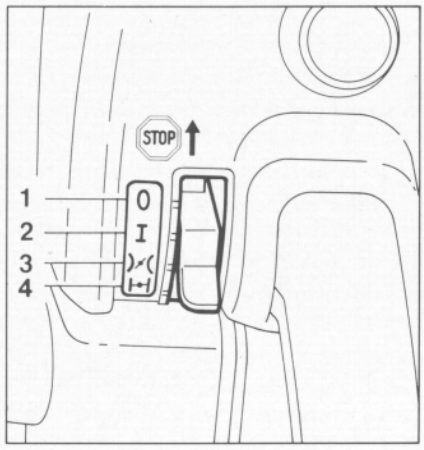
- Push the annular buffer into the engine housing until its groove engages the housing rib.

- Position the ground and short circuit wires correctly in the handle housing (see illustration) and push them into their retainers.

9. MASTER CONTROL

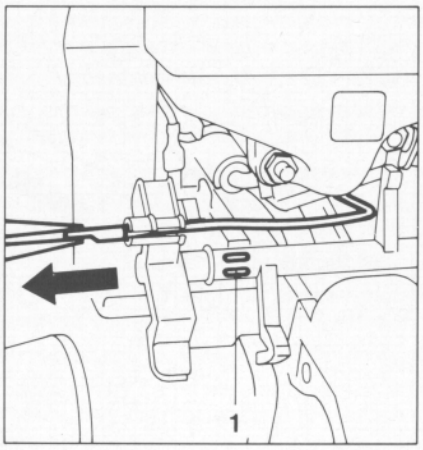
9.1 Switch Shaft

Positions of Master Control lever:
1 = STOP
2 = RUN
3 = START (warm start)
4 = CHOKE (cold start)



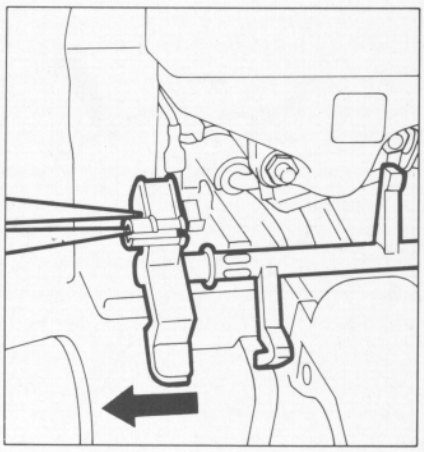
Top:
Removing connector sleeve
1 = Seat on switch shaft

Bottom:
Detaching the switch shaft



Top:
Withdrawing the switch shaft

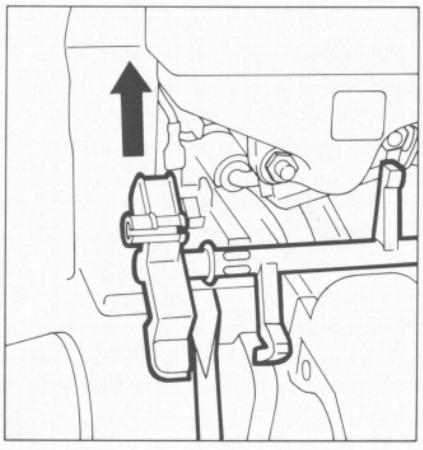
Bottom:
Holding the contact spring up

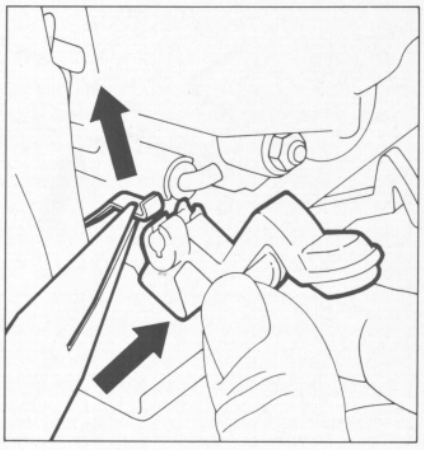


The main part of the Master Control is the switch shaft with an integrally molded multi-function operating lever, a molded seat for the contact spring and connector sleeve and three levers.

The thumb-operated Master Control lever moves the switch shaft to select the required function.

The following positions can be selected with the Master Control lever (from the top down):





- STOP (short circuit contact closed, ignition interrupted)
- RUN (normal operating position)
- START (warm start - starting throttle/ choke shutter open)
- CHOKE (cold start - starting throttle/ choke shutter closed)

- Remove the carburetor box cover - see 11.1.
- Set the Master Control to "CHOKE".
- Take the short circuit wire out of its seat on the switch shaft.
- Pull the connector sleeve of the short circuit wire out of the switch shaft.

- Lever the switch shaft out of its pivot mount.
- Pull the switch shaft out of the bore.

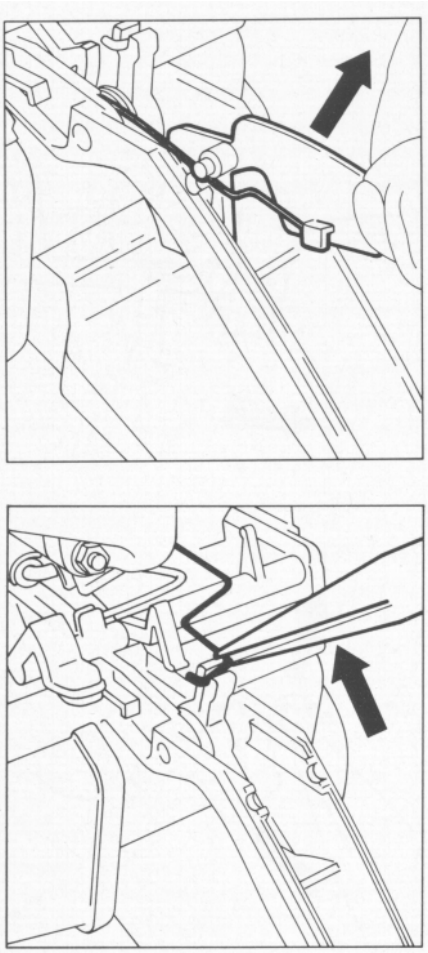
Installation is a reversal of the removal sequence.

Note: The contact spring must be held up while installing the switch shaft.

9.2 Interlock Lever/ Throttle Trigger

Top:
Withdrawing interlock lever

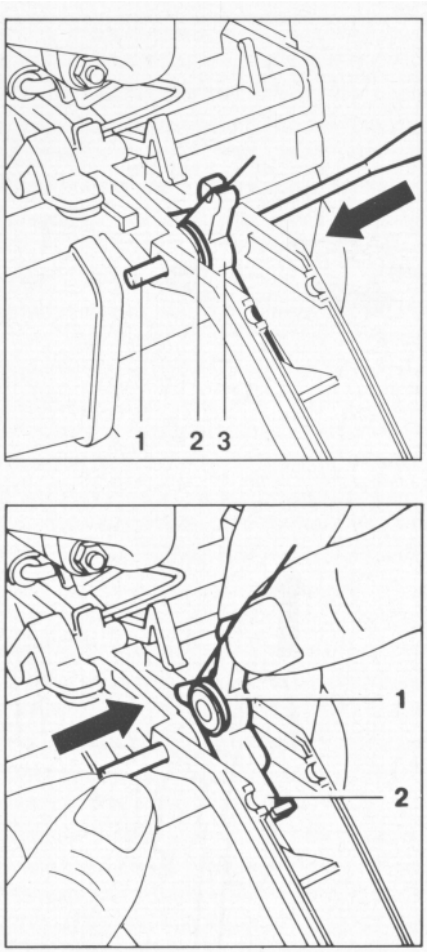
Bottom:
Disconnecting throttle rod from throttle trigger.



- Remove the carburetor box cover.
- Move Master Control to cold start position (CHOKE).
- Take out the handle molding fastening screw. Lift away the handle molding.
- Take the interlock lever out of its seat.
- Move Master Control lever to "RUN" position.

Top:
1 = Cylindrical pin
2 = Torsion spring
3 = Throttle trigger

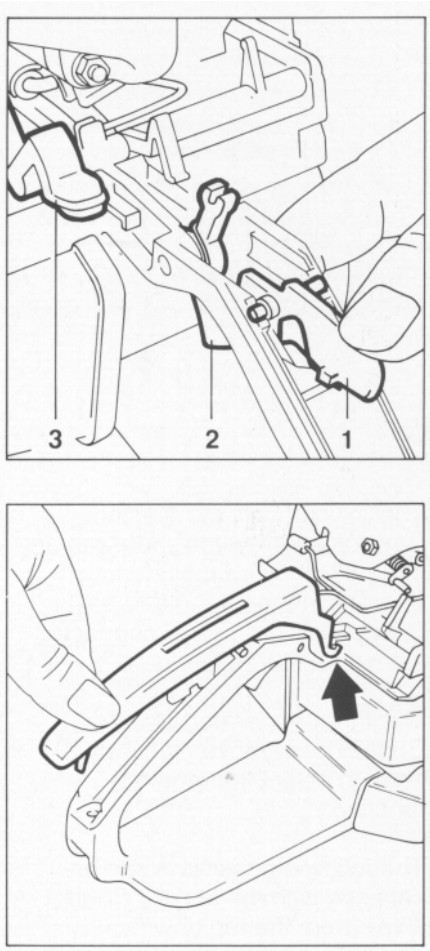
Bottom:
1 = Torsion spring
2 = Throttle lever



- Disconnect the throttle rod from the trigger.
- Use a 4 mm (5/32") drift to drive out the cylindrical pin. Remove the throttle trigger and torsion spring.
- Position the torsion spring on the throttle trigger -long leg of spring must face upward.
- Fit the throttle trigger so that the seat for the throttle rod points up ward. Push the cylindrical pin into position.

Top:
1 = Interlock lever
2 = Throttle trigger
3 = Master Control lever

Bottom:
Fitting handle molding



- Push the interlock lever into the slots.

Note: The torsion spring must be under the interlock lever and engage the notch.

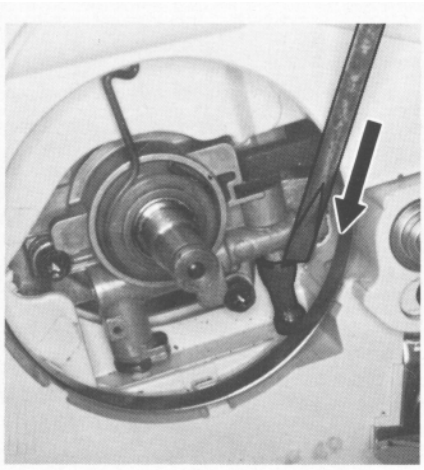
- Press the interlock lever down- ward. Push the throttle trigger upward and move the Master Control lever to the "CHOKE" position.
- Fit the handle molding so that it engages behind the lugs as shown in the illustration. Secure with screw.

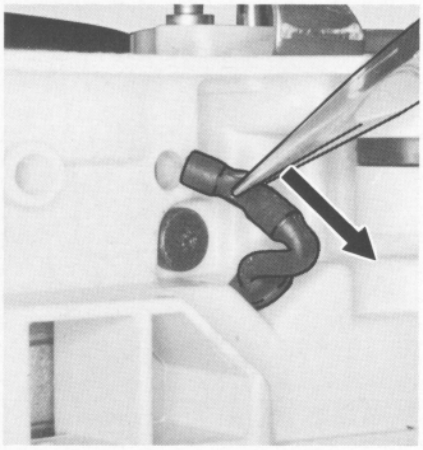
10. CHAIN LUBRICATION

10.1 Suction Hose/Pickup Body

Top:
Removing suction hose from oil pump nipple

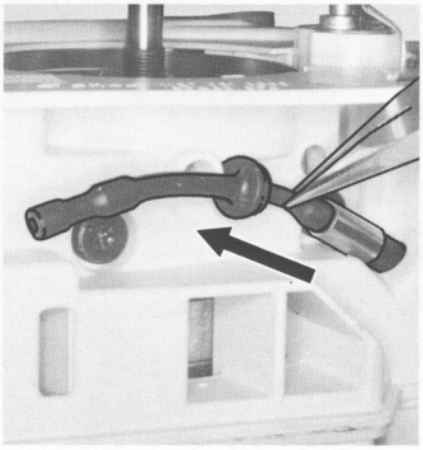
Bottom:
Pulling out the suction hose

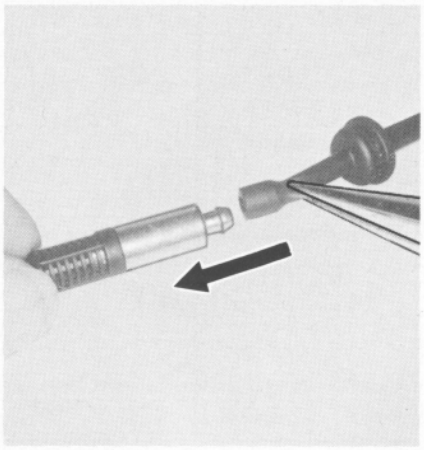




Top:
Pulling out suction hose with pickup body

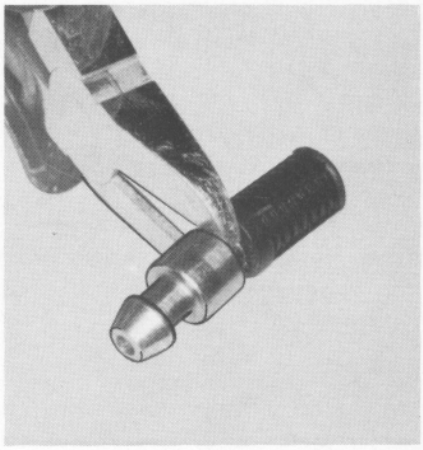
Bottom:
Pulling pickup body out of hose

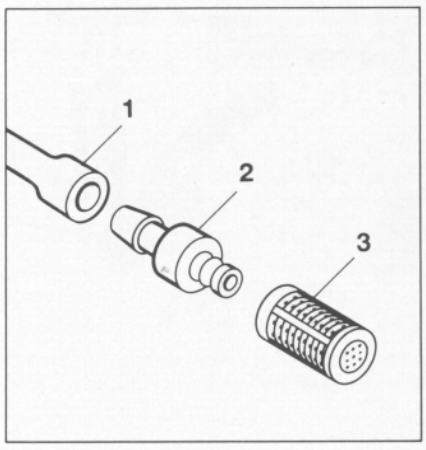




Top:
Removing the strainer

Bottom:
1 = Hose
2 = Connector
3 = Strainer





Impurities gradually clog the fine pores of the filter with tiny particles of dirt. This prevents the oil pump from supplying sufficient oil to the bar and chain. In the event of problems with the oil supply, first check the oil tank and the pickup body.
Clean the oil tank if necessary.

- Remove the front handle – see 8.1.
- Remove the clutch - see 3.2.
- Drain the oil tank.
- Push the suction hose off the nipple on the oil pump.
- Pull the suction hose out of the engine housing.
- Pull the suction hose with pickup body out of the housing.
- Pull the pickup body out of the hose.
- Use side cutters or similar tool to remove the strainer from the connector.
- Wash the strainer and pickup body in white spirit and, if possible, blow out with compressed air.

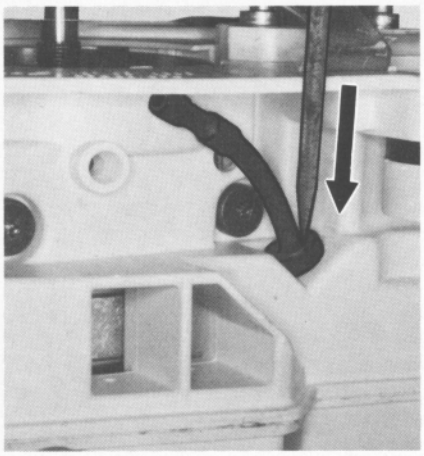
Important: Always replace a damaged pickup body.

