

Instruction Manual / Owner's Manual

STIHL 090



STIHL®

Warning:
Always follow safety precautions in
Owner's Manual – improper use
can cause serious injury!

STIHL 090, 090 AV, 090 G

Congratulations!

You are the owner of a precision-manufactured STIHL chain saw designed to give you long and dependable service. To receive maximum performance and satisfaction from your STIHL chain saw, it is important that you read and understand the maintenance and safety precautions before using your saw. Contact your STIHL Dealer or the STIHL Distributor for your area if you do not understand any of the instructions or warnings in this Manual.

This Manual contains warnings regarding your saw, operating and safety instructions for all STIHL 090 series power saws.

Warning!

Because a chain saw is a high-speed wood-cutting tool, some special safety precautions must be observed as with any other power saw to reduce the risk of personal accidents. Careless or improper use may cause serious or even fatal injury.

It is important that you fully understand the contents of this Manual and that you allow only persons who understand this Manual to operate your chain saw.

Pay special attention to the safety precautions and cutting techniques outlined on pages 4 to 19.

STIHL's philosophy is to continually improve all of its products. As a result, engineering changes and improvements are made from time-to-time. Written notices relating to such changes are sent to STIHL Dealers. If the operating characteristics of the appearance of your saw differs from those described in this Manual, please contact your local STIHL Dealer for updated information and assistance.

Instruction Manual/Owner's Manuals, Sharpening and Maintenance of Saw Chains

Contents

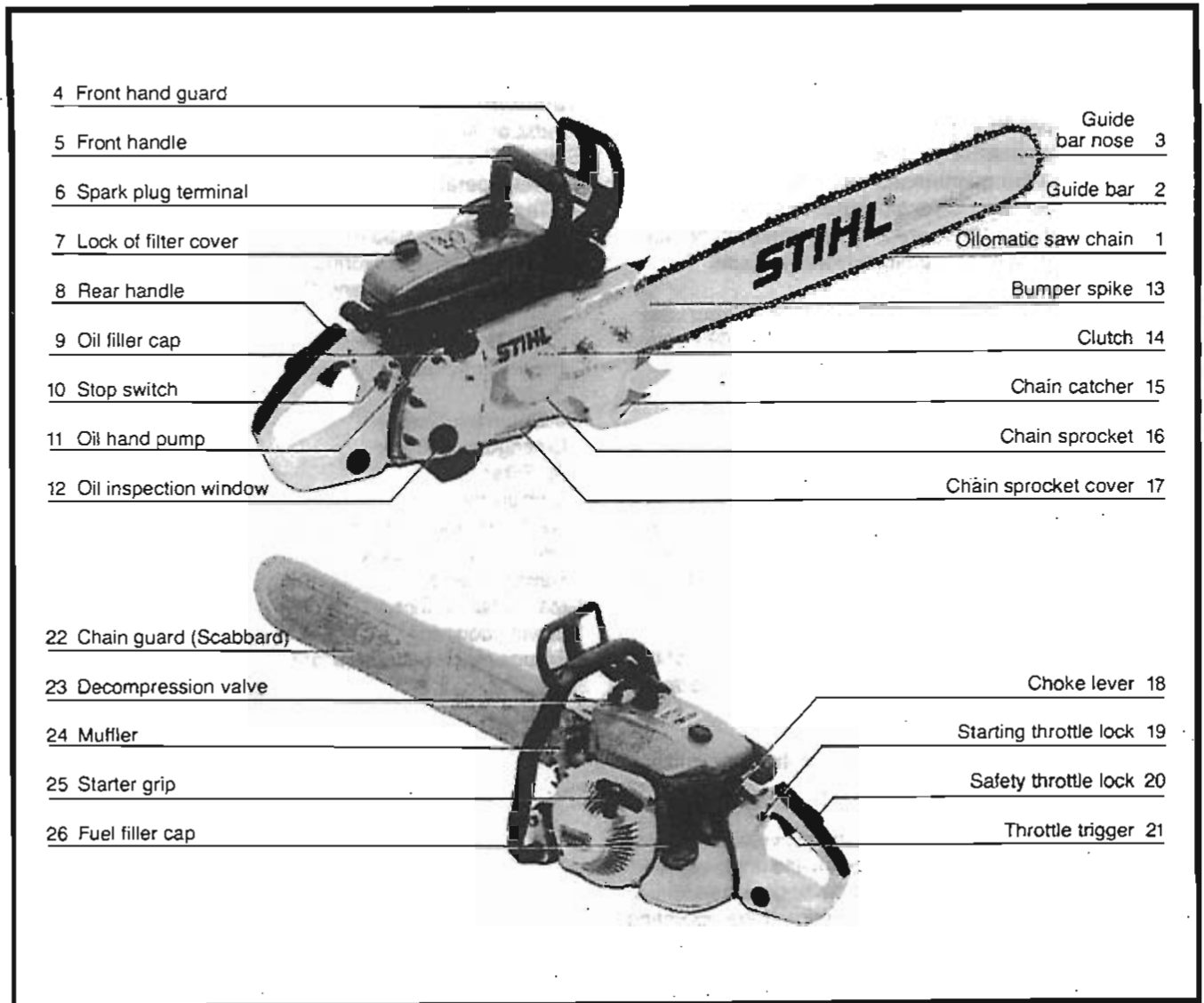
| | |
|---|----|
| Parts of the Chain Saw | 2 |
| Safety Precautions | 4 |
| – The Operator | 4 |
| – The Saw | 6 |
| – The Use of the Saw | 6 |
| – Maintaining and Storing the Saw | 19 |
| Mounting Guide Bar and Chain | 20 |
| Fuel | 22 |
| Chain Oil | 22 |
| Helpers Handle | 23 |
| Starting | 24 |
| Oil Quantity Control | 27 |
| Cutting Attachment | 28 |
| Air Filter | 30 |
| Carburetor | 31 |
| Replacing the Chain Sprocket | 32 |
| Gear Lubricant 090 G | 33 |
| Rewind Starter | 34 |
| Maintenance Chart | 36 |
| Specifications | 37 |
| Sharpening and Maintenance of Saw Chain | 39 |

STIHL®

Andreas Stihl
D-7050 Waiblingen

1

Parts of the Chain Saw



Definitions

1. **Oilomatic Saw Chain.** A loop consisting of cutters, tie straps and drive links.
2. **Guide Bar.** Supports and guides the saw chain.
3. **Guide Bar Nose.** The exposed part of the guide bar.
4. **Front Hand Guard.** Provides protection against projecting branches and helps prevent the left hand from touching the chain if it slips off the handle bar.
5. **Front Handle.** Handle bar for the left hand at front of saw.
6. **Spark Plug Terminal.** Connects the spark plug with the ignition wire.
7. **Lock of Filter Cover.** For removing filter cover, permits filter to be cleaned.
8. **Rear Handle.** The support handle for the right hand, located at or toward the rear of the saw.
9. **Oil Filler Cap.** For closing the oil tank.
10. **Stop Switch.** Switches the engine's ignition system off and stops the running of the engine.
11. **Oil Hand Pump.** For additional manual chain lubrication.
12. **Oil Inspection Window.** For controlling the chain oil level.
13. **Bumper Spike.** Toothed stop for holding saw steady against wood.
14. **Clutch.** Couples engine to chain sprocket when engine is accelerated beyond idle speed.
15. **Chain Catcher.** Catches a broken chain and guides it inside the chain sprocket cover.
16. **Chain Sprocket.** The toothed wheel that drives the saw chain.
17. **Chain Sprocket Cover.** Covers the clutch and the sprocket.
18. **Choke Lever.** Eases engine starting by enriching mixture.
19. **Starting Throttle Lock.** Keeps the throttle partially open during starting.
20. **Safety Throttle Lock.** Must be depressed before activating the throttle trigger.
21. **Throttle Trigger.** Controls the speed of the engine.
22. **Chain Guard (Scabbard).** Protects the operator from touching the chain.
23. **Decompression Valve.** Makes starting easier.
24. **Muffler.** Attenuates exhaust noises and diverts exhaust gases in required direction.
25. **Starter Grip.** The grip of the pull starter, which is the device to start the engine.
26. **Fuel Filler Cap.** For closing the fuel tank.

Safety Precautions



The use of any chain saw may be hazardous. The saw chain has large, sharp cutters. If the cutters contact your flesh, they will cut you, even if the chain is not moving. At full throttle, the chain speed can reach 45 mph (20 m/s). It is important that you read, fully understand and observe the following safety precautions and warnings. Read the owner's manual and the safety instructions periodically. Pay special attention to the section on reactive forces, pages 10 to 13.

Warning!

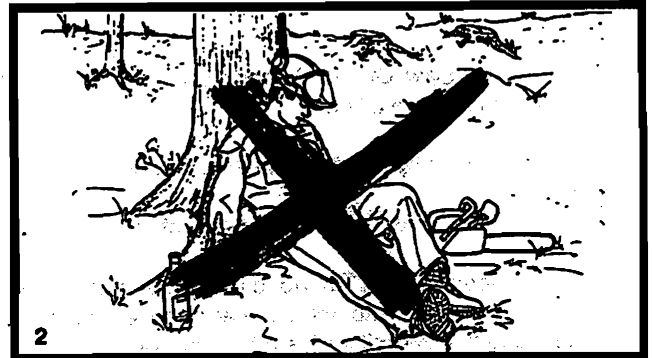
Reactive forces, including kickback, can be dangerous. Careless or improper use of any chain saw may cause serious or fatal injury.

All safety precautions that are generally observed when working with an axe or a hand saw also apply to the operation of chain saws. However, because a chain saw is a highspeed, fast cutting power tool, special safety precautions must be observed to reduce the risk of personal accidents.

Have your STIHL dealer show you how to operate your chain saw. Observe all applicable local safety regulations, standards and ordinances.

Warning!

- 4 Minors should never be allowed to use a chain saw.



Bystanders, especially children and animals should not be allowed in the area where a chain saw is in use (ill. 1). Never let the saw run unattended. Store it in a locked place away from children and empty the fuel tank before storing for longer than a few days.

Do not lend your chain saw without the Owner's Manual. Be sure that anyone using your saw understands the information contained in this Manual.

These safety precautions and warnings apply to the use of all STIHL chain saws. Different models may have different parts and controls. See the appropriate section of your Owner's Manual for a description of the controls and function of the parts of your model saw.

Safe use of a chain saw involves

1. the operator
2. the saw
3. the use of the saw.

THE OPERATOR

Physical Condition

You must be in good physical condition and mental health and not under the influence of any substance (drugs, alcohol), which might impair vision, dexterity or judgment.

Do not operate a chain saw when you are fatigued (ill. 2). Be alert – If you get tired while operating your chain saw, take a break, tiredness may result in loss of control. Working with any chain saw can be strenuous. If you have any condition that might be aggravated by strenuous work, check with your doctor before operating a chain saw.

Warning!

Prolonged use of chain saws (or other machines) exposing the operator to vibrations may produce Whitefinger disease (Raynaud's phenomenon). This phenomenon reduces the hand's ability to feel and regulate temperature, produces numbness and burning sensations and may cause nerve and circulation damage and tissue necrosis. Many STIHL models are available with an anti-vibration system designed to reduce engine vibration. An anti-vibration system is recommended for those using chain saws on a regular or sustained basis.

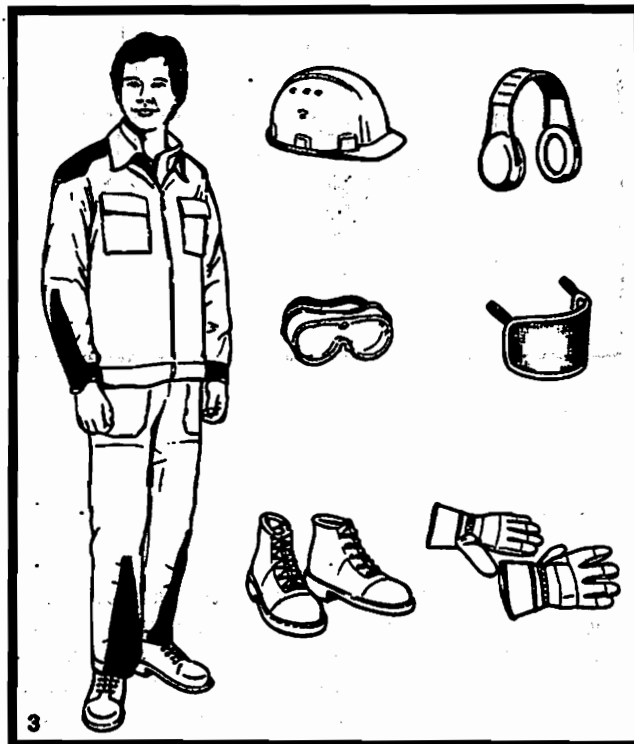
Heated handles help to reduce the risk of Whitefinger disease and are recommended for cold weather use. Most STIHL powerheads are available with heated handles.

Anti-vibration systems and heated handles do not guarantee that you will not sustain Whitefinger disease. Therefore continual and regular users should monitor closely their use of chain saws and their physical condition.

Proper Clothing

Clothing must be sturdy and snug-fitting, but allow complete freedom of movement. Avoid loose-fitting jackets, scarfs, neckties, jewelry, flared or cuffed pants, or anything that could become entangled with the saw or brush. Wear overalls or jeans with a reinforced cutting resistant insert (ill. 3).

Protect your hands with gloves when handling saw and saw chain. Heavy-duty, nonslip gloves improve your grip and protect your hands.

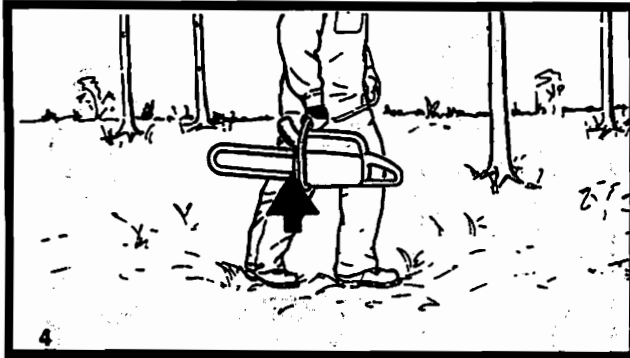


Good footing is most important in chain saw work. Wear sturdy boots with nonslip soles. Steel-toed safety boots are recommended.

Proper eye protection is a must. Non-fogging, vented goggles or a face screen is recommended. Their use reduces the risk of eye injury.

Wear an approved safety hard hat to protect your head. Chain saw noise may damage your hearing. Always wear sound barriers (ear plugs or ear mufflers) to protect your hearing.

Continual and regular users should have their hearing checked regularly.



THE SAW

Parts of the chain saw; illustrations and definitions of the parts see pages 2 and 3!

Warning!

Never modify a chain saw in any way. Only attachments supplied by STIHL or expressly approved by STIHL for use with the specific STIHL saw models are authorized. Although certain unauthorized attachments are useable with the STIHL powerhead, their use may, in fact, be extremely dangerous.

THE USE OF THE SAW

Transporting the chain saw

Warning!

Always stop the engine before putting a chain saw down or carrying it. Carrying a chain saw with the engine running is extremely dangerous. Accidental acceleration of the engine can cause the chain to rotate. Avoid touching the hot muffler.

6 **By hand:** When carrying your saw by hand, the engine

must be stopped and the saw must be in the proper position. Grip the front handle and place the muffler at the side away from the body (Ill. 4).

