Power Chain Saw STIHL 041, 041 AV, 041 AV electronic Model 1110 Shop Service Manual

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Power Chain Saw
STIHL 041, 041 AV,
041 AV electronic
Model 1110
Shop Service Manual

This service shop manual relates to our models STIHL 041 AV and 041 AV electronic beginning with machine number 2716500, January 1970, and STIHL 041 beginning with machine number 2768500, October 1970. The technical bulletins you received to date will help you repairing power chain saws of the same model but with the lower serial numbers.

This guide book should be used only for the instruction of our dealers and authorized service shops.

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

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Contents

Specifications

We reserve the right to make changes in design whenever it is deemed necessary or an advantage.

Engine

STIHL-single cylinder-two stroke engine

Piston displacement:	3.72 cu.inches (61 cm^3)
Cylinder bore:	1.72″ (44 mm)
Piston stroke:	1.60″ (40 mm)
Permissible max. speed:	11 000 RPM
Min. idling speed:	2 400 RPM
Bearings:	Grooved ball bearings
Crankshaft:	Split shaft
Crank pin:	.574″ (14.4 mm) in diameter
Piston pin:	.4″ (10 mm) in diameter
Length of connecting rod:	2.8″ (70 mm) distance between axes
Rewind starter:	Forced engagement with autom. rewinding of starter rope; easy starting by throttle lock and choke shutter
Clutch:	Centrifugal clutch with pressed on friction linings, 2.76″ (69 mm) in diameter
Clutch starting to engage at:	3000 RPM
Full engagement at:	about 6000 RPM
Pressure testing crankcase:	test pressure 7 lbs. per sq. inch (0.5 kp/cm^2)

Fuel System

Carburetor:	All-position Tillotson-diaphragm carburetor HS 87 with built-in fuel pump; easily accessible adjusting screws for re-adjustment of carburetor
Venturi:	9/16″ (14.3 mm) in diameter
Main adjustment screw H:	3/4 of a turn open
Idle adjustment screw L:	1 1/4 turns open (basic adjustment of carburetor, from limit stop)
Pressure testing carburetor:	Testing pressure 7 lbs. per sq. inch (0.5 kg/cm^2)
Fuel tank capacity:	1.31 pints (0.62 liters = 620 cm^3)
Fuel mixture:	1 part of oil to 20 parts of gasoline during the first 50 operating hours; 1 part of oil to 25 parts of gasoline thereafter (oil SAE 30 weight)
Air filter:	Flocked air filter with large filtering surface

Ignition System

041 and 041 AV:	Bosch-Fly-wheel magneto (coil ignition system)
Magneto edge gap:	.24—.36″ (6—9 mm)
Advanced ignition:	.1″ (2.5 mm) ± .004″ (0.1 mm) before top dead center
Advanced ignition angle:	25° before dead center
Breaker point gap:	.012″—.016″ (0.3—0.4 mm)

Condenser:	Capacity about 0.15—0.19 µF
Ignition Armature:	Primary winding 0.6—0.7 ohm Secondary winding 5900—6500 ohm
041 AV electronic:	Bosch magneto high-tension condenser ignition system (MHKZ); electronic thyristor ignition system, without breaker points
Advanced ignition:	.076″ (1.9 mm) before top dead center
Advanced ignition angle:	23° before top dead center
Condenser:	Capacity 0.6—0.9 µF
Ignition armature:	Primary winding max. 1 ohm Secondary winding 1000—3000 ohm
Charging armature:	Winding 900—1200 ohm
Spark plug:	Bosch WKA 175 T6 Heat Value 175 Spark gap .02″ (0.5 mm)
Air gap between armature and fly-wheel:	0.01—.014″ (0.25—0.35 mm)

Screw and Nut Torques

Crankshaft nut magneto side:	21.8 ft. lbs. (3.0 mkp)
Crankshaft nut clutch side:	29.06 ft. lbs. (4.0 mkp)
Clutch carrier:	25.33 ft. lbs. (3.5 mkp)
Starter shaft:	10.9 ft. lbs. (1.5 mkp)
Bottom of cylinder:	6.11 ft. lbs. (0.8 mkp)

Cutting attachment

Guide bars:	Induction hardened with stellite tipping at the nose or with star shaped roller nose
Bar length:	14, 16, 20 and 25″ (35, 40, 50 and 63 cm), 13 and 15″ (33 and 37 cm) with star-shaped roller nose **.404″ pitch** STIHL Chain Model 3812 **3/8″ pitch** STIHL Chain Model 3825, 3818, 3826
Chain Speed:	About 53′ per second (16 m per second) with .404″ pitch chain
Max. Chain Speed:	About 92.4′ per second (28 m per second) with 3/8″ pitch chain
Chain lubrication:	Fully automatic oil pump, oil feed depending on speed; with additional quantity control by turning the control knob
Max. oil feed:	1.1 cu. inches per minute (18 cm^3 per minute) at 5000 RPM
Min. oil feed:	.43 cu. inches per minute (7 cm^3 per minute) at 5000 RPM
Medium oil feed adjustment:	.61 cu. inches per minute (10 cm^3 per minute) at 5000 RPM
Oil tank capacity:	.53 pint (.25 liter)

Chain sprocket:	7 teeth for .404″ pitch 7 and 8 teeth for 3/8″ pitch
Weight of saw	with 14″ (35 cm) bar and chain: 16.5 lbs. (7.5 kgs)

Extras

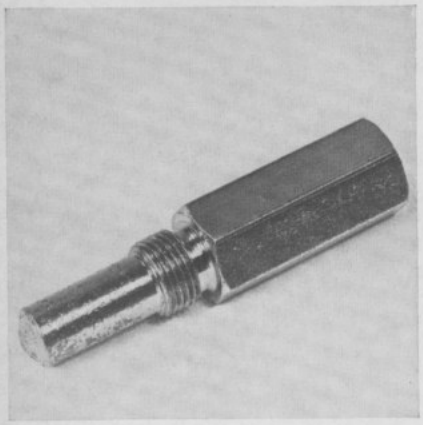
STIHL repair kit 041, 041 AV, 041 AV electronic (set of the most common wearing parts), wrap around handle, wrap around AV handle, muffler with spark arrester for 041, 041 AV, 041 AV electronic and 041 G.

Chain Drive with Clutch

Disassembly and Repair

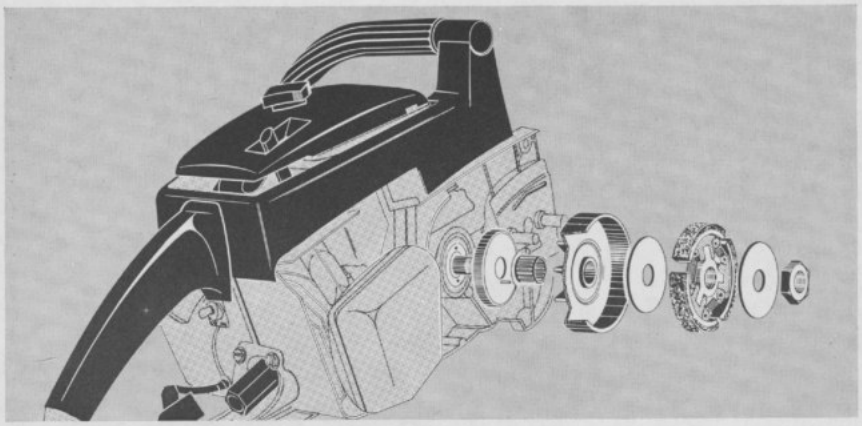
top:
Crankshaft locking nut

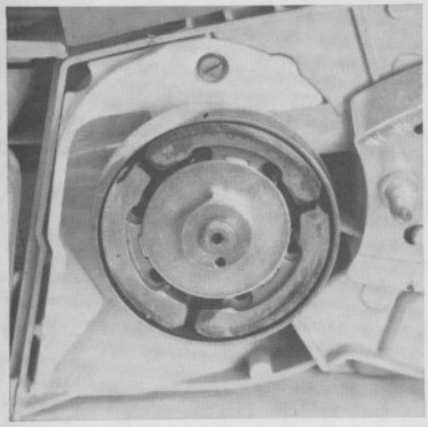
bottom:
Assembled clutch

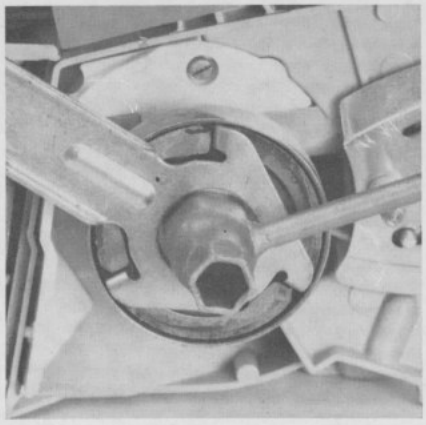


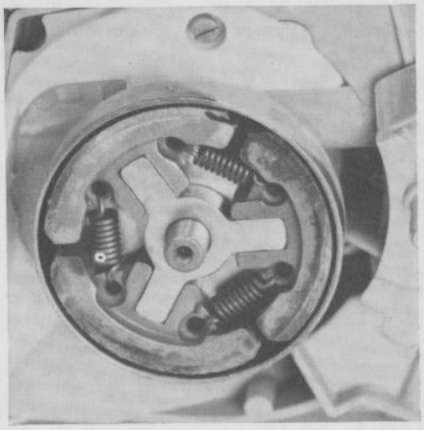
top:
Schematic view of clutch disassembly

bottom:
Loosening the crankshaft nut
Exposed clutch









For disassembling the chain drive with clutch, remove spark plug and screw in crankshaft locking screw.

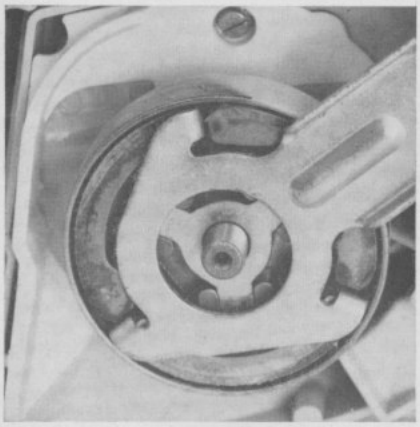
Unscrew hexagonal nut at chain sprocket cover, remove chain sprocket cover and place clutch wrench 1110 893 1310 between clutch shoes in order to lock the clutch when removing the crankshaft nut. Remove crankshaft nut at clutch side with combination wrench (SW 21) by turning it clockwise. **Note: Left-hand thread!**

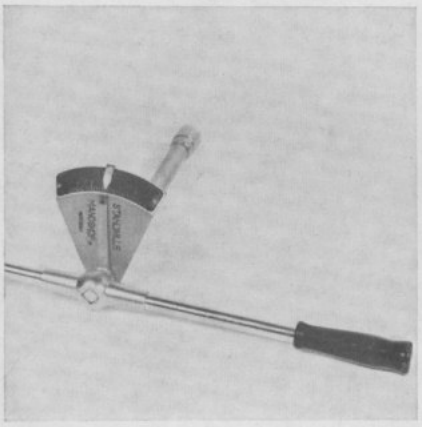
At both sides of the clutch you will find a clutch retaining washer holding the clutch shoes in position on the clutch spider. These retaining washers are slightly arched and have a rim at one side. They have to be installed in such a way that they are resting against the spider under tension. Remove the front washer, place special wrench between clutch shoes and remove clutch by turning it clockwise. Remove the second retaining washer from the crankshaft, then take off clutch drum with sprocket, needle cage and cover plate with pressed-in drive pin. One end of this drive pin which is pressed into the cover plate extends at one side into the hole in the chain sprocket and the other end engages the hole in the worm gear. The drive of the oil

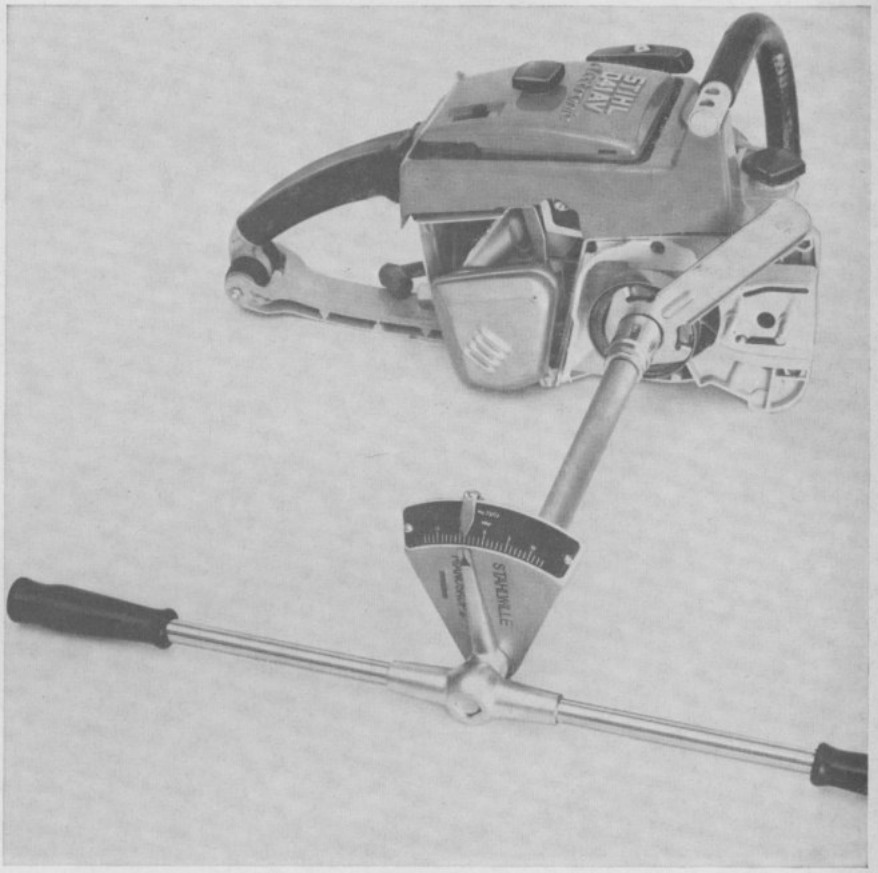
top:
Removing the clutch

bottom:
Torque wrench

Tightening the crankshaft nut with torque wrench







pump is effected in this way. When exchanging the chain sprocket, place cover plate onto new sprocket. Grease needle bearing with ball bearing grease.

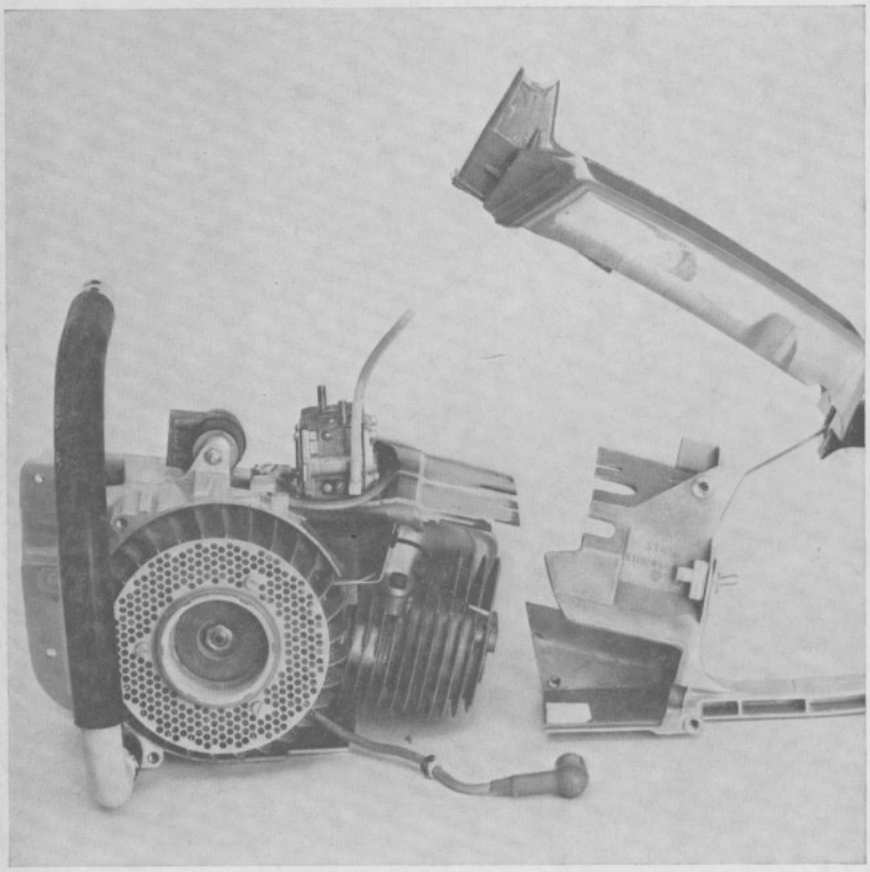
Clutch shoes and clutch springs must be replaced as a complete set! Under normal conditions the chain drive sprocket should be replaced when two chains have been worn out. The wear of the chain sprocket should not be more than .04″ or 1 mm.