10.2 Vent Valve

10.3 Removing and Installing the Oil Pump

Top:
Oil filler cap

Bottom:
Pushing bead of suction hose into position



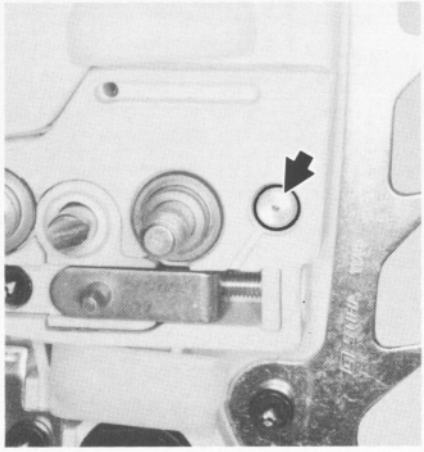
- Remove the oil filler cap and the cap retainer. Flush out the oil tank.

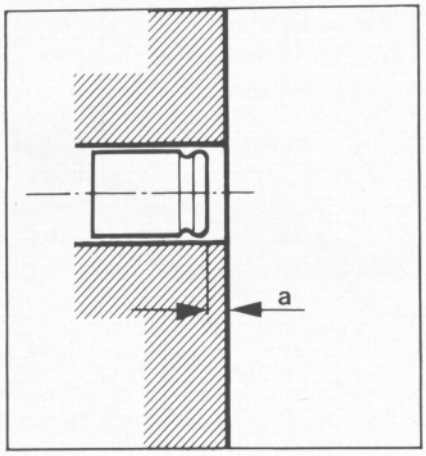
Assembly is a reversal of the disassembly sequence.

Note: Coat the bead of the suction hose with oil to simplify fitting.

Top:
Vent valve

Bottom:
Installed position of valve a = approx. 1 mm (3/64")



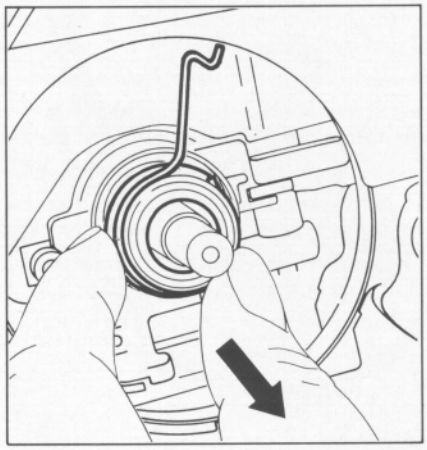


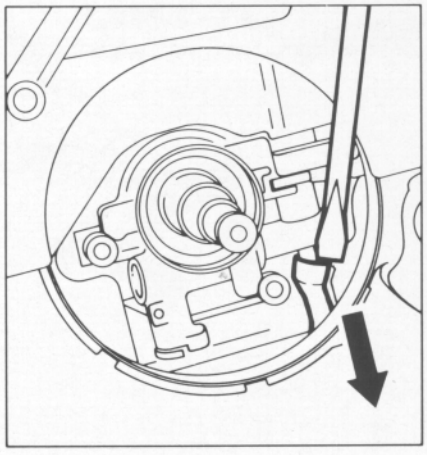
A valve is installed in the tank wall to keep internal tank pressure equal to atmospheric pressure.

- Drain the oil tank.
- Use a 7 mm (9/32") dia. drift to carefully drive the vent valve into the engine housing and then remove it from the oil tank.
- Carefully press in the new valve until it is about 1 mm (3/64") below the face of the housing.

Top:
Removing the worm

Bottom:
Removing suction hose from oil pump nipple



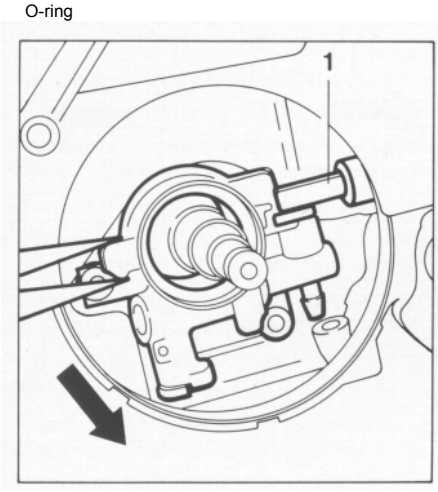


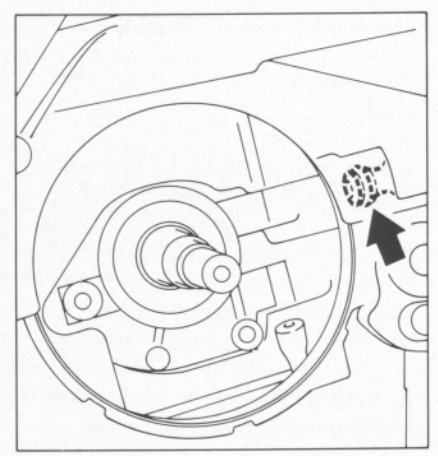
- Remove the clutch - see 3.2.
- Pull the worm and drive spring off the crankshaft stub.
- Take the spring off the worm.
- Push the suction hose off the nipple on the oil pump.

10.4 Servicing the Oil Pump

Top:
Removing the oil pump
1 = Elbow connector

Bottom:
O-ring

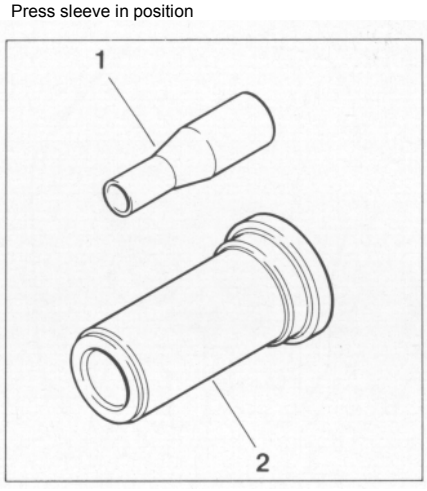


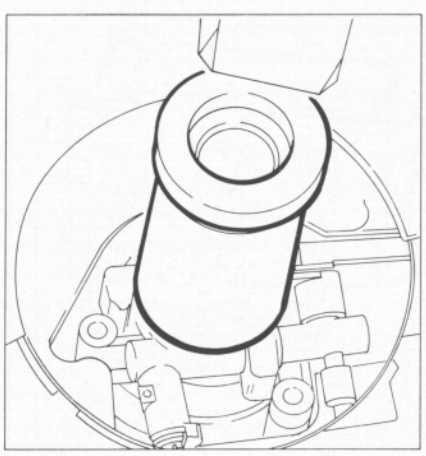


- Take out the oil pump mounting screws.
- Push the oil pump to one side and ease the elbow connector off the nipple.
- Remove the oil pump.
- Take the O-ring off the nipple and fit a new one.
- Place the pump in position and line it up.

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

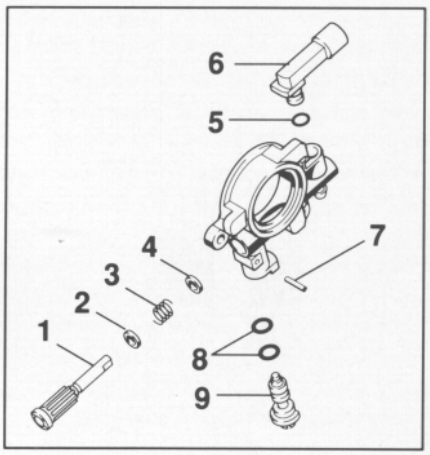
Bottom:
Press sleeve in position





- Slip the assembly sleeve over the crankshaft stub.
- Fit the mounting screws by hand.
- Place the press sleeve in position. Tap the end of the press sleeve lightly to seat the pump housing.
- Tighten screws to 4.0 Nm (3 lbf.ft).
- Fit the worm.
- Install the clutch - see 3.3.

1 = Pump piston
2 = Washer
3 = Helical spring
4 = Washer
5 = O-ring
6 = Elbow connector
7 = Spring pin
8 = O-ring
9 = Control bolt



Always check the suction hose and pickup body before disassembling the oil pump.

- Remove the oil pump - see 10.3.
- Swing the elbow connector to one side and pull it out of the housing.
- Remove the O-ring from the elbow connector.
- Use a 2 mm (5/64") dia. drift to drive out the spring pin. Pull the control bolt out of the housing and remove the O-rings.
- Take out the pump piston with helical spring and washers.
- Wash all parts in white spirit. Inspect the parts for damage and replace as necessary.

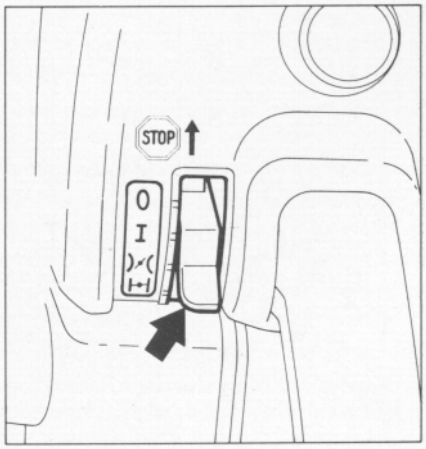
Assembly is a reversal of the disassembly sequence.

Note: Always install new O-rings. Coat the pump piston and worm with grease, - see 12.2, before installing.

11. **FUEL SYSTEM**

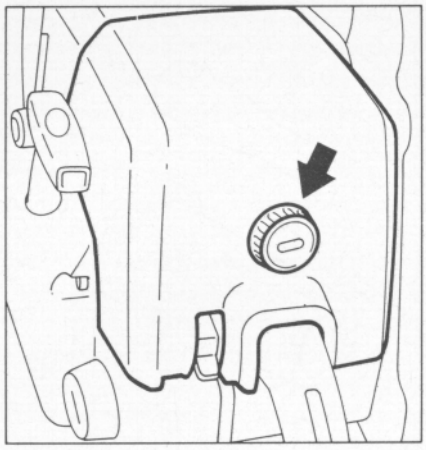
11.1 **Air Filter**

Master Control in "CHOKE" position

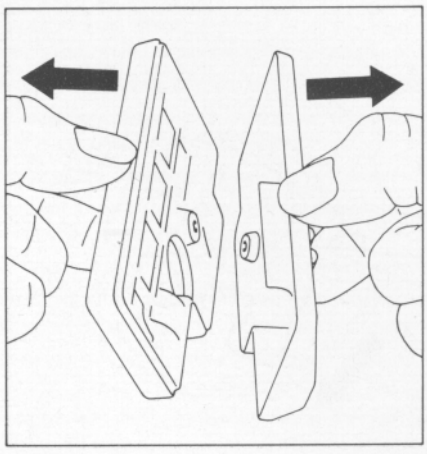


Top:
Twist lock on carburetor box cover

Bottom:
1 = Prefilter
2 = Slotted nuts



Separating two halves of air filter



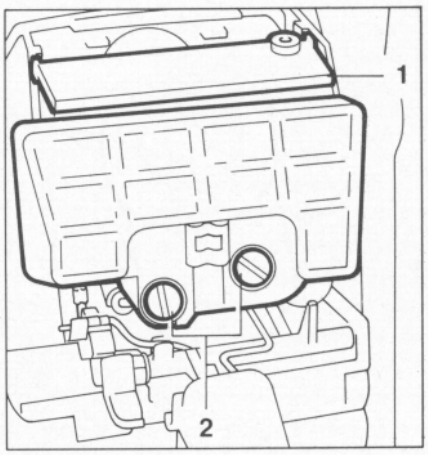
The air filter's function is to remove any dust and dirt sucked in with the combustion air and thus help reduce wear on engine components to a minimum.

Dirty and clogged air filters reduce engine power, increase fuel consumption and make starting more difficult.

The air filter should always be cleaned when engine power begins to drop off.

Before removing the filter, close the choke shutter to prevent dirt falling into the carburetor - press down the interlock lever and move Master Control down to cold start position (CHOKE).

- Turn twist lock on carburetor box cover one quarter turn counter-clockwise and take away the cover.



- Clean away any loose dirt from around the filter.

- Push the prefilter up a little or take it out of the recesses in the handle housing.

- Unscrew the slotted nuts.

- Pull the air filter off the studs.

- Separate the two halves of the filter.

- Wash both parts of the filter in a fresh, non-flammable cleaning solution (e.g. warm soapy water) and, if possible, blow clear with compressed air. Encrusted dirt should be softened by immersing the filter in the cleaning solution.

Important: Do not clean flocked air filters with compressed air, brushes or rags.

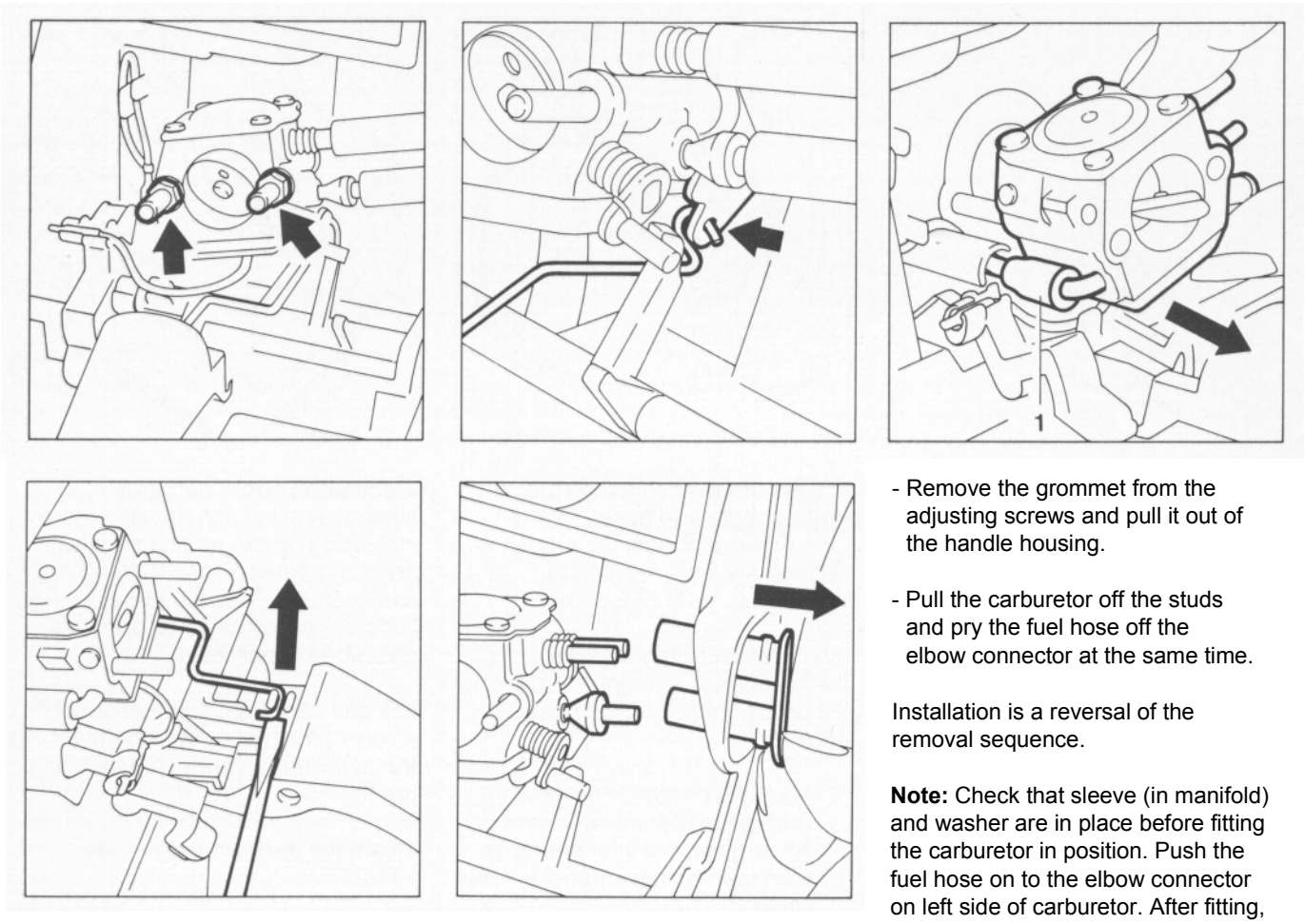
Note: If the filter is damaged, replace it immediately.

