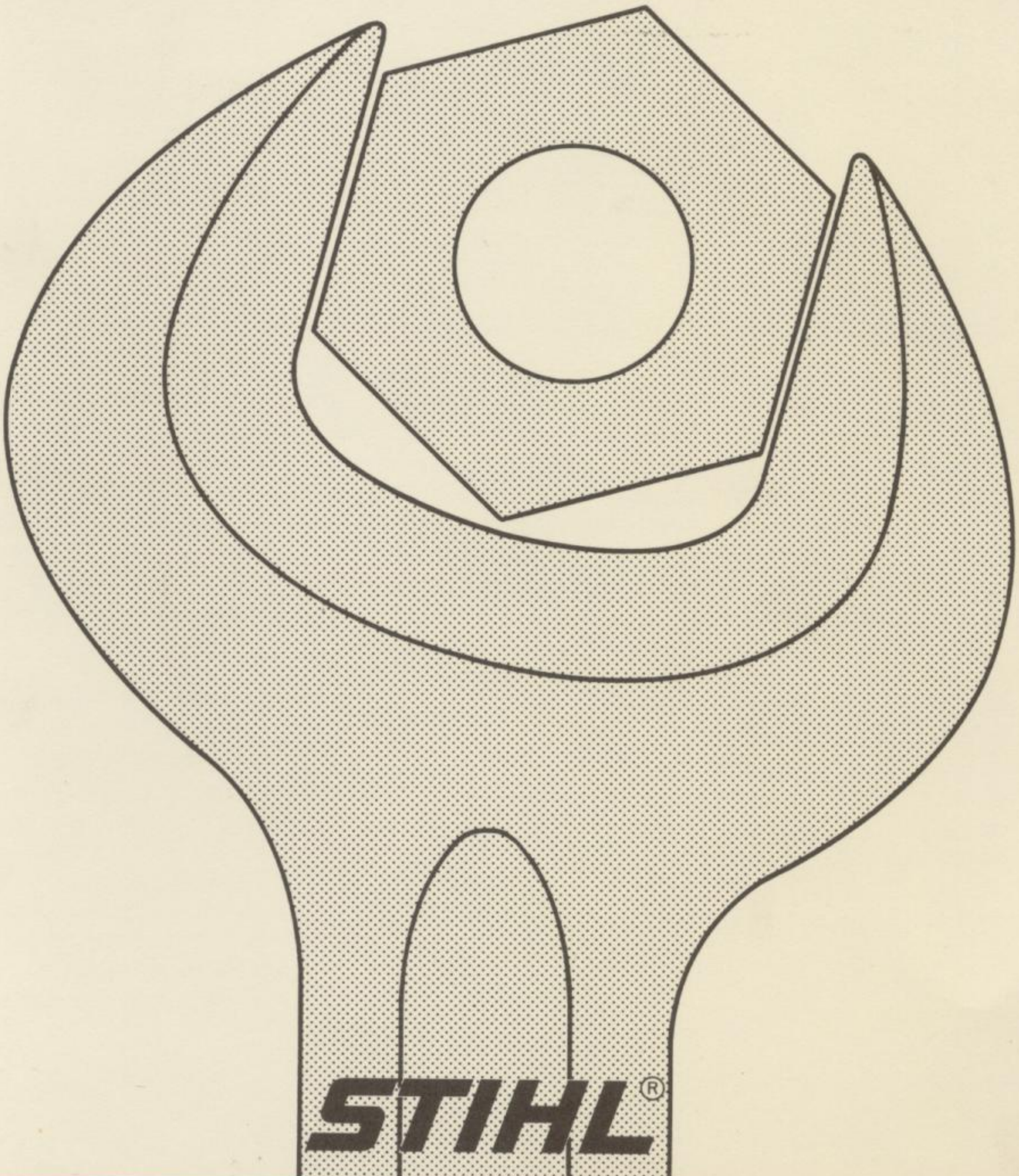
STIHL 051, 076



SERVICE MANUAL
050 AV, 051 AV, 051 AV electronic,
075 AV electronic,
076 AV electronic

SPECIAL TOOL MANUAL

FOREWORD

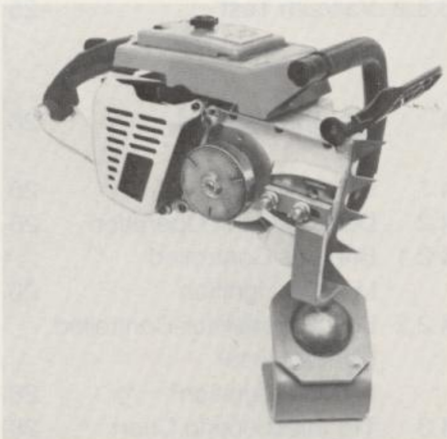
This Service Manual covers model 050, 051 and 075 chain saws up to machine number 5 277 720 as well as later machines unless technical information bulletins have been issued in the meantime with updated repair procedures.

With the exception of the rewind starter and the ignition system, the new 076 and the 075 are identical. The relevant engineering changes are outlined in technical information bulletin number 27.80.

In the event of faults it is quite possible that a single fault may have several causes. It is therefore advisable to contsult the "Troubleshooting 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.

Repair work is made considerably easier if the chain saw is mounted on assembly stand 5910 850 3100. The saw is easily attached to the stand by means of the two bar mounting studs and collar nuts.



While on the assembly stand the chain saw can be swivelled into any required position within a cartain range to suit the repair in question. This not only has the advantage of keeping the component in the best position for the repair but also leaves both hands free for the work and thus effects a considerable time saving.

Our special tool manual illustrates and lists the part numbers of all available machine-related tools as well as general purpose tools for all machines.

The special tool manual is available in various languages and can be ordered by quoting the appropriate part number listed hereunder.

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

STIHL®

CONTENTS

1. SPECIFICATIONS 051 AV (050 AV), 075 AV, 076 AV

1.1 Engine

STIHL single cylinder two-stroke engine with specially processed cylinder bore

Displacement:	051: 89 cm^3 075; 076: 111 cm^3
Cylinder bore:	051: 52 mm 075; 076: 58 mm
Stroke:	42 mm
Compression ratio:	9.5:1
Power output:	051: 4.3 kW (5.8 DIN HP) at 7000 rpm 075; 076: 5.15 kW (7.0 DIN HP) at 7000 rpm
Max. torque:	051: 5.9 Nm (0.6 kpm) at 5000 rpm 075; 076: 6.8 Nm (0.7 kpm) at 5000 rpm
Max. permissible engine speed:	10000 rpm
Mean idle speed:	2000 rpm
Crankshaft:	two-part drop forging
Crankshaft bearings:	2 deep-groove ball bearings
Crankpin:	18.0 mm dia.
Big-end bearing:	Needle cage
Piston pin:	13.0 mm dia.
Small-end bearing:	Needle cage
Rewind starter:	Friction shoe system with automatic starter rope rewind mechanism
Starter rope:	4.5 mm dia., 1000 mm long

Clutch:
Centrifugal clutch with press-fitted linings, 86 mm dia.

Clutch engages at:	approx. 2700 rpm
Crankcase leakage test:	
with overpressure:	0.6 bar (8.7 lbf/in^2)
with vacuum:	0.4 bar (5.8 lbf/in^2)

1.2 Fuel System

Carburetor:	All position diaphragm carburetor with integral fuel pump
Adjustment:	
High speed adjustment screw H:	Open 1 turn
Low-speed adjustment screw L:	Open 1¼ turns (basic setting with screws initially hard against their seats)
Carburetor leakage test with overpressure:	0.4 bar
Fuel capacity:	051: 0.9 litre

Fuel mixture:	Regular grade gasoline and 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:	Flocked wire mesh element

1.3 **Ignition System**

051 AV (050 AV) up to machine No. 3001400

Type:	Breaker-controlled magneto ignition
Magneto edge gap:	12 – 16 mm (9–13 mm up to machine No. 2981245)
Air gap:	0.15 – 0.3 mm
Ignition timing:	1.9 – 2.1 mm before T.D.C. (2.3 – 2.7 mm up to machine No. 2981245)
Ignition advance angle:	22° – 23° before T.D.C. (24° – 26° before T.D.C. up to machine No. 2981245)
Breaker point gap:	0.35 – 0.4 mm
Condenser:	Capacitance 0.6 – 0.9 μF
Ignition armature:	Coil winding resistance Primary approx. 1Ω, Secondary approx. 8.7 kΩ

051 AVE, 075 AVE; 076 AVE

Type:	Transistor-controlled (breakerless) magneto igniton
Air gap:	0.15–0.25 mm
Ignition timing:	2.5 mm before T.D.C.
Ignition advance angle:	25° before T.D.C.
Ignition armature:	as 050/051
Spark plug (suppressed):	
051:	Bosch WSR 6 F (formerly WKA 200 TR 6), Champion RCJ 6 Y or NGK BPM - 7, Heat range 175
075; 076:	Bosch WSR 6 F (formerly WKA 200 TR 6), Champion RCJ 6 Y, Heat range 225, Electrode gap 0.5 mm, Spark plug thread M 14 x 1.25; 9.5 mm long

1.4 **Tightening Torques**		
	Crankshaft nut – Ignition side M 8x1:	35 Nm (3.5 kpm)
	Sprocket side M 12x1.5 left-hand:	60 Nm (6.0 kpm)
	Clutch spider:	40 Nm (4.0 kpm)
	Hub:	75 Nm (7.5 kpm)
	Decompression valve or plug:	12 Nm (1.2 kpm)
	M 6 hex. nuts:	8 Nm (0.8 kpm)
	M 5 hex. nuts:	4 Nm (0.4 kpm)
	M 5 socket head screws:	8 Nm (0.8 kpm)
	M 5 pan head screws:	5 Nm (0.5 kpm)
	M 4 pan head screws:	2.5 Nm (0.25 kpm)
	Spark plug:	25 Nm (2.5 kpm)
	Collar nuts:	25 Nm (2.5 kpm)

1.5 **Cutting Attachment**		
	Guide bars:	STIHL Duromatic guide bars with stellite-tipped nose. STIHL Rollomatic guide bars with sprocket nose. Both types with corrosion-resistant finish and induction hardened rails.
	Bar lengths:	051: 43, 53, 63 and 75 cm 075: 43, 53, 63, 75 and 90 cm
	Oilomatic chain:	9.32 mm (3/8'') pitch 10.26 mm (0.404'') pitch 12.7 mm (1/2'') pitch
	Chain sprocket:	8-tooth for 9.32 mm (3/8'') pitch 7-tooth for 10.26 mm (0.404'') pitch 6-tooth for 12.7 mm (1/2'') pitch
	Chain speed:	16.8 m/s at 8500 rpm with 0.404'' chain
	Chain lubrication:	Speed-controlled oil pump with pump plunger; operative only when chain is running. Additional flow quantity control by means of adjusting screw. 075; 076 also equipped with unit-mounted manual oil pump.
	Max. oil delivery rate:	19 cm^3/min at 6000 rpm
	Min. oil delivery rate:	7 cm^3/min at 6000 rpm
	Oil tank capacity:	0.55 litre

1.6 Weights

	Model	Model
Dry weight with 53 cm bar and chain:	051 AVE	075 AVE; 076 AVE
	11.2 kg	11.7 kg

1.7 Special Accessories

		Rewind starter:
STIHL repair kit 051 (050); 075:	1111 900 5000	(With friction shoe)
STIHL repair kit 051; 075; 076:	1111 900 5001	(With pawl)
Gasket set 051 (050):	1111 007 1050	
Gasket set 075; 076:	1111 007 1051	
Decompression valve for 051:	1111 020 9400	

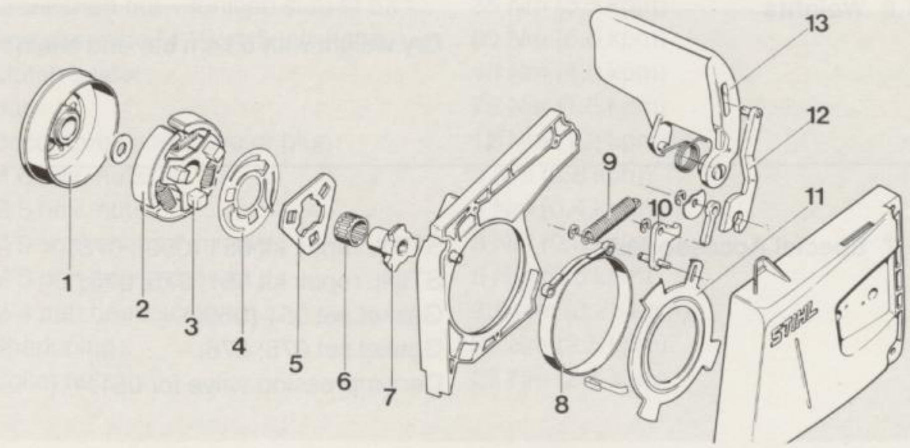
2. CLUTCH, CHAIN DRIVE AND CHAIN BRAKE

2.1 Construction and Operation

2.1.1 Clutch and Chain Sprocket

Component parts of chain brake

1 Chain sprocket
2 Clutch
3 Spider
4 Flat spring
5 Driving plate
6 Needle cage
7 Hub
8 Brake band
9 Tension spring
10 Cam
11 Release plate
12 Lever
13 Hand guard



The transmission of power from the engine to the saw chain is effected via a centrifugal clutch. On models equipped with a chain brake (Quickstop) the centrifugal clutch incorporates an isolating clutch which is actuated by the chain brake.

On **Quickstop** machines the hub screwed to the crankshaft is the clutch element which absorbs the torque and acceleration of the crankshaft. It is essential that the hub is always tightened down to the specified torque. The clutch spider is supported on the hub by a needle cage but not connected to it in any other way. The driving plate is located on the three lugs of the clutch spider and can move axially while remaining in constant mesh with the spider. The flat spring between the spider and driving plate presses the driving plate against the release plate; this means that the internal teeth of the driving plate are always in mesh with the teeth of the hub when the chain brake is disengaged, and thus insures positive transmission of engine torque to the clutch spider. When the chain brake is actuated, the release plate disengages the driving plate from the hub. The clutch spider and hub can then rotate independently.

On **standard** machines the clutch spider takes over the function of the hub and must therefore always be tightened to the specified torque. The centrifugal clutch has three clutch shoes with pressed-fitted linings. The clutch drum and chain sprocket form a single unit.

When the engine is running at idle speed the clutch shoes are also in the idle position because the tension of the clutch springs is greater than the centrifugal force. As engine speed increases centrifugal force presses the clutch shoes outward against the clutch drum until positive frictional contact is made and engine torque is then transmitted via the chain sprocket to the saw chain.

The preload and strength of the clutch springs are designed so that the clutch shoes begin to make contact with the clutch drum at an engine speed of approx. 2700 rpm (engagement speed). The clutch engages fully above this speed. It is therefore very important to set the carburetor to the correct idle speed in order to insure that the clutch engagement speed is not reached when the engine is idling.

2.1.2 Chain Brake

Chain brake disengaged

The chain brake is a spring-loaded band brake without any friction lining. Its main components are the brake band, tension spring, hand guard and the release plate which controls the isolating clutch.

The chain brake is actuated by means of the hand guard which is used to disengage or engage the brake.

Chain brake engaged

The **chain brake is disengaged** by pulling the hand guard back toward the handlebar. This movement is transmitted via a lever system which preloads the tension spring and releases the brake band. At the same time the release plate moves back and allows the driving plate to engage on the hub. The brake lever, which is connected to the tension spring, brake band and release plate, is thus locked in the idle position by the relay lever.

The **chain brake is engaged** by moving the hand guard toward the bar nose. This movement unlatches the brake lever and causes the brake band to the clamped around the clutch drum by the force of the preloaded tension spring. The release plate simultaneously disengages the driving plate from the hub and interrupts the transmission of power between the crankshaft and the centrifugal clutch. The clutch drum and saw chain are brought to a standstill within a fraction of a second, even if the engine continues running at high speed.

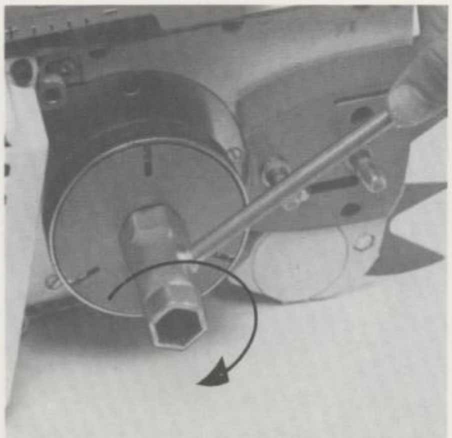
2.2 Troubleshooting Chart

Fault	Cause	Remedy
Saw chain turns at idle speed	Engine idle speed too high	Readjust at idle speed adjusting screw
	Clutch springs stretched, spring hooks broken	Renew all clutch springs
	Needle cage damaged	Fit new needle cage
Excessive chain wear	Incorrect chain tension	Tension chain correctly
Chain stops in mid-cut even with engine at maximum speed	Isolating clutch worn	Fit new hub and driving plate
	Clutch linings worn	Renew all clutch shoes
	Clutch linings and drum smeared with oil	Wash clutch linings and drum with gasoline. Roughen linings with fine emery cloth
Isolating clutch disengages during cutting	Flat spring broken	Fit new flat spring
Isolating clutch does not re-engage after chain brake is released	Engine idle speed too high	Readjust at idle speed adjusting screw
	Flat spring broken	Fit new flat spring
Saw chain does not stop immediately when chain brake is engaged	Tension spring broken	Fit new tension spring
	Brake actuating components dirty	Clean brake actuating components

2.3 Disassembly and Repair

2.3.1 Clutch and Chain Sprocket

Releasing hexagon nut



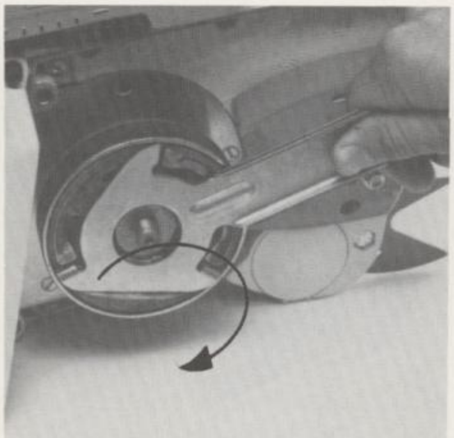
Quickstop machines: Disengage the chain brake before removing the chain sprocket. To do this, pull the hand guard back toward the front handle.

Remove the chain sprocket cover, chain and bar. Use the combination wrench to unscrew and remove the spark plug.

Caution: Hexagon nut and clutch have left-hand threads. Unscrew clockwise.

Fit the locking screw in the cylinder and screw it down by hand as far as it will go. Rotate the crankshaft clockwise until it is blocked. Now use the combination wrench to release and unscrew the hexagon nut. Take off the outer washer.

Unscrewing the clutch



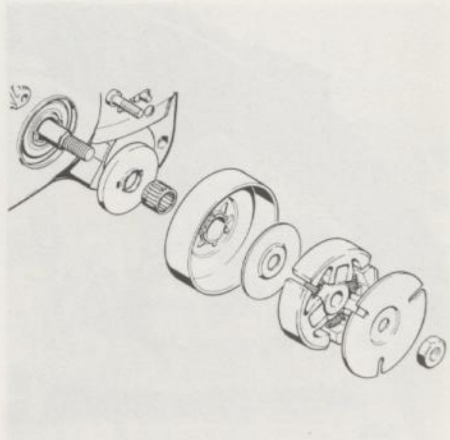
To unscrew the clutch: Engage clutch wrench between the clutch shoes and then unscrew the clutch clockwise. If the clutch carrier is stuck, free it off by tapping the end of the wrench with a plastic mallet. Take away the inner washer, chain sprocket and needle cage.

Clean the crankshaft stub. Wash the needle cage in white spirit and lubricate it with bearing grease.

When reinstalling, make sure the lugs on the oil pump worm pass through the holes in the cover plate and engage the chain sprocket.

The raised centers of the clutch shoe guide washers must locate against the clutch carrier.

Component parts of clutch



Fit the needle cage, chain sprocket and inner washer on the crankshaft so that the recessed side of the clutch hub faces the chain sprocket. Tighten to 70 Nm (51 lbf.ft) with clutch wrench. Fit the hexagon nut and tighten it to 40 Nm (30 lbf.ft).

Take out the locking screw and then refit the spark plug, guide bar, chain and chain sprocket cover.

2.3.1.1 Machines with Isolating Clutch

Locking screw in position

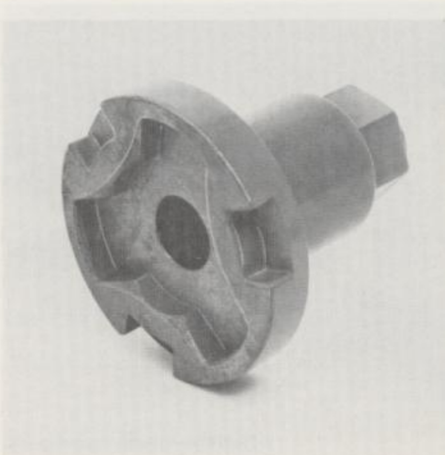
The chain brake must be disengaged before the chain sprocket cover can be removed, i.e. pull hand guard back toward the handlebar. Remove the chain sprocket cover and the bar and chain. Take out spark plug and screw the locking screw (tool kit) into the spark plug hole. Now use the special wrench to release the hub and unscrew it together with the clutch from the crankshaft.

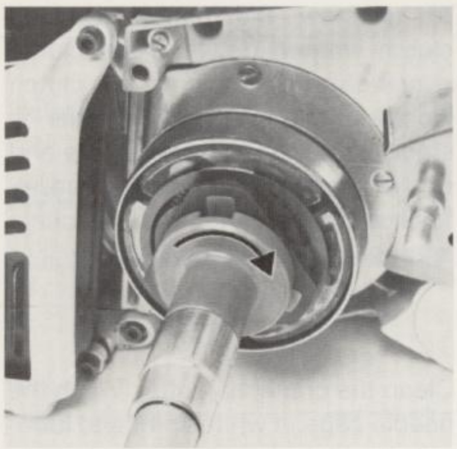
Caution: The hub has a left-hand thread and must be unscrewed clockwise.

From this stage onward the disassembly sequence, including the chain sprocket, is as previously described for machines without chain brake. When installing the flat spring on the clutch spider make sure that the tabs of the spring face away from the clutch.

Top:
Special wrench

Bottom:
Releasing the hub





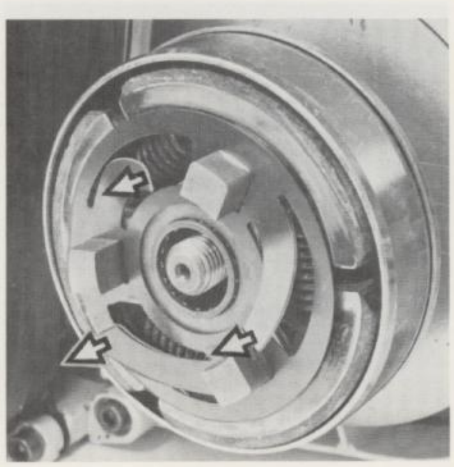
The hub must be tightened down to a torque of 75 Nm with the special wrench.

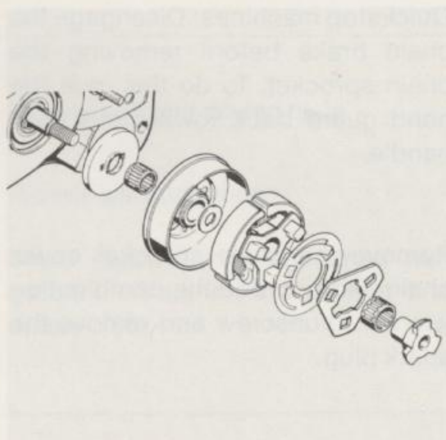
Notes on repair

- Always replace clutch shoes and springs as **complete sets.**
- If the clutch is only caked with dirt, the clutch components can be washed in clean gasoline and blown dry with compressed air.

Top:
Tabs of flat spring face outward

Bottom:
Component parts





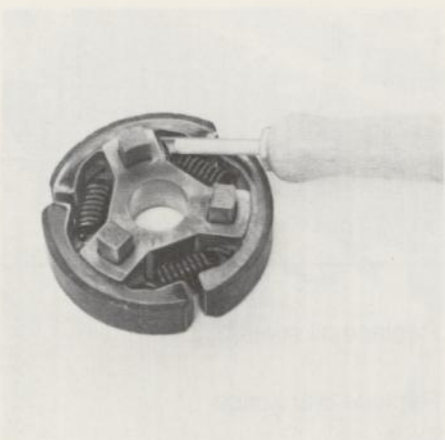
- Clean the surface of the linings with emery cloth.
- Renew chain sprocket if the wear marks are deeper than 0.5 mm.

On machines with chain brake the springs must be detached from the clutch shoes before the clutch shoes can be taken off the spider.

2.3.2 Chain Brake

Top:
Recess on assembly tool

Bottom:
Detaching clutch springs

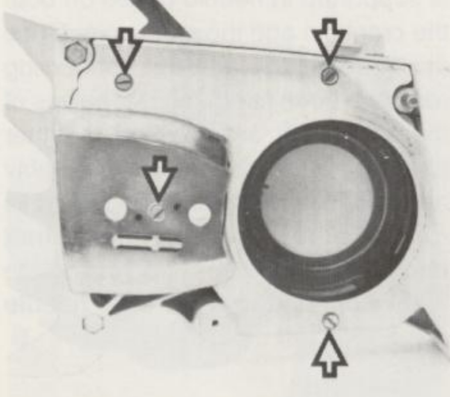


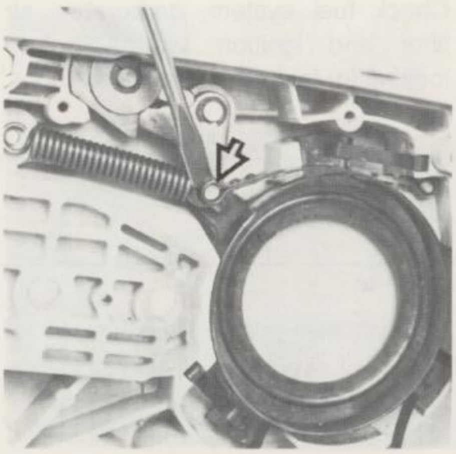
Removal of the springs – and refitting – is best carried out with the aid of special assembly tool 1117 890 0900 for the chain brake spring.

A small recess should be made in the tube of this assembly tool so that the spring can be held securely during removal or installation.

Top:
Unscrew the side plate and cover

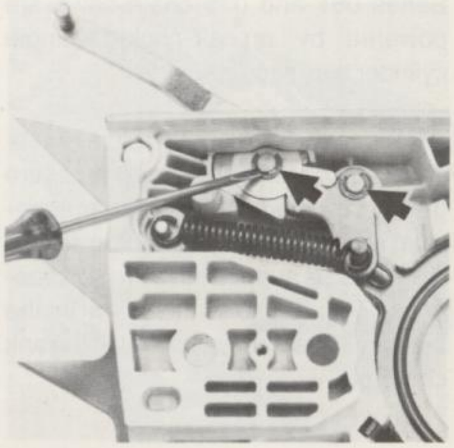
Bottom:
Removing brake band





Disengage the chain brake and then remove the chain sprocket cover. Remove outer side plate by unscrewing the pan head screw and then take off the cover. To remove the brake band, take off the retaining washer and then use a screwdriver to prise the brake band off the cam. The lever and cam are held by retaining washers. Remove the retaining washers and lift out the lever and cam.

Removing retaining washers on lever and cam



The three springs which hold the release plate are simply pushed into holes in the chain sprocket cover and can be pulled out upward.

Thoroughly clean all parts and check their condition. It is essential to replace any damaged or worn parts of the brake mechanism.

Lightly grease running faces of levers and cam before installing them.

3. ENGINE

3.1 Construction

Series 051 and 075 chain saws are powered by an air-cooled, single cylinder two-stroke engine.

The crankcase is a two-part pressure die casting made of a special magnesium alloy. The two-piece, drop-forged crankshaft is supported in two ball bearings. Two oil seals installed in the crankcase hermetically seal the crank chamber.

The connecting rod, also drop-forged, is supported in needle cages on both the crankpin and the piston pin. Once the needle cage and the connecting rod have been fitted, the two halves of the crankshaft are pressed together to a form a torsionally rigid assembly and then machine finished. For this reason **a replacement crankshaft can only be supplied complete with connecting rod and needle cage.**

The cylinder and piston are made of a special aluminium alloy. The cylinder bore is coated in a special process.

