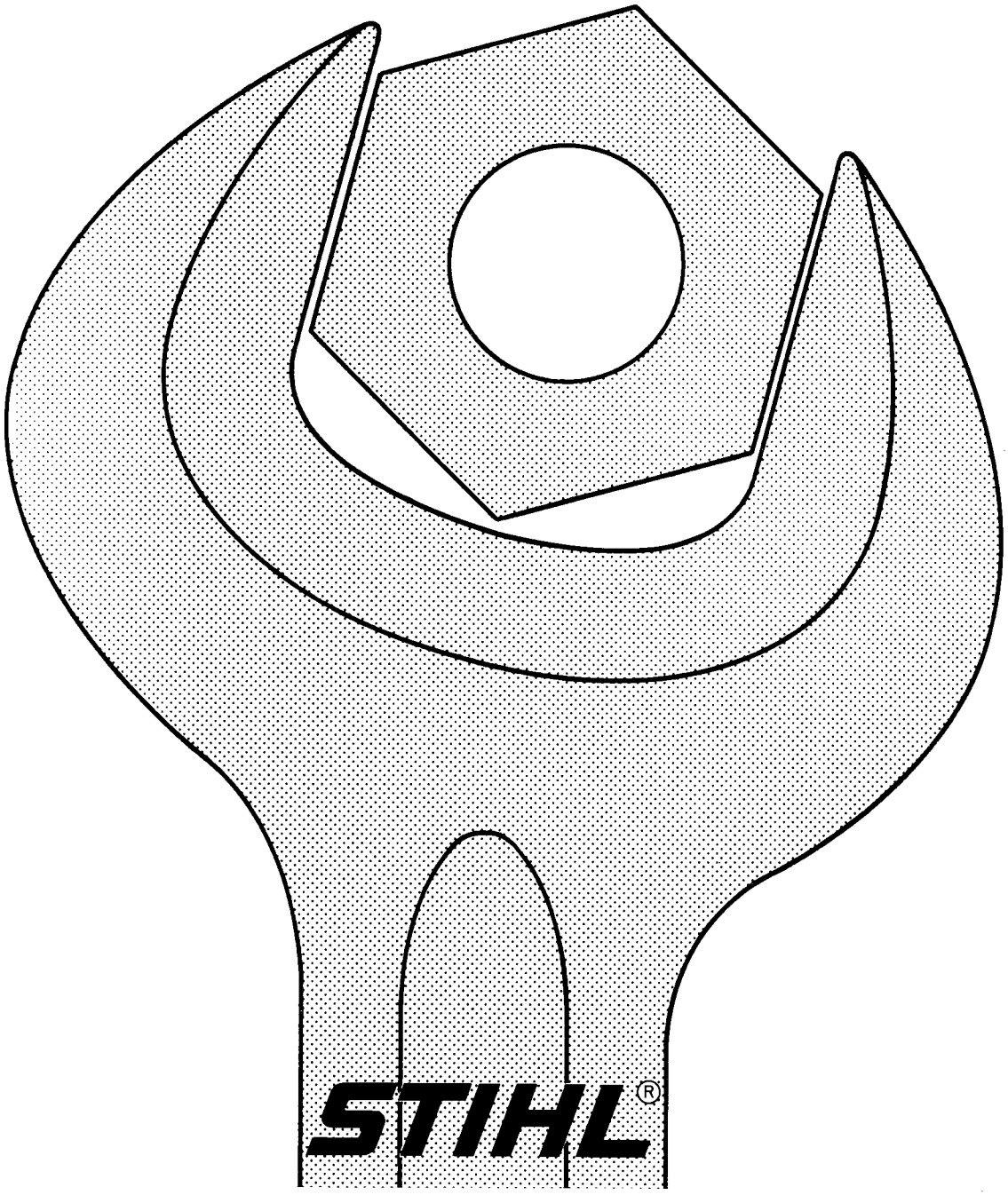
STIHL 015



PREFACE

The power chain saws STIHL 015 and 015 L have been first introduced at the beginning of July 1973. This service shop manual is ment to serve you as a guide book for proper and skilled repair works on both of these machines.

Moreover, we suggest to use the illustrated spare parts list in our instruction manuals as a help when repairing. Technical modifications which should be necessary after publication of this repair instruction will be brought to your attention by our "Technical Informations".

This service shop manual as well as all Technical Informations being subject to modifications shall only be given to personell which is in charge of service and repair.

Handing over or lending this manual to other persons is prohibited.

STIHL®

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CONTENTS

Specifications **2**
Engine 2
Fuel system 2
Ignition system 3
Torques for screws and nuts 3
Cutting attachment 3

Chain Drive and Clutch **5**
Function 5
Troubling 5
Disassembly 6
Repair 6
Reassembly 7

Engine **8**
Construction 8
Troubling 8
Exposing the cylinder 9
Cylinder 10
Disassembly-crankcase crankshaft and piston 11
Reassembly-crankcase 12
Pressure testing of crankcase 15
Pressure testing with vacuum pump 16

Ignition System **17**
Design and operation 17
Spark plug 18
High tension lead 18
Ignition stop switch 19
Short circuit wire 19
Flywheel 20
Checking the ignition timing 21
Adjusting the ignition timing 22

Ignition System 015 L electronic **28**
Design and operation 28
Checking the ignition timing 29
Adjusting the ignition timing 29
Flywheel 30
Ignition coil 30
Magneto air gap 31
Trigger plate 31
Magneto edge gap 22
Checking the magneto edge gap 23
Contact plate 23
Ignition coil 25
Trouble shooting for ignition armature 27

Rewind Starter **32**
Design and operation 32
Troubling 32
Installation of a new starter rope 33
Installation of rewind spring 34
Tensioning the rewind spring 34
Pawls and hook-on spring 35
General repair 35

Oil Pump **36**
Design and operation 36
Troubling 36
Disassembly of oil pump 37
Repair 37

Carburetor with Air Filter **38**
Design and operation 38
Disassembly of carburetor 39
Repair 39
Pressure testing 41
Carburetor adjustment 42
Troubling 43
Fuel hose 43

Special Tools **44**

SPECIFICATIONS

We reserve the right to change design if this is deemed advantageous or necessary.

Engine

STIHL one-cylinder-two cycle engine	
Piston displacement:	32 cm^3 (1,96 cu. in.)
Cylinder bore:	38 mm (1,525 in.)
Piston stroke:	28 mm (1,12 in.)
Cylinder wall:	Heavy chromium impregnated
Max. allowed speed:	12500 r.p.m.
Mean idle speed:	2500 r.p.m.
Crankshaft:	One-part
Crankshaft bearing:	Both sides needle bushings
Crankpin:	11,6 mm (0,45 in.) in diameter
Piston pin:	9 mm (0,36 in.) in diameter
Length of conrod:	53 mm (2,12 in.)
Rewind starter:	Forced engagement with automatic rewind of starter rope
Starter rope:	Length 960 mm (38,4 in.) 3,5 mm (0,14 in.) in diameter
Clutch:	Heavy duty centrifugal clutch without friction linings
Clutch engagement at:	approx. 3000 r.p.m.
Full engagement:	approx. 6000 r.p.m.
Pressure test of crankcase with crankcase testing device:	Testing pressure 0,5 kp/cm^2 (7,1 lbf./$in.^2$)
Pressure test of crankcase with vacuum pump:	Testing pressure 0,2 kp/cm^2 (2,8 lbf./$in.^2$)

Fuel System

Carburetor:	All position Walbro diaphragm carburetor HDC 17 with integral fuel pump
Venturi:	11,1 mm ($^7/_{16}$") in diameter
High speed adjustment screw H:	$^3/_4$ of a turn open
Low speed adjustment screw L:	$^3/_4$ of a turn open (basic carburetor adjustment from snug seat of adjustment screws)
Pressure test of carburetor:	0,4 kp/cm^2 (5,7 lbf./$in.^2$)
Fuel tank capacity:	0,33 l—330 cm^3 (0,70 US pts.)

	Fuel mixture:	Mixing ratio 1:25 (1 part oil to 25 parts gasoline) 1:40 when using STIHL special two-stroke motor oil.
	Air Filter:	Felt pad

Ignition System	Phelon flywheel magneto of separated construction	
	Magneto edge gap:	3—7,5 mm (0,12—0,29 in.)
	Advanced ignition:	2—2,2 mm (0,08—0,09 in.) before top dead center
	Breaker point gap:	0,35—0,4 mm (0,14—0,16 in.)
	Condenser:	Capacity about 0,17 μF
	Armature:	Primary winding 0,8—1,3 Ω Secondary winding 7200—8800 Ω
	Spark plug:	Bosch WKA 175 T 6 (SW 21) Champion CJ-6 (SW 19) Heat range 175 Electrode gap 0,5 mm (0,02 in.) Spark plug thread M 14
	Spark plug thread:	14 mm (0,55 in.)
	Armature air gap:	0,2—0,3 mm (0,007—0,011 in.)

Torques for Screws and Nuts	Crankshaft nut ignition side	2,5 kpm (18,08 ft/lbf.)
	Clutch carrier	2,5 kpm (18,08 ft/lbf.)
	Spark plug	2,5 kpm (18,08 ft/lbf.)
	Cylinder head screw M 4	0,25 kpm (1,79 ft/lbf.)
	Cylinder head screw M 4 for fastening of plastic parts	0,2 kpm (1,45 ft/lbf.)
	Cyl. hd. screw M 5	0,5 kpm (3,62 ft/lbf.)
	Cylinder hd. screws M 5 crankcase screws at cylinder bottom	0,7 kpm (5,06 ft/lbf.)

Cutting Attachment	Guide bars:	Induction hardened with and without stellite tipping at the bar head.

	Bar lengths:	**25 cm (10 in.) guide bar** without stellite tipping at the bar head **30 cm (12 in.) Duromatic guide bar** with stellite tipping at the bar head **30 cm (12 in.) Rollomatic guide bar** with star shaped roller nose
	Chain:	**1/4″-oilomatic chipper chain** STIHL chain model 3831 **1/4″-oilomatic-S-safety chain** STIHL chain model 3849 **1/4″-micromatic-semi-chisel chain** STIHL chain model 3856 **1/4″-micromatic-S-safety chain** STIHL chain model 3855
	Chain speed:	approx. 14,2 m/sek (46,58 ft/sec.) at 8500 r.p.m.
	Chain lubrication:	Oil pump with pump plunger governed by engine speed, pumps only when chain is rotating
	Oil tank capacity:	0,18 l—180 cm^3 (0,38 US pts.)
	Chain sprocket:	8 teeth for 1/4″ chain

Weight of Saw	with 25 cm (10 in.) bar and chain	015	4,2 kg (9,24 p.)
		015 L, 015 L electronic	4,4 kg (9,68 p.)

Extras	STIHL emergency kit Special muffler, hand guard

SAW CHAIN DRIVE AND CLUTCH

Function

The power from the engine is transmitted to the saw chain by a centrifugal clutch. This clutch is composed of clutch carrier, two clutch shoes and one clutch spring. The washer which is positioned behind the clutch for the guidance of the clutch shoes as well as the chain sprocket with clutch drum riveted onto it are also part of the clutch assembly.

With increasing speed- at approx. 3000 r.p.m. the clutch shoes held by the clutch spring are forced to the outside. They are pressed against the clutch drum thus transmitting the engine power to the saw chain. The chain sprocket also drives the oil pump at engaged clutch, as the tooth profile engages in a provided recess at the small spur gear for the pump.

Note:
The carburetor has to be adjusted in such a way (see "carburetor adjustment") that the chain does not rotate when engine is idling.

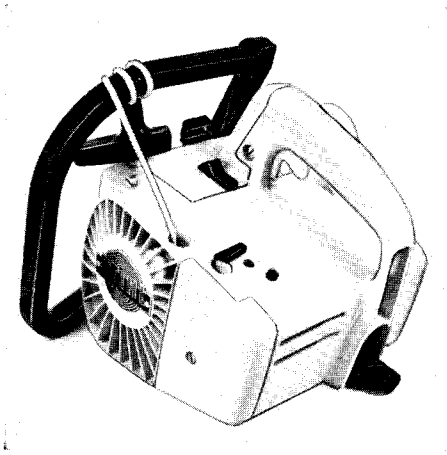
Troubling

The clutch is maintenance free. Normal wear, however, cannot be avoided. Therefore, the clutch and chain sprocket must be checked on proper condition periodically.

Troubles	Causes	How to correct
Extraneous noises	Engine is running too high when idling	Adjust idle speed regulating screw
Saw chain does not stop running when idling	Spring stretched or fatigued Spring hooks damaged	Replace spring
Extreme chain wear	Worn chain sprocket	Replace chain sprocket

Disassembly

Starter rope coiled around handle frame



A fouled or improperly operating clutch as well as a worn chain sprocket must be disassembled and repaired respectively replaced.

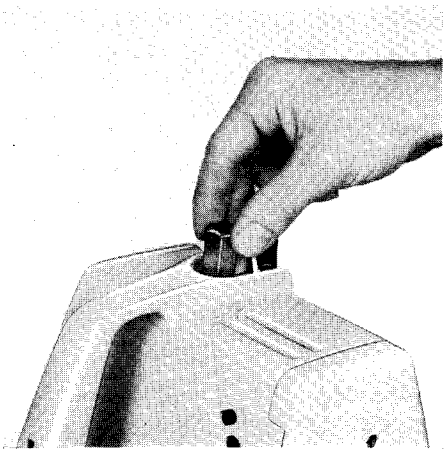
For disassembly first take off chain sprocket cover and cutting attachment. Carefully pull of spark plug terminal and screw out spark plug. Thereafter pull out starter rope and wind it three to four times around the handle frame. This prevents possible breakage of the starter rope when reinstalling the clutch.

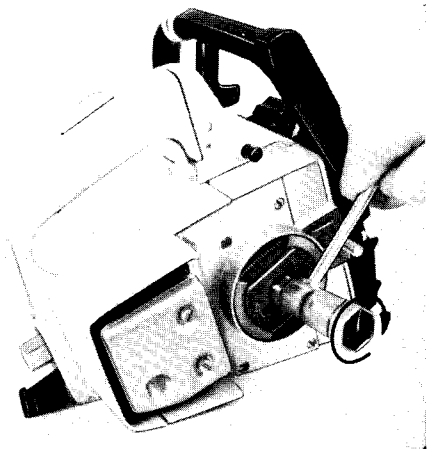
Now insert locking screw into spark plug thread by hand until its snug seat to lock the crankshaft. Then unscrew clutch with combination wrench (SW 13) from the crankshaft.

Note! Clutch carrier has left hand thread! Therefore unscrewing is done in clockwise direction.

Top:
Inserting locking screw

Bottom:
Loosening the clutch

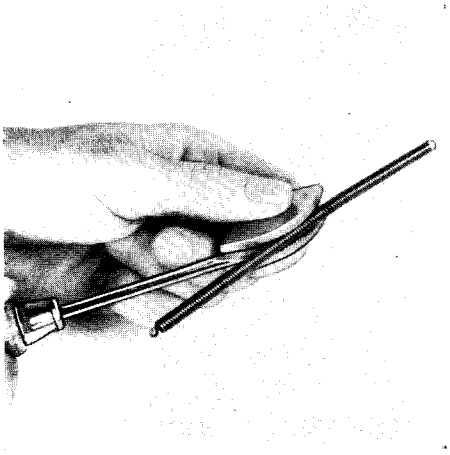




For proper guidance of the clutch shoes a washer is positioned behind the clutch. It has to be installed in such a way that it rests with its indented side against the carrier. Washer, chain sprocket and needle cage can now be taken from the crankshaft.

Repair

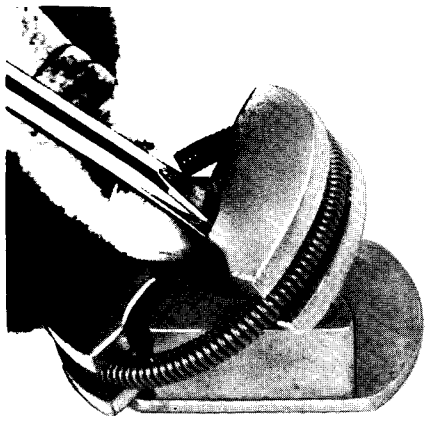
Prying off worm spring



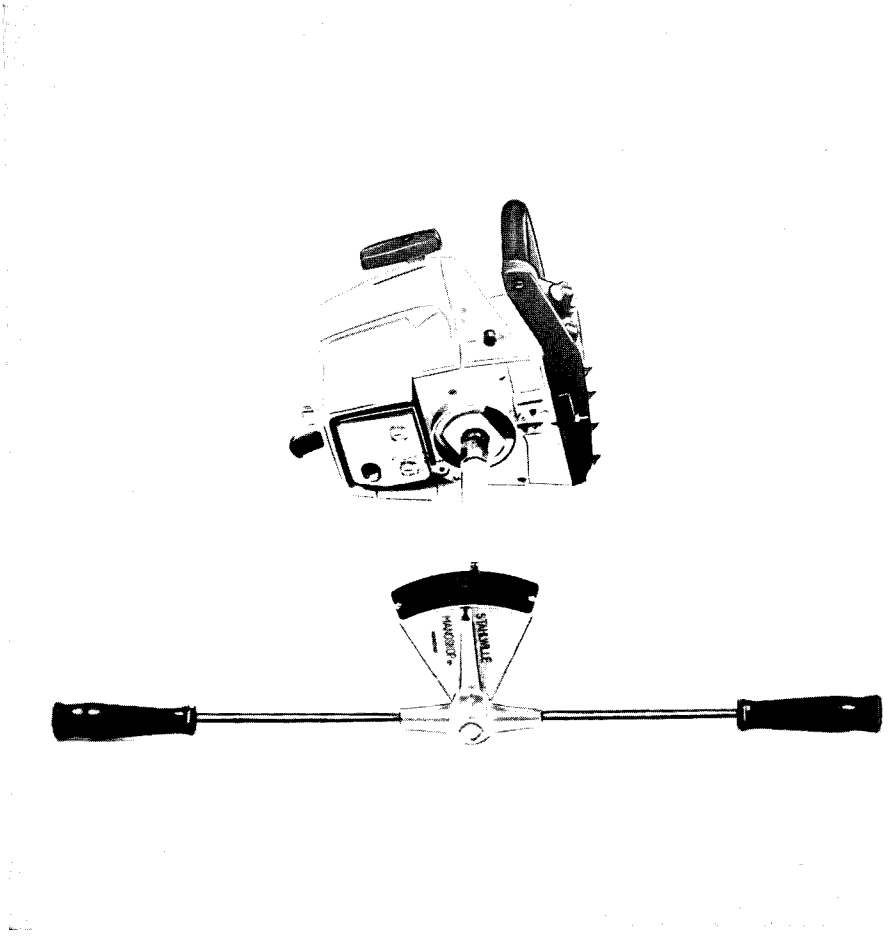
Clutch:
Pull off clutch shoes from carrier and unhook springs at the lugs. If spring stays hooked in the toothed profile of the clutch shoes do not try to pull it out by force. Take a small screw driver and pry out spring carefully of the tooth profile. Damaged parts of the clutch and worn clutch shoes have to be replaced. Don't replace a single clutch shoe, always use a **complete set.** To mount a new clutch spring position clutch shoes symmetrically one facing the other. Hook clutch spring together at its ends and press it onto the clutch shoes.

The mounting groove for the clutch spring in the clutch shoes is provided in its center with a tooth profile which prevents the clutch spring from twisting. When pressing on the clutch spring take care **that the spring lugs always rest in the middle of the tooth profile of each clutch**

Prying off clutch shoes



Tightening the clutch



shoe. Moreover, it is very important that the clutch spring always rests completely in the groove of the clutch shoe- this is true **also for the area of the tooth profile.** If the clutch spring is protruding it is undergoing an unnecessary wearing process at engaged clutch- as a result of clutch drum friction. If the spring lugs are placed outside of a clutch shoe a breakage of the spring might occur. Then slide clutch shoes with clutch springs onto carrier. With a screwdriver pry on the clutch shoes to the carrier. Thereby press clutch shoes with one hand to the carrier in order to avoid its jump-back caused by the pretensioning of the clutch spring.