To re-assemble the chain drive, place cover plate, needle cage, chain sprocket and rear clutch retaining washer onto the crankshaft. Turn clutch onto shaft and tighten it to 25.33 ft.-lbs. (3.5 mkp). Place front retaining washer onto crankshaft and turn crankshaft nut onto crankshaft. Tighten crankshaft nut with a torque wrench to 29 ft. lbs. (4 mkp). To tighten the nut, the clutch must be held in position with a clutch wrench by a second man to avoid a turning of the clutch!

Driving System

Crankshaft with conrod, cylinder and piston

Removing the handle frame



Cylinder and piston must be disassembled and checked as follows:

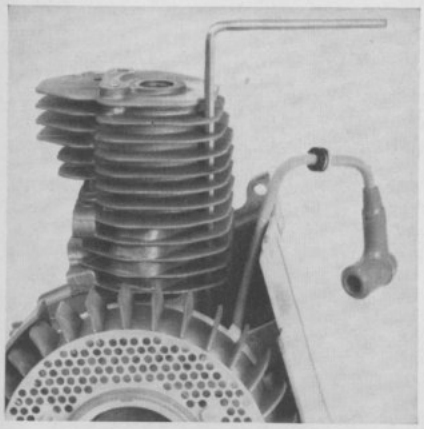
Remove fan housing cover with rewind starter and pull fuel hose off the elbow connector. Close choke shutter; remove filter cover at air filter and chain sprocket cover. Unscrew the 2 screws with inner hexagon head at the top end of the handle tube, the 2 screws at the front of the handle frame and 1 screw connecting the handle frame with the support.

Unscrew the two M 5 retaining nuts from the filter housing fixation, remove shim, lift filter housing off the studs and pull choke rod out of the choke shaft of the carburetor. Then un-hook throttle rod from throttle shaft and remove handle frame. Pull impulse hose off carburetor and remove carburetor. Pull high tension lead off ignition switch and deflecting plate. Unscrew the 2 flange fastening srcews with inner hexagon head at the cylinder and remove deflecting plate, flange and insulating plate together with all gaskets from the cylinder.

Remove spark plug terminal and pull high tension lead out of the clamps of the shroud. Unscrew the 2 screws connecting the shroud with the cylinder and the 1 screw of the lower muffler fixation; remove shroud in rearward direction. Unscrew the 2 screws with inner hexagon head connecting the muffler with the cylinder and remove muffler. Now you can check the cylinder and clean the outside of the cylinder thoroughly.

Disassembly of Cylinder and Piston

Loosening the cylinder fastening screws



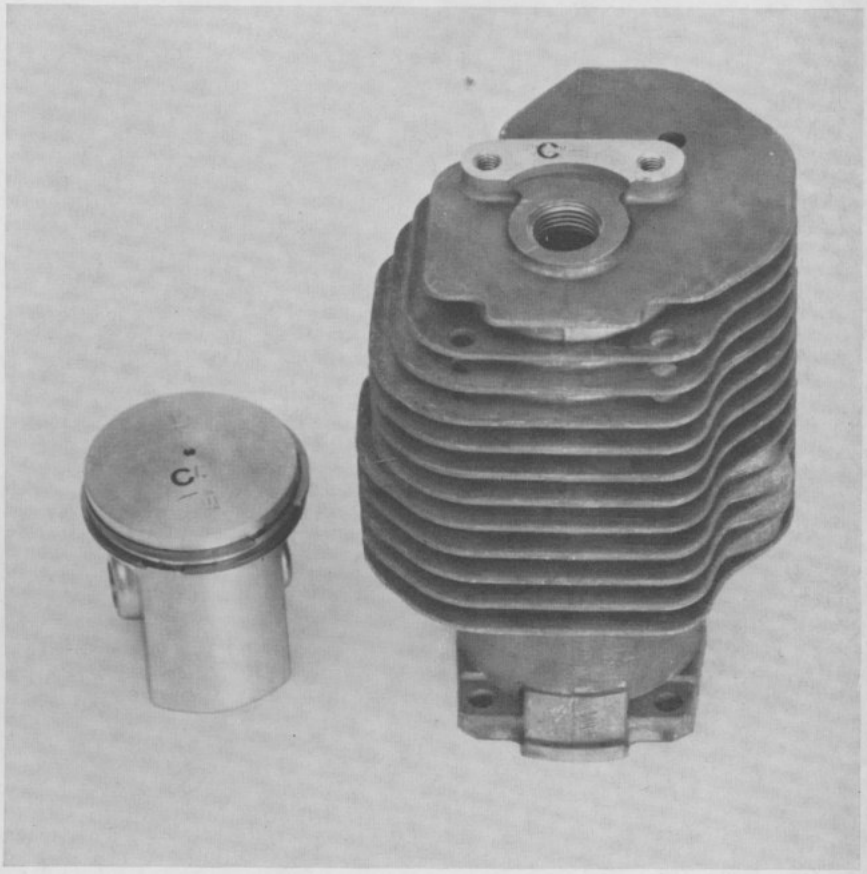
To disassemble the cylinder, unscrew the 4 screws with inner hexagon head at the bottom of the cylinder. Now remove cylinder from piston. If the cylinder has to be replaced, the piston must be replaced too.

Piston and cylinder are divided into 5 different measure or tolerance groups being marked by a letter from A to E. The 5 different pistons are combined in 3 main groups with 3 ordering numbers.

Piston AB — 1110 030 2000
Piston CD — 1110 030 2005
Piston E — 1110 030 2010

When installing new cylinders and pistons make sure to install only cylinders and pistons of the same tolerance group. Only the piston can be of the next smaller dimension group than the cylinder. However, when installing a piston into a used cylinder, the dimension group of the piston can differ to both sides by one group from that of the cylinder. For instance, the piston B can be installed in a cylinder C and the piston C also into a cylinder B.

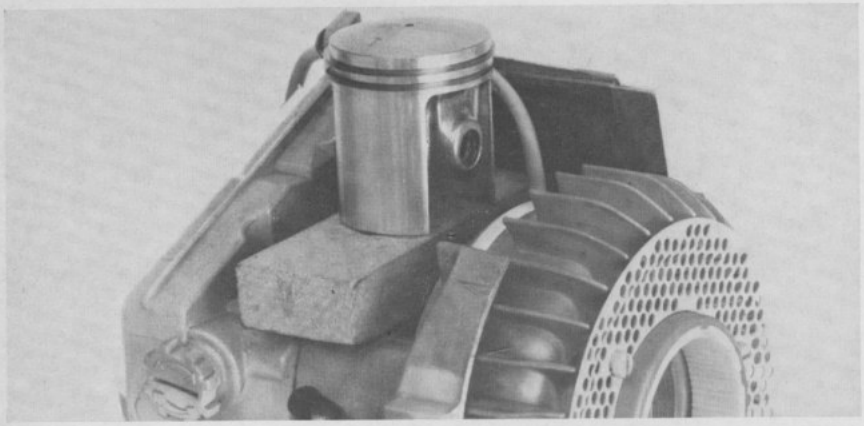
Cylinder and piston

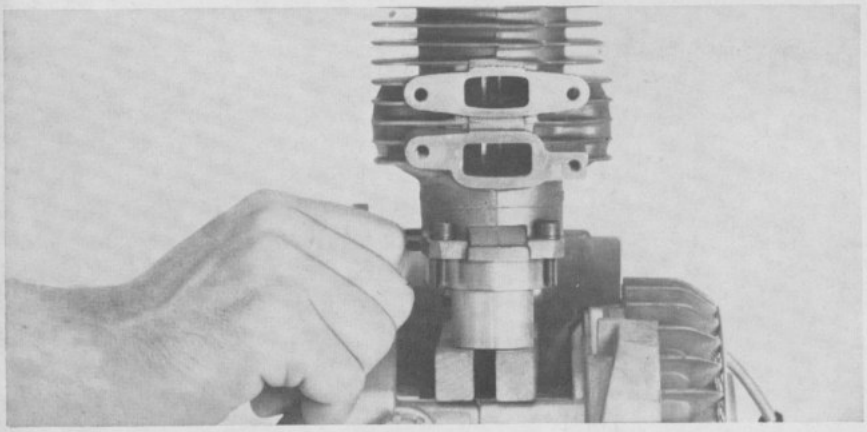


When installing a piston into a new cylinder		When repairing a used cylinder	
Piston	for cylinder	Piston	for cylinder
A	AB	A	AB
B	BC	B	ABC
C	CD	C	BCD
D	DE	D	CDE
E	E	E	DE

top:
Placing the piston onto the wooden support

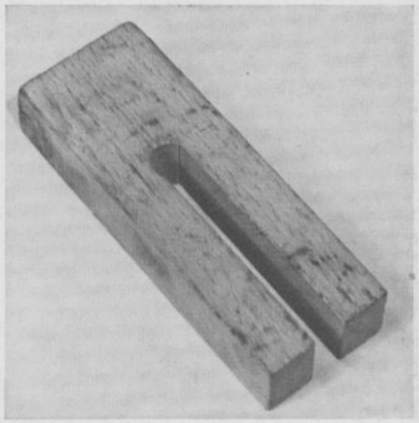
bottom:
Assembly of cylinder and at the same time pressing the piston rings together with the piston ring compressor

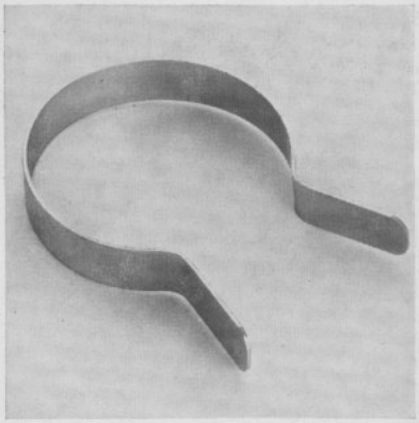




top:
Wooden support

bottom:
Piston ring compressor



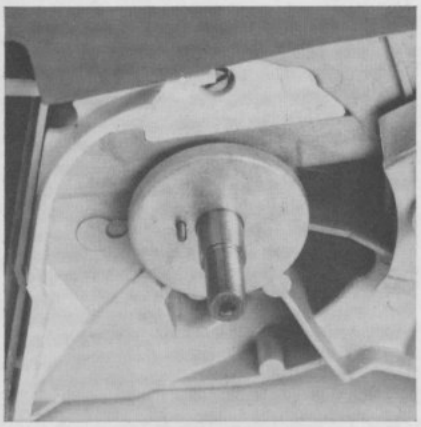


To disassemble the piston, remove the retaining rings holding the piston pin, push piston pin out of piston and remove piston. The piston pin is supported in the con-rod by a needle cage. Install piston in such a way that the arrow marked with "A" at the top of the piston is pointing in the direction of the exhaust.

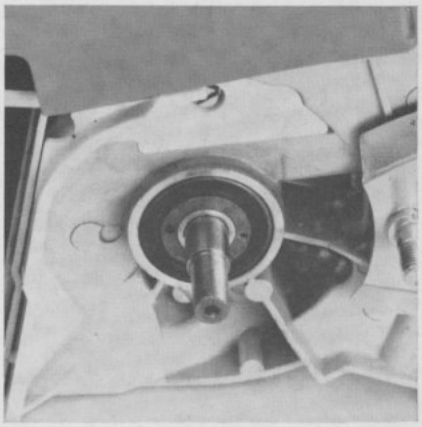
The wooden support and the piston ring compressor are a good help for placing the cylinder onto the piston (see illustration). The wooden support supports the piston on the crankcase and the piston ring compressor compresses the piston rings in the ring grooves when pushing the cylinder down over the rings and piston. Put a new cylinder gasket under the cylinder and tighten the cylinder screws at the bottom of the cylinder to 6.11 ft. lbs. (0.8 mkp). Mount muffler, carburetor, shroud, handle frame, etc. by reversing the disassembly sequence.

top:
Needle bearing

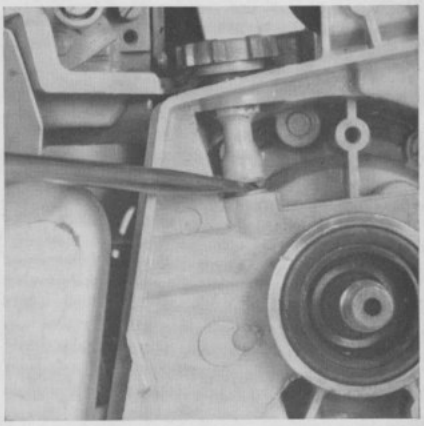
bottom:
Crankshaft

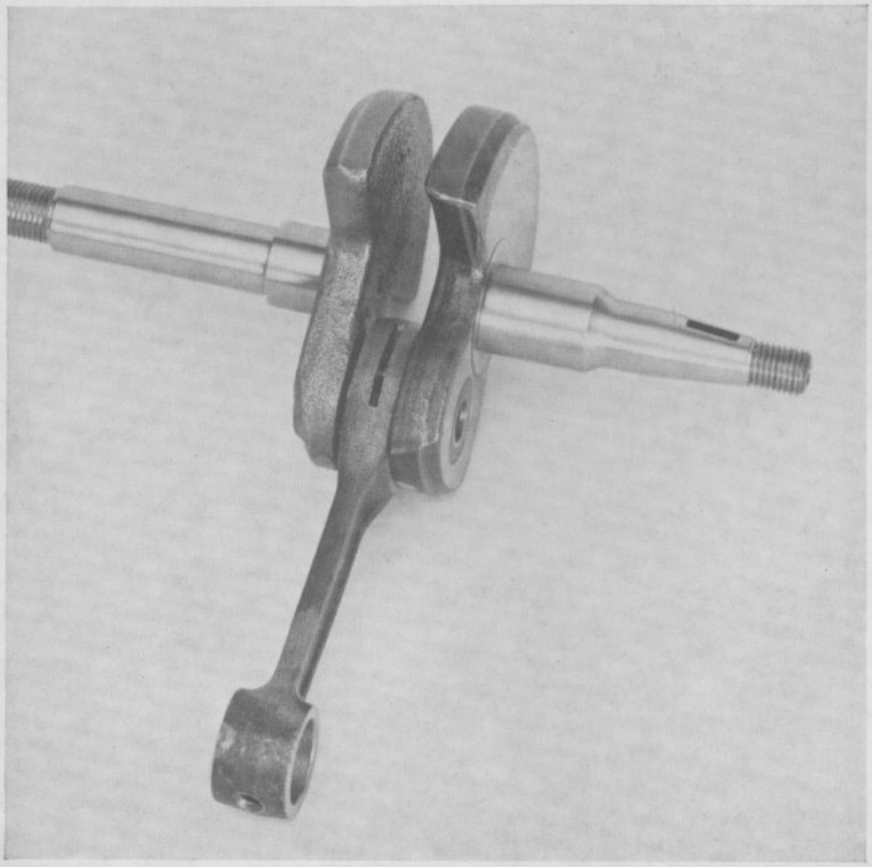


Alignment of crankshaft



Prying off the control knob



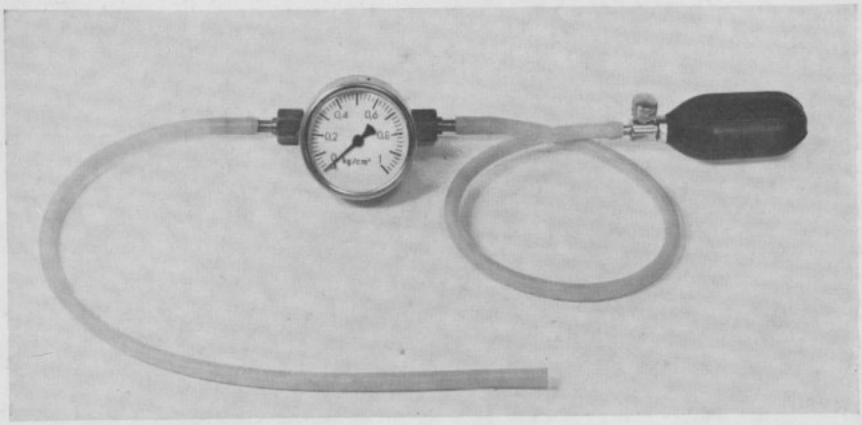


You have to take apart the crankcase in order to replace the damaged crankshaft. After having removed cylinder and piston, unscrew handle tube completely. Remove top bracket with annular buffers, disassemble fly-wheel (page 16) and chain drive with clutch (page 5). Unscrew worm of oil pump out of crankcase by turning the cover plate with drive pin counterclockwise. Unscrew the cylindrical screw at the plastic protecting plate and remove plate.

