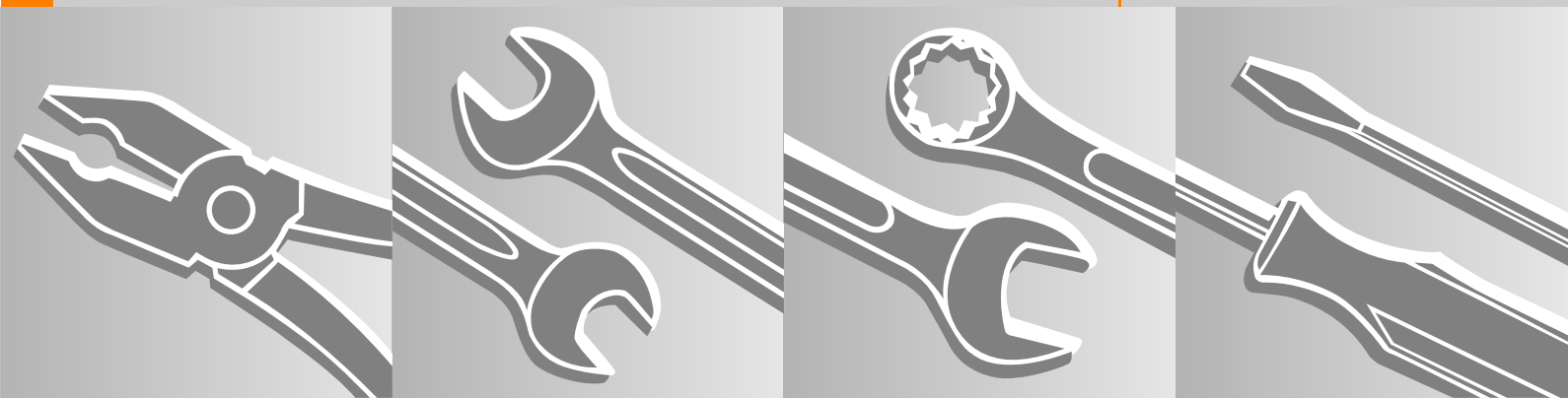


**STIHL MS 231, 251**

**2010-10**



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## 1. Introduction and Safety Precautions

### 1.1 Introduction

This service manual contains detailed descriptions of all the repair and servicing procedures specific to 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 chapter on "Troubleshooting" and the "STIHL Service Training System" for all assemblies.

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 a revised edition is issued.

The special tools mentioned in the descriptions are listed in the chapter on "Special Servicing Tools" in 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:

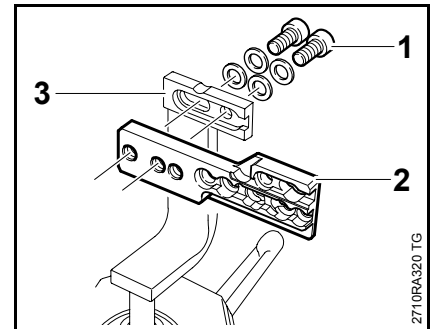
In the descriptions:

- 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:

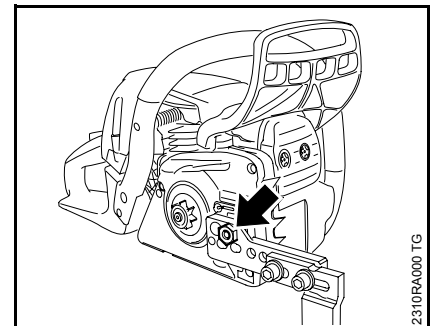
- ➔ Pointer
- ➡ Direction of movement
- 📖 4.2 =Reference to another chapter, i.e. chapter 4.2 in this example.

Service manuals and all technical information bulletins are intended exclusively for the use of properly equipped repair shops. They must not be passed to third parties.



Servicing and repairs are made considerably easier if the machine is mounted to assembly stand (3) 5910 890 3101. To do this, secure the mounting plate (2) 5910 850 1650 to the assembly stand with two screws (1) and washers.

The screws must not project since they, depending on the machine, may damage housings when the machine is clamped in position.



Engage the bar mounting stud in the outer bore in the mounting plate and secure the machine in position with the M 8 nut (arrow).

The machine is held in position on the mounting plate by the screw heads on the engine housing.

## Preparations for servicing

Remove the chain sprocket cover, saw chain and guide bar before carrying out repairs or mounting the machine to the assembly stand.

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.

## Storing and disposing of oils and fuels

Collect fuel or lubricating oil in a clean container and dispose of it properly in accordance with local environmental regulations.

## 1.2 Safety Precautions

If the machine 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 instruction manual.

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

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.

Always perform leakage test after working on the fuel system and the engine.

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.

Always wear suitable protective gloves for operations in which components are heated for assembly or disassembly.

Improper handling may result in burns or other serious injuries.

Always replace damaged parts. Check disassembled parts for wear or damage before re-installing – replace as necessary.

Run the machine only with the shroud mounted in position – there is otherwise a risk of injury from the fanwheel and a risk of engine damage due to overheating.


The chapter on tightening torques lists all machine components that have to be tightened to a specific torque or coated with threadlocking adhesive. The specifications must be maintained when tightening down screws, nuts and other fasteners in all the procedures described in this service manual.

## Fuel system – hose barb connectors


Pull off or push on fuel hoses in line with the connector, preferably by hand, to ensure the tightness of the fuel system.

Avoid damaging the hose barb – do not use sharp-edged pliers, screwdrivers, etc. Do not cut open fuel hoses with a knife or similar tool.

Do not re-use fuel hoses after removal. Always install new hoses – fuel hoses can be overstretched during removal.

Install new fuel hoses either dry or with the aid of STIHL press fluid,  14.

Other press fluids are not approved and may result in damage to the fuel hoses.

Coat the ends of the hoses and the connectors with STIHL press fluid and then push the new hoses on to the hose barbs,  14.

## 2. Specifications

### 2.1 Engine

	MS 231	MS 251
Displacement:	40.6 cm <sup>3</sup>	45.6 cm <sup>3</sup>
Bore:	41.5 mm	44.0 mm
Stroke:	30.0 mm	30.0 mm
Engine power to ISO 7293:	2.0 kW (2.7 bhp) at 9,500 rpm	2.2 kW (3.0 bhp) at 9,500 rpm
Maximum permissible engine speed with bar and chain:	13,000 rpm	13,000 rpm
Idle speed:	2,800 rpm	2,800 rpm
Clutch:	Centrifugal clutch without linings	Centrifugal clutch without linings
Clutch engages at:	3,500 rpm	3,500 rpm
Crankcase leakage test at gauge pressure:	0.5 bar	
under vacuum:	0.5 bar	

---

### 2.2 Fuel System

Carburetor leakage test at gauge pressure:	0.8 bar
Operation of tank vent at gauge pressure:	0.5 bar
Fuel:	as specified in instruction manual

---

### 2.3 Ignition System

Air gap between ignition module and fanwheel:	0.30 (+ 0.05/- 0.10) mm
Spark plug (resistor type):	NGK CMR 6 H
Electrode gap:	0.5 mm

---

### 2.4 Chain Lubrication

Speed-controlled Ematic oil pump	
Oil delivery rate:	8.0 (+/-3.0) cm <sup>3</sup> /min at 10,000 rpm

## 2.5 Tightening Torques

DG and P (Plastoform) screws are used in polymer and light metal 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 impairing the strength of the screwed assembly, providing the specified tightening torque is observed.

For this reason it is **essential to use a torque wrench**.

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	P 4x12	Chain tensioner cover	1.5	
Screw	P 5x18	Antivibration element / engine housing	4.0	
Screw	P 5x34	Antivibration element / tank housing	4.0	
Screw	P 4x12	Brake band/engine housing	2.0	
Screw	P 4x10	Brake cable retainer / tank housing	1.0	Q
Collar screw	D 8x18	Collar stud for bar	16.0	
Collar screw	D 8x18	Collar stud for bar	16.0	B
Collar screw	D 9x18	Collar stud for bar / engine housing (repair solution)	16.0	
Screw	P 5x18	Cover, chain brake / engine housing	4.0	
Nut	M 5	Filter base / baffle / carburetor	3.5	
Screw	P 6x26.5	Handlebar / tank housing, right	6.0	
Screw	M 5x16	Handlebar / tank housing, bottom	5.0	2), 3)
Screw	M 5x20	Hand guard / fan housing / engine housing	6.0	2)
Screw	M 5x14	Shroud / engine housing	5.0	
Screw	P 5x16	Spiked bumper / engine housing	4.0	
Screw	D 4x12	Manifold / cylinder	4.0	1), 3)
Screw	D 5x18	Bearing plug / cylinder	8.0	1), 3)
Screw	P 5x18	Fan housing / engine housing	4.0	
Screw	P 4x12	Air baffle / engine housing	2.0	
Carrier	M 12x1 L	Carrier / crankshaft	50.0	
Screw	P 6x28	Engine housing / bearing plug	6.0	
Screw	D 4x16	Oil pump	4.0	1), 3)
Screw	M 5x16	Muffler / cylinder	10.0	2), 3)
Nut	M 8x1	Flywheel / crankshaft	28.0	4)
Screw	P 4x10	Retainer	1.0	

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	P 4x12	Pre-separator / engine housing	2.0	
Screw	P 4x10	Elbow connector / air guide shroud	1.6	
	M 10x1	Spark plug / cylinder	12.0	
Screw	D 4x20	Ignition module/cylinder	4.5	1), 3)
Screw	D 5.3x41	Cylinder / engine housing	11.0	

#### Remarks:

- 1) Screws with binding head
- 2) Micro-encapsulated screws
- 3) Waxed screws
- 4) Degrease crankshaft/flywheel and mount oil-free
- Q) QuickStop Super
- B) Quick chain adjuster

Use the following procedure when refitting a DG or P screw in an existing thread:

Place the screw in the hole and rotate it counterclockwise until it 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 and weaken the assembly.

Coat micro-encapsulated screws with medium strength Loctite 242 or 243 before reinstalling.

Power screwdriver setting for polymer: DG and P screws max. 500 rpm  
Do not use an impact wrench for releasing or tightening screws.

Do not mix up screws with and without binding heads.



### 3. Troubleshooting

#### 3.1 Clutch

Condition	Cause	Remedy
Saw chain stops under full load	Clutch shoes badly worn	Install new clutch
	Clutch drum badly worn	Install new clutch drum
Saw chain rotates at idle speed	Engine idle speed too high	Readjust idle speed screw <b>LA</b>
	Clutch springs stretched	Replace the clutch springs or install new clutch
	Clutch springs broken	Replace the clutch springs
Loud noises	Clutch springs stretched	Replace all clutch springs
	Needle cage damaged	Fit new needle cage
	Clutch shoe retainer broken	Install new retainer or clutch
	Clutch shoes and carrier worn	Install new clutch

### 3.2 Chain Drive, Chain Brake, Chain Tensioner

Condition	Cause	Remedy
Chain sprocket wears rapidly	Chain not properly tensioned	Tension chain as specified
	Wrong chain pitch	Fit chain of correct pitch
	Insufficient chain lubrication	Check chain lubrication
Saw chain stops under full load	Clutch shoes badly worn	Install new clutch
	Clutch drum badly worn	Install new clutch drum
	Brake band blocked	Check freedom of movement and operation of brake band
Saw chain rotates at idle speed	Engine idle speed too high	Readjust idle speed screw <b>LA</b>
	Clutch springs stretched	Replace the clutch springs or install new clutch
	Clutch springs broken	Replace the clutch springs
Saw chain does not stop immediately when brake is activated	Brake spring stretched or broken	Fit new brake spring
	Brake band stretched or worn	Fit new brake band
	Clutch drum worn	Install new clutch drum

Condition	Cause	Remedy
<b>QuickStop Super</b> Coasting brake does not disengage even though lockout lever is depressed	Brake cable stretched	Readjust brake cable
	Brake cable disconnected or broken	Reconnect or replace brake cable
<b>QuickStop Super</b> Coasting brake does not disengage properly even though lockout lever is depressed	Too much free travel on lockout lever	Adjust brake cable
<b>QuickStop Super</b> Braking action of coasting brake inadequate – lockout lever not depressed	Brake cable overtensioned	Adjust brake cable

### 3.3 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 inlet hole in guide bar is blocked	Clean oil inlet hole
	Intake hose or pickup body clogged or intake hose ruptured	Fit new intake hose and pickup body
	Valve in oil tank blocked	Clean or replace valve
	Teeth on worm worn	Install new worm
	Oil pump damaged or worn	Install new oil pump
Machine losing chain oil	Oil pump damaged or worn	Install new oil pump
	Oil suction hose connection damaged	Install new oil intake hose
	Engine housing cracked	Install new engine housing
Oil pump delivers insufficient oil	Oil pump damaged or worn	Install new oil pump
	Worm driver is loose	Install new worm

### 3.4 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
Starter rope does not rewind	Rewind spring very dirty or corroded	Clean or replace rewind spring
	Insufficient spring tension	Check rewind spring and increase tension
	Rewind spring broken	Fit new rewind spring
Starter rope cannot be pulled out far enough	Spring overtensioned	Check rewind spring and reduce tension
Starter rope can be pulled out almost without resistance (crankshaft does not turn)	Guide peg on pawl or pawl itself is worn	Fit new pawl
	Spring clip on pawl fatigued	Fit new spring clip
	Spring clip installed wrong	Install spring clip correctly
...Models with ErgoStart	Guide pegs on pawls or pawls themselves are worn	Fit new pawls
	Torsion springs on flywheel fatigued, pawls worn or sticking	Clean seats on pawls or replace pawls and torsion springs if necessary
	Lugs on carrier worn	Install new carrier
	Spring loop in spring housing not attached to carrier	Attach spring loop to carrier
Starter rope is difficult to pull – models with ErgoStart	Spring in spring housing fatigued	Install new spring housing

Condition	Cause	Remedy
Starter rope is difficult to pull or rewinds very slowly	Starter mechanism is very dirty	Thoroughly clean complete starter mechanism
	At very low outside temperatures: Lubricating oil on rewind spring becomes viscous (spring windings stick together) or moisture has got onto the rewind spring (spring windings frozen together)	Coat rewind spring with a small amount of standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons), then pull rope carefully several times until normal action is restored

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. If sooting keeps recurring, check air filter
	Fuel/oil mixture – too much oil	Use correct mixture of fuel and oil
	Incorrect air gap between ignition module and flywheel	Set air gap correctly
	Flywheel cracked or damaged or pole shoes have turned blue	Install new flywheel
	Ignition timing wrong, flywheel out of adjustment – key in flywheel has sheared off	Install new flywheel
	Weak magnetization in flywheel	Install new flywheel
	Irregular spark	Check operation of switch shaft/contact spring and ignition module Damaged insulation or break in ignition lead or short circuit. Check ignition lead/module, replace ignition module if necessary. Check operation of the spark plug, clean or replace spark plug if necessary.

### 3.6 Carburetor

Condition	Cause	Remedy
Carburetor floods; engine stalls	Inlet needle not sealing – foreign matter in valve seat or cone	Remove and clean the inlet needle, clean the carburetor
	Inlet needle worn	Replace the inlet needle
	Inlet control lever sticking on spindle	Check the inlet control lever and replace if necessary.
	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
	Metered diaphragm deformed	Fit a new metering diaphragm
Poor acceleration	Setting of low speed screw too lean	Check basic carburetor setting, correct if necessary
	Setting of high speed screw too lean	Check basic carburetor setting, correct if necessary
	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Diaphragm gasket leaking	Fit new diaphragm gasket
	Metering diaphragm damaged or shrunk	Fit a new metering diaphragm
	Tank vent faulty	Replace tank vent
	Leak on fuel hose from tank to carburetor	Seal connections or install new fuel hose
Engine loses power during acceleration	Sealing ring or spring in accelerator pump worn or damaged	Install new carburetor



Condition	Cause	Remedy
Engine will not idle, idle speed too high	Throttle shutter opened too wide by idle speed screw ( <b>LA</b> )	Reset idle speed screw ( <b>LA</b> ) correctly
	Oil seals/engine pan leaking	Seal or replace oil seals/engine pan
	Throttle shutter does not close	Install new carburetor
Engine stops while idling	Idle jet bores or ports blocked	Clean the carburetor
	Low speed screw too rich or too lean	Reset low speed screw ( <b>L</b> ) correctly
	Setting of idle speed screw <b>LA</b> incorrect – throttle shutter completely closed	Reset idle speed screw ( <b>LA</b> ) correctly
	Tank vent faulty	Replace tank vent
	Leak on fuel hose from tank to carburetor	Seal connections or install new fuel hose
Saw chain rotates at idle speed	Engine idle speed too high	Readjust with idle speed screw <b>LA</b> (counterclockwise)
	Clutch springs stretched or fatigued	Replace the clutch springs or install new clutch
	Clutch spring hooks broken	Replace the clutch springs

Condition	Cause	Remedy
Engine speed drops quickly under load – low power	Air filter dirty	Clean air filter or replace if necessary
	Throttle shutter not opened fully	Check throttle rod
	Tank vent faulty	Replace tank vent
	Fuel pickup body dirty	Install new pickup body
	Fuel strainer dirty	Clean fuel strainer in carburetor, replace if necessary
	Leak on fuel hose from tank to carburetor	Seal connections or install new fuel hose
	Setting of high speed screw <b>H</b> too rich	Check basic carburetor setting, correct if necessary
	Main jet bores or ports blocked	Clean the carburetor
	Pump diaphragm damaged or fatigued	Fit new pump diaphragm
Engine running extremely rich, has no power and a very low maximum speed	Ignition timing wrong, flywheel out of adjustment – key in flywheel has sheared off	Install new flywheel
	Choke shutter does not open	Check carburetor and choke shaft, service or replace if necessary

### 3.7 Engine



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

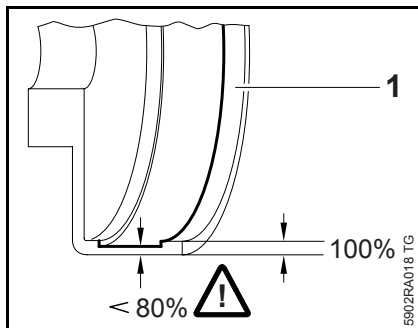
- Air filter
- Fuel system
- Carburetor
- Ignition system

Condition	Cause	Remedy
Engine does not start easily, stalls at idle speed, but operates normally at full throttle	Oil seals in engine damaged	Replace the oil seals
	Engine pan leaking or damaged (cracks)	Inspect engine pan, re-seal or replace if necessary.
	Intake manifold damaged / bore blocked	Clean bore or install new manifold.
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, replace muffler if necessary
	Air filter dirty	Clean or replace air filter
	Fuel hose kinked or torn	Fit new hose or position it free from kinks
	Intake manifold damaged / bore blocked	Clean bore or install new manifold.
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
	Air inlet in fan housing dirty	Clean air inlet on fan housing

## 4. Clutch

### 4.1 Clutch Drum

- Remove and install the clutch drum, see instruction manual.
- Remove the needle cage.
- Clean the needle cage and crankshaft stub,  14
- Lubricate the needle cage and crankshaft stub,  14






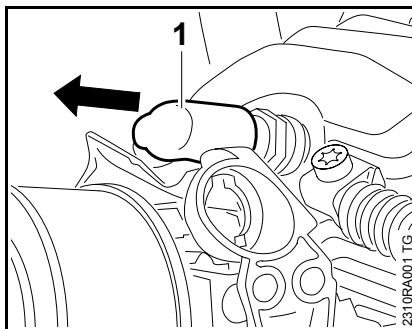
- Inspect the clutch drum (1) for signs of wear.

If there are signs of serious wear on the inside diameter of the clutch drum (1), check the remaining wall thickness. If it is less than about 80% of the original thickness, install a new clutch drum.

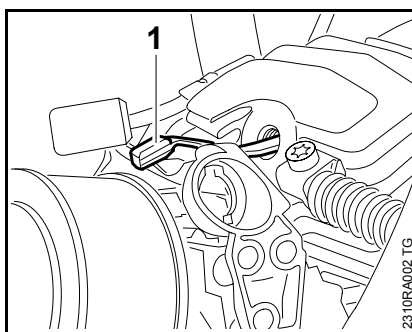
- Install the clutch drum.

### 4.2 Clutch

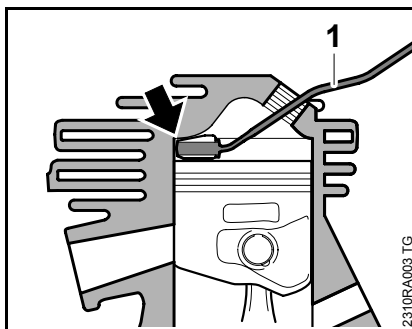
- Troubleshooting,  4.2
- Remove the clutch drum,  4.1
- Remove the shroud,  6.4



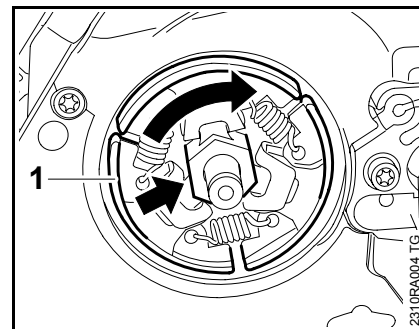
- Pull boot (1) off the spark plug.
- Unscrew the spark plug.



- Hold the locking strip (1) 0000 893 5904 so that the flat side of its metal top faces the piston and then push it into the cylinder.

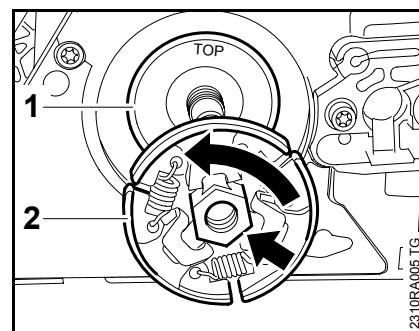


- The locking strip (1) 0000 893 5904 must butt against the cylinder wall (arrow) and the flat side of its metal top must rest on the piston crown – as shown in the illustration.



