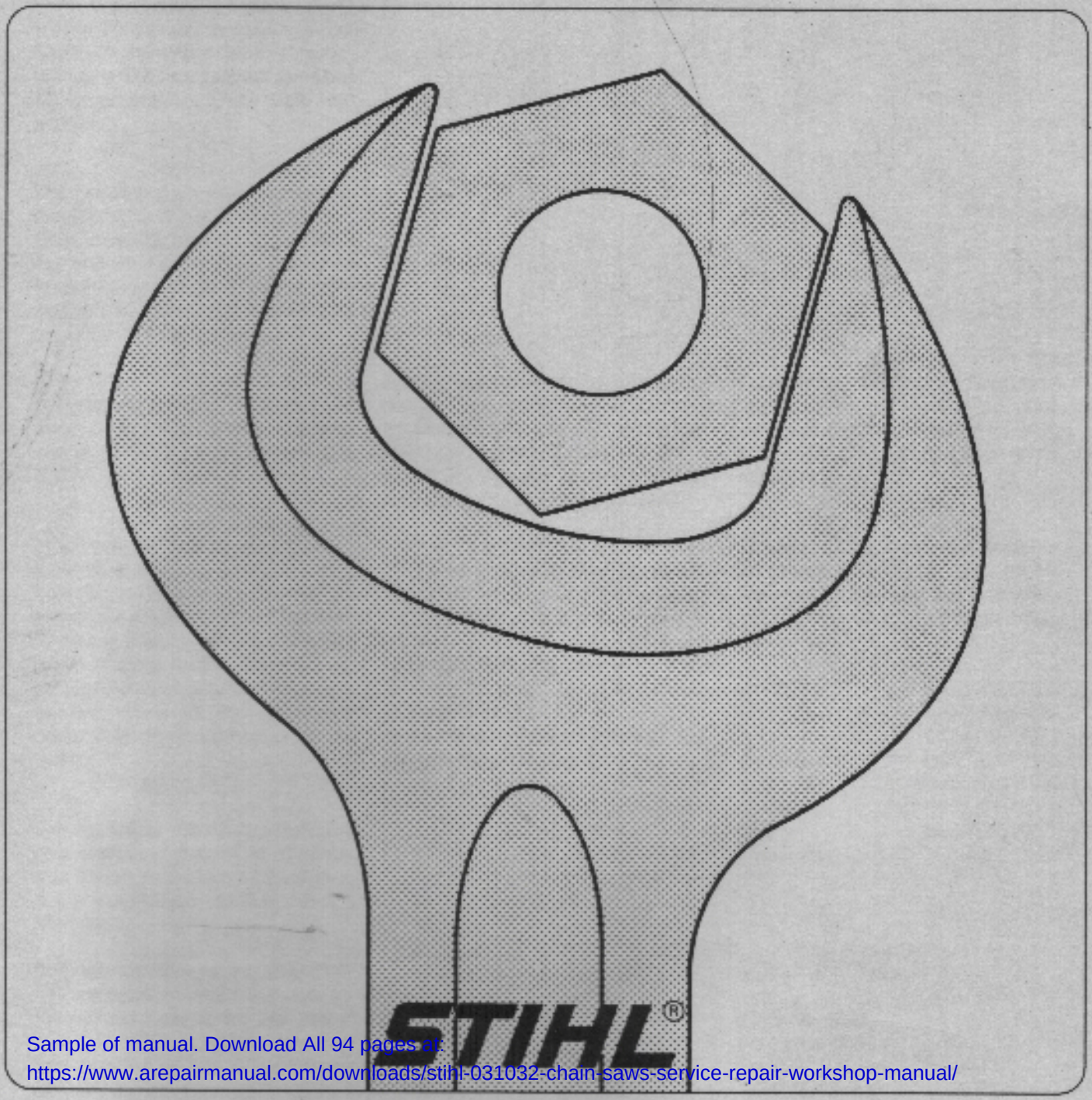
STIHL 031, 032



SERVICE MANUAL
032 AV (031 AV, 030 AV)

SPECIAL TOOL MANUAL

FOREWORD

This service manual covers model 032 chain saws from machine No. 532 9921 onward (start of production) and can thus be used as a basis for professional overhauls and repairs.

The previous service manual for models 030 AV and 031 AV has been discontinued. As the models are substantially identical in their engineering design, the repair procedures in this manual can also be used for models 031/030.

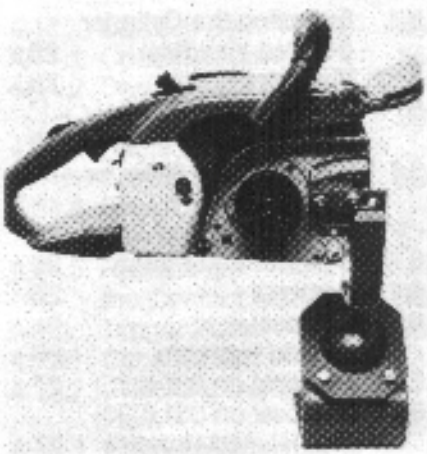
Differences in construction have been dealt with separately and identified by the supplement "031 (030)".

In the event of faults it is quite possible that a single condition may have several causes. It is therefore advisable to consult the "Trouble-shooting Charts" in all chapters when tracing faults. We also recommend you make use of the exploded views in the illustrated parts lists when carrying out repairs.

Our technical information bulletins give details of engineering changes which have been introduced since publication of this service manual.

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

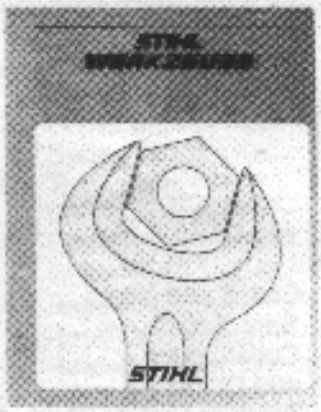
Assembly stand



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

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

Special tool manual



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

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

German	0455 9010023
English	0455 9010123
French	0455 9010223
Spanish	0455 9010323
Yugoslav	0455 9010423
Swedish	0455 9010523
Italian	0455 9010723
Portuguese	0455 9011223

STIHL®

Andreas Stihl
Postfach 1760
D-7050 Waiblingen
West Germany

CONTENTS

1. SPECIFICATIONS – 032

Engine	Single cylinder two-stroke engine with specially processed cylinder bore.	
	Displacement:	51 cm^3
	Bore:	45 mm
	Stroke:	32 mm
	Compression ratio:	9,5:1
	Power output:	2.6 kW (3.5 DIN HP) at 10,000 r.p.m.
	Max. torque:	3 Nm at 6,500 r.p.m.
	Max. permissible engine speed:	12,000 r.p.m.
	Mean idle speed:	2,200 r.p.m.
	Crankshaft:	two-part drop forging
	Crankshaft bearings:	2 deep-grove ball bearings
	Crankpin:	14.4 mm diam.
	Big-end bearing:	Needle cage
	Piston pin:	10 mm diam.
	Small-end bearing:	Needle cage
	Rewind starter:	Pawl engagement with automatic starter rope rewind mechanism
	Starter rope:	3.5 mm diam., 1060 mm long
	Clutch:	Centrifugal clutch without linings, 69 mm diam.
	Clutch engages at:	3,200 r.p.m.
	Crankcase leakage test with overpressure:	0.5 bar
	with vacuum:	0.5 bar
Fuel System	Carburetor:	All position diaphragm carburetor with integral fuel pump
	Adjustment:	
	High-speed adjustment screw H:	Open 1½ turns
	Low-speed adjustment screw L:	Open 1½ turns (basic setting with screws initially lightly against their seats)
	Carburetor leakage test with overpressure:	0.4 bar
	Fuel capacity:	0.53 liter
	Fuel mixture:	Regular grade gasoline and two-cycle engine oil Mix ratio 1:40 with STIHL two-cycle engine oil; 1:25 with other branded two-cycle engine oils
	Air filter:	Large area, double sided flat wire mesh element

Ignition System

032 AV and 032 AVQ

Type:	Breaker-controlled magneto ignition
Magneto edge gap:	4.7–8.5 mm
Air gap:	0.2–0.3 mm
Ignition timing:	2.1–2.3 mm before T.D.C.
Advance angle:	27–28°
Breaker point gap:	0.3–0.4 mm
Condenser:	Capacitance 0.15–0.19 µF
Ignition armature:	Coil winding resistances

Primary	Secondary
0.7–1.0 Ω	7.7–10.3 kΩ

032 AVE

Type:	Transistor-controlled (breakerless) magneto ignition with automatic advance
Air gap:	0.2–0.3 mm
Ignition timing:	2.7 mm before T.D.C. at 8,000 r.p.m.
Advance angle:	30° at 8,000 r.p.m.
Ignition armature:	as 032 AV/032 AVQ

All models

Spark plug (suppressed):	Bosch WSR 6 F or Champion RCJ 6 Y Heat range 200 Electrode gap 0.5 mm Spark plug thread M 14 x 1.25, 9.5 mm long

Tightening torques

Crankshaft nut (ignition side) M 8 x 1:	30 Nm
Hub/clutch carrier (sprocket side):	40 Nm
M 5 socket head screws:	8 Nm
M 5 pan head screws:	5 Nm
M 4 pan head screws:	2.5 Nm
M 5 nuts:	5 Nm
Spark plug:	25 Nm

Cutting Attachement	Guide bars:	STIHL Duromatic guide bars with stellite-tipped nose. STIHL Rollomatic guide bars with sprocket nose. Both types with corrosion-resistant finish and induction hardened rails.
	Bar lengths:	Duromatic 40, 45 and 50 cm Rollomatic 32, 37, 40 and 45 cm
	Chain:	8.25 mm (0.325") Oilomatic Rapid-Micro 8.25 mm (0.325") Oilomatic Rapid-Micro S 9.32 mm (3/8") Oilomatic Rapid-Standard 9.32 mm (3/8") Oilomatic Rapid-Standard S
	Chain sprocket:	7-tooth for 3/8" pitch 8-tooth for 0.325" pitch
	Chain speed:	18.5 m/s at 8,500 r.p.m.
	Chain lubrication:	Fully automatic speed-controlled oil pump with plunger; operative only when chain is running. Additional flow quantity control by means of adjusting screw.
	Oil delivery rate:	10 cm^3 at 6,000 r.p.m.
	Oil tank capacity:	0.31 liter

Weights	Model:	AV/AVE/ AVEW	AVQ/AVEQ/ AVEQW
	Dry powerhead less bar and chain:	5.6 kg	6.0 kg
	Dry powerhead with 32 cm bar and chain:	6.5 kg	6.9 kg

Special Accessoires	STIHL repair kit 032	1113 900 5001
	STIHL repair kit 030 and 031	1113 900 5000
	Gasket set 032	1113 007 1051
	Gasket set 031	1113 007 1050

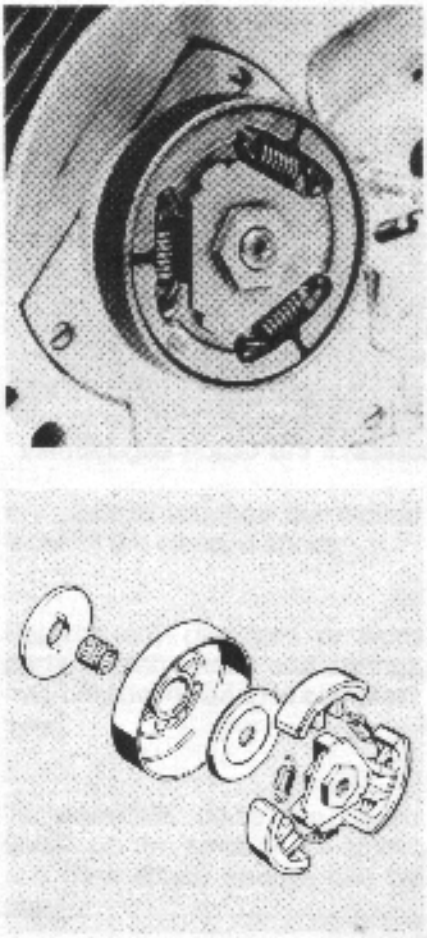
SPECIFICATIONS
031 AV (030 AV)

Engine	Displacement:	48 cm^3 (45 cm^3)
	Bore:	44 mm (42 mm)
	Power output:	2.4 kW/3.2 DIN HP (2.2 kW/3.0 DIN HP) at 8,500 r.p.m.
	Max. torque:	2.85 Nm at 6,000 r.p.m.
	Rewind starter:	Two-pawl starter with automatic starter rope rewind mechanism
	Starter rope:	3.5 mm diam., 960 mm long
Fuel System	Carburetor setting:	
	High-speed adjustment screw H:	Open 1¼ turns
	Low-speed adjustment screw L:	Open 1¼ turns
Ignition System	Type:	Breaker-controlled magneto ignition
	Magneto edge gap:	3.5–7.5 mm
	Ignition timing:	2.0–2.3 mm before T.D.C.
	Ignition armature:	Coil winding resistance Primary 0.8–1.1 Ω Secondary 6.5–8.0 kΩ
	031 AVE	
	Type:	Transistor-controlled (breakerless) magneto ignition
	Magneto edge gap:	0.15–0.25 mm
	Ignition timing:	2.5 mm before T.D.C. at 8,000 r.p.m.
	Advance angle:	25° at 8,000 r.p.m.

