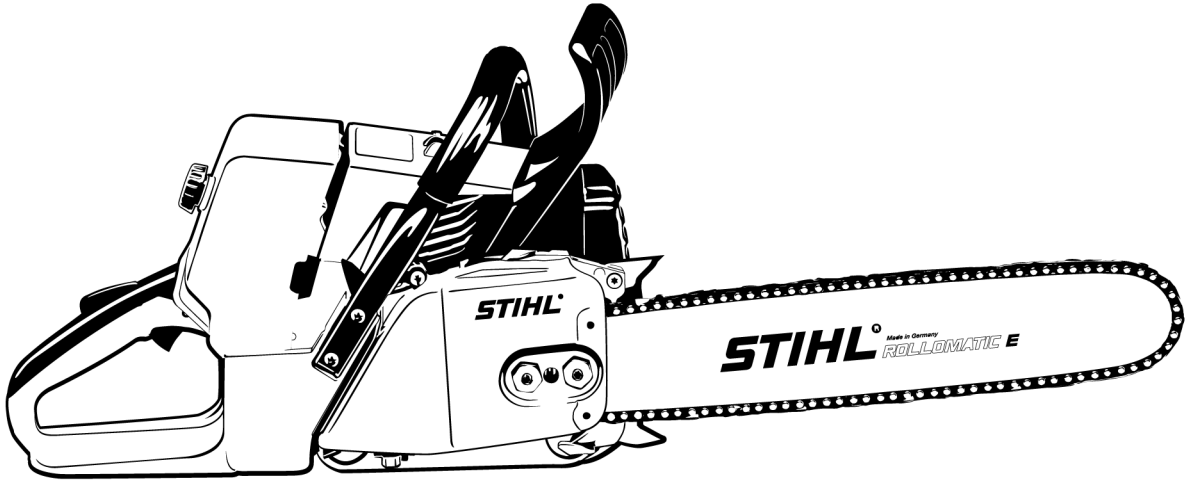
STIHL®

Chain Saw Safety Manual



Contents

This manual contains the safety precautions and recommended cutting techniques outlined in the instruction manuals for STIHL chain saws.

The chapter on "Main Parts of the Saw" shows the MS 211 as an example. Other chain saw models may have different parts and controls.

This manual contains references to various chapters in the model-specific instruction manuals.

You should therefore always refer to the instruction manual of your particular saw model.

Please contact your STIHL dealer if you any questions after reading this manual.

Original Instruction Manual

Printed on chlorine-free paper
Printing inks contain vegetable oils, paper can be recycled.

STIHL®

Safety Precautions and Working Techniques

Special safety precautions must be observed when using a chain saw because the work goes faster than with an axe and a hand saw, because the chain runs at very high speeds, and because the cutters are extremely sharp.

It is important that you carefully read the entire Instruction Manual before using the machine for the first time and keep it in a safe place for future reference. Non-compliance with the Instruction Manual may cause serious or even fatal injury.

Observe the national safety regulations issued, for example, by the employers' liability insurance association, social security institutions, occupational safety and health authorities or other organizations.

If you have never used a power tool before: Ask the salesperson or another expert to explain how to use it safely – or attend a training course.

Minors should never be allowed to use a chain saw – except for young trainees over the age of 16 when working under supervision.

Keep children, animals and bystanders well away from the machine.

When not using the machine, it must be laid down in such a way that it does not endanger anyone. Ensure that the machine cannot be used without authorization.

The user is responsible for accidents or risks involving third parties or their property.

The machine should only be provided or loaned to people familiar with this model and its operation – and the Instruction Manual should always be handed over with the machine.

The machine may only be operated by people who are fit, in good physical health and in good mental condition. If you have any condition that might be aggravated by strenuous work, check with your doctor before operating a power tool.

If you have a pacemaker: The ignition system of your machine produces an electromagnetic field of very low intensity. An effect on individual pacemaker types cannot be excluded entirely. STIHL recommends that you consult your doctor and the manufacturer of your pacemaker in order to avoid all health hazards.

Anyone who has consumed alcohol, medicines affecting their ability to react or drugs must not operate a power tool.

Postpone the work if the weather is bad (rain, snow, ice, wind) - **higher risk of accidents!**

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

Other uses are not permitted and may lead to accidents or damage to the machine. The machine must not be modified in any way - this may also lead to accidents or damage to the machine.

Only use tools, guide bars, chains, chain sprockets or accessories that have been approved by STIHL for this machine or which are technically equivalent. Contact a dealer if in doubt. Only use high-quality tools or accessories. Otherwise there may be a risk of accidents or damage to the machine.

STIHL recommends the use of genuine STIHL tools, guide bars, chains, chain sprockets and accessories. These have been optimized for the product and the user's requirements.

Clothing and equipment

Wear proper protective clothing and equipment.

Clothing must be sturdy and snug-fitting, but allow complete freedom of movement. Wear snug fitting clothing with **cut-retardant pads** – an overall, not a loose-fitting jacket.

Clothing which could become trapped in wood, brush or moving parts of the machine should not be worn. Do not wear a scarf, tie or jewelry when operating the machine. Long hair must be tied up and covered (headscarf, cap, helmet, etc.).

Wear **safety boots** – with cut-retardant material, non-slip soles and steel toe caps

Wear a **hard hat** – if objects could fall on you.

Wear **safety glasses** or a **face shield** and "personal" **hearing protection** – e.g., ear defenders.

Wear **heavy-duty, non-slip gloves** – preferably made of leather.

STIHL can supply a comprehensive range of protective clothing and equipment.

Transporting the chain saw

Always engage the chain brake and attach the chain scabbard – even before transporting the saw for short distances. When transporting the saw for longer distances (more than approx. 50 m), also stop the engine.

Always carry the saw by the handlebar – with the hot muffler away from your body, the guide bar must point to the rear. Avoid touching hot parts of the machine, especially the surface of the muffler – **risk of burns!**

In vehicles: When transporting in a vehicle, properly secure your machine to prevent turnover, damage and fuel spillage.

Refueling

Gasoline is an extremely flammable fuel – keep clear of naked flames and fire – do not spill any fuel – no smoking.

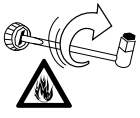
Switch off the engine before refueling.

Never refuel the machine while the engine is still hot – the fuel may spill over – **risk of fire!**

Open the filler cap carefully so that any excess pressure is relieved gradually and fuel does not splash out.

The machine may only be refueled in a well ventilated place. Clean the machine immediately if fuel is spilled. Change your clothes immediately if they are contaminated with fuel.

A number of different filler caps are installed as standard at the factory.



Close the filler cap as tightly as possible after refueling.

Place the cliplock filler cap (bayonet-type) in position, turn it until it will go no further and fold the cliplock down.

This helps reduce the risk of unit vibrations causing an incorrectly tightened filler cap to loosen or come off and spill quantities of fuel.

Before starting

Check that saw is properly assembled and in good condition - refer to appropriate chapters in the Instruction Manual:

- functional chain brake, front hand guard
- Correctly mounted guide bar
- Correctly tensioned chain
- The throttle trigger and throttle trigger interlock must move easily – throttle trigger must return automatically to the idle position when released.
- Master control/stop switch must move easily to **STOP** or **0**
- Check that the spark plug boot is secure. A loose boot can lead to flying sparks which may ignite the escaping fuel/air mixture – **risk of fire!**
- Never attempt to modify the controls or safety devices
- Keep the handles dry and clean – free from oil and pitch – for safe control of the chain saw.

The chain saw should only be used if it is in full working order – **risk of accident!**

Starting the engine

Move at least 3 meters away from the place at which the machine was refueled and never in enclosed spaces.

The machine is operated by only one person – there should not be any other person within the working area – not even when starting the machine.

Lock the chain with the chain brake before starting – risk of **personal injury** due to rotating chain!

Do not drop-start the engine – start as described in the Instruction Manual.

Do not start the chain saw if the chain is in a cut.

During work

In the event of impending danger or in an emergency, switch off the engine immediately by moving the Master Control/stop switch to **STOP** or **0**.

Never let the machine run unattended.

When the engine is running: Note that the chain continues to rotate for a short period after your let go of the throttle trigger – coasting effect.

Exercise caution with slippery surfaces, water, snow, ice, steep slopes, uneven ground or green wood that has just been stripped of its bark –**danger of slipping!**

Use caution with tree stumps, roots, ditches – **danger of stumbling!**

Ensure you always have a firm and safe footing.

Do not work alone – keep within calling distance of others in case help is needed.

More care and attention than usual are required when wearing ear protection, since warning sounds (shouts, alarms, etc.) cannot be heard properly.

Take breaks in due time in order to prevent tiredness and exhaustion – **risk of accidents!**

Keep easily combustible materials (e.g., wood chips, bark, dry grass, fuel) away from hot exhaust gases and hot mufflers – **risk of fire!** Mufflers with catalytic converters can become especially hot.

Your power tool produces toxic exhaust fumes as soon as the engine is running. These gases may be colorless and odourless and may contain unburnt hydrocarbons and benzene. Never run the engine indoors or in poorly ventilated areas, even if your model is equipped with a catalytic converter.

Ensure proper ventilation when working in trenches, hollows or other confined areas. **Toxic fumes can kill!**

If you feel sick, if you have a headache, vision problems (e.g., your field of vision gets smaller), hearing problems, dizziness or inability to concentrate, stop work immediately. Such symptoms may be caused by an excessively high concentration of exhaust emissions – **risk of accident!**

Dust (e.g., sawdust), fumes and smoke produced while using the machine may be hazardous to health. Wear a dust mask if dust is generated.

No smoking when working with or near the machine - **risk of fire!** Combustible fuel vapor may escape from the fuel system.

If the machine is subjected to unusually high loads for which it was not designed (e.g., heavy impact or a fall), always check that it is in good condition before continuing work - refer also to the section "Before starting". Check the fuel system for leaks and make sure the safety devices are working properly. Never continue using a power tool that is not in perfect working order. Consult a STIHL dealer if in doubt.

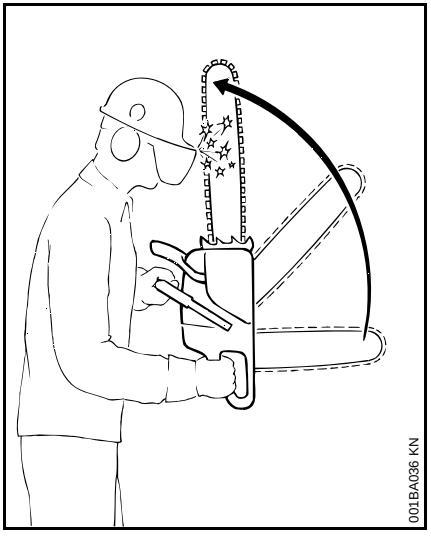
Make certain that the saw chain does not continue rotating when the engine is idling – if necessary, correct the low speed setting – if the chain continues to keep rotating in idle, have it checked by a servicing dealer.

Reactive forces

The most common reactive forces are: kickback, pushback and pull-in.

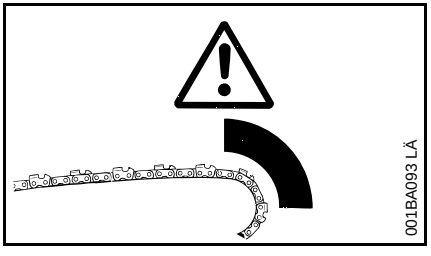
Dangers of kickback

Kickback can result in fatal cuts.



Kickback occurs when the saw is suddenly thrown up and back in an uncontrolled arc towards the operator.

Kickback occurs if, for example,



- the saw chain in the area of the upper quarter of the guide bar nose unintentionally comes into contact with wood or a solid object – e.g., unintentionally touches another limb during limbing
- the saw chain at the nose of the guide bar is pinched in the cut

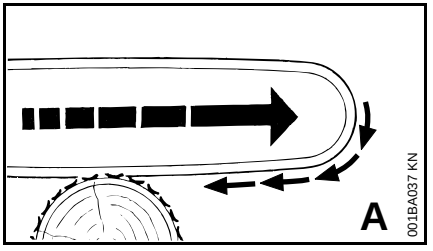
Quickstop chain brake:

This device reduces the risk of injury in certain situations - it cannot prevent kickback. When activated, the chain brake stops the saw chain within a fraction of a second –
for a description of this device refer to the section "Chain Brake" in this Instruction Manual

Reduce the risk of kickback

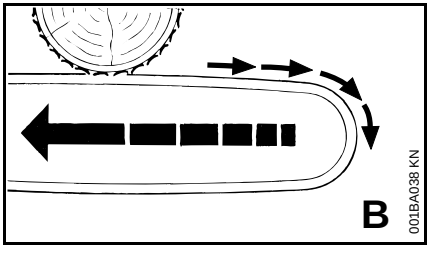
- Work cautiously and methodically
- Hold the chainsaw firmly with both hands and maintain a secure grip.
- Always cut at full throttle
- Be aware of the location of the guide bar nose
- Do not cut with the guide bar nose
- Be especially careful with small, tough limbs, undergrowth and offshoots – the saw chain may become caught in them
- Never cut several limbs at once
- Do not lean too far forward
- Do not cut above shoulder height
- Use extreme caution when re-entering a previous cut.
- Do not attempt plunge cuts if you are not experienced in this cutting technique
- Be alert for shifting of the log or other forces that may cause the cut to close and pinch the chain
- Always cut with a correctly sharpened, properly tensioned saw chain - the depth gauge setting must not be too large.
- Use low-kickback saw chains as well as narrow-radius guide bars

Pull-in (A)



When the chain on the bottom of the bar – overbucking – is suddenly pinched, caught or encounters a foreign object in the wood, the chain saw may suddenly be drawn forward toward the log – **to avoid this, engage the bumper spike firmly in the wood**.

Pushback (B)



When the chain on the top of the bar – underbucking – is suddenly pinched, caught or encounters a foreign object in the wood, the chain saw may suddenly be driven straight back toward the operator – **to avoid this**:

– Do not allow the top of the guide bar to become jammed
– Do not twist the guide bar in the cut

Be very careful

– with freely hanging limbs
– with trunks that are under tension between other trees because they fell unfavorably
– when working in windbreaks

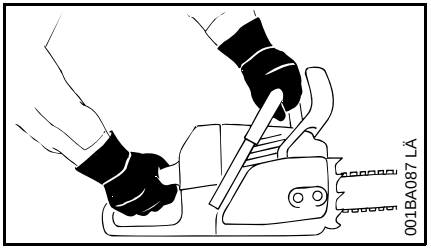
In these cases, do not use a chain saw – use a hoist, winch or dragline instead.

Pull out trunks that are lying about and have been cut free. Whenever possible, deal with them in open areas.

Deadwood (brittle, rotten or dead wood) poses a substantial, highly unpredictable hazard. It is extremely difficult or even practically impossible to recognize the danger. Use aids such as winches or draglines.

Always be especially careful when**felling timber near roads, railway lines, power lines** etc. If necessary, notify police, power companies or railway authorities.

Holding and guiding the machine



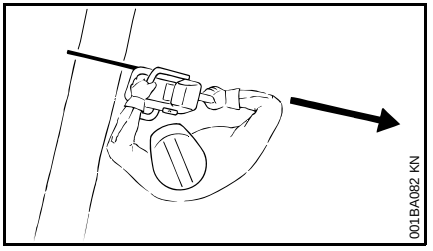
Always hold the chain saw **firmly with both hands:** Right hand on the rear handle – even if you are left-handed. To ensure reliable control, wrap your thumbs tightly around the handlebar and handle.

Sawing

Do not use the starting throttle position for cutting. Engine speed cannot be controlled with the throttle trigger in this position.

Work calmly and methodically – only with good lighting and visibility. Do not endanger others – stay alert at all times.

Use the shortest possible guide bar: The chain, guide bar and chain sprocket must match each other and your saw.



Make certain that all parts of your body are well clear of the extended **range of travel** of the saw chain.

Always pull the saw out of the cut with the saw chain running.

Use the chain saw only for sawing – not for prying or shoveling away limbs or roots.

Do not underbuck freely hanging limbs.

Be careful when cutting shattered wood – **risk of injury from slivers being caught and thrown in your direction!**

Make sure your saw does not touch any foreign materials: Stones, nails, etc. may be flung off and damage the saw chain – the saw may kick back unexpectedly.

On slopes, always stand above or to the side of the trunk or felled tree. Watch out for rolling trunks.

When working above ground level:

- always use a lift bucket
- never work on a ladder
- not in a tree
- not in unsteady locations
- not above shoulder height
- not with one hand

Begin cutting with the saw at full throttle and engage the bumper spike – then saw.

Never use the chain saw without the bumper spike, the saw may pull you forward suddenly. Always engage the bumper spike securely.

At the end of the cut, the chain saw is no longer supported by the cutting attachment in the cut. The machine's weight must be borne by the user – **risk of loss of control!**

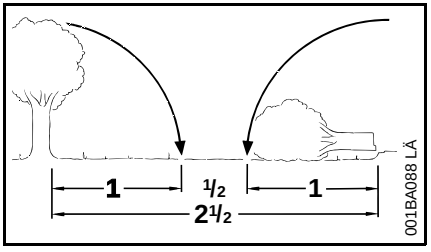
Felling

Felling may only be carried by persons who have had special training. Persons who are not experienced chain saw users should carry out neither felling nor limbing – **increased risk of accidents!**

Comply with national regulations regarding felling technique.

