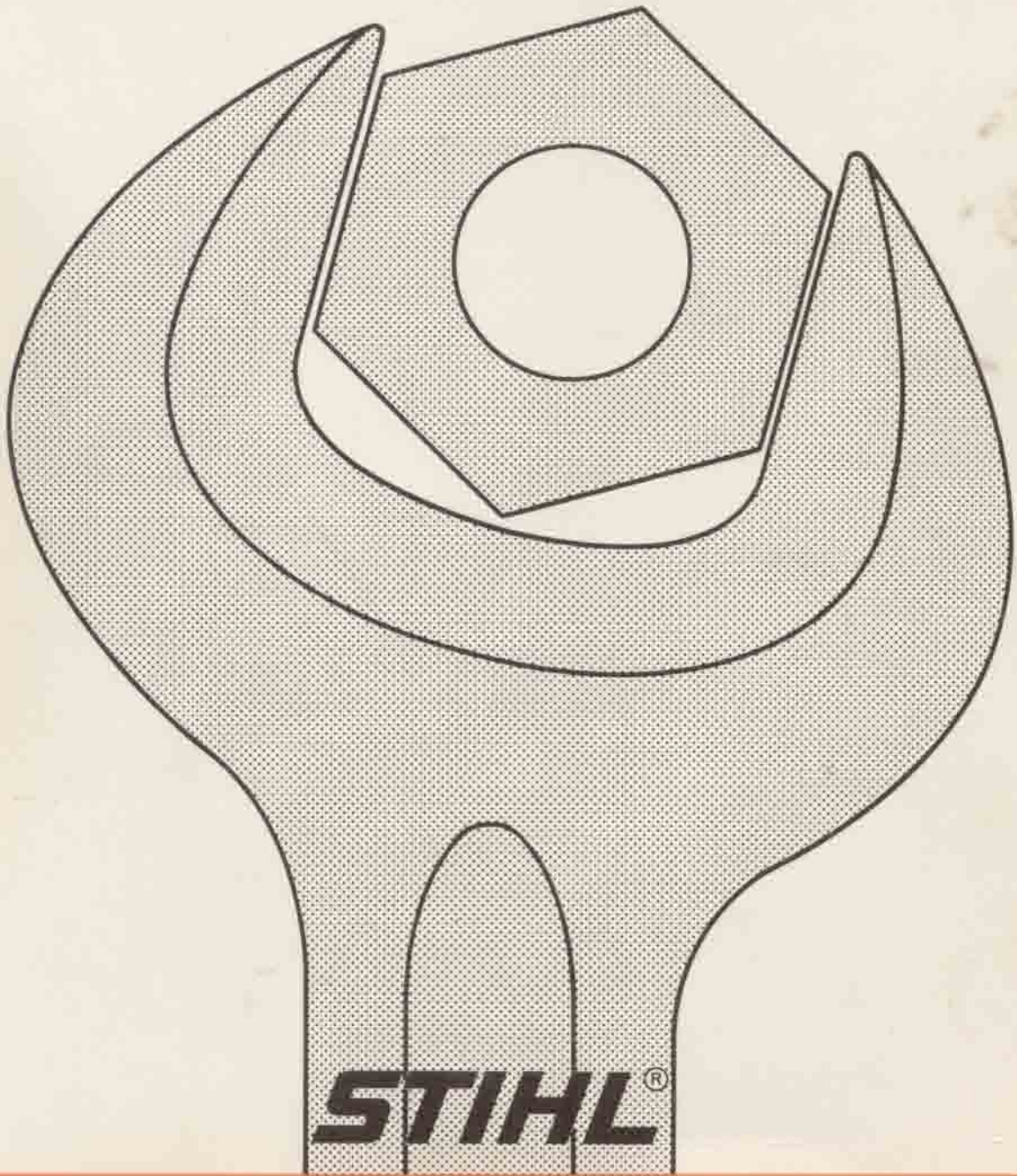
STIHL 042, 048



SERVICE MANUAL
STIHL 042, 048

FOREWORD

Special Tools Manual

This Service Manual covers model 042 chain saws up to machine number 6 230 790 as well as later machines unless technical information bulletins have been issued in the meantime with updated repair procedures.

Model 042 have substantially the same constructional features as model 048 chain saws. This Service Manual can therefore be used for the 048 chain saws as well.

In the event of faults it is quite possible that a single fault may have several causes. It is therefore advisable to consult the "Trouble-shooting Chart" in each chapter when tracing faults. We also recommend that you make use of the exploded views in the illustrated parts lists when carrying out repair work.

This service manual and all technical information bulletins are intended exclusively for the use of STIHL servicing dealers and staff and must not be passed on to third parties.

You will find it much easier to do any repair on the saw if you mount it on the assembling fixture 5910 850 3111 and use the two studs and collar nuts for fastening the bar.

The power saw may be swung into any convenient repair position within a certain range. In this way the critical component can be oriented for optimal accessibility. So you may use both hands for safe and time-saving work.

Our Special Tools Manual lists and illustrates by part numbers all available tools grouped according to their purpose, namely, by tools specially designed for a certain type of machine and such for general use on any STIHL power saw.

This Special Tools Manual is available in other languages too. It may be ordered by any of the following Part Numbers:

German	0455 901 0023
English	0455 901 0123
French	0455 901 0223
Spanish	0455 901 0323
Croato-Serbian	0455 901 0423
Swedish	0455 901 0523
Italian	0455 901 0723
Portuguese	0455 901 1223

STIHL®

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1. SPECIFICATIONS 042

1.1 Engine

STIHL single-cylinder two-stroke engine with specially coated cylinder wall	
Piston displacement:	68 cm^3 (4.15 cu. in)
Cylinder bore:	49 mm (1.93 in)
Piston stroke:	36 mm (1.42 in)
Compression ratio:	9:1
Max. torque:	4 Nm (2.97 lbf. ft) at 6000 rpm
Max. speed:	11500 rpm
Mean idling speed:	2200 rpm
Crankshaft:	Bi-sectional, drop forged
Crankshaft bearings:	2 deep-groove ball bearings
Crankpins:	16.0 mm (0.63 in) in dia.
Conrod big-end bearing:	Needle cage
Piston pin:	13.0 mm (0.51 in) in dia.
Piston pin bearing:	Needle cage
Starter:	Friction shoe, with automatic rope rewind
Starter rope:	4.5 mm (0.18 in) in dia. 1000 mm (39.4 in) long
Clutch:	Non-faced centrifugal clutch, 76 mm (3 in) in dia.
Clutch engagement speed:	Approx. 3200 rpm
Crankcase leakage test,	
for pressure:	0.5 bar (7.25 lbf/in^2)
for vacuum:	0.5 bar (7.25 lbf/in^2)

1.2 Fuel system

Carburetor:	Omnipositionally operable diaphragm carburetor with integral fuel pump
Main adjustment screw H:	1 turn open
Idle adjustment screw L:	1 turn open (basic adjustment from locked position of screws)
Carburetor leakage test pressure:	0.4 bar (5.8 lbf/in^2)
Fuel tank capacity:	0.82 l (1.73 pt)
Fuel mixture:	Regular grade gasoline and branded two-cycle engine oil Mix ratio 1:40 with STIHL two-cycle engine oil; 1:25 with other branded two-cycle engine oils
Air filter:	Large-surface, double-face wire mesh flat filter

1.3 Ignition system

Principle:	Thyristor controlled magneto capacitor system
Timing:	2.5 mm (0.098 in) before TDC at 8000 rpm
Spark advance angle:	27° before TDC at 8000 rpm
Point gap:	0.2...0.3 mm (0.008...0.012 in)
Spark plug:	Bosch WSR 6 F spark gap 0.5 mm (0.02 in)
Spark plug thread:	M 14x1.25; 9.6 mm (0.37 in) long

1.4 Tightening torque

Crankshaft nut (at igniter end), M 10x1	29.4 Nm (21.7 lbf. ft)
Hub (at output end)	58.8 Nm (43.4 lbf. ft)
Hex. socket screws, M 6x25	9.8 Nm (7.2 lbf. ft)
Hex. socket screws, M 5x20	6.9 Nm (5.1 lbf. ft)
Screws, M 4	2.5 Nm (1.8 lbf. ft)
Cylinder head bolts and nuts, M 5 Bolts and nuts, M 6	6.9 Nm (5.1 lbf. ft)
Spark plug:	24.5 Nm (18.1 lbf. ft)

Observe: The M 5x12 flat-head screws at the leading hand guard and the M 4x6 screws at the driver are locked with LOCTITE.

1.5 Bar and chain assembly

Guide bars:	STIHL Duromatic bar with carbide tipped nose; STIHL Rollomatic bar with spider nose. Either type is protected from corrosion by induction-hardened contact surfaces
Length of cut:	Duromatic 40, 45 and 50 cm (16, 18 and 20 in) Rollomatic 40, 45 and 50 cm (16, 18 and 20 in)
Chains:	9.32 mm (3/8") pitch
Chain sprocket:	7 teeth for 9.32 mm (3/8") pitch
Chain speed:	18.5 m/s (60.7 ft per second) at 8500 rpm

Chain lubrication:	Speed-controlled, reciprocating piston oil pump delivers only when chain is running. Pin-adjustable, additional metering device. Oil delivery can be shut off mechanically for zero delivery for various attachments
Max. oil delivery:	13.5 cm^3/min (0.82 cu. in per min) at 6000 rpm
Min. oil delivery:	4 cm^3/min (0.24 cu. in per min) at 6000 rpm
Oil tank capacity:	0.43 l (0.91 pt)

1.6 Weight

	AV/AVE	AVEQ
with 40 cm bar and chain	8.9 kg (19.6 lb)	9.0 kg (19.8 lb)

1.7 Special accessories

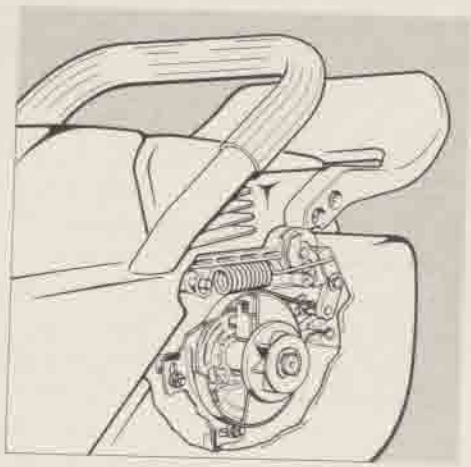
STIHL repair kit 042 (friction shoe rewind starter)	1117 900 5000
STIHL repair kit 048 (single pawl rewind starter)	1117 900 5001
Set of gaskets 042/048	1117 007 1050

2. CLUTCH, CHAIN DRIVE AND CHAIN BRAKE

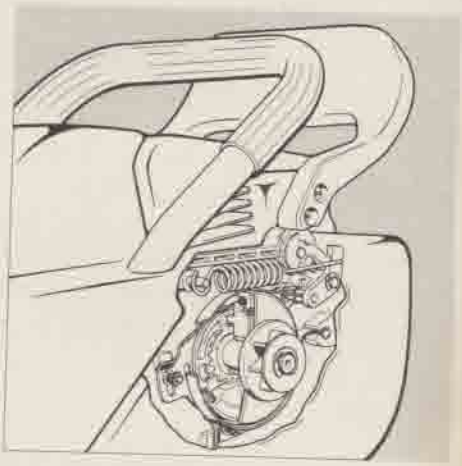
2.1 Design and operation

2.1.1 Clutch and drive sprocket

Chain brake applied



Chain brake, lifted



As in all other STIHL power saws, power is transmitted from the engine to the chain across a centrifugal clutch. A controlled isolating clutch is integrated with the standard safety chain brake which controls it.

The whole clutch and brake mechanism is housed in the crankcase in a dust-proof manner.

The hub screwed to the crankshaft takes the torque and acceleration forces applied by the crankshaft. Make absolutely sure that the hub is tightened with the specified torque of 58,8 Nm (43.4 lbf.ft). The clutch driver is supported on the hub by a needle cage and is not otherwise connected with it. Axial movements are prevented by a retainer ring. The driver plate is guided by three driver fingers, moves in axial direction and is always in positive engagement with the driver. A leaf spring arranged between the driver and the driver plate permanently forces the driver plate against the control plate. Thereby the teeth of the driver plate are in mesh with the hub when the chain brake is lifted, and the torque applied by the engine is positively transmitted to the clutch driver. When the chain brake is applied the control plate forces the driver plate out of mesh with the hub, and the driver, together with the control plate and the hub, may rotate independently of each other.

The centrifugal clutch proper carries three nonfaced weights. The clutch drum and the drive sprocket are isolated from each other. A tooth contour is machined into the gear rim and the drum hub for engagement of the drive sprocket.

When the engine idles the centrifugal weights remain inactive because centrifugal forces cannot overcome the pull force of the extension spring. When the engine accelerates these weights, due to the increasing centrifugal force, are thrust against the clutch drum and thus transmit the torque applied by the engine across the clutch drum and the drive sprocket to the saw chain.

The biasing force and stiffness of the annular spring are rated such that the centrifugal weights begin to skid on the clutch drums at the engaging speed (approx. 3200 rpm). With the speed further increasing the clutch is engaged. It is therefore very important to have the idling speed adjusted on the carburetor at all times. The clutch engaging speed must never be reached by an idling engine.

2.1.2 Chain brake

The chain brake is a spring biased, non-faced band type. Its major components are the brake band, the extension spring, the hand guard and the controlplate; the latter controls the isolating clutch.

You may control the chain brake by the hand guard for either mode of operation — lifting or application.

The chain brake is **lifted** by moving the hand guard up to the handle bar. The former acts on a linkage which tensions the spring and thereby slackens the brake band. At the same time the control plate assumes its rearmost position and releases the driver plate to mesh with the hub. This position is maintained because the brake lever connected with the extension spring, the brake band and the control plate is locked by the control finger even when the hand guard is released.

To **apply** the chain brake, the hand guard is moved toward the nose of the guide bar. This unlocks the brake lever, which transmits the force of the extension spring to the brake band which clings to the clutch drum. At the same time the control plate forces the driver plate out of engagement with the hub and interrupts the transmission of force between the crankshaft and the centrifugal clutch. Within a fraction of a second the clutch drum and saw chain are stopped even if the engine continues to run at high speed.

2.2. Trouble shooting guide

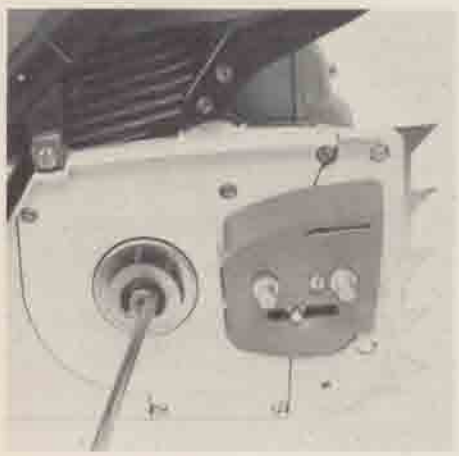
Symptom	Cause	Remedy
Chains runs at idling speed	Engine idles too high	Adjust idling speed at idle adjustment screw
	Annular spring is stretched or fatigued. Spring eyes are broken	Replace annular spring
Chain wears rapidly	Incorrect chain tension	Tension chain correctly
Chain stops in kerf; isolating clutch disengages during cut	Worn isolating clutch	Replace hub and driver plate
Isolating clutch does not engage when chain brake is lifted	Engine idles too high	Adjust idling speed at idle adjustment screw
	Leaf spring is broken or fatigued	Replace leaf spring
Saw chain does not stop immediately when chain brake is applied	Extension spring is broken	Replace extension spring

2.3 Disassembly and repair

2.3.1 Clutch

Top:
Chain brake lifted

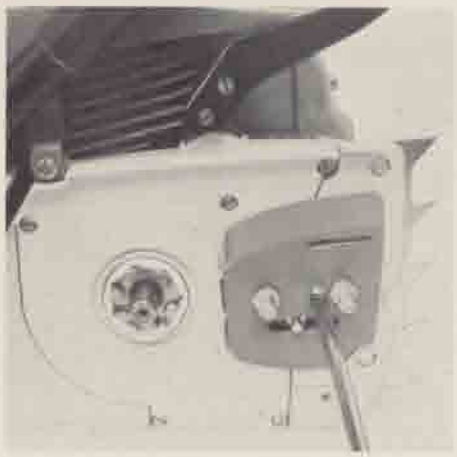
Bottom:
Removing the retaining washer



Top:
Loosening the chain cover plate

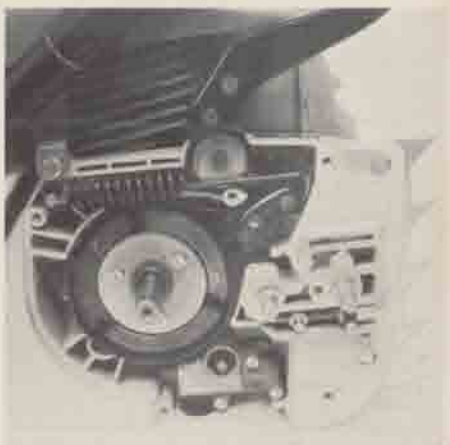
Center:
Loosening the side cover

Bottom:
Spur gear rim removed



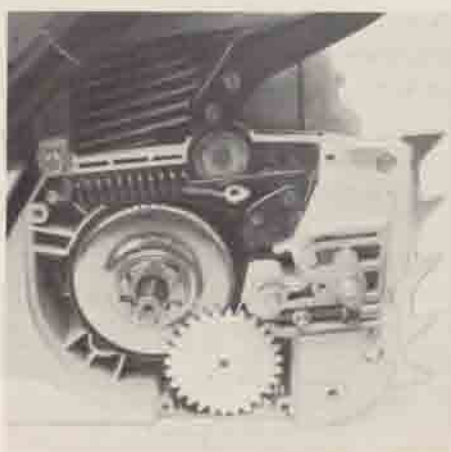
Top:
Turning off the spur gear

Bottom:
Removing the clutch drum and the needle cage



First remove the sprocket cover and the guide bar assembly.