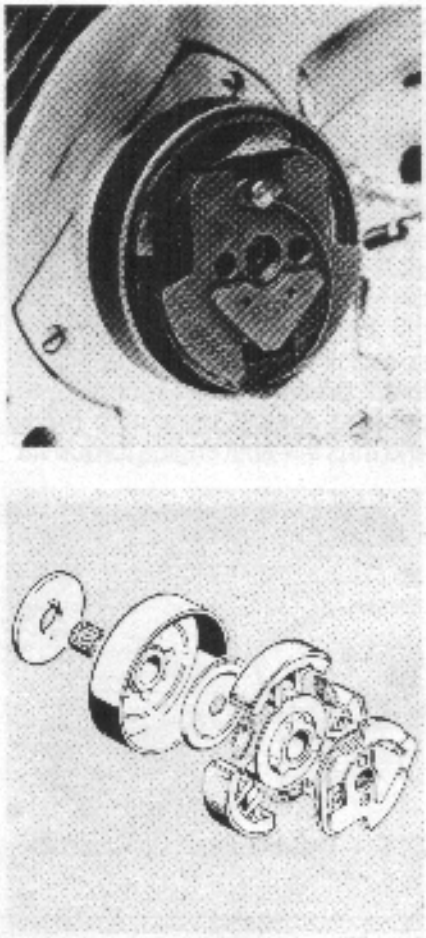
2. CLUTCH, CHAIN DRIVE AND CHAIN BRAKE

2.1 Clutch and Chain Sprocket

Top:
Standard Clutch
Bottom:
Component parts of standard clutch



Top:
Isolating clutch
Bottom:
Component parts of isolating clutch



2.1.1 Construction and Operation

The transmission of power from the engine to the saw chain is effected via a centrifugal clutch. On "Quickstop" models (up to machine No. 6375950) the centrifugal clutch incorporates an isolating clutch which is actuated by the chain brake.

On the **standard clutch** the carrier screwed to the crankshaft is the clutch element which absorbs the torque and acceleration of the crankshaft. It is essential that the carrier is always tightened down to the specified torque load.

On **Quickstop models with an isolating clutch** the driving plate is the element which absorbs the torque and acceleration of the crankshaft and must, therefore, always be tightened down to the specified torque load. The clutch spider is supported on the hub of the driving plate by a plain bearing bush, but not connected to it in any other way. The release plate and locking ring are positively connected to the driving plate, but free to move radially.

When the chain brake is desengaged the release plate is moved radially into its normal position by the cam of the actuating lever, while the locking ring is moved into mesh with the lugs of the clutch spider by spring force. The engine torque is transmitted positively to the clutch spider in this way. To safeguard against wear the shape of the locking ring and strength of the springs are designed so that the locking ring only engages below approx. 3,500 r.p.m. At higher speeds the centrifugal force of the asymmetric locking ring acts against the spring force – the locking ring does not engage.

When the chain brake is activated, the cam of the actuating lever disengages the release plate and thus the locking ring from the clutch spider. The clutch spider and driving plate can then rotate independently.

The centrifugal clutch has three clutch shoes; the clutch drum is rigidly connected to the chain sprocket.

When the engine is running at idle speed the clutch shoes are in a state of rest because the tension of the clutch spring(s) is greater than the centrifugal force. As engine speed increases the centrifugal force presses the clutch shoes outward against the clutch drum and thus transmit engine torque via the clutch drum and chain sprocket to the saw chain.

The preload and strength of the clutch spring(s) are designed so that the clutch shoes begin to make contact with the clutch drum at an engine speed of approx. 3,200 r.p.m. (engagement speed). The clutch engages fully above this speed. It is therefore very important to set the carburetor to the correct idle speed in order to ensure that the clutch engagement speed is not reached when the engine is idling.

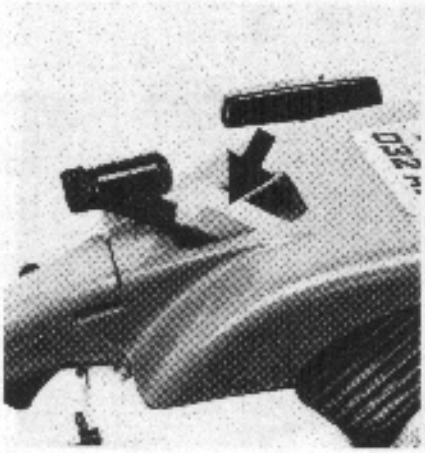
2.1.2 **Troubleshooting Chart**

Condition	Cause	Remedy
Saw chain turns at idle speed	Engine idle speed too high	Readjust at idle speed adjusting screw
	Clutch spring(s) stretched or fatigued, spring hooks broken	Replace spring(s)
Isolating clutch does not engage when chain brake is released	Engine idle speed too high	Readjust at idle speed adjusting screw
	Locking ring, release plate or spring broken	Fit new locking ring, release plate or spring
Chain wears at high rate	Incorrect chain tension	Tension chain correctly

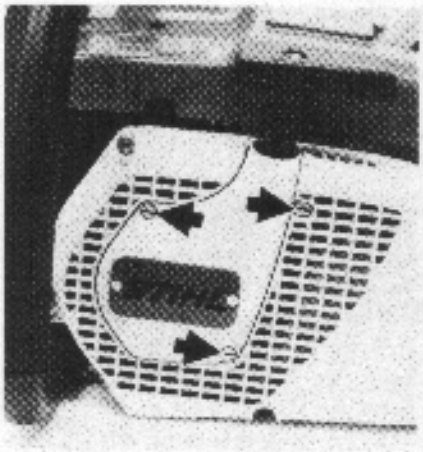
2.1.3 Disassembly and Repair

Disengage chain brake

Locking screw in position



Top:
Unscrew starter cover on 031
Center:
Unscrewing clutch spider
Bottom:
Refitting clutch shoes



2.1.3.1. Standard Clutch with 3 Springs

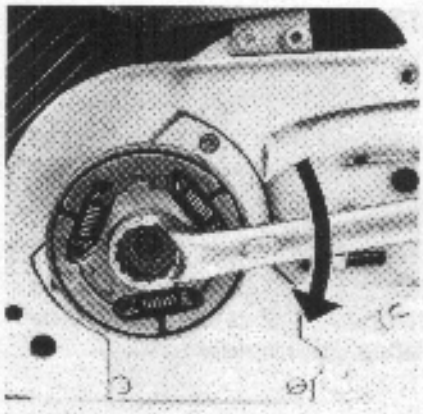
First disengage the chain brake on Quickstop models and take off the sprocket cover, saw chain and bar. Remove the spark plug and fit the locking screw in its place – screw down by hand as far as it will go. On model 031 it is necessary to remove the starter cover as well.

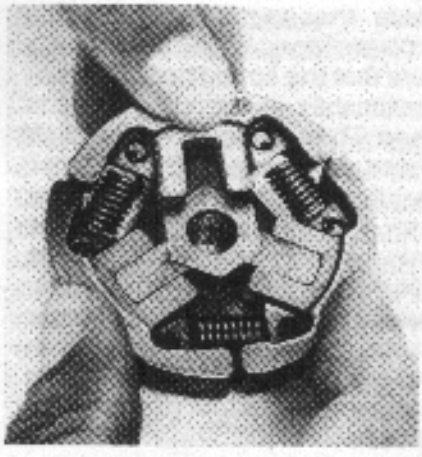
Use a ring or socket wrench to release the clutch spider (left-hand thread – turn clockwise) and unscrew it from the crankshaft. Then take the support washer, chain sprocket with needle cage and cover plate off the crankshaft.

Pull the clutch shoes off the spider and detach the clutch springs. Wash out component parts of the clutch, including the clutch drum and the needle cage, in clean gasoline and blow out with compressed air, if available. If the clutch shoes have linings, use emery cloth to roughen the friction faces of the cleaned shoes.

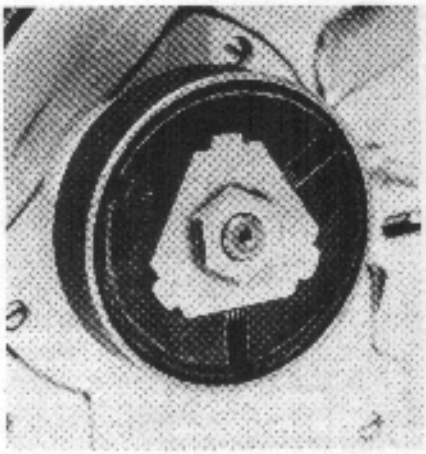
Replace any damaged or worn parts. Clutch shoes and springs may only be replaced **in complete sets!**

To assemble, place the clutch shoes on the arms of the spider and then attach springs one by one.

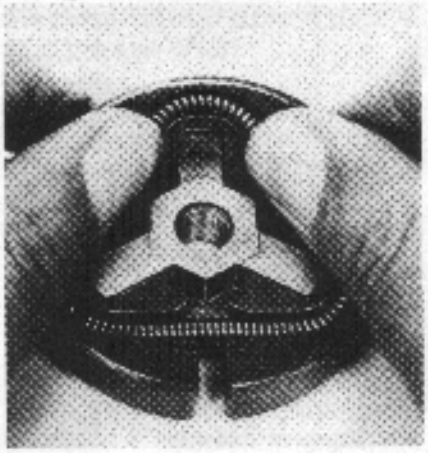




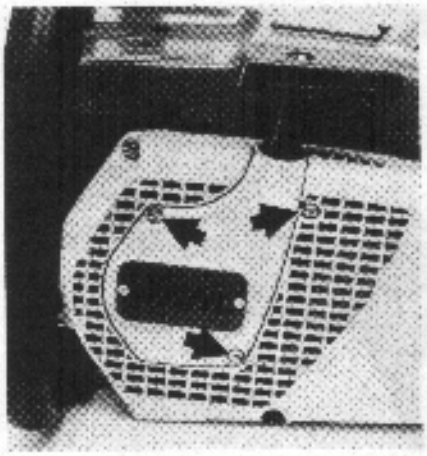
Standard clutch with ring spring



Pressing ring spring into position



Top:
Unscrew starter cover on 031
Center:
Face wrench 1113 890 3600
Bottom:
Releasing the driving plate



2.1.3.2 **Standard Clutch with Ring Spring**

Proceed as described under 2.1.3.2 for removal and disassembly.