The chain guard (scabbard) should be over the chain and the guide bar which should point backwards. When carrying your saw the bar should be behind you (Ill. 4).

By vehicle: When transporting in a vehicle, keep chain and bar covered with the chain guard. Properly secure your saw to prevent turnover, fuel spillage and damage to the saw.

Preparation for the use of the saw

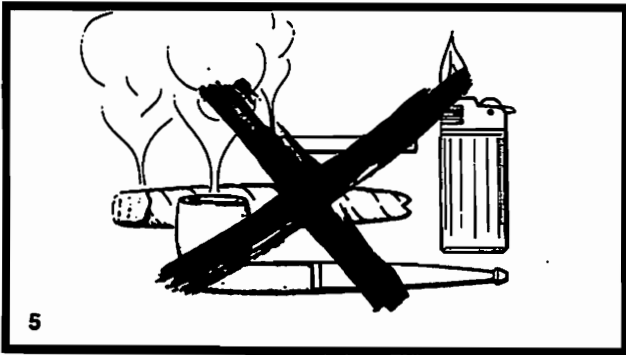
Take off the chain guard and inspect for safety in operation. For assembly please follow the procedure described at the appropriate section "Mounting the Bar and Chain" of your Owner's Manual.

STIHL-Oilomatic chain, guide bar and sprocket must match each other.

If the guide bar or chain is replaced, it must be with a bar or chain of the same type. Replacement with another type of guide bar or chain will seriously increase the chances of operator injury due to the contact of the moving chain with the operator during rotational kickback.

Warning!

Proper tension of the chain is extremely important. In order to avoid false setting the tensioning procedure must be followed as described in your Manual. Make always sure the hexagonal nut(s) for the sprocket cover is (are) tightened securely after tensioning the chain. Check chain tension once more after having tightened the nuts and thereafter at regular intervals (whenever the saw is shut off). If the chain becomes loose while cutting, shut off the engine and then tighten. Never try to tighten the chain while the engine is running!



Fueling

Your STIHL chain saw uses an oil-gasoline mixture for fuel (see chapter "Fuel" of your Owner's Manual).

Warning!

Gasoline is an extremely flammable fuel. Use extreme caution when handling gasoline or fuel mix. Do not smoke or bring any fire or flame near the fuel (ill. 5).

Fueling Instructions

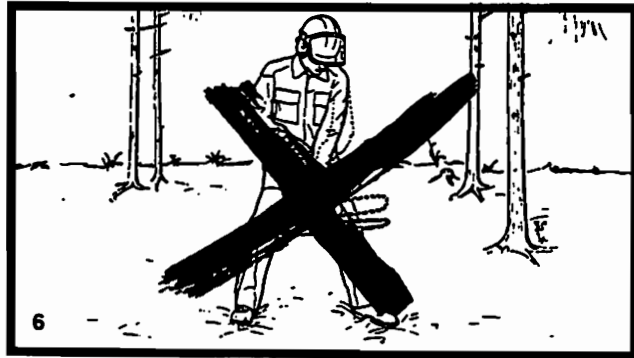
Fuel your chain saw in well-ventilated areas, outdoors only.

Always shut off the engine and allow it to cool before refueling. Relieve fuel tank pressure by loosening fuel cap slowly.

Select bare ground for fueling and move at least 10 feet (3 m) from fueling spot before starting the engine.

Wipe off any spilled fuel before starting your saw and check for leakage.

Check for fuel leakage while refueling and during operation. If fuel or oil leakage is found, do not start or run the engine until leak is fixed and spilled fuel has been wiped away.



Starting

Warning!

Your chain saw is a one-person saw. Do not allow other persons to be near the chain saw. Start and operate your saw without assistance.

For safe and specific starting instructions, see the appropriate section of the Owner's Manual.

Do not drop start. This method is very dangerous because you may lose control of the saw (ill. 6).

Place the chain saw on firm ground or other solid surface in an open area. Maintain a good balance and secure footing.

Be absolutely sure that guide bar and chain are clear of you and all other obstructions and objects, including the ground: because when the engine starts at starting-throttle, engine speed will be fast enough for the clutch to engage sprocket and turn the chain, which may cause kickback to occur.

Engage the chain brake when starting a Quickstop model (see chapter "Chain Brake" in your Owner's Manual).

Never attempt to start the saw when the guide bar is in a cut or kerf.

When you pull the starter grip, don't wrap the starter rope around your hands. Do not allow the grip to snap back, but guide the starter rope slowly back to permit the rope to rewind properly. Failure to follow this procedure may result in injury to hand or fingers and may damage the starter mechanism.

Important adjustments

Warning! At correct idle speed, chain should not turn. For directions to adjust idle speed, see the appropriate section of this Owner's Manual.

Do not use a saw with incorrect idle speed adjustment. Adjust the idle speed your-self according to the appropriate section of this manual.

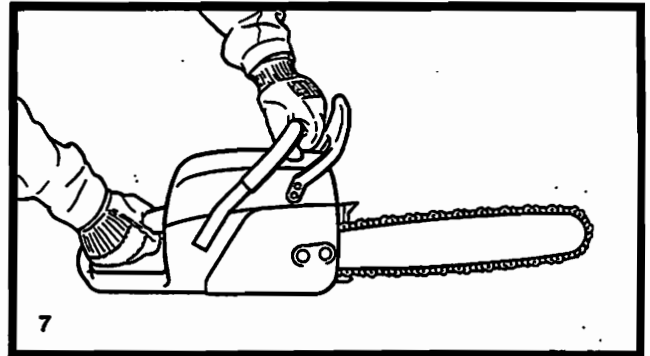
Have your STIHL Dealer check your saw and make proper adjustments or repairs.

After adjusting a chain start the saw, let the engine run for a while, then switch engine off and recheck chain tension. Proper chain tension is very important at all times.

Working Conditions

Operate your chain saw only outdoors in a ventilated area. Operate the saw under good visibility and daylight conditions only.

Warning! Take extreme care in wet and freezing weather (rain, snow, ice). Put off the work when the weather is windy, stormy or rainfall is heavy. Clear the area where you are working.



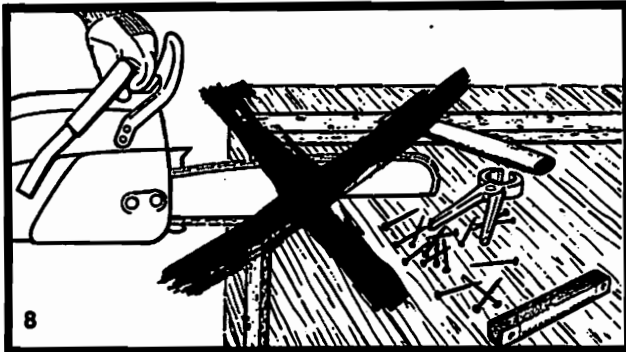
Warning! Avoid stumbling on obstacles such as stumps, roots or rocks and watch out for holes or ditches. Be extremely cautious when working on slopes or uneven ground. There is increased danger of slipping on freshly debarked logs.

Cutting Instructions

Grip: Always hold the saw firmly with both hands when the engine is running. Place your left hand on front handle bar and your right hand on rear handle and throttle trigger. Left-handers should follow this instruction too.

Wrap your fingers tightly around the handles, keeping the handles cradled between your thumb and forefinger (ill. 7). With your hands in this position, you can best oppose and absorb the push, pull and kickback forces of your saw without having it slip out of your grip (see section of reactive forces). Make sure your chain saw handles and grip are in good condition and free of moisture, pitch, oil or grease.

Warning! Never use the saw with one hand. You cannot control reactive forces (see pages 10 to 13) and may lose control of the saw.



Warning! Do not operate your chain saw with starting throttle. Cutting with starting throttle does not permit the operator proper control of the saw or chain speed.

Warning! Never touch a rotating chain with your hand or any part of your body.

Warning!

Do not cut any material other than wood or wooden objects.

Use your chain saw for cutting only. It is not designed for prying or shoveling away limbs, roots or other objects.



When sawing, make sure that the saw chain does not touch any foreign materials such as rocks, nails and the like (ill. 8). Such objects may be flung off, damage the saw chain or cause the saw to kick back.

In order to keep control of your saw, always maintain a firm foothold. Never work on a ladder, in a tree or on any other insecure support. Never use the saw above shoulder height (ill. 9).



Position the chain saw in such a way that your body is clear of the cutting attachment whenever the engine is running. Stand to the left of cut while bucking (see ill. 10).

Don't put pressure on the saw when reaching the end of a cut. The pressure may cause the bar and rotating chain to pop out of the cut or kerf, go out of control and strike the operator or some other object. If the rotating chain strikes some other object a reactive force (see pages 10 to 13) may cause the chain to strike the operator.

Reactive forces during the cut, including kickback

WARNING!

Reactive forces, that may occur during any cut are kickback, pushback and pull-in. Reactive forces can be dangerous! In any chain saw, the powerful force used to cut wood can be reversed (and work against the operator).

If the rotating chain is suddenly stopped by contact with any solid object like a log or branch or is pinched, the reactive forces instantly occur. These reactive forces may result in loss of control which may, in turn, cause serious or fatal injury. An understanding of the causes of these reactive forces may help you avoid loss of control.

The most common reactive forces are

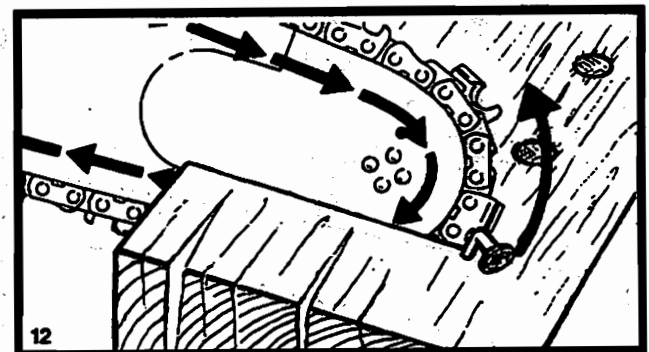
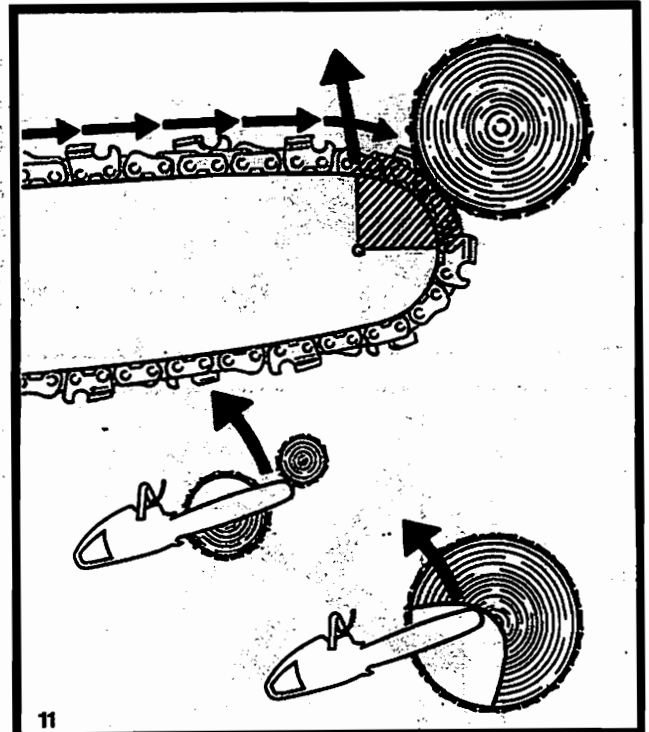
- kickback,
- pushback,
- pull-in.

Kickback:

Kickback occurs when the upper quadrant of the bar nose contacts a solid object in the wood or is pinched (ill. 11). The reaction of the cutting force of the chain causes a rotational force of the chain saw in the direction opposite to the chain movement, mainly in the plane of the bar. This may fling the bar in an uncontrolled arc mainly in the plane of the bar.

Under some circumstances the bar moves towards the operator who may suffer severe or fatal injury. It may also occur during limbing. It also occurs when the nose of the guide bar is pinched unexpectedly, unintentionally contacts solid material in the wood (ill. 12) or is incorrectly used to begin a plunge or boring cut.

10 The greater the force of the kickback reaction, the more difficult it becomes for the operator to control the saw.



Many factors influence the occurrence and force of the kickback reaction. The type of bar and saw chain you use is a factor in the force of the kickback reaction.

The speed of contact at which the cutter contacts the object.

Kickback forces increase with the rate of impact.

The contact angle between the nose of the bar and the foreign object (see ill. 11).

Kickback is most pronounced in the upper quadrant of the bar nose.

Some STIHL chain types are designed to reduce kickback forces.

The depth gauges:

Improper lowering of the depth gauges also increases the chance of a kickback.

The sharpening condition:

Warning!

A dull or improperly sharpened chain may increase the risk of kickback. Always cut with a properly sharpened chain.

Devices for reducing the risk of kickback injury

STIHL has developed a chain stopping system to reduce the risk of injury in certain kickback situations. It is called a Quickstop.

The Quickstop is available as an option on most STIHL chain saws.

When a kickback occurs the guide bar may rotate around the front handle. If the cutting position is such that the

operator's left hand is gripping the front handle behind the hand guard, and if the left hand rotates around the front handle and contacts the front hand guard, which is the Quickstop activating lever, this contact will activate the Quickstop and stops the chain (see ill. 13).

The chain brake of some STIHL chain saws is additional self-activated by inertia. See appropriate chapter "Chain Brake" of your Owner's Manual.

Kickback tendency increases as the radius or size of the guide bar nose increases. STIHL has developed guide bars with small nose radius. These bars are designed to reduce the kickback tendency and are available as an option.

STIHL has developed chains whose configurations are designed to reduce kickback forces. These chains are available as an option.

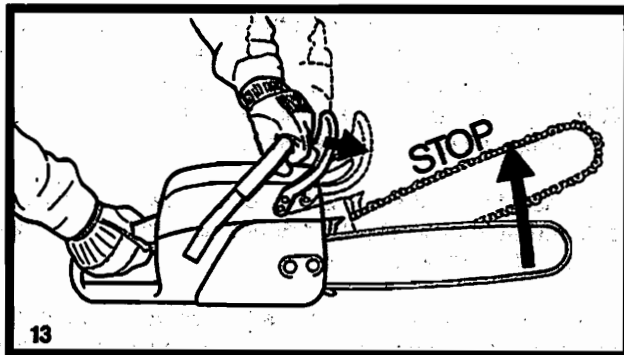
Warning!

Chain saw kickback may cause serious or fatal injury. To reduce the risk of kickback injuries STIHL recommends that you equip your saw with a narrow nose bar, low profile chain or other chain designed to reduce kickback forces, and a STIHL Quickstop.

Warning!

No Quickstop or chain brake device prevents kickback. These devices are designed only to stop the chain, if activated, in certain kickback situations.

In order for the Quickstop to reduce the risk of kickback injury, it must be properly maintained and in good working order. In addition, there must be enough distance between the bar and the operator to ensure that the Quickstop has sufficient time to activate and stop the chain before potential contact with the operator.