Chain sprocket:
The stress on the chain sprocket is extremely high. If it shows visible wear at the teeth it has to be exchanged. This wear should not exceed a depth of 0,5 mm (0,019 in.).

Before reassembling needle cage apply some ball bearing grease to it. Then mount needle cage, chain sprocket and washer (observe correct inserting position) onto crankshaft and screw in crankshaft with clutch in reverse direction of engine rotation thereby reducing the starter rope tension till limit stop position of the locking screw. Then let starter rope slide back fully. Screw in clutch counterclockwise with combination wrench and tighten with torque wrench to 2,5 kpm (18,08 ft/lbf.). Mount chain sprocket cover and insert spark plug tightening torque of spark plug 2,5 kpm (18,08 ft./lbf.).

ENGINE

Construction

The power chain saws are driven by an aircooled one-cylinder two-cycle engine. The crankcase consists of two housing parts; as a special construction feature the cylinder at the same time serves as crankcase half. Cylinder and piston are made of a special aluminum alloy. The crankshaft is drop forged. It is a onepart crankshaft and is supported in the crankcase with 2 heavy duty needle bushings. At the bearing seats of the crankcase the crankshaft is sealed by separate oil seals on both sides. The bearing support between crankshaft and conrod is achieved by 12 cylindrical rollers which are individually positioned in a grease layer on the crankshaft and are kept in the guide groove on the crankshaft by the connecting rod.

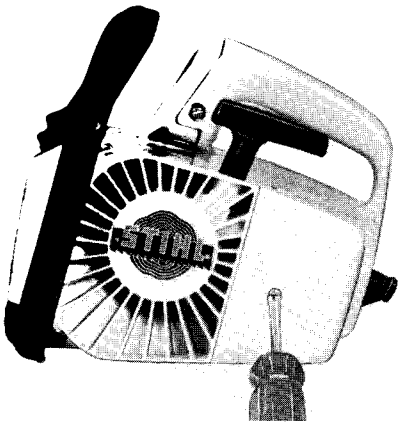
The crankshaft at the ignition side is provided with a cam to activate the breaker point set. The conrod is made of a special tempered case hardened steel.

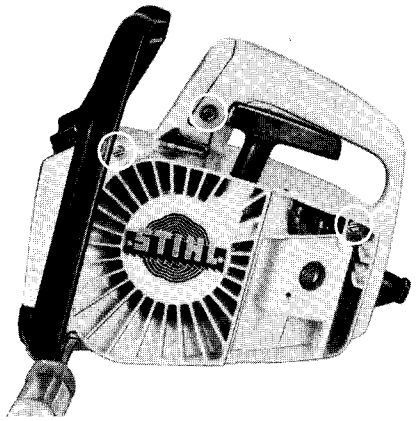
Troubling	Causes	How to correct
Engine stops when idling, however, operates normal at full throttle	Sealing ring of crankshaft leaks	Replace sealing rings
	Crankcase defective (cracks)	Replace crankcase
Motor does not reach full performance or runs irregularly	Air filter clogged	Clean
	Engine gets by-pass air by badly fitted carburetor	Mount carburetor correctly if necessary replace flange gasket
	Piston ring leaky or broken	Replace piston ring
Engine overheated	Insufficient cylinder cooling. Air intake openings at handle shroud clogged or cooling fins fouled	Clean cooling air by passes.
Engine all right	Trouble source must be looked for in fuel system respectively carburetor or ignition system, see respective paragraph.	

Exposing the Cylinder

Top:
Unscrewing the filter cover

Bottom:
Loosening the handle shroud fixation

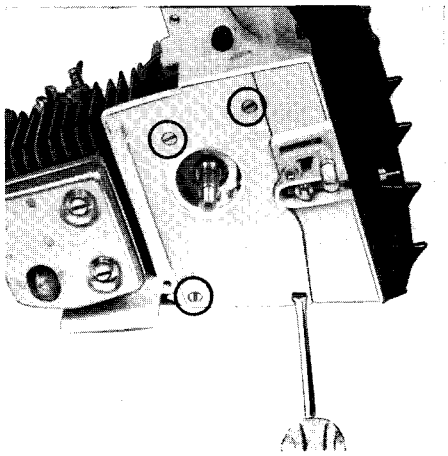




Before starting to repair the engine — also when exposing the cylinder — first empty oil- and fuel tank!

Then take off chain sprocket cover, unscrew filter cover and remove air filter. Pull off choke lever and spark plug terminal. Unscrew spark plug as well as the 4 cyl. hd. screws M 5×20 of handle shroud fixation. Lift off handle shroud from motor half.

Loosening the cover of the oil pump



Then screw in locking screw into spark plug port by hand until its snug seat to lock the crankshaft. Remove clutch from crankshaft. Now unscrew the 4 cyl. hd. screws M 4×15 for fixation of the cover which protects the oil pump against saw dust and take off cover with small spur gear.

Then unscrew hex. nut for flywheel fixation at blocked crankshaft anti-clockwise, remove washer and loosen flywheel with special tool 1116 893 0800 from crankshaft.

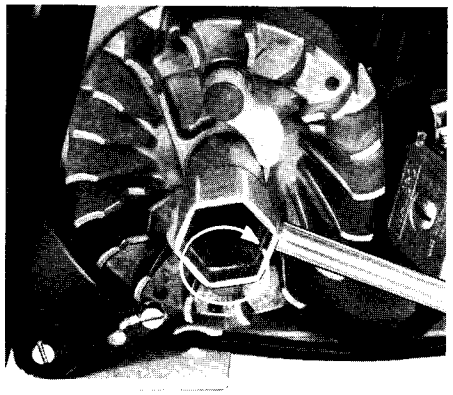
To do so screw the special tool onto the crankshaft (at crankshaft part-ignition side). The special tool must not rest against the flywheel.

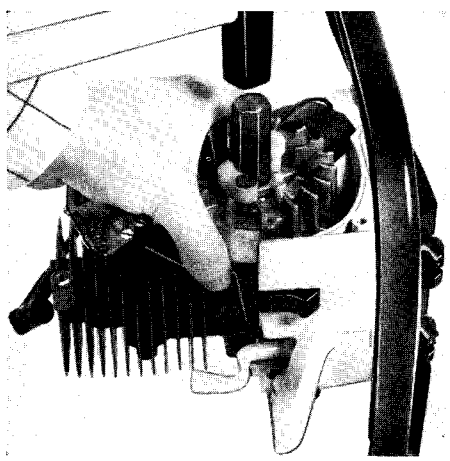
Now loosen the flywheel with light hammer blows onto the shaft of the special tool. While doing so hold chain saw at flywheel.

Top:
Loosening the hexagonal nut

Center:
Special tool

Bottom:
Loosening the flywheel

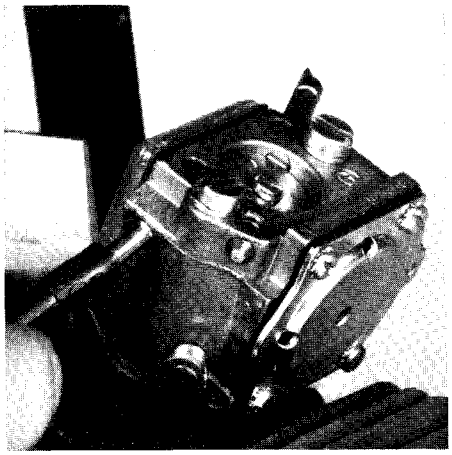


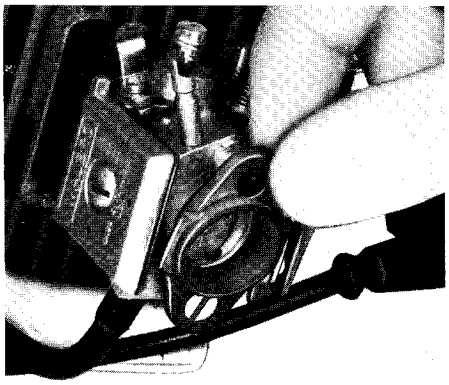


Cylinder

Top:
Pulling off the fuel hose

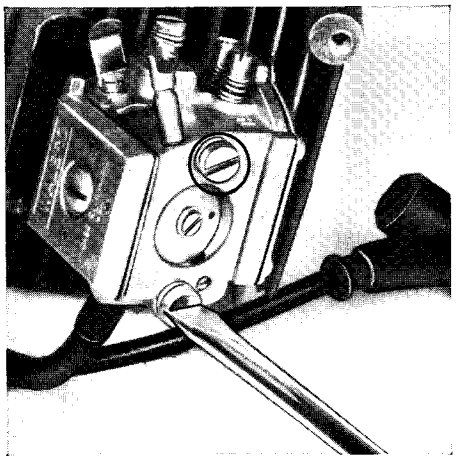
Bottom:
Removing the rubber flange

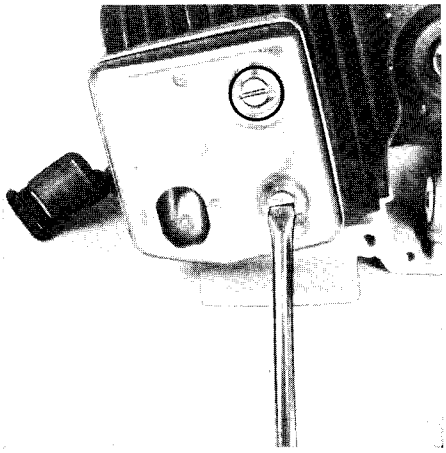




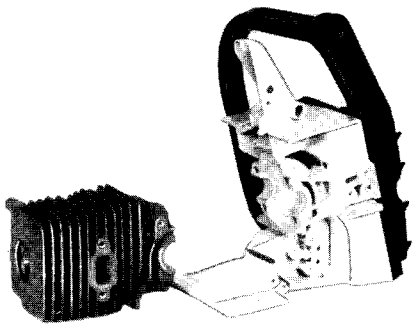
Top:
Removing the carburetor

Bottom:
Dismantling the muffler





Cylinder and second crankcase half



The cylinder of model 1116 has been designed in such a way to serve at the same time as crankcase half. If the cylinder has to be replaced always the complete crankcase must be exchanged since the main bearing seats are only machined at the finished crankcase assembly.

When ordering spare parts therefore the cylinder can be supplied only complete with the second crankcase half. A damaged piston, however, can be easily replaced by a new one without any further need.

Now clean cylinder fins thoroughly and check for defectiveness.

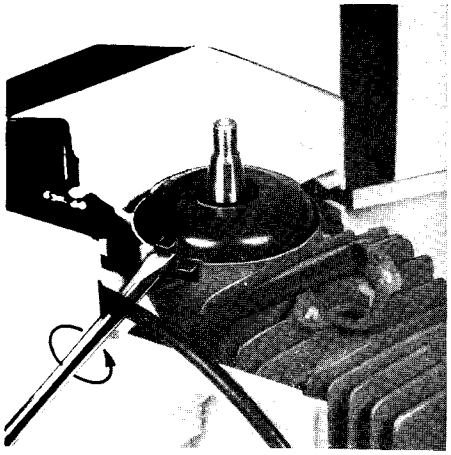
If for proper inspection of the cylinder also the carburetor and muffler have to be disassembled first unhook throttle rod from throttle lever and throttle shaft, pull off fuel hose at carburetor and take off rubber flange from carburetor.

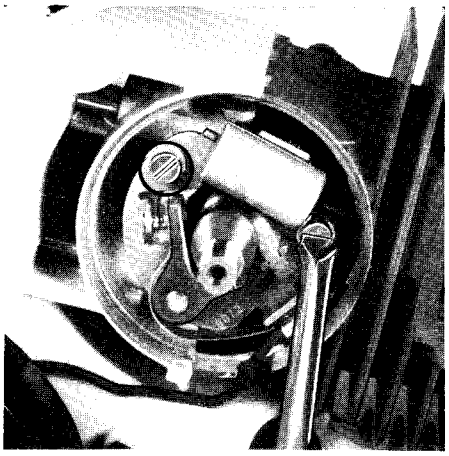
Unscrew the 2 cyl. hd. screws M 5×65 for the fixation of carburetor and the 2 cyl. hd. screws for the fixation of muffler in order to be able to remove the parts.

Disassembly of crankcase, crankshaft and piston

Top:
Prying off the plastic cover

Bottom:
Loosening the breaker point set

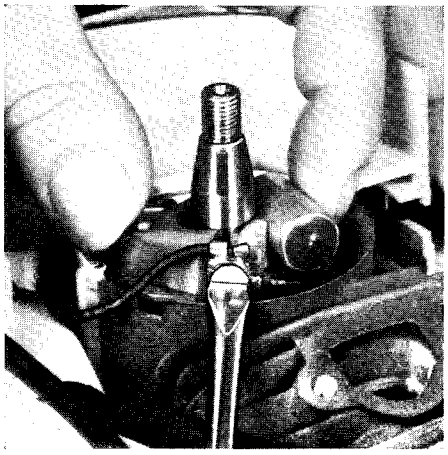


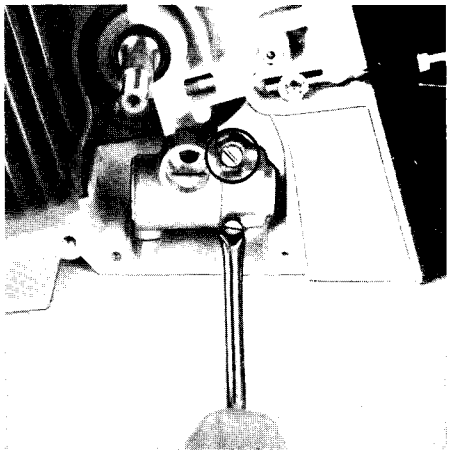


Top:
Loosening the wire connections

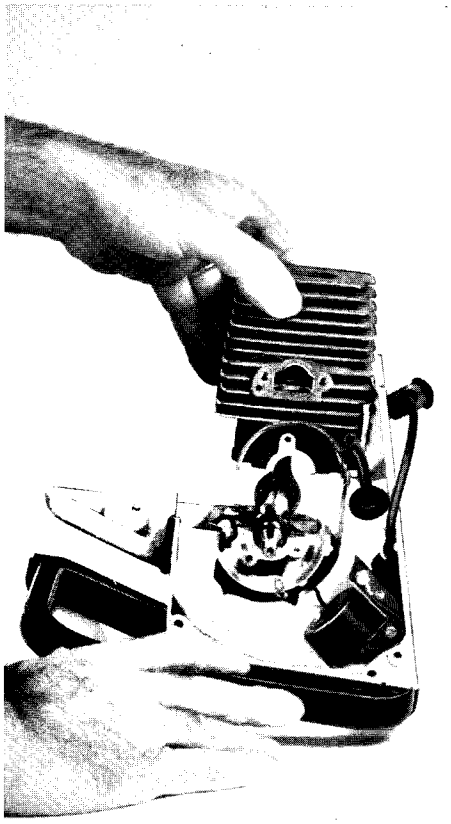
Center:
Loosening the oil pump

Bottom:
Loosening the crankcase screwing

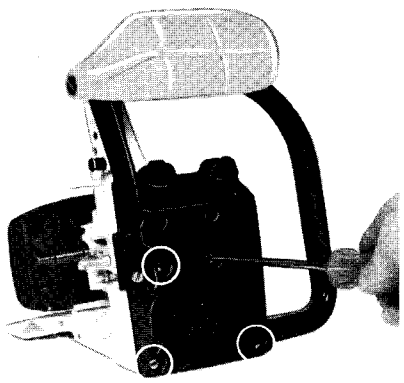




Pulling off the cylinder



After exposing the cylinder carefully pry off the cover which protects the contact set against saw dust with screwdriver from its seat in the crankcase. Screw out the 2 cyl. hd. screws which are fastening the contact set to the crankcase as well as the cylinder head screw for the fixation of the wire connections at the contact set. Pull off big spur gear of the oil pump drive and unscrew the two cylinder head screws which are holding the oil pump.



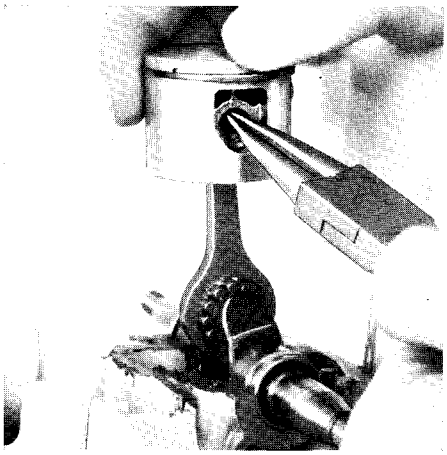
Remove the 4 cyl. hd. screws of the crankcase screwing at the handle shroud. Position motor part onto handle shroud side and pull cylinder.

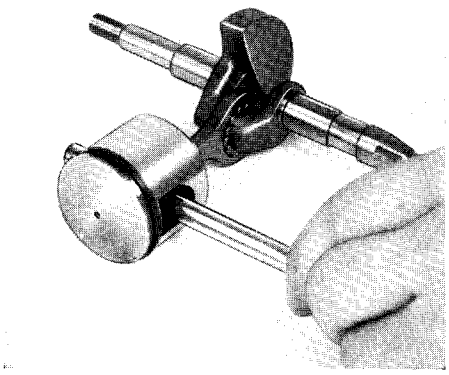
Should the cylinder still be connected with the crankcase half by the sealing liquid loosen parts with light blows of a wooden or rubber hammer.

Assembly of crankcase

Top:
Removing the circlips

Bottom:
Inserting the piston pin

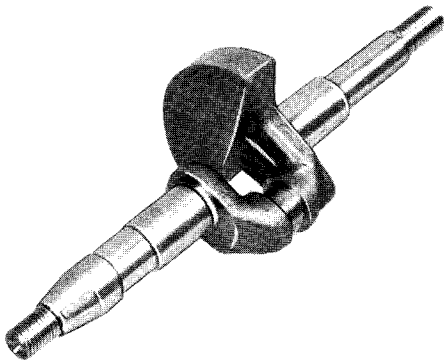




Now remove circlips for piston pin securing with special pliers. The piston pin connects piston with connecting rod. The piston pin connection is fitted by sliding fit. The piston pin is pushed out of the piston with mounting bolt 1114 893 4700. Should it sit tight because of carbonization loosen it with light hammer blows. Thereby counterhold at the piston.

The now exposed onepart crank-

One-part crankshaft

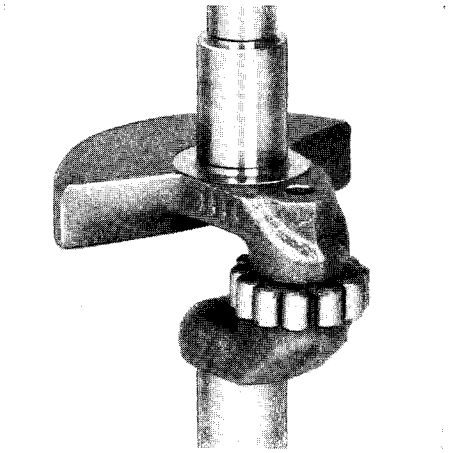


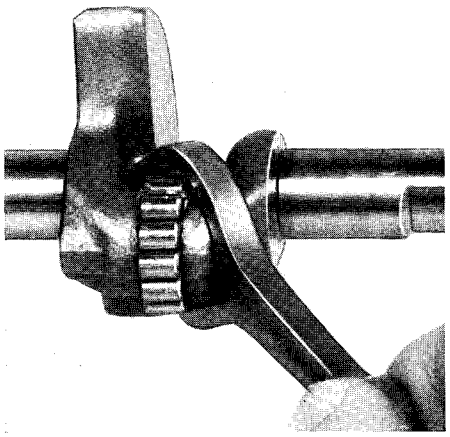
shaft is supported in the crankcase with two heavy duty needle bushings each of them in turn is adjusted by a thrust ring. The crankshaft is sealed at both sides by a separate oil seal at the bearing seats of the crankcase.