3.2 Troubleshooting Chart

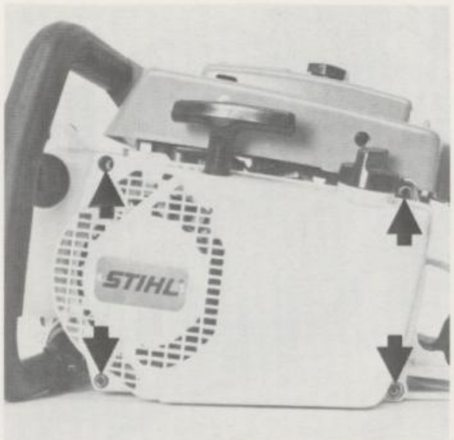
Check fuel system, carburetor, air filter and ignition system before looking for faults in the engine.

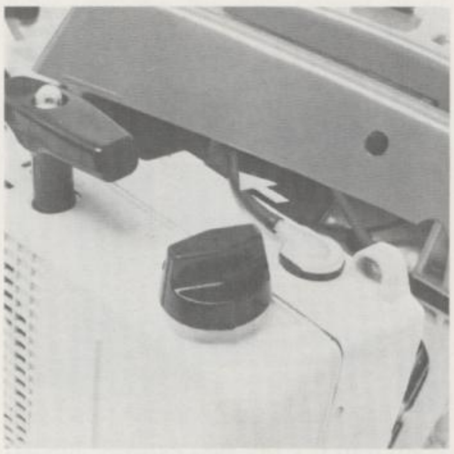
Fault	Cause	Remedy
Engine does not start easily, stalls at idle speed, but runs normally at full speed	Oil seals in crankcase leaking	Replace oil seals
	Crankcase damaged (cracks)	Replace crankcase
Engine does not deliver full power or runs erratically	Secondary air seepage into engine through poorly mounted carburetor	Mount carburetor correctly
	Piston rings leaking or broken	Replace piston rings
Engine overheats	Insufficient cylinder cooling. Air inlets in fan housing blocked or cylinder cooling fins clogged with dirt	Thoroughly clean all cooling air openings

3.3 **Exposing the Cylinder**

Top:
Unscrew the fan housing

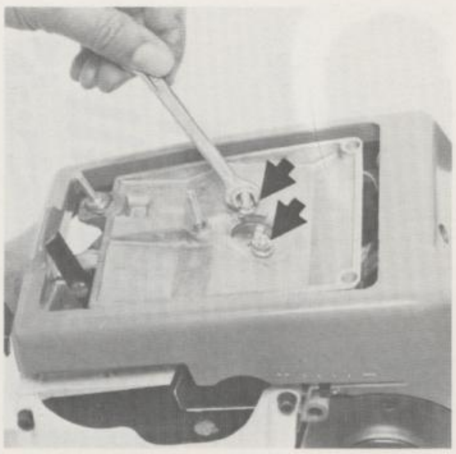
Bottom:
Pull fuel line off elbow connector





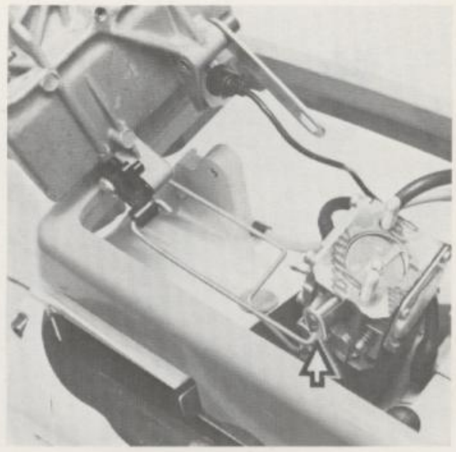
Top:
Unscrew air filter cover

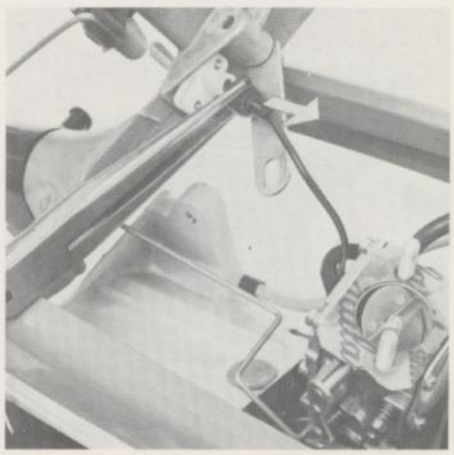
Bottom:
Removing collar nuts



Top:
Disconnect choke rod

Bottom:
Pull lead off ignition stop switch





Remove the chain sprocket cover, cutting attachment and fan housing with cover and rewind starter. Pull the fuel line off the elbow connector while you are removing the fan housing.

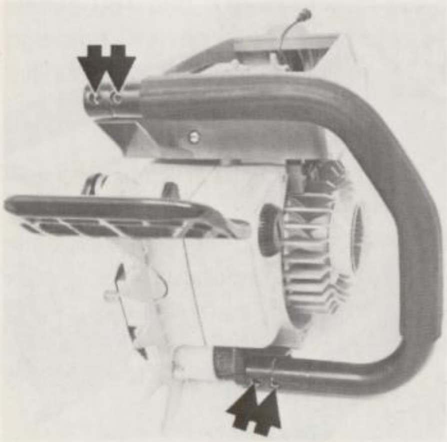
Move choke lever to "Choke" position, unscrew the air filter cover and take it off together with the air filter element.

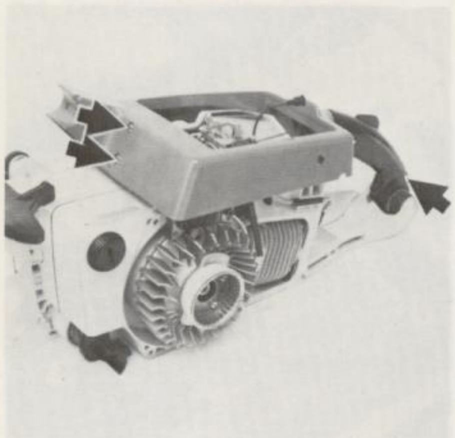
Release and unscrew the two M 5 collar locknuts from the filter housing. (Also remove washer on old type machines, but only use collar nuts for reassembly). Raise filter housing and disconnect choke rod from lever on choke spindle.

Push back rubber boot on ignition stop switch and use flatnose pliers to grip brass sleeve and pull lead out of the ignition stop switch.

Top:
Removing handlebar

Bottom:
Removing handle frame

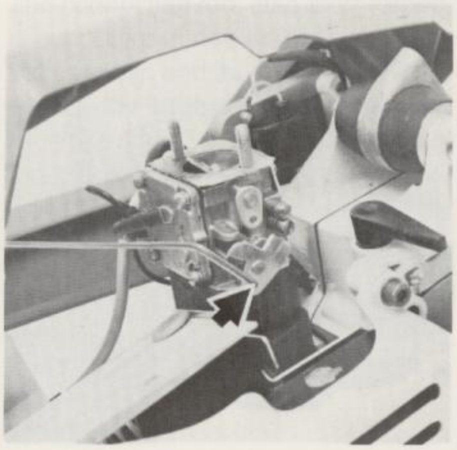


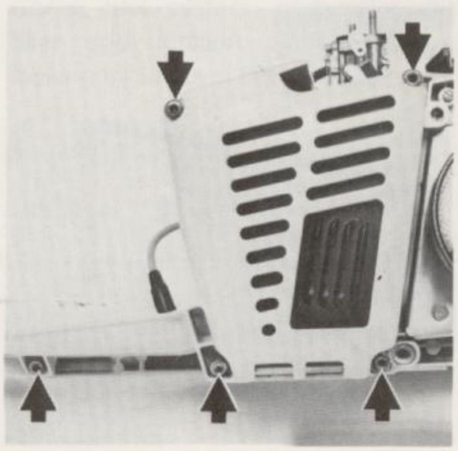


The handlebar can be lifted off after unscrewing the 4 socket head screws (6 screws on wrap-around handle). To remove the handle frame, unscrew the 2 pan head screws on the front of the handle frame and 1 pan head screw which connects the rear handle to the support. Detach throttle rod from throttle shaft and then lift off the handle frame. Pull terminal off spark plug and unscrew the spark plug. The muffler guard is secured by a total of 5 screws in the crankcase and shroud.

Top:
Disconnecting throttle rod

Bottom:
Removing muffler guard



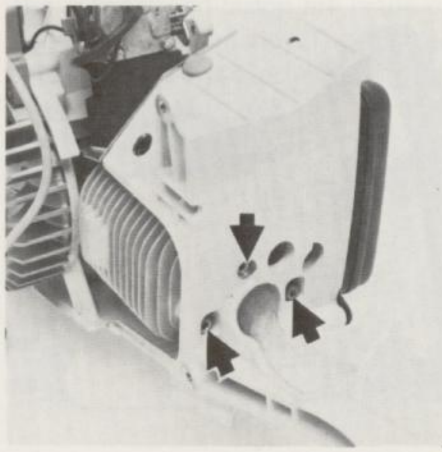


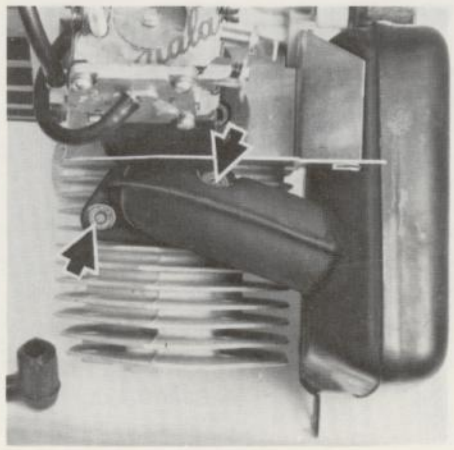
Remove the shroud. It is held by one socket head screw on the crankcase and three socket head screws on the cylinder. Take out the two socket head screws on the muffler flange and lift off the muffler.

Pull pulse hose off nipple on carburetor end cover and lift carburetor with sealing washers off the two studs.

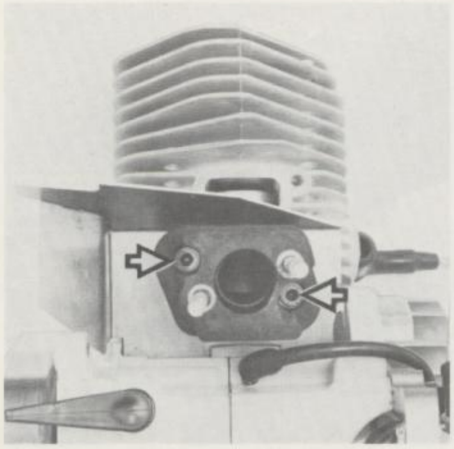
Top:
Unscrewing the shroud

Bottom:
Removing muffler





Removing insulating flange



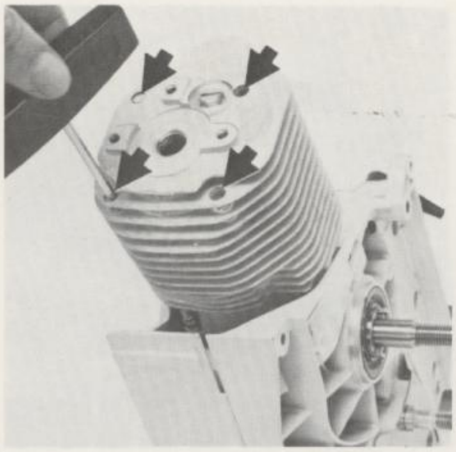
Now unscrew the two socket head screws securing the insulating flange and heat shield and remove the parts. Thoroughly clean the exterior of the cylinder and inspect it for signs of damage (cracks, broken cooling fins etc.).

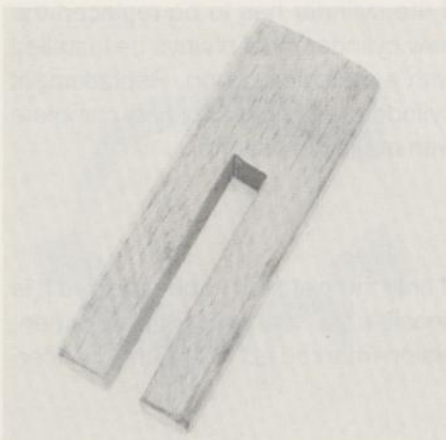
From machine No. **4755571** onward the 0.5 mm thick gasket between the carburetor flange and the heat shield has been replaced by a new 1.5 mm gasket. Always use the 1.5 mm thick gasket on all machines when carrying out carburetor repairs.

3.4 Disassembly of Cylinder and Piston

Top:
Unscrewing the cylinder base screws

Bottom:
Wooden assembly block





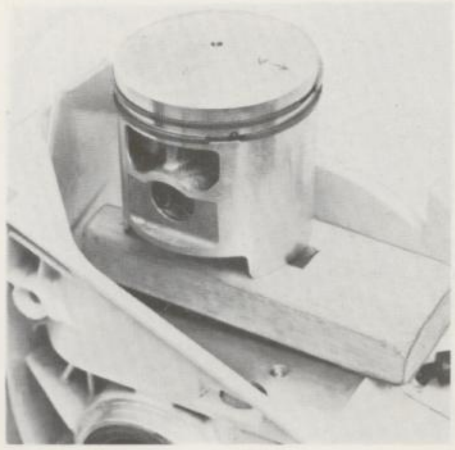
On the 051 the cylinder is secured by means of four M 5 socket head screws; four M 6 hexagon nuts are used on the 075.

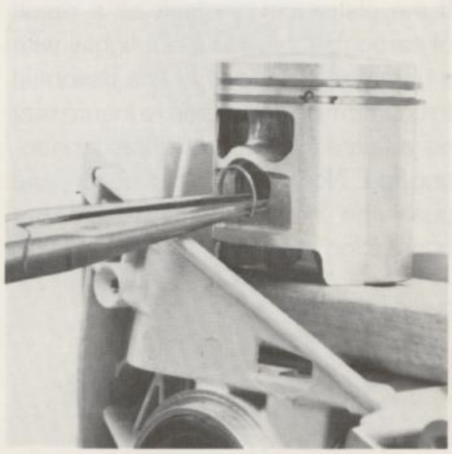
Once these fasteners are removed the cylinder can be pulled off the piston.

Before removing the piston it must be decided whether or not the crankshaft is to be removed as well. This is important because the wooden block has to be fitted between the crankcase and piston into order to lock the crankshaft for removal of the flywheel, clutch and chain sprocket.

Top:
Piston supported on wooden block

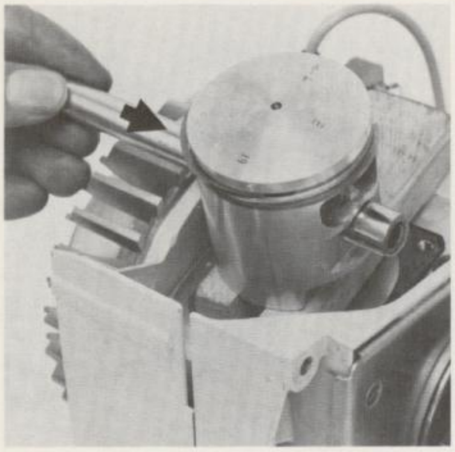
Bottom:
Removing the wire retainers





To remove the piston, first take out the two wire retainers which secure the piston pin and use drift 1111 893 4700 to press the piston pin out of the piston and the needle cage.

Pressing out the piston



If the piston pin is stuck as a result of carbonization, tap it out lightly with a hammer and the drift. It is essential to counterhold the piston to insure that no jolts are transmitted to the connecting rod. Now remove the piston and push the neddle cage out of the connecting rod.

3.5 **Assembly of Piston and Cylinder**

Arrow and ,,A'' point toward exhaust port

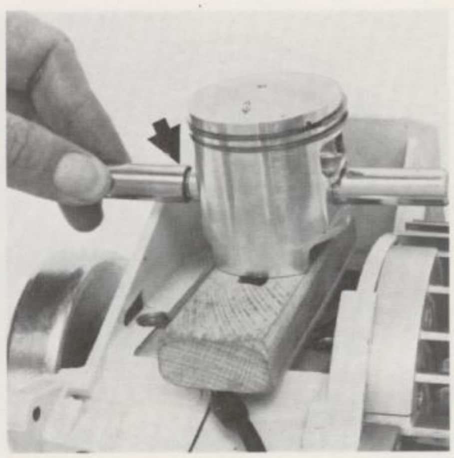
If the cylinder has to be replaced the new cylinder must always be installed with a matching piston. Replacement cylinders are only supplied complete with matching pistons.

If only the piston is to be renewed it is possible to use every replacement piston (marked ,,B'') with any cylinder.

When carrying out repairs it should be noted that pistons with a size group code letter that does not have a circle may only be installed in cylinders with a hard-chromium plated bore. Cylinders which are **not** hard-chromium plated are identified by the letters **,,Sil''** which are integrally cast on the base of the cylinder.

Before installing the piston, lubricate

Fit piston pin on assembly drift



the needle cage with oil and insert it in the connecting rod. Position piston on connecting rod so that the stamped marking (arrow and ,,A'') points toward the cylinder exhaust port. Now fit piston pin in piston and connecting rod. To do this, push assembly drift through piston bore and connecting rod to align both bores concentrically. Fit piston pin on spigot of assembly drift and slide it into the piston. Gently move piston to and fro to ease insertion of the piston pin.

The piston pin must move freely in its bore. Never use force during assembly.

Now insert the two wire retainers and make sure they are properly seated. They must fit snugly in the grooves.

Wire retainer in position

Mounting of the cylinder is best carried out with the aid of the following tools:

- Wooden assembly block
  11088934800
- Clamping strap 00008932600
- Ring compressor
  051: 11078934900
  075: 11068934900

Fit new cylinder gasket on the crankcase. Lubricate piston and piston rings with oil. Place wooden assembly block on crankcase so that piston is resting on it.

Turn the piston rings in their grooves so that the radii at the ring gaps locate against their respective fixing pins in the grooves.

Top:
Piston rings correctly positioned

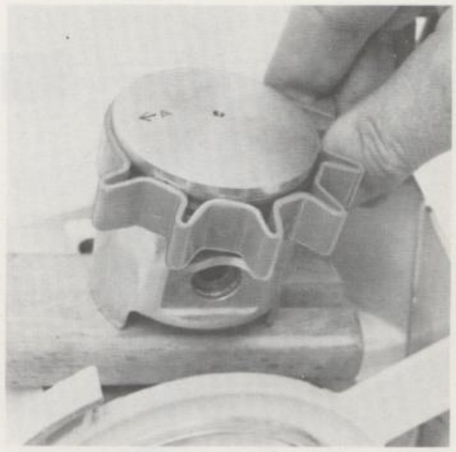
Bottom:
Clamping strap

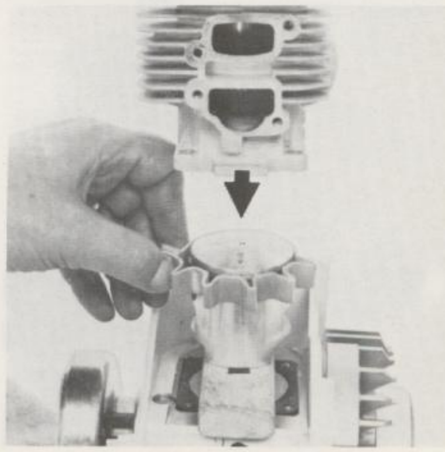
Use the ring compressor or clamping strap to compress the piston rings around the piston, but make sure they do not move out of position in the process.

Fit cylinder over the piston with the exhaust port facing in the direction of the arrow and ,,A'' (on piston head). During this process make sure that

Top:
Compressing piston rings with clamping strap

Bottom:
Fitting the cylinder

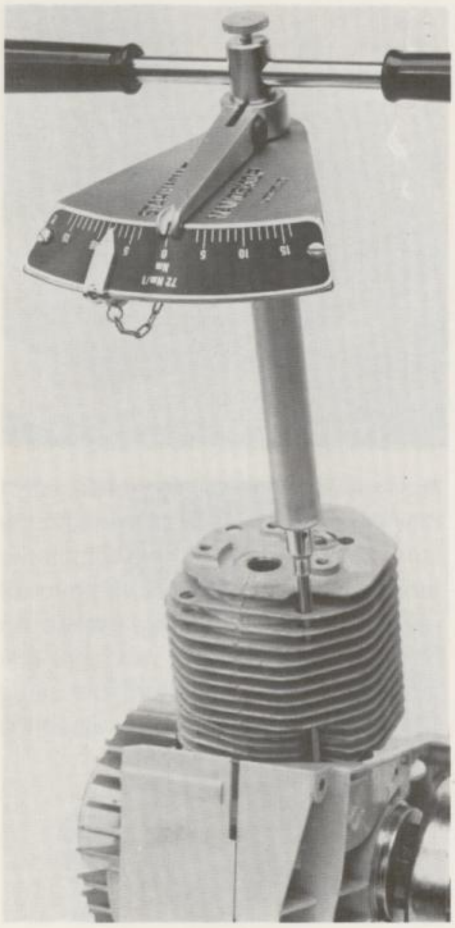




the cylinder is properly aligned, i.e. the imaginary center line through the inlet or exhaust port must be in line with the longitudinal axis of the connecting rod. It this is not done the piston rings may break!

The ring compressor is pushed downward as the piston rings move into the cylinder. Remove wooden assembly

Tightening cylinder base screws with torque wrench



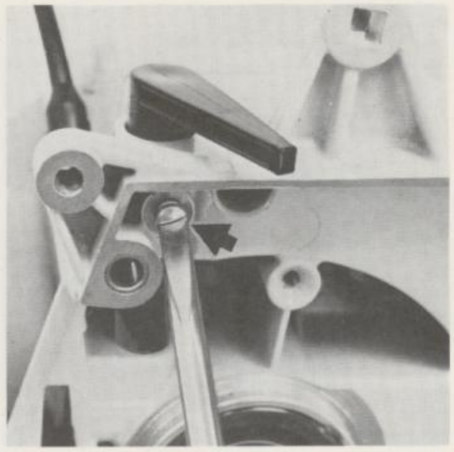
block and ring compressor. Tighten down the four socket head screws, on the 051, or the four M 6 hexagon nuts, on the 075, in a diagonal pattern to a torque of 8 Nm.

Tightening the muffler

Reassemble the heat shield with gaskets and the carburetor flange and tighten them down. Now attach muffler temporarily to the cylinder with the two socket head screws. Secure shroud to cylinder and crankcase with the 4 socket head screws. The muffler can be finally tightened down after the guard is assembled. The two socket head screws can be tightened through the two holes in the shroud (with rubber plugs) to a torque of 8 Nm. Refit the rubber plugs. Assembly of the remaining parts is then a reversal of the disassembly sequence.

3.6 Disassembly of Crankcase – Removal of Crankshaft

Removing oil control handle



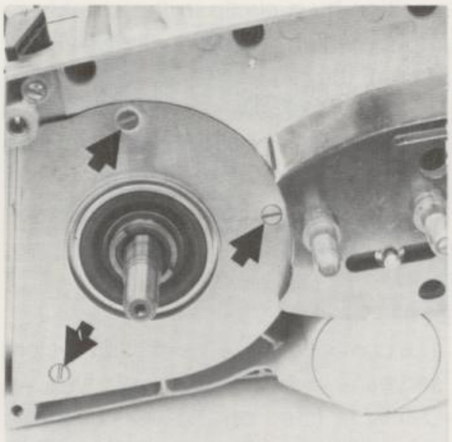
The following operations must be performed in order to gain access to the crankshaft:

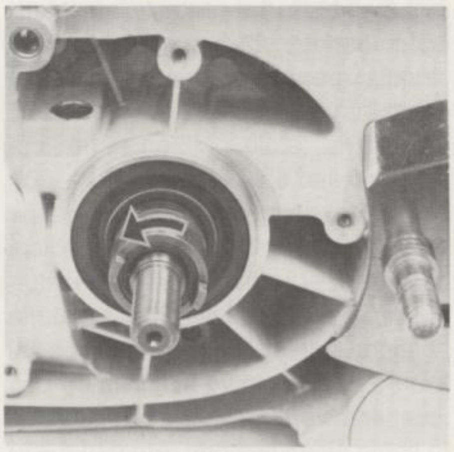
Clutch (2.3.1)
Exposing the cylinder (3.3)
Disassembly of cylinder and piston (3.4)
Removal of flywheel (4.4.5)
Removal of ignition armature
Removal of trigger plate (4.4.9)
Remove contact breaker plate on early machines
Disassembly and repair of oil pump (8.6)

Unscrew flat head screw which locates the control handle and then pull handle out of the housing. Remove the cover plate, it is secured with three countersunk screws. Turn oil pump worm counterclockwise to disengage it from the pump plunger and then pull it off the shaft.

Top:
Removing cover plate

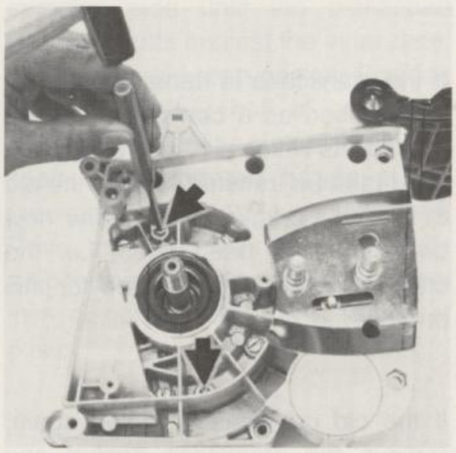
Bottom:
Unscrewing worm





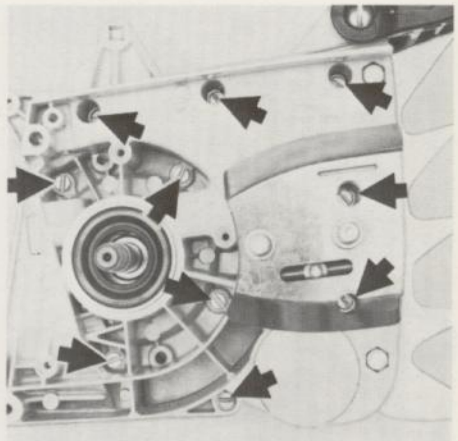
Top:
Releasing locknut on vibration mount

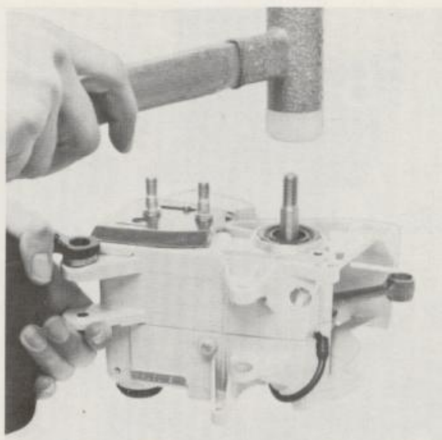
Bottom:
Knocking out cylindrical pins



Top:
Removing the pan head screws

Bottom:
Driving out the crankshaft



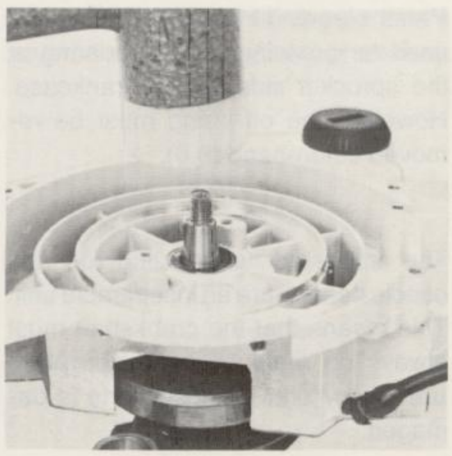


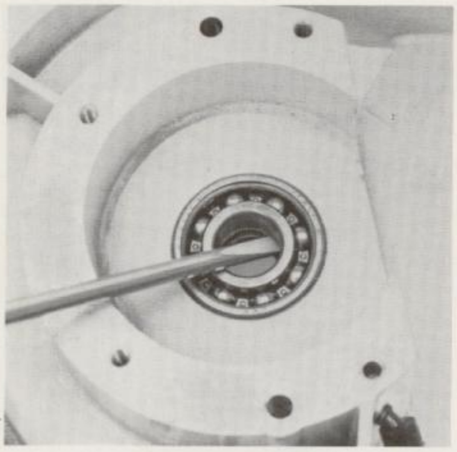
Unscrew the locknut and then pull the M 6 x 70 round head screw out of the upper vibration mount.

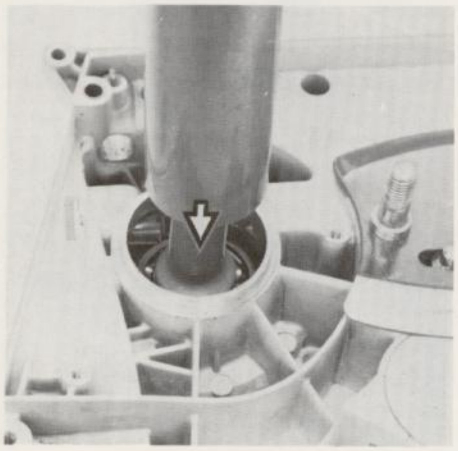
Knock out the two cylindrical pins in the direction of the ignition side of the crankcase and then remove all ten pan head screws.