Replace damaged or worn parts. The clutch shoes may only be replaced **in complete sets.**

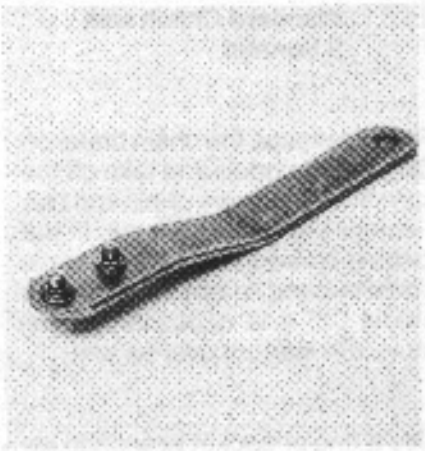
To assemble, first hook the two ends of the spring together and place the spring in the spring groove of one clutch shoe, making sure that the spring hooks are approximately in the center of the shoe. Then place all three clutch shoes on the arms of the spider so that the spring grooves face away from the triangular plate on the spider. Now press the ring spring into the spring grooves of the other two clutch shoes with both your thumbs. Use a blunt tool to push the whole length of the spring down to the bottom of the clutch shoes.

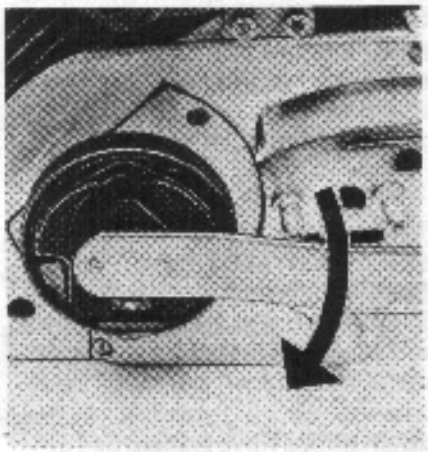
2.1.3.3 **Quickstop Clutch (with Isolating Clutch)**

First disengage the chain brake and take off the sprocket cover, chain and bar. Remove the spark plug and fit the locking screw in its place – screw down by hand as it will go. On model 031 it is necessary to remove the starter cover as well.

Use the face wrench to release the driving plate (left-hand thread – turn clockwise) and unscrew it together with the centrifugal clutch from the crankshaft.

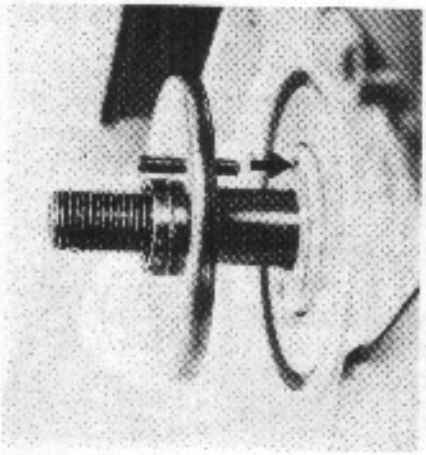
The repair procedure is otherwise as described under 2.1.3.1.



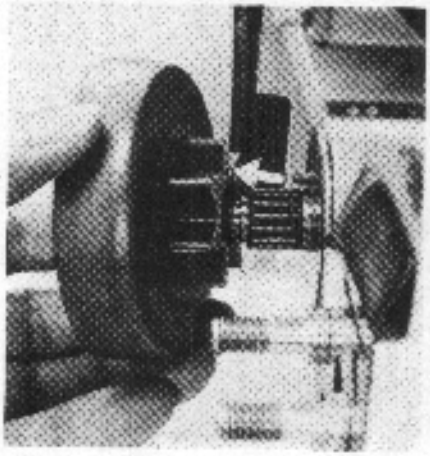


2.1.4 Installation

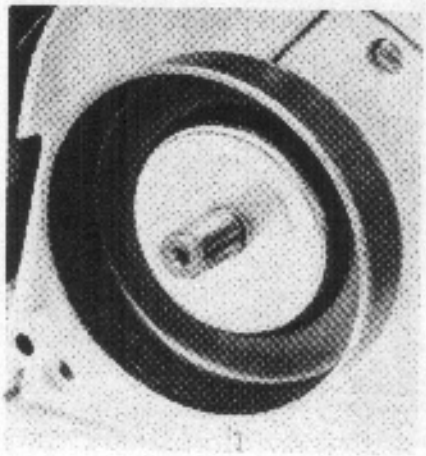
Top:
Drive pin must engage in spur gear
Bottom:
Tightening the clutch spider

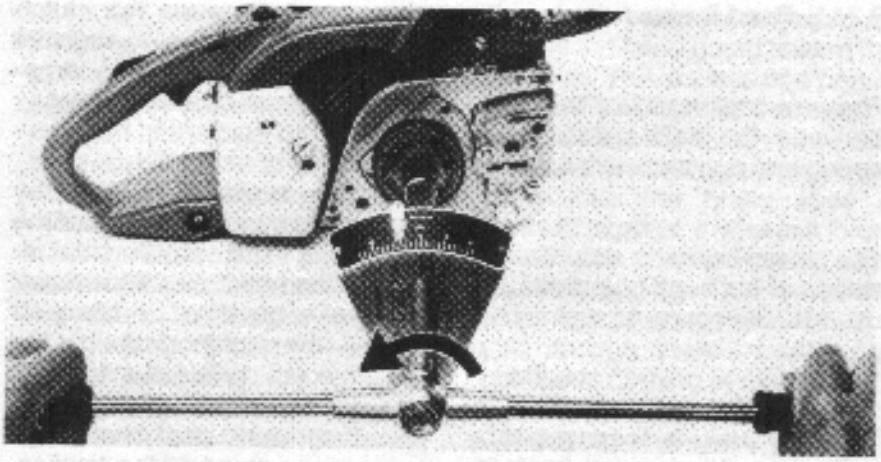


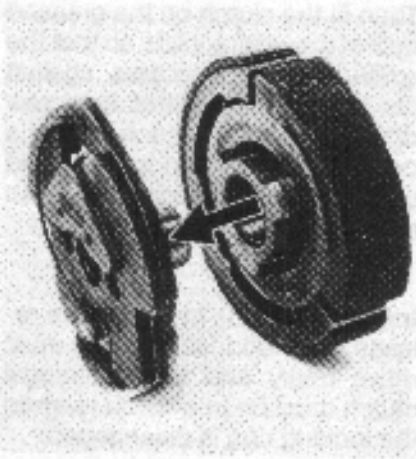
Fit chain sprocket on needle cage



Top:
Support washer correctly positioned
Bottom:
Fit clutch correctly on hub of spider







2.1.4.1. Standard Clutch

First fit the cover plate on the crankshaft so that the drive pin (bearing pin) for the oil pump drive engages in the spur gear. Lubricate needle cage with antifriction bearing grease and fit along with chain sprocket and support washer on the crankshaft.

Now screw clutch spider onto crankshaft (left-hand thread) so that its triangular plate faces away from the crankshaft and tighten it down with a 19 mm ring or socket wrench to a torque load of 40 Nm.

Finish off by removing the locking screw, refitting the spark plug and sprocket cover. The starter cover must also be fitted on the model 031.

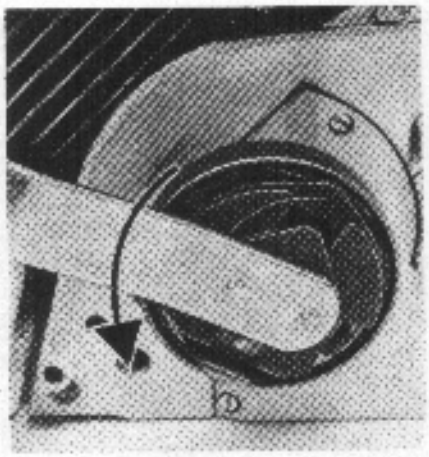
2.1.4.2 Quickstop Clutch (with Isolating Clutch)

First fit the cover plate on the crankshaft so that the drive pin (bearing pin) for the oil pump drive engages in the spur gear. Lubricate needle cage with antifrication bearing grease and fit along with chain sprocket and support washer on the crankshaft.

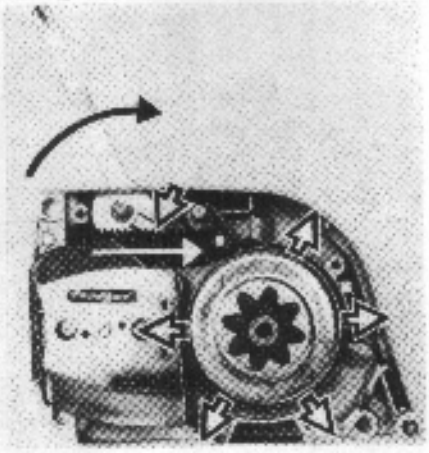
2.2 Chain Brake

2.2.1 Construction and Operation

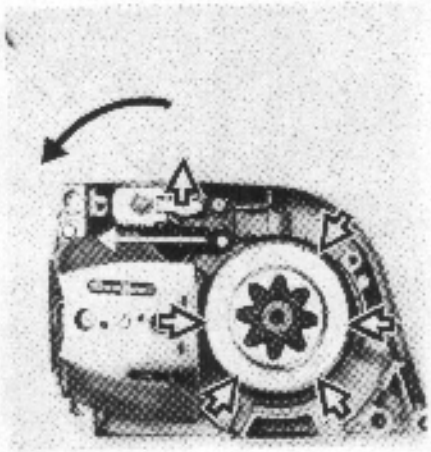
Tightening the clutch spider



Chain brake released



Chain brake engaged



Then fit the clutch on the greased hub of the driving plate so that the spider's washer locates against the locking ring. Carefully screw driving plate with clutch onto the crankshaft (left-hand thread!) and use the face wrench to tighten down to a torque load of 40 Nm.

Important: Once installed, the release plate and locking ring must move freely and the centrifugal clutch must be free to rotate when the locking ring is disengaged.

Finish off by removing the locking screw, refitting spark plug and sprocket cover. The starter cover must also be fitted on the model 031.

2.2.1.1 Band Brake

The main components of this chain brake are the brake band, tension spring and a system of levers.

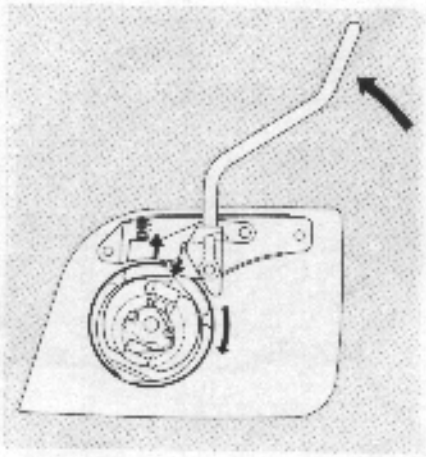
The chain brake is actuated by means of the hand guard which is used to disengage as well as engage the brake.

The **chain brake is desengaged** by pulling the hand guard back toward the handlebar. This movement is transmitted via a lever system which preloads the tension spring and releases the brake band. The brake lever, which is connected to the tension spring and brake band, is thus locked in the idle postion by the relay lever and remains so even when the hand guard is released.