Installation is a reversal of the removal sequence.

11.2 Removing and Installing the Carburetor

Top:
Flanged lock nuts

Bottom:
Detaching throttle rod



Top:
Detaching throttle rod

Bottom:
Removing grommet for adjusting screws

Removing the carburetor
1 = Fuel hose

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 2.6.

- Remove the air filter - see 11.1.

Note: For removal of carburetor on machines with automatic choke - see 11.6.8.

- Unscrew the flanged lock nuts from the mounting studs.

- Disconnect the throttle rod from the throttle trigger.

- Disconnect the throttle rod from the throttle shaft.

- Remove the grommet from the adjusting screws and pull it out of the handle housing.

- Pull the carburetor off the studs and pry the fuel hose off the elbow connector at the same time.

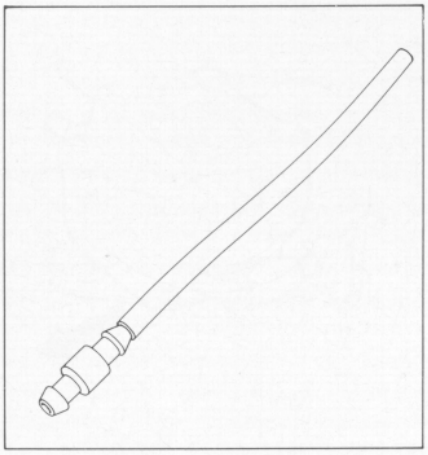
Installation is a reversal of the removal sequence.

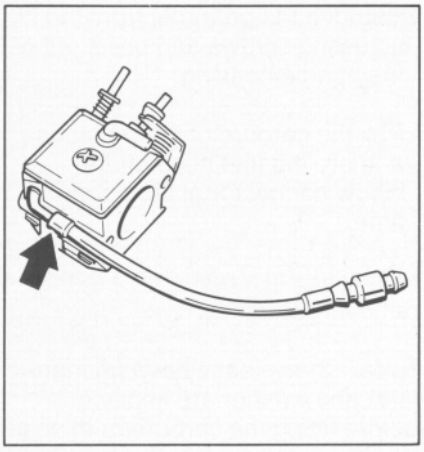
Note: Check that sleeve (in manifold) and washer are in place before fitting the carburetor in position. Push the fuel hose on to the elbow connector on left side of carburetor. After fitting, check that elbow connector on underside of carburetor is properly engaged in impulse hose. Fit new flanged lock nuts and torque them down to 3.2 Nm (2.4 lbf.ft).

11.3 Leakage Testing the Carburetor

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

Bottom:
Fuel line on elbow connector



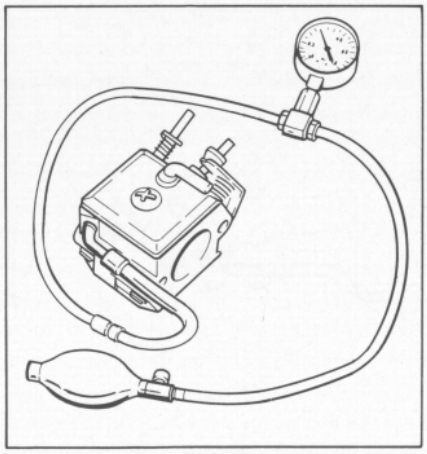


The carburetor can be tested for leaks with the carburetor and crankcase tester.

- Remove the carburetor, - see 11.2.

- Connect tester's pressure hose to elbow connector on side of carburetor. Note that a separate nipple and a length of fuel line are required to make this connection.

Pressure testing carburetor with carburetor/crankcase tester 1106 850 2905



- Close the vent screw on the rubber bulb and pump air into the carburetor until the pressure gauge shows a reading of approx. 0.4 bar (5.8 psi).

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

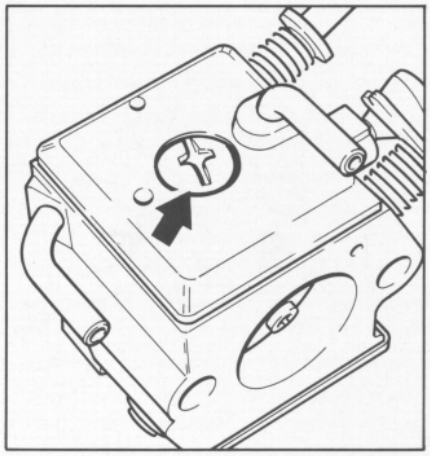
1. The inlet needle is not sealing (foreign matter in valve seat or sealing cone of inlet needle is damaged or inlet control lever sticking).

2. The metering diaphragm is damaged.

In either case the carburetor must be removed and serviced.

11.4 Servicing the Carburetor

Fastening screw on fuel pump end cover



Zama and Walbro carburetors of almost identical construction are installed in these machines. The servicing procedures for the Zama carburetor are described below. Differences in individual parts are described separately.

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

- Remove the carburetor – see 11.2.

- Unscrew the fuel pump end cover and take it off.

Top:
Fuel pump end cover with gasket

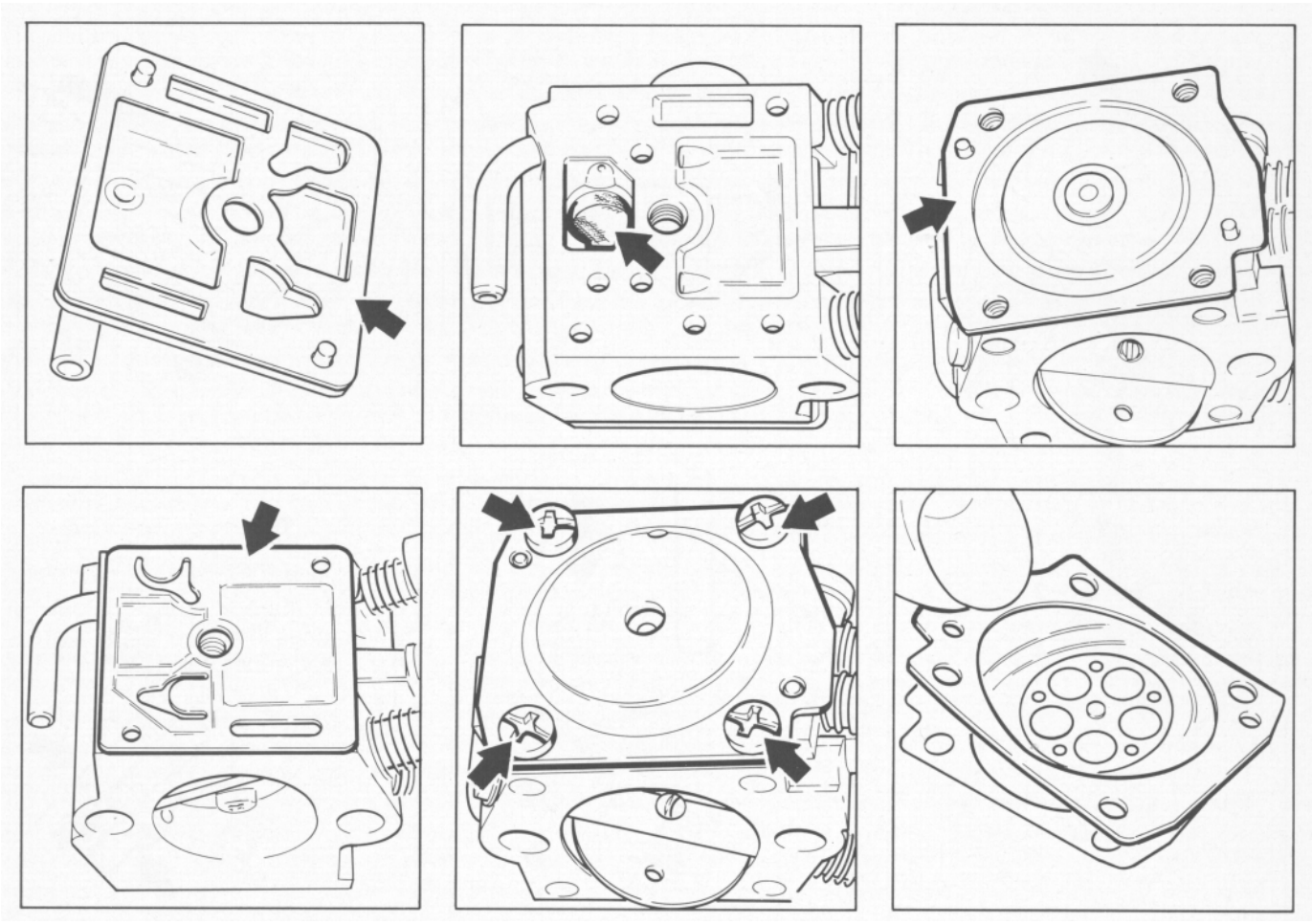
Bottom:
Pump diaphragm on carburetor body

Top:
Fuel strainer in carburetor body

Bottom:
Fastening screws of metering chamber end cover

Top:
Metering diaphragm with gasket on end cover

Bottom:
Separating gasket and diaphragm



- Remove the gasket and pump 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 11.8.

- 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:
Round head screw on control lever spindle (Zama)

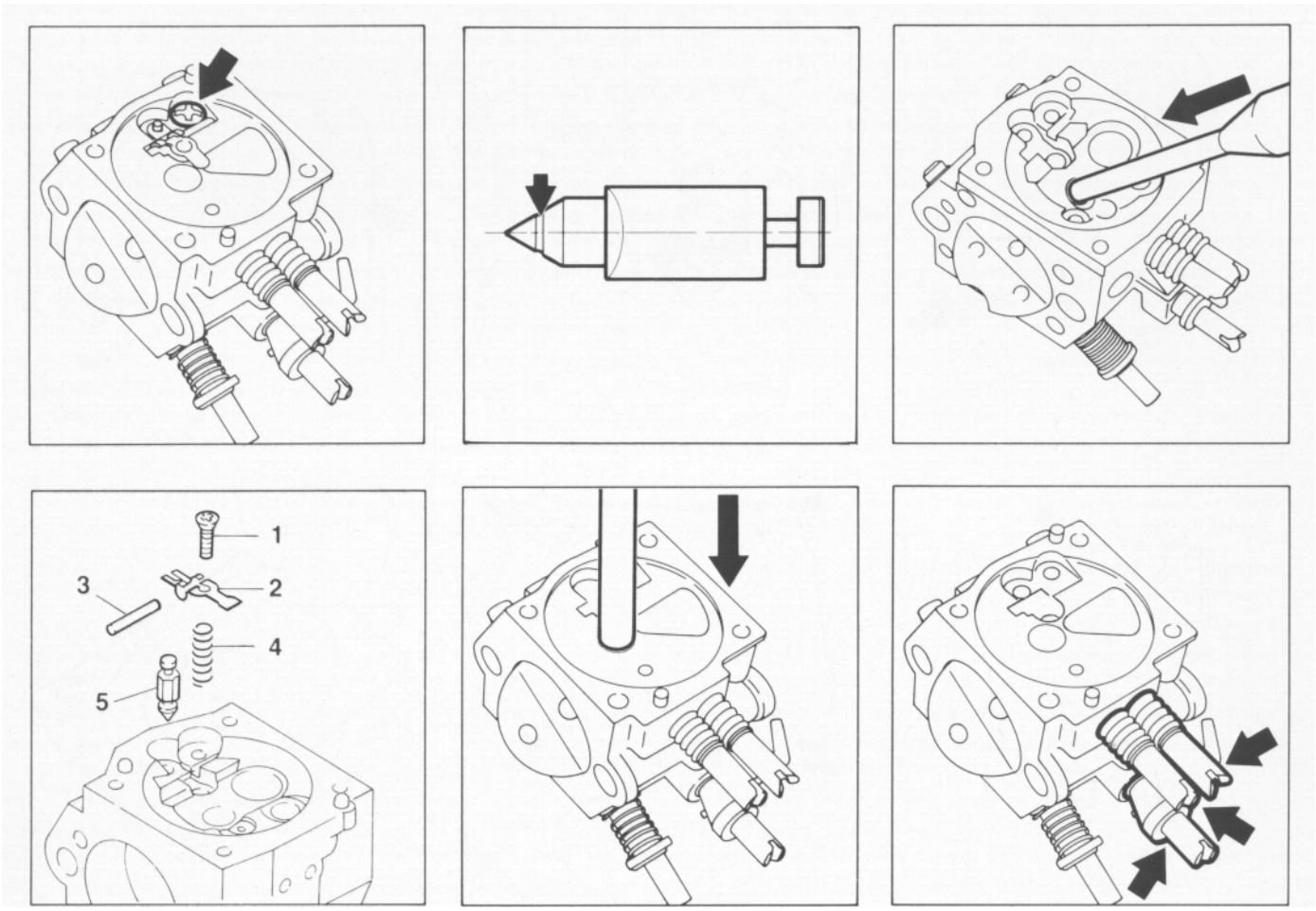
Bottom:
1 = Round head screw
2 = Inlet control lever
3 = Spindle
4 = Helical spring
5 = Inlet needle

Top:
Damaged inlet needle

Bottom:
Pressing out valve jet (Zama)

Top:
Pressing out valve jet (Walbro)

Bottom:
Carburetor adjusting screws



- The inlet needle valve is located in a recess in the metering diaphragm chamber. Remove the round head screw or collar 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.

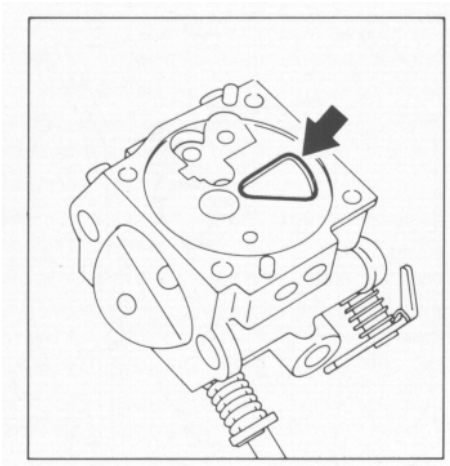
- Use a 5 mm (approx. 3/16") dia. drift to press the valve jet out of its seat in the direction of the venturi and wash it in white spirit.

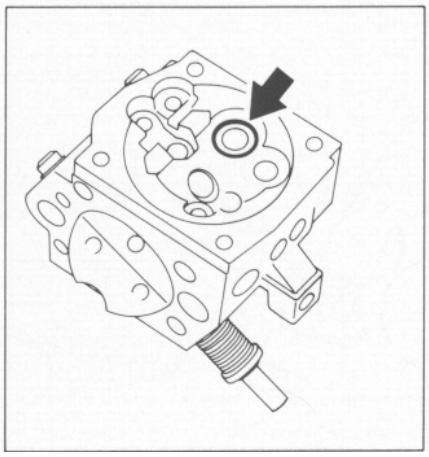
Note: On Walbro carburetor, use a 4 mm (approx. 5/32") dia. drift to press the valve jet out of its seat.

- Remove the carburetor adjusting screws.

Top:
Sealing plate (Zama)

Bottom:
Sealing plug (Walbro)

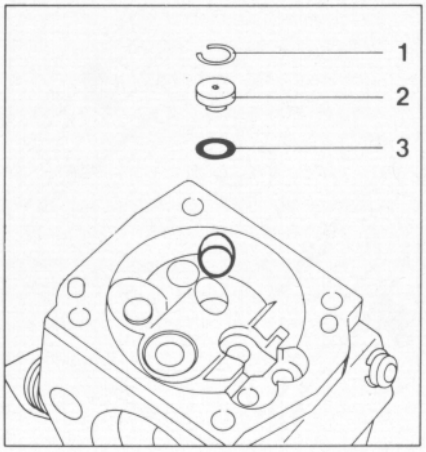




- Remove the sealing plate or plug from of the metering chamber.