- Apply wrench to hexagon (arrow) and unscrew the clutch (1) – left-hand thread.

### Installing



Fit the cover washer (1) so that the word "TOP" faces outwards.

- Position the clutch (2) on the crankshaft stub so that the raised hexagon (arrow) faces outwards.
- Fit the clutch (2) and tighten it down firmly – left-hand thread.
- Remove the locking strip from the cylinder.
- Reassemble all other parts in the reverse sequence.

## 5. Chain Brake

### 5.1 Checking Operation

The chain brake is one of the most important safety devices on the chain saw. 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.

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, which prolongs the braking time. A fatigued or stretched brake spring has the same negative effect.

- Starting 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.


### Machines with QuickStop Super

The clutch drum must rotate freely when the lockout lever is depressed.



With the coasting brake disengaged, open the throttle wide and let go of the lockout lever on the rear handle – the chain must come to an abrupt stop.

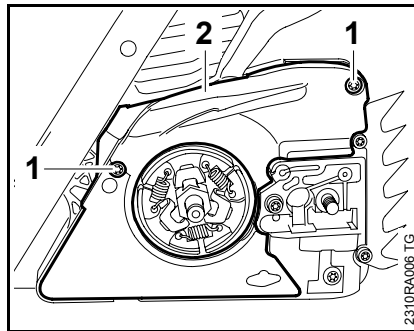
### All models

The braking time is in order if deceleration of the saw chain (less than a second) is imperceptible to the eye.

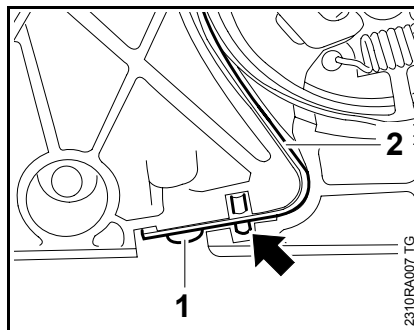
If the chain brake does not operate properly, refer to troubleshooting,  3.2.

### 5.2 Brake Band

- Remove the clutch drum,  4.1
- Troubleshooting,  3.2

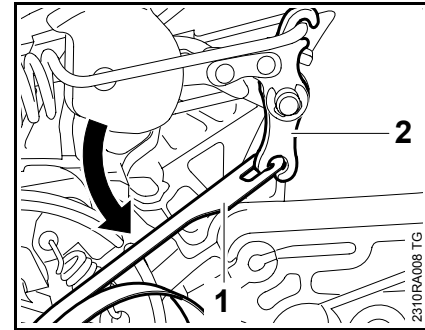


- Take out the screws (1).
- Remove the cover (2).
- Engage the chain brake.

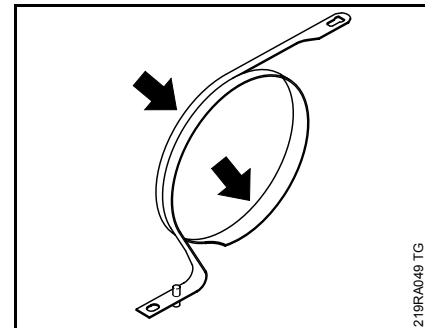


- Remove the screw (1) from the underside of the machine.

- Pry the brake band (2) out of its seat (arrow).
- Remove the brake band without overstretching it.
- Disengage the chain brake

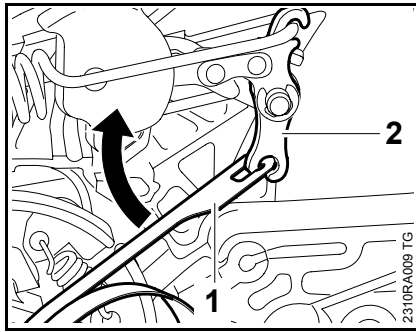


- Turn the brake band (1) to one side and disconnect it from the brake lever (2).



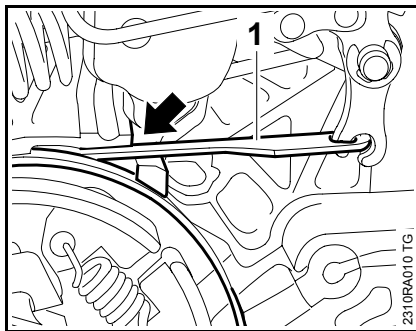
Install a new brake band if there are noticeable signs of wear (large areas on inside diameter and/or parts of outside diameter – arrows) and its remaining thickness is less than 0.6 mm.

## Installing



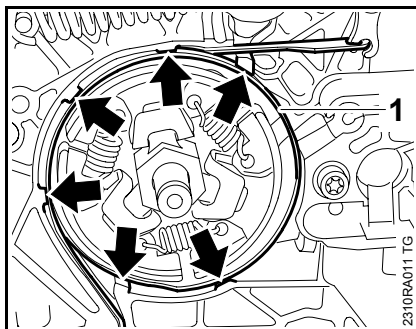
– Disengage the chain brake

- Hold the brake band (1) sideways, attach it to the brake lever (2) and then swing it in the direction of its seat.

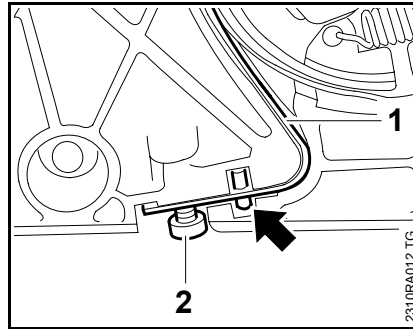


- Position the brake band (1) in the guide (arrow).

– Engage the chain brake.

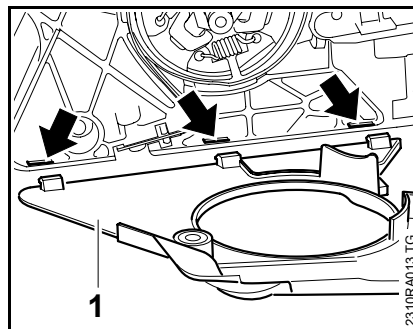


- Push the brake band (1) over the guide lugs (arrows) and into its seat.

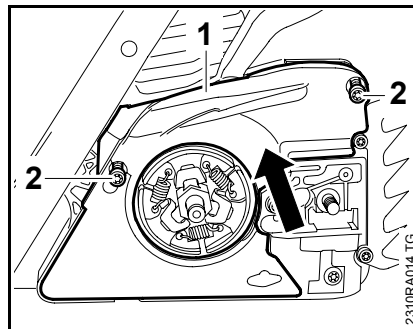


- Push the brake band (1) into its seat (arrow) as far as it will go.

- Fit the screw (2) on the underside of the machine and tighten it down firmly.



- Engage the cover (1) in the slots (arrows) first.



- Place the cover (1) in position.
- Insert and tighten down the screws (2) firmly.

– Install the clutch drum, 4.1

The clutch drum must rotate freely when the chain brake is disengaged.

– Carry out the other checks, 5.1

– Reassemble all other parts in the reverse sequence.

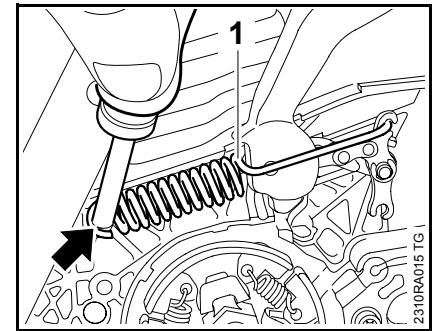
## 5.3 Brake Lever

– Troubleshooting, 3.2

– Remove the shroud, 6.4

– Remove the fan housing, 8.2

– Remove the brake band, 5.2

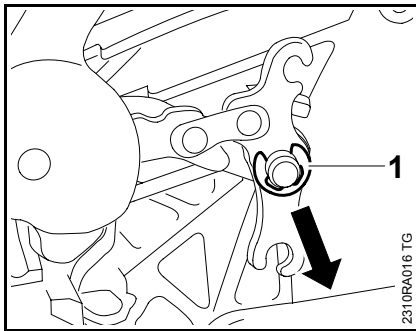


– Engage the chain brake.

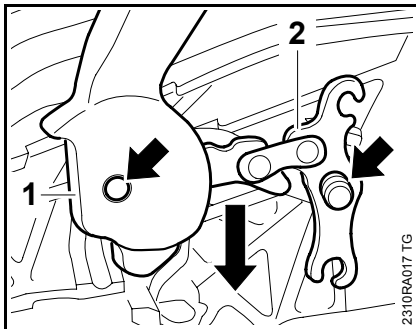
The brake spring is now relaxed.

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

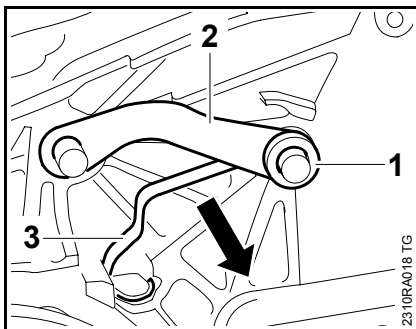
– Remove the brake spring from the brake lever.



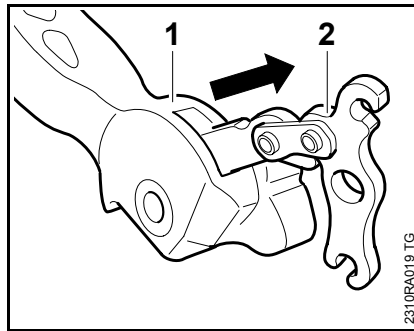
- Remove the retaining ring (1).



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



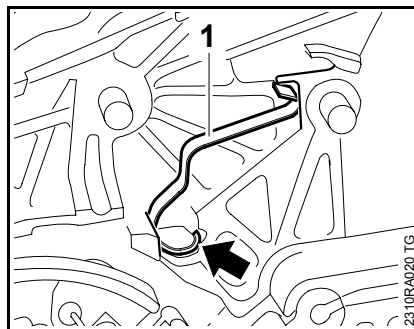
- Remove the spacer washer (1) and strap (2).
- Pull out the flat spring (3).



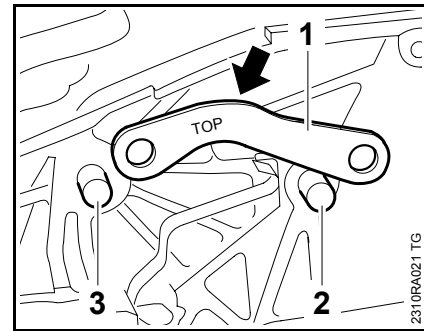
- Take the brake lever (2) out of the hand guard (1).
- Check the anchor pin – if it is worn, install a new engine housing.
- Check the cam on the hand guard and replace the hand guard if necessary.

#### Installing

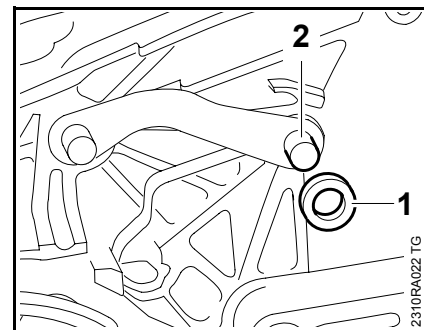
- Clean the pivot pins and disassembled parts, 14
- Lubricate the pivot pins, 14



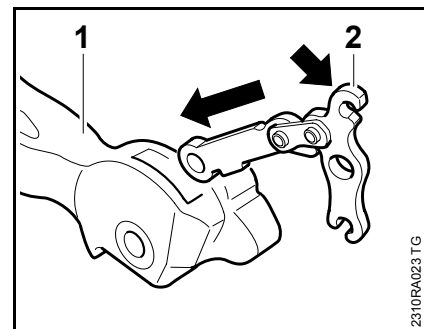
- Push the loop of the flat spring (1) into its seat (arrow) as far as stop.



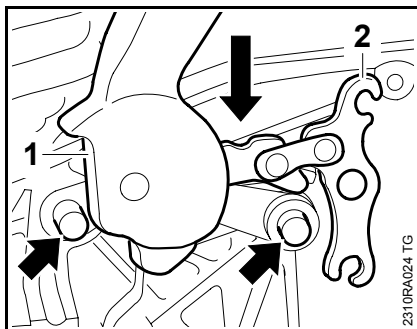
- Fit the strap (1) on the pivot pins (2) and (3) so that "TOP" faces outwards and the curve (arrow) faces up.



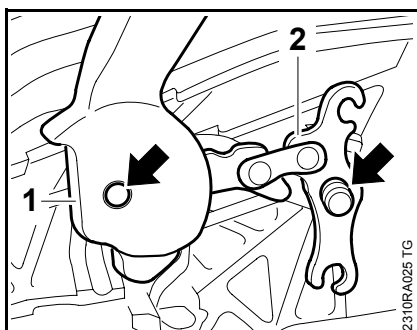
- Slip the spacer washer (1) onto the pin (2).



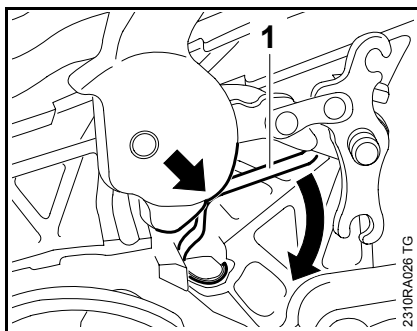
- Hold the brake lever (2) so that the brake spring attachment point (arrow) is at the top.
- Push the brake lever (2) into the recess in the hand guard (1) and line up the holes.



- Push the hand guard (1) with brake lever (2) over the machine until they are positioned against the pivot pins (arrows).

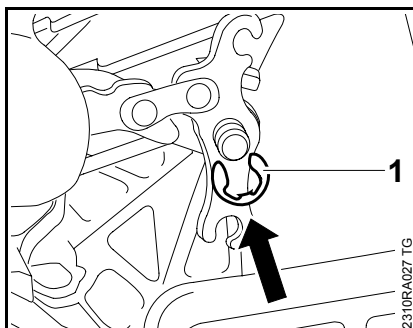


- Lift the bearing boss of the hand guard (1) and the brake lever (2) a little and position them over the pivot pins (arrows).

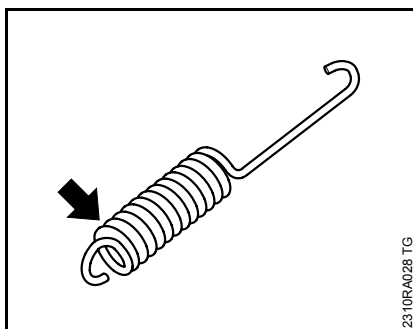


- Push the flat spring (1) slightly to one side until the cam of the hand guard (arrow) slips passed it.

- Push the hand guard bearing boss and the brake lever on to the pivot pins.

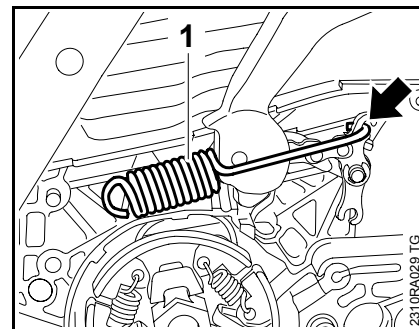


- Fit the retaining ring (1).

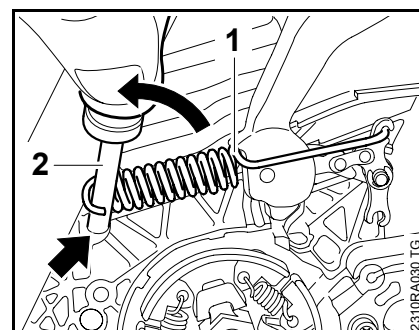


The turns of the brake spring must be tightly against one another in the relaxed condition. If this is not the case, replace the brake spring.

- If the groove in the brake spring's anchor pin is worn, install a new engine housing, 6.6



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







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

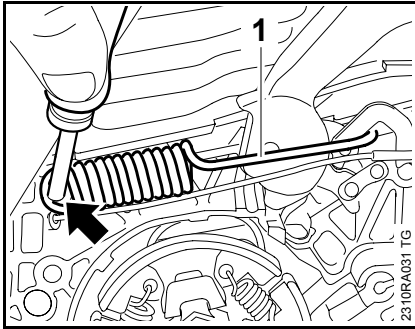
- Lubricate the brake lever, flat spring and slot in hand guard, 14

- Reassemble all other parts in the reverse sequence.



## 5.4 Brake Lever on Machines with QuickStop Super

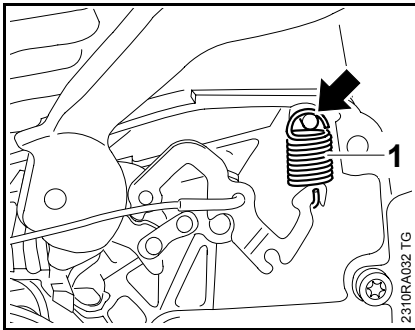
- Troubleshooting,  3.2
- Remove the shroud,  6.4
- Remove the fan housing,  8.2
- Remove the brake band,  5.2



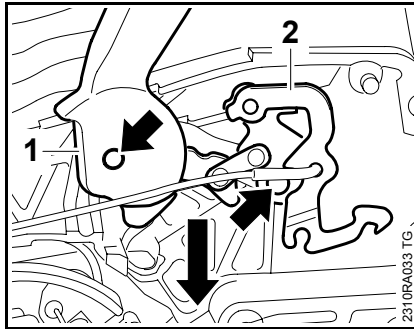
- Engage the chain brake.

The brake spring is now relaxed.

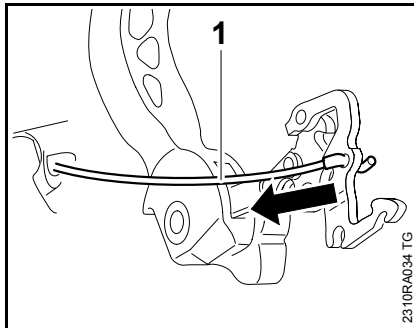
- Use the assembly tool 1117 890 0900 to disconnect the brake spring (1) from the anchor pin (arrow).
- Remove the brake spring from the brake lever.



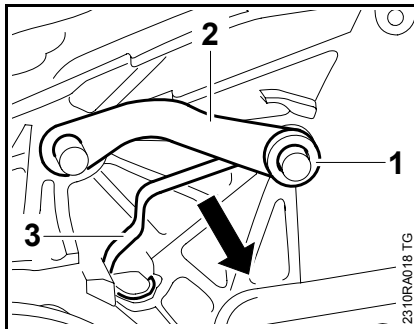
- Disconnect the spring (1) from the anchor pin (arrow).
- Remove the brake spring (1) from the brake lever.



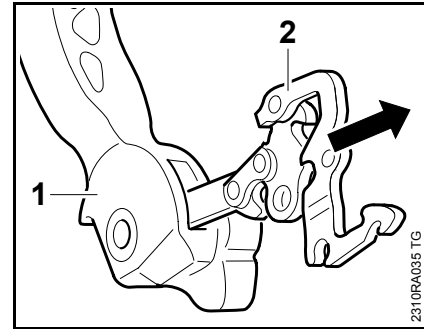
- Pull the hand guard (1) and brake lever (2) off the pivot pins (arrows) together.
- Remove the hand guard and brake lever.



- Disconnect the brake cable (1).





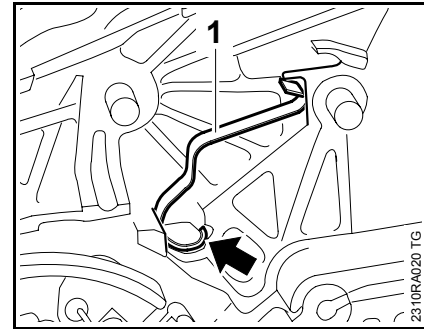
- Remove the spacer washer (1) and strap (2).
- Pull out the flat spring (3).



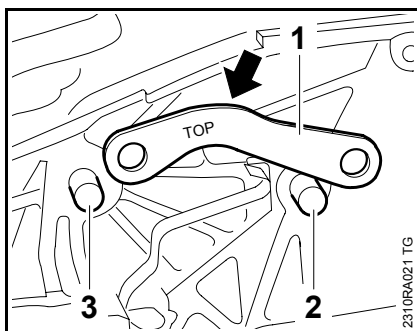
- Take the brake lever (2) out of the hand guard (1).
- Check the anchor pin – if it is worn, install a new engine housing.
- Check the cam on the hand guard and replace the hand guard if necessary.

### Installing

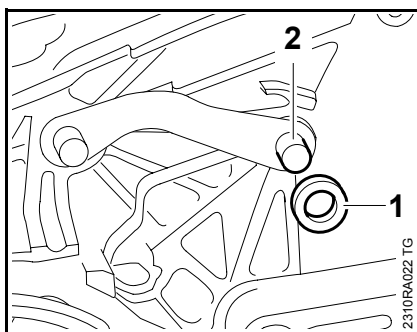
- Clean the pivot pins and disassembled parts,  14
- Lubricate the pivot pins,  14



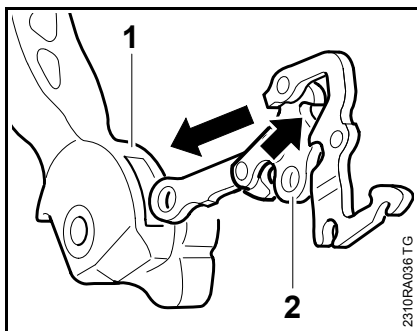
- Push the loop of the flat spring (1) into its seat (arrow) as far as stop.



- Fit the strap (1) on the pivot pins (2) and (3) so that "TOP" faces outwards and the curve (arrow) faces up.

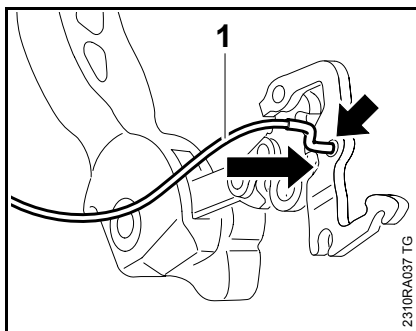


- Slip the spacer washer (1) onto the pin (2).