The crankcase halves are aligned by 2 cylindrical pins and screwed together by 8 screws. The oil quantity control knob covers one of these screws. Therefore pry retaining washer off knob and lever control knob from control bolt. Unscrew the screws of the crankcase and punch down cylindrical pins. If crankcase halves are still held together by the gasket, pry crank-

Pressure-Testing the Crankcase

Carburetor and crankcase pressure testing device



case halves apart by light blows with a wooden or rubber hammer.

The crankshaft is supported in the crankcase by 2 grooved ball bearings. The crankcase is sealed at both sides by an oil seal. The crankshaft is a split shaft with the crank pin forged to the shaft at the clutch side. The conrod is solid and has lubricating pockets in the big end and a lubricating hole in the piston end.

The crankshaft with conrod can only be supplied together.

Heat crankcase halves to install the main bearings. Do not twist the bearings during installation to insure a proper fit at the retaining ring and on the bearing seat. Heat inner race of the bearings with a soldering bit for inserting the crankshaft. Then punch in the cylindrical pins and turn in the screws. Tighten screws crosswise. Finish assembly by reversing disassembly sequence.

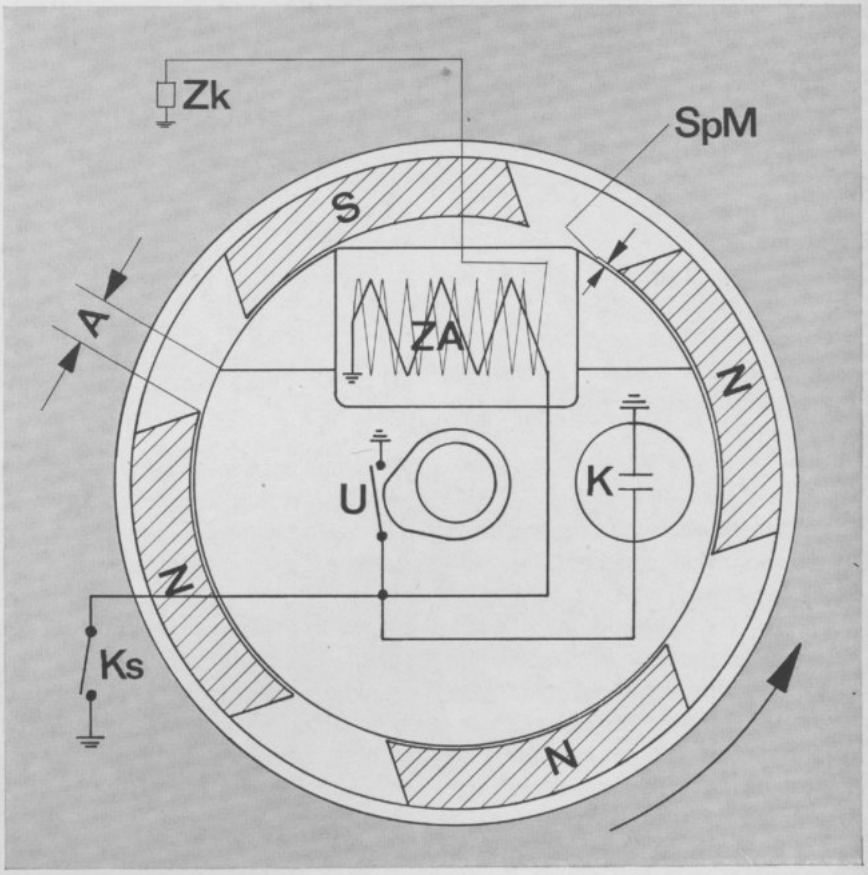
With the carburetor and crankshaft testing device it is possible to check the driving parts of the engine for leakage due to faulty seals or gaskets as well as porous housings and cracks in the crankcase. Leakages allow secondary air to enter the crankcase and this changes the air fuel mixing ratio. As a result the adjustment of the idle speed is very difficult and sometimes even impossible. Erratic operation of the engine may also be due to leakage in the crankcase. If you notice such troubles, you should therefore make the pressure test at the crankcase.

Remove carburetor assembly and muffler. Fasten pressure test flange 1110 850 4200 to the cylinder placing the muffler gasket in-between. Connect pressure hose with nipple of pressure test flange. Plug impulse nipple at crankcase. For this test you must leave the spark plug in the cylinder. Raise the piston to top dead center. Close venting screw at pressure ball and squeeze the ball until the pressure gauge indicates a reading of 7 lbs. per sq. inch (0.5 kp/cm^2). If this pressure remains constant, it indicates that the crankcase is not leaking. Otherwise you must find the leaky spot and replace the faulty part. Then re-open venting screw and disconnect the hose.

Fly-Wheel Magneto Ignition System (Ignition System with Breaker Points)

Operation

Schematic view of flywheel magneto:
ZK — High-tension lead
A — Magneto edge gap
KS — Ignition stop switch
N — North pole
S — South pole
SpM — Air gap between armature and flywheel
ZA — Ignition armature
K — Condenser
U — Breaker



Power chain saws are equipped with a fly-wheel magneto ignition system needing neither a battery nor a dynamo. The main parts of the Bosch fly-wheel magneto of the 041 and 041 AV are the fly-wheel with permanent magnets and pole shoes, the armature plate with point set, the ignition armature and the condenser, the high tension lead and spark plug as well as the ignition switch with ground lead to stop the engine.

The fly-wheel magneto operates on the principal of electro-magnetic induction. Electric current is produced when a wire is moved through a magnetic field. The direction of flow of the magnetic field is from the north pole to the south pole.

When the flywheel is turning, the lines of force between the permanent magnets cut across the wire turns of the primary winding of the ignition armature and induce a low voltage current in the primary winding. 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 plug.

As the condenser is connected parallel with the breaker points, it prevents the current from arching across the opening breaker points which would mean a loss of energy.

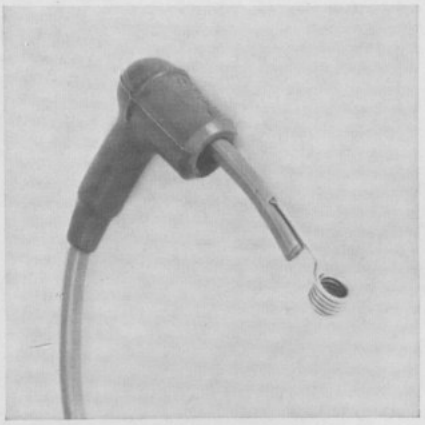
If the engine is difficult to start, or if you notice a loss of power, remove and check spark plug. Do not clean a fouled spark plug with a steel brush! Remove the dirt of a fouled spark plug with a grease solvent fluid and blow out spark plug with compressed air. Remove oil carbon residues at the spark plug with a brass brush. Then blow out spark plug with compressed air to remove any metal particles.

Make sure that spark plug has the proper heat range of 175. Fouling of the plug may also be caused by an improper fuel-air mixing ratio, a too rich carburetor adjustment, a clogged air filter or a partly closed choke shutter. Check electrode gap with a feeler gauge, it should be .02″ (0.5 mm) and must be readjusted if necessary. Install a new spark plug if electrodes are badly burned down.

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, connect spark plug with elbow connector and connect it with ground. Then a strong spark must jump the air gap between the electrodes when you pull the rewind starter.

High Tension Lead and Ignition Switch

Inserting the spring into the high-tension lead



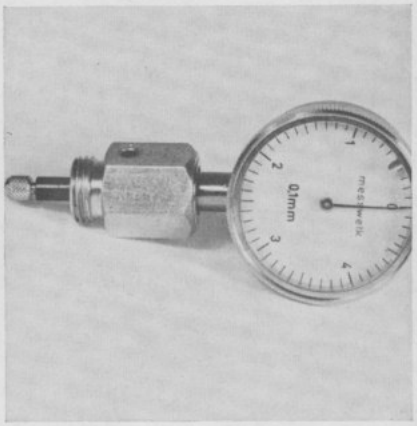
A worn insulation at the high tension or ground lead or a faulty ignition switch will cause an accidental ground and the engine will not start. Unscrew faulty high tension lead from ignition armature and replace it by a new one.

In a new high tension lead you must also use a new hook-on spring. Oil or grease the end of the lead to be inserted into the elbow connector and pull it through the elbow connector with flat nose pliers. Press hook of hook-on spring firmly and **exactly into the middle** of the cable profile to get a connection with the wire in the center of the lead, then insert cable with spring into the rear hole of the elbow connector.

With an ohm-meter it can be checked whether the connection between the ellbow connector and the high tension lead end is correct. The ohm-meter must show a reading of "zero" ohm.

Checking the Ignition Timing

Ignition timing dial gauge



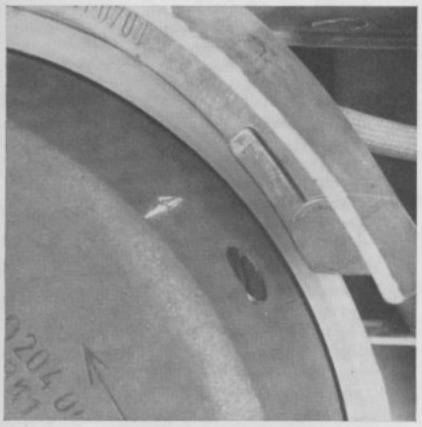
Unscrew fan housing cover with rewind starter. Pull fuel line off elbow nipple. Pull plug of ground lead off ignition switch. Unscrew spark plug, screw holder 1110 890 8905 of ignition timing dial gauge into spark plug hole and insert ignition timing dial gauge. The feeler pin can be extended by an intermediate piece.

Now adjust ignition timing dial gauge to "0" position with piston at top dead center. Connect one terminal of ignition timing device 0000 890 8905 with the plug terminal of the ground lead and other terminal with ground. Turn fly-wheel about 1/4 of a turn in reverse direction of engine rotation to lower the piston from top dead center.

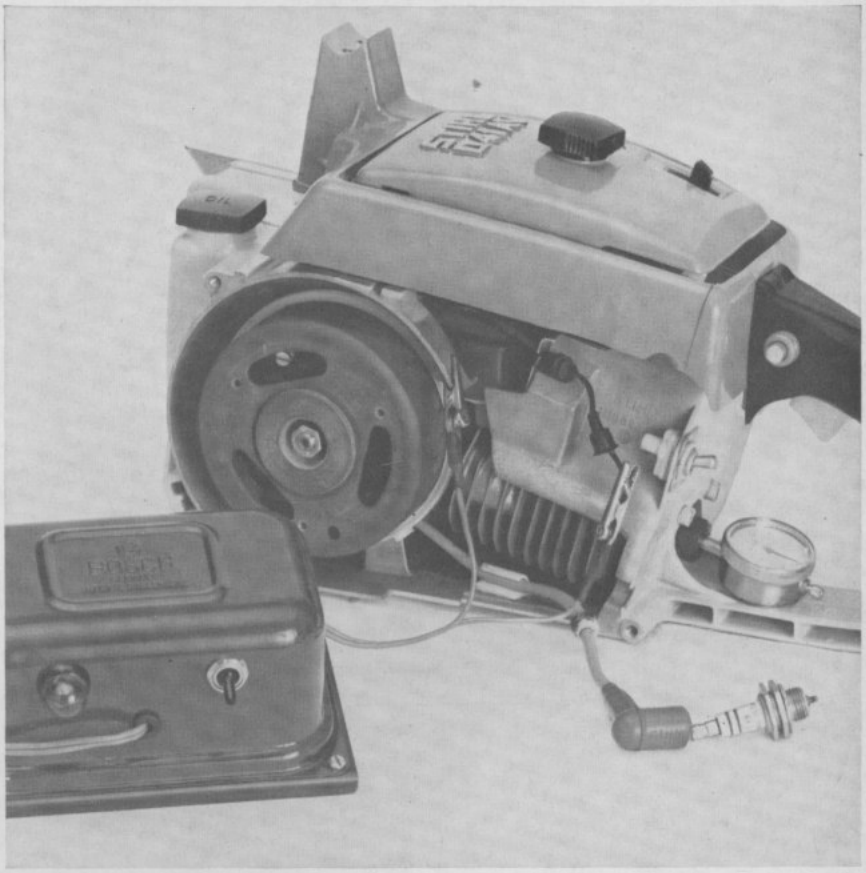
Switch on the ignition timing device and turn fly-wheel slowly in direction of engine rotation until light of the

Adjusting the Ignition Timing

Marks at flywheel and crankcase



Connecting the ignition timing device and inserting the ignition timing dial gauge



ignition timing device goes on. Now the ignition timing dial gauge should indicate a value of .1″ (2.5 mm) ±.004″ (±0.1 mm) before top dead center. The ignition timing must be re-adjusted if this value is not reached.

The ignition point is marked by two marks at the fly-wheel and the crankcase (see illustration). Therefore, you do not necessarily need the ignition timing dial gauge, the ignition timing device will also be sufficient.

Unscrew the three M 4 screws from fly-wheel and remove rotating screen, fan wheel and gasket. Remove plug of dust protecting cap through the hole in the fly-wheel.

Raise piston to top dead center, and check breaker point gap with feeler gauge. It must be .012″—.016″ (0.3—0.4 mm). If you have to adjust the breaker point gap, loosen the screw which you see through the hole in the dust protection cap. Now adjust breaker point gap by turning the breaker point base. Re-tighten screw. If breaker points are badly burned, renew the whole set of breaker points.

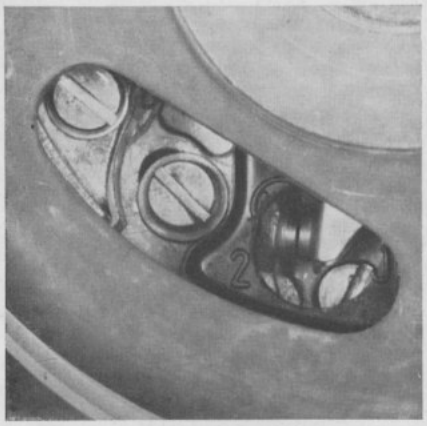
Loosen the two screws holding the armature plate through the hole in the fly-wheel. Raise or lower the piston to 0.1″ (2.5 mm) before top dead center. The piston has this position when the mark at the fly-wheel is exactly matching with that of the

Checking the Magneto Edge Gap

Ignition timing device

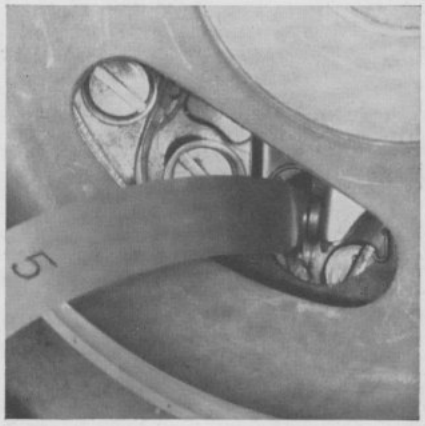
crankcase. Turn armature plate counter-clockwise if ignition timing is too far advanced, or clockwise if ignition timing is not enough advanced until the light of the ignition timing device goes on with the piston at 0.1″ (2.5 mm) before top dead center. Re-tighten armature plate and re-check ignition timing once more. If you exchange the crankshaft or the crankcase, you should re-mark the crankcase with a mark for the ignition point.

Open breaker points



Check magneto edge gap when readjusting the ignition timing. If ignition timing and breaker point gap are correct, the magneto edge gap is guaranteed by the position of the groove. The magneto edge gap specifies the position of the magnet at the moment of interruption of current. That means that this gap is the distance between the trailing edge of the fly-wheel magnet and the pole piece of the armature at the point when the breaker points start to open. The correct gap of the magneto of the 041 and 041 AV is 0.24″—0.36″ (6—9 mm). It is to be measured from the edge of the north pole in front of the south pole (see illustration). If the magneto edge gap is too large, the spark intensity will be too low when starting; if the edge is too small, it will cause ignition slips at high engine speed.

Inserting the feeler gauge



To check the magneto edge gap, insert the feeler gauge of .002″ (0.05 mm) between the open breaker points. Turn fly-wheel in counter-clockwise direction of engine rotation until feeler gauge can just be drawn out. Now check magneto edge gap. If this gap is not within the permissible limit, you can correct it by changing the breaker point gap. A smaller breaker point gap increases the magneto edge gap and vice versa.

Instead of the feeler gauge you can also use the ignition timing device. Then you must measure the magneto edge gap at the moment when the timing light goes on.