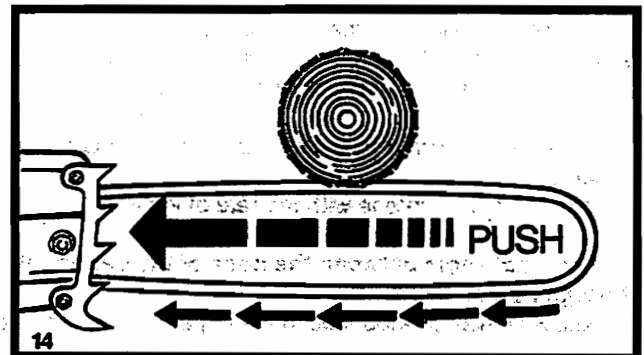
Warning!

Even if your saw is equipped with a Quickstop, a narrow nose bar or reduced kickback chain, this does not guarantee that you will not be injured by kickback, and therefore always observe all safety precautions to avoid kickback situations.

To avoid kickback

The best protection from personal injury that may result from kickback is to avoid kickback situations:

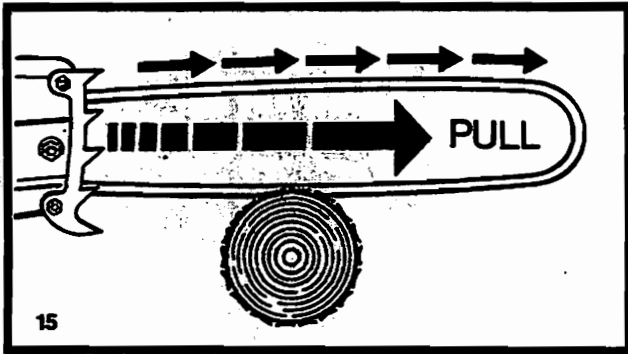
1. Hold the chain saw firmly with both hands and maintain a secure grip.
2. Be aware of the location of the guide bar nose at all times.
3. Never bring the nose of the guide bar in contact with any object. Do not cut limbs with the nose of the guide bar. Be especially careful with small, tough limbs, small size brush and saplings which may easily catch the chain.
4. Don't overreach.
- 12 5. Don't cut above shoulder height.



6. Begin cutting and continue at full throttle.
7. Cut only one log at a time.
8. Use extreme caution when re-entering a previous cut.
9. Do not attempt plunge cuts (see page 16) if you are not experienced with these cutting techniques.
10. Be alert for shifting of the log or other forces that may cause the cut to close and pinch the chain.
11. Maintain saw chain properly. Cut with a correctly sharpened, properly tensioned chain at all times.
12. Stand to the side of the cutting path of the chain saw.

Pushback:

Pushback occurs when the chain on the top of the bar is suddenly stopped when it is pinched, caught or encounters a foreign object in the wood. The reaction of the chain drives the saw straight back toward the operator causing loss of saw control. Pushback frequently occurs when the top of the bar is used for cutting (see ill. 14).



To avoid pushback

1. Be alert to forces or situations that may cause material to pinch the top of the chain.
2. Do not cut more than one log at a time.
3. Do not twist the saw when withdrawing the bar from a plunge cut or under buck cut (figures 25 to 27 and 33, pages 16, 17 and 19), because the chain can pinch.

Pull-in:

Pull-in occurs when the chain on the bottom of the bar is suddenly stopped. The chain on the bottom of the bar stops when it is pinched, caught or encounters a foreign object in the wood (see ill. 15). The reaction of the chain pulls the saw forward, causing the operator to lose control.

Pull-in frequently occurs when the bumper spike of the saw is not held securely against the tree or limb and when the chain is not rotating at full speed before it contacts the wood.

Warning!

Use extreme caution when cutting small size brush and saplings which may easily catch the chain and pull you off balance.

To avoid pull-in

1. Always start a cut with the chain rotating at full speed and the bumper spike in contact with the wood.
2. Pull-in may also be prevented by using wedges to open the kerf or cut.

Cutting Techniques

Felling

Felling is cutting down a tree.

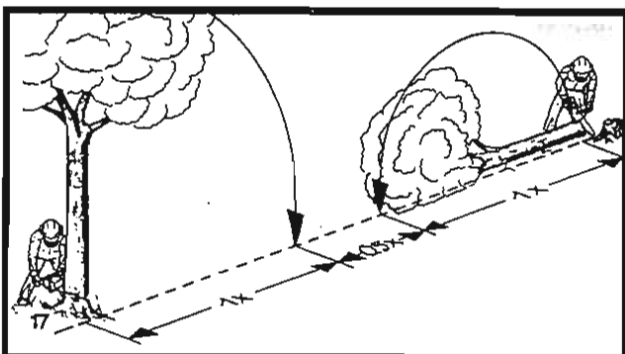
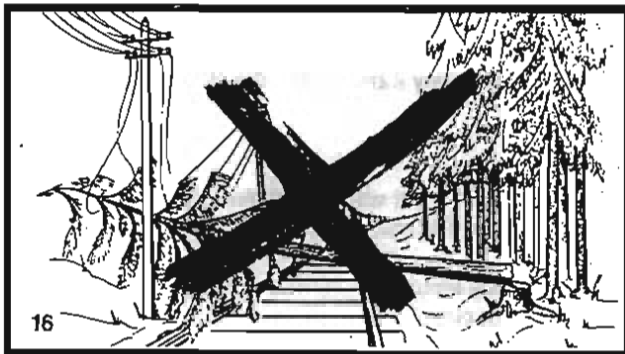
Before felling a tree, consider carefully all conditions which may affect the direction of fall, including:

- The intended direction of the fall.
- The natural lean of the tree.
- Any unusually heavy limb structure.
- Surrounding trees and obstacles.
- The wind direction and speed.

Warning!

Always observe the general condition of the tree. Look for decay and rot in the trunk. If it is rotted inside, it could snap and fall toward the operator while being cut.

Also look for broken or dead branches which could vibrate loose and fall on the operator. When felling on a slope, the operator should stand on the up-hill side if possible.



When felling in the vicinity of roads, railways and power lines, etc., take extra precautions (see ill. 16). Inform the police, utility company or railway authority before beginning to cut.

When felling, maintain a distance of at least $2\frac{1}{2}$ tree lengths from the nearest person (see ill. 17).

Note:

14 The noise of your engine may drown any warning call.

Felling Instructions:

First clear the tree base and work area from interfering limbs and brush and clean its lower portion with an axe (ill. 18).

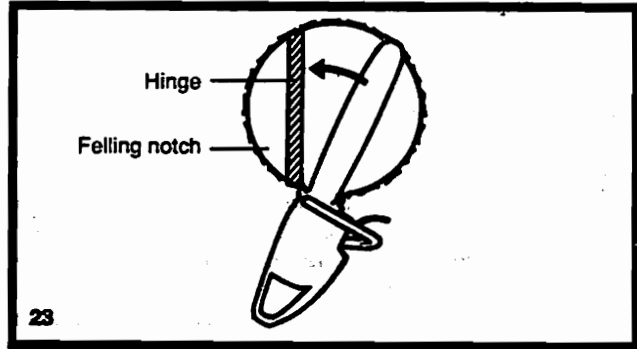
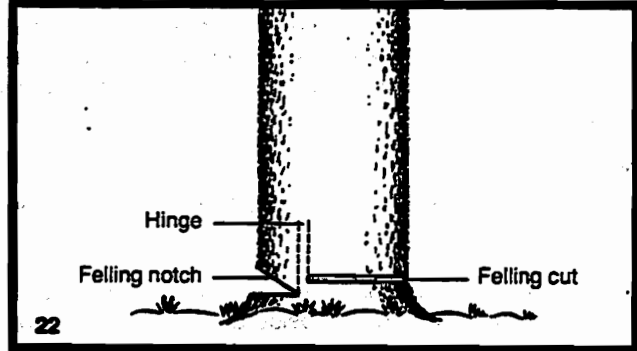
Then, establish a path of escape and remove all obstacles. This path should be opposite to the planned direction of the fall of the tree and at a 45° angle (ill. 19). An alternate path must also be selected. Place all tools and equipment a safe distance away from the tree, but not on the escape path.

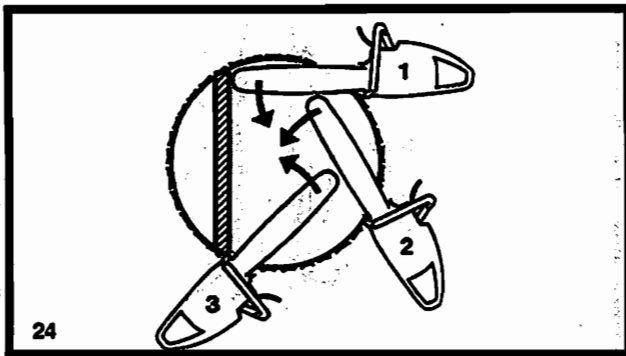


If the tree has large buttress roots, cut into the largest buttresses vertically first (horizontally next) and remove (ill. 20).

Then, determine the placement of the felling notch (ill. 21). The felling notch when properly placed determines the direction in which the tree will fall. It is made perpendicular to the line of fall and should be as close to the ground as possible. Cut the felling notch to a depth of about one-fifth to one-fourth of the trunk diameter (ill. 22). It should be in no case higher than it is deep. Make the felling notch very carefully.

Begin the felling cut slightly higher than the felling notch and on the opposite side of the tree (ill. 22). Then cut horizontally through towards the felling notch. Apply the chain saw with its spikes directly behind the uncut portion of wood and cut toward the notch (ill. 23). Leave approximately $\frac{1}{10}$ of the tree diameter uncut. This is the hinge (ill. 23). Do not cut through the hinge because you could lose control of the direction of the fall. Drive wedges into the felling cut where necessary to control the direction of the fall. Wedges should be of wood, light alloy or plastic—never of steel, which can cause kickback and damage to the chain.





Always keep to the side of the falling tree. When the tree starts to fall, shut off the engine, withdraw the bar and walk away on the pre-planned escape path. Watch out for falling limbs.

Warning!

Be extremely careful with partially fallen trees which are poorly supported.

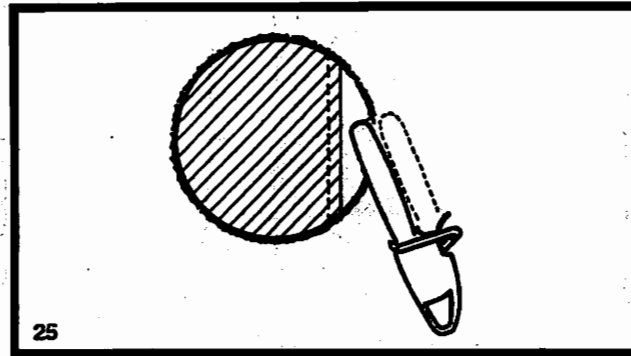
When the tree hangs or for some other reason does not fall completely, set the saw aside and pull the tree down with a cable winch, block and tackle or tractor. If you try to cut it down with your saw, you may be injured.

Sectioning Method

Warning!

Felling a tree that has a diameter greater than the length of the guide bar requires use of either the sectioning or plunge-cut method. These methods are extremely dangerous because they involve the use of the nose of the guide bar and can result in kickback. Only properly trained professionals should attempt these techniques.

16



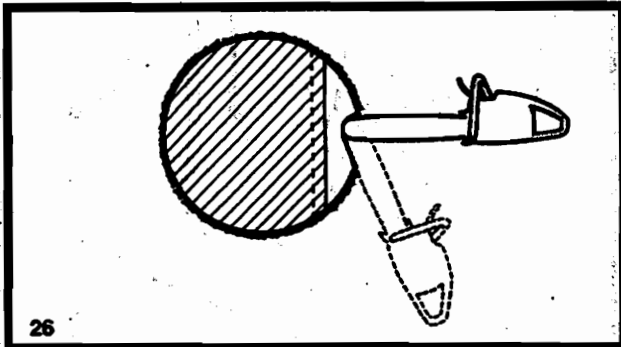
For the sectioning method (ill. 24) make the first cut with the guide bar fanning in toward the hinge. Then, using the bumper spike as a pivot, reposition the saw for the next cut. Avoid repositioning the saw more than necessary. When repositioning for the next cut, keep the guide bar fully engaged in the kerf to keep the felling cut straight. If the saw begins to pinch, insert a wedge to open the cut. On the last cut, do not cut the hinge.

Plunge-Cut Method

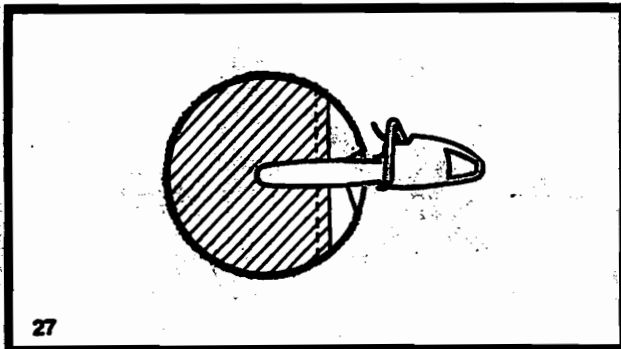
Timber having a diameter more than twice the length of the guide bar requires the use of the plunge-cut method before making the felling cut.

First, cut a large, wide notch. Make a plunge-cut in the center of the notch.

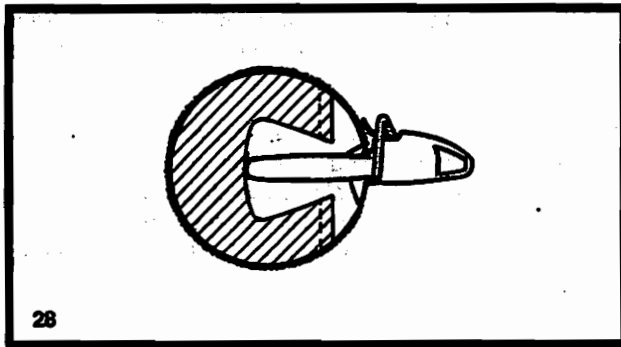
The plunge cut is made with the guide bar nose. Begin the plunge cut by applying the lower portion of the guide bar nose to the tree at an angle (ill. 25). Cut until the depth of the kerf is about the same as the width of the guide bar



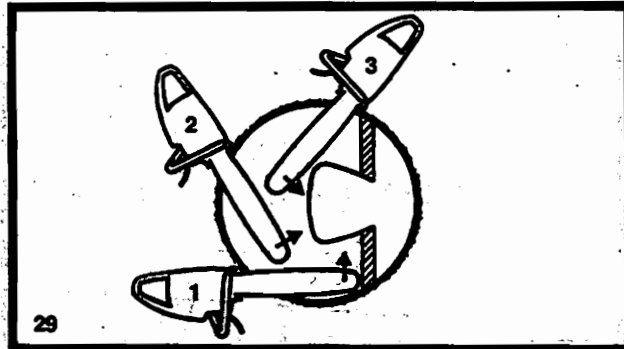
26



27



28



29

(ill. 26). Next, align the saw in the direction in which the recess is to be cut.

With the saw at full throttle, insert the guide bar in the trunk (ill. 27).

Enlarge the plunge cut as shown in illustration (ill. 28).

Warning!

There is an extreme danger of kickback at this point. Extra caution must be taken to maintain control of the saw. To make the felling cut, follow the sectioning method described previously (ill. 29).

If you are inexperienced with a chain saw plunge-cutting should not be attempted. Seek the help of a professional.

