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**STIHL®**

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This service manual contains detailed descriptions of all the typical repair and servicing procedures for this power tool.

You should make use of the illustrated parts lists while carrying out repair work. They show the installed positions of the individual components and assemblies.

Refer to the latest edition of the relevant parts list to check the part numbers of any replacement parts.

A fault on the machine may have several causes. To help locate the fault, consult the troubleshooting charts for all assemblies and systems in this manual and the "STIHL Service Training System".

Refer to the "Technical Information" bulletins for engineering changes which have been introduced since publication of this service manual. Technical information bulletins also supplement the parts list until an updated edition is issued.

The special tools mentioned in the descriptions are listed in chapter "Special Servicing Tools" of this manual. Use the part numbers to identify the tools in the "STIHL Special Tools" manual.

The manual lists all special servicing tools currently available from STIHL.

Symbols are included in the text and pictures for greater clarity. The meanings are as follows:

In the descriptions:

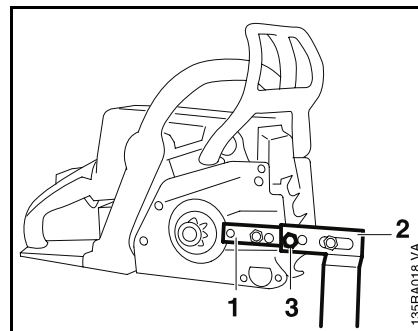
- = Action to be taken as shown in the illustration (above the text)
- = Action to be taken that is not shown in the illustration (above the text)

In the illustrations:

➔ Pointer

➡ Direction of movement

Service manuals and all technical Information bulletins are intended exclusively for the use of STIHL servicing dealers. They must not be passed to third parties.



Servicing and repairs are made considerably easier if the clamp (1) 5910 890 2000 is used to mount the machine on assembly stand (2) 5910 890 3100 so that one clamp screw engages the outer 10 mm bore (3) in the assembly stand. The chainsaw can then be swivelled to the best position for the ongoing repair.

To service the underside of the machine, turn it upside down and mount it in the assembly stand.

Pull the hand guard back against the front handle for this purpose.

#### **Always use original STIHL replacement parts.**

They can be identified by the STIHL part number, the **STIHL** logo and the STIHL parts symbol . This symbol may appear alone on small parts.

If the engine is started up in the course of repairs or maintenance work, observe all local and country-specific safety regulations as well as the safety precautions and warnings in the owner's manual.

Gasoline is an extremely flammable fuel and can be explosive in certain conditions.

Improper handling may result in burns or other serious injuries.

**Warning!**

Do not smoke or bring any fire, flame or other source of heat near the fuel. All work with fuel must be performed outdoors only. Spilled fuel must be wiped away immediately.

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### 3.1 Engine

|  | MS 270   | MS 280   |
|--|--|--|
| Displacement:  | 49.6 cm <sup>3</sup>                             | 54.2 cm <sup>3</sup>                             |
| Bore:  | 44.0 mm  | 46.0 mm  |
| Stroke:  | 32.6 mm  | 32.6 mm  |
| Engine power to ISO 7293:                              | 2.6 kW (3.54 HP)<br>at 9,500 rpm                 | 2.8 kW (3.81 HP)<br>at 9,500 rpm                 |
| Max. permissible engine<br>speed (with bar and chain): | 13,500 ± 150 rpm                                 | 13,500 ± 150 rpm                                 |
| Idle speed:  | 2,800 rpm  | 2,800 rpm  |
| Clutch:  | Three-shoe centrifugal<br>clutch without linings | Three-shoe centrifugal<br>clutch without linings |
| Clutch engages at:                                     | 3,300 rpm  | 3,300 rpm  |
| Crankcase leakage test                                 |  |  |
| – at gauge pressure:                                   | 60 kPa (0.6 bar)                                 | 60 kPa (0.6 bar)                                 |
| – under vacuum:  | 40 kPa (0.4 bar)                                 | 40 kPa (0.4 bar)                                 |

### 3.2 Fuel System

|   |                    |                    |
|---|--------------------|--------------------|
| Carburetor leakage test<br>at gauge pressure: | 80 kPa (0.8 bar)   | 80 kPa (0.8 bar)   |
| Tank vent operates<br>at gauge pressure:      | 30 kPa (0.3 bar)   | 30 kPa (0.3 bar)   |
| Fuel:   | see owner's manual | see owner's manual |

### 3.3 Ignition System

|  |                |                |
|--|----------------|----------------|
| Air gap between ignition<br>module and fanwheel: | 0.20 – 0.30 mm | 0.20 – 0.30 mm |
| Spark plug (resistor type):                      | NGK BPMR 7A    | NGK BPMR 7A    |
| Electrode gap:                                   | 0.5 mm         | 0.5 mm         |

### 3.4 Chain Lubrication

Fully automatic speed-controlled oil pump with rotary piston

|                    |                         |                         |
|--------------------|-------------------------|-------------------------|
| Oil delivery rate: | 10 cc/min at 10,000 rpm | 10 cc/min at 10,000 rpm |
|--------------------|-------------------------|-------------------------|

### 3.5 Tightening Torques

DG and P screws (Plastoform) are used in polymer and light-alloy components. These screws form a permanent thread when they are installed for the first time. They can be removed and installed as often as necessary without detrimentally affecting the strength of the screwed assembly, providing the specified tightening torque is observed.

For this reason **always use a torque wrench**.

| Fastener            | Thread size | For component                          | Torque Nm | Remarks  |
|---------------------|-------------|--|-----------|----------|
| Spline screw        | IS-M4x8     | Cover plate, chain tensioner/crankcase | 3.0       | 1)       |
| Countersunk screw   | IS-PT4x12   | Cover plate/chain sprocket cover       | 2.5       | 2)       |
| Spline screw        | IS-B3.9x13  | Cover plate/fan cover                  | 1.5       |          |
| Spline screw        | IS-M8x22    | Brake band/crankcase                   | 10.0      | 3)       |
| Spline screw        | IS-P4x10    | Brake cable, support/tank housing      | 1.0       | 4)       |
| Collar screw        | IS-M10/M8   | Guide bar/crankcase                    | 30.0      | 2) 5) 6) |
| Collar screw        | IS-M8x21.5  | Guide bar/crankcase                    | 23.0      | 7) 3) 8) |
| Spline screw        | IS-DG4x16   | Cover/crankcase                        | 3.0       |          |
| Decompression valve | IS-M10x1    | Decompression valve                    | 14.0      |          |
| Collar nut          | M5          | Filter base/baffle/carburetor          | 5.0       |          |
| Spline screw        | IS-B4.2x9.5 | Screen/muffler                         | 2.0       | 9)       |
| Spline screw        | IS-DG5x24   | Hand guard, sleeve/fan cover           | 4.0       |          |
| Spline screw        | IS-DG5x24   | Shroud/crankcase                       | 4.5       |          |
| Spline screw        | IS-DG5x24   | Shroud/fan housing                     | 4.5       |          |
| Spline screw        | IS-DG5x18   | Chain catcher/crankcase                | 9.0       |          |
| Spline screw        | IS-DG5x18   | Spiked bumper/crankcase                | 9.0       |          |
| Spline screw        | IS-DG5x24   | Fan cover/fan housing                  | 4.0       |          |

#### Remarks:

- 1) Special accessory
- 2) Only machines with quick chain adjuster
- 3) Secure screw with Loctite 243
- 4) Only machines with QuickStop Super
- 5) Secure screw with Loctite 270
- 6) With quick chain adjuster
- 7) Only machines without quick chain adjuster
- 8) Without quick chain adjuster
- 9) Only muffler with spark arresting screen

| Fastener       | Thread size | For component                       | Torque Nm | Remarks |
|----------------|-------------|-------------------------------------|-----------|---------|
| Spline screw   | IS-DG5x24   | Fan housing/crankcase               | 9.0       |         |
| Spline screw   | IS-DG5x24   | Fan housing/bearing plug            | 4.0       |         |
| Clutch carrier | M12x1L      | Carrier/crankshaft                  | 50.0      |         |
| Spline screw   | IS-DG5x18   | Muffler/cylinder                    | 9.0       |         |
| Nut            | M8x1        | Flywheel/crankshaft                 | 28.0      |         |
| Pan head screw | M4x8        | Inner side plate                    | 3.0       | 1)      |
| Collar screw   | M8SK6       | Dihedral sleeve/crankcase/bar guide | 30.0      | 1) 6)   |
| Spline screw   | IS-M5x28    | Cylinder/crankcase                  | 9.0       |         |
| Spark plug     | M14x1.25    | Spark plug                          | 25.0      |         |
| Spline screw   | IS-DG4x20   | Ignition module/cylinder            | 4.0       |         |
| Spline screw   | IS-DG4x16   | Oil pump/crankcase                  | 3.0       |         |

**Remarks:**

- 1) Only machines with quick chain adjuster
- 6) Secure screw with Loctite 270

Screws secured with adhesive are easier to loosen if the adhesive is heated first with a hot air blower.

**Exercise caution on polymer components.**

Use the following procedure to fit a P (Plastoform) screw in an existing thread:

- Place the P screw in the hole and rotate it counterclockwise until drops down slightly.
- Tighten the screw clockwise to the specified torque.

This procedure ensures that the screw engages properly in the existing thread and does not form a new thread, which would weaken the assembly.

Power screwdriver speed setting for polymer:

- P screws: max. 500 rpm

**4 Troubleshooting Chart**  
**4.1 Clutch, Chain Drive, Chain Brake, Chain Tensioner**

| Condition                                   | Cause                                       | Remedy   |
|---|---|--|
| Saw chain stops under load at full throttle | Clutch shoes badly worn                     | Replace clutch shoes or install new clutch   |
|   | Clutch drum badly worn                      | Install new clutch drum  |
|   | Brake band stuck                            | Check freedom of movement and function of brake band. If necessary, adjust brake cable of QuickStop Super (option) |
|   | QuickStop Super brake cable broken (option) | Replace the brake cable  |
| Saw chain rotates at idle speed             | Engine idle speed too high                  | Readjust with idle speed screw (counterclockwise)  |
|   | Clutch springs stretched or fatigued        | Replace the clutch springs   |
|   | Clutch spring hooks broken                  | Replace the clutch springs   |
| Loud noises                                 | Clutch springs stretched or fatigued        | Replace all clutch springs   |
|   | Needle cage damaged                         | Fit new needle cage  |
|   | Clutch shoe retainer broken                 | Fit new retainer   |
|   | Clutch shoes and carrier worn               | Install new clutch   |
| Chain sprocket wears rapidly                | Chain not properly tensioned                | Tension chain as specified   |
|   | Wrong chain pitch                           | Fit chain of correct pitch   |



| Condition   | Cause                            | Remedy               |
|---|----------------------------------|----------------------|
| Saw chain does not stop immediately when brake is activated | Brake spring stretched or broken | Fit new brake spring |
|   | Brake band stretched/worn/broken | Fit new brake band   |

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## 4.2 Rewind Starter

| Condition   | Cause  | Remedy   |
|---|--|--|
| Starter rope broken   | Rope pulled out too vigorously as far as stop or over edge, i.e. not vertically                                    | Fit new starter rope   |
|   | Normal wear  | Fit new starter rope   |
| Rewind spring broken (rope does not rewind)   | Spring overtensioned – no reserve when rope is fully extended  | Fit new rewind spring  |
|   | Very dirty or corroded   | Clean or replace rewind spring   |
| Starter rope can be pulled out almost without resistance (crankshaft does not turn) | Guide peg on pawls or pawls themselves are worn  | Fit new pawls  |
|   | Spring clip fatigued   | Fit new spring clip  |
| Starter rope is difficult to pull and rewinds very slowly                           | Starter mechanism is very dirty  | Thoroughly clean complete starter mechanism  |
|   | Lubricating oil on rewind spring becomes viscous at very low outside temperatures (spring windings stick together) | Apply a few drops of kerosine (paraffin) to spring, then pull rope carefully several times until normal action is restored |

### 4.3 Chain Lubrication

In the event of trouble with the chain lubrication system, check and rectify other sources of faults before disassembling the oil pump.

| Condition                          | Cause   | Remedy   |
|------------------------------------|---|--|
| Chain receives no oil              | Oil tank empty  | Fill up with oil   |
|                                    | Oil inlet hole in guide bar is blocked                                | Clean oil inlet hole   |
|                                    | Intake hose or pickup body (strainer) clogged or intake hose ruptured | Wash intake hose and pickup body (strainer) in fresh STIHL cleaner or replace if necessary |
|                                    | Valve in oil tank blocked   | Clean or replace valve   |
|                                    | Teeth on pump piston and/or worm worn                                 | Install new oil pump and/or new worm   |
|                                    | Oil pump hoses blocked/damaged  | Clean or replace hoses   |
| Machine losing chain oil           | Oil pump hoses porous/ruptured  | Fit new hoses  |
|                                    | Bore in pump housing worn   | Fit new oil pump   |
| Oil pump delivers insufficient oil | Pump piston worn  | Fit new oil pump   |
|                                    | Oil pump hoses not installed correctly/leaking/ruptured/blocked       | Check correct installation of hoses or clean/replace hoses                                 |
|                                    | Bore in pump housing worn   | Fit new oil pump   |

#### 4.4 Ignition System

Exercise extreme caution while carrying out maintenance and repair work on the ignition system. The high voltages which occur can cause serious or fatal accidents!

| Condition  | Cause   | Remedy   |
|--|---|--|
| Engine runs roughly, misfires, temporary loss of power | Spark plug boot is loose  | Press boot firmly onto spark plug and fit new spring if necessary  |
|  | Spark plug sooted, smeared with oil   | Clean the spark plug or replace if necessary   |
|  | Weak spark or no spark  | Faulty insulation on ignition lead or short circuit wire. Use ohmmeter to check ignition lead for break. If break is detected or high resistance measured, fit a new ignition lead |
|  | Incorrect air gap between ignition coil and flywheel  | Set air gap correctly  |
|  | Flywheel cracked or has other damage  | Install new flywheel   |
|  | Check operation of spark plug. Inspect Master Control lever, ignition coil/lead for damage insulation and leakage current | Clean or replace spark plug, replace faulty parts of ignition system   |
|  | No ignition spark   | Check operation of Master Control lever and ignition module  |

## 4.5 Carburetor

| Condition                           | Cause   | Remedy  |
|-------------------------------------|---|---|
| Carburetor floods;<br>engine stalls | Inlet needle not sealing. Foreign matter in valve seat or cone damaged                          | Remove and clean or replace the inlet needle, clean the fuel tank, pickup body and fuel line if necessary |
|                                     | Inlet control lever sticking on spindle   | Free off inlet control lever  |
|                                     | Helical spring not located on nipple of inlet control lever                                     | Remove the inlet control lever and refit it correctly   |
|                                     | Perforated disc on diaphragm is deformed and presses constantly against the inlet control lever | Fit a new metering diaphragm  |
|                                     | Inlet control lever too high (relative to correct installed position)                           | Set inlet control lever flush with top edge of housing  |
| Poor acceleration                   | Idle jet too lean   | Rotate low speed screw (L) counterclockwise (richer), no further than stop                                |
|                                     | Main jet too lean   | Rotate high speed screw (H) counterclockwise (richer), no further than stop                               |
|                                     | Inlet control lever too low (relative to correct installed position)                            | Set inlet control lever flush with top edge of housing  |
|                                     | Inlet needle sticking to valve seat   | Remove inlet needle, clean and refit  |
|                                     | Diaphragm gasket leaking  | Fit a new diaphragm gasket  |
|                                     | Metering diaphragm damaged or shrunk  | Fit a new metering diaphragm  |

| Condition   | Cause   | Remedy                                      |
|---|---|---|
| Engine speed drops quickly under load – low power | Air filter dirty  | Clean the air filter                        |
|   | Tank vent faulty  | Replace tank vent                           |
|   | Leak in fuel line between tank and fuel pump              | Seal connections or install a new fuel line |
|   | Pump diaphragm damaged or fatigued                        | Fit a new pump diaphragm                    |
|   | Main jet bores or ports blocked                           | Clean the bores and ports                   |
|   | Fuel pickup body dirty                                    | Clean the pickup body, fit a new filter     |
|   | Fuel strainers dirty                                      | Clean the fuel strainers                    |
|   | Spark arresting screen dirty                              | Clean or replace spark arresting screen     |
|   | Setting of high speed screw (H) too rich                  | Reset high speed screw (H) correctly        |
| Engine will not idle, idle speed too high         | Throttle shutter not opened fully                         | Check linkage                               |
|   | Throttle shutter opened too wide by idle speed screw (LA) | Reset idle speed screw (LA) correctly       |
|   | Engine leaking  | Seal the engine                             |

| Condition                   | Cause   | Remedy   |
|-----------------------------|---|--|
| Engine stalls at idle speed | Idle jet bores or ports blocked   | Clean jet bores and ports and blow clear with compressed air |
|                             | Idle jet too rich or too lean   | Set low speed screw (L) correctly                            |
|                             | Setting of idle speed (LA) incorrect – throttle shutter completely closed | Set idle speed screw (LA) correctly                          |
|                             | Small plastic plate in valve jet does not close                           | Clean or renew valve jet                                     |

## 4.6 Engine

Always check and, if necessary, repair the following parts before looking for faults on the engine:

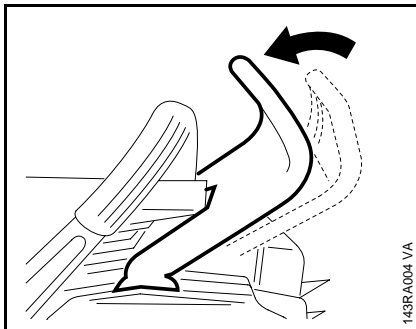
- Air filter
- Fuel system
- Carburetor
- Ignition system

| Condition  | Cause   | Remedy  |
|--|---|---|
| Engine does not start easily, stalls at idle speed, but operates normally at full throttle | Oil seals in crankcase damaged  | Replace the oil seals   |
|  | Crankcase leaking or damaged (cracks)   | Seat or replace the crankcase   |
|  | Muffler leaking   | Replace the muffler   |
| Engine does not deliver full power or runs erratically                                     | Piston rings worn or broken   | Fit new piston rings  |
|  | Muffler/spark arresting screen carbonized   | Clean the muffler (inlet and exhaust), replace spark arresting screen |
|  | Air filter element dirty  | Replace air filter element  |
|  | Fuel/impulse line severely kinked or damaged  | Replace lines or position them free from kinks                        |
|  | Decompression valve sticking  | Replace the decompression valve                                       |
| Engine overheating   | Insufficient cylinder cooling. Air inlets in fan housing blocked or cooling fins on cylinder very dirty | Thoroughly clean all cooling air openings and the cylinder fins       |

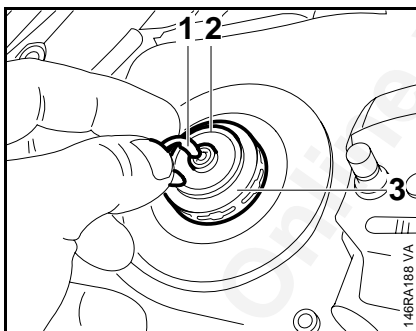


## 5 Clutch, Chain Drive, Chain Brake and Chain Tensioner

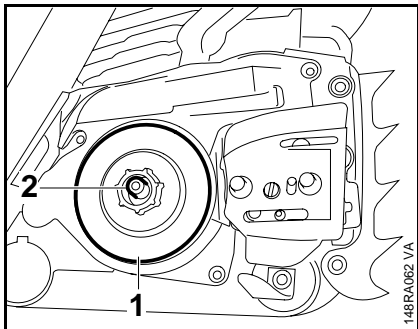
### 5.1 Clutch Drum/Chain Sprocket



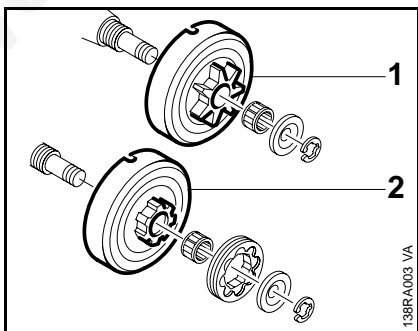
- Remove the chain sprocket cover.
- Remove the bar and chain – wear work gloves to protect your hands from injury.
- Disengage the chain brake by pulling the hand guard towards the front handle.



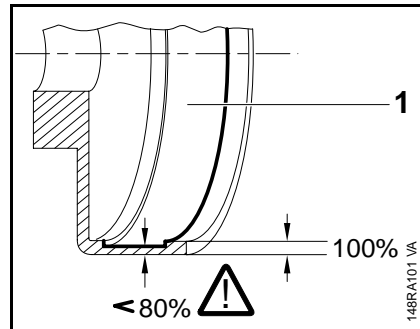
- Remove the E-clip (1), washer (2) and, if fitted, the rim sprocket (3).



- Pull off the clutch drum (1) with needle cage (2).
  - Inspect the needle cage for damage.
- On machines with QuickStop Super:
- Press down the throttle trigger interlock to disengage the coasting brake and then pull off the clutch drum (1) with needle cage (2).



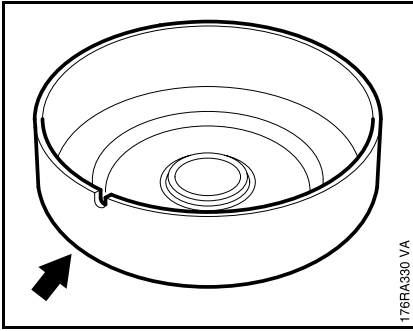
- Pull off the chain sprocket (1) or clutch drum (2).
- Remove the needle cage.



- Inspect the clutch drum (1) for signs of wear.

If there are noticeable wear marks on the inside diameter of the clutch drum (1), check its wall thickness. If it is less than 80% of the original wall thickness, fit a new clutch drum.

If the clutch drum has to be replaced, also check the brake band – see 5.4.2.

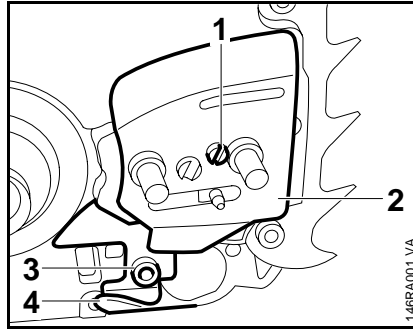


If the clutch drum is still serviceable, use No. 120 emery paper or emery cloth (grain size approx. 120 µm) to clean and roughen its friction surface.

Reassemble in the reverse sequence.

Clean stub of crankshaft. Wash needle cage in clean white spirit and lubricate with STIHL multipurpose grease – [see 14](#).

- Rotate clutch drum/chain sprocket and apply slight pressure at the same time until the oil pump drive spring engages the notch (see arrow).

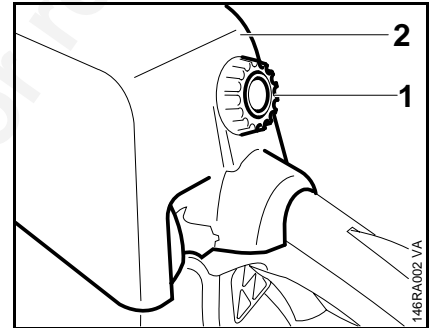


- Remove the chain sprocket cover.
- Remove the bar and chain – wear work gloves to protect your hands from injury.
- Take out the slotted screw (1).
- Remove the side plate (2).
- Take out the screw (3).
- Remove the chain catcher (4).

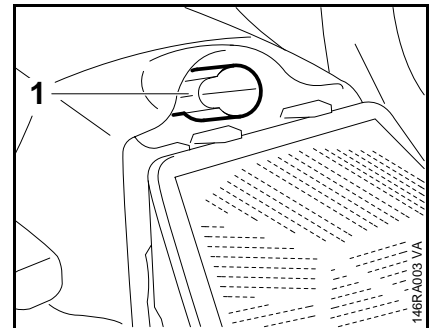
Install in the reverse sequence.

Troubleshooting chart – [see 4.1](#).

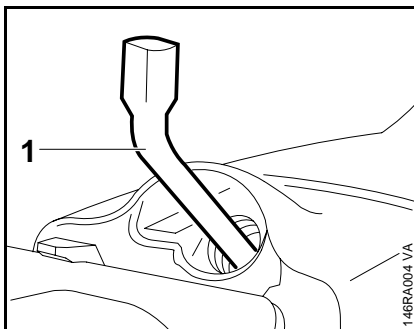
- Remove the clutch drum or chain sprocket – [see 5.1](#).



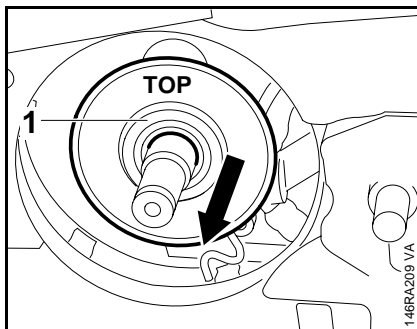
- Release the twist lock (1) and lift away the carburetor box cover (2).



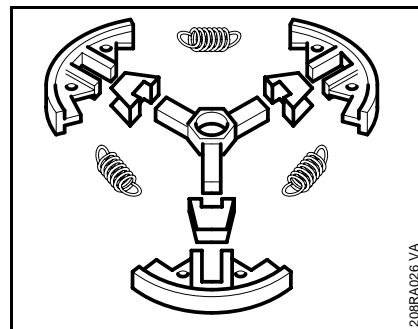
- Remove the spark plug boot (1).
- Unscrew the spark plug.



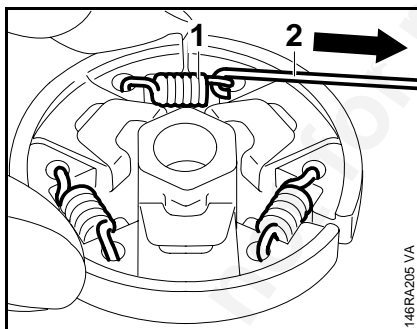
- Close the decompression valve, if fitted.
- Push the locking strip (1) 0000 893 5903 into the spark plug hole so that "OBEN-TOP" faces up.



- Take the cover washer (1) off the crankshaft stub.

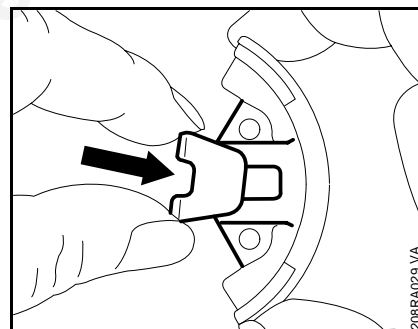


- Clean all parts with STIHL cleaner – see 14.
- Replace any damaged parts.



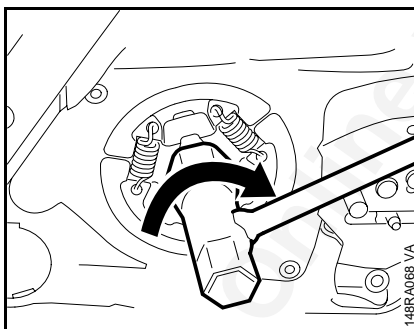
#### Disassembling the clutch

- Use hook (2) 5910 890 2800 to remove the clutch springs (1).

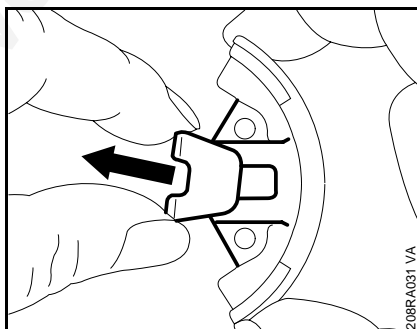


#### Assembling the clutch

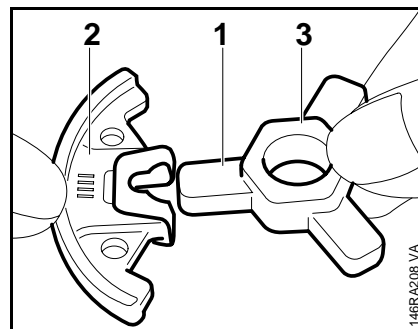
- Slip the retainers onto the clutch shoes.



- Unscrew the clutch from the crankshaft clockwise (left-hand thread).