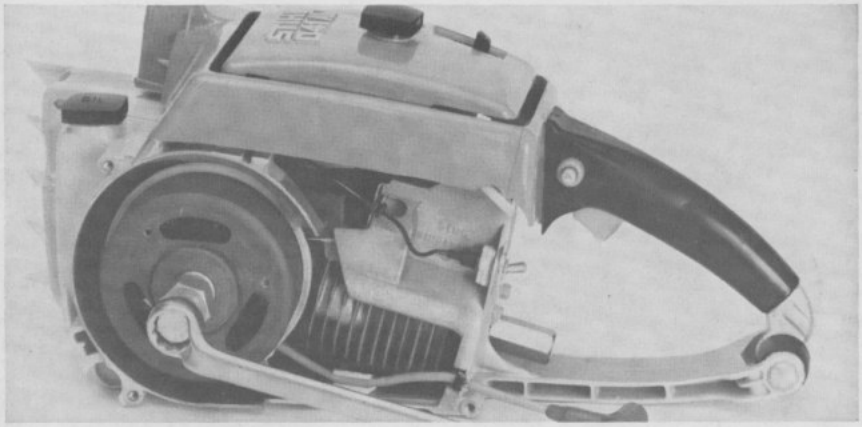
Disassembly of Fly-wheel

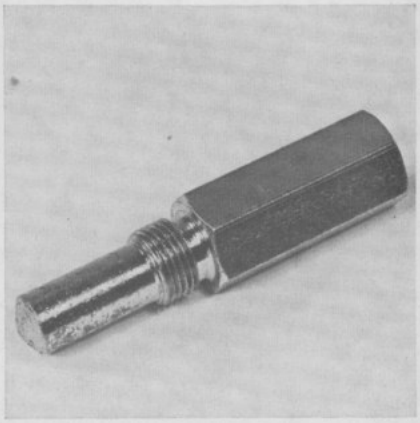
top:
Pulling the flywheel off tapered end of crankshaft

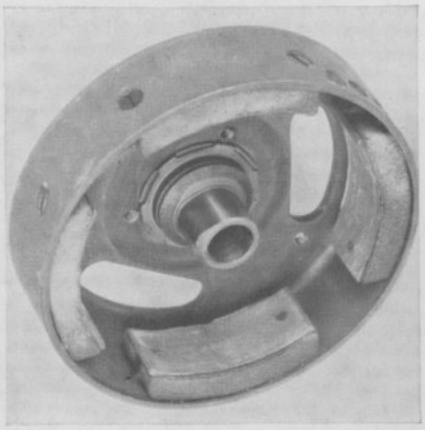
bottom left side and center:
Flywheel

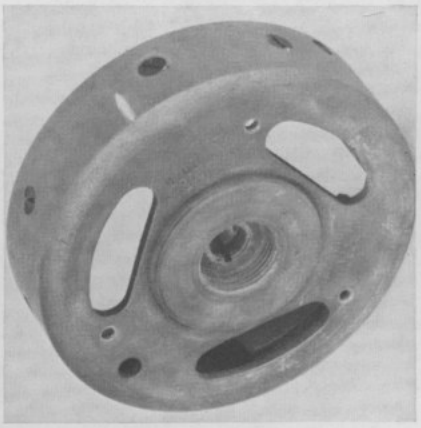
top:
Crankshaft locking screw

bottom:
Flywheel puller









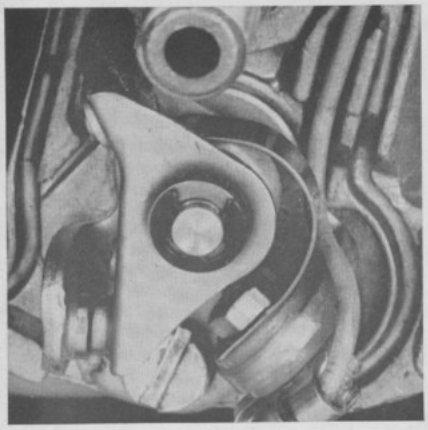
If ignition is still erratic in spite of correct ignition timing and proper spark plug, you must inspect the armature plate. First remove fly-wheel.

Insert crankshaft locking screw into spark plug hole. Loosen crankshaft nut with SW 13 combination wrench and remove it. Turn fly-wheel puller to limit stop. Turn fly-wheel clockwise until piston bottoms on the crankshaft locking screw. Screw in thrust bolt of fly-wheel puller to loosen the fly-wheel from crankshaft taper and lift it off the crankshaft.

The breaker cam is ground to the hub of the fly-wheel. The 4 permanent magnets are unsymmetrically arranged; there are 3 north poles and 1 south pole. They are sensitive to percussion as they are made of a very brittle oxide material. The magnets should never be broken or damaged. If necessary replace the whole fly-wheel.

Replacing Breaker Points

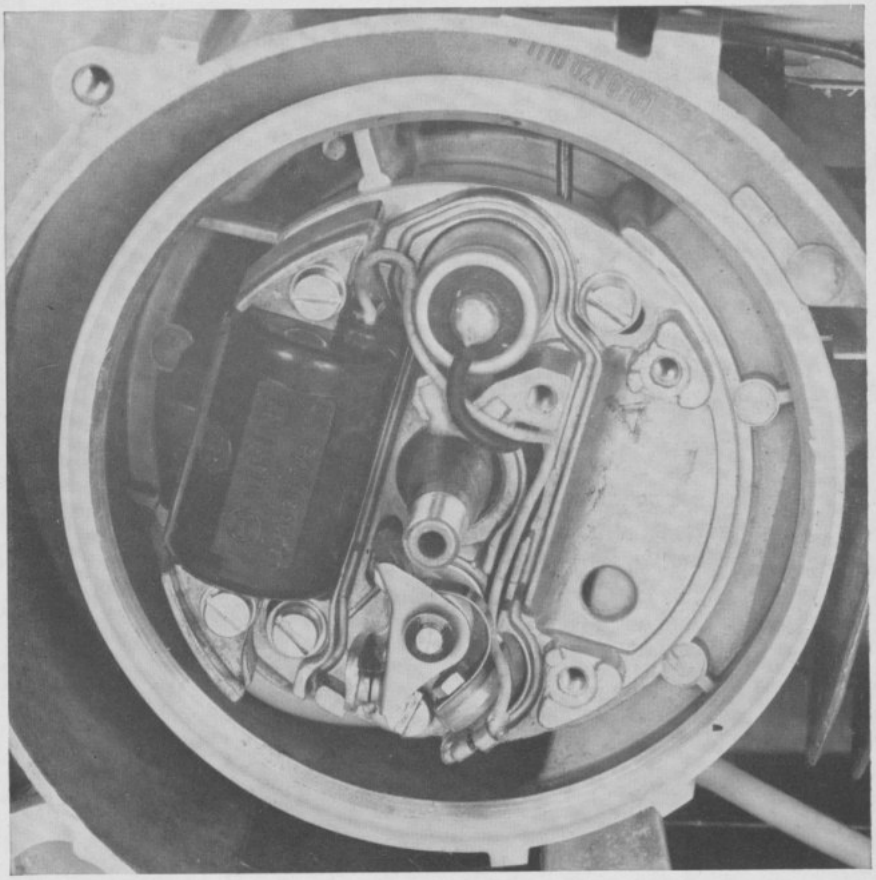
Breaker points



Badly burned breaker points have to be replaced as follows: Unscrew dust protecting cap, loosen the nut holding the terminals and disconnect the lead. Pry lock washer off connecting shaft and unscrew cylinder head screw. Remove point set and install a new set. After reassembly, adjust ignition timing.

Armature Plate

Armature plate



The armature plate is held by 2 cylinder head screws in a seat in the crankcase which is concentric to the crankshaft. The armature plate holds the breaker point set, the ignition armature and the condenser. With fly-wheel installed, the armature plate is protected against dust by the ring gasket 1110 086 8902. Should dirt have got in, inspite of that, clean it with a brush, compressed air or with a dry rag, but do not wash it with gasoline or a similar cleansing agent.

Checking the Ignition Armature

The disassembled ignition armature can be tested on spark-over with an ignition coil testing device, for instance Bosch EFMZ 1 A or EFAW 106 A. At the ignition armature 1110 404 3200 the sparking distance should be at least .28″ (7 mm) at 2.5 ampere.

Measurement of resistance of the primary winding with an ohm-meter: Resistance between yellow wire and ground (armature core) 0.6—0.7 ohm.

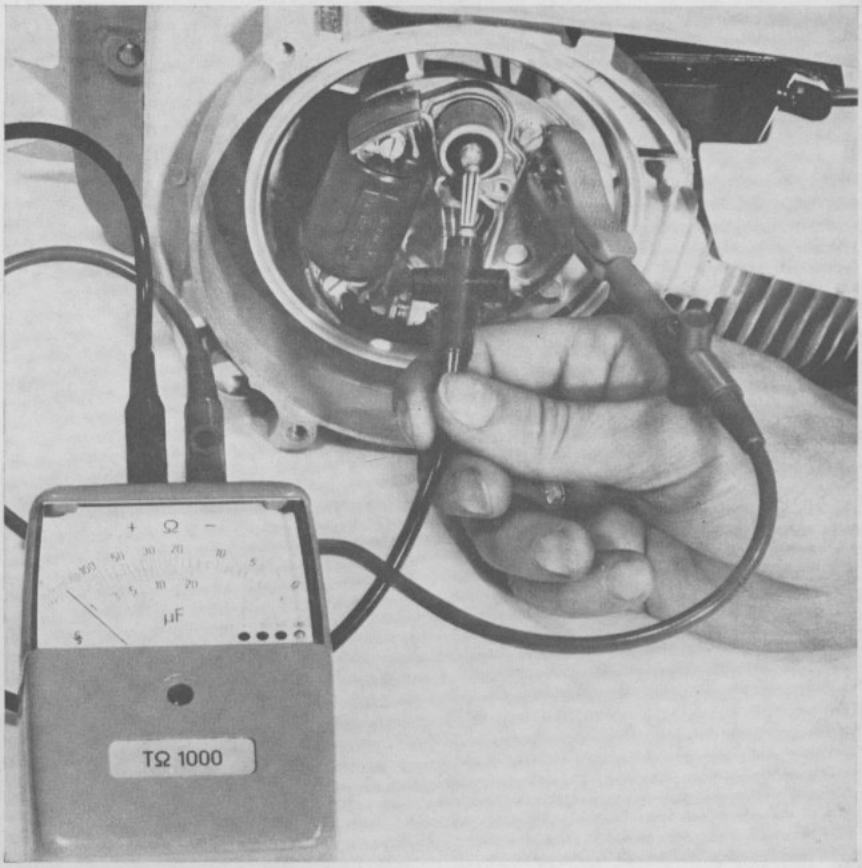
Resistance of secondary winding: Unscrew high tension lead. . Resistance between high tension lead connection and ground (armature core) 5900—6500 ohm.

You have to replace the ignition armature if a test reading is not within the above limit. With ignition armature reassembled, check **armature air gap** with a feeler gauge.

The armature air gap is the distance between the armature pole and the inner edge of the fly-wheel pole piece. To insure a proper sparking power this clearance must be .01—.014″ (0.25—0.35 mm). If the armature air gap is not correct, you must re-adjust the ignition armature accordingly.

Condenser

Checking the condenser with the pocket ohmmeter

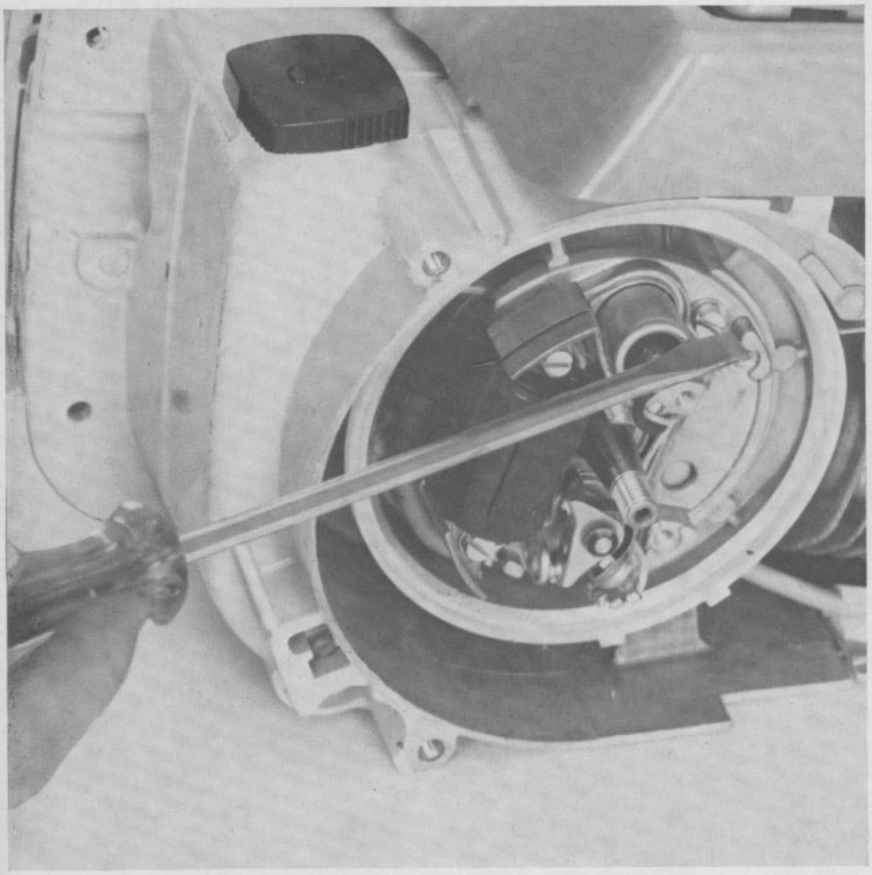


Burned breaker points are often caused by a defective condenser. You can check the condenser with a Siemens pocket ohm-meter 5910 850 4800 as follows:

Pull terminal of high tension lead off the ignition switch. Disconnect lead from breaker point base. Attach negative pole (—) of ohm-meter to ground (armature plate) and hold positive pole (+) to the connection of the condenser. For a short time the deflection of the pointer should be within the range of 0.15—0.19 on the μF-scale. Otherwise you have to replace the condenser. As the condenser is charged by the testing device, you have to discharge it after the test by short-circuiting with a screw driver.

Assembly of the Ignition System

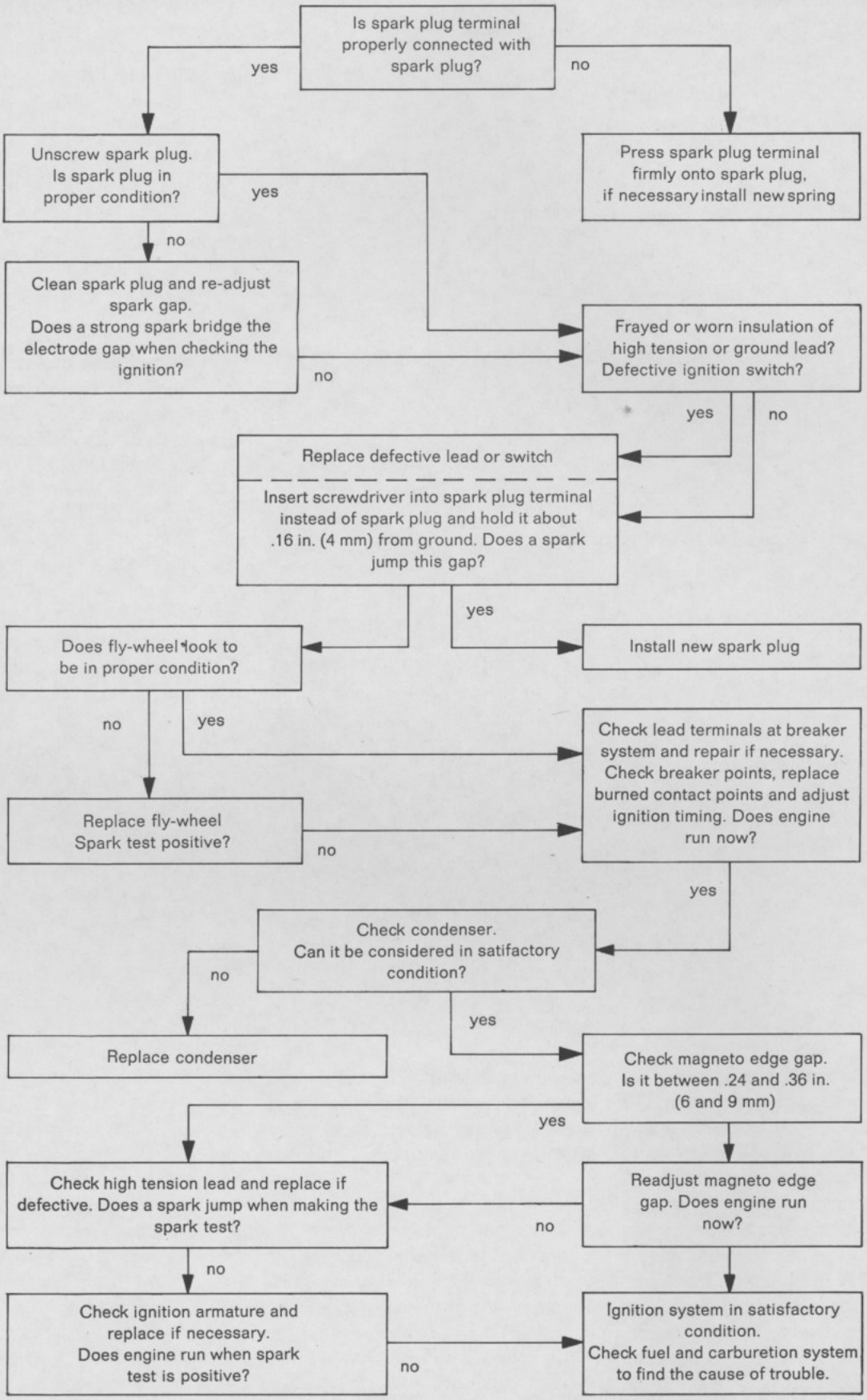
Discharging the condenser by short-circuiting



Reassemble ignition system by reversing disassembly sequence. Do not forget felt ring when inserting the armature plate. Tighten dust protecting cap and place fly-wheel on crankshaft. Make sure Woodruff key is correctly positioned in the key way of the crankshaft. Tighten nut to 21.8 ft. lbs (3 mkp). Re-adjust ignition timing. Connect ground lead with ignition switch. Fasten gasket, fan wheel and rotating screen to fly-wheel. Connect fuel line with elbow connector at fan cover and fasten fan cover. Install a good spark plug and place spark plug terminal onto spark plug.