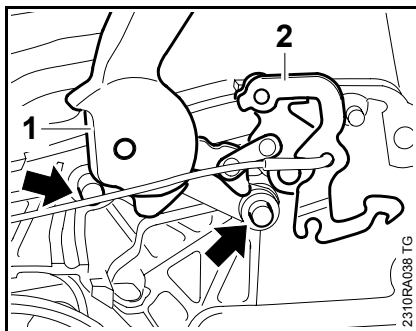


- Hold the brake lever (2) so that the brake spring attachment point (arrow) is at the top.

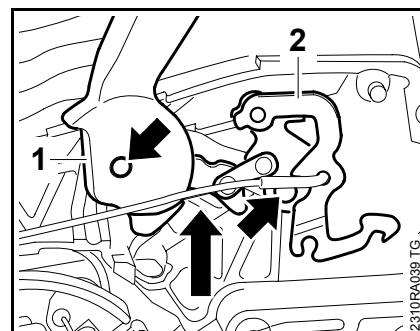
- Push the brake lever (2) into the recess in the hand guard (1) and line up the holes.



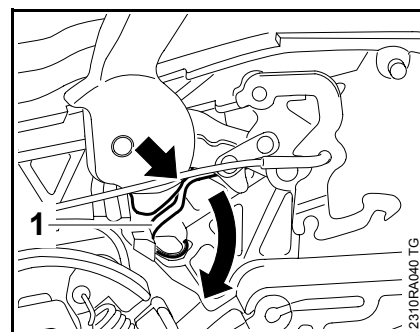
- Fit the brake cable (1) in the hole (arrow).



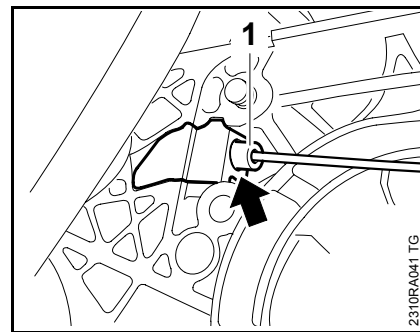
- Push the hand guard (1) with brake lever (2) over the machine until they are positioned against the pivot pins (arrows).



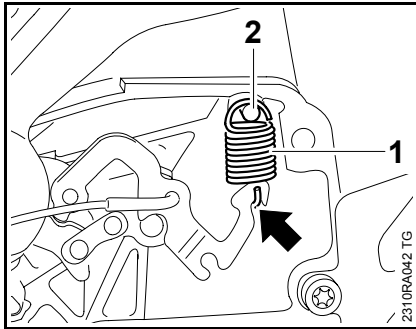
- Lift the bearing boss of the hand guard (1) and the brake lever (2) a little and position them over the pivot pins (arrows).



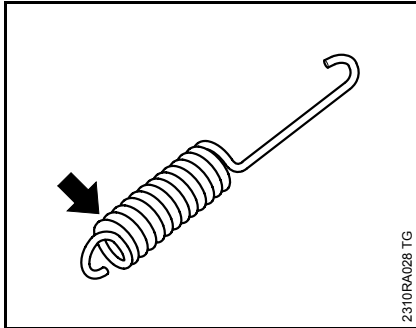
- Push the flat spring (1) slightly to one side until the cam of the hand guard (arrow) slips past it.
- Push the hand guard bearing boss and the brake lever on to the pivot pins.



- Push the brake cable grommet (1) into its seat (arrow) as far as stop.

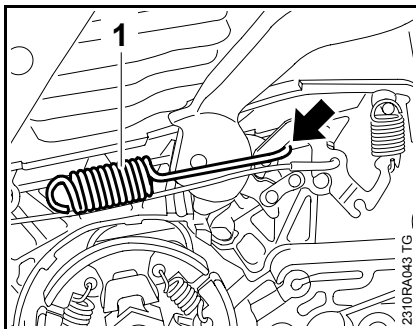


- Attach the spring (1) to the brake lever (arrow) so that the open side of the spring hook (arrow) is visible.
- Attach the spring (1) to the anchor pin (2).

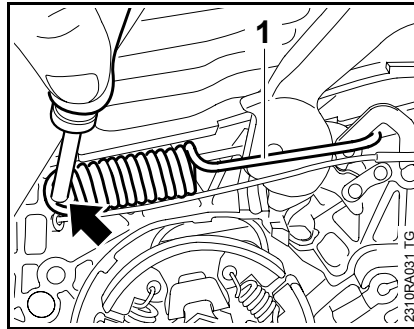


The turns of the brake spring must be tightly against one another in the relaxed condition. If this is not the case, replace the brake spring.

- If the groove in the brake spring's anchor pin is worn, install a new engine housing, 6.6



- Attach the spring (1) to the brake lever (arrow).



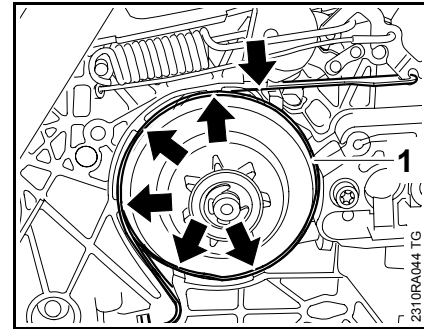
- Use the assembly tool 1117 890 0900 to disconnect the brake spring (1) from the anchor pin (arrow).
- Lubricate the brake lever, flat spring and slot in hand guard, 14
- Adjust the brake cable, 5.4.1
- Reassemble all other parts in the reverse sequence.

#### 5.4.1 Adjusting the brake cable

If problems occur on the coasting brake even though the brake band is in order, the reason may be the adjustment of the brake cable.

- Troubleshooting, 3.2
- Checking condition and free travel
- Remove the chain brake cover, 5.2

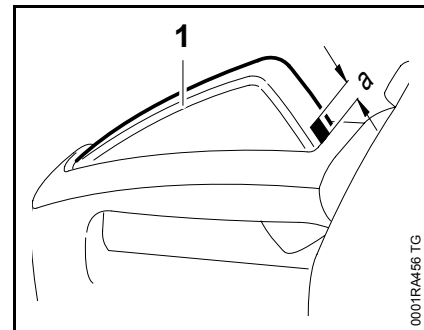
The brake cable must be relaxed when the lockout lever is released.



- Press down the lockout lever (1) and hold it in that position.

The brake band (1) must locate snugly against engine housing (arrows) and the clutch drum must rotate freely.

- Release the lockout lever.



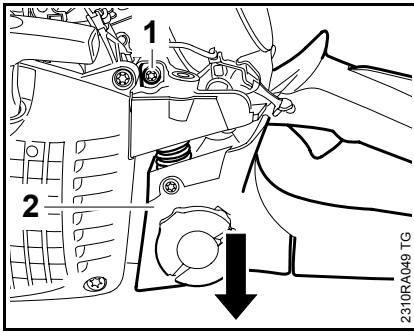
- Carefully press the lockout lever (1) to check free travel.
- Free travel must be within the mark (a).

Free travel is the distance the lockout lever (1) can be depressed without the brake lever moving.

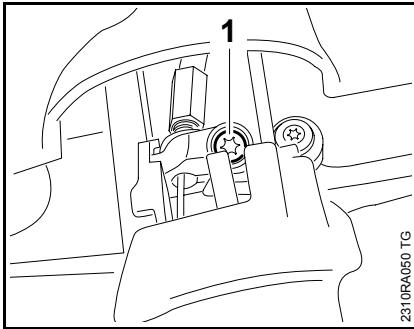
A certain amount of free travel is necessary to guarantee correct operation of the coasting brake.

- Troubleshooting, 3.2

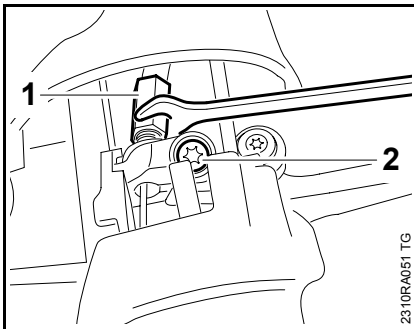
## Adjusting brake cable



- Take out the screw (1).
- Lower the tank housing (2).

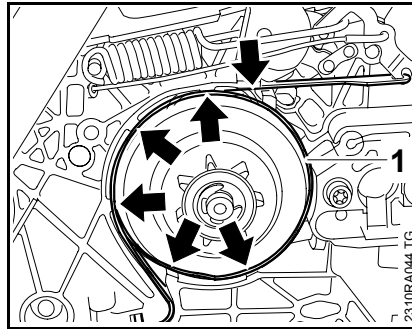


- Loosen the clamp screw (1) on the brake cable retainer.



- Use 6mm open end wrench the set free travel on the adjusting screw (1).

- Turn adjusting screw clockwise to increase free travel.
- Turn adjusting screw counter-clockwise to reduce free travel.
- When the setting is correct, tighten down the clamp screw (2) firmly.



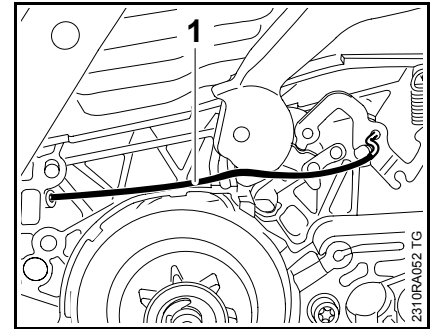
- Press down the lockout lever (1) and hold it in that position.

The brake band (1) must locate snugly against engine housing (arrows) and the clutch drum must rotate freely.

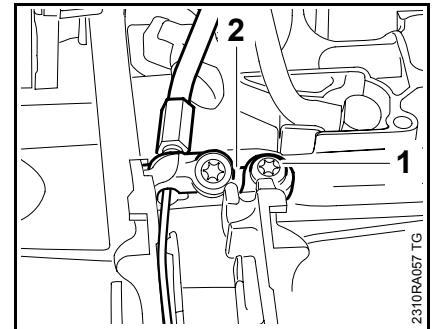
- Reassemble all other parts in the reverse sequence.

### 5.4.2 Brake cable Removing and Installing

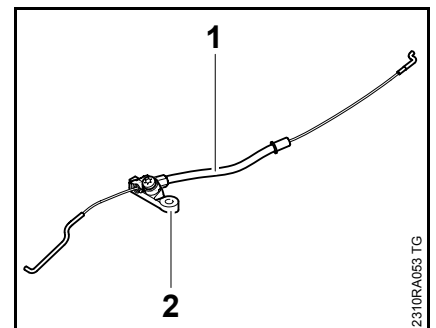
- Disconnect the brake spring, 5.4
- Remove the carburetor, 12.5
- Remove the throttle trigger, 10.3
- Remove the switch lever, 10.3.1



- Pull out the brake cable (1) a little and disconnect it.
- Loosen and lower the tank housing, 12.11.2
- Take care not to stretch the hose.

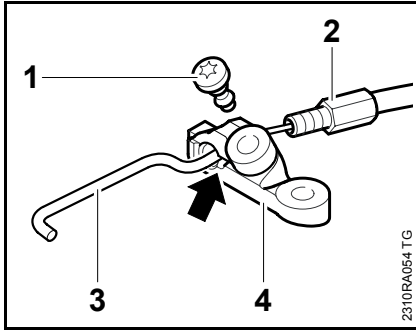


- Take out the screw (1).
- Remove the retainer (2) with brake cable.



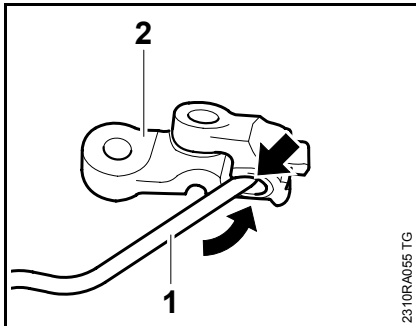
- Check the brake cable (1) and retainer (2), replace if necessary

## Disassembling the brake cable and retainer

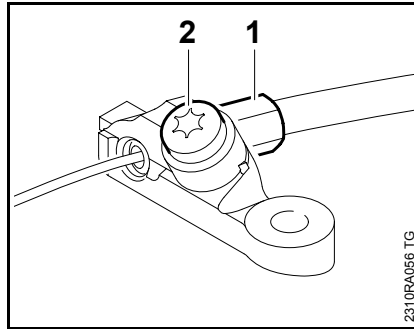


- Loosen the clamp screw (1) and take out the adjusting screw (2).
- Turn the hook (3) so that its offset is next to the recess (arrow) and then remove it from the retainer (4).

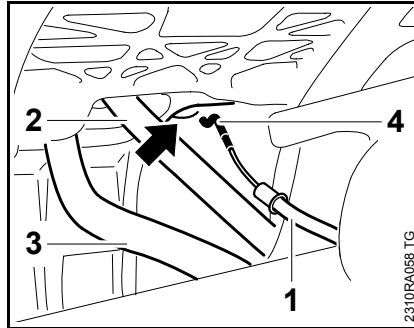
## Installing



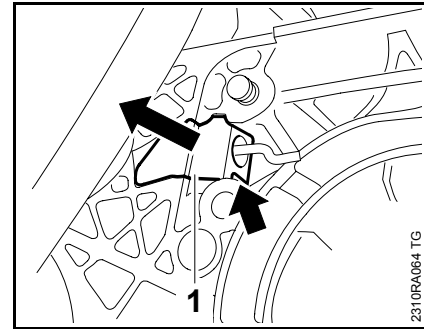
- Position the hook (1) so that it is next to the retainer (2) and push it into the bore (arrow).
- Turn the hook (1) slightly while pushing it through the retainer (2).



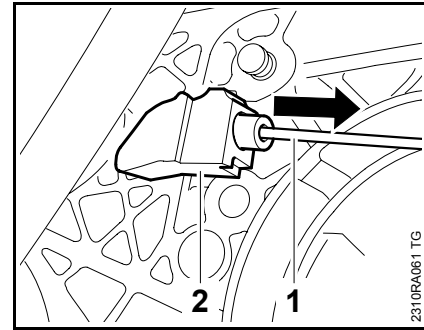
- Fit the adjusting screw (1) and wind it home until the gap between the screw's hexagon and the retainer is 2 mm.
- Fit the clamp screw (2) and tighten it down firmly.



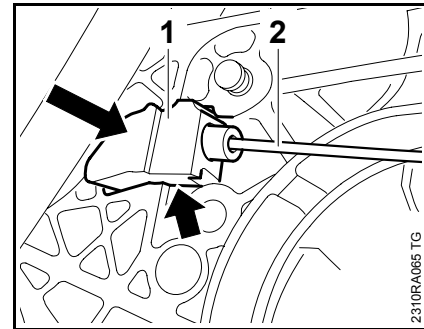
- Pass the brake cable (1) between the tank housing and engine housing to the right of the fuel hose (3) or, on versions with a manual fuel pump, to the right of the fuel hose (3) and fuel return hose (2).
- Push the brake cable (1), short hook (4) first, through the bore (arrow) in the engine housing.



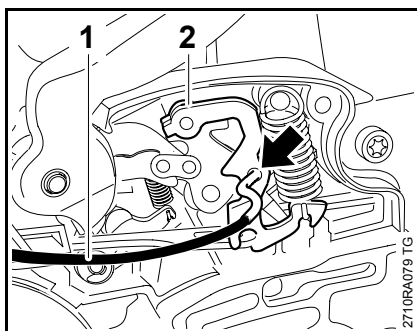
- Pry the insert (1) out of the recess (arrow).



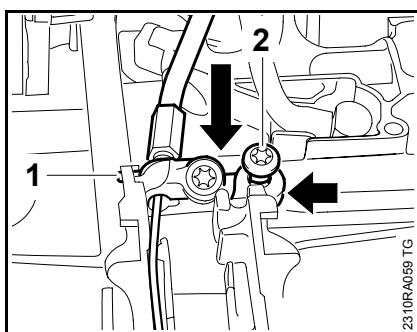
- Push the brake cable grommet (1) into the insert (2) as far as stop.



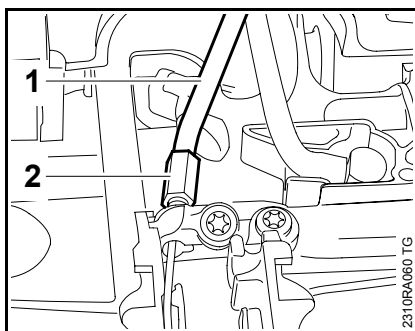
- Push the insert (1) with brake cable (2) into its seat (arrow) as far as stop.
  - The insert must be flush with the housing ribs.



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

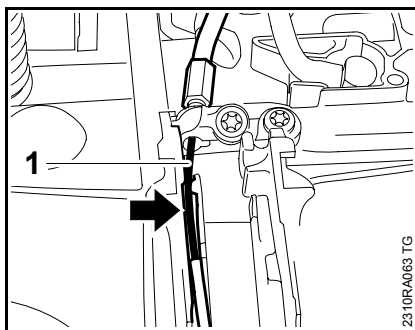


- Slide the brake cable retainer with lug (1) through the opening and press it into its seat (arrow).
- Insert and tighten down the screw (2) firmly.



When lifting the tank housing make sure the grommet (1) is pushed fully into the adjusting screw (2) – if this is not the case, the adjustment of the brake cable will vary.

- Check position of fuel hose and correct if necessary, [12.11.2](#)
- Check position of fuel return hose and correct if necessary, [12.11.3](#)
- Lift the tank housing and secure it in position, [12.11.2](#)

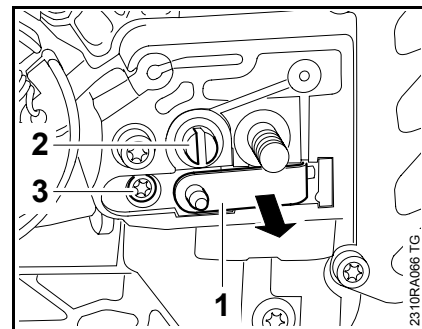


- Position the brake cable (1) in the guide (arrow).
- Install the switch lever, [10.3.1](#)
- Install the throttle trigger, [10.3](#)

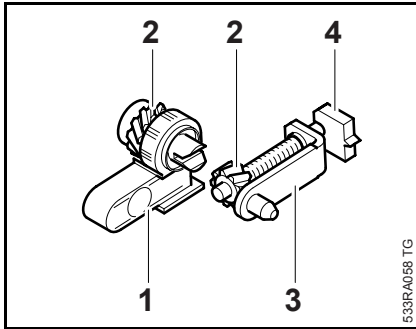
- Reassemble all other parts in the reverse sequence.
- Check operation and adjust the brake cable, [5.4.1](#)

## 5.5 Chain Tensioner

- Troubleshooting, [3.2](#)



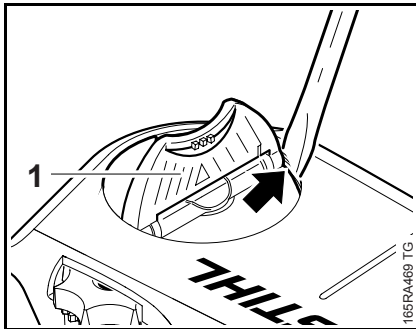
- Turn the spur gear (2) clockwise until the tensioner slide (1) butts against the right-hand end and the screw (3) is visible.
- Take out the screw (3).
- Pull out the spur gear (2) and tensioner slide (1).



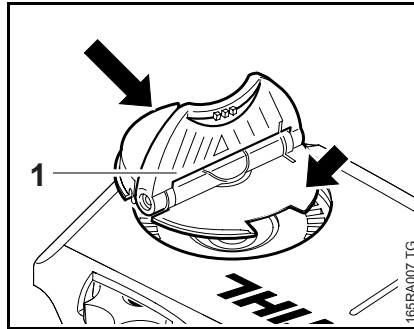
- Inspect the cover (1), spur gear set (2), tensioner slide (3) and thrust pad (4) and replace as necessary.
- Clean all disassembled parts, 14
- Lubricate thread and gears with STIHL multipurpose grease, 14
- Reassemble in the reverse sequence.

### 5.5.1 Quick Chain Tensioner

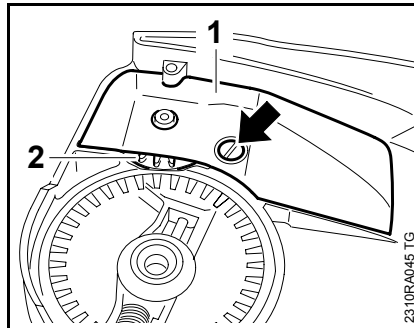
The quick chain tensioner is installed in the sprocket cover.



- Apply tool to the side (arrow) of the wing nut (1) and carefully pry it out of the sprocket cover.
- Check the wing nut (1) and replace if necessary



- Swing the wing nut (1) upright.
- Push the wing nut (1), thin side first (see arrow), into the opening and press it down until it snaps into position.



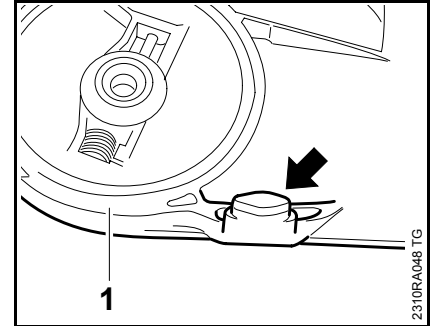
- Take out the screw (arrow).
- Remove the cover plate (1) and adjusting wheel (2).

When installing the adjusting wheel, make sure its teeth face the cover plate.

- Reassemble in the reverse sequence.

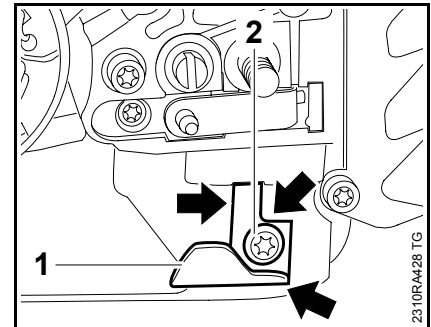
### 5.5.2 Chain Catcher

- Remove the chain sprocket cover.