Split the two halves of the crankcase by tapping the sprocket end of the crankshaft with a soft-nosed hammer. Now drive the crankshaft out of the ignition side of the crankcase. The oil seals can be knocked out of their seats with a screwdriver.

The two ball bearings should be driven out of their seats from the outside to the inside of the crankcase in each case.







Press sleeve 1114 893 4600 can be used for pressing out the bearing at the sprocket side of the crankcase. However, the oil pump must be removed beforehand (8.6).

The crankshaft, connecting rod and needle bearing are an inseparable unit. This means that the crankshaft must always be replaced as a **complete unit** if any one of these parts is damaged.

When installing a replacement crankshaft it is advisable to fit new ball bearings as well. The oil seals must always be replaced.

If the tapped holes for fastening screws in castings (crankcase, shroud etc.) have become unserviceable as a result of overtightening or tearing, the universal repair tool 5910 850 5200 and its HELI-COIL inserts can be used to restore the threads to their original condition.

If the crankcase is damaged it must be replaced as a **complete** unit. All other parts which are still serviceable must then be transferred from the old to the new crankcase after the new bearings have been fitted, i.e. the crankcase has to be heated for this purpose.

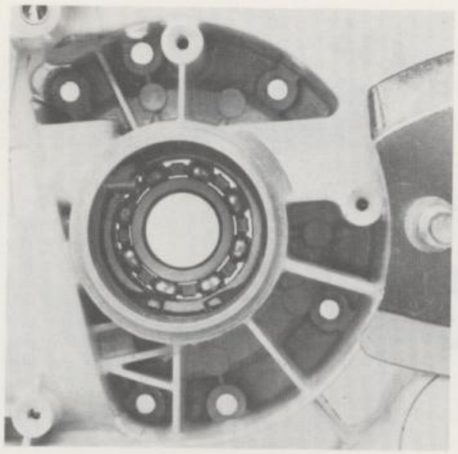
If the old crankcase is used again, remove the crankcase gasket and clean the sealing faces with a scraper or similar tool.

The 051 and 075 crankcases are identical on machine numbers **9 280310** up to **9281309** and from machine number **9422350** onward. On earlier versions of the 051 the crankshaft is supported in a ball bearing at the ignition side and a cylindrical roller bearing at the sprocket side. The cylindrical roller bearing is held in position by a circlip in the crankcase groove which locates against the outer race of the bearing. The outer race of the ball bearing has an annular groove in which a snap ring is fitted to hold the bearing in the crankcase. (The ball bearing is secured on the crankshaft by an additional snap ring).

The contact plate of the ignition system serves as a crankcase end cover. An O-ring is fitted on the outside of its crankcase seat. The oil seal is pressed into the hole in the contact plate. Make sure that the O-ring remains in its annular groove during assembly.

3.7 Installing the Crankshaft – Assembly of Crankcase

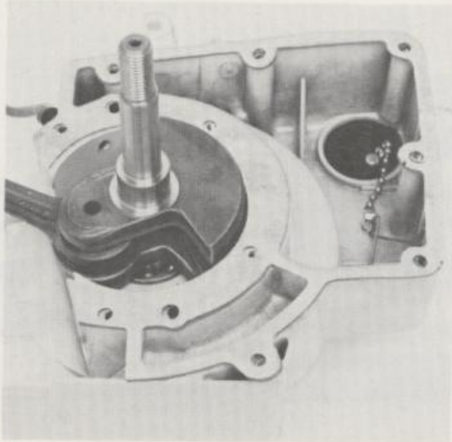
Circlip and ball bearing installed



If a new crankcase is being fitted, first insert the circlip in the groove of the bearing seat on the sprocket side. Heat both halves of the crankcase, e.g. on a heating plate, to approx. 150 – 180° C and fit the ball bearings squarely – without canting – from the inside of the crankcase so that the outer races butt against the crankcase shoulder or the circlip. If the crankcase is heated as specified the ball bearings can be installed by hand. If there are no facilities for heating the crankcase, use a hammer and a suitable piece of pipe (pipe diameter should equal size of bearing outer race) to drive the bearings into their seats.

The inner races of the ball bearings must also be heated for insertion of the crankshaft. This is best done with a soldering iron and a suitable attachment. Then push the straight stub of the crankshaft into the bearing on the sprocket side until the crankshaft shoulder butts against the inner race. Fit a new crankcase gasket. Position bearing of other half of crankcase (ignition side) on the stub of the crankshaft, place the two halves of the crankcase together and align them. Drive the two cylindrical pins fully home, insert screws and tighten them in a diagonal pattern to a torque of 5 Nm.

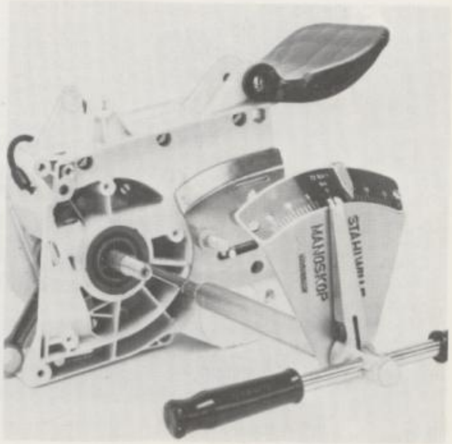
Crankshaft fitted and gasket in position



To install the oil pump worm, slip the assembly sleeve 1111 893 4600 over the crankshaft stub at the sprocket side. Press oil seal, sealing lip first, into the oil pump worm until it is flush with the front edge of the seat. Fit oil pump worm over the assembly sleeve and onto the crankshaft and screw it into position. The assembly sleeve is not required for installation of the oil seal at the ignition side. This side of the crankshaft has no sharp edges which could damage the sealing lip.

Top:
Tightening screws with torque wrench

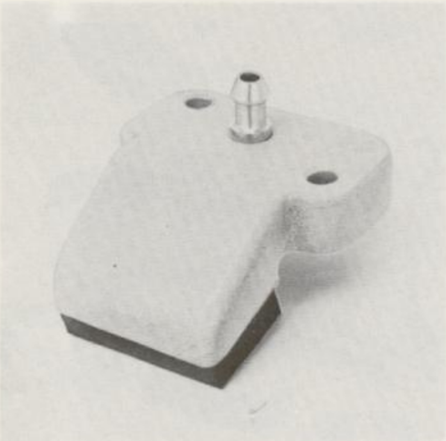
Bottom:
Pushing oil pump worm over assembly sleeve



Assembly of the remaining parts is a reversal of the disassembly procedure.

3.8 **Leakage Testing the Crankcase**

Test flange



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

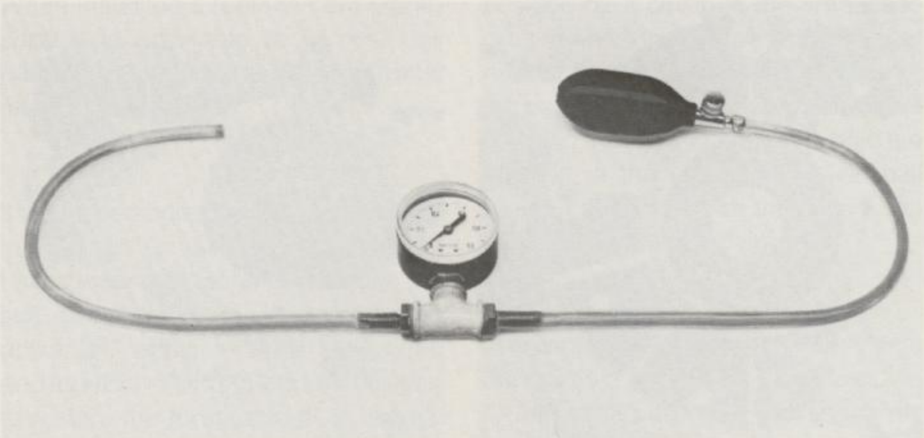
This makes adjustment of the prescribed idle speed difficult or even impossible. Moreover, the transition from idle speed to part or full load is not smooth.

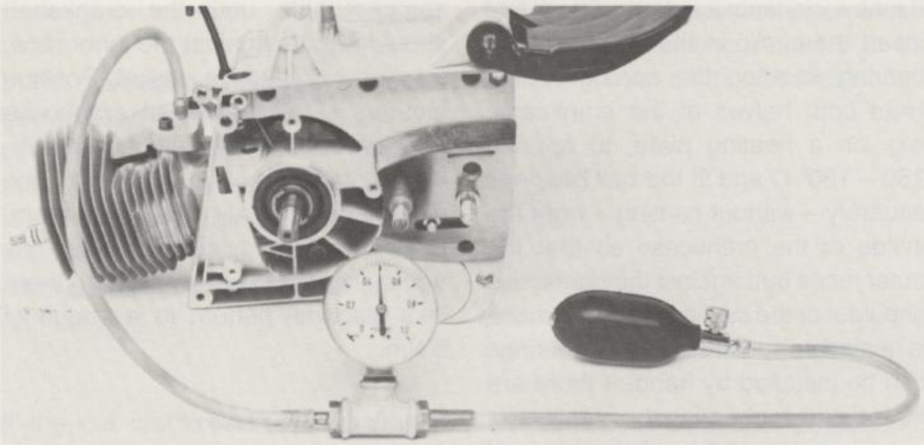
The crankcase can be checked accurately for leaks with the carburetor/crankcase tester 1106 850 2900 and vacuum pump 0000 850 3500.

3.8.1 **Pressure Test**

Top:
Carburetor and crankcase tester

Bottom:
Pressure testing the crankcase





First expose the cylinder (3.3). Remove the carburetor together with flange and heat shield and take off the muffler. Seal the carburetor and muffler ports on the cylinder with test flange 1111 850 4200 (1111 850 4205 for 075). The gasket 1111 129 1400 must be fitted between the carburetor port and the test flange. Seal the pulse nipple – or the hose on the crankcase (e.g. bend it double). Make sure the spark plug is securely tightened down and the piston is at top dead center (T.D.C.).

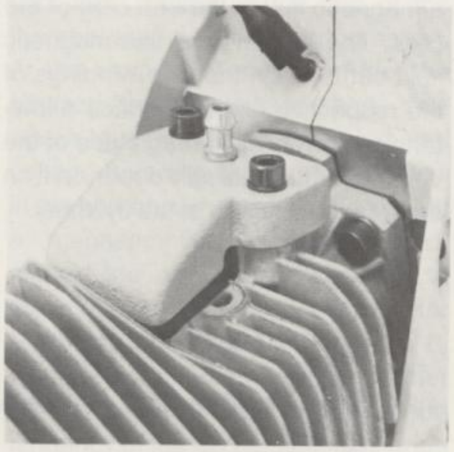
Connect tester's pressure hose to the nipple on the test flange. Close bleed screw on rubber bulb and pump air into crankcase until the pressure gauge shows an overpressure of 0.5 bar. If this pressure remains constant, the crankcase is airtight.

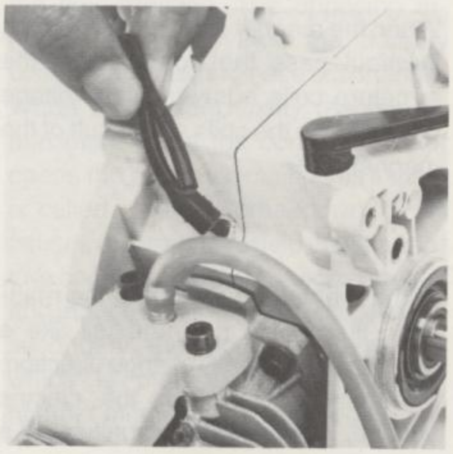
However, if the pressure reading drops the leak must be found and the faulty part replaced.

3.8.2 **Vacuum Test**

Top:
Test flange in position

Bottom:
Bending the pulse hose

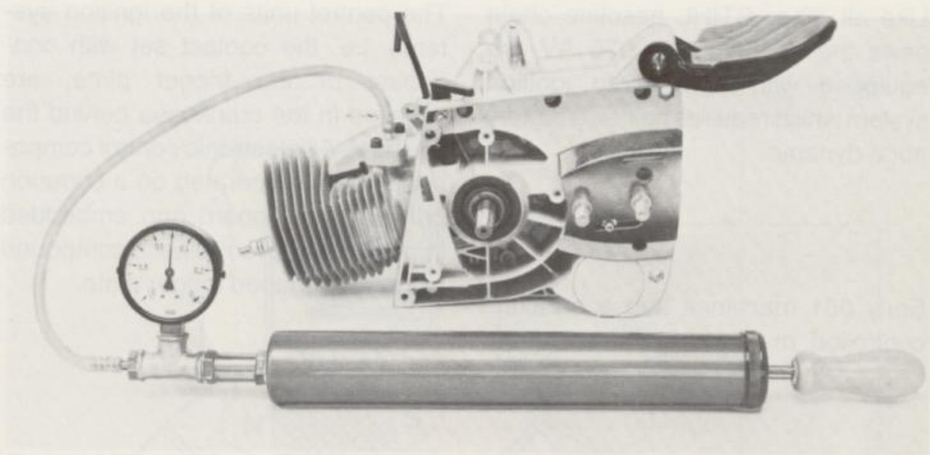


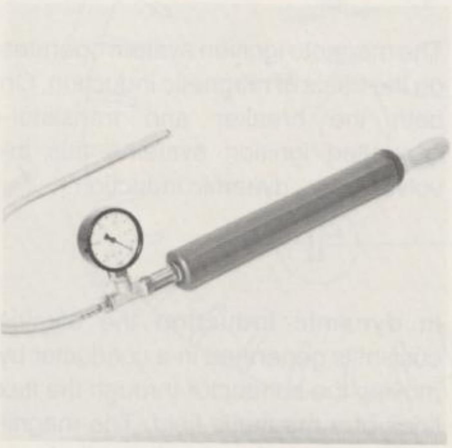


When the test is completed, open the bleed screw and disconnect the pressure hose.

Top:
Leakage test

Bottom:
Vacuum tester





Oil seals tend to fail when subjected to a vacuum. During the piston's induction stroke the sealing lip lifts off the crankshaft owing to the lack of internal counterpressure.

An additional test can be carried out with the vacuum pump to detect this fault. The preparations for this test are the same as for the pressure test (3.8.1).

Connect suction hose of vacuum pump to nipple of test flange. Pull out pump piston until the gauge indicates a vacuum of 0.5 bar. When the handle of the pump piston is released the non-return valve automatically closes the suction hose. If the vacuum reading remains constant or drops no further than 0.3 bar, the oil seals are in good condition. However, if the vacuum continues to drop (down to 0 bar), the oil seals must be replaced even if no leaks were found in the previous pressure test.

4. IGNITION SYSTEM

Like all other STIHL gasoline chain saws the 051 AV and 075 AV are equipped with a magneto ignition system which requires neither a battery nor a dynamo.

Early 051 machines had a breaker-controlled magneto ignition system.

As from machine No. **3 001 400** exclusive use is made of the breakerless (transistor) magneto ignition system.

4.1 **Construction**

The ignition systems (both breaker and transistor-controlled) are of a component-type construction and consist of three main parts – the flywheel (magnet wheel), the ignition armature and the control unit.

The flywheel carries the permanent magnet with a north and south pole and is located on the crankshaft stub. The ignition armature is mounted in the crankcase on the periphery of the flywheel so that it can only be adjusted in the radial direction.

The control units of the ignition systems, i.e. the contact set with condenser or the trigger plate, are installed in the crankcase behind the flywheel. All electronic control components are incorporated on a common printed circuit board and embedded in a moisture-proof plastic compound in the ring-shaped trigger plate.

4.2 **Description of Operation**

The magneto ignition system operates on the basis of magnetic induction. On both the breaker and transistor-controlled ignition systems this involves only ,,dynamic induction''.

In **dynamic induction** the electric current is generated in a conductor by moving the conductor through the flux lines of a magnetic field. The magnitude of the induced voltage is, basically dependent on the strength of the magnetic field and the speed of the flux change. This in turn is influenced, among other things, by the intensity of the movement.

In terms of the magneto ignition system this means: as the flywheel rotates, the flux lines flowing between the poles of the permanent magnet, from north pole to south pole, create a magnetic flux in the iron core of the coils. The flux lines of this magnetic field cut through the wire windings of the respective coil and induce a low-tension current. The magnitude of the voltage is thus basically dependent on the rotational speed of the flywheel.

4.2.1 **Breaker-Controlled Magneto Ignition**

When the magnet poles of the rotating flywheel pass the iron core of the armature coils a low-tension voltage is induced in the coils as a result of the magnetic flux.

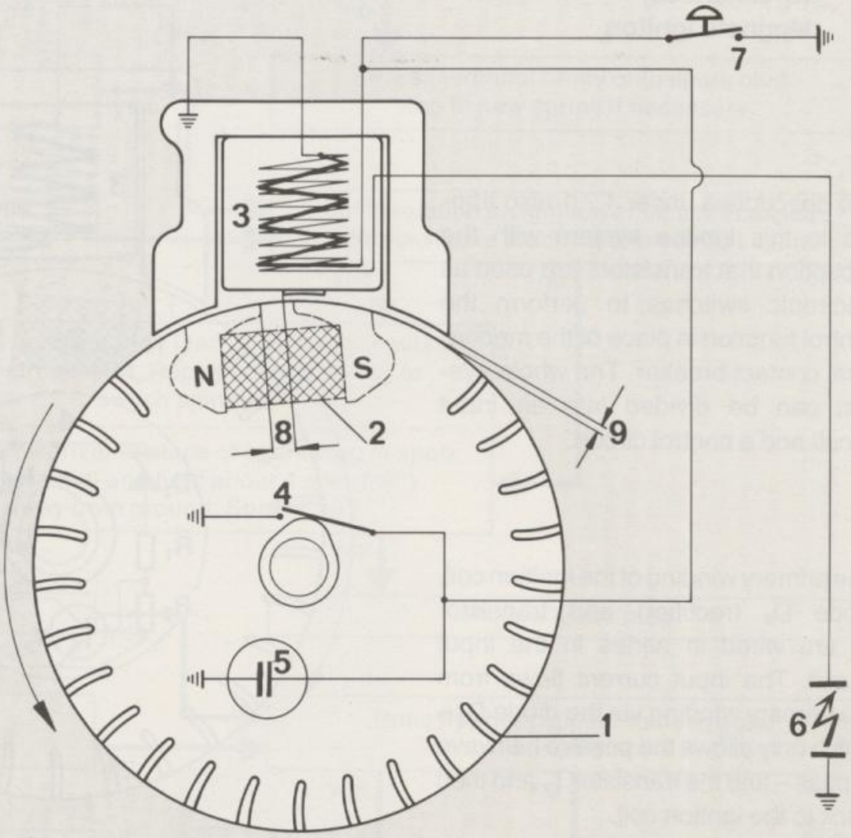
Without any form of control the magnetic flux would rise and fall like a sine-wave and finally change direction. The same applies for the electric voltage. However, the magnitude of a voltage pulse generated in this way would not be sufficient to produce a sparkover.

This means that the voltage curve must be controlled. In this system the mechanical contact breaker performs the control function.

The contact breaker is opened by the

Diagram of ignition system

1 Flywheel
2 Permanent magnet
3 Armature with primary and secondary windings
4 Contact breaker
5 Condenser
6 Spark plug
7 Ignition stop switch
8 Edge gap
9 Air gap



cam lobe ground on the hub of the flywheel and closed by spring action. At the moment of maximum flux the contact breaker closes and thus closes the primary circuit. The induced voltage thus allows a current to flow in the primary winding which builds up a magnetic field (armature field) around the coil. This is opposed to the inducing magnetic field (exciter field) and counteracts its tendency to change the flux direction. The further the flywheel rotates, the greater the tendency of the exciter field to change the flux direction. The opposing armature field and thus the primary current must also increase accordingly. When the current finally reaches its maximum value the contact breaker opens the primary circuit – this instant is called ,,magnet breakdown''. This causes the magnetic field in the armature core to suddenly change direction and induce a high-tension pulse in the secondary winding of the armature which is proportional to the high number of turns in the winding.

This pulse is fed via the high-tension igniton lead to the spark plug and is discharged as a sparkover from the center to the ground electrode and thus ignites the fuel-air mixture.

A condenser is wired in parallel with the contact breaker in the primary circuit in order to prevent excessive sparking (arcing) between the breaker points while they are opening and insure that there is no loss of energy or premature erosion of the points.

The primary circuit is permanently closed by means of the ignition stop switch. This suppresses the abrupt change in direction of the magnetic flux so that no further high-tension pulse can be induced.

4.2.2 Bosch Transistor-Controlled (Breakerless) Magneto Igniton

The description under 4.2.1 also applies to this igniton system with the exception that transistors are used as electronic switches to perform the control function in place of the mechanical contact breaker. The whole system can be divided into an input circuit and a control circuit.

The primary winding of the ignition coil, diode D_2 (rectifier) and transistor T_1 are wired in series in the input circuit. The input current flows from the primary winding via the diode D_2 – which only allows the positive halfwave to pass – and the transistor T_1 and then back to the igniton coil.

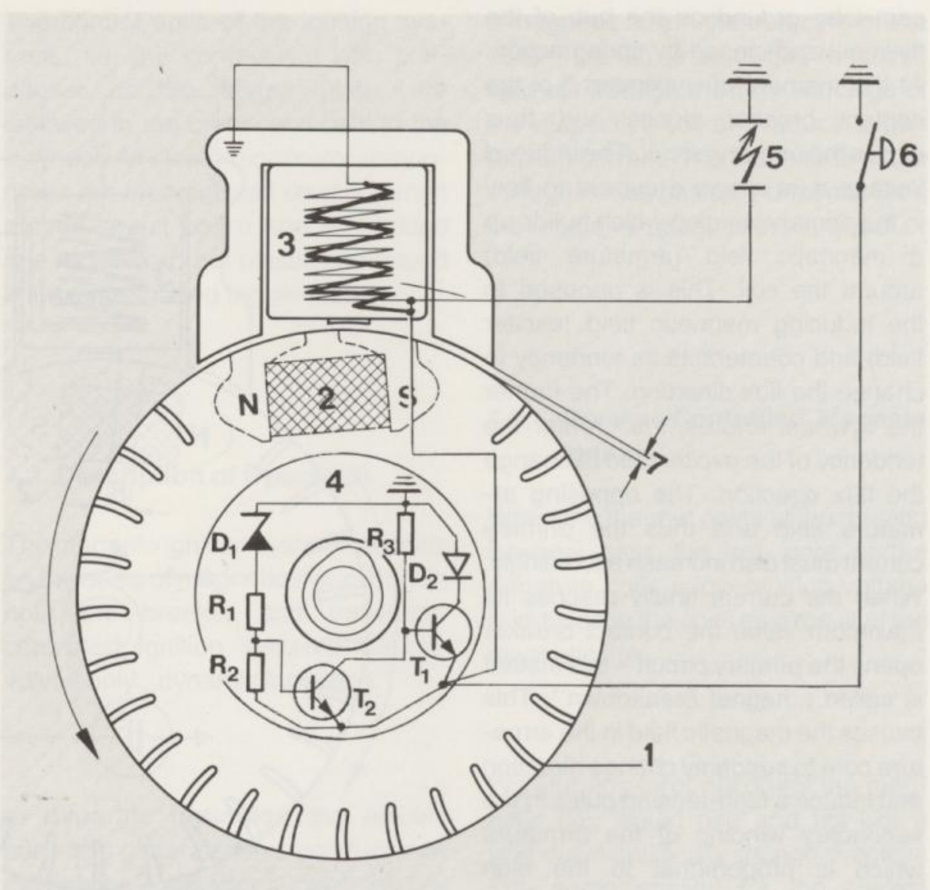
The transistor T_1 must be conductive to allow the input current to flow. This is achieved by the primary voltage positively triggering the base of T_1 via resistor R_3 at the point of maximum magnetic flux.

The control circuit is formed by the primary winding of the ignition coil, zener diode D_1, the resistors R_1 and R_2 (voltage dividers) and the transistor T_2. Voltage rises as the input current increases. The voltage rises to the breakdown value of the zener diode D_1 just before the input current reaches its highest value. D_1 becomes conductive – the control circuit is closed, the base of T_2 is positively triggered, T_2 becomes conductive. The control current for T_1 now flows via T_2, thus causing the potential at the base of T_1 to return to the negative state. T_1 inhibits current flow and the input circuit is open. This corresponds to the opening of the contact breaker.

The process up to sparkover then takes place as described under 4.2.1.

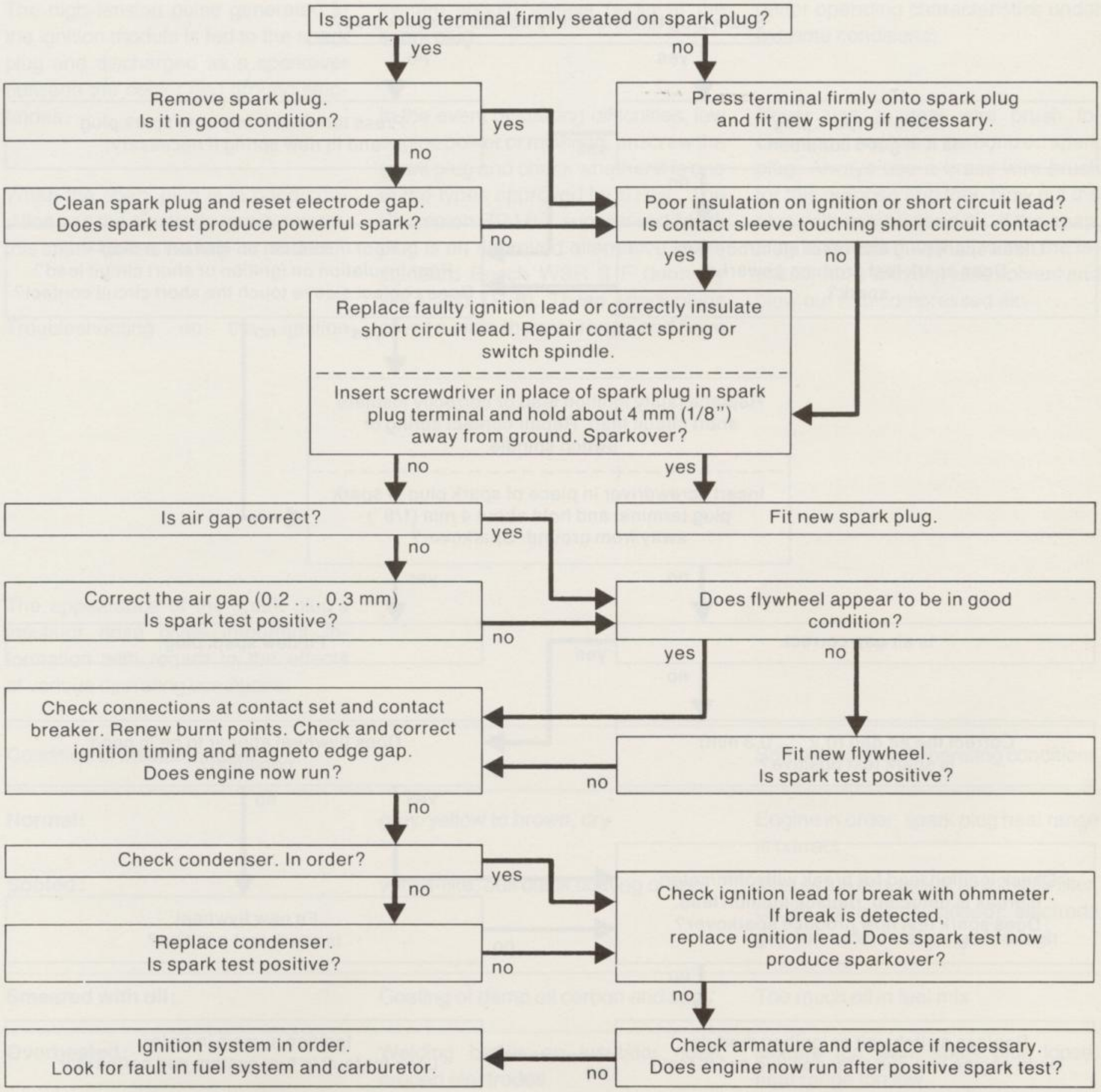
Diagram of transistorized ignition system

1 Flywheel
2 Permanent magnet
3 Armature with primary and secondary windings
4 Trigger plate
5 Spark plug
6 Ignition stop switch



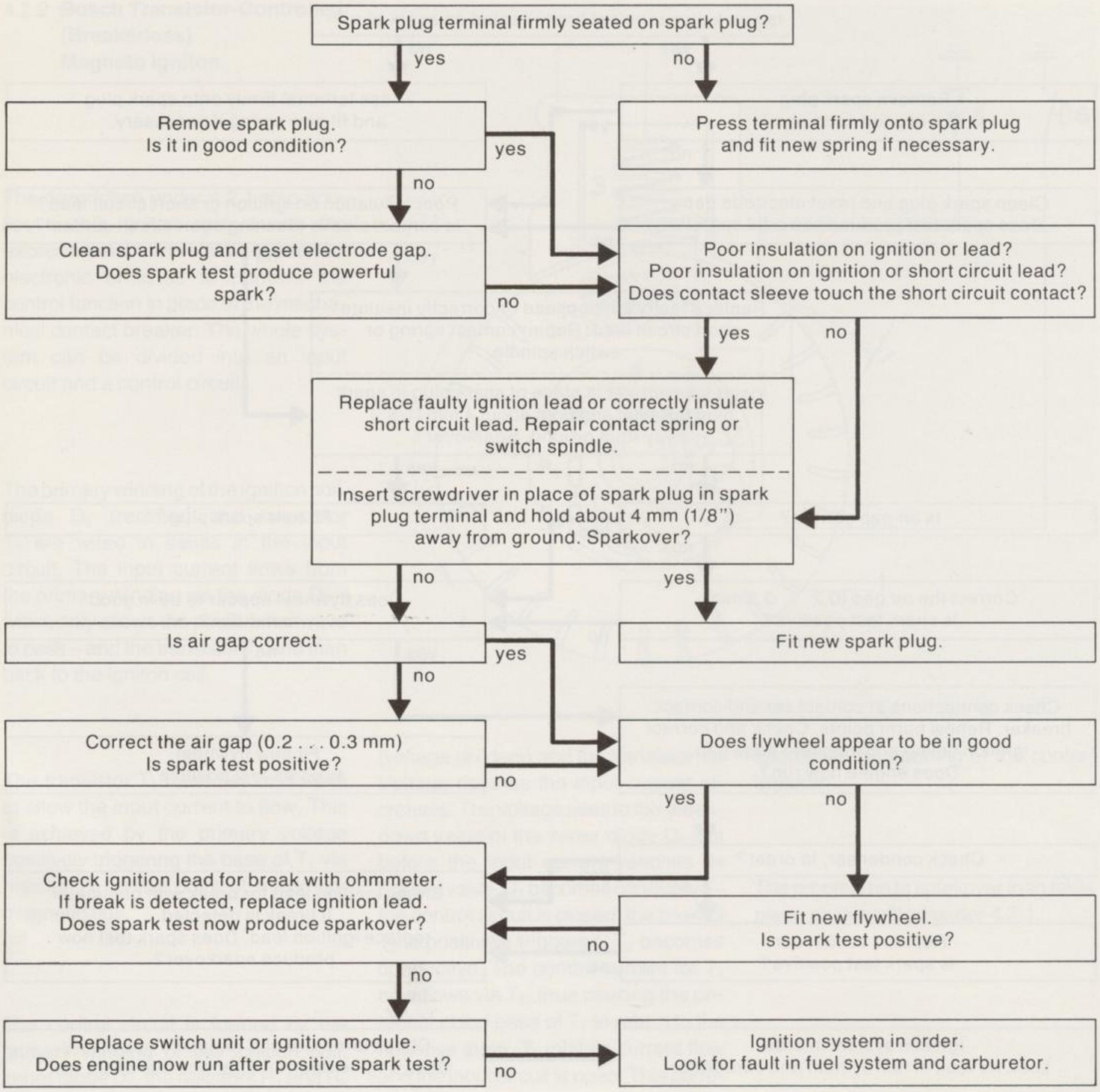
4.3 Troubleshooting

4.3.1 Breaker-controlled Ignition System



4.3.2 **Electronic Ignition System**

Great care must be taken during troubleshooting as well as maintenance and repair work on the ignition system. The high voltages which occur can cause serious accidents.