Trouble Shooting of Fly-wheel Magneto

When you follow the arrows of the following chart and answer the questions therein, you will soon find the cause of the malfunction of the ignition system.


Is spark plug terminal properly connected with spark plug?
yes
no
Unscrew spark plug. Is spark plug in proper condition?
Press spark plug terminal firmly onto spark plug, if necessary install new spring
yes
no
Clean spark plug and re-adjust spark gap. Does a strong spark bridge the electrode gap when checking the ignition?
Frayed or worn insulation of high tension or ground lead? Defective ignition switch?
no
yes
no
Replace defective lead or switch
Insert screwdriver into spark plug terminal instead of spark plug and hold it about .16 in. (4 mm) from ground. Does a spark jump this gap?
yes
Does fly-wheel look to be in proper condition?
Install new spark plug
no
yes
Check lead terminals at breaker system and repair if necessary. Check breaker points, replace burned contact points and adjust ignition timing. Does engine run now?
Replace fly-wheel Spark test positive?
no
yes
Check condenser. Can it be considered in satifactory condition?
no
yes
Replace condenser
Check magneto edge gap. Is it between .24 and .36 in. (6 and 9 mm)
yes
Check high tension lead and replace if defective. Does a spark jump when making the spark test?
Readjust magneto edge gap. Does engine run now?
no
no
Check ignition armature and replace if necessary. Does engine run when spark test is positive?
Ignition system in satisfactory condition. Check fuel and carburetion system to find the cause of trouble.
no

High tension condenser magneto ignition system
Electronic ignition system of 041 AV electronic

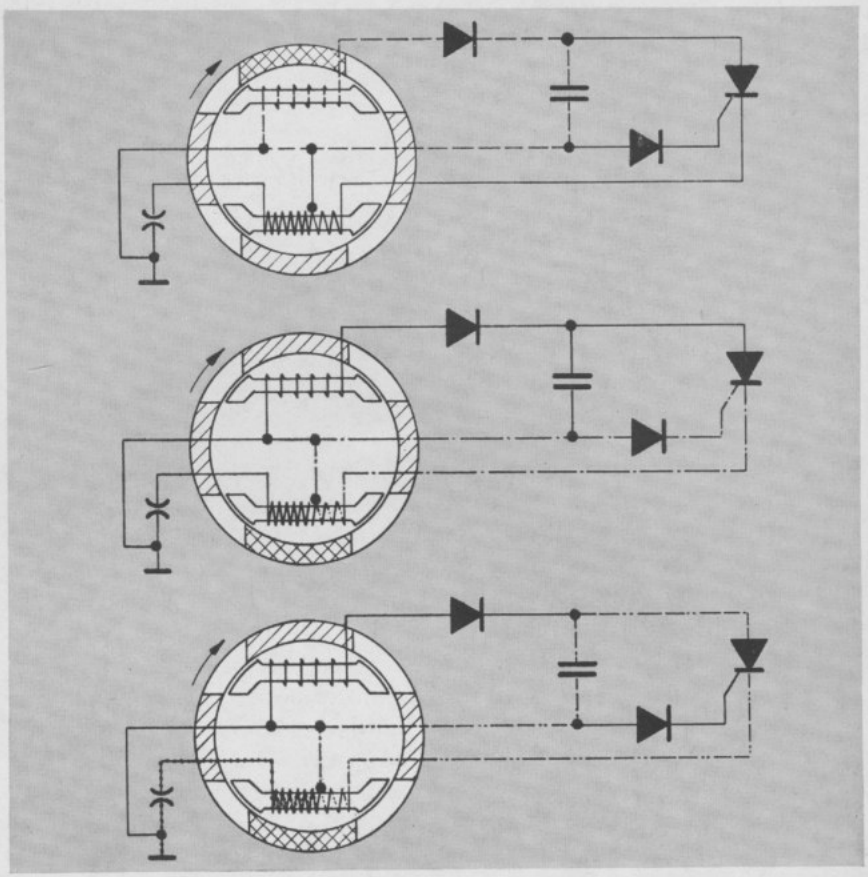
Advantages and operation

The STIHL 041 AV electronic power chain saws are equipped with the electronic Bosch high tension condenser magneto ignition system (MHKZ). Compared with a fly-wheel magneto ignition system, this ignition system has the advantage that it does not have breaker points, it is breakerless. Therefore, the electronic ignition system is unaffected by dirt, humidity or fluctuation in temperature.

The solid state magneto ignition system is also based on the electro magnetic induction. When the north pole of the fly-wheel is passing the charging armature, an alternating voltage is produced in the charging armature. This voltage charges the capacitor by means of the charging diode. During this process the charging diode rectifies the AV-voltage.

When the fly-wheel has turned by further 180°, then the north pole is opposite the ignition armature and induces a control voltage in the primary winding. Now the control elements in the control box are activated by the control voltage.

Schematic view of magnetic high-tension condenser ignition system:
1st stage: charging the storing condenser
2nd stage: controlling the thyristor
3rd stage: Generating an ignition spark by discharging the condenser



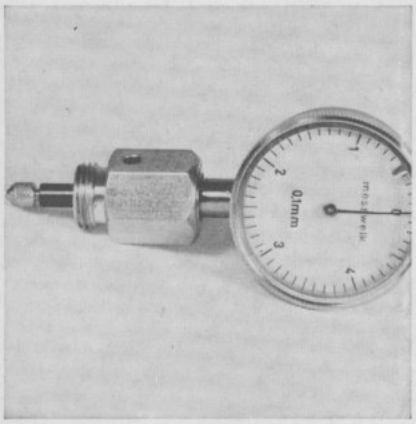
The control voltage, too, is rectified by a diode when then transmitted to the gate of the thyristor. As soon as the necessary control power is reached by a sufficiently high speed, the thyristor is switched on and gets contactive. Now the capacitor is discharged through the primary winding of the ignition armature and this generates the necessary high voltage in the secondary winding which is transmitted to the spark plug.

Checking the cable connections

When you have troubles with the MHKZ, check spark plug, high tension and ground lead as well as ignition stop switch. Then check the connecting cables from the switch box to the armature plate and on the armature plate.

Checking the ignition timing

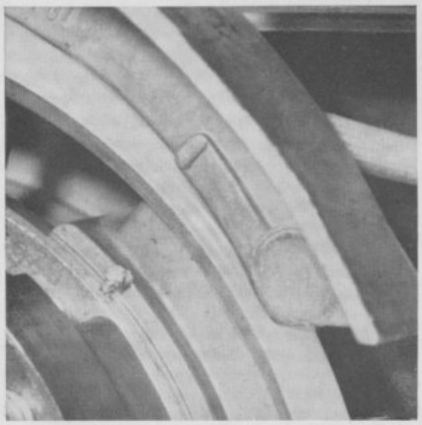
Ignition timing dial gauge



Note: When testing the ignition system, use a good serviceable spark plug properly grounded and with the spark plug connector attached. When venting a flooded engine, make sure the ignition stop switch is in its "off" position!

Remove the cover of the fan case with the starter assembly. Pull fuel line off the elbow connector. Disconnect terminal of ground lead at ignition stop switch. Loosen and remove rotating screen and fan wheel from fly-wheel. Disassemble fly-wheel (see fly-wheel magneto ignition system, page 12). Check to be sure that the mark on the armature plate is in register with that on the crankcase. Otherwise loosen the 2 cylinder head screws holding the armature plate. Turn armature plate until the two marks are in register with each other and re-tighten armature plate.

Marks at armature plate and crankcase



Screw holder 1110 890 8905 of ignition timing device into spark plug hole and insert ignition timing dial gauge. The feeler gauge can be prolonged by a lengthening piece. Attach the flywheel to the crankshaft and adjust the timing dial gauge to 0 position by turning the dial with piston at top dead center. Then move the piston, by turning the fly-wheel against the sense of rotation of the engine, to 0.76″ (1.9 mm) before top dead center. In this position, the mark on the fly-wheel must be in register with the mark on the crankcase. Otherwise you have to readjust the ignition timing or apply a new mark.

Adjusting the ignition timing

Remove fanwheel, rotating screen, and gasket from fly-wheel. Screw ignition timing dial gauge into spark plug hole and adjust it to 0 position with piston at top dead center. Then move the piston, by turning the fly-wheel against the sense of rotation of the engine, to .076″ (1.9 mm) before top dead center. Now apply the mark to the crankcase in register with that on the fly-wheel. Remove the fly-wheel. Unscrew the 2 cylinder head screws holding the armature plate. Now turn the armature plate until its mark registers with that on the crankcase. Re-tighten armature plate and fasten fly-wheel. Tighten crankshaft nut to 21.8 ft. lbs (3 mkp). Mount fan-wheel and rotating screen to fly-wheel.

Thereby, do not forget the paper gasket between fly-wheel and fan-wheel. Connect ground lead and fasten fan housing cover.

The adjusting mark on the armature plate is always correct. The adjusting mark on the crankcase, however, must be renewed after having checked the ignition timing whenever the crankcase or the armature plate is replaced by a new one.

Optionally, the high tension condenser magneto ignition system may be timed with the help of a timing gun. Then the timing gauge should

top:
Timing gun

bottom:
Taphole speedometer

be screwed into the spark plug hole and set to 0 position with piston at top dead center. Position the piston, by rotating the crankshaft against the sense of rotation of the engine, to 0.076″ (1.9 mm) before top dead center. Using a colored pencil, apply two registering marks to the rotating screen and to the slot of the cooling air inlet at the fan case cover. These marks are to be made and to be checked with fan case cover mounted to the

Adjusting speed with idle speed regulating screw

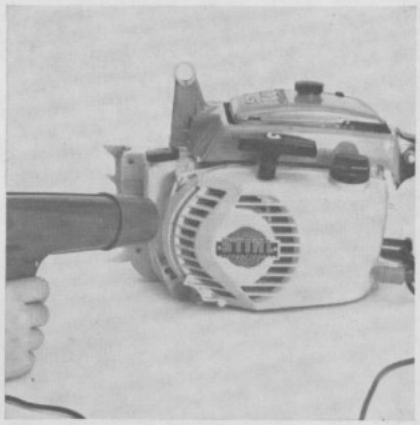
machine. Then remove the timing dial gauge, install the spark plug and tighten it. Connect the timing gun with the ignition circuit between spark plug and high tension lead and start engine.

Then proceed as follows:

a) Hold the saw and open the throttle
b) Measure the crankshaft speed at clutch side with revolution counter
c) Adjust speed to 6000 RPM by adjusting the idle speed regulating screw of the carburetor
d) Flash at the marks with timing gun.

The marks on the rotating screen and on the cooling air inlet must register at an engine speed of about 6000 RPM. If the mark on the rotating screen, viewed in the rotational sense of the engine, is displaced

Flashing at the marks

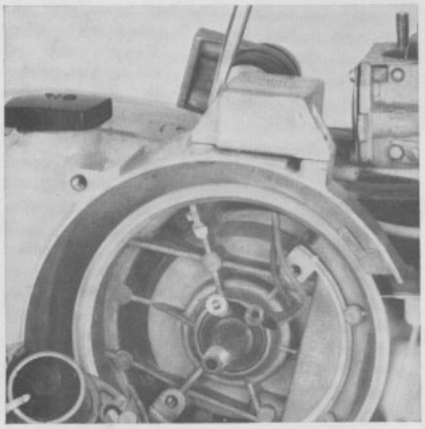


ahead of the mark on the cooling air inlet (which means that ignition is too much advanced), then the armature plate should be turned in counter-clockwise direction. The armature plate can be unscrewed and turned through the openings in the fly-wheel. To adjust the armature plate, remove fan case cover as well as fan-wheel and rotating screen. Re-assemble ignition system, start engine and flash at the marks a second time. Turn armature plate until ignition is correctly adjusted. After the final adjustment of the ignition timing, renew the adjusting mark on the crankcase.

Disassembly of control unit and armature plate

Loosening connecting leads (red and blue)

Disassembled armature plate



In the control unit 1110 400 1000 you find the electronic parts as, for instance, the thyristor. For protection against corrosion, the housing is fully cast and can be replaced only by a new one.

Remove fan case cover, put choke lever to "0" position, remove filter cover and air filter. Loosen the two M 5 retaining nuts of the filter housing fixation from the studs, remove shim, lift filter housing and unhook choke rod. Pull impulse hose off the carburetor, remove carburetor and unhook throttle rod. Unscrew the 2 cylinder head screws with inner hexagon at the top end of the handle bar and the 2 cylinder head screws at the face side of the handle frame. Then fold handle frame back and now the control unit will be accessible.

After the disassembly of the fly-wheel, loosen the 2 cylinder head screws and then remove armature plate from crankcase. Loosen the 2 hexagonal nuts and disconnect the connecting cables from the control box to the armature plate — red and blue — from the terminals of the armature plate. Pull ground lead off the ignition stop switch and take connecting cable out of crankcase. Loosen the 2 cylinder head screws fastening the control box to the crankcase.

Hints for the assembly of control unit and the armature plate

The cables of the control box must be laid very carefully. They should not contact the AV-handle bracket, the crankcase or the connector of the impulse hose to avoid chafing. Watch that the cables are not damaged when installing the rubber grommet into the bore of the crankcase. Make sure that the control cables are laid parallel to each other between the control box and the armature plate. If the cables are run through the hole of the armature plate on top of each other, they may be squeezed by the cross rib of the crankcase which may lead to a short-circuit.

Moreover, the armature plate should not be bent and the control unit must be grounded. The armature plate of the MHKZ-ignition system should be cleaned only with a brush, with a dry rag, or with compressed air.

Flywheel

Fly-wheel

The fly-wheel of the breakerless ignition system has no breaker cam, moreover it has 1 north pole and 3 south poles. Check and disassemble fly-wheel in the same way as the fly-wheel of the fly-wheel magneto ignition system.

Checking the Charging Armature

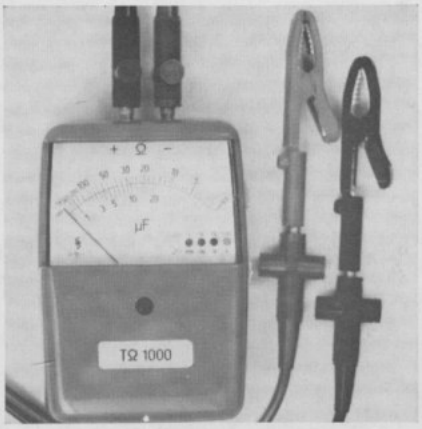
Measure resistance of charging armature coil anddiode with Siemens pocket ohmmeter 5910 850 4800.
Disconnect line of charging armature from terminal C of armature plate.