Before removing the drive sprocket the chain brake must be lifted. Pry out the retainer washer from the circular slot of the crankshaft. Now the contact plate, the sprocket and the needle cage can be pulled off the crankshaft.

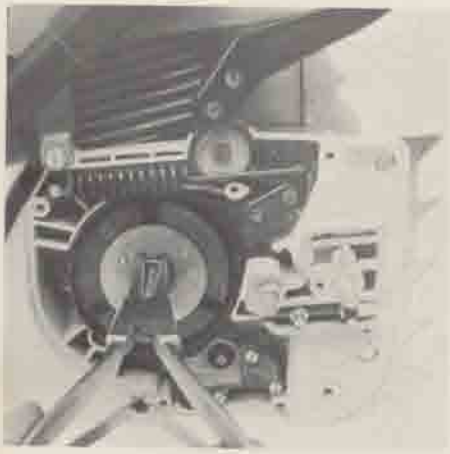


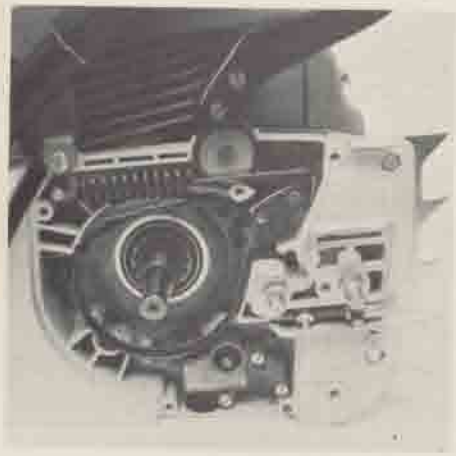
Then remove the inner side plate secured by one M 4×12 cylinder head screw. After removal of five more M 4×12 cylinder head screws the cover can be taken off. Remove the spur gear rim from the clutch drum and the large spur gear from the oil pump axle, turning clockwise.

Pull the clutch drum and the needle cage off the crankshaft and remove

Top:
Removing the retainer ring

Bottom:
Driver plate removed



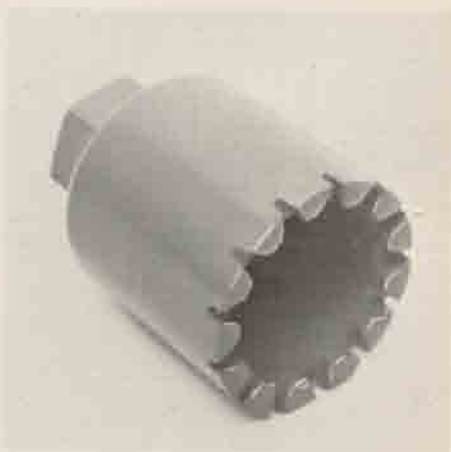


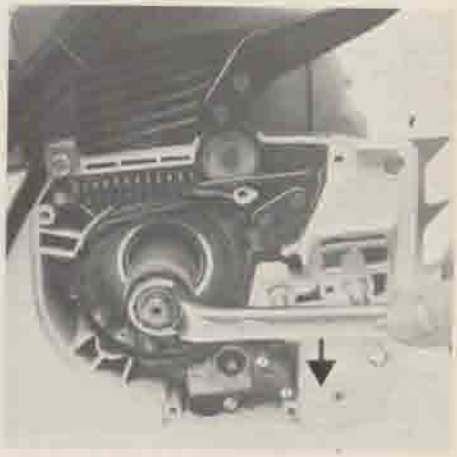
Top:
Locking screw 1117 893 1200

Bottom:
Locking screw inserted

Top:
Special hub wrench

Bottom:
Loosening the hub





the retainer washer which axially holds the clutch driver on the hub. The driver, together with the leaf spring and the needle cage, can now be pulled off the hub. If you have to unscrew the hub, remove the driver plate and lock the crankshaft. For this purpose unscrew the spark plug and replace it by the locking screw 1117 893 1200, tightening the latter by hand.

Use only this special locking screw because of the high torque required for loosening the hub. Using the normal locking screw 1107 191 1200 will destroy the piston crown. Also use the special wrench 1117 893 1300 for loosening the hub.

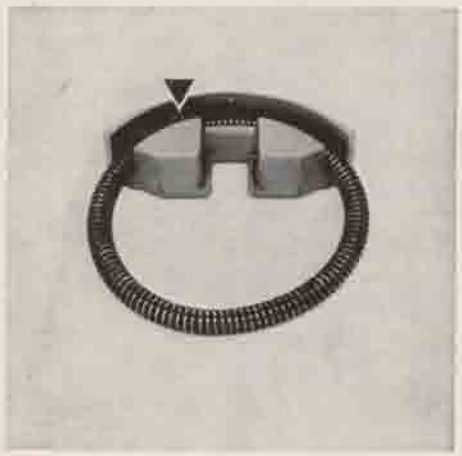
OBSERVE: The hub has a left-hand thread. Loosen it in clockwise direction.

Wash all clutch components and the needle cages in clean petrol and blow them dry with compressed air if available. Also clean the crankshaft end.

Replace all damaged or worn parts.

Top:
Unscrewing the guide plate

Bottom:
Annular spring inserted in socket



Top:
Annular spring passed over driver arm

Middle:
Second clutch shoe inserted

Bottom:
Pressing in the annular spring

Levering the driver in place

Replace the annular spring or the clutch shoes as follows:

First unscrew the guide plate from driver, then pry off the clutch shoes from the driver.

For re-assembly, first insert the annular spring into the spring socket of the clutch shoe with the adaptor sleeve in place. Make sure to pass the spring eye parallel to the bottom of the socket across the adaptor sleeve. Then insert one driver arm ino the shoe and pass the annular spring over the two free ends of the driver.

Now insert one free driver arm into the second clutch shoe. Press the annular spring into its socket whilst holding the driver. Force the clutch shoe outwardly using a screwdriver and at the same time force the driver all the way into the socket for the clutch shoe. Repeat this for the third shoe.

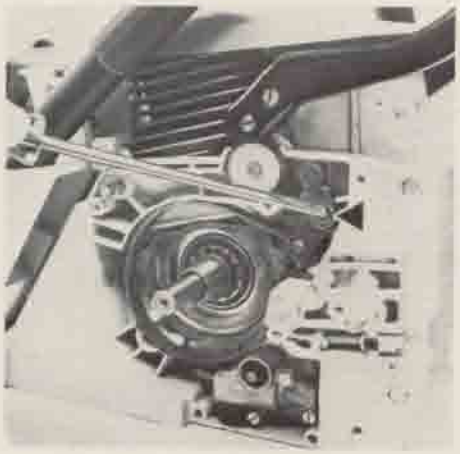
Then re-assemble the guide plate. Lock the three M 4×6 cylinder head screws with LOCTITE.

2.3.2 Chain brake

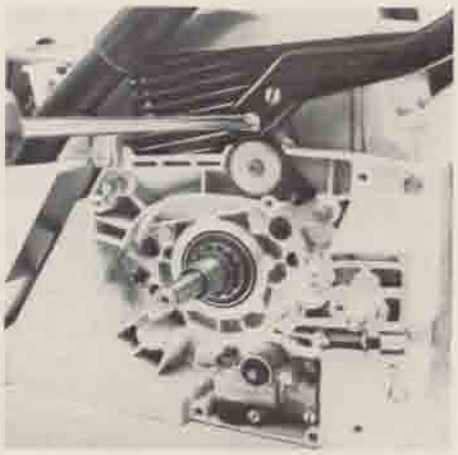
Top:
Prying off the lock washer

Middle and bottom:
Unscrewing the hand guard

Unhooking the extension spring



Remove the clutch drum before disassembling the brake band. Trip the chain brake and unhook the extension spring. Then force the lock washer off the bearing pin of the brake lever and pull off the brake lever carefully. Be sure not to lose the washers and coil springs on the pin of the brake band. The other end of the band may now be pried out of the recess in the crankcase.



Remove the clutch assembly before taking out the control plate. Then remove the lock washers, washers and coil springs. Now the control plate may be taken out of the crankcase.

After unscrewing the hand guard (the M 5×12 screws are locked with LOCTITE and do not turn readily), remove the lever, the control finger and the leg spring.

If the spring guide pins in the crankcase are worn, replace them.

The stud screws should be locked to prevent them from loosening. For this purpose the female threads in the crankcase and the stud bolt threads should be carefully degreased with a suitable agent (trichloroethylene, nitrogen thinner etc.) Then wet the bolt threads with some locking compound — Part No. 0786 111 1101 (LOCTITE 242) — turn them into the crankcase and tighten applying a torque of 4,9 Nm (3.6 lbf. ft.).

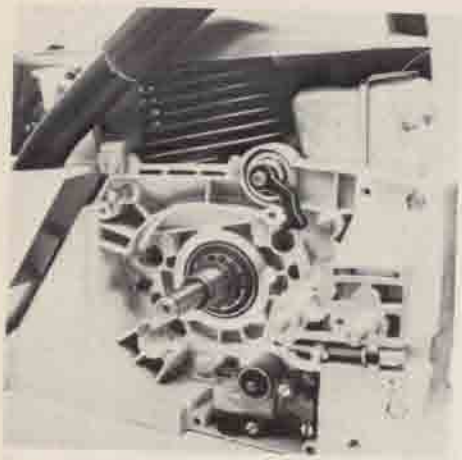
To protect the bolt material in the area of the slot from damage it is absolutely necessary to use a perfectly fitting screwdriver with a flawless edge which nearly fills the slot. A 1×6.5, DIN 5265 screwdriver will be a suitable tool.

2.4 Reassembly

2.4.1 Chain brake

Top:
Leg spring and control finger in place

Bottom:
Lever, assembled



First assemble the leg spring, control finger, lever and hand guard. The ends of the leg spring must engage with the bores in the crankcase and in the lever. See that the control finger is positioned correctly. Lock the flat head screws M 5×12 with LOCTITE again.

Now place the control plate into the crankcase to have the oblong holes receive the guide pins. Then

Brake band located in recess

slide the following parts on the guide pins in sequence: Washer, coil spring, washer and lock washer. Place the angled end of the brake band into the recess in the crankcase and insert the pin of the brake lever into the eye of the band. Also slide the washer, the oil spring and the washer onto the lever fulcrum pin, slide the lever on the pin inserting the pin into the slot of the control plate at the same time. Finally, lock the brake lever by the lock washer and re-install the extension spring.

Use the mounting sleeve 1117 890 0900 to make this work easier.

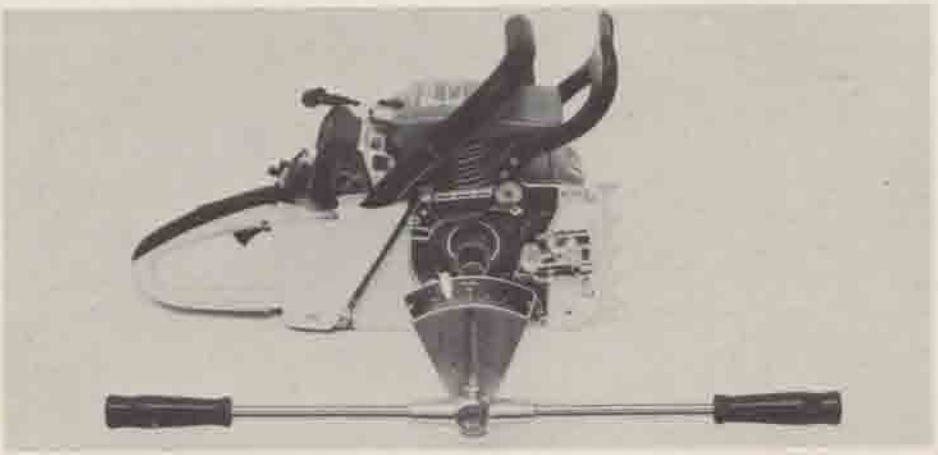
Top:
Brake lever, assembled

Middle:
Mounting sleeve (special tool)

Bottom:
Hooking the extension spring in place

2.4.2 Clutch

Top:
Tightening the hub with a torque wrench



Bottom:
Driver plate in position

First degrease both threads with a suitable solvent (trichloroethylene, thinner etc.). Then place the washer on the crankshaft, turn the hub onto the crankshaft in counterclockwise direction and tighten it with the help of the special wrench 1117 893 1300 and a torque wrench at a torque of 58,8 Nm (43.4 lbf.ft).

Maintain the specified tightening torque under all circumstances to prevent the hub from turning loose.

Bottom:
Leaf spring placed on driver

Then place the driver plate on the hub gear. Its mounted orientation is optional, but the chain brake must be lifted. Place the leaf spring on the driver finger of the clutch driver with the angled ends pointing away from the clutch. Slide the clutch, together with the degreased needle cage, on the hub and turn it back and forth until the driver fingers engage with the driver plate.

Then lock the clutch with the lock

Assembled clutch

washer. Lubricate the needle cage of the clutch drum with antifriction bearing grease and slide it on the crankshaft. Slide the clutch drum on the crankshaft and the needle cage and finally slide the large spur gear onto the axle of the oil pump and the spur gear rim onto the clutch drum hub.

Finally, install the cover and the drive sprocket. Remove the locking screw, turn in the spark plug and tighten.

3. POWER UNIT

3.1 Design

The 042 AV electronic Quickstop power saw is driven by an air-cooled, single-cylinder, two-stroke cycle engine.

The crankcase halves are made of a special magnesium alloy by a die-casting process. The bi-sectional, drop forged crankshaft is supported at two points by deep-groove ball bearings.

Two shaft seals, one at the ignition end in the crankcase and the other at the bumper end in the ball bearing, seal the crankcase against the ambient air.

The drop-forged connecting rod is supported at the crankpin and the piston pin by one needle cage each. During production, the two crankshaft halves are nontorsionally pressed together and finish machined. For this reason the crankshaft can be supplied only as a complete assembly, with connecting rod and needle cage.

The cylinder and piston are made of a special Al alloy; the cylinder wall has a special coating.

3.2 Trouble shooting guide

Before trying to seek any fault in the power unit, first check and, if necessary, repair the fuel supply, carburetor, air cleaner and ignition system.

Symptom	Cause	Remedy
Engine is difficult to start, stops at idling speed, but runs normally at full throttle.	Defective shaft seals in crankcase. Leaking intake tube.	Replace shaft seals.
	Cracks etc. in crankcase.	Replace crankcase.
Engine does not develop full power or stutters.	Engine draws "wrong air" because of improperly mounted carburetor.	Correct carburetor mounting: replace gasket.
	Piston rings do not seal or are broken.	Replace piston rings.
Engine overheats.	Inadequate cooling of cylinder. Air inlets in fan case are clogged. Cylinder cooling fins are fouled.	Thoroughly clean all cooling air passages.

3.3 Exposing the cylinder

Top:
Removing the hood

Bottom:
Unscrewing the muffler

To expose the cylinder, remove the carburetor box cover, the hood and the muffler. Also remove the cutting attachment because the right-hand mounting screw of he hood will be accessible only if the sprocket cover is taken off.

The outer surfaces (fins) of the cylinder may now be thoroughly cleaned and inspected for cracks, broken fins etc.

3.4 Disassembling the cylinder and piston

Loosening the cylinder foot screws

First drain the fuel and lub oil tanks. Before disassembling the cylinder, decide whether the crankshaft must be removed too. Turn the locking screw 1117 893 1200 into the female spark plug thread to lock the crankshaft for disassembling the flywheel and the clutch hub.

Take off the carburetor and the spark plug and remove the four cylinder head screws by which the cylinder is fastened to the crankcase. The cylinder can now be pulled off the piston. At the same time push the intake tube out of the carburetor seat of the tank case in forward direction.

To remove the piston, take off both circlips which secure the piston pin and push out the piston pin using the pin 1 11 893 4700 from the piston and the needle cage. If the piston pin seizes because of gum,

Top:
Removing the circlips

Bottom:
Pushing out the piston pin

drive it out against the pin. Be sure to use a counter support to prevent damage to the connecting rod.

Now the piston may be removed, and the needle cage may be slid out of the con rod.

3.5 Re-assembling the cylinder and piston

Arrow points in direction of exhaust port

Fitting the piston pin

Top:
Mounting clip and mounting block

Bottom:
Intake tube assembled

If the cylinder must be replaced the piston matched to the spare cylinder has to be installed too. Spare cylinders are supplied together with the piston only.

If only the piston is replaced, any spare piston marked "B" may be mated with any cylinder.

Before installing a piston, wet the needle cage with oil and insert it into the small-end boss. Place the piston over the con rod to have the arrow point in the direction of the cylinder exhaust port (to the bar nose).

Then insert the piston pin into the piston and con rod. Use the mounting pin 1111 893 4700 for this purpose. Slide the mounting pin through the piston bore and the con rod to obtain concentricity. Slide the piston pin over the journal of the mounting pin and then slide it into the piston, moving the piston slightly in either direction to make insertion of the piston pin easier.

The piston pin must rotate freely. Avoid any force when installing.

Finally, replace both wire circlips and ensure proper seating.

Using the mounting block and the mounting clip 1107 893 4900 will greatly help you in installing the cylinder.

The intake tube must first be mounted when a new cylinder is to be fitted. For perfect sealing the inside of the tube neck should be coated with sealing compound 0783 810 1101. Place the tube to the intake neck to have the curved portion point upward (to the cylinder head) and the round notches at the carburetor-end flange form an angle with the cylinder axis of less than 45°.

Finally, lock the intake tube with a hose clamp. Watch out for correct fit and perfect condition of the clamp.

Top:
Piston placed on assembling block

Bottom:
Piston rings in position

Then place the new cylinder gasket on the crankcase. Wet the piston and especially then compression rings with engine oil and place the assembling block on the crankcase to provide a seat for the piston.