4.4 Function and Repair of Components

4.4.1 Spark Plug

The high-tension pulse generated in the ignition module is fed to the spark plug and discharged as a sparkover between the center and ground electrodes.

When the spark plug is in good condition and the electrode gap is correct, this spark ignites the fuel-air mixture.

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

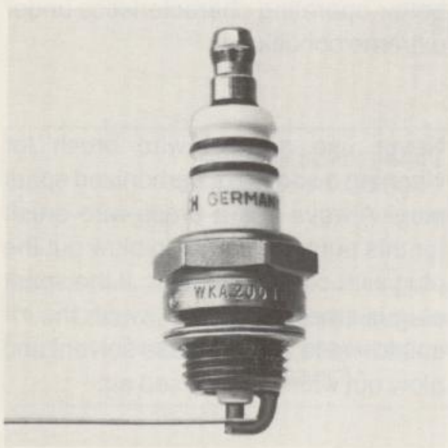
In the event of starting difficulties, low engine power or misfiring, unscrew the spark plug and check whether it is one of the types approved by STIHL. The Champion RCJ 6 Y suppressed spark plug is an approved alternative to the standard Bosch WSR 6 F (formerly WKA 200 TR 6). These spark plugs cover a wide thermal range and have better operating characteristics under extreme conditions.

Never use a steel wire brush for cleaning a sooted or carbonized spark plug. Always use a brass wire brush for this purpose and then blow out the plug with compressed air. If the spark plug is smeared with oil, wash the insulator nose with a grease solvent and blow out with compressed air.

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

Condition of insulator nose		Some associated operating conditions
Normal:	grey/yellow to brown, dry	Engine in order; spark plug heat range is correct
Sooted:	velvet-like, dull black coating of soot	Mixture too rich, lack of air (dirty air filter, choke valve partly closed), electrode gap too wide, heat range too high
Smeared with oil:	Coating of damp oil carbon and soot	Too much oil in fuel mix
Overheated:	Welding beads on insulator nose, eroded electrodes	Mixture too lean, spark plug loose, heat range too low

Checking electrode gap

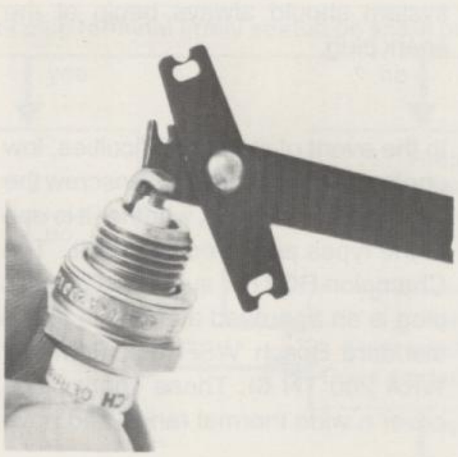


As the electrode gap becomes wider through normal erosion the gap must be checked with a feeler gauge at regular intervals and reset as necessary. The specified gap is **0,5 mm** and can be restored by bending the ground electrode. However, always fit a new spark plug if the electrodes are badly eroded.

Accurate checking of the spark plug is only possible with a special spark plug tester. A provisional check can be carried out by fitting the clean spark plug in the ignition lead terminal and holding it gainst ground. There should be a healthy sparkover at the electrodes when the engine is cranked by pulling the rewind starter.

If there is no sparkover although the spark plug is in good condition, first check the lead connections. Chafed insulation on the ignition and ground

Resetting electrode gap woth spark plug gauge

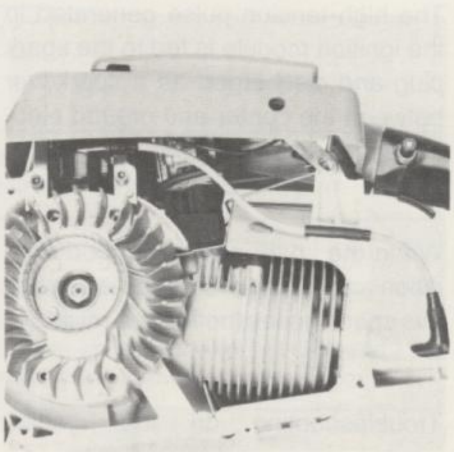


leads will cause a short-circuit to ground. If this is the case the engine will either not start or only run erratically.

Before refitting the spark plug in the cylinder, clean the spark plug seat and make sure the sealing ring is in good condition. Tighten down spark plug to a torque of 25 Nm.

4.4.2 **Ignition Lead**

Position of ignition lead in housing



The ignition lead feeds the high-tension pulse generated in the armature to the spark plug. If its insulation is brittle or damaged in any other way, a sparkover to ground can occur and thus interrupt the ignition process.

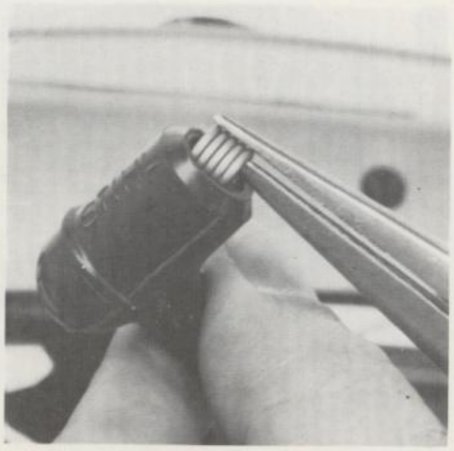
The ignition lead must be renewed in such a case.

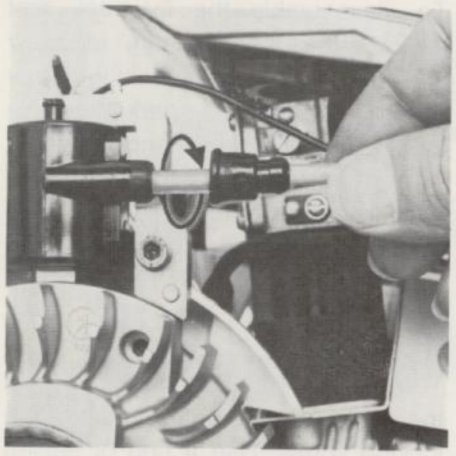
To remove the ignition lead, take off the fan housing cover with rewind starter and pull the ignition lead terminal off the spark plug. Use a suitable pair of pliers to grip and pull the leg spring out of the ignition lead terminal. Disconnect leg spring from ignition lead. Pull lead out through terminal and unscrew it from wood screw on hightension output of armature.

The new igniton lead has a length of 150 mm. Slip the rubber boot over one end of the lead and screw the lead

Top:
Pulling leg spring out of ignition lead terminal

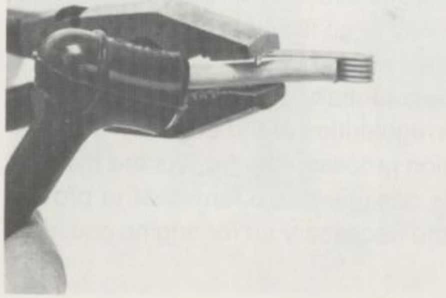
Bottom:
Unscrewing ignition lead from armature





firmly onto the wood screw in the armature – this is made easier if a hole is made in the center of the lead with a pointed tool. Coat the other end of the lead with a little oil and then fit the tube over the lead. Push the terminal over the end of the lead and use a suitable pair of pliers to grip and pull the end of the lead out through the terminal. Pinch the hook of the leg spring into the center of the lead cross section about 15 mm from the end of the lead. Pull lead back so that the leg spring

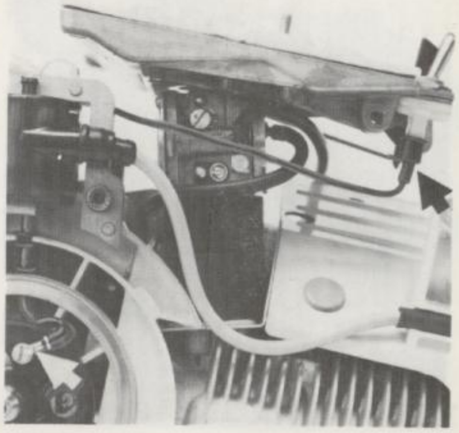
Pressing hook of leg spring into ignition lead



locates in the terminal. Fit terminal on spark plug and reassemble the fan housing cover.

4.4.3 Ignition Stop Switch Lead/ Ground Lead

Ground lead

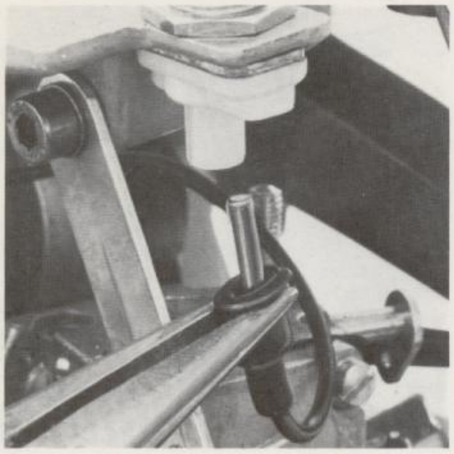


The ground lead is combined in a single terminal with the primary connection of the armature and connected to the contact set (breaker controlled ignition) or the trigger plate (transistor ignition). The free end has a contact sleeve which is inserted in the ignition stop switch.

If the insulation of the ground lead is damaged, a short-circuit to ground may occur and thus cause the ignition to operate erratically or even fail completely. As the ground lead cannot be replaced as such, the defective insulation must be repaired in such a case.

4.4.4 **Ground Lead Contact**

Pulling ground lead out of ignition stop switch



The igniton stop switch is used to short the ignition and thus stop the engine. The switch is installed in the filter housing and makes ground contact when in the ,,STOP'' position. The contact sleeve of the ground lead is a push fit in the switch.

A faulty ignition stop switch must always be replaced. To do this, first remove the filter cover, air filter and the filter housing. Pull the ground lead out of the ignition stop switch and then unscrew the switch from the housing.

Insert new switch in hole in filter housing and secure it with the hexagon nut. Push contact sleeve of ground lead firmly into the ignition stop switch. Check operation of switch.

4.4.5 **Flywheel**

The flywheel has several fuctions. It accommodates the permanent magnet with a north and south pole for the ignition system (polarized in engine's normal direction of rotation). The relatively large flywheel mass insures that the engine turns smoothly, i.e. it substantially suppresses the normal irregularities of the engine's combustion process. The front of the flywheel is designed as a fanwheel to provide the necessary air for engine cooling.

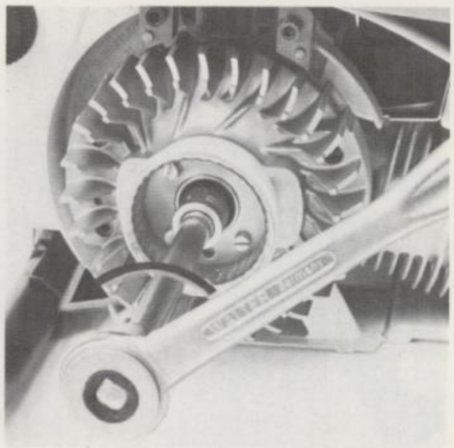
The starter hub is also secured to the front side of the flywheel by means of four pan head screws. The starter hub transmits the starting torque to the crankshaft.

On machines with a breaker-controlled ignition system the flywheel is provided with apertures to facilitate setting of the contact breaker gap.

These apertures are not necessary on electronic ignition systems. For this reason the cover plate was also deleted as from machine No. **4622861.**

The flywheel is mounted at the ignition side of the crankshaft on a taper seat, located by means of a key and secured with a hexagon nut.

Releasing hexagon nut

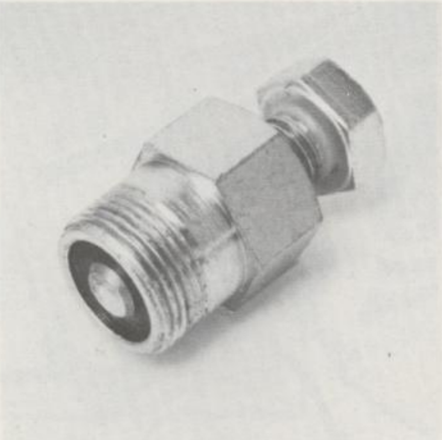


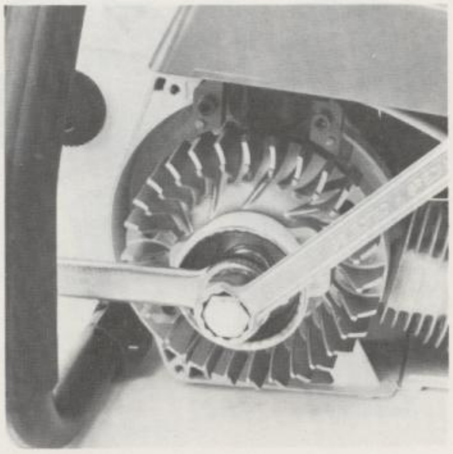
To disassemble the flywheel, first remove the fan housing, unscrew the spark plug and fit locking screw 1107 191 1200 in the spark plug hole and tighten down by hand. Take off starter hub (and cover plate, if fitted) after removing the four pan head screws.

Turn flywheel counterclockwise until the piston head butts against the locking screw. Use a ring or socket wrench to slacken off and remove the hexagon nut counterclockwise.

Top:
Puller

Bottom:
Pulling off flywheel



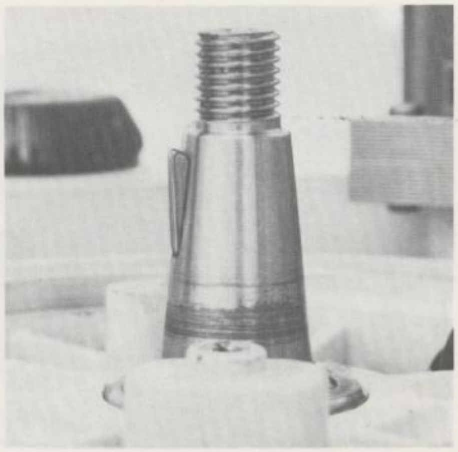


Screw flywheel puller 1110 890 4500 as far as it will go into the thread of the flywheel hub. Hold the threaded sleeve of the puller with a 24 mm open-end or ring wrench and tighten down the thrust bolt with a 19 mm wrench until the flywheel hub is released from the crankschaft's taper seat.

The flywheel will come off its seat more easily if the puller's thrust bolt is tapped with a hammer after it has been tightened down. Always replace the flywheel if it is damaged in any way (cracks, broken fan blades etc.).

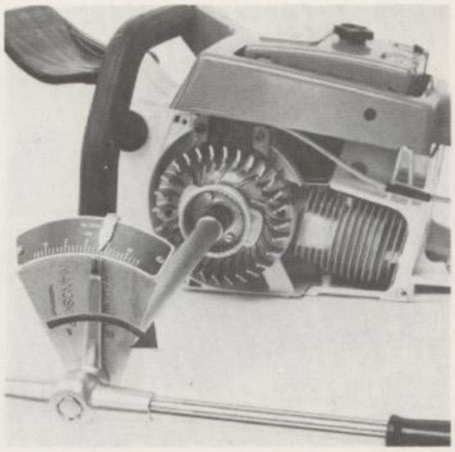
Top:
Key correctly positioned

Bottom:
Key slot in flywheel hub



Before re-installing the flywheel clean the crankshaft taper and flywheel hub bore with a suitable degreasing agent (e.g. trichlorethene, diluted nitro).

Tightening the crankshaft nut



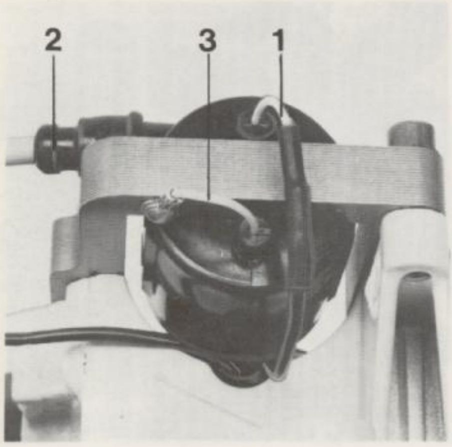
Make sure the key is properly positioned.

Fit the flywheel on the crankshaft so that the key engages in the slot in the flywheel hub. The key is only provided to insure that the flywheel is correctly positioned. The driving force between the crankshaft and flywheel must be absorbed entirely by the taper seat. It is therefore absolutely essential to insure that the crankshaft nut is tightened down to the specified torque of 35 Nm.

Finish off by removing the locking screw, refitting the spark plug and fan housing.

4.4.6 **Ignition Armature**

1 Primary connection
2 Secondary connection
3 Ground connection



On the ignition armature the primary and secondary coils are arranged on the center arm of the iron core and encased in a plastic compound to make them moisture-proof. Three electrical connections emerge from the coil body, i.e. the primary and secondary connections and the common ground connection which is riveted to the core.

There are two ways of testing the ignition armature:

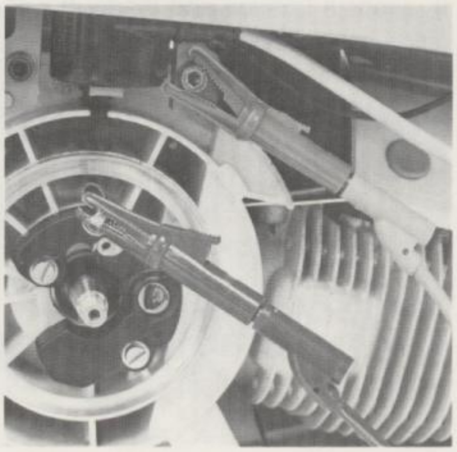
The resistance of both coil windings can be checked with the aid of ohmmeter 5910 850 4800.

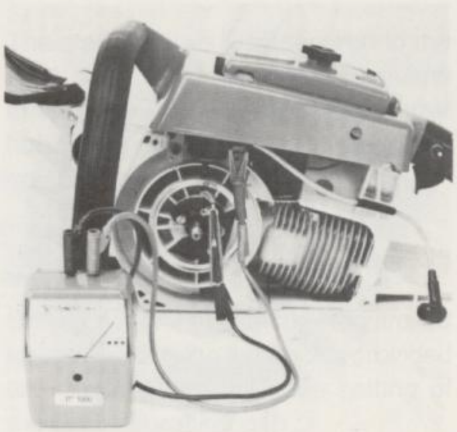
An ignition coil tester must be used for accurate testing.

4.4.6.1 **Resistance Test on Primary Winding**

Top:
Test leads clipped to primary connection and ground

Bottom:
Resistance test on primary winding





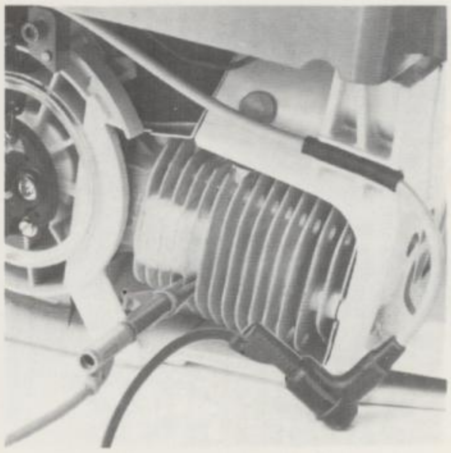
To test the primary winding, first remove the flywheel (4.4.5) and disconnect lead from contact set or trigger plate. Clip one of the two test leads to the primary connection and the other to ground of ignition armature. In measuring range ,,Ω x 1'' the ohmmeter should show a value of approx. 1.0 (Ω).

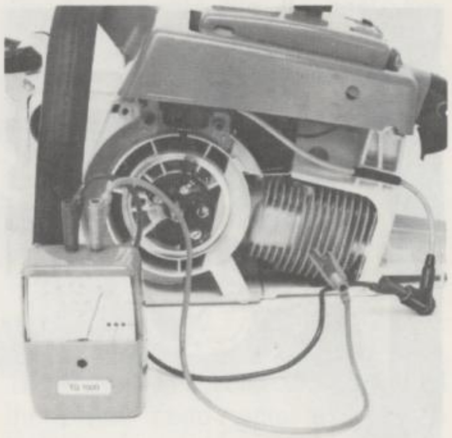
If any other value is obtained the ignition armature must be replaced.

4.4.6.2 **Resistance Test on Secondary Winding**

Top:
Test leads clipped to ignition lead and ground

Bottom:
Resistance test on secondary winding



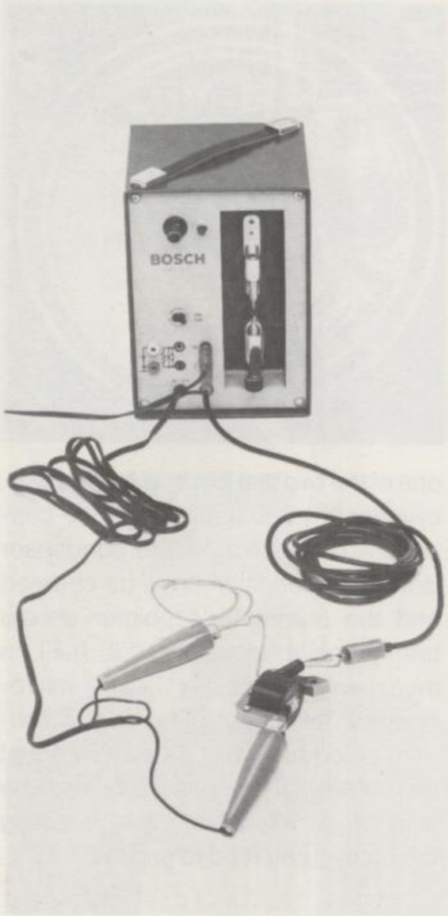


To test the secondary winding, connect banana-pin of one test lead to the leg spring in the spark plug terminal and the other test lead to ground of ignition armature. In measuring range ,,Ω x 1000'' (kΩ) the ohmmeter should indicate a value of 8.7 (kΩ).

If the reading obtained deviates from this value the ignition armature must be replaced.

4.4.6.3 Testing with Ignition Coil Tester

Armature test with ignition coil tester



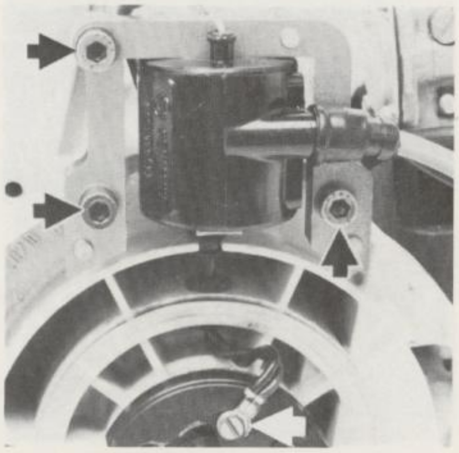
The sparkover can be checked with an ignition coil tester, e.g. Bosch EFZM 1 A or EFAW 106 A. The armature must be removed from the machine and the ignition lead unscrewed for this purpose.

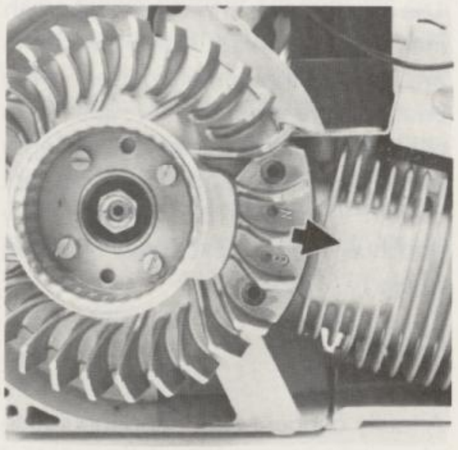
In this test the spark length must be 8 mm at 2.4 A.

4.4.6.4 Removal and Installation

Top:
Unscrew armature mounting and lead terminal

Bottom:
Magnet poles point toward cylinder

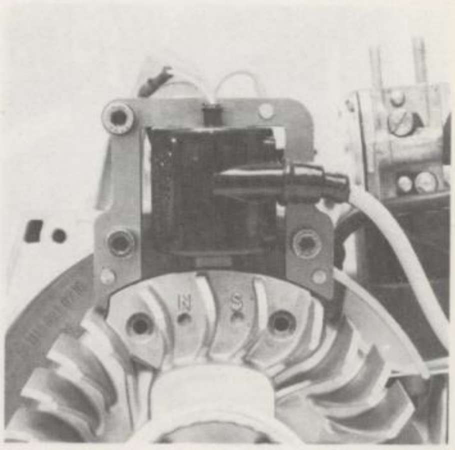


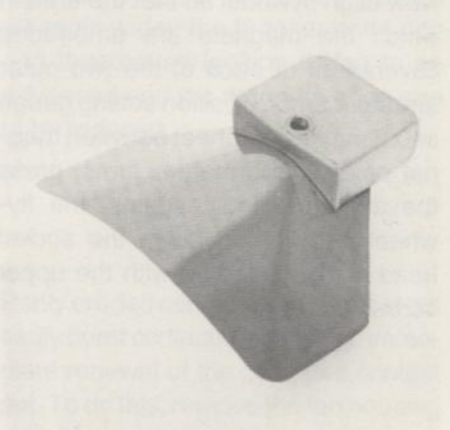


First remove the flywheel (4.4.5) and then unscrew the armature mounting screws. Now disconnect common terminal with ground and primary leads from the contact set or trigger plate and pull both leads, along with the rubber grommets, out of the crankcase bores. Take spark plug terminal off the defective armature and fit it on the new armature.