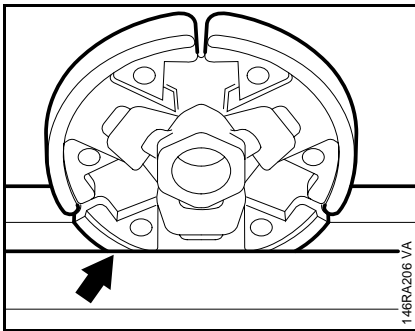
- Pull the clutch shoes off the carrier.
- Pull the retainers off the clutch shoes.



- Fit the clutch shoes (2) over the arms (1) of the clutch carrier (3).

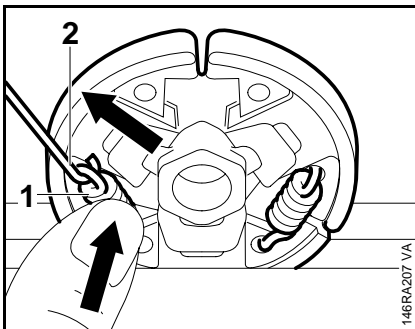
## 5.4 Chain Brake

### 5.4.1 Checking Operation

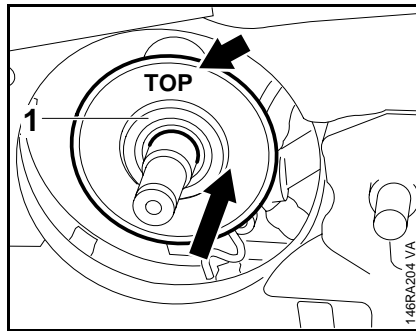


- Clamp the clutch in a vise.

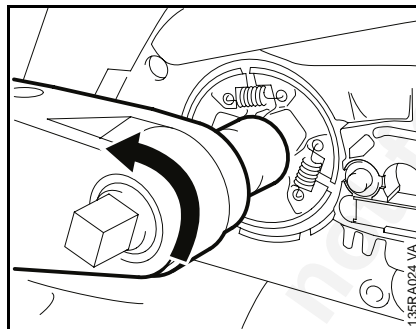
Use protective jaws so as not to damage the clutch.



- Attach one end of each spring (1) to the clutch shoes.
- Use the hook (2) 5910 890 2800 to attach other ends of springs and press them firmly into the clutch shoes.



- Push cover washer (1), "TOP" (arrow) facing outward, onto the crankshaft.



- Screw on the clutch and tighten it down – **see 3.5.**
  - Remove locking strip from the cylinder.
  - Screw home spark plug and tighten it down – **see 3.5.**
  - Fit boot on the spark plug.
  - Fit the shroud.
  - Install clutch drum/chain sprocket – **see 5.1.**

The chain brake is one of the most important safety devices on the chainsaw. Its efficiency is measured in terms of the chain braking time, i.e. the time that elapses between activating the brake and the saw chain coming to a complete standstill. The shorter the braking time, the better the efficiency and protection offered against being injured by the rotating chain.

Contamination (with chain oil, chips, fine particles of abrasion, etc.) and smoothing of the friction surfaces of the brake band and clutch drum impair the coefficient of friction. This, in turn, reduces the frictional forces and thus prolongs the braking time. A fatigued or stretched brake spring has the same negative effect.

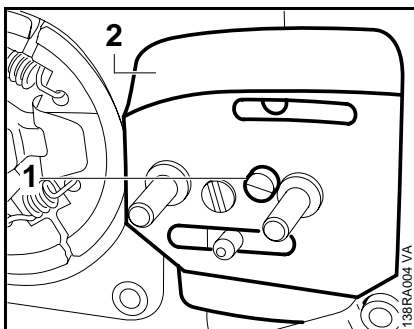
- Start the engine.
- With the chain brake activated (locked), open the throttle wide for a brief period (max. 3 seconds) – the chain must not rotate.
- With the chain brake released, open the throttle wide and activate the brake manually – the chain must come to an abrupt stop.

The braking time is in order if deceleration of the saw chain is imperceptible to the eye.

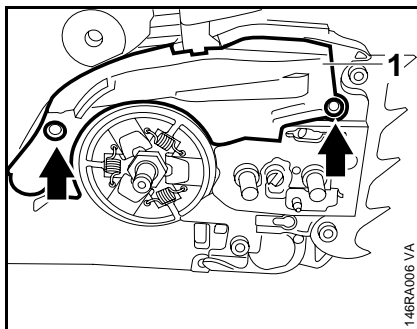
## 5.4.2 Removing

Troubleshooting chart – [see 4.1](#).

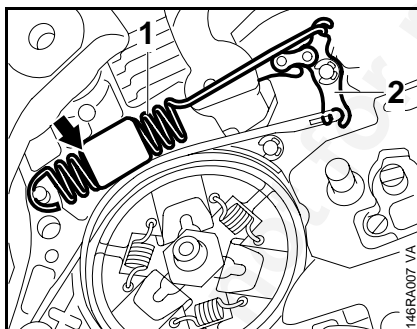
- Remove the chain sprocket cover, bar and chain – wear work gloves to protect your hands from injury.
- Remove the clutch drum/chain sprocket – [see 5.1](#).



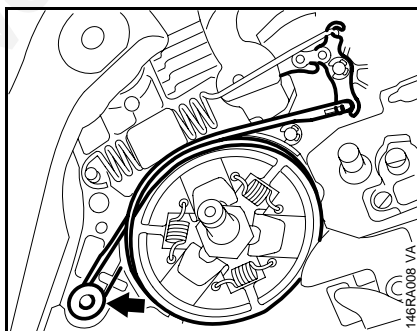
- Take out the screw (1).
- Remove the side plate (2).
- Engage the chain brake by pushing the hand guard away from the front handle.



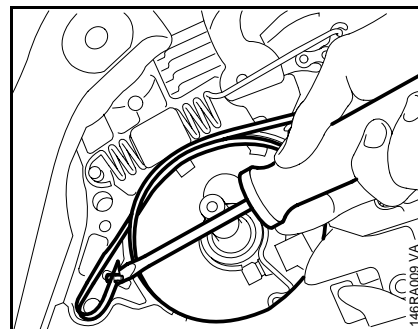
- Take out the screws (arrows).
- Remove the cover (1).
- Relieve tension of brake spring by pushing hand guard forward.



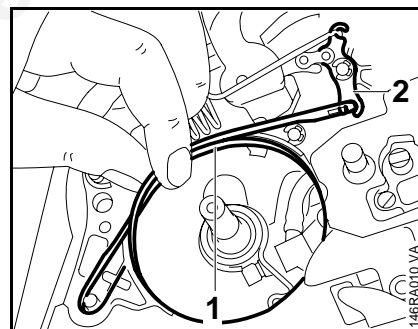
- Carefully ease the brake spring (1) off the anchor pin and take it off the bell crank (2).



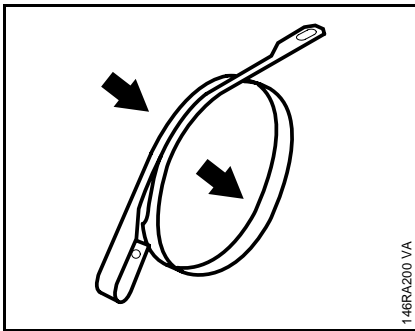
- Take out the screw (arrow).



- Pry the brake band out of the crankcase.



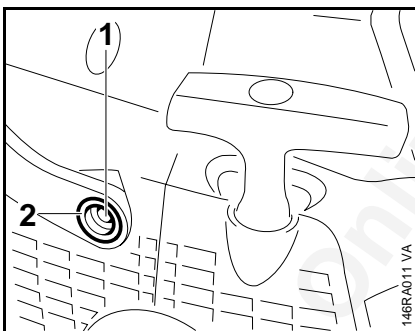
- Remove the brake band (1) from the lugs on the crankcase.
- Disconnect the brake band from the bell crank (2).



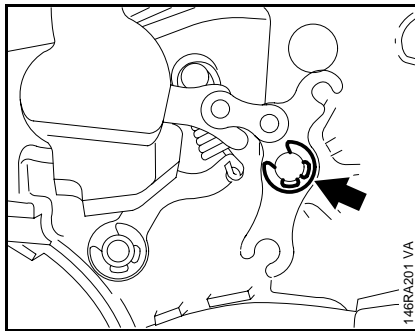
Install a new brake band if there are noticeable signs of wear (large areas on inside diameter and/or parts of outside diameter) and its remaining thickness is less than 0.6 mm.

**Important:**

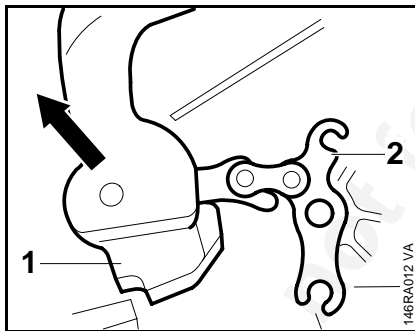
Thickness of brake band must **not** be less at any point.



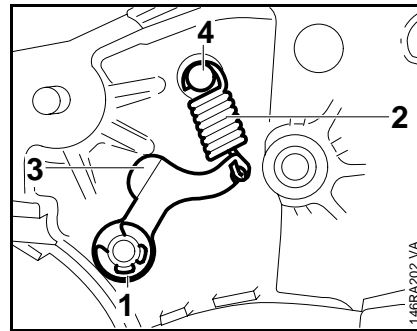
- Take out the screw (1) together with the bushing (2).



- Remove the E-clip (arrow).



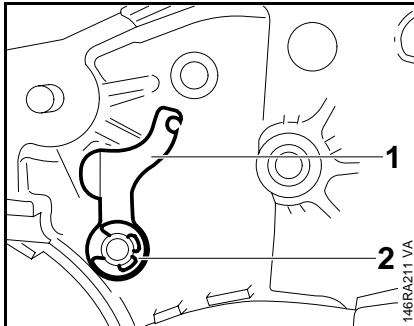
- Carefully pry the hand guard (1) and bell crank (2) off their pivot pins and remove them together.
- Pull the bell crank out of the hand guard.



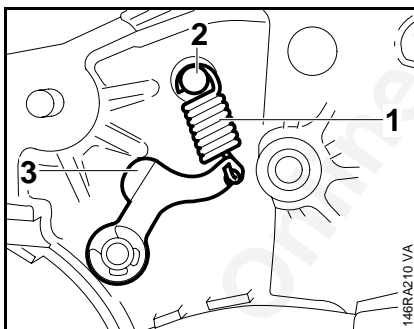
- Remove the E-clip (1).
- Detach the spring (2).
- Pull off the cam lever (3).
- Inspect parts and replace if damaged.
- Clean the entire housing recess for the chain brake.
- If the groove in the pin (4) is worn, fit a new pin – **see 5.6**.

### 5.4.3 Installing

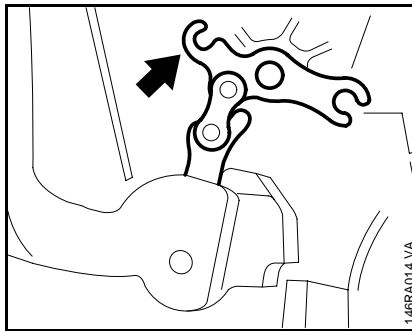
If the brake spring anchor pin was removed because it was worn, it must be installed before starting the following operations – [see 5.6](#).



- Push the cam lever (1) into position.
- Fit the E-clip (2).

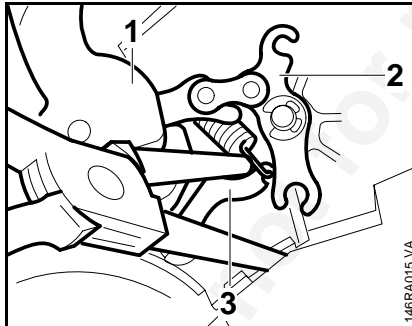


- Attach spring (1) to pivot pin (2) and cam lever (3).

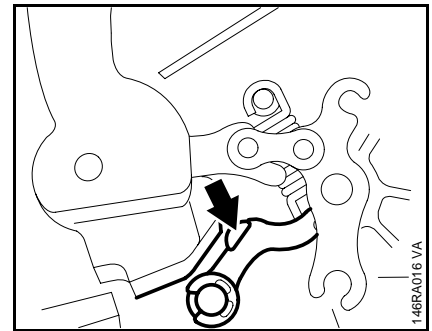


- Push the bell crank into the side of the hand guard.

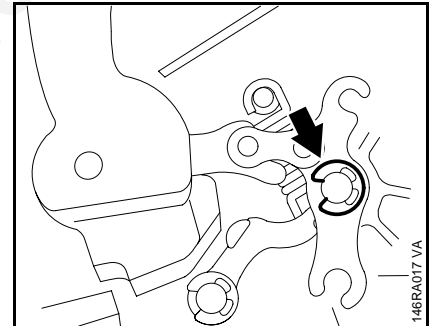
The short arm of the bell crank must point to the top of the hand guard.



- Position the bearing boss of the hand guard (1) against the pivot pin and fit the other side of the hand guard over the housing.
- Position the bell crank (2) against the pivot pin.
- Press the cam lever (3) slightly downward and push the hand guard and bell crank onto their pivot pins.
- Tighten down the hand guard mounting screw – [see 3.5](#).

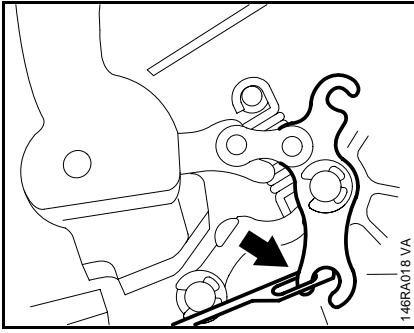


- Check that cam lever is properly located on face (arrow) of hand guard bearing boss.

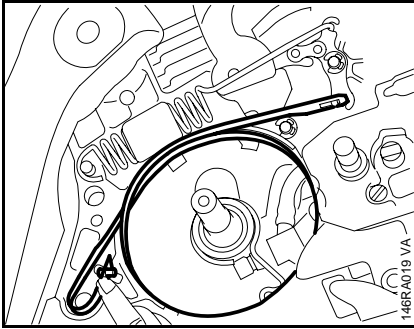


- Secure bell crank with E-clip.
- Coat the brake band with chain oil to protect it from corrosion and help reduce "snatching" during the first few brake applications.

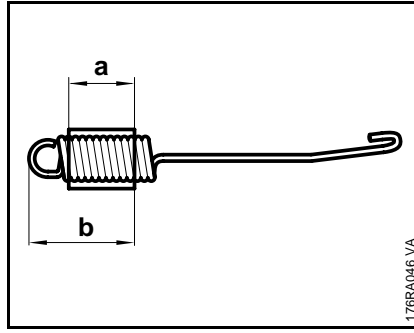




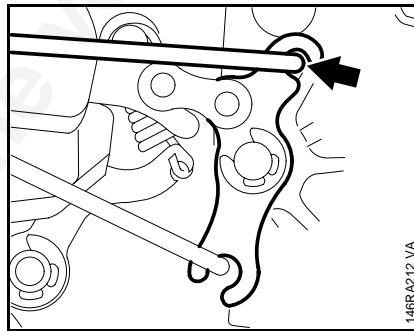
- Attach the brake band to the bell crank.



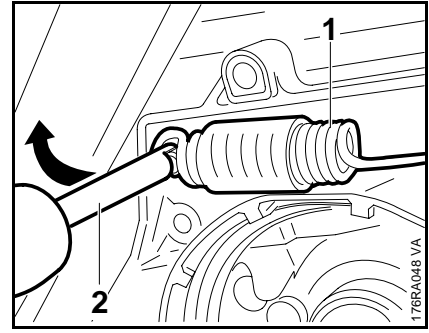
- Push brake band into the slot in the crankcase.
- Coat the screw with Loctite 243 – [see 14](#).
- Fit the screw and tighten it down firmly – [see 3.5](#).



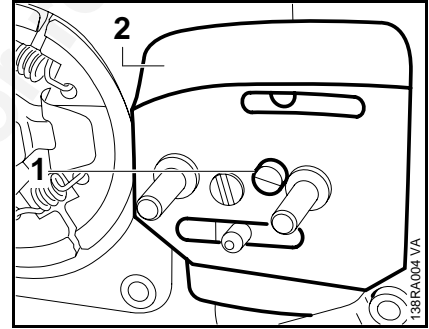
- Turns of brake spring must be tightly against one another in the relaxed condition. If this is not the case, replace the brake spring.
- Check correct position of protective tube:  
a = 20 mm  
b = 32 mm



- Hook the brake spring to the bell crank (arrow).



- Use assembly tool (2) 1117 890 0900 to attach the brake spring (1) to the anchor pin.
- Fit chain brake cover.



- Fit the side plate (2) over the collar screws and push it against the crankcase.
- Fit the screw (1) and tighten it down firmly.
- Install the clutch drum/chain sprocket – [see 5.1](#).
- Fit the bar, chain and chain sprocket cover. Tighten down nuts on the chain sprocket cover – [see 3.5](#).
- Check operation of chain brake – [see 5.4.1](#).

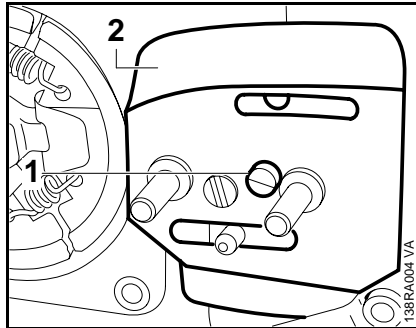


## 5.5 Chain Brake with QuickStop Super

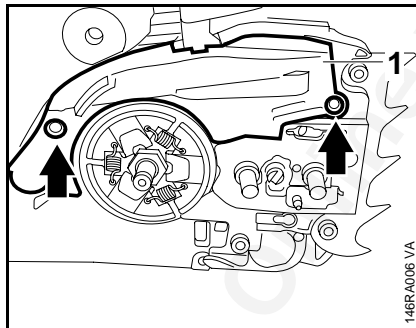
### 5.5.1 Removing

Troubleshooting chart – [see 4.1](#).

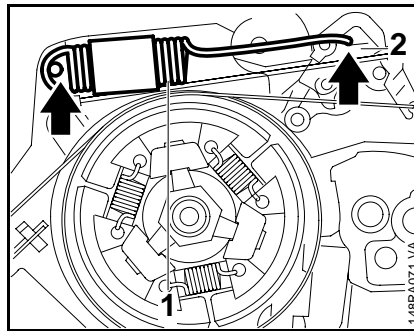
- Remove the chain sprocket cover.
- Remove the clutch drum/chain sprocket – [see 5.1](#).



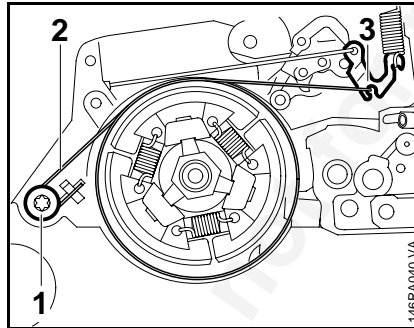
- Take out the screw (1).
- Remove the side plate (2).



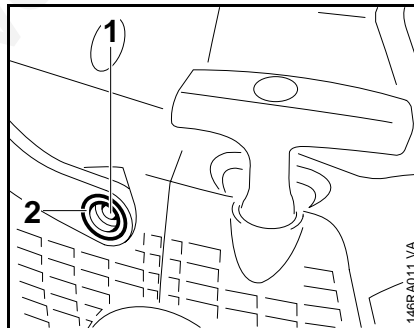
- Take out the screws (arrows).
- Remove the cover (1).
- Relieve tension of brake spring by pushing hand guard forward.



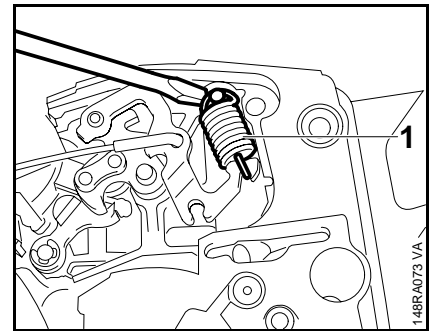
- Carefully ease the brake spring (1) off the anchor pin and take it off the brake lever (2).



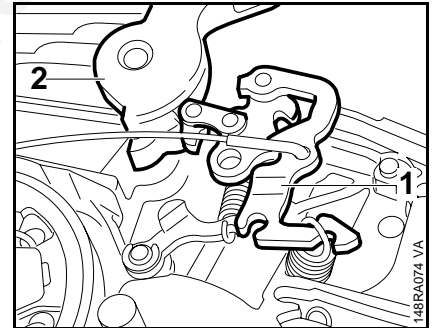
- Take out the screw (1).
- Pry the brake band (2) out of the crankcase and disconnect it from the brake lever (3).



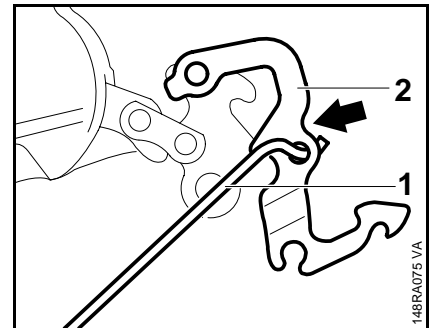
- Take out the screw (1).
- Remove the bushing (2).



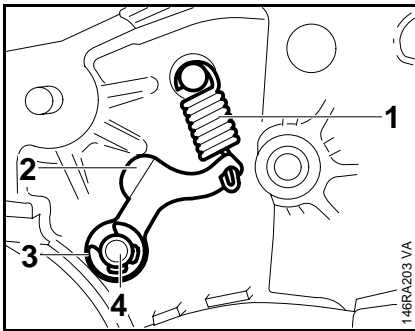
- Carefully pry the spring (1) off the pivot pin.



- Pull the hand guard (2) and brake lever (1) off their pivot pins.



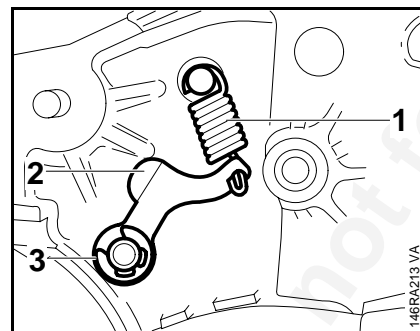
- Unhook coasting brake cable (1) from the brake lever (2).
- Pull the brake lever out of the hand guard.



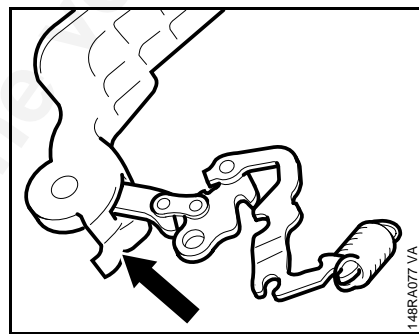
- Disconnect spring (1) from lever (2).
- Pry the E-clip (3) off the pin and remove the lever with spring.

Clean all disassembled parts in STIHL cleaner – [see 14](#). Replace any damaged or worn parts.

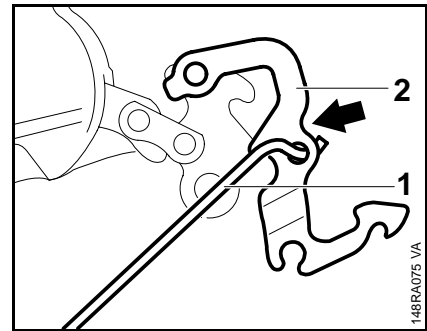
- If the groove in the pin (4) is worn, fit a new pin – [see 5.6](#).



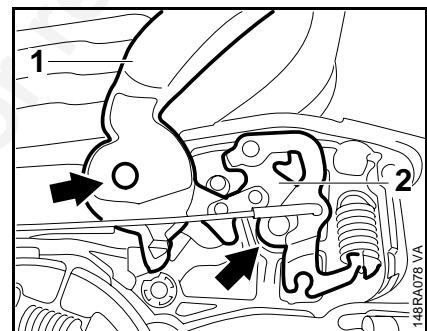
- Fit the lever (2) and spring (1).
- Fit the E-clip (3).



- Push the lever into the side of the hand guard.

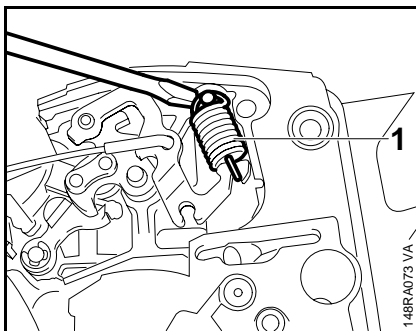


- Attach the coasting brake cable (1) to the hole (arrow) in the brake lever (2).

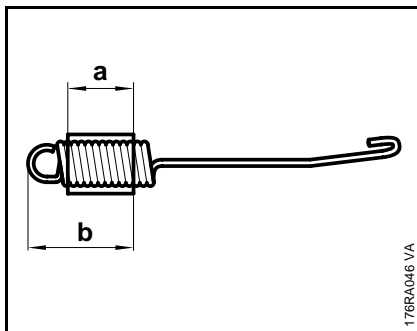


- Position bearing boss of the hand guard (1) against the pivot pin and fit the other side of the hand guard over the fan cover.
- Press the lever (1) slightly downward and push the hand guard and brake lever (2) onto their pivot pins.
- Fit hand guard mounting screw at fan cover side and tighten it down firmly – [see 3.5](#).

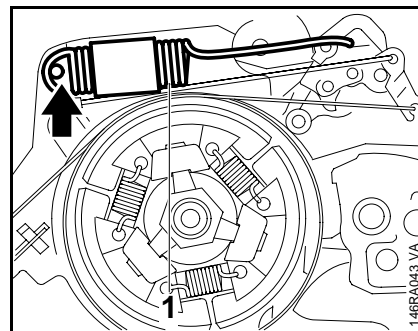
Coat all sliding and bearing points with STIHL multipurpose grease – [see 14](#). Do not lubricate the brake band.



- Attach spring (1) to the pivot pin.

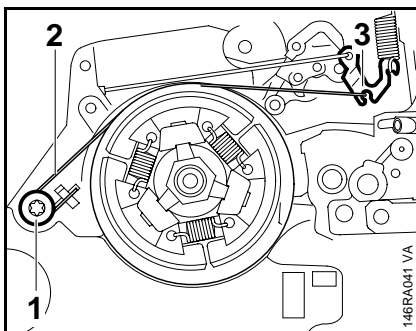


- Turns of brake spring must be tightly against one another in the relaxed condition. If this is not the case, replace the brake spring.
- Check correct position of protective tube:  
a = 30 mm  
b = 40 mm

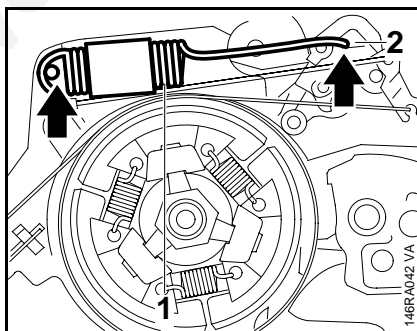


- Use the assembly tool 1117 890 0900 to attach the brake spring (1) to the anchor pin.

Assemble all other parts in the reverse sequence.



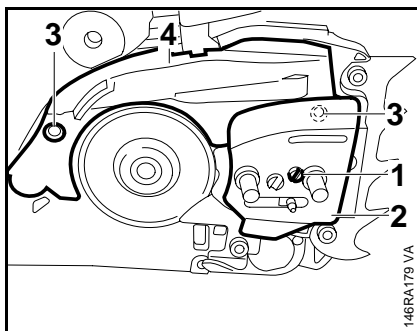
- First attach the brake band (2) to the brake lever (3) and then push it into the slot in the crankcase.
- Install screw (1) with Loctite 243 and tighten it down firmly  
– see 3.5.



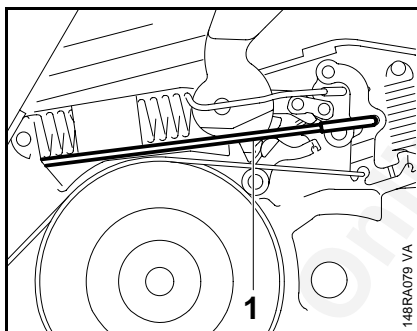
- Hook the brake spring (1) to the brake lever (2).