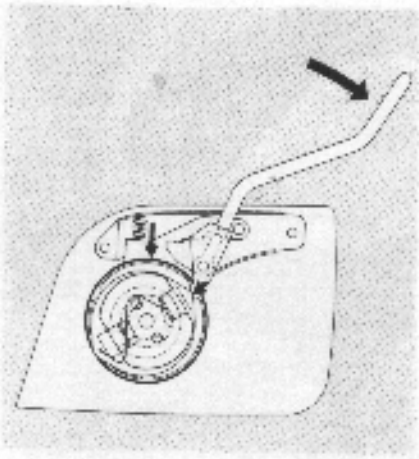
If the chain brake has been activated at full throttle, the throttle must be released immediately (back to idle speed) because the clutch shoes would otherwise run against the blocked clutch drum and generate excessive frictional heat.

The **chain brake is engaged** by moving the hand guard toward the bar nose. This movement unlatches the brake lever and causes the brake band to be clamped around the clutch drum by the force of the preloaded tension spring. The clutch drum (chain sprocket) and saw chain are brought to a standstill in a fraction of a second.

Chain brake released



Chain brake engaged



2.2.1.2 **Shoe Brake**

The main components of this chain brake are the brake shoe, compression springs and the actuating lever with cam – which controls the isolating clutch as well.

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

The **chain brake is disengaged** by pulling the hand guard back against the handlebar. This causes one part of the cam on the end of the actuating lever to lift the brake shoe off the clutch drum and the other part of the cam to move the rotating release plate into its normal position. This makes the isolating clutch engage (providing the engine is running at idle speed). The cam is locked in position by the brake shoe so that the hand guard can then be released.

The **chain brake is engaged** by moving the hand guard toward the bar nose. This causes one part of the cam to displace the rotating release plate radially and thus disengage the isolating clutch. At the same time the brake shoe is pressed against the clutch drum by the force of the preloaded compression springs. This brings the chain sprocket to a standstill in a split second even if the engine continues running at high speed.

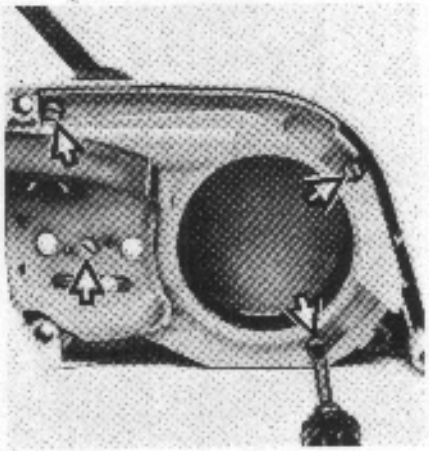
2.2.2 **Troubleshooting Chart**

Condition	Cause	Remedy
Saw chain does not stop immediately when chain brake is engaged	Brake spring(s) broken	Fit new brake spring(s)
	Brake band broken	Fit new brake band

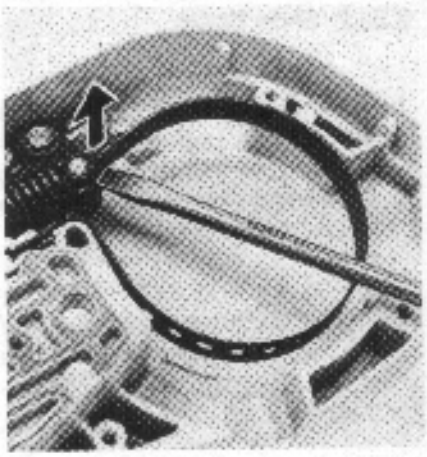
2.2.3 **Disassembly and Repair**

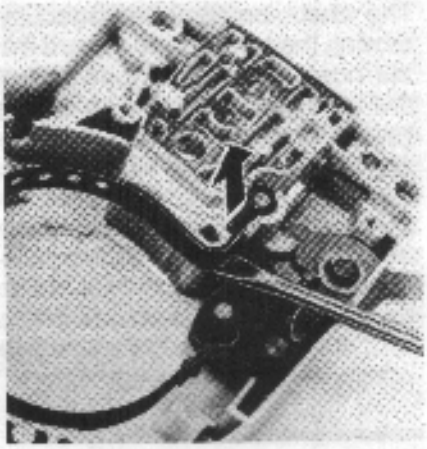
Top:
Release chain brake
Bottom:
Engage chain brake on disassembled sprocket cover

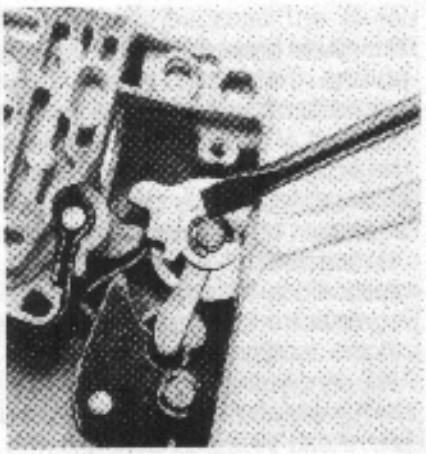
Top:
Unscrew side plate and cover
Bottom:
Lever brake band out of its seat



Top:
Detaching brake band and tension spring
Bottom:
Removing retaining washers







2.2.3.1 **Band Brake**

Release the chain brake by pulling the hand guard toward the handlebar and take off the sprocket cover. Then re-engage the chain brake and unscrew the side plate and cover.

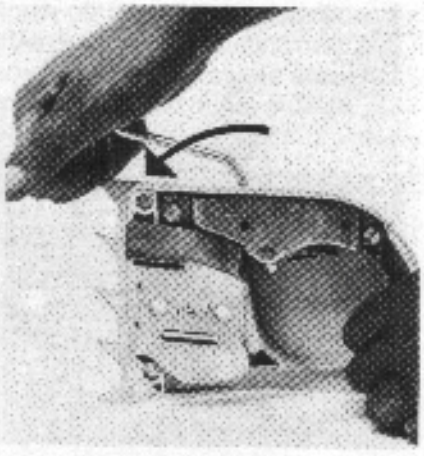
Detach brake band and tension spring from the pivot pin.

Remove pin for tension spring from sprocket cover and withdraw the tension spring. Remove the retaining washers and take off the actuating lever, relay lever and cam.

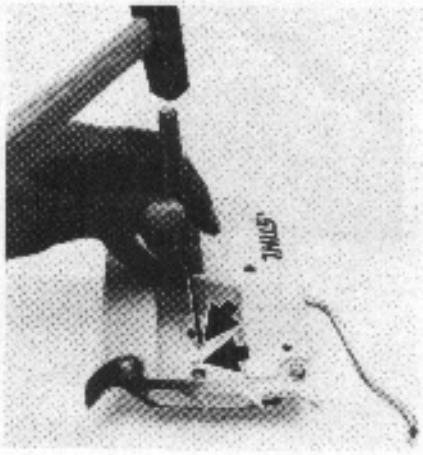
The brake band can now be levered out of its seat in the sprocket cover.

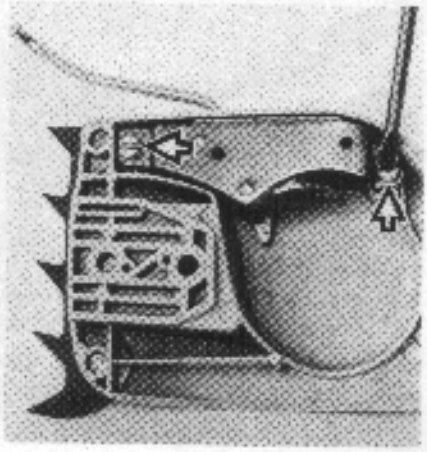
Wash all disassembled component parts in clean gasoline and inspect them for signs of wear. It is best to compare them against new parts.

Top:
Release chain brake
Bottom:
Engage chain brake on disassembled sprocket cover

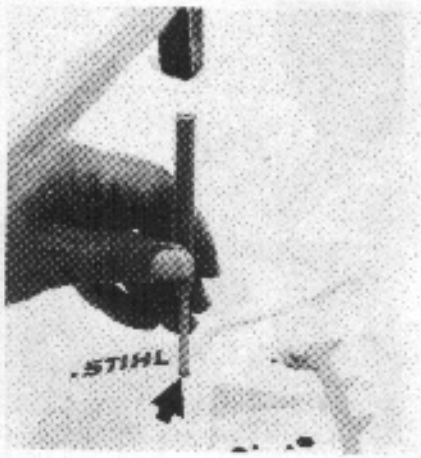


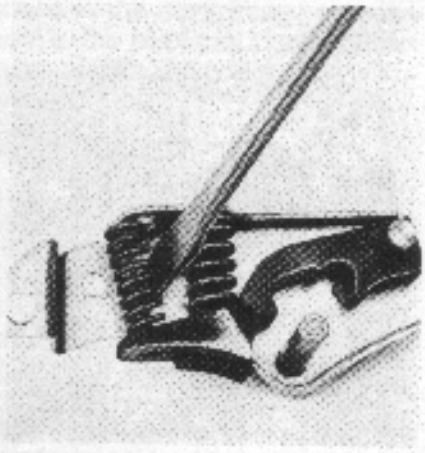
Top:
Drive out notched pins
Bottom:
Unscrew cover plate





Top:
Drive out pivot pin
Bottom:
Detach compression springs





2.2.3.2 **Shoe Brake**

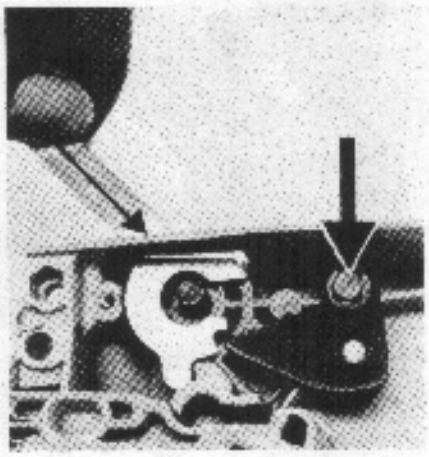
Release the chain brake by pulling the hand guard toward the handlebar and take off the sprocket cover. Then re-engage the chain brake so as to relieve the compression springs.

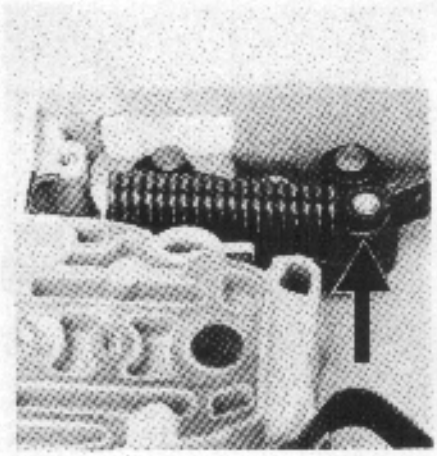
Use a suitable punch to drive out the notched pins which secure the outer side plate. Then remove the two screws which hold the cover plate (they will be difficult to remove because they are secured with adhesive). Use a suitable punch to drive the cam's pivot pin – riveted to the cover plate – out of the sprocket cover, from the outside inwards. The cover plate can now be lifted off; the pivot pin slips out of the cam. Detach the compression springs and pull off the brake shoe.

Examine all disassembled parts for signs of wear – compare with new parts where necessary. The brake shoe lining must have a minimum thickness of 1 mm or braking efficiency will otherwise be impaired.