If the cylinder respectively the crankcase are damaged and have to be exchanged then the remaining parts which are still fastened to it such as ignition coil, fuel hose etc. have to be removed.

Top:
Placed cylindrical rollers

Bottom:
Inserting the connecting rod





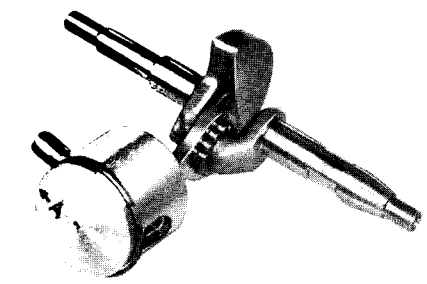
If a new crankshaft has to be installed first mount 12 new cylindrical roller needles as well as a new connecting rod onto the crankshaft.

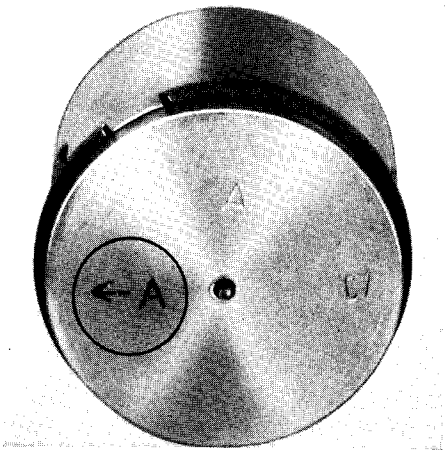
To mount the cylindrical roller needles thoroughly grease guide groove at the crankshaft with ball bearing grease, then press cylindrical roller needles one after the other into the grease layer.

Now hold crankshaft horizontally

Top:
Plugged side of piston pin towards direction "A"

Bottom
Arrow must point towards cylinder outlet

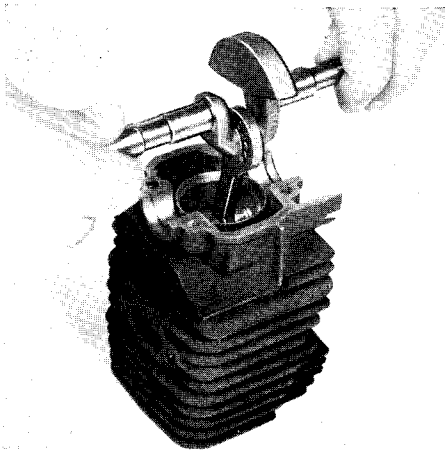




carefully sliding the connecting rod starting at the magneto side of the crankshaft over the cylindrical roller needles. Now place crankshaft with mounted connecting rod onto the work bench and mount the piston onto the connecting rod. — Take care that the cylindrical roller needles do not fall out of the guide groove.

To do so push the piston pin into the piston boring in such a way **that**

Inserting the piston into the cylinder



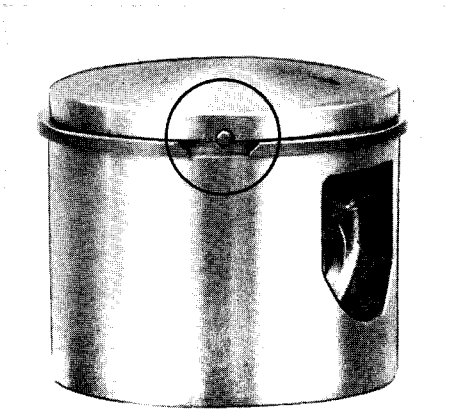
its plugged side points towards the direction of the arrow which is stamped into the piston bottom and marked with "A". Thereafter secure the piston ring with a circlip on both sides of the piston.

Moreover, when mounting the piston care has to be taken that the arrow marked with an "A" on the top of the piston always points towards the exhaust outlet of the cylinder (crankshaft-clutch side).

Now mount the needle bushing as well as the supporting ring which are of larger diameter onto the crankshaft (ignition side) and the needle bushing with supporting ring of smaller diameter onto the clutch side of the crankshaft.

Attention: For the first production runs of the STIHL 015 needle bushings and supporting rings of same size were used on both sides.

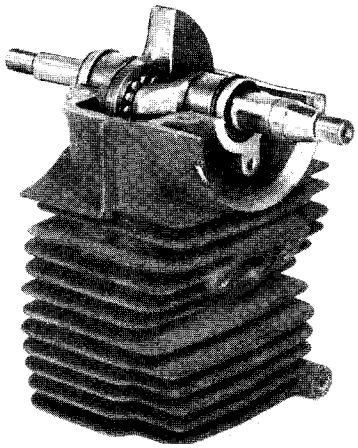
Mounted piston ring

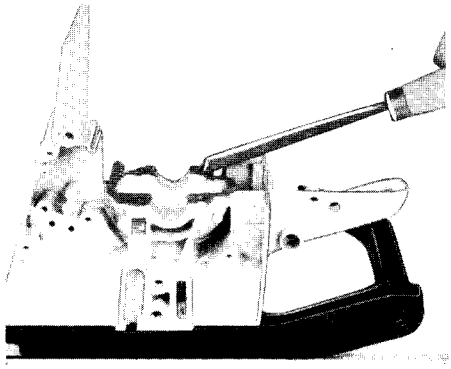


To do so put cylinder upside down. Hold crankshaft with piston over the cylinder and insert piston slowly into the cylinder gently forcing it by hand. For the insertion of the piston hold crankshaft parallel to the crankshaft bearing in the cylinder. Pay attention that the crankshaft ends point into the respective directions (for instance crankshaft part-magneto side must point towards the magneto side of the motor).
Do not turn the piston once it is inserted into the cylinder since there is the risk that the compression ring gets hooked in the cylinder causing its breakage.
Prior to inserting the piston apply sufficient lubricant and take care that the compression ring is properly inserted. The compression ring is secured in the piston groove by a cylindrical pin against turning. Don't place the compression ring onto this cylindrical pin since the ring will brake when inserting the piston into the cylinder.

Top:
Placed crankshaft

Bottom:
Applying sealing paste



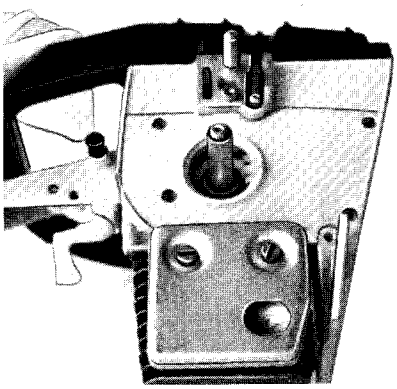


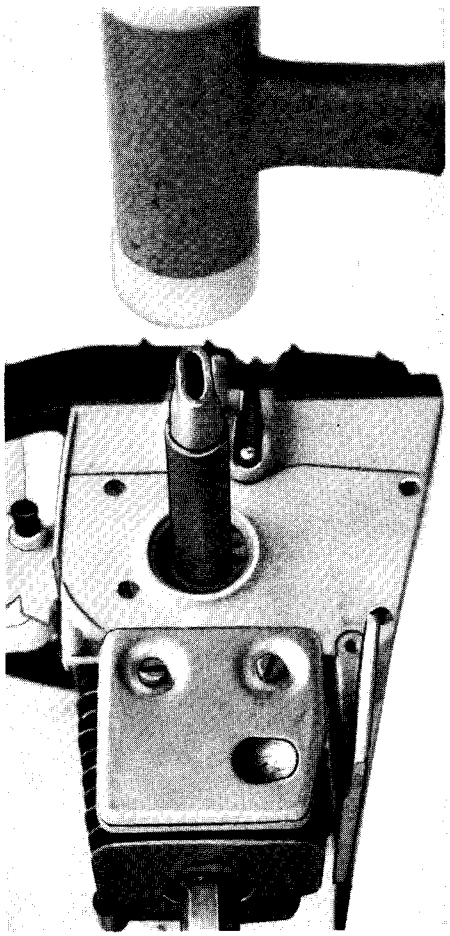
When installing a new crankcase first screw the handle shroud with the crankcase together before going on with the assembly work. First, however, mount the pick-up body for the chain lubricant and the oil hose. Don't forget to place a new gasket between crankcase half and handle shroud!

Then apply sealing paste-recommended by the factory- to the sealing surfaces. It is most suitable to take a smoothing trowel or similar accessories. When reusing the old crankcase first clean sealing surfaces! (Completely remove old sealing paste.)

Top:
Inserted mounting sleeve

Bottom:
Inserting the oil seal



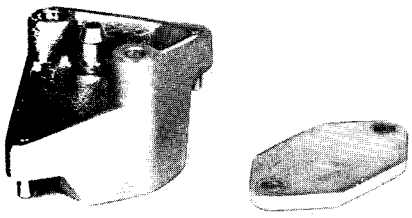


Now mount the rubber grommet with short circuit wire on crankcase and afterwards put crankcase onto cylinder. Tighten crankcase with the 4 cyl. hd. screws BM 5×95-torque 0,7 kpm (5,06 ft./lbf.). Now mount on both sides of the crankshaft each a sealing ring. To do so use mounting tool and take care that the sealing lips point towards the center of the crankshaft. Don't twist the sealing rings!

The further assembly is done by reversing the disassembly sequence. Before installing carburetor hook in throttle rod. Observe correct inserting position! Don't squeeze any wire connections. Replace all disassembled gaskets and careful observe the correct tightening torques of the fastening screws.

Pressure Testing the Crankcase

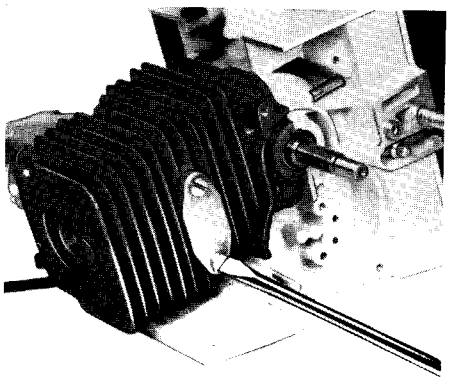
Adapter and cover flange



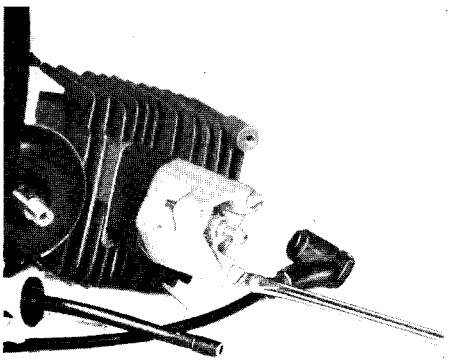
Top:
Closing the outlet opening

Center:
Carburetor- and crankcase testing device

Bottom:
Pressure testing the crankcase



Sealing the intake opening

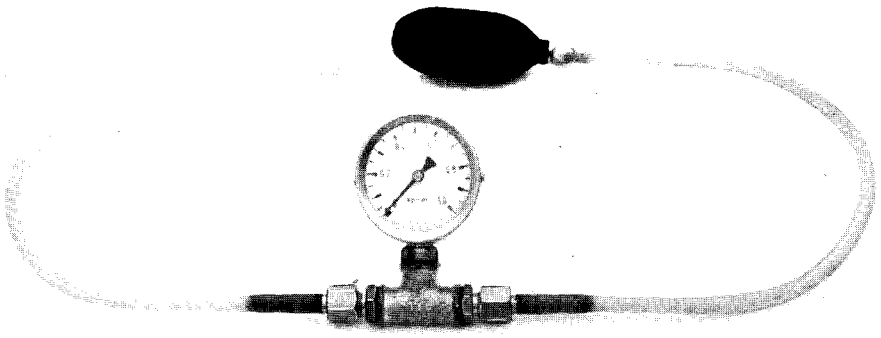


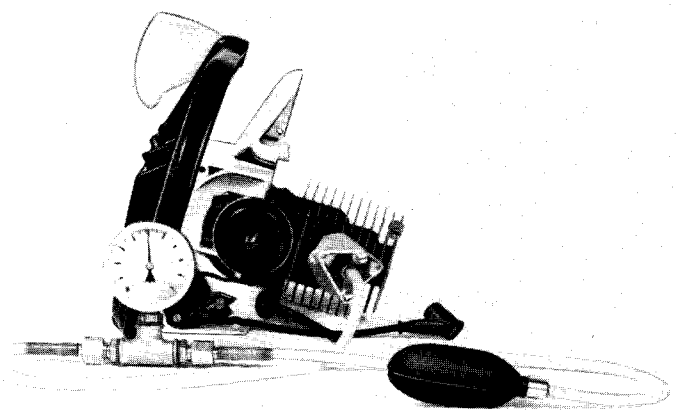
With the carburetor and crankcase pressure testing device 1106 850 2900 it is possible to check the engine for proper tightness.

Faulty oil seals and gaskets, cracks or inclosures in the castings are mostly the cause for leaking crankcases. Through these leaks additional air may enter the crankcase and may change the composition of the fuel-air mixture. Consequently the adjustment of the recommended idle speed will be most difficult if not impossible. Moreover, no smooth acceleration will be achieved when changing the motor speed (throttling).

Should such troubles occur always pressure test the crankcase to find the leaky spot.

To connect the pressure testing device take off handle shroud, carburetor, muffler and the flywheel. Close exhaust port in cylinder with

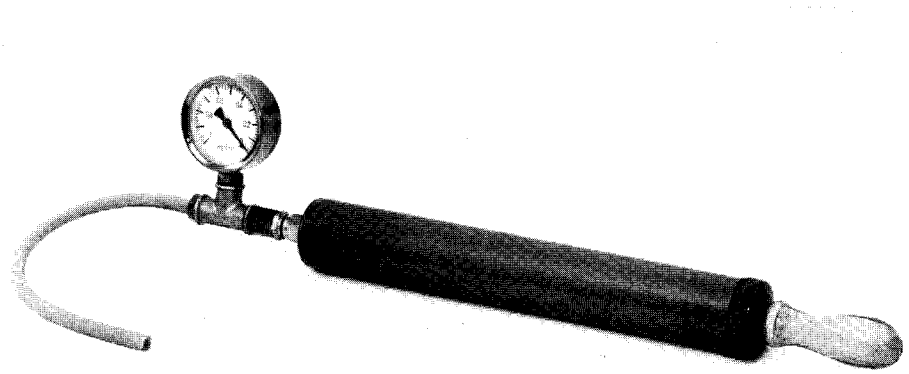


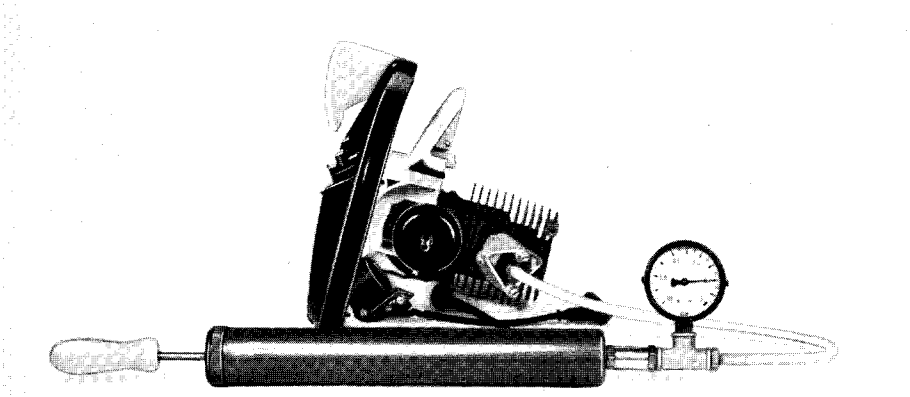


Sealing Test with Vacuum Pump

Top:
Vacuum pump

Bottom:
Tightness test with vacuum pump





sealing flange 1114 855 4200- place exhaust gasket underneath! Seal intake opening with flange 1113 850 4200. To do so place carburetor flange and gaskets underneath. Take care that the fuel boring is sealed with the flange 1113 850 4200. Tighten screws and nuts so that the respective openings are properly sealed.

Connect pressure hose to fitting of pressure test flange. With screwed in spark plug piston must be brought into top dead center position. Close venting screw at pressure ball. Pump air into the crankcase until the pressure gauge indicates a reading of 0,5 kp/cm² (7,1 lbf./in.²). If this pressure remains constant then the crankcase is properly sealed; if this is not the case, you must find out the leaky spot and replace the faulty part.

After the test open venting screw again and pull off hose.

Since air is bypassing the oil seals at vacuum, that means at piston pumping motion, an additional sealing test can be carried out with the vacuum pump 0000 850 3500.

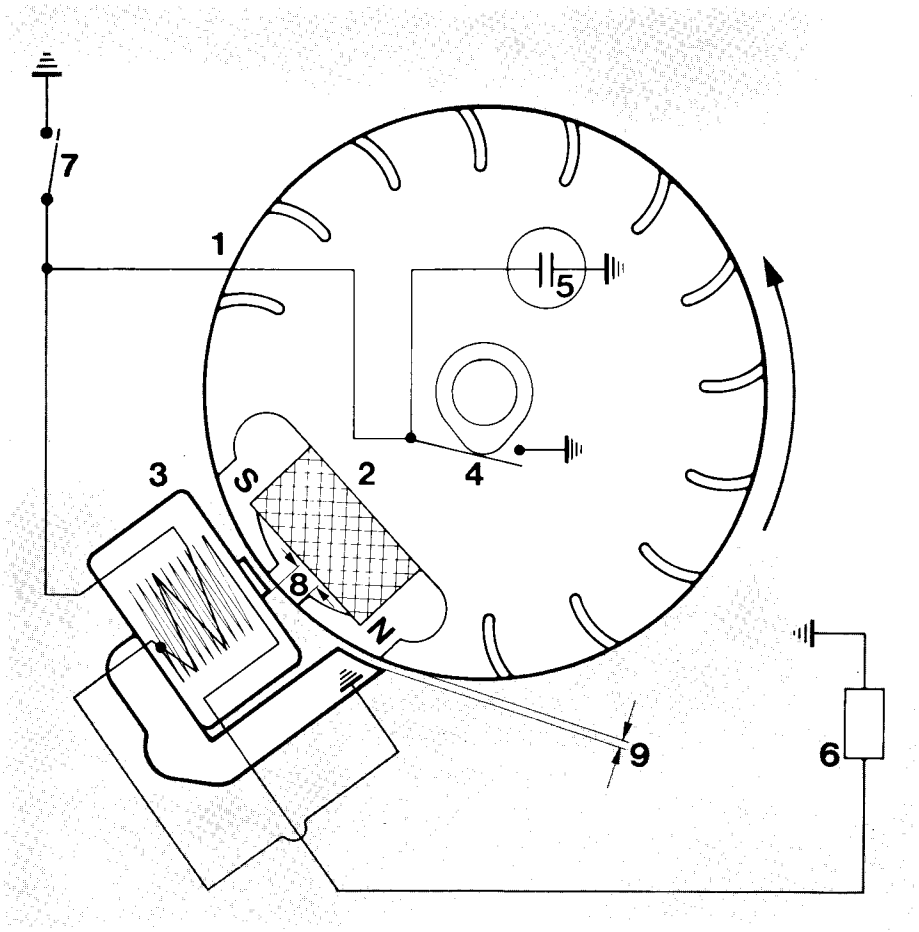
To do so close cylinder exhaust port and intake port (see "pressure testing"). Connect pressure hose of vacuum pump to fitting of pressure testing flange. Pull out pumping handle of pump until pressure gauge indicates a reading of 0,5 kp/cm² (7,1 lbf./in.²). The integral relief valve shuts itself automatically.

The crankcase is sealing properly if this low pressure does not drop below 0,2 kp/cm² (2,8 lbf./in.²). If the pressure drops below this reading then the oil seals have to be replaced even though if no leakage has been found when pressure testing previously.

IGNITION SYSTEM

Design and Operation of Flywheel Magneto-Ignition System (Breaker Point System)

Schematic view of ignition system:
1 Flywheel
2 Permanent magnet with north-and south pole and pole shoes
3 Armature with primary and secondary coil
4 Breaker points
5 Condenser
6 Spark plug
7 Ignition switch
8 Magneto edge gap
9 Armature air gap



Like all STIHL power chain saws the 015 and 015 L are equipped with a flywheel magneto ignition system needing neither a battery nor a dynamo.