Top:
Flywheel aligned

Bottom:
Setting gauge

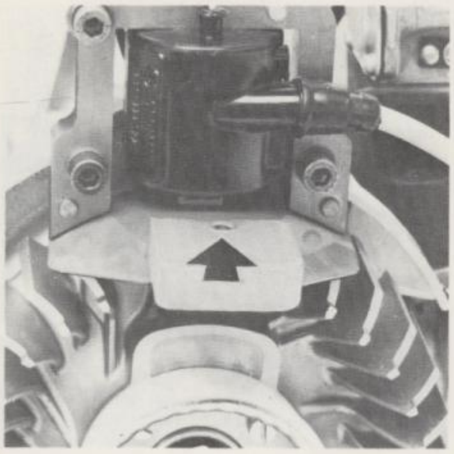




Now push primary and ground leads through the crankcase bores, position the rubber grommets in the bores and secure the lead terminal to the contact set or trigger plate. Fit flywheel and turn it so that the magnet poles are pointing toward the cylinder.

Provisionally secure armature to crankcase with the socket head screws.

Setting gauge in position

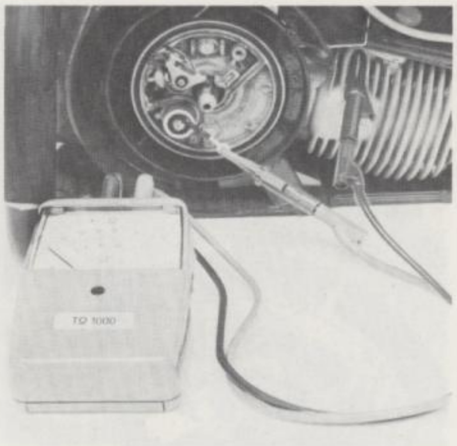


Now align flywheel so that the area in which the magnets are embedded covers half of each of the two outer armature arms. Position setting gauge or 0.2 mm gauge sheet between magnet poles and armature arms, press the armature firmly against the flywheel and tighten down the socket head screws, starting with the upper screw.

Pull out the gauge sheet and check the air gap with a feeler gauge. It should be between 0.2 and 0.3 mm.

4.4.7 **Condenser**

Checking condenser with an ohmmeter



The condenser is wired in parallel with the contact breaker. While the points are opening the primary current is fed briefly to the condenser until it is charged. This insures that the strength of the current flowing via the contact breaker at this point is only very low and thus prevents excessive sparking (arcing).

A faulty condenser is often the cause of premature erosion of the contact breaker points and loss of ignition voltage. The condenser's capacitance – it is 0.18 μF – can be checked with ohmmeter 5910 850 4800 or the Bosch ignition coil and condenser tester EFAW 106 A. To do this, remove the fan housing and flywheel and disconnect the condenser lead from the contact set.

To check with the ohmmeter, connect

Unscrewing armature plate

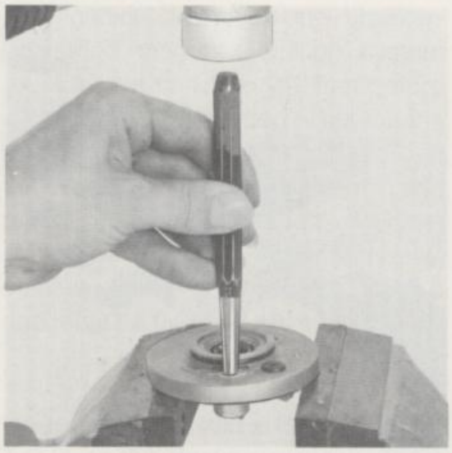
one of the two test leads to ground (e.g. cylinder fin) and the other to the condenser connection. If the condenser is in good condition it will be charged and the ohmmeter's pointer should briefly move to about 0.9 (μF) in measuring range „μF x 1" (μF = microfarad). If this is not the case the condenser is faulty and a new one must be installed. The condenser must be discharged after this test by shorting the connecting lead to ground.

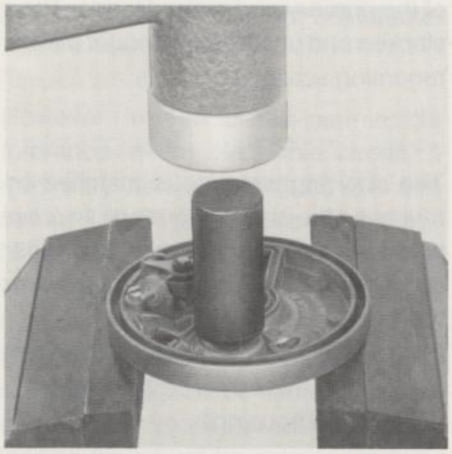
If the Bosch tester EFAW 106 A is used for the test, follow the instructions provided with the unit.

To replace the condenser, unscrew the armature plate and press or knock out the condenser from the rear with a suitable tool.

Top:
Knocking out condenser

Bottom:
Inserting new condenser



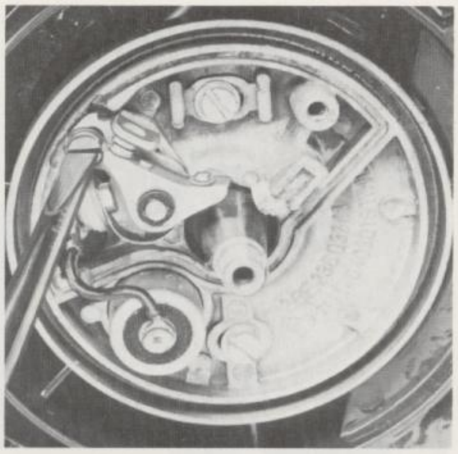


Insert new condenser in armature plate with installing sleeve 11108932400, the lead terminal must face the contact breaker. Tap installing sleeve lightly with a hammer to peen the edge of the bore. The underside of the condenser must not project beyond the lower face of the armature plate.

Finish off by refitting the flywheel and fan housing.

4.4.8 **Contact Set**

Unscrewing contact set

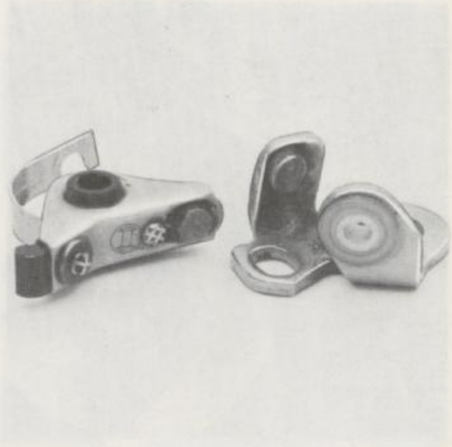


The contact breaker set consists of a fixed contact, which is connected to ground, and a moving contact breaker lever which is insulated from ground and connected to the primary connection of the ignition coil, the condenser and the ground contact. The contact set is used as a switch which closes the primary circuit and opens it again at the point of ignition.

The service life of the heel on the contact breaker lever is greatly dependent on proper lubrication. It is therefore important to insure that the grease impregnated lubricating felt in the contact plate is always in good condition and the groove behind the heel packed with ample grease.

The contact breaker points gradually

Eroded contacts



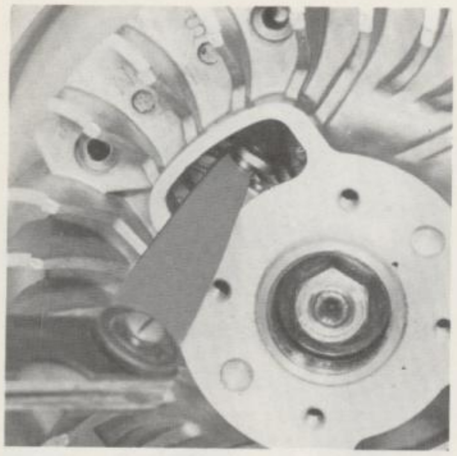
wear as a result of erosion. Eroded contacts widen the breaker point gap and thus cause ignition timing to be advanced and the magneto edge gap to be reduced.

Partly eroded contacts can be reset but badly burnt contacts necessitate immediate renewal of the complete contact set. To do this, remove the fan housing and flywheel, disconnect leads from terminal and then unscrew the contact set's mounting screws.

Fit the new contact set, reconnect leads and adjust the breaker point gap, i.e. push the flywheel onto the crankshaft, remove the spark plug and turn the crankshaft to T.D.C. The flywheel cam opens the contact breaker lever fully in this position.

4.4.9 Trigger Plate (Transistor Ignition)

Checking breaker point gap with feeler gauge

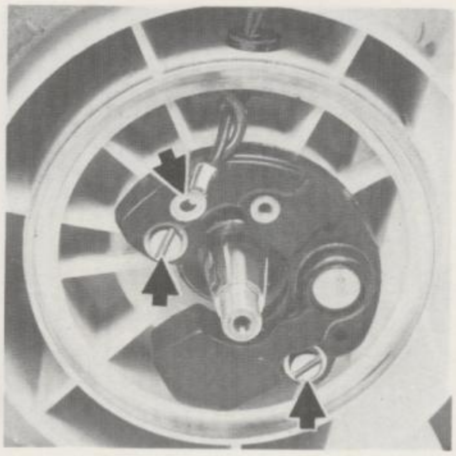


Now slacken the contact set and turn it until a breaker point gap of 0.35 – 0.4 mm is obtained with a clean feeler gauge. Retighten the mounting screws and check ignition timing and magneto edge gap.

The breaker point gap, ignition timing and magneto edge gap are interrelated and none of these values can be altered without influencing the others. However, this also means that if one of these values is correctly set, the others should also be correct. The dominating factor is the magneto edge gap. If variations are experienced in practice, preference should be given to maintaining the correct edge gap.

Finish off by filling the groove of the contact breaker lever with the grease supplied with the new contact set and reassemble all parts.

Lead terminal disconnected, removing the mounting screws



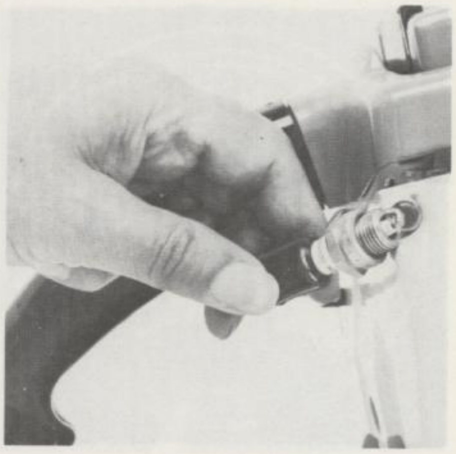
The electronic switch elements and the other parts of the electronic control are arranged on a common printed circuit board in the trigger plate and embedded in a plastic compound. The electronic control unit is therefore resistant to moisture and dirt.

The trigger plate is not subject to mechanical wear and is practically trouble-free in operation. As long as the trigger plate is intact the ignition point will remain constant and does not, therefore, require checking.

However, if the spark test on the ignition system is negative, and the other component parts are in order, the trigger plate is at fault and must be replaced.

To remove the trigger plate, first disassemble the fan housing and flywheel and disconnect the common terminal

Spark test



of the primary and ground leads. Then slacken and unscrew the trigger plate's mounting screws.

The new trigger plate is installed by reversing the above sequence. In order to increase operational reliability under damp conditions it is advisable to cover the terminal screw with Elastosil, part No. 07838200110. Refit the flywheel (make sure that key is properly seated) and the fan housing.

Check operation of unit by repeating the spark test.

4.5 Ignition Timing

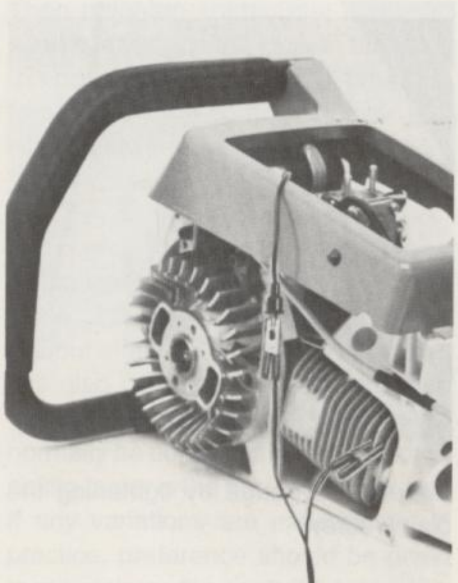
The ignition timing on the breaker-controlled magneto ignition system must be set to 1.9 to 2.1 mm before T.D.C. (top dead center). That means that the moving contact should just begin to lift off the fixed contact in this position. The contact breaker points should be fully open when the crankshaft is in the T.D.C. position and the gap must be 0.35 – 0.40 mm.

Ignition timing is fixed at 2.5 mm before T.D.C. on the electronic (breakerless) ignition system and is not adjustable.

However, in view of the permissible tolerance in the electronic circuit, it may vary between 2.4 and 2.8 mm before T.D.C. As there is no mechanical wear on these systems the ignition timing cannot get out of adjustment during operation. However, an internal fault in the circuit can alter the switching point to such an extent that, although the spark test is still positive, ignition timing will be outside the permissible tolerance and thus impair engine starting and running characteristics.

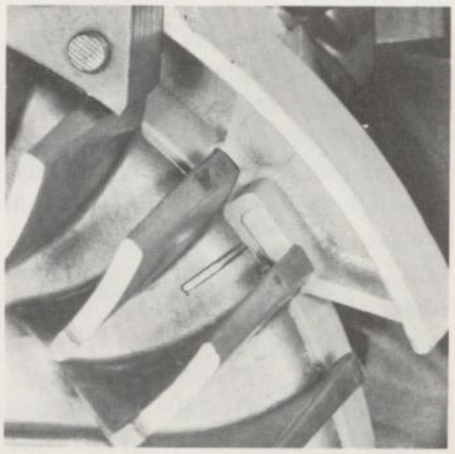
4.5.1 Checking Breaker-Controlled Ignition

Ignition timing unit connected



To check ignition timing, first remove the filter cover, air filter, filter housing and fan housing and unscrew the spark plug (it is then easier to turn the flywheel). Pull contact sleeve of ground lead out of ignition stop switch and connect one terminal clip of the ignition timing unit to the contact sleeve and the other to ground.

Timing marks on crankcase and flywheel in alignment



Switch on the ignition timing unit and turn flywheel slowly in the engine's normal direction of rotation (counter-clockwise) passed T.D.C. until the indicator lamp on the timing unit lights up. The contact breaker points open in this position. The timing marks on the flywheel and crankcase should now be exactly in alignment. If this is not the case the ignition must be retimed.

On machines without timing marks the T.D.C. position must be determined with the aid of a dial gauge as follows.

Remove the socket head screw on the right of the spark plug hole.

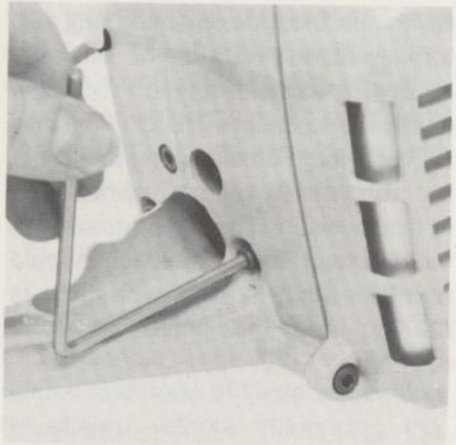
Secure the clamp 1106 890 4200 at this point with the M 5x35 screw and washer. Fit extension on tracer pin and then insert dial gauge in clamp and spark plug hole.

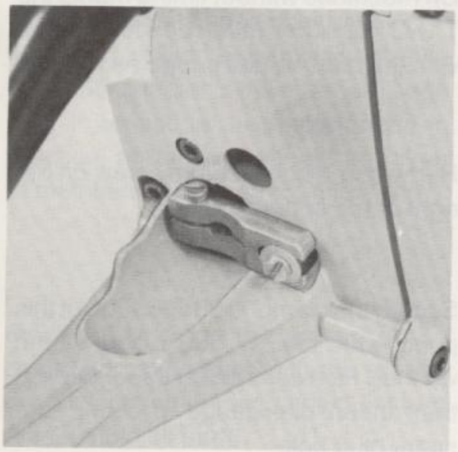
4.5.2 Adjusting Breaker-Controlled Ignition

Top:
Clamp, dial gauge and tracer pin extension

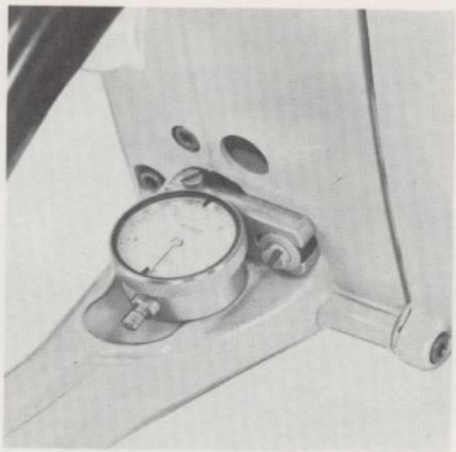
Center:
Removing socket head screw

Bottom:
Clamp in position





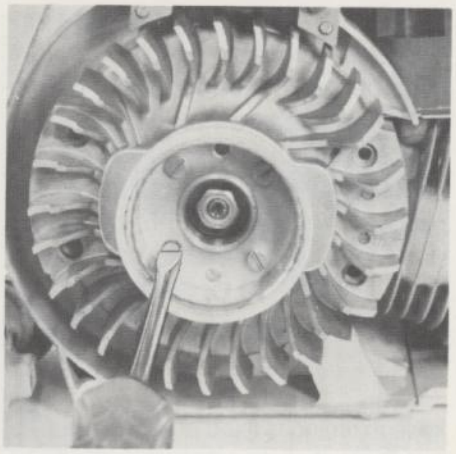
Dial gauge secured in clamp



Secure dial gauge by tightening the clamp screw.

Move piston to T.D.C. position by turning the flywheel and then set the dial gauge pointer to ,,0'' in this position. Now turn flywheel backward about a quarter of a revolution. Switch on ignition timing unit and slowly turn flywheel in the engine's normal direction of rotation until the indicator lamp on the timing units lights up, or the buzzer sounds. The contact breaker opens in this position. The dial gauge should now indicate a value between 1.9 and 2.1 mm. If this is not the case the ignition must be retimed.

Exposing timing apertures in flywheel



In addition to the preparations described under 4.5.1 it is necessary to expose the timing apertures in the flywheel. Remove the starter hub and cover plate for this purpose.

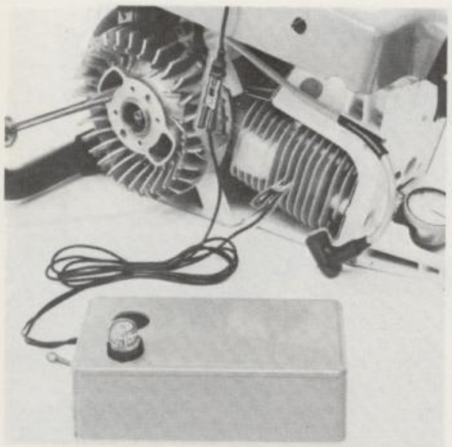
Remove socket head screw from shroud and cylinder mounting above the spark plug hole. Then secure clamp of timing unit 1106 890 4200 with screw 9043 319 1080 (M 5x35). Unscrew short tracer pin with ball tip from dial gauge.

Now screw the 20 mm extension and then the 10 mm extension into the measuring spindle and then refit the short tracer pin extension which has just been removed.

Position dial gauge, tracer pin first, in

4.5.3 **Checking Electronic Ignition**

Ignition timing unit connected



the clamp and the cylinder so that a sufficiently large deflection is obtained on the dial gauge when the flywheel is turned.

Tighten the screws moderately. Caution: If the screw is overtioghtened the neck of the dial gauge, which is also the measuring spindle guide, will be deformed and the measuring spindle will stick. Align clamp so that it and the tracer pin are concentric with the spark plug hole. Secure the clamp.

Bring piston exactly into T.D.C. position by turning the flywheel. Set dial gauge to ,,0'' by adjusting the bezel. Now turn crankshaft beyond T.D.C. until the dial gauge shows a mean reading of 2.0 mm. Switch on the ignition timing unit, slacken the contact set and turn it so that the indicator lamp on the timing unit just lights up.

Then retighten contact set mounting screws and recheck ignition timing. If it is now between 1.9 and 2.1 mm before T.D.C., the contact breaker gap will be between 0.35 and 0.4 mm.

The contact breaker gap, ignition timing and magneto edge gap are interrelated. None of these values can be altered without affecting the others. However, this also means that if one of these values is correctly set the others will normally be correct as well. The dominating factor is the magneto edge gap. If any variations are experienced in practice, preference should be given to maintaining the correct edge gap.

Finish off by removing the test equipment and refitting the cover plate with starter hub, fan housing, filter housing, air filter, spark plug etc.

Important: It should be noted that on machines up to No. **2981245** the ignition advance is 2.3 – 2.7 mm and the edge gap 9 – 13 mm.

On breakerless igniton systems the ignition timing is fixed by the position of the key slots in the crankshaft and flywheel. Contrary to breaker-controlled ignitions, the ignition timing on breakerless ignitions cannot be checked statically, i.e. it must be checked with a stroboscopic timing light while the engine is running. The Bosch ET Z 003 stroboscope (Bosch order No. 0684 100300) and the timing lights EFAW 180 (Bosch order No. 0681 101 103) and EFAW 185 (Bosch order No. 0681 101 102), for mains or battery operation, are particularly suitable for this purpose.

The preparatory work is the same as described under 4.5.2, i.e. set the piston to 2.5 mm ± 0.1 before T.D.C. with the aid of the dial gauge.

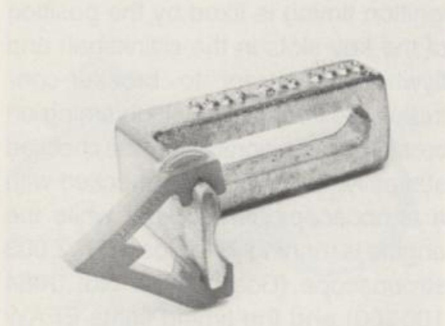
Now push the adjusting flange with slide (special tool) onto the guide bar mounting studs and secure it in position. Apply a mark to the clutch cover plate – or one of the clutch shoes on older machines – in line with the arrow point of the flange.

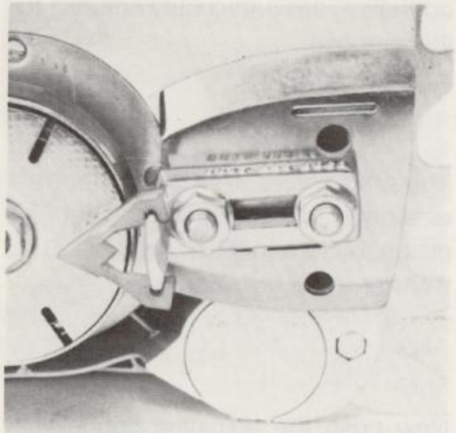
Before the engine can be started it is necessary to remove the dial gauge and clamp and refit the cover plate with starter hub, fan housing, filter housing, air filter, spark plug etc. Now

Top:
Adjusting flange

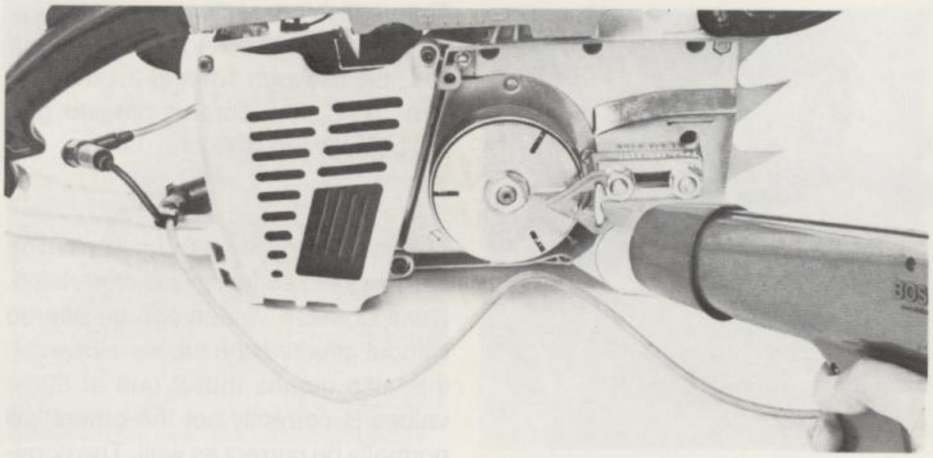
Center:
Adjusting flange in position

Bottom:
Mark applied to clutch





Checking ignition timing with timing light



connect up the test lead as described in the timing light's operating instructions.

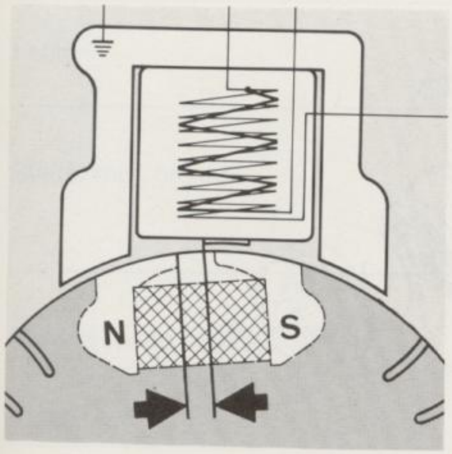
Once all preparations have been made for the test, start the engine and set the speed to 6000 rpm with the aid of a rev counter. After briefly warming up the engine (approx. 1 minute), point the timing light at the mark on the clutch. If ignition timing is correct the mark should appear to be in line with the arrow of the adjusting flange. If the mark is outside this area, the electronic control is faulty and the trigger plate must be replaced.

It is only possible to alter the ignition timing very slightly. The key which locates the flywheel has a certain amount of play in its seat in the crankshaft. In this way the position of the flywheel can be varied a fraction to either side. When this is done it may be necessary to counterhold the flywheel while tightening the hexagon nut. It is recommended that the flywheel be mounted to the left within the key slot tolerance.

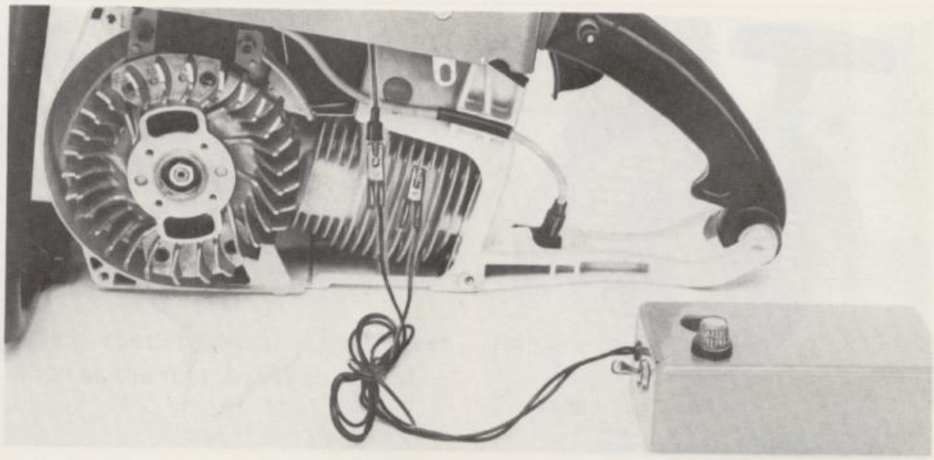
Repeat the test procedure. Then remove the test equipment and reassemble all other parts.

4.6 Magneto Edge Gap on Breaker-Controlled Ignition

Magneto edge gap



Checking edge gap with ignition timing unit



The position of the magnet at the point of current interruption, i.e. ignition, is called the edge gap. The edge gap is, therefore, the distance between the trailing edge of the north pole shoe and the left-hand edge of the center armature arm when the contact breaker points begin to open. This distance is 12 to 16 mm on the Bosch breaker-controlled ignition system. On machines up to No. **2 981 245** the edge gap was 9 to 13 mm with the ignition set at 2.3–2.7 mm before T.D.C.

The magneto edge gap has a decisive influence of the performance of the ignition system. If it is too large the ignition voltage during starting will be too low; however, if it is too small, the engine will misfire at high speed.

If the ignition is properly timed the magneto edge gap will automatically be correct as the two factors are interrelated. However, variations may occur through the accumulation of upper manufacturing tolerances. The edge gap should, therefore, also be checked whenever the ignition timing is adjusted. Preference should always be given to maintaining the correct edge gap even if this means that there are minor discrepancies in ignition timing and the contact breaker gap.

To check the edge gap, push an 0.5 mm feeler gauge between the open contact breaker points and turn the flywheel backwards until the feeler gauge can just be pulled out. Now check the edge gap. If it is not within the specified tolerance it can only be corrected by altering the contact breaker gap. A narrower contact breaker gap increases the edge gap and vice versa.

In the event of starting difficulties always check the edge gap.