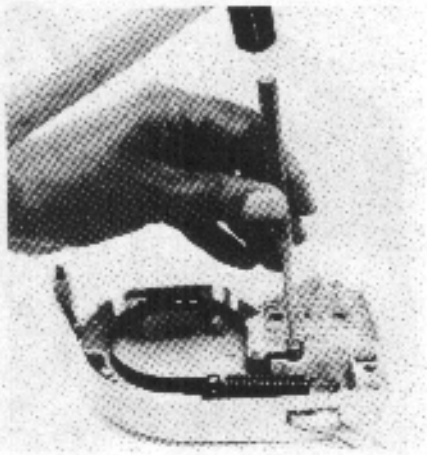
2.2.4 **Installation**

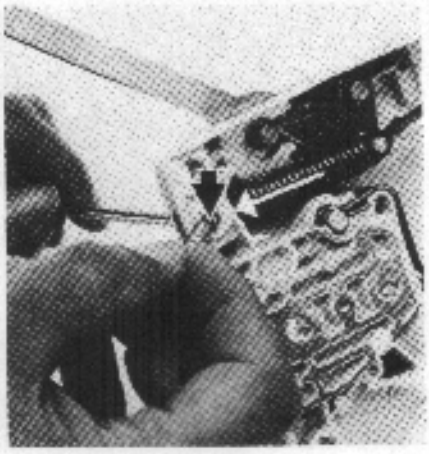
Top:
Actuating lever in position with pivot pin fitted
Bottom:
Tension spring and brake band fitted on cam



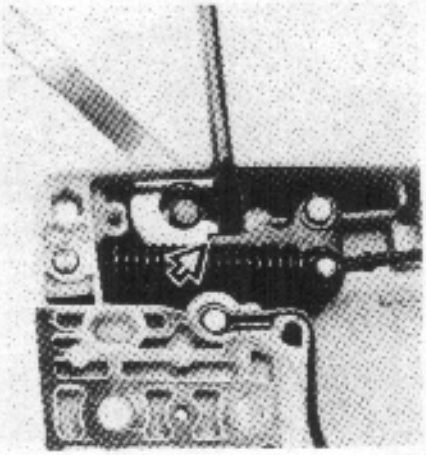


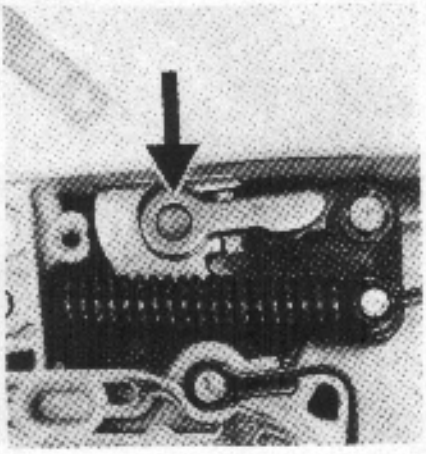
Top:
Carefully drive retaining pin into loop
Bottom:
Fit tension spring in sprocket cover slot





Top:
Use a screwdriver to position tip of cam in notch
Bottom:
Relay lever correctly positioned





2.2.4.1. **Band Brake**

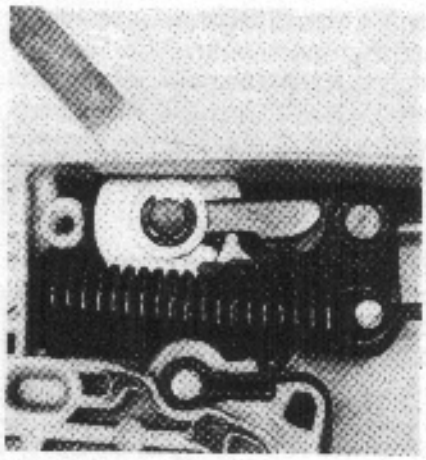
Insert actuating lever through slot in sprocket cover, grease the pivot pin and fit the cam so that its tip engages in the opening in the actuating lever. Fit the retaining washer on the cam pivot pin. Fit closed loop of tension spring in the slot in the brake band's loop and then slip both over the pin (lubricate with grease!) on the cam. At the same time engage the hook at the other end of the tension spring in the slot in the sprocket cover.

Then press the bent end of the brake band into its seat in the sprocket cover and carefully drive the retaining pin into the loop. Use a small screwdriver and insert it in the tension spring's pivot pin hole from the front of the sprocket cover and push the spring loop forward up to the edge of the hole. Fit the pivot pin in the hole from the inside and push it in until the spring loop engages in the groove.

Use a screwdriver to turn the cam against the spring until its tip engages the notch in the actuating lever; the cam is thus locked in this position for the time being. Now push the relay lever over the pivot pin and line it up by hand so that it can be pressed into its seat in the actuating lever.

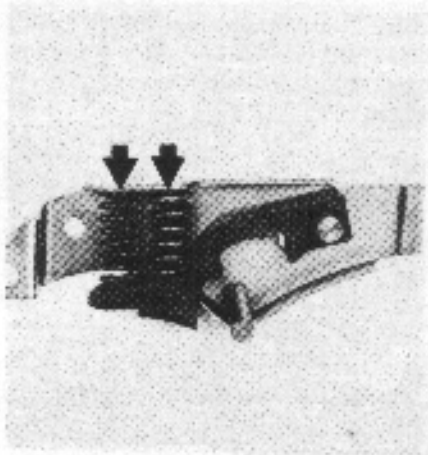
Then fit plain and retaining washers on the relay lever's pivot pin. Coat friction faces of cam and relay lever with ample grease.

Actuating lever assembled



Finish off by checking function of chain brake; refit plastic cover and side plate as well as the sprocket cover. The chain brake must be released before the sprocket cover can be fitted.

Top:
Brake shoe in position
Bottom:
Compression springs correctly positioned

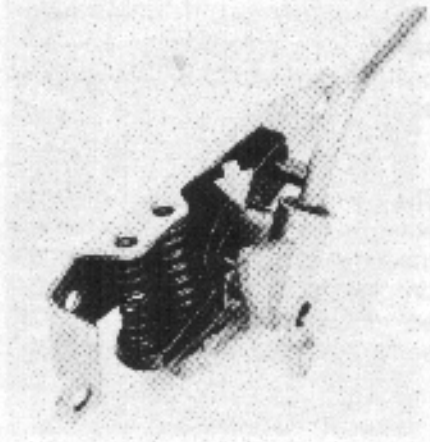


2.2.4.2 **Shoe Brake**

Slip the brake shoe over the short pivot pin (lubricate with grease first!). Fit the large diameter compression spring outside and the other spring inside between the cover plate and brake shoe.

Then push the cam onto the pivot pin in the cover plate (lubricate with grease first!) so that the cam which controls the brake shoe en-

Cam engages in recess



gages in the semicircular recess next to the pivot pin. Coat friction faces of cam and brake shoe with ample grease.

Now insert the actuating lever through the slot in the sprocket cover, locate the pivot pins on the cover plate in their respective holes and use a hammer to drive home the cam pivot pin until it is flush with the front side of the sprocket cover. Coat cover mounting screws with adhesive 07861111109 (LOCTITE 270 or 73), insert them and tighten down securely.

Finish off by refitting the side plate, checking the function of the chain brake and mounting the sprocket cover. The chain brake must be released before the sprocket cover can be fitted.

3. ENGINE

3.1. Construction

Model 032 and 031 (030) chain saws are powered by an air-cooled, single cylinder two-stroke engine.

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

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

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

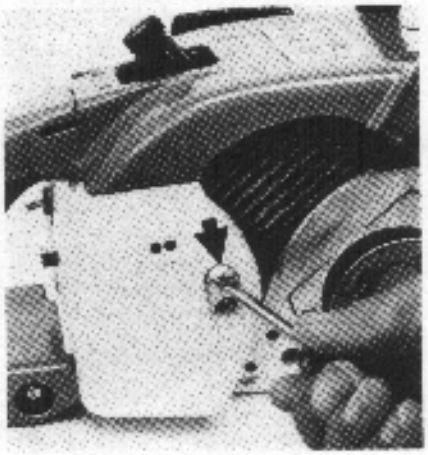
3.2 Troubleshooting Chart

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

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

3.3 Exposing the Cylinder

Top:
Unscrew slotted nut on carburetor box cover
Bottom:
Unscrew slotted nuts on air filter

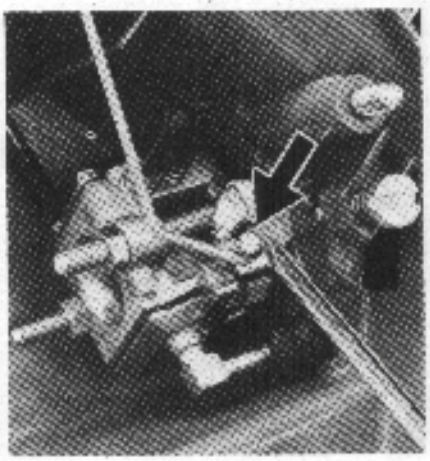


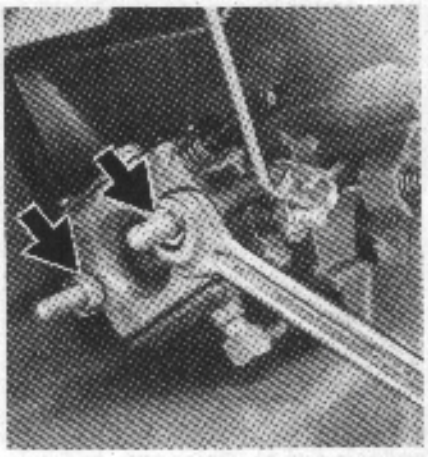
Disassemble the sprocket cover, cutting attachment and fan housing. (Disengage the chain brake on Quickstop models.)

Unscrew the slotted nut on the carburetor box cover and take off the carburetor box cover.

Remove both slotted nuts on the air filter and pull off the air filter.

Top:
Remove retaining washer and disconnect throttle rod
Bottom:
Remove carburetor mounting nuts

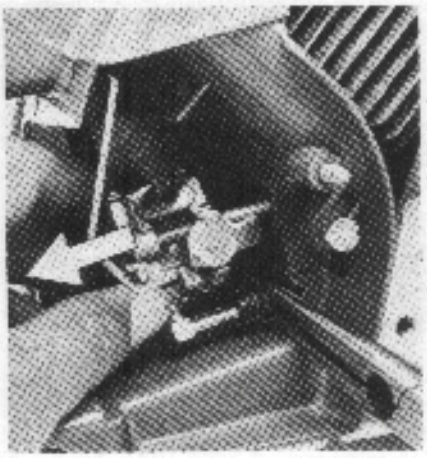


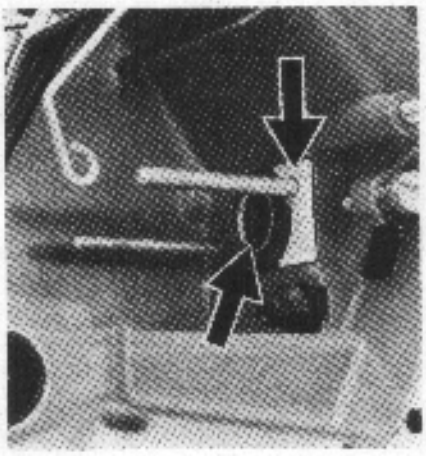


Press the retaining washer out of the groove in the throttle shaft and disconnect the throttle rod.