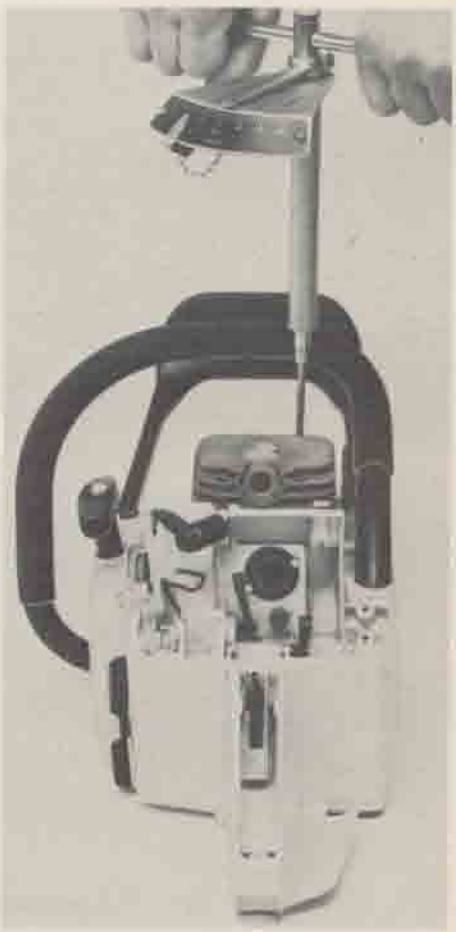
Rotate the compression ring in its groove so that the radii ground to the ends engage with the locator pin in the ring groove.

Replacing a cylinder

Insert the four cylinder head screws M 6x25 into the mounting bores of the cylinder. Grasp the piston and the compression rings with the assembling clip watching their correct position. Pass the cylinder over the piston with the exhaust port pointing toward the bar nose. The cylinder must be oriented exactly in its installed position. The outer edges of the cooling fins must be in parallel alignment with the outer edge of the bumper-end crankshaft half. Failure to observe this may result in broken piston rings.

Slide the assembling clip downward and i sert the compression rings into the cylinder. Remove the assembling block and assembling clip. Push the flange of the intake tube through the bore in the tank case (avoid using sharp tools). Position the cylinder gasket and the cylinder. Thread in the 4 cylinder foot screws and tighten

Tightening the cylinder foot screws using torque wrench



them with a torque of 9.8 Nm (7.2 lbf. ft) in diagonal sequence.

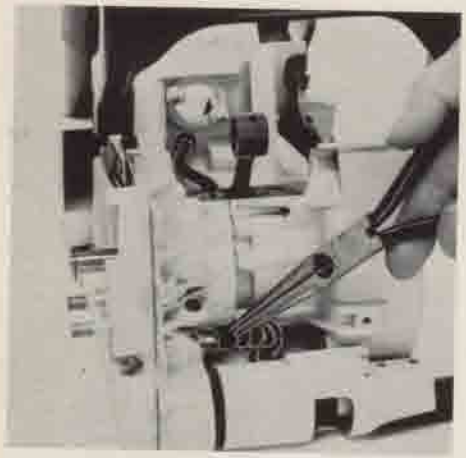
Finally, re-install the muffler, hood, carburetor, grip shell, control shaft, air cleaner, spark plug and carburetor cover.

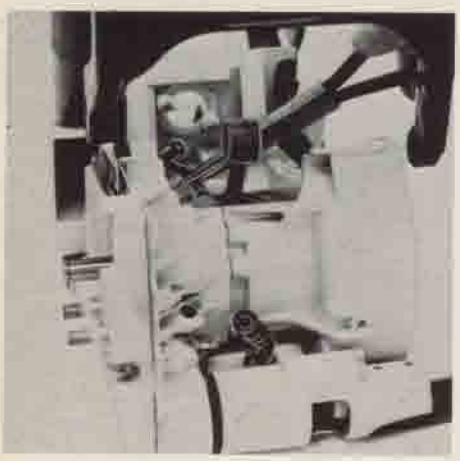
The muffler mounting screws must be secured with adhesive 0786 111 1109.

3.6 Disassembling the crankcase — removing the crankshaft

Top:
Pulling off the pulse hose

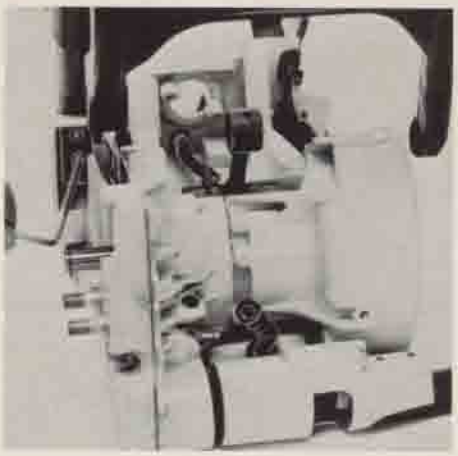
Bottom:
Pulling off the suction hose





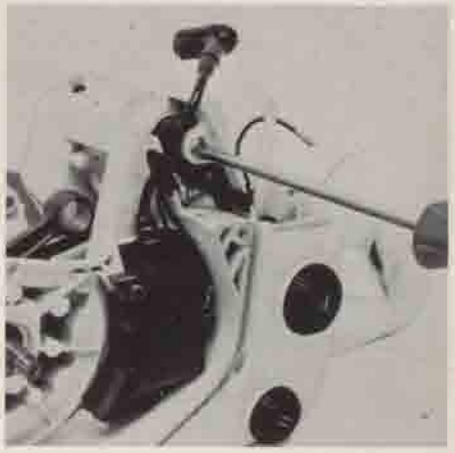
Top:
Loosening the handle bar

Bottom:
Unscrewing the handle bar bracket



Top and middle:
Loosening the collar screws

Bottom:
Removing the ground wire and contact spring



To remove the crankshaft, first take off the clutch, the hub (2.3.1), the flywheel (4.4.5) and the cylinder and piston assembly (3.4).

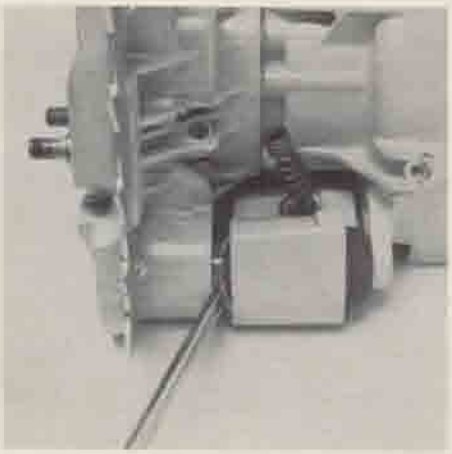
Then remove the tank case as follows:

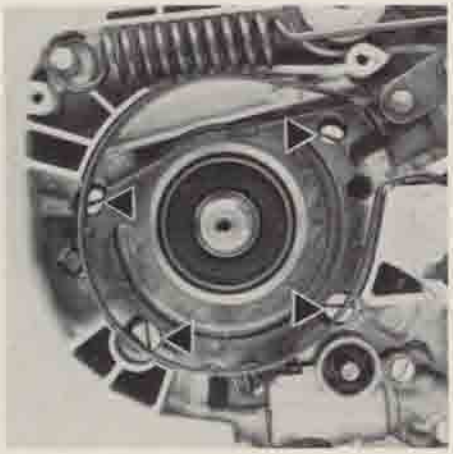
Pull the pulse hose and the oil suction hose from their connections. Turn out the 4 cylinder socket screws which secure the handle bar. Also unscrew the handle bar bracket from the tank case. Now the handle bar can be taken off.
Then unscrew the collar screws which pass through the three shock absorbers and remove the ground wire together with the contact spring.

The bumper-end forward shock absorber is locked by a 3,5 mm (0.14 in) high screw head. For removing the tank case from the crankcase, slide a screwdriver between

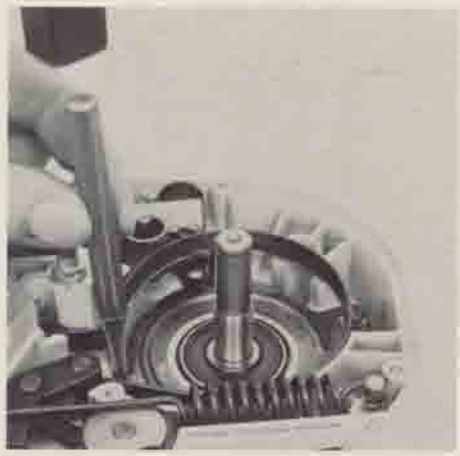
Top:
Compressing the shock absorber

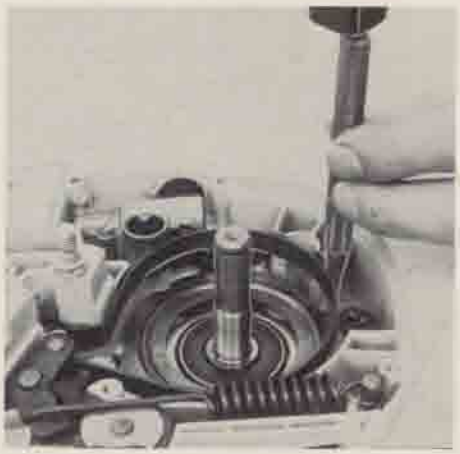
Bottom:
Crankcase mounting screws





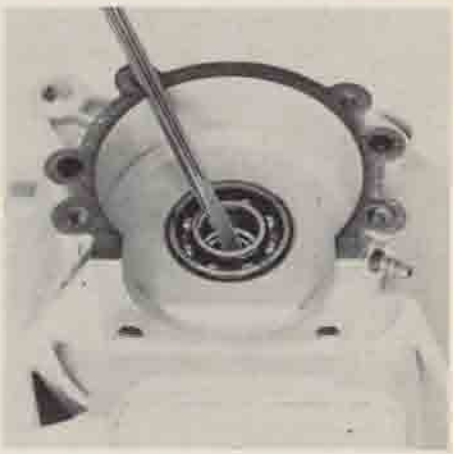
Top and bottom:
Driving back the cylinder pins





Top:
Driving out the crankshaft

Bottom:
Driving out the shaft seals



the crankcase and the bumper-end shock absorber and compress the latter by the amount of screw head height. Now the tank case can be completely removed.

In the now following disassembly of the crankcase loosen and remove the 4 flat-head screws of the crankcase. Be sure to lift the chain brake, also when driving back the cylinder pin above the oil pump into the ignition-end crankcase half.

Then trip the chain brake, unscrew the hand guard and drive the other cylinder pin back into the ignition end crankcase half too.

Holding the crankcase half against the direction of blow, knock the crankshaft out of its bearings with a plastic hammer. Before doing this, take out the key from the ignition-end shaft end.

3.7 Re-assembling the crankshaft, assembling the crankcase

Forcing out the ignition end ball bearing

Before removing the ball bearing from the ignition end crankcase half, remove the shaft seal from the recess in the crankcase with a screwdriver or similar tool. Then force out the ball bearing toward the inside using a drive pin 1117 893 7200. Do not use blows.

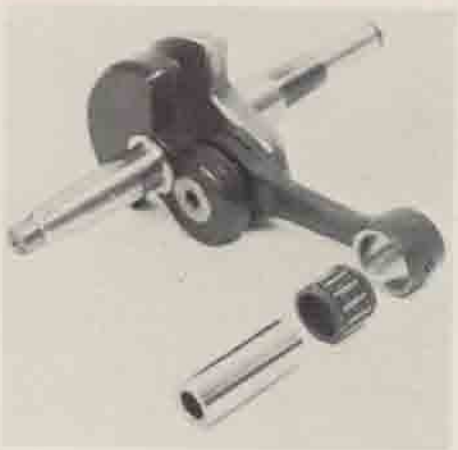
The bumper-end ball bearing should also be forced out of its seat with a drive pin 1117 893 7200 in inward direction.

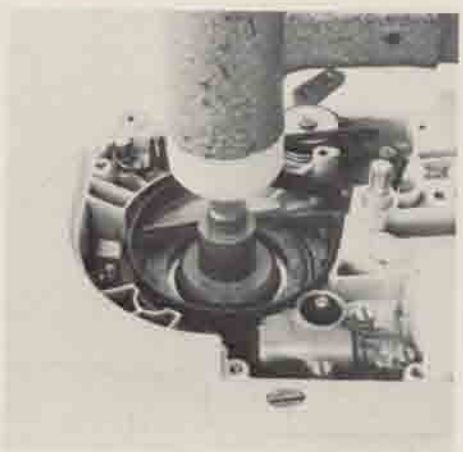
The crankshaft, con rod and needle bearing form a sub-assembly and are supplied as such only. If any one of these components should be damaged the crankshaft assembly must be installed for replacement.

It is advised to renew the ball bearings and shaft seals, too, whenever replacing a crankshaft. The shaft seals, however, must be renewed in any event.

Top:
Crankshaft with needle bearing and piston pin

Bottom:
Forcing out the bumper-end ball bearing





If the crankcase is damaged it must be replaced **completely.** Fit all other components to the new crankcase if they are serviceable.

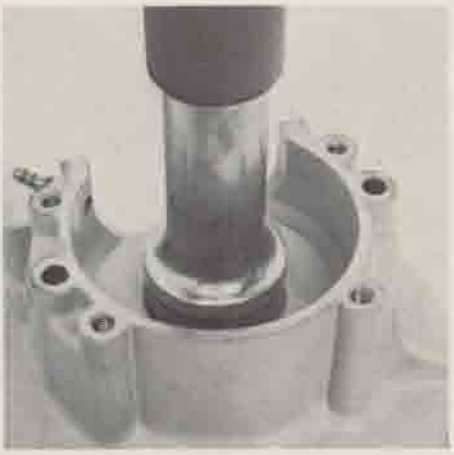
Top:
Cleaning the seal surfaces

Bottom:
Circlip installed

If the old crankcase is to be reused, remove the crankcase gasket and clean all sealing surfaces with a suitable tool, perhaps a scraper. In a new crankcase insert the circlip into the groove of the bumper-end bearing seat. Heat both crankcase halves on a hotplate and press the ball bearings in straight from the case inside to have the outer races bear against the crankcase shoulder and circlip. Use a mounting sleeve

Top:
Mounting sleeve

Bottom:
Forcing in the ignition-end ball bearing



1113 893 4600 for the ignition-end ball bearing. Force the bumper-end ball bearing in with a drive pin 1117 893 7200.

To insert the crankshaft into the inner races of the ball bearings the latter must be heated. Use a soldering iron with a suitable tip. Then insert the crankshaft with the tapered shaft end into the bearing of the ignition-end case half until the boss

Crankshaft slid in up to the crank check

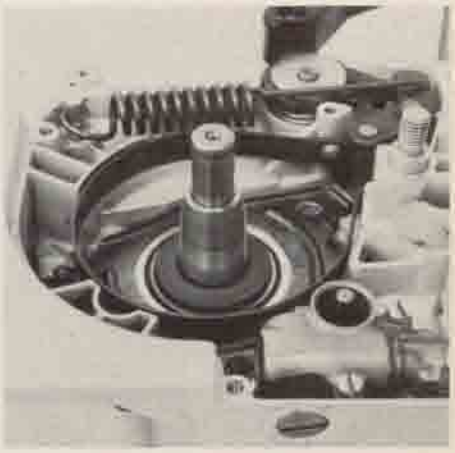
of the crank check contacts the inner race.

Coat the sealing surfaces of both crankcase halves with sealing compound 0783 810 1101, if available. Put on a new crankcase gasket. Slide the inner bearing race of the bumper end case half over the cylindrical shaft end, fit the case halves together and straighten them out. Drive the cylinder pins home completely. Turn in the screws and tighten them in diagonal sequence with a torque of 4,9 Nm (3.6 lbf.ft).

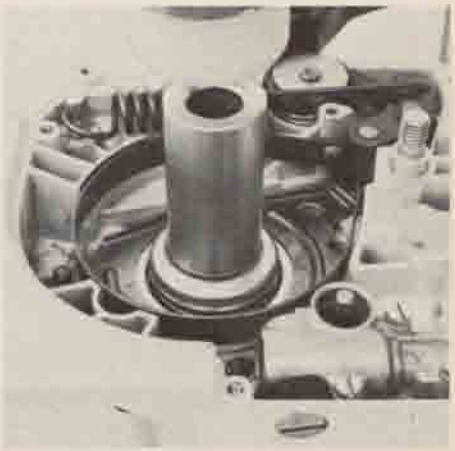
To install the shaft seals, apply the assembling sleeve 1117 893 4605 to the clutch end crankshaft end. Slide the seal with the lip first on the sleeve and force it in with the drive sleeve 1117 893 2405 until it is flush with the forward edge of the ball bearing.

When inserting the ignition end shaft seal, the assembling sleeve is

Top:
Shaft seal slid over assembling sleeve



Bottom:
Installing the shaft seal



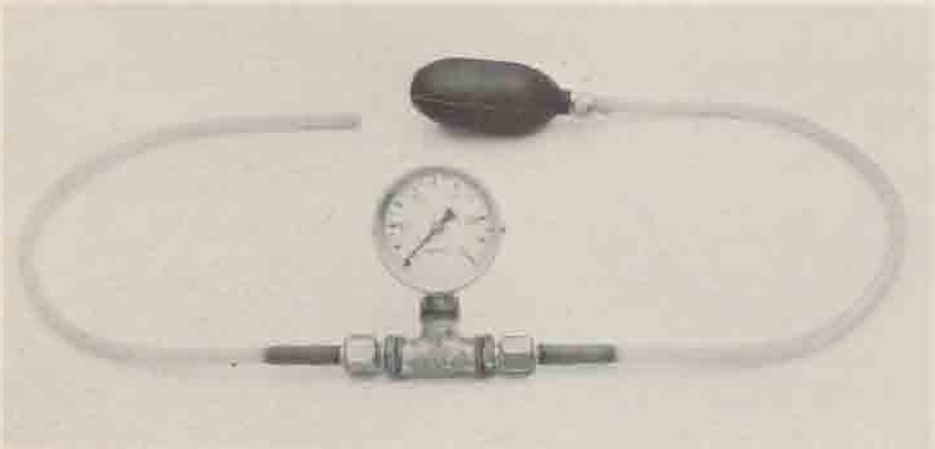
not needed. This seal is forced in place with the shank of the drive sleeve 1117 893 2405.