1. Connect positive pole (+) of ohmmeter with free end of connecting line, and negative pole (—) with ground.
2. Connect negative pole with connecting line and positive pole with ground.

The second value measured with the Ohmmeter must be **at least 10 times** larger **or** smaller than the value measured the first time. Otherwise the charging armature must be replaced.

Checking the ignition armature

Pocket ohmmeter



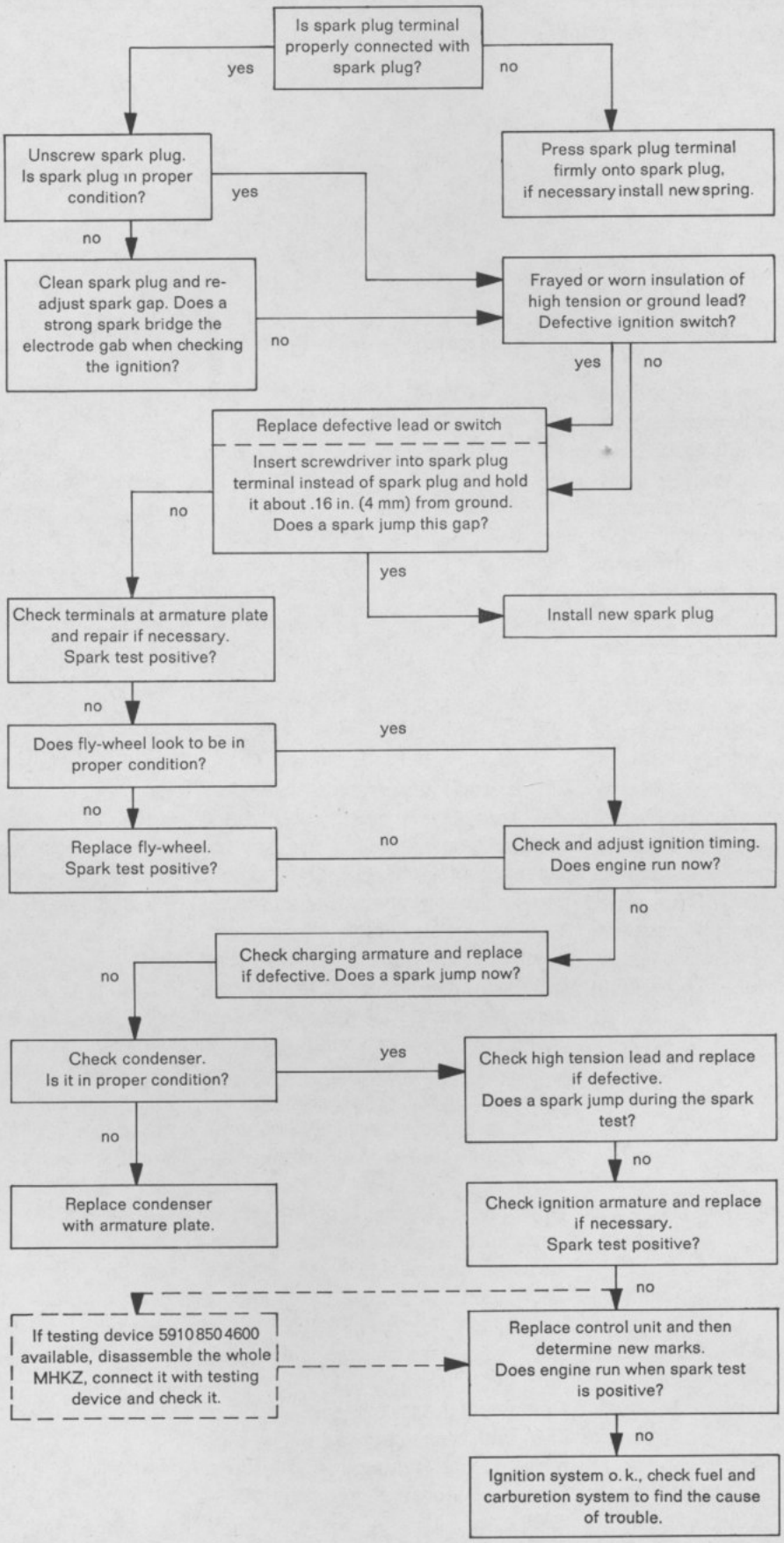
There is no ignition armature testing device on the market which could be used for checking the ignition armature 1110 404 3205 of the MHKZ breakerless ignition system. High-tension flash overs in the secondary winding can be discovered only on a test stand. Moreover it can also be tested only on a test stand or on the testing device 5910 850 4600 whether the spark over is correct. The length of the spark must be at least .24″ (6 mm).
Resistance test of the primary winding:
Disconnect yellow cable from B terminal at armature plate. The resistance between the yellow cable and ground (armature core) should be 0.45 to 0.55 ohm (<1 Ω).
Resistance test of secondary winding:
Remove high tension lead.
The resistance between the high tension lead terminal and ground (armature core) should be 1000—3000 ohm.

Checking the Condenser

Disconnect terminal of ground lead from ignition stop switch. Loosen white connecting cable from C terminal of armature plate. Hold negative pole (—) of ohmmeter to ground and positive pole (+) to terminal of connecting cable. **The indicator of the ohmmeter** must point between 0.6 and 0.9 µF on the µF scale **for a short time.** Otherwise replace condenser with armature plate. As the condenser is charged by the testing device, it must be discharged after the test by short-circuting, for instance with a screwdriver.

Checking the High-Tension Lead

The high-tension lead can be checked in the same way as on the flywheel magneto ignition system.


Is spark plug terminal properly connected with spark plug?
yes
no
Unscrew spark plug. Is spark plug in proper condition?
Press spark plug terminal firmly onto spark plug, if necessary install new spring.
yes
no
Clean spark plug and re-adjust spark gap. Does a strong spark bridge the electrode gab when checking the ignition?
Frayed or worn insulation of high tension or ground lead? Defective ignition switch?
no
yes
no
Replace defective lead or switch
Insert screwdriver into spark plug terminal instead of spark plug and hold it about .16 in. (4 mm) from ground. Does a spark jump this gap?
no
yes
Check terminals at armature plate and repair if necessary. Spark test positive?
Install new spark plug
no
Does fly-wheel look to be in proper condition?
yes
no
Replace fly-wheel. Spark test positive?
no
Check and adjust ignition timing. Does engine run now?
no
Check charging armature and replace if defective. Does a spark jump now?
no
Check condenser. Is it in proper condition?
yes
Check high tension lead and replace if defective. Does a spark jump during the spark test?
no
Replace condenser with armature plate.
Check ignition armature and replace if necessary. Spark test positive?
no
If testing device 5910850 4600 available, disassemble the whole MHKZ, connect it with testing device and check it.
Replace control unit and then determine new marks. Does engine run when spark test is positive?
no
Ignition system o. k., check fuel and carburetion system to find the cause of trouble.

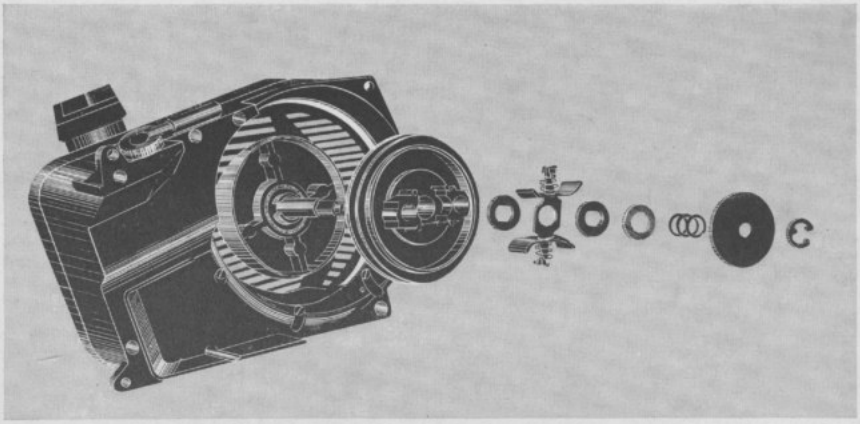
Rewind Starter
Disassembly and Repair

top:
Schematic view of disassembled rewind starter

center:
Rewind spring mounted into rope rotor

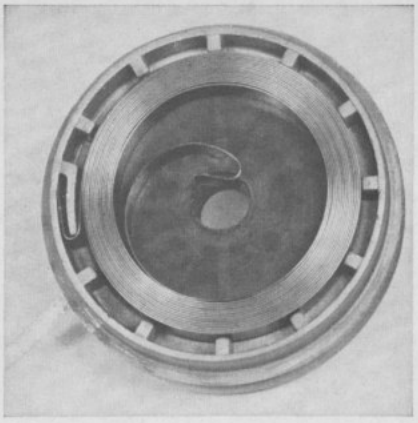
bottom:
Spare rewind spring

Unscrew fan housing cover with starter assembly, pull fuel hose off the elbow connector. Then release tension of rewind spring as follows:

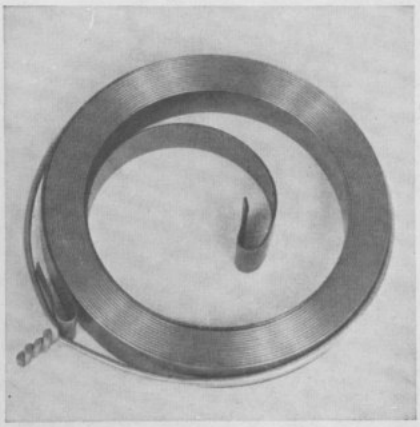


Pull starter rope partly out, hold rotor and unwind a few windings of starter rope from rotor. Release rotor slowly. In this way pretension of rewind spring is relieved. If rewind spring or starter rope is broken, the pretension of the spring has already been relieved.

Remove retaining ring of rewind starter holding the check plate so that it cannot jump out and the brake spring cannot get lost. Remove brake spring, steel washer and friction shoe assembly with the two fiber washers.



The rewind spring is located in the rope rotor and no dirt can enter it as it is sealed by a cover and a snug fitting "Resitex" washer which is installed between rope rotor and rewind spring. The outer loop of the rewind spring is hooked into a lug of the rope rotor housing, the inner loop into the recess in the fan housing cover. The rewind spring and the rope rotor are identical with the rewind spring and the rope rotor of model STIHL 050 AV. For disassembling a broken rewind spring, remove the cover from the rope rotor with a screwdriver.



The new spare spring is secured with a wire loop. Remove wire loop when pushing spring into rotor. If spring should have uncoiled, coil it into pully in clockwise direction starting with the outer loop and ending with the inner loop. Slide the rotor with installed spring and pressed-on cover into place on shaft of rewind starter so that the inner loop of rewind spring is hooked into the recess in the fan housing cover.

Caution: The felt ring must be located in the annular groove. It keeps saw dust out of the rewind spring.

Installation of a new starter rope and tensioning of rewind spring

top:
Friction shoe

center:
Threading in the starter rope

bottom:
Tensioning the rewind spring

Insert new rope into rotor and knot one end. Thread other end through hole in fan housing cover then through handle and secure it with a double knot. The correct length of the rope is 40 inches (1000 mm).

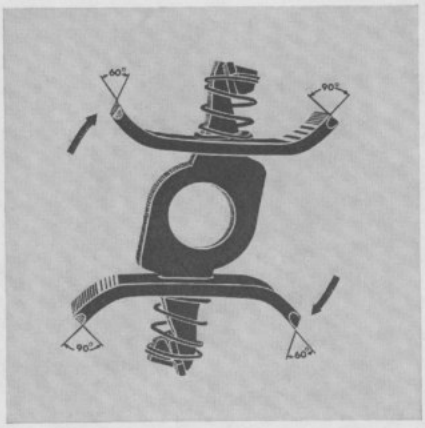
To tension the spring, pull loop of cord up between rotor and fan housing cover. Now turn pulley about 7 turns in clockwise direction.

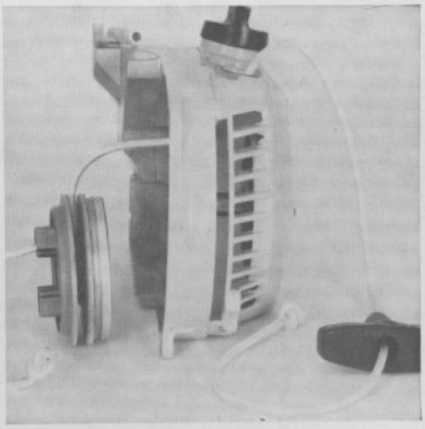
Thereby, do not allow the rope to wind onto the rotor. Hold rotor, draw starter rope out and let rope rotor turn back slowly thereby winding the rope slowly onto the rotor.

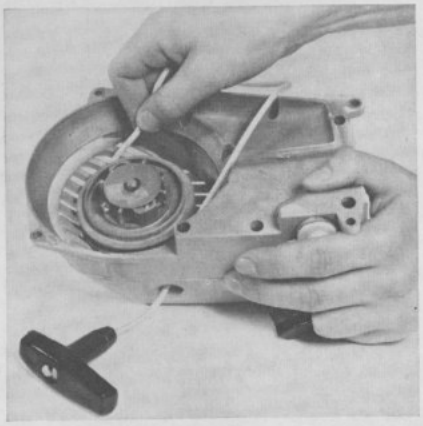
The spring is now correctly tensioned if rotor can still be turned one turn before reaching maximum spring tension when the cord is pulled out fully. Excessive spring tension will cause breakage of the spring.

Now place lower fiber washer onto shaft of rewind starter; then install friction shoe assembly so that those edges of the friction shoe plate which are ground by 60° turn in clockwise direction (see illustration).

Now install upper fiber washer, steel washer, brake spring and check plate, and press in retaining washer.







Hints for the repair of the rewind starter

When repairing the rewind starter, inspect fiber washers. Fouled, dirty or oil saturated fiber washers have a reduced braking action and will cause starting problems. These washers are acting as brake washers and are therefore subject to wear. For this reason, they must be replaced from time to time. The friction shoes have ground ends.

That side of the friction shoe which engages the starter cup first when starting, has a ground angle of 60°. The opposite side has an angle of 90°. Check to be sure that those edges which are ground at an angle of 60° are really sharp. The edges of the friction shoes get dull after prolonged operation and will cause starting problems.

Grind friction shoes at a right angle to the longitudinal axis of the friction shoe. The service life of the starter cup will be much longer if you check the ground edges of the friction shoes regularly. Oil shaft of rewind starter and bearing bushing of rotor before reassembly. Tighten shaft of rewind starter to 10.9 ft.-lbs. (1.5 mkp).

AV-Handle **Disassembly and repair**

Arrangement of rubber buffers

Both handles of the saw are attached to each other by the handle frame and are fastened to the machine by 3 strategically located ring buffers. These buffers can be found at the support at the end of the throttle handle, at the front underside of the handle frame and at the bottom side of the handle bar. A defective rubber buffer must be replaced.

At the end of the throttle handle: Loosen nut, remove screw, replace ring buffer.

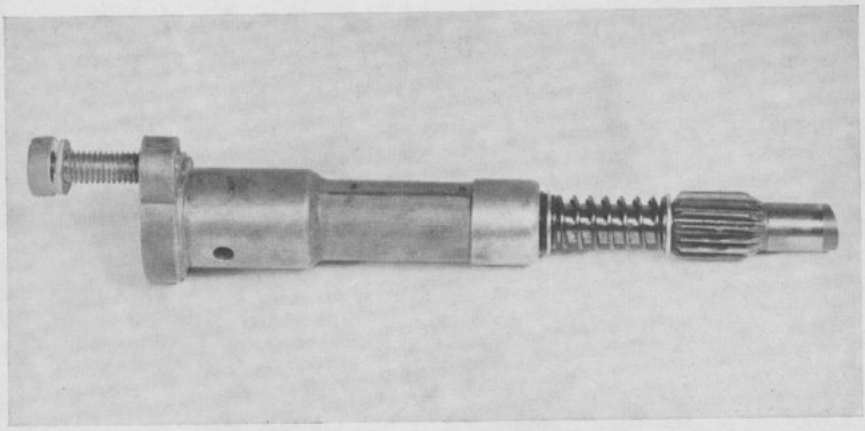
At the front underside of handle frame: remove filter cover and filter. Unscrew the 2 screws with inner hexagon head at top end of handle bar and the 2 cylinder head screws at the face side of the handle frame. Unscrew the cylinder head screw at the rear top of the fan housing cover which at the same time connects the strap of the filter housing with the shroud. Unscrew the two M 5 retaining nuts at the filter housing. Remove the shim and lift filter housing off the studs. Unhook choke rod from choke shaft of carburetor. Unhook throttle rod from throttle shaft and fold back handle frame. Loosen retaining nut from flat head screw and remove flat head screw. Replace ring buffer.