The chain catcher (arrow) is an integral part of the sprocket cover (1).

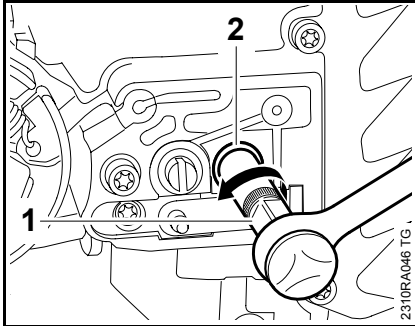
- If the chain catcher is damaged or worn, install a replacement chain catcher.



- Position the replacement chain catcher (1) so that it lines up with the contour of the recess (arrows).
- Insert and tighten down the screw (2) firmly.
- Reassemble in the reverse sequence.

## 5.6 Bar Mounting Stud

- Remove the chain sprocket cover.

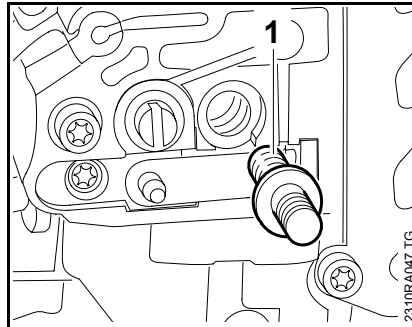


- Push stud puller 5910 893 0501 (1) over the collar stud (2) as far as it will go and unscrew the stud counter-clockwise.
- Coat the collar stud with threadlocking adhesive, fit and tighten down firmly, 14
- Reassemble all other parts in the reverse sequence.

## Repair solution

If the thread in the engine housing is badly damaged or stripped it will not be possible to tighten the standard collar stud to the specified torque – the security of the collar stud is no longer guaranteed.

In such a case use the collar stud in the screw list as a repair solution, 2.5.





- Remove the standard collar stud – do not re-drill the hole.
- Coat the thread of the collar stud (1) with threadlocking adhesive, 14
- Fit the collar stud by hand so that it engages the existing thread.
- Screw home the collar stud and tighten it down firmly.
- Reassemble all other parts in the reverse sequence.



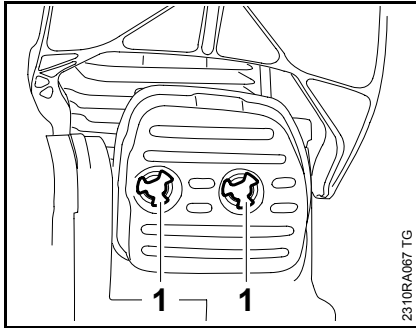
## 6. Engine

### 6.1 Muffler

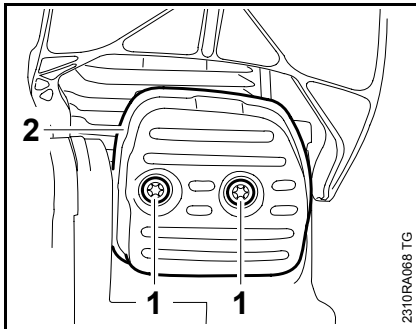
Always check and, if necessary, repair the fuel system, carburetor, air filter and ignition system before looking for faults on the engine.

- Troubleshooting,  3.7
- Remove the shroud,  6.4

Before removing the muffler, set the piston to top dead center to ensure that no dirt falls into the cylinder.



- Pry out the plugs (1)
  - do not re-use plugs that have been removed.

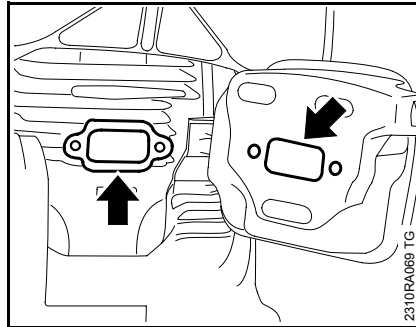


- Take out the screws (1).
- Remove the muffler (2), check and replace if necessary.
- Remove the exhaust gasket
  - always install a new exhaust gasket.

- Remove and install the spark arresting screen, if fitted – see instruction manual.

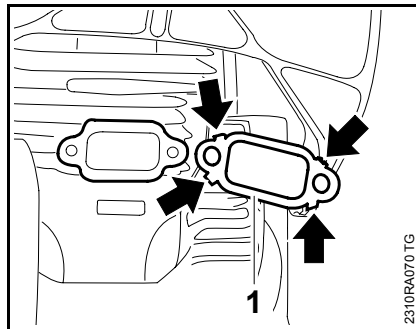
#### Installing

- Cover the exhaust port. Remove any dirt from around the cylinder and exhaust port.

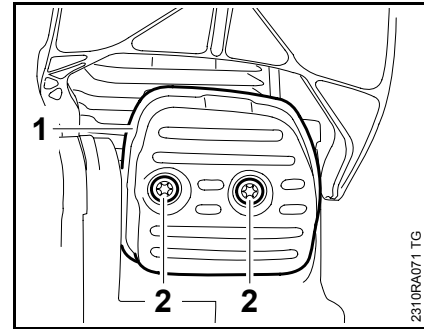


- Check and clean the sealing faces (arrows), remove any gasket residue – make sure there is no gasket residue or dirt in the exhaust port.

Always replace components with damaged sealing faces.



- Position the new exhaust gasket (1) so that the tabs (arrows) point towards the cylinder.
- Fit the new exhaust gasket (1) and use the tabs (arrows) to line it up on the cylinder.



- Carefully place the muffler (1) in position.
- Check the position of the gasket and fit the screws (2).
- Insert and tighten down the screws (2) firmly.
- Use a blunt tool to push home the new plugs squarely and uniformly – take care not to damage the plugs.

## 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.

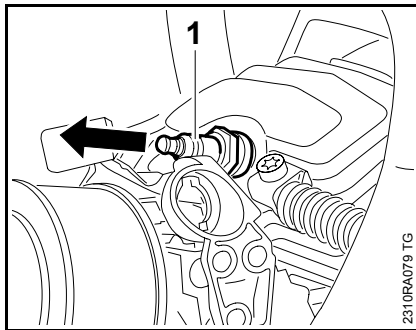
Moreover, the transition from idle speed to part or full throttle is not smooth.

Always perform the vacuum test first and then the pressure test.

The engine can be checked thoroughly for leaks with the pump 0000 850 1300.


### 6.2.1 Preparations

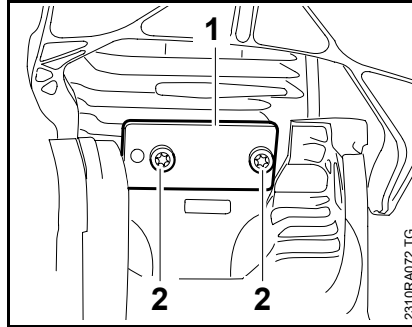
- Remove the shroud,  6.4



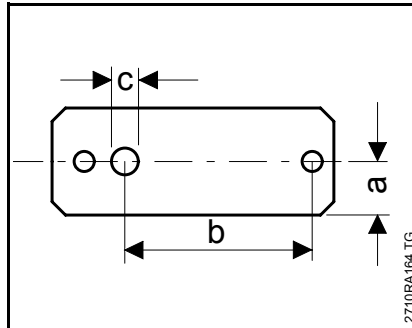
- Pull off the boot and unscrew the spark plug.
- Set the piston to top dead center. This can be checked through the spark plug hole.

- Fit the spark plug (1) and tighten it down firmly.

- Remove the muffler and gasket,  6.1

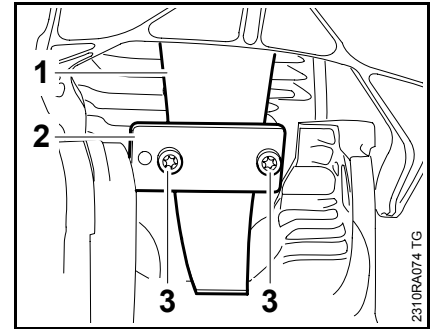


- Fit the test flange (1) 5910 855 4201 on cylinder exhaust port.
- Fit the screws (2)
  - do not tighten down yet.



Flange (1) 4224 893 2501 can be modified as shown.

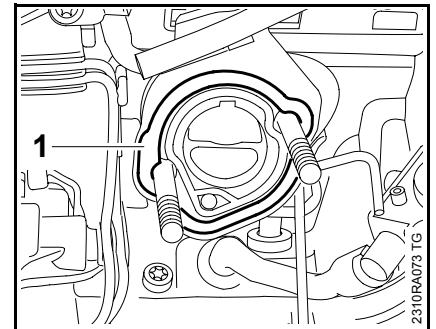
a = 13 mm  
b = 39.25 mm  
c = 6 mm



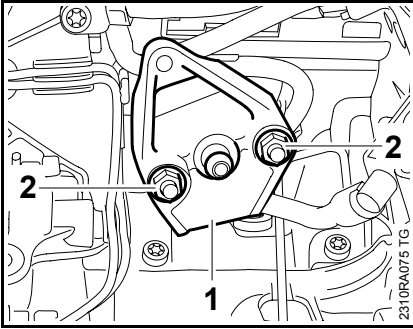
- Fit the sealing plate (1) 0000 855 8106 between the cylinder exhaust port and flange (2).
- Tighten the screws (3) moderately.

The sealing plate must completely fill the space between the two screws.

- Remove the carburetor,  12.5



- Make sure the washer (1) is in place.

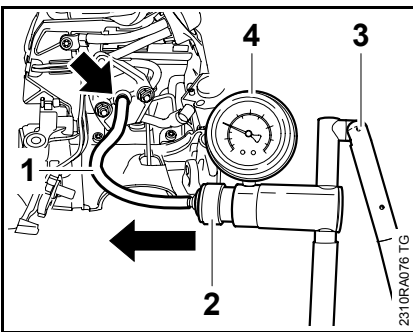


- Line up the flange (1) 1118 850 4200 and fit it over the studs
- Fit the test flange (1) 1118 850 4200.
- Fit the nuts (2) and tighten them down firmly.

### 6.2.2 Vacuum Test

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.

A test can be carried out with pump 0000 850 1300 to detect this kind of fault.



- Connect hose (1) of pump 0000 850 1300 to the nipple (arrow).

- Push ring (2) to the left – vacuum test.
- Operate the lever (3) until the pressure gauge (4) indicates a vacuum of 0.5 bar.

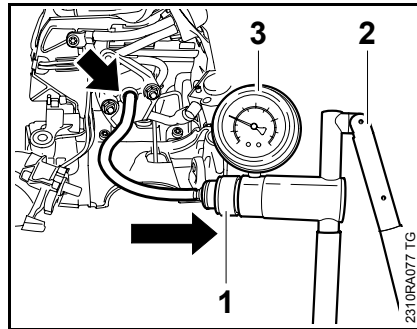
If the vacuum reading remains constant, or rises to no more than 0.3 bar within 20 seconds, it can be assumed that the oil seals are in good condition.

If the pressure continues to rise (reduced vacuum in the engine), the oil seals must be replaced, [6.3](#).

- After finishing the test, push the ring to the right to vent the pump.
- Continue with pressure test, [6.2.3](#)

### 6.2.3 Pressure Test

Carry out the same preparations as for the vacuum test, [6.2.2](#)



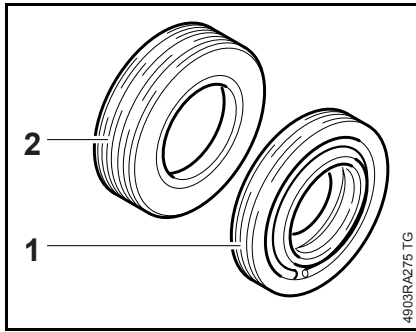
- Push ring (1) to the right – pressure test.
- Operate the lever (2) until the pressure gauge (3) indicates a pressure of 0.5 bar. If this pressure remains constant for at least 20 seconds, the engine is airtight.

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

To find the leak, coat the suspect area with soapy water and pressurize the engine again. Bubbles will appear if a leak exists.

- After finishing the test, push the ring to the left to vent the pump – disconnect the hose.
- Remove the flange 1118 850 4200 from the intake manifold.
- Install the carburetor, [12.5](#)
- Remove the flange 5910 855 4201 and sealing plate 0000 855 8106.
- Install the muffler, [6.1](#)
- Use a blunt tool to push home the new plugs – take care not to damage the plugs.
- Reassemble all other parts in the reverse sequence.

## 6.3 Oil Seals



Use soft oil seal (1) 9638 003 1581 with snap ring for replacement on closed engine.

Use hard oil seal (2) 9639 951 1584 without snap ring for replacement on opened engine.

Install the soft oil seal with the snap ring facing outwards and the hard oil seal with its open side facing the ball bearing.

It is not necessary to disassemble the engine to replace the oil seals.

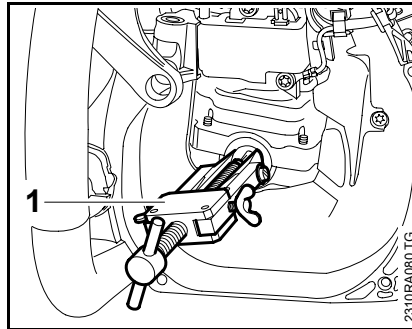
Use the correct jaws when removing the oil seals with puller 5910 890 4400.

Soft oil seal with snap ring – jaws (No. 3.1) 0000 893 3706.

Hard oil seal without snap ring – jaws (No. 6) 0000 893 3711.

### 6.3.1 Ignition side

- Remove the fan housing, 8.2
- Remove the flywheel, 7.6

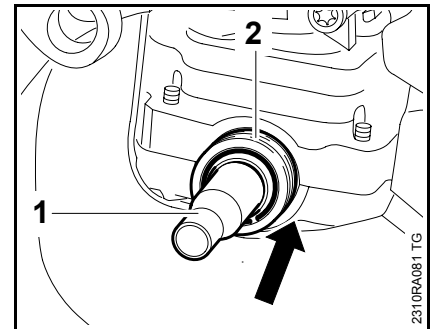


Take care not to damage the crankshaft stub.

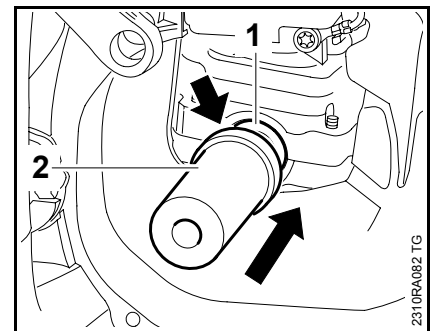
- Free off the oil seal in its seat by tapping it with a suitable tube or a punch.
- Apply puller (1) 5910 890 4400.
- Clamp the puller arms.
- Pull out the oil seal.

#### Installing

- Clean the sealing face, 14
- Lubricate sealing lips of new oil seal with grease, 14



- Fit the installing sleeve (1) 1141 893 4600.
- Slip the oil seal (2), snap ring facing outwards, over the installing sleeve.
- Remove the installing sleeve (1).





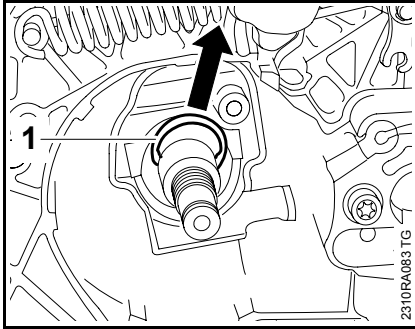
- Fit press sleeve (2) 1122 893 2405 with the collar (arrow) facing the engine.
- Use press sleeve (2) 1122 893 2405 to install the oil seal (1).

The seating face must be flat and free from burrs.

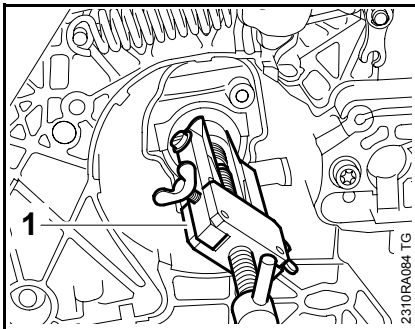
- Degrease the crankshaft taper, 14
- Reassemble all other parts in the reverse sequence.

### 6.3.2 Clutch side

- Remove the clutch,  4
- Remove the oil pump,  11.3





- Remove the retaining ring (1).

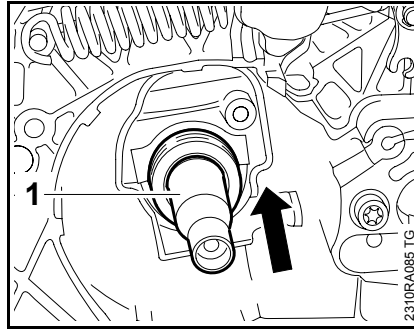


Take care not to damage the crankshaft stub.

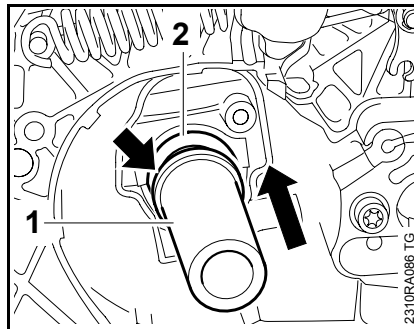
- Free off the oil seal in its seat by tapping it with a suitable tube or a punch.
- Apply puller (1) 5910 890 4400.
- Clamp the puller arms.
- Pull out the oil seal.

### Installing

- Clean the sealing face,  14
- Lubricate sealing lips of new oil seal with grease,  14

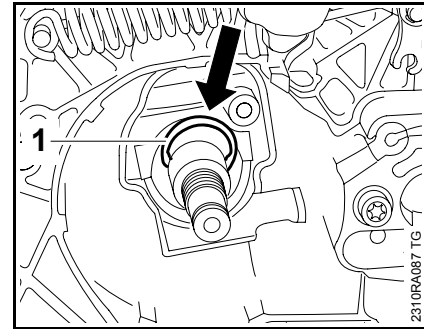


- Fit the installing sleeve (1) 1118 893 4602.
- Slip the oil seal, open side facing the engine housing, over the installing sleeve.
- Remove the installing sleeve (1).



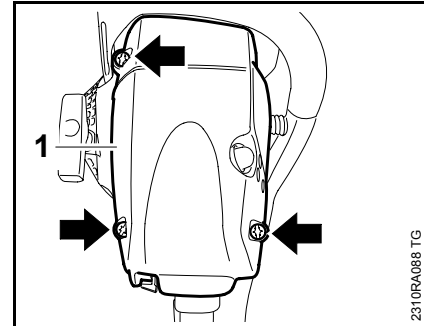
- Fit press sleeve (1) 1122 893 2405 with the collar (arrow) facing the engine.
- Use press sleeve (1) 1122 893 2405 to install the oil seal (2).

The seating face must be flat and free from burrs.

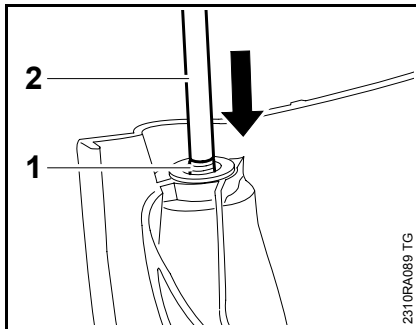


- Fit the retaining ring (1).
- Reassemble all other parts in the reverse sequence.

### 6.4 Shroud

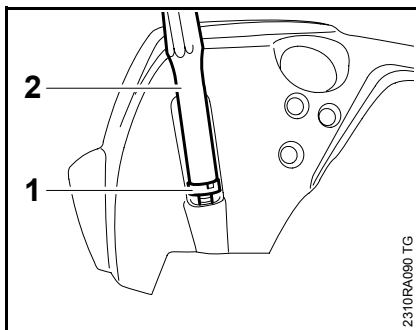


- Take out the screws (arrows).
- Remove the shroud (1).



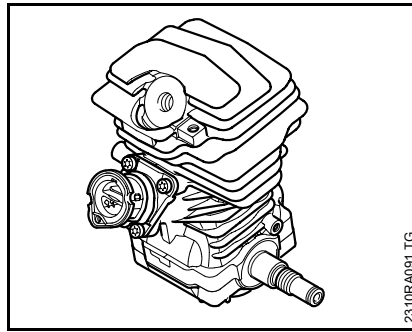
- Use a drift (2) to drive out the screw (1).

### Installing



- Use a drift (2) to drive home the screw (1).
- Reassemble all other parts in the reverse sequence.

## 6.5 Engine

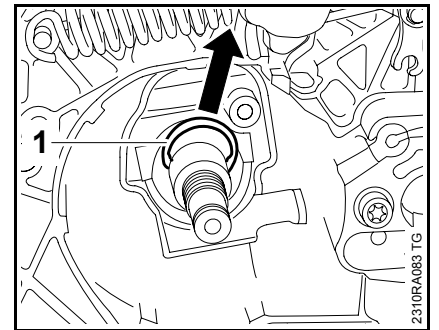


The complete engine has to be removed before removing the piston or cylinder.

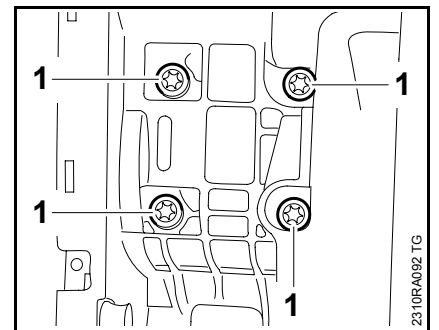
All sealing faces must be in perfect condition. If the sealing faces are damaged, replace the part concerned, [book 3.7](#).