Re-assemble the remaining parts in reversed order.

3.8 Testing the crankcase for leaks

Top:
Carburetor and crankcase tester

Bottom:
Vacuum pump



Defective shaft seals and gaskets or cracks in the die-cast components are often the cause of leakage. Leaks may induce erratic air and thus alter the aspirated air and gas mixture ratio.

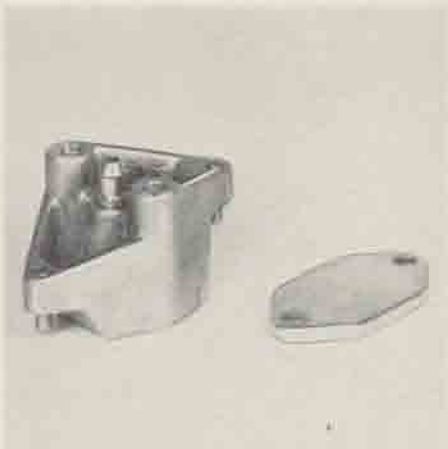
As a consequence, adjustment of the specifield idling speed will be difficult, if not impossible. Also, there is no smooth transition from idle to partial or full load.

The carburetor and crankcase tester 1106 850 2900 and the vacuum pump 0000 850 3500 will detect any leakage of the crankcase.

3.8.1 Pressure test

Top:
Test flange and blind flange

Bottom:
Blind flange installed



First, remove the carburetor (9.4) and the muffler. Close the exhaust port of the cylinder with the flange 1115 855 4205 placing the exhaust gasket between. Cylinder head screws M 5x16 (one of them can be found at the lower right of the muffler) may be used for mounting the flange.

If a new-type seal plate 000 855 8105 is used in place of the flange 1115 855 4205 the hood must be re-

Top:
Mounting the test flange

Bottom:
Pressure-testing the carburetor

Seal plate installed

Pressure hose connected

moved whilst the muffler may remain on the engine. The three mounting screws should be loosened only by an amount which permits the seal plate to be inserted between the cylinder exhaust and the muffler with the narrow side first from the top. Tighten the upper mounting screws M 5x65 moderately. The seal plate now plugs the cylinder exhaust.

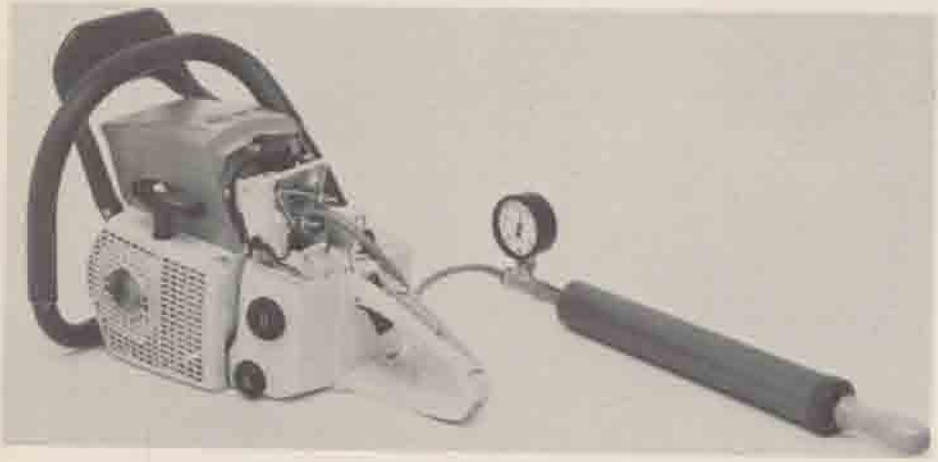
Slide the test flange 1113 850 4200 over the stud bolts in the tank case (carburetor seat) in such way that the lower cylinder pin enters the opening of the pulse hose and thus provides an airtight seal. Finally, turn the two nuts M 5 on the stud bolts and tighten them slightly to press the flange against the intake tube and in this way seal the latter.

The spark plug must be firmly tightened and the piston must be in TDC (top dead centre) position. Connect the pressure hose of the tester to the nipple of the test flange, close the vent screw at the compression bulb and pump air into the crankcase until a gauge pressure reading of 0,5 bar (7.25 lbf/in²) is obtained. If the pressure does not drop the crankcase is tight. On the other hand, if the pressure drops, the defective area must be located and the faulty component replaced.

After the test, open the vent screw and pull off the hose.

3.8.2 Vaccum test

Leakage testing with vacuum pump



Failure of the shaft seals can best be detected under vacuum. When the piston evacuates the cylinder the sealing lip lifts off the crankshaft because of missing internal counter pressure.

To establish this condition an additional test with a vacuum pump may be made. In this test the preparatory work is the same as that for pressure testing (3.8.1).

Connect the suction hose of the vacuum pump to the nipple of the test flange. Pull out the pump piston far benough to obtain a gauge vacuum reading of 0,5 bar (7.25 lbf/in²). The check valve will automatically close the suction line when the pump piston is released.

If the indicated vacuum persists or does not go up beyond 0,3 bar (4.35 lbf/in²) the shaft seals are satisfactory.

However, if the vacuum decreases above that reading (to 0 bar), replace the shaft seals even if no leakage was detected in the foregoing pressure test.

3.8.3 Replacing the shaft seals

Extractor applied

If only the shaft seals must be replaced the power unit needs not to be disassembled. Remove the clutch, hub (2.3.1) and flywheel (4.4.5).

Pull the ignition-end seal out of the recess in the crankcase using the extractoer 0000 890 4400. Fit the grippers No. 1 into the extractor. The bumper-end shaft seal can be simply pried out of the ball bearing with a screwdriver. Proceed very carefully in either case.

For the ignition-end seal be careful not to damage the sealing surface of the crankshaft and for the output end seal the ball bearing cage.

Install the new shaft seals as outlined in 3.7.

4. IGNITION SYSTEM

4.1 Design and construction

As are all other STIHL power saws, the 042 AV electronic Quickstop is equipped with an ignition system which is independent of a battery and generator. This saw incorporates a thyristor controlled (pointless) magneto-capacitor igniter.

The compact ignition system consists of only two major components — a flywheel or magnet wheel and an external igniter module. Cast into the flywheel is a permanent magnet with a north and a south pole. The igniter module contains a charging armature, a trigger coil and an ignition transformer arranged on the legs of a common iron core and molded liquid-proof in resin together with the storage capacitor and the electronic switch. The ignition module is arranged at the periphery of the flywheel to permit radial adjustment only. This means that, by adjusting the ignition module, the gap but not the ignition timing is altered. Disregarding the internal electronic circuitry, ignition is timed only by the position of the feather key grooves in the crankshaft and flywheel hub.

An ignition of this type is superior to point-controlled magnetos because it contains no mechanically and erosively stressed components, such as breaker points.

Electronic components control the ignition process. This is why the system works satisfactorily even in the presence of fouling, high humidity and extreme temperature fluctuation.

The principal advantage, however, is seen in the fact that the primary voltage at the time of ignition does not have to be generated inductively. It is available capacitively when needed. At the moment of ignition the high-voltage pulse is fed to the spark plug instantly, ensuring a positive igniting spark.

4.2 Operation

The operational mode of this magneto, too, is based on magnetic induction. However, we distinguish here between "motional induction" in the charging unit and "stationary induction" in the working unit.

In **motional** induction the electrical potential in an electrical conductor is generated by moving it across the lines of flux of a magnetic field. The amount of the induced potential depends, among other things, on the intensity of movement.

In terms of this magneto system this means: When the flywheel rotates the lines of flux between the permanent magnets which start from the north pole and enter the south pole generate a magnetic flux in the iron core. The lines of flux of this magnetic field intersect the wire windings of a trigger coil and a charging coil in sequence and generate a low electrical voltage therein. The amount of this voltage, therefore, depends on the rotational speed of the flywheel, too.

In the case of stationary induction an electrical voltage is generated in an electrical conductor by a magnetic field built up by electrical current, in which the conductor lies which changes its intensity or direction of flux. This is known as the transformer principle.

Applied to our ignition system, this means: When the energy stored in

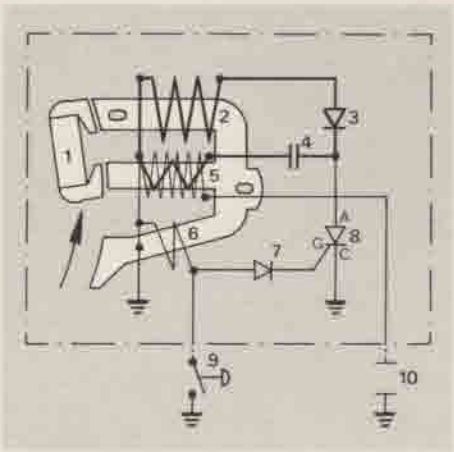
the capacity is fed to the primary coil of the ignition transformer an intense, instantaneous current will flow in this coil, which generates an intense magnetic flux in the common iron core. This flux in turn induces a high-voltage pulse in the secondary coil. The tension of this pulse depends on the ratio of windings between the primary and secondary coils, i. e. the transmission ratio.

During each revolution of the flywheel the thyristor (and thereby ignition) is triggered and the storage capacitor is charged alternatingly.

For a better understanding of what happens in the system we begin with the charging of the capacitor.

4.2.1 Charging the storage capacitor

Charging the storage capacitor



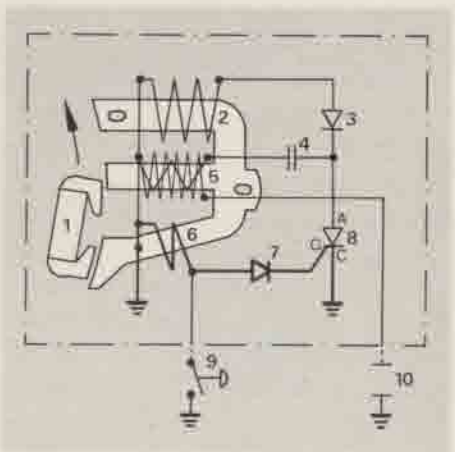
When the poles of the permanent magnet pass the core of the charging coil when the flywheel is rotated, an electrical voltage pulse is generated in the coil by the directional change of the magnetic flux.

The winding of the charging coil is connected in series with the storage capacitor and the primary winding of the ignition transformer. The voltage pulse generated flows to the storage capacitor. The rectifier diode connected between, however, allows only the positive portion (a half-wave) of this pulse to pass and blocks the negative portion with the result that the capacitor holds a positive charge after charging.

As both the charging diode (in reverse direction) and the thyristor exert a checking effect, the capacitor cannot discharge any electrical energy at this stage.

4.2.2 Triggering the thyristor

Triggering the thyristor



After nearly another revolution of the flywheel the poles of the permanent magnet pass the iron core of the trigger coil. Also because of the change of flux an electrical voltage pulse is induced in this coil.

The winding of the trigger coil is connected with the control electrode (G) of the thyristor across the ground. The voltage pulse generated there flows through the interconnected control diode — which also allows only the positive half-wave to pass — to the control electrode (G) of the thyristor and renders it conductive in the direction of A — C (Anode — Cathode).

Here, too, the intensity of the voltage pulse depends on the rotational speed of the flywheel.

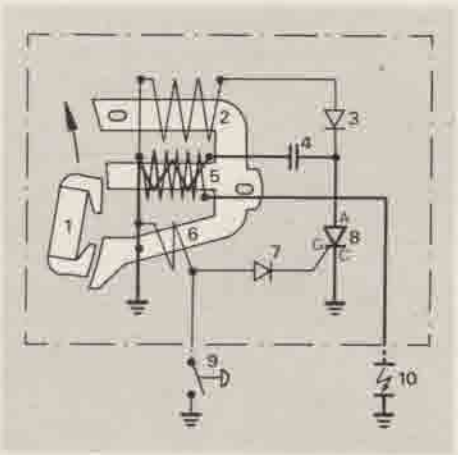
The higher this speed becomes the earlier — in terms of angle of rotation — the intensity of the voltage

4.2.3 Ignition

pulse needed for triggering the thyristor is reached.

This phenomenon explains the electronic shifting of ignition timing in this system. The faster the engine runs the earlier ignition will take place. At a speed of 8000 rpm the designed timing of 2,5 mm (0.098 in) before the top dead centre is finally attained.

The ignition process



By the triggering of the thyristor a path of current is formed which leads from the storage capacitor over the A — C stretch of the thyristor, the ground and the primary winding of the ignition transformer back to the storage capacitor. The charge of the storage capacitor flows along this path and allows for an instantaneous flow of intense current in the primary winding of the ignition transformer.

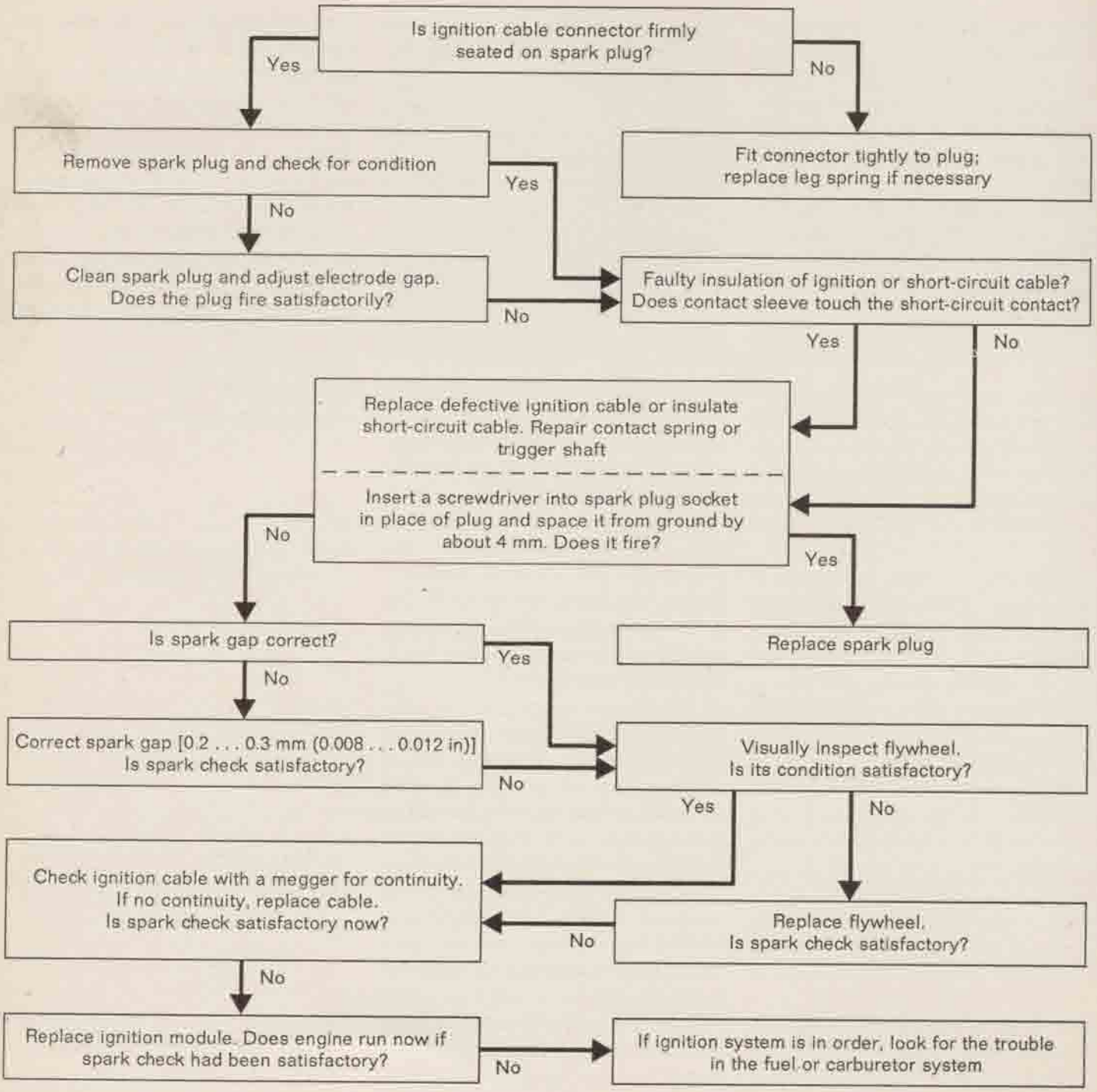
The intense electrical current in the primary winding causes a strong magnetic flux in the common iron core, which induces a high-voltage pulse in the secondary winding of the ignition transformer commensurately with the high number of windings. This pulse is conducted by the high-voltage ignition cable to the spark plug where it discharges in the form of a spark from the middle to the grounded electrode and thus ignites the air-fuel mixture.

The sequence of storage capacitor charging, thyristor triggering and ignition repeats at each flywheel revolution. Unless this sequence is interrupted the engine will go on running.

To stop the engine, this sequence must be interrupted. This is done by connecting the control pulse from the trigger coil through the short-circuit contact to ground. Then the thyristor is no longer triggered, the storage capacitor cannot discharge and high-voltage pulses are no longer induced.

4.3 Trouble shooting chart

Warning: Proceed with utmost care when repairing defects or doing any maintenance work. High voltage may cause fatal accidents



4.4 Operation and repair of components

4.4.1 Spark plug

The spark plug receives the high-voltage pulses generated in the ignition module and discharges in the form of a spark going from the middle to the ground electrode. If the spark plug is intact and the spark gap is set correctly this spark will ignite the air and fuel mixture.

Always begin at the spark plug whenever locating any trouble with the ignition system.

If the engine is difficult to start or does not develop its full power, stutters or does not otherwise perform as its hould, unscrew the spark plug and see if it has the specified heat value. Besides the WKA 175 T 6 spark plug with a heat value of 175 the new interference suppressing plug WKA 200 TR 6 has been used for some time. The latter type covers a larger heat range and is superior to the WKA 175 T 6 in other respects too.

The appearance of the insulator tip furnishes valid information on the effect of a variety of operating conditions.