Unscrew the two mounting nuts from the carburetor studs. Pull the carburetor off the studs but use pliers to hold the impulse hose securely in its housing slot. Take off the fuel hose. Remove shim on right-hand stud and take sleeve out of manifold. Push the manifold and the impulse hose into the space

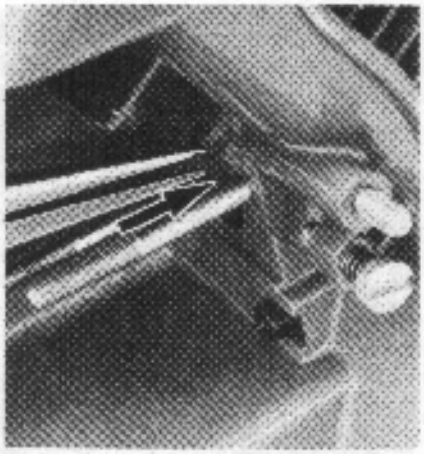
Top:
Pull off carburetor, hold impulse hose securely
Bottom:
Take out shim and sleeve

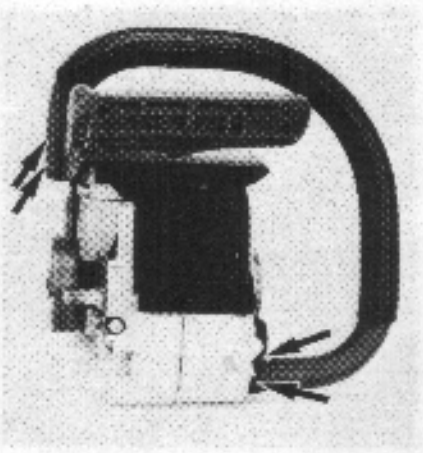




between the cylinder and handle frame.

Top:
Push manifold and impulse hose inwards
Bottom:
Unscrew handlebar



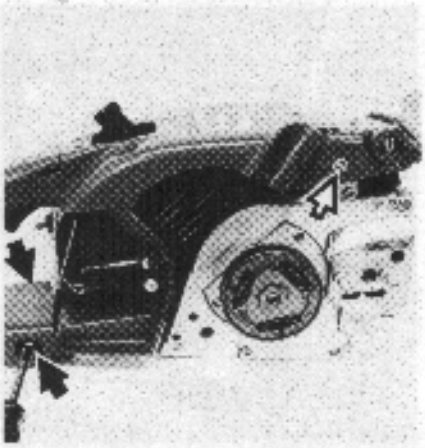


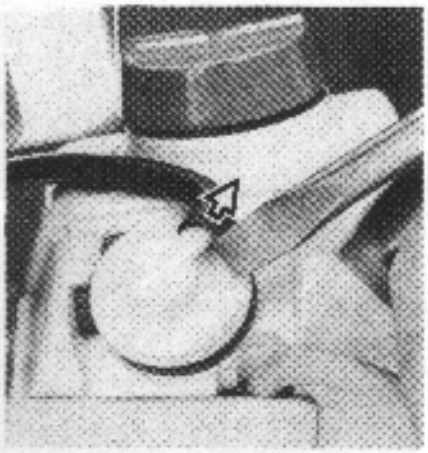
Unscrew handlebar at handle frame and crankcase.

Remove the two collar screws in the handle frame (rear vibration dampers) and one collar screw at the annular buffer.

Pull the fuel hose off the elbow connector. The elbow connector is behind the fuel filler cap.

Top:
Remove collar screws from handle frame
Bottom:
Pull fuel hose off elbow connector



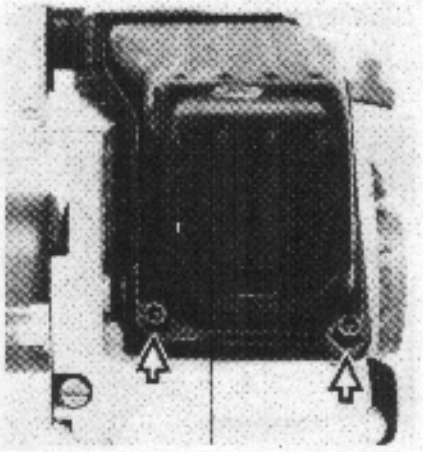


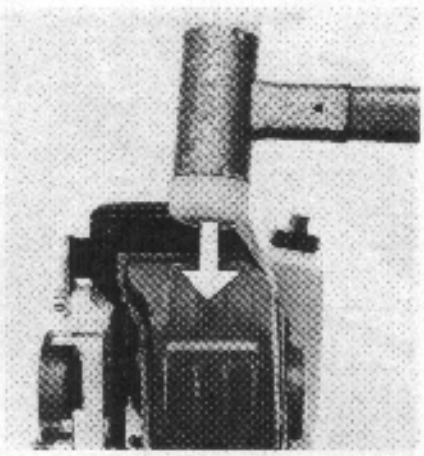
Take off the handle frame.

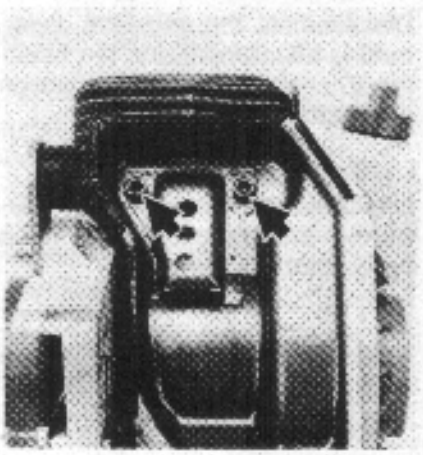
Remove the socket head screw(s) securing the muffler cover. Separate the muffler cover from the casing by tapping lightly with a plastic-faced hammer.

Unscrew the muffler casing at the cylinder exhaust port. The socket head screw on the crankcase is located directly above the front collar screw.

Top:
Unscrew muffler cover
Center:
Split muffler cover and casing
Bottom:
Unscrew muffler casing



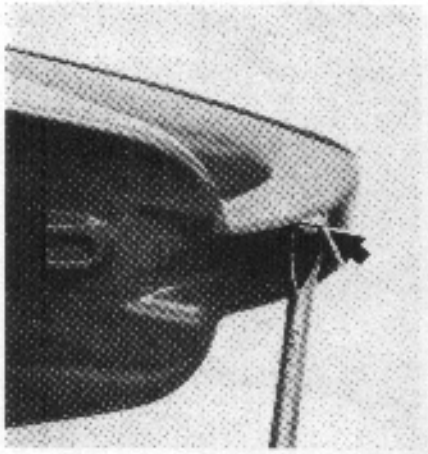


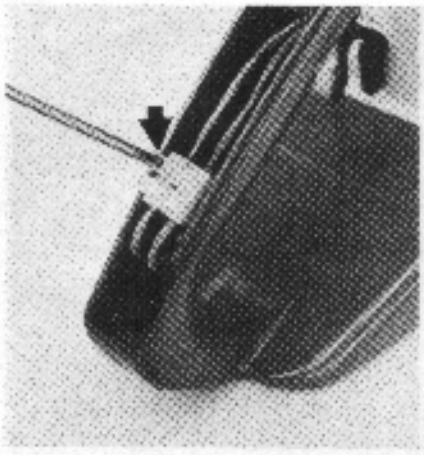


3.3.1 Exposing the Cylinder (Heated Handles)

See Chapter 3.3

Top:
Remove handle cover retaining screw
Bottom:
Unscrew ground wire





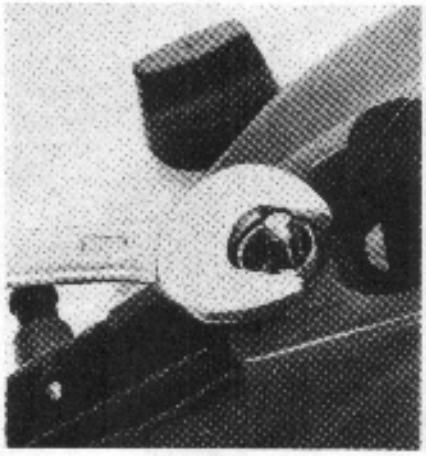
Difference

Unscrew the handle cover retaining screw and remove the handle cover and lever (safety throttle lock).

Disconnect the ground wire at the terminal strip.

Remove the nut on the stop switch.

Unscrew nut on stop switch



Take off the handle frame and handlebar. Handlebar is still connected to leads of electric handle heating.

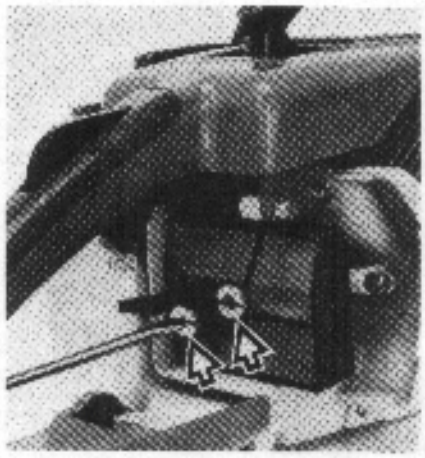
3.4 Visual Inspection

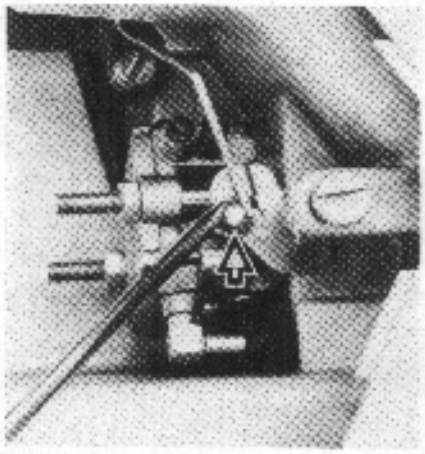
Thoroughly clean dirt off the cylinder fins, especially in the cooling air intake area (fan housing).

Examine cylinder for broken cooling fins.

3.5 Exposing the Cylinder 031 (030)

Top:
Remove slotted nuts from air filter
Bottom:
Remove retaining washer and disconnect throttle rod

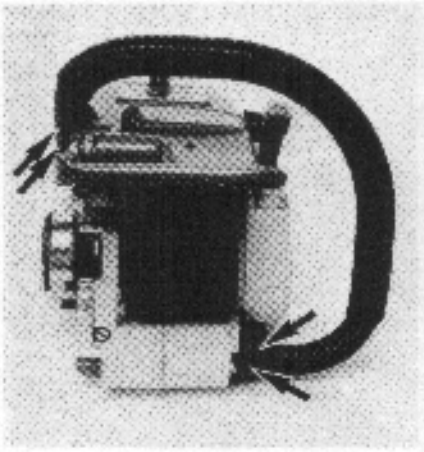


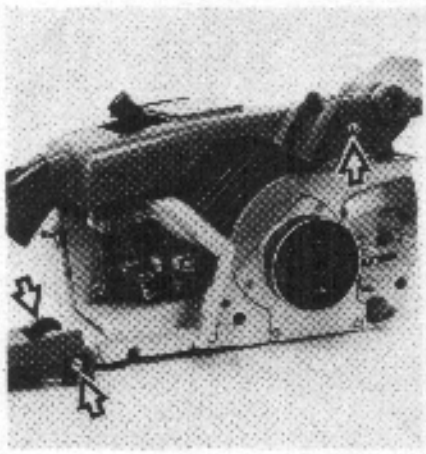


Disassemble the sprocket cover and cutting attachment. Take off the carburetor box cover.

Remove both slotted nuts from the air filter; pull off the air filter, press off the retaining washer and disconnect the throttle rod.