At the bottom side of handle bar: The ring buffer at the bottom side of the handle bar is fastened with a threaded bolt between handle bar and support. Loosen the 2 screws with inner hexagon head at the upper end of the handle bar and the cylinder head screw at the support. Remove handle bar, unscrew the remaining parts of the damaged rubber buffer from handle bar and support and insert new rubber buffer.

Note: Install rubber buffers in such a way that they are not twisted in their longitudinal axis.

Oil pump
Operation

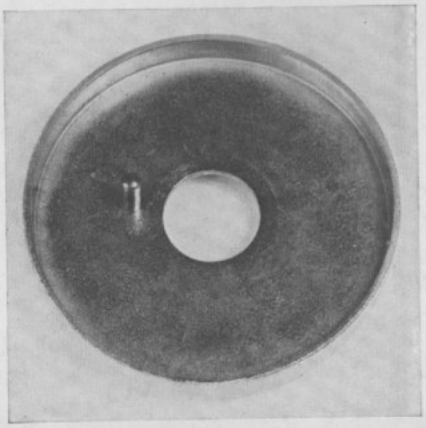
Oil pump



center:
Oil pump worm gear

bottom:
Drive pin

The oil pump is driven by the chain sprocket and starts working as soon as the clutch is engaged. The worm gear of the oil pump is turned by the drive pin in the cover plate of the chain sprocket which in turn drives the oil pump plunger. The cam surface at the end of the plunger rides on the ball-shaped part of the control bolt which causes the spring loaded plunger to go back and forth. An oil pocket at the pump plunger controls the intake and outlet of chain oil from the lubricating oil tank to the bar and chain. To prevent dirt in the lubricating oil entering the oil pump, the oil is filtered in a hose in the oil tank which is provided with a pick-up body.



Oil quantity control

The oil supply can be adjusted by the control knob: Turning the control knob clockwise — thick end of arrow — increases the oil supply (max. 1.1 cu. inches per minute = 18 cu. cms per minute at 5000 RPM); turning it counter-clockwise — small end of arrow — decreases the oil flow (min. 0.43 cu. inches per minute = 7 cu. cms per minute at 5000 RPM).

The control knob can be turned at the lateral lugs with a screwdriver. Insert screwdriver through the lateral recess in the handle frame.

The control knob can be turned $1^3/_4$ turns from minimum to maximum. Brand-new saws are adjusted for the standard cutting equipment with 16 inch (40 cm) bar and chain which corresponds to an average oil quantity of about .61 cu. inch per minute (10 cm^3 per minute) at 5000 RPM. You get this oil quantity by turning the control knob to maximum position and then turning it back by 1 turn. The control bolt is screwed into the crankcase. The control knob is fitted onto the control bolt and secured by a retaining ring in the housing.

Disassembly of oil pump

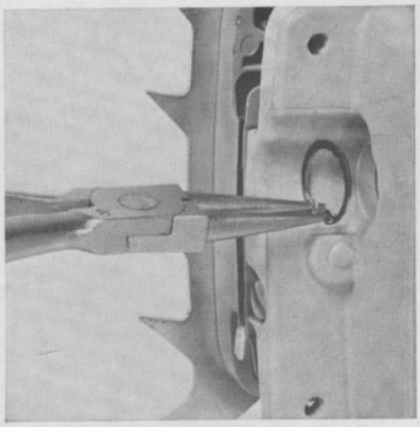
top:
Removing retaining ring

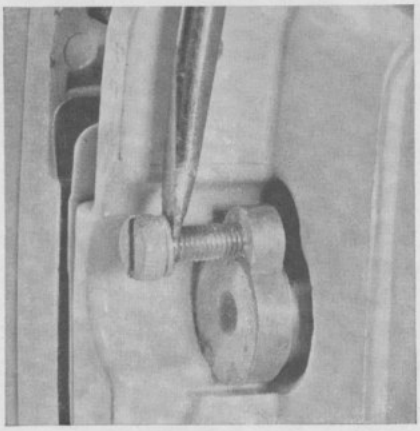
center:
Pulling out the oil pump

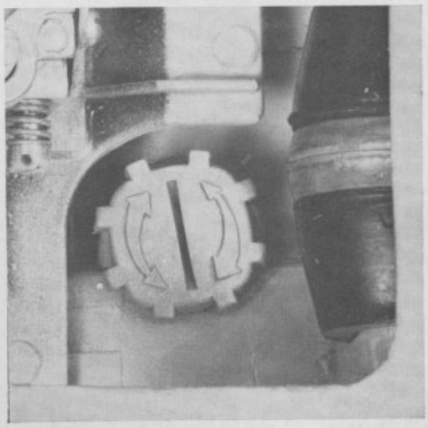
bottom:
Control knob

If oil pump does not supply oil, clean oil inlet hole in guide bar and bar groove. If the oil pump is the cause of trouble, then empty oil tank and inspect hose with pick-up body. Pull hose out of tank through the oil filler hole with a hook, you find in your tool kit, and clean it if necessary. Do not pull hose off the elbow connector! Do not bend or twist hose when putting the hose back into the tank. If hose has slipped off the elbow connector, or must be replaced, connect hose with the elbow connector with the hook 1110 893 8800.

Disassemble chain sprocket and clutch (see page 5) to disassemble the drive worm gear and to check the drive pin. If drive pin is broken, press in a new drive pin into cover plate or install a new cover plate with drive pin. Unscrew worm gear by turning the cover plate with engaging drive pin counter-clockwise. Then remove retaining ring holding the oil pump in the crankcase with special pliers. Turn an M5 screw into the thread in the pump housing, free oil pump by levering it with a screwdriver or pliers and draw it out of crankcase.







Construction of oil pump

The pump plunger with oil pocket and worm gear is inserted into the pump housing and sealed by an O ring. A helical spring is located between 2 washers on the plunger shaft and pushes the plunger against the ball-shaped part of the control bolt. The pump housing is sealed by a rubber ring. Both oil channels in the rubber ring are provided with a steel sleeve to avoid closing when the rubber ring is under pressure. The thread in the boss of the pump housing is a valuable aid for disassembling and assembling the oil pump.

All these parts are available as spares.

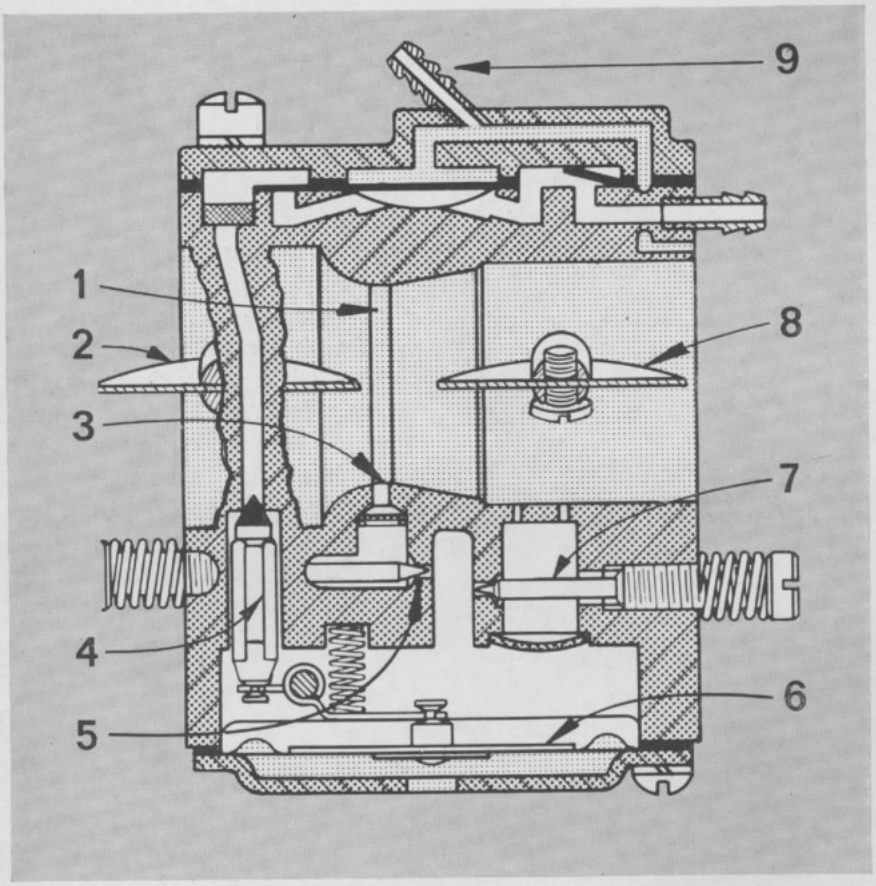
Chain Lubricating Oil

The chain lubricating oil must have a viscosity of 6.5—7.5 °E at +122 °F (+50 ° C) and a solidifying point of about —40 ° F (—40 ° C).

If you use another brand of oil than recommended by us, this oil must have the same properties as mentioned above to ensure proper lubrication of bar and chain and to avoid undue wear of same.

Carburetor

Construction and operation of carburetor



1: Venturi
2: Choke shutter
3: Main nozzle
4: Inlet needle
5 Adjustable fuel orifice
6: Metering diaphragm
7: Idle adjustment screw
8: Throttle shutter
9: Impulse fitting

The STIHL Power Chain Saws 041, 041 AV and 041 AV electronic are equipped with an HS Tillotson diaphragm carburetor with built-in fuel pump. The fuel pump is separated from the carburetor and is operating independently from the carburetor.

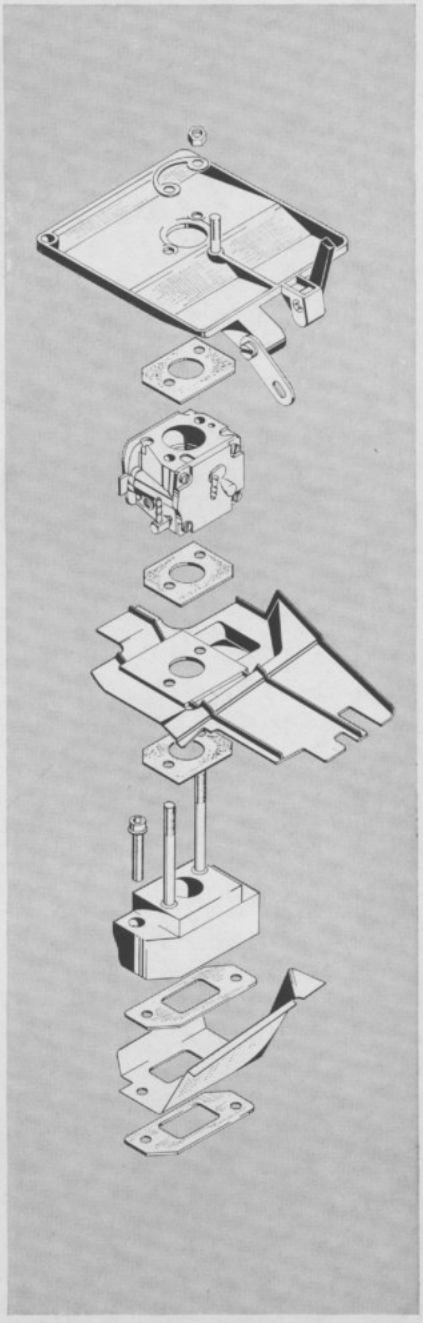
The impulse chamber of the fuel pump is connected with the crankcase by the impulse hose. Engine operation causes pressures and vacuums at each stroke of the piston and the diaphragm of the pump will pulsate at each turn of the crankshaft, thus forcing the pump to work in correspondence with the engine speed. In this way the pumping diaphragm draws fuel from the fuel pick-up body through the fuel line and through the inlet and outlet valve of the pump to the needle valve of the carburetor.

The inlet needle of the needle valve is connected with a control diaphragm by the inlet control lever.

The chamber under the control diaphragm (diaphragm chamber) is vented to the outside air through a hole in the control diaphragm cover of the carburetor. The suction in the cylinder creates a vacuum in the venturi and a pressure drop as compared to the atmosphere. Due to this vacuum which varies with the speed and the load on the engine, fuel is drawn out through the respective jets from the diaphragm chamber into the venturi. At the same time the control diaphragm is pushed upwards and unseats the inlet needle which is connected with the control diaphragm, thus allowing fuel to flow into the diaphragm chamber.

Disassembly

Disassembly of carburetor:
Filter housing
Gasket
Carburetor
Insulating plate
Gasket
Adapter
Gasket
Deflecting plate
Gasket



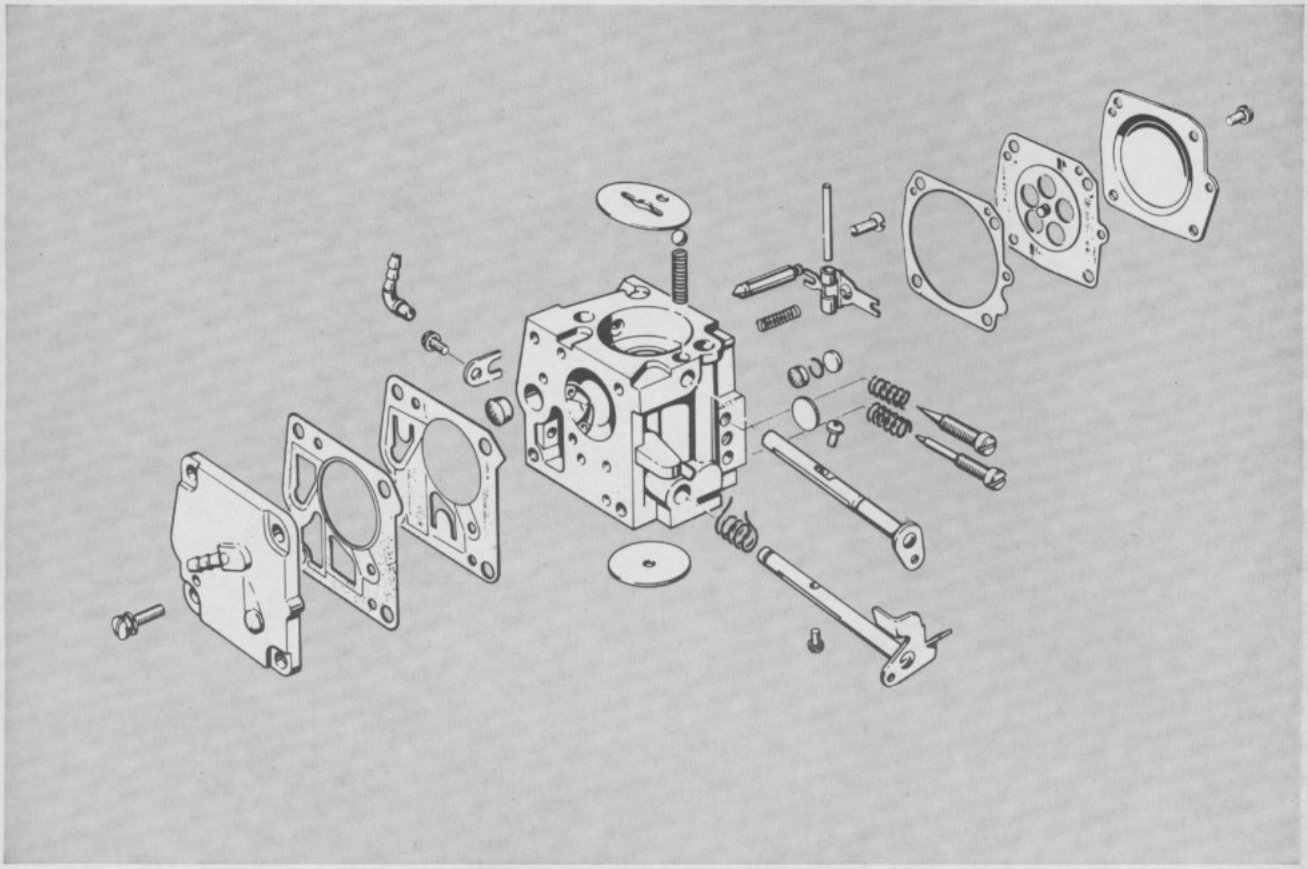
Close choke shutter, choke lever to "0" position. Remove filter cover and air filter. Unscrew the cylinder head screw at the rear upper part of the fan housing cover which at the same time fastens the strap of the filter housing to the shroud. Loosen the two M 5 retaining nuts of the filter housing from the studs, remove shim, lift filter housing off the studs and unhook choke rod from choke shaft of carburetor. Pull fuel and impulse hose off the carburetor. Remove carburetor and unhook throttle rod from throttle shaft.

If you have to further disassemble the carburetor, unscrew the 2 screws with inner hexagon head at the other end of the handle bar and the 2 cylinder head screws at the face side of the handle frame. Then fold back handle frame.