- Remove the shroud, [book 6.4](#)
- Pull off the boot and unscrew the spark plug, [book 4](#)
- Remove the fan housing, [book 8.2](#)
- Remove the flywheel, [book 7.6](#)
- Remove the clutch, [book 4](#)
- Remove the oil pump, [book 11.3](#)
- Remove the filter base, [book 12.3](#)
- Remove the carburetor, [book 12.5](#)
- Remove the carburetor carrier, [book 12.8](#)
- Remove the air guide shroud, [book 12.4](#)

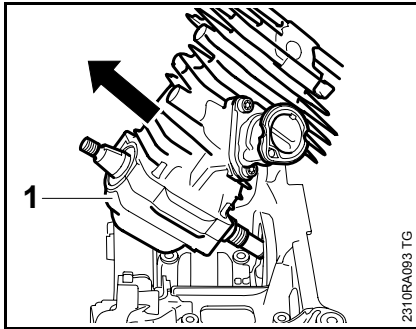
- Remove the muffler, [book 6.1](#)
- Remove the handlebar, [book 9.4](#)
- Remove the tank housing, [book 12.11.5](#)



- Remove the retaining ring (1).



- Remove the screws (1) from the underside of the machine.



- Carefully swing the engine (1) in the direction of the clutch and lift it upwards and out of the engine housing.

- Turn the engine upside down.

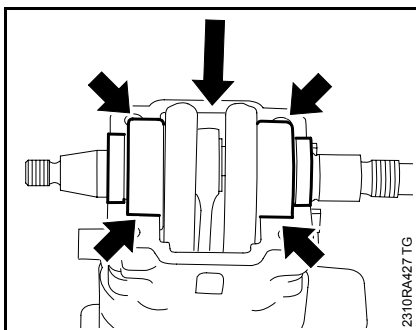
After loosening the engine pan, always clean the sealing faces and apply fresh sealant, 6.6.

- Loosen and remove the engine pan, remove remaining sealant and clean the sealing faces, 14

### Installing

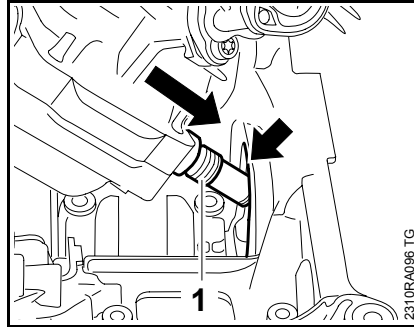
- Push the oil seals into position, 6.6

Note installed depth of the oil seals.

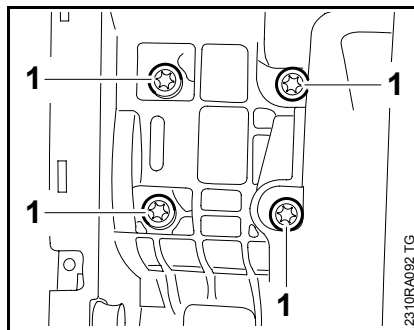


- Push the crankshaft with ball bearings into the bearing seats (arrows).

- Use suitable press sleeves to line up the oil seals 6.6
- Seal the engine pan with fresh sealant and install, 6.6, 14

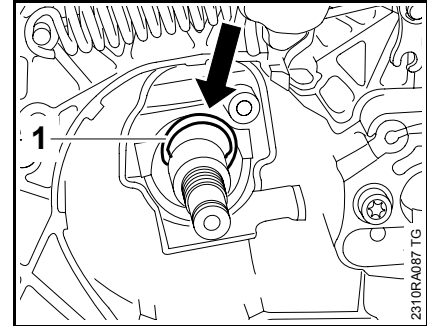


- Fit the straight crankshaft stub (1) in the opening (arrow) in the engine housing.
- Carefully position the engine in the engine housing
  - support the engine pan from below with one hand.



- Line up and hold the engine in the engine housing
  - the bores in the engine housing, engine pan and cylinder must be in alignment.
- Insert the screws (1) – do not tighten them down yet.

- Viewing the engine from above (cylinder), turn it counterclockwise as far as stop and tighten down the screws firmly in a crosswise pattern.

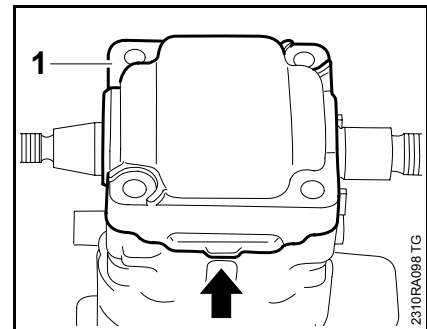


- Fit the retaining ring (1).
- Reassemble all other parts in the reverse sequence.
- Perform leakage test, 6.2

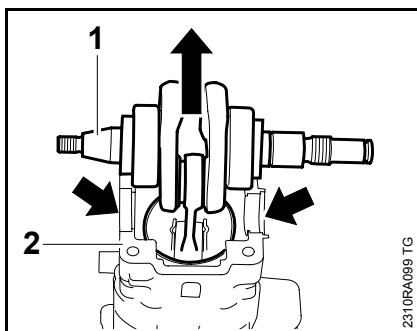
### 6.6 Cylinder / Crankshaft

- Remove the engine, 6.5

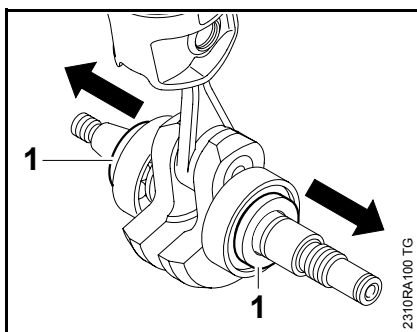
Always install new oil seals after removing the crankshaft.



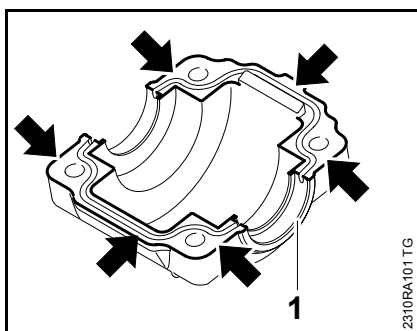
- Carefully pry the engine pan (1) loose at the point shown (arrow) and lift it away.



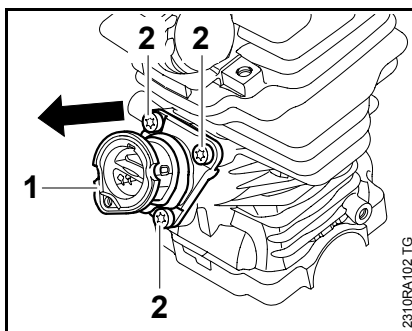
- Release the crankshaft (1) from the bearing seats (arrows) in the cylinder (2) and pull it out together with the piston.



- Pull off the oil seals (1) – always install new oil seals.

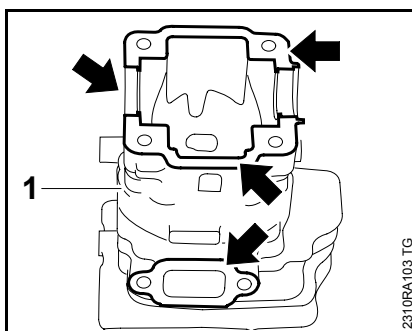


- Remove sealant from the sealing face (arrows) on the engine pan (1).
- Inspect and clean the sealing face, 14



- Inspect the intake manifold (1) and replace it if necessary – even very minor damage can result in engine running problems, 3.7

- Take out the screws (2).
- Remove the intake manifold (1).



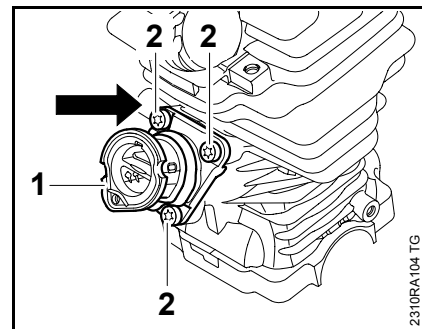
- Remove sealant and gasket residue from the sealing faces (arrows) of the cylinder (1).
- Inspect and clean all sealing faces, 14

When reinstalling the cylinder, always seal it with fresh sealant on the engine pan.

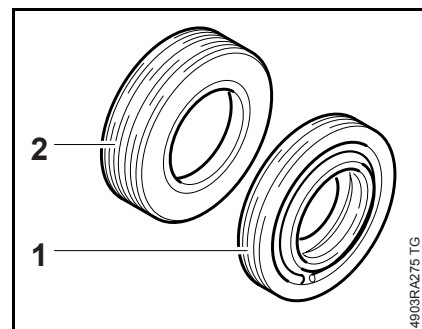
- Inspect the piston and piston rings and replace if necessary, 6.8, 6.9

If the piston or the oil seals are damaged, also inspect the inside of the cylinder for signs of damage and install a new cylinder if necessary.

## Installing



- Fit the manifold (1) in position.
- Insert and tighten down the screws (2) firmly.

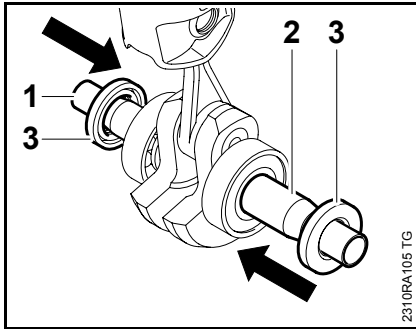


Use soft oil seal (1) 9638 003 1581 with snap ring for replacement on closed engine.

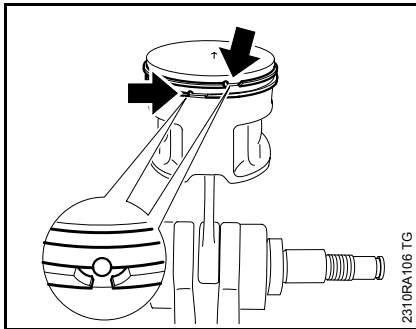
Use hard oil seal (2) 9639 003 951 without snap ring for replacement on opened engine.

Install the soft oil seal with the snap ring facing outwards and the hard oil seal with its open side facing the ball bearing.

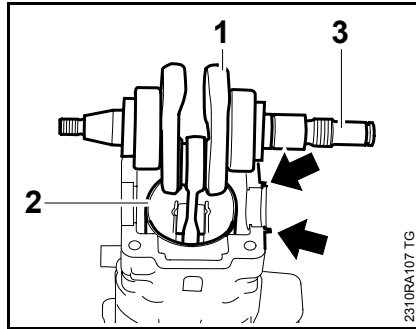




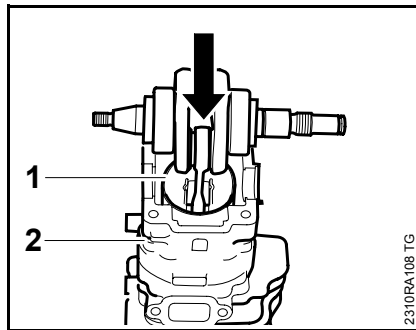
- Fit installing sleeve (1) 1141 893 4600 on the straight crankshaft stub and installing sleeve (2) 1118 893 4602 on the tapered crankshaft stub.
- Fit new oil seals (3) with their sealing lips facing the crankshaft.



- Lubricate the piston, piston rings and cylinder wall with oil, 14
- Install the piston rings so that the radii at the ring gaps meet at the fixing pins in the piston grooves (arrows).



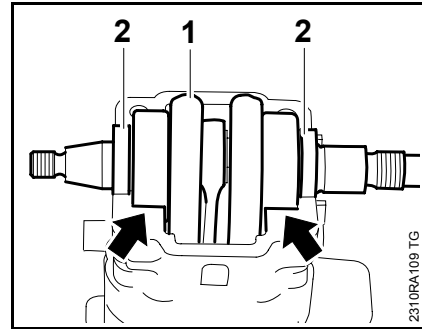
- Line up the crankshaft (1) so that the piston (2) points towards the cylinder bore and its long stub (3) towards the lugs (arrows).



The top of the cylinder bore is tapered to ease installation.

When pushing the piston into the cylinder, check that the gaps in the piston rings meet at the fixing pins – they might otherwise break.

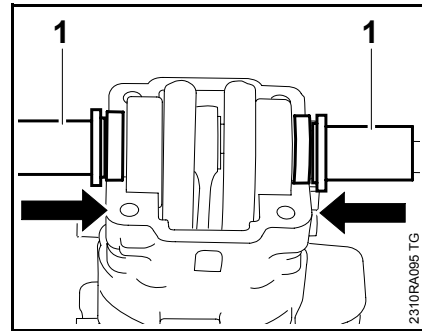
- Position the piston (1) on the cylinder bore and ease it into the cylinder (2).



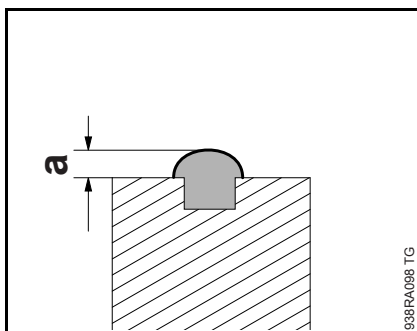
- Push the crankshaft (1) into the bearing seats (arrows) as far as stop.
- Position the oil seals (2) so that they are flush with the housing.

### Align the oil seals

Use the correct press sleeves to position the oil seals squarely and at the right installed depth.

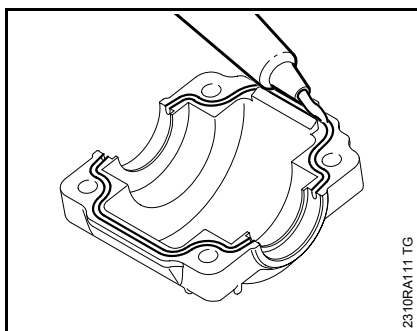


- Push press sleeve (1) 1122 893 2405, collar facing cylinder, on to the straight and tapered crankshaft stubs as far as stop.



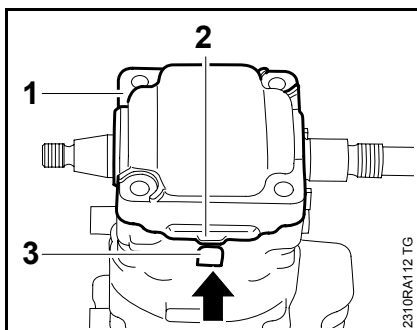
- Apply a bead of sealant to the engine pan so that it is about 2 – 3 mm high (a).

Make sure the sealant does not project into the crankcase.



- Apply sealant to the groove in the sealing face, 14

Do not coat oil seals with sealant.



- Position the engine pan (1) so that the tab (2) lines up with the shoulder (3) on the cylinder.

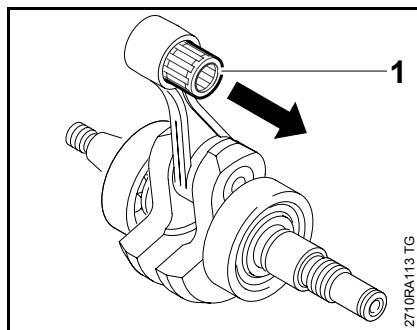
- Place the engine pan (1) on the cylinder's sealing face.
- Press the engine pan carefully into position so that the sealant is evenly distributed.

Take care not to damage the crankshaft stubs.

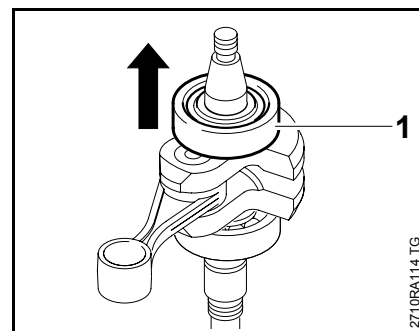
- Install the engine, 6.5

## 6.7 Bearings / Crankshaft

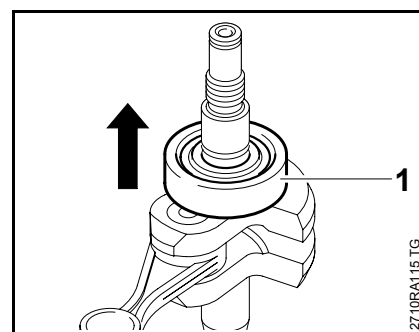
- Remove the engine, 6.5
- Remove the crankshaft and pull off the oil seals, 6.6
- Remove the piston, 6.8



- Pull out the needle cage (1), check it and replace if necessary.



- Pull the ball bearing (1) off the tapered crankshaft stub (ignition side).




- Pull the ball bearing (1) off the straight crankshaft stub (clutch side).

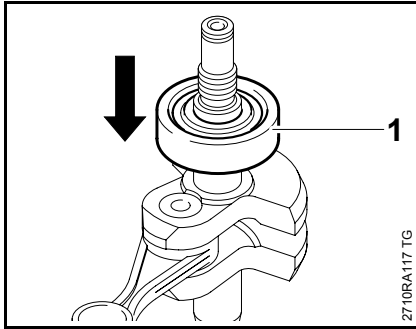
The crankshaft, connecting rod and needle bearing form an inseparable unit.

When fitting a replacement crankshaft, always install new ball bearings and oil seals.

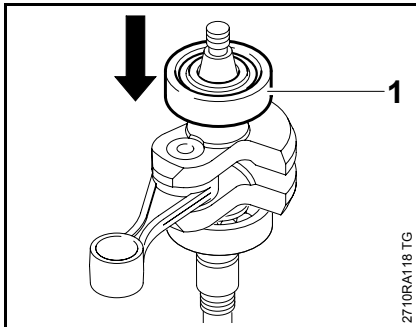
## Installing

Before installing, clean the crankshaft,  14

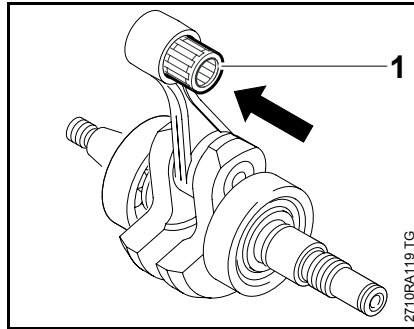
Heated ball bearings must be installed quickly because the crankshaft stubs absorb heat and expand.






- Position the ball bearing (1) with its open side facing the crankshaft.
- Heat the inner bearing race to approx. 150°C (300°F).
- Push the ball bearing (1) onto the straight crankshaft stub (clutch side) as far as stop.





- Position the ball bearing (1) with its open side facing the crankshaft.
- Heat the inner bearing race to approx. 150°C (300°F).
- Push the ball bearing (1) onto the tapered crankshaft stub (ignition side) as far as stop.



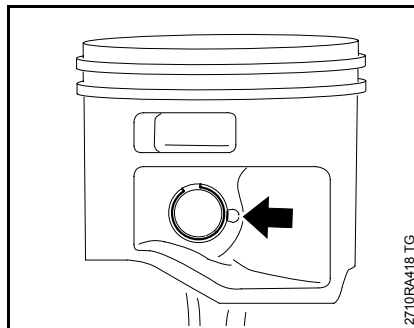
- Lubricate the needle cage (1) with oil and push it into the connecting rod.
- Install the piston,  6.8
- Install the crankshaft and new oil seals,  6.5
- Install the engine,  6.5

### 6.8 Piston

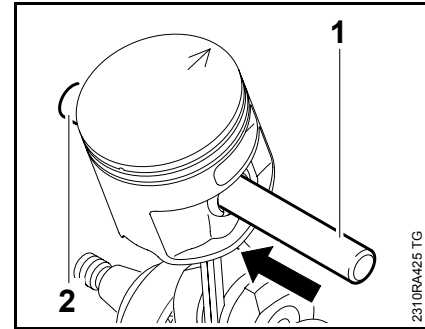
- Remove the engine,  6.5
- Remove the crankshaft,  6.6

The assembly drift passes through the installed snap ring. Therefore, only one snap ring needs to be removed.

- Remove the snap at the side with the recess.




- Use a suitable tool to grip the hookless snap ring at the recess (arrow) and ease it out.



- Slide the assembly drift (1) 1110 893 4700 through the installed snap ring and push the piston pin (2) out of the piston.

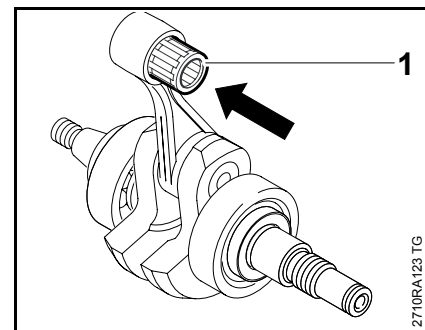
If the piston pin is stuck, release it by tapping the end of the drift lightly with a hammer.

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

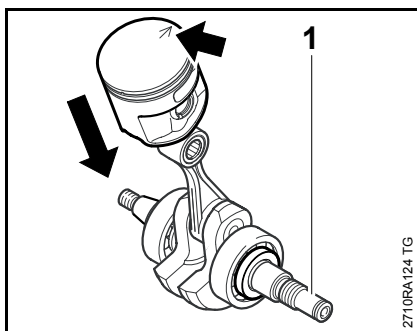
- Remove the piston.
- Inspect the piston rings and replace if necessary,  6.9

## Installing

- Pull out the needle cage, check it and replace if necessary.

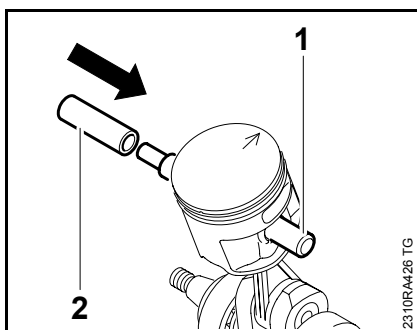


- Lubricate the needle cage (1) with oil and push it into the connecting rod.



- Position the piston as shown so that the arrow (arrow) points to the rear and the straight crankshaft stub (1) is on the right – the arrow must point in the direction of the exhaust port.

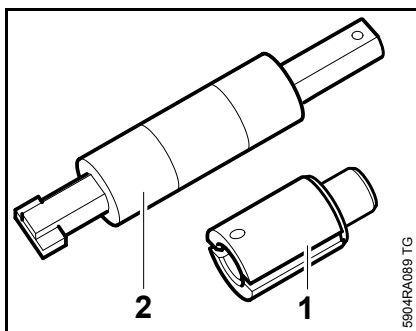
– Place the piston on the connecting rod.