The Phelon ignition of separated construction consists mainly of flywheel with permanent magnets and pole shoes as well as contact set, condenser, ignition coil, high tension lead, spark plug, short circuit wire and ignition switch.

The flywheel magneto operates on the principal of magnetic induction. Electric current is produced when a wire is moved through a magnetic field. When the flywheel is turning, the lines of force between the permanent magnets which flow out at the north pole of the magnet and flow in at the south pole of the magnet cut across the wire turns of the primary winding of the ignition coil and induce therein a low voltage current. When the current in the primary winding is at the maximum the electric circuit is interrupted by the breaker point. This will cause the magnetic field in the armature core to collapse and to induce a high voltage current in the secondary winding which is necessary for the ignition and this high voltage current will flow to the spark.

The condenser which is connected parallel with the breaker points prevents an excessive sparking (electric arc) between the contact sets and therefore a loss of energy and premature wear.

The breaker point is opened by the cam which is ground to the flywheel hub and closed by a spring. The running engine is stopped by grounding the primary winding by means of the ignition switch.

Spark Plug

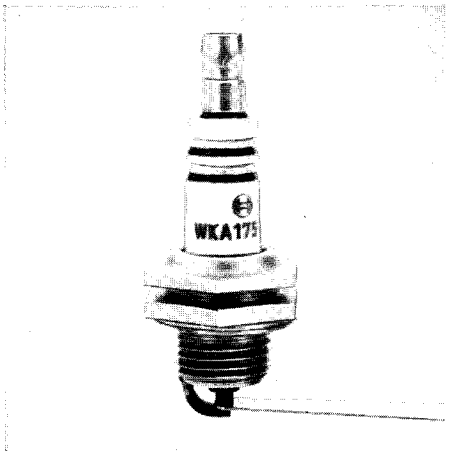
The spark plug provides the means for igniting the compressed fuel air mixture. Ignition occurs when a spark jumps the air gap between the center electrode and the ground electrode.

Therefore, in case of trouble with the ignition system trouble shooting should begin at the spark plug.

If the engine is difficult to start or if you notice a loss of power remove and check spark plug. The correct heat range of the spark plug must be 175. Remove carbon coating on the spark plug with a brass brush. Blow out spark plug with compressed air. If spark plug is fouled by oil remove the fouling with a grease solvent fluid and blow out spark plug with compressed air afterwards. Fouling of the plug may be caused by an improper fuel-air mixing ratio, a too rich carburetor adjustment, a clogged air filter or a partly closed choke shutter.

The electrode gap must be checked with a feeler gauge and adjusted at regular intervals as the gap becomes larger by normal erosion of the electrodes. The electrode gap can be adjusted to the required distance of 0.02″ (0,5 mm) by bending the ground electrode.

Checking the electrode gap



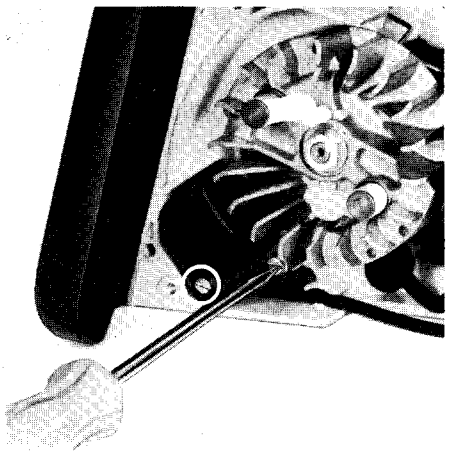
A new spark plug, however, must be used if electrodes are badly eroded. An exact control of the spark plug is only possible with a spark plug testing device. If you do not have such a spark plug testing device insert the unscrewed and cleaned spark plug terminal and connect it with ground. A strong spark must jump the electrode gap when pulling the rewind starter.

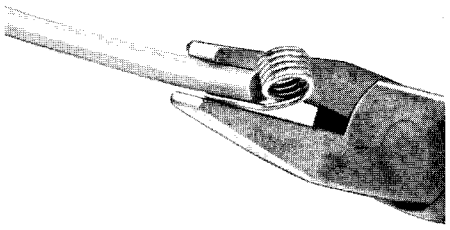
If no spark jumps inspite of a functioning spark plug then as a next step the wire connections have to be checked. Polished insulations of the ignition and short circuit wires are leading to faulty grounding. As a result the engine will not start or does not function properly. Before inserting spark plug clean spark plug port and check gasket on proper condition. Tighten spark plug with a torque of 18,08 ft/lbf. (2,5 kpm).

High Tension Lead

Top:
Removing the ignition coil

Bottom:
Mounting the leg spring





To be able to remove the high tension lead take off handle shroud. A defective high tension lead can be unscrewed from the ignition coil and has to be replaced. To do so the ignition coil has, however, to be removed from the crankcase. The length of the ignition wire is 180 mm (7.020 in.). When using a new ignition wire the leg spring has to be mounted to the wire as well. Push the hook of the leg spring at the end of the cable leading to the

Inserting the leg spring

spark plug exactly into the center of the wire diameter to achieve a proper connection with the metal wire running in the center of the lead. Then pull high tension lead with hooked-on leg spring through spark plug terminal. To do so oil or grease the wire end and push wire with leg spring into the terminal (see illustration).

It can be checked with an ohm-meter whether the connection between the spark plug terminal and the high tension lead end is conductive. The ohm-meter must show a reading of "zero" ohm (no restistance).

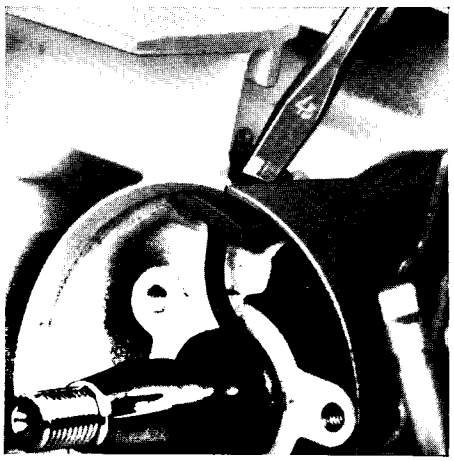
Ignition Switch

Removing the spring

Special care has to be taken that the ignition switch is grounding only when switch is in "off" position. Special attention has to be paid to the contact surfaces on the housing to be free of dirt and dust so that a proper ground connection is always assured. If the contact spring is broken push ignition switch out of its support, remove the remaining pieces of the spring and install a new one. Then mount ignition switch again.

Ground Lead

Pushing in the grommet



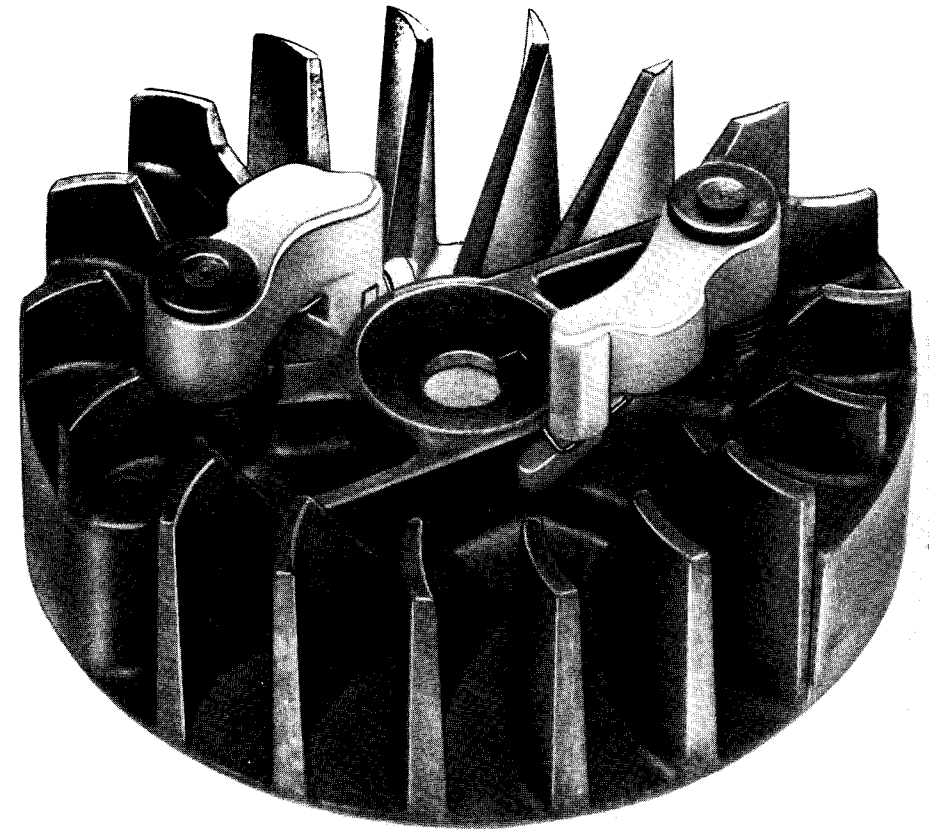
If the ground lead has to be replaced first expose the breaker point sets. To do so take off handle shroud, pull off flywheel from crankshaft (see paragraph flywheel) and pry off cover which protects the point set against fouling with the screwdriver. Unscrew fixation for the point set and loosen the wire connections at the contact.

Now push the grommet and the ground lead downwards with a screwdriver. The new ground lead has to be led first with the wire clamp from above into the opening and then the grommet has to be placed in its seat.

Now fasten the wire connections of the contacts again and screw the contact bank again to the crankcase. Then readjust ignition and assemble remaining parts.

Flywheel

Flywheel with starter pawls



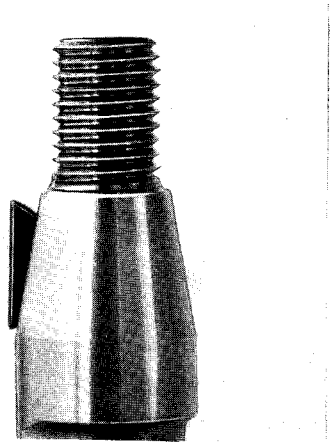
The flywheel serves at the same time as fanwheel for the cooling of the engine. The flywheel is made of non magnetic material and a permanent magnet and pole shoes are casted into it. The magnet determines the edge gap and the ignition point. Its position towards the crankshaft and piston is achieved by a groove and key adjustment.

A damaged flywheel cannot be repaired but has to be replaced.

To remove the flywheel first take off handle shroud. Insert locking screw for locking the crankshaft into spark plug port. Then unscrew hex. nut M 8×1 for the fixation of the flywheel with combination wrench and pull off flywheel with special tool 1116 893 0800 from crankshaft.

To do so screw special tool onto crankshaft and loosen the flywheel by applying light hammer blows

Installed key

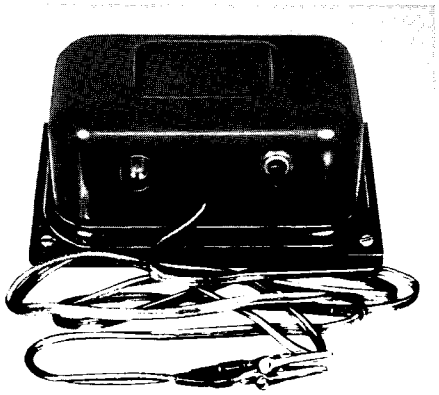


onto the shaft of the tool, thereby counterholding at the flywheel.

Before reinstalling take care that no magnetic parts are attached to the flywheel; flywheel and crankshaft taper must be free of grease and oil. Also the proper seat of the key is most important. Tighten crankshaft nut again, not forgetting to put back the washer (tightening torque 2,5 kpm (18,08 ft/lbf.).

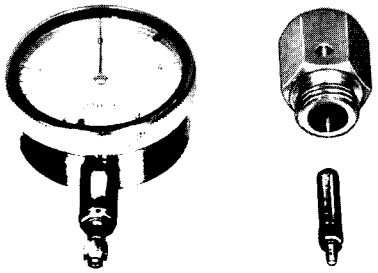
Checking the Ignition Timing

Ignition timing device

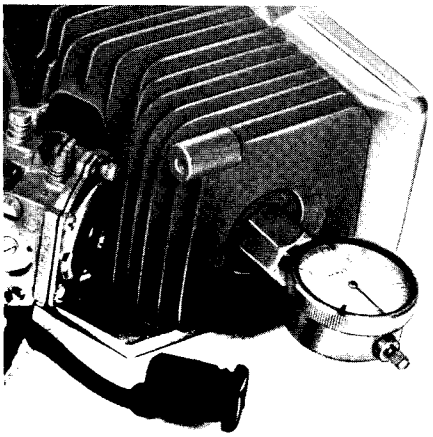


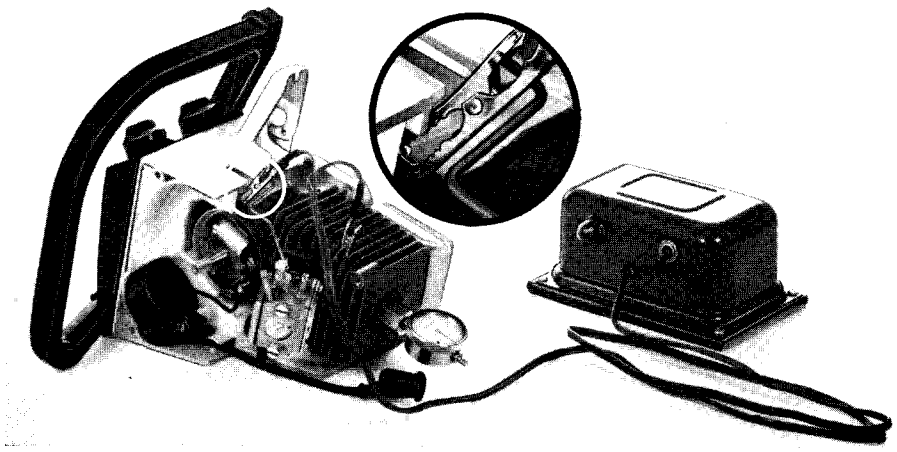
Top:
Dial gauge with holder and extension piece

Bottom:
Connected timing device



Mounted dial gauge



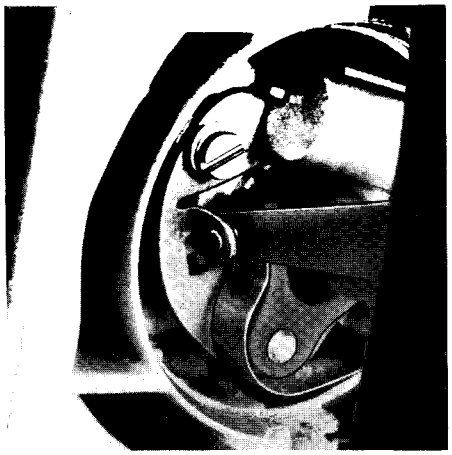


The ignition timing (advanced ignition) of the 015 and 015 L is 2,2 mm (0,09 in.) before top dead center. When breaker points are fully open the breaker point gap must be 0.014″—0.016″ (0,35—0,4 mm). To check the ignition timing remove handle shroud, flywheel and plastic cover which protects the contact set against fouling. Screw holder of ignition timing device into spark plug port and insert ignition timing dial gauge. The feeler of the dial gauge can be extended by an intermediate piece. Connect Bosch ignition timing device with one pole clip to ground and the other pole clip to the ground lead. Before doing this remove ignition stop switch. Attention-no ground contact should be made between the clamp attached to the end of the ground lead and the crankcase or the throttle rod.

Bring piston to top dead center position by turning the crankshaft; in this piston position adjust the scale of the dial gauge so that the indicator points to "0". Then turn crankshaft approx. 1/4 turn in reverse direction of engine rotation. Switch on ignition timing device and turn crankshaft slowly in direction of engine rotation until the light of the ignition timing device goes on. The breaker points open at this position and therefore the indicator of the timing dial gauge must now read 2,2 mm (0,09 in.) before top dead center, otherwise the ignition timing must be readjusted.

Adjusting the Ignition Timing

Controlling the breaker point gap

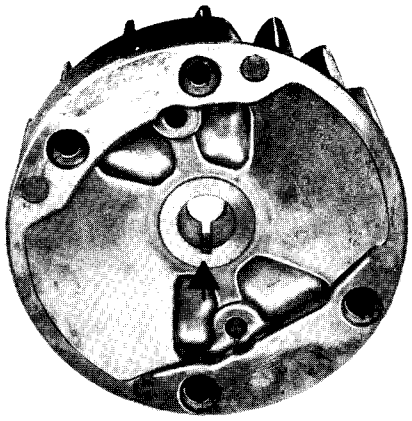


First check with feeler gauge if the max. breaker point gap is between 0,35—0,4 mm (0,014—0,016 in.) with piston positioned at top dead center. If gap must be adjusted loosen breaker point assembly and adjust breaker base until the breaker points have the specified gap. Then tighten cyl. hd. screws.

Turn crankshaft somewhat in reverse direction of engine rotation and switch on ignition timing device. Now turn crankshaft in direction of engine rotation until light of control lamp dies, this must happen at a piston position of 2,2 mm (0,09 in.) before top dead center. If not, readjust breaker point set. If you exchange the crankshaft or the crankcase the ignition timing has to be newly adjusted! Replace burned breaker points.

Magneto Edge Gap

Key groove in flywheel



At each readjustment of the ignition timing also check magneto edge gap.

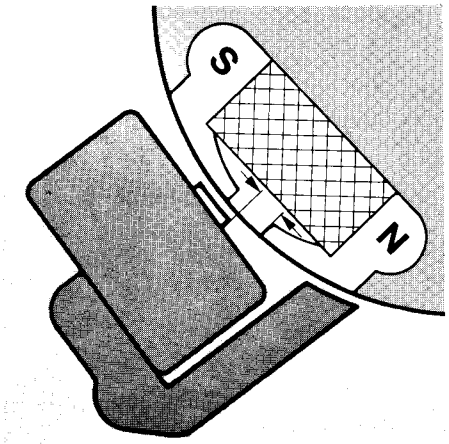
The magneto edge gap specifies the position of the rotating flywheel magnets towards the ignition coil at the moment of interruption of current.

The correct edge gap on 015 and 015 L saws is therefore the distance between the trailing pole edge of the north pole of the magnet and the inner edge of the center core of the coil. The specified magneto edge gap is between 3—7,5 mm (0,12—0,29 in.).

When the advanced ignition and the breaker point gap are properly adjusted then the correct magneto edge gap is set by the key groove in the flywheel.

If the magneto edge gap is too large or too small then the spark intensity

Schematic view of the magneto edge gap

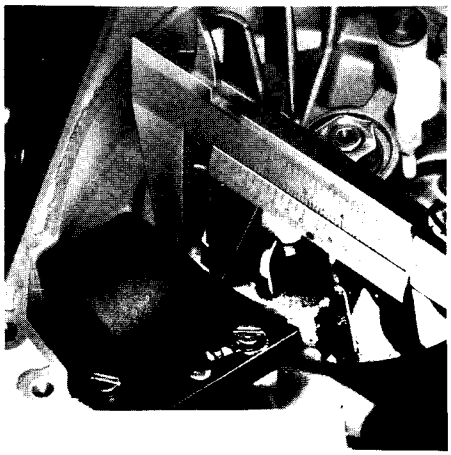


is too low. This may cause difficult starting and misfiring. **If you have trouble starting the engine you must check the magneto edge gap!**

If the magneto edge gap is not within the specified tolerance you must adjust the breaker point gap and ignition timing even if you found them correct when you checked them before! Moreover it is recommende to check, whether the flywheel is positioned correctly on the key or if this key has been pressed out of the crankshaft groove when mounting the flywheel.