### 5.5.3 Checking Play

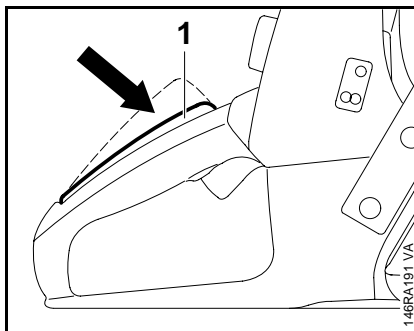
- Pull the hand guard towards the front handle.
- Remove the chain sprocket cover.
- Remove the cutting attachment – wear work gloves to protect your hands from injury.



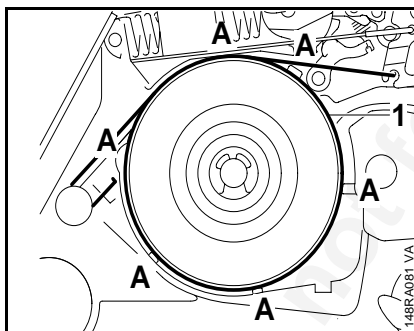
- Take out the screw (1) and remove the side plate (2).
- Take out the screws (3) and remove the cover (4).



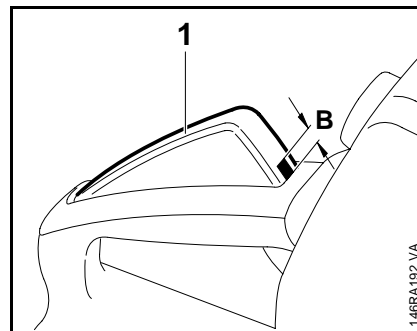
- The brake cable (1) must hang loosely in the crankcase when the brake is disengaged.



- Press down interlock lever (1) all the way and hold it in that position.



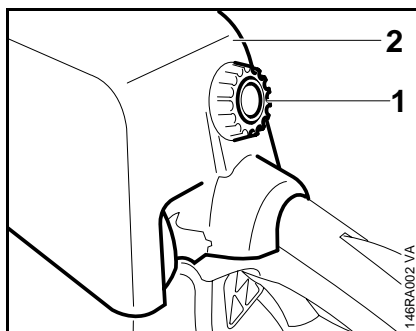
- The brake band (1) must locate without any play at the points shown (A) in the crankcase.



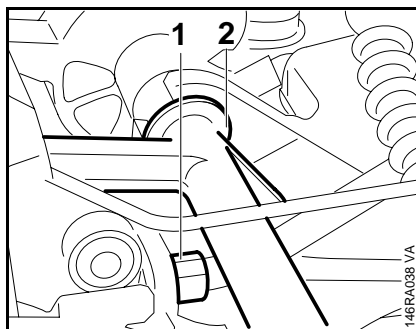
- Let go of the interlock lever (1).
- Check free travel by slowly squeezing the interlock lever (1). Play must be within the mark (B) at the front end of the interlock lever. The brake lever must not move. If it does, adjust play – see 5.5.4.

Reassemble in the reverse sequence.

### 5.5.4 Adjusting Play



- Release twist lock (1) and lift away the carburetor box cover (2).



- Use a 6mm open-end wrench to adjust play on nut (1).

Turn wrench to right to reduce play.

Turn wrench to left to increase play.

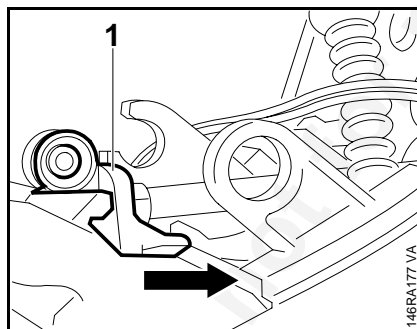
Remove the switch shaft (2), [see 10.1](#), if it gets in the way of adjustments.

Reassemble in the reverse sequence.

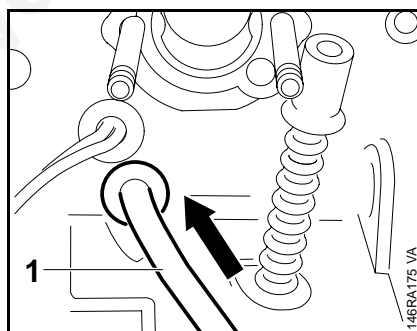
### 5.5.5 Brake Cable

Machines with QuickStop Super have an additional brake cable.

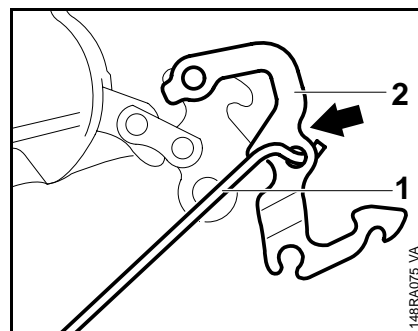
- Remove the switch shaft – [see 10.1](#).
- Remove brake cable from switch lever – [see 10.2.2](#).
- Separate crankcase and tank housing – [see 9.2.2](#).



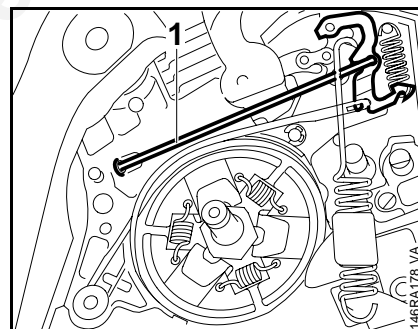
- Ease the support (1) upwards and push it in the direction of the cylinder.



- Pull the cable (1) out of the tank housing in the direction of the cylinder.
- Remove the brake spring – [see 5.5.1](#).



- Disconnect coasting brake cable (1) from the brake lever (2).



- Pull the brake cable (1) out of the crankcase in the direction of the rear handle.

Reassemble in the reverse sequence.

### 5.5.6 Checking Operation of Coasting Brake

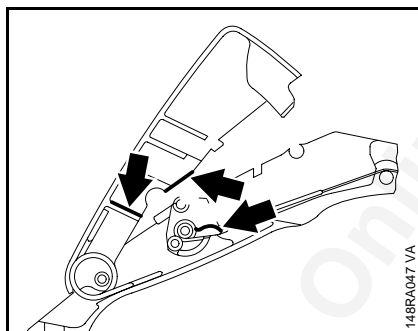
Check operation of the brake with the bar and chain mounted.

When starting the machine observe country-specific safety regulations and the safety precautions in the owner's manual.

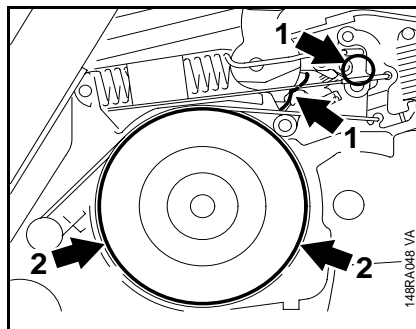
- With the engine running, open the throttle wide.
- Release the rear handle.

The chain must come to a standstill in less than one second.

If the brake does not operate properly, service the sliding and bearing points shown in the illustrations as follows:



- Lubricate bearing points (arrows) of interlock and switch levers with Mobilplex grease – see 14.



- Lubricate brake lever bearing points (1) with grease – see 14.
- Coat outside diameter of clutch drum (2) with chain oil – see 14.

#### If lightly contaminated:

- Clean all parts with a brush and STIHL cleaner – see 14.

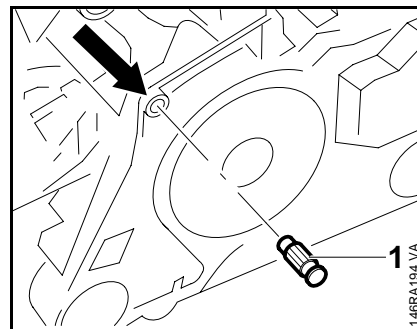
#### If heavily contaminated or clogged with resin:

- Remove the parts concerned and clean in STIHL cleaner – see 14.
- Replace worn or damaged parts.
- Before re-installing parts, clean machine recesses and seats with STIHL cleaner – see 14.

If a biological chain oil is preferred, STIHL recommends the use of rapidly biodegradable STIHL Bioplus.

To guarantee troublefree operation, use only original STIHL replacement parts as per the latest parts list.

### 5.6 Brake Spring Anchor Pin



#### Removing

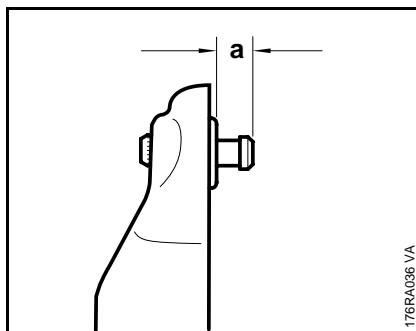
The anchor pin (1) must be replaced if it is worn or damaged:

- Remove the fan cover – see 8.2.
- Remove the chain brake spring – see 5.4.2 or see 5.5.1.
- Remove the shroud – see 6.4.
- Use a suitable punch to drive the anchor pin (1) out of the crankcase in the direction of the arrow.

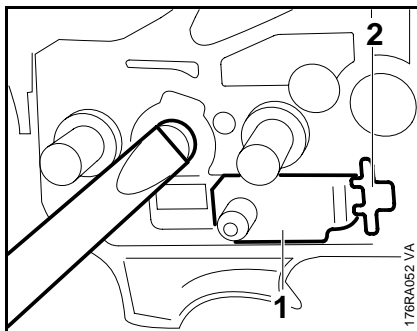
Do not drive out the pin in the other direction as this would damage the annular bead which was formed in the crankcase bore when the pin was originally installed. In such a case neither the new anchor pin nor the brake spring would locate properly. Furthermore, the crankcase could be damaged in this way and possibly impair correct operation of the chain brake.

## Installing

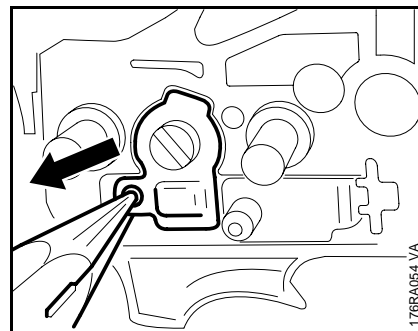
- Before installation, coat the knurled area of the new pin with Loctite 243 – [see 14](#).
- Position the new pin in the bore so that the knurling on the pin meshes with the existing knurling in the bore. Turn pin back and forth as necessary.



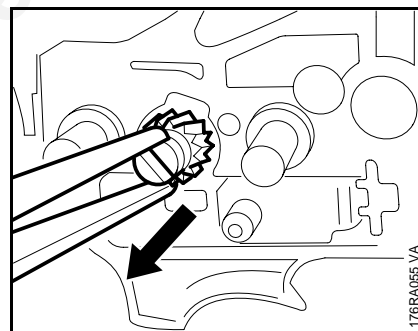
- Carefully tap home the pin squarely to obtain dimension "a" (about 4 mm).
- Coat all sliding and bearing points with STIHL multipurpose grease – [see 14](#).
- Fit the fan cover – [see 8.2](#).
- Fit the shroud – [see 6.4](#).



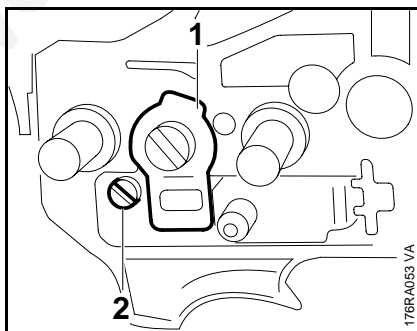
- Remove the inner side plate – [see 5.4.2](#).
- Rotate the spur gear clockwise until tensioner slide (1) butts against the thrust pad (2).



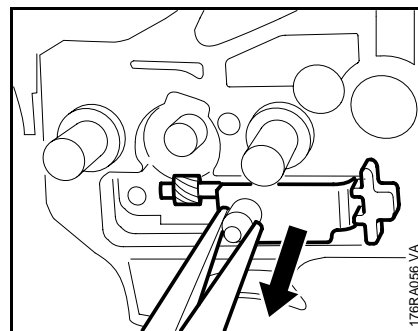
- Remove the cover plate.



- Pull out the spur gear.

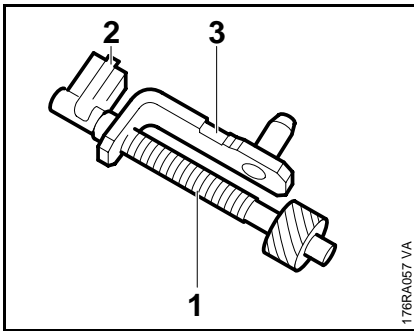


- Pull out the retainer (1).
- Take out the screw (2).



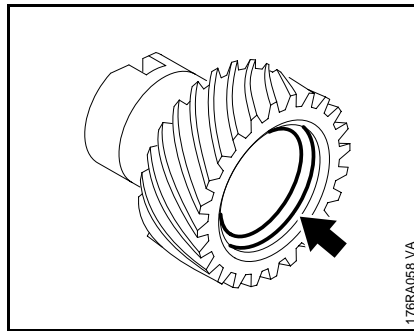
- Take out the tensioner slide with adjusting screw and thrust pad.





- Inspect the teeth on the spur gear and adjusting screw (1), replace both parts if necessary. To do this, pull off the thrust pad (2) and unscrew the tensioner slide (3).

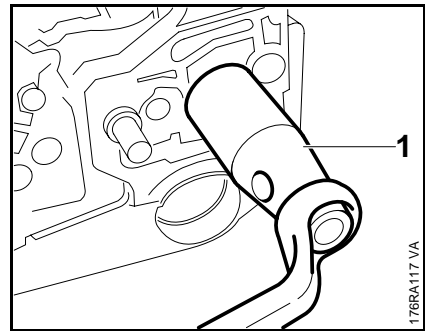
The adjusting screw and spur gear must be replaced as a matching pair.



- When reassembling, check that O-ring (arrow) is fitted in spur gear and coat with oil before fitting the spur gear.

- Coat teeth of adjusting screw and spur gear with grease, **see 14**, before refitting.

Assemble all other parts in the reverse sequence.



- Remove the chain sprocket cover and cutting attachment.

Wear work gloves to protect your hands from injury.

- Push stud puller 5910 893 0501 over the collar stud as far as it will go. Use a 15 mm wrench to unscrew the collar stud counter-clockwise.
- Machines with quick chain adjuster: Before installing, coat thread of collar stud with Loctite 270 – **see 14**.
- Machines without quick chain adjuster: Before installing, coat thread of collar stud with Loctite 243 – **see 14**.
- Install and tighten down the collar studs – **see 3.5**.

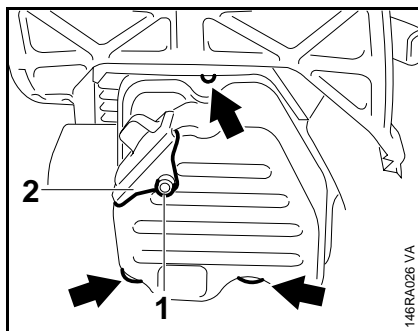


## 6 Engine

### 6.1 Muffler/Spark Arresting Screen

Always check and, if necessary, repair the fuel system, carburetor, air filter and ignition system before looking for faults on the engine.

Troubleshooting chart – see 4.6.



- Take out the screws (arrows).
- Remove the muffler.
- Take out the screw (1), if fitted, and pull out the spark arresting screen (2).
- Inspect spark arresting screen (2) for damage, clean or replace if necessary.

Reassemble in the reverse sequence.

## 6.2 Leakage Test

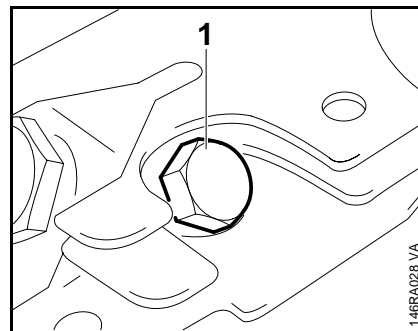
Defective oil seals and gaskets or cracks in castings are the usual causes of leaks. Such faults allow supplementary air to enter the engine and upset the fuel-air mixture.

This makes adjustment of the prescribed idle speed difficult, if not impossible.

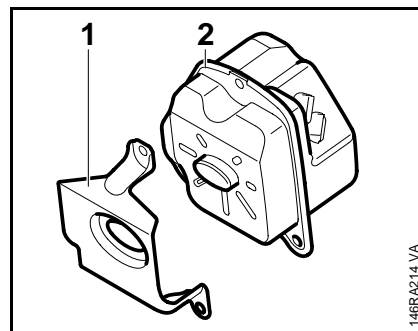
Moreover, the transition from idle speed to part or full throttle is not smooth.

The crankcase can be checked thoroughly for leaks with the carburetor and crankcase tester and the vacuum pump.

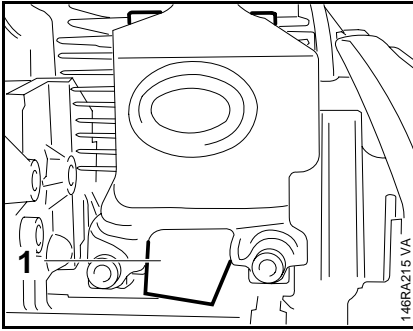
## 6.2.1 Preparations



- Remove the shroud – see 6.4.
- Remove the decompression valve, if fitted – see 6.8.
- Install plug (1) 1122 025 2200 and tighten down to 25 Nm.
- Make sure spark plug is properly tightened down – see 3.5.
- Remove the muffler – see 6.1.



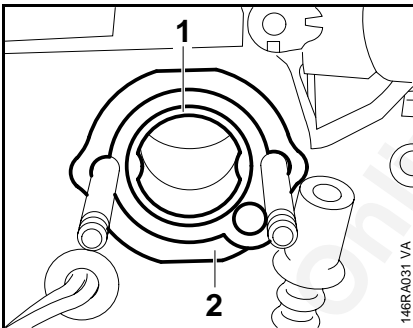
- Remove the heat shield (1) from the muffler (2).



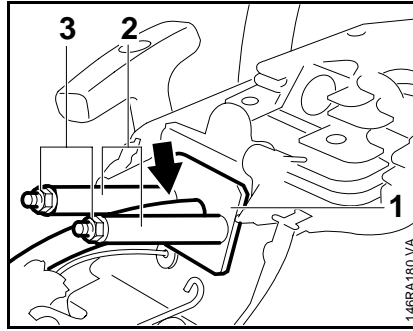
- Fit sealing plate (1) 0000 855 8106 between the heat shield and cylinder exhaust port and tighten down the heat shield with the muffler mounting screws.

The sealing plate must completely cover the opening in the heat shield.

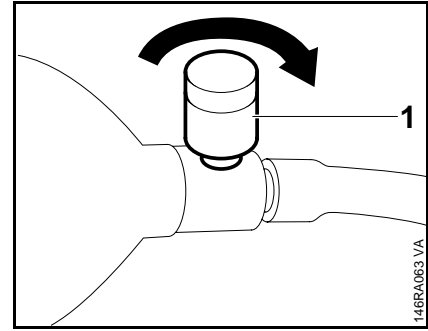
- Remove the carburetor
  - see 12.2.1.
- Set the piston to top dead center (T.D.C.).



- Check that the sleeve (1) and washer (2) are in place.

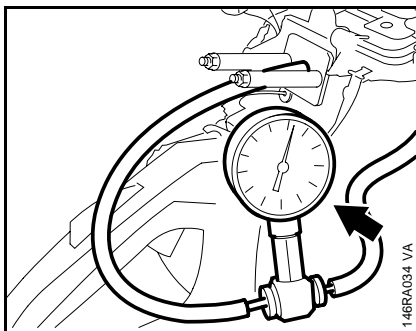


- Fit the test flange 1119 850 4201 (1).
- Fit sleeves (2) 1124 893 7100.
- Fit nuts (3) and tighten them down firmly.
- Connect pressure hose of tester 1106 850 2905 to nipple on test flange (arrow).



- Close vent screw (1) on the rubber bulb.
- Pump air into the crankcase with rubber bulb until the gauge indicates a pressure of 0.6 bar. If this pressure remains constant for at least 20 seconds, the crankcase is airtight.

### 6.2.3 Vacuum Test



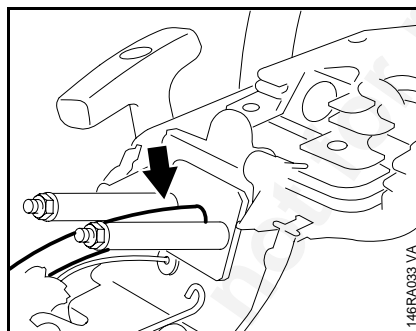
- If the pressure drops, the leak must be found and the faulty part replaced.

To find the leak, coat the suspect area with oil and pressurize the crankcase again. Bubbles will appear if a leak exists.

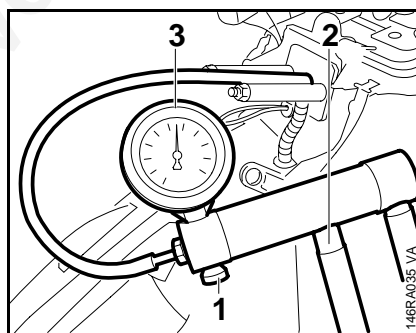
- Continue with vacuum test
  - [see 6.2.3](#)

Oil seals tend to fail when subjected to a vacuum, i.e. the sealing lip lifts away from the crankshaft during the piston's induction stroke because there is no internal counterpressure.

An additional test can be carried out with vacuum pump to detect this kind of fault. Carry out the same preparations as for the pressure test – [see 6.2.1](#).



- Connect suction hose (arrow) of vacuum pump 0000 850 3501 to nipple of test flange.



- Close the vent screw (1) on the pump.
- Operate lever (2) until the pressure gauge (3) indicates a vacuum of 0.4 bar.

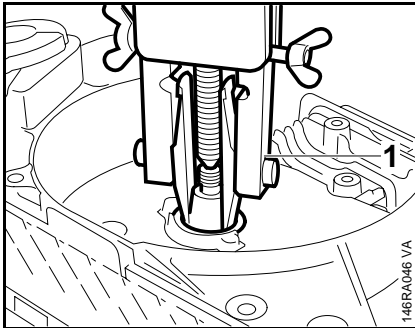
If the vacuum reading remains constant, or rises to no more than 0.3 bar within 20 seconds, it can be assumed that the oil seals are in good condition. However, if the pressure continues to rise (reduced vacuum in the crankcase), the oil seals must be replaced.

- After finishing the test, open the vent screw and disconnect the hose.
- Remove the test flange.
- Install the carburetor
  - [see 12.2.1](#).
- Remove the screws from the cylinder. Remove the sealing plate.
- Mount the muffler – [see 6.1](#).
- On engines with decompression valve, unscrew the plug from the cylinder, [see 6.2.1](#), and install the decompression valve – [see 6.8](#).

It is not necessary to disassemble the complete crankcase to replace the oil seals.

### Flywheel side

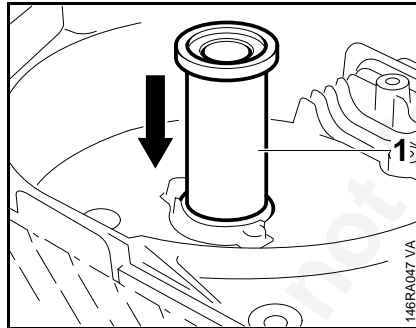
- Remove the flywheel  
– see 7.3.



- Free off the oil seal in its seat by tapping it with a punch.
- Apply puller (1) 0000 890 4400 with No. 3.1 jaws.
- Clamp the puller arms.
- Pull out the oil seal.

Take care not to damage the crankshaft stub.

- Clean sealing face with STIHL cleaner – see 14.
- Lubricate sealing lip of oil seal with grease – see 14.
- Thinly coat the outside diameter of the oil seal with sealant  
– see 14.



- Slip the oil seal, open side facing the crankcase, over the crankshaft stub.
- Use the press sleeve (1) 1108 893 2405 to install the oil seal.

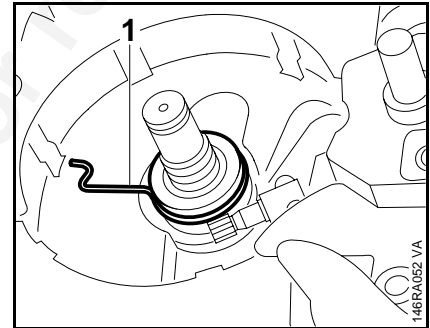
The seating face must be flat and free from burrs.

- Wait about one minute, then rotate the crankshaft several times.

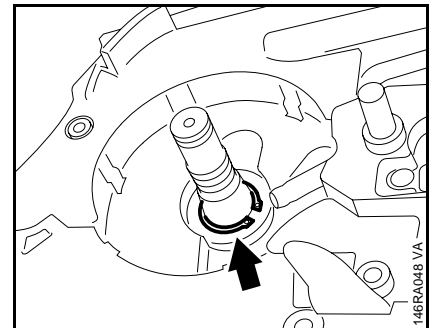
- Install the flywheel – see 7.3.
- Fit the fan cover – see 8.2.

### Clutch side

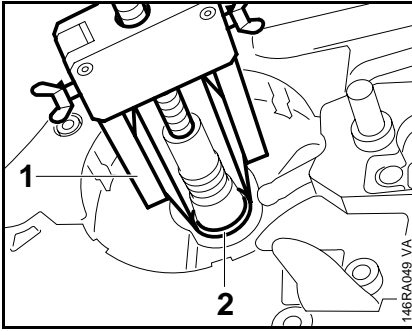
- Remove the clutch – see 5.3.



- Remove the drive spring (1) with worm.
- Remove the oil pump – see 11.4.



- Remove the retaining ring (arrow).
- Free off the oil seal in its seat by tapping it with a punch.



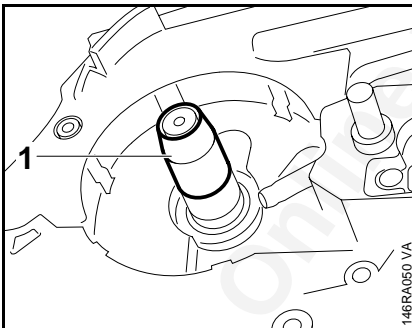
- Apply puller (1) 0000 890 4400 with No. 3.1 jaws.

– Clamp the puller arms.

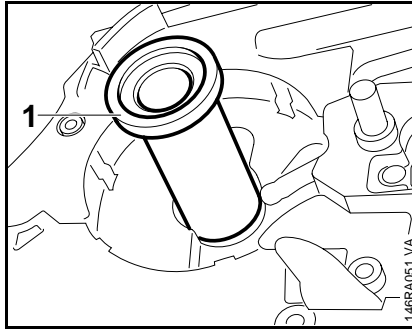
- Pull out the oil seal (2).

Take care not to damage the crankshaft stub.

- Clean sealing face with STIHL cleaner – [see 14](#).
- Lubricate sealing lip of oil seal with grease – [see 14](#).
- Thinly coat the outside diameter of the oil seal with sealant – [see 14](#).



- Fit the installing sleeve (1) 1118 893 4602 on the crankshaft.



- Slip the oil seal, open side facing the crankcase, over the crankshaft stub.

- Use press sleeve (1) 1118 893 2405 to install the oil seal.

- Remove the installing sleeve.

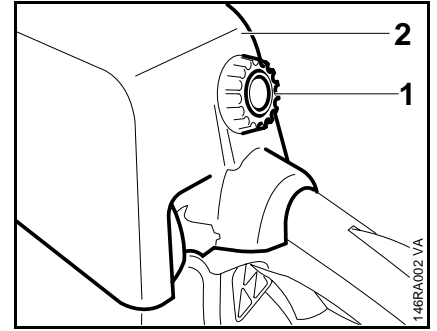
- Wait about one minute, then rotate the crankshaft several times.

- Install retaining ring in crankshaft groove.