Top:
Unscrew handlebar
Bottom:
Remove collar screws from vibration dampers

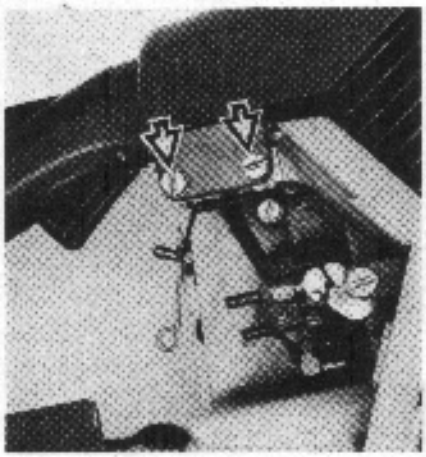


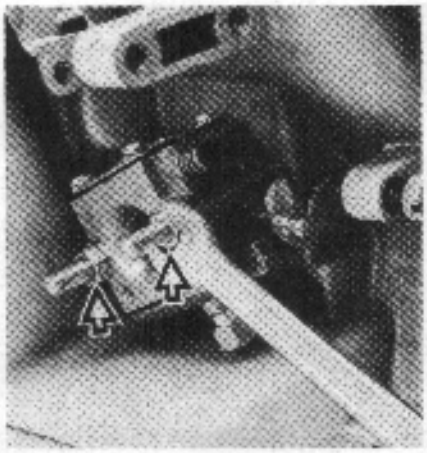


Unscrew the handlebar at the handle frame and crankcase and remove. Take out the two collar screws in the handle frame (rear vibration dampers) and one collar screw at the front annular buffer. Unscrew handle frame at carburetor box cover (three pan head screws); lift off the handle frame.

Unscrew the two carburetor mounting nuts from the studs. Pull carburetor off the studs while holding the impulse hose firmly in position with a pair of pliers.

Top:
Remove pan head screws from carburetor box cover
Bottom:
Unscrew carburetor mounting nuts

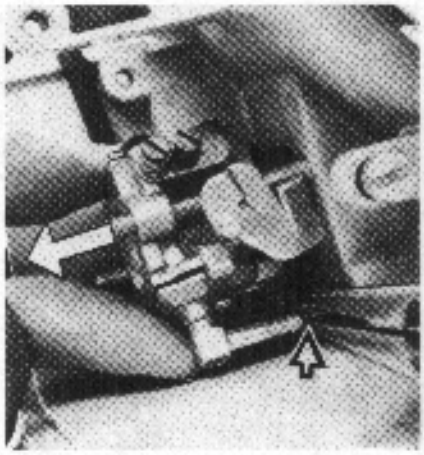


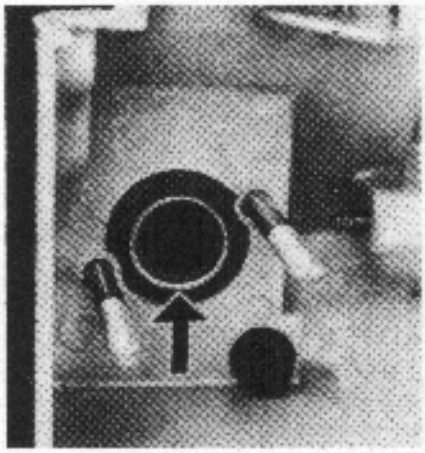


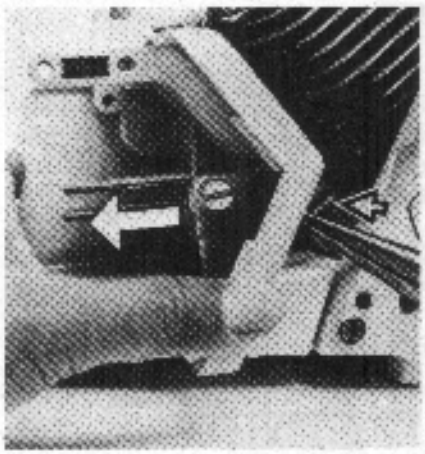
Pull off the fuel hose.

Take the sleeve out of the manifold. Push the manifold into the space between the cylinder and carburetor box. Take off the carburetor box and pull the impulse hose off the connector on the crankcase at the same time.

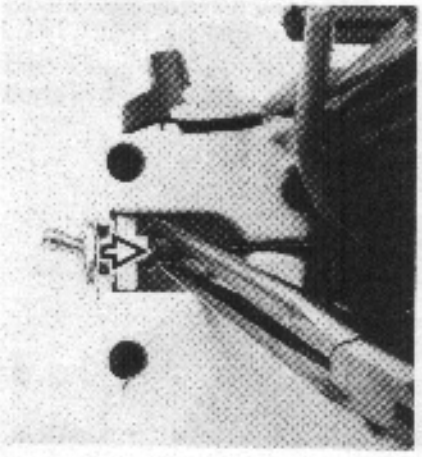
Top:
Take off carburetor and hold impulse hose securely
Center:
Take sleeve out of muffler
Bottom:
Take off carburetor box cover and pull out impulse hose

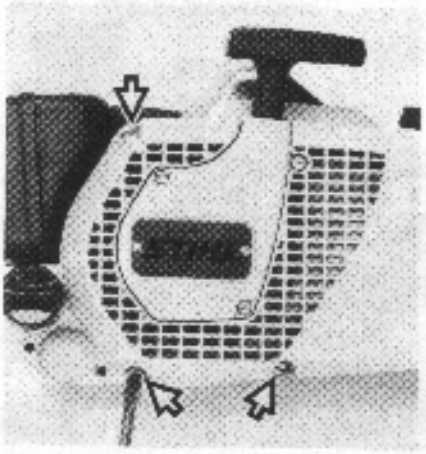






Top:
Pull short circuit lead out of stop switch
Bottom:
Remove pan head screws from fan housing

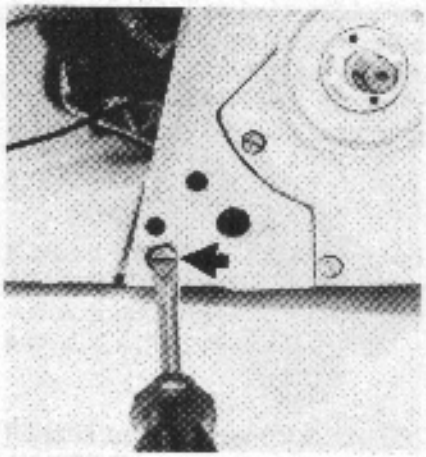


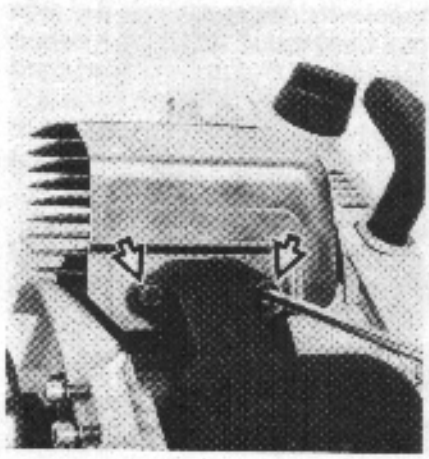


Pull off short circuit lead at the stop switch. Disassemble the fan housing and tank housing. To do this, unscrew 3 pan head screws at the fan housing side and 1 pan head screw at the sprocket side.

Unscrew the muffler at the cylinder exhaust port and crankcase. The pan head screw on the crankcase is located directly above the front collar screw.

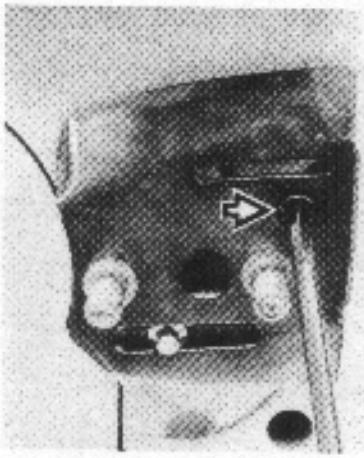
Top:
Unscrew pan head screw at sprocket side
Bottom:
Unscrew muffler from cylinder





Take off the muffler with air guide plate.

Unscrew muffler from crankcase



3.5.1 **Exposing the Cylinder – 031 (030) Heated Handles**

See Chapter 3.5

Difference

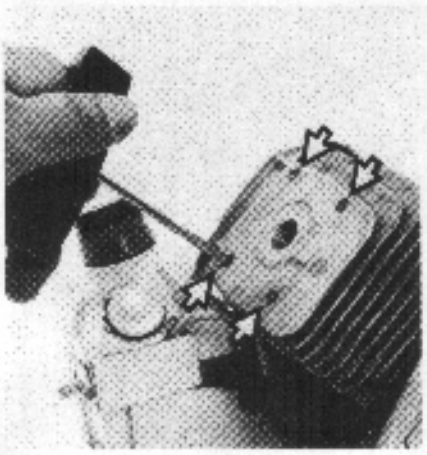
The flexible heating tube is located about 40 mm down inside the handlebar. Take care when removing the handlebar that the heating tube is not torn away.

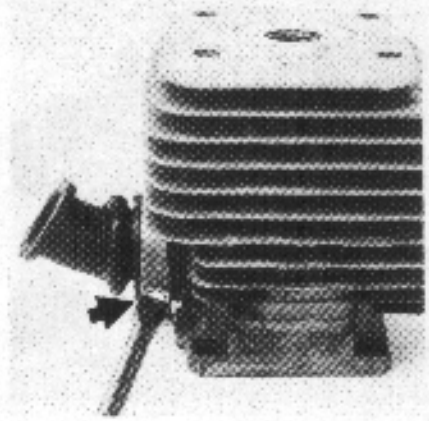
The clamp at the transition point between the valve and muffler must be unscrewed and the valve pushed off the muffler connection before the handle frame is removed.

3.6 Cylinder and Piston

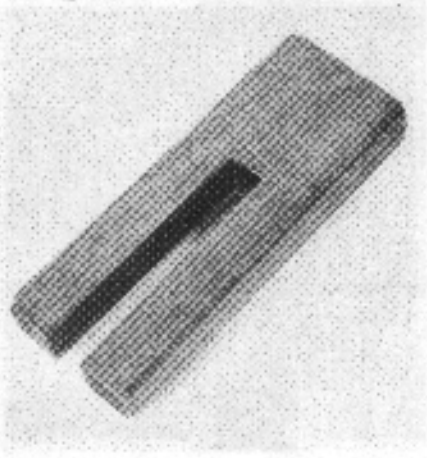
3.6.1 Removal

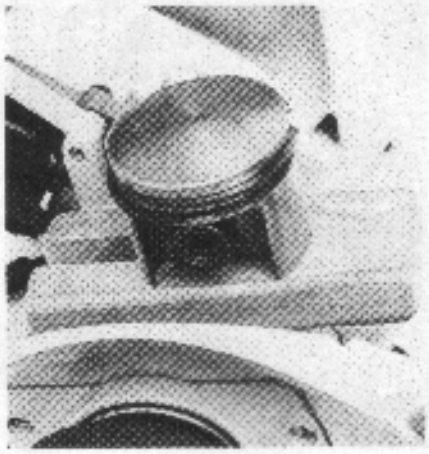
Top:
Unscrewing the cylinder
Bottom:
Release clamp on manifold



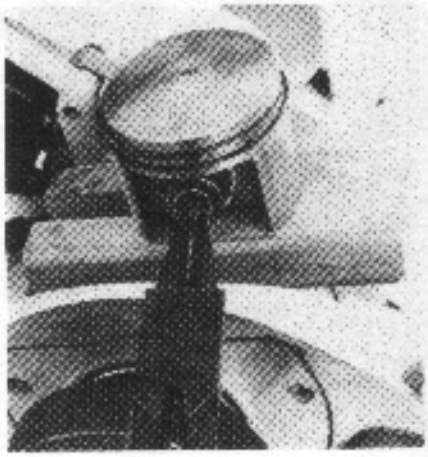


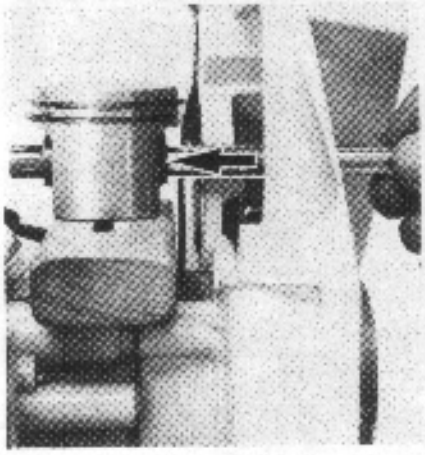
Top:
Wooden assembly block
1108 893 4800
Bottom:
Lock crankshaft with wooden assembly block





Top:
Removing wire retainers
Bottom:
Pushing out piston pin with drift
1110 893 4700





Preparations – see 3.3 or 3.3.1.