Condition of insulator tip		Operating conditions
Normal:	Gray-yellow to brown; dry	Engine is in good condition; heat value of spark plug is correct
Sooted:	Velvet-like, dull-black soot coating	Air-fuel mixture too rich; lack of air (clogged air cleaner, partially closed choke). Spark gap too wide. Heat value too high
Oiled:	Wet gum and soot coating	Too much oil in the fuel mix
Overheated:	Beads on the insulator tip; eroded electrodes	Air-fuel mixture too lean. Loose spark plug. Heat value too low

4.4.2 Ignition cable

Checking the spark gap with the feeler gage

Adjusting the electrode gap with the Bosch spark plug gage

Pulling out the leg spring

A sooted or gummed spark plug should not be cleaned with a steel wire brush; use a brass brush instead and clean the plug with compressed air afterwards. If a spark plug is oil covered, wash the insulator tip with a solvent and blow it dry with compressed air.

The electrode gap gradually widens during use and must therefore be checked with a feeler gage and adjusted periodically. By bending the ground electrode the gap may be adjusted to the specified dimension of 0,5 mm (0.02 in).

If the electrodes are heavily eroded the spark plug should be replaced.

Whether a spark plug is good or not can be definitely found out in a compression spark plug tester.

An expedient method of testing consists of connecting the removed and cleaned plug to the ignition wire connector and holding it to the ground. A heavy spark must then jump when the starter rope is pulled.

If no spark jumps in spite of a good plug, check the cable terminals first. Scoured insulating material on the ignition and short circuit cables cause undesired grounding, with the result that the engine will not start or run smoothly.

Before screwing the spark plug into the cylinder, clean the plug seat and check if the seal is in good condition. The specified tightening torque for the spark plug is 24,5 Nm (18.1 lbf.ft).

The ignition cable conducts the high-tension pulse generated in the ignition module to the spark plug. If the plug insulator is cracked or damaged otherwise the spark may jump to ground and thus fail to do its job. In that event the ignition cable must be replaced.

To remove the ignition cable, unscrew the carburetor box cover, drive sprocket cover, hood and fan shroud. Pull the ignition connector off the spark plug, grip the leg spring with a suitable pair of pliers and pull it forwardly out of the ignition cable connector together with the ignition line connector. Unhook the leg spring from the ignition cable, pull the latter out of the ignition line connector and the rubber sleeve and turn it off the wood screw at the high-tension output of the ignition module.

A new ignition cable is 125 mm (4.9 in) long. Attach the protective

4.4.3 Short-circuit cable and ground conductor

Top:
Turning off the ignition cable

Bottom:
Attaching the leg spring

sleeve to a cable end and turn the latter firmly onto the wood screw in the ignition module. You are advised to punch a hole into the centre of the cable cross section with a pointed tool.

Pass the ignition cable through the rubber sleeve again, wet its end slightly with oil and insert it into the ignition line connector. Grip the end with a suitable pair of pliers and pull it forwardly out of the ignition line connector. Press the hoods of the leg spring into the centre of the cable cross section at a distance of about 15 mm from the cable end and pull the ignition cable back to have the leg spring snap into the recess of the ignition line connector.

Rubber sleeve attached

Finally, attach the ignition line connector to the spark plug, insert the rubber sleeve into the housing recess and re-install the fan shroud, hood and carburetor box cover.

The short-circuit cable is integrated in the ignition module at one end and provided with a terminal socket on the other, which is inserted in the cam of the trigger shaft. The short circuit cable is intended to ground the tension pulse of the trigger coil when the short-circuit contact is closed, i. e. if the engine is to be stopped.

Because the contact spring of the short-circuit contact is arranged in the insulated fuel tank case it is not in reliable electrical contact with the ground of the ignition module.

For this reason a ground conductor from the short circuit contact to the ground of the ignition module is necessary.

If the insulation of the short-circuit cable is damaged the damaged portion may ground its core. This condition will disturb or even prevent the ignition process. As the short circuit cable as such cannot be exchanged the damaged spot must be newly insulated.

Replace the ground conductor only if it is interrupted. If it is, first unscrew the fan shroud, carburetor box cover, drive sprocket cover and hood, unscrew the contact spring and turn out the mounting screw on the back of the ignition module.

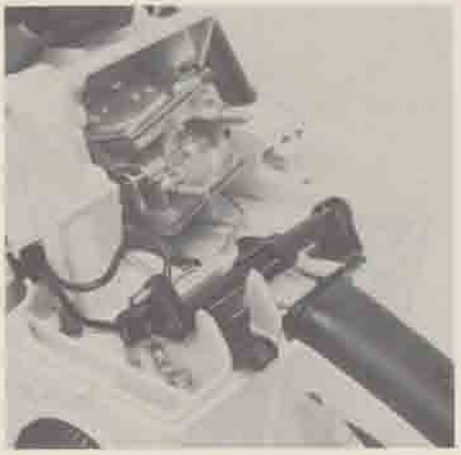
4.4.4 Shorting contact

Loosening the ignition module

Pull the ground conductor out of the rubber sleeves. Pass the new ground conductor with the 4 mm (0.16 in) cable shoe first through the large, then through the smaller rubber sleeve. For the smaller sleeve this is easier if the short circuit cable is pulled out first and inserted only after the ground conductor has been threaded in. Then tighten the ground conductor together with the ignition module and the contact spring again.

Because of the partial loosening of the ignition module the gap spacing (4.4.6) must be checked and corrected if necessary. Then insert the rubber sleeves into the case recesses and re-install the fan shroud, hub and carburetor box cover.

Air cleaner removed



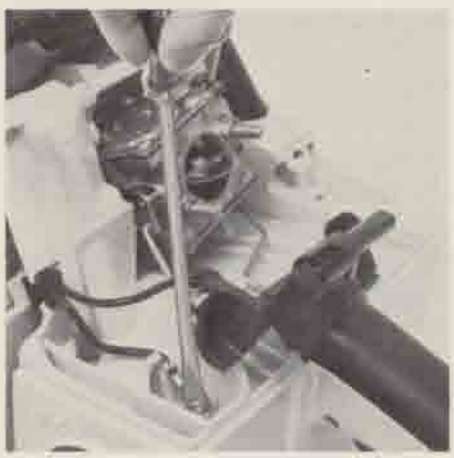
The short circuit for stopping the engine is actuated by means of the combined control lever of the one-hand control (7). The trigger element integrated in the trigger shaft in which the contact socket of the short-circuit cable is accomodated establishes the electrical contact between the ground conductor and the short-circuit cable when the combined control lever is in its STOP position.

The short-circuit system is intact if the contact spring clings to the sleeve with the combined lever control in STOP position. If the contact spring is deformed or broken it must be replaced.

To exchange the spring, remove the carburetor box cover and air cleaner and unhook the switch shaft (7.2). Turn out the cylinder head screw M 4x8 which fastens the contact spring.

Top:
Trigger shaft unhooked

Bottom:
Removing the contact spring



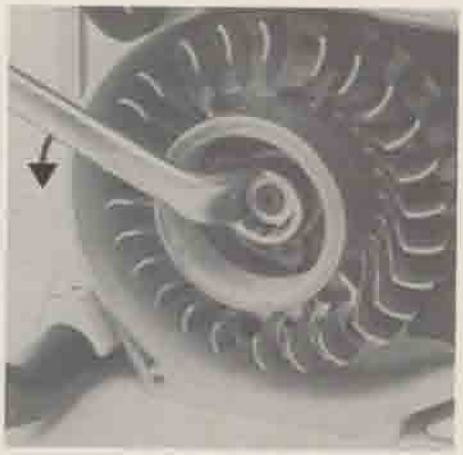
When installing a new contact spring, first pick up the cable shoe of the ground conductor by the screw, insert the contact spring and tighten it.

Then re-install the switch shaft and check if it works. Re-install the air cleaner and the carburetor box cover.

4.4.5 Flywheel

Top:
Loosening the hexagonal nut

Bottom:
Thrust piece attached to the crankshaft end



Top:
Applying the extractor

Bottom:
Pulling off the flywheel

The flywheel serves a number of functions at the same time. Firstly, it carries the permanent magnet with a north and a south pole (polarity in the order of engine rotation) for the ignition system. Its face is adapted as a fan wheel which generates the air flow for cooling the engine. Also at the flywheel face there is a plastic ring through which the starting torque is initiated. One of the prominent tasks of the relatively large-mass flywheel consists in canceling out in part the imbalance caused by the reciprocating piston.

The flywheel is arranged on the magneto-end crankshaft end, fastened by means of a key and locked by a hexagonal nut.

To remove the flywheel, take off the fan shroud, turn out the spark plug and replace it by the locking screw 1117 893 1200 turned into the cylinder and lock it by hand.

Rotate the flywheel counterclockwise until the piston crown contacts the locking screw.

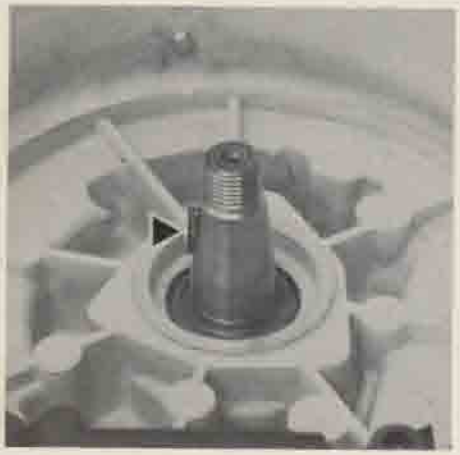
Using a box or socket wrench, loosen and turn off the hexagonal nut in counterclockwise direction.

Attach the thrust piece of the extractor 1107 890 4500 with its cylindrical bore to the crankshaft end. Then insert the extractor sleeve into the recess of the flywheel and secure it with three cylinder head screws M 5 × 16. Do not use shorter screws because they may damage the threads in the flywheel. With a SW 17 open-end wrench lock the extractor sleeve and turn the thrust screw in with another SW 17 wrench until the flywheel hub has loosened from the tapered crankshaft seat.

Loosening becomes easier if you use a hammer blow against the thrust screw after it has been tightened.

If the flywheel ist damaged in the form of cracks or broken fan vanes, replace it under all circumstances.

Woodruff key installed



Before installing the flywheel, clean the crankshaft end and the hub bore with a suitable grease solvent (trichloroethylene, thinner etc.).

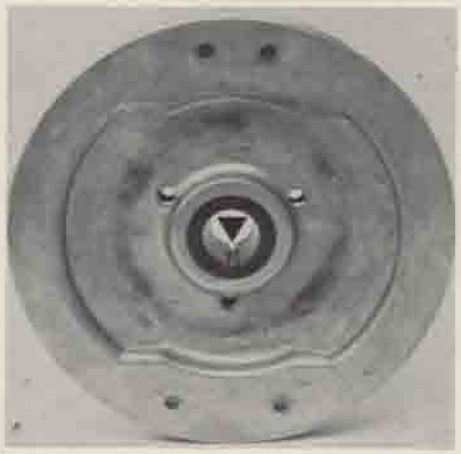
Be sure to position the key correctly.

Then attach the flywheel to the crankshaft such that the slot in the hub bore receives the key. Turn the hexagonal nut on the crankshaft and tighten it.

To save the Woodruff key from stress, see that all forces exerted by the flywheel are transmitted by the tapered connection between the flywheel and crankshaft. The specified tightening torque for the crankshaft nut of 29,4 Nm (21.7 lbf.-ft) must be observed under all circumstances.

Top:
Slot in hub bore

Bottom:
Tightening the crankshaft nut



Finally, turn out the locking screw, install the spark plug and replace the fan shroud and carburetor box cover.

4.4.6 Ignition module

The ignition module is arranged at the periphery of the flywheel in such manner that in can be adjusted radially only. Therefore, only the amount of gap between the magnet poles and armature legs can be varied. The timing cannot be set.

The charging coil, storage capacitor, electronic trigger unit and ignition coil are integrated. The three coils are arranged at one leg each of the common iron core. All components are moulded in resin in a liquid-tight manner; only two electrical terminals — the high-tension output and the short-circuit line — emerge from the ignation module. If any one of the integrated components should become defective the whole module must be replaced.

Remove the fan shroud, carburetor box cover and hood before taking off the ignition module. Then pull the short-circuit cable out of the switch shaft. The ground conductor together with the contact spring must be unscrewed, too. To facilitate the removal of these lines, take off the air cleaner before. Then remove the rubber grommets from the housing recesses and remove the cylinder head screws by which the ignition module is fastened.

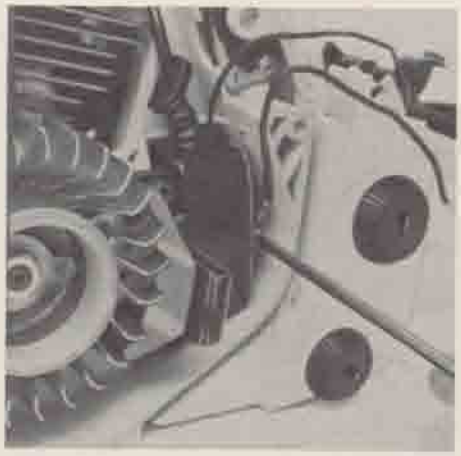
From a defective ignition module, remove the ignition line connector, rubber sleeves and ground conductor and fasten these components to the new module.

Top:
Flywheel oriented correctly

Center:
Setting gage

Bottom:
Setting gage applied

Securing the ignition module



Rotate the flywheel to have the magnet poles point to the handle bar. Insert the ignition module into the crankcase; turn in the cylinder head screws and tighten them slightly. The eye of the ground conductor sould be engaged by the screw which passes through the central armature leg. Orient the flywheel such that the area in which the magnets are embedded overlaps the two outer armature legs by one-half each. Now insert the setting gage 1111 890 6400 or a 0.2 mm thick steel strip gage between the magnet poles and the armature legs. Press the ignition module firmly against the flywheel and firmly tighten the cylinder screws beginning with the one which passes through the central armature leg.

Pull out the gage and check the air gap with the feeler gage. The gap should be from 0,2 to 0,3 mm

Check gap with feeler gage

(0.008 to 0.012 in). At the lower, wider armature leg, however, the dimension of 0,2 mm (0.008 in) should be accurately maintained for optimal starting performance.

Replace the rubber grommets in the housing recess, pass the ground conductor and short circuit cable behind the fuel tank vent hose and secure both. For fastening the ground conductor and contact spring, shift the combined lever to CHOKE position.

Finally, re-install the fan shroud, air cleaner, hood and carburetor box cover.

5. STARTER ASSEMBLY

5.1 Construction and operation

The starter assembly is arranged on the starter axle in the fan shroud, directly in front of the magneto flywheel. Its major components are the starter rope with its handle, the rope rotor, the friction shoe and the brake spring. A lock washer keeps these components in their relative positions. The starter rope wound around the rotor by the biasing force of the rewind spring turns the rotor when it is pulled. The friction shoe is embedded in a recess in the rotor. When the starter rope is pulled out the brake lever is turned relatively to the rope rotor by the force exerted by the brake spring. When this happens the beveled edges of the friction shoe plates are positioned against the inside of a plastic ring.

The torque imparted through the starter rope is therefore non-positively transmitted through the flywheel to the crankshaft.

When released, the extended starter rope is automatically rewound on the rotor by the biased rewind spring.

The starter assembly needs practically no maintenance. Only the rope rotor should be lubricated with non-resinous oil at regular intervals.

5.2 Trouble shooting guide

Trouble	Cause	Remedy
Starter rope broken	Too much force applied to rope, or rope drawn over edge instead of straight up	Renew rope
Rewind spring broken	Spring biased too much; has no spare capacity when rope is pulled out all the way	Replace spring
Starter rope pulls out nearly without resistance (crankshaft is not rotated)	Brake plates oiled or worn	Replace brake plates
	Plastic ring worn or broken	Replace plastic ring
Too much force needed for pulling out starter rope; rope rewinds sluggishly	Starter is heavily fouled	Clean complete starter assembly
	Lubricating oil thickens in very cold weather (spring coil is tacky)	Apply some kerosene to rewind spring, then pull rope carefully a few time until it works satisfactorily

5.3 Disassembly

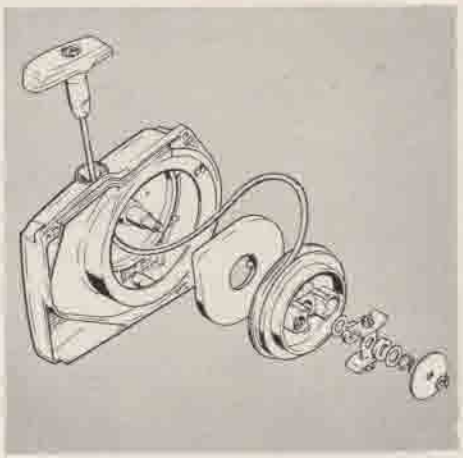
Top:
Unscrewing the fan shroud

Bottom:
Prying off the lock washer

First unscrew the fan shroud together with the starter assembly. Then unload the rewind spring by pulling the starter rope at some length. Lock the rotor by hand and take off two to three turns of the rope. Release the rotor to unload the spring.

The rewind spring is no longer biased if the starter rope is broken. Carefully pry the lock washer from the axle with a screwdriver, locking the contact plate with the other hand to prevent it from popping up and to avoid losing the brake spring.

Starter assembly components



The components of the starter assembly may now be pulled off the starter axle one after the other.

5.4 Replacing the starter rope

Top:
Starter rope fastened in rotor

Bottom:
Special knot in handle recess

Remove the broken rope from the rotor, thread in a new starter rope 4,5 mm (0.18 in) in diam., 1150 mm (45.3 in) long and secure it in the rotor with an overhand knot. Pass the other end of the rope through the rope bushing in the fan shroud and fasten it to the starter handle with a figure-eight knot. Do not wind up the rope.