Checking the Magneto Edge Gap

Measuring the edge gap

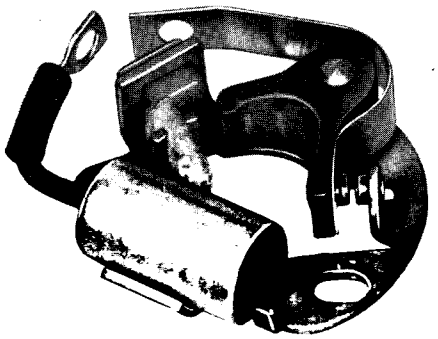


To check the magneto edge gap connect ignition timing device and insert dial gauge (see "Checking the Ignition Timing"). Adjust the ignition timing with the ignition timing device. Lock flywheel in this position and check whether magneto edge gap is within the specified range of 3—7,5 mm (0,12—0,29 in.).

Otherwise you must readjust the breaker point gap and the ignition timing.

Armature Plate

Contact plate with condenser



The breaker point set and the condenser are fastened tightly to the armature on this ignition system.

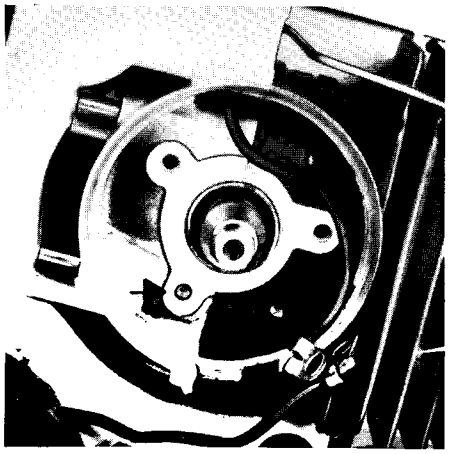
The contact set (breaker points) is composed of a solid part, the anvil, which has ground connection, and a movable arm, the hammer (breaker lever). It is insulated against ground and connected by wire connections with the ignition coil and the condenser. The hammer is actuated by the cam provided on the crankshaft.

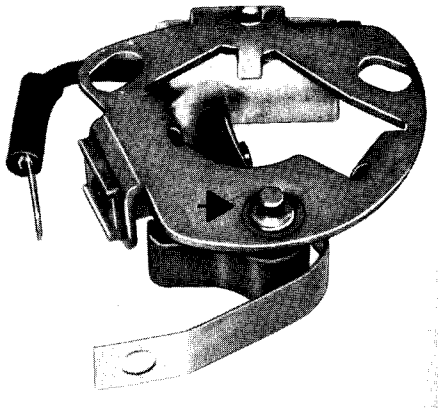
For the durability of the breaker lever it is important that the lubricating felt is in proper condition. Burned or damaged breakers must be replaced.

If the breaker points have to be exchanged, however, the complete armature plate must be replaced.

Top:
Boring in crankcase

Bottom:
Cylindrical pin in contact plate

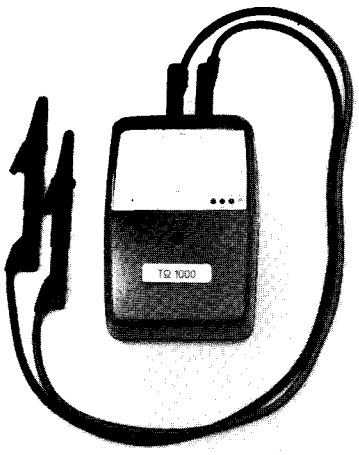




To replace the armature plate remove flywheel and plastic cover. Unscrew 2 cyl. hd. screws holding the contact plate at the crankcase and remove cyl. hd. screw for fastening the wire connections.

When rebuilding, first fasten wire connections to the contact plate. The contact plate is guided in the crankcase by a cylindrical pin. When mounting care has to be taken

Pocket Ohmmeter



that this cylindrical pin is properly inserted into the boring provided in the crankcase. Fasten contact set with the 2 cyl. hd. screws M 4×10 and readjust ignition timing.

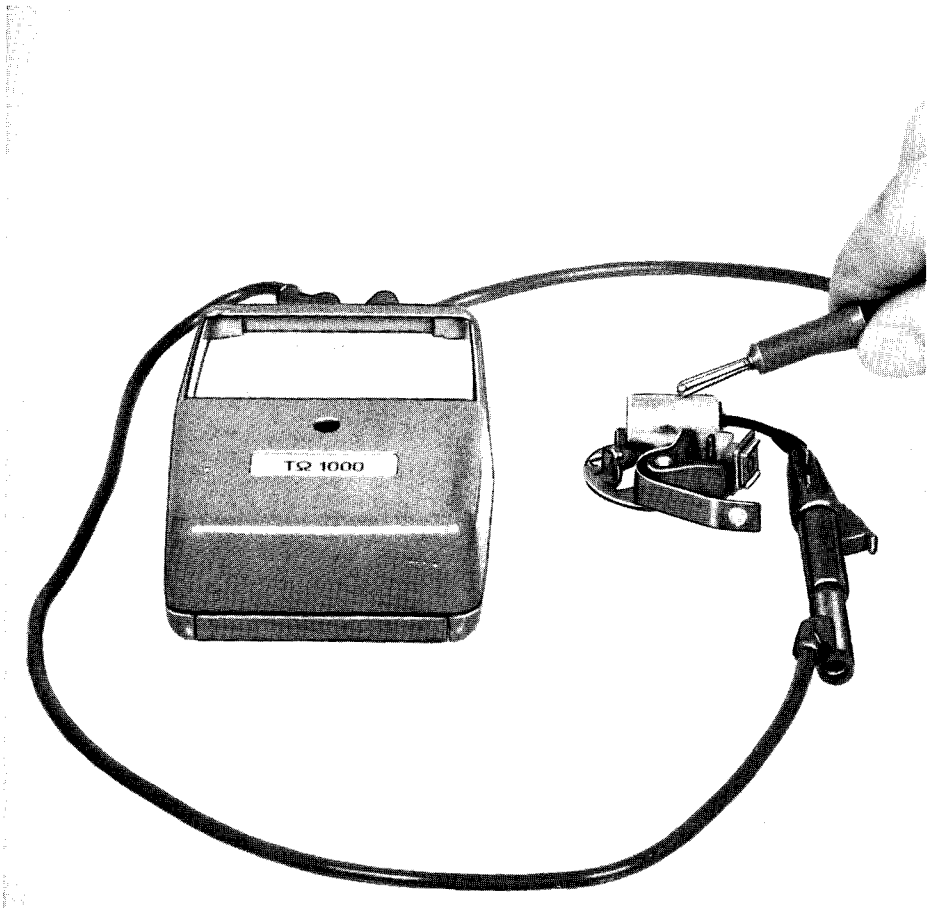
Remove contact plate **to check condenser.** Connect positive pole (+) of testing device (Siemens pocket ohmmeter 5010 850 4800) with condenser lead terminal and hold negative pole (—) onto the condenser shell.

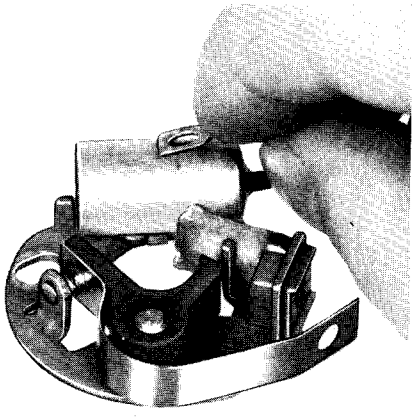
The pointer of the ohmmeter must deflect for a short time within the range of 0,17 on the μF scale.

If this does not prove right the condenser is defect. This means, a new contact plate has to be installed. As the condenser is charged during the test by the ohmmeter you have to discharge it after the test by short-circuiting — hold condenser lead terminal to shell of condenser.

Top:
Controlling the condenser with pocket ohmmeter

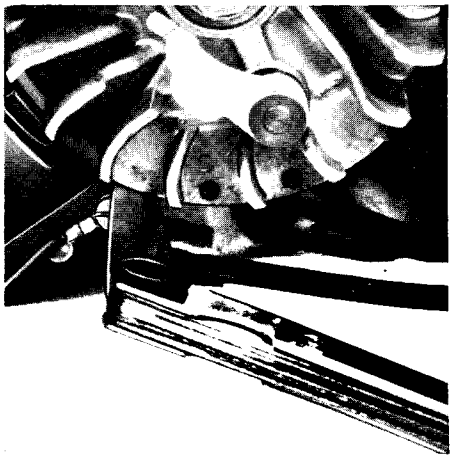
Bottom:
Discharging the condenser



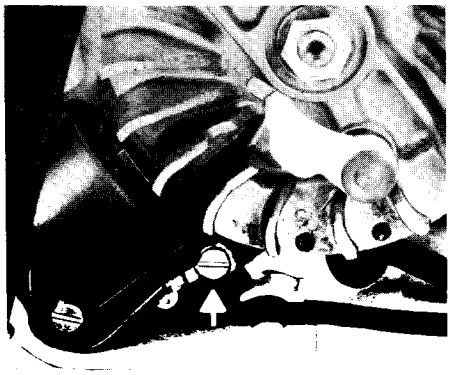


Ignition Coil

Checking the point gap with feeler gauge

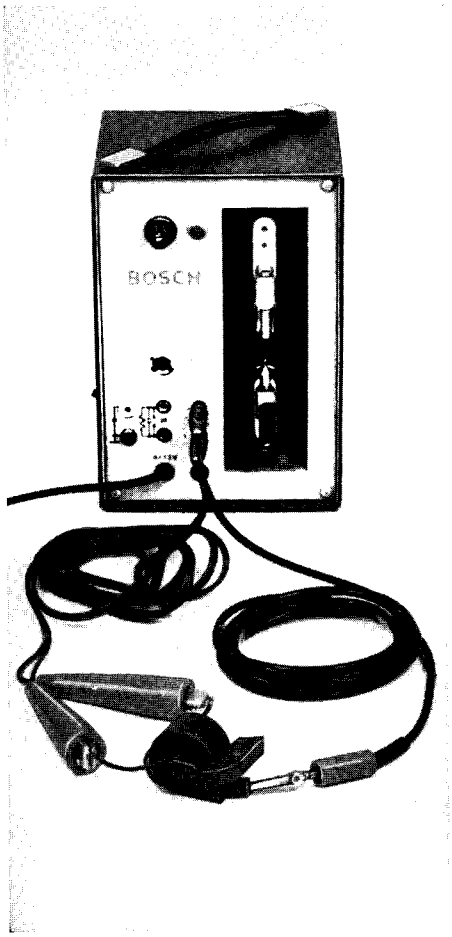


Fastening of the wire connection



Top:
Ignition coil testing apparatus

Bottom:
Ignition wire intake



The coil is fastened to the crankcase by 2 cyl. hd. screws. For protection against dirt and humidity the windings are fully cast into plastic material.

When reinstalling a new ignition coil or one that has been removed before check with a feeler gauge the distance between the pole shoes of the armature and the flywheel.

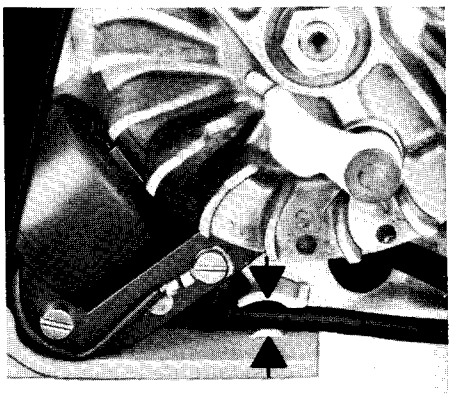
The recommended armature air gap is 0,2—0,3 mm (0,007—0,011 in.)

Only with this gap a proper ignition performance is guaranteed. If necessary the ignition coil can be adjusted by loosening its fastening screws depending on the variation of the edge gap.

It is important that the ignition coil has sufficient ground connection through the ground lead to the crankcase.

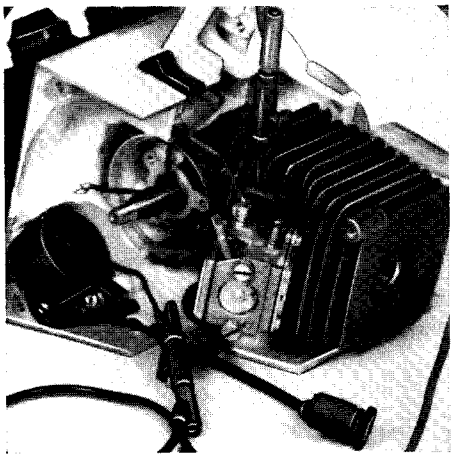
When reinstalling the ignition coil the wire clamp of the ground lead is fastened with the cyl. hd. screw for the fixation of the coil in the front boring of the outer core leg. The disassembled coil can be tested on sparkover with an ignition coil testing device like the Bosch EFMZ 1 A or EFAW 106 A. The sparking distance of the coil 1116 404 3200 of the 015 and 015 L should be at least 6 mm (0,24 in.) at 12 volt. A more simple resistance test of the two ignition coils can be made with the Siemens pocket ohmmeter.

When reassembling take care that the ignition wire is pressed into its intake.



Resistance Test of Primary Winding

Top and Bottom:
Resistance test of primary winding

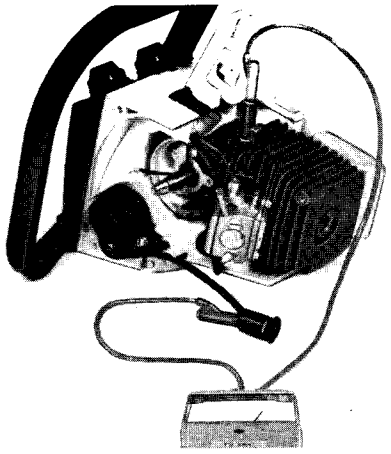


Loosen lead terminal at breaker point assembly and disconnect connecting lead of the coil. Switch on ignition stop switch and now check resistance between connecting lead of the coil and ground with the pocket-ohmmeter.

It must show a reading between 0,8—1,3 ohm.

Resistance Test of Secondary Winding

Top and Bottom:
Resistance test of secondary winding

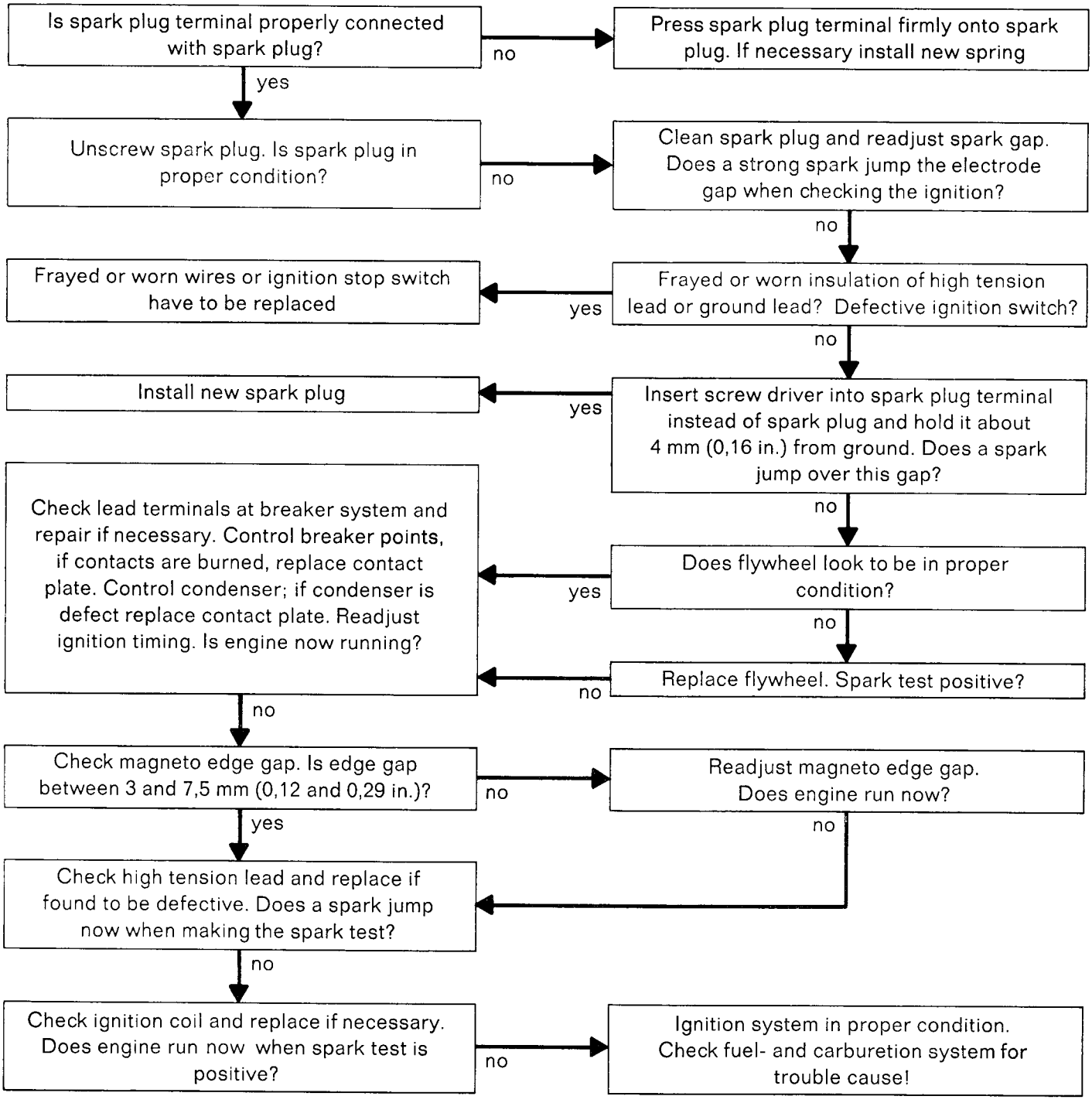


Either unscrew the high tension lead from the coil, to do so you also have to loosen the armature from the crankcase and measure resistance between high tension lead terminal (woodscrew-thread) and ground, or, if the high tension lead is in perfect condition, connect the device between leg spring of the spark plug port and ground.

Resistance must read 7200—9000 ohm.

Trouble Shooting at the Ignition System

When you follow the arrows of the chart for the ignition system on page 27 and answer the questions therein respectively make tests you then will soon find the cause of the malfunctioning of the ignition system and be able to correct it.

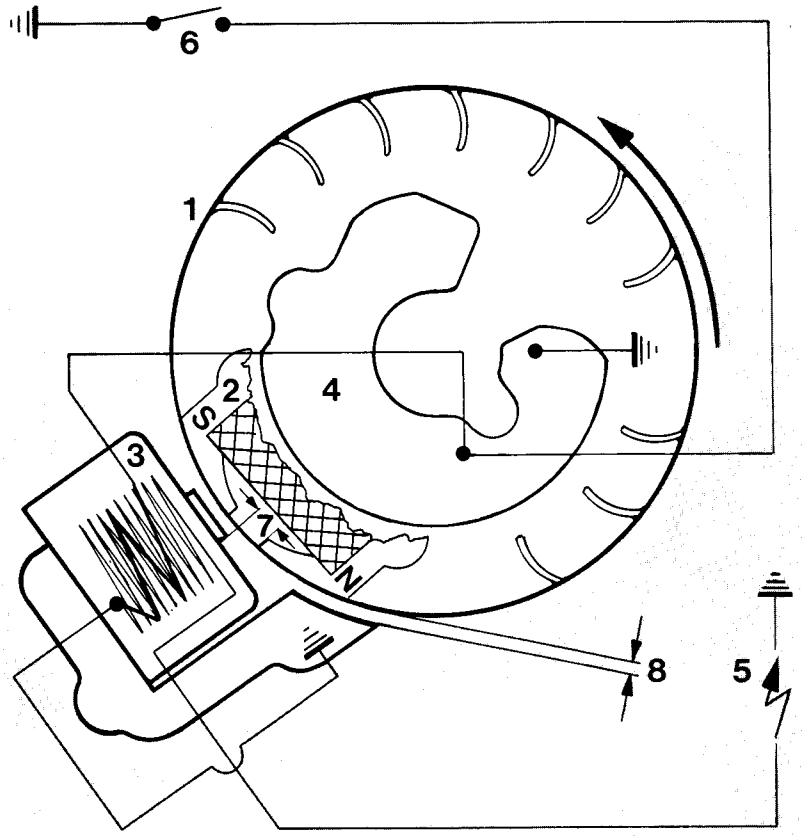

Is spark plug terminal properly connected with spark plug?
no
Press spark plug terminal firmly onto spark plug. If necessary install new spring
yes
Unscrew spark plug. Is spark plug in proper condition?
no
Clean spark plug and readjust spark gap. Does a strong spark jump the electrode gap when checking the ignition?
no
Frayed or worn wires or ignition stop switch have to be replaced
yes
Frayed or worn insulation of high tension lead or ground lead? Defective ignition switch?
no
Install new spark plug
yes
Insert screw driver into spark plug terminal instead of spark plug and hold it about 4 mm (0,16 in.) from ground. Does a spark jump over this gap?
no
Check lead terminals at breaker system and repair if necessary. Control breaker points, if contacts are burned, replace contact plate. Control condenser; if condenser is defect replace contact plate. Readjust ignition timing. Is engine now running?
yes
Does flywheel look to be in proper condition?
no
no
Replace flywheel. Spark test positive?
no
Check magneto edge gap. Is edge gap between 3 and 7,5 mm (0,12 and 0,29 in.)?
no
Readjust magneto edge gap. Does engine run now?
yes
no
Check high tension lead and replace if found to be defective. Does a spark jump now when making the spark test?
no
Check ignition coil and replace if necessary. Does engine run now when spark test is positive?
no
Ignition system in proper condition. Check fuel- and carburetion system for trouble cause!