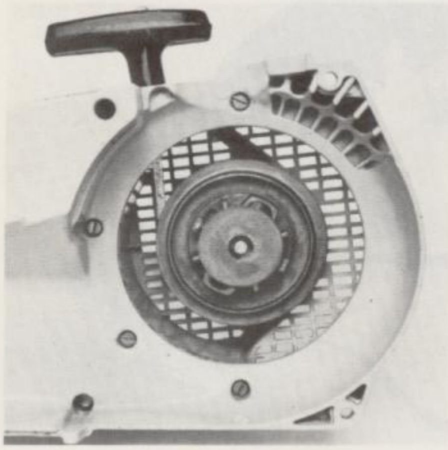
Moreover, it is advisable to check that the flywheel is correctly positioned and make sure the key has not been pushed out of the crankshaft slot, i.e. when fitting the flywheel.

To check the edge gap, first follow procedure for checking ignition timing on breaker-controlled ignition systems (4.5.1) by turning the flywheel in the engine's normal direction of rotation and beyond top dead center until the indicator lamp on the timing unit lights up. The edge gap should then be measured at the moment the indicator lamp lights up (ignition point).

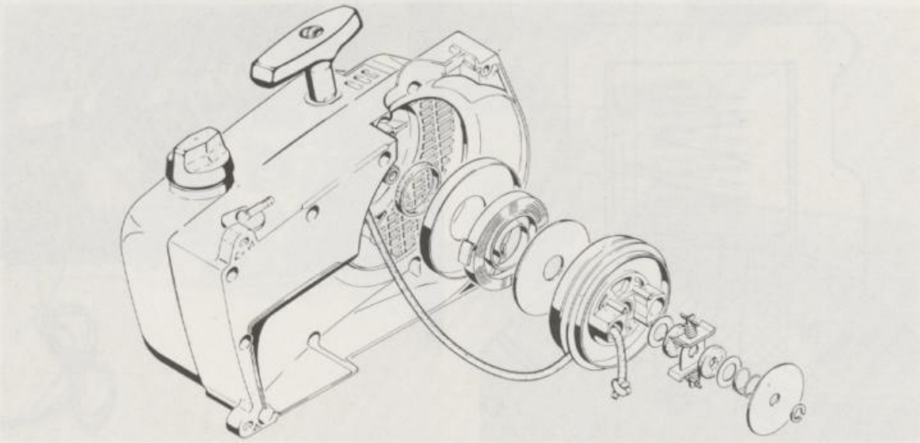
5. REWIND STARTER

5.1 Construction and Operation

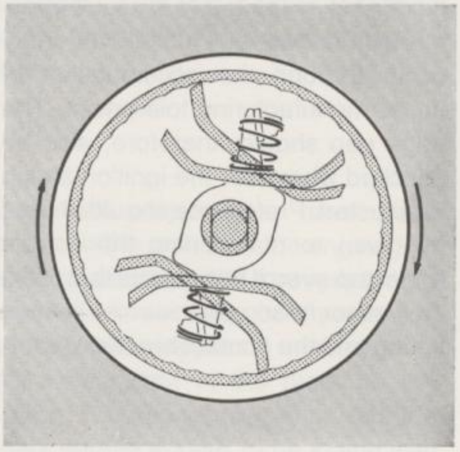
Rewind starter



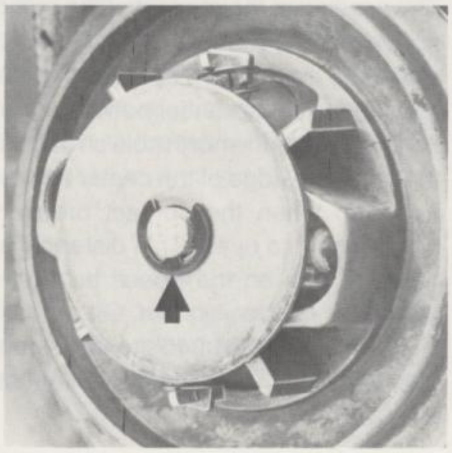
Top:
Component parts of rewind starter



Bottom:
Schematic of friction shoe system



Bottom:
Retaining washer



The rewind starter mechanism is mounted on the starter post in the fan housing, directly in front of the flywheel. Its main components are the starter rope with grip, rope rotor with rewind spring, friction shoe and brake spring. A retaining washer holds these components in position on the post. The starter rope, which is wound onto the rope rotor by the preload of the rewind spring, rotates the rotor when the starter grip is pulled. The friction shoe is located in a recess in the rope rotor. When starter grip is pulled the brake lever is offset relative to the rope rotor owing to the checking action of the brake spring. This cause the sharp edges of the friction shoe plates to be pressed against the inside of the starter hub.

The torque produced by the starter rope is thus transmitted positively to the flywheel and turns the crankshaft.

The withdrawn starter rope is automatically rewound onto the rope rotor by the tensioned rewind spring.

The rewind starter mechanism is practically maintenance-free. Only the bearing bush of the rope rotor needs to be lubricated with non-resinous oil at regular intervals.

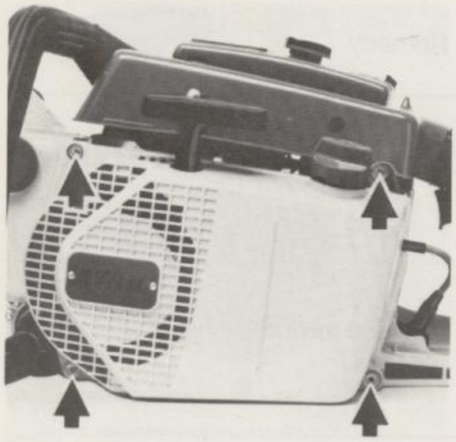
5.2 **Troubleshooting Chart**

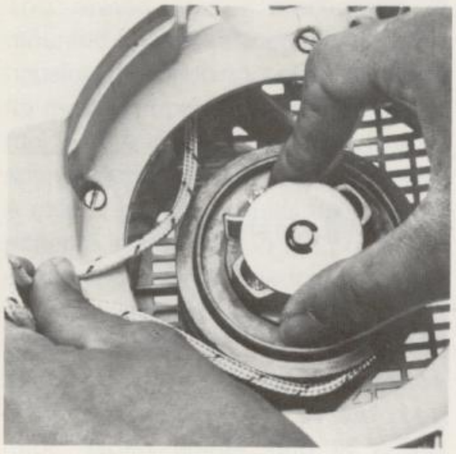
Fault	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or not pulled vertically	Replace starter rope
Rewind spring broken	Spring overtensioned – no reserve when starter rope is fully extended	Replace rewind spring
Rewind starter makes poor frictional contact	Washers smeared with oil or worn	Replace washers
Starter rope can be pulled out almost without resistance (crankshaft does not turn)	Edges of friction shoe plates worn	Fit new friction shoe plates
	Starter hub worn by edges of friction shoe plates	Replace starter hub
	Brake washers smeared with oil or worn	Replace brake washers
Starter rope difficult to pull and rewinds very slowly	Rewind starter mechanism very dirty (dusty conditions)	Thoroughly clean rewind starter
	The lubricating oil on the rewind spring becomes viscous at very low outside temperatures (spring windings stick together)	Apply a little paraffin to the rewind spring, then pull starter rope carefully several times until normal action is restored

5.3 **Disassembly**

Top:
Unscrewing fan housing

Bottom:
Releasing tension on rewind spring

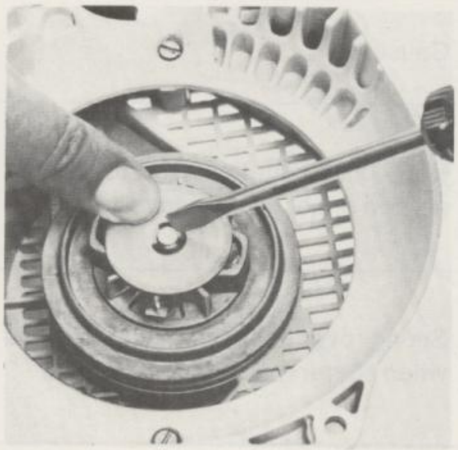




First unscrew the fan housing together with the rewind starter. Then release tension on rewind spring. To do this, pull starter rope partly out of the housing, hold the rope rotor firmly and unwind two to three turns of the starter rope. Let go of rope rotor – it will turn back and the rewind spring is then relieved of preload.

There will, of course, be no preload

Removing retaining washer



on the rewind spring if the starter rope is broken. Now use a screwdriver to carefully remove the retaining washer from the starter post while holding down the thrust washer with your other hand to make sure it does not jump off the post along with the brake spring.

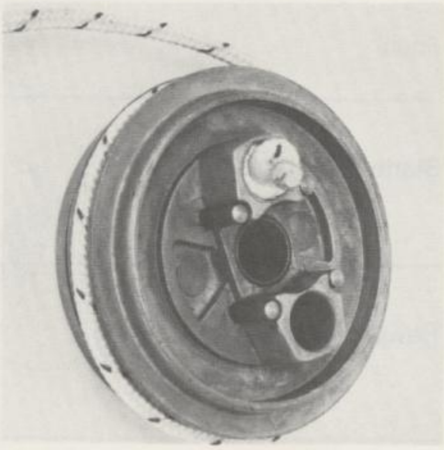
The component parts of the rewind starter can now be taken off the starter post.

When refitting the rope rotor on the starter post make sure that the felt washer is properly seated.

5.4 **Replacing the Starter Rope**

Top:
Starter rope secured in rope rotor

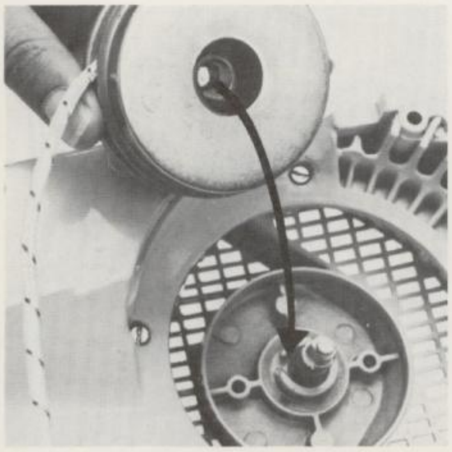
Bottom:
Special knot



Remove rope residue from rope rotor, thread a new 4.5 mm dia. and 1000 mm long starter rope through the rope rotor and secure it with a simple knot.

Push the other end of the rope through the rope guide bush in the fan housing cover and the underside of the starter grip and secure it with a double knot.

Engage rewind spring in recess



Lubricate the starter post with oil. Push the rope rotor – with rewind spring and cover fitted – onto the starter post. Make sure that the inner end of the rewind spring engages in the recess of the annular rib in the fan housing cover. Now refit the other parts of the rewind starter in the correct sequence.

It is important to insure that the two washers (brake washers) are positioned in front of and behind the friction shoe system. The friction shoe system is correctly assembled when the lugs on the spring retainers point in the clockwise direction and the word "TOP" faces upward.

Secure rope rotor on starter post with the retaining washer and then tension the rewind spring.

5.5 Replacing the Rewind Spring

Friction shoe correctly positioned

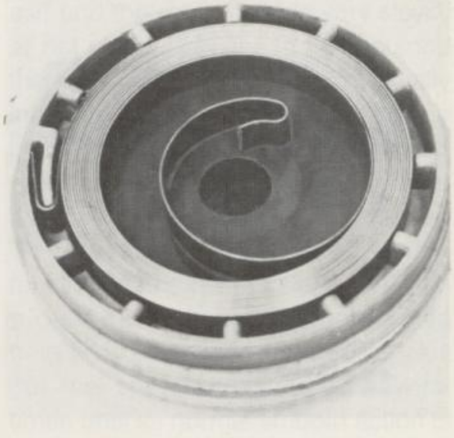
The replacement spring is supplied ready for assembly and is held together by a wire strap. It should be lubricated with a few drops of non-resinous oil before installation.

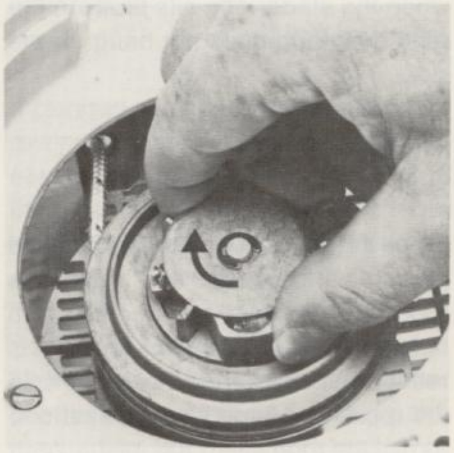
Position rewind spring in the rope rotor so that the outer end of the spring engages over the cast lug on the rope rotor. The wire strap is pushed off the spring during installation. If the rewind spring jumps out and uncoils during installation, it should be refitted in the rope rotor in the clockwise direction, starting with the outer end and working inward. Press cover on the rope rotor and then fit the rope rotor in position.

5.6 Tensioning the Rewind Spring

Top:
Rewind spring in position

Bottom:
Winding starter rope onto rotor





Hold the rope rotor firmly and wind the starter rope completely onto the rope rotor in the clockwise direction. With the rope wound onto the rotor, turn the rotor another half turn clockwise. Now pull end of rope far enough out of the hole in fan housing cover so that starter grip can be slipped over it. Then secure rope with a double knot in the starter grip.

The rewind spring is correctly tensioned

Starter grip firmly seated in rope bush

when the starter grip sits firmly in the rope bush and does not hang to one side.

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

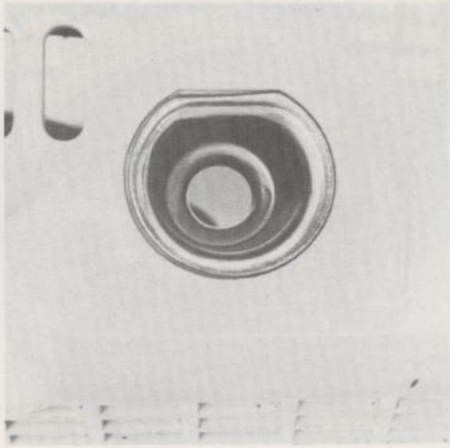
Do not overtension the rewind spring as this will cause it to break prematurely.

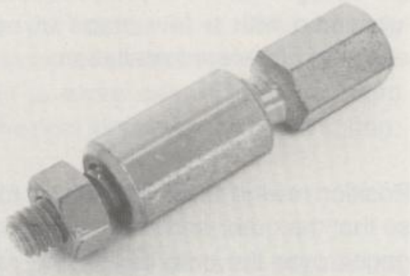
Fit the fuel line on the elbow connector before reassembling the fan housing cover.

5.7 Replacing the Starter Rope Guide Bush

Top:
Rope guide bush

Bottom:
Installing tool for rope guide bush

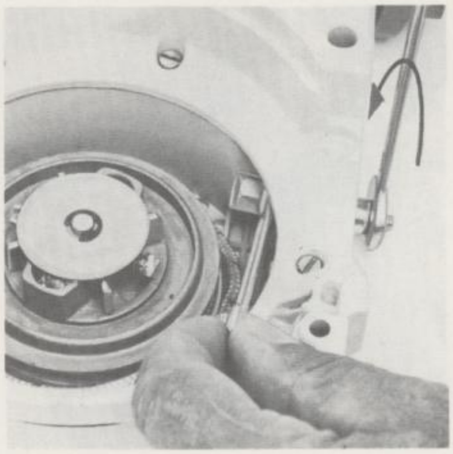




The wear on the guide bush is increased considerably if the starter rope is pulled sideways during starting. The wall of the bush eventually wears through, becomes loose and must be replaced.

To do this, release tension on rewind spring, untie the knot in rope and pull rope out of starter grip and rope bush.

Fitting new rope guide bush

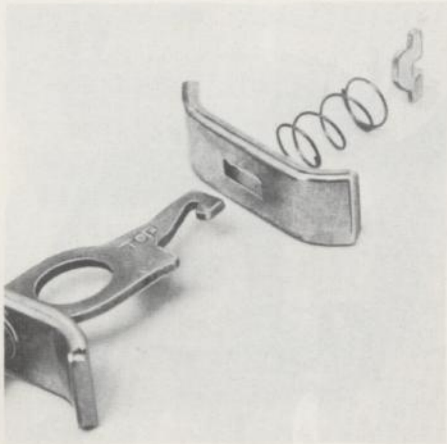


The worn bush can now be levered out of the fan housing cover with a screwdriver or other suitable tool. Then position new bush in its seat.

Insert threaded end of installing tool 0000 890 2201 through the guide bush from the inside of the fan housing and fit the thrust sleeve and hexagon nut. Now tighten the hexagon nut to fold over the lower end of the rope bush until it is firmly seated.

5.8 Replacing the Friction Shoe Plates

Brake lever with spring and spring retainer



The edges of the friction shoe plates are subject to a certain amount of wear each time the rewind starter is used. This eventually causes the edges to become completely blunt so that the rewind starter can not engage positively, i.e. begins to slip.

As the friction shoe plates are symmetrically shaped they can be turned once so that the good edges are used. To do this, disengage the spring retainers from the break lever, remove the springs and friction shoe plates. Turn the friction shoe plates and then reassemble them.

The complete friction shoe assembly should be replaced when both edges of the friction shoe plates are worn.

5.9 Replacing the Starter Hub

Removing the four pan head screws

The starter hub is secured to the flywheel and is subject to normal wear. A new starter hub must be fitted when the fluting on its inner diameter is worn. The fluting is designed to improve the grip of the friction shoe plates.

The starter hub is fastened to the flywheel by means of four pan head screws.

5.10 Routine Maintenance

If the starter rope action becomes very stiff and the rope rewinds very slowly or not completely, it can be assumed that the rewind starter is mechanically in order but plugged with dirt. At very low outside temperatures the oil on the rewind spring may thicken and cause the spring windings to stick together. This has a detrimental effect on the function on the rewind starter. In such a case it is sufficient to apply a little paraffin to the rewind spring. Then pull out the starter rope slowly several times until its normal smooth action is restored.

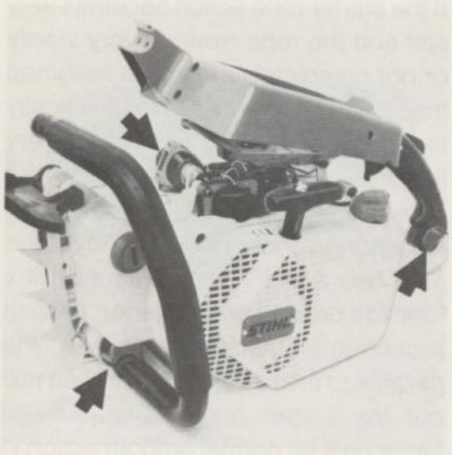
If clogged with dirt or resin, the entire rewind starter mechanism, including rewind spring, must be removed from the machine. Take special care when removing the spring. Wash all parts in paraffin or clean gasoline.

Lubricate the rewind spring and starter post with oil when reassembling the mechanism but make sure that no oil gets on the brake washers.

6. AV HANDLE SYSTEM

6.1 Construction and Operation

Position of vibration dampers



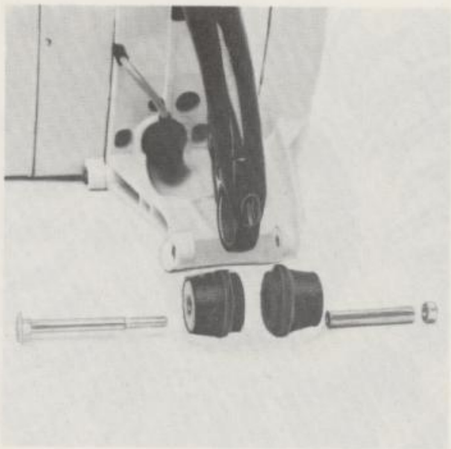
The anti-vibration handle system reduces engine and cutting attachment vibrations to a minimum before they reach the operator. This vibration insulation is achieved by means of resilient anti-vibration mounts between the chain saw housing and the handles.

The vibration dampers therefore have too smooth out vibration but must also be stiff enough to transmit the operator's commands accurately to the cutting attachment.

For this reason it is extremely important that the chain saw be operated only with completely intact vibration dampers to insure that the full benefit of the AV handle system is maintained. It is also important to insure that the fastening screws are always properly tightened.

6.2 Repair

Rubber buffer mounting at end of rear handle



At end of rear handle:

Unscrew hexagon nut and pull out carriage bolt. Replace the faulty vibration damper elements.

Do forget to fit the spacer tube when reassembling the damper elements.

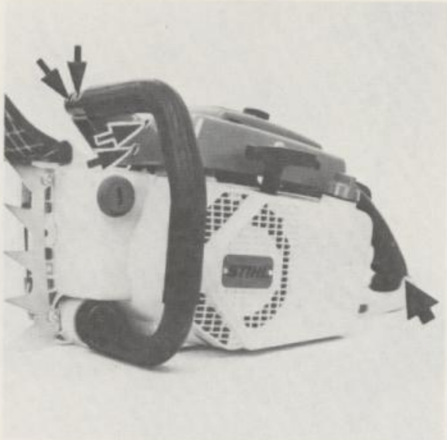
On handle frame:

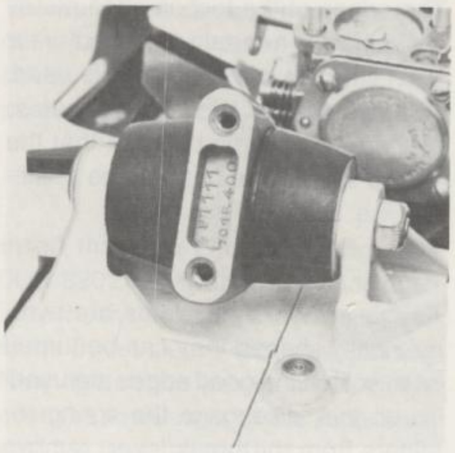
Remove the two socket head screws at the top end of the front handle and the two pan head screws at the front of the handle frame.

Take out the pan head screw which secures the end of the handle frame to the support. Now pull choke rod out of choke shaft on carburetor and disconnect throttle rod from throttle shaft. The handle frame can now be lifted away from the machine. Unscrew locknut from carriage bolt and pull out the bolt. Replace the faulty damper elements.

Top:
Removing handle frame

Bottom:
Damper elements on handle frame

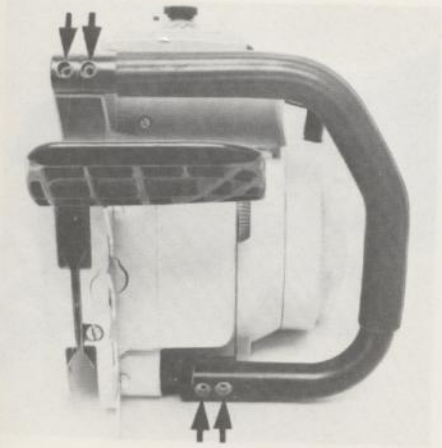


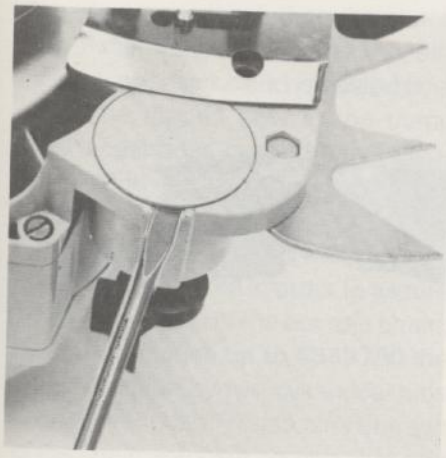


When reassembling, only tighten the hexagon nut moderately first. Swing the handle frame back into position and secure it with the two pan head screws on the bracket between the vibration damper elements. Then finally tighten the hexagon nut.

Top:
Remove the 4 socket head screws

Bottom:
Levering out the plastic cover



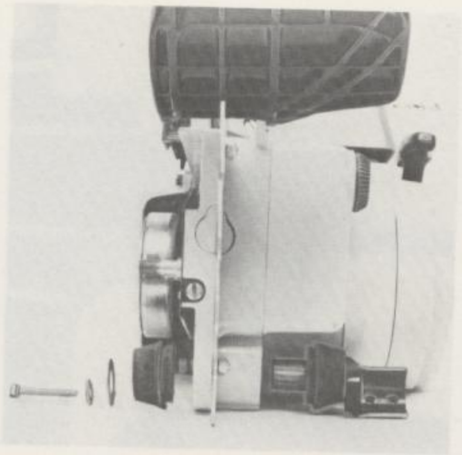


At underside of front handle:

The complete front handle must be removed in order to gain access to and disassemble this vibration damper. To do this, unscrew the four socket head screws.

Then take off the chain sprocket cover and use a screwdriver to lever out the plastic cover underneath the inner side plate. This exposes an M5 pan head

Component parts of vibration damper element on front handle



screw which should be removed. Take out the handle bracket with vibration damper element.

When installing the new damper element, first screw the handle bracket to the front handle, fit one damper element on the bracket and insert it in its seat from the starter side.

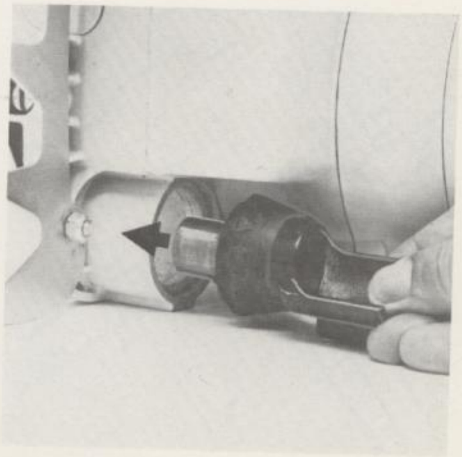
Position the second damper element and the washer in its seat from the clutch side and secure it on the handle bracket with the pan head screw. Press the plastic cover into position.

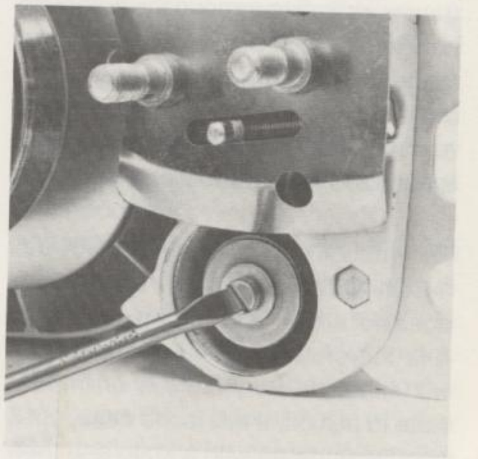
On machines with a wrap-around handle (075 AVRE) there are two additional socket head screws which have to be removed from the lower right-hand handle bracket. Then use a screwdriver to remove the M 5x40 pan head screw. Once the two handle brackets have been removed the vibration damper element can be taken out.

Before reassimbling, check condition

Top:
Fitting front handle with bracket from starter side

Bottom:
Securing damper element with washer from clutch side



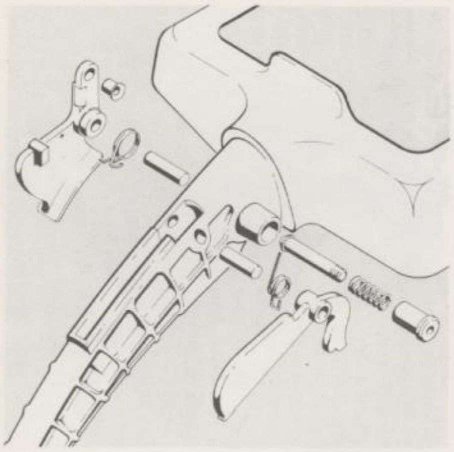


of sealing ring in sprocket side of crankcase and replace it if necessary.

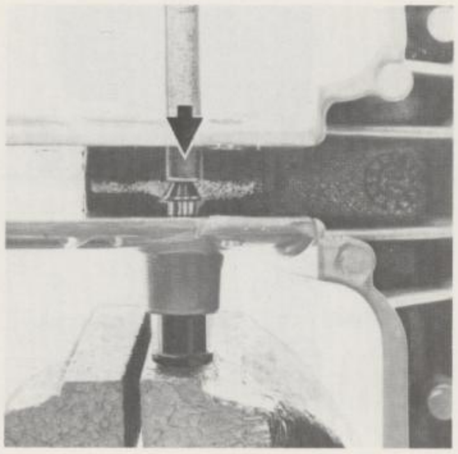
7. THROTTLE MECHANISM

7.1 Disassembly and Repair

Component parts of throttle mechanism

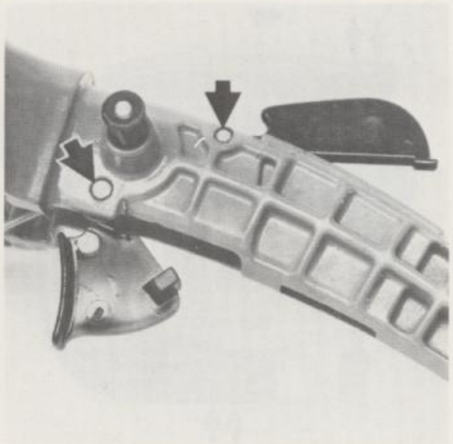


Securing the half-throttle button



Top:
Cylindrical pins of safety throttle lock lever and throttle trigger

Bottom:
Fitting rubber grip



It is necessary to remove the complete handle frame in order to gain access to the throttle mechanism. To do this, unscrew the handle frame at the front and rear handles and disconnect the throttle rod at the carburetor (3.3).