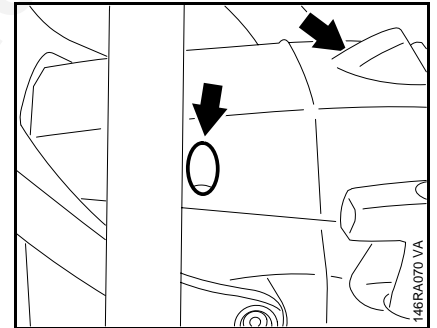
If the retaining ring is fatigued, fit a new one.

- Install the oil pump – [see 11.4](#).

Reassemble in the reverse sequence.



- Release twist lock (1) and remove the carburetor box cover (2).



- Pull off the spark plug boot.

- Take out the shroud mounting screws (arrows).

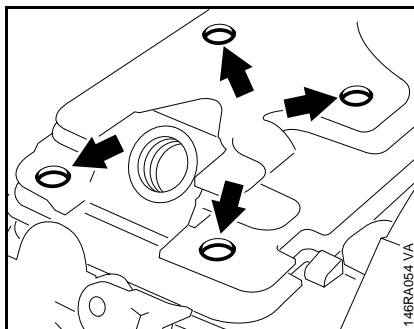
- Remove the shroud upwards.

Reassemble in the reverse sequence.

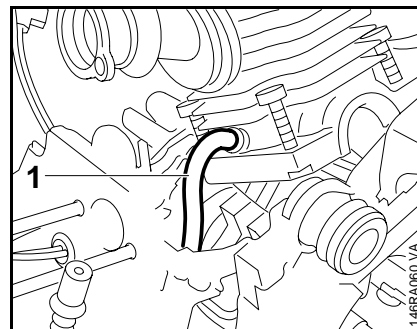
## 6.5 Cylinder and Piston

### 6.5.1 Removing

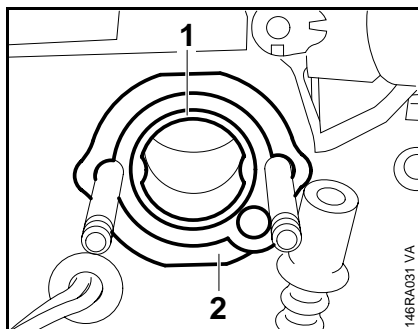
- Remove the handlebar – [see 9.1.](#)
- Remove the muffler – [see 6.1.](#)
- Remove the shroud – [see 6.4.](#)
- Remove the spark plug – [see 5.3.](#)
- Remove the carburetor  
– [see 12.2.1.](#)



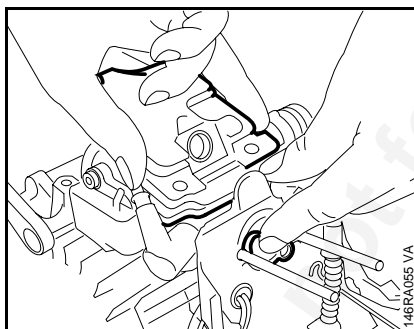
- Take out the cylinder base screws through the holes (arrows) in the cylinder.



- Disconnect the hose (1) from the cylinder.
- Pull the cylinder off the piston.



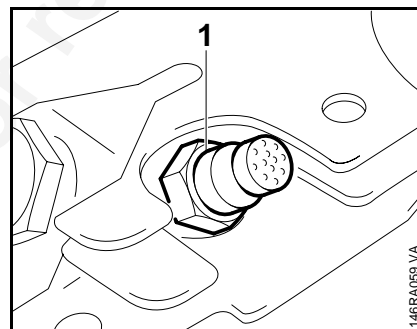
- Remove the sleeve (1) from the manifold.
- Take the washer (2) off the studs.
- Remove the fan cover.



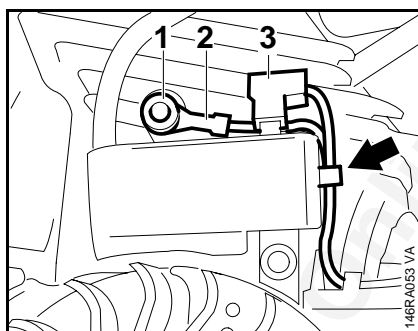
- Carefully lift the cylinder and, at the same time, push the manifold through the tank housing opening.

#### Caution:

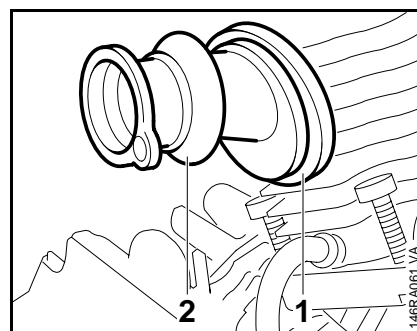
Do not use pointed or sharp-edged tools for this job.



- Unscrew the decompression valve (1), if fitted.

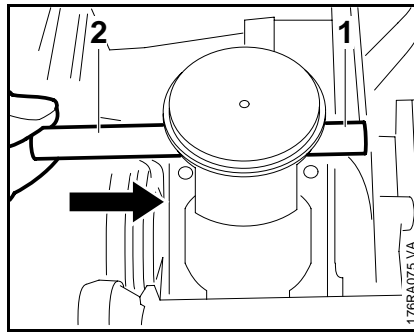


- Remove the screw (1) with washer and ground wire (2). Disconnect the short circuit wire (3) and take the wires out of the guide (arrow).



- Remove the clamp ring (1).
- Pull the manifold (2) off the intake port.
- Inspect the cylinder for damage and replace it if necessary.

- If a new cylinder has to be installed, **always** fit a new matching piston.
- Before removing the piston, decide whether or not the crankshaft has to be removed as well. The crankshaft has to be blocked to remove the flywheel and clutch by resting the piston on the wooden assembly block with the cylinder removed or loosened.
- Remove the clutch – [see 5.3](#).
- Remove the flywheel – [see 7.3](#).

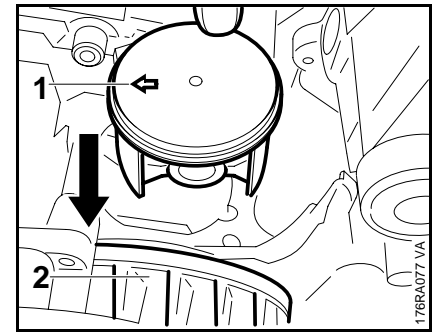


- Use the assembly drift (2) 1108 893 4700 to push the piston pin (1) out of the piston.

If the piston pin is stuck, tap the end of the drift **lightly** with a hammer if necessary.

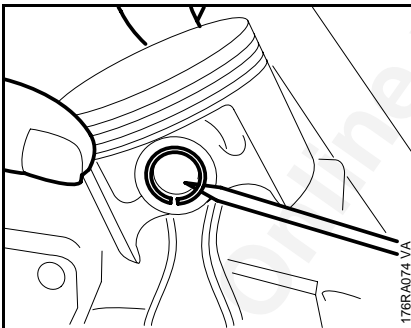
Hold the piston **steady** during this process to ensure that no jolts are transmitted to the connecting rod.

- Remove the piston from the connecting rod and take the needle cage out of the small end.
- Inspect the piston rings and replace if necessary – [see 6.6](#).



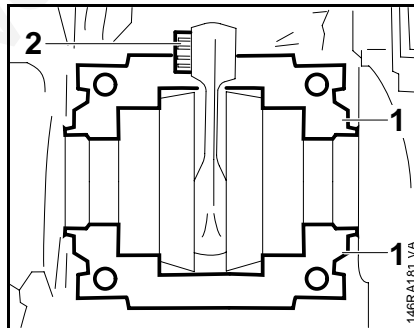
- Note installed position of piston:  
1 = Arrow  
2 = Flywheel

The arrow mark must point towards the muffler.

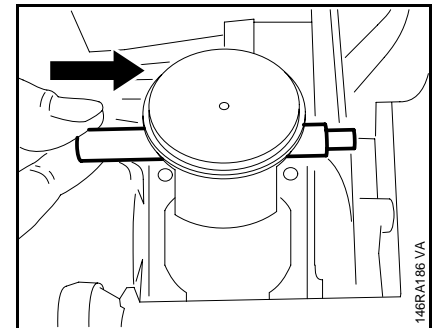


- Remove the hookless snap rings from the piston.

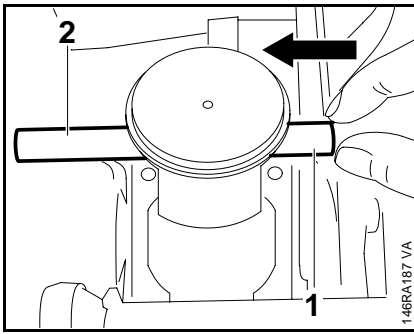
**Wear safety glasses** to protect your eyes when working with snap rings.



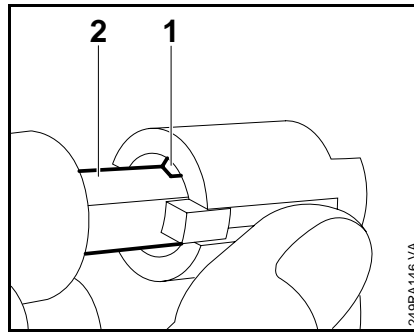
- Thoroughly clean the gasket seating surface (1).
- Lubricate the needle cage (2) with oil and fit it in the small end.



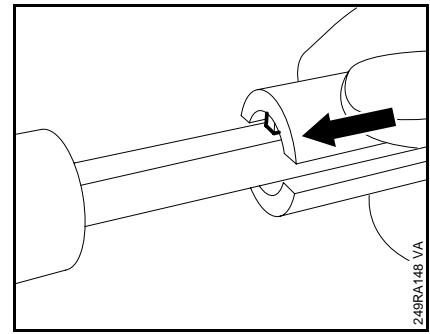
- Push the assembly drift 1108 893 4700, small diameter first, through the piston and small end (needle cage) and line up the piston.



- Fit the piston pin (1) on the assembly drift (2) and slide it into the piston.

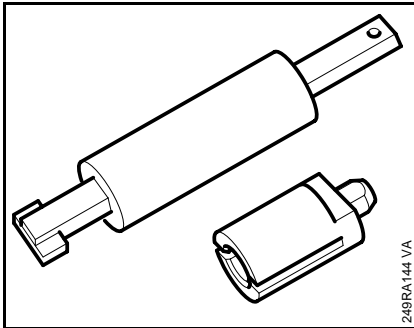


- Push the large slotted diameter of the sleeve over the magnet and snap ring. Position the sleeve so that the inner pin (1) points toward the flat face (2) of tool's shank.

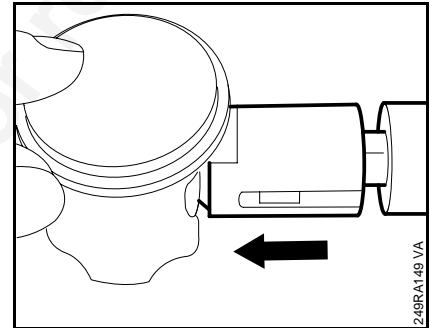


- Remove the sleeve and slip it onto the other end of the shank.

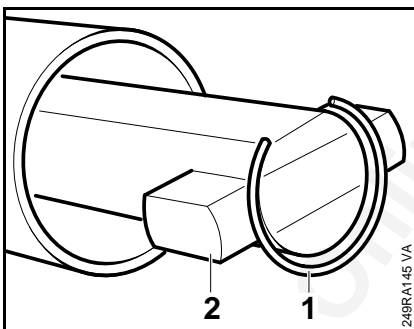
Inner pin must again point toward flat face.



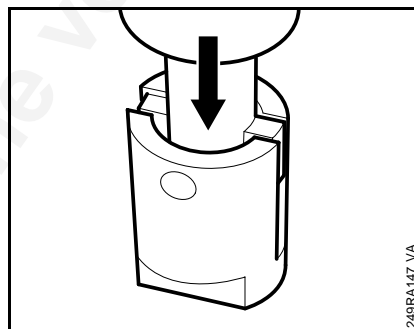
- Remove the sleeve from installing tool 5910 890 2210.



- Apply the installing tool 5910 890 2210 to the piston boss, hold the piston steady, center the tool shank exactly and press home until the snap ring slips into the groove.

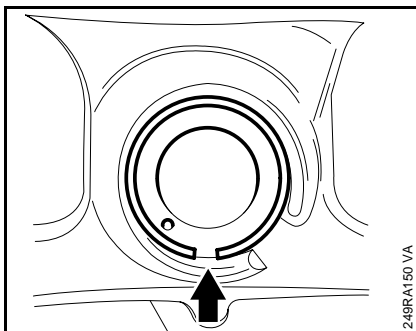


- Attach the snap ring (1) to the magnet (2) so that the snap ring gap is on the flat side of the tool's shank.

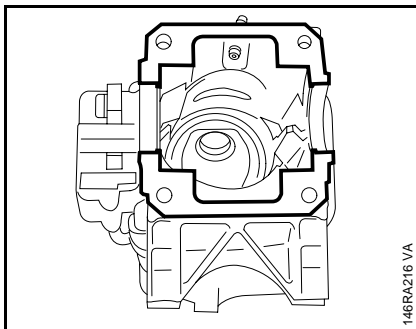


- Stand the installing tool, sleeve downward, on a flat surface (wooden board) and press vertically downwards until the sleeve butts against the tool's shoulder.

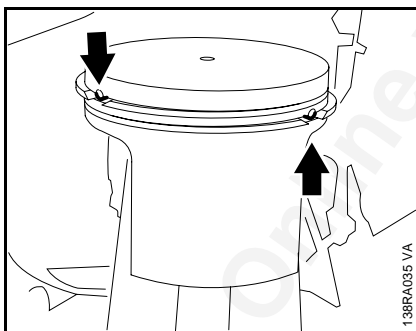




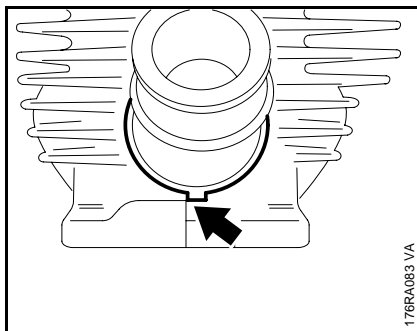
Fit the snap rings so that their gaps are on the piston's vertical axis (they must point either up or down – see arrow).



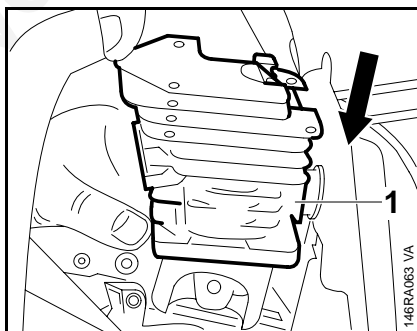
- Coat cylinder sealing face with Dirko red – [see 14](#).



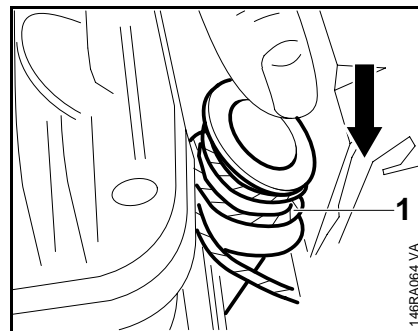
- Position the piston rings in the grooves so that the radii at the ring gaps engage the fixing pins (arrows) in the piston grooves upward.



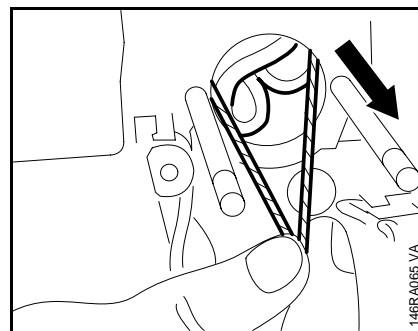
- Push the manifold on to the intake port.
- Fit the clamping ring, note the installed position (arrow).
- Make sure the piston rings are properly positioned.
- Lubricate the inside of the cylinder with oil and line it up so that it is positioned as it will be in the installed condition.



- Carefully slide the cylinder (1) over the piston.



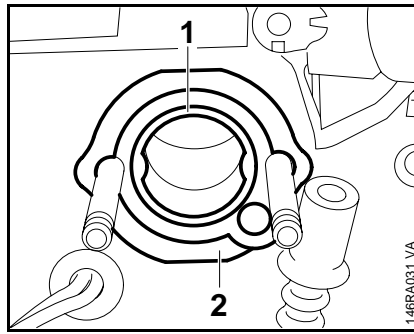
- Wind a piece of string (1) (about 15 cm long) around the back of the manifold flange and pass the ends of the string through the intake opening.
- Press the manifold down.



- Pull the ends of the string outward.

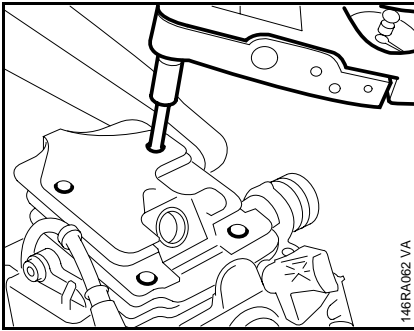
The manifold flange is pulled through the tank housing intake opening without damaging the manifold.

- Make sure the flange is properly seated in the tank housing.

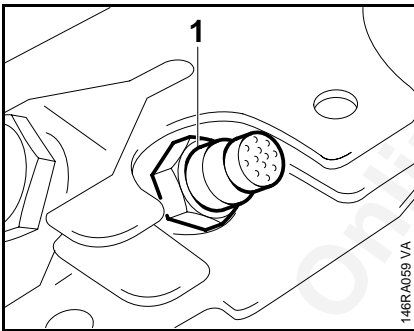


- Fit sleeve (1) in the manifold.
- Push the washer (2) onto the studs.

Reassemble all other parts in the reverse sequence.

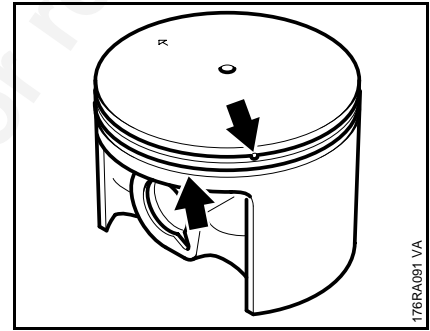


- Line up the cylinder.
- Fit the cylinder base screws and torque down in a diagonal pattern – see 3.5.

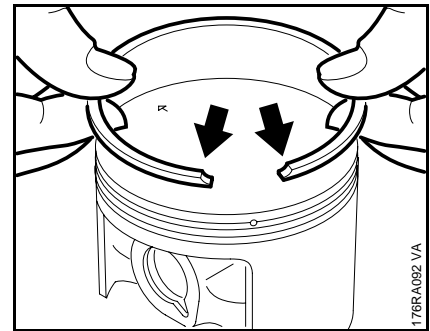


- Install and tighten down the decompression valve (1) firmly (if fitted) – see 3.5.

- Remove the piston – see 6.5.1.
- Remove the piston rings from the piston.



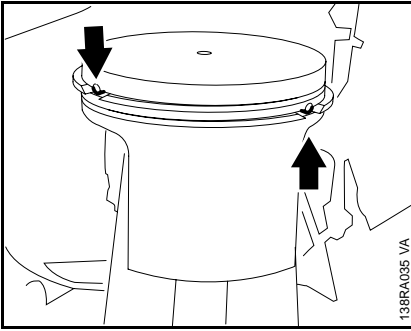
- Use a piece of old piston ring to scrape the grooves clean.



- Install the new piston rings in the grooves so that the radii at the ends of the rings face upward.
- Install the piston – see 6.5.2.

## 6.7 Crankcase

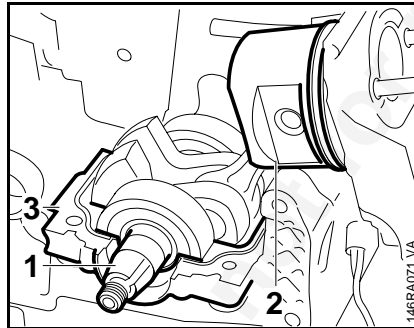
### 6.7.1 Crankshaft



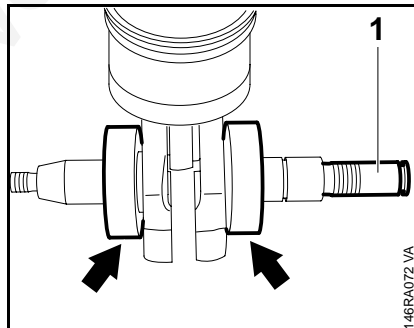
- Position the piston rings so that the radii at the ring gaps meet at the fixing pins (arrows) in the piston groove when the rings are compressed.

#### Removing

- Remove the chain catcher – [see 5.2.](#)
- Remove the chain brake – [see 5.4.2.](#)
- Remove the cylinder – [see 6.5.1.](#)
- Drain the oil tank.
- remove the oil pump – [see 11.4.](#)
- Remove the flywheel – [see 7.3](#)

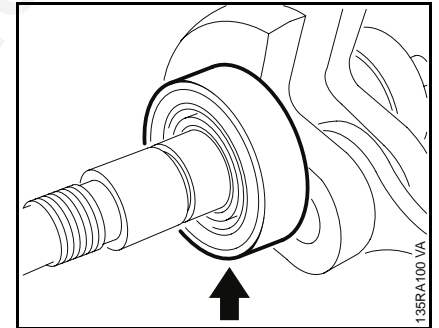


- Lift the crankshaft (1) with piston (2) out of the crankcase (3).
- Pull off the oil seals.



- Check the ball bearings (arrows) on crankshaft (1) for damage and replace if necessary.

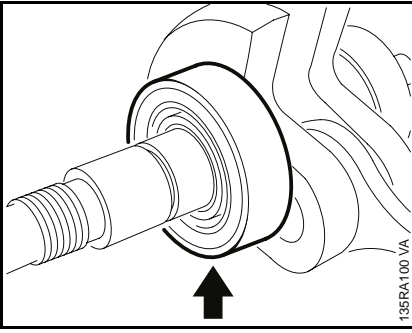
If the ball bearings are damaged, remove them as follows:



- Heat the ball bearing (arrow) to about 50°C and pull it off the crankshaft.

The crankshaft and connecting rod form an inseparable unit. This means that the crankshaft must always be replaced as a complete unit in the event of damage to either part.

If the crankshaft has to be replaced, remove the piston – [see 6.5.1.](#)



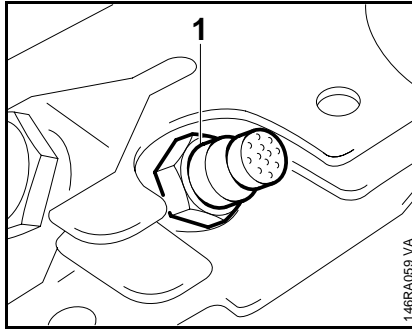
### Installing

If a new crankshaft has been installed, fit the piston – [see 6.5.2](#).

- Heat the ball bearings to about 50°C and push them on, closed side facing outwards, as far as stop.

Reassemble all other parts in the reverse sequence.

- Coat cylinder with 'Dirko red' before installation – [see 14](#).
- Install the cylinder – [see 6.5.2](#).



### Removing

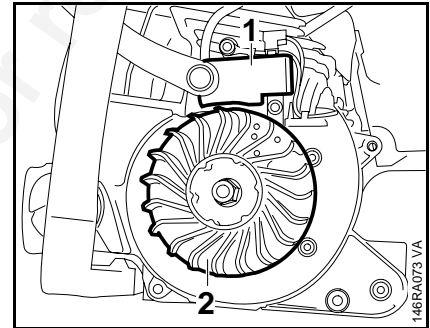
- remove the carburetor box cover and shroud – [see 6.4](#).
- Unscrew the decompression valve (1).

### Installing

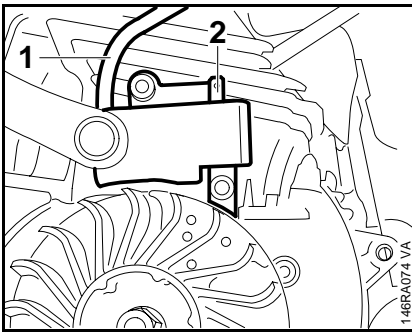
- Fit the decompression valve and tighten it down firmly – [see 3.5](#).
- Fit the carburetor box cover and shroud – [see 6.4](#).

Exercise extreme caution when troubleshooting or carrying out maintenance and repair work on the ignition system. The high voltages that occur can cause serious or even fatal accidents.

Troubleshooting on the ignition system should always begin at the spark plug – [see 4.4](#).



The electronic ignition system basically consists of an ignition module (1) and flywheel (2).



The ignition module accommodates all the components required to control ignition timing. There are two electrical connections on the coil body:

- High voltage output with ignition lead (1).
- Connector tag (2) for short circuit wire.

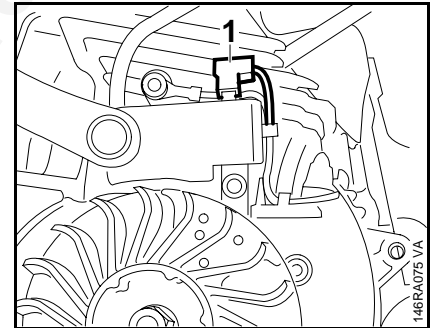
Testing in the workshop is limited to a spark test.

A new ignition module must be installed if no ignition spark is obtained (after checking that wiring and stop switch are in good condition).

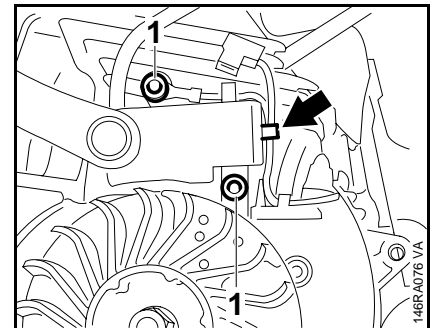
Ignition timing is permanently set according the design specification cannot be adjusted during repair work.

Since there is no mechanical wear in these systems, ignition timing cannot get out of adjustment. However, an internal fault in the circuit can alter the switching point in such a way that a spark test will still show the system to be in order although timing is outside the permissible tolerance. This will impair engine starting and running behavior.

- Remove the shroud – see 6.4.
- Remove the fan cover with rewind starter – see 8.2.



- Pull the short circuit wire (1) off the connector tag on the ignition module.

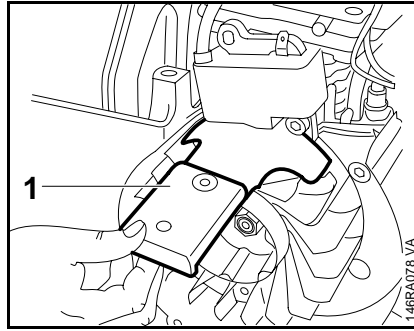


- Take out the screws (1) and washers and remove the wires from the guide (arrow).
- Remove the ignition module.

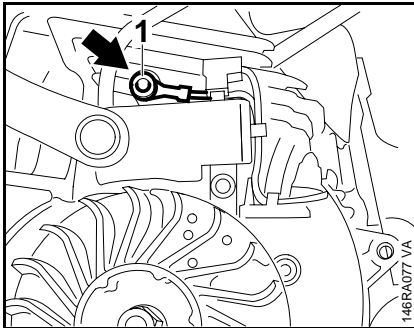
If the ignition lead is damaged, install a new ignition module.

If the spark plug boot is damaged, install a new one – [see 7.2](#).

Reassemble in the reverse sequence.



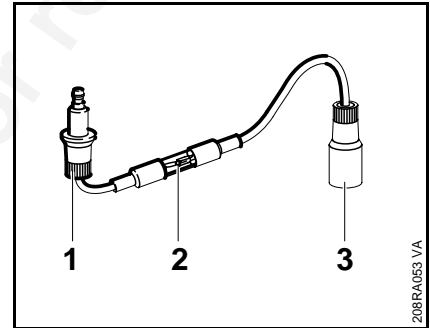
- Rotate the flywheel until the pole shoes are under the ignition module.
- Slide the setting gauge (1) 1111 890 6400 between the arms of the ignition module and the flywheel pole shoes.
- Press the ignition module against the flywheel and tighten down the mounting screws – [see 3.5](#).
- Remove the setting gauge and use a feeler gauge to check the air gap. It should be 0.2 to 0.3 mm.
- Connect the short circuit wire.
- Fit the fan cover and tighten down the screws – [see 3.5](#).
- Fit the shroud – [see 6.4](#).