Only persons who are engaged in felling may be present in the felling area.

Make certain that no one is endangered by the falling tree – engine noise can drown out shouting.



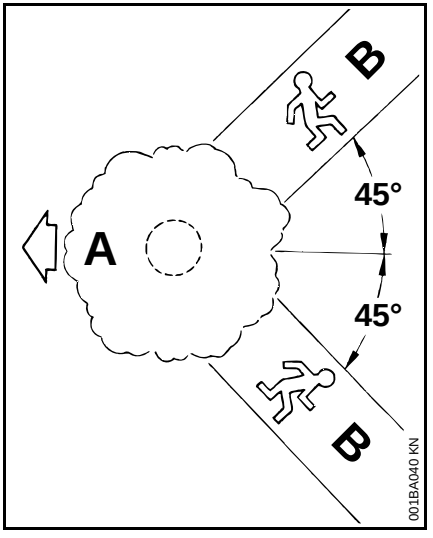
The distance to the next worksite must be at least 2 1/2 tree lengths

Determine direction of fall and escape paths

Select a gap in the timber stand into which the tree can be felled.

Pay special attention to the following points:

- the natural inclination of the tree
- unusually heavy limb structure, asymmetrical growth, damage to tree
- wind direction and speed – do not fell trees in high winds
- direction of slope
- neighboring trees
- snow load
- Take the general condition of the tree into account – be especially careful with trunk damage or deadwood (brittle, rotten or dead wood)

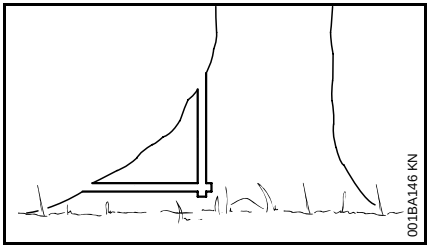


A direction of fall
B escape paths

- Establish escape paths for each worker – approx. 45° diagonally backwards
- Clear escape paths, eliminate obstacles
- Put down tools and equipment at a safe distance – but not on the escape paths
- When felling, stand only to the side of the falling trunk and only move back laterally onto the escape route
- Plan escape routes on slopes parallel to the slope
- When getting out of the way, watch out for falling branches and the crown area

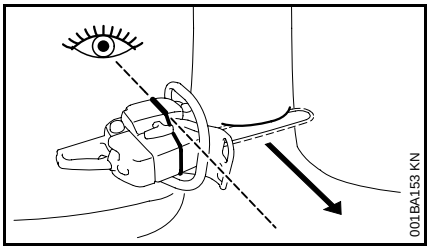
Preparing the work area at the trunk

- Clear the work area at the trunk of branches, brush and other obstacles – secure footing for all workers
- Carefully clear the base of the trunk (e.g., with an axe) – sand, stones and other foreign objects will dull the saw chain



- Remove large buttresses: remove the largest buttress first – saw first vertically, then horizontally – only if the tree is in sound condition

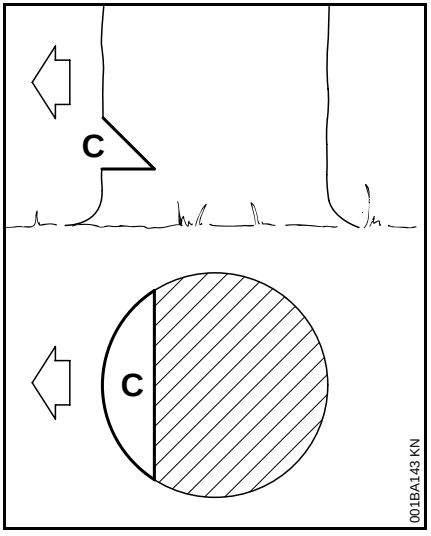
Making a felling notch



With the help of the gunning sight on the shroud and fan housing of the chain saw, it is possible to check the direction of fall when cutting the felling notch.

When making the felling notch, orient the chain saw so that the gunning sight points precisely in the direction in which you want the tree to fall.

Several possibilities are permissible when it comes to the sequence of horizontal and diagonal cuts – observe national regulations with regard to felling technique.



The felling notch (C) determines the direction of fall.

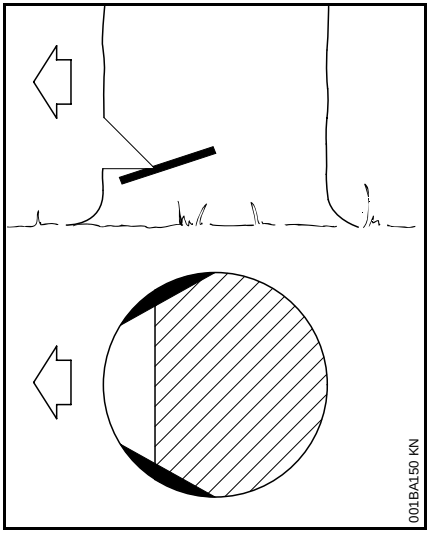
STIHL recommends the following procedure:

- Make a horizontal cut – in doing so, check the direction of fall with the gunning sight
- Start a diagonal cut at an approx. 45° angle
- Check the felling notch – then correct the felling notch, if necessary

Important:

- Felling notch at right angle to direction of fall
- As close to the ground as possible
- cut to a depth of approx. 1/5 to 1/3 of the diameter of the trunk

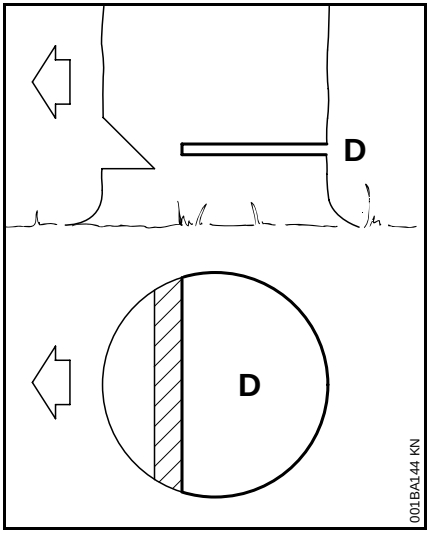
Sapwood cuts



With long-fibered wood, sapwood cuts prevent the sapwood from splintering when felling the trunk – saw both sides of the trunk at the level of the felling notch base to approx. 1/10 of the diameter of the trunk – with thicker trunks, not more than the width of the guide bar.

Do not use sapwood cuts on diseased trees.

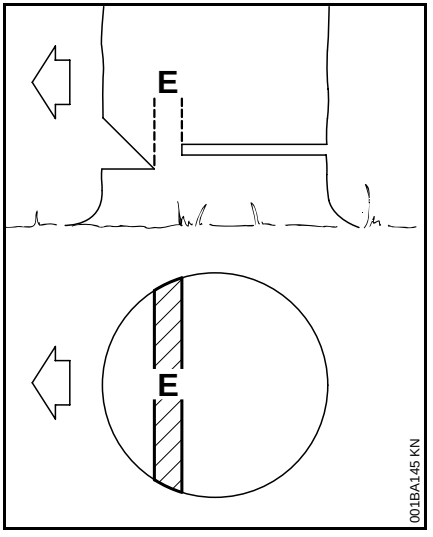
Felling cut



Give a warning cry of "timber!" before making the felling cut.

- Make the felling cut (D) slightly higher than the horizontal cut of the felling notch
- – Exactly horizontal
- – approx. 1/10 of the diameter of the trunk must remain standing between the felling cut and the notch = bridge

Insert wedges in the felling cut in time – use only wedges made of wood, light metal or plastic - no steel wedges. Steel wedges damage the saw chain and can cause kickback.

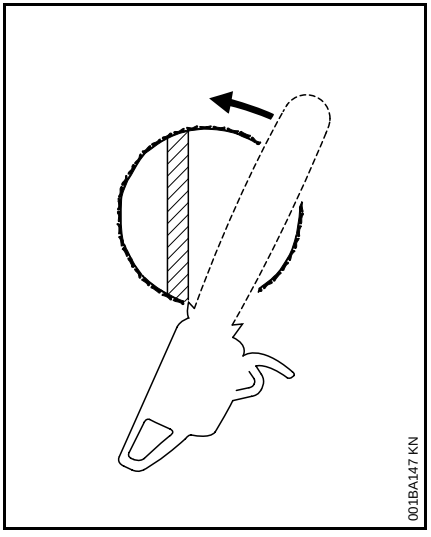


The **bridge** (E) functions as a hinge to guide the tree to the ground.

- – Never saw through the bridge while felling – otherwise the tree with fall in a direction other than the one planned – **risk of accident!**
- – With rotten trunks, leave a wider bridge

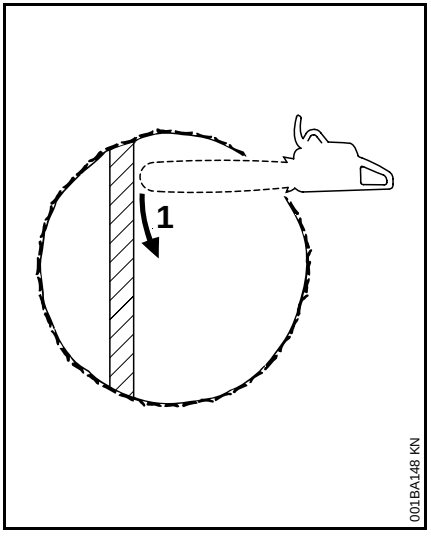
Immediately before felling the tree, give out a second warning cry of "timber!".

Thin trunks: simple fan cut



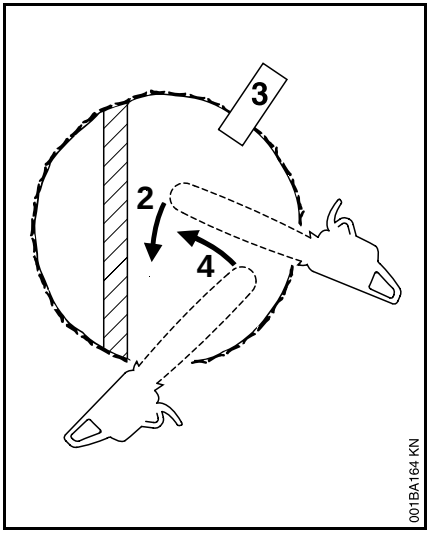
- Engage the spiked bumper behind the hinge. Pivot the chain saw around this point – only as far as the bridge – the spiked bumper rolls against the trunk.

Large diameter trunks: sectioning method



Use the sectioning method if the diameter of the trunk exceeds the length of the chain saw guide bar.

1. **First cut**
   The nose of the guide bar should enter the wood just behind the hinge – hold the saw absolutely horizontally and swing it as far as possible – use the spiked bumper as a pivot point – reposition the chain saw as little as possible.



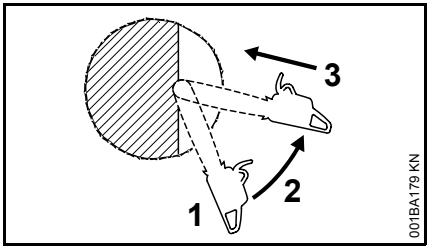
2. While repositioning for the next cut, keep the guide bar fully engaged in the cut in order to avoid an uneven felling cut - apply the spiked bumper again, etc..
3. Insert wedge (3)
4. Last cut: Position the chain saw as for the simple fan cut – do not saw through the hinge!

Special cutting techniques

Plunge-cutting and heartwood cutting require training and experience.

Plunge-cutting

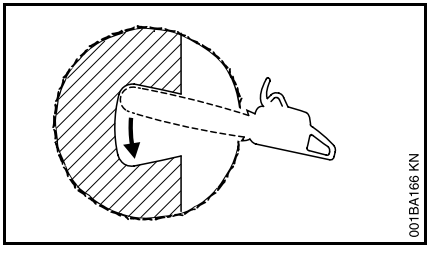
– for felling leaners
– for relieving cuts during bucking
– for DYI projects



- use a low kickback chain and be especially cautious

1. Begin the cut by applying the lower portion of the guide bar nose – do not use the upper portion – **risk of kickback!** Cut until the depth of the kerf is twice the width of the guide bar
2. Swing the saw slowly into the plunge-cutting position – **risk of kickback or pushback!**
3. Make the plunge cut very carefully – **danger of pushback!**

Heartwood cut



- if the diameter of the trunk exceeds twice the length of the guide bar
- if a piece of heartwood remains uncut on large diameter trunks
- with trees that are difficult to fell (oak, beech), to make possible to maintain the planned direction of fall more precisely and prevent the heartwood from splintering
- with soft deciduous trees to relieve tension in horizontal trunks and prevent slivers of wood from being torn out of the trunk

- Make the plunge cut in the felling notch very carefully – **danger of pushback!** – then swing in the direction of the arrow

Limbing

Limbing may only be carried by persons who have had special training. Persons who are not experienced chain saw users should carry out neither felling nor limbing – **risk of accidents!**

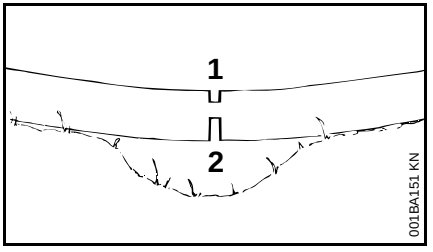
- use a low-kickback saw chain
- Support the chain saw as much as possible
- Do not stand on the trunk when limbing
- Do not cut with the guide bar nose
- Watch out for limbs that are under tension
- Never cut several limbs at once

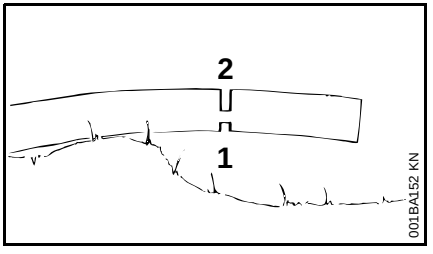
Sawing thin wood

- Use a sturdy, stable fixture – sawhorse
- Do not hold the wood in place with your foot
- Other persons must neither be allowed to hold the wood nor help in any other way

Lying or standing logs under tension

Always make the cuts in the correct order (first compression side (1), then tension side (2), otherwise the chain saw may pinch or kick back – **risk of injury!**



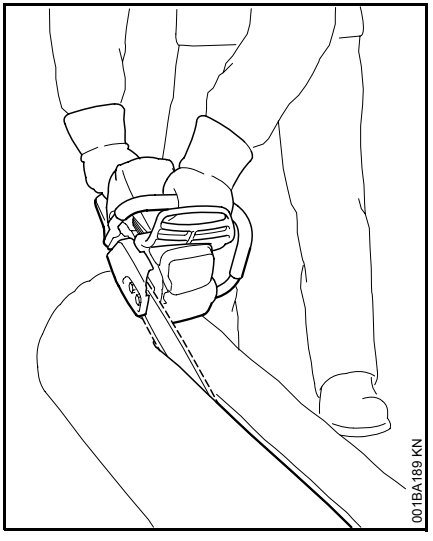


- Make relieving cut in the compression side (1)
- Make bucking cut in the tension side (2)

If the bucking cut is made from the bottom upwards (underbuck) – **risk of pushback!**

Lying logs must not touch the ground at the point where the cut is made – otherwise the chain will be damaged.

Ripping



Sawing technique without use of the spiked bumper – risk of pull-in – position the guidebar at as shallow an angle as possible – be especially careful – increased **risk of kickback!**

Vibrations

Prolonged use of the power tool may result in vibration-induced circulation problems in the hands ("white finger disease").

No general recommendation can be given for the length of usage because it depends on several factors.

The period of usage is prolonged by:

- Hand protection (wearing warm gloves)
- Work breaks

The period of usage is shortened by:

- Any personal tendency to suffer from poor circulation (symptoms: frequently cold fingers, tingling sensation)
- Low outside temperatures
- Amount of gripping force (holding the power tool tightly restricts circulation)

Users who use the machine periodically or for long periods or users who repeatedly experience corresponding symptoms (e.g., tingling sensation in fingers), should undergo a medical examination.

Maintenance and repairs

The machine must be serviced regularly. Do not attempt any maintenance or repair work not described in the Instruction Manual. All other work should be carried out by a servicing dealer.

STIHL recommends that maintenance and repair work be carried out only by authorized STIHL dealers. STIHL dealers receive regular training and are supplied with technical information.

Use only high-quality replacement parts, in order to avoid the risk of accidents or damage to the machine. Contact a dealer if in doubt.

STIHL recommends the use of genuine STIHL spare parts. Such parts have been optimized for the machine and the user's requirements.

Before starting any maintenance or repair work and before cleaning the machine, always **stop the engine and disconnect the spark plug boot – risk of injury** if the engine starts up inadvertently! – Exception: adjustment of carburetor and idle speed.

To reduce the **risk of fire** due to ignition outside the cylinder, move the slide control / stop switch to **STOP** or **0** before turning the engine over on the starter with the spark plug boot removed or the spark plug unscrewed.

Do not service or store the machine near a naked light - **risk of fire** due to the fuel.

Check fuel cap regularly for tightness.

Use only spark plugs that are in perfect condition and have been approved by STIHL – see Specifications.

Inspect ignition lead (insulation in good condition, secure connection).

Check that the muffler is in perfect working condition.