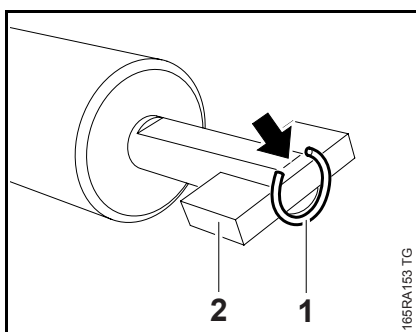
- Push the assembly drift (1) 1110 893 4700 into the piston, at the side with the snap ring, and through the small end (needle cage) – the piston is aligned.

– Lubricate the piston pin (2) with oil.

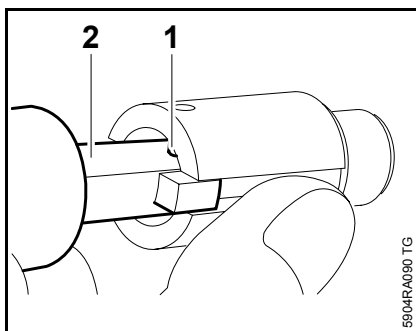
- Fit the piston pin (2) on the assembly drift (1) and slide it into the piston.



- Remove the sleeve (1) 5910 893 1707 from the installing tool (2) 5910 890 2210.

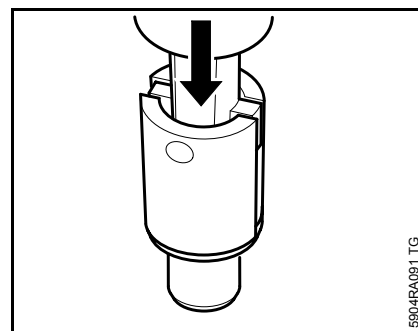


- Attach the snap ring (1) to the magnet (2) so that the snap ring gap is on the flat side of the tool's shank (arrow).



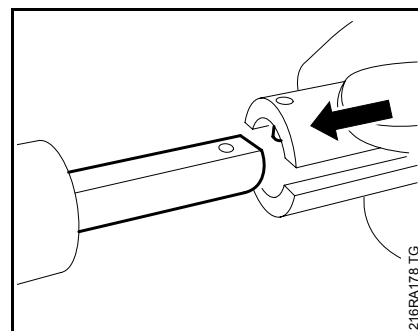
- Push the large slotted diameter of the sleeve over the magnet and snap ring.

The inner pin (1) must point towards the flat face of the tool's shank (2).

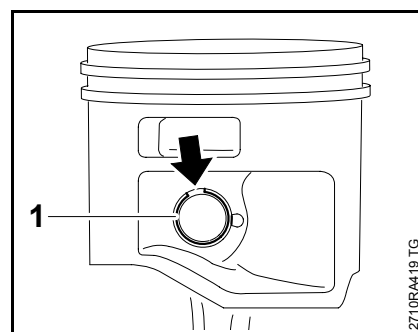


- Press the installing tool downwards into the sleeve until the magnet butts against the end of the guide slot.

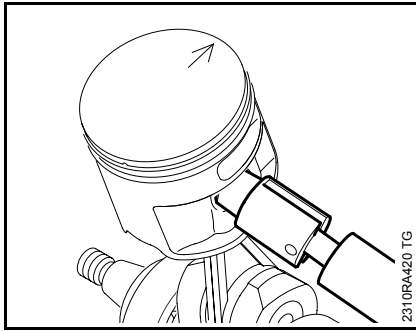
Use a suitable base.



- Remove the sleeve and slip it onto the other end of the shank – the inner pin must point towards the flat face.

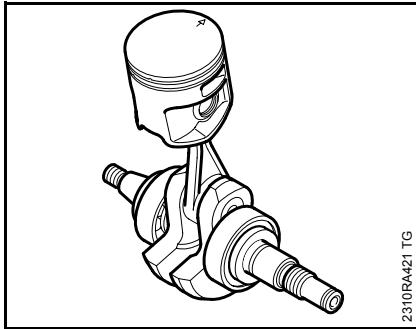


Fit the snap ring (1) so that its gap (arrow) is on the piston's vertical axis (it must point up).



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

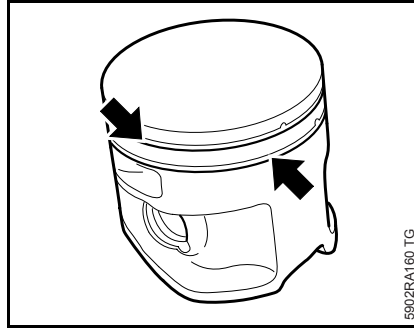
Make sure the tool is held square on the piston pin axis.



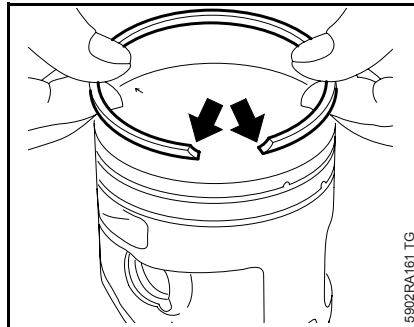
- Inspect the piston rings and replace if necessary, 6.9
- Install the crankshaft and new oil seals, 6.5
- Install the crankshaft, 6.6
- Install the engine, 6.5

## 6.9 Piston Rings

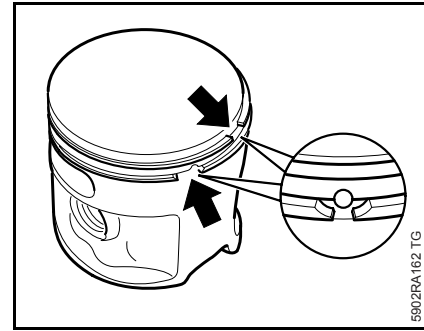
- Remove the piston, 6.8
- Remove the piston rings from the piston.



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




- Position the new piston rings so that the radii face upward (arrows).



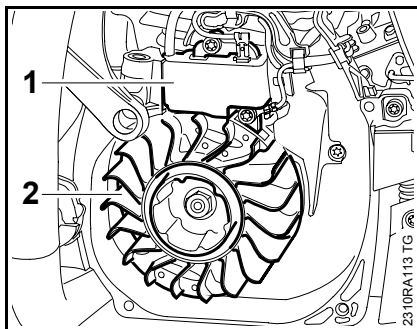
- Carefully fit the piston rings over the piston
  - they might otherwise break.
- Install the piston rings so that the radii at the ring gap meet at the fixing pins in the piston grooves (arrows).
- Check correct installed position of the piston rings (arrows).
- Install the piston, 6.8
- Reassemble all other parts in the reverse sequence.

## 7. Ignition System

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

Troubleshooting on the ignition system should always begin at the spark plug,  3.5

- Remove the fan housing,  8.2



The electronic (breakerless) 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:

1. High voltage output with fixed ignition lead.
2. Connector tag for the 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).

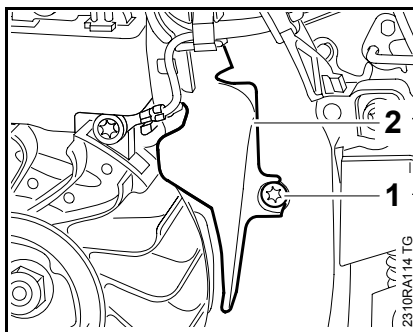
### 7.1 Ignition Timing

Ignition timing is fixed and cannot be adjusted during repair work.

Since there is no mechanical wear in these systems, ignition timing cannot get out of adjustment during operation.


### 7.2 Preseparator

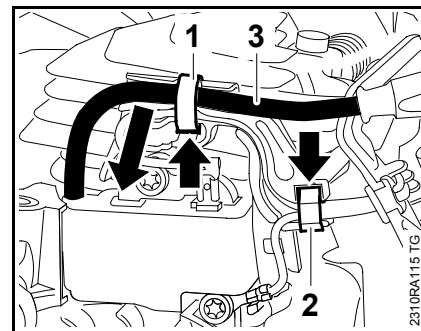
- Remove the fan housing,  8.2



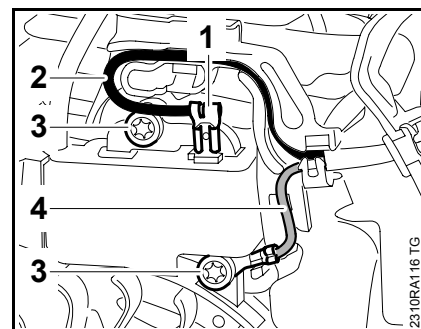
- Take out the screw (1).
- Check the preseparator (2) and replace if necessary
- Reassemble in the reverse sequence.

### 7.3 Install new ignition module

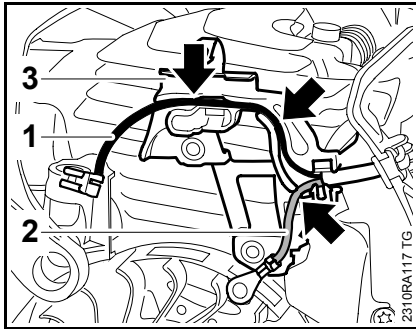
- Remove the fan housing,  8.2
- Pull the boot off the spark plug.



- Pull the retainers (1) and (2) carefully out of the slots (arrows) and open them.
- Pull the ignition lead (3) out of the guide.



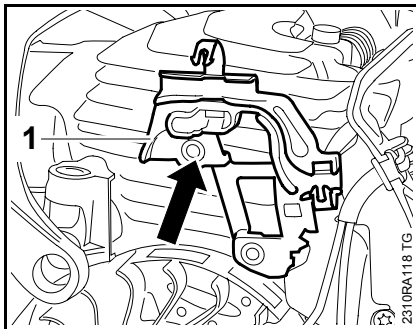
- Disconnect terminal (1) of the short circuit wire (2).
- Take out the screw (3) with washers.
- Remove the ground wire (4).
- Remove the ignition module.



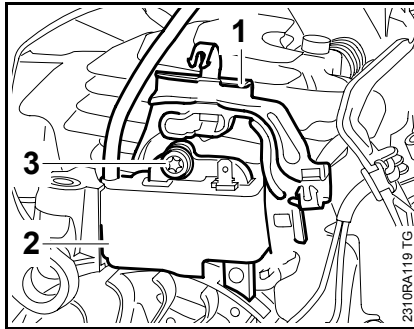
- Pull the short circuit wire (1) and ground wire (2) out of the guides (arrows) and remove the retainer (3).

- Check ignition lead, replace ignition module if necessary
- Check the spark plug boot and replace if necessary, 7.5
- Troubleshooting, 3.5

## Installing

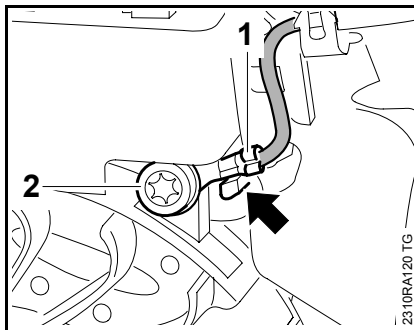


- Position the retainer (1) against the cylinder and attach its pegs to the bosses.

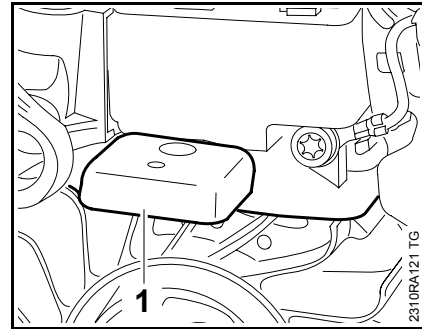


- Hold the retainer (1) against the cylinder and place the ignition module (2) in position.
- Fit the screw (3) with washer – do not tighten down yet.

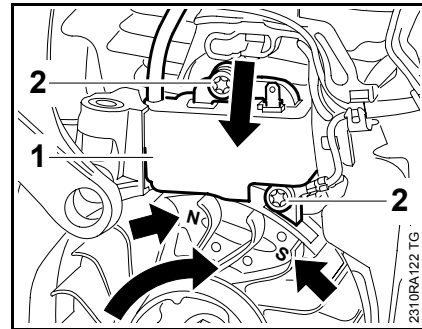
The crimped side of the ground wire terminal must face the screw head.



- Fit the ground wire (1) so that the terminal butts against the stop (arrow) and its crimped side faces the screw head.
- Fit the screw (2) with washer – do not tighten down yet.

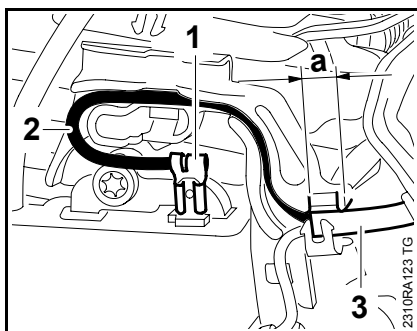


- Push the ignition module back and slide the setting gauge (1) 1111 890 6400 between the arms of the ignition module and the flywheel magnet poles.



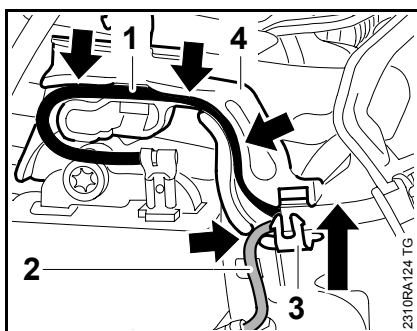
The setting gauge is not shown in the illustration.

- The flywheel must turn freely.
- Rotate the flywheel until the magnet poles (arrows) are next to the ignition module (1).
- Press the ignition module (1) against the setting gauge and tighten down the screws (2) firmly – the ground wire terminal must butt against the stop.
- Remove the setting gauge.
- Check operation
  - Rotate the flywheel and make sure it does not touch the ignition module.

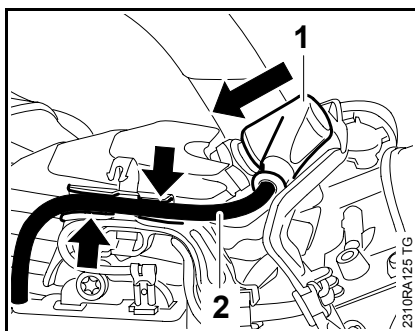


Crimped side of terminal (1) must face outwards.

- Connect the short circuit wire terminal (1) – the terminal must be pushed fully home.
- Push the short circuit wire (2) and protective tube (3) into the guide so that "a" is about 5 mm. – The protective tube must be pushed into the grommet on the air guide shroud as far as stop.

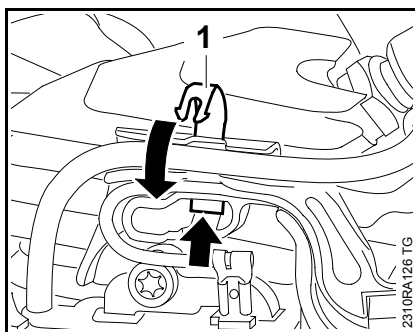


- Push short circuit wire (1) and ground wire (2) fully into the guides (arrows) and push the retainer (3) into the slot in retainer (4) until it snaps into position. – The wiring harness is secure.



- Fit the boot (1) on the spark plug so that it is parallel to the air guide shroud.
- Push the ignition lead (2) fully into the guide (arrows). – Note installed position of ignition lead, see illustration.

Ignition lead and spark plug boot must not touch the air guide shroud.



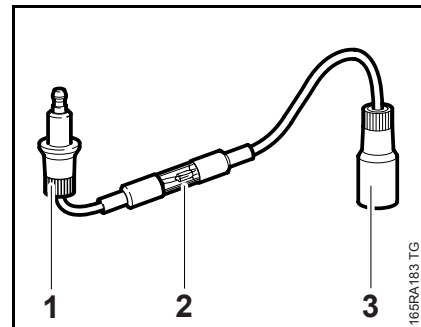
- Push the retainer (1) into the slot (arrow) until it snaps into position.
- Reassemble all other parts in the reverse sequence.

#### 7.4 Testing the Ignition Module

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 ZAT 4 ignition system 5910 850 4503



- Before starting the test, install a new spark plug in the cylinder and tighten it down firmly.
- Connect spark plug boot to the input terminal (1). Push the tester's output terminal (3) on to the spark plug.

High voltage – risk of electric shock.

- Crank the engine quickly with the rewind starter and check spark in the tester's window (2).

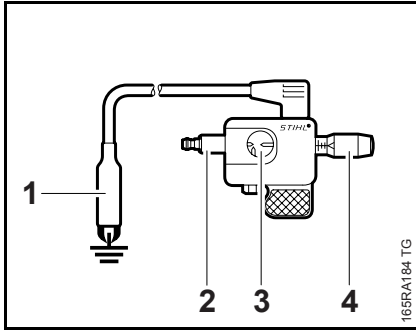
The engine may start and accelerate during the test.

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

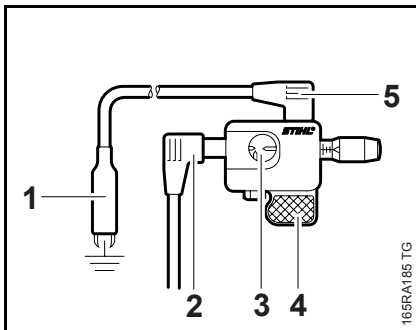
- If no spark is visible in the window (2), check the ignition system with the aid of the troubleshooting chart, 7.8



## Using the ZAT 3 ignition tester 5910 850 4520



- Before starting the test, install a new spark plug in the cylinder and tighten it down firmly.
- Connect spark plug boot to the terminal (2).
- Attach the ground terminal (1) to the spark plug.
- Use adjusting knob (4) to set the spark gap to about 2 mm, see window (3).



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).

High voltage – risk of electric shock.

- Crank the engine quickly with the rewind starter and check spark in the tester's window (3).

The engine may start and accelerate during the test.

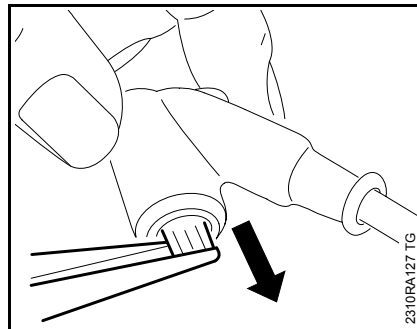
If a spark is visible in the window (3), the ignition system is in order.

- If no spark is visible in the window (3), check the ignition system with the aid of the troubleshooting chart, 7.8

### 7.5 Spark Plug Boot / Ignition Lead

The ignition module (1) and ignition lead (2) form a unit. A new ignition module must be installed if the ignition lead is damaged.

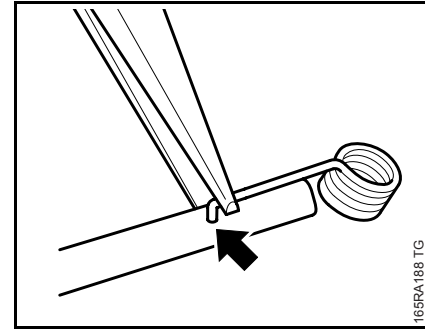
- Remove the shroud, 6.4
- Remove the spark plug boot and pull the ignition lead out of the guides, 7.3



- Use suitable pliers to pull the leg spring out of the spark plug boot.

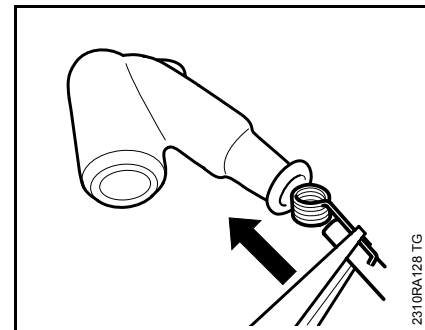
- Unhook the leg spring from the ignition lead.
- Pull the boot off the ignition lead.

### Installing

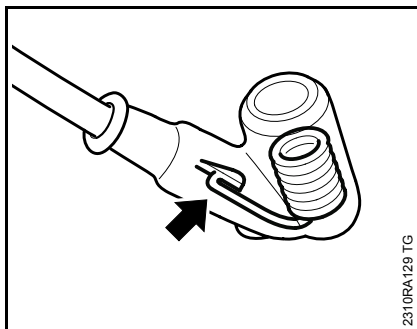


- If the ignition module is new, use a pointed tool to pierce the center of the ignition lead's insulation, about 15 mm from the end of the lead.

- Pinch the hook of the leg spring into the pierced hole in the center of the lead (arrow).



- Coat the inside of the spark plug boot with STIHL press fluid, 14
- Hold the ignition lead and leg spring together and push them into the spark plug boot.



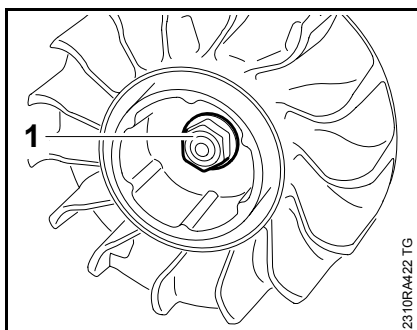
- Make sure the leg spring (arrow) locates properly inside the spark plug boot.
- Fit the spark plug boot and push the ignition lead fully into the guide, 7.3

Ignition lead and spark plug boot must not touch the air guide shroud.

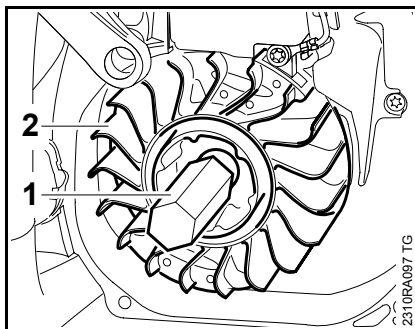
- Reassemble all other parts in the reverse sequence.