- Use the left-hand screw with washer (arrow) to secure the the ground wire (1).

To test the ignition module, use either the ZAT 4 ignition system tester 5910 850 4503 or the ZAT 3 ignition system tester 5910 850 4520.

The ignition test refers only to a spark test, not to ignition timing.



#### Using the ZAT 4 ignition tester 5910 850 4503

- Before starting the test, install a new spark plug in the cylinder and tighten it down firmly – [see 3.5](#).
- Pull the boot off the spark plug and connect it to the input terminal (1). Push the tester's output terminal (3) onto the spark plug.
- Crank the engine quickly with the rewind starter (min. 1,000 rpm) and check spark in the tester's window (2).

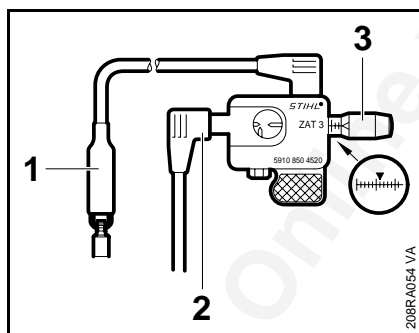
**Warning!**

The engine may start and accelerate during the test.

If a spark is visible, the ignition system is in order. In case of doubt about the result, perform additional test with ZAT 3.

If no spark is visible in the window (2), check the following points:

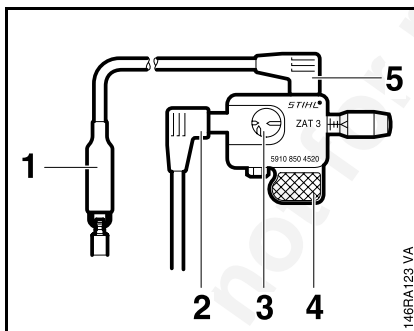
- Check the wiring harness for damage – [see 7.4](#).
- Check operation of start-stop switch – [see 7.5](#).
- Check leg spring – [see 7.2](#).
- If necessary, check ignition system with aid of the troubleshooting chart – [see 7.6](#).



### Using ZAT 3 ignition tester 5910 850 4520

It is necessary to use the ZAT 3 ignition system tester 5910 850 4520 to test the auxiliary spark gap.

- Before starting the test, install a new spark plug in the cylinder and tighten it down firmly – [see 3.5](#).
- Pull the boot off the spark plug and connect it to the terminal (2).
- Attach ground terminal (1) to the spark plug.
- Use adjusting knob (3) to set spark gap to about 2 mm.



While using the ZAT 3, hold it only by the handle (4) or position it in a safe place. Keep fingers or other parts of your body at least 1 cm away from the spark window (3), high voltage connection (2), ground connection (5) and the ground terminal (1).

**Warning!**

**High voltage – risk of electrocution.**

- Crank the engine quickly with the rewind starter (min. 1,000 rpm) and check sparkover in the tester's window (3).

**Warning!**

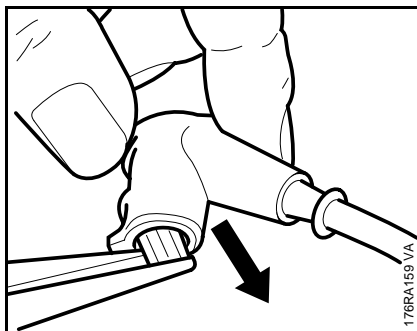
The engine may start and accelerate during the test.

If a spark is visible, the ignition system is in order.

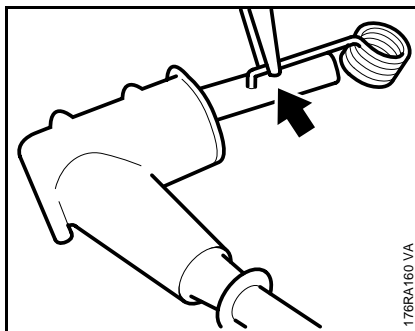
- If necessary, check ignition system with aid of the troubleshooting chart – [see 7.6](#).

If no spark is visible in the window (3), check the following points:

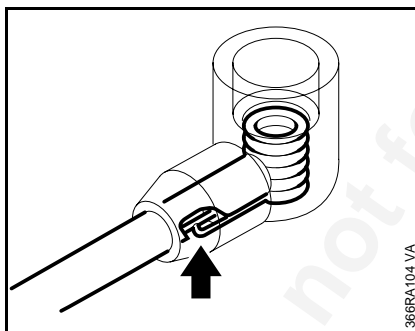
- Check the wiring harness for damage – [see 7.4](#).
- Check operation of start-stop switch – [see 7.5](#).
- Check leg spring – [see 7.2](#).



- Pull boot off the spark plug.
- Remove the shroud – see 6.4.
- Use suitable pliers to pull the leg spring out of the spark plug boot.
- Unhook the leg spring from the ignition lead.
- Pull the boot off the ignition lead.
- Coat end of the ignition lead (about 20 mm) with oil.
- Fit spark plug boot over the ignition lead.
- Use pliers to grip the end of the ignition lead inside the spark plug boot and pull it out.



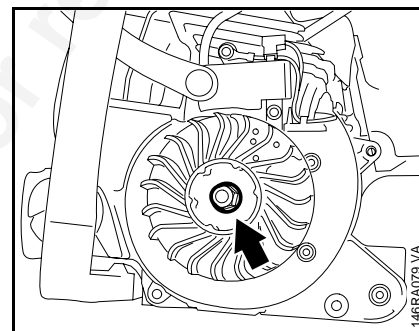
- Pinch the hook (arrow) of the leg spring into the center of the lead, i.e. about 15 mm from the end of the lead.



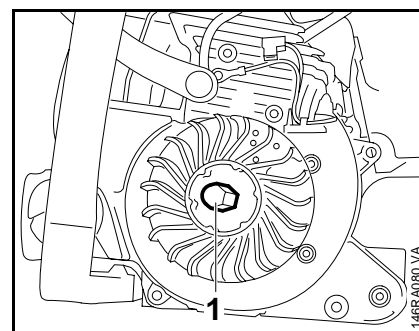
- Pull the lead back into the boot so that the leg spring locates properly inside it (see arrow).

Reassemble in the reverse sequence.

- Remove the fan cover with rewind starter – see 8.2.
- Block the piston with the locking strip – see 5.3.



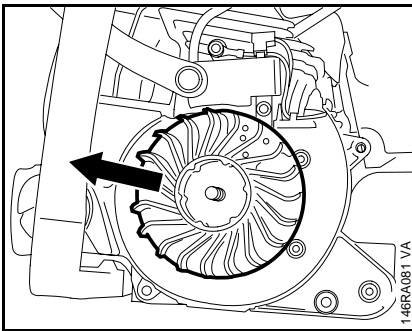
- Unscrew the flywheel nut (arrow).



If the flywheel cannot be removed by hand, screw on the puller (1) 4133 893 0800 and tap its end to release the flywheel.



## 7.4 Short Circuit Wire/ Ground Wire



- Remove the puller from the crankshaft.

- Pull off the flywheel.

Inspect flywheel and magnet poles for cracks or other damage. If you find any damage, install a new flywheel.

Reassemble in the reverse sequence.

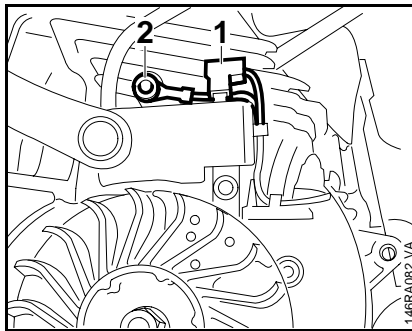
Degrease crankshaft stub and bore in flywheel with STIHL cleaner – [see 14](#).

- Fit the flywheel in position.

Check position of slot.

- Fit the flywheel nut and tighten it down firmly – [see 3.5](#).

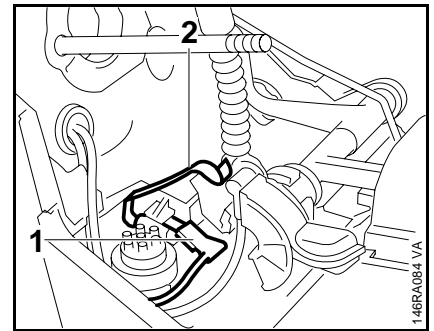
Assemble all other parts in the reverse sequence.



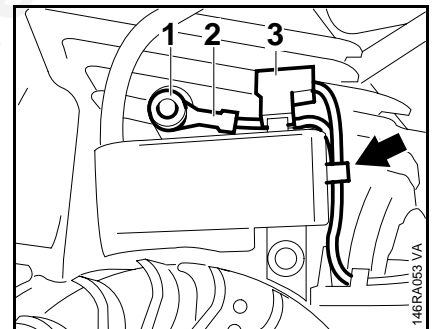
If the insulation of the short circuit wire (1) is damaged it can cause a short circuit to ground and upset or completely interrupt ignition. Replace damaged wires.

To remove the short circuit wire (1) and the ground wire (2), perform the following operations:

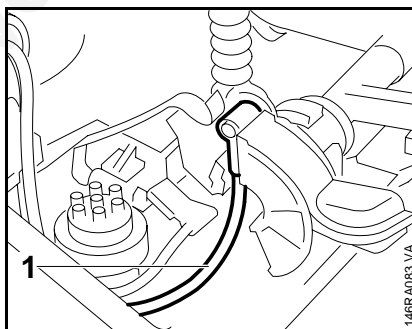
- Remove the fan cover with rewind starter – [see 8.2](#).
- Remove the shroud – [see 6.4](#).
- Remove the air filter/filter base – [see 12.1](#).



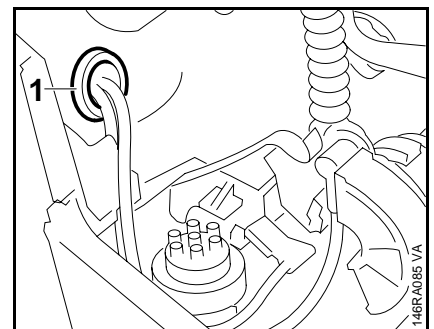
- Pull the ground wire (1) off the contact spring (2).



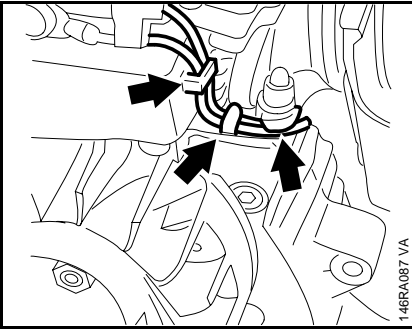
- Remove the screw (1) with washer and ground wire (2). Disconnect the short circuit wire (3) and take the wires out of the guide (arrow).



- Pull the connector sleeve of the short circuit wire (1) out of its seat in the switch shaft.



- Pull the grommet (1) out of the tank housing.
- Pull the wires out of the tank housing.

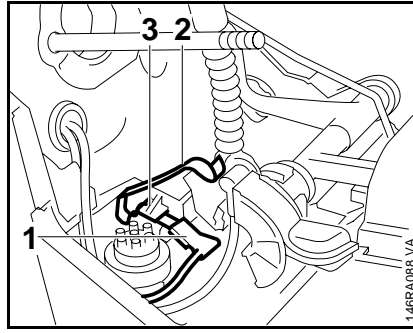


- Remove the wires from the retainers (arrows).

Reassemble in the reverse sequence.

**Important:**

Make sure the wires are properly positioned in the area of the flywheel.



- Remove the air filter/filter base  
– **see 12.1.**

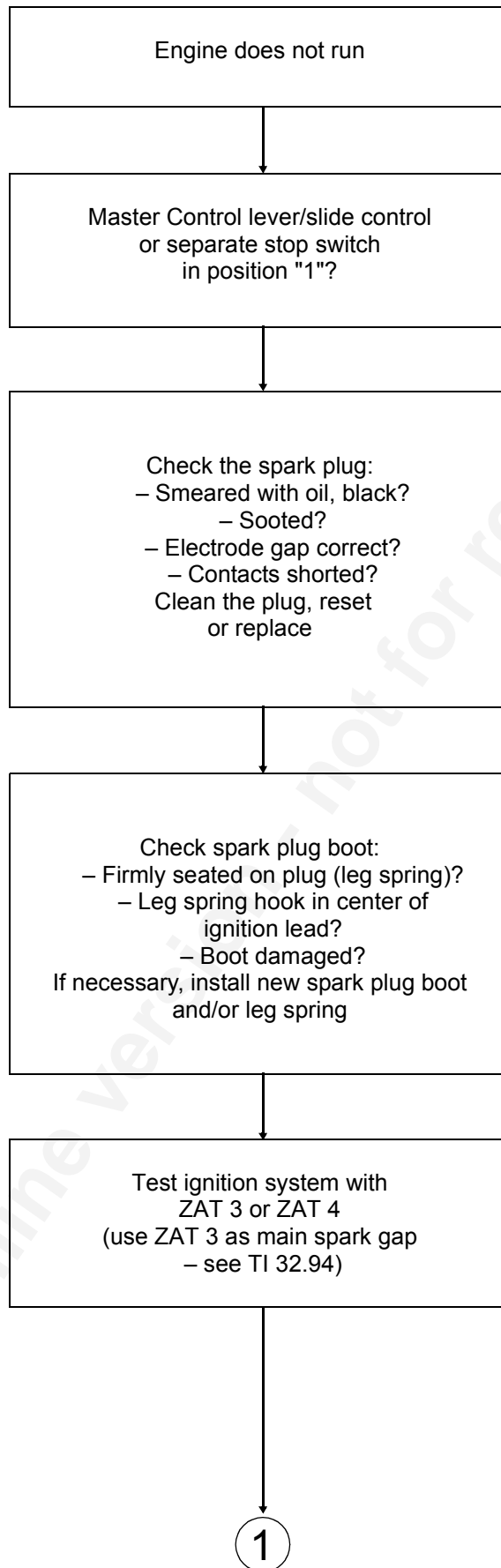
The contact spring is in order if the short circuit wire makes contact with the connector sleeve when the Master Control lever is in the "STOP" position.

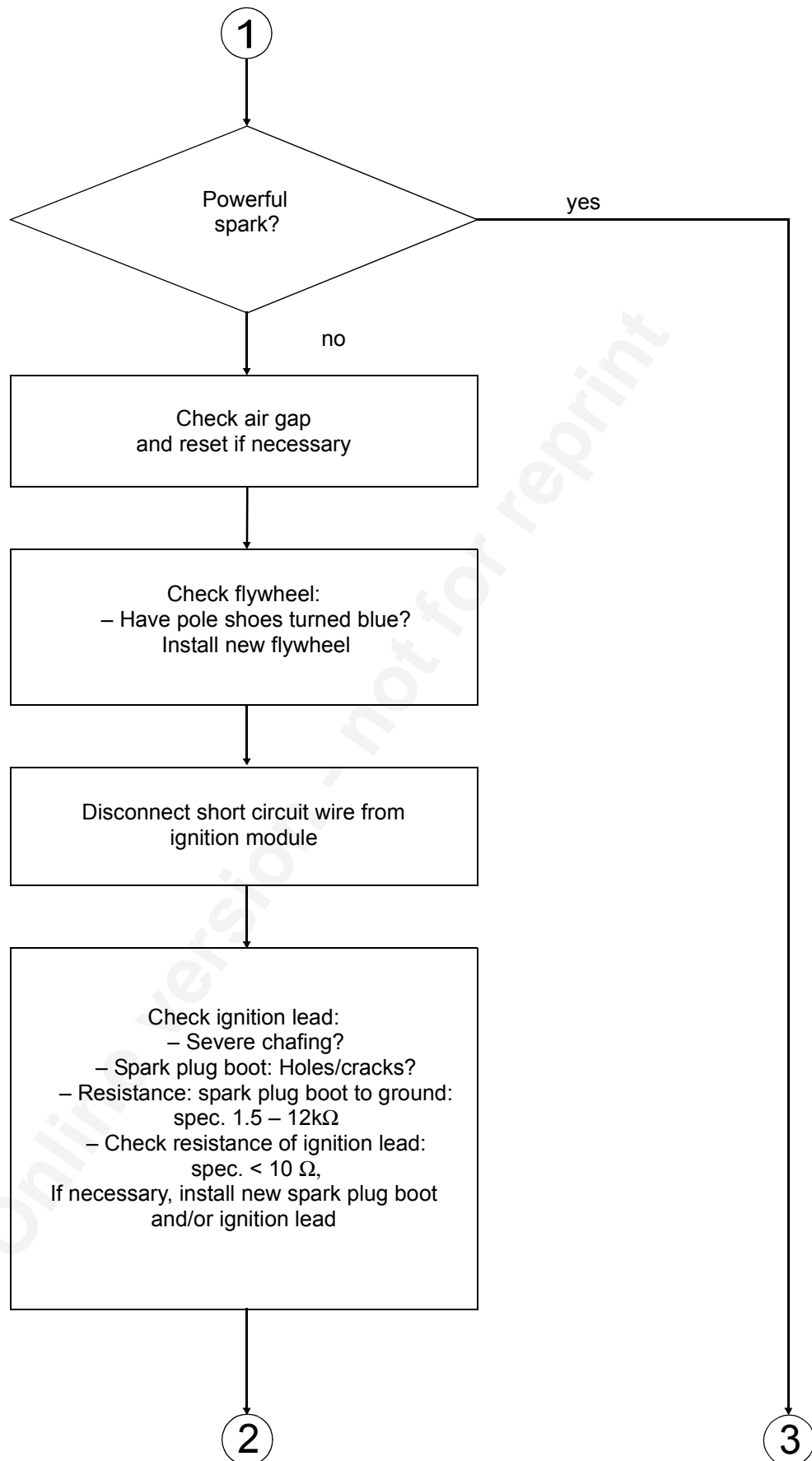
Replace the contact spring if it is broken or bent.

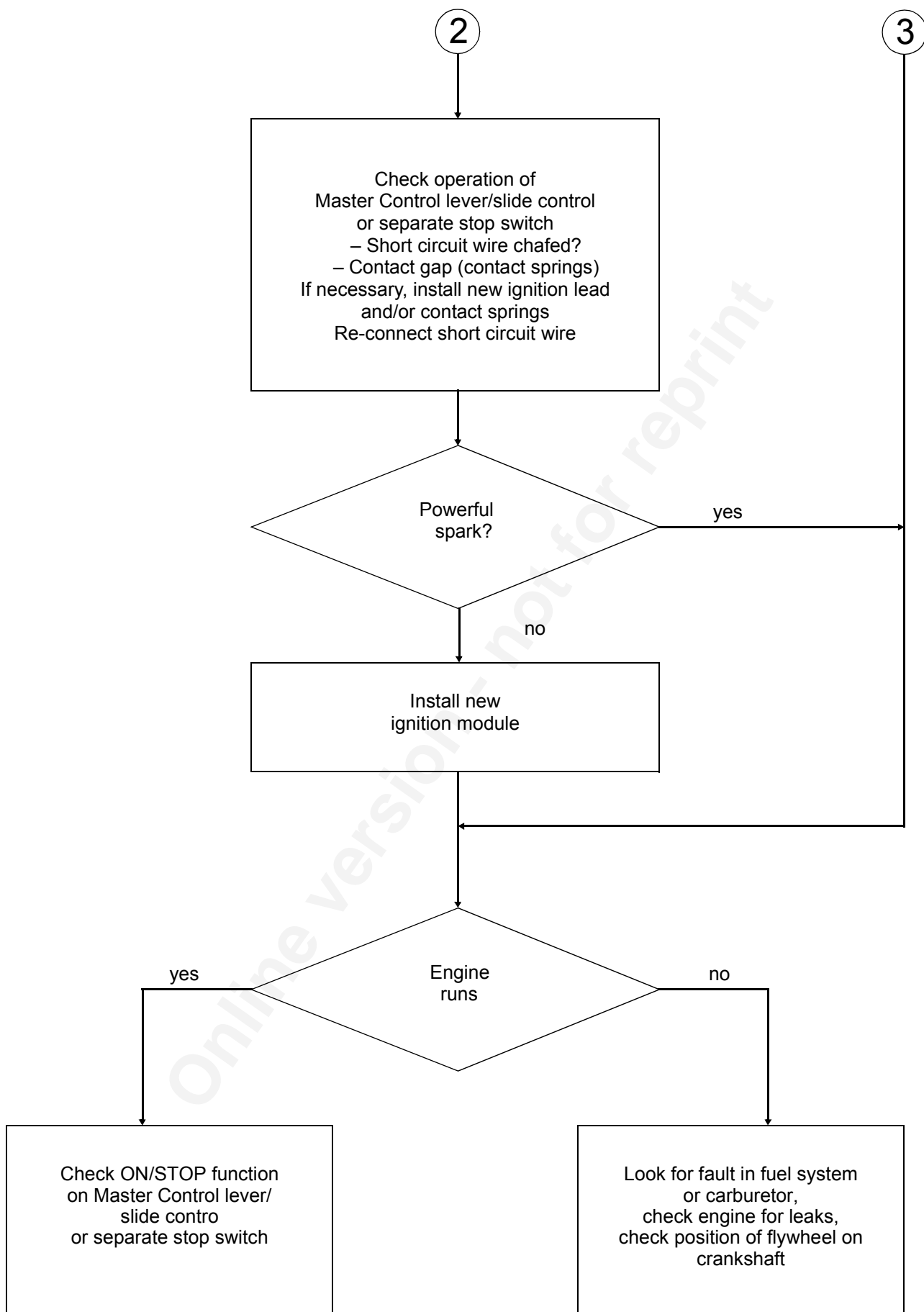
Replace the contact spring as follows:

- Pull the wire (1) off the contact spring (2).
- Pry the contact spring (2) out of the retaining clip (3) and remove it.

Reassemble in the reverse sequence.







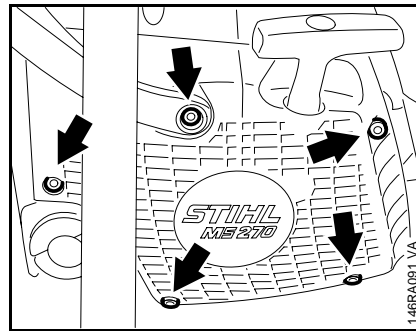
If the action of the starter rope becomes very stiff and the rope rewinds very slowly or not completely, it can be assumed that the starter mechanism is in order but plugged with dirt. At very low outside temperatures the lubricating oil on the rewind spring may thicken and cause the spring windings to stick together. This has a detrimental effect on the function of the starter mechanism. In such a case it is sufficient to apply a few drops of paraffin (kerosine) to the rewind spring.

Carefully pull out the starter rope several times and allow it to rewind until its normal smooth action is restored.

If clogged with dirt or pitch, the entire starter mechanism, including the rewind spring, must be removed and disassembled – [see 14](#).

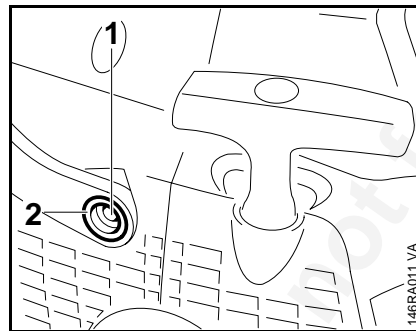
Wash all parts in STIHL cleaner – [see 14](#).

Lubricate the rewind spring and starter post with STIHL special lubricant, [see 14](#), before installing.



### Removing

- Take the screws (arrows) out of the fan cover.
- Remove the fan cover.



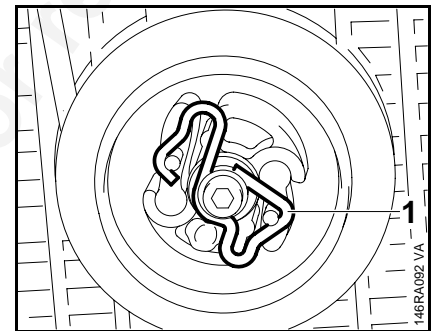
### Installing

- The hand guard is mounted to the fan cover and fan housing with the IS-M5x35 screw (1) and bushing (2).
- Tighten down the screws firmly – [see 3.5](#).

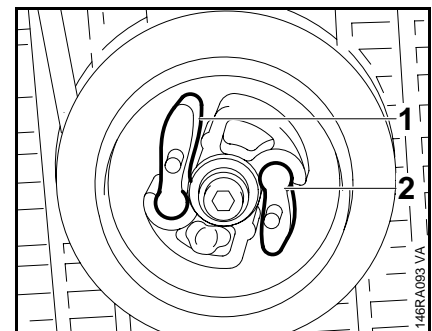
Reassemble all other parts in the reverse sequence.

### Removing

- Remove the fan cover with rewind starter – [see 8.2](#).



- Use a screwdriver or pliers to carefully remove the spring clip (1) from the starter post.



- Pull the pawls (1 and 2) out of the rope rotor.

### Installing

- Coat pegs of new pawls with graphite grease – [see 14](#).

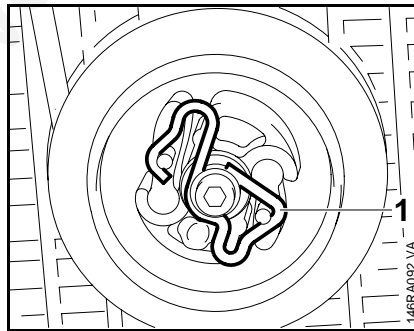
Reassemble all other parts in the reverse sequence.

- Remove the fan cover with rewind starter – [see 8.2](#).

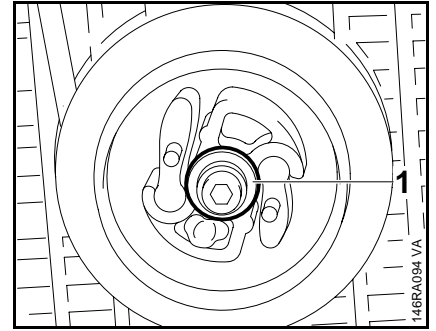
### Relieving tension of rewind spring:

The rewind spring will not be under tension if the starter rope is broken.

- Pull out the starter rope about 5 cm and hold the rope rotor steady.
- While still holding the rope rotor steady, take three full turns off the rope rotor.
- Pull out the rope with the starter grip and slowly release the rope rotor.
- Remove the starter rope from the rotor.



- Use a screwdriver or pliers to carefully remove the spring clip (1) from the starter post.



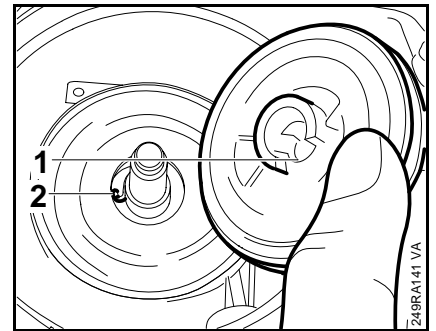
- Remove the washer (1) from the starter post.
- Carefully pull the rope rotor off the starter post.

The rewind spring may pop out and unwind if rope rotor is not removed very carefully.

- Remove the starter rotor – [see 8.5](#).

Reassemble in the reverse sequence.

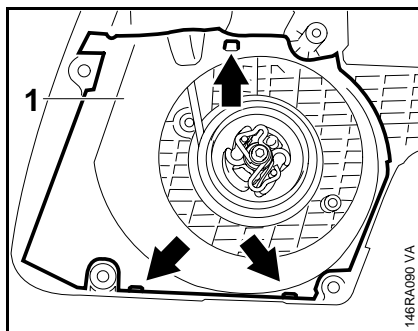
- Install the starter rope – [see 8.5](#).
- Coat bore in rope rotor with STIHL special lubricant – [see 14](#).



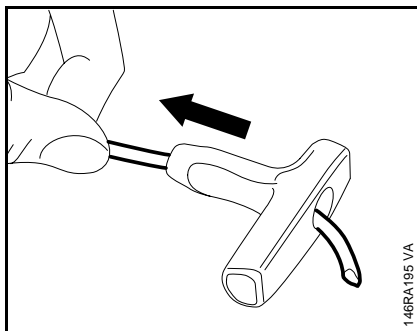
- Fit the rotor on the starter post so that the lug (1) on the rope rotor slips behind the inner spring loop (2).
- Tension the rewind spring – [see 8.5.2](#).