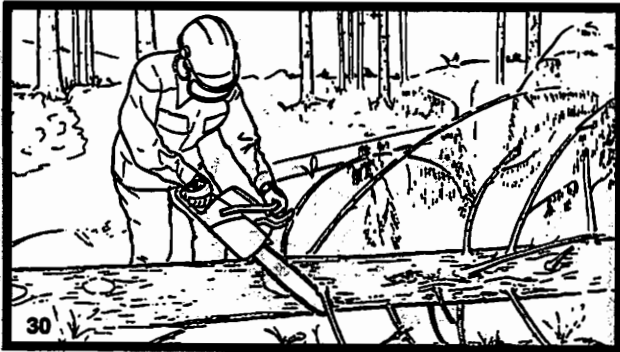
Limbing

Limbing is removing the branches from a fallen tree.

Warning!

There is an extreme danger of kickback during the limbing operation. Do not work with the nose of the bar. Be extremely cautious and avoid contacting the log or other limbs with the nose of the guide bar.

Do not stand on a log while limbing it – you may slip or the log may roll.



Start limbing by leaving the lower limbs to support the log off the ground (ill. 30). Always cut from the top of the limb. Do not underbuck freely hanging limbs. A pinch may result or the limb may fall, causing loss of control. If a pinch occurs, stop the engine and remove the saw, by lifting the limb.

Warning!

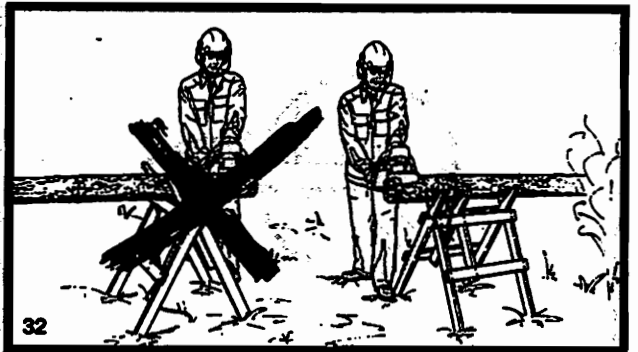
Be extremely cautious when cutting limbs under tension. The limb could spring back toward the operator and cause loss of control of the saw or injury to the operator.

Bucking

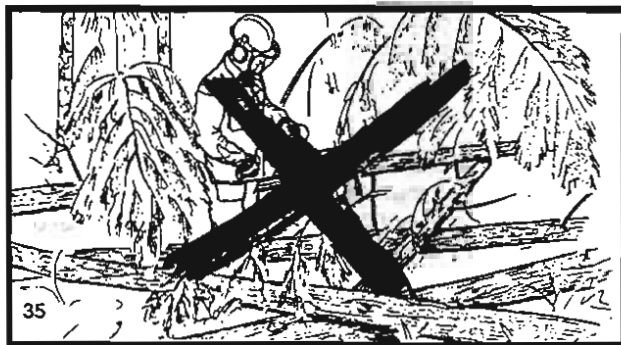
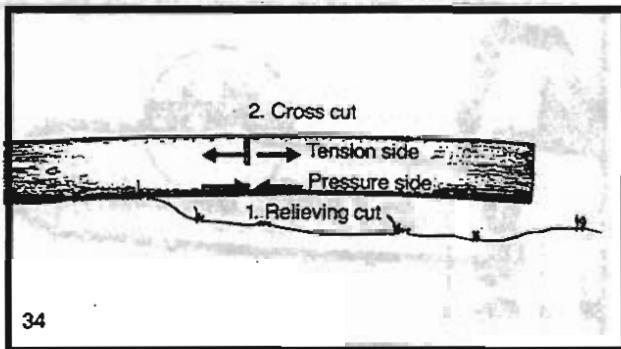
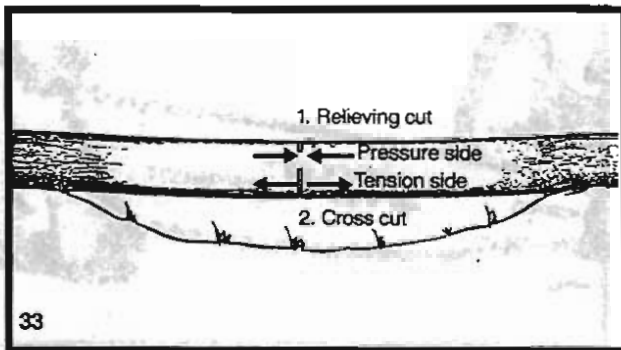
Bucking is cutting a log into sections.

Warnings!

1. When bucking, do not stand on the log. Make sure the log will not roll down-hill. If on a slope, stand on the up-hill side of the log (see ill. 31). Watch out for rolling logs.
2. Cut only one log at a time.
3. Shattered wood should be cut very carefully. Sharp slivers of wood may be caught and flung in the direction of the operator of the saw.



4. When cutting small logs, use a sawhorse (ill. 32). Never permit another person to hold the log. Never hold the log with your leg or foot.
5. Logs under strain require special attention to prevent the saw from pinching. The first cut is made on the compression side to relieve the stress on the log (see ill. 33, 34). The bucking cut is then made as shown. If the saw pinches, stop the engine and remove it from the log.
6. Only properly trained professionals should work in an area where the logs, limbs and roots are tangled (i.e. a



blowdown area, ill. 35). Working in blowdown areas is extremely hazardous.

7. Drag the logs into a clear area before cutting. Pull out exposed and cleared logs first.

Maintenance and Repair

Never operate a chain saw that is damaged, improperly adjusted or not completely or securely assembled. Follow the maintenance and repair instructions in the appropriate section of your Owner's Manual.

Warning!

Always stop the engine and make sure that the chain is stopped before doing any maintenance or repair work or cleaning the saw. Do not attempt any maintenance or repair work not described in your Owner's Manual. Have such work performed at your STIHL service shop only.

MAINTAINING AND STORING THE SAW

Keep the chain, bar and sprocket clean and lubricated; replace worn sprockets or chains.

Keep the chain sharp. You can spot a dull chain when easy-to-cut wood becomes hard to cut and burn marks appear on the wood.

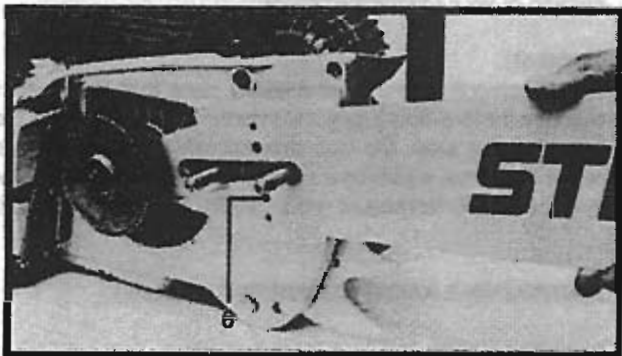
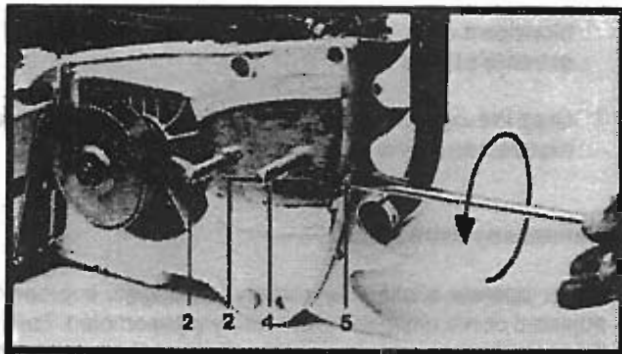
Keep the chain at proper tension. Tighten all nuts, bolts and screws except the carburetor adjustment screws after each use.

Keep spark plug and wire connection tight and clean.

Store saws in a high or locked place, away from children.

Mounting Guide Bar and Chain

Top: Backing off tensioning nut
Bottom: Locating the guide bar

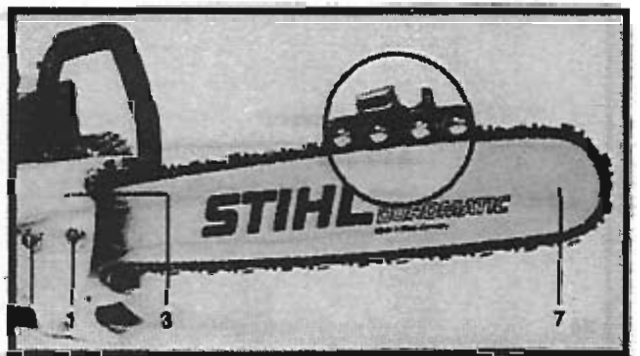


The guide bar and Oilomatic chain are supplied separately for safety reasons.

To mount them, first unscrew the collar nuts (1) from the stud bolts (2) and take off the sprocket cover (3).

Now back off the chain tensioning nut (4) – below the stud bolts (2) – by turning the tensioning screw (5) counter-clockwise to the end of its thread.

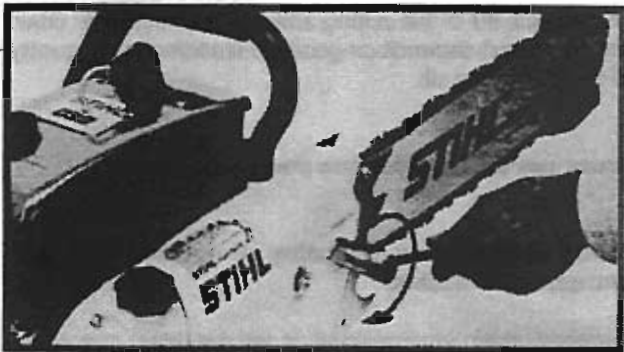
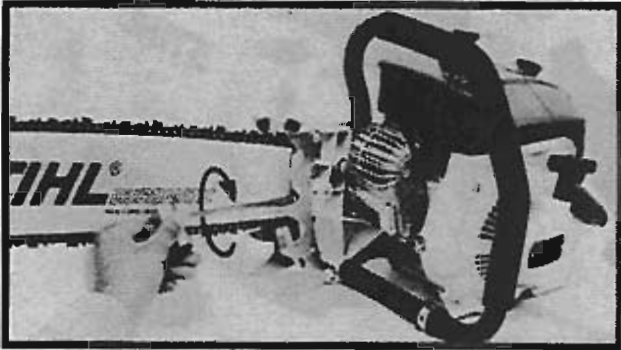
Top: Fitting the Oilomatic chain
Bottom: Cutting edges face the bar nose



Locate slot of guide bar over the stud bolts (2) so that the lug of the tensioning nut (4) engages in the lower fixing hole (6).

Starting at the chain sprocket, place the Oilomatic chain on the guide bar so that cutting edges on the top of the bar are facing the bar nose (7). Fit chain sprocket cover (3) on the stud bolts (2) and tighten collar nuts (1) temporarily by hand.

Top: Tensioning the Oilomatic chain
Bottom: Tighten collar nuts securely



Now tension the Oilomatic chain by turning the tensioning screw (5) clockwise, making sure that the drive link tangs are lined up with the bottom groove of the bar. Hold the bar nose (7) up turn tension screw (5) until the Oilomatic chain is properly seated on the underside of the bar. While still holding the bar nose up, tighten the collar nuts (1) securely.

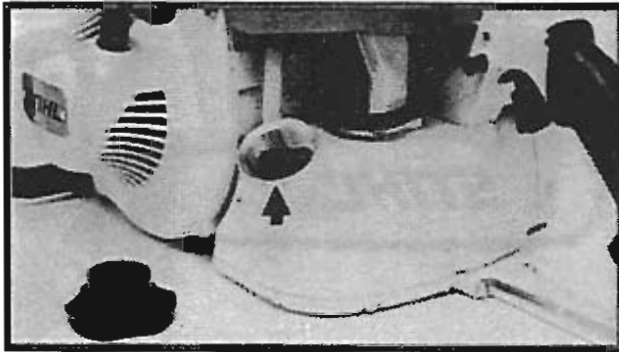
Checking chain tension



The Oilomatic chain is correctly tensioned when it fits snugly on the underside of the bar but can still be pulled easily around the bar.

Fuel

Fuel tank cap open



Your two-stroke engine is powered by a mixture of gasoline and engine oil.

Only regular gasoline may be used. Never use high octane gasoline as it contains benzol which would permanently damage the carburetor diaphragms.

Only use STIHL two-cycle engine oil or other branded two-cycle engine oils for mixing. The mix ratio is 1:40 (1 part oil to 40 parts regular gasoline) with STIHL two-cycle engine oil or 1:25 for other branded engine oils.

Important: Always shake mixture in fuel can vigorously before fueling.

Chain Oil

Oil filler cap open



The service life of the cutting attachment (Oilomatic chain and guide bar) depends on good lubrication and the quality of the lubricating oil.

Never use waste oil for this purpose!

Always use the chain lubricating oil approved by STIHL and appointed dealers.

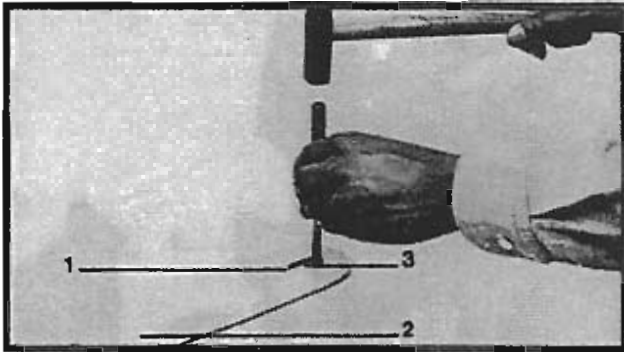
If special chain lubricating oil is not available, one of the high-duty, single grade engine oils listed below may be used in an emergency, depending on the outside temperature.

Outside temperature +10°C... +40°C: SAE 30
Outside temperature +10°C... -10°C: SAE 20
Outside temperature -10°C... -30°C: SAE 20 W or
SAE 10 W

Always top up with chain oil when you refuel. Carefully clean the area around the filler caps before opening and make sure that no dirt falls into the tank while you are refueling.

Helpers Handle

Knocking out blanking plug



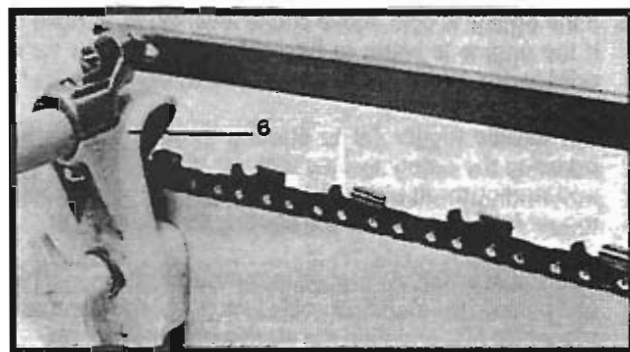
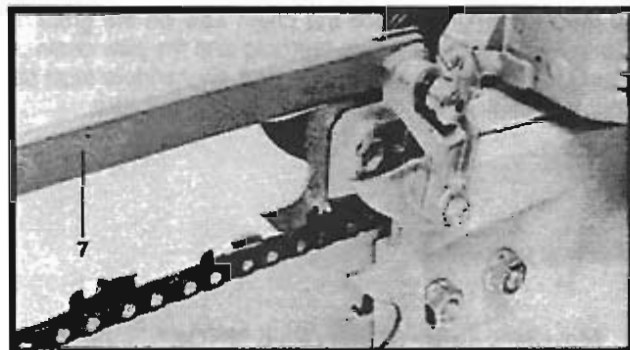
For safety reasons and to improve cutting accuracy it is advisable to use the helpers handle (1109 660 2500) if your saw is equipped with a 105 cm (42 in) or longer cutting attachment. With the handle fitted a second man can safely assist the saw operator in handling the saw.