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

Removing the fixed jet
1 = Retaining ring
2 = Fixed jet
3 = O-ring



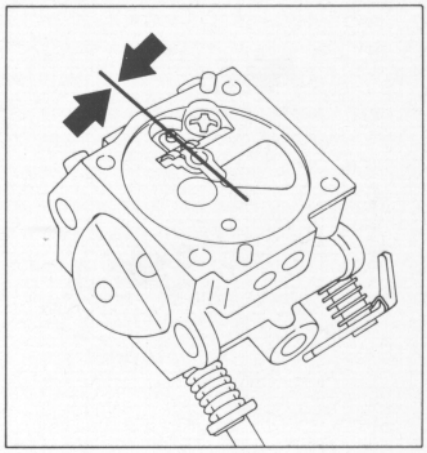
- The Walbro carburetor is equipped with a fixed jet. To remove, use a suitable tool to ease the retaining ring out of its seat and then take out the fixed jet and O-ring.

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

- To install the fixed jet, fit a new O-ring in the bore for the fixed jet. Press home the fixed jet (flat side up) as far as stop and secure in position with the retaining ring.

- When fitting the valve jet, make sure it is exactly vertical in the bore. Press it home until it is flush with the bottom of the metering chamber.

Correct position of inlet control lever



- 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 the head of the inlet needle and tighten down the round head screw. Make sure that the helical spring locates on the control lever's nipple.

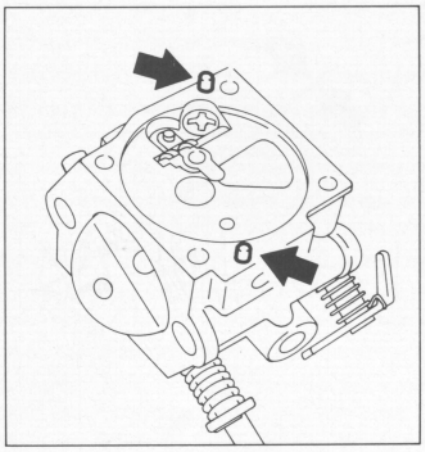
- Check easy action of the inlet control lever.

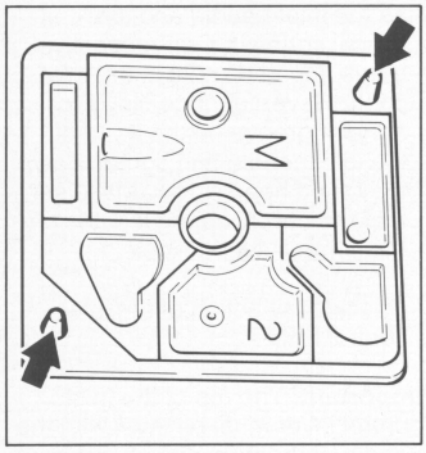
Important: The top of the inlet control lever must be level with the bottom of the metering chamber. If necessary, use suitable pliers to carefully bend the lever.

- After fitting new sealing plate or plug, fill gap between carburetor body and plate or plug with Loctite – see 12.2.

Top:
Locating pegs on body

Bottom:
Locating pegs on cover



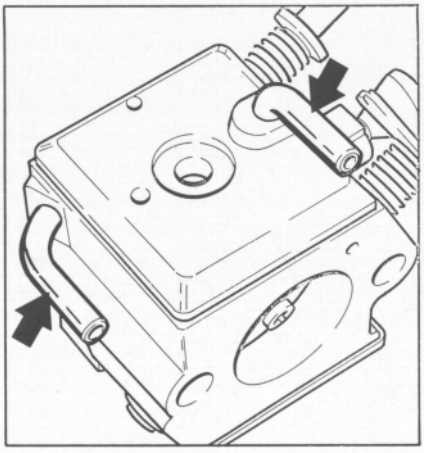


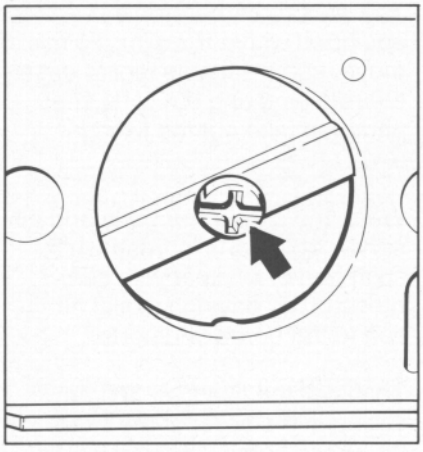
- Fit the gasket, metering diaphragm and end cover. The metering diaphragm and gasket are held in position by the integrally cast pegs on the carburetor body.

- 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:
Elbow connectors

Bottom:
Throttle shutter
fastening screw





Note: Fit the end cover so that the two elbow connectors are pointing in the same direction.

- Refit the carburetor adjusting screws.

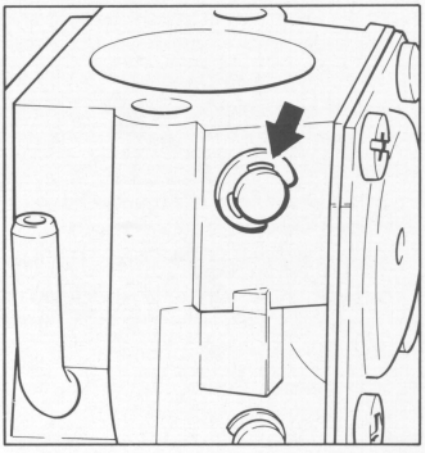
- Carry out leakage test before installing the carburetor – see 11.3.

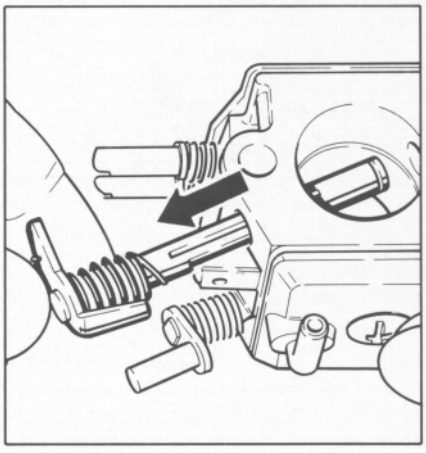
Removing the throttle shaft:

Note: For machines with automatic choke - see 11.6.10.

Top:
E-clip

Bottom:
Withdrawing throttle shaft





- Unscrew the throttle shutter fastening screw.

- Use suitable pliers to pull the throttle shutter out of the throttle shaft.

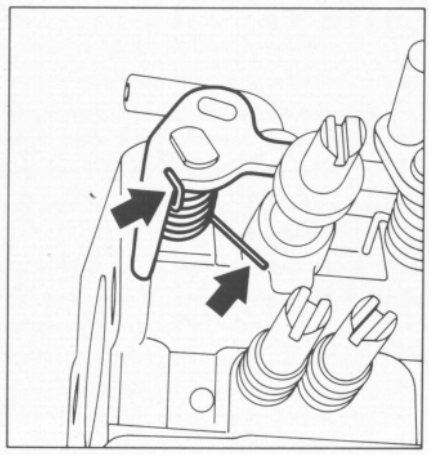
- Pry the E-clip off the end of the throttle shaft.

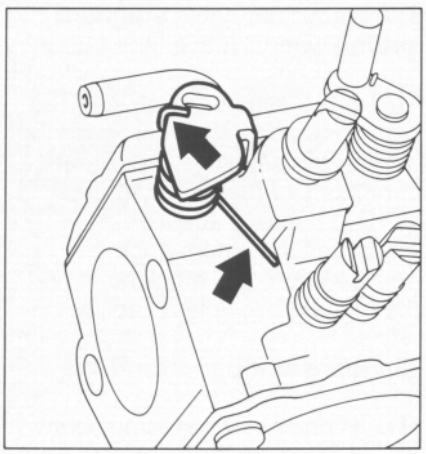
- Withdraw the throttle shaft from the carburetor.

- Remove the torsion spring.

Top:
Correct position of torsion spring
(Zama)

Bottom:
Correct position of torsion spring
(Walbro)

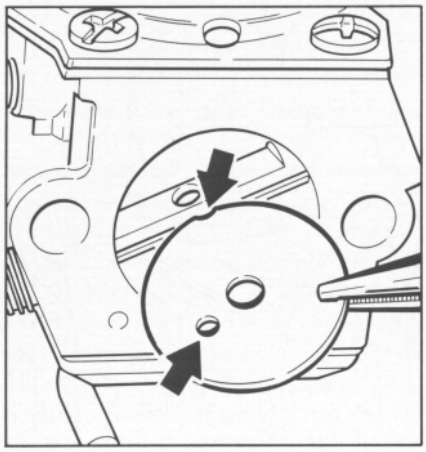


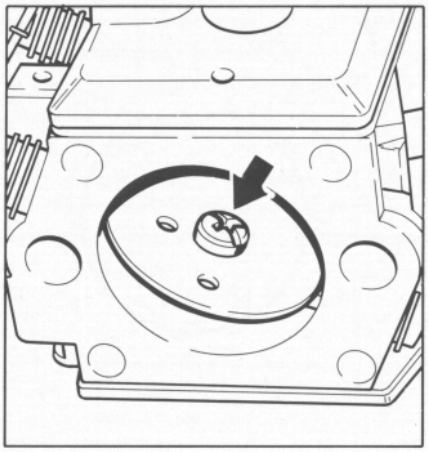


- After fitting the throttle shaft, check that the torsion spring is correctly positioned.

Top:
Fitting throttle shutter

Bottom:
Choke shutter fastening
screw





- Fit the throttle shutter, round notch first, with the small bore pointing to the throttle lever.

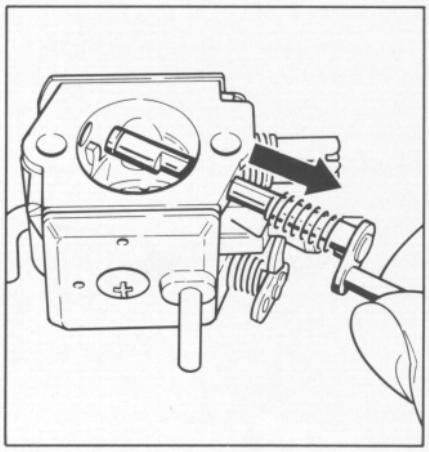
- Coat the fastening screw with Loctite, - see 12.2, and tighten down firmly.

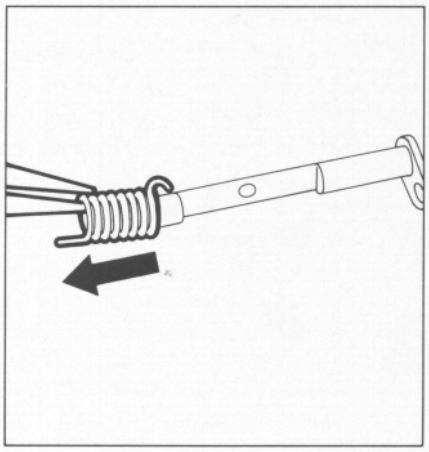
Removing choke shaft:

Note: For machines with automatic choke - see 11.6.10.

Top:
Withdrawing choke shaft

Bottom:
Removing the torsion spring





- Unscrew choke shutter fastening screw. Remove the choke shutter.

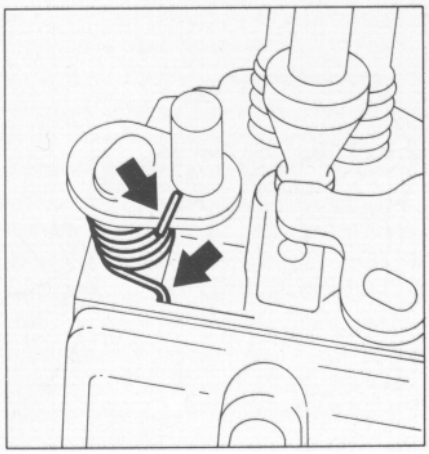
- Pry the E-clip off the end of the choke shaft and withdraw the shaft from the carburetor.

- Remove the torsion spring.

11.5 Carburetor Adjustment

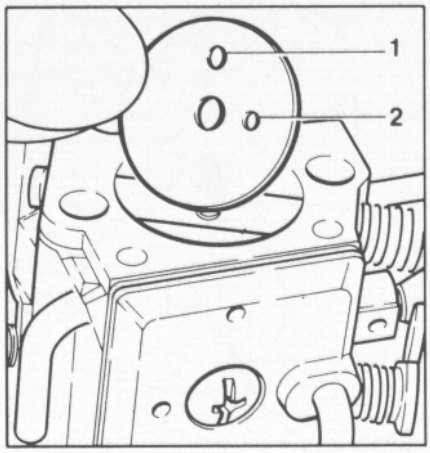
Top:
Correct position of torsion spring (Zama)

Bottom:
Correct position of torsion spring (Walbro)

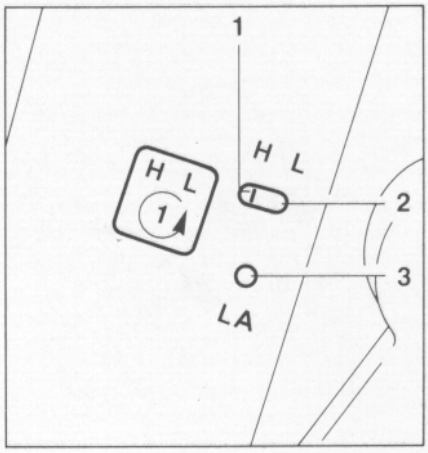


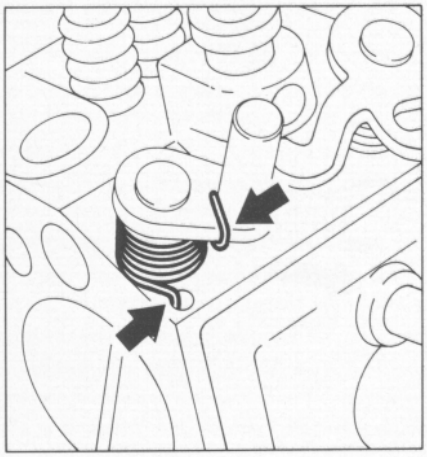
Top:
Fitting choke shutter (Zama)
1 = Large bore
2 = Small bore

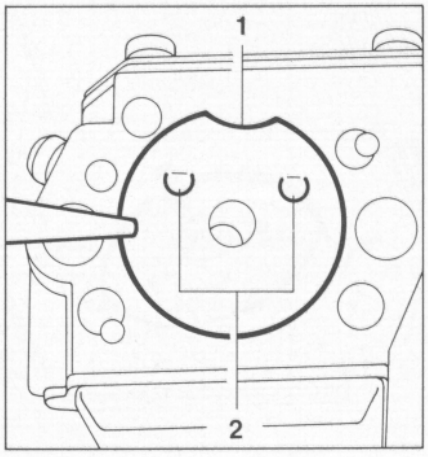
Bottom:
Fitting choke shutter (Walbro)
1 = Round notch
2 = Indentation



1 = High speed adjusting screw
2 = Low speed adjusting screw
3 = Idle speed adjusting screw







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

- Position choke shutter of Zama carburetor so that the large bore points toward the metering end cover and the small bore toward the lever on the choke shaft.

Note: Fit the choke shutter of Walbro carburetor so that the round notch points toward the metering end cover and the indentations face inward.

- Coat the fastening screw with Loctite, - see 12.2, and tighten down firmly.

- Install the carburetor - see 11.2.