Do not use the machine if the muffler is damaged or missing – **risk of fire!** – **Hearing damage!**

Never touch a hot muffler – **risk of burns!**

The condition of the antivibration elements influences vibration behavior – inspect antivibration elements periodically.

Inspect chain catcher – replace if damaged.

Switch off engine

- to check the chain tension
- to retension the chain
- to change chains
- for remedying malfunctions

Observe sharpening instructions – for safe and proper handling, always keep the chain and guide bar in flawless condition. Keep the chain properly sharpened, tensioned and well lubricated.

Change chain, guide bar and chain sprocket in due time.

Check that the clutch drum is in perfect working condition.

Always store fuel and chain lubricant only in the specified type of containers and ensure they are correctly labeled. Avoid direct skin contact with gasoline. Do not inhale gasoline vapors – **danger to health!**

In the event of a chain brake malfunction, switch off the machine immediately – **risk of injury!** Consult a dealer – do not use the machine until the malfunction has been remedied, see "chain brake".

Maintenance and Care

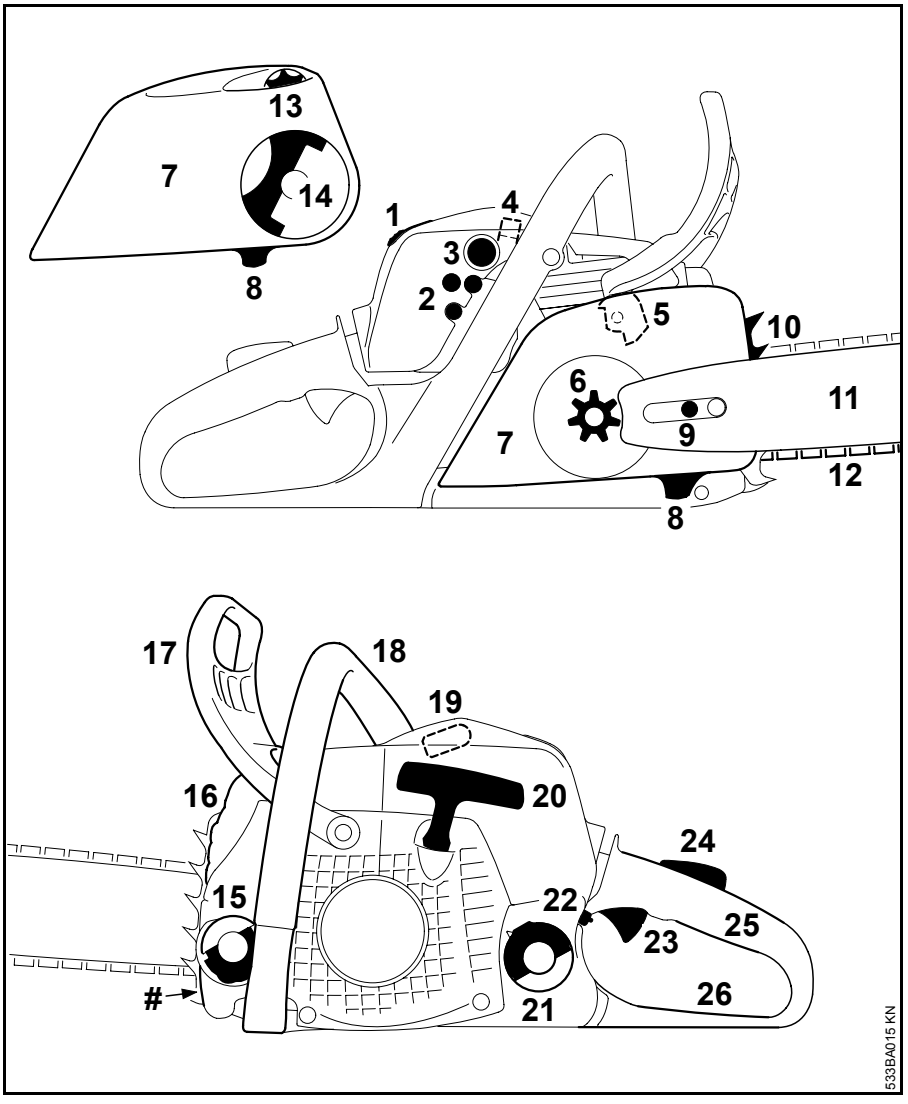
The following maintenance intervals apply for normal operating conditions only. If your daily working time is longer or operating conditions are difficult (very dusty work area, resin-rich wood, tropical wood, etc.), shorten the specified intervals accordingly. If you only use the saw occasionally, extend the intervals accordingly.		before starting work	after finishing work or daily	after each refueling stop	weekly	monthly	every 12 months	if problem	if damaged	if required
Complete machine	Visual inspection (condition, leaks)	X		X						
	Clean		X							
Throttle trigger, trigger interlock, choke lever, stop switch, Master Control lever (depending on version)	Check operation	X		X						
Chain brake	Check operation	X		X						
	Have checked by dealer[1)]									X
Pickup body/filter in fuel tank	Check					X				
	Clean, replace filter element					X		X		
	Replace						X		X	X
Fuel tank	Clean					X				
Chain oil tank	Clean					X				
Chain Lubrication	Check	X								
Saw chain	Inspect, also check sharpness	X		X						
	Check chain tension	X		X						
	Sharpen									X
Guide bar	Check (wear, damage)	X								
	Clean and turn over									X
	Deburr				X					
	Replace								X	X
Chain sprocket	Check				X					
Air filter	Clean							X		X
	Replace								X	
Anti-vibration elements	Check	X						X		
	Have replaced by dealer[1)]								X	

The following maintenance intervals apply for normal operating conditions only. If your daily working time is longer or operating conditions are difficult (very dusty work area, resin-rich wood, tropical wood, etc.), shorten the specified intervals accordingly. If you only use the saw occasionally, extend the intervals accordingly.		before starting work	after finishing work or daily	after each refueling stop	weekly	monthly	every 12 months	if problem	if damaged	if required
Cooling inlets	Clean		**X**							
Cylinder fins	Clean		**X**			**X**				
Carburetor	Check idle adjustment – chain must not rotate	**X**		**X**						
	Adjusting Idle Speed									**X**
Spark plug	Readjust electrode gap							**X**		
	Replace after 100 hours of operation									
All accessible screws and nuts (not adjusting screws) [2]	Retighten									**X**
Spark arresting screen in muffler (not all markets)	Check[1]							**X**		
	Clean, replace if necessary[1]								**X**	
Chain catcher	Check	**X**								
	Replace								**X**	
Safety labels	Replace								**X**	

1) STIHL recommends a STIHL servicing dealer.

2) Firmly tighten down the cylinder base screws of professional saws (3.4 kW or more) after 10 to 20 hours of operation.

Main Parts



1 Shroud lock
2 Carburetor adjusting screws
3 Fuel pump (easy start[1)])
4 Shutter (summer / winter operation, MS 211 only)
5 Chain brake
6 Chain sprocket
7 Chain sprocket cover
8 Chain catcher
9 Chain tensioner (side)
10 Bumper spike
11 Guide bar
12 Oilmatic saw chain
13 Adjusting wheel (quick chain tensioner)
14 Handle of wingnut[1)] (quick chain tensioner)
15 Oil filler cap
16 Muffler
17 Front hand guard
18 Front handle (handlebar)
19 Spark plug boot
20 Starter grip
21 Fuel filler cap
22 Master Control lever
23 Throttle trigger
24 Throttle trigger interlock
25 Rear handle
26 Rear hand guard
Serial number

1) Depending on model

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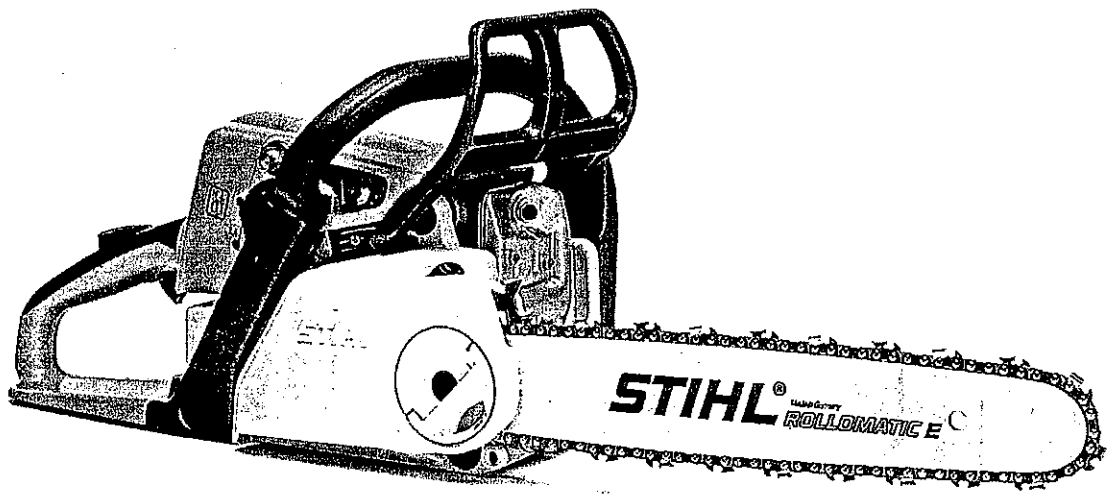
STIHL®

STIHL MS 210, 230, 250

Instruction Manual



Guide to Using this Manual

Pictograms

All the pictograms attached to the machine are shown and explained in this manual.

The operating and handling instructions are supported by illustrations.

Symbols in text

The individual steps or procedures described in the manual may be marked in different ways:

- Step or procedure without direct reference to an illustration.

Description of step or procedure that refers directly to the illustration and contains item numbers that appear in the illustration.
Example:

Loosen the screw (**1**)

Lever (**2**) ...

In addition to the operating instructions, this manual may contain paragraphs that require your special attention. Such paragraphs are marked with the symbols described below:

⚠ Warning where there is a risk of an accident or personal injury or serious damage to property.

Warning where there is a risk of damaging the machine or individual components.

Note or hint which is not essential for using the machine, but may improve the operator's understanding of the situation and result in better use of the machine.

Note or hint on correct procedure in order to avoid damage to the environment.

* Equipment and features

This instruction manual refers to several models with different features. Components that are not installed in all models and related applications are marked thus *. Such components are available as special accessories from your STIHL dealer.

Engineering improvements

STIHL's philosophy is to continually improve all of its products. As a result, engineering changes and improvements are made from time to time. If the operating characteristics or the appearance of your machine differ from those described in this manual, please contact your STIHL dealer for assistance.

Therefore, we cannot be responsible for changes, modifications or improvements not covered in this manual.

ErgoStart*

Chainsaws equipped with ErgoStart can be started with less effort at a lower cranking speed.

⚠ ErgoStart stores the energy required to start the chainsaw. Therefore, a delay of several seconds may occur between cranking the engine and it actually starting.

- Keep children well away from the machine – even small children could start the saw.
- Hold the saw firmly by the front handle during the entire starting procedure – allow for time delay between cranking the engine and it starting.
- To help prevent the engine starting unintentionally when the saw is not in use, move the Master Control to the stop position and engage the chain brake.
  Protect the machine from unauthorized use (e.g. children).

See also chapter on "Starting / Stopping the Engine".

Safety Precautions

Because a chainsaw is a high-speed wood-cutting tool some **special safety precautions** must be observed in addition to those that generally apply when working with an axe or hand saw.

It is important that you read and understand the owner's manual before using your chainsaw for the first time. Non-observance of the following safety precautions may cause serious or even fatal injury.

Always observe local safety regulations, standards and ordinances.

If you have never used this chainsaw model before:
Have your STIHL dealer or other experienced user show you how to operate your chainsaw or attend a special course of training in chainsaw operation.

Minors should never be allowed to use a chainsaw.

Children, bystanders and animals should not be allowed in the area where a chainsaw is in use.

The chainsaw user is responsible for accidents or risks involving third parties or their property.

Do not lend or rent your chainsaw without the owner's manual. Be sure that anyone using your saw understands the information contained in this manual.

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.

If you have a pacemaker: The ignition system of this power tool produces a very weak electromagnetic field. It is not possible to exclude the risk of it interfering with some types of pacemakers. To avoid health problems, STIHL recommends that you ask your doctor and the pacemaker manufacturer for advice.

* Special option

STIHL recommends only guide bars, saw chains and chain sprockets supplied by STIHL and explicitly approved for your chainsaw model by STIHL (see specifications and sales documentation).

The characteristics of these components are specifically designed to match your chainsaw model and meet your performance requirements (cutting capacity, vibration, kickback behavior).

Only use attachments supplied by STIHL or explicitly approved for your chainsaw model by STIHL. Other attachments must not be used because of the increased risk of accidents and negative effects on the chainsaw.

Never attempt to modify your chainsaw in any way since this can be extremely dangerous and result in serious or fatal injury. STIHL cannot accept any liability for personal injury or damage to property caused by modifications to the chainsaw, using attachments not approved by STIHL or non-approved guide bars and saw chains.

Clothing and Equipment

Wear proper protective clothing and equipment.

Clothing must be sturdy and snug-fitting, but allow complete freedom of movement. Wear overalls with a cut-retardant inlay - a STIHL safety coverall is recommended.

Do not wear loose-fitting garments, scarves, jewelry or anything that could restrict movement or become entangled with the saw, wood or brush. Confine long hair (e.g. with a hair net).

Wear steel-toed **safety boots** with non-slip soles.

Wear a **safety hard hat** to protect your head.

Wear **safety glasses** and **sound barriers**, i.e. ear plugs or ear muffs.

Wear **heavy-duty, non-slip gloves**, preferably made of chrome leather.

STIHL offers a comprehensive range of personal protection equipment

Transporting the Chainsaw

Always engage the chain brake and fit the chain guard (scabbard) before carrying the saw short distances. Also stop the engine before carrying the saw longer distances (more than about 50 m).

Always carry the saw by the front handle – with the hot muffler away from your body – the guide bar must point to the rear. To avoid serious burn injuries, avoid touching hot parts of the machine, especially the surface of the muffler.

Transporting by vehicle: When transporting in a vehicle, properly secure your saw to prevent turnover, fuel spillage and damage.

When your saw is not in use, put it down in a safe place so that it does not endanger anybody.

Fueling

Gasoline is an extremely flammable fuel. Keep clear of naked flames and fire. Do not spill any fuel.

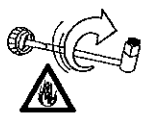
Stop the engine before refueling.

Do not refuel while the engine is still hot since fuel may overflow and catch fire.

In order to reduce risk of burns or other personal injury from escaping gas vapor and fumes, unscrew the fuel cap carefully to allow any pressure build-up in the tank to release slowly.

Fuel your chainsaw in a well-ventilated area, outdoors only. If you spill fuel, wipe the saw immediately – if fuel gets on your clothing, change immediately.

The saw comes standard with either a screw-type or bayonet-type fuel filler cap.



After fueling, tighten down the screw-type fuel filler cap as securely as possible.

Insert the fuel filler cap with hinged grip (bayonet type) correctly in the opening, turn it clockwise as far as stop and fold the grip down.

This helps reduce the risk of unit vibrations causing an improperly tightened fuel cap to loosen or come off and spill quantities of fuel.

To reduce the **risk of serious or fatal burn injuries**, check for fuel leakage. If fuel leakage is found, do not start or run the engine until leak is fixed.

Before Starting

Check that saw is properly assembled and in good condition - refer to appropriate chapters in the owner's manual:

- Check operation of chain brake.
- Correctly mounted guide bar.
- Correctly tensioned chain.
- Smooth action of throttle trigger and throttle trigger interlock – throttle trigger must return automatically to idle position.
- Master control/stop switch must move easily to **STOP** or ■
- Check that spark plug boot is secure – a loose boot may cause arcing that could ignite combustible fumes and cause a fire.
- Never attempt to modify the controls or safety devices
- Keep the handles dry and clean – free from oil and pitch – for safe control.

To reduce risk of personal injury, do not operate your saw if it is damaged or not properly assembled.

Starting the Engine

Start the engine at least 3 meters from the fueling spot, outdoors only.

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

To reduce risk of chain rotation and personal injury, lock the chain with the chain brake before starting.

Do not drop start the chainsaw.
The correct starting procedure is described in your owner's manual.

During Operation

In the event of impending danger or in an emergency, switch off the engine immediately by moving the Master Control/stop switch to ■ or ⊖.

When the engine is running:
Note that the chain continues to rotate for a short period after your let go of the throttle trigger.

Take special care in slippery conditions – damp, snow, ice, on slopes, uneven ground and freshly debarked logs.

Avoid stumbling on stumps, roots, rocks or in ditches.

Take special care to maintain good footing at all times.

Do not work alone – keep within calling distance of others in case help is needed.

Be particularly alert and cautious when wearing hearing protection because your ability to hear warnings (shouts, alarms, etc.) is restricted.

If you get tired, take a break in good time.

To reduce risk of fire, keep hot exhaust gases and hot muffler away from easily combustible materials (e.g. wood chips, bark, dry grass, fuel).

Your chainsaw produces toxic exhaust fumes as soon as the engine is running. These fumes may be colorless and odorless. Never run the engine indoors or in poorly ventilated locations, even if your model is equipped with a catalytic converter.