When the helpers handle is being used the non-cutting side of the saw chain must always be covered by a guard rail which matches the bar length.

To assemble the helpers handle, first knock out the blanking plug (3) in the slot (1) at the bar nose (2). Then turn the clamp nut (5) (star knob) counterclockwise to rotate the head of the clamp bolt (4) so that it fits through the slot (1) in the bar. The head of the clamp bolt (4) is turned through 90° when the clamp nut (5) (star knob) is tightened and thus secures the helpers handle (6) against the guide bar (2).

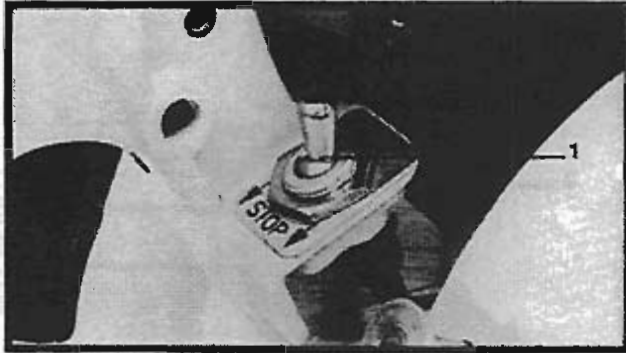
To attach the guard rail (7), first fit the mounting hardware to the crankcase and the helpers handle and then place the guard rail in position.

Top: Tightening the clamp nut
Center: Mounting hardware fitted on bumper spike
Bottom: Guard rail in position



Starting

Stop switch away from "STOP"



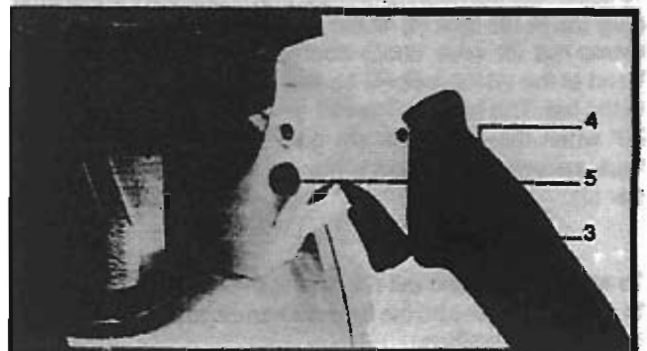
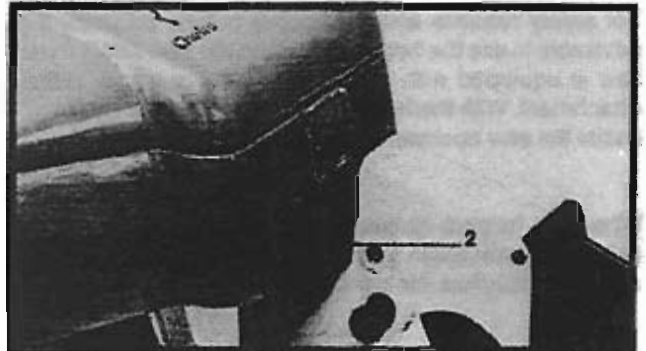
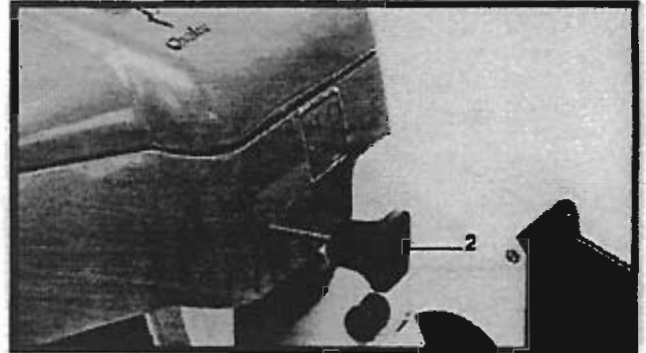
To start the engine, place the chain saw on the ground, make sure you have a firm foothold and the saw chain is clear of all obstacles and the ground. Bystanders must be kept well clear of the general work area of the saw.

Starting procedure

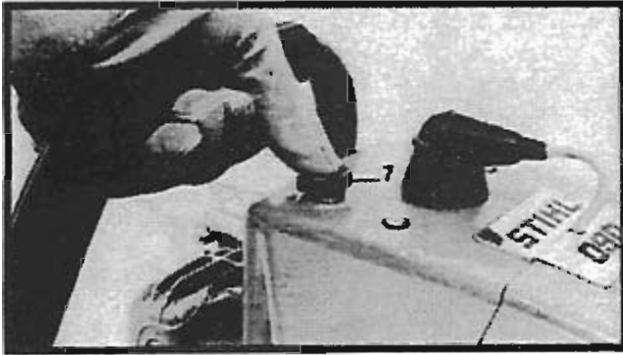
1. Move stop switch (1) away from "STOP".
2. If the engine is cold, move choke lever (2) to "Choke". If the engine is warm or has only been stopped for a brief period, move choke lever (2) away from "Choke".
3. Set throttle trigger (3) to starting throttle position by pressing the safety throttle lock (4), throttle trigger (3) and starting throttle lock (5) in that order. Let go of throttle trigger (3) first and then the starting throttle lock (5).

If you have an 090 AV first squeeze the throttle trigger (3) and press in the starting throttle lock (5). Let go of throttle trigger (3) first and then the starting throttle lock (5).

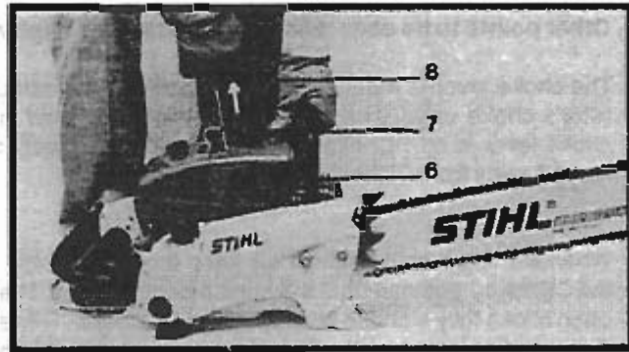
Top: Choke lever in "Choke" position (cold start)
Center: Choke lever away from "Choke" position (warm start)
Bottom: Starting throttle position



Pressing the decompression valve



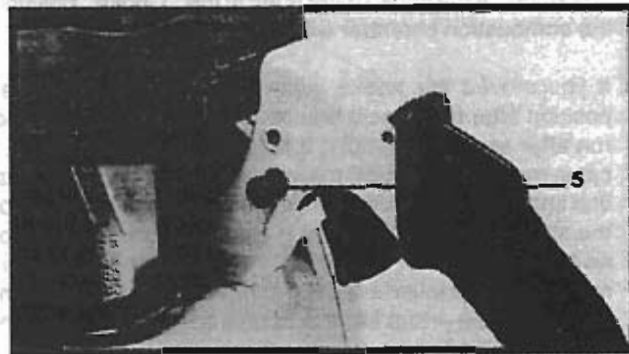
Top: Starting
Center: Idle position
Bottom: Stop switch in "STOP" position



4. Hold the saw firmly on the ground with your left hand around the handlebar (6) and put the toe of your right foot into the rear handle and press down.
5. Press the decompression valve (7) with the thumb of your left hand. Pull the starter grip (8) slowly with your right hand until you feel the starter engage and then give it a brisk strong pull.

The starter rope should not be pulled out more than 70 cm (27 in) as there is otherwise a risk of it breaking.

Do not allow starter grip (8) to snap back. Guide it back vertically so that the starter rope can rewind correctly.



6. As soon as the engine is running, release the decompression valve (7) and immediately disengage the starting throttle lock (5) by briefly squeezing the throttle trigger so that the engine can settle down to idle speed.

7. To stop the engine, flick the stop switch (2) to the "STOP" position.



Other points to be observed when starting the engine:

The choke lever is mechanically connected to the carburetor's choke valve. The choke valve is closed when the choke lever is on "Choke" and when the choke lever is moved away from "Choke".

When starting a cold engine only keep the choke lever in the "Choke" position until the engine begins to fire. Then open choke fully – choke lever away from "Choke" – even if the engine stops and you have to repeat the starting procedure. If the choke lever is left in the "Choke" position, the combustion chamber will flood and stall the engine.

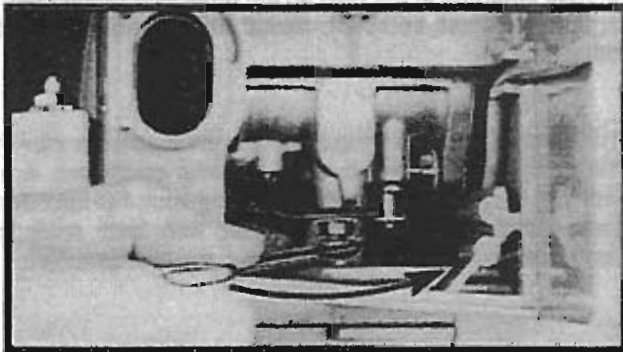
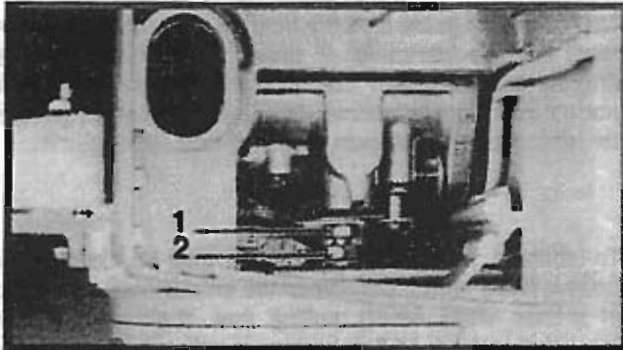
If you moved the choke lever away from the "Choke" position after the engine fired and the engine still does not run after several attempts, it is already flooded. In such a case, remove and dry off the spark plug. Clear the combustion chamber by cranking the engine over several times on the starter with the spark plug still removed and the stop switch in the "STOP" position. When you now try to start, move the choke lever away from "Choke" – even if the engine is cold – and set the throttle trigger to the starting throttle position.

In very cold weather only open the choke slightly after starting – move choke lever to center position. Allow engine to warm up for a brief period at half-throttle. Then move choke lever away from "Choke" and disengage the starting throttle lock.

A new engine or one which has been run until the fuel tank is dry will not start first time after fueling because the carburetor's diaphragm pump only delivers sufficient fuel after the engine has been turned over several times.

Oil quantity control

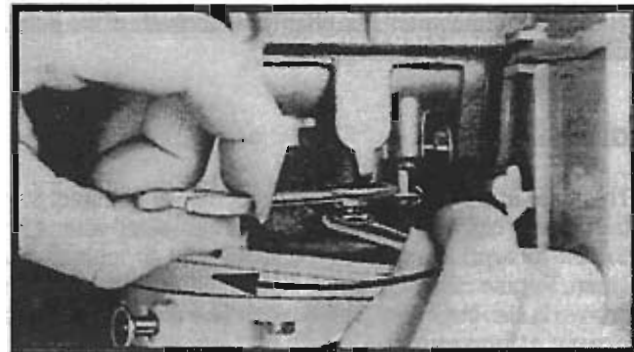
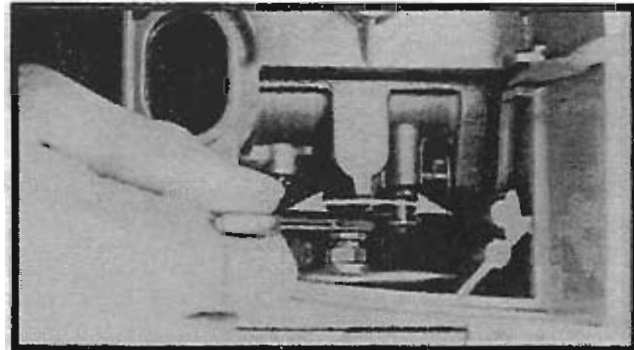
Top: 1 = Adjusting screw
2 = Counter nut
Bottom: Loosening the counter nut



At the factory the chain oil supply of the oil pump is adjusted to the standard cutting lengths of 53 cm (20.9 in.) bar for 090, 090 AV, 90 cm (35.4 in.) bar for 090 G. When using longer guide bars it is possible to adjust the oil quantity according to the bar length used by means of the provided adjustment screw.

Before readjusting the oil quantity remove filter cover and filter, first, however, close choke shutter (position "0") so that no dirt can drop into the carburetor.

Top: Adjusting the oil quantity
Bottom: Countering

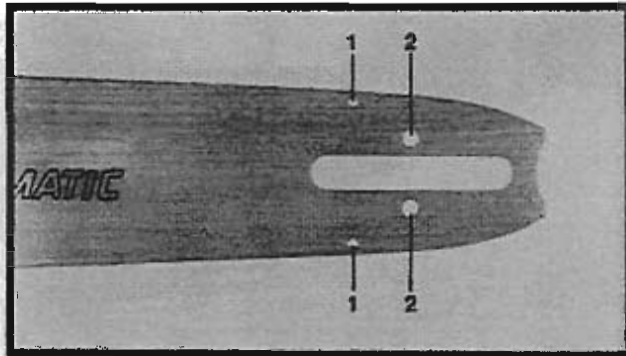


The adjusting screw for regulating the oil quantity is located at the rear wall of the oil tank and is countered with a hexagonal nut. Hold adjusting screw with fork wrench SW 10 and loosen counter nut with second wrench.

When turning the adjusting screw to the left – counter clockwise – more oil is supplied and when turning to the right less oil is supplied. Turning the adjusting screw $\frac{1}{3}$ of a turn corresponds approx. to the necessary change of oil supply which is needed for the next longer bar length.

Cutting Attachment

- 1 Oil Inlet borings
- 2 Centering borings



The cutting attachment of a chain saw consists of the guide bar, saw chain and chain sprocket.

Guide bar

The nose and underside of the guide bar are subject to a particularly high rate of wear. To avoid one-sided wear, turn the bar around every time you sharpen or replace the chain. Regular cleaning of the oil inlet holes and guide bar groove is also important. The bar can be examined for signs of wear at the same time.

A minimum bar groove depth of 7 mm (0.28 in) must be maintained in order to prevent the drive links fouling the bottom of the groove (the heels of the cutter and tie strap would no longer locate on the guide bar track).

This depth should be measured at the point where the bar is stressed most, i.e. the bar nose on Duromatic bars and the area where most of the cutting is done on Rollomatic bars. The guide bar must be replaced if the minimum depth cannot be maintained.

On Rollomatic guide bars the bearing of the nose sprocket must also be lubricated at regulated intervals with the appropriate grease gun. Lubricate at least once daily under normal operating conditions. Only use a high grade grease for refilling the grease gun, e.g. refill tube 0781 120 1111.

To lubricate, place chain saw on its side so that the bar nose is firmly supported. Clean the grease hole and pump in grease while slowly pulling saw chain around bar (sprocket rotates) so that bearing is uniformly filled. When grease emerges at the hole on the other side of the bar or around the nose sprocket, repeat the procedure on the other side.