The rubber grip is stuck on with adhesive at the factory to insure that it does not slip or twist during operation. It is therefore probable that the grip will either be very difficult or impossible to pull off. If this is the case, cut it open lengthwise with a knife and then remove it.

If the half-throttle button is faulty, fit the new pivot pin through the hole from the other side of the handle and rest head of pin on a suitable base. Fit helical spring and half-throttle button on the pin and then secure button on pin by tapping lightly with a hammer.

The safety throttle lock lever and the throttle trigger are each secured in the handle by a cylindrical pin. If either the lever or trigger or both have to be replaced, push out the pins with a drift and fit the new parts.

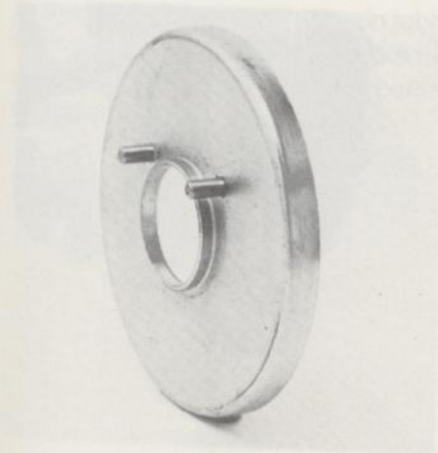
Coat the handle with adhesive before fitting a new rubber grip. It is always advisable to fit a new rubber grip to insure a tight fit on the handle.

Now connect throttle rod to throttle trigger and check operation of the throttle mechanism. Assemble the remaining parts by reversing the disassembly sequence.

8. CHAIN LUBRICATION

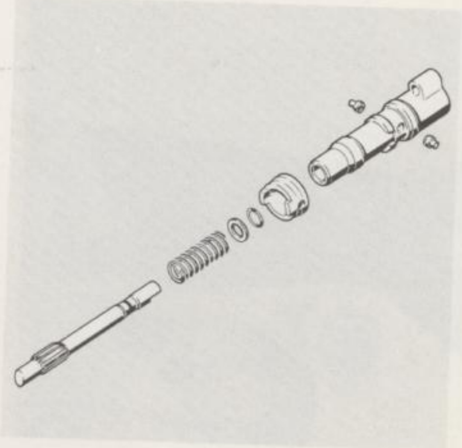
8.1 Construction and Operation of Oil Pump

Cover plate with pins



Oil pump worm with drive lugs

Component parts of oil pump



The oil pump is located on the clutch side of the crankcase behind the left-hand bumper spike and is sealed by a plug. The tapped hole in the pump body's cast boss is used only for removal and installation. The pump feeds chain oil from the oil tank to the guide bar and chain and must always operate trouble-free in order to assure ample lubrication of the bar and chain. On 051 machines **up to 8369700** the pump is driven by two cylindrical pins in the cover plate. These pins engage in the chain sprocket on one side and in the oil pump worm on the other side. This means that the chain sprocket drives the plump plunger via the cover plate and worm when the centrifugal clutch is engaged.

From machine number **8369700** onward the pump is driven directly through the chain sprocket and worm. The 075 also uses this form of drive. Two lugs on the worm pass through the slots in the cover plate and engage in a recess on the chain sprocket.

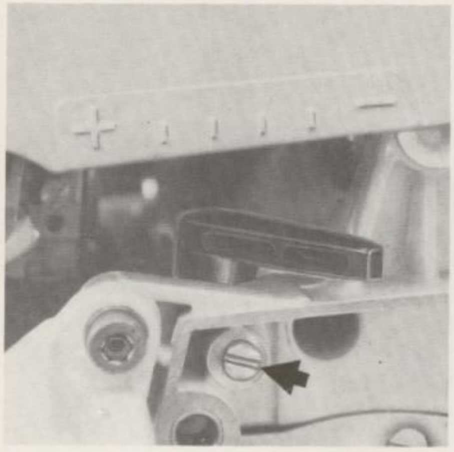
When the pump plunger is rotated it performs a longitudinal stroke which is brought about by the angled end face of the plunger running against the spherical adjusting bolt and the helical spring. The pump plunger moves downward on its intake stroke. An oil pocket at the top of the plunger "collects" the oil at the intake port and transfers it to the outlet port. On the plunger's upward stroke the oil is compressed and forced through the outlet port.

The pump body is sealed externally at the intake and delivery sides by a rubber ring. Both oil holes in the rubber ring are provided with bushes to insure they cannot close up in the installed condition.

The oil delivery rate is in a fixed linear ratio to the chain speed. This means there is always a sufficient supply of lubricating oil to the guide bar and chain at every engine speed. A minimum feed rate is assured on new machines by means of an adjusting lever stop on the chain sprocket cover. It is therefore possible to set the oil feed rate with the adjusting lever between the minimum mark (–) and the maximum mark (+) to suit the length of cutting attachment. The shaft of the adjusting lever in the crankcase has a helical slot in which a flat head screw engages. When the adjusting lever is turned toward (+) or (–) it travels either up or down on the end of the flat head screw. As the angled face of the pump plunger runs against the spherical end of the adjusting bolt, any vertical movement of the adjusting bolt will modify the plunger's stroke and thus change the oil feed rate.

The adjusting lever allows the oil feed rate to be infinitely varied between a maximum of 19 cm^3/min in the (+)

Adjusting lever and flat head screw



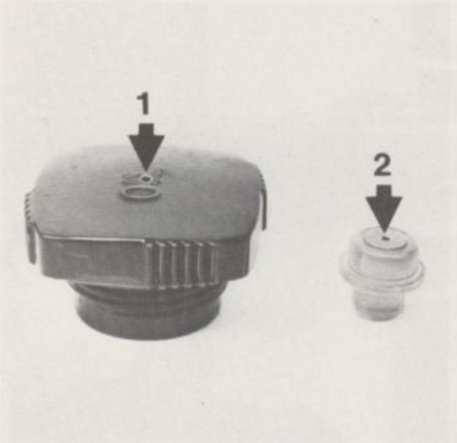
position and a minimum of 7 cm^3/min in the (–) position at 6000 rpm in each case. The shaft of the adjusting lever is sealed and located in the crankcase by means of two 0-rings.

The chain lubricating oil is filtered by the pickup body in the oil tank to prevent any impurities reaching the oil pump.

Faults very seldom occur on the oil pump itself. Contamination of other parts is usually the cause of inadequate oil feed.

8.2 **Oil Tank/Tank Vent**

1 Valve in oil filler cap
2 Valve (new version)

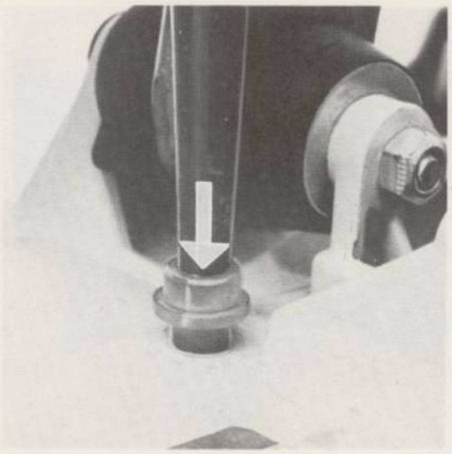


The chain oil tank is an integral part of the crankcase. The elbow fitting (051) or pump body of the manual oiler (075) secured at the sprocket side has a connector for the pickup hose and the pickup body. On the oil pump's intake stroke the chain oil is drawn out of the oil tank through the pickup body, pickup hose and connector.

A precondition for correct operation of the oil pump is the maintenance of equal pressure inside and outside the oil tank. A valve is used to maintain equal pressures.

This valve was integrated in the oil filler cap up to machine number **5170371;** later machines have a separate valve in the crankcase. If the valve is operating correctly it will open at an oil tank depression of approx. 0.1 bar. The valve also effectively prevents chain oil leaking from the tank irrespective of the chain saw's opera-

Pressing valve into crankcase



ting position. If the valve in the filler cap becomes dirty it can be cleaned or blown out with compressed air. To do this, unscrew the oil tank filler cap and blow it out with compressed air from the outside to the inside.

However, if the crankcase valve becomes so dirty that it malfunctions, it should be replaced. To remove the valve, use water pump pliers to lift it out of its seat; the new valve can be installed either by knocking it in with a plastic-faced hammer or pressing it in with an arbor. The handle frame must be removed for this purpose (3.3).

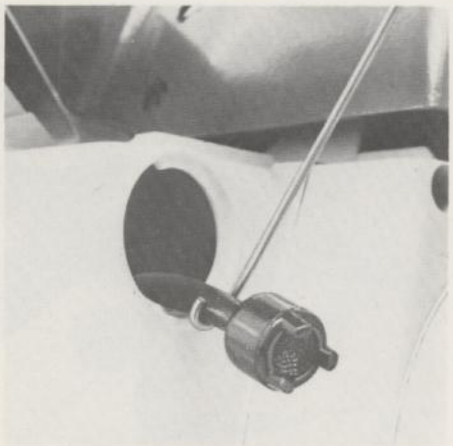
8.3 Troubleshooting Chart

In the event if faults in the chain lubricating system, always investigate the other possible sources of faults before disassembly the oil pump.

Fault	Cause	Remedy
No oil supply to chain	Oil tank empty	Fill up with oil
	Oil inlet hole in guide bar is blocked	Clean oil inlet hole
	Pickup hose or pickup body (strainer) blocked	Wash pickup hose and pickup body (strainer) in clean gasoline and blow out with compressed air. Renew pickup body if necessary
	Cylindrical pin in cover plate broken	Install new cylindrical pin in cover plate, fit new cover plate
	Tank vent in oil filler cap blocked	Clean filler cap
	Teeth on pump plunger and worm worn	Install new plunger and worm; it is better to fit a new pump
Machine loses chain oil	Faulty oil seal, sealing ring, rubber ring on pump or O-ring on adjusting lever	Fit new seals
	Sealings rings on pump body, adjusting lever or worm leaking	Fit new seals

8.4 Pickup Hose/Pickup Body

Withdrawing the pickup body

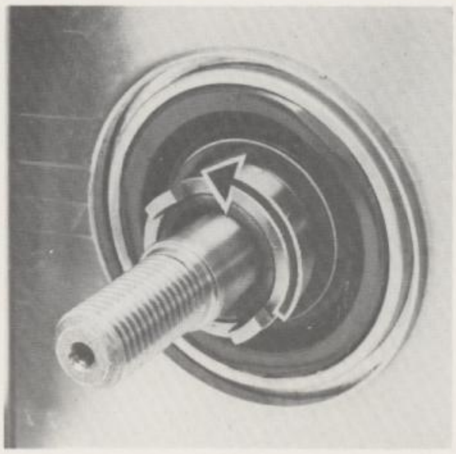


The oil tank must be emptied in order to clean or replace the pickup hose and pickup body. Then use a suitable hook (1110 893 8800) or pliers to pull the pickup hose off the connector. Bend back the hose bell and take out the pickup body.

Wash the pickup hose and pickup body in clean gasoline and blow them out with compressed air. Refit clean or new parts in reverse sequence. Make sure that the pickup hose is neither kinked nor twisted in the oil tank.

8.5 Cover Plate/Worm

Removing pump worm



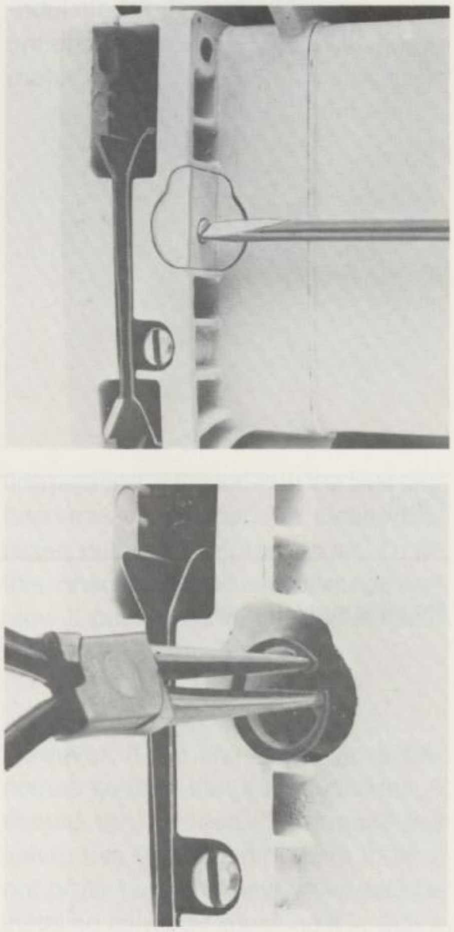
To remove and check the two press-fitted cylindrical pins in the cover plate of early machines or the two lugs on the oil pump worm on later machines, first disassemble the bar and chain, clutch and chain sprocket.

If the cylindrical pins in the cover plate have become loose or are broken, new ones can be fitted to effect a repair. However, if the lugs on the pump worm are worn, always fit a new part. To remove, grip cylindrical pin of cover plate or lug of worm, turn counterclockwise and remove from crankshaft. The special assembly sleeve 1111 893 4600 must be used for installation of the new pump worm to insure that the integral rubber ring is not damaged.

8.6 Disassembly and Repair of Oil Pump

Top:
Unscrewing blanking plug

Bottom:
Removing circlip

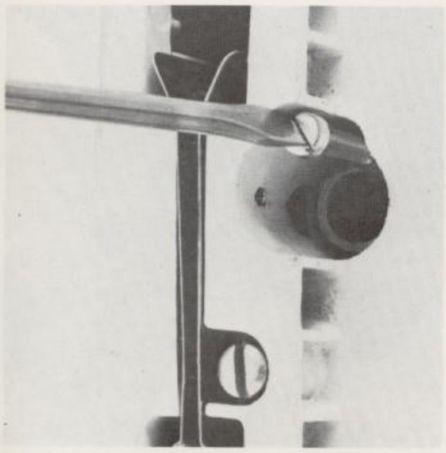


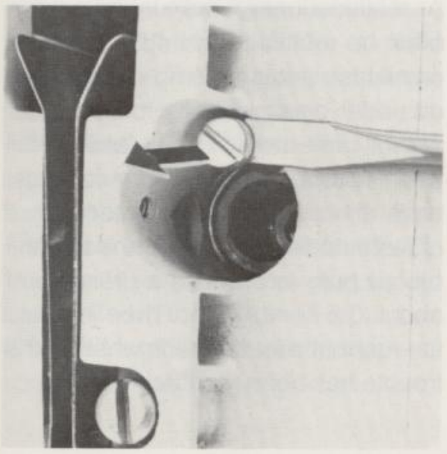
If trouble persists after all other possible sources of faults have been investigated and rectified, the cause must be in the oil pump.

To remove the oil pump, first take off the bar and chain and empty the oil tank. Unscrew bumper spike from crankcase, remove blanking plug and circlip from oil pump chamber. Screw an M5 pan head screw into the pump body's tapped hole and use a screwdriver to lever the screw head out of

Top:
Inserting pan head screw

Bottom:
Withdrawing oil pump by means of pan head screw



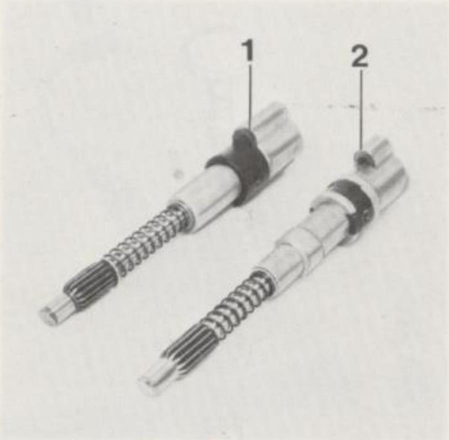


the crankcase. Then withdraw oil pump carefully from the crankcase.

Wash all parts of the pump thoroughly in clean gasoline, blow out with compressed air. Check oil ports for blockages.

Unlike the previous arrangement, the body of the new pump is no longer located by the rubber ring but is supported at several points in the crankcase. This modification provides a more accurate guide and dependable pump plunger drive.

Oil pump
1 Old type
2 New type



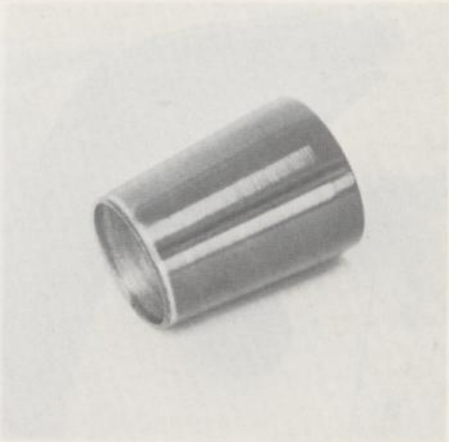
The helical spring bears directly on the splines of the pump plunger; the second washer previously fitted as a spring retainer has been deleted.

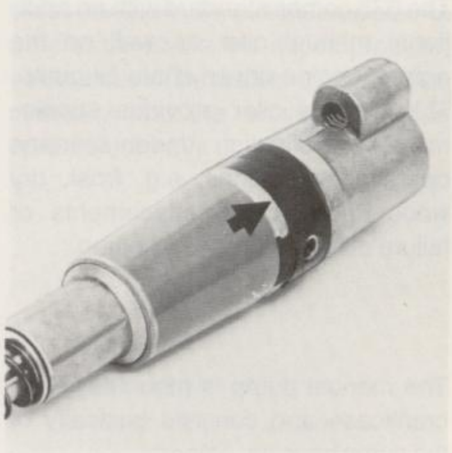
Owing to this change it was necessary to modify the helical spring and the rubber ring to suit the new shape pump body.

The new rubber ring, also equipped with metal bushes in the oil ports, provides a seal between the pump body and atmosphere. The rubber ring has two forward facing lugs to insure a snug fit. The special assembly sleeve 1111 893 4605 should be used for installation. (See also Technical Information bulletin 7.77).

Top:
Special assembly sleeve 1111 893 4605

Bottom:
Rubber ring fitted over assembly sleeve



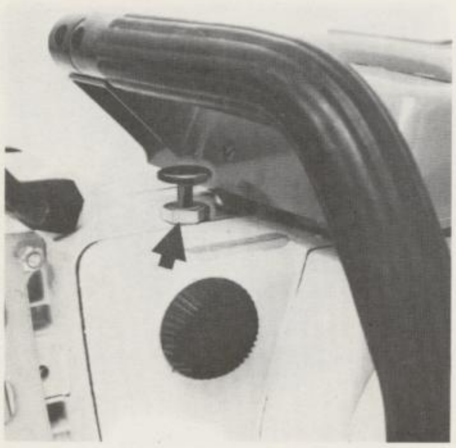


Coat parts with oil before assembly and then refit by reversing the disassembly procedure.

8.7 Manual Oil Pump

8.7.1 Construction and Operation of Manual Oil Pump

Manual oiler on 075 models

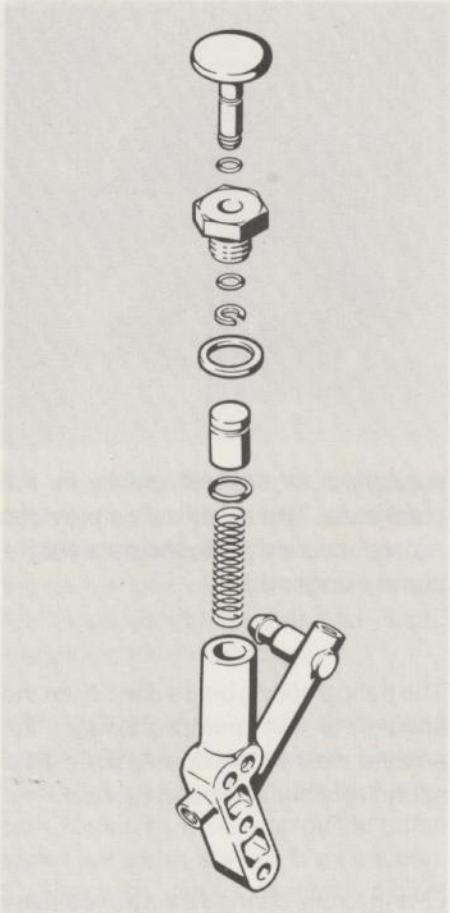


The 075 comes standard with an additional manual oiler as well as the normal engine driven chain oil pump. This manual oiler provides supplementary lubrication under extreme operating conditions, e.g. frost, dry wood, long cutting attachments or failure of the automatic oil pump.

The manual pump is mounted in the crankcase and consists basically of the pump housing, compression spring and pump plunger. The pickup hose and pickup body fit on the pump housing connector.

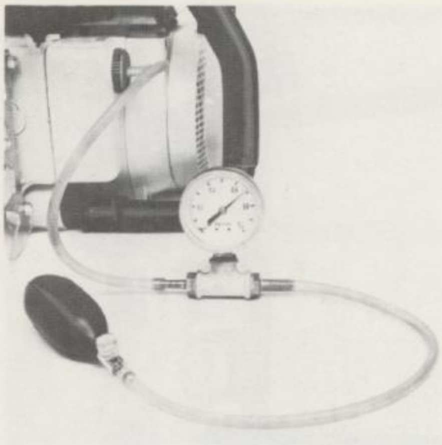
The bush button for operation of the manual oiler is located on the crankcase just below the front handle. It runs in a screw plug. The bush button must be pressed down several times as far as it will go in order to provide extra lubrication.

Component parts of manual oil pump



8.7.2 Disassembly and Repair

Pumping in lubricating oil



A malfunctioning manual oiler can often be rectified by simply using the crankcase tester to pump in lubricating oil under pressure for a brief period. The oil tank should be at least half full for this purpose and the filler cap must have a hose connector. Attach hose of tester to the connector and use the rubber bulb to produce a pressure of about 0.5 to 0.7 bar. Then operate the manual oiler to check whether the trouble has been rectified.

In the event of faulty seals or a broken push button it is only necessary to remove the screw plug to gain acess to these parts. However, in the case of faults on the pump housing, compression spring, pump plunger etc., the machine must be disassembled and the defective parts replaced.

The length of the screw plug was shortened by 2 mm to 14 mm in order to improve operation and feed capacity

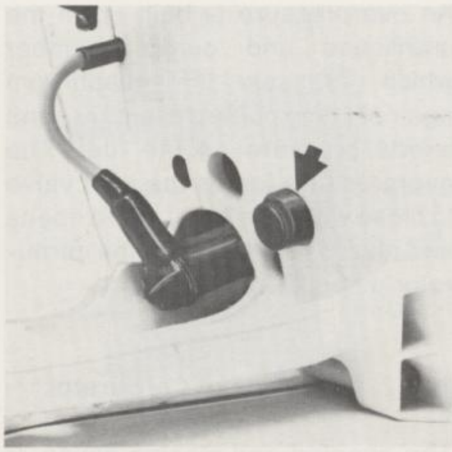
Removing screw plug

of the manual oiler. If the chain oil feed is found to be unsatisfactory on older machines it is likely that the old 16 mm long screw plug is the cause. This can be rectified either by installing a new screw plug or reworking the old one to the above mentioned length (see Technical Information bulletin 19.75). Only the 14 mm long screw plug should be installed in the course of repairs as only this length insures correct operation of the pump.

9. DECOMPRESSION VALVE

9.1 Construction and Operation

075 AVE with built-in decompression valve



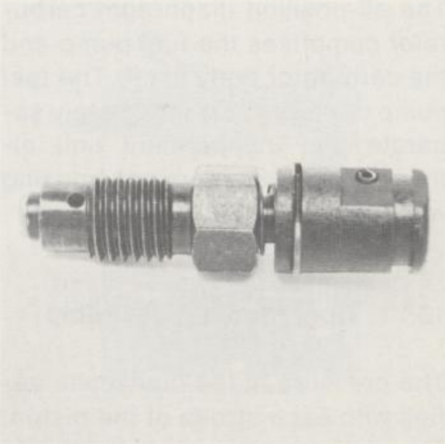
On STIHL 075 AVE chain saws (option on 051 AVE) a decompression valve (1111 020 9405) is installed in the cylinder to ease starting.

The valve consists of the insert, the valve with button and helical spring, an annular spring and clamping sleeve. A metal ring is used to provide a seal between the decompression valve and the cylinder.

The button is pressed in before starting and allows a small proportion of the compressed fuel mixture to flow via the valve to atmosphere. This reduces the compression pressure and thus makes starting easier.

As soon as the fuel mixture ignites the engine accelerates rapidly and the

Decompression valve



pressure above the piston head cannot be dissipated via the decompression valve bore. The valve closes automatically and the engine can then operate normally.

10. FUEL SYSTEM

10.1 Construction and Operation of Carburetor

The all-position diaphragm carburetor comprises the fuel pump and the carburetor body itself. The fuel pump operates as a completely separate and independent unit although it shares a common housing with the carburetor.

10.1.1 Operation of Fuel Pump

The pressure in the crankcase varies with each stroke of the piston. The piston creates a depression in the crankcase on its upward stroke and overpressure on its downward stroke. This process is utilized for actuation of the fuel pump. The chamber in front of the pump diaphragm (pulse chamber) is connected to the crankcase by a pulse line. The changes in pressure act directly on the pump diaphragm and cause it to move in time with the piston. Control is effected by means of two flap valves stamped into the pump diaphragm.

The depression created by the upward stroke of the piston draws the pump diaphragm into the pulse chamber. This enlarges the pump chamber and creates a vacuum. The inlet valve then opens and the higher atmospheric pressure forces fuel from the tank into the pump chamber and presses the outlet valve onto its seat.

The downward stroke of the piston changes the relative pressures. An overpressure is built up in the crankcase and pump chamber which presses the diaphragm against the pump chamber and exerts pressure on the fuel. The overpressure forces the inlet valve to close while the other valve opens and allows fuel to flow to the carburetor's needle valve.

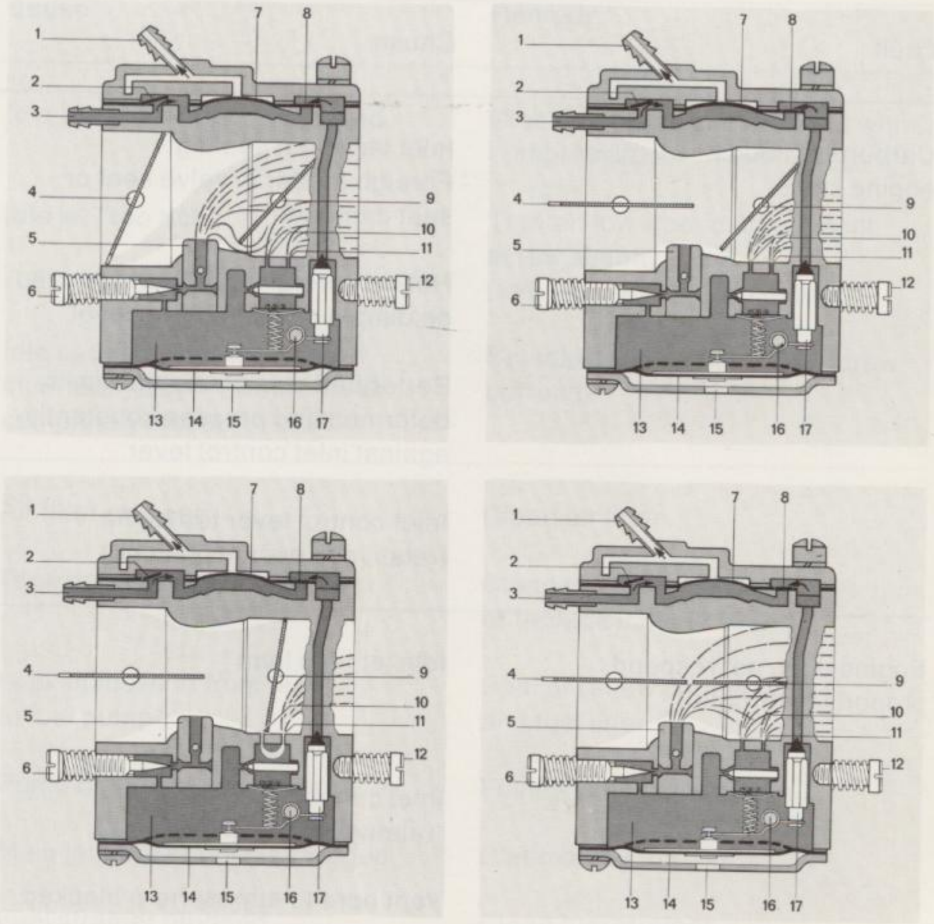
10.1.2 Operation of Carburetor

The opening and closing action of the needle valve and, therefore, the supply of fuel to the carburetor is controlled by the metering diaphragm. The metering diaphragm is in a position of rest when atmospheric and diaphragm chamber pressure are equal (the chamber in front of the diaphragm is connected to atmosphere).