To reduce the risk of serious or fatal injury from breathing toxic fumes, ensure proper ventilation when working in trenches, hollows or other confined locations.

The dusts (e.g. sawdust) produced during cutting may be dangerous to health. If the work area is very dusty, wear a respirator.

To reduce risk of fire, **do not smoke** while operating or standing near your chainsaw. Note that combustible fuel vapor may escape from the fuel system.

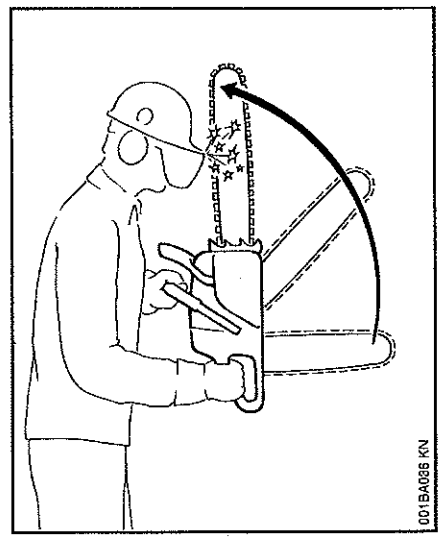
If your chainsaw is subjected to unusually high loads for which it was not designed (e.g. heavy impact or a fall), always check that it is in good condition before continuing cutting work.

Check the fuel system for leaks and make sure the safety devices are working properly. Do not continue operating your saw if it is damaged. In case of doubt, have the saw checked by your STIHL servicing dealer.

Make sure the chain does not rotate while the engine is idling. If necessary, adjust idle speed properly. If the chain still rotates, have the saw checked by your STIHL dealer.

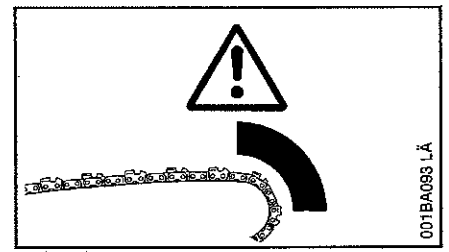
Dangers of kickback

Kickback can result in serious or fatal injury.



Kickback causes the the saw to be suddenly thrown up and back in an uncontrolled arc towards the operator.

Kickback may occur in the following situations



- when the upper quadrant of the bar nose unintentionally contacts wood or another solid object, e.g. another limb during limbing,
- when the chain at the nose of the guide bar is pinched in the cut.

Quickstop chain brake

This device reduces the risk of injury in certain situations – it cannot prevent kickback. If activated, the brake stops the saw chain within a fraction of a second – for a description of this device refer to "Chain Brake" chapter in this manual.

To reduce the risk of kickback

- Work cautiously using proper cutting techniques.
- Hold the chainsaw firmly with both hands and maintain a secure grip.
- Always cut at full throttle.
- Be aware of the location of the guide bar nose at all times.
- Do not cut with the bar nose.
- Take special care with small, tough limbs, they may catch the chain.
- Never cut several limbs at once.
- Do not overreach.
- Never cut above shoulder height.
- Do not attempt plunge cuts if you are not experience in this cutting technique.
- Be wary of position of log and forces that may cause the cut to close and pinch the chain.
- Always cut with a correctly sharpened, properly tensioned chain – the depth gauge setting must not be too large.

Use reduced kickback chain and a guide bar with a narrow radius nose.

Vibrations

Prolonged use of the unit may result in vibration-induced circulation problems in the hands (whitefinger disease).

No general recommendation can be given for the length of usage because it depends on several factors.

The period of usage is prolonged by:

- Hand protection (wearing warm gloves)
- breaks

The period of usage is shortened by:

- Any personal tendency to suffer from poor circulation (symptoms: frequently cold fingers, itching).
- Low outside temperatures.
- Gripping force (a tight grip hinders circulation).

Continual and regular users should monitor closely the condition of their hands and fingers. If any of the above symptoms appear, seek medical advice.

Maintenance and Repairs

Service the machine regularly. Do not attempt any maintenance or repair work not described in your owner's manual.

Have all other worked performed by your STIHL dealer. Only use genuine STIHL replacement parts. Never modify your machine in any way as this could result in serious injury.

Always shut off the engine

- before checking chain tension.
- before retensioning the chain.
- before replacing the chain.
- before rectifying problems.

Check the chain catcher – and replace it if damaged.

Observe sharpening instructions for safe and correct handling of saw chain and guide bar.
Keep the chain in good condition at all times. It must be properly sharpened, tensioned and well lubricated.

Always change the chain, guide bar and sprocket in good time.

Check condition of clutch drum periodically.

Check the fuel tank for leaks at short regular intervals.

Do not touch a hot muffler. Check condition of muffler at regular intervals to reduce the risk of fires and damage to hearing. Do not operate your machine if the muffler is damaged or missing.

Use only a spark plug of the type approved by STIHL and make sure it is in good condition (see chapter "Specifications"). Inspect ignition lead (insulation in good condition, secure connection).

To reduce the **risk of fire** and bum injury as a result of sparking outside the cylinder, move the stop switch to STOP before turning the engine over on the starter with the spark plug boot removed or the spark plug unscrewed.

Store fuel and chain lubricant in properly labelled, safety-type canisters only. Take care when handling gasoline. Avoid direct contact with the skin and avoid inhaling fuel vapour.

To reduce the **risk of injury**, shut down your chainsaw immediately in the event of a chain brake malfunction.
Take the saw to your STIHL dealer. Do not use your chainsaw until the fault has been fixed (see chapter "Chain Brake").

Using the Saw

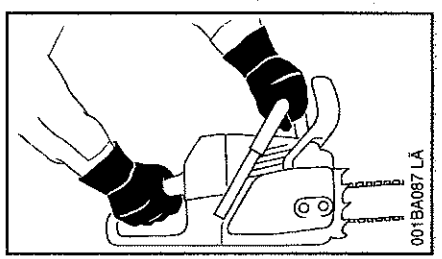
Cutting

Use your saw for cutting wood or wooden objects only.

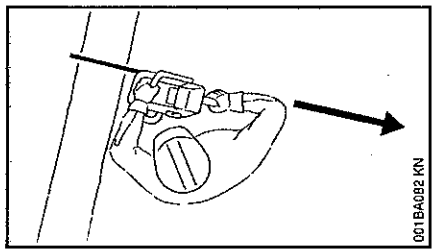
Do not operate your chainsaw with the starting throttle lock engaged. Engine speed cannot be controlled with the throttle trigger in this position.

Work calmly and carefully – in daylight conditions and only when visibility is good – ensure you do not endanger others – stay alert at all times.

Use the shortest possible guide bar: The chain, guide bar and chain sprocket must match each other and your saw.



Always **hold your saw firmly with both hands** - right hand on the rear handle, even if you are left-handed. To ensure safe control, wrap your fingers tightly around the front handle and control handle.



Position the saw so that your body is clear of the cutting attachment.

Always pull the saw out of the cut with the chain running.

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

Do not underbuck freely hanging limbs.

Take special care when cutting shattered wood – sharp slivers of wood may be caught and flung in your direction.

Make sure your saw does not touch any foreign materials:
Stones, nails, etc. may be flung off, damage the saw chain or cause the saw to kick back unexpectedly.

If on a slope, stand on the uphill side or to one side of the log. Watch out for rolling logs.

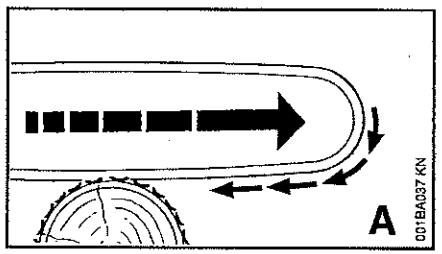
When working at heights:

- Always use a lift bucket.
- Never work on a ladder.
- Never work in a tree.
- Never work on any insecure support.
- Do not work above shoulder height.
- Never operate the saw with one hand.

Run the engine at full throttle, **engage the spiked bumper firmly in the wood** and then start cutting.

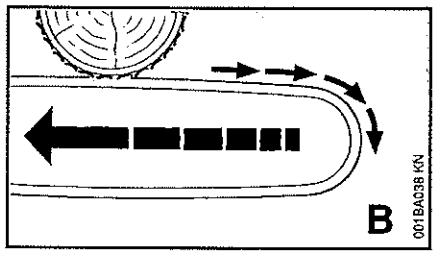
Never work without the spiked bumper – the saw may pull you forwards and off balance.

A = Pull-in



Pull-in occurs when the chain on the bottom of the bar is suddenly pinched, caught or encounters a foreign object in the wood. The reaction of the chain pulls the saw forward. **Always hold the spiked bumper securely against the tree or limb.**

B = Pushback



Pushback occurs when the chain on the top of the bar is suddenly pinched, caught or encounters a foreign object in the wood. The reaction of the chain drives the saw straight back toward the operator.

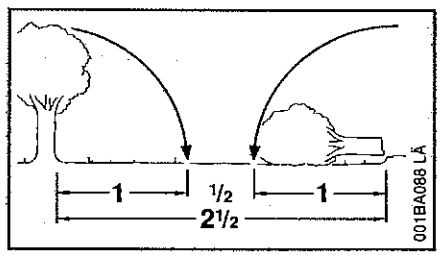
Felling and limbing

Do not attempt felling or limbing unless you have been trained in the necessary techniques.

Observe local regulations on felling techniques.

Bystanders must not be allowed in the felling area – other than helpers.

Make sure no-one is endangered by the falling tree – the noise of your engine may drown any warning calls.



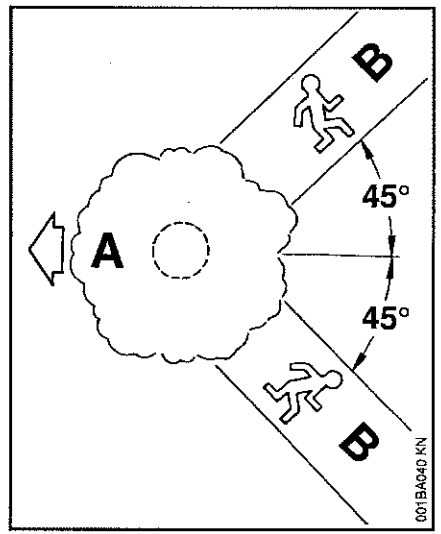
Maintain a distance of at least $2^1/_2$ tree lengths from next felling site.

Determine direction of fall and escape paths

Select a clearing into which the tree can fall.

Pay special attention to the following points:

- The natural lean of the tree.
- Any unusually heavy limb structure, damage to tree.
- The wind direction and speed – do not fell in high winds.
- Direction of slope.
- Neighboring trees.
- Snow load.
- Check the general condition of the tree. Take particular care with dry or damaged trees (decayed or rotted).



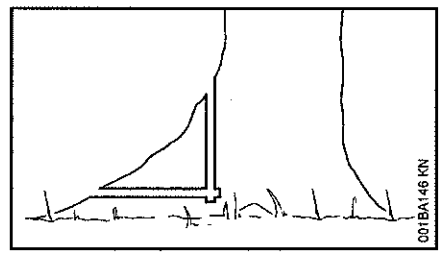
A = Direction of fall

B = Escape paths

- Establish paths of escape for everyone concerned – opposite to direction of fall at about 45°.
- Remove all obstacles from escape paths.
- Place all tools and equipment a safe distance away from the tree, but not on the escape paths.
- Always keep to the side of the falling tree. When the tree starts to fall, withdraw the bar, shut off the engine and walk away on the preplanned escape path.
- On steep slopes, prepare escape paths parallel to the slope.
- Watch out for falling limbs and pay attention to crown.

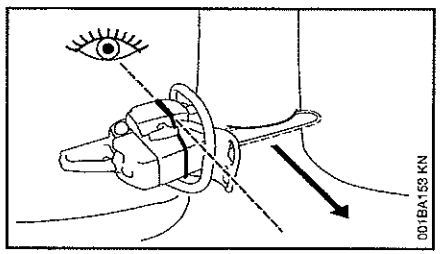
Preparing work area at base of tree

- First clear the tree base and work area from interfering limbs and brush – safe footing for all persons concerned.
- Clean lower portion of tree base with an axe. Sand, stones and other foreign objects will dull the saw chain.



- Remove large buttress roots: Make vertical cut first, then horizontal – but only if tree is in sound condition.

Making felling notch

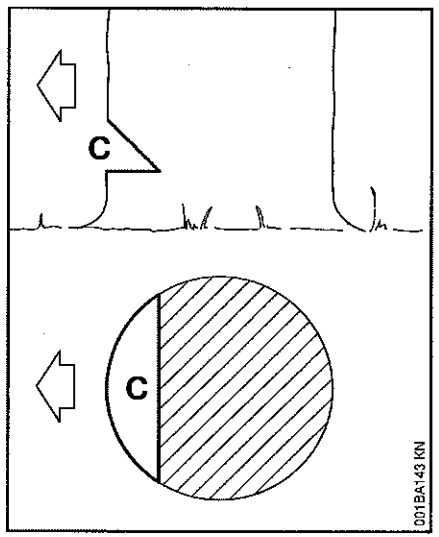


When making the felling notch, make use of the gunning sight on the shroud and fan housing to check the planned direction of fall.

Position your saw so that the gunning sight points in exactly in the direction you want the tree to fall.

There are several permissible ways of making the horizontal and angled cuts – observe country-specific regulations on felling techniques.

STIHL recommends the following sequence:

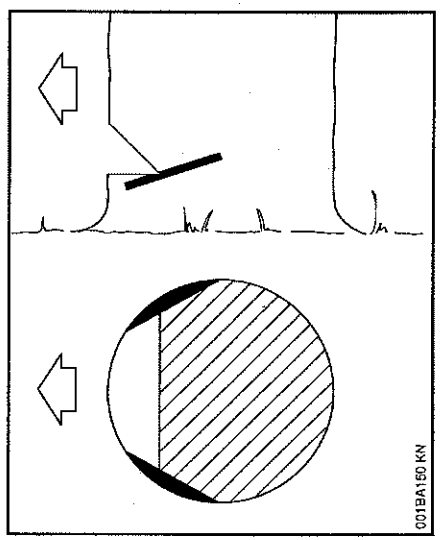


C = Felling notch determines the direction of fall

- Make the horizontal cut – check the direction of fall with the gunning sight.
- Make top cut at an angle of about 45°.
- Check the felling notch and correct it if necessary.

Important points:

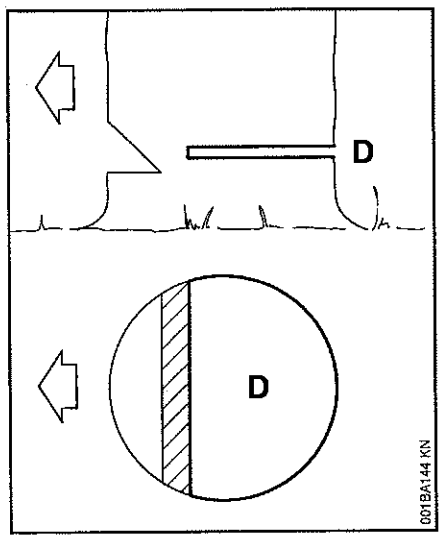
- Felling notch at a right angle to planned direction of fall.
- As close as possible to the ground.
- Cut to a depth of about $^1/_5$ to $^1/_3$ of the trunk diameter.



Sapwood cuts

Sapwood cuts help prevent long-fibered wood splintering when the tree falls. Apply the cuts at both sides of the trunk at the same height as the bottom of the felling notch, to a depth of about $^1/_{10}$ of the trunk diameter. On large diameter trees, cut to no more than the width of the guide bar.

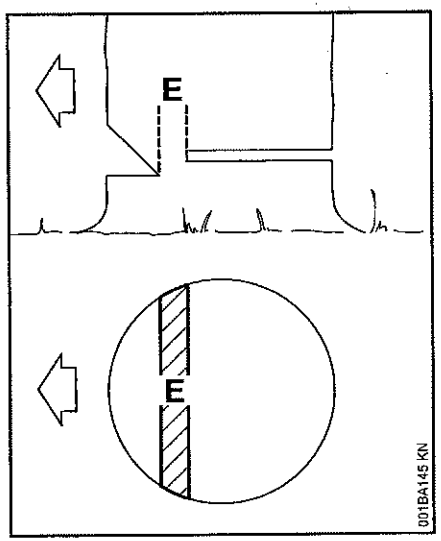
Do not use sapwood cuts on diseased trees.



Felling cut

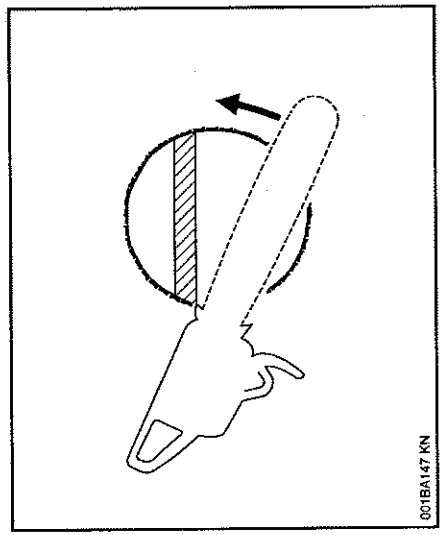
Shout a warning before starting the felling cut.