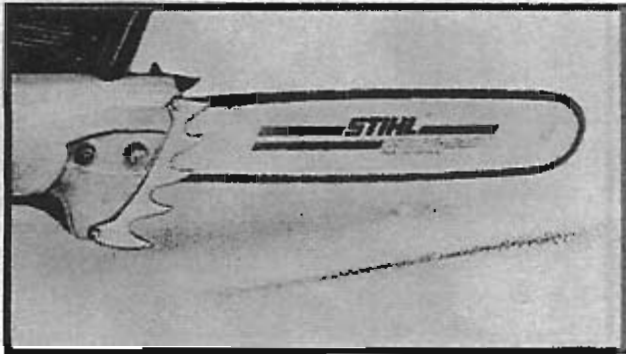
The sprocket nose bearing should be greased more often if the cutting attachment is used in damp conditions, e.g. working in snow. After finishing cutting work the sprocket nose should be thoroughly greased from both sides to force moisture out of the bearing and prevent corrosion.

Chain lubrication

Never operate the chain saw without proper chain lubrication. Check operation of chain lubrication and level in oil tank before starting work.

Hold chain saw with mounted cutting attachment over a light background. Take care, the Oilomatic chain must not touch the ground, i.e. keep it at least 20 cm (8 in) clear of the ground. Run the engine with half-throttle position. If an increasing patch of oil can be seen, chain lubrication is operating correctly.

Checking chain lubrication



Worn chain sprocket



Breaking in Oilomatic chain

Every new chain has to be broken in for about 2 to 3 minutes. Ample chain lubrication is essential during this period. After breaking in, stop the engine, check chain tension and adjust if necessary.

Correct chain tension

The Oilomatic chain must always be slackened off after finishing cutting work. A chain properly tensioned when it is warm would, when the temperature drops, be subjected to such great contraction stresses that it would break and also damage the crankshaft and bearings.

The Oilomatic chain must, therefore, always be tensioned – with the engine switched off – before you start cutting. Chain tension is correct in the cold condition when the chain fits snugly on the underside of the bar and can still be moved along the bar by hand. Extreme care must be taken as the cutting edges are very sharp.

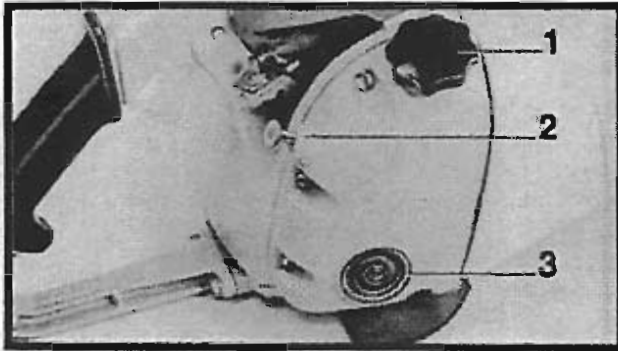
When the chain saw is operated at extremely low outside temperatures a correctly cold-tensioned Oilomatic chain will begin to sag noticeably as it warms up to normal operating temperature. The chain must then be retensioned. However, the chain must be slackened off again **immediately** after shutting down the saw. This is necessary to avoid contraction stress which would occur as the chain cools down to ambient temperature.

A new chain must be retensioned more frequently than a used one until it has stretched fully.

Chain sprocket

The stress and strain on the chain sprocket are particularly high. If the wear marks on the teeth are very pronounced (about 0.5 mm / 0.02 in deep), the sprocket should be replaced. A worn sprocket reduces the service life of the saw chain. The chain sprocket should be replaced as a matter of routine with every second Oilomatic chain. It is best to use two chains alternately with one sprocket.

- 1 = Oil filler cap
- 2 = Manual oiler
- 3 = Oil inspection window



After adjusting hold adjusting screw with a fork wrench and counter hexagonal nut again with second wrench. Thereafter assemble air filter and filter cover again.

In extreme cases (failure of automatic oil pump, heavy frost etc.) the use of the hand oiler assures sufficient chain lubrication.

Also during longer cutting periods with longer cutting lengths the chain is additionally supplied with lubricating oil by activating the manual oiler. Moreover, before starting we recommend to supply additional lubricating oil to bar and chain by activating the manual oiler should the saw sit idle at freezing temperatures for a longer period. Thus the cutting attachment is protected against excessive wear.

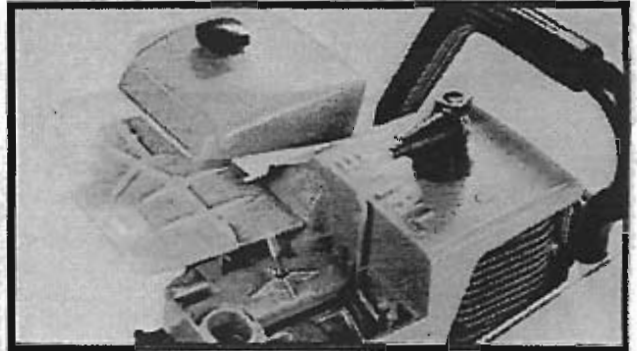
The oil level can be checked at the inspection window (3).

Always fill up with chain oil before starting work. Check the oil level at frequent intervals during cutting and top it up before it drops too low.

30

Air Filter

Disassembly of air filter



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

Clogged air filters reduce engine power, increase fuel consumption and make starting more difficult.

The air filter must be cleaned daily – or more frequently in very dusty operating conditions.

Before removing the filter, close the choke valve so that no dirt can get into the carburetor. Unscrew the filter cover and take out the filter element.

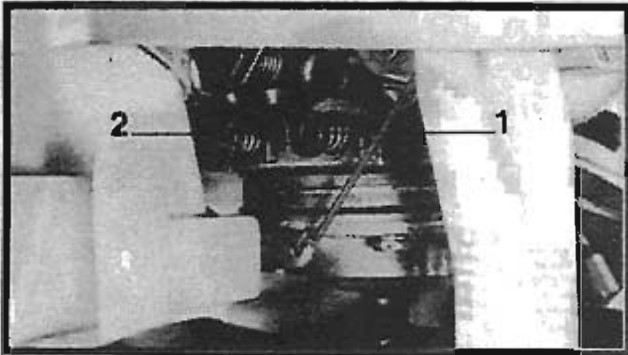
For daily cleaning it is sufficient to clean the filter with a soft brush. However, the complete air filter should be washed in clean gasoline at least once a week and blown out with compressed air if possible (flocked air filters must not be cleaned with compressed air, brushes or rags).

If the wire mesh is damaged on either half of the air filter (or if the flocking is damaged), always fit a new part.

It is advisable to carry a spare filter with you at all times and clean the dirty filter in the workshop.

Carburetor

- 1 = High speed adjustment screw
- 2 = Low speed adjustment screw



The carburetor is adjusted at the factory for maximum performance and most economic fuel consumption under average local atmospheric conditions. When working at high altitudes (mountains) or near sea level the carburetor may need to be readjusted. This must be done with two adjustment screws and the idle speed regulating screw.

Basic adjustment of the carburetor:

High speed adjustment screw (H): short,
1 turn open

Low speed adjustment screw (L): long,
1 turn open

Take this basic adjustment as a guide when readjusting your carburetor. Check carburetor adjustment with warm engine and a clean air filter. Carefully screw in both adjustment screw until snug fit!

Notes for fine adjustment of carburetor

Engine stops while idling:

Turn idle speed adjustment screw slightly clockwise while the engine is running (chain must not turn).

Chain turns while engine is idling:

Turn idle speed adjustment screw slightly counter-clockwise.

Engine runs erratically at idle speed:

Adjust at low speed adjustment screw. Turn clockwise for leaner mixture or counter-clockwise for richer mixture.

Caution: The setting of the high-speed adjustment screw affects the engine's maximum off-load speed, if it is set too lean (adjustment screw turned too far clockwise), the maximum permissible engine speed of 8000 r.p.m. will be exceeded. This can result in engine damage brought about by insufficient lubrication in particular.

Apart from minor readjustments, you should not attempt carburetor adjustments or repairs yourself. Entrust such work to STIHL Service. In most areas you will find STIHL Service Shops with trained specialists and the tools necessary for expert servicing.

Replacing the chain sprocket

Remove chain sprocket cover and cutting attachment. Loosen and remove spark plug with combination wrench. Screw locking screw from your tool set into cylinder and turn crankshaft clockwise until the piston rests against the locking screw thus locking the crankshaft.

On 090/090 AV proceed as follows:
Loosen hexagonal nut with combination wrench.

Attention! The hexagonal nut is of left hand thread – loosen clockwise!

Remove front washer, spacer ring, clutch, spiet-sleeve, rear washer, chain sprocket and needle cage.

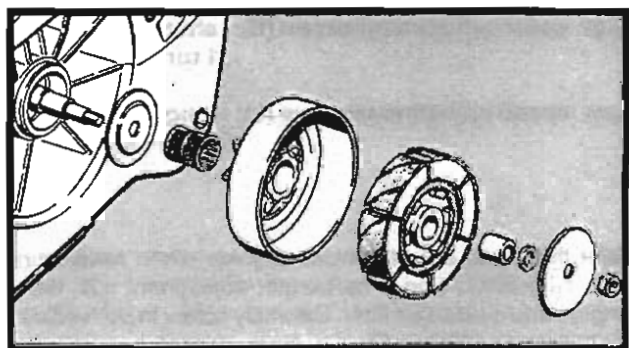
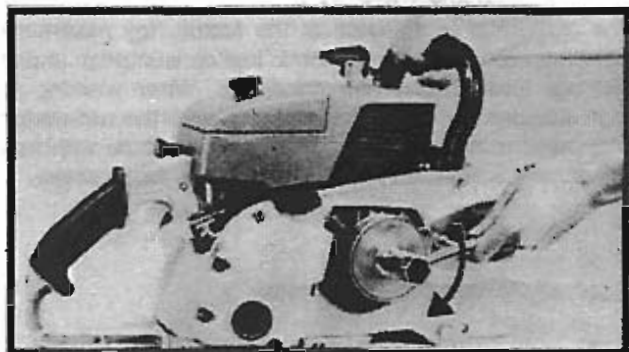
Clean needle cage in clean gasoline and grease with roller bearing grease.

When replacing the chain sprocket assembling is done in reverse sequence. Thereby care has to be taken that the rear washer with the arched indent at its outer diameter is pointing towards the crankcase.

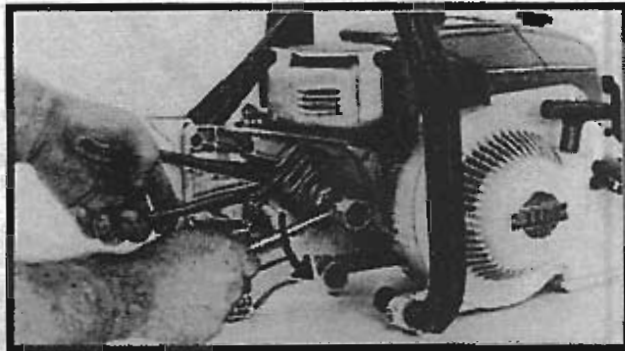
Tighten hex. nut with torque wrench at a torque of 5.0 kpm (36.2 lbf. ft.).

On the 090 G the chain sprocket is held in place with pipe pliers and the crankshaft nut is loosened by turning left – anticlockwise. Remove washer underneath the nut and pull off chain sprocket by means of special puller 1109 890 4401.

Top: Inserted locking screw
Center: Loosening the crankshaft nut (090/090 AV)
Bottom: Sequence of component parts (090/090 AV)



Top: Loosening the hex. nut (090 G)
Bottom: Pulling off the chain sprocket (090 G)

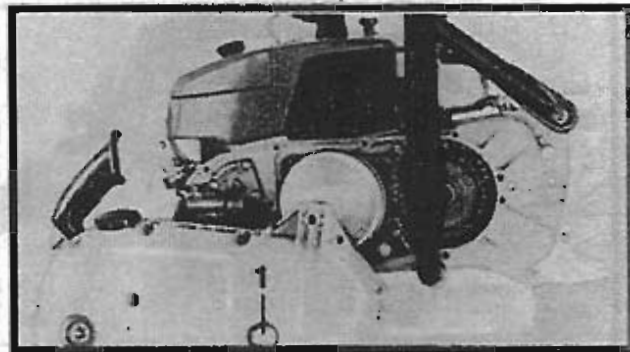


Clean and grease shaft end. Heat new chain sprocket sufficiently and slide it onto the driving shaft; thereby taking care that the key groove is guided properly over the key. Then place washer and nut onto the shaft, counterhold chain sprocket with pliers and strongly tighten hex. nut.

Remount cutting attachment and chain sprocket cover. Remove locking screw and mount spark plug again.

Gear lubricant 090 G

Opened gear cover
1 = Filler screw for gear lubricant



The spur gear of the 090 G is lubricated by a motor oil of group HD SAE 30. To avoid a malfunction of the centrifugal clutch this oil brand must be used under all circumstances for new fillings and when refilling.

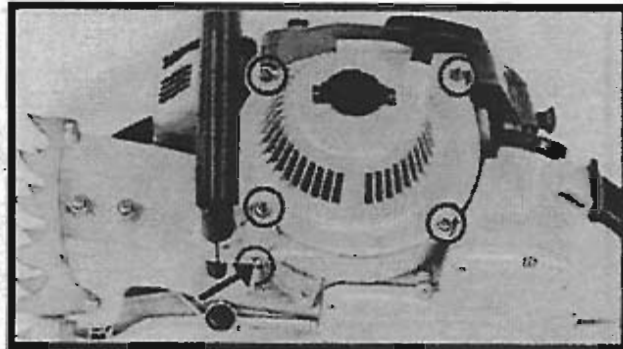
The oil level in the gear should be checked weekly. At horizontal position of the machine the oil level should be at the lower edge of the tap hole of the locking screw. If not, the respective quantity of oil must be refilled.

At least every 6 months the oil in the gear must be renewed. Put machine with gear cover pointing up, screw out manual oiler and remove gear cover. Empty the old oil and pry off cap on clutch drum by means of a screw driver; clean gear and clutch thereafter with clean gasoline.

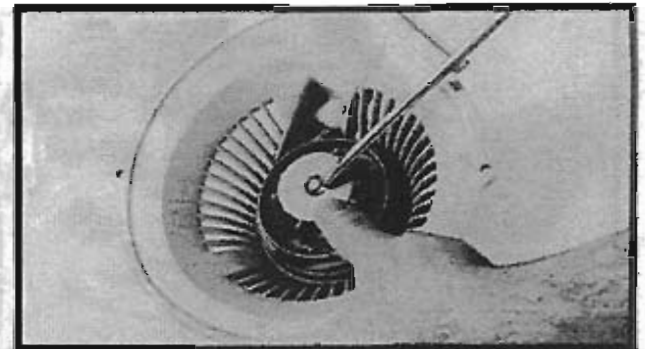
Press cap tightly onto the clutch drum again, put on gear cover and tighten. Then screw in manual oiler. Remove locking screw and fill in 0,15 l (0.32 pt.) oil.