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 (300 m/1000 ft above sea level). It ensures maximum engine performance, fuel efficiency and the highest possible reliability.

Standard setting:

H = High speed adjusting screw backed off 1 full turn
L = Low speed adjusting screw backed off 1 full turn

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

If no tachometer is available, do not turn the high speed adjusting screw beyond the standard setting to make the mixture leaner.

If the saw is used at high altitudes (mountains) or near sea level:

A slight correction **may** be necessary.

For corrections to high speed adjusting screw **(H)**:
Use a tachometer - do not exceed maximum permissible engine speed. Engine can be damaged by lack of lubricant and overheating.

Maximum engine speed with bar and properly tensioned chain: 13,000 r.p.m.

- Check chain tension
- Check air filter and clean if necessary
- Adjust idle speed correctly (chain must not rotate)
- Start the saw - warm up the engine

Turn high speed adjusting screw **(H)** and low speed adjusting screw **(L)** clockwise for leaner mixture at high altitudes or counter-clockwise for richer mixture at sea level.

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

Corrections to high speed adjusting screw:
The setting of the high speed adjusting screw **(H)** affects the maximum off-load engine speed. If the setting is too lean, the maximum permissible engine speed will be exceeded and increase the risk of engine damage.

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

Engine stops while idling
Turn idle speed adjusting screw **(LA)** clockwise until the chain begins to run - then turn it back one quarter turn.

Chain runs while engine is idling
Turn the idle speed adjusting screw **(LA)** counterclockwise until the chain stops running - and then turn about another quarter turn in the same direction.

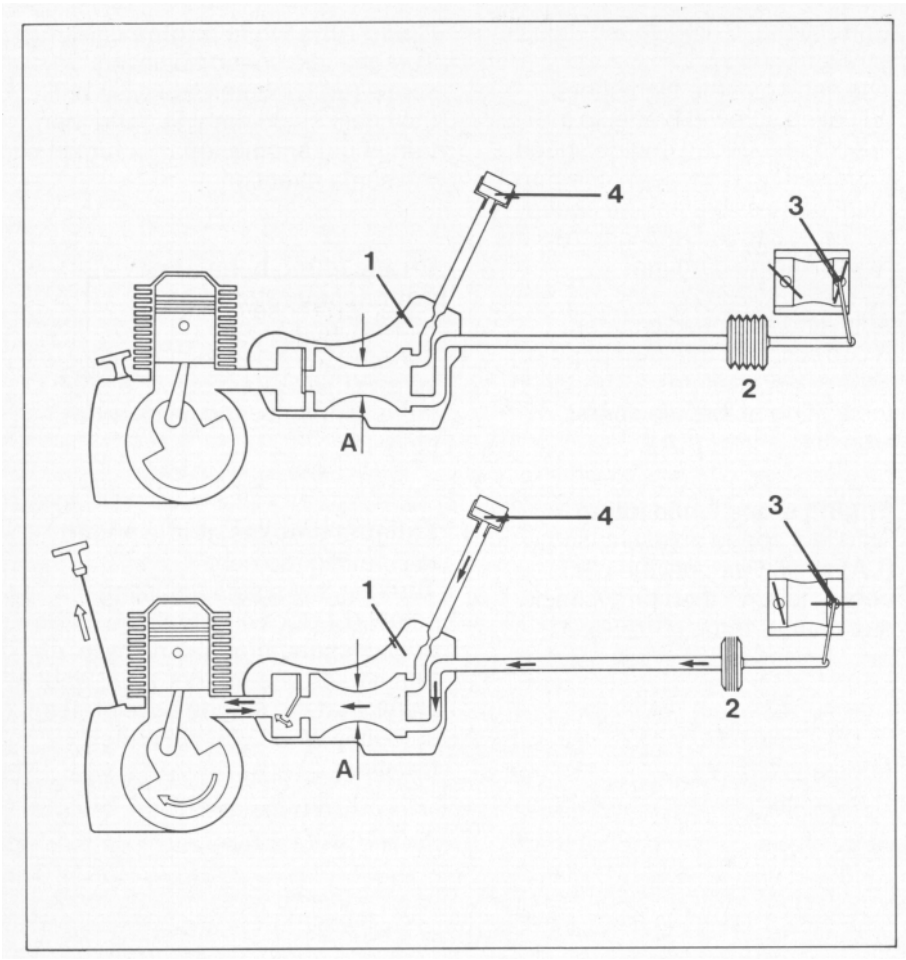
Erratic idling behavior, poor acceleration Idle setting too lean. Turn the low speed adjusting screw **(L)** counterclockwise until the engine runs and accelerates smoothly.

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 one quarter turn - and check that the engine accelerates smoothly when you open the throttle.

11.6. Automatic Choke

11.6.1 Description of Operation

Schematic
1 = Control valve
2 = Bellows
3 = Choke shutter
4 = Sintered polymer and foam filter
A = Variable cross section



The automatic choke selects the throttle and choke shutter positions required for an optimum mixture.

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

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

These variations in pressure are fed via a cutout in the engine housing and through a port in the cylinder to the control valve.

The control valve feeds the low pressure waves at a predetermined interval to the bellows, which contract and thus open the choke shutter.

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

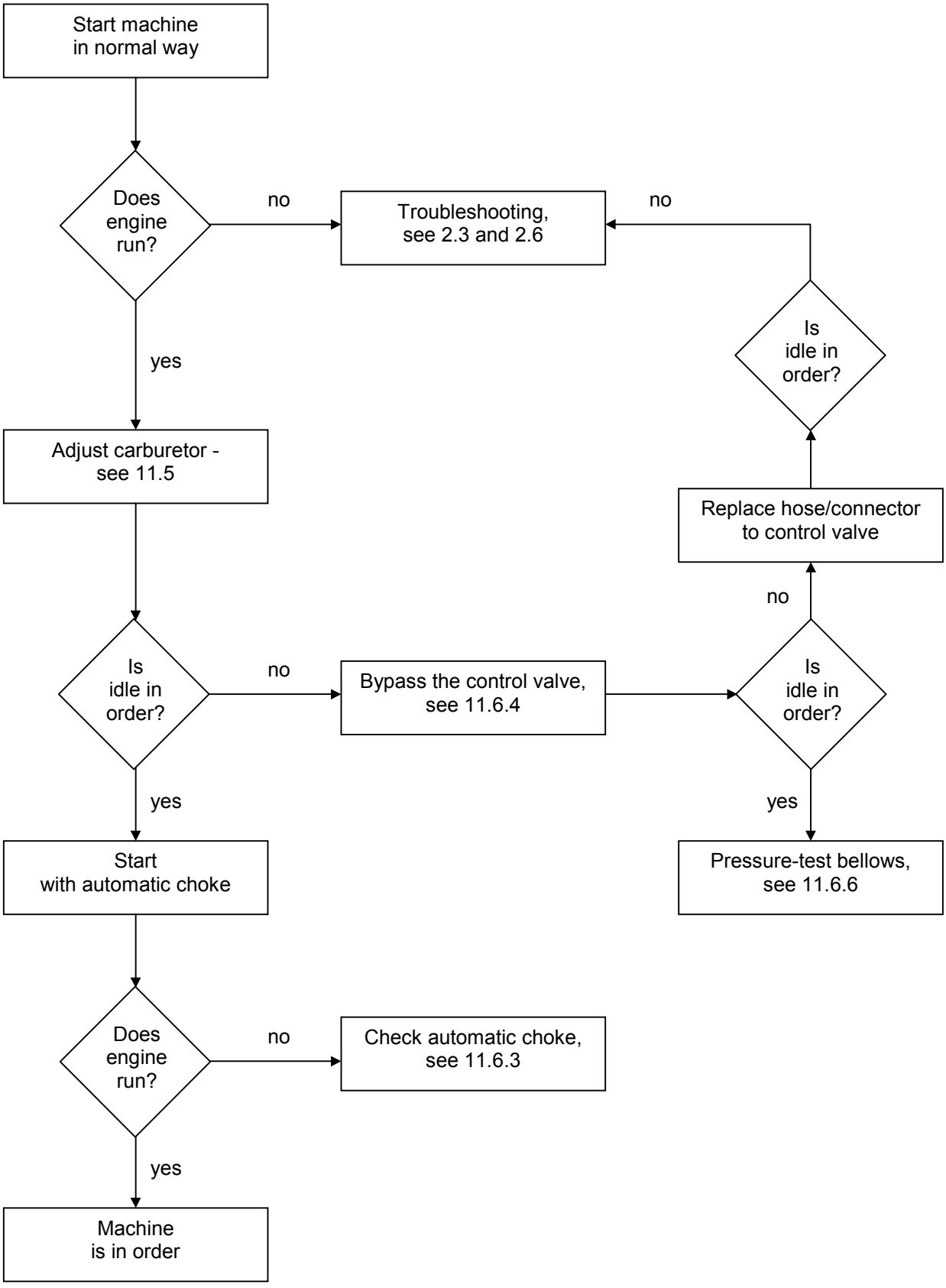
A system of levers connects the choke shutter to the throttle shutter. The throttle shutter is at an angle of 37 degrees to the carburetor mounting flange just before the choke shutter opens fully. The throttle shutter returns to the idle position when the choke shutter is fully open.

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

The pressurizing process is accompanied by a low whistling noise. The polymer sintered filter and foam filter are located in the area of the handle housing.

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

11.6.2 **Troubleshooting Chart**



11.6.3 Testing Automatic Choke

- Remove the air filter – see 11.1.1 or 11.1.2.

- Pull the terminal off the spark plug. Unscrew the spark plug.

- Close the choke by moving the Master Control down to the cold start position.

- Open the choke shutter slowly by turning the right-hand end of the shaft.

Note: The throttle shutter must jump to the idle position (almost closed) just before the choke shutter is fully closed. This is accompanied by a definite clicking sound.

- Pull the starter rope slowly: Depending on the temperature of the control valve, you should observe **one of the following functions:**

Control valve temperature above +35°C (95°F):

Choke shutter begins to open during first revolution of crankshaft and opens fully for brief moment after second revolution of crankshaft.

Note: Pulling starter rope out about 40 cm (16") is equivalent to two revolutions of crankshaft.

Control valve temperature between +5°C (40°F) and +25°C (77°F):

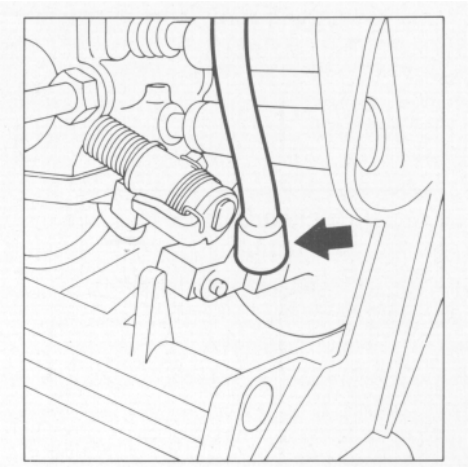
Choke shutter only begins to open after several revolutions of crankshaft and opens briefly to no more than 45 degrees when starter rope is fully extended. It must not move to the fully open position.

Control valve temperature below -5°C (3°F):

Choke shutter must not move while the starter rope is pulled out to its full length.

11.6.4 Leakage Testing Engine Housing and Control Valve

Air inlet hose on bellows



It is necessary to interrupt the connection between the automatic choke and atmosphere before testing the engine housing and built-in control valve for leaks.

The connection between the cylinder and control valve is also tested for leaks during the pressure and vacuum tests. The vacuum test is used to check the complete control valve since only part of the valve is pressurized in the pressure test.

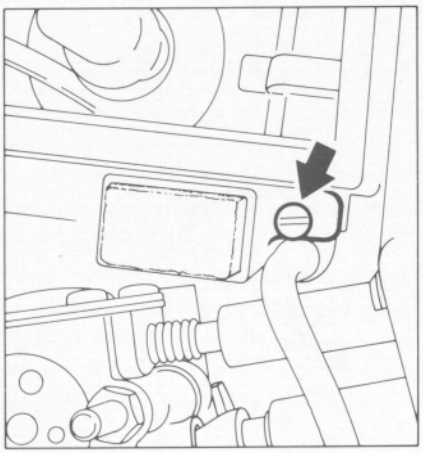
- Remove the air filter - see 11.1.

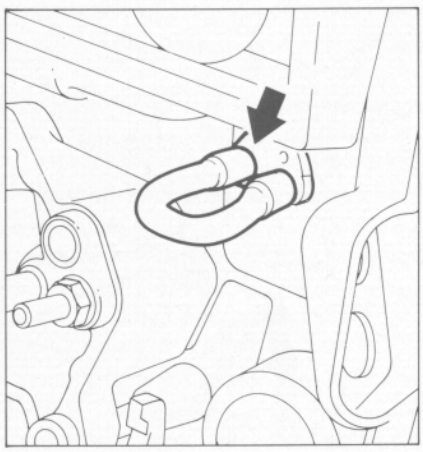
- Pull the air inlet hose off the nipple on the bellows.

11.6.5 **Testing Control Valve (removed from machine)**

Top:
Fastening screw on filter box

Bottom:
Control valve bypassed





- Remove the fastening screw from the filter box. Pull the filter box with filters off the connector.

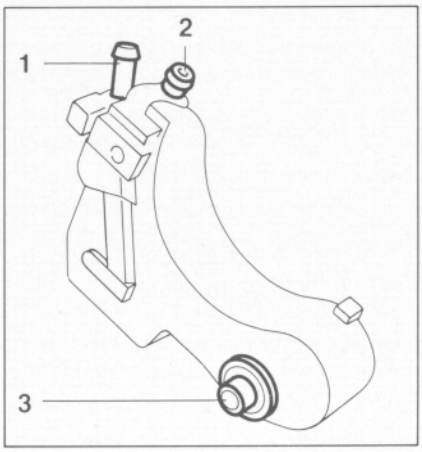
- For preparations - see 4.2.1.

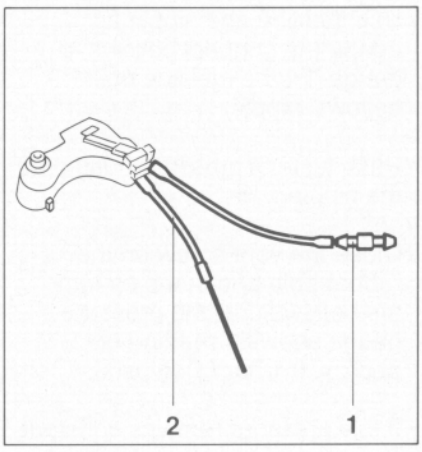
- Bypass the control valve by pushing the air inlet hose onto the two nipples on the connector.

- For leakage test - see 4.2.2 and 4.2.3.

Top:
1 = Air inlet nipple
2 = Air outlet nipple
3 = Connector on cylinder

Bottom:
1 = Nipple 0000 855 9200 with fuel line 1110 141 8600
2 = Air inlet hose



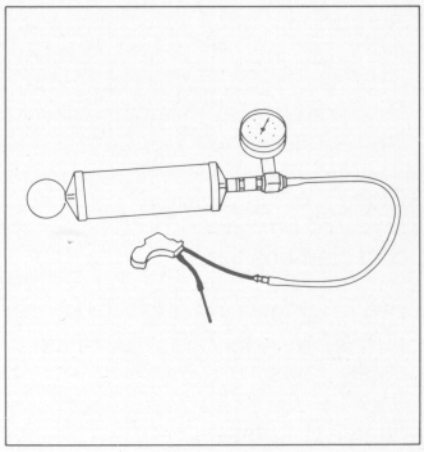


The control valve can be tested with the vacuum pump that is used for leakage-testing crankcases.

- Remove the control valve – see 11.6.12.

- Push air inlet hose onto the air outlet nipple and seal it, e.g. with a scriber.

Leakage test with vacuum pump 0000 850 3500



- Make connection between vacuum pump and control valve - using fuel line and nipple as adapter.

- Push tester's pressure hose onto the nipple.