IGNITION
SYSTEM 015 L ELECTRONIC

Design and Operation

Schematic view of ignition system:

1 Flywheel
2 Permanent magnet with north-and south pole and pole shoes
3 Armature with primary and secondary coil
4 Trigger plate
5 Spark plug
6 Ignition switch
7 Magneto edge gap
8 Armature air gap



This chain saw model was equipped with a transistor ignition system which is another electronic ignition system design. The advantages of this ignition system compared to breaker point ignition systems are the non-existance of mechanical wearing parts such as breaker points and therefore this ignition system needs no special maintenance.

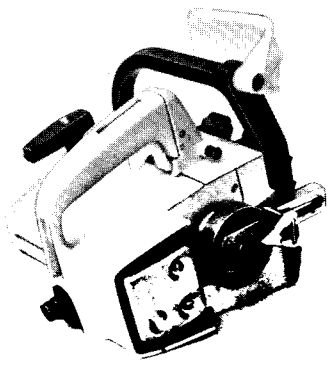
Moreover, this magnet transistor ignition (MTZ) naturally incorporates all advantages of an electronic ignition system such as trouble free operating under heavy polluted conditions, humidity and extreme temparatures.

The required ignition current of this system also develops from magnetic induction. When the flywheel is turning the lines of force between the permanent magnet casted into the flywheel which flow out at the north-pole of the magnet and flow in at the southpole of the magnet cut across the wire turns of the ignition coil. Thereby a voltage is induced in the primary winding of the ignition coil and the trigger plate is switched on. Once the required voltage is reached one of the two transistors connects through in connection with other electronic elements which are completely casted into the trigger plate thus the second transistor which has been conductive before is triggered the base of which becomes now negative.

The electric circuit which was conductive before is now interrupted, the magnetic field in the coil core breaks down instantaneously. Thus the transistor takes over the function of a breaker point. A high voltage is now induced in the secondary winding which is led over the high tension wire to the spark plug. At the electrodes of the spark plug the spark jumps over and ignites the air-fuel mixture.

Checking the ignition timing

Mounted adjusting adapter

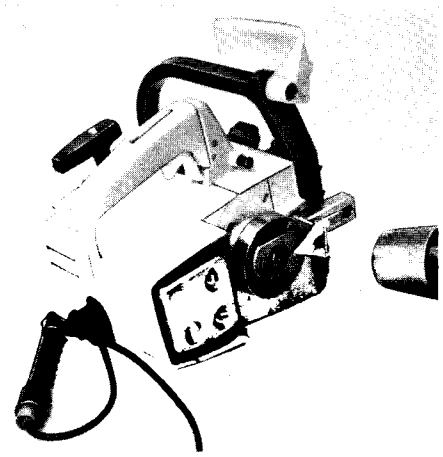


The ignition timing of the 015 L electronic is checked by means of a strob light. First remove sprocket cover and spark plug.

Then slide the control flange 0000 850 4000 which is supplied as an extra onto the bar stud and tighten with hexagonal nut. Now screw support 1110 890 8905 into the spark plug port and insert timing dial gauge. Adjust timing dial gauge into "0" position at top dead center position of piston. Then adjust piston by turning the clutch against the direction of engine rotation to 2,2 mm (0,09 in.) before top dead center. At this adjustment (2,2 mm before top dead center) a marking is set at the clutch just opposite of the point of the control flange.

Now insert spark plug again and connect strob light with the ignition circuit between spark plug and

Flashing the marking with strob-light



ignition stop switch. Then start the engine. Adjust engine speed by turning the idle speed regulating screw to 6000 r.p.m. (control with revolution counter). The revolution counter is slightly and carefully pressed with its feeler pin against the crankshaft end.

The marking at the clutch is now flashed with the strob light. The point of the control flange must be positioned exactly opposite of the marking.

If the marking on the clutch is found to be positioned in engine rotation before (above) the flange point then there is too much advanced ignition. Should the marking be behind (below) the point of the flange there is not enough advanced ignition.

Adjusting the ignition timing

The ignition timing is given by the adjustment of the key groove and the key itself. However, the ignition timing can slightly be varied.

The key for the adjustment of the flywheel has a certain tolerance in its seat in the crankshaft. Also the position and the width of the groove in the flywheel are subject to a production tolerance which cannot be avoided. Therefore, when mounting the flywheel its position might insignificantly tolerate to both sides.

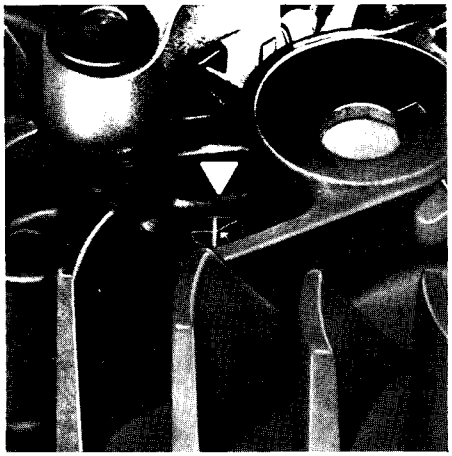
If the 015 L electronic shows too much advanced ignition it is recommended to place the flywheel to the left hand side limit stop (in opposite direction of engine rotation) within the key groove tolerance and to counterhold when tightening the wheel with the hex. nut.

If there is not enough advanced ignition the flywheel has to be placed to the right hand side key stop (in direction of engine rotation) and also it is recommended to counterhold when tightening the flywheel nut.

By these measures the timing of the electronic ignition can be slightly varied. No other timing adjustment is possible.

Flywheel

Transistor — trigger sign on electronic — flywheel



The flywheel of the electronic ignition system must not be interchanged with the flywheel of the breaker point ignition system!

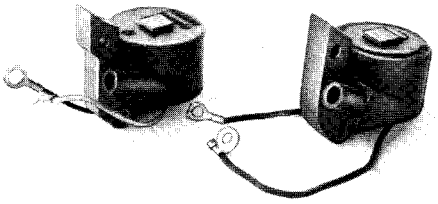
The positioning of the groove and the magnetizing of the permanent magnet is different on flywheels for breaker- and electronic ignition system.

To avoid mix-ups the flywheels have different order numbers. Additionally the electronic ignition is provided with a casted-in transistor-trigger sign.

Ignition coil

left:
ignition coil for electronic ignition

right:
ignition coil for breaker-point ignition



It is most important not to install the ignition coil used with the breaker system on STIHL model 015 L electronic. The ignition coils for the breaker point- and for the transistor ignition must under no circumstances be interchanged.

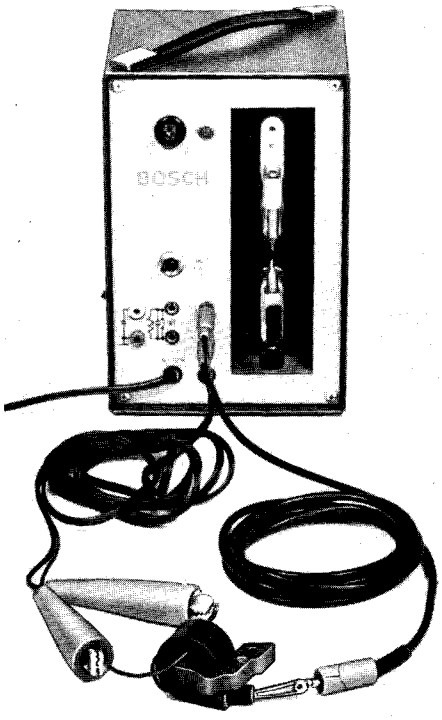
The ignition coil for the electronic ignition system has different control- and resistance specifications. Please kindly observe these differences.

The disassembled ignition coil can be tested for spark jumping on an ignition coil testing device such as the Bosch EFMZ 1 A or EFAW 106 A. The ignition coil 1116 404 3205 for the 015 L electronic must have a spark distance of at least 7 mm (0,28 in.) at 2,5 Amp.

When testing the resistance of the primary winding with the Siemens pocket-ohmmeter (testing procedure is described in detail for the breaker point ignition system) the resistance between connecting lead and ground (ground lead) must be 1,5—1,9 ohm.

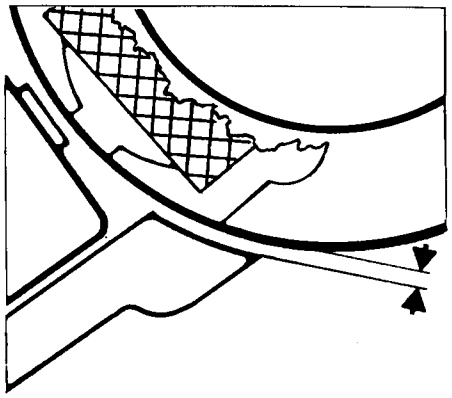
When testing the resistance of the secondary winding (testing procedure is described in detail for the breaker point ignition system) the measuring result must be 6500—9000 ohm.

Controlling the ignition coil



Magneto Air gap

Magneto air gap



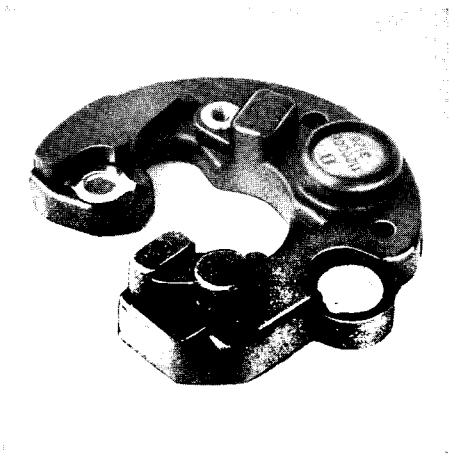
Most important with the electronic ignition is the correct setting of the magneto air gap. The distance between flywheel and the core of the ignition coil **must be** 0,15—0,2 mm (0,006—0,008 in.)! Only this setting gives best ignition power!

The air gap is influencing the starting characteristics of the saw. Generally one can say that the larger the air gap the more difficult it is to start the engine. Naturally other factors may also be the cause for starting difficulties such as starting revolutions, temperatures etc.

Should it occur that the saw is difficult to start even at best ignition timing you can decrease and adjust the air gap to an absolute minimum (the flywheel, however, must not touch the core — even not when engine is running!).

Trigger plate

Trigger plate



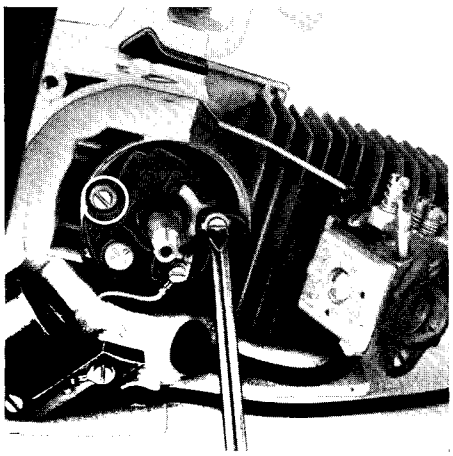
The trigger plate as such can not be repaired. It incorporates all resistances, diodes, transistors and other important electronic elements which are fully resin-molded to the plate. If all other components of the electronic-ignition system such as coil, spark plug etc. are in proper working condition then the trouble must originate in the trigger plate which consequently has to be replaced.

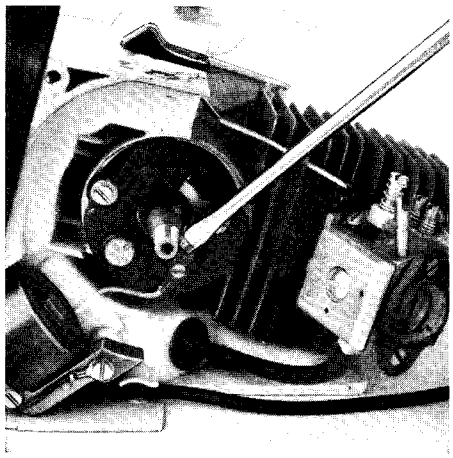
To replace the trigger plate first remove the handle shroud and the flywheel. Unscrew the 2 cyl. hd. screws holding the trigger plate and the cyl. hd. screw for the wire connections.

Prior to installation carefully clean all wire connections (remove old insulating paste) and fasten them to the trigger plate. Now screw trigger plate to crankcase, thereby taking care that no wires are pinch-

Top:
Loosening the trigger plate

Bottom:
Applying sealing paste





ed or can come in contact with the flywheel. Finally apply some insulating paste 0783 820 0110 to the cyl. hd. screw M 3 which holds the wire connections on the plate as well as to the connections to protect them against entering dust and humidity.

REWIND STARTER

Design and Operation

The rewind starter of the 015 and 015 L is mainly composed of starter rope and grip, rope rotor, rewind spring, pawls and leg springs as well as of a few additional component parts. All parts are installed in the handle shroud except for the pawls and leg springs which are fastened to the flywheel.

When pulling the starter rope the pawls engage at the lugs of the rope rotor, thus the crankshaft, the connecting rod and the piston are rotated by means of the flywheel; fuel is sucked in and as soon as the motor reaches its minimum speed the necessary ignition current is provided.

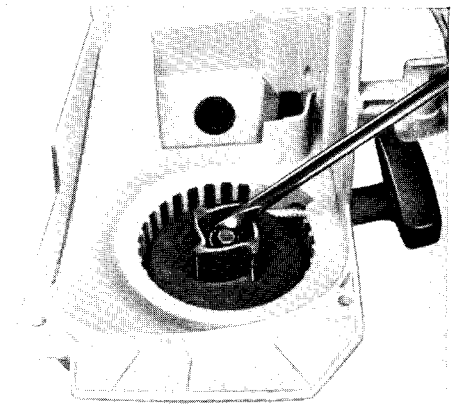
The rewind starter is maintenance-free. But, of course, normal wear cannot be avoided. Just lubricate the starter axle of the rope rotor with a few drops of oil at regular intervals.

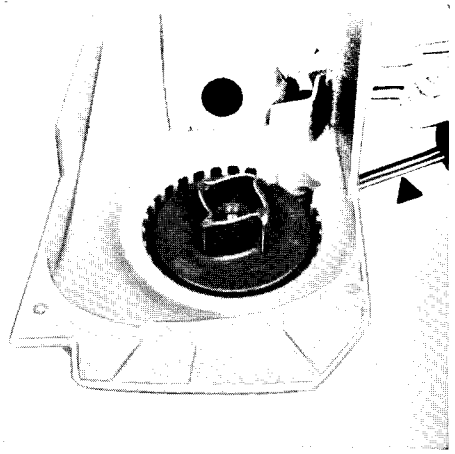
Troubles	Causes	How to correct
Starter rope is hard to pull-hooks	Armature air gap too low. Fanwheel is touching the coil core leg	Readjust armature air gap
Starter rope broken	Starter rope has been pulled out too far or pulled over the edge; starter rope has not been pulled vertically.	Replace starter rope
Rewind spring broken	If pretension is too high the spring has no overload tolerances when rope is fully pulled out.	Replace rewind spring
Pawls worn or leg spring broken. When pulling the starter rope no resistance	Due to excessive use when starting the pawls are worn	Install new pawls and leg springs.

Installation of a new Starter rope

Top:
Prying off the retainer ring

Bottom:
Pushing back the recoil spring



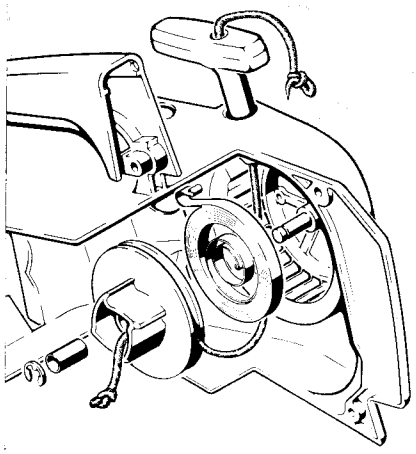


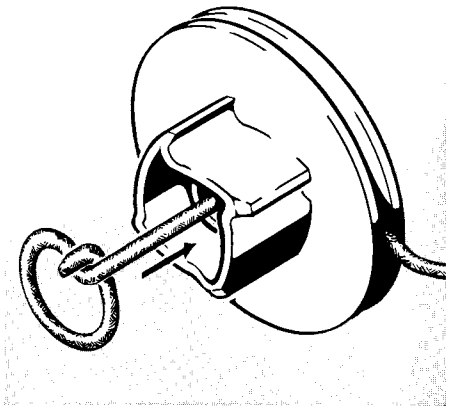
Carefully pull off choke lever and spark plug terminal. Unscrew spark plug. Screw out cyl. hd. screw of filter cover fastening. Remove cover and air filter. Unscrew handle shroud.

Pry off retainer washer from starter axle. To prevent a jerking of the rewind spring when pulling off the starter rope, first lift off rope approx. 1 cm (0,3013 in.) from the starter axle.

Top:
Removing the starter device

Bottom:
Securing the rope (loop)

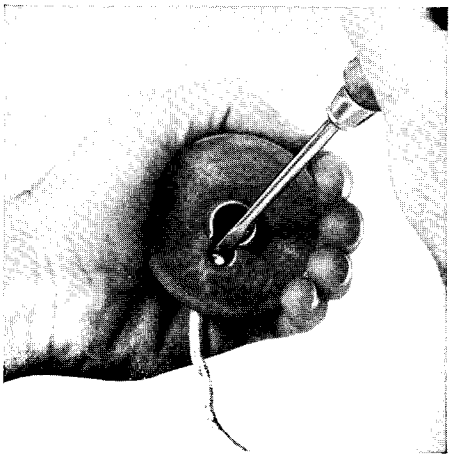




Insert screw driver through the rope guide boring in the handle housing, push back rewind spring into the seat and hold it there. Now take off starter rope completely from the starter axle.

Now insert a new rope — 960 mm (38,4 in.) in length — between the guide plates of the rope rotor to the boring and with a small screw driver press it through towards the cast-

Inserting the starter rope



on lugs. Pull rope somewhat through and secure with a single knot.

The rope, however, can also be fastened with a loop in the rope rotor (see illustration).

Thread the other end of the rope through the rope bushing in the fan cover and secure it in the grip with a double knot.

Mount rope rotor again onto the starter axle by applying some oil and secure it with retaining washer.

Take care that the notch of the rope rotor is positioned correctly over the inner loop of the rewind spring.