Rewind starter

Loosening the fastening screws



Top: Prying off the retainer washer
Bottom: Component parts



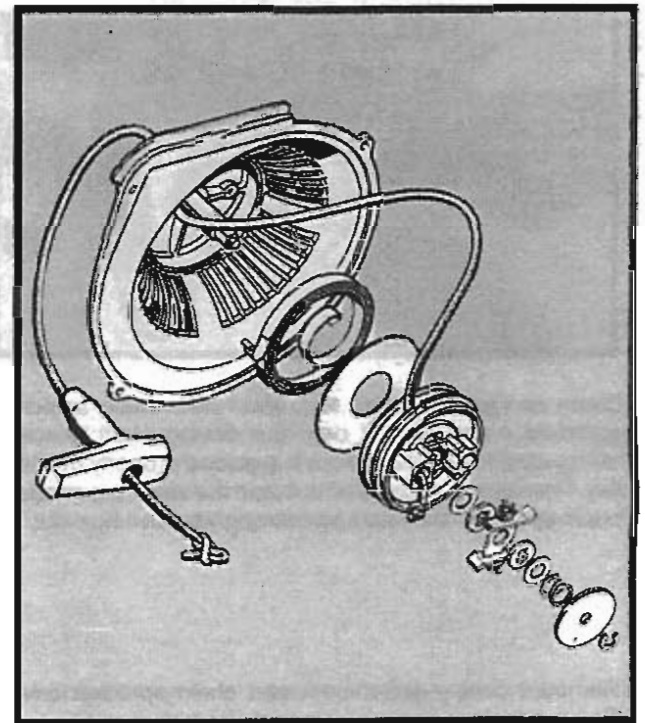
Replacing a broken starter rope:

Unscrew the 4 screws holding the fan cover and remove fan cover. On 090 G, however, first remove handle tube support. Pry off the retainer washer from starter shaft with a screw driver thereby holding brake washer in place in order to avoid that it jumps out thereby loosing the brake spring.

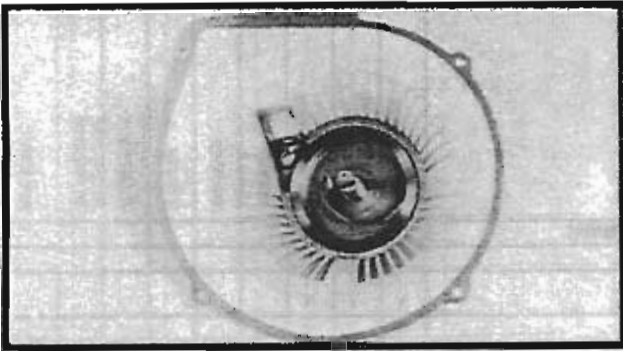
Now the component parts of the rewind starter can be removed.

Be careful when removing the rope pulley. The hooked in rewind spring must not jump out. Remove the remaining piece of the old starter rope, thread in a new rope of 4,5 mm (0.18 in.) \varnothing and 1000 mm (39.4 in.) length and secure in the pulley with a single knot. Thread the other end of the rope through the rope bushing in the fan cover and secure it in the starter grip with a double knot. Don't wind up the rope.

Mount rope pulley onto the starter shaft thereby applying some oil and take care that the cast lug of the rope pulley is hooked properly into the loop of the rewind spring.



Installed rewind spring



Now reinstall the remaining parts of the rewind starter in the correct sequence as shown on the illustration.

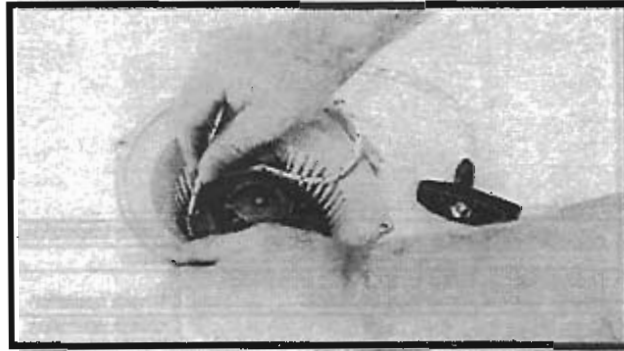
It is important that the two fiber material washers have to be inserted in front of and behind the friction shoe system. The friction shoe system is mounted properly when the lugs at the spring retainers point in clockwise direction. Secure rope with retaining washer and tension rewind spring.

Replacing a broken rewind spring

The spare spring is supplied ready for installation complete with spring housing and should be applied with a few drops of oil before mounting.

Insert recoil spring with spring housing – housing bottom pointing downwards – in the fan housing and hook outer spring lug into the cast lug of the fan housing. Should the rewind spring jump out during installation loop it back into the spring housing in clockwise direction starting with the outer loop and ending with the inner loop. Cover rewind spring with washer and mount rope pulley again.

Tensioning of rewind spring



Tensioning of rewind spring

Hold the uncoiled rope close to the pulley and insert the rope into the notch at the periphery of the rope pulley. Now turn rope pulley by means of the rope 4-5 turns in clockwise direction – to the right – thereby tensioning the rewind spring. Hold rope pulley, rearrange twisted rope and pull out completely.

Release rope pulley and slowly let starter rope go so that it coils itself automatically onto the rope pulley by the attained pretension.

The rewind spring is properly tensioned if the starter grip is tightly pulled into rope bushing and does not tilt sideways. At fully pulled out starter rope one should still be able to turn the pulley at least $\frac{1}{2}$ turn until maximum spring tension is reached. Otherwise pull out starter rope, hold pulley and uncoil rope by one layer. Then remount fan cover and on 090 G handle tube support.

Excessive spring tension will cause breakage of the spring.

Maintenance Chart

| | | before starting work | after finishing work or daily | after each refueling stop | weekly | monthly | if faulty | if damaged | as required | see page: |
|---|---|----------------------|-------------------------------|---------------------------|--------|---------|-----------|------------|-------------|-----------|
| Complete machine | Visual inspection (condition, leaks) | x | | x | | | | | | |
| | clean | | x | | | | | | | |
| Throttle trigger, safety throttle lock, stop switch, Master Control, depending on model | Check operation | x | | x | | | | | | |
| Chain brake | Check operation | | | | | | | | | |
| | Clean | | | | | | | | | |
| Filter in fuel tank | Clean wire filter | | | | | x | | | | |
| | Replace felt | | | | | | x | | | |
| Fuel tank | Clean | | | | | x | | | | |
| Chain oil tank | Clean | | | | | x | | | | |
| Chain lubrication | Check | x | | | | | | | | 28, 29 |
| Saw chain | Inspect, also check sharpness | x | | x | | | | | | 29 |
| | Check chain tension | x | | x | | | | | | 29 |
| | Sharpen | | | | | | | | x | 39 |
| Guide bar | Inspect (wear, damage) | x | | | | | | | | 28 |
| | Clean and turn over | | | | x | | x | | | |
| | Deburr | | | | x | | | | | |
| | Replace | | | | | | | x | x | |
| Chain sprocket | Check | | | | x | | | | | 29 |
| Air filter | Clean | x | | | | | | | | 30 |
| | Replace | | | | | | | x | | 30 |
| Cooling inlets | Clean | | x | | | | | | | |
| Cylinder fins | Clean | | | | | x | | | | |
| Carburetor | Check idle adjustment – chain must not turn | x | | x | | | | | | 31 |
| | Readjust idle | | | | | | | | x | 31 |
| Spark plug | Readjust electrode gap | | | | | | x | | | |
| All accessible screws and nuts (not adjusting screws) | Retighten | | | | | | | | x | |
| | Inspect | | | | x | | | | | |
| Rubber vibration buffers | To be replaced only by STIHL Dealer | | | | | | | x | | |
| Spark arrestor screen | Inspect, depending on model | | | | | | | | | |
| | Clean or replace | | | | | | | | | |
| Chain catching bolt | Check | x | | | | | | | | |
| | Replace | | | | | | | x | | |

Specifications 090, 090 AV

Engine

STIHL single cylinder two-stroke engine

Displacement: 137 cm³ (8.36 cu. in)
Bore: 66 mm (2.6 in)
Stroke: 40 mm (1.57 in)

Ignition System

Type: Flywheel magneto
Ignition timing: 2.9–3.1 mm (0.114–0.122 in) before T.D.C.
Breaker point gap: 0.35–0.45 mm (0.013–0.018 in)
Spark plug: Bosch WSR 6 F
Champion RCJ 6 Y

Fuel System

All position diaphragm carburetor
Fuel capacity: 1.2 l (2.5 US pt)
Air filter: Flocked wire mesh element
Fuel mixture: Mix ratio 1:25 with SAE 30 two-cycle engine oil; 1:40 with STIHL two-cycle engine oil

Cutting Attachment

Bar lengths: 53, 63, 75, 90, 105, 120, 150 cm (20, 25, 30, 35, 41, 47, 59 in)
use helpers handle on guide bars of 105 cm (41 in) and longer
Chain: 0.404" (10.26 mm) and 1/2" (12.7 mm) pitch
Chain sprocket: 6 and 7-tooth
Chain lubrication: Fully automatic with oil feed control and supplementary, unit-mounted hand pump
Oil capacity: 0.53 l (1.1 US pt)

Weights

090 with 53 cm (21 in) bar and chain: approx. 13.9 kg (30.6 lb)
090 AV with 53 cm (21 in) bar and chain: approx. 14.6 kg (32.2 lb)
090 G with 90 cm (35 in) bar and chain: approx. 6.8 kg (15 lb)

Specifications 090 G

106 cm³ (6.36 cu. in)
58 mm (2.3 in)
40 mm (1.57 in)

Flywheel magneto
2.9–3.1 (0.114–0.122 in) before T.D.C.
0.35–0.45 mm (0.013–0.018 in)
Bosch WSR 6 F
Champion RCJ 6 Y

All position diaphragm carburetor
1.2 l (2.5 US pt)
Flocked wire mesh element
Mix ratio 1:25 with SAE 30 two-cycle engine oil; 1:40 with STIHL two-cycle engine oil

90, 105, 120, 150 cm (35, 41, 47, 59 in)
use helpers handle on guide bars of 105 cm (41 in) and longer
1/2" (12.7 mm) pitch
6-tooth
Fully automatic with oil feed control and supplementary, unit-mounted hand pump
0.53 l (1.1 US pt)

Gearbox

Type: Spur gear
Reduction ratio: 2:1
Lubrication: HD SAE 30 engine oil
Oil capacity: 0.15 l (0.32 US pt)

Ordering Spare Parts

For ordering spare parts fill in below the model name of your power tool, the machine number as well as the part number of your chain and guide bar.

This makes ordering of a new chain and bar easier as both parts are wearing parts. The part number for the chain sprocket which from time to time must be replaced as well is already filled in; also the part numbers for the standard chain and guide bar are already filled in.

When purchasing these parts it is sufficient to just mention the model and the respective part number.

The machine number is found at the crankcase, the part number for the chain is marked on the chain box and the one of the guide bar can be found on the guide bar packaging.

| | |
|------------------------------|---|
| Model description | <input type="text"/> |
| Serial number | <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> |
| Chain part number | <input type="text"/> <input type="text"/> <input type="text"/> |
| Guide bar part number | <input type="text"/> <input type="text"/> <input type="text"/> |
| Sprocket part number | <input type="text"/> <input type="text"/> <input type="text"/> |

| | |
|--|----------------------|
| Chain sprocket 0.404" (10,26 mm) 7T | 1106 640 2015 |
| Standard chain Rapid-Standard | 3812 000 0072 |
| Standard bar 53 cm (21 in) | 3001 000 9223 |

Guaranty for repairs can only be given if the repair work is done by an authorized STIHL-Service Shop using original STIHL spare parts.

Sharpening and Maintenance of Saw Chain

Description of chains

The illustration on the right shows the component parts of a STIHL saw chain. Every chain manufactured by STIHL features the Oilomatic system. Apart from the three basic types (Rapid, Topic and Picco), there are three different versions whose names denote the cutter shape, i.e. chipper tooth = Standard, semi-chisel = Micro and full chisel = Super.

The main size measurement on a saw chain is the pitch. It is determined by measuring the distance between one rivet and the next but one and dividing the measurement by two. The result is the pitch which is generally specified in inch ($\frac{3}{8}'' = 9.32 \text{ mm}$).

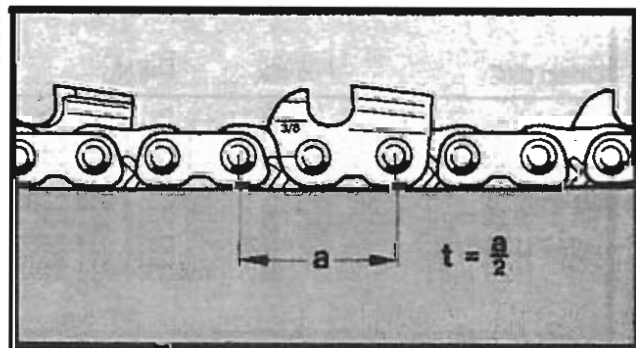
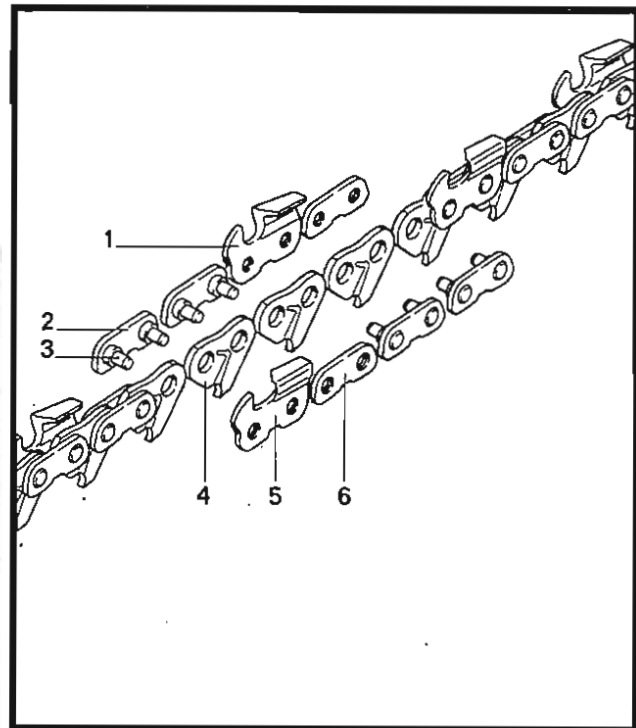
Like any other cutting tool, the saw chain is subject to normal wear and tear. A properly sharpened chain slices through wood and requires very little infeed effort. For this reason alone you should never attempt to cut with a dull or damaged chain. There are a few crucial angles which must be observed in order to obtain good results when sharpening a chain. They are explained below.

Filing angle

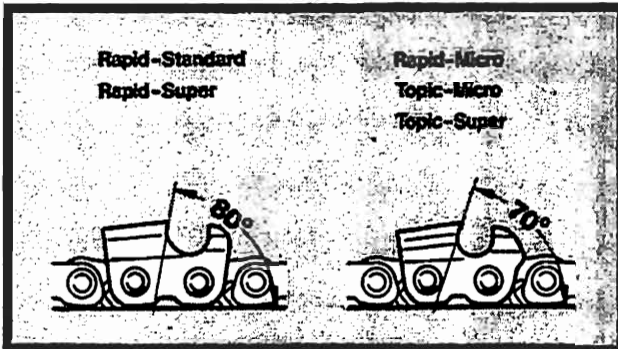
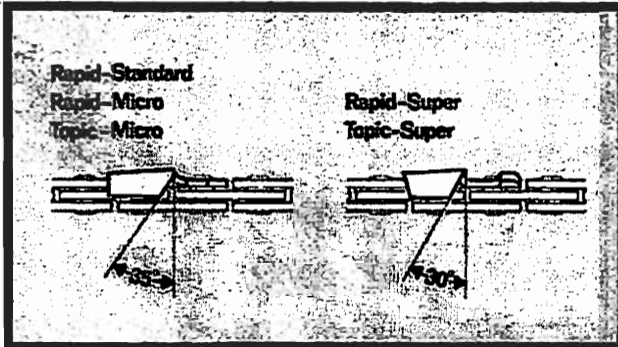
The filing angle for Rapid-Standard, Rapid-Micro and Topic-Micro chains is 35° ; these chains are sharpened to this angle before leaving the factory. However, if you want to use the chain primarily for cutting hardwood or frozen timber, it is best to sharpen it to an angle of 30° . Rapid-Super and Topic-Super chains are always sharpened to 30° .