Detach the spark plug terminal and unscrew the spark plug. Remove the four socket head screws which secure the cylinder. Pull the cylinder off the piston. Release the clamp on the manifold sufficiently for the clamp to be removed over the manifold. Take manifold off cylinder intake port.

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

Take out the wire retainers. Use the drift to push out the piston pin out of the piston and needle cage. If the piston pin is stuck as a result of carbonization of the piston boss, tap it out lightly with a hammer. It is essential to counterhold the piston to ensure that no jolts are transmitted to the connecting rod.

3.6.1.1 Removal, Heated Handles

See Chapter 3.6.1 and preparations in chapter 3.3.1.

3.6.2 **Removal on 031 (030)**
See Chapter 3.6.1 and preparations in chapter 3.5.

3.6.2.1 **Removal on 031 (030) with Heated Handles**
See Chapter 3.6.1 and preparations in chapter 3.5.1.

3.6.3 **Visual Inspection**

Examine the piston. Piston rings must move freely and not stick in their grooves. If the edges of the piston rings are worn round, fit new rings. Inspect small end needle cage. Make sure that manifold is in good condition.

Check cylinder bore. In the case of excessive wear and deep scores, fit a new cylinder.

3.6.4 **Installation**

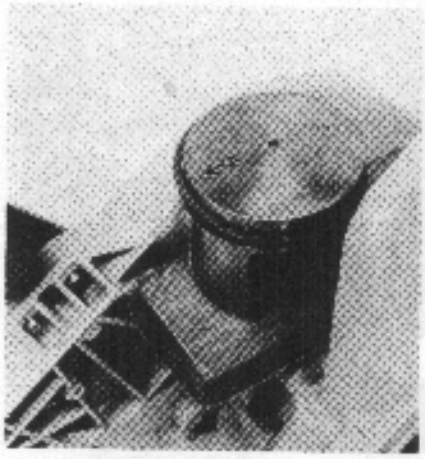
If the cylinder has to be replaced, the new cylinder must always be installed with a matching piston. Replacement cylinders are only supplied complete with matching pistons.

If only the piston is to be renewed on the 032 it is possible to use any replacement piston (marked "B") with any cylinder.

Pistons and cylinders of model 031 AV (030 AV) were previously available in 5 size groups with the letter codes A to E and subdivided into the 3 main groups A–B, C–D and E. The size group code is stamped on the piston crown and cylinder head.

For reasons of rationalization these groups were reduced to cylinders A, B and C with piston B and cylinders D and E with piston C. The pistons B and C can be installed in all cylinders of their respective groups.

Arrow and "A" point towards exhaust port

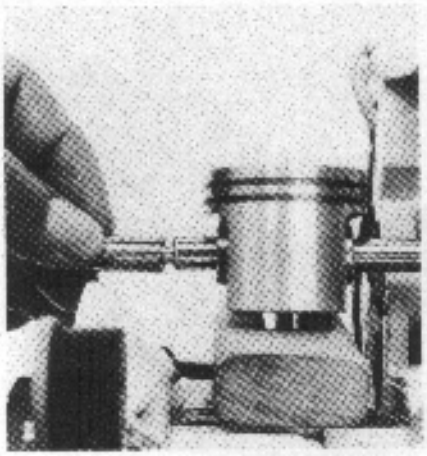


Coat the needle cage with oil and insert it in the piston boss. Place new cylinder gasket on the crankcase – cutouts face intake port. Position piston on connecting rod so that the arrow and "A" stamped on the piston crown point towards the cylinder exhaust port.

Table – 031 (030)

Previous version for new cylinders		Previous version for broken-in cylinders		Simplified system	
Piston	for cylinder	Piston	for cylinder	Piston	for cylinder
A	AB	A	AB	–	–
B (AB)	BC	B	ABC	B	ABC
C (CD)	CD	C	BCD	C	DE
D (E)	DE	D	CDE	–	–
E	E	E	DE	–	–

Fit piston pin on assembly drift



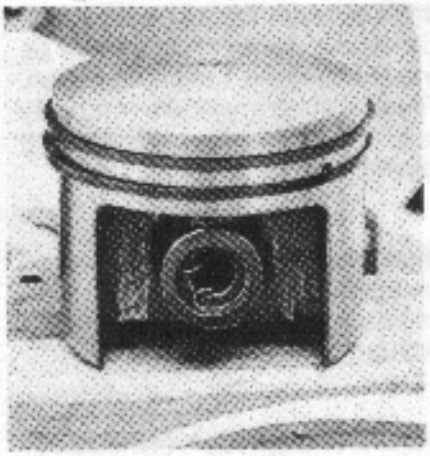
Fit the piston pin in the piston and connecting rod. To do this, push assembly drift through the piston bore and the connecting rod to align both bores concentrically. Fit piston pin on the spigot of the assembly drift and slide it into the piston. Gently move the piston to and fro to easy insertion of the piston pin.

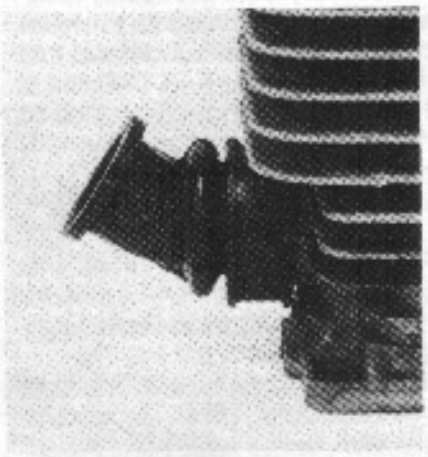
Light thumb pressure is all that should be required to install the piston pin. Do not use any force during assembly. Fit the two wire retainers and make sure they are properly seated in their grooves.

In the case of a new cylinder or if the manifold is faulty, it is necessary to fit the manifold before mounting the cylinder.

Push the manifold on to the intake port; it must point upwards (towards cylinder head) and the molding seam should be vertical (parallel with the cylinder axis).

Top:
Wire retainer fitted
Bottom:
Manifold correctly positioned on intake port



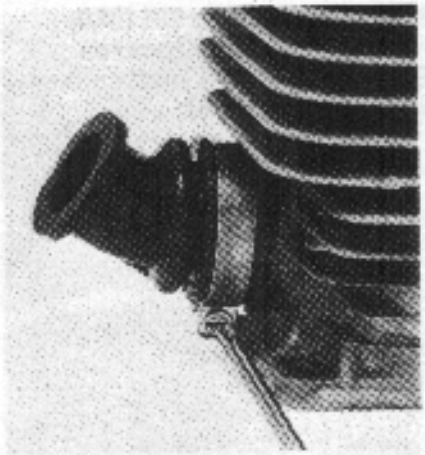


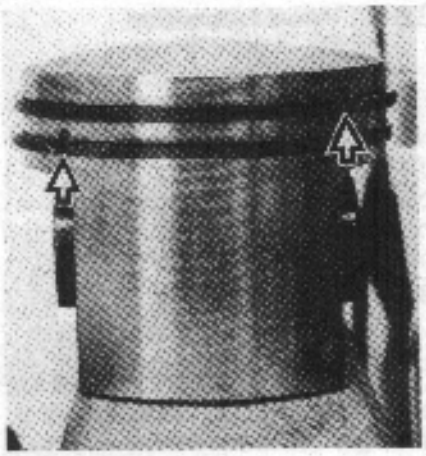
Attach and secure the hose clamp.

Make sure that manifold is correctly seated and properly sealed. Coat piston and its rings with engine oil (do not use old oil for this purpose).

Place the wooden assembly block on the crankcase so that the piston is resting on it. Turn the piston rings in their grooves so that the radii at the ring gaps locate (when the

Top:
Clamp in position
Bottom:
Piston rings correctly positioned

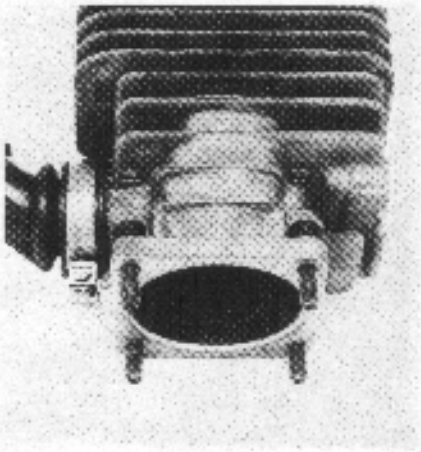


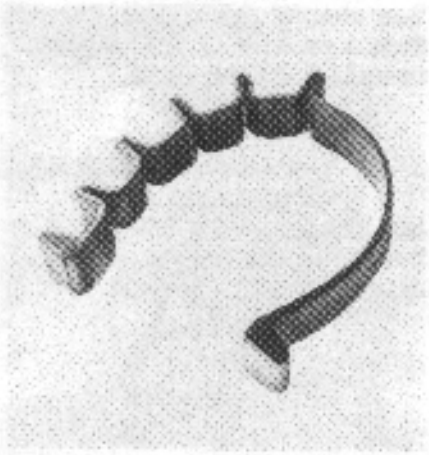


rings are compressed) against the fixing pins in the grooves.

Insert four M5x18 socket head screws (with captive washers) in the cylinder mounting holes. Use the clamping strap to encircle and compress the piston rings around the piston, but ensure they do not move out of position in the process.

Top:
4 socket head screws in position
Bottom:
Clamping strap
0000 893 2600

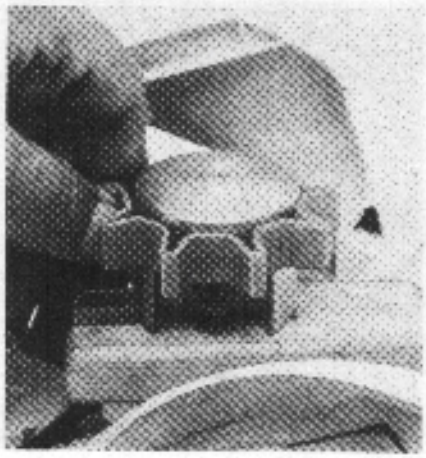


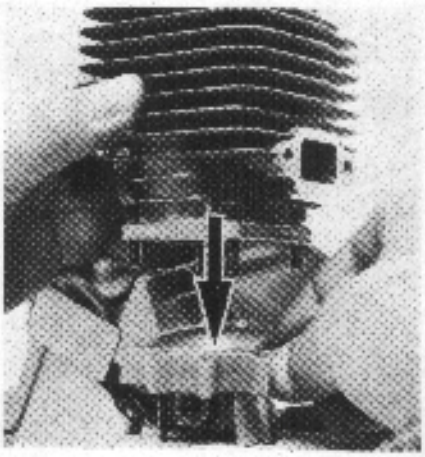


Fit the cylinder over the piston with the exhaust port facing in the direction of the bar nose. The cylinder must be exactly aligned in its normal installed position. If this is not done there is a risk of the piston rings breaking!

Take off the clamping strap and the wooden assembly block. Line up the gasket and cylinder. Screw down the cylinder base screws [illegible] pattern to a torque load of 8 Nm.

Top:
Compress piston rings
Bottom:
Fitting the cylinder





Assembly is then a reversal of the sequence in chapter 3.3.

Note: The M 5 x 16 screws used on early machines (before machine No. 5 090 200) should be replaced by M 5 x 18 screws.

Tightening cylinder base screws