Apply a few drops of non-resinous oil to the bearing bush of the rope

5.5 Replacing the rewind spring

Top:
Recess in ring rib of rope rotor

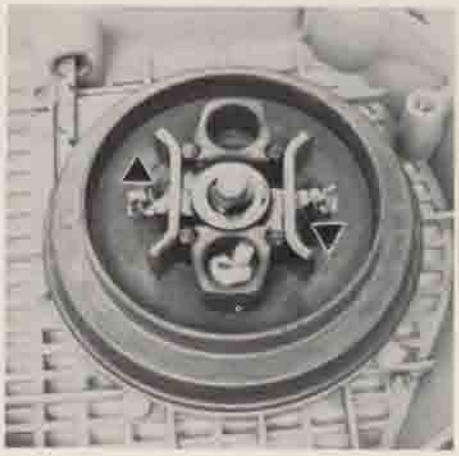
Bottom:
Turning the rope rotor back and forth

rotor, slide the latter on the starter axle and allow the inner eye of the rewind spring to snap into the recess of the ring fin.

Now assemble the remaining components of the starter assembly in the order shown by the illustration.

Be sure to dry up the excess oil scraped off by sliding the rope rotor onto the starter axle.

Friction shoe assembly, mounted correctly



Make sure that the two brake plates are positioned behind and in front of the brake lever and that they are kept free from oil or grease.

The friction shoe assembly is mounted correctly if the noses at the spring retainers of the brake lever point in clockwise direction. Lock the rope rotor with the lock washer and tension the rewind spring.

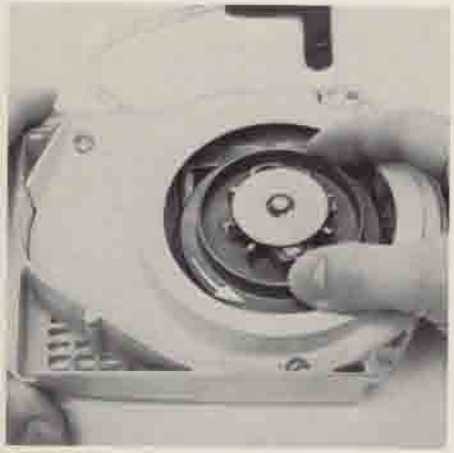
Rewind spring ready for installation

First remove the rope rotor and take the spring housing together with the rewind spring out of the fan shroud. Wet the rewind spring with non-resinous oil and insert it together with the spring housing into the fan shroud, passing the outer spring eye over the cast-on projection of the fan shroud.

If the spring should jump out when trying to insert it, re-install it into the spring housing from outside to inside in counterclockwise direction. Then assemble the rope rotor again.

5.6 Winding up the rewind spring

Coiling the starter rope



Coil up the starter rope by rotating the rotor in counterclockwise direction until the starter handle is spaced about 20 cm (0.8 in) apart from the fan shroud. Form a loop at the end of the hanging-out rope at the rotor and use it to turn the rotor clockwise by three turns. Lock the rotor. Pull out the twisted rope and arrange it neatly.

Release the rope rotor and slacken the rope slowly so that it may run fully onto the rope rotor by the load of the spring.

The rewind spring is tensioned correctly if the starter handle is firmly pulled into the rope guide sleeve and does not tilt away sideways. If it does, tension the spring by another turn.

With the rope fully extended the rope rotor must rotate by at least another half turn until the maximum

Tensioning the rewind spring

spring travel is reached. Otherwise, pull out the starter rope, hold the rope rotor and take off one turn of the rope.

A spring tensioned too heavily is apt to break.

Then re-install the fan shroud.

5.7 Replacing the rope guide sleeve

Removing the segment

If the starter rope is not pulled out straight the rope guide sleeve is stressed excessively during starting and will wear out in the course of time. Then the sleeve will loosen and must be replaced.

To replace an unserviceable sleeve, unscrew the segment and pull the starter rope out of the starter handle and sleeve after untying the knot.

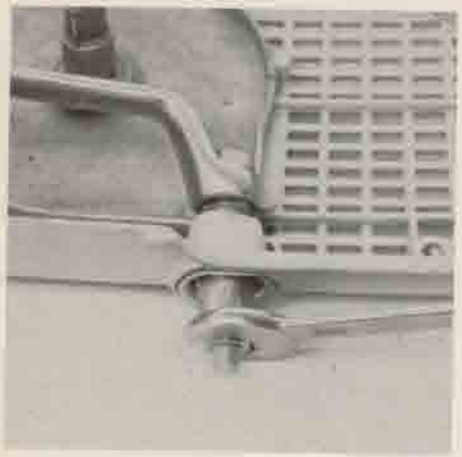
The worn guide sleeve may now be pried out of the fan shroud by means of a screwdriver or a similar, suitable tool. Then install the new sleeve. Pass the threaded end of the special tool 0000 890 2201 through the guide sleeve starting from inside the fan shroud and assemble the thrust piece and the hexagon nut. By tightening the nut the lower end of the guide sleeve is crimped outwardly until the sleeve is firmly seated.

5.8 Replacing the plastic ring

5.9 General servicing

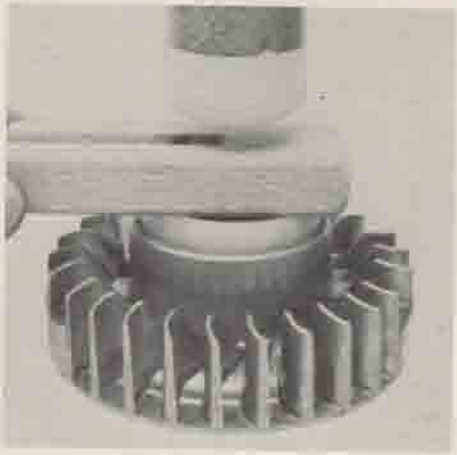
Top:
Special rope guide sleeve assembling tool

Bottom:
Fastening the new rope guide sleeve



Finally, thread in the starter rope again, secure it in the starter handle with the special knot and re-install the segment.

Installing a new plastic ring



The plastic ring forced into the member which surrounds the flywheel is subjected to natural wear. If the serrated surface at the inner periphery of the ring (which provides for a better grip of the friction shoe plates) is worn or if the ring is broken, a new ring must be pressed in place.

First remove the fan shroud and flywheel (4.4.5) and pry out the old ring with a screwdriver. Then press in a new ring carefully or drive it in position with a few light blows of a hammer. When doing this, put the flywheel on a flat wooden surface.

Be sure that the assembly is oriented correctly.

If much effort is needed for pulling out the starter rope and if it moves back in very sluggishly or incompletely the starter assembly may be heavily fouled rather than being unserviceable mechanically. At work sites exposed to extreme cold the oil on the rewind spring may have thickened; then the spring turns may stick together and in this way impede the operation of the starter assembly. In such instances a few drops of kerosene applied to the rewind spring will do the job.

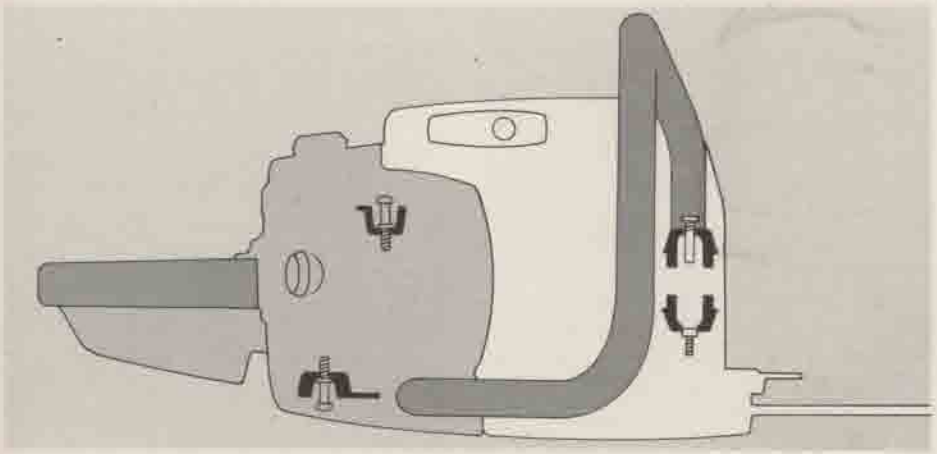
Pull out the starter rope carefully until it moves satisfactorily. If a starter assembly is fouled or gummed the whole assembly — including the rewind spring — must be removed. Be careful when taking out the spring. Wash all components in kerosene or clean petrol.

Apply some oil to the rewind spring and the axle, but make sure that no oil can reach the brake plates.

6. THE AV HANDLE SYSTEM

6.1 Construction and operation

Arrangement of vibration dampers



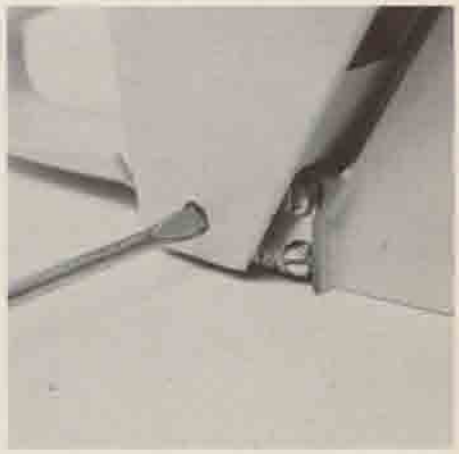
The purpose of the AV handle system consists in damping all vibration generated by the engine and cutter assembly to the attainable minimum. Besides the actual power unit (including the starter, ignition system, chain drive and chain brake), all other parts are connected to the AV system. Due to the compact construction of this power saw in which the grip, handle bar, carburetor and air cleaner and the fuel and chain lubrication oil tank are arranged at and in the tank case, respectively, vibration is damped only between the crankcase and the tank case.

The joints between the crank and tank cases have a total of four vibration dampers which are arranged as follows:

Two dampers act midway on the extension of the tank case on the front end of the saw, whilst one damper lies on the lower right and another on the upper left in the rear. The vibration dampers, therefore, are those parts of the power tool that dissipate its vibration; they are subjected to high mechanical stress. For satisfactory operation of the AV system it is therefore absolutely necessary that all vibration dampers be in perfect condition at all times. Proper tightening of the collar and the mounting screws and bolts is therefore essential.

6.2 Repair

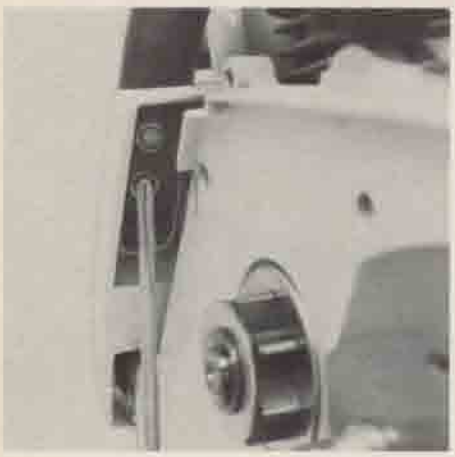
Top and bottom:
Loosening the vibration dampers



Damaged vibration dampers must always be replaced by new ones.

To replace both rear elements, remove the hood and carburetor box cover, the collar screw and the two M 5 x 12 flat-head screws. The vibration damper can then be removed. Install the new vibration dampers with the buffer ring oriented toward the inside of the machine and tighten them. Then register the

Removing the handle bar from the tank case



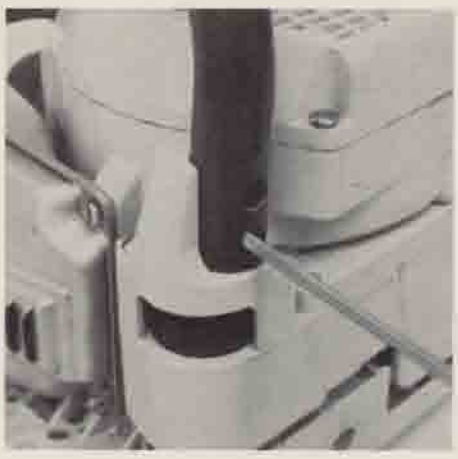
bores in the rubber buffer with those in the tank case, install the collar screw and tighten it firmly.

To replace the front-end vibration dampers (the buffer rings), remove both collar screws of the rearward vibration damping assembly.

Also remove the handle bar together with its holder. For this purpose remove 2 cylinder head screws M 5x20 each by which the handle bar is secured to the tank case at the bumper end and to the handle bar holder at the ignition end. Then remove the handle bar holder secured by 2 flat head screws M 5x35, too. Now the handle bar holder and the handle bar can be removed one after the other. Turn out the collar screw which receives the ignition-end buffer ring. The bumper-end buffer is located by a 3,5 mm (0.14 in) high screw

Top:
Removing the handle bar from its holder

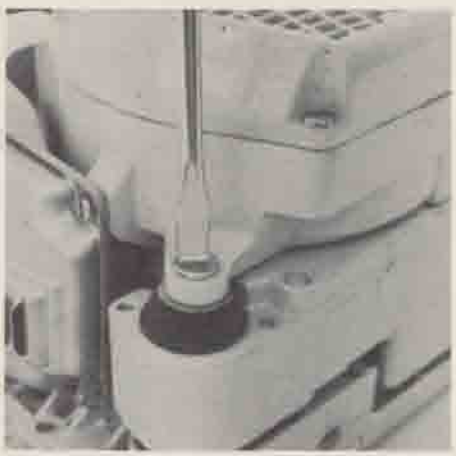
Bottom:
Unscrewing the handle bar holder

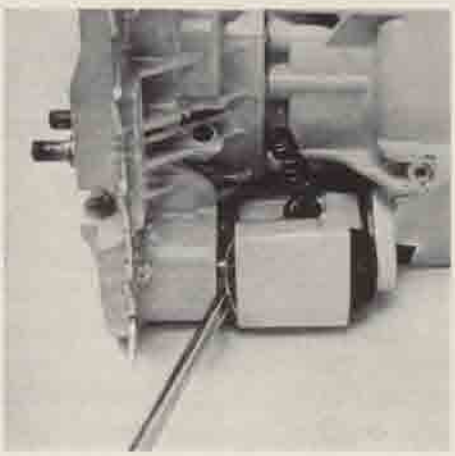


head. To expose this screw head, slide a screwdriver between the crankcase and the buffer ring and compress the latter by an amount corresponding to the height of the screw head. The tank case extension together with the buffer ring may now be swung out of the recess of the crankcase in downward direction. The buffer rings can then be pried out of the centering of the tank case by means of a screwdriver.

Top:
Removing the collar screw

Bottom:
Compressing the buffer ring





Install the new buffer rings in reversed order. Check if the oil suction and impulse hoses are still seated on their connections.

7. SINGLE-HAND CONTROL

7.1 Construction and operation

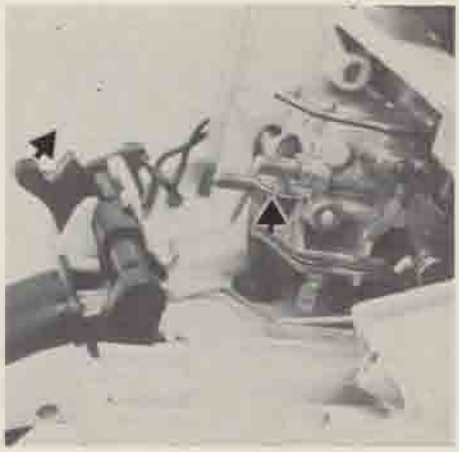
The primary component of the single-hand control assembly is a control shaft with an integral combination control lever and two cams. The control shaft is arranged in an extension of the grip in the tank case and is supported at three points. The combination control lever actuates through the control shaft the position of the control members.

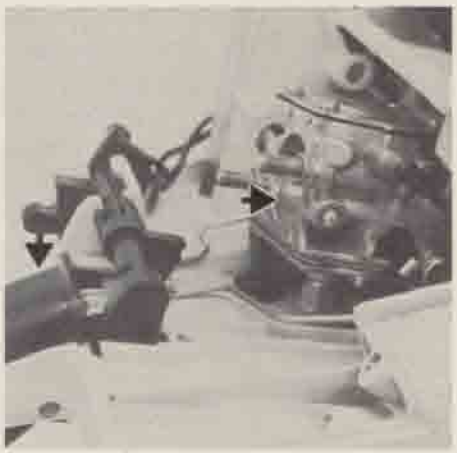
The combination control lever sets the operational modes of START (half throttle, with choke opened), CHOKE (half throttle, with choke closed) and STOP (short-circuit contact closed).

The exterior cam receives the contact sleeve of the short-circuit cable and at the same time forms a stop for the contact spring. In STOP position the contact sleeve touches the contact spring. The cam on the right-hand half of the control shaft actuates the throttle linkage for the half-throttle position in the START and CHOKE modes. The grooves in the goosenecked portion of the throttle linkage serve as notches for the intermediate positions between START and CHOKE. The actuating lever for the choke linkage is separately arranged on the control shaft with a certain play in the drive unit. The amount of this play is rated such that the actuating lever is driven by the control shaft only when the

Top:
Combination control in START position

Bottom:
Combination control in CHOKE position

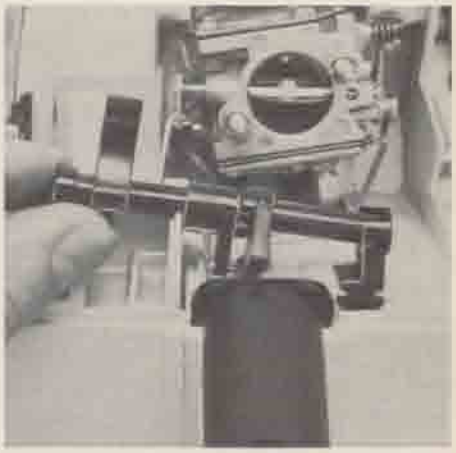




combination control lever is moved beyond its START position in the direction of CHOKE.

7.2 Removal and installation

Lifting out the control shaft



First remove the carburetor box cover and the air cleaner. Pull the short-circuit cable out of the control cam. Move the combination control lever beyond its STOP position until the flat surfaces on the control shaft are vertical. Then lift the control shaft out of its bearings on the tank case and unhook the starter linkage from the actuating lever.