- Make the felling cut (**D**) slightly higher than bottom of felling notch.
- Cut horizontally.
- Leave approx. $^{1}/_{10}$ of tree diameter uncut. This is the hinge.



Drive wedges into the felling cut in good time – use only wooden, aluminum or plastic wedges – never steel, which can damage the chain and cause kickback.

- The hinge (**E**) helps control the falling tree.
- Do not cut through the hinge – you could lose control of the direction of fall – this could result in an accident.

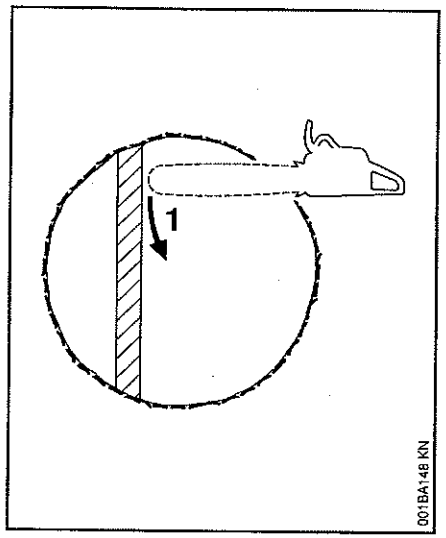


- If the trunk is rotten, leave a wider hinge.

Shout a warning immediately before the tree falls.

Small diameter trees: simple fan cut

Apply the spiked bumper behind the hinge – pivot the saw around this point – only as far as the hinge. The spiked bumper rolls against the trunk.

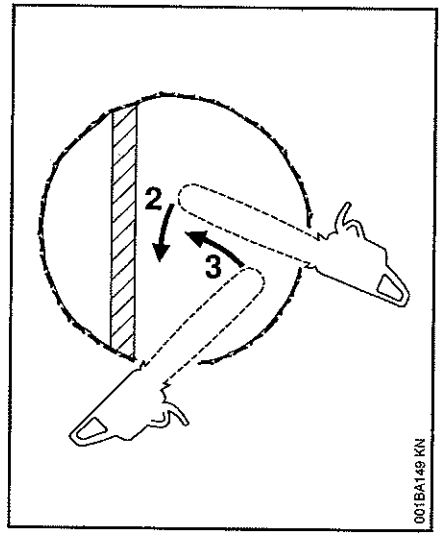


Large diameter trees: sectioning method

If the diameter is greater than the length of the guide bar, use the sectioning method.

Use the spiked bumper as a pivot – avoid repositioning the saw more than necessary.

First cut (1):
Nose of guide bar should enter wood just behind the hinge – hold the saw horizontally and swing it as far as possible.



When repositioning for the **next cut (2)**, keep the guide bar fully engaged in the kerf to keep felling cut straight – apply the spiked bumper.

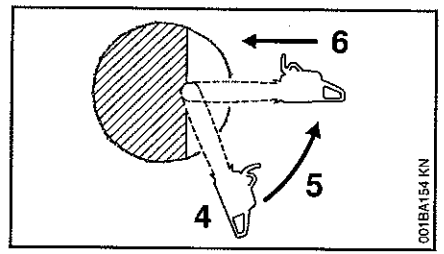
Last cut (3):
Apply the spiked bumper as for the simple fan cut.

Do not cut through the hinge!

Plunge-cutting

Do not attempt plunge-cutting unless you are experienced in this cutting technique.

- Use a low kickback chain and be extremely cautious.
- For heartwood cut.
- For felling leaners.
- For relieving cuts during bucking.
- For DIY projects.



Begin cut by applying lower portion of the guide bar nose (**4**) – do not use upper portion because of risk of kickback. Cut until depth of kerf is twice the width of the guide bar.

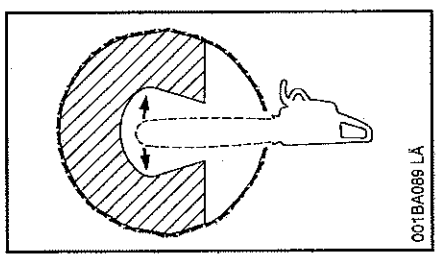
Swing saw slowly (**5**) into plunge-cutting position. Take care because of the **risk of kickback or pushback**.

Make the plunge cut (**6**) very carefully. **Danger of pushback**.

Heartwood cut

Perform heartwood cut

- if tree diameter is more than twice the length of the guide bar.
- if a large portion of heartwood remains uncut on large diameter trees.
- on trees that are difficult to fell (oak, beech), to prevent heartwood splintering and maintain planned direction of fall.
- on soft deciduous trees to relieve tension in lying log and prevent slivers in the center of the hinge being torn out of the log.



- Begin plunge cut by inserting the bar in the felling notch and then enlarge the cut to both sides.

Exercise extreme caution

- with leaners
- with trees that have fallen unfavorably between other trees and are under strain
- when working in blowdown areas.

Do not work with the chainsaw in such circumstances. Use block and tackle, cable winch or tractor.

Pull out exposed and cleared logs. Select clear area for cutting.

Dry or damaged trees (decayed or rotted) represent a considerable danger that is difficult or almost impossible to assess. Use aids such as block and tackle, cable winch or tractor

When felling in the vicinity of roads, railways, power lines, etc.
Take extra precautions. If necessary, inform the police, utility company or railway authority

Limbing

- Use a low kickback chain.
- Work with the saw supported wherever possible.
- Do not stand on the log while limbing.
- Do not work with the bar nose.
- Watch for limbs which are under tension.
- Never attempt to cut several limbs at once.

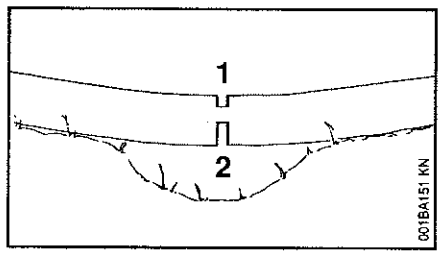
When cutting small logs

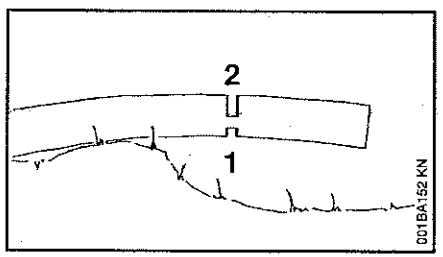
- Use a sturdy and stable support – sawhorse.
- Never hold the log with your leg or foot.
- Never allow another person to hold the log or help in any other way.

Mounting the Bar and Chain

(Side chain tensioner)

Lying or standing logs under tension

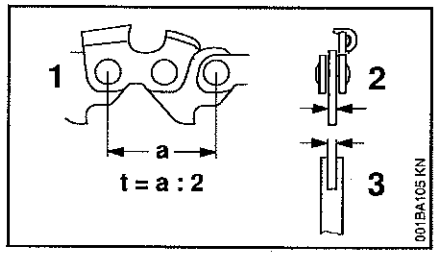




Always start relieving cut (**1**) at the compression side, then perform the bucking cut (**2**) at the tension side – the saw will otherwise pinch or kick back.

If not otherwise possible, make the bucking cut from the bottom upwards (underbuck) – **be wary of pushback.**

Lying logs must not touch the ground at the point where the cut is made – this will damage the chain.

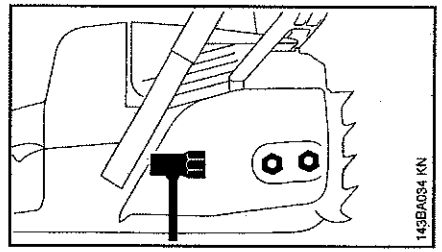


You can run chains of different pitches on this chainsaw – depending on the chain sprocket (see "Specifications"):

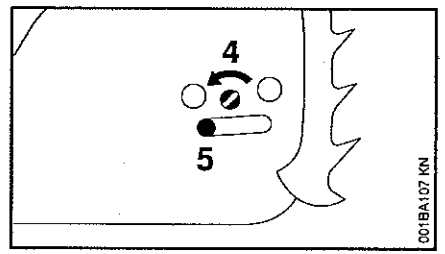
The chain pitch **(1)** must match the pitch of the sprocket and the guide bar (for Rollomatic). The drive link gauge **(2)** must match the bar groove width **(3)**.

The pitch is marked on the chain sprocket and guide bar in inches (e.g. 3/8 or .325). The groove width is marked on the guide bar in millimeters (e.g. 1.6).

If non-matching components of the wrong pitch or drive link gauge are run together on the same machine they may be damaged beyond repair after a short period of operation.



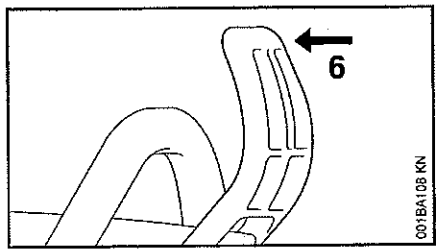
- Unscrew the nuts and take off the chain sprocket cover.



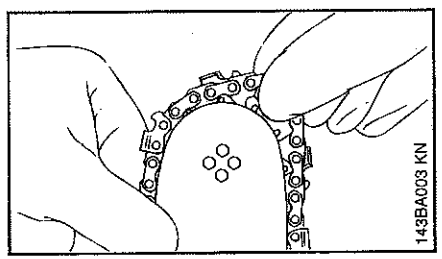
- Turn screw **(4)** counterclockwise until the tensioner slide **(5)** butts against left end of housing slot.

Mounting the Bar and Chain

(Front chain tensioner)

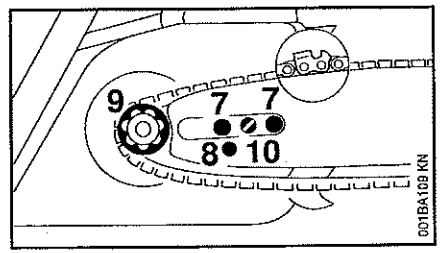


- Disengage the chain brake: Pull hand guard **(6)** toward front handle.

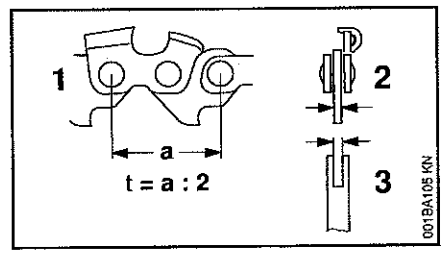


⚠ Wear work gloves to protect your hands from the sharp cutters.

- Fit the chain – start at the bar nose.



- Fit the guide bar over the studs **(7)** – cutting edges on top of bar must point to right – and engage the peg of the tensioner slide in locating hole **(8)** — place the chain over sprocket **(9)** at the same time.
- Now turn tensioning screw **(10)** clockwise until there is very little chain sag on the underside of the bar — and the drive link tangs are located in the bar groove.
- Refit the sprocket cover – and screw on the nuts only finger-tight.
- Go to "Tensioning the Saw Chain".



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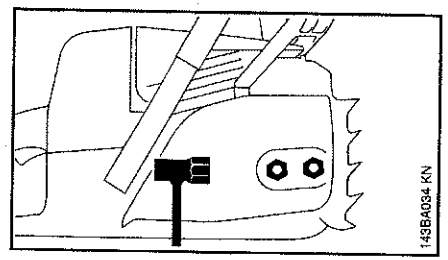
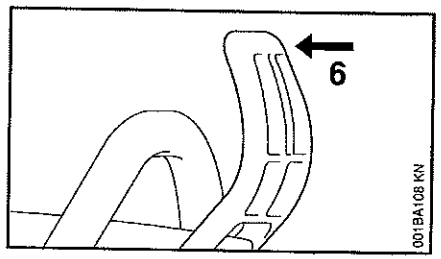
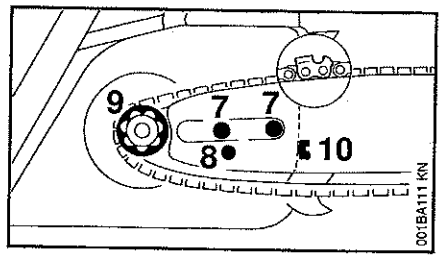


- Unscrew the nuts and take off the chain sprocket cover.



- Disengage the chain brake: Pull hand guard **(6)** toward front handle.



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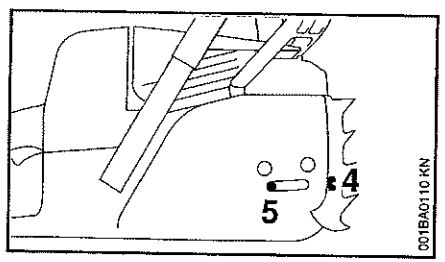
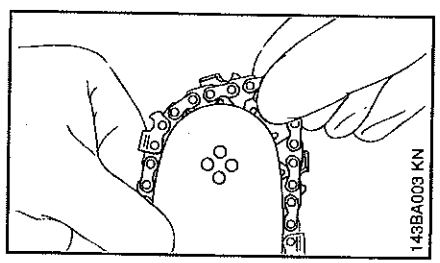


- Turn screw **(4)** counterclockwise until the tensioner nut **(5)** butts against left end of housing slot.

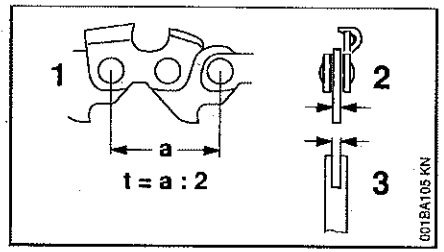


⚠ Wear work gloves to protect your hands from the sharp cutters.

- Fit the chain – start at the bar nose.

Mounting the Bar and Chain

(Quick Chain Tensioner)



You can run chains of different pitches on this chainsaw – depending on the chain sprocket (see "Specifications"):

The chain pitch **(1)** must match the pitch of the sprocket and the guide bar (for Rollomatic). The drive link gauge **(2)** must match the bar groove width **(3)**.

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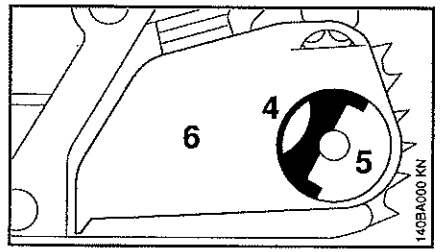
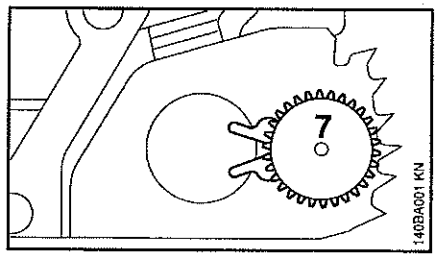
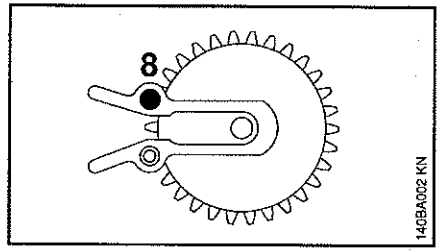
If non-matching components of the wrong pitch or drive link gauge are run together on the same machine they may be damaged beyond repair after a short period of operation.



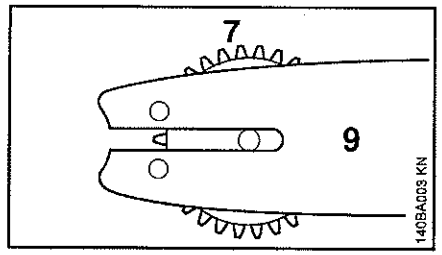
- Pull out the hinged handle **(4)** so that it snaps into position.
- Turn the wingnut **(5)** counterclockwise until it hangs loose in the sprocket cover **(6)**.
- Remove the sprocket cover.



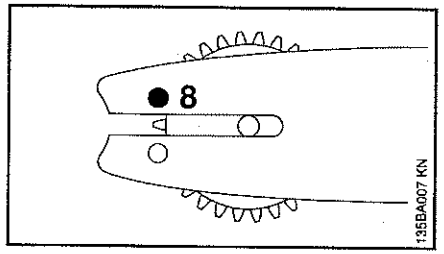
- Remove the tensioning gear **(7)** and turn it over.



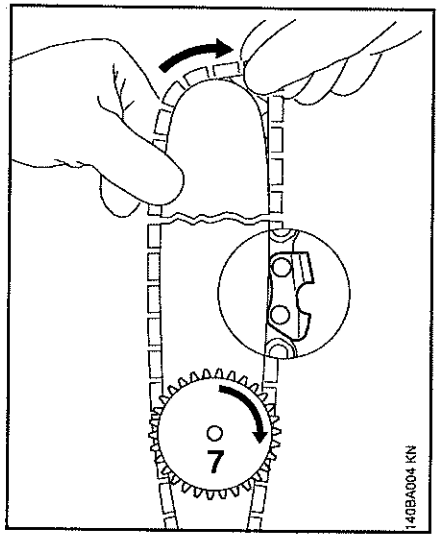
- Take out the screw **(8)**.



- Position the tensioning gear **(7)** against the guide bar **(9)**.

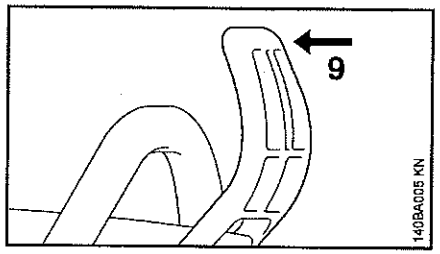


- Fit and tighten down the screw **(8)**.