The cone of the inlet needle is held on its seat by spring pressure.

The metering diaphragm chamber is filled with fuel when the engine is running. A depression is created in the choke tube (venturi) during the induction stroke. Fuel is drawn into the choke tube through the jet bores between the choke tube and diaphragm chamber. This in turn produces a depression in the diaphragm chamber and the atmospheric pressure of the free air presses the metering diaphragm towards the carburetor body. The force generated by the pressure difference times diaphragm area acts on the inlet control lever via the perforated disc on the diaphragm, overcomes spring force and lifts the inlet needle off its seat. This allows fresh fuel to flow from the pump chamber into the diaphragm chamber. The needle valve closes again as soon as atmospheric pressure is reached in the metering diaphragm chamber. Under normal operating conditions the needle valve does not open and close constantly. The metering diaphragm actually settles down to a mean level, depending on engine speed and the needle valve remains open relative to the diaphragm's position.

The quantity of fuel drawn into the choke tube depends on the amount of depression, and this in turn is influenced by the position of the choke and throttle valves. The volume of fuel can be altered to suit different operating conditions by means of adjustment srews for the idle and main jets.



Top:
Starting position

Bottom:
Idle position

1 – Pulse nipple
2 – Inlet valve open
3 – Fuel intake
4 – Choke valve
5 – Valve jet
6 – High-speed adjustment srew
7 – Pump diaphragm (intake position)
8 – Outlet valve closed

Top:
Changing from idle to part or full-throttle position

Bottom:
Full-throttle position

9 – Throttle valve
10 – Secondary idle jet
11 – Primary idle jet
12 – Low-speed adjustment srcew
13 – Metering diaphragm chamber
14 – Metering diaphragm
15 – Connection to atmosphere
16 – Inlet control lever
17 – Inlet needle

(both adjustment screws are drawn offset by 90°)

Four basic operating conditions are described below to explain the function of the carburetor:

1. The choke valve is closed and the throttle valve partly opened during the **starting process.** A powerful vacuum is created in the choke tube during the induction stroke because the entry of outside air is almost completely restricted by the closed choke valve. This means that the engine draws in a large amount of fuel through all the jets and relatively little air. A rich starting mixture is obtained in this way. The choke valve must be opened as soon as the engine fires – the mixture would otherwise be too rich and stall the engine.

2. Very little fuel is required for **idling.** The choke valve is fully open and the throttle valve almost completey closed. The vacuum only acts on the **primary idle jet** so that fuel is only drawn off through this jet. Owing to the pressure difference between the choke tube (venturi) and the intake pipe behind the throttle valve, air flows through the secondary idle jet and air correction jet into the idle chamber and prevents the mixture becoming too rich. However, because of this pressure difference, it is necessary to prevent supplementary air getting into the diaphragm chamber, making the mixture too lean and causing the engine to stall. This problem is eliminated by a small plate in the valve jet which closes against the inlet when there is insufficient depression in the choke tube.

3. During the **changeover** from idle to part or full-throttle sufficient fuel must be drawn in with the suddenly increased flow of air when the throttle valve is opened. This is effected by means of the **secondary idle jet** which is exposed to the effects of vacuum at this point, thus producing the richer, igniteable mixture required.

4. Opening the throttle valve further brings the **main jet (valve jet),** located at the narrowest point of the choke tube, into operation and provides the fuel required for **full-throttle operation.**

10.2 Troubleshooting Chart

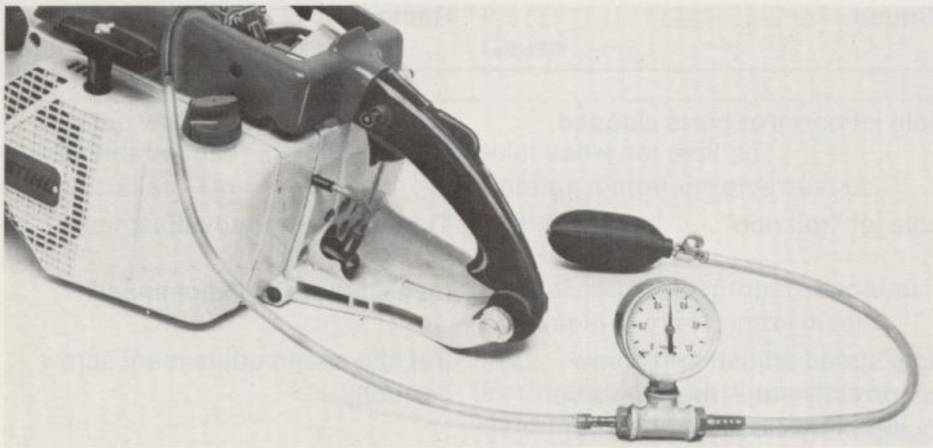
Fault	Cause	Remedy
Carburetor floods; engine stalls	Inlet valve not sealing. Foreign metter in valve seat or seat damaged	Remove and clean or renew inlet needle
	Helical spring not properly located on dimple of inlet control level	Remove inlet control lever and refit correctly
	Perforated disc on diaphragm is deformed and presses constantly against inlet control lever	Fit new metering diaphragm
	Inlet control lever too highg (relative to design position)	Set inlet control lever flush with top edge of plate
Engine does not respond properly to throttle	Idle jet "too lean"	Back off low-speed adjustment screw slightly (see Carburetor Adjustment)
	Inlet control lever too low (relative to design position)	Set inlet control lever flush with top edge of plate
	Vent bore to atmosphere blocked	Clean bore
	Diaphragm gasket leaking	Fit new diaphragm gasket
	Metering diaphragm damaged	Fit new metering diaphragm
Engine will not idle	Throttle valve opened too far by idle speed adjustment screw	Readjust idle speed adjustment screw

Fault	Cause	Remedy
Engine stalls at idle speed	Idle jet bores or ports clogged	Clean jet bores and blow out with compressed air
	Idle jet "too rich"	Tighten low-speed adjustment screw slightly (see Carburetor Adjustment)
	Idle speed adjustment screw incorrectly set – throttle valve completely closed	Set idle speed adjustment screw correctly
Engine speed drops off quickly under load – low power	Air filter plugged	Clean air filter
	Tank breather faulty	Clean tank breather or replace if necessary
	Leak in fuel line from tank to fuel pump	Seal or renew connections and fuel line
	Pump diaphragm damaged	Fit new pump diaphragm
	Main jet bores or ports clogged	Clean bores and ports
	Fuel strainer plugged	Clean fuel strainer

See also 3.2

10.3 Leakage Test (Pressure Test) on Carburetor

Pressure testing the carburetor



The carburetor can be tested for leaks with the carburetor and crankcase tester 1106 850 2900.

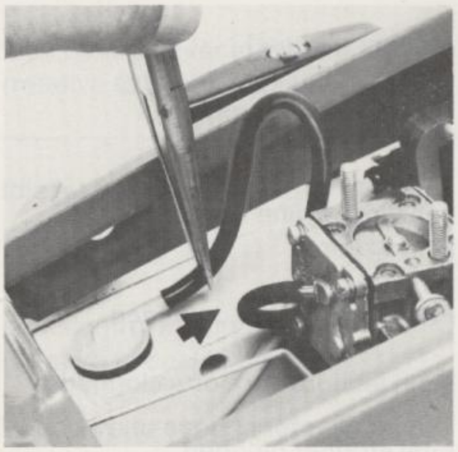
First remove the fan housing (with cover and rewind starter) and pull fuel line off elbow connector at the same time.

Push the end of the fuel line, which you have just removed from the elbow connector, into the tester's hose.

Now close vent valve on rubber bulb and pump air into the carburetor until the pressure gauges indicates a pressure of 0.4 to 0.5 bar.

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

Bottom:
Pulling fuel line off elbow connector



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

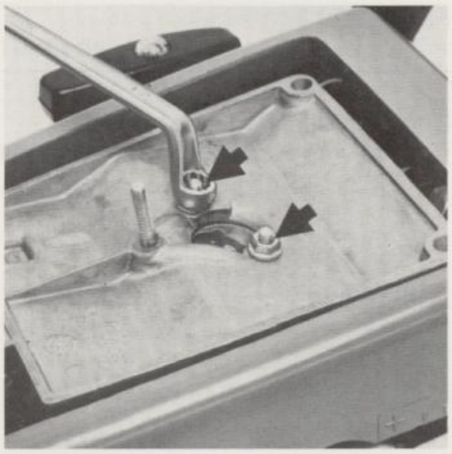
2. The metering diaphragm is damaged.

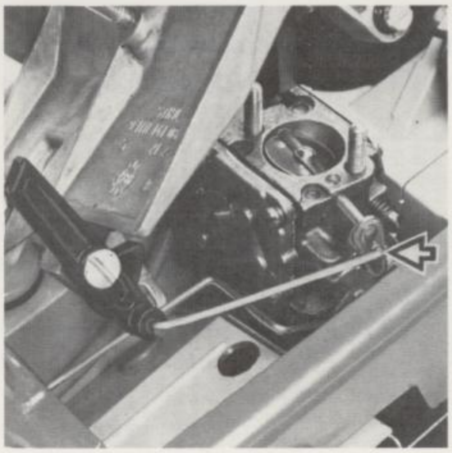
In either of these cases the carburetor must be removed and repaired.

10.4 Disassembly of Carburetor

Top:
Locknuts

Bottom:
Disconnect choke rod





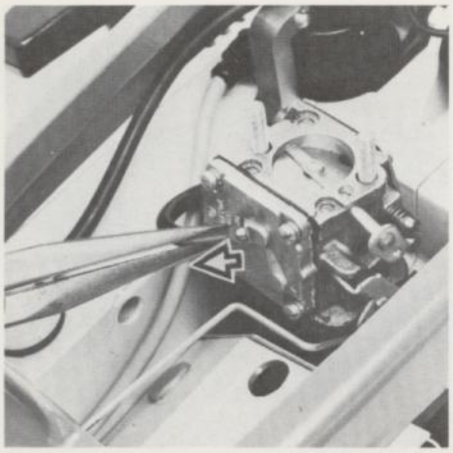
Remove the fan housing and pull the fuel line off the elbow connector. Close the choke valve, slacken off and remove filter cover together with the air filter. Unscrew the two locknuts from the studs. Lift off filter housing and disconnect choke rod from lever on choke spindle at the same time. Push back rubber boot on ignition stop switch and pull off lead with flat-nosed pliers.

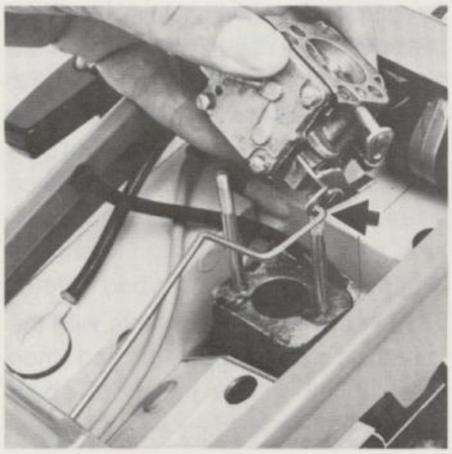
Remove pulse line from fuel pump

10.5 **Repair of Carburetor**

Top:
Removing pulse line

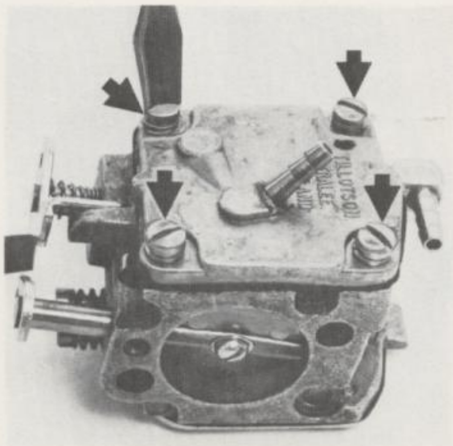
Bottom:
Disconnecting throttle rod





cover. Lift carburetor upward off the studs and disconnect throttle rod from lever on throttle shaft.

Removing fuel pump cover



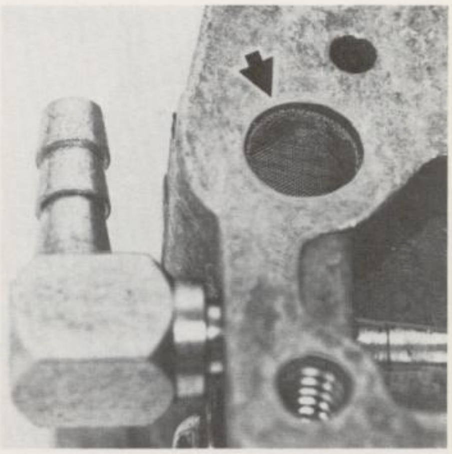
It is advisable to check the serviceability of the fuel pump whenever the carburetor is removed for repair.

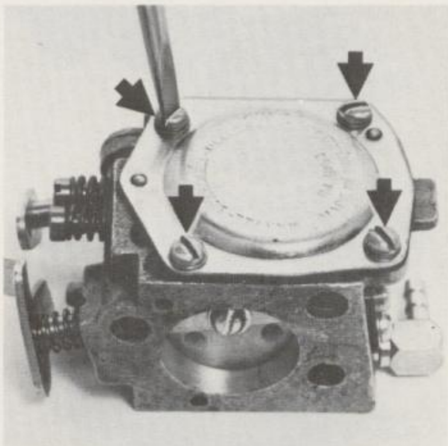
Unscrew the fuel pump cover and remove the gasket and pump diaphragm. The cover, gasket, and diaphragm are frequently stuck firmly together and must be carefully separated if this is the case. If the fuel strainer in the pump side of the carburetor body is dirty, it can be lifted out with a screwdriver and washed out in clean gasoline. Always replace the fuel strainer if it shows any signs of damage.

To disassemble the carburetor body, unscrew the metering diaphragm cover and remove the metering diaphragm and gasket. This diaphragm and the gasket may also be stuck together and must be separated very carefully.

Top:
Fuel strainer

Bottom:
Removing metering chamber cover



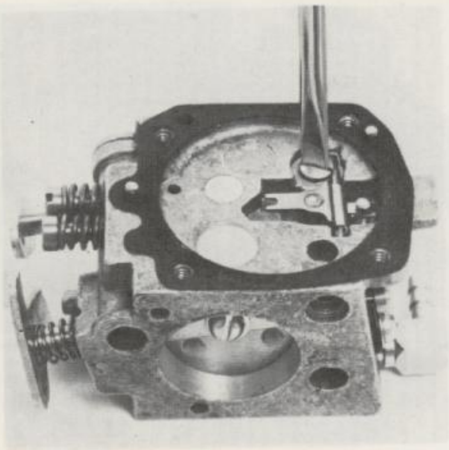


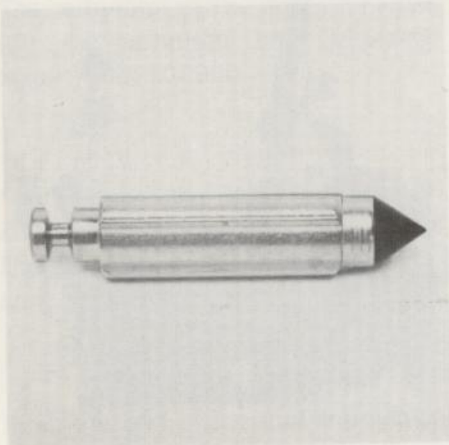
The diaphragms are the most delicate parts of the carburator. Due to the continuous alternating stress to which the diaphragms are subjected the material eventually shows signs of fatigue – the diaphragms distort and swell. When this stage is reached the carburetor can no longer function correctly and the diaphragms must be replaced.

The inlet needle valve is located in a

Top:
Unscrewing oval-head screw on inlet control lever

Bottom:
Cone of inlet needle

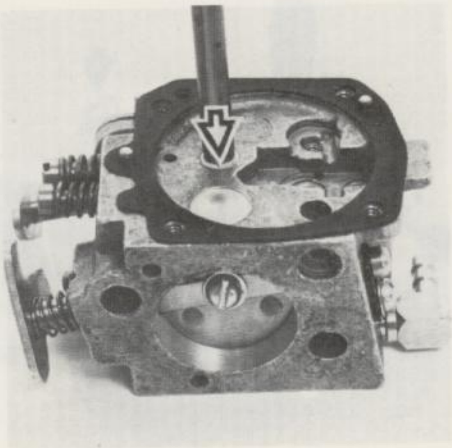




recess in the metering diaphragm chamber. The inlet control lever and inlet needle can be removed after unscrewing the M 3x6 oval-head screw. If an annular indentation is visible on the cone of the inlet needle, it should be replaced as it will no longer seal properly. This is indicated by constant flooding of the carburetor even after cleaning the needle.

If the small plastic plate in the valve jet

Pressing out jet

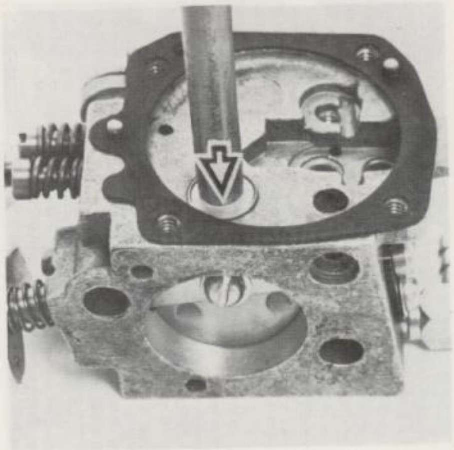


(main jet) no longer moves freely or is stuck, press or knock out the jet from the diaphragm chamber side toward the choke tube with a suitable tool of about 5 mm diameter.

Wash out the carburetor body and all parts which can be used again in clean gasoline (never use high octane gasoline) and blow out, bores and ports in particular, with compressed air but first remove the two adjustment screws for this purpose.

Check blanking plug 11101229410 for leaks by coating it with oil and applying a compressed air line to the tapped hole for the idle speed adjustment screw. If air bubbles appear in the oil, carefully peen the circumference of the blanking plug and check again. Fit a new blanking plug if leaks persist.

Flattening the blanking plug



To remove the old plug, apply a punch of about 3 mm dia. to the center of the plug. Press or tap punch until the plug buckles downward and is released from the wall of the hole. Take out plug and blow out idle hole with compressed air.

Fit new blanking plug in hole with the curvature facing upward and then press it flat with a punch of about 6 mm diameter.

When installing the valve jet make sure it is inserted exactly vertical and not canted in the bore. The rear edge of the valve jet must be flush with the bottom of the diaphragm chamber.

Fit inlet needle and helical spring in their respective bores. Insert spindle in inlet control lever and engage short clevis in the annular groove at the top of the inlet needle. Tighten down the

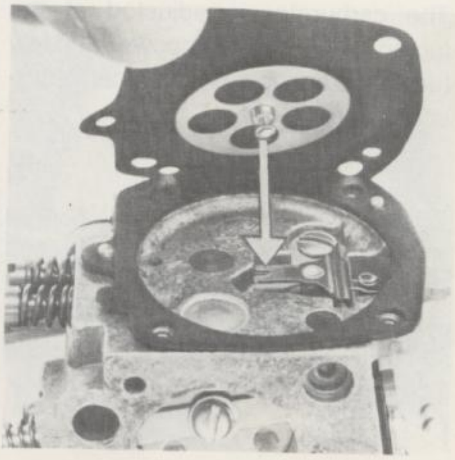
Inlet needle and helical spring in position

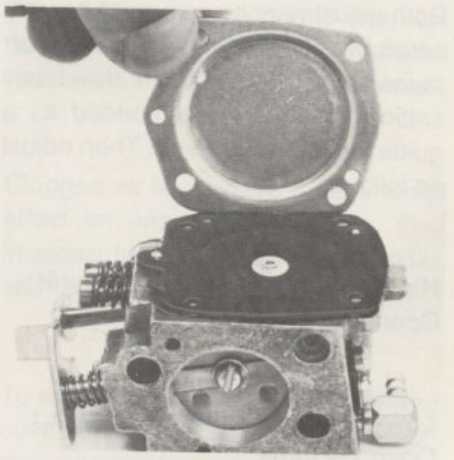
Helical spring on dimple of control lever

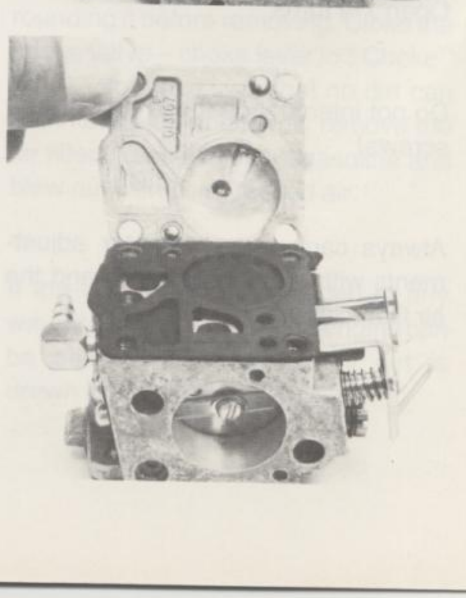
Top:
Engage annular groove in control lever clevis

Center:
Fitting metering diaphragm

Bottom:
Fitting pump diaphragm







ovalhead screw while making sure that the helical spring locates on the control lever's dimple. Check freedom of movement of inlet control lever.

Now fit gasket, metering diaphragm and metering chamber cover on carburetor body and tighten down securely.

Fit and secure the fuel strainer, pump diaphragm, gasket and screw end cover firmly in position.

Installation of the carburetor is then a reversal of the disassembly procedure. The elbow connector locates automatically in the pulse line when the carburetor is pushed into position.

10.6 Carburetor Adjustment

The carburetor is adjusted at the factory to provide high power and low fuel consumption under local atmospheric conditions.

If the chain saw is operated at high altitudes (mountains) or near sea level, the carburetor setting must be changed. This correction is made at the two adjustment screws and the idle speed screw.

Both adjustment screws must be very carefully screwed down onto their seats in order to obtain the basic setting which is only intended as a guide for fine adjustment. Then adjust as follows:

High-speed adjustment screw H:
Open 1 turn

Low-speed adjustment screw L:
Open 1 1/4 turns

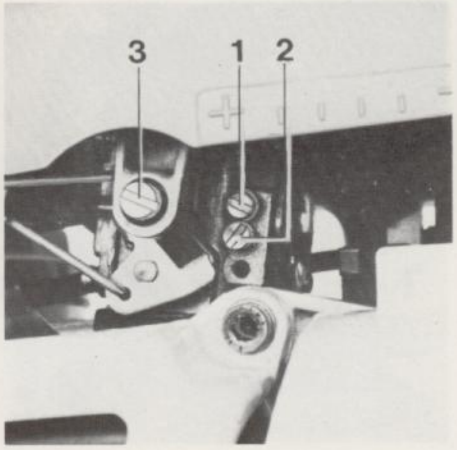
Do not interchange these adjustment screws!

Always carry out carburetor adjustments with the engine warm and the air filter clean.

10.6.1 Notes for Fine Adjustment of Carburetor

Carburetor adjustment screws

1 High-speed adjustment
2 Low-speed adjustment
3 Idle speed



Engine stops while idling:
Turn idle speed screw slightly clockwise while the engine is running (chain must not rotate).

Chain rotates at idle speed:
Turn idle speed screw slightly counterclockwise.

Engine runs erratically at idle speed:
Regulate at low-speed adjustment screw. Turn clockwise for leaner mixture or counterclockwise for richer mixture.

Important: Even very slight alternation of the adjustment screw settings has a marked effect on engine running characteristics.

10.7 Fuel Line and Tank Vent

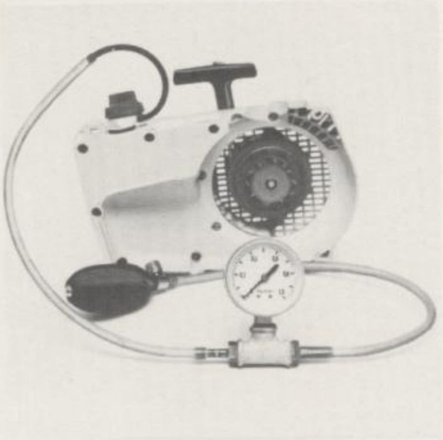
Withdrawing pickup body

The diaphragm pump draws fuel out of the tank and into the carburetor via the fuel line. Any impurities mixed with the fuel in the tank are filtered out by the pickup body (filter and strainer). The wire mesh in the pickup body and the fine pores of the filter eventually become clogged with minute particles of dirt. This restricts passage of fuel and the result is fuel starvation.

In the event of trouble with the fuel supply system, always clean the pickup body first. To do this, pull the pickup body out through the tank filler and disconnect it from the hose.

It is not advisable to clean the filter – always fit a new one. Take this opportunity to clean the fuel tank by flushing it out with clean gasoline and then reverse the above procedure to assemble all the parts.

Checking tank vent



To replace a faulty pickup hose, first remove the fan housing. Use a screwdriver to prise the elbow connector out of the bead of the hose and then the bead itself out of the hole in the tank housing. Disconnect pickup body and pull hose out of tank. the new hose is fitted in the reverse sequence but make sure you do not damage the bead of the hose when pressing it into position.

Correct operation of the carburetor depends on fuel tank and atmospheric pressures always being equal. This is assured by the tank vent in the fuel filler cap.

If the event of difficulties with the carburetor or fuel supply system, always check and clean the tank vent.

A check can be carried out with the carburetor and crankcase tester. To do this, disassemble the fan housing. Pull the fuel line off the carburetor. Reconnect one end of fuel line to elbow connector on tank housing and the push other end into tester's tube. Now close vent screw on rubber bulb and pump air into the fuel tank until the pressure gauges indicates about 0.3 to 0.4 bar. If the tank vent is in order the pressure will drop immediately to zero.

10.8 **Air Filter**

Air filter

The air filter's function is to intercept dust and dirt in the intake air and thus reduce wear on engine components.

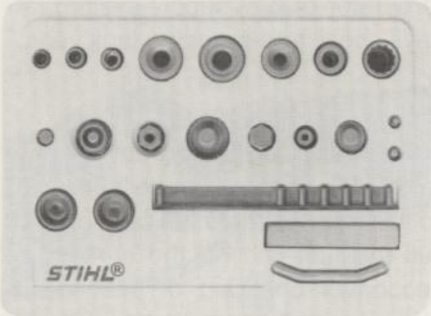
Clogged air filters have a detrimental effect on engine performance, they increase fuel consumption and make starting more difficult.

To remove the filter, take off the filter cover. Clean dirt off filter and area surrounding it before removing. Close the choke valve – choke lever to ,,Choke'' (,,0'') – to make sure that no dirt can get into the cylinder. Now remove the air filter, wash it in clean gasoline and blow out with compressed air.

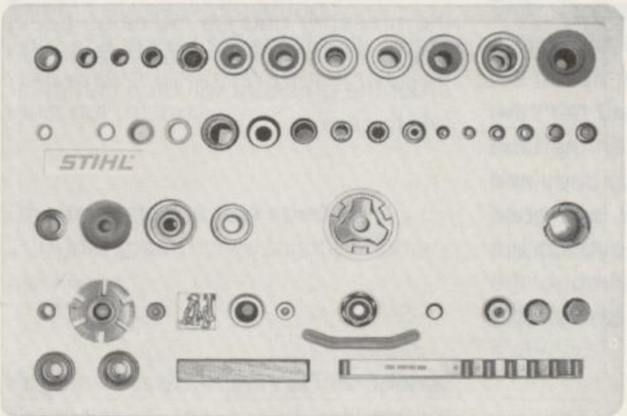
If the wire mesh is damaged in any way, fit a new element – the engine can be permanently damaged if dirt is drawn in with the intake air.

Special tool kits and testing tool kit

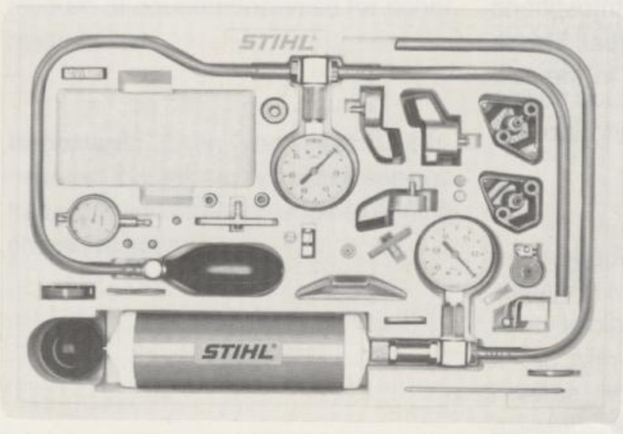
**Special tool kit (small)
0000 890 1706
(for 009 to 032)**



**Special tool kit (large)
0000 890 1705**



Testing tool kit 0000 890 1710



englisch/english

0455 111 0123. M0,5. F7. Sä.
Printed in West Germany

X