If the actuating lever is to be replaced, shift it somewhat to the left on the conrol shaft and rotate it so that the flat surfaces on the control shaft approach the recess in the actuating lever hub. Then the actuating lever can be taken off.

To re-install the control shaft, proceed exactly in reversed sequence.

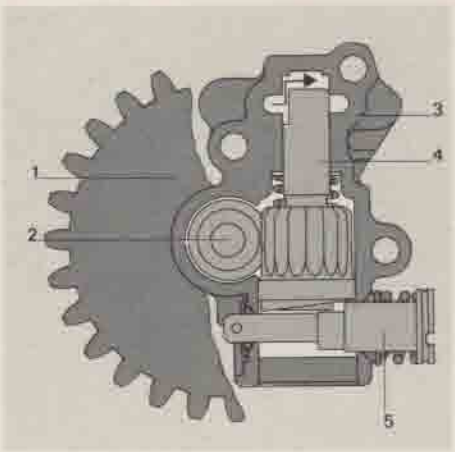
9. OIL PUMP

9.1 Construction and operation

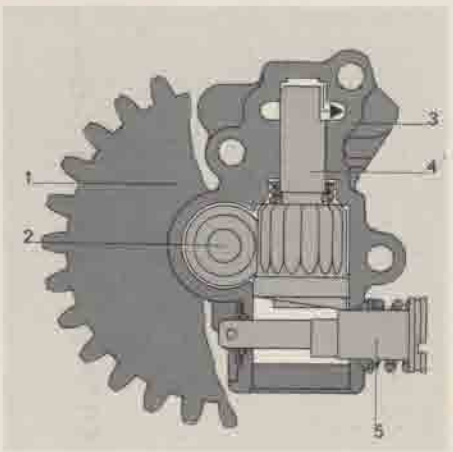
Schematic view of the oil pump:

1 = spur gear
2 = worm
3 = pump housing
4 = pump piston
5 = regulating pin

Suction



Pressure



The oil pump is arranged in the bumper-end crankcase half. It serves the purpose of delivering the chain lubricating oil from the lub oil tank to the cutter assembly.

The oil pump is driven by the clutch drum across two spur gears. The driving gear has the form of a rim and sits loosely on the hub of the clutch drum. It froms a non-positive power transmitting assembly with the clutch drum by the assembled sprocket through an integral star contour. The driven spur gear is supported on an axle in the pump housing; the hub has the configuration of a singlethread worm which finally drives the pump piston at a total transmission ratio of ≈ 29. This means that the pump piston performs one revolution after about 29 sprocket revolutions.

The suction and pressure effects of the pump piston are obtained in such way that the piston performs a reciprocating motion together with its rotary motion. For this purpose the crown of the piston has an oblique control plane which is permanently biased by a spring against the regulating pin. When the piston rotates it is imparted a reciprocating motion the travel of which is determined by the position of the eccentric on the pin.

During the suction stage the piston moves into its rearmost position and generates a vacuum on the suction end, whereby oil is taken from the oil tank into the pump housing. An oil pocket at the foot of the pump piston receives the oil at the suction port and delivers it to the outlet port; the oil is compressed by the forward stroke of the piston and delivered to the cutter assembly through an outlet port and a pipe.

The rate of delivery of the oil is commensurate with the speed of the saw chain; this means that only the volume of oil needed for the respective engine speed is delivered. The rate of oil delivery may be varied, too, depending on the length of cut, the type of material to be cut etc. In order to protect the cutter assembly from unnecessary wear, the minimum rate of delivery should be used only in exceptional cases (for extremely thin wood etc.).

Turning the regulating pin clockwise up to stop will set the maximum rate, whilst turning it oppositely all the way will result in minimum delivery. By depressing the regulating pin and continuing to turn it in counterclockwise direction the pump is shut off mechanically for zero delivery.

To prevent any dirt contained in the lubricating oil from entering the oil pump, the oil is filtered by a suction head in the oil tank.

9.2 Trouble shooting guide

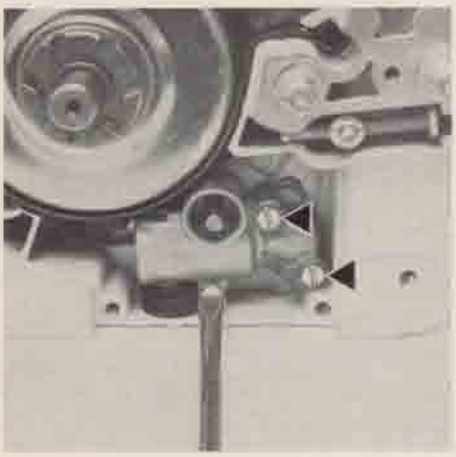
In a defective chain lubricating system, first correct any other potential faults before removing the oil pump.

Trouble	Cause	Remedy
No oil delivered to saw chain	Lub. oil tank is empty	Refill tank
	Oil inlet port in guide bar is clogged	Clean oil inlet port
	Suction line or suction head (strainer) is clogged or suction line is broken	Wash suction line and suction head strainer in clean petrol and blow dry with compressed air. Replace if necessary
	Tank vent in tank case clogged	Clean tank vent
	Spur gears or worm flanks worn	Install new spur gears
Saw loses chain oil	Cylinder bore in pump housing is worn out	Replace pump housing
Oil pump does not deliver enough oil (despite max. delivery setting)	Cylinder bore in pump housing is worn out	Replace pump housing

If the suction hose or suction head is to be cleaned or replaced, first drain the oil tank and remove the muffler. Then pull the suction hose off the elbow connector, pry the rim of the suction house out of the bore in the tank with a screwdriver and pull it out together with the suction head. Then pull off the hose from the connector and tilt the strainer out of the suction head by side pressure. Re-install the cleaned or renewed components in reversed order, seeing that the rim of the suction head is not damaged when forcing it in.

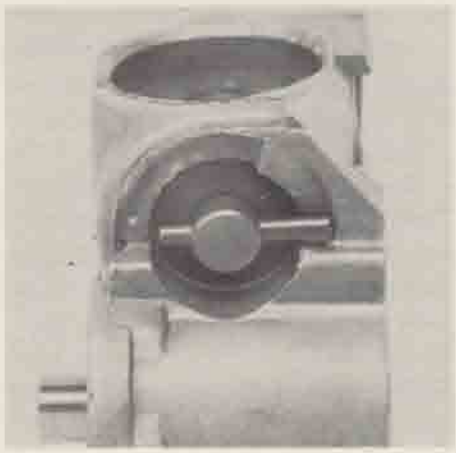
9.3 Removal and repair

Unscrewing the oil pump



Top:
Removing the plug

Bottom:
Setting the regulating pin for zero delivery



Depressing the regulating pin; removing the pin stop

Upon correction of any other possible causes of defect in the chain lubricating system, look for the cause of trouble in the oil pump.

To remove the oil pump, first remove the cutter assembly, chain sprocket, side plate and cover and drain the oil tank. After turning off the spur gear and removing the 3 cylinder head screws M 4×25 by which the oil pump is fastened the latter may be removed from the crankcase recess together with the gasket. Trip the chain brake for this purpose to allow the head of the regulating pin to extend.

When disassembling the oil pump, remove the regulating pin first. This is spring-biased and is held by the pin stop. To remove the pin stop, take out the plug, set the regulating pin to zero delivery and depress it using a pair of water pump pliers or a vise. Now the pin stop and the regulating pin can be pulled out. Loosen the pump piston from the housing by slightly knocking the pump housing on a soft support.

Before reassembly, wash all serviceable components in clean petrol. Slide the coil spring and washer onto the stem of the pump piston, wet them wih oil and slide them together into the pump housing. Then re-insert the regulating pin and push in the pump piston at the same time. Set the regulating pin to zero delivery again (wih the crest of the cam oriented toward the piston) and re-install the pin stop.

Finally, fill both chambers (in the worm axle and regulating pin region) with grease K-LP 2k complying with DIN 51502, Part No. 0781 120 1109, and re-install the plug.

The oil pump assembly may now screwed into the crankcase with the gasket in position and the rubber ring attached. Finish up by installing the cover and the chain sprocket.

10. FUEL SYSTEM

10.1 Construction and operation of carburetor

The major components of the carburetor specially designed for use in power saws are the pump body and the carburetor body. The fuel pump, a unit completely isolated from and independent of the carburetor, is integrated with the latter.

10.1.1 Operation of the fuel pump

Each reversal of the piston stroke in the pump results in a change in pressure in the crankcase. A vacuum prevails during the upstroke of the piston while pressure builds up during the downstroke. This is used for actuating the fuel pump. The space under the pump diaphragm (the impulse chamber) is in connection with the crank space by the impulse port. The pressure and vacuum cycles, respectively, act directly on the pump diaphragm and cause it to vibrate in time with the piston strokes. Control is effected by two valves punched out of the pump diaphragm and connected to the latter at one side.

The pump diaphragm is pulled into the diaphragm chamber by the vacuum generated during the upstroke of the engine piston. This increases the volume of the pump chamber and generates a vacuum. When the inlet valve opens the higher atmospheric pressure forces fuel out of the tank into the pump chamber and the outlet valve against its support.

The pressure conditions change with the upstroke of the engine piston. Pressure builds up in the crank and diaphragm spaces, which forces the pump diaphragm against the pump chamber and thereby against the fuel volume. The inlet valve is forced against its support by pressure while the outlet valve lifts and releases the fuel on its way to the needle valve of the carburetor.

10.1.2 Operation of the carburetor

The needle valve and thereby the fuel supply to the carburetor is opened and closed as controlled by the metering diaphragm. The diaphragm is at rest when the atmospheric pressure is equal to the pressure in the diaphragm chamber (the space above the diaphragm communicates with the atmosphere).

The tapered portion of the inlet needle is biased by spring force against the valve seat.

When the engine is running the diaphragm chamber is filled with fuel. During intake a vacuum is formed in the venturi. Fuel is sucked off because the venturi connects to the diaphragm chamber through the orifices. This also creates a vacuum in the diaphragm chamber, and the atmospheric pressure forces the diaphragm down.

The force generated by the pressure differential times the diaphragm area acts on the fuel inlet control arm, overcomes the biasing force of the spring and lifts the inlet needle off its seat. Fuel can now flow from the pump chamber into the diaphragm chamber. When the metering chamber is under atmospheric pressure again the needle valve closes. In actual operation, however, the needle valve does not open and close alternatingly; it rather adjusts itself to the operational state of the engine to an intermediate level, so that the needle valve remains open more or less, depending on the control exerted by the diaphragm.

The rate of fuel taken into the venturi depends on the height of the prevailing vacuum; the vacuum in turn is influenced by the choke and throttle shutters. To adapt the carburetor to prevailing operating conditions the fuel metering to the idle and main adjustment orifices can be set by means of adjustment screws.

Top:
Starting operation

Bottom:
Idling operation

1 — Impulse nipple
2 — Fuel inlet open
3 — Fuel intake connection
4 — Choke shutter
5 — Valve port
6 — Main adjustment screw
7 — Fuel pump diaphragm
8 — Outlet valve, closed

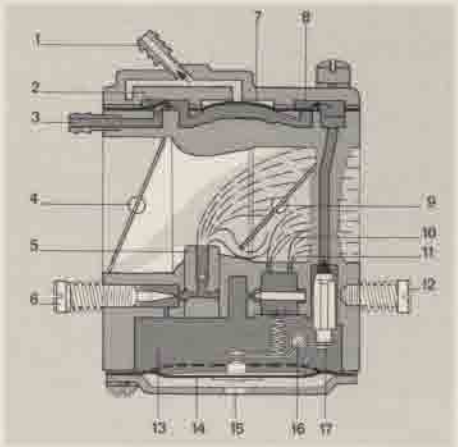
Top:
Change form idle to intermediate or high speed operation

Bottom:
Full throttle position

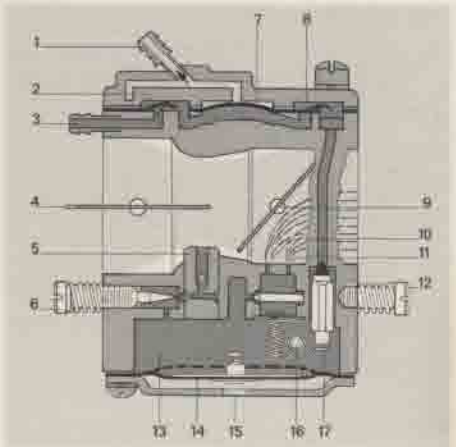
9 — Throttle shutter
10 — Secondary idle discharge port
11 — Primary idle discharge port
12 — Idle adjustment screw
13 — Diaphragm chamber
14 — Diaphragm
15 — Atmospheric vent hole
16 — Inlet control lever
17 — Inlet needle

(Both adjustment screws are shown 90° offset)

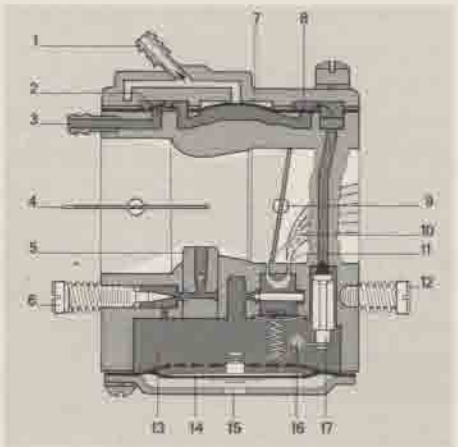
For better a understanding of the principle by which the carburetor works the following four operational states should be given a closer look:



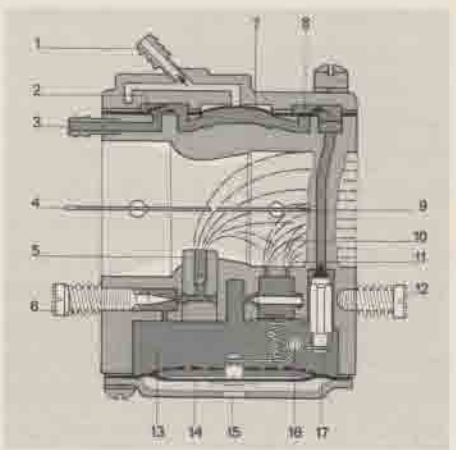
1. In the **starting operation** the choke is closed and the throttle shutter is partially opened. During intake, a high vacuum is generated in the intake because the atmospheric air flow is heavily restricted by the closed choke. A relatively large proportion of fuel is drawn in through all orifices to form the rich mixture necessary for the starting operation. As the engine is pulled through, the choke should be closed at once because the rich air-fuel mixture would drown the engine immediately after starting.



2. In the **idling operation** only little fuel is needed. The choke is fully opened while the throttle shutter is nearly closed. The vacuum acts on the **primary idle discharge port** only. Because of the difference in pressure between the venturi and the intake behind the throttle shutter, "wrong" air would enter the diaphragm chamber through the main orifice, the air-fuel mixture would become too lean and the engine would stop. This condition is prevented by a small plate which closes the main orifice when there is no vacuum in the venturi.



3. If the throttle shutter is now opened further, a sufficient quantity of fuel must be taken along with the larger rate of air which suddenly streams in during the **transition** from idling to intermediate or even high speed operation. This is effected through the **secondary idle discharge port** which is now influenced by the vacuum, too. In this way the required enrichment of the air-fuel mixture is obtained for a mixture which can be ignited.



4. When the throttle shutter opens still farther the **main orifice** at the narrowest spot of the ventury begins to operate. The fuel needed for **full speed** operation is now taken in from this orifice.