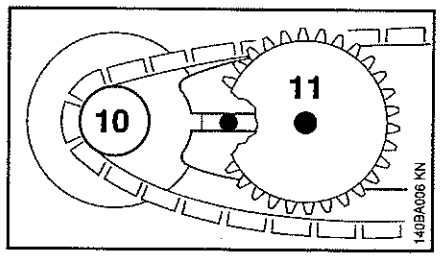


⚠ Wear work gloves to protect your hands from the sharp cutters!

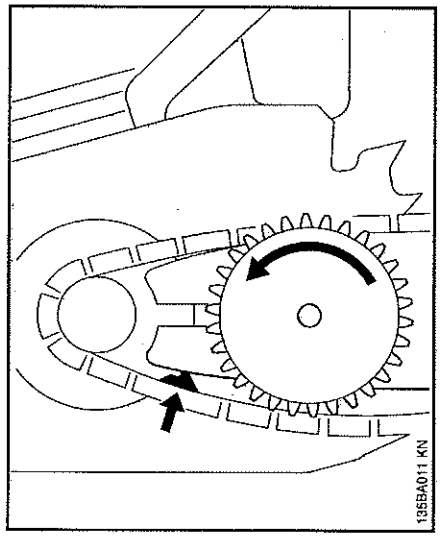
- Fit the chain – start at the bar nose. Pay attention to the position of the tensioning gear and the cutting edges.
- Turn the tensioning gear **(7)** clockwise as far as stop.



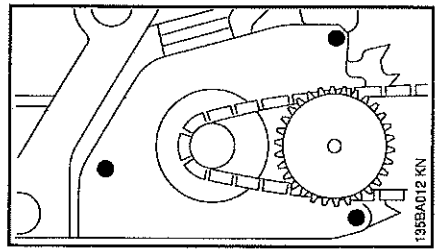
- Disengage the chain brake: Pull hand guard **(9)** back towards the front handle.
- Turn the guide bar so that the tensioning gear is facing you.



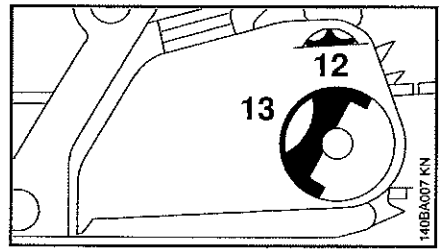
- Fit the chain over the sprocket **(10)**.
- Fit the guide bar over the collar screw **(11)**, the head of the rear collar screw must locate in the slot.



- Make sure the drive link tangs engage the bar groove (see arrow) and then rotate tensioning gear counterclockwise as far as stop.



- Place the chain sprocket cover in position and engage guide lugs in recesses in engine housing at the same time.

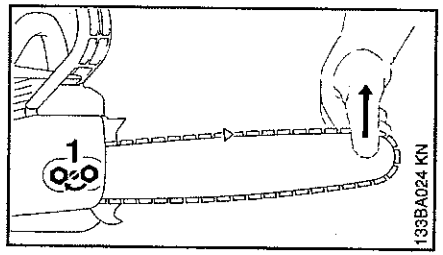


- When fitting the chain sprocket cover, check that the teeth of the tensioning gear and adjusting wheel mesh properly. If necessary, turn the adjusting wheel **(12)** slightly until the sprocket cover can be pushed flush against the engine housing.
- Pull out the hinged handle **(13)** so that it snaps into position.
- Engage wingnut and tighten it down moderately.

Go to "Tensioning the Saw Chain".

Tensioning the Saw Chain

(Side chain tensioner)



Retensioning during cutting work:

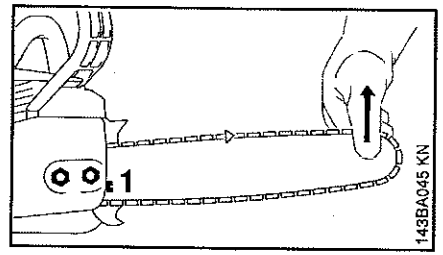
- Shut off the engine first – and then loosen the nut.
- Hold the bar nose up and use screwdriver to turn tensioning screw **(1)** clockwise until chain fits snugly against the underside of the bar.
- While still holding the bar nose up, tighten down the nut **firmly**.
- Go to "Tensioning the Saw Chain"

A new chain has to be retensioned more often than one that has been in use for some time.

- Check chain tension frequently – see "During Operation".

Tensioning the Saw Chain

(Front chain tensioner)



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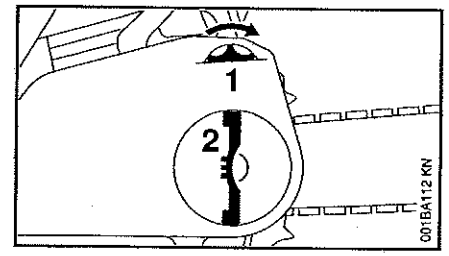
A new chain has to be retensioned more often than one that has been in use for some time.

- Check chain tension frequently – see "Operating Instructions".

Tensioning the Saw Chain

(Quick chain tensioner)



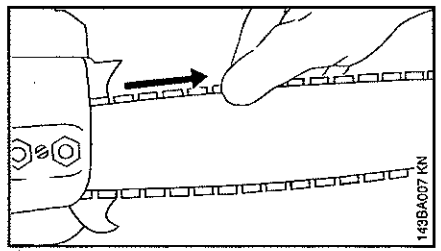
Retensioning during cutting work:

- Shut off the engine.
- Pull out the hinged clip and loosen the wingnut.
- Tum the adjusting wheel **(1)** clockwise as far as stop.
- Tighten down the wingnut **(2) firmly** by hand.
- Fold down the hinged clip.
- Follow instructions in "Checking Chain Tension".

A new chain has to be retensioned more often than one that has been in use for some time.

- Check chain tension frequently – see "Operating Instructions".

Checking Chain Tension



- Shut off the engine.
- Wear work gloves.
- Chain must fit snugly against the underside of the bar – and, with the chain brake disengaged, it must still be possible to pull the chain along the bar by hand.
- If necessary, retension the chain.

A new chain has to be retensioned more often than one that has been in use for some time.

Check chain tension frequently – see "Operating Instructions".

Fuel

Your engine requires a mixture of gasoline and engine oil.

The quality of these constituents and the mix ratio have a decisive influence on the function and service life of the engine.

Unsuitable fuels or lubricants or mix ratios other than those specified may result in serious damage to the engine (piston seizure, rapid rate of wear, etc.).

Gasoline

Use only regular branded gasoline with a minimum octane rating of 90. If the octane rating of the regular grade gasoline in your area is lower, use premium fuel – leaded or unleaded.

For health and environmental reasons, you should give preference to unleaded gasoline.

If your machine is equipped with a **catalytic converter**, you must use **unleaded gasoline**.

A few tankfuls of leaded gasoline will greatly reduce the efficiency of the catalytic converter.

Engine Oil

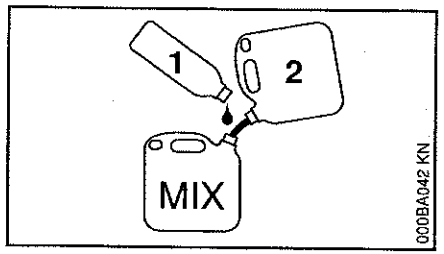
Use only quality two-stroke engine oil. We recommend **STIHL two-stroke engine oil since it is specially formulated for use in STIHL engines and guarantees a long engine life.**

Other quality two-stroke engine oils must conform to classification TC.

Poor quality gasoline or engine oil may damage the engine, sealing rings, hoses and the fuel tank.

Use only **STIHL 50:1 heavy-duty engine oil** for the fuel mix in models with a **catalytic converter**.

Mixing Fuel



⚠ Avoid direct skin contact with gasoline and avoid inhaling gasoline vapour.

- Use a canister approved for storing fuel. Pour oil (**1**) into the canister first, then add gasoline (**2**) and mix thoroughly.

Mix Ratio

STIHL 50:1 two-stroke engine oil:
50 parts gasoline to 1 part oil

Other branded two-stroke engine oils (classification TC):
25 parts gasoline to 1 part oil

Examples

Gasoline	STIHL engine oil 50:1		Other branded TC oils 25:1	
Liters	Liters	(cc)	Liters	(cc)
1	0.02	(20)	0.04	(40)
5	0.10	(100)	0.20	(200)
10	0.20	(200)	0.40	(400)
15	0.30	(300)	0.60	(600)
20	0.40	(400)	0.80	(800)
25	0.50	(500)	1.00	(1000)

Storing Fuel

Fuel mix ages:
Only mix sufficient fuel for a few months work. Store in approved safety-type fuel canisters in a dry and safe location.

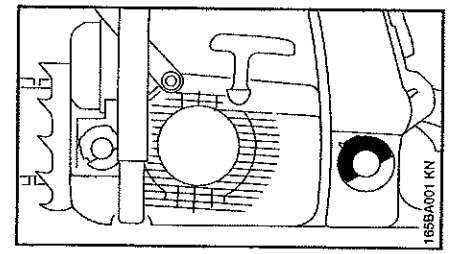
- Thoroughly shake the mixture in the canister before fueling your machine.

⚠ Pressure may build up in the canister – open it carefully.

- Clean the fuel tank and canister from time to time.

Dispose of remaining fuel and cleaning fluid properly in accordance with local regulations and environment requirements.

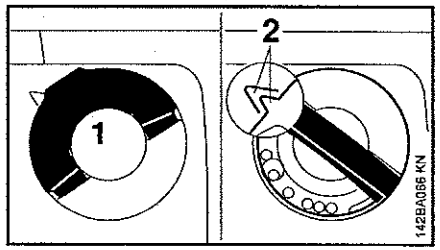
Fueling



- Before fueling, clean the filler cap and the area around it to ensure that no dirt falls into the tank.
- Position the machine so that the filler cap is facing up.

Take care not to spill fuel while fueling and do not overfill the tank. The STIHL filler nozzle* is recommended for this purpose and also helps you avoid inhaling fuel vapor.

* see "Guide to Using this Manual"



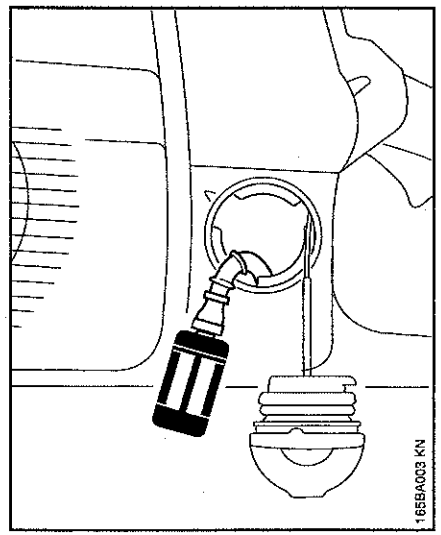
The fuel tank cap shown above features a cliplock. It can be opened and closed without tools.

Opening the cap:

- Swing the cliplock **(1)** up.
- Turn the cap counterclockwise as far as stop and remove.

Closing the cap:

- Place the cap in position with cliplock up – the marks **(2)** must line up.
- Turn cap clockwise as far as stop.
- Fold down the cliplock.



Change the fuel pickup body once every year

- Drain the fuel tank.
- Use a hook to pull the fuel pickup body out of the tank and take it off the hose.
- Push the new pickup body into the hose.

Place the pickup body in the tank.

Chain Lubricant

For automatic and reliable lubrication of the chain and guide bar – **use only an environmentally compatible quality chain and bar lubricant. Rapidly biodegradable STIHL Bioplus is recommended.**

Biological chain oil must be resistant to aging (e.g. STIHL Bioplus) since it will otherwise quickly turn to resin. This results in hard deposits that are difficult to remove, especially in the area of the chain drive, clutch and chain. It may even cause the oil pump to seize.

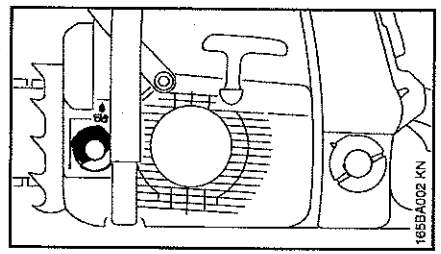
The service life of the chain and guide bar depends on the quality of the lubricant. It is therefore essential to use only a specially formulated chain lubricant.

If special chain lubricant is not available, you may - in an emergency - use an HD single grade or multigrade engine oil with a viscosity that suits the prevailing outside temperature.

⚠ **Do not use waste oil!**
Medical studies have shown that renewed contact with waste oil can cause skin cancer. Moreover, waste is environmentally harmfuel!

Waste oil does not have the necessary lubricating properties and is unsuitable for chain lubrication.

Filling Chain Oil Tank

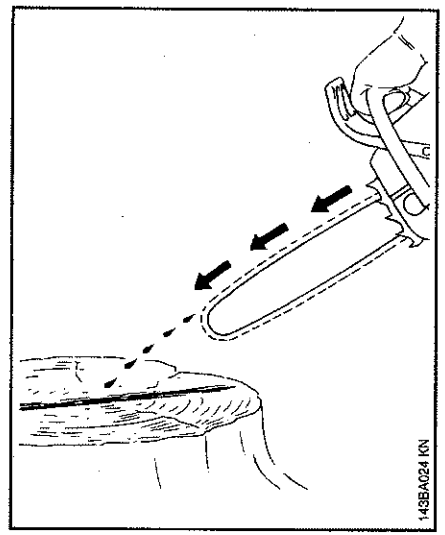


- Thoroughly clean the oil filler cap and the area round it to ensure that no dirt falls into the tank.
- Refill the chain oil tank every time you refuel.

There must still be a small amount of oil in the oil tank when the fuel tank is empty.

If the oil tank is still partly full, the reason may be a problem in the oil supply system: Check chain lubrication, clean the oilways, contact your STIHL dealer for assistance if necessary.

Checking Chain Lubrication



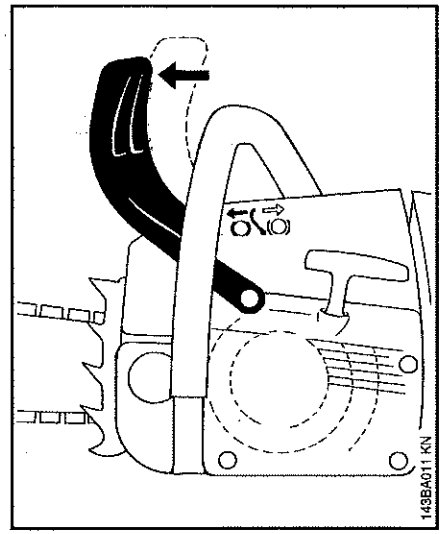
The saw chain must always throw off a small amount of oil.

Never operate your saw without chain lubrication. If the chain runs dry, the whole cutting attachment will be irretrievably damaged within a very short time.
Always check chain lubrication and oil level in tank before starting work.

Every new chain has to be broken in for about 2 to 3 minutes.

After breaking in chain, check chain tension and adjust if necessary – see "Checking Chain Tension".

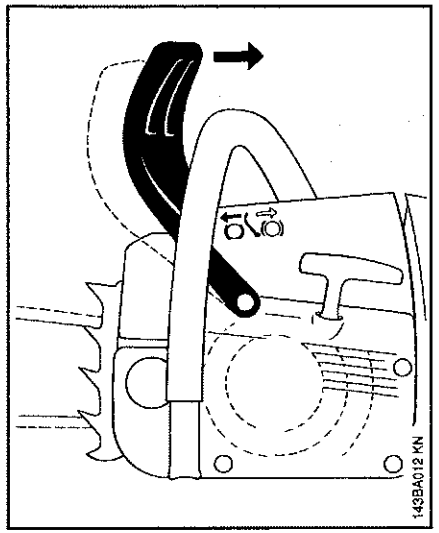
Chain Brake



Locking chain with chain brake

– in an emergency
– when starting
– at idling speed

The chain is stopped and locked when when the hand guard is pushed toward the bar nose by the left hand –
or when brake is activated by inertia in certain kickback situations.



Releasing the chain brake

- Pull the hand guard back toward the front handle.

Always disengage chain brake before accelerating engine and before starting cutting work. The only exception to this rule is when you check operation of the chain brake.

High revs with the chain brake engaged (chain locked) will quickly damage the powerhead and chain drive (clutch, chain brake).

The chain brake is also activated by the inertia of the front hand guard if the kickback force of the saw is high enough:
The hand guard is accelerated toward the bar nose - even if your left hand is not behind the hand guard, e.g. during felling cut.

The chain brake will operate only if the hand guard has not been modified in any way.

Check operation of chain brake

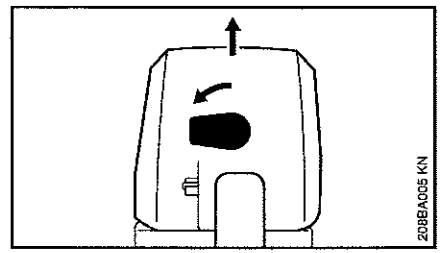
Before starting work:
Run engine at idle speed, engage the chain brake (push hand guard toward bar nose). Accelerate up to full throttle for no more than 3 seconds – the chain must not rotate. The hand guard must be free from dirt and move freely.