## 7.6 Flywheel

- Remove the fan housing, 8.2
- Use locking strip to block the piston, 4.2



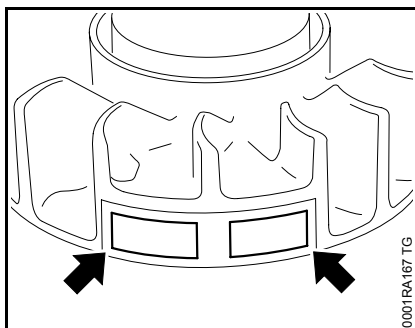
- Unscrew the flywheel nut (1).



- Screw the puller (1) 5910 893 0801 onto the crankshaft as far as stop, then back it off a 1/4 turn.
- Tap the puller (1) sharply to release the flywheel (2) from its tapered seat.

Take care not to damage the pawls on models with ErgoStart.

- Take the puller (1) 5910 893 4504 off the crankshaft and remove the flywheel.

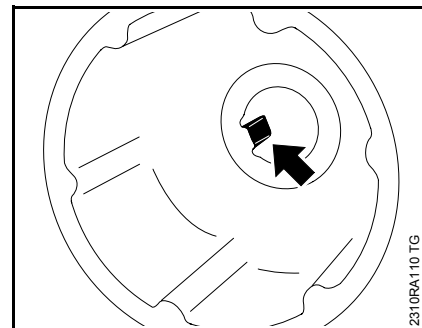


The flywheel and magnet poles (arrows) must not be damaged or have turned blue. Replace flywheel if necessary.

- On models with ErgoStart, check the pawls for damage and freedom of movement, 8.4.

## Installing

The flywheel and crankshaft stub must be free from grease before assembly.



Make sure the key (arrow) engages the slot in the crankshaft.

- Set the air gap between the ignition module and flywheel, 7.3
- Reassemble all other parts in the reverse sequence.

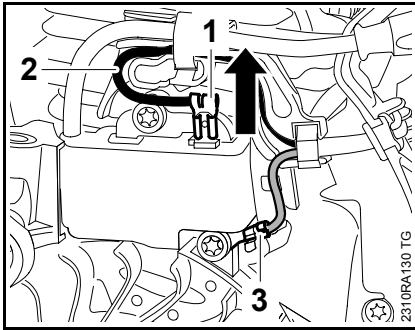
## 7.7 Short Circuit Wire

The ground and short circuit wires are combined in a wiring harness.

If the spark plug, ignition lead and spark plug boot are in order, check the short circuit wire.

### 7.7.1 Testing

- Remove the fan housing, 8.2



- Disconnect terminal (1) of the short circuit wire (2).
- Connect the ohmmeter to ground (3) and the short circuit wire's terminal (1).
- Set the Master Control lever to "0".

The resistance measured must be about 0  $\Omega$ . If it is much higher, the reason is a break and the wiring harness has to be replaced, 7.7.2.

- Set the Master Control lever to "I".

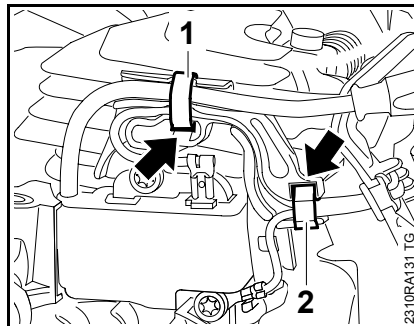
The resistance measured must be infinitely high. If not, replace the wiring harness, 7.7.2.

Also perform contact and continuity check on ground wire between terminal and contact spring and replace the wiring harness if necessary.

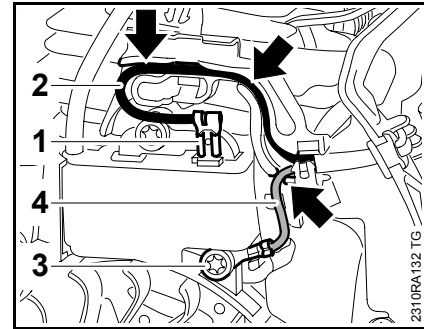
- If no fault can be found, check the ignition system with the aid of the troubleshooting chart, 7.8
- Reassemble in the reverse sequence.

### 7.7.2 Removing and Installing

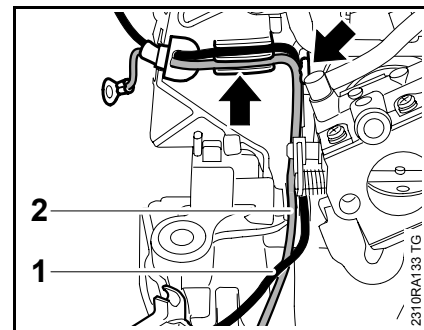
- Remove the shroud, 6.4
- Pull the boot off the spark plug.
- Remove the fan housing, 8.2
- Remove the choke rod, 10.3.3



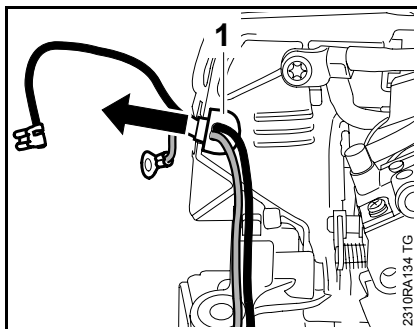
- Pull the retainers (1) and (2) carefully out of the slots (arrows) and open them.



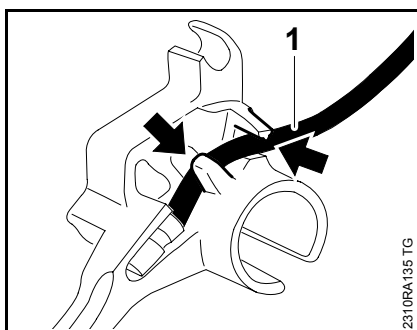
- Disconnect terminal (1) of the short circuit wire (2).
- Take out the screw (3).
- Pull the short circuit wire (2) and ground wire (4) out of the guides (arrows).
- Remove the filter base, 12.3
- Remove the contact spring, 7.7.4
- Pull the switch lever off the shaft on the filter base, 10.1
- Pull the carburetor towards the control handle
  - take care not to stretch the fuel hose.



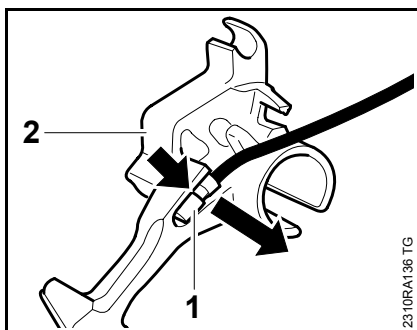
- Pull the short circuit wire (1) and ground wire (2) out of the guides (arrows) in the air guide shroud.



- Pull out the grommet (1) with wiring harness.

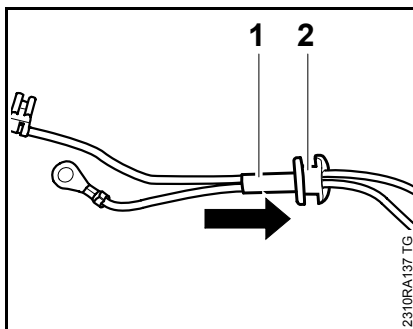


- Take the short circuit wire (1) out of the guides (arrows).



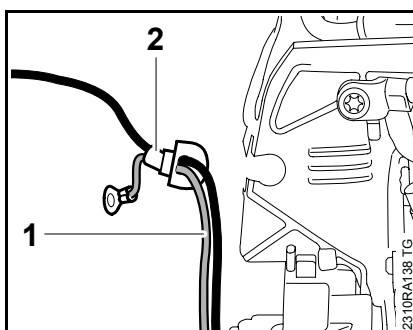
- Pry the terminal sleeve (1) out of the guide (arrow).
- Remove the Master Control lever (2).

## Installing

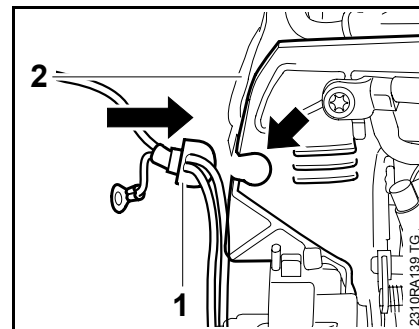


The protective tube (1) must locate in the grommet's bore.

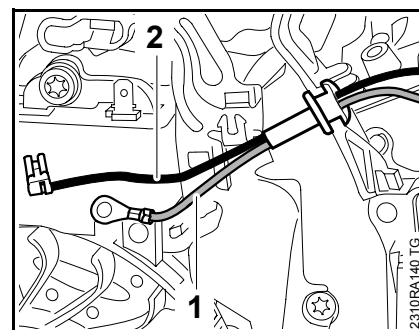
- If necessary, push the wiring harness into the grommet until the protective tube (1) locates in the grommet (2).



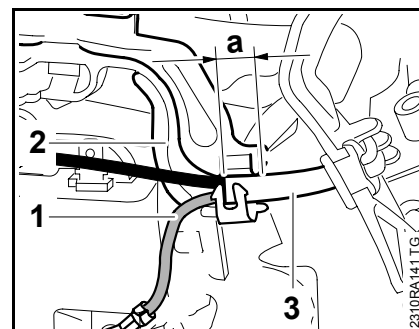
- Position the wiring harness (1) so that the protective tube (2) points towards the ignition module.



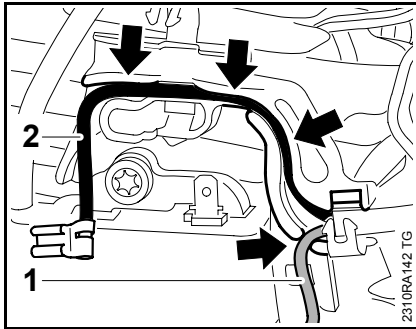
- Push the grommet (1) into the recess (arrow) in the air guide shroud (2) until it is flush with the outside edge.



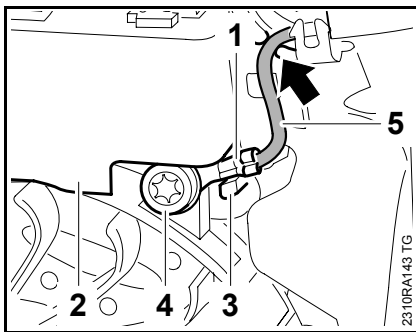
The ground wire (1) must be below the short circuit wire (2).



- Position the wiring harness (1) in the retainer (2) so that about 5 mm (a) of the protective tube (3) is held as shown – the protective tube must be pushed into the grommet as far as stop.

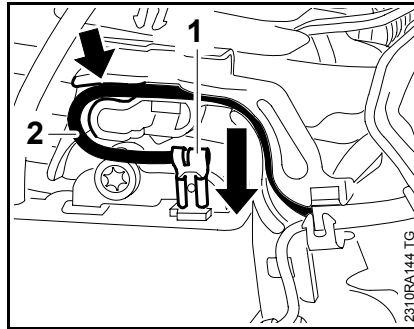


- Fit the ground wire (1) and short circuit wire (2) in the guides (arrows).



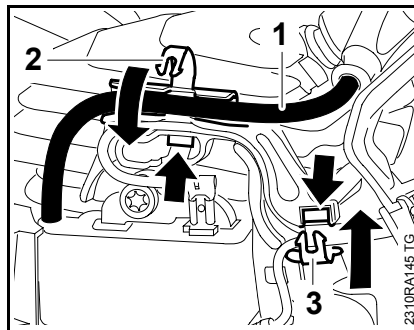
Ground wire: Crimped side of terminal (1) must face outwards.

- Position the terminal (1) between the ignition module (2) and stop (3).
  - Check the air gap between the ignition module and flywheel and adjust if necessary, [7.3](#)
- Fit the screw (4) with washer and tighten it down firmly.
- Press the ground wire (5) fully into the guide (arrow).



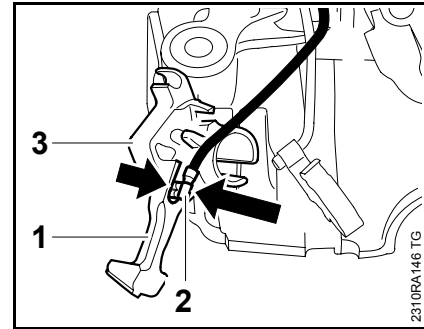
Short circuit wire: Crimped side of terminal (1) must face outwards.

- Connect terminal of short circuit wire (2) – make sure the terminal is pushed fully home.
- Press the short circuit wire (2) fully into the guide (arrow).

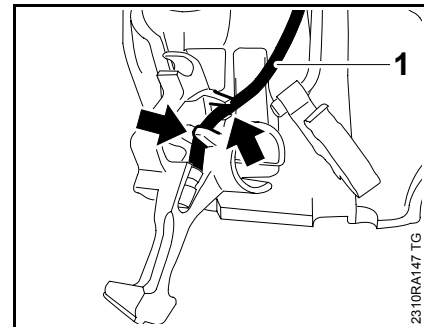


Check that the ignition lead (1) is properly seated in the guide.

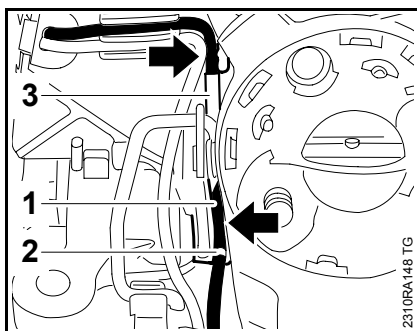
- Carefully push the retainers (2) and (3) into the slots (arrows) until they snap into place.
- Position filter base in the carburetor box.



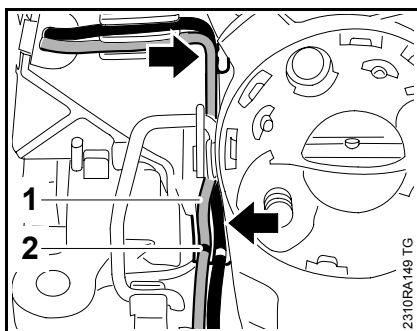
- Position the switch lever (1) in the carburetor box.
- Position terminal sleeve (2) of short circuit wire so that its crimped side faces the cam (3).
- Push terminal sleeve (2) into the guide (arrow) as far as stop.



- Fit the short circuit wire (1) in the guides (arrows).
  - Install the switch lever, [10.1](#)
  - Fit the contact spring, [7.7.4](#)
  - Install the filter base, [12.3](#)



- Use punch-down tool 5910 890 4000 to press the short circuit wire (1) into the guides (arrows) so that the marking (2) is at the edge of the guide and the protective tube (3) locates below the guide rib.



- Use punch-down tool 5910 890 4000 to press the ground wire (1) into the guides (arrows) so that the marking (2) is at the edge of the guide.
- Check operation of switch lever, 10.1
- Reassemble all other parts in the reverse sequence.

### 7.7.3 Ground Wire

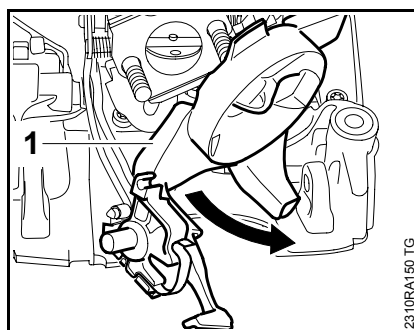
Test and install the ground wire as described for the short circuit wire.

- Check for contact and continuity and replace the wiring harness if necessary, 7.7

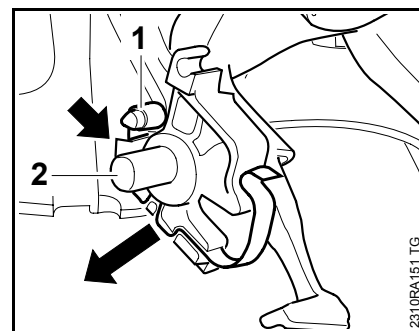
### 7.7.4 Contact Spring

The ground wire must be firmly seated in the contact spring's loop, perform contact and continuity test if necessary, 7.7.1.

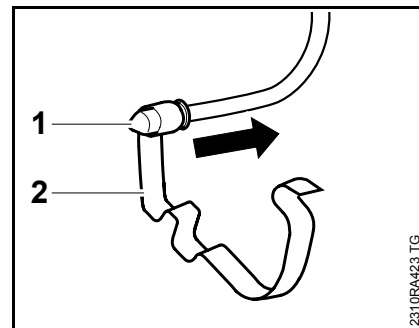
- Pull the filter base off the studs, 12.3



- Swing the filter base (1) to one side.

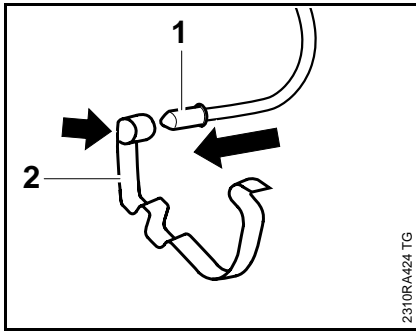


- Lift the contact spring (1) a little and ease it over the tab (arrow).
- Ease the contact spring (1) out of the guides in the filter base (2).

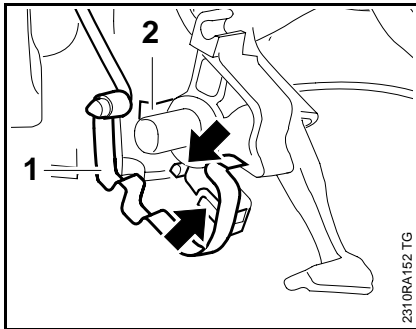


- Push the sleeve (1) out of the contact spring (2).
- Check the contact spring and replace it if necessary,

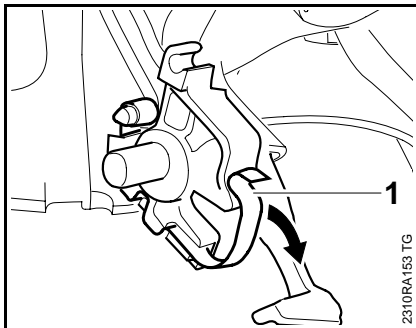
## Installing



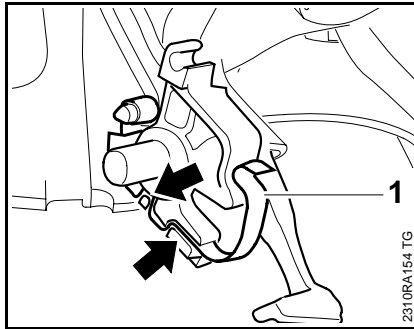
- Push the sleeve (1) into the loop (arrow) of contact spring (2) as far as stop.



- Position the contact spring (1) against the guide (arrows).
- Lift the contact spring (1) a little and ease it over the tab (arrow).  
– take care not to overstretch the contact spring.

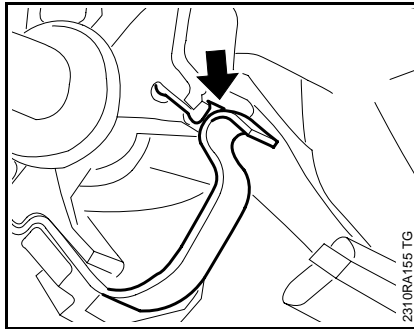


Before pushing the contact spring (1) fully home, lift it a little and ease it over the switch level – no more than 2 mm.

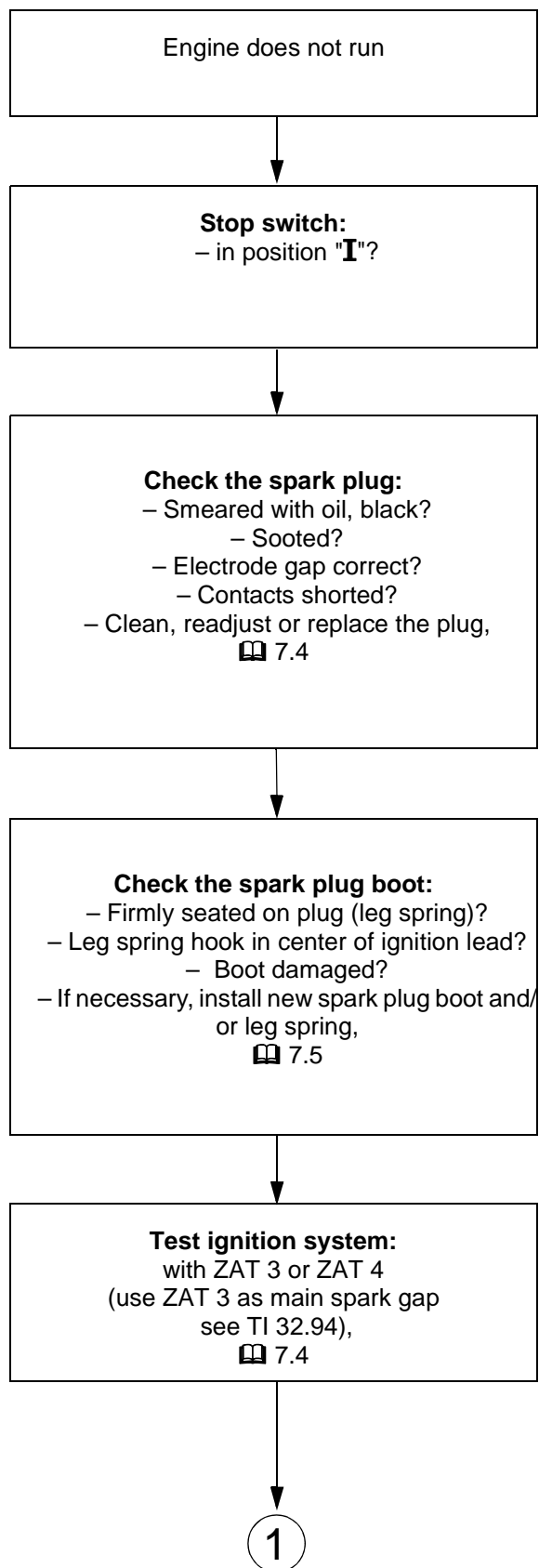


- Push the contact spring (1) into the guide (arrows) until it is engaged by the tab.