## 8.5 Starter Rope

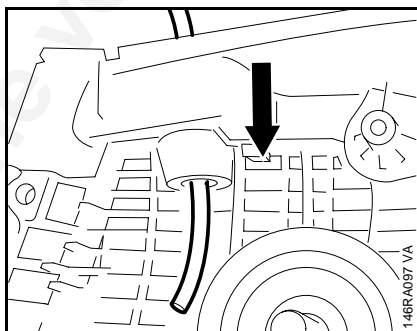
- Remove the fan cover with rewind starter – [see 8.2](#).



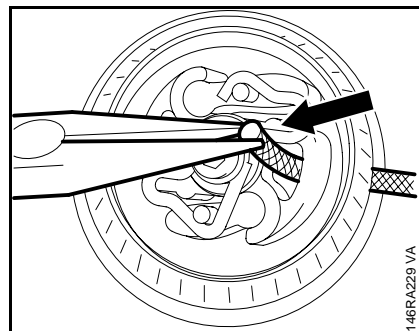
- Unclip the segment (1) from the upper retainer in the fan cover and take it out of the lower retainers.
- If the starter rope is broken, remove the remaining rope from the rope rotor, fan cover and starter grip.
- If the starter rope is worn, relieve tension of rewind spring, [see 8.4](#), pull the end of the rope out of the rotor and undo the knot. Then pull the worn rope out of the starter grip, fan cover and rotor.



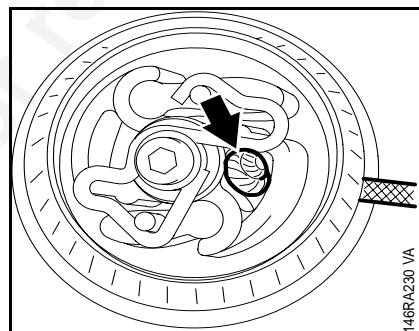
- Starter grips without ElastoStart: Thread one end of new rope through the top of the starter grip and tie a simple overhand knot.
- Pull the rope with knot into the starter grip.
- For ElastoStart grips – [see 8.5.1](#).



- Thread the other end of the rope, from outside, through the guide bush in the fan housing.



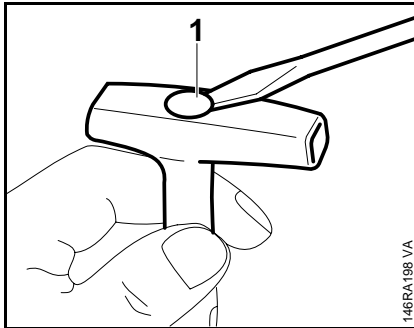
- Thread the end of the rope through the hole in the side of the rotor, pull it out.



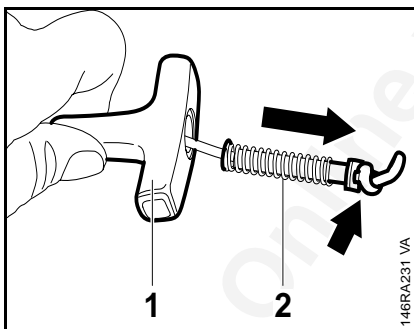
- Secure the rope with a simple overhand knot.
- Pull the rope back until the knot locates in the recess (arrow) in the rope rotor.
- Tension the rewind spring – [see 8.5.2](#).
- Fit fan cover with rewind starter – [see 8.2](#).



- Remove the fan cover with rewind starter – [see 8.2](#).
- Relieve tension of rewind spring – [see 8.4](#).

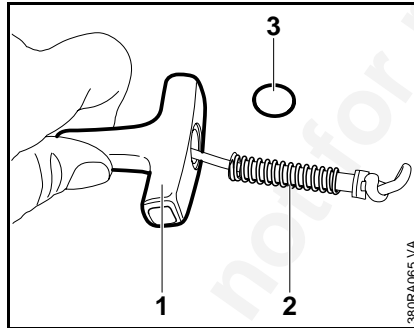


- Pry the cap (1) out of the starter grip.

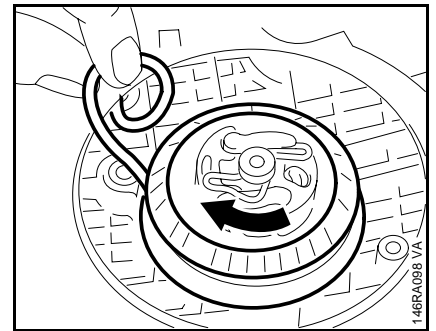


- Pull starter rope and, if necessary, the spring element (2) out of the grip (1).
- Undo the knot (arrow) in the starter rope.

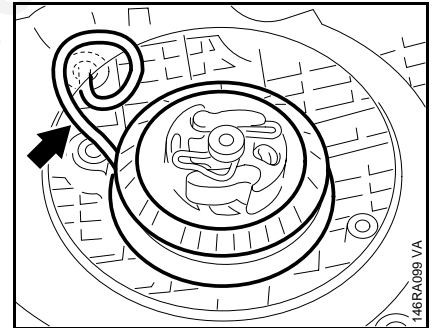
- Pull the grip and, if necessary, the spring element off the starter rope.



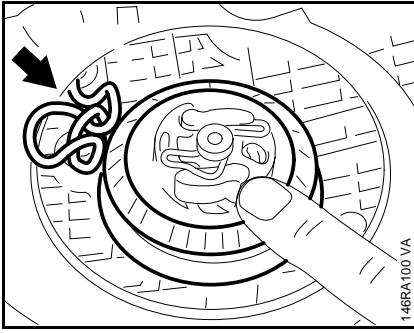
- Thread end of new starter rope through the grip (1) and the spring element (2) – if removed.
- Tie a simple overhand knot in the end of the rope.
- Pull the rope and spring element into the grip and then fit the cap (3).
- Tension the rewind spring – [see 8.5.2](#).
- Fit fan cover with rewind starter – [see 8.2](#).



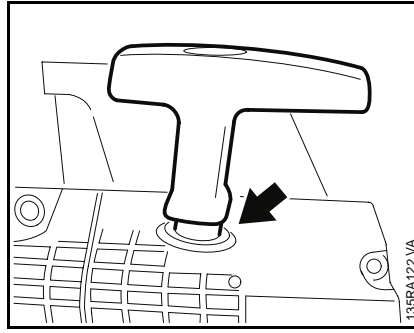
- Make a loop in the starter rope.



- Grip the rope next to the rotor (in area of arrow) and use it to turn the rope rotor six times clockwise.



- Hold the rope rotor steady.
- Pull out the rope with the starter grip and straighten it out.
- Hold the starter grip firmly to keep the rope tensioned.
- Let go of the rope rotor and slowly release the starter rope so that it can rewind properly.



The rewind spring is correctly tensioned when the starter grip sits firmly in the rope guide bush without drooping to one side. If this is not the case, tension the spring by one additional turn.

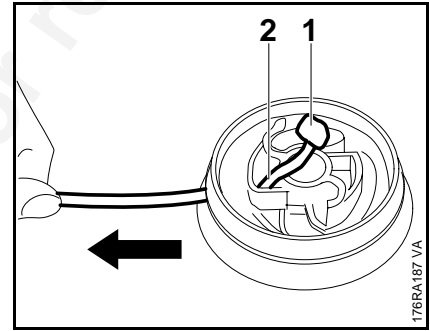
When the starter rope is fully extended, it must still be possible to rotate the rope rotor at least another half turn before maximum spring tension is reached. If this is not the case, pull the rope out, hold the rope rotor steady and take off one turn of the rope.

**Do not overtension the rewind spring as this will cause it to break.**

- Fit the fan cover – [see 8.2](#).

Wear on the guide bush is accelerated by the starter rope being pulled sideways. The wall of the guide bush eventually wears through and the bush becomes loose.

- Remove the rope rotor – [see 8.4](#).



- Pull knot (1) out of recess (2) in the rope rotor.
- Undo the knot.
- Pull starter rope out of the rope rotor and guide bush.

Troubleshooting chart – [see 4.2](#).

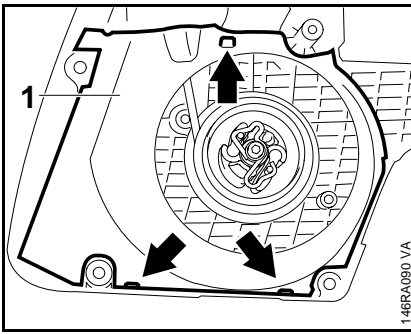
The replacement spring comes ready for installation and is secured in a frame.

### Removing

#### Important:

Wear a face shield and work gloves.

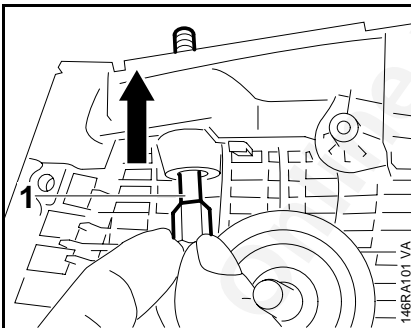
- Remove the rope rotor – [see 8.4](#).



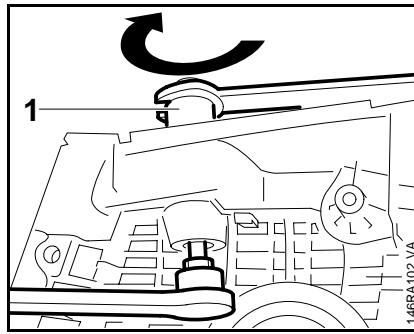
- If necessary, unclip segment (1) from upper retainer in the fan cover and take it out of the lower retainers.
- Use a suitable tool to pry the damaged bush out of the fan cover.

### Installing the rope bush

- Place the new bush in its seat in the fan cover.



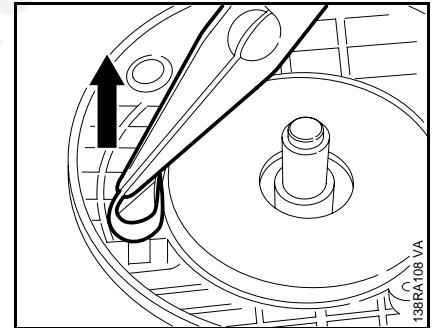
- Insert the screw spindle (1) of the installing tool 0000 890 2201 through the bush from inside the fan cover.



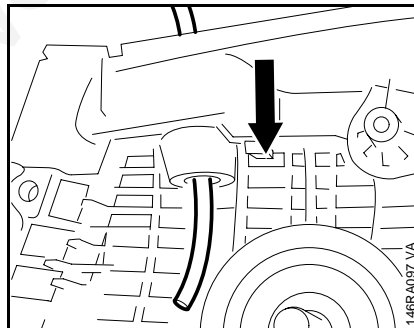
- Fit the thrust sleeve (1), tapered end first, and the hex nut.
- Tighten down the hex nut until the bush is firmly seated.

The installing tool flares the lower end of the rope bush.

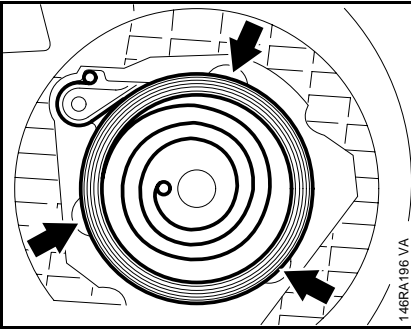
- Remove the installing tool.



- Use suitable pliers to grip the outer spring loop and lift it up.
- Take the rewind spring out of the fan cover.
- Remove any remaining pieces of spring from the fan housing and fan cover.



- Thread the starter rope through the guide bush from outside and fit it on the rope rotor – [see 8.5](#).
- Install the rope rotor – [see 8.4](#).



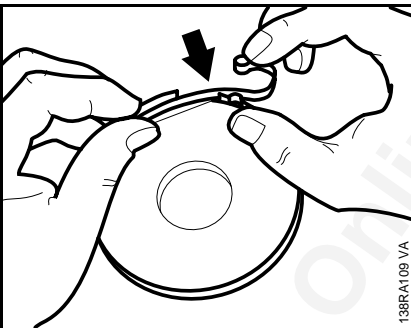
### Installing

- Lubricate the spring with a few drops of STIHL special lubricant before installation – [see 14](#).
- Position replacement spring with frame in the fan cover.

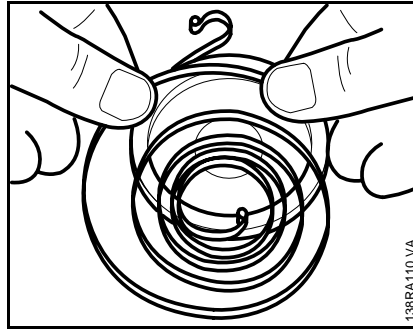
The spring anchor loop must engage the lug in the fan cover.

- Place suitable guides on the recesses (arrows) and push the spring into its seat in the fan cover.

If the rewind spring has popped out, refit it in the assembly tool 1116 893 4800 as follows:



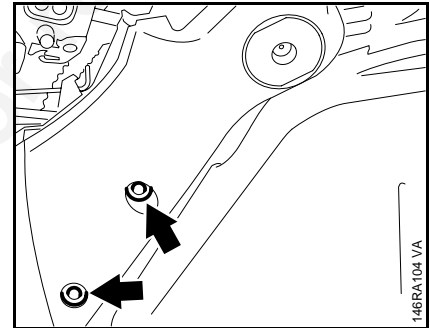
- Position the anchor loop about 25 mm from the edge of the spring housing.



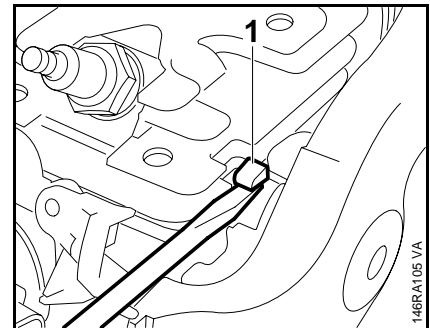
- Fit the rewind spring in the counterclockwise direction, starting from outside and working inwards.
- Fit the spring housing in the fan housing and press the spring loop into the recess at the same time.
- Install the rope rotor – [see 8.4](#).
- Tension the rewind spring – [see 8.5.2](#).

Reassemble all other parts in the reverse sequence.

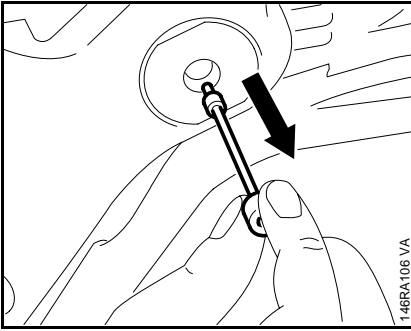
- Remove the shroud – [see 6.4](#).



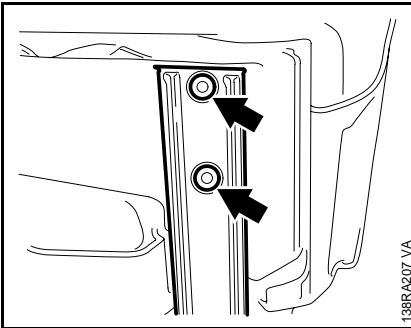
- Take out the screws (arrows).



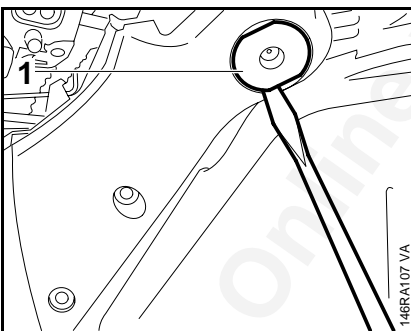
- Use screwdriver (1) to pry the clip upwards.



- Push the retainer through the handlebar to the outside and remove.



- Take out the screws (arrows).



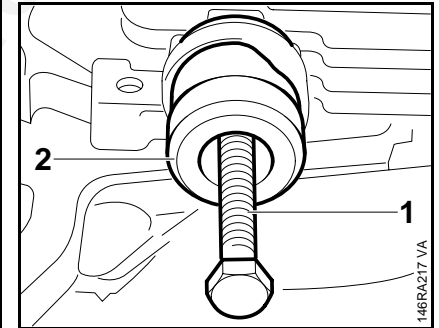
- Pry plug (1) out of the handlebar to expose the annular buffer.
- Pry the annular buffer out of the handlebar.

Reassemble in the reverse sequence.

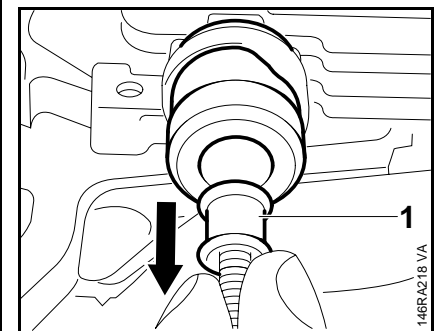
Annular rubber buffers and a spring are installed between the tank housing and crankcase to minimize vibrations. Damaged annular buffers must always be replaced.

### Removing

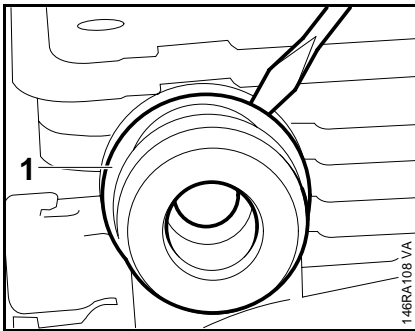
- Remove the handlebar – see 9.1.



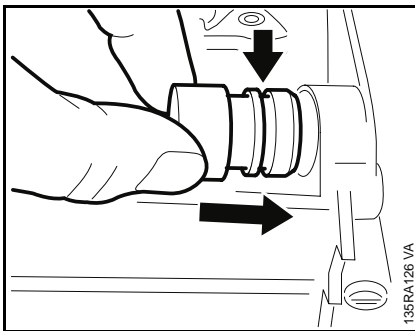
- Fit an M6 screw (1) in the bushing in the annular buffer (2).



- Use the screw to pull out the bushing (1).
- Take the screw out of the bushing.



- Use a screwdriver to pry the annular buffer (1) out of its seat in the crankcase.



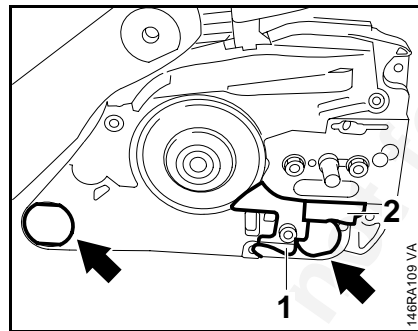
### Installing

- Coat inside and outside of annular buffer with STIHL installing fluid – [see 14](#).
- Push home the annular buffer until the groove (arrow) engages over the housing rib.
- Push the bushings, flat end first, home as far as stop.

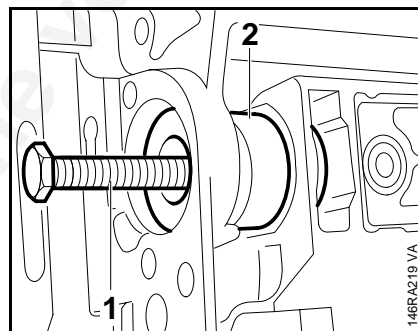
Reassemble all other parts in the reverse sequence.

### Removing

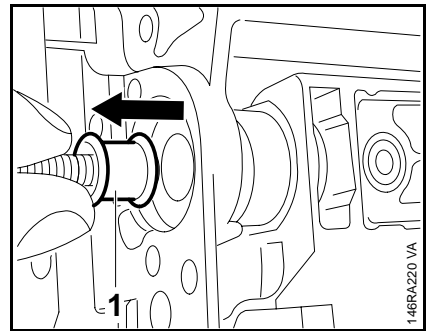
- Remove the chain sprocket cover.
- Remove the cutting attachment – wear work gloves to protect your hands from injury.



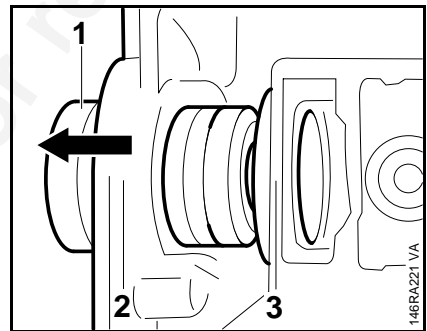
- Remove the chain catcher (1) – [see 5.2](#).
- Remove the bumper strip (2) and pry the plugs (arrows) out of the annular buffers.



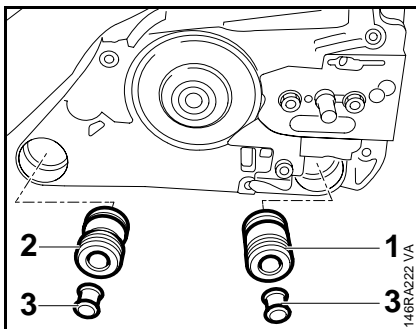
- Fit an M6 screw (1) in the bushing in the annular buffer (2).



- Use the screw to pull out the bushing (1).
- Take the screw out of the bushing.



- Pull annular buffer (1) out of its seat (3) in the tank housing and the seat (2) in the crankcase.
- Repeat the procedure (fitting an M6 in the bushing, pulling bushing out with the screw and then pulling out the annular buffer) on the second annular buffer in the tank housing.



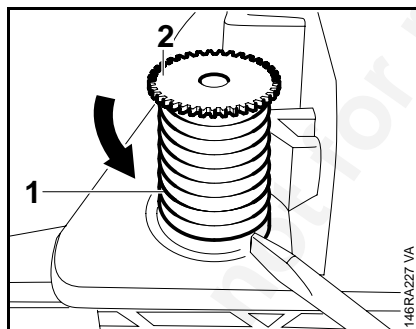
#### Installing

- Coat inside and outside of annular buffer with STIHL installing fluid – see 14.
- Note the different shapes of annular buffers (1) and (2). Make sure they are not switched during installation.
- Press home annular buffers in crankcase and tank housing until their grooves are properly seated in the housings.
- Press home the bushings (3), flat end first, as far as stop.

Do not use pointed or sharp-edged tools for this job.

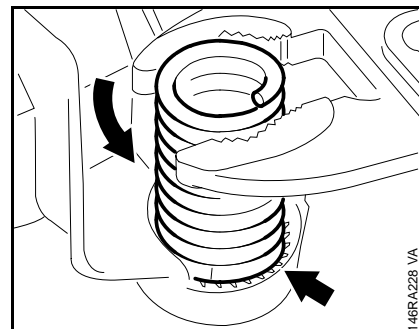
Reassemble all other parts in the reverse sequence.

- Remove the fan housing
- see 11.5.



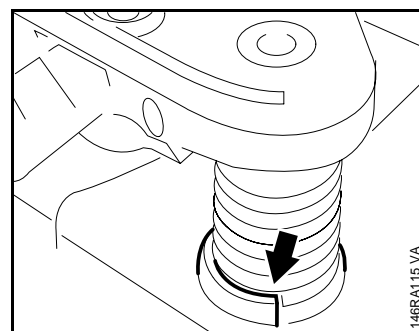
- Apply a screwdriver to the coil end and unscrew the spring (1) together with the bearing plug (2).
- To ensure that the teeth on the bearing plug are not damaged during disassembly, unscrew the bearing plug from the spring by hand.

If the spring is too tight on the bearing plug, proceed as follows:



- Engage bearing plug with spring in the teeth (arrow) in the fan housing.
- Use pliers to unscrew the spring from the bearing plug.
- Remove the bearing plug from the fan housing.
- Inspect fan housing, bearing plug and spring for damage and replace if necessary.

Reassemble in the reverse sequence.



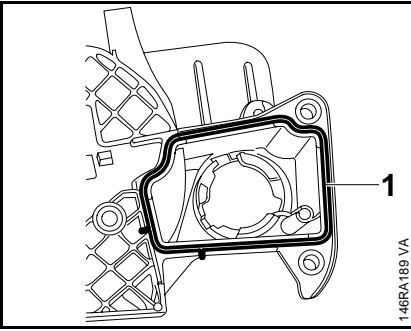
- When installing the spring, make sure the end of the spring coil butts against the stop (arrow) on the tank housing.

## 10 Master Control/ Handle System

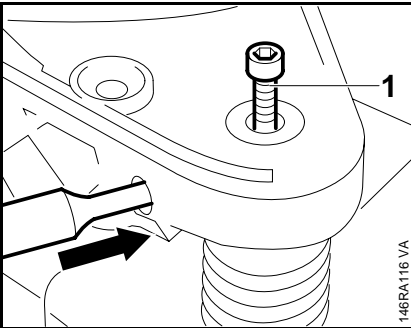
### 10.1 Switch Shaft

- Remove the carburetor
  - see 12.2.1.

Install in the reverse sequence.

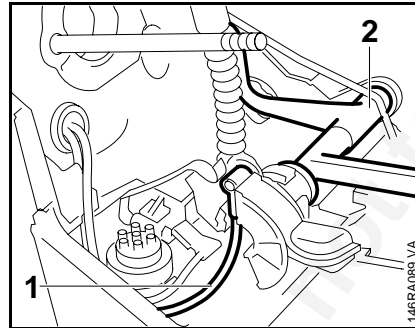


- Inspect fan housing gasket (1) and replace if necessary.
- Fit the fan housing and tighten down the screws firmly
  - see 3.5.

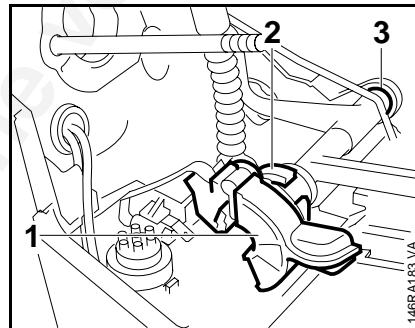


- Before fitting the screw (1) above the spring, insert a 5 mm diameter drift or punch in the hole (arrow) to prevent the bearing plug, with spring, slipping out of the tank housing.

Reassemble all other parts in the reverse sequence.



- Remove the short circuit wire (1) from the switch shaft (2).

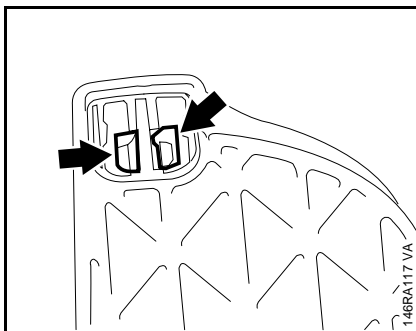


- Pry the switch shaft (1) out of the tank housing (2).
- Carefully pull the switch shaft (1) out of the pivot mount (3).

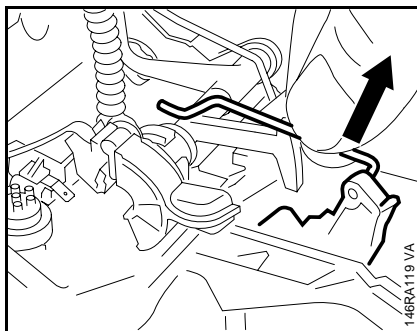


## 10.2 Throttle Trigger/Interlock Lever

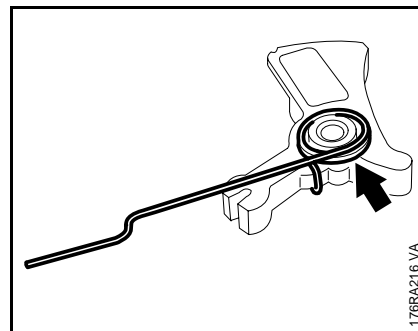
### 10.2.1 Machines without QuickStop Super



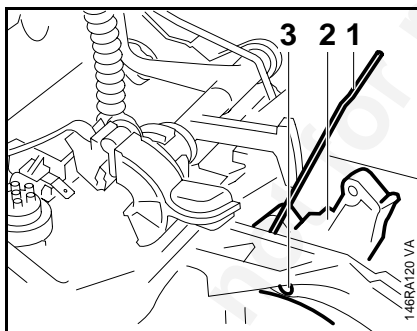
- Remove the carburetor box cover  
– see 6.4.
- Push the two retainers (arrows) on the underside of the hand guard apart and remove the handle molding upwards.