Installation of Rewind Spring

Rewind spring hooked on cast lug

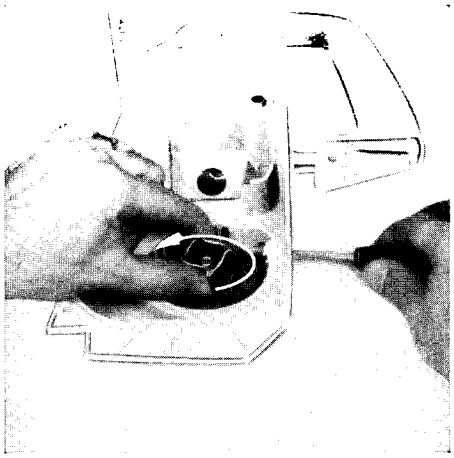
A broken rewind spring can only be replaced by a new one. The spare spring is supplied ready for installation — secured by a spring loop. It is hooked into the cast lug of the seat in the handle housing with the outer spring loop. When inserting the spring into its seat the snaked wire is pushed off.

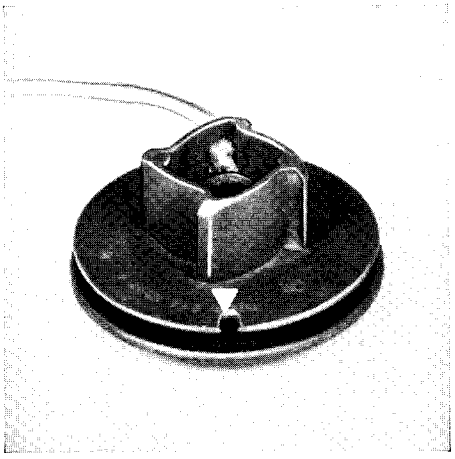
Should rewind spring get loose and jump out during insertion it has to be recoiled again in clockwise direction starting with the outer loop and ending with the inner loop. Apply oil sparingly to the inserted spring. Slide rope rotor into place on shaft and install retaining washer.

Tensioning the Rewind Spring

Top:
Recoiling the rope

Bottom:
Notch at the rope rotor



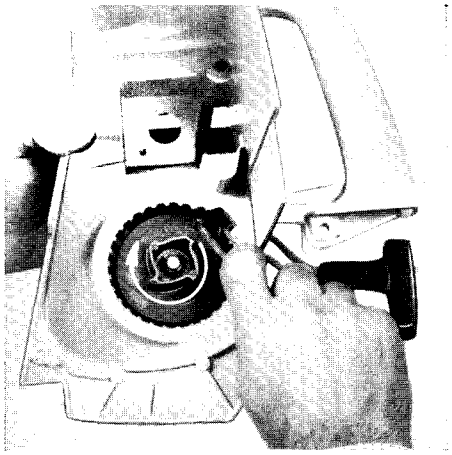


Wind starter rope into rope rotor by turning the rope rotor anti-clockwise. Pull out handle again abt. 30—40 cm (12—16 in.) and hold rope rotor in this position.

At the outer diameter of the rope rotor a notch is provided. Pull back starter rope through this notch and form a loop. When doing this do not release the rope rotor!

Now turn rope rotor 3—4 times in clockwise direction. Starter rope must not wind onto rope rotor. Hold rope rotor again with one hand and with the other hand pull back starter rope through the rope bushing in the handle housing. Now let go starter rope carefully. The starter rope coils itself-by the pretension of the rewind spring-onto the rope rotor.

Tensioning the rewind spring



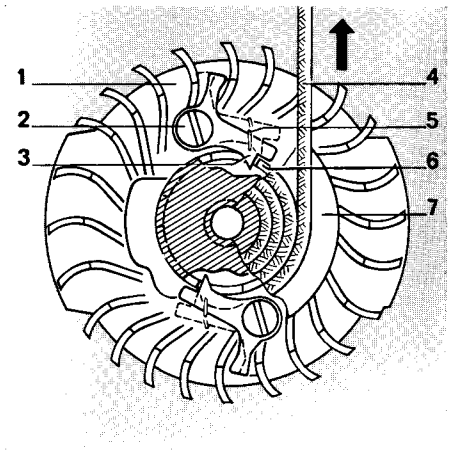
The rewind spring has the proper tension when the handle rests tightly in the housing and does not hang to the side. And if at completely pulled out starter rope the rope rotor can still be turned at least 1/2 turn before reaching maximum spring tension.

Excessive spring tension will cause breakage of the spring!

Starter Pawls and Pawl Springs

Schematic view of the pawl system

1 Flywheel
2 Fastening bolts
3 Starter pawl
4 Rope
5 Leg spring
6 Ring with lugs
7 Rope rotor



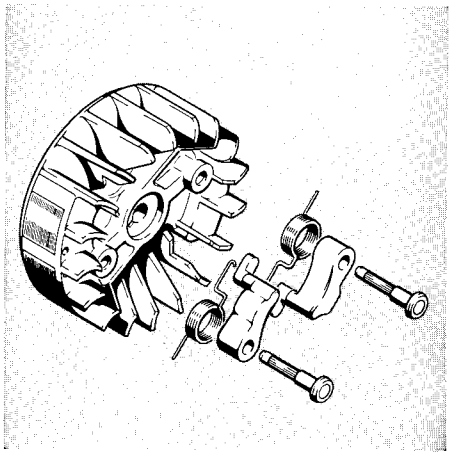
The starter pawls fastened to the flywheel engage at the lugs in the rope rotor when pulling the starter rope. Troubles with the pawls and pawl springs, however, are very seldom, if necessary, these parts must be replaced.

To do so take off fan housing and loosen flywheel from crankshaft (see paragraph "Flywheel"). Then the bolts holding the pawls and pawl springs can be knocked out of the flywheel with a punch.

When installing secure bolts with LOCTITE. Note that the newly inserted pawls are moving freely and do not jerk.

Top:
Removing the fastening bolts

Bottom:
Removing the pawls, leg springs and bolts



If pulling of the starter rope is difficult and if rope recoils only very slowly or not completely the cause for it can be that the rewind starter is mechanically in proper condition, but is heavily fouled. Moreover, at very low temperatures the oil in the rewind spring may not be liquid any more, the spring coils will then stick together and will affect the function of the rewind starter. In this case you only need to apply some kerosene to the rewind spring. Carefully pull starter rope until starter functions properly again.

A clogged rewind starter has to be completely disassembled-including the rewind spring. Attention when removing rewind spring! Wash all parts in kerosene or clean gasoline. When reinstalling apply ample oil to the rewind spring and rope rotor.

Note: Before installing the fan housing pull starter rope somewhat until you hear the pawls snap into the rope rotor! Only then tighten screws.

OIL PUMP

Design and Operation

The oil pump for chain lubrication is fastened in a recess at the chain sprocket side. It is protected against dirt by a plastic cover. It is driven at engaged clutch through the chain sprocket and two plastic spur gears.

The smaller spur gear is positioned on the crankshaft. It has a recess into which the tooth profile of the chain sprocket engages. The axle of the larger spur gear at the same time is formed as a worm gear to drive the pump piston. The pump piston, also a plastic part, is held in the fan housing by a cylindrical pin which engages in a ring groove provided in the pump piston.

An oil pocket at the pump piston controls the intake and the supply of chain lubricating oil from the oil tank to the bar and chain. To prevent dirt entering the oil pump the oil is filtered by a pick-up body in the oil tank.

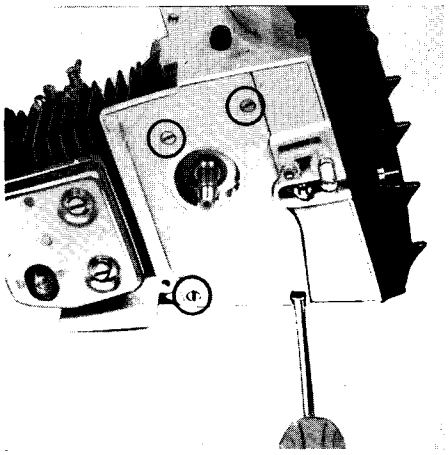
Troubles	Causes	How to correct
Saw chain does not get lubricating oil	Oil tank empty	Refill
	Borings for oil inlet at guide bar clogged	Clean
	Exhaust pipe respectively pick-up body clogged	Wash in clean gasoline and blow out with compressed air.
	Sucking-respectively oil pick-up hose defect	Mount new hoses
Chain saw looses chain lubricating oil	Gasket between pump and crankcase defect	Insert new gasket
	Gasket between handle shroud and crankcase defect	Insert new gasket

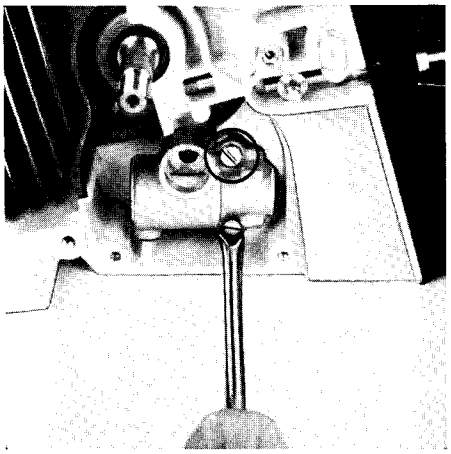
Disassembly of Oil Pump

Repair

Top:
Loosening the plastic cover

Bottom:
Unscrewing the oil pump



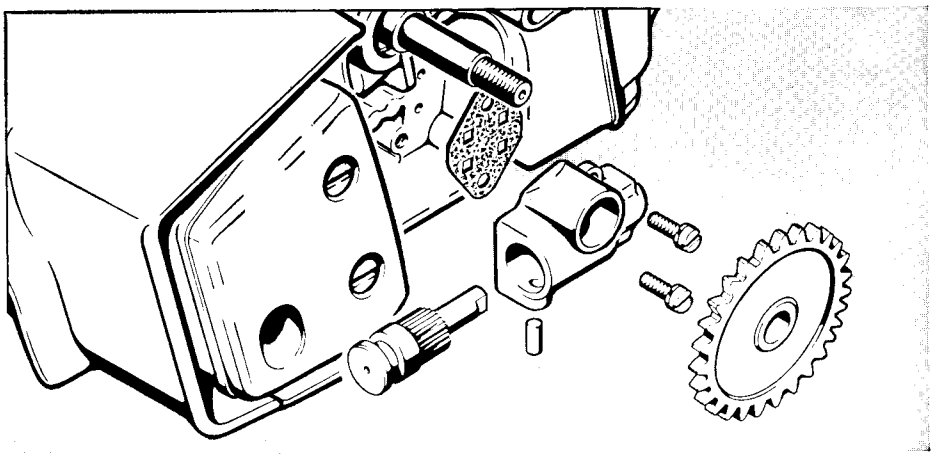


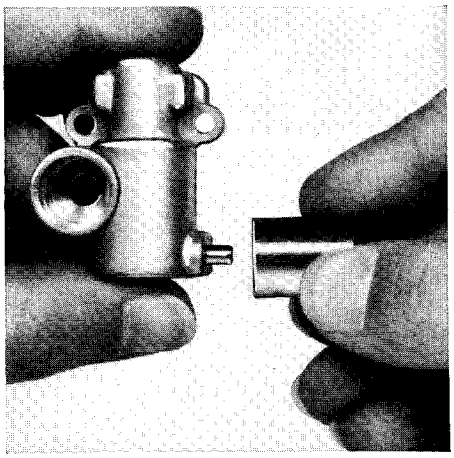
First remove clutch and chain sprocket. Loosen plastic cover which is fastened to the crankcase with 4 cyl. hd. screws M 4×12 and pry off cover together with small spur gear from crankshaft.

Then pull out the large spur gear from the pump housing and unscrew the 2 cyl. hd. screws M 4×12 for fastening of pump housing.

Top:
Removing the pump

Bottom:
Pulling out the cylindrical pin





Troubles at the pump are very seldom, mostly the fouling of some parts are the reason for unsufficient oil supply.

The pump piston with worm gear toothing is inserted in the pump housing and is held by a cylindrical roller.

To disassemble the pump piston just remove the cylindrical pin from the housing. The cylindrical pin is removed from its seat in the pump housing with a magnet. After that the pump piston can be loosened by light hammer blows if it does not come out of the housing by itself.

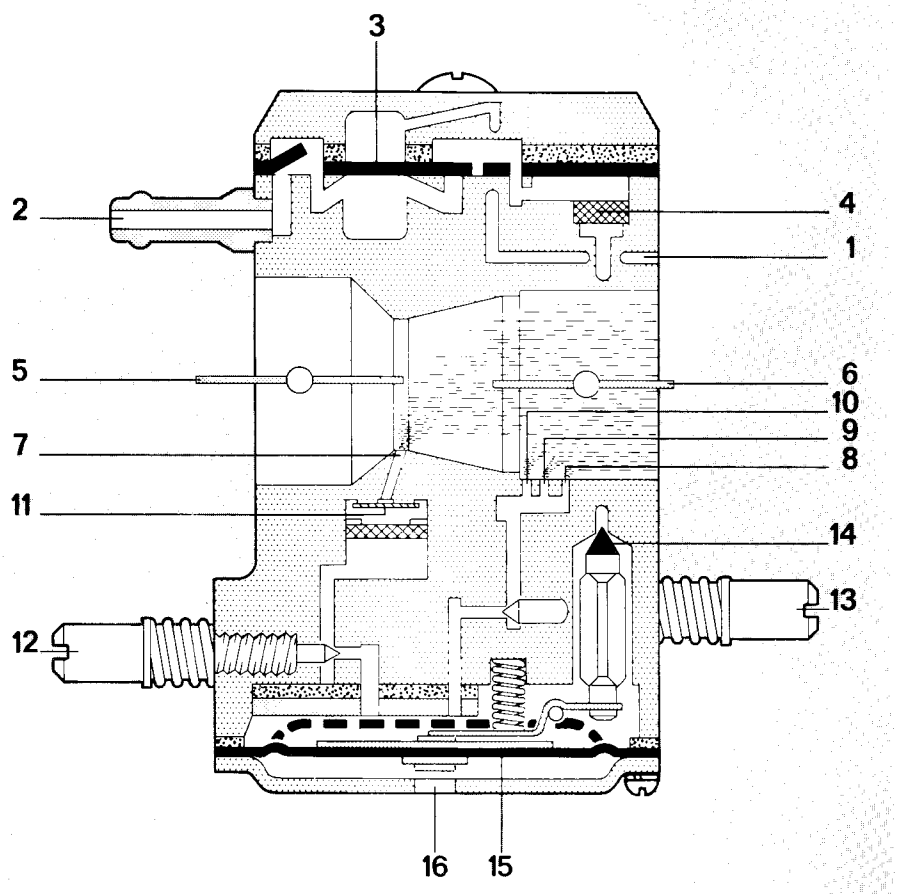
If the oil pump is heavily clogged, clean all parts, then lubricate the parts with oil and reverse disassembly sequence to assemble the pump. When installing insert new gasket between pump and crankcase.

CARBURETOR AND AIR FILTER

Design and Operation

Schematic view of carburetor

1 Impulse channel
2 Fuel pick-up connector
3 Pump diaphragm
4 Fuel strainer
5 Choke shutter
6 Throttle shutter
7 High speed nozzle
8 Primary idle nozzle
9 Second idle nozzle
10 Third idle nozzle
11 Check valve of high speed nozzle
12 High speed adjustment screw
13 Low speed adjustment screw
14 Inlet needle
15 Metering diaphragm
16 Atmospheric vent



The STIHL 015, 015 L and 015 L electronic chain saws are equipped with a Walbro diaphragm carburetor model HDC 17 with built-in fuel pump. The fuel pump is a completely separate and independently working unit.

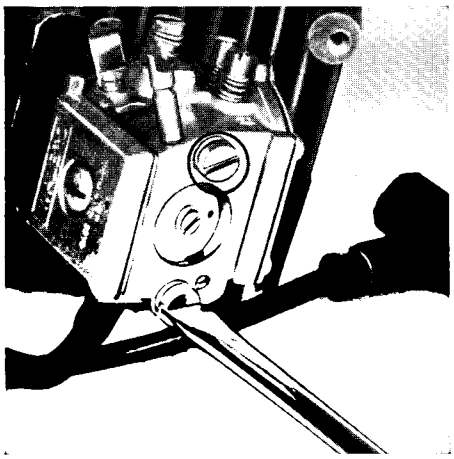
The impulse chamber of the fuel pump is connected to the crankcase via the impulse channel which leads through the flange. The alternate surges of pressure and vacuum at each stroke of the piston cause pulsation of the pump diaphragm thus forcing the pump diaphragm to operate in a direct relationship to the engine speed. The pumping diaphragm draws fuel over pickup felt and fuel pick-up hose through the inlet and outlet valves of the pump to the needle valve of the carburetor.

The inlet needle of the needle valve is linked by the inlet control lever to the metering diaphragm. The chamber underneath the metering diaphragm is vented to the outside (atmosphere) through a hole in the metering diaphragm cover of the carburetor to allow the metering movements of the diaphragm. The upward stroke of the piston creates a vacuum in the crankcase and therefore in the Venturi of the carburetor and thereby causing a pressure drop to the atmosphere. This low pressure which varies with the engine speed and the load on the engine and with the position of the throttle shutter, creates an air stream drawing fuel out through the fuel jets into the Venturi. At the same time the metering diaphragm is pushed upward and unseats the inlet needle thus allowing fuel to flow into the diaphgram chamber.

Carburetor and cylinder are connected by the elbow connector. The air filter has to clean the intake air and to protect the carburetor and the driving parts against dirt.

Disassembly

Removing the carburetor



First close choke shutter and then pull off choke lever. Then remove handle frame; to do so unscrew filter cover, take out air filter and screw out the 4 cyl. hd. screws for the fixation of the handle frame. Now unhook throttle rod from throttle shaft and take the rubber flange off the fastening screws. Unscrew the 2 cyl. hd. screws M 5×65 which are fastening the carburetor to the cylinder and remove carburetor with flange and gaskets.

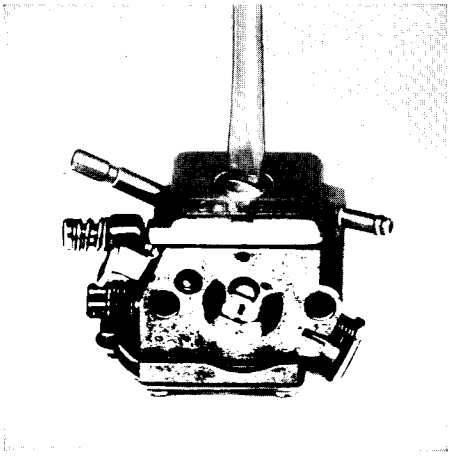
When reinstalling the carburetor replace removed gaskets by new ones!

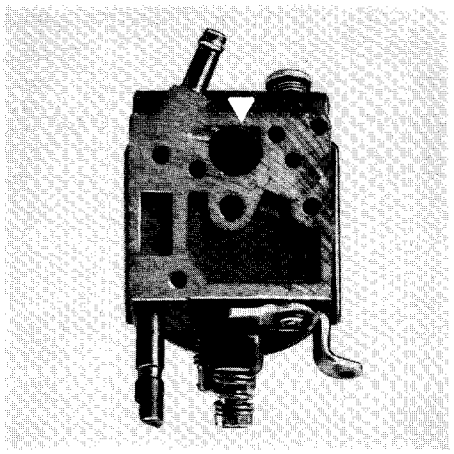
Repairing the Carburetor

Individual Parts

Top:
Loosening the fuel pump cover

Bottom:
Filter strainer

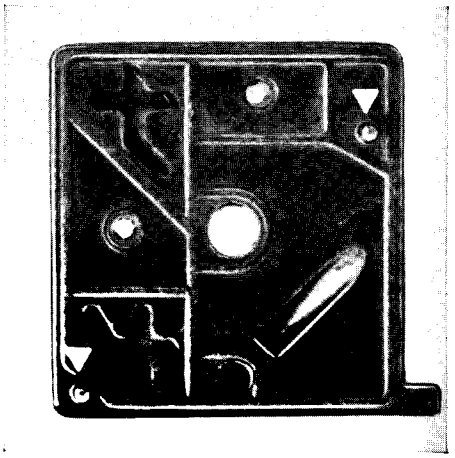




The pumping section of the carburetor can be found under the cast fuel pump cover, next to the fuel inlet connector. The metering diaphragm and the needle valve, however, are positioned underneath the steel diaphragm cover.