Note: Leave the cylinder connector open.

- Pull out pump piston several times until pressure gauge shows a vacuum of 0.4 bar (5.8 psi).

Note: Vacuum must not drop more than 0.2 bar (2.9 psi) within 5 sec. If it does, the control valve is faulty.

Checking bellows air inlet function

- Apply vacuum of 0.4 bar (5.8 psi).

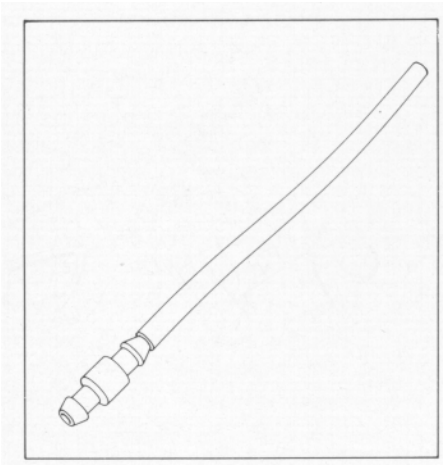
- Open the air inlet hose.

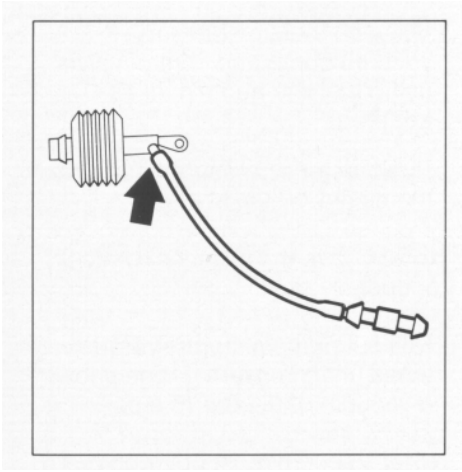
Note: Vacuum must drop immediately (approx. 0.5 sec.) to 0 bar (0 psi). If it doesn't, the control valve is faulty.

11.6.6 Leakage Testing the Bellows

Top:
Nipple 0000 855 9200 connected to fuel line 1110 141 8600

Bottom:
Fuel line connected to nipple on bellows

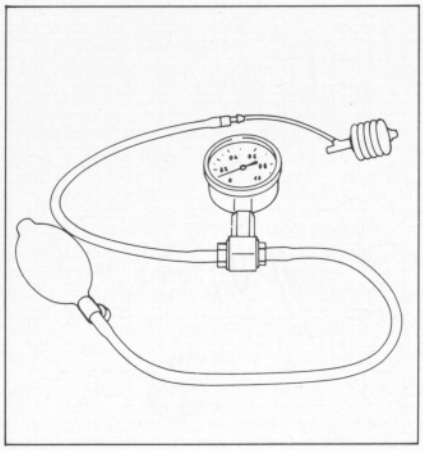




The bellows can be checked for leaks with carburetor and crankcase tester.

The following test is carried out with the bellows removed from the machine, but it can also be performed with the bellows installed in the machine. To do this, it is only necessary to pull the air inlet hose off the nipple.

Testing bellows for leaks with carburetor/crankcase tester 1106 850 2905

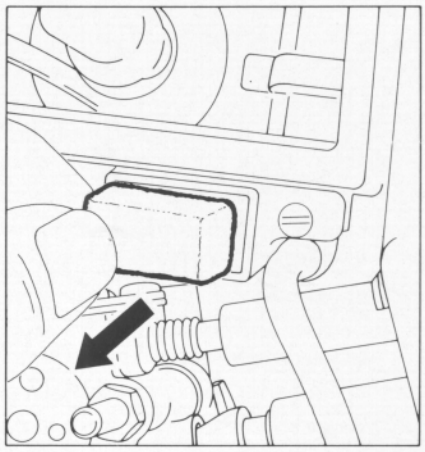


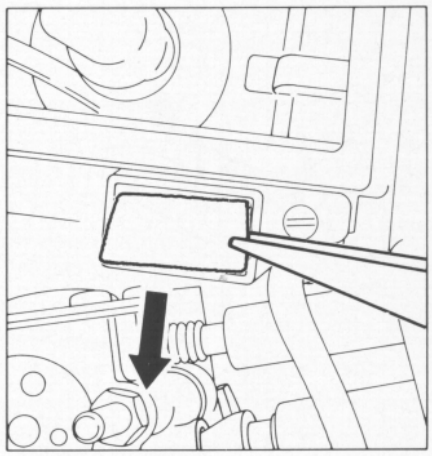
- Use fuel line and nipple as adapter to connect bellows to gauge. Fit the fuel line on bellows' nipple.
- Push tester's pressure hose onto the nipple.
- Close the vent screw on the rubber bulb and pump air into the bellows until the pressure gauge shows a reading of approx. 0.1 bar (1.45 psi).
- If this pressure remains constant for one minute, the bellows are airtight. If not, install new bellows.

11.6.7 Foam Filter/Polymer Sintered Filter

Top:
Removing the foam filter

Bottom:
Removing the polymer sintered filter



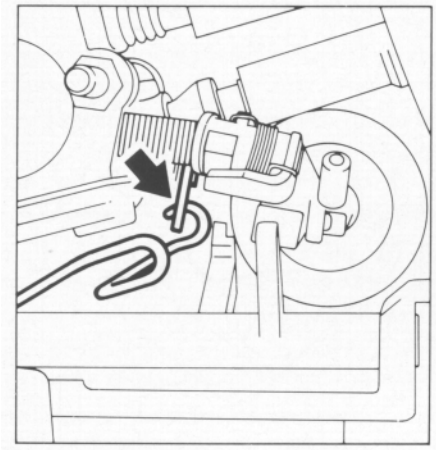


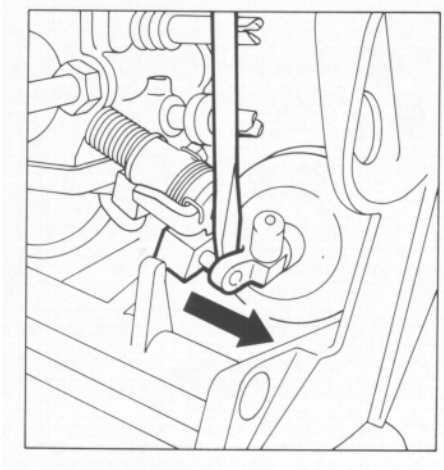
- Remove the air filter - see 11.1.
- Pull the foam filter out of the filter box.
- Pull the polymer sintered filter out of the filter box.

11.6.8 Removing and Installing the Carburetor

Top:
Disconnecting throttle rod from throttle shaft

Bottom:
Removing bellows from choke lever





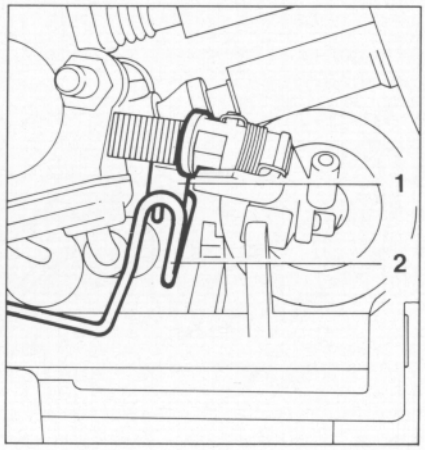
For removal of carburetor - see 11.2.

Only the additional operations are described below.

- Remove the filter box together with foam filter and polymer sintered filter - see 11.6.7.

- Disconnect and remove the throttle rod from the throttle shaft.

1 = Arm on choke lever
2 = Hook on throttle rod



- Carefully pry the bellows link off the pin on the choke lever.

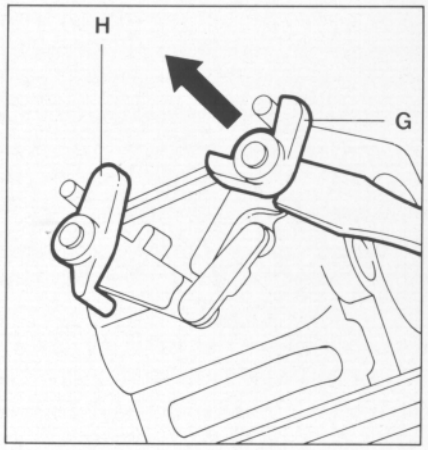
- Before attaching the throttle rod to the throttle shaft, open the choke shutter and use a suitable piece of material (e.g. roll of paper) to hold it in that position.

- Connect the throttle rod and remove the material holding the choke shutter.

Note: The hook on the throttle rod must be in front of the arm on the choke lever. Operate the throttle lever to check whether the choke shutter opens.

11.6.9 Removing and Installing Lever System on Carburetor

Removing bell crank "G" and lever "H"



Removal:

- Remove the carburetor – see 11.6.8.

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

- Remove the lever system from the shafts.

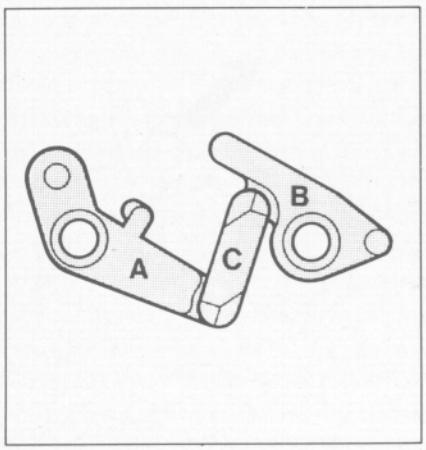
- Take the torsion spring off the throttle shaft.

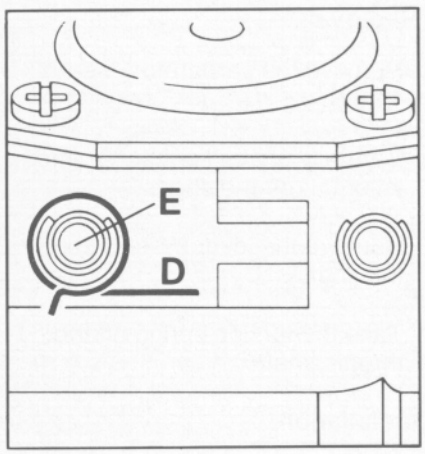
Installation:

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

Top:
Levers "A" and "B" joined by link "C"

Bottom:
D = Torsion spring
E = Throttle shaft

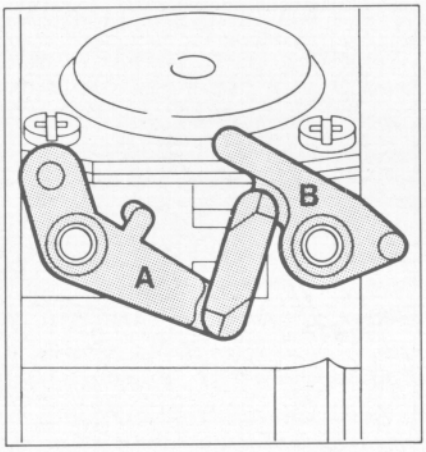


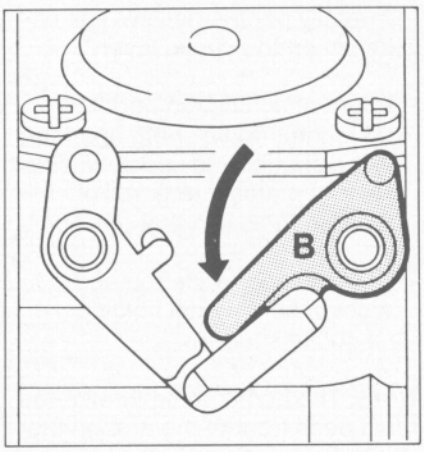


- Carefully push the link "C" into position to connect levers "A" and "B".
- Fit the torsion spring on the throttle shaft so that its bent end points away from the carburetor.

Top:
Fitting levers "A" and "B"

Bottom:
Rotating lever "B"

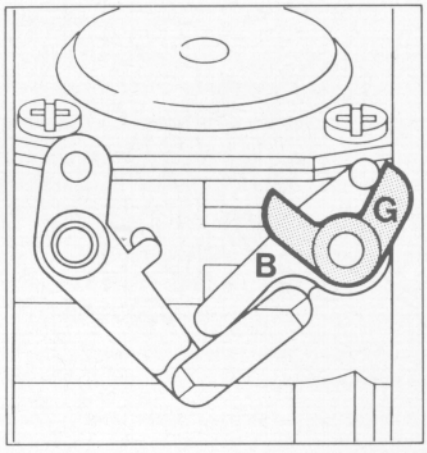


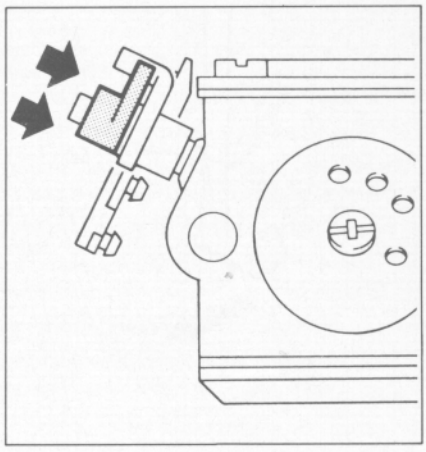


- Push lever "A" on to the throttle shaft and, at the same time, lever "B" on to the choke shaft.
- Rotate lever "B" on choke shaft counterclockwise as far as stop.

Top:
Fitting bell crank "G"

Bottom:
Pressing home bell crank "G"



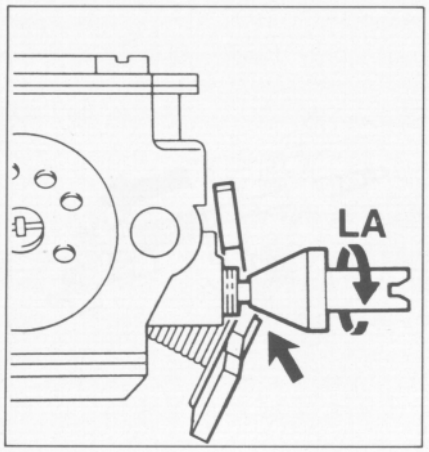


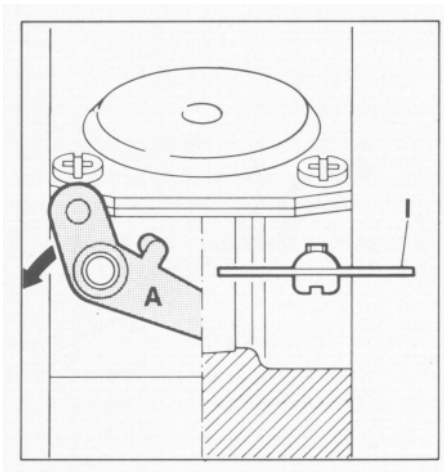
- Fit the bell crank "G" (with flat face pointing to lever "B") over the choke shaft so that the pin on lever "B" is between the arms of bell crank "G".
- Rotate bell crank counterclockwise until its right arm butts against the pin on lever "B".
- With the bell crank in this position, carefully press it on to the choke shaft.

Important: Take care not to bend the shaft.

Top:
Backing off the
idle speed adjusting screw

Bottom:
Turning lever "A" and
opening choke shutter





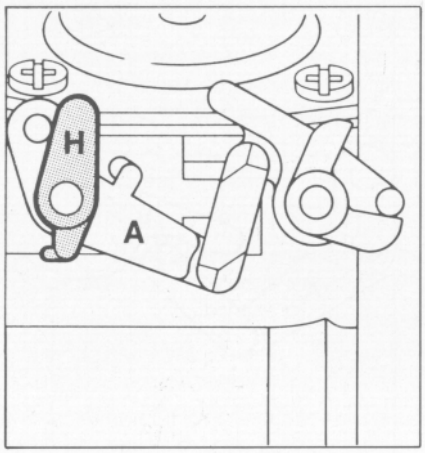
- Turn the idle speed screw "LA" counterclockwise until the throttle shaft is clear of the taper on the idle speed screw.