Winter Operation

Chain brake maintenance

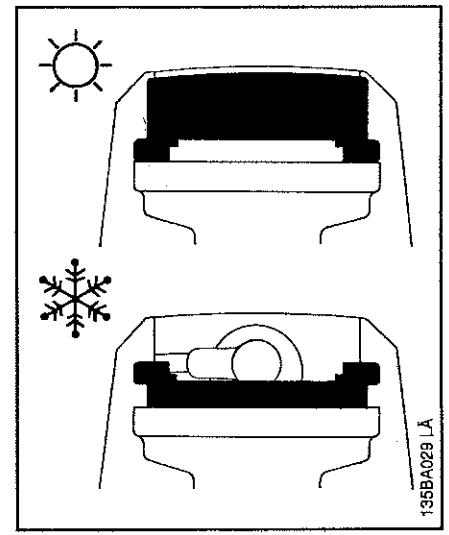
The chain brake is subject to normal wear. It is necessary to have it serviced and maintained regularly by trained personnel, such as your STIHL servicing dealer, at the following intervals:

Full-time professional users:	every 3 months
Semi-professional users (in agriculture and construction):	every 6 months
Hobby and occasional users:	every 12 months



At temperatures below +10°C/ 50°F:

- Press down the throttle trigger interlock and move the Master Control lever to ⊢ (cold start).
- Turn the twist lock above the rear handle 90° to the left.
- Lift off the carburetor box cover vertically.

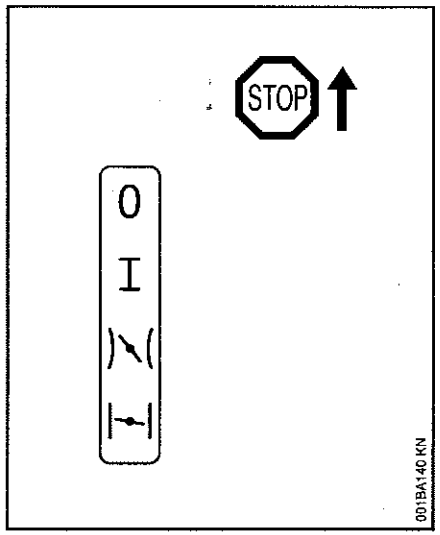


- Lift out the shutter (in front of spark plug) vertically.
- Turn the shutter 180°.
- Refit the shutter.
- Refit the carburetor box cover and secure it the twist lock.

Heated air is now drawn in from around the cylinder and mixed with cold air – this helps prevent carburetror icing.

At temperatures above +20°C/70°F, always close the shutter again. This is important to avoid engine running problems, i.e. overheating.

Information Before You Start



The four positions of the Master Control lever

0 = Engine off – ignition is switched off.

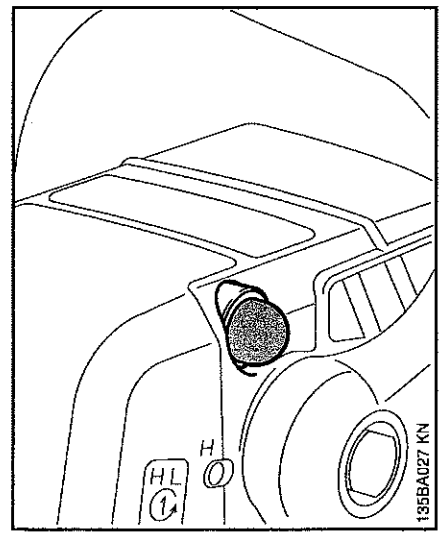
I = Normal run position – engine runs or can fire.

To move the Master Control lever from **I** to)\(or |~|, press down the throttle trigger interlock and squeeze throttle trigger at the same time.

)\(**=Warm start** – this position is used to start a warm engine. The Master Control lever moves to the normal run position as soon as the throttle trigger is squeezed.

|~|**=Cold start** – this position is used to start a cold engine.

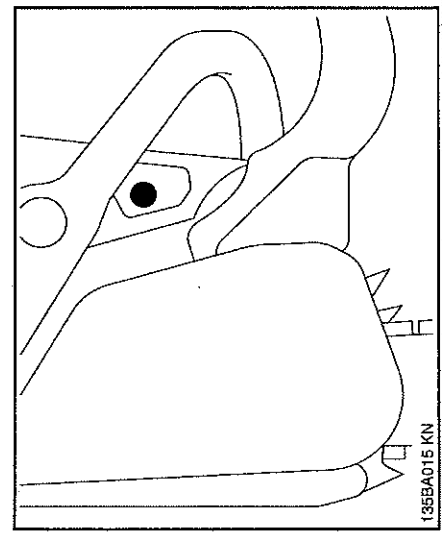
Starting / Stopping the Engine



Models with Easy Start System

- Prime the fuel system by pressing the fuel pump bulb about five times.

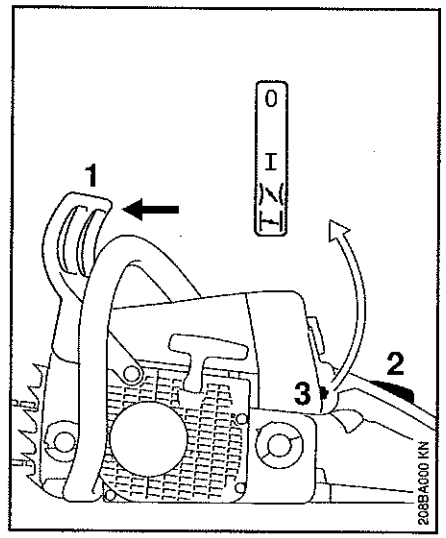
Press a few times more if you are starting for the first time after refilling a dry tank.

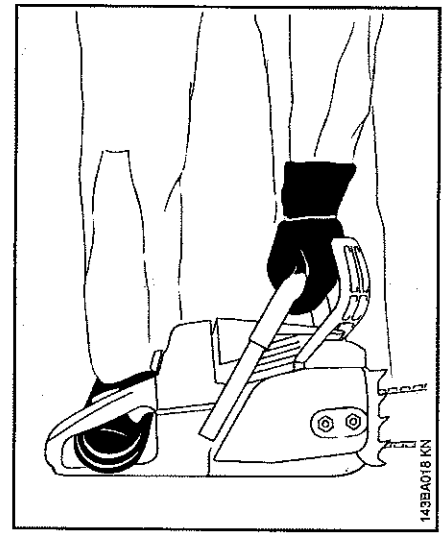


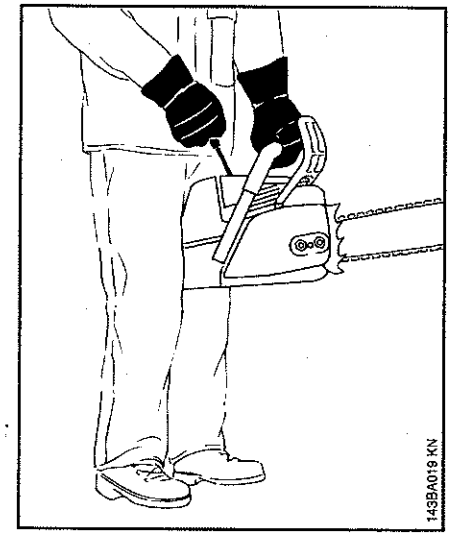
- Press in the button to open the decompression valve.

The decompression valve closes as soon as the engine fires.

- For this reason you must press in the button before each starting attempt.







All Models

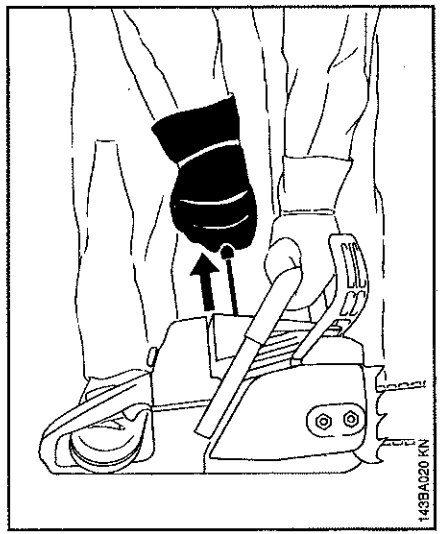
- Observe safety precautions – see chapter "Safety Precautions".
- Push hand guard (**1**) forward: The chain is now locked.
- Press down trigger interlock (**2**) and squeeze throttle trigger (**3**) at the same time.
  Set Master Control lever to:
  for cold start
  for warm start
  (even if engine has been running but is still cold).
- Place your saw on the ground. Make sure you have a firm footing – check that chain is not touching any object or the ground.

⚠ Bystanders must be well clear of the general work area of the saw.

- Hold the saw firmly on the ground with your left hand on the front handle – your thumb should be under the handle.
- Put your right foot into the rear handle and press down.

Alternative method of starting:

- Hold the rear handle tightly between your legs, just above the knees.
- Hold the front handle firmly with your left hand – your thumb should be under the handle.



If the engine is new, pull the starter several times to prime the fuel system.

Standard versions:

- Pull the starter grip slowly with your right hand until you feel it engage – then give the grip a brisk strong pull and push down the front handle at the same time.
- Do not pull out the starter rope to its full length – **it might otherwise break.**
- Do not let the starter grip snap back – guide it slowly and vertically into the housing so that the starter rope can rewind properly.

Versions with ErgoStart:

ErgoStart stores the energy required to start the chainsaw. Therefore, a delay of several seconds may occur between cranking the engine and it actually starting.

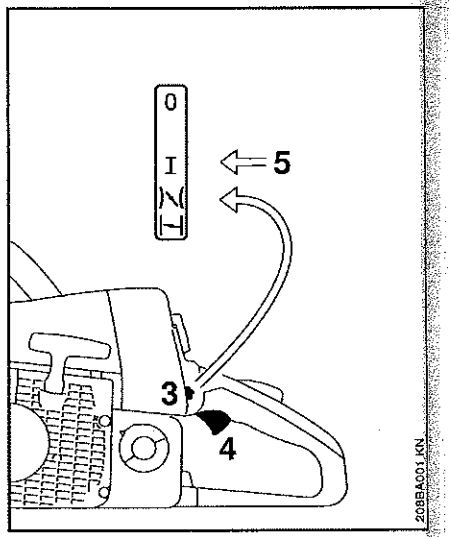
There are two ways of starting with the ErgoStart:

- Pull the starter grip slowly and steadily with your right hand

  or:

  Pull the starter grip in several short strokes with your right hand, using only a short length of rope for each pull.

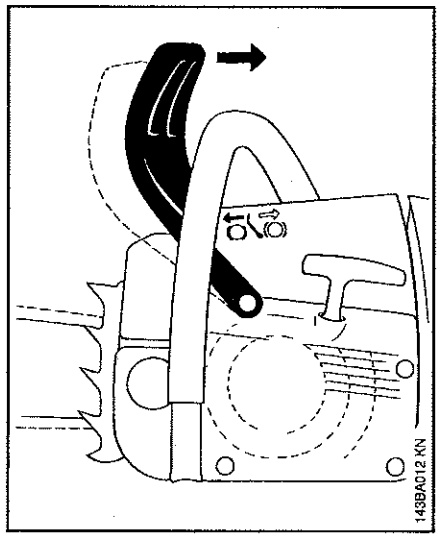
- Do not pull out the starter rope to its full length – **it might otherwise break.**
- Do not let the starter grip snap back – guide it slowly and vertically into the housing so that the starter rope can rewind properly.



When engine begins to fire:

- Move Master Control lever (**3**) to I and continue cranking – **as soon as engine runs, immediately** blip the throttle trigger (**4**) – the Master Control lever (**3**) will move to the "run" position I (**5**) and the engine settles down to idling speed.

As the chain brake is still engaged, the engine must be returned to idling speed **immediately** – or the engine and chain brake might otherwise be damaged.



- Pull the hand guard back toward the front handle:
  The chain brake is now disengaged – your saw is ready for operation.

Always disengage chain brake before accelerating engine. High revs with the chain brake engaged (chain locked) will quickly damage the engine and chain drive (clutch, chain brake).

- Observe safety precautions.
- Always check operation of chain lubrication before starting work.

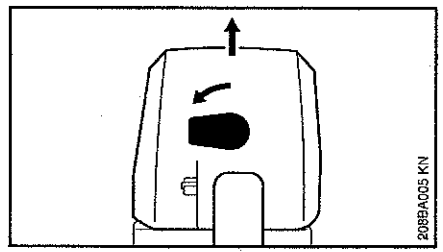
To shut down the engine:

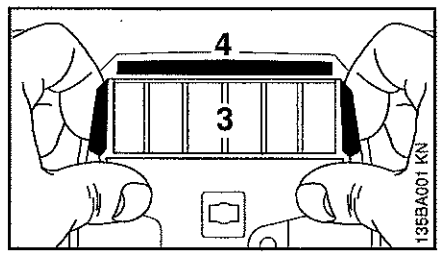
- Move the Master Control lever to ■

At very low outside temperatures: Allow the engine to warm up

As soon as the engine runs:

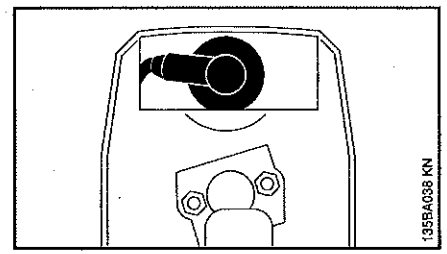
- Blip the throttle trigger to disengage it from the starting throttle position. The Master Control lever will move to the operating position – engine settles down to idling speed.
- Disengage the chain brake: Pull hand guard back toward front handle as shown in illustration.
- Open throttle partly – warm up engine for short period.





If the engine doesn't start:
If you did not move the Master Control lever to warm start position quickly enough after the engine began to fire, the combustion chamber is flooded.

- Press down the interlock lever and move the Master Control lever to (cold start).
- Turn the twist lock 90° to the left.
- Lift off the carburetor box cover vertically.
- Place fingers behind the air filter (**3**), press thumbs against the housing and swing filter in direction of rear handle.
- Take out the shutter (**4**).



- Pull off the spark plug boot.
- Unscrew and dry off the spark plug.
- Set the Master Control lever to stop position ■.
- Crank the engine several times with the starter to clear the combustion chamber.
- Refit the spark plug. Connect the spark plug boot and reassemble all other parts.
- Set Master Control lever to }\{ – even if engine is cold.
- Now start the engine.

If fuel tank has been run until dry and then refueled:

Machines without easy start system:

- Pull starter rope several times until fuel system is primed.

Machines with easy start system:

- Press fuel pump bulb (in handle housing) several times.

During break-in period

A factory new machine should not be run at high revs (full throttle off load) for the first three tank fillings. This avoids unnecessary high loads during the break-in period. As all moving parts have to bed in during the break-in period, the frictional resistances in the engine are greater during this period. The engine develops its maximum power after about 5 to 15 tank fillings.

Do not make the mixture leaner to achieve an apparent increase in power – this could damage the engine – see "Adjusting Carburetor".

Always disengage the chain brake before opening the throttle. Running the engine at higher revs with the chain brake engaged (saw chain at a standstill) will quickly damage the engine and chain drive (clutch, chain brake).

Taking Care of Guide Bar

During operation

Check chain tension frequently
A new chain has to be retensioned more often than one that has been in use for some time.

Chain cold:
Tension is correct when chain fits snugly against the underside of the bar and can still be pulled along the bar by hand.
Retension if necessary – see "Tensioning the Saw Chain".

Chain at operating temperature:
The chain stretches and begins to sag. The drive links must not come out of the bar groove – the chain may otherwise jump off the bar.
Retension the chain – see "Tensioning the Saw Chain"!

Always slacken off the chain after finishing work. The chain contracts as it cools down. If it is not slackened off, it can damage the crankshaft and bearings.

After long period of full-throttle operation
Allow engine to run for a short while at idle speed so that engine heat can be dissipated by flow of cooling air. This protects engine-mounted components (ignition, carburetor) from thermal overload.

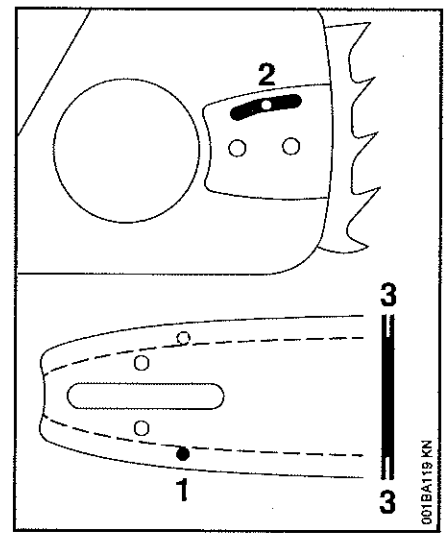
After finishing work

- Slacken off the chain if you have retensioned it at operating temperature during cutting work.

The chain contracts as it cools down. If it is not slackened off, it could damage the crankshaft and bearings.

Storing your saw for a short period:
Wait for engine to cool down. To avoid condensation, fill the fuel tank and keep the machine in a dry place, well away from sources of ignition, until you need it again.

Storing for a long period:
See "Storing the Machine"!