It is essential to ensure that the filing angle is kept exactly the same on all cutters. Irregular angles will cause the chain to run roughly and unevenly as well as accelerate the rate of wear and increase the risk of breakage.

Top: Component parts of an Oilomatic chain
Bottom: Measuring chain pitch "t"



Top: Filing angle
 Center: Side plate angle
 Bottom: Table of file diameters



| Chain pitch | File dia. | File No. |
|------------------|----------------------|---------------|
| .325" (8.25 mm) | Rapid 3/16" (4.8 mm) | 0811 411 8088 |
| .325" (8.25 mm) | Topic 5/32" (4.0 mm) | 0814 242 3383 |
| 3/8" (9.32 mm) | Rapid 3/16" (4.8 mm) | 0811 411 8088 |
| 3/8" (9.32 mm) | Topic 5/32" (4.0 mm) | 0814 242 3383 |
| .404" (10.26 mm) | 3/16" (4.8 mm) | 0811 411 8088 |
| 1/2" (12.7 mm) | 1/4" (6.3 mm) | 0811 411 8118 |

Side plate angle

The upright cutting edge just below the top plate is known as the side plate cutting edge. The side plate angle is, therefore, the angle between the side plate cutting edge and the horizontal line formed by the cutter toe and heel. The following side plate angles are specified:

| | | | |
|----------------|-----|-------------|-----|
| Rapid-Standard | 80° | Topic-Micro | 70° |
| Rapid-Micro | 70° | Topic-Super | 70° |
| Rapid-Super | 80° | | |

These angles are obtained automatically if you use a file holder or roller filing guide with the specified size of file (diameter) and hold the file correctly during sharpening.

Top plate cutting angle

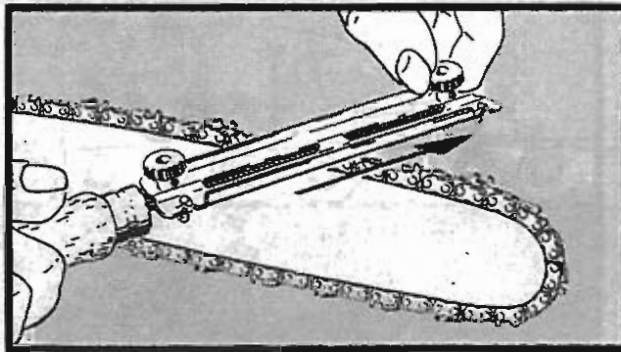
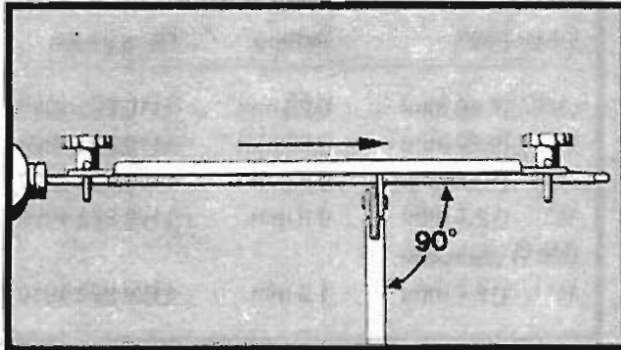
The top plate cutting angle is the most important angle since it influences the chain's cutting behavior. It is also obtained automatically if sharpening is performed properly with a suitable STIHL sharpening tool.

Sharpening

Only special saw chain files may be used for sharpening and they must match the chain concerned (basic type, pitch). The shape and cut of machinists' files makes them unsuitable for saw chain. It is best to use the special chain file with a file holder or other filing aid. **Always file from the inside to the outside of the cutter.** If you sharpen the chain while it is on the bar, increase chain tension before filing and reset it to correct tension afterward.

All cutters must be filed to the same length. Since the top plate slopes downward to the rear (clearance angle), the

Top: File position for Rapid-Standard, Rapid-Micro and Topic-Micro
 Bottom: Sharpening with file holder

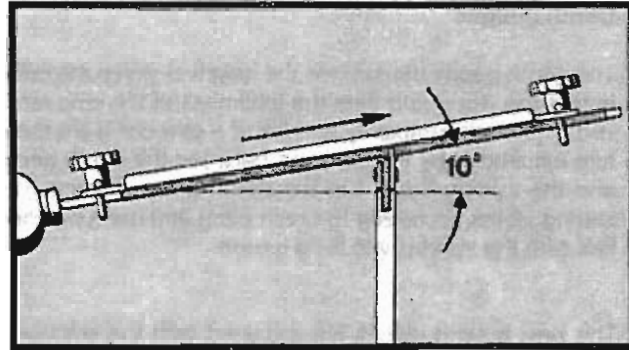


cutter heights will be uneven if the cutter lengths are different. If the cutters are not all the same height the chain will run roughly and eventually break.

As it is very important to achieve uniform cutter lengths, it is best to measure them with a slide caliper. Find and sharpen the shortest cutter first and then use it as a master for all the others, i.e. all cutters must be filed back to the same length as the master cutter. Sharpen all the cutters on one side of the chain first and then repeat the procedure on the other side.

The file must be held level for Rapid-Standard, Rapid-

File position for Rapid-Super and Topic-Super



Micro and Topic-Micro chain so that it is at 90° to the perpendicular faces of the chain links or the guide bar.

On Rapid-Super and Topic-Super chains the file must be guided so that the handle is 10° lower than the tip of the file, i.e. in this case the file must run upward at an angle of 10° to the horizontal. A filing aid (file holder, filing tool) must always be used for sharpening Rapid-Super and Topic-Super chains.

File evenly and steadily and note that the file **only sharpens on the forward stroke**. Lift the file off the cutter on the backstroke. Make sure you do not touch the tie straps and drive links with the file. Use a piece of hardwood to remove burrs from the cutting edge.

Important: Sharpen the chain frequently and take away as little material as possible. Two or three strokes of the file are usually sufficient to keep the chain sharp. Variations in angles and the lengths of the cutters cannot be completely avoided during manual sharpening. For this reason the chain should be restored to its original condition with a workshop chain sharpener (STIHL USG, STIHL FG 2) after it has been resharpened about five times by hand.

Depth gauges

The depth gauge determines the height at which the cutter enters the wood and thus the thickness of the chip removed. The cutting capacity and life of a saw chain are therefore influenced by the distance between the depth gauge and the cutting edge, i.e. the depth gauge setting. This setting varies according to chain pitch and must be checked with the appropriate filing gauge.

The best cutting results are obtained with the settings listed in the table. However, the depth gauge setting may be increased by 0.2 mm for cutting softwood in mild weather conditions.

Since the depth gauge setting is reduced when the cutter is sharpened, its height must be checked and lowered if necessary. If the depth gauge projects from the filing gauge, it must be filed down level with the gauge using a flat or triangular file. The contour of the depth gauge must also be rounded off on Rapid chain. In the case of Topic chains the depth gauge should be rounded off in line with the stamped markings.

General chain maintenance

Chain maintenance begins as soon as the chain is fitted on the bar and sprocket. The essential points are **correct chain tension and ample lubrication**. See also "Guide Bar, Chain and Sprocket".

42

Clean the chain thoroughly in gasoline after sharpening to remove filings or grinding dust. Then lubricate the chain by

Top: Table of recommended depth gauge settings
Center: Depth gauge setting
Bottom: Filing down depth gauge (Topic chain)

| Chain pitch | Setting | Filing gauge |
|------------------|---------|---------------|
| .325" (8.25 mm) | 0.65 mm | 1110 893 4000 |
| 3/8" (9.32 mm) | 0.65 mm | 1110 893 4000 |
| .404" (10.26 mm) | 0.8 mm | 1106 893 4000 |
| 1/2" (12.7 mm) | 0.8 mm | 1106 893 4000 |
| 090 G chain saw | | |
| 1/2" (12.7 mm) | 1.2 mm | 1106 893 4010 |

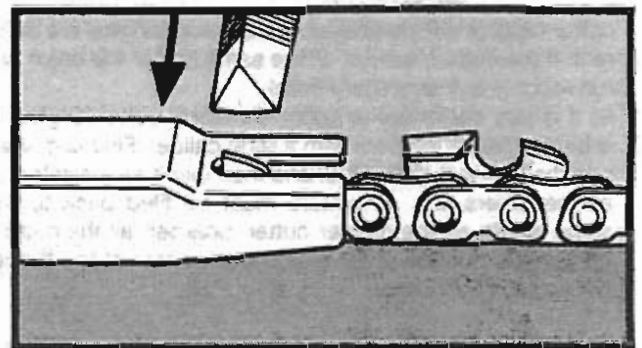
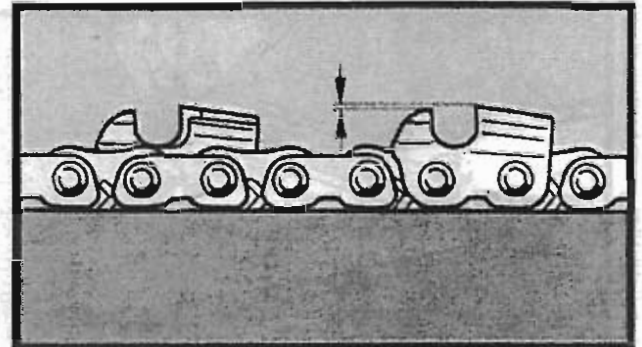


Table of file holders

immersing it in an oil bath. If you are not going to use the chain for a prolonged period, clean it with a brush and immerse it in an oil-paraffin bath.

Carefully examine chain for cracks in the links or damaged rivets while you are sharpening and cleaning it. Any damaged or worn parts must be replaced. The new parts must be reworked to match the shape and size of the original parts.

Chain repairs can be carried out with the STIHL handheld chain breaking and rivet spinning tool, the STIHL NG 1 or NG 5 rivet spinners and the STIHL NG 4 chain breaker.

Tools for chain maintenance

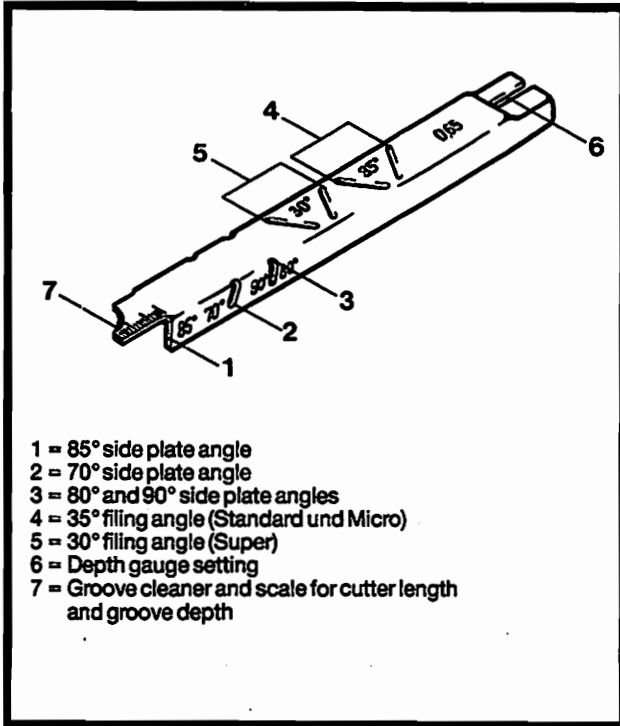
There is a range of chain sharpening aids and tools to suit the user's needs (frequency of sharpening, time required etc.).

File holders, which have reference marks for the filing angle, simplify chain sharpening and are available for all types of chain.

The **FG 1 filing tool** attaches to the guide bar and sharpens all types of chain.

The **STIHL FG 2 Filerite** and **USG universal electric sharpener** are workshop tools suitable for sharpening all types of chain.

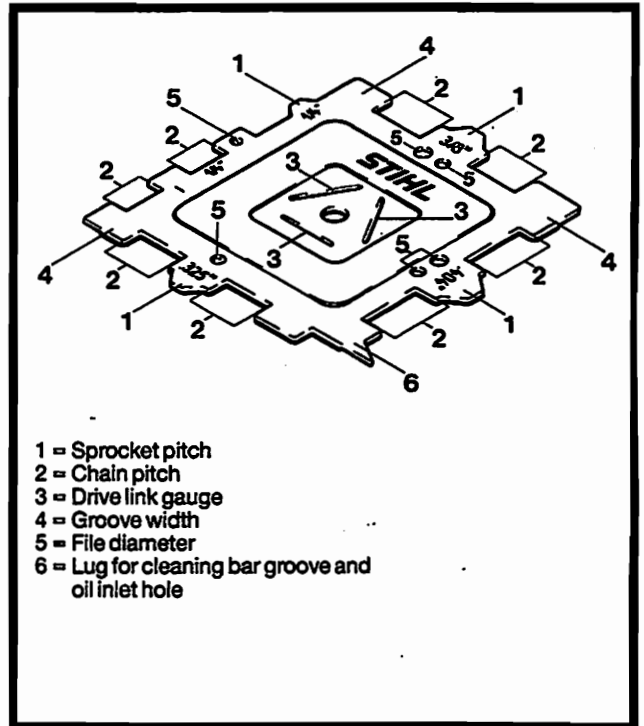
| Chain pitch inch (mm) | Chain | File holder Part No. |
|--------------------------|----------------|-------------------------|
| .325 (8.25) | Rapid-Micro | 5605 750 4326 |
| .325 (8.25) | Rapid-Super | 5605 750 4336 |
| .325 (8.25) | Topic-Micro | 5605 750 4321 |
| .325 (8.25) | Topic-Super | 5605 750 4351 |
| $\frac{3}{8}$ (9.32) | Rapid-Standard | 5605 750 4326 |
| $\frac{3}{8}$ (9.32) | Rapid-Micro | 5605 750 4326 |
| $\frac{3}{8}$ (9.32) | Rapid-Super | 5605 750 4336 |
| $\frac{3}{8}$ (9.32) | Topic-Micro | 5605 750 4321 |
| $\frac{3}{8}$ (9.32) | Topic-Super | 5605 750 4351 |
| .404 (10.26) | Rapid-Standard | 5605 750 4326 |
| .404 (10.26) | Rapid-Micro | 5605 750 4326 |
| .404 (10.26) | Rapid-Super | 5605 750 4336 |



The filing gauge is a universal tool for checking the filing and side plate angles as well as the depth gauge setting and cutter length. It can also be used for cleaning the guide bar groove and oil inlet hole and measuring the groove depth. The following filing gauges are available:

Filing gauge 1110 893 4000 for 0.325" and 3/8" chain (0,65 mm depth gauge setting).

44 Filing gauge 1106 893 4000 for 0.404" and 1/2" chain (0,8 mm depth gauge setting).



The reference gauge 0000 893 4105 is used to determine the distinguishing characteristics of saw chains and guide bars. Furthermore, it can be used to clean the guide bar groove and oil inlet hole as well as check the diameter of the chain sharpening file.