10.2 Trouble shooting guide

Trouble	Cause	Remedy
Carburetor flooded; engine "drowns"	Inlet needle does not seal. Foreign material in valve seat or seat cone damaged	Remove inlet needle; clean or replace
	Coil spring does not rest on ball-shaped portion of inlet control lever	Remove inlet control lever and re-install properly
	Perforated plate at diaphragm is deformed and presses the inlet control lever permanently	Replace diaphragm
	Inlet control lever too high (relative to installed position)	Make inlet control lever flush with upper edge of plate
Engine does not accelerate properly	Idle fuel adjustment orifice set too "lean"	Turn out idle adjustment screw somewhat (refer to "Carburetor Adjustment")
	Inlet control lever too low (relative to installed position)	Make inlet control lever flush with upper edge of plate
	Clogged atmospheric vent hole	Clean hole
	Diaphragm gasket leaks	Replace gasket
	Damaged diaphragm	Replace diaphragm
Engine does not change to idle	Throttle shutter opened too wide by idle adjustment screw	Re-adjust idle adjustment screw

Trouble	Cause	Remedy
Engine stops at idling speed	Idle orifices or channels clogged	Clean orifices and blow through with compressed air
	Idle adjustment too rich	Turn in idle adjustment screw somewhat (refer to "Carburetor Adjustment")
	Idle screw maladjusted — throttle shutter fully closed	Correct idle screw adjustment
Engine speed markedly drops under load — engine does not develop its full power	Clooged air cleaner	Clean air cleaner
	Defective tank vent	Clean tank vent or replace
	Fuel line from tank to fuel pump leaks	Seal connections and line; replace if necessary
	Damaged pump diaphragm	Replace pump diaphragm
	Main orifices bores or channels clogged	Clean orifices and channels
	Chlogged fuel strainers	Clean fuel strainers

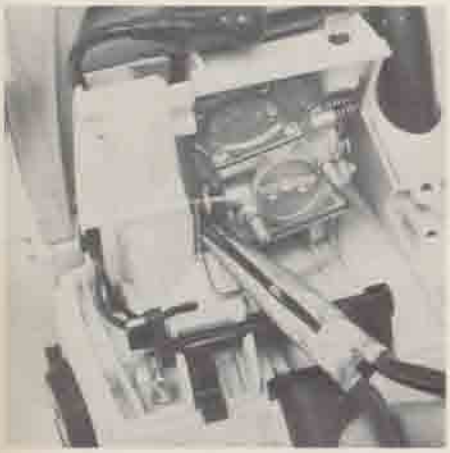
Also refer to No. 3.2, page 14

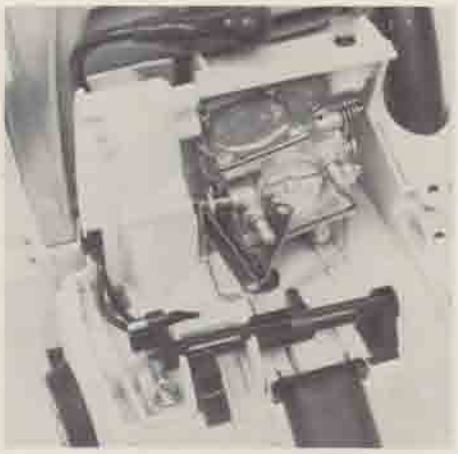
10.3 Pressure test for carburetor leakage

Top:
Fuel line on elbow connector

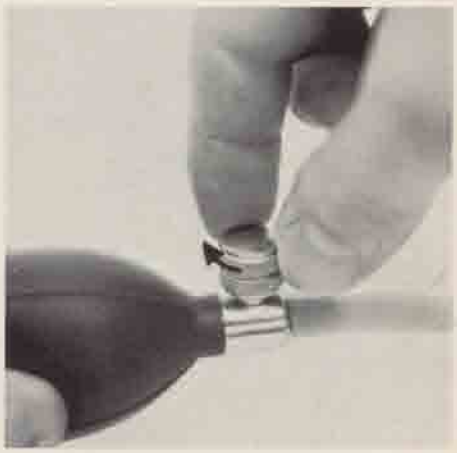
Bottom:
Pressure testing the carburetor

Pulling the fuel line off the elbow





Closing the vent screw



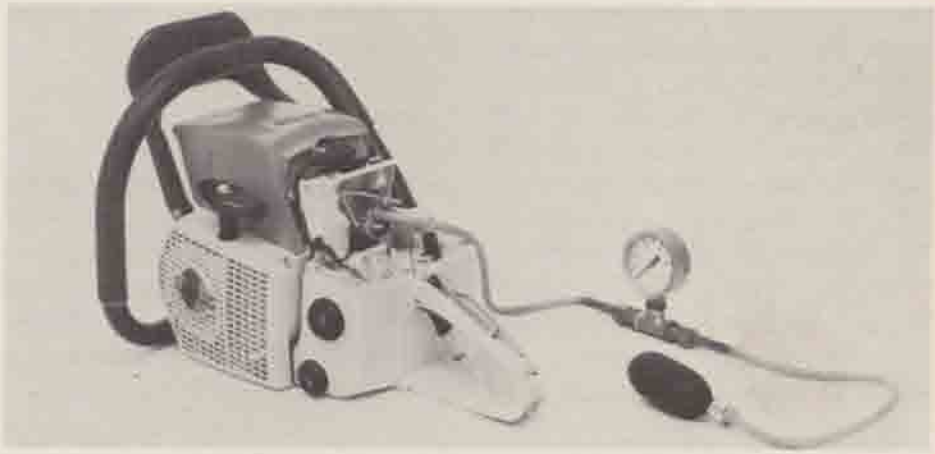
A carburetor may be tested for leaks by means of the carburetor and crankcase tester 1106 850 2900.

First remove the carburetor box cover and air cleaner and pull the fuel line off the elbow. Since the inside diameter of the test hose is larger than the outside diameter of the elbow connector it cannot be coupled directly.

A fuel line 1110 141 8600 should be used as an adaptor. Slide it on the elbow connector by one end and into the pressure hose of the tester by the other.

Now close the vent screw at the bulb and pump air into the carburetor until the gauge shows a reading of 0,4 to 0,5 bar (5.8 to 7.5 lbf/in^2).

The carburetor does not leak if this pressure is maintained for a length of time. If the pressure drops this may be due to any of two causes:



1. The inlet needle does not seal (foreign particles in the seat or taper of the inlet needle).

2. The diaphragm is damaged.

In either instance the carburetor must be removed and repaired.

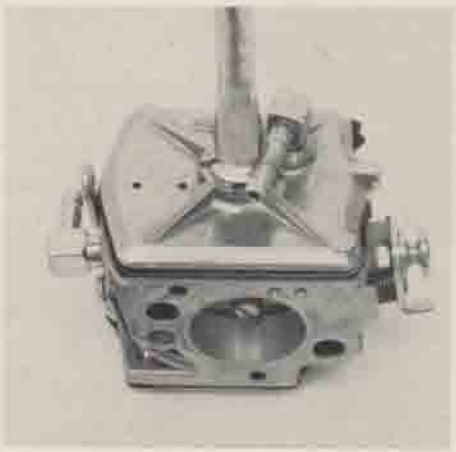
10.4 Removing the carburetor

Removing the carburetor

First remove the carburetor box cover, air cleaner and control shaft (7.2). Then unscrew the grip shell. Unhook the accelerator linkage from the throttle lever and then from the lever of the throttle shutter axle. Finally pull the fuel line off the elbow connector of the carburetor. Remove the two hex. nuts M 5 by which the carburetor is held on the studs. Upon unhooking the starter linkage the carburetor may be pulled off the studs; at the same time remove the impulse hose from the elbow connector of the carburetor with a screwdriver.

10.5 Repairing the carburetor

Loosening the pump-end cover

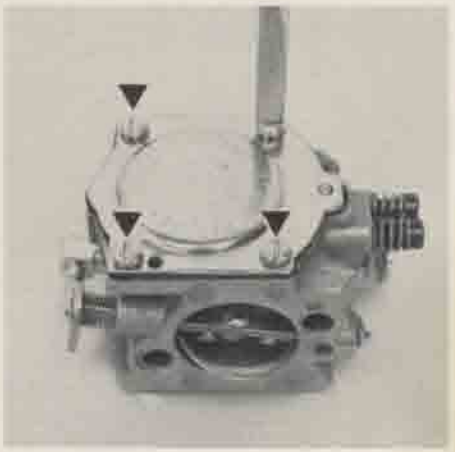


Whenever repairing a carburetor, also check the fuel pump.

After removing the pump-end cover fastened by an oval-head screw M 5x14, the gasket, fuel pump diaphragm and diaphragm plate can be removed in this order. Often the cover, gasket and diaphragm stick together and have to be separated carefully from one another. If the fuel strainers on the pump end of the carburetor are fouled, remove them with a screwdriver and wash them in clean petrol. A damaged fuel strainer must be replaced under all circumstances.

To disassemble the carburetor section, first remove the carburetor-end cover. Then take off the main diaphragm and its gaskert. Move the main diaphragm into the direction of the adjustment screws in order to unhook the journal on the

Loosening the pump-end cover



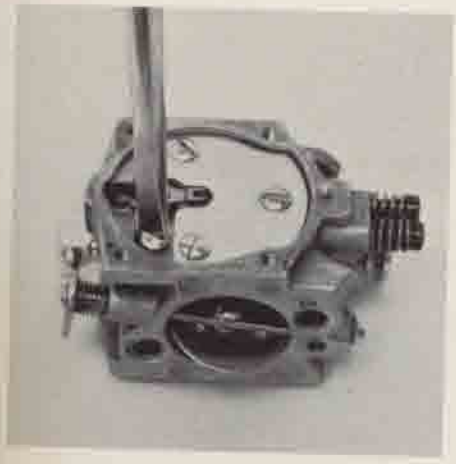
perforated plate from the inlet control lever. Here, too, the diaphragm and diaphragm gasket often stick together and should be separated very carefully.

The diaphragms are the touchiest components of a carburetor. Because of load cycling, the material of the diaphragms show fatigue after prolonged operation; the diaphragms will bulge and must be replaced.

The inlet needle valve is arranged in a recess of the main diaphragm chamber. After removal of the oval head screw M 3x6 the inlet control lever with its axle, the coil spring and the inlet needle may be taken out.

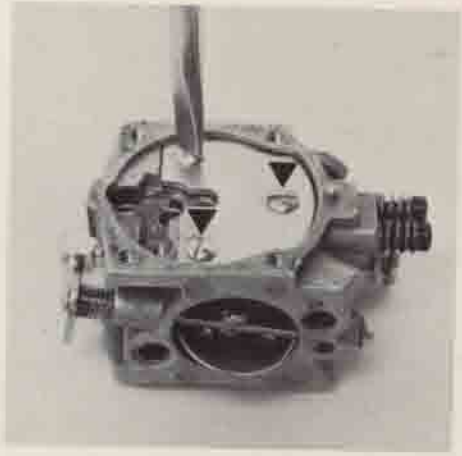
Top:
Removing the inlet needle valve

Bottom:
Circular depression in inlet needle

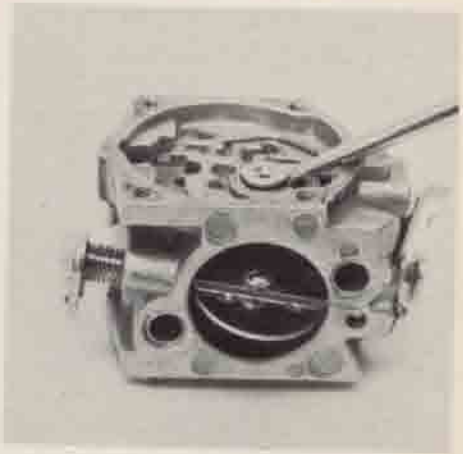


Top:
Removing the plate

Bottom:
Pushing through the orifice



Prying out the orifice



If there is a circular depression in the taper of the inlet needle, the needle must be replaced because proper sealing will no longer be ensured. This defect shows by permanent flooding of the carburetor.

A special feature of this carburetor type is the unrestricted accessibility of all channels and orifices after removal of the plate and gasket. If the little plastic plate in the main orifice cannot move freely, push the orifice outward from the ventury side with a screwdriver, place two small screwdrivers under the collar and pry out the orifice completely. Replace this orifice by a new one.

Wash the carburetor body and all serviceable parts in clean petrol (do not use premium) and blow them dry with compressed air (especially the channels and ports). The two adjustment screws must be turned out before, of course.

When installing a valve orifice make sure that it is fitted with an undamaged O-ring. Replace the gasket and plate and tighten the screws.

Then insert the inlet needle and place the coil spring into the bore. Insert the axle into the bore of the inlet control lever, pick up the ring groove with the short fork and turn in the oval-head screw. Be sure that the coil spring receives the ball-shaped extension of the lever. Finally check the inlet control lever for unrestricted mobility.

10.6 Adjusting the carburetor

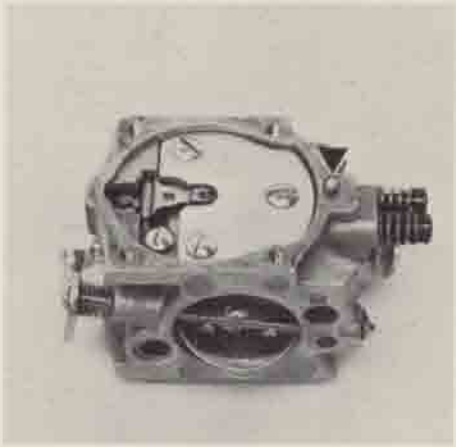
Now place the carburetor-end gasket and main diaphragm on the body in such way that the integrated locator pin enters the locating bores in the respective lugs. Also make sure that the ring groove in the pin of the perforated plate receives the clevis of the inlet control lever. Attach and secure the cover.

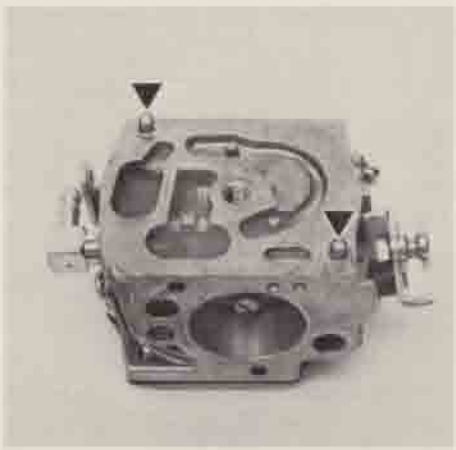
On the pump end, insert the fuel strainers. Attach the pump diaphragm, the gasket and the cover and tighten the screws. Observe the correct position: the integrated locator pins must engage with the respective locator holes. Finally replace the adjusting screws and test the carburetor for leakage again before installing it.

Install the carburetor in reversed sequence. The elbow connector will slide by itself into the impulse hose when the carburetor is pushed in place. Make sure that the throttle control clevis and the leg spring are positioned correctly.

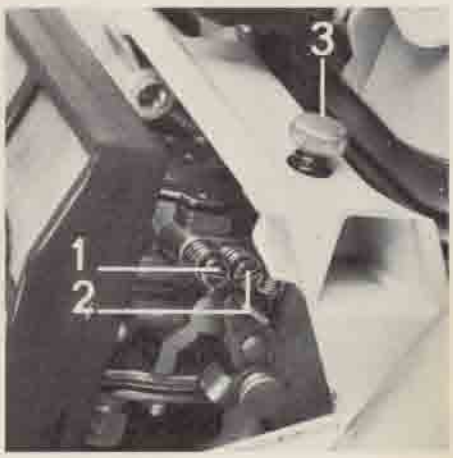
Top and centre:
Locator pins on carburetor body

Bottom:
Locator holes in cover





Carburetor adjustment screws:
1 — Main adjustment screw
2 — Idle adjustment screw
3 — Idle stop screw



The carburetor is factory-adjusted for local air pressure conditions and will render optimal engine performance at minimal fuel consumption.

If the power saw is to be used in high altitudes or at sea level, the carburetor must be re-adjusted by the two carburetor adjustment screws and the idle stop screw.

For basic adjustment from which the carburetor is finally adjusted, cautiously turn in both adjustment screws all the way. Then set the carburetor as follows:

Main adjustment screw H:
Open by 1 turn

Idle adjustment screw L:
Open by 1 turn

Do not mix up the adjustment screws.

10.7 Fuel line and tank vent

Adjust the carburetor on a hot engine and with a clean air cleaner only.

Hints for final carburetor adjustment

Engine stops when idling:
With the engine running, turn the idle stop screw clockwise by a slight amount. The saw chain must not run at this time.

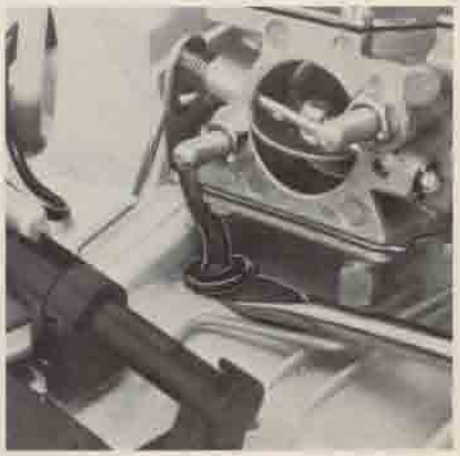
Chain runs while engine idles:
Turn the idle stop screw counterclockwise by a slight amount.

Idle speed goes up and down:
Set the idle adjustment screw. Rotate it clockwise for a lean air-fuel mixture or counterclockwise for a richer mixture.

Observe:
Even a slight amount of rotation of the adjustment screws results in a noticeable variation of the engine running characteristics.

Removing the cap

Prying out the hose



The diaphragm pump sucks the fuel from the tank and delivers it to the carburetor. Foreign particles which may enter the tank with the fuel are kept back by the suction head (filter and strainer). The fine wire mesh in the suction head and the minute pores of the filter will be closed by dirt particles in the course of time.

This narrows the suction cross sectional area with the result that not enough fuel is delivered.

Always clean the suction head first when trouble occurs in the fuel system. Remove the suction head from the tank through its filler neck and pull it off its hose. Remove the cap and take out the filter, strainer and insert from the suction head. Clean all these components. Avoid damaging the strainer mesh.

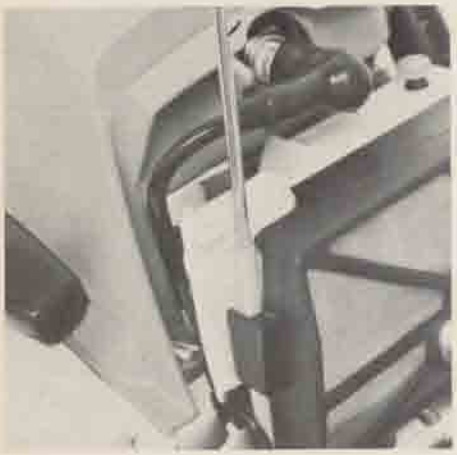
It is not worth your while to clean the filter element. Replace it by a new one. Then assemble all components in reversed sequence. Clean the fuel tank on this occasion, too, by rinsing it with clean petrol.

If the hose is to be replaced remove the air cleaner first. With a screwdriver pry the rim of the hose out of the bore in the tank case and pull out the hose. Pull off the suction head before doing this. Install the new hose in reversed order, making sure that the rim of the suction head is not damaged when pushing in the hose.

For satisfactory performance of the carburetor the pressure between the inside of the fuel tank and the atmospheric pressure must be equal. This is attained by an intact tank vent. The vent canal is formed by the cross sectional area of the spaces around the thread of the stud in the vent hose.

10.8 Air cleaner

Turning out the stud



If trouble occurs on the carburetor or other parts of the fuel system, always check and clean the tank vent, too. If the thread has cut deeply into the hose, replace the tank vent hose.

Top:
Combination control lever in CHOKE position

Bottom:
Removing the carburetor box cover

An air cleaner is designed to retain all foreign particles taken in with the combustion air and thereby to reduce wear on the power unit components.

A clogged air cleaner reduces the power developed by the engine, increases fuel consumption and makes starting difficult.

Before removing the air cleaner, clean it and its surrounding parts

Loosening the slotted screw

from coarse dirt etc. Close the choke by setting the combination control lever to CHOKE to keep dirt out of the carburetor.

Remove the carburetor box cover by turning the lock counterclockwise. Then remove the two slotted nuts in the air cleaner. The two air cleaner halves may now be pulled off the studs — **one after the other.** Wash both halves in clean petrol and blow them dry with compressed air.

If the wire strainer is damaged the respective component must be replaced under all circumstances. Any dirt which enters the engine will destroy it.

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