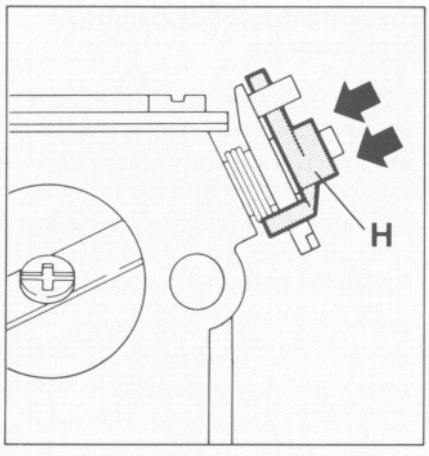
- Open the choke shutter "I" and hold it steady in that position.

- Swing lever "A" counterclockwise as far as stop.

Top:
Fitting lever "H"

Bottom:
Pressing lever "H" into position



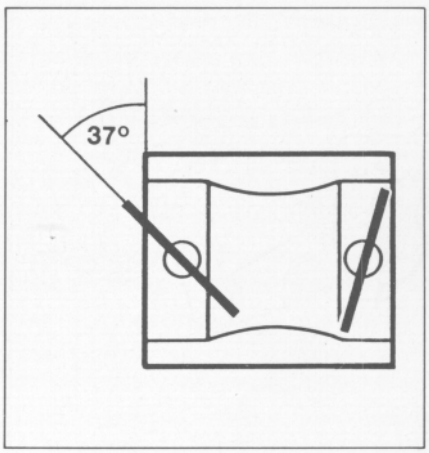


Important: The choke shutter must be held open for the next two operations.

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

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

Correct positions of choke
and throttle shutters



Checking installed positions of levers:

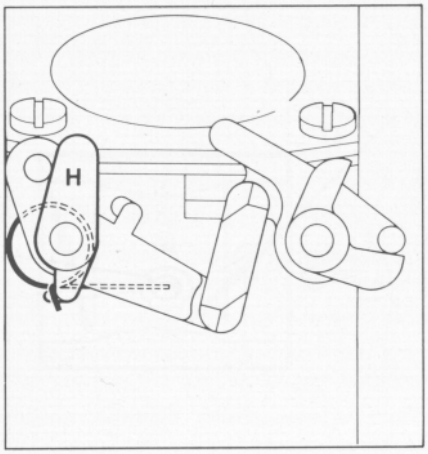
- In the idle position the choke shutter must be closed and the throttle shutter at an angle of 37 degrees to the carburetor mounting face.

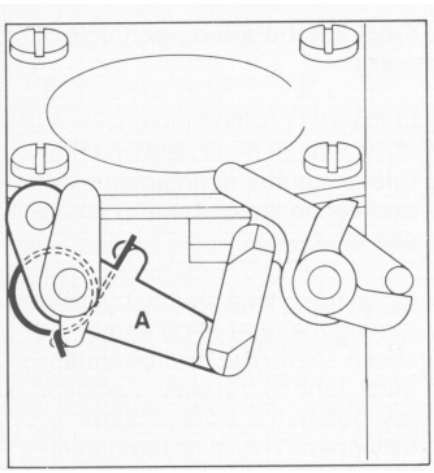
- Open the choke shutter by slowly turning the right-hand end of the choke shaft. The throttle shutter must jump to the closed position just before the choke shutter is fully open. This is accompanied by a definite clicking sound.

11.6.10 **Throttle Shaft/ Choke Shaft**

Top:
Attaching torsion spring to lever "H"

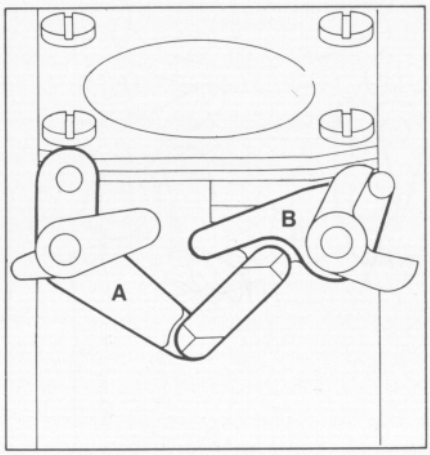
Bottom:
Attaching torsion spring to lever "A"





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

Correct positions of levers "A" and "B"

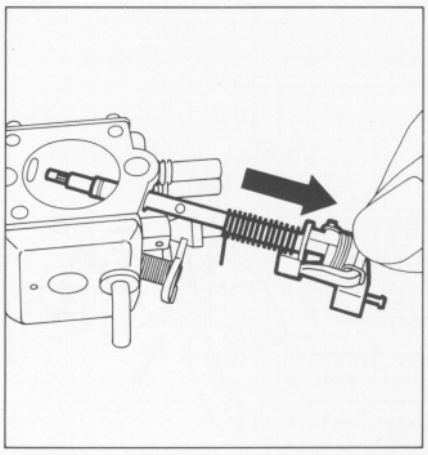


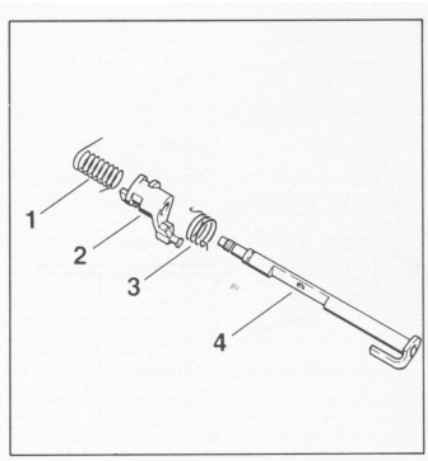
Checking installed position of torsion spring:

- Open throttle and choke shutters simultaneously and hold them steady: The torsion spring must move levers "A" and "B" into the positions shown in the illustration.
- Install the carburetor - see 11.6.8.

Top:
Withdrawing the choke shaft

Bottom:
1 = Torsion spring
2 = Choke lever
3 = Torsion spring
4 = Choke shaft



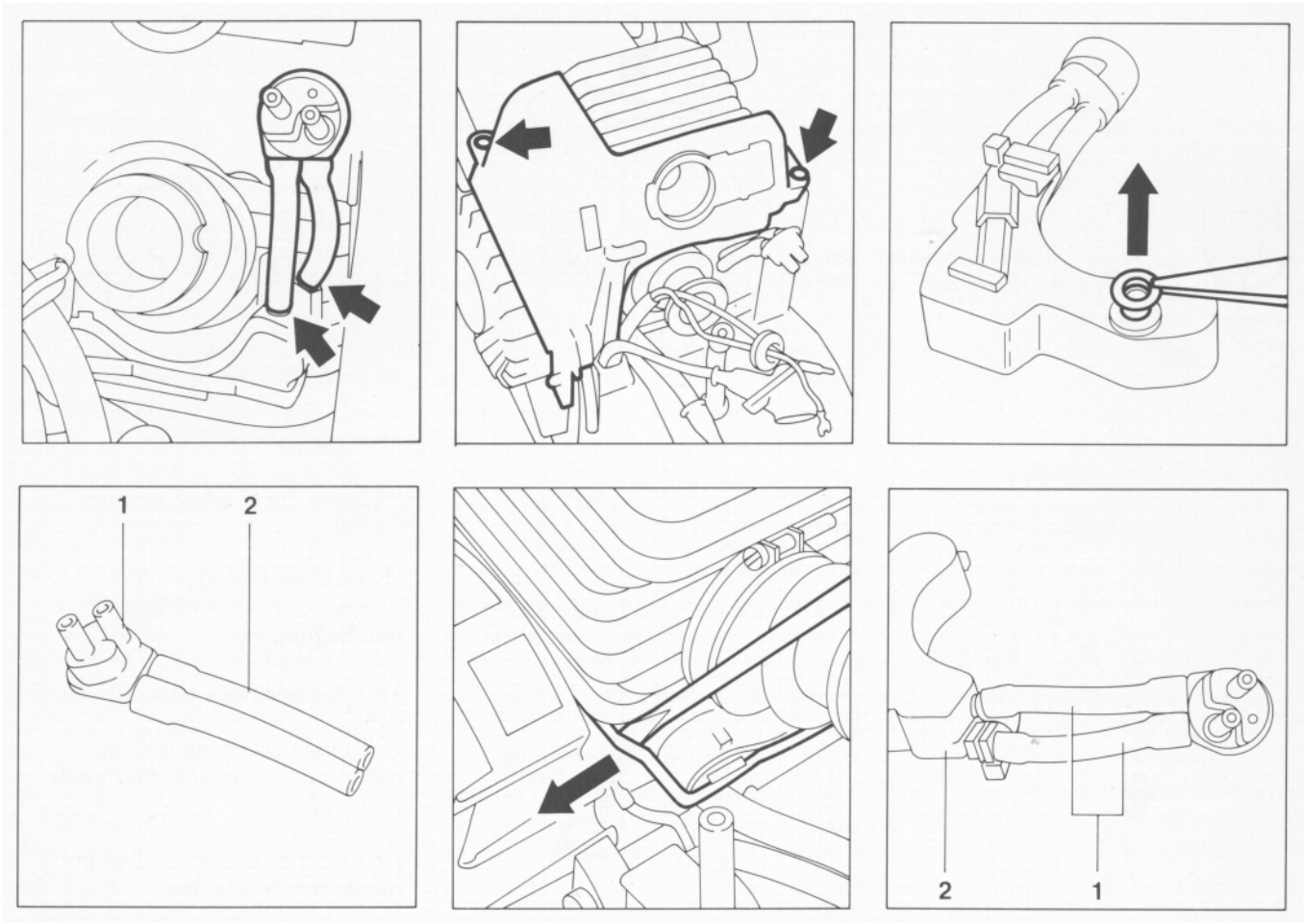


- Remove the lever system – see 11.6.9.
- Remove the throttle shaft – see 11.4.
- Remove the choke shutter – see 11.4.
- Pry the E-clip off the choke shaft and then withdraw the choke shaft.
- Remove the torsion springs and choke lever from the choke shaft.

11.6.11 **Hose/Connector**

Top:
Hose on control valve

Bottom:
1 = Connector
2 = Hose



- Remove the handle housing – see 8.1.1.
- Clean the cylinder and the area around the control valve.
- Pull the hose off the nipple on the control valve.
- Pull the connector out of the hose.

Install in the reverse sequence.

11.6.12 **Control Valve**

Top:
Cover mounting screws

Bottom:
Removing the clip

- Remove the handle housing – see 8.1.1.
- Take out the cover mounting screws and lift away the cover.
- Clean the cylinder and the area around the control valve.
- Ease the clip away from both sides of the cylinder.

Top:
Removing the O-ring

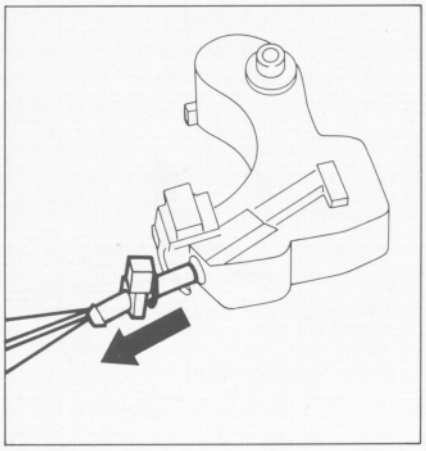
Bottom:
1 = Hose
2 = Control valve

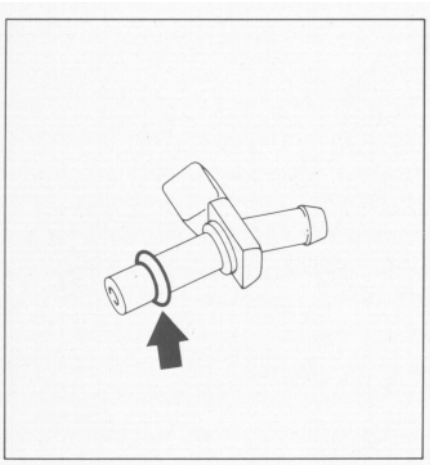
- Remove the control valve from the cylinder.
- Take the O-ring out of the hole in the cylinder or off the control valve's stub.
- Pull the hose off the control valve's nipple.
- Test the control valve – see 11.6.5.

11.6.13 **Bellows**

Top:
Withdrawing the stub

Bottom:
O-ring



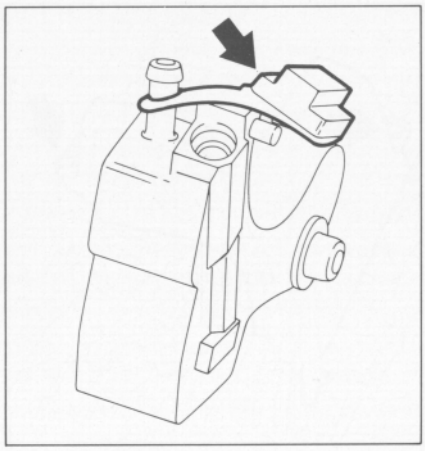


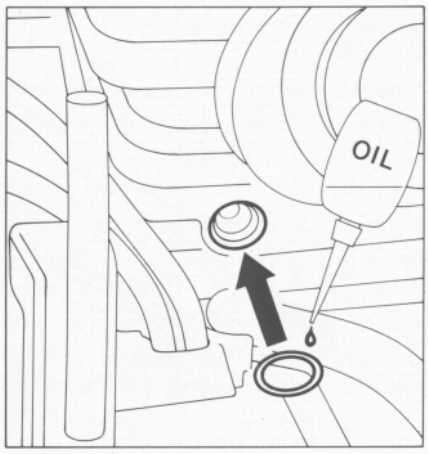
- Pull the stub out of the control valve.
- Remove the O-ring from the stub.
- Take the retainer off the control valve.

Installation is a reversal of the removal sequence.

Top:
Retainer

Bottom:
Installing the O-ring



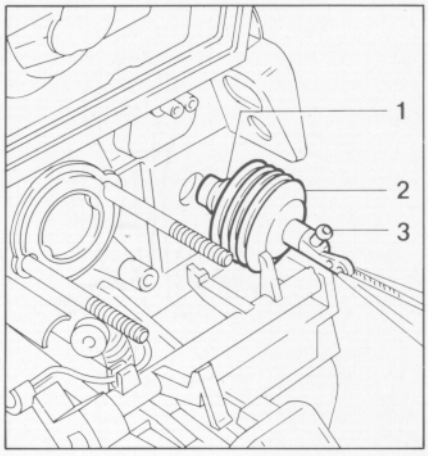


Note: Lubricate new O-ring with a little oil and fit it in the hole in the cylinder.

Position control valve against the cylinder and push the stub into the hole in the cylinder.

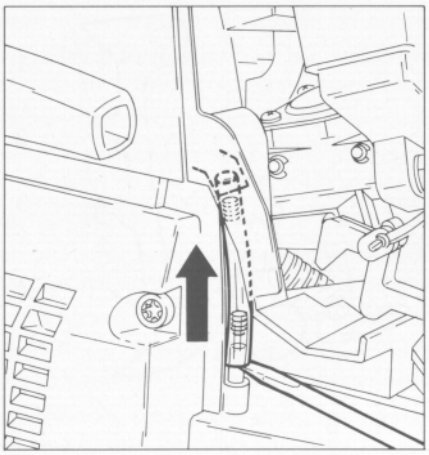
Check that clip is properly positioned between cooling fins.

1 =Collar
2 = Bellows
3 = Nipple



- Remove the carburetor – see 11.6.8.
- Use a blunt tool to pry the bellows out of the hole in the handle housing.
- Test the bellows - see 11.6.6.
- Push bellows home until the collar locates behind the handle housing.
- Line up the bellows so that its nipple points upward.
- Install the carburetor - see 11.6.8.