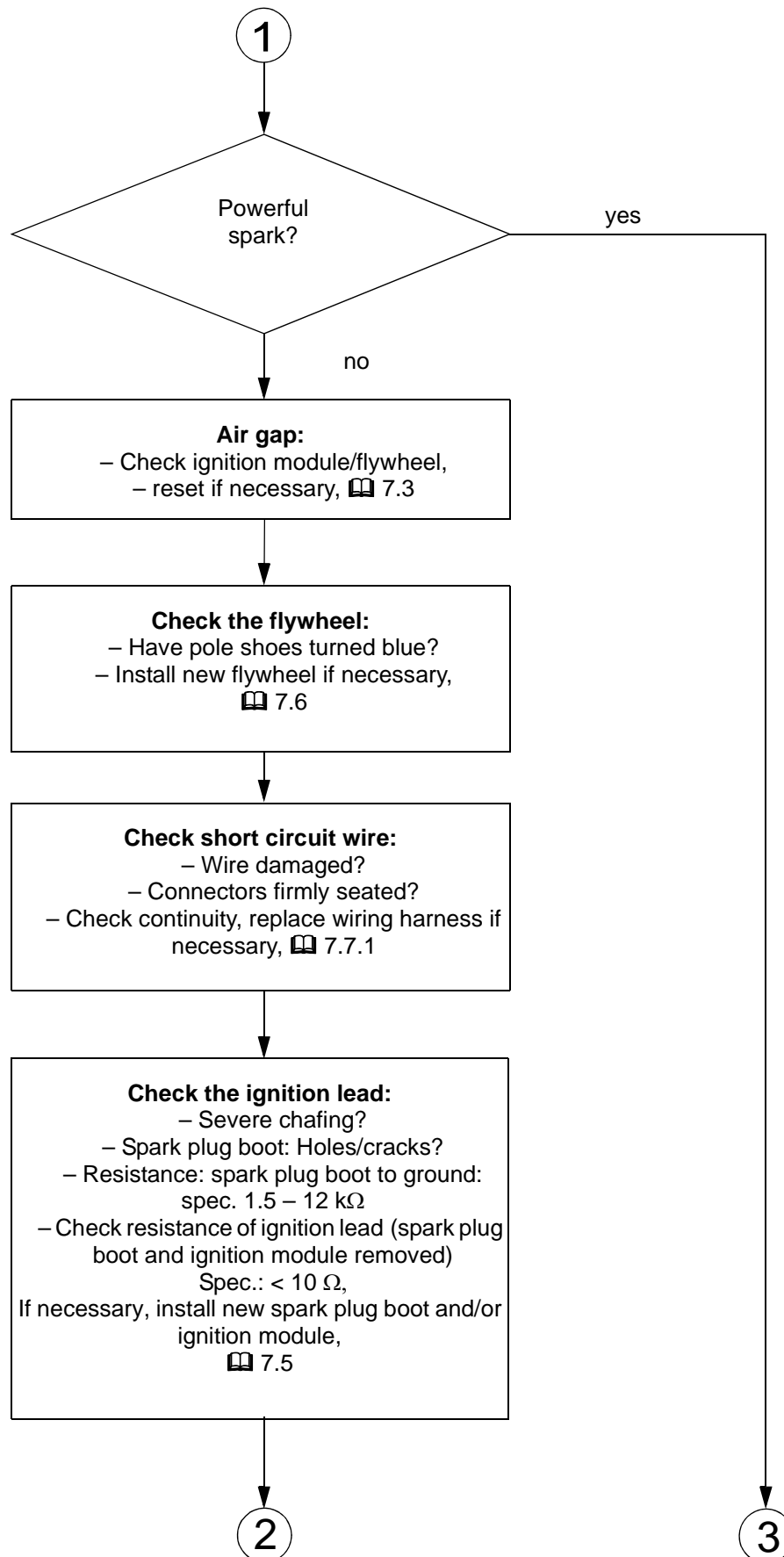
– Install the filter base, 12.3

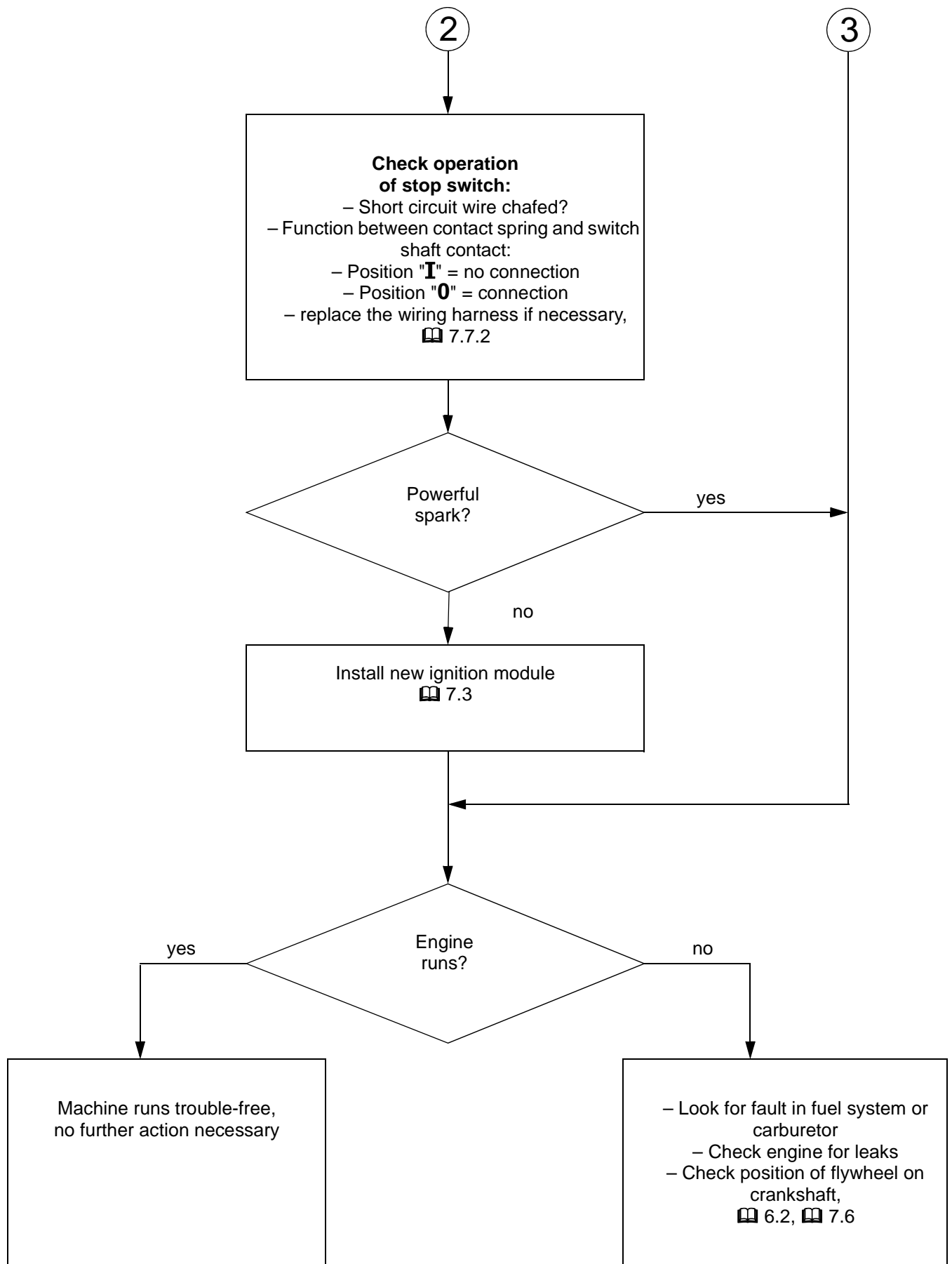


- Check operation  
– short circuit wire's terminal sleeve must touch the contact spring (arrow) in position "0".
- Reassemble all other parts in the reverse sequence.










## 8. Rewind Starter

### 8.1 General

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 a standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons) to the rewind spring.


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

Before installing, lubricate the rewind spring and starter post with STIHL special lubricant,  14.


If clogged with dirt or pitch, the entire starter mechanism, including the rewind spring, must be removed and disassembled. Take particular care when removing the rewind spring.

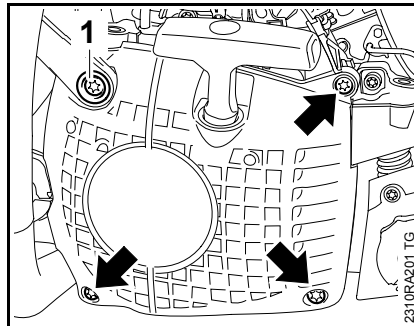
- Clean all components.

### Models with ErgoStart

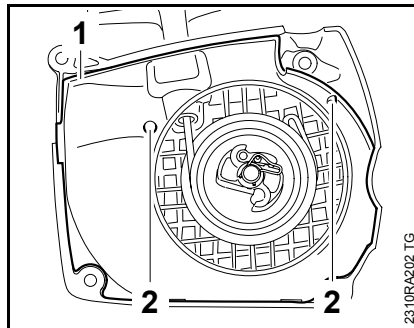
- Relieve tension of rewind spring,  8.4

### 8.2 Fan housing

- Remove the shroud,  6.4

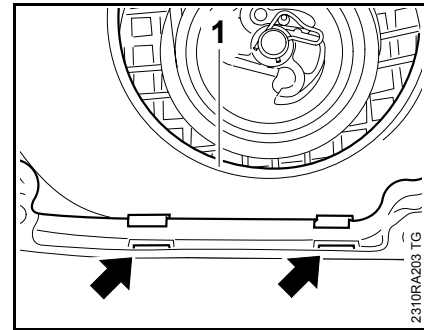


- Take out the screw (1) with sleeve and screws (arrows).
- Lift the hand guard a little and remove the fan housing.

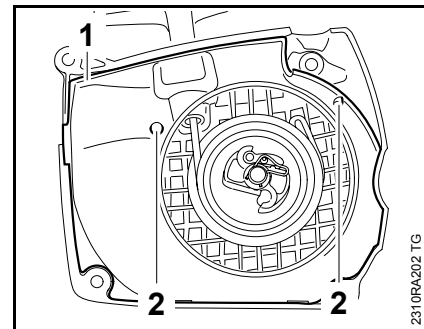


- Apply a punch to the holes on the other side of the segment (1) to push it off the pegs (2).
- Examine the fan housing and segment and replace if necessary.

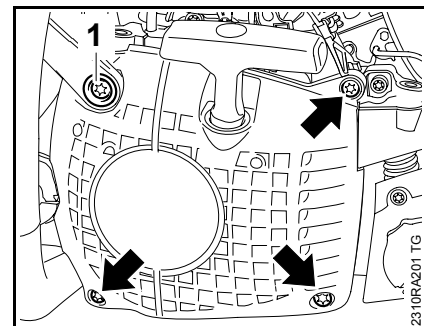
### Installing



- Engage the segment (1) in the slots (arrows) in the fan housing first and swing it into position.





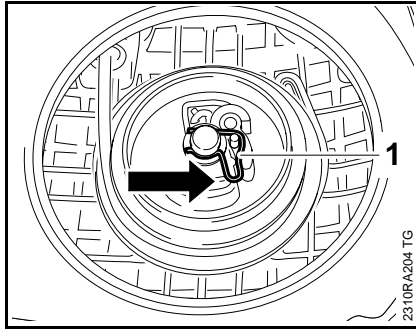
- Push the segment (1) onto the pegs (2) as far as stop.



- Lift the hand guard a little and fit the fan housing in position.
- Insert screw (1) with sleeve and screws (arrows) and tighten them down firmly.
- Reassemble all other parts in the reverse sequence.

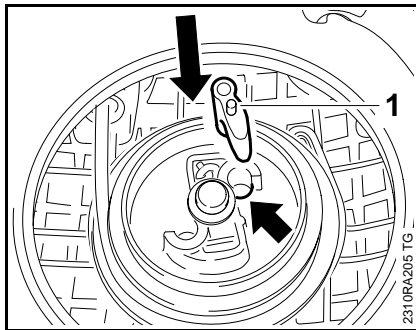
### 8.3 Pawls


- Remove the fan housing,  8.2
- Relieve tension of rewind spring,  8.5

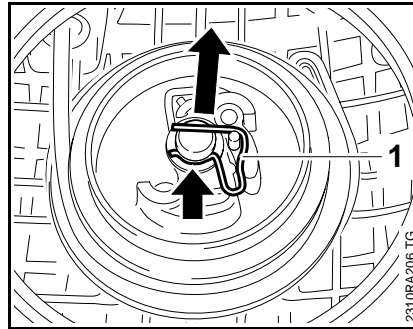


- Carefully ease the spring clip (1) off the starter post.
- Pull the pawl out of the rotor.

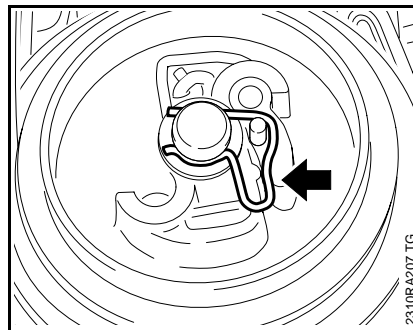
#### Installing



- Fit the new pawl in the bore (arrow) and lubricate the peg (1),  14



- Position the spring clip (1) so that its loop engages the peg on the pawl. The rounded part of the spring clip (short arrow) must engage the starter post's groove.
- Push the straight part of the spring clip over the starter post until it snaps into the groove.




The spring clip's guide loop must be in line with the pawl (arrow).



#### Check operation

- Pull the starter rope, the rotor turns and the peg on the pawl moves in the direction of the spring loop – the pawl moves outwards.
- Reassemble all other parts in the reverse sequence.

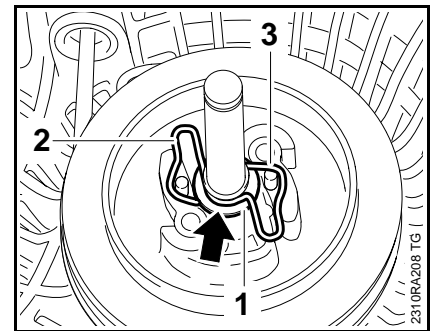
### Models with ErgoStart

- Remove the ErgoStart,  8.4

Two pawls are installed in models with ErgoStart. The removal procedure is the same as for the standard version.

- Lubricate the seats of the new pawls,  14
- Fit the new pawls and lubricate their pegs with resin-free oil,  14

#### Installing




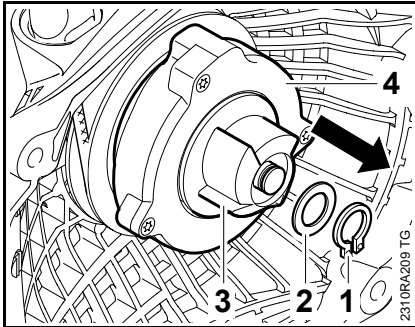
Make sure the washer (1) is in place.

- Position the spring clip (2) so that its loops engage the pegs on the pawls. The rounded part of the spring clip (short arrow) must engage the starter post's groove.
- Push the straight part (3) of the spring clip over the starter post until it snaps into the groove.
- Reassemble all other parts in the reverse sequence.

## 8.4 ErgoStart


The spring may still be under tension and must always be relieved before assembling.

- Pull out the starter rope until the engine turns – this relieves spring tension.
- Remove the fan housing and, if necessary, the segment,  8.2

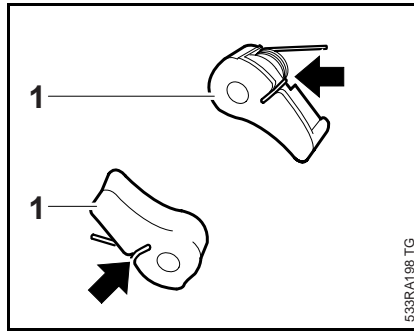


- Remove the circlip (1).
- Remove the washer (2) and carrier (3).
- Pull off the spring housing (4).

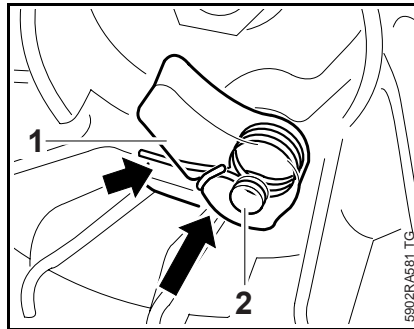


- Remove the E-clips (arrows).
- Pull off the pawls (1) and remove the torsion springs.
- Clean the seats of the pawls (1),  14

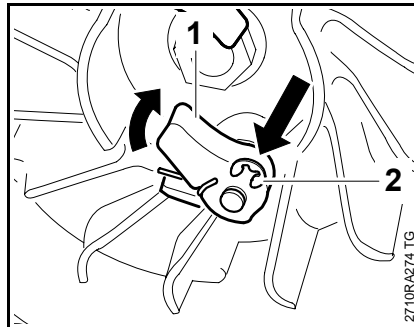
## Installing



- Fit the torsion springs on the pawls (1) – note installed position (arrows).



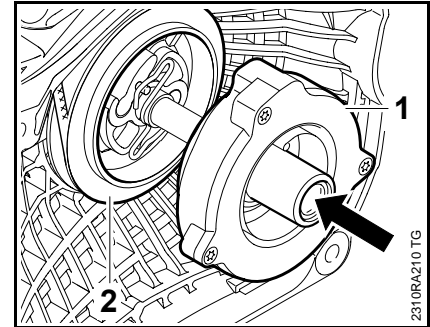
- Fit the pawls (1) on the pins (2) on the flywheel, preload the torsion springs at the same time and locate them against the ribs (arrow).



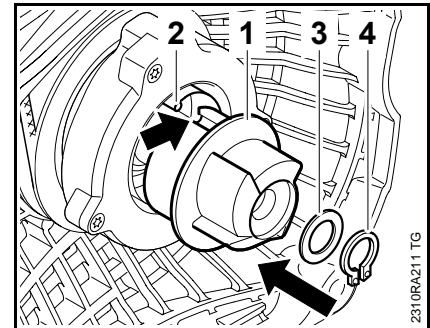
- Fit the pawls (1) so that they can move towards the center of the flywheel as far as stop (arrow).
- Fit the E-clips (2).

## Check operation

Pawls must move freely and be held against the stop by the torsion springs.



- Push the spring housing (1) over the starter post and into the pawls (2) – the pawls must engage the spring housing.




- Push the carrier (1) into the spring housing so that its lug (arrow) engages the loop (2) of the rewind spring.
- Fit the washer (3).
- Fit the E-clip (4).  
– Do not overstretch the retaining ring.
- Reassemble all other parts in the reverse sequence.


## 8.5 Rope Rotor

### Relieving tension of rewind spring

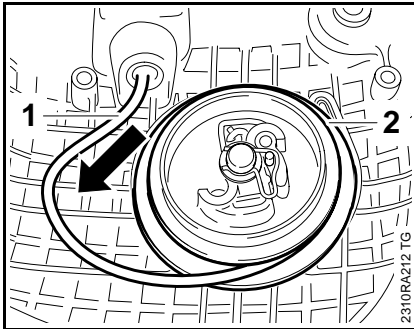
The system will not be under tension if either the starter rope or rewind spring is broken.



- Remove the fan housing and the segment,  8.2

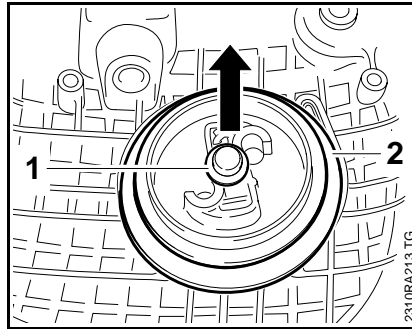
### Models with ErgoStart

- Remove the ErgoStart,  8.4

### All models




- Pull out the starter rope (1) about 5 cm and hold the rope rotor (2) steady.
- Take three full turns of the rope off the rope rotor.
- Pull out the rope with the starter grip and slowly release the rope rotor.
- Remove the starter rope or remaining rope from the rotor,  8.6
- Remove the spring clip and pawl(s),  8.3

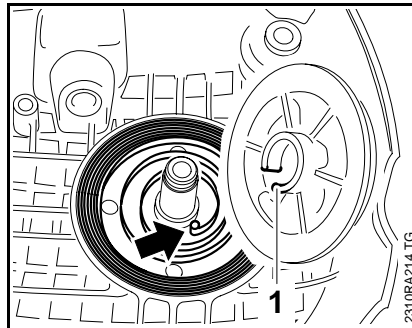


- Remove the shim (1).

Rewind spring must be relaxed.

- Carefully remove the rope rotor (2).
  - The rewind spring may pop out and unwind.
- Check the rope rotor and replace if necessary.
- Coat bore in rope rotor with STIHL special lubricant,  14





### Installing




- Fit the rope rotor on the starter post so that the inner spring loop (arrow) engages the recess (1).

The recess in the hub of the rope rotor is the anchor point for the spring.


- Fit the cover washer.

- Install the pawl(s) and spring clip,  8.3
- Install the starter rope,  8.6
- Tension the rewind spring,  8.7
- Lubricate peg(s) on the pawl(s) with grease,  14
- Reassemble all other parts in the reverse sequence.


## 8.6 Starter Rope / Grip

- Remove the fan housing and the segment,  8.2

### Models with ErgoStart

- Remove the ErgoStart,  8.4

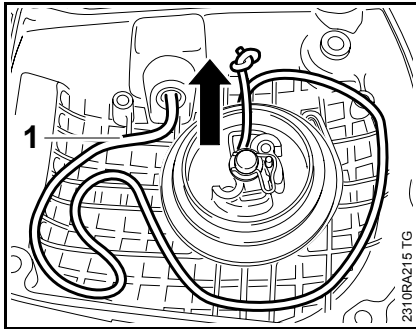
### All