- Pull the throttle rod out of the throttle trigger sideways.

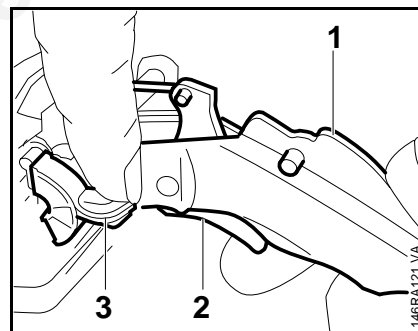


The torsion spring must be installed so that it is under the interlock lever and locates in its seat.

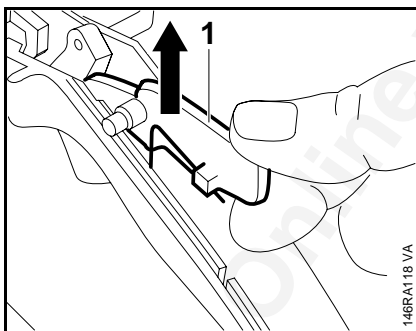


- Drive out the pin (3) with a 5 mm drift.
- Take out the throttle trigger (2) with torsion spring (1).

Install in the reverse sequence.

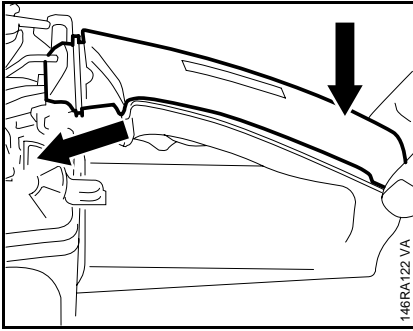


- Press down the interlock lever (1).
- Press the throttle trigger (2) up and the switch shaft (3) to "Choke" position.

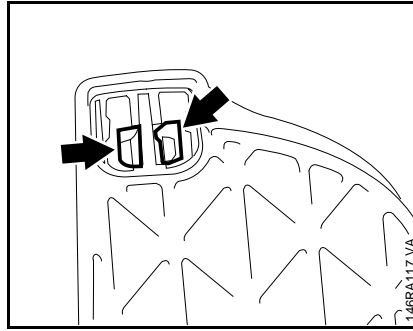


- Move the switch shaft to the normal operating position.
- Pull out the interlock lever (1).

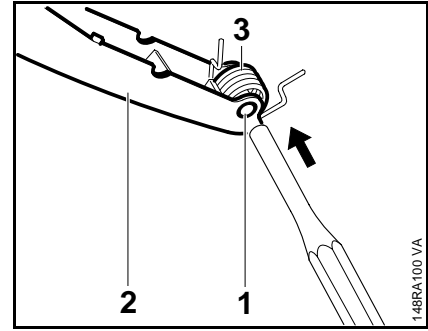
## 10.2.2 Machines with QuickStop Super



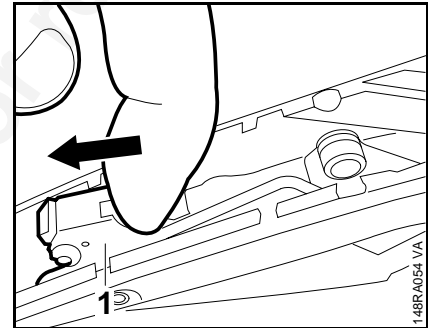
- Fit the handle molding so that the lugs engage the recesses.
- Press down the end of the handle molding until the retainers snap into position in the handle housing.



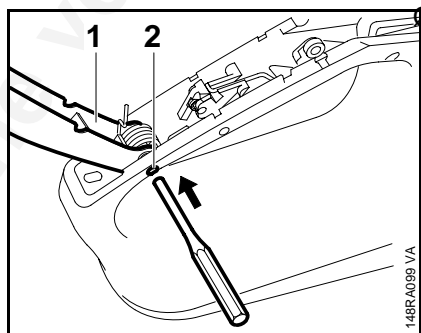
- Remove the carburetor box cover – see 6.4.
- Push the two retainers (arrows) on the underside of the hand guard apart and remove the handle molding upwards.



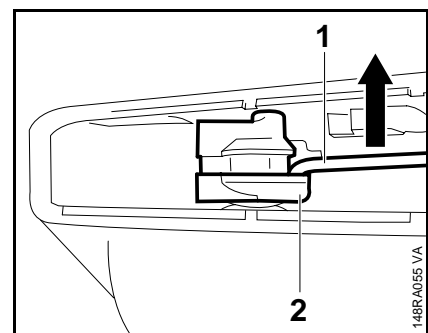
- Use a 4.5 mm drift to drive the bushing (1) out of the interlock lever (2) and then remove the torsion spring (3).



- To remove the switch lever (1), tilt it back.



- Use a 3 mm drift to drive the needle roller (2) out of the interlock lever (1). Remove the interlock lever.

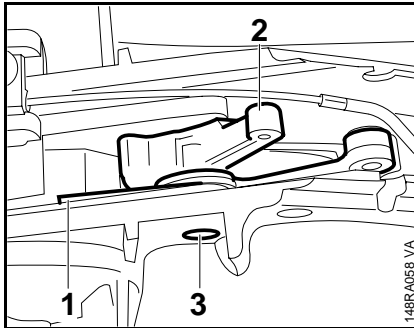


- Disconnect brake cable (1) from switch lever (2).
- Use a 3 mm drift to drive the needle roller out of the switch lever.

## 11 Chain Lubrication

### 11.1 Pickup Body/ Suction Hose

- Remove the switch lever.
- To remove the throttle trigger, first remove the switch shaft
  - see 10.1.



- Use a 5 mm drift to drive out the pin (3) and then remove the throttle trigger (2) with torsion spring (1).

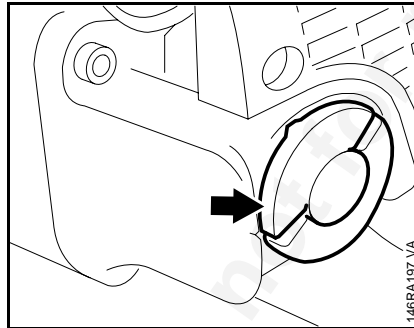
- Take the torsion spring off the throttle trigger.

Install in the reverse sequence.

When installing, make sure that short arm of torsion spring locates in the throttle trigger. The long arm points toward the carburetor.

Impurities gradually clog the fine pores of the filter with minute particles of dirt. This prevents the oil pump from supplying sufficient oil to the bar and chain. In the event of problems with the oil supply system, first check the oil tank and the pickup body. Clean the oil tank if necessary.

Troubleshooting chart – see 4.3.

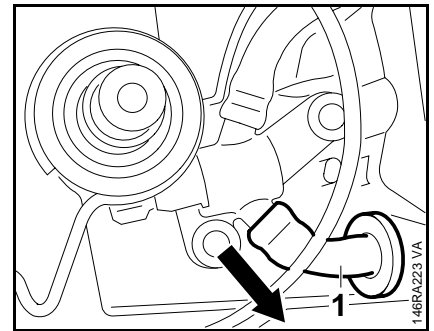


#### Removing

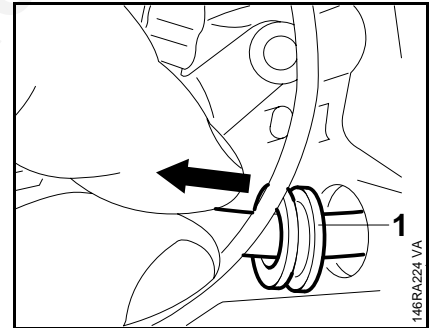
- Unscrew the oil filler cap (arrow) and drain the oil tank.

Collect chain oil in a clean container or dispose of it properly at an approved disposal site.

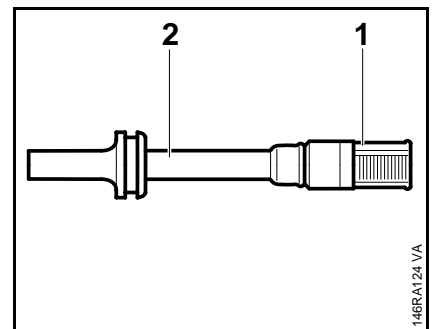
- Remove the clutch – see 5.3.
- Remove the chain catcher
  - see 5.2.



- Disconnect the suction hose (1) from the oil pump.



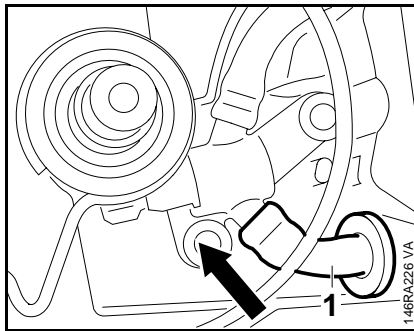
- Pull the suction hose (1) with pickup body out of the crankcase.



- Pull the pickup body (1) off the suction hose (2).
- Inspect the pickup body for damage and dirt and replace if necessary.

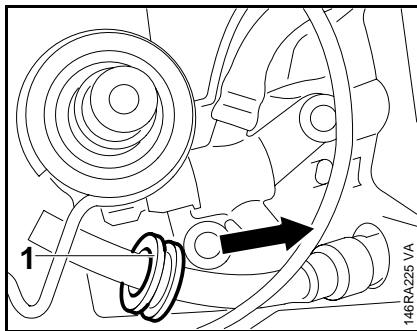
As a temporary measure, a dirty pickup body may be washed in STIHL cleaner – [see 14](#).

- Examine suction hose for signs of damage and replace if necessary.



- Use a blunt tool to push the grommet (1) into position in the crankcase. Make sure the grommet is properly seated.
- Connect the suction hose to the oil pump.

Reassemble all other parts in the reverse sequence.



### Installing

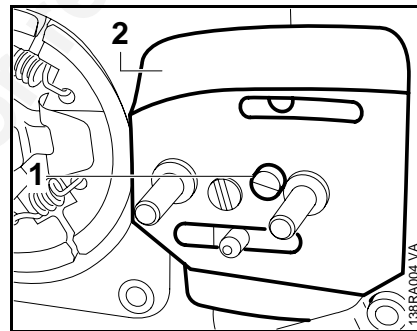
- Push the pickup body into the suction hose.
- Coat grommet (1) on suction hose with a little oil.
- Insert suction hose, pickup body first, in the crankcase.

Troubleshooting chart – [see 4.3](#).

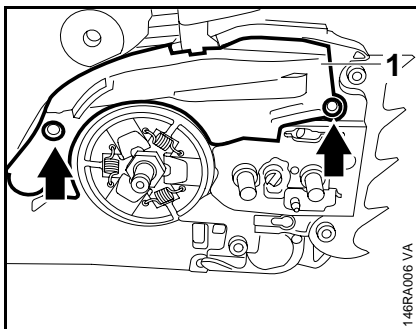
- Remove the chain sprocket cover and cutting attachment.

Wear work gloves to protect your hands from injury.

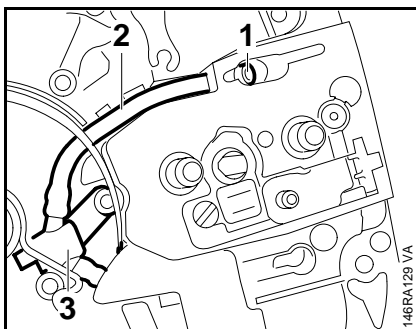
- Remove the clutch drum/chain sprocket – [see 5.1](#).



- Take out the screw (1).
- Remove the side plate (2).
- Engage the chain brake by pushing the hand guard away from the front handle.

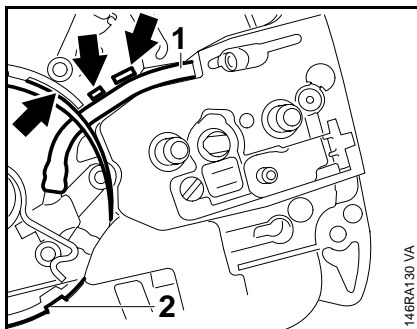


- Take out the screws (arrows).
- Remove the cover (1).



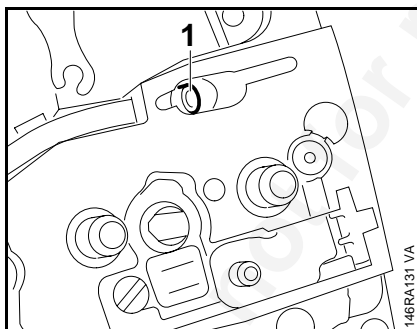
- Carefully remove the sleeve (1) from the hose.
- Pull the hose (2) off the oil pump (3) and take it out of the crankcase.

Install in the reverse sequence.



When installing, make sure the hose is properly positioned (arrows) and not kinked.

- The hose (1) must be fitted behind the brake band (2).



- Fit the sleeve (1) in the hose.
  - Carefully install the hose in the crankcase, making sure the sleeve does not drop out in the process.
- Use a suitable tool to carefully press the sleeve (1) into position.

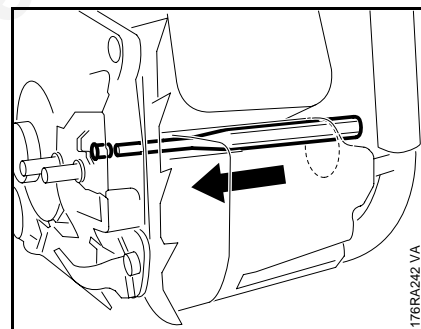
Reassemble all other parts in the reverse sequence.

A vent valve is installed in the tank wall to keep the internal pressure in the oil tank equal to atmospheric pressure.

### Removing

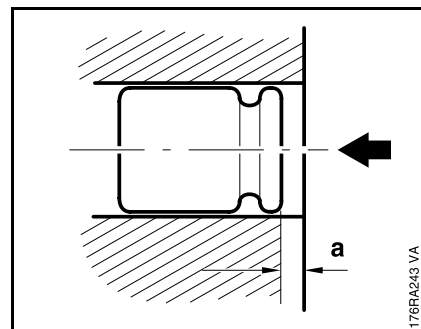
- Remove the inner side plate
  - see 5.4.2.
- Unscrew the oil filler cap.
- Drain the oil tank.

Collect chain oil in a clean container or dispose of it properly at an approved disposal site.



- Use a 3 mm diameter drift to carefully drive the valve out of the housing from inside the tank.

### Installing



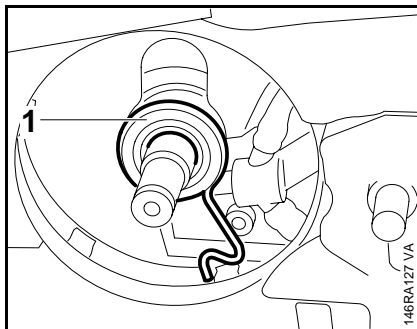
- Use a 7 mm diameter drift to carefully push home the valve until it is about 1 mm below the housing face ('a' in illustration).

Reassemble in the reverse sequence.

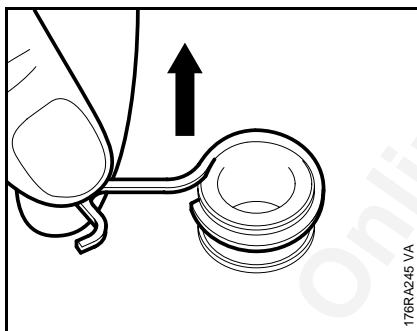
## 11.4 Oil Pump

Check the suction hose and pickup body before replacing the oil pump.

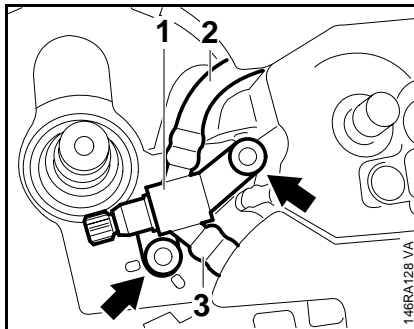
- Remove the clutch – [see 5.3](#).
- Remove the brake band
  - [see 5.4.2](#).



- Pull worm (1) with drive spring off the crankshaft.



- If necessary, remove the drive spring from the worm.



- Take out the screws (arrows).
- Disconnect the delivery hose (2) and suction hose (3).
- Remove the oil pump (1).

Install in the reverse sequence.

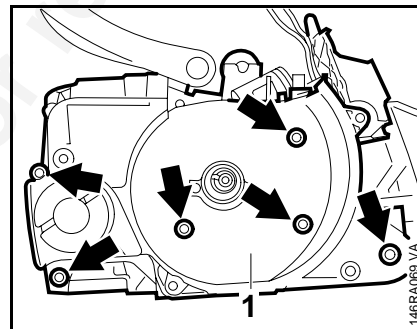
Make sure the hoses are free from kinks.

- Lubricate worm with grease before installation – [see 14](#).

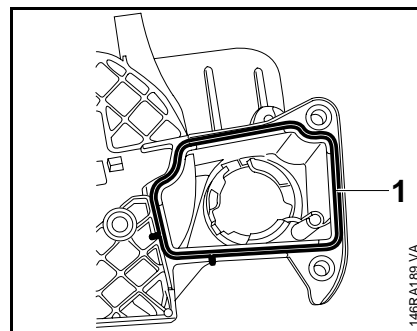
## 11.5 Fan Housing

- Drain the oil tank.
- Remove the flywheel – [see 7.3](#).

Dispose oil and fluids properly.



- Take out the fan housing mounting screws (arrows).
- Remove the fan housing (1).

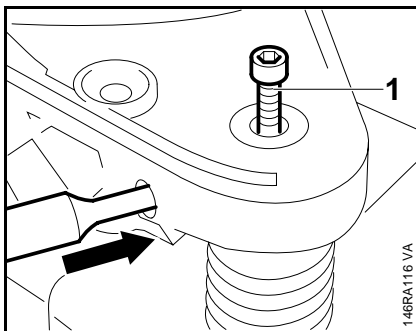


- Inspect fan housing gasket (1) and replace if necessary.

Install in the reverse sequence.

## 12 Fuel System

### 12.1 Air Filter



– Fit the fan housing and tighten down the screws firmly – **see 3.5**.

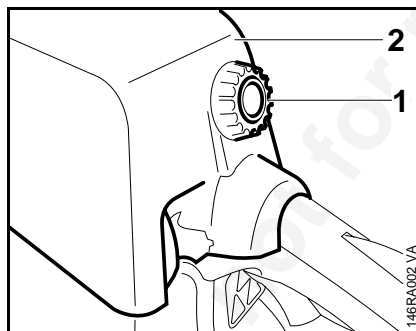
- Before fitting the screw (1) above the spring, insert a 5 mm diameter drift or punch in the hole (arrow) to prevent the bearing plug, with spring, slipping out of the tank housing.

Reassemble all other parts in the reverse sequence.

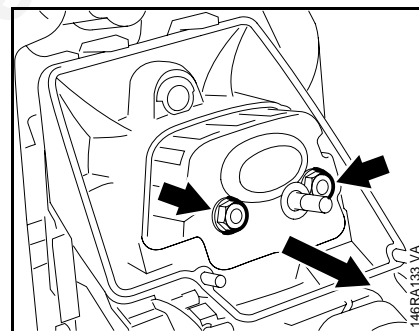
Dirty air filters reduce engine power, increase fuel consumption and make starting more difficult.

**The air filter should be cleaned when there is a noticeable loss of engine power.**

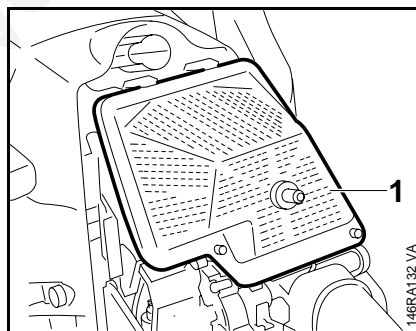
Wash air filter thoroughly in STIHL cleaner – **see 14**. Replace a damaged air filter.



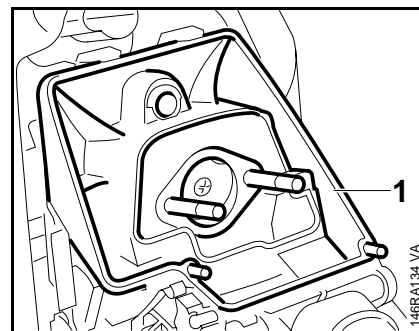
- Release the twist lock (1).
- Remove the carburetor box cover (2).



- Unscrew the collar nuts (arrows).
- Pull off the baffle in the direction of the arrow.



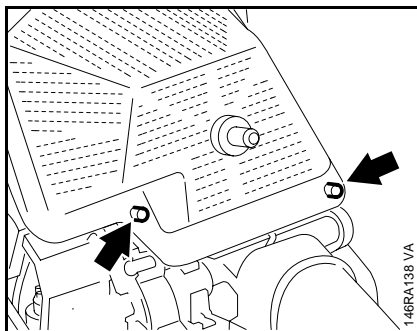
- Remove all loose dirt from around the filter.
- Pull air filter (1) away to the rear.



- Remove the filter base (1).
- Install in the reverse sequence.

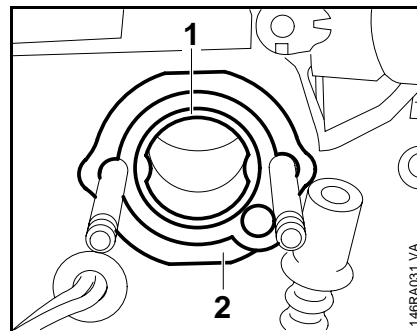
## 12.2 Carburetor

### 12.2.1 Removing and Installing



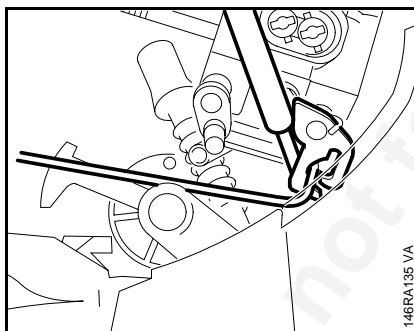
- Fit the air filter and make sure it is correctly seated (arrows).

- Troubleshooting chart – [see 4.5](#).
- Remove the filter base  
– [see 12.1](#).
- Open the tank cap to release internal pressure.
- Close the tank cap.

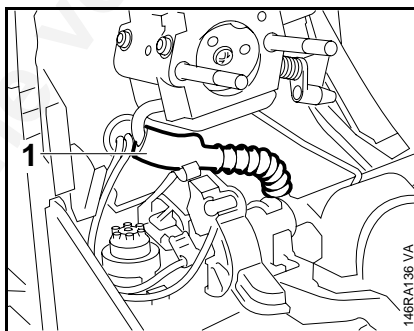


- Before fitting the carburetor, check that the sleeve (1) and washer (2) are in position.

Reassemble in the reverse sequence.



- Use a screwdriver to press the throttle shaft down and disconnect the throttle rod.



- Pull the hose (1) off the carburetor.
- Remove the carburetor.

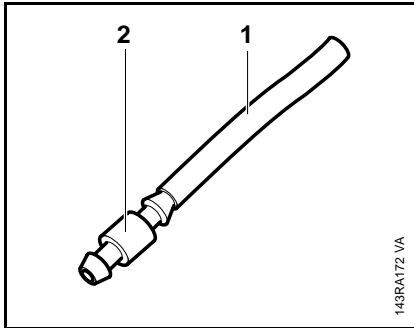


### 12.2.2 Leakage Test

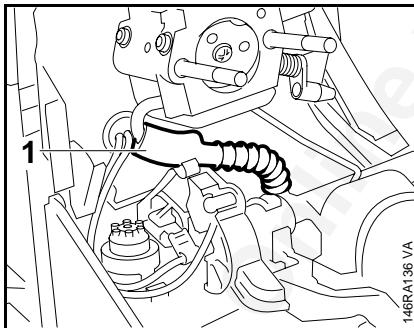
In the case of problems with the carburetor or fuel supply system, also check and clean or replace the tank vent – [see 12.5](#).

The carburetor can be tested for leaks with the carburetor and crankcase tester 1106 850 2905.

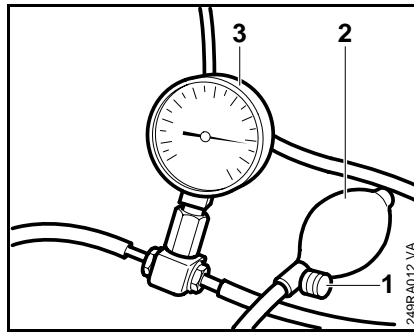
- Remove the filter base  
– [see 12.1](#).
- Remove the carburetor  
– [see 12.2.1](#).



- Push the fuel line (1) 1110 141 8600 onto the nipple (2) 0000 855 9200.



- Disconnect fuel hose (1) from the carburetor.
- Push the fuel line with nipple onto the carburetor's elbow connector.



- Connect the tester's pressure hose 1106 850 2905 to the nipple.
- Close the vent screw (1) on the rubber bulb (2) and pump air into the carburetor until the pressure gauge (3) shows a reading of approx. 0.8 bar (8 kPa).

If this pressure remains constant, the carburetor is airtight. However, if it drops, there are two possible causes:

1. The inlet needle is not sealing (foreign matter in valve seat or sealing cone of inlet needle is damaged or inlet control lever sticking). Remove to clean  
– [see 12.3.2](#).
2. Metering diaphragm damaged, replace if necessary  
– [see 12.3.1](#).

– After completing the test, open the vent screw (1) and pull the fuel line off the carburetor.

– Push the fuel hose onto the elbow connector.

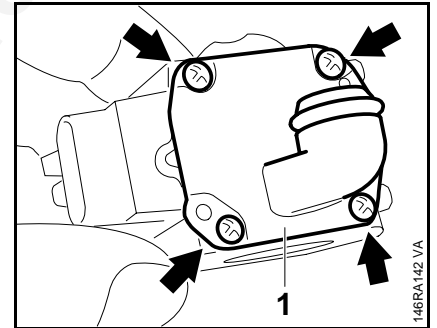
– Install the carburetor  
– [see 12.2.1](#).

Reassemble all other parts in the reverse sequence.

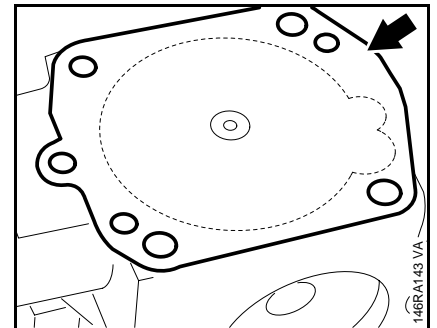
### 12.3 Servicing the Carburetor

#### 12.3.1 Metering Diaphragm

- Remove the carburetor  
– [see 12.2.1](#).

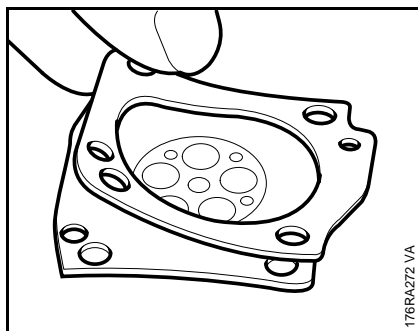


- Take out the screws (arrows).
- Remove the end cover (1).



- Remove the metering diaphragm and gasket (arrow) from the carburetor body or end cover.

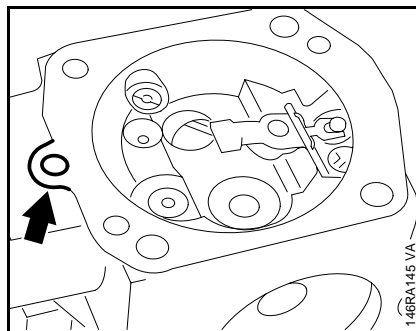
If the gasket and diaphragm are stuck to the carburetor, remove them very carefully.



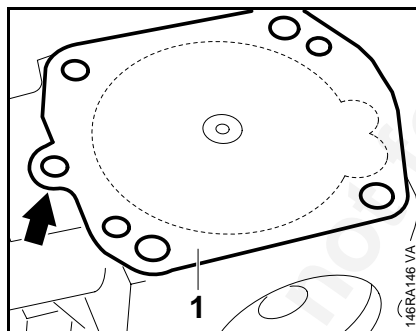
- Carefully separate the diaphragm and gasket.