Unscrew the 2 screws with inner hexagon head of the adapter of the cylinder. Remove insulating plate with carburetor gasket and ground lead with grommet from deflecting plate. Remove adapter with studs and cylinder head screws as well as deflecting plate and gasket.

Renew all gaskets before reassembling the carburetor. And observe the correct sequence of the different parts: gasket between cylinder and deflecting plate, deflecting plate (fasten ground lead with grommet), gasket, adapter with studs (screw in screws with inner hexagon head), gasket, insulating plate. When you have assembled the insulating plate, screw in cylinder head screws of the adapter fixation and tighten them. Insert gasket between insulating plate and carburetor, hook in throttle rod and place carburetor on to the studs.

Connect white fuel hose with the vertical fitting and the black impulse hose with the inclined fitting of the carburetor. Place upper gasket of carburetor into position, hook in choke rod and install filter housing. Install shim and tighten retaining nut. Screw cylinder head screws into handle frame, handle bar and filter housing cover, mount air filter and filter cover. Clean the air filter before installing it. Tap air filter onto the flat of your hand and then wash it in clean gasoline. Do not use wire brushes, cleaning rags or compressed air to clean the filter because they would damage the flocked filter material.



Carburetor repair — individual parts

The HS carburetor differs from the HL models in design and dimensions. It is smaller and the pump diaphragm and the metering diaphragm are separated from each other. The pump section of the carburetor is located under the fuel pump diaphragm cover with pressed-in impulse fitting, whereas the control diaphragm with the needle valve is located under the smaller steel control diaphragm cover.

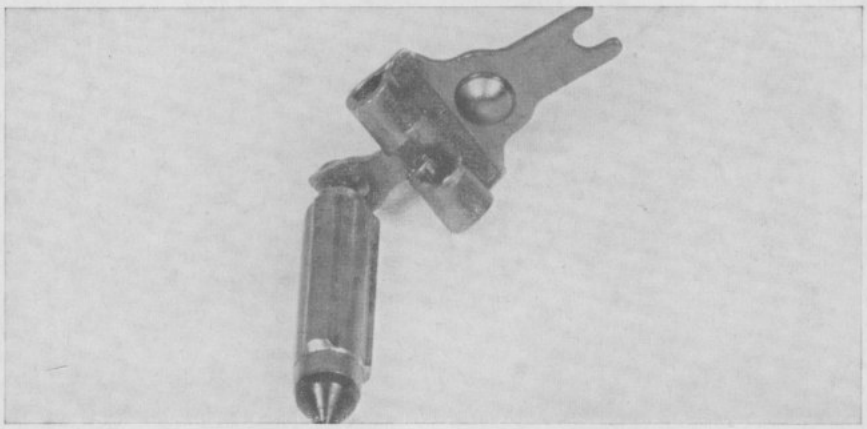
Remove the 4 lens-head screws holding the cover to the carburetor body, then remove the gasket and the pump diaphragm. As the gasket and the diaphragm are tightly pressed together when the carburetor is assembled, they will stick together when you have to disassemble them. Therefore, separate them carefully. The pump diaphragm is provided with 2 valve flaps — the inlet and outlet valve — which have to be inspected on wear. When you have removed the gasket and the 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. To reassemble the pumping part of the carburetor, first place the gasket and then the diaphragm onto the guide pins of the cover and fasten the cover to the carburetor body.

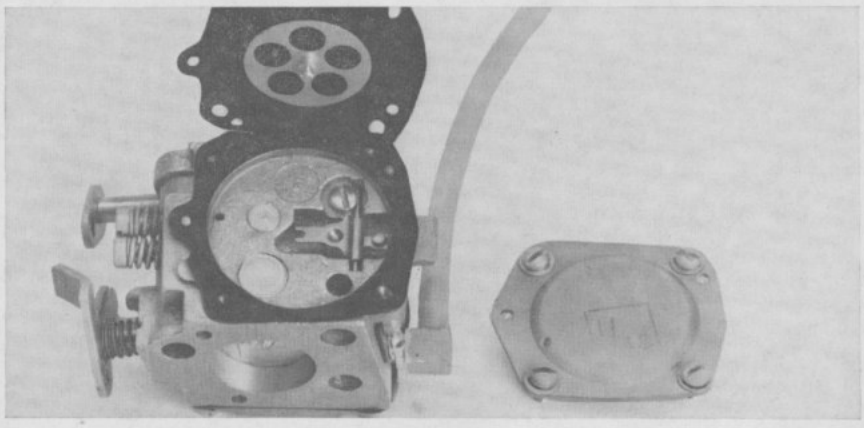
Unscrew the 4 button-head screws and then remove steel cover. Under the cover you will first find the control diaphragm and then the gasket. Lift control diaphragm carefully out of the dove-tailed guide of the inlet control lever. The shaft of the inlet control lever is fastened to the carburetor body with a lens-head countersunk screw. The inlet needle is hooked into the second dove-tailed guide of the inlet control lever. The latter is spring-loaded by a small spring. To disassemble the lever, loosen lens-head screw and remove inlet control lever with inlet needle. Be careful not to lose the spring.

The point of the inlet needle in the HS carburetor is fitted with a rubber tip which is pressed into the inlet needle.

top:
Inlet needle with inlet control lever

bottom:
Carburetor with disassembled metering diaphragm





The main fuel port of the carburetor is in the **valve jet.** This valve jet is pressed into the carburetor body at the narrowest point of the venturi. A small ball in the valve jet closes the jet when the engine is idling and there is not enough air passing through the venturi to create the necessary vacuum. This prevents air entering the diaphragm chamber through the valve jet at this engine speed. Otherwise the fuel-air mixture would be too lean and the engine would stop. When the vacuum in the venturi is increased at partial or full load, the ball in the valve jet opens the fuel orifice so that the necessary amount of fuel can flow into the venturi. If the valve jet causes trouble, blow valve jet out of carburetor body in the direction of the venturi. In order to check the other fuel orifices, it is necessary to remove the plug which however must be replaced by a new one thereafter.

In reassembling the carburetor you must keep in mind that the inlet control lever is controlled by the metering diaphragm. Therefore, do not forget to hook the inlet needle and the control diaphragm into their respective dovetailed guides at the inlet control lever. Then install gasket and place gasket and metering diaphragm accurately onto the 2 guide pins. Then fasten control diaphragm cover with the round-headed screws.

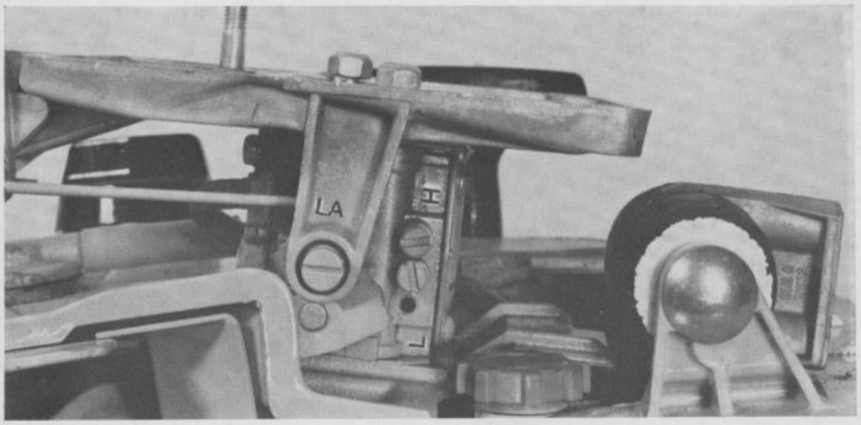
When you have disassembled the carburetor, all fuel channels and orifices must be checked on free passage and cleaned if necessary.

Moreover, check adjustment screws on proper condition. Make sure that the tapered ends of the adjustment screws are not bent or out of shape! Do not mix up the 2 adjustment screws when reassembling the carburetor.

Main adjustment screw: shorter, idle adjustment screw: longer.

Carburetor Adjustment

Carburetor adjustment screws:
LA = Idle speed regulating screw
L = Idle adjustment screw
H = Main adjustment screw



The factory setting of the carburetor gives best performance and economic fuel consumption at the local atmospheric conditions. Working up in the mountains or near sea level, necessitates a readjustment of the carburetor. The adjustment of the carburetor must be made at the 2 adjustment screws and the idle speed regulating screw. You get a richer fuel-air mixture by turning out the adjustment screws and a leaner mixture by turning them in.

The normal setting of the carburetor adjustment screws is as follows:

Main adjustment screw H (on top):
3/4 of a turn open

Idle adjustment screw L (at bottom):
1 1/4 turns open

These adjustments are measured from closed position of the adjustment screws in the carburetor. **Turn both adjustment screws carefully to limit stop without applying force.** Turning the idle speed regulating screw clockwise, increases the idling speed and turning it counter-clockwise, lowers the idling speed.

Hints for readjusting the carburetor
Engine stops when idling:
With engine running, turn idle speed regulating screw clockwise (chain should not move).

Chain moves when engine is idling:
Turn idle speed regulating screw counter-clockwise.

Engine speed is erratic when idling:
Sligthly adjust idle adjustment screw. You get a leaner mixture by turning it clockwise, and a richer mixture by turning it counter-clockwise.

Pressure test on carburetor

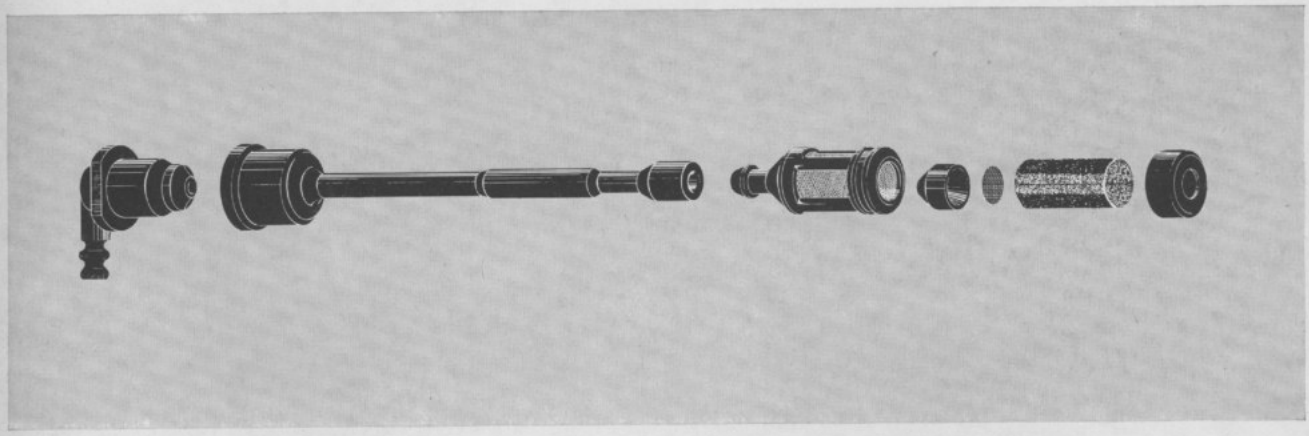
In the event of carburetor problems, it is advisable to check the carburetor with a carburetor pressure testing device. The test must be made with a wet carburetor, that means with fuel sucked into it.

Therefore, pull starter several times with ignition stop switch at "off" position before you start the test.

Remove filter cover, air filter and filter housing (page 33). Pull fuel hose off the carburetor and slip hose end of testing device over the nipple of the elbow connector. The impulse hose must remain closed.

Close venting screw at pressure ball and squeeze the ball until the pressure gauge indicates a reading of 7 lbs. per squ. inch (0.5 kp/cm^2).

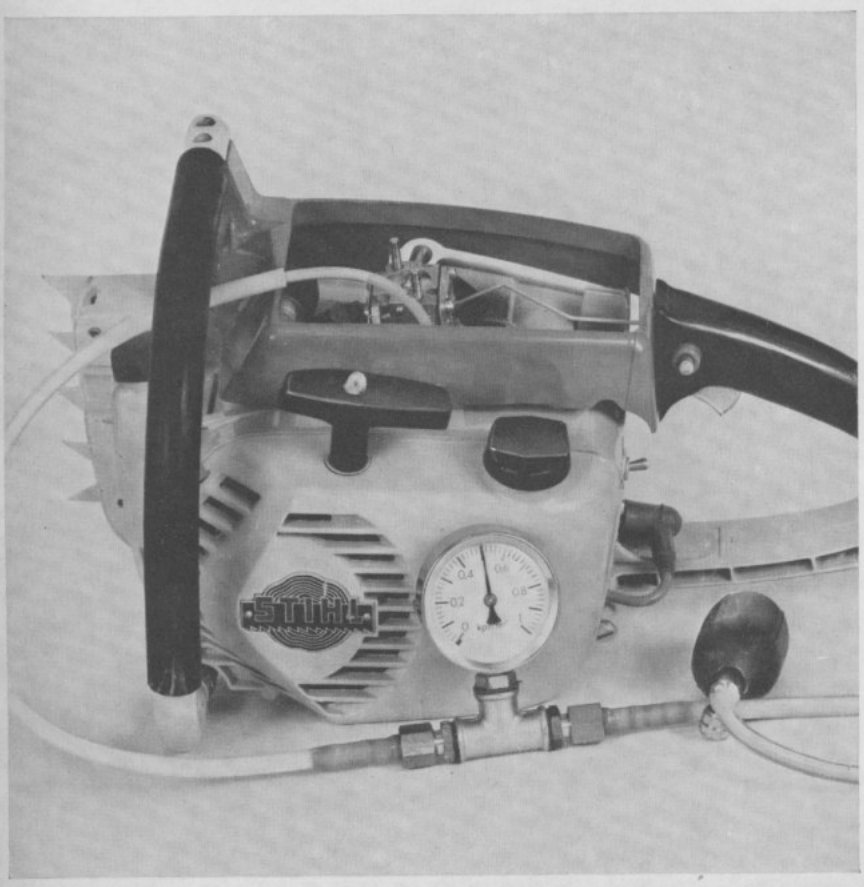
The carburetor is properly sealed if there is no drop in pressure. If pressure changes, you must remove and check the carburetor. After the test, re-open venting screw and pull hose off the carburetor.



top:
Fuel line

bottom:
Pressure testing the carburetor

Fuel system



The fuel system is composed of the fuel pick-up body, the outlet fitting and the fuel hose. The pick-up body should be cleaned at regular intervals especially if the carburetor is clogged. First remove the outlet fitting from the fan housing and then lift the whole pick-up assembly out of the fuel tank.

Clean all parts, namely hose, pick-up body, insert, strainer, filter and cap in clean gasoline and reassemble these parts. When you have put the pick-up assembly back into the tank, check to be sure that the hose is not twisted or bent.

Rinse fuel tank from time to time — after about every 150 operating hours. If the pick-up body is heavily clogged, you must clean the fuel tank too. Rinse tank with clean gasoline.

Service tools and devices for STIHL power chain saws 041, 041 AV, 041 AV electronic, model 1110

Fly-wheel puller	1110 890 4500
Mounting bolt for piston	1110 893 4700
Piston ring compressor	1108 893 4900
Mounting sleeve for oil pump worm gear	1110 893 4600
Wooden support for mounting cylinder	1108 893 4800
Ignition timing device for battery	0000 890 8905
Ignition timing device with dial gauge	1106 890 8700
Revolution counter with insert	5910 850 1000
Clutch wrench	1110 893 1310
Crankshaft locking screw	1107 191 1200
Mounting tool for helicoil insert	5910 850 5200
Mounting tool for Gripp-threaded insert	5910 850 5210
Carburetor and crankcase pressure testing device	1106 850 2900
Pressure testing flange	1110 850 4200
Torque wrench for crankshaft nuts	5910 890 0310
Insert .84 inch (21 mm) for chain sprocket	5910 893 5615
Insert .52 inch (13 mm) for magneto	5910 893 5608
Piston ring remover	1106 890 6200
Puller for general repair works	1106 890 4510
Retaining ring pliers for outer retaining rings A 19 DIN 5254	1105 893 1800
Retaining ring pliers for outer retaining rings A 10 DIN 5254	0008 613 1200
Retaining ring pliers for internal retaining rings J 2 22-60 B	0008 613 3380
Punch 4 × 140 diameter	1110 893 3300
Groove gauge for guide bars .064 inch (1.6 mm)	1106 893 9000
Groove opener for guide bars .064 inch (1.6 mm)	1106 893 9200
Groove gauge for guide bars 3/8 of an inch	1110 893 9000
Groove opener for guide bars 3/8 of an inch	1110 893 9200

Complete set of special tools in Styropor-box for STIHL power chain saws ordering No. 0000 890 1700