After loosening the roundheaded screw which is fastening the diaphragm cover to the carburetor body first remove gasket and then pump diaphragm. In most cases

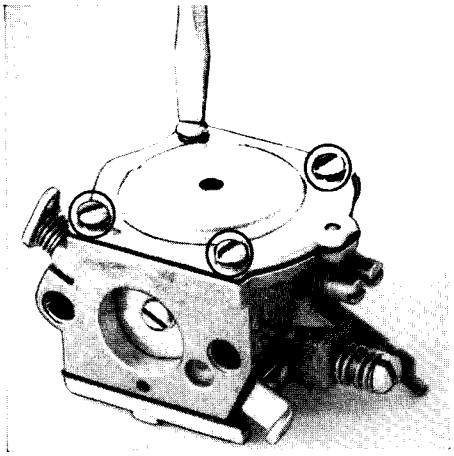
Guide lugs

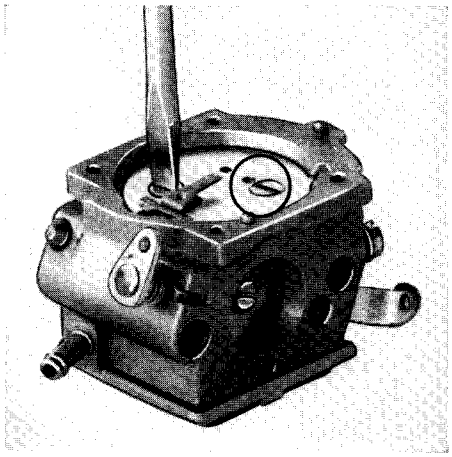


gasket and diaphragm are sticking together caused by the tight pressing in installed condition. Separate both parts carefully. The pump diaphragm is provided with 2 valve flaps — the inlet — and outlet valve- which have to be thoroughly inspected on wear. After removing gasket and diaphragm you will see the filter strainer. This strainer can get clogged after some time of operation and should therefore be checked from time to time and cleaned if necessary. When reassembling the pumping part first place the gasket and then the diaphragm onto the guide pins of the cover and fasten the cover again to the carburetor body.

Top:
Loosening the steel diaphragm cover

Bottom:
Loosening the cover plate

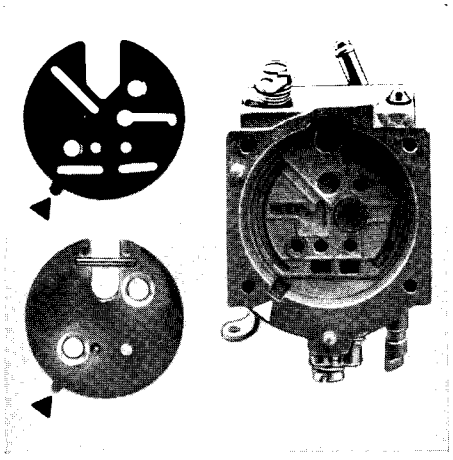




After unscrewing the 4 button head screws take off the steel diaphragm cover, metering diaphmarg and gasket.

The inlet control lever is fastened to the carburetor body by a cover plate which is held by two countersunk screws. The inlet needle is linked to the dove-tailed guide of the inlet control lever. The lever is installed under spring load with a small spring. To disassemble unscrew countersunk screws which are holding the plate; remove plate and inlet control lever with inlet needle. Don't loose the spring. At the closing taper of the inlet needle a rubber tip is pressed in. If the rubber tip is damaged, replace inlet needle.

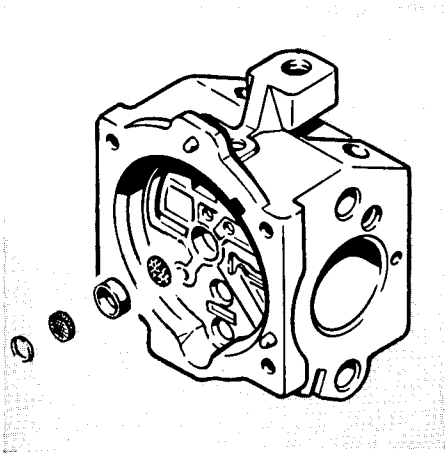
Adjusting lugs



After removing the plate and the gasket 1116 129 0910 the different jets and the valve are visible by which the combination of the air-fuel mixture (gas) is controlled.

The main valve of the Walbro carburetor, however, does not consist of a valve jet like the Tillotson carburetor, but of several component parts such as rubber diaphragm, valve body, strainer and circlip (valve kit 1116 120 5500).

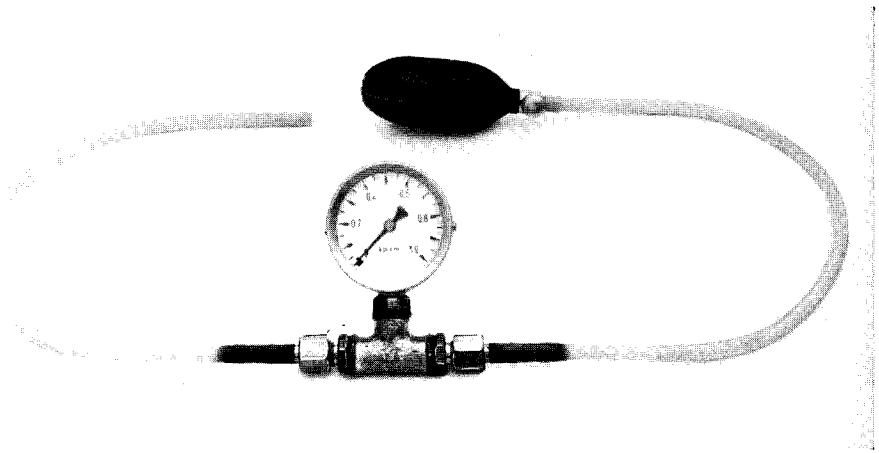
Disassembly of valve



The valve is positioned in front of the narrowest part of the Venturi which means, just in front of the high speed fuel orifice (high speed nozzle) of the carburetor. The rubber diaphragm closes the valve — it is pressing against the valve body — if the engine is idling and if there is only a very low vacuum in the Venturi. Thus preventing air from entering the diaphragm chamber at this engine speed through the valve jet; otherwise the fuel-air mixture (gas) would lean out stalling the engine. At partial or full load the vacuum in the Venturi increases the rubber diaphragm in the valve opens the fuel orifice and the necessary amount of fuel required for that respective speed range can flow into the Venturi. If the valve jet is defective it can be removed from the carburetor body. To do so remove circlip, take out fuel strainer press out valve body with a small screw driver and then remove rubber diaphragm.

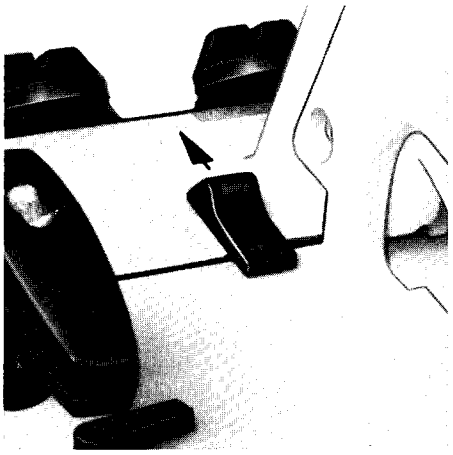
Pressure Test of Carburetor

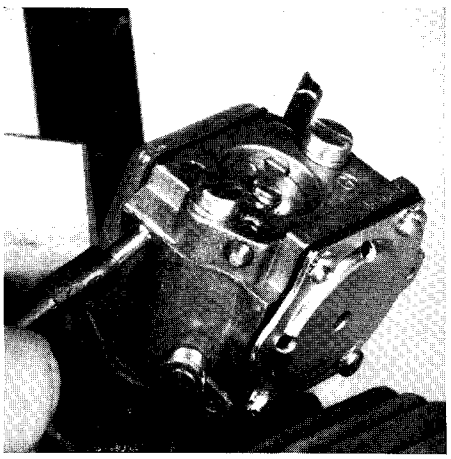
Carburetor and crankcase testing device



Center:
Ignition stop switch in "stop" position

Bottom:
Pulling off the fuel hose





If the valve is disassembled it always has to be replaced by a new one! (Valve kit 1116 120 5500.)

Before installing a new valve check and clean all fuel ports in the carburetor body. When installing a new valve watch for the correct sequence of the component parts. Rubber diaphragm, valve body, strainer and circlip. The valve body is pressed into carburetor body. To do so use a punch with the dimensions of the outer valve body-diameter. After installing the valve insert gasket, mount inlet needle, inlet control lever, spring and cover plate. The inlet needle must be linked to the respective dove tailed guide of the inlet control lever. Then put on gasket and metering diaphgram. Take care that gasket and metering diaphragm engage in the two guide lugs at the carburetor body. Now fasten diaphgram cover with round-headed screws.

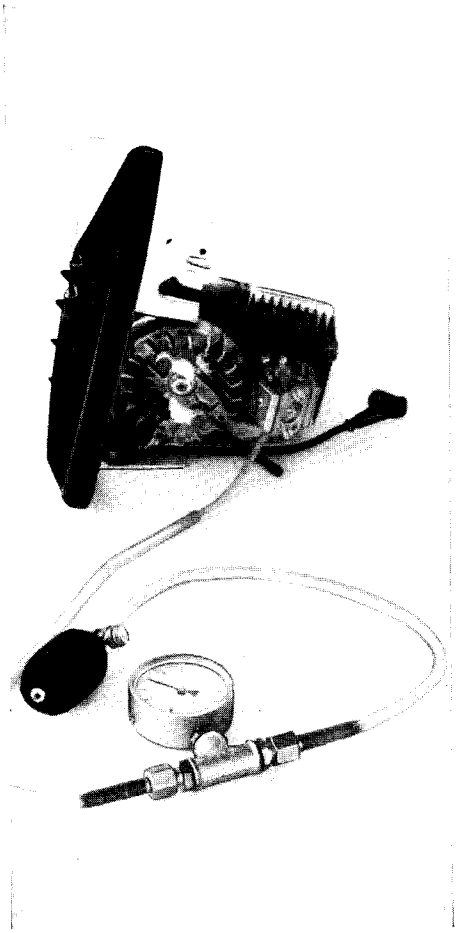
If carburetor troubles have to be traced it can be controlled with the combined crankcase- and carburetor testing device for leakage. The testing has to be carried out with the carburetor being wet and filled with fuel. To do so the starter device has to be activated several times at turned off ignition stop switch (position "Stop").

To assure proper testing it is additionally recommended to use a fuel hose of model 1114 or 1113 which can be taken from your spare parts department.

The handle shroud has to be removed first to connect the testing device. Then pull off the fuel hose from the carburetor and replace it by a fuel hose 1113 141 8605 or the hose 1114 141 8600 which has to be plugged to the connector of the carburetor. Now insert the open end of

Carburetor Adjustment

Pressure test of the carburetor



the fuel hose into the hose of the testing device. Close venting screw of the pressure ball and squeeze ball to pump air into the carburetor until the pressure gauge indicates a reading of 0,4 kp/cm² (.57 lbf./in.²).

If this reading remains constant for a while the carburetor is properly tightened; if not, open vent screw again. Pull off impulse hose from testing device and check carburetor again.

The carburetor is factory adjusted for best performance and most economic fuel consumption at local atmospheric conditions. Cutting in high altitudes or at sea level requires a certain readjustment. This readjustment is done by means of 2 carburetor adjustment screws and the idle adjustment screw.

The basic setting of the carburetor adjustment screws is following:

High speed adjustment screw (H):
3/4 turns open

Low speed adjustment screw (L):
3/4 turns open

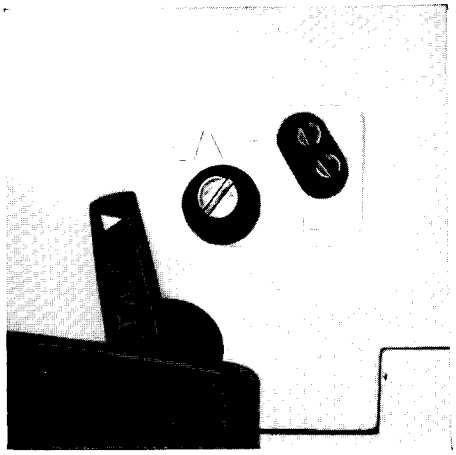
These terms are based on a snug fit of both adjustment screws.

Screw in both adjustment screws carefully until they fit snuggly.

The idle speed is increased by turning it in clockwise direction. Turning it counterclockwise will decrease the idle speed.

Hints for the Carburetor Adjustment

Carburetor adjustment screws
LA = Idle speed adj. screw
L = Idle speed screw
H = High speed screw



Engine stops when idling:

Turn idle speed regulating screw (LA) somewhat clockwise (chain should not turn).

Chain turns at idle speed:

Turn idle speed regulating screw somewhat counterclockwise.

Engine speed erratic when engine is idling:

Adjustment to the right (in clockwise direction) gets leaner mixture, adjustment to the left gets richer mixture. Please note: Already a very insignificant adjustment of the carburetor shows considerable changes.

Adjust idle speed regulating screw slightly.

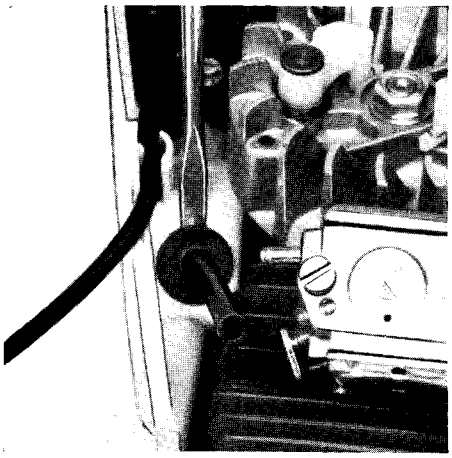
The Fuel Hose

The fuel hose is composed of a felt piece (acting as pick-up body) and the fuel hose. A grommet is molded to rubber fuel hose to provide proper sealing of the fuel line in the tank housing. The fuel hose should be checked for proper condition from time to time and the felt piece should be renewed.

To do so remove handle shroud, pull off fuel hose from connector and pull hose out of the tank housing; thereby prying off carefully the molded on grommet from the fuel hose out of the recess in the crankcase. Remove felt piece from its seat in the fuel hose and replace it by a new one.

When reinstalling the fuel line care has to be taken that the rubber grommet of the fuel hose seals properly at the crankcase. The fuel tank has also to be cleaned at intervals of approx. 50 operating hours. This is done by simply rinsing it with clean gasoline.

Prying off the grommet

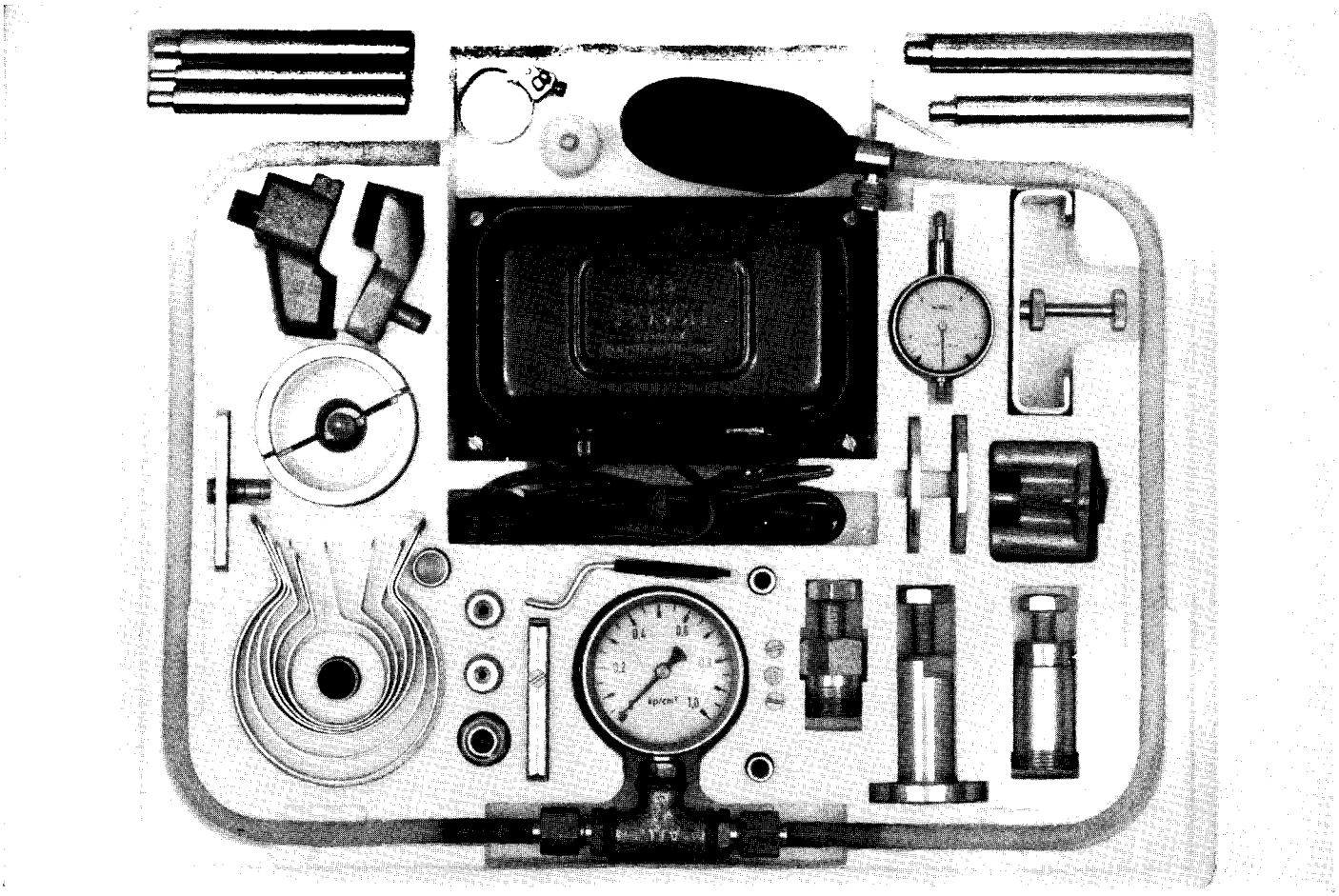


Troubles	Causes	How to correct
Motor gets hot	Carburetor adjustment too lean	Readjust
	Cooling fins of cylinder clogged	Clean
Motor does not reach peak performance, runs irregularly	Carburetor adjustment too lean or too rich	Readjust
	Air filter clogged	Clean
Excessive fuel consumption	Air filter clogged	Clean or replace
	Carburetor adjustment too rich	Readjust

If carburetor is in proper condition look for defect in motor or in ignition system, see respective paragraphs.

Special Tools for Power Chain Saws STIHL 015 and 015 L — Model 1116

Complete Set of Special Tools packed in Styropor box for STIHL Chain Saws
Order Number 0000 890 1700



1116 893 0800	Flywheel puller
1107 191 1201	Locking screw
5910 890 0310	Torque wrench for sprocket and flywheel
1110 893 9000	Gauge for guide bars of .050 in. (1,3 mm) gauge
5910 893 5608	Insert of 13 mm (0,512 in.) for sprocket and ignition
5910 850 1000	Revolution Counter with insert for all gasoline driven engines
1114 893 4700	Mounting bolt for piston pin
1110 893 9200	Groove opener for guide bars of .050 in. (1,3 mm) gauge
0811 641 8280	Inner circlip pliers for C 19
0000 850 3500	Low pressure testing device for crankcase
1106 850 2900	Carburetor-crankcase testing device
0000 890 8905	Ignition timing device
1106 890 8700	Ignition dial gauge with timing device
5910 850 4400	Testing device for ignition systems