11.7 Tank Vent



Removing tank vent

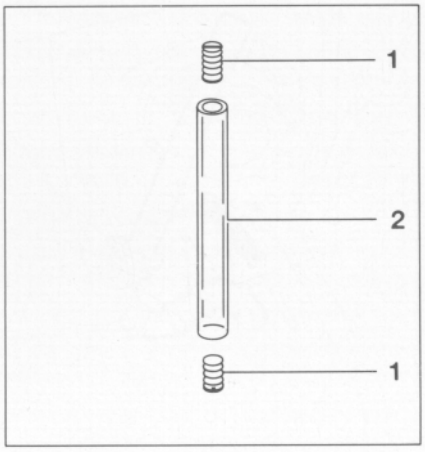
Correct operation of the carburetor is only possible if atmospheric pressure and internal fuel tank pressure are equal at all times. This is ensured by the tank vent.

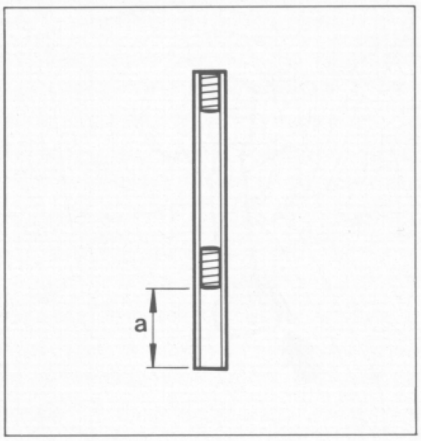
Important: In the event of trouble with the carburetor or the fuel supply system, always check and clean the tank vent.

- Remove the carburetor box cover – see 11.1.
- Remove the vent from the nipple on the fuel tank and take it out of its seat in the cover.
- Use a 3 mm (1/8") dia. drift to push the grub screws out of the hose.
- Wash all parts in fresh white spirit and blow out with compressed air.

Top:
1 = Grub screw
2 = Vent hose

Bottom:
Correct positions of grub screws a = approx. 18 mm (11 /16")





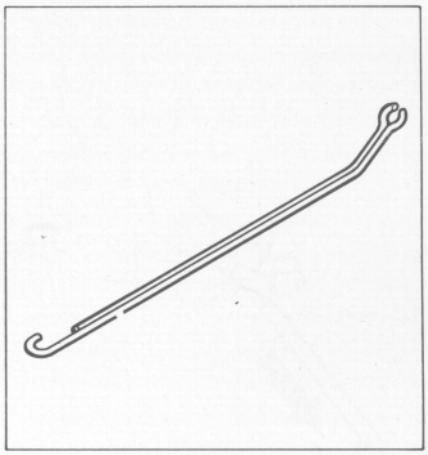
Installation of the tank vent is a reversal of the removal sequence.

Note: Use a drift to position the grub screws as shown in the drawing.

Fit the tank vent on the nipple and then push it into its seat in the cover.

11.8 Fuel Pickup Body and Fuel Hose

Assembly hook 5910 893 8800



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.

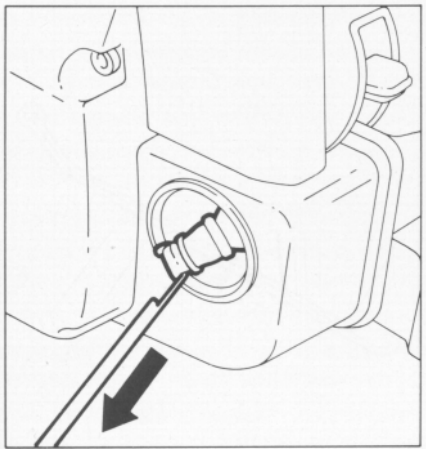
Important: In the event of trouble with the fuel supply system, always check the fuel tank and the pickup body first. Clean the fuel tank if necessary.

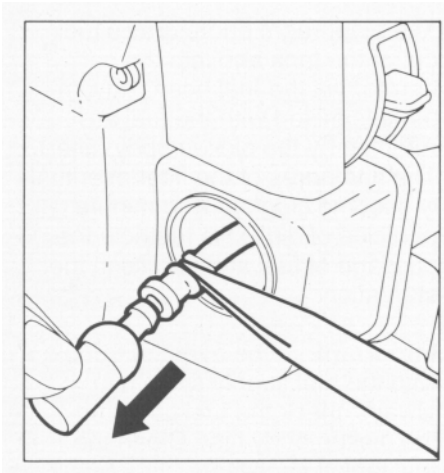
Cleaning the fuel tank:

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

Top:
Withdrawing the pickup body

Bottom:
Disconnecting pickup body





Removing and installing the pickup body:

- Use the assembly hook to pull the pickup body out through the fuel tank filler opening.

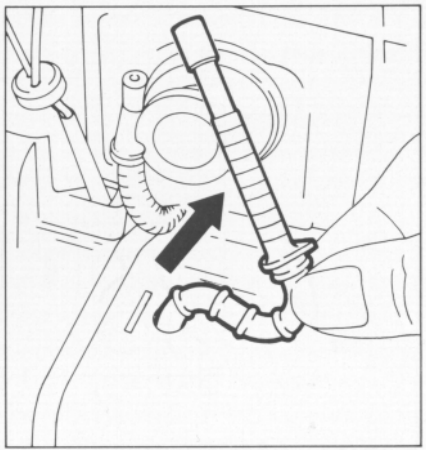
Note: Do not over-stretch the suction hose while pulling out the pickup body.

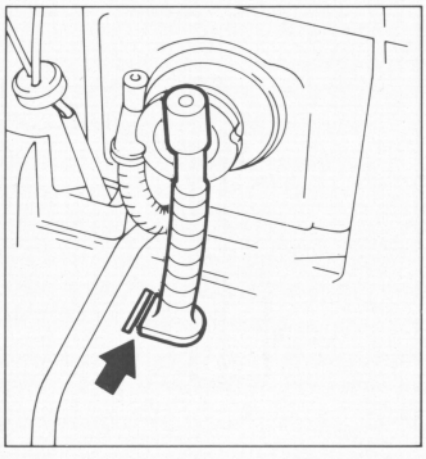
- Pull the pickup body off the suction hose and fit a new pickup body.

Installation is a reversal of the removal sequence.

Top:
Removing suction hose

Bottom:
Correct position of hose flange





Removing the suction hose:

- Remove the handle housing – see 8.1.1.

- Pull off the pickup body.

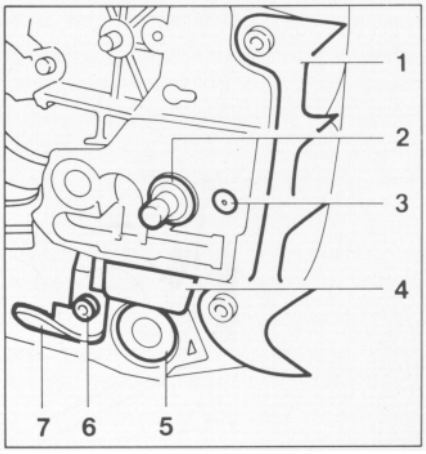
- Pry the suction hose out of the tank. Remove the hose.

Installation is a reversal of the removal sequence.

Coat the hose flange with a little oil to simplify installation. The straight side of the hose flange must locate against the rib on the tank housing.

11.9 Replacing the Fuel Tank

1 = Spiked bumper
2 = Collar stud
3 = Valve
4 = Bumper strip
5 = Rubber buffer
6 = Mounting screw
7 = Chain catcher



The fuel tank and engine housing are one piece.

- Remove the engine - see 4.4.

- Remove the chain tensioner – see 3.4 or 3.5.

- Remove the chain brake - see 3.3.1.

- Remove the fuel suction hose – see 11.8.

- Remove the oil suction hose – see 10.1.

- Remove the mounting screws from the spiked bumper and take the spiked bumper away.

- Remove the vent valve - see 10.2.

- Unscrew the collar stud - see 3.6.

- Pry the bumper strip out of its seat.

- Remove the rubber buffer - see 7.1.

- Remove the mounting screw from the chain catcher and take away the chain catcher.

Top:
O-ring

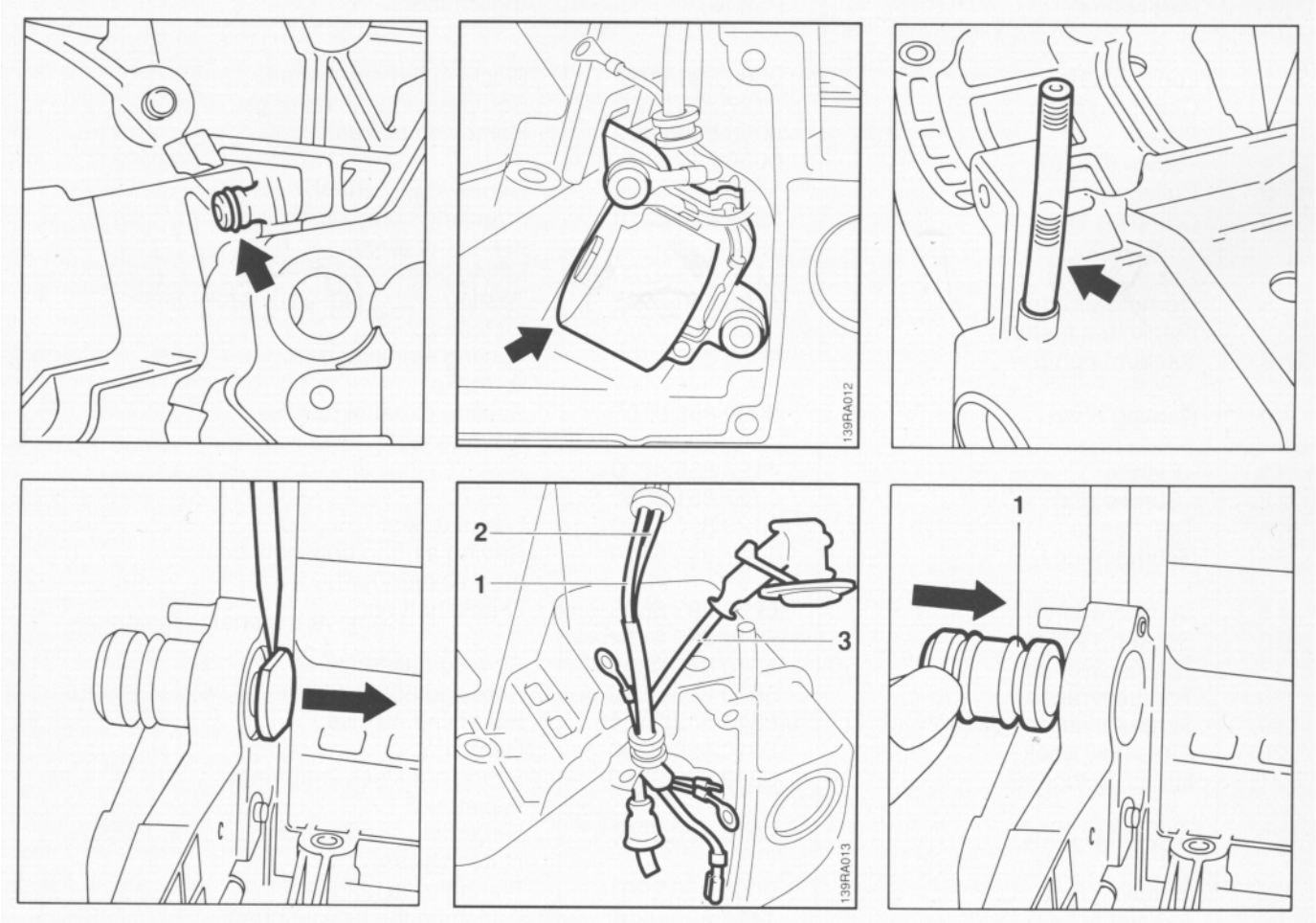
Bottom:
Removing the plug

Top:
Ignition module

Bottom:
1 = Ground wire
2 = Short circuit wire
3 = Ignition lead
4 = Grommet

Top:
Tank vent

Bottom:
Fitting annular buffer
1 = Groove



- Remove O-ring from nipple of oil pump's elbow connector.

- Pry the plug out of the upper annular buffer and then push the buffer out of the housing.

- Remove the ignition module – see 5.1.2.2.

- Pull the grommet off the ignition lead.

- Pull the ignition lead, ground wire and short circuit wire out of the housing.

- Remove the tank vent from the nipple on the tank housing.

Assembly is a reversal of the disassembly sequence.

Note: After assembly, set the air gap between the ignition module and flywheel - see 5.1.2.2.

- Push the upper annular buffer into the housing from outside so that its groove engages over the edge of the housing.

12. Special Servicing Tools and Aids

12.1 Special Servicing Tools

No.	Part Name	Part No.	Application
1	Locking strip	0000 893 5902	Blocking the crankshaft
2	Clamping strap	1127 893 2600	Compressing piston rings
3	Puller	0000 890 4400	Removing oil seals
4	- Jaws (No. 6)	0000 893 3711	
5	Puller	1116 893 0800	Removing flywheel
6	Crimping tool	5910 890 8210	Attaching connectors to electric wires
7	Assembly drift	1110 893 4700	Fitting piston pin
8	Carburetor and crankcase tester	1106 850 2905	Testing carburetor and crankcase for leaks
9	Vacuum pump	0000 850 3500	Testing crankcase for leaks
10	Sealing plate	0000 855 8106	Sealing exhaust port for leakage test
11	- Flange	1123 855 4200	
12	- Sleeve (2x)	1127 851 8300	
13	Test flange	1128 850 4200	Leakage test
14	Setting gauge	1127 890 6400	Setting air gap between ignition module and flywheel
15	Socket, 13 mm	5910 893 5608	Crankshaft nut
16	Socket, 19 mm	5910 893 5612	
17	Torque wrench	5910 890 0300	Screwed assemblies 1)
18	Torque wrench	5910 890 0310	Screwed assemblies 1)
19	Screwdriver bit I-5x150	0812 542 2104	For spline screws
20	Assembly hook	5910 893 8800	Removing pickup bodies
21	Installing tool 10	5910 890 2210	Fitting hookless snap rings in piston
22	Assembly hook	5910 890 2800	Detaching springs from clutch shoes
23	Installing tool	0000 890 2201	Flaring rope guide bush
24	Assembly tube	1117 890 0900	Attaching the brake spring
25	T-handle screwdriver QI-5x150	5910 890 2400	For all IS screws 2)
26	Stud puller M8	5910 893 0501	Removing bar mounting studs
27	Assembly stand	5910 850 3100 5910 890 3100	Holds saw in position for repairs
28	Press sleeve	1127 893 2400	Installing oil seals Installing oil pump
29	Assembly sleeve	1122 893 4600	Fitting oil seals Guides press sleeve for oil pump installation

Remarks
1) DG screws must always be tightened with a torque wrench.
2) In case of DG screws, use for releasing only.

12.2 **Servicing Aids**

No.	Part Name	Part No.	Application
1	Lubricating grease	0781 120 1111	Oil seals, oil pump drive, chain sprocket bearing
2	High-strength threadlocking (Loctite 270)	0786 111 1109	Throttle and choke shutter and fastening screws, sealing plate and plug
3	High-strength threadlocking (Loctite 649)	0786 110 0119	Threads of bar mounting studs (sprocket side)
4	Standard commercial, solvent-based degreasant containing no CFCs		Cleaning crankshaft stub and taper in flywheel
5	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in starter
6	Ignition lead HTR 10 m (33')	0000 930 2251	
7	Molykote grease		Sliding and pivot points of brake band
8	Graphite grease		Peg on starter pawl
9	Elektrician's repair kit	0000 007 1013	
10	Elastosil sealant		Outer diameter of oil seals
11	Dirko sealant, 100 g (3 1 /2 oz)	0783 830 2120	Engine pan, cylinder
12	STIHL multipurpose grease	0781 120 1109	Packing high voltage output on ignition module