The diaphragm, inlet and outlet valves are subjected to continuous alternating stresses and the material eventually shows signs of fatigue, i.e. the diaphragm distorts and swells and has to be replaced.

Install in the reverse sequence.



- Place the gasket on the carburetor body so that the tab (arrow) points towards the adjusting screws.

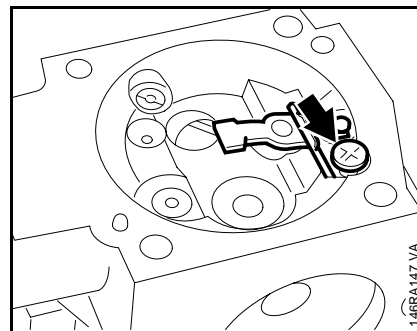


- Fit the metering diaphragm (1) on the carburetor body so that the perforated plate faces the inlet control lever and the tab (arrow) points towards the adjusting screws.

The gasket and metering diaphragm are held in position by integrally cast pegs.

- Fit the end cover.
- Insert the screws and tighten them down firmly – see 3.5.

Reassemble all other parts in the reverse sequence.



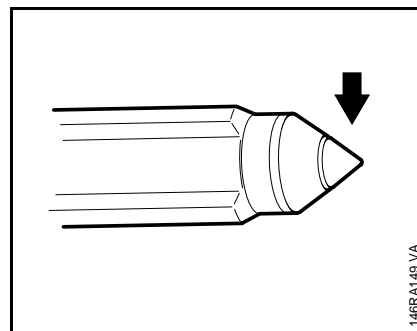
- Remove the metering diaphragm – see 12.3.1.

- Take out the screw (arrow).

- Remove the inlet control lever with spindle.

Note: There is a small spring under the inlet control lever which may pop out during disassembly.

- Take out the inlet needle.



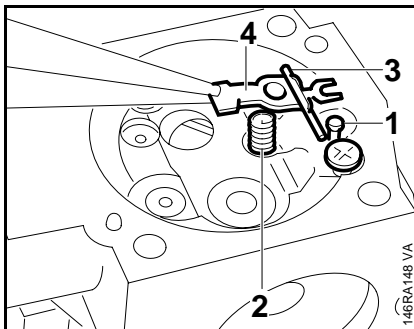
- If there is an annular indentation on the sealing cone of the inlet needle, it will be necessary to replace the inlet needle because it will no longer seal properly.

Install in the reverse sequence.

The upper edge of the inlet control lever must be flush with the top of the carburetor body.

- Install the metering diaphragm
  - see 12.3.1.

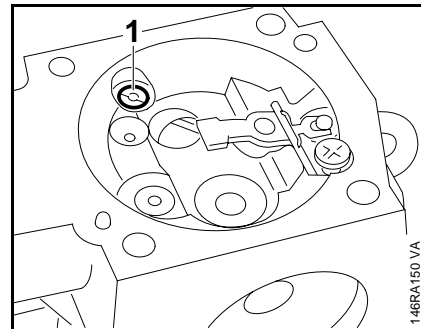
Reassemble all other parts in the reverse sequence.



- Fit the inlet needle (1).
- Fit spring (2) in bore.
- Insert spindle (3) in the inlet control lever (4).
- Engage clevis in annular groove on head of the inlet needle.
- Press the inlet control lever down and secure it with the screw.

Make sure the helical spring locates on the control lever's nipple.

- Check that inlet control lever moves freely.



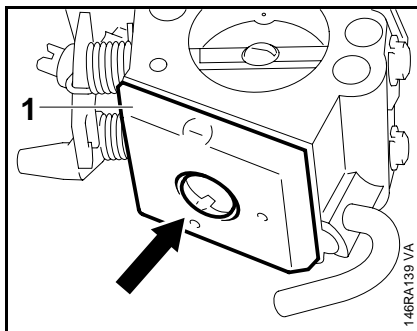
- Remove the metering diaphragm
  - see 12.3.1.

- Use a suitable screwdriver to unscrew the fixed jet (1).

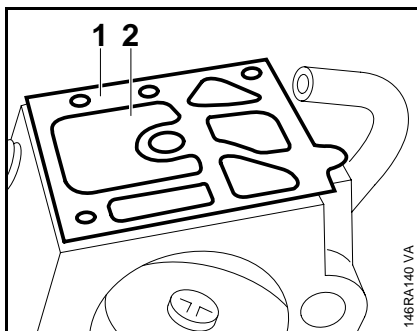
Take care not to damage the fixed jet with the screwdriver when removing and installing.

Reassemble in the reverse sequence.

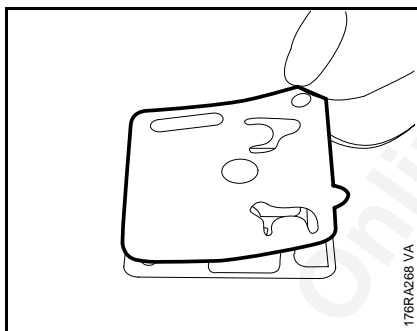
### 12.3.4 Pump Diaphragm



- Take out the screw (arrow).
- Remove the end cover (1).

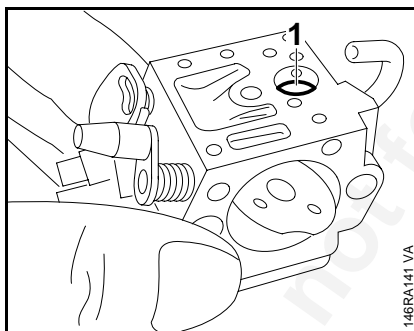


- Carefully remove the gasket (1) and pump diaphragm (2) from the end cover or carburetor body.



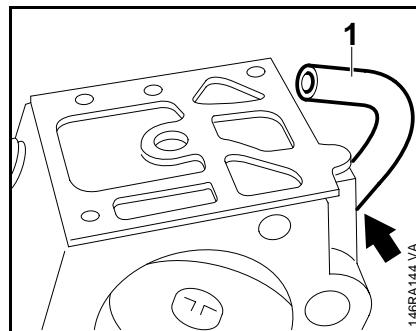
- Carefully separate the diaphragm and gasket.
- Inspect diaphragm for damage and wear, install a new gasket.

The diaphragm, inlet and outlet valves are subjected to continuous alternating stresses and the material eventually shows signs of fatigue, i.e. the diaphragm distorts and swells and has to be replaced.



- Inspect the fuel strainer (1) for contamination and damage. If necessary, use a needle to remove it from the carburetor body and clean or replace.

Install in the reverse sequence.



- Place the diaphragm and gasket on the carburetor body so that their tabs (arrow) point towards the elbow connector (1).

– Fit the end cover on the carburetor body.

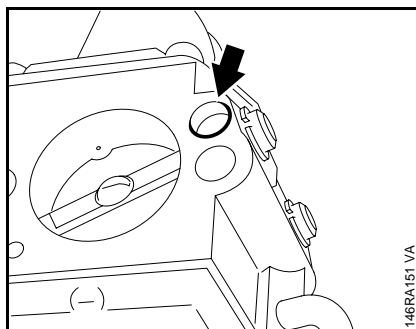
The pump diaphragm, gasket and end cover are held in position by pegs on the end cover.

- Fit screw and tighten down firmly  
– **see 3.5.**

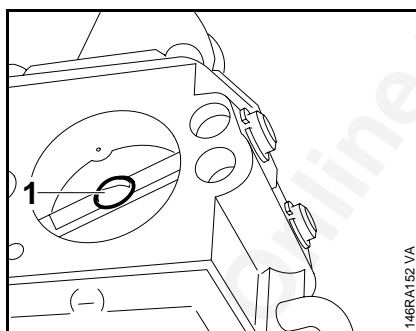
Reassemble all other parts in the reverse sequence.

### 12.3.5 Accelerator Pump

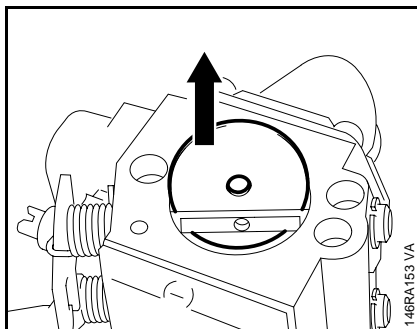
- Remove the carburetor
  - see 12.2.1.



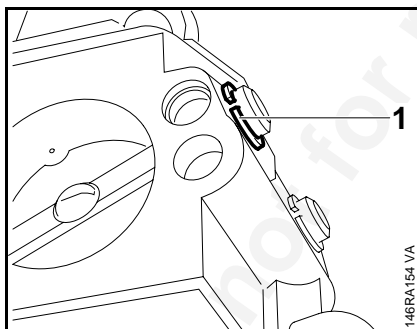
- Use a suitable pointed tool to remove the sealing plug.



- Take the screw (1) out of the throttle shutter.



- Set the throttle shaft to the full throttle position.
- Carefully pull the throttle shutter out of the shaft.

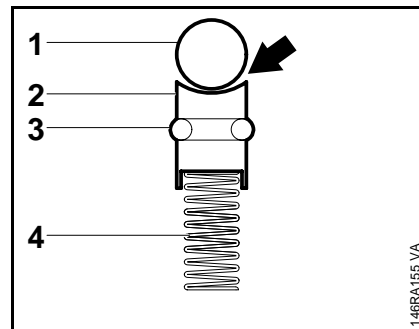


- Remove the snap ring (1) from the throttle shaft.

Hold accelerator pump bore closed with one finger so that the parts of the accelerator pump do not pop out of the carburetor when the throttle shaft is removed.

**Wear safety glasses.**

- Pull the throttle shaft out of the carburetor body.



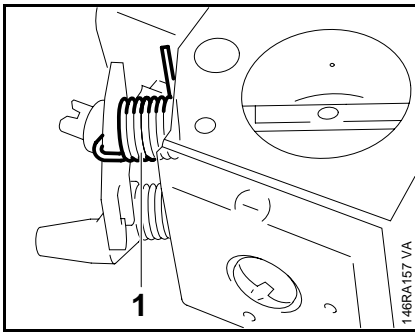
- Remove ball (1), pump piston (2) with sealing ring (3) and spring (4) from the carburetor body.
- Inspect parts for damage and wear and replace if necessary.

Install in the reverse sequence.

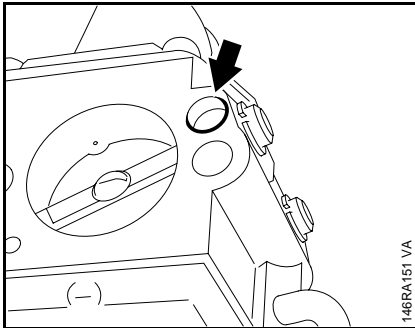
**Wear safety glasses** while installing the accelerator pump/throttle shaft to protect your eyes from injury if parts suddenly pop out of the carburetor body.

Note correct installed sequence of the individual parts of the accelerator pump: First fit the spring (4), then the pump piston (2), with the ball seat (arrow) facing you, and the ball (1).

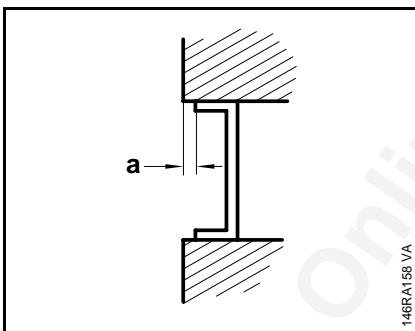
Use a suitable tool to press the ball (1) down and fit the throttle shaft.



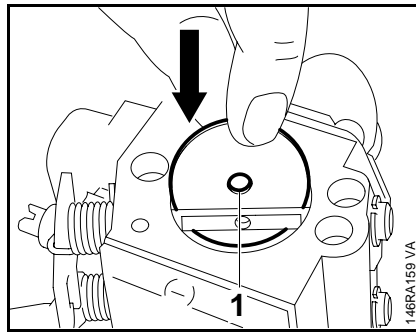
- Check correct installed position of the spring (1).



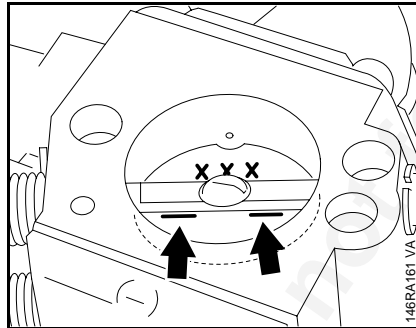
- Use a suitable tool to carefully install a new sealing plug (arrow) in the accelerator pump's bore.



- Press home sealing plug so that it is recessed 1 mm (dimension 'a') in the accelerator pump's bore.

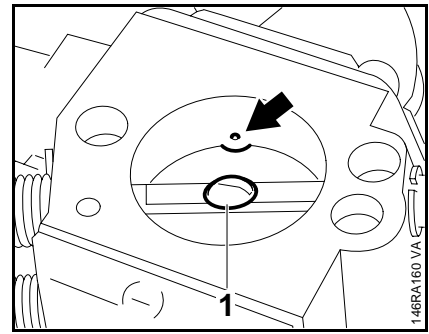


- Fit the throttle shutter (1) in the shaft.



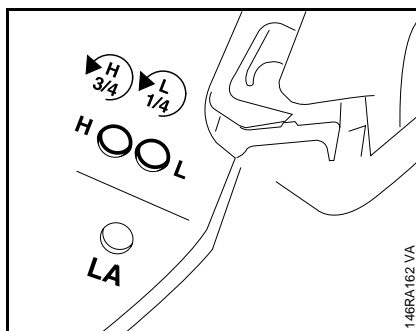
Check that the stamped digits face you.

The two marks (see arrows) must be parallel to the throttle shaft.



Check that the center of the notch in the throttle shutter is in line with the hole (arrow) in the carburetor body.

- Tighten the screw (1) moderately.
  - Center the throttle shutter so that it moves freely.
  - Tighten down the screw (1) firmly.
  - Check freedom of movement again.



### Standard setting

Do not remove the limiter cap to carry out the standard setting.

- With this carburetor it is only possible to correct the settings of the high speed screw (**H**) and low speed screw (**L**) within fine limits.

Make the following adjustments:

- Open the high speed screw (**H**) counterclockwise as far as stop.
- Close the low speed screw (**L**) clockwise as far as stop, then open it one quarter turn counterclockwise.

### Adjusting engine idle speed

#### Engine stops while idling

- Set the low speed screw (**L**) so it is one quarter turn open.
- Turn the idle speed screw (**LA**) clockwise until the saw chain begins to move. Then turn it back one full turn.

#### Chain runs while engine is idling

- Set the low speed screw (**L**) so it is one quarter turn open.
- Turn the idle speed screw (**LA**) counterclockwise until the chain stops running. Then turn the screw about another full turn in the same direction.

#### Erratic idling behavior, poor acceleration

although low speed screw is set one quarter turn open.

- Idle setting too lean. Turn the low speed screw (**L**) counterclockwise, but no further than stop, 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**).

#### Adjustments for operation at high altitude or sea level

A minor correction may be necessary if engine power is not satisfactory when operating at high altitude or at sea level.

- Check standard setting.
- Warm up the engine.

#### At high altitude

- Turn high speed screw (**H**) clockwise (leaner) no further than stop.

#### At sea level

- Turn high speed screw (**H**) counterclockwise (richer) no further than stop.

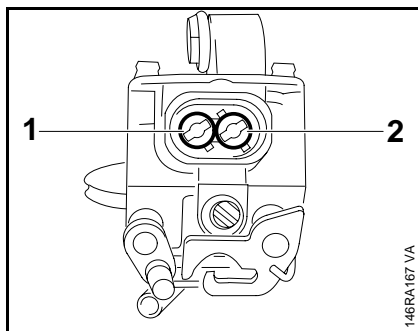
If the setting is made too lean there is a risk of engine damage as a result of insufficient lubrication and overheating.

## 12.4.1 Standard Setting

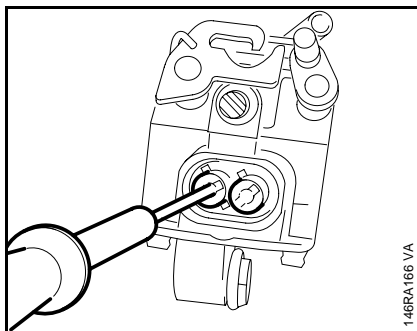
The limiter caps need be removed from the adjusting screws only if it is necessary to replace the high speed screw (H) or low speed screw (L), clean the carburetor or carry out the standard setting.

Perform the two following operations:

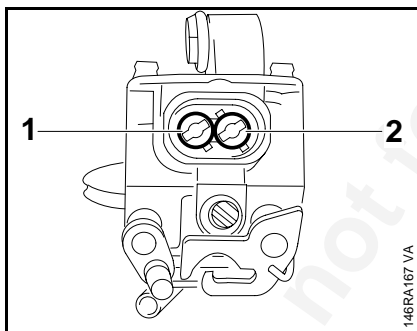
After removing the limiter cap **it is necessary** to carry out the standard setting.



- Turn the left-hand limiter cap (1) of high speed screw (H) counterclockwise as far as stop until the limiter cap lugs are in line with the carburetor openings.
- Turn the right-hand limiter cap (2) of low speed screw (L) clockwise as far as stop. Turn the limiter cap back one quarter turn until its lugs are in line with the carburetor openings.



- Insert puller 5910 890 4500 in center of limiter caps, apply slight pressure and screw home counterclockwise until the limiter caps come out of the carburetor body.



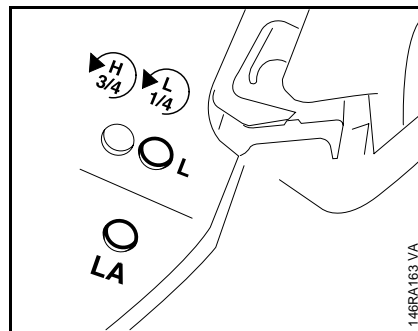
- Screw down both adjusting screws until they are against their seats.

On MS 270, make the following adjustment:

- Open the high speed screw (H) (1) 1 1/8 turns.
- Open the low speed screw (L) (2) 1 1/4 turns.

On MS 280, make the following adjustment:

- Open the high speed screw (H) (1) 1 1/4 turns.
- Open the low speed screw (L) (2) 1 1/4 turns.



### Adjusting engine idle speed

- Check the air filter and clean or replace as necessary.
- Check chain tension.
- Warm up the engine.

Adjust idle speed with a tachometer. Adjust specified engine speeds within tolerance of +/- 200 rpm.

1. Adjust engine speed with idle speed screw (LA) to 3,300 rpm.
2. Turn low speed screw (L) clockwise or counterclockwise to obtain maximum engine speed.

If this speed is higher than 3,700 rpm, abort the procedure and start again with step 1.

3. Use the idle speed screw (LA) to set engine speed again to 3,300 rpm.
4. Set the engine speed to 2,800 rpm with the low speed screw (L).
5. Set engine's maximum speed to 13,500 rpm with the high speed screw (H).



## 12.5 Tank Vent

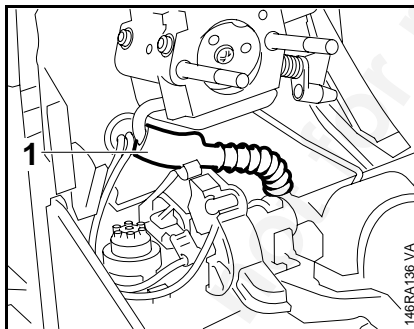
6. Install new limiter caps, noting that the stop lugs on the limiter caps must line up with the openings in the carburetor.

Limiter caps that have been removed once are damaged and must not be re-used.

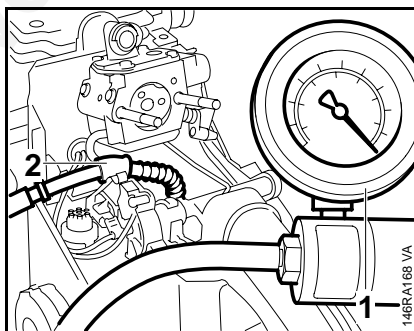
Correct operation of the carburetor is only possible if atmospheric pressure and internal fuel tank pressure are equal at all times. This is ensured by the tank vent.

In the event of trouble with the carburetor or the fuel supply system, always check and clean the tank vent.  
Check function by performing vacuum test on the tank via the fuel hose.

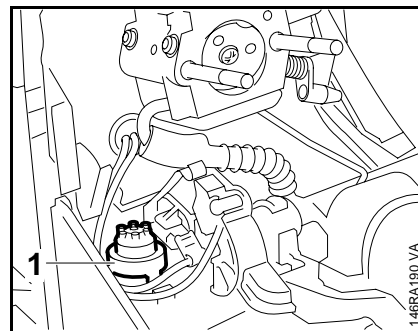
- Remove the filter base
  - see 12.1.



- Disconnect the fuel hose (1) from the carburetor.

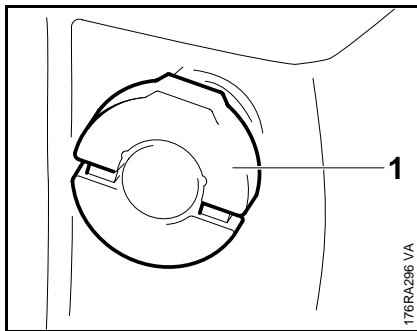


- Connect vacuum pump (1) 0000 850 3501 to fuel hose (2) and subject fuel tank to vacuum.



- Equalization of pressure in the fuel tank takes place via the tank vent valve (1). There must be no build-up of vacuum during the test. In the event of a malfunction, use a screwdriver to remove the vent valve (1) and install a new valve with a new sealing ring.
- Reassemble in the reverse sequence.

The diaphragm pump draws fuel out of the tank and into the carburetor via the fuel hose. Any impurities mixed with the fuel are retained by the pickup body (filter). The fine pores of the filter eventually become clogged with minute particles of dirt. This restricts the passage of fuel and results in fuel starvation.

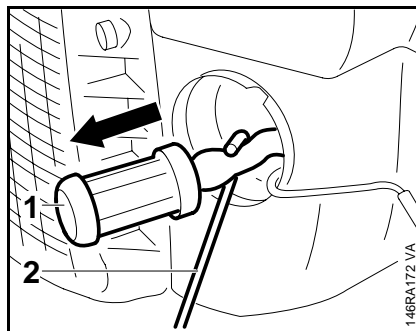


In the event of trouble with the fuel supply system, always check the fuel tank and the pickup body first. Clean the fuel tank if necessary.

### Cleaning the fuel tank

- Remove the filler cap (1) and drain the tank.
- Pour a small amount of clean gasoline into the tank. Close the tank and shake the saw vigorously.
- Open the tank again and drain it.

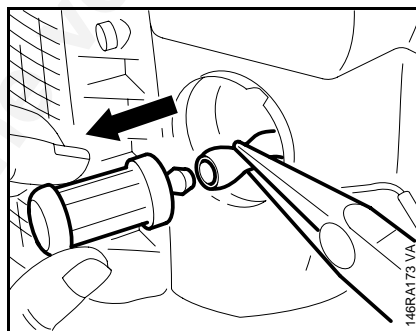
Dispose of fuel properly.



### Pickup body

- Use hook (2) 5910 893 8800 to pull the pickup body (1) out of the fuel tank.

Do not stretch the fuel hose too much during this operation.

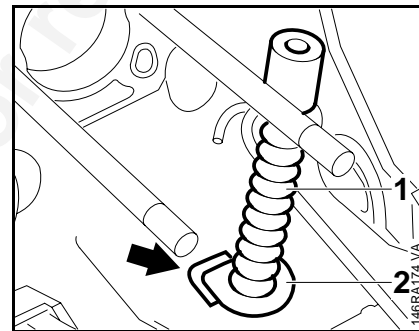


- Pull the pickup body off the fuel hose.

– Fit a new pickup body.

Install in the reverse sequence.

- Remove the carburetor  
– see 12.2.1.
- Pull off the pickup body  
– see 12.6.



- Use a screwdriver to pry the flange of the fuel suction hose out of the fuel tank.
- Pull the suction hose (1) with pickup body out of the tank.

Install in the reverse sequence.

- Coat the hose flange (2) with a little oil to simplify installation.
- The straight side of the hose flange must locate against the marking (arrow) on the housing.

Reassemble all other parts in the reverse sequence.

| No. | Part Name                       | Part No.      | Application   | Rem. |
|-----|---------------------------------|---------------|---|------|
| 1   | Locking strip                   | 0000 893 5903 | Blocking the crankshaft   |      |
| 2   | Sealing plate                   | 0000 855 8106 | Sealing exhaust port for leakage test   |      |
| 3   | Wooden assembly block           | 1108 893 4800 | Fitting piston  |      |
| 4   | Socket, DIN 3124, 13 mm         | 5910 893 5608 | Flywheel nut  |      |
| 5   | Clamping bar                    | 5910 890 2000 | For mounting chainsaw to assembly stand   |      |
| 6   | Assembly stand                  | 5910 890 3100 | Holds chainsaw for repairs  |      |
| 7   | Carburetor and crankcase tester | 1106 850 2905 | Testing engine and carburetor for leaks   |      |
| 8   | Vacuum pump                     | 0000 850 3501 | Testing crankcase for leaks, testing tank vent  |      |
| 9   | – Nipple                        | 0000 855 9200 | Testing carburetor for leaks  |      |
| 10  | – Fuel line                     | 1110 141 8600 | Testing carburetor for leaks  |      |
| 11  | Test flange                     | 1119 850 4201 | Leakage test  |      |
| 12  | Press sleeve                    | 1108 893 2405 | Installing oil seal (starter side)  |      |
| 13  | Assembly drift                  | 1108 893 4700 | Removing and fitting piston pin   |      |
| 14  | Installing tool 10              | 5910 890 2210 | Installing hookless snap rings in piston  |      |
| 15  | Assembly sleeve                 | 1118 893 4602 | Installing oil seal (clutch side)   |      |
| 16  | Ignition system tester, ZAT 4   | 5910 850 4503 | Checking ignition   |      |
| 17  | Ignition system tester, ZAT 3   | 5910 850 4520 | Checking ignition   |      |
| 18  | Puller                          | 4133 893 0800 | Releasing flywheel  |      |
| 19  | Stud puller, M8                 | 5910 893 0501 | Removing guide bar mounting studs   |      |
| 20  | Installing tool                 | 0000 890 2201 | Flaring starter rope guide bush   |      |
| 21  | Setting gauge                   | 1111 890 6400 | Setting air gap between ignition module and flywheel  |      |
| 22  | Hook                            | 5910 893 8800 | Removing pickup body  |      |
| 23  | Assembly tube                   | 1117 890 0900 | Attaching/detaching brake spring  |      |
| 24  | Torque wrench                   | 5910 890 0301 | 0.5 – 18 Nm (0.4 – 13.5 lbf.ft)<br>Alternative:<br>Torque wrench 5910 890 0302 with optical/acoustic signal |      |
| 25  | Torque wrench                   | 5910 890 0311 | 6 – 80 Nm (4.4 – 60 lbf.ft)<br>Alternative:<br>Torque wrench 5910 890 0312 with optical/acoustic signal     |      |

| No. | Part Name  | Part No.      | Application  |
|-----|--|---------------|--|
| 1   | Lubricating grease (225g tube)                       | 0781 120 1111 | Oil seals, oil pump drive, chain sprocket bearing, sliding and bearing points of throttle trigger, switch lever, brake lever and interlock lever |
| 2   | STIHL special lubricant                              | 0781 417 1315 | Bearing bore in rope rotor, rewind spring in fan housing   |
| 3   | Dirko sealant (100g tube)                            | 0783 830 2000 | Crankcase, oil seals (outside)   |
| 4   | STIHL cleaner  |               | Crankshaft stubs   |
| 5   | Graphite grease                                      |               | Pegs on pawls  |
| 6   | Molykote grease                                      |               | Sliding and bearing points of brake band   |
| 7   | Medium-strength threadlocking adhesive (Loctite 243) | 0786 110 0101 |  |
| 8   | High-strength threadlocking adhesive (Loctite 270)   | 0786 111 1109 |  |