- **Turn the bar over –**
  every time you sharpen the chain and every time you replace the chain – this helps avoid one-sided wear, especially at the nose and underside of the bar.
- Regularly clean
  the oil inlet hole **(1)**,
  the oilway **(2)** and
  the bar groove **(3)**.
- **Measure groove depth –**
  with scale on filing gauge* – in area used most for cutting.

* see "Guide to Using this Manual"

Chain type	Pitch	Minimum groove depth
Picco	3/8" P	5.0 mm
Rapid	1/4"	4.0 mm
Rapid	3/8"; 0.325"	6.0 mm
Rapid	0.404"	7.0 mm

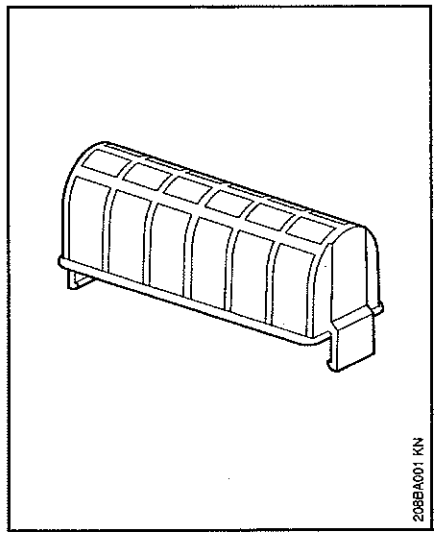
If groove depth is less than specified:

- Replace the guide bar.

The drive link tangs will otherwise scrape along the bottom of the groove – the cutters and tie straps will not ride on the bar rails.

Air Filter System

The air filter system can be adapted to suit different operating conditions by simply installing a choice of filters.

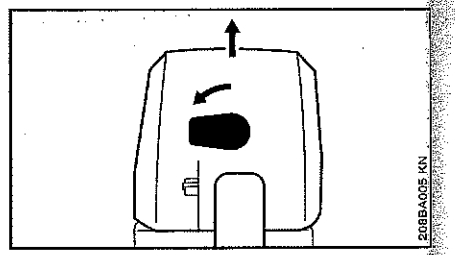


Fabric filter*
For normal operating conditions and winter operation.

Fleece filter* (non-woven)
For dry and very dusty work areas.

* see "Guide to Using this Manual"

Cleaning the Air Filter

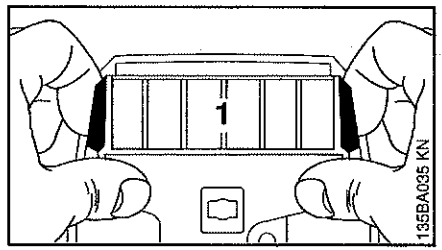


Dirty air filters reduce engine power, increase fuel consumption and make starting more difficult.

If there is a noticeable loss of engine power

- Press down the throttle trigger interlock and move the Master Control lever to ⊢┤ (cold start).
- Turn the twist lock 90° to the left.
- Lift off off the carburetor box cover vertically.
- Always replace damaged filter elements.
- Clean away loose dirt from around the filter.

Adjusting the Carburetor



- Place fingers behind the air filter (**1**), press thumbs against the housing and swing filter in direction of rear handle.
- Blow out the filter with compressed air from the clean air side.

If the filter fabric is caked with dirt or no compressed air is available:

- Wash the filter in a clean, non-flammable solution (e.g. warm soapy water) and then dry.
- Reinstall the filter.

General Information

Your carburetor comes from the factory with a standard setting.

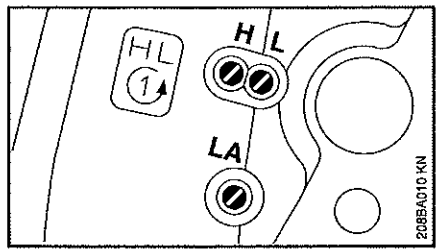
This setting provides an optimum fuel-air mixture under most operating conditions.

The high speed screw alters the engine's power output and the maximum off-load engine speed.

If the **setting is too lean** there is a **risk of engine damage** due to insufficient lubrication and overheating.

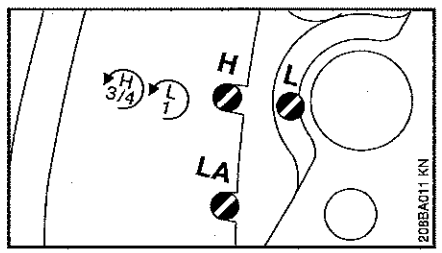
Standard Setting

Models with
H = 1 and L =1



- Shut off the engine.
- Check the air filter and clean or replace if necessary.
- Carefully screw both adjusting screws down onto their seats (clockwise).
- Turn the high speed screw (**H**) one full turn counterclockwise.
- Turn the low speed screw (**L**) one full turn counterclockwise.

Models with
H = $^3/_4$ and L =1



- Shut off the engine.
- Check the air filter and clean or replace if necessary.
- Turn the high speed screw (**H**) counterclockwise as far as stop (no more than $^3/_4$ turn).
- Carefully screw the low speed screw (**L**) down onto its seat (clockwise), then turn it back one full turn counterclockwise.

Adjusting Idle Speed

Engine stops while idling

- Carefully screw the low speed screw (**L**) down onto its seat (clockwise), then turn it back one full turn counterclockwise.
- Turn the idle speed screw (**LA**) clockwise until the chain begins to run – then turn the screw back one quarter of a turn from that position.

Chain runs while engine is idling

- Carefully screw the low speed screw (**L**) down onto its seat (clockwise), then turn it back one full turn counterclockwise.
- Turn the idle speed screw (**LA**) counterclockwise until the chain stops running – then turn the screw another quarter of a turn in the same direction.

Erratic idling behavior, poor acceleration

(even though L screw is open 1 full turn)

Idle setting is too lean:

- Turn low speed screw (**L**) counterclockwise until the engine runs and accelerates smoothly.

It is usually necessary to change the setting of the idle speed screw (**LA**) after every correction to the low speed screw (**L**).

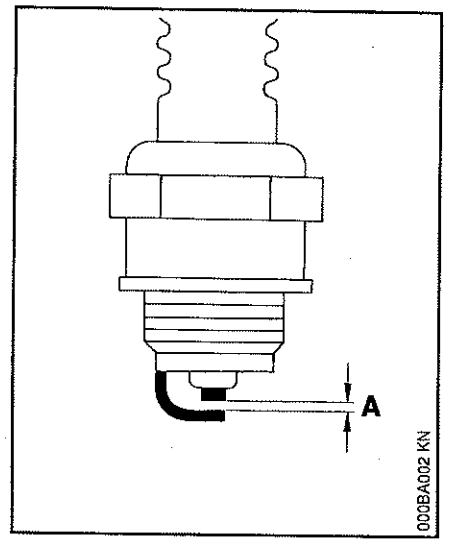
Fine Tuning for Operation at High Altitude

A slight correction of the setting may be necessary if engine power is not satisfactory when operating at high altitude:

- Check the standard setting.
- Warm up the engine.
- Turn high speed screw (**H**) slightly clockwise (leaner). On models with H = $^3/_4$, turn no further than stop.

If the **setting is too lean** there is a **risk of engine damage** due to insufficient lubrication and overheating.

Checking the Spark Plug

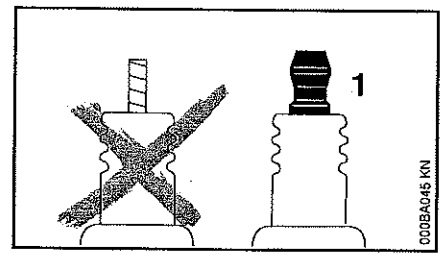


If engine is down on power, difficult to start or runs poorly at idle speed, first check the spark plug.

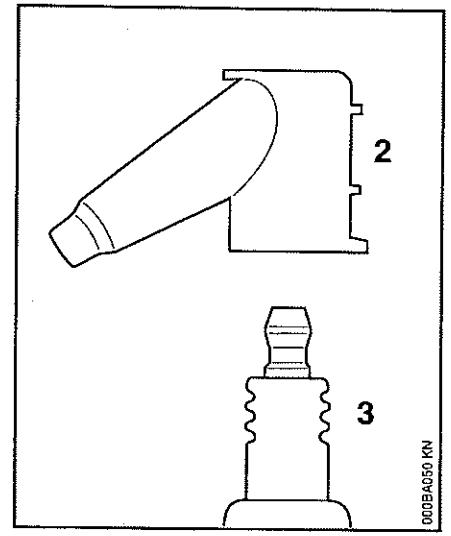
- Remove the spark plug – see "Starting / Stopping the Engine".
- Clean dirty spark plug.
- Check electrode gap (**A**) and readjust if necessary – see "Specifications".

- Rectify the problems which have caused fouling of spark plug:
  - To much oil in fuel mix.
  - Dirty air filter.
  - Unfavorable running conditions.
- **Fit a new spark plug after about 100 operating hours** – or sooner if the electrodes are badly eroded.
  Install only suppressed spark plugs of the type approved by STIHL – see "Specifications".

To reduce the risk of arcing and fire:



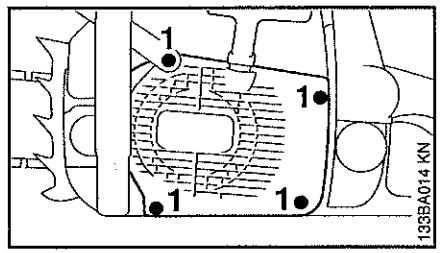
- If the spark plug comes with a detachable adapter nut (**1**), screw it on **firmly**.



On all spark plugs:

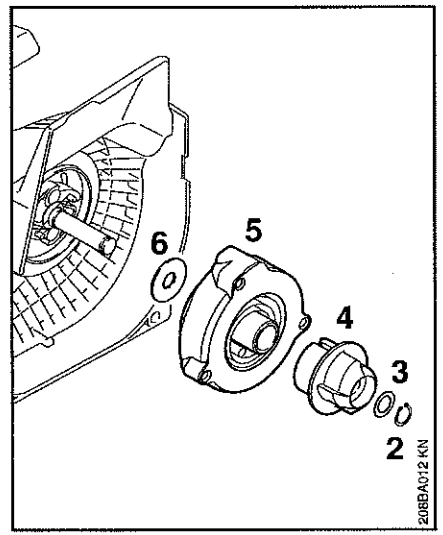
- Always press the boot (**2**) **firmly** on to the spark plug (**3**).

Replacing Starter Rope and Rewind Spring



- Remove the screws (1).
- Push the hand guard upward.
- Pull the underside of the fan housing away from the crankcase and remove it downward.

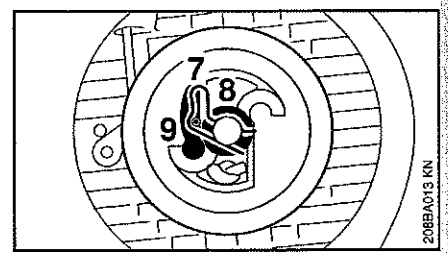
Versions with ErgoStart



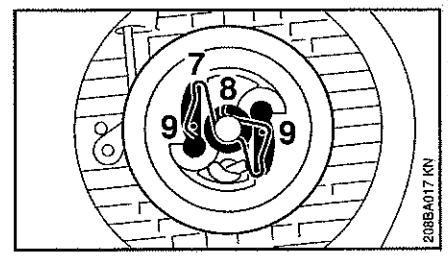
- Use circlip pliers to carefully remove circlip (**2**).
- Remove the washer (**3**), driver (**4**), spring housing (**5**) and washer (**6**).

If no suitable circlip pliers are available, have the starter rope or rewind spring replaced by your STIHL dealer.

Standard versions



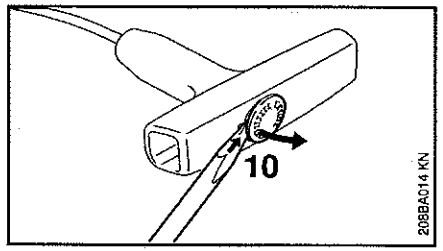
Versions with ErgoStart



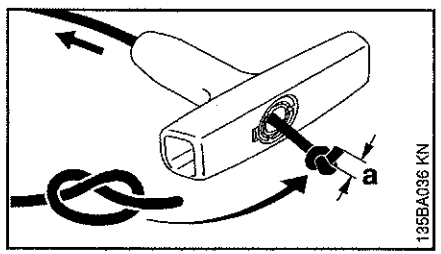
- Remove the spring clip (**7**).
- **Carefully** remove the rope rotor with washer (**8**) and pawl (**9**).

The rewind spring may pop out and uncoil – take care to avoid injury.

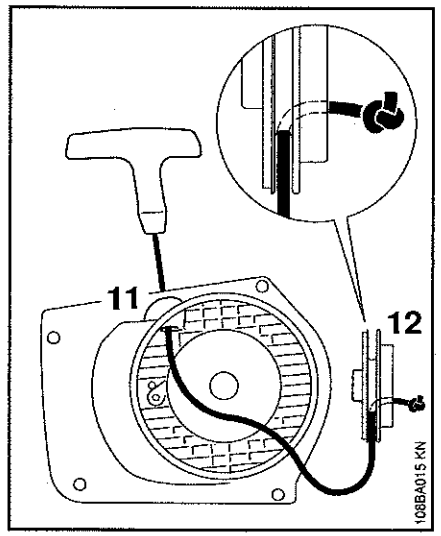
Starter Rope with ElastoStart*



- Ease the cap (**10**) out of the starter grip.
- Remove the remaining rope from the rotor and grip.

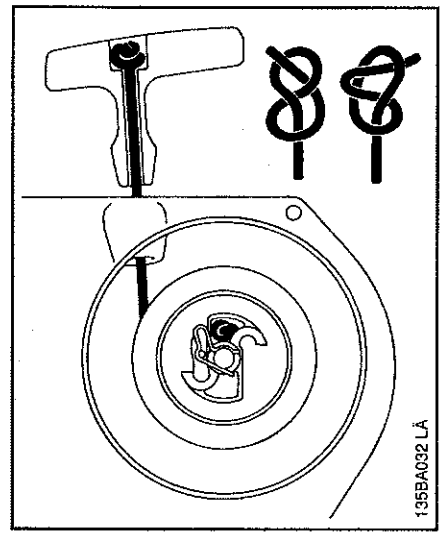


- Thread the new rope through the starter grip and tie a simple overhand knot. Dimension "a" should be 4 – 7 mm.
- Pull the knot back into the grip.
- Refit the cap in the grip.



- Thread the rope through the top of the guide bush (**11**), pull it through the rotor (**12**) and secure it with a simple overhand knot.
- Go to "Installing the Rope Rotor".

Starter Rope without Elastostart

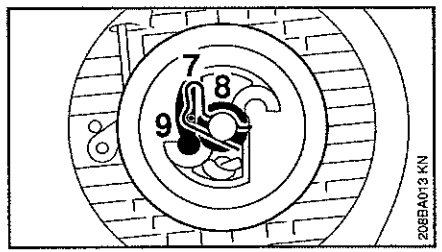


- Thread the new starter rope through the rotor and secure it with a simple overhand knot.
- Thread the other end of the rope through the guide bush (from inside) and the underside of the starter grip and secure it with one of the special knots shown – do not wind the rope onto the rotor.

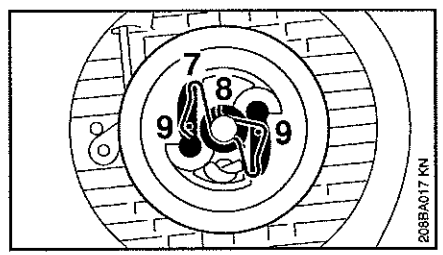
* see "Guide to Using this Manual"

Installing the Rope Rotor

Standard versions

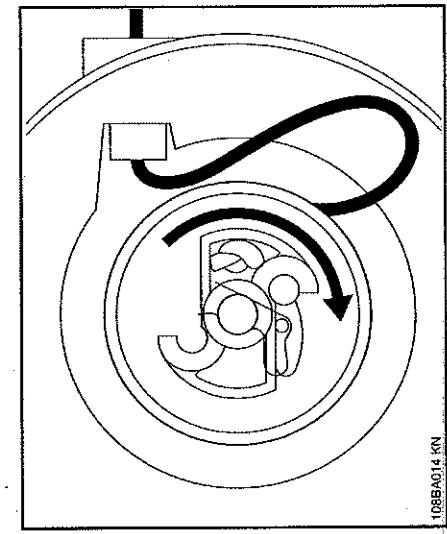


Versions with ErgoStart



- Coat rope rotor bearing bore with resin-free oil.
- Slip rotor over the starter post – turn it back and forth to engage anchor loop of the rewind spring.
- Fit the pawl or pawls (**9**) in the rope rotor.
- Fit the washer (**8**) on the starter post.
- Use a screwdriver or suitable pliers to install the spring clip (**7**) on the starter post and engage it on the pawl's peg – the spring clip must point clockwise as shown in the illustration.

Tensioning the Rewind Spring



- Make a loop in the starter rope and use it to turn the rope rotor six full revolutions in the direction of the arrow.
- Hold the rotor steady – pull out and straighten the twisted rope.
- Release the rope rotor.
- Let go of rope slowly so that it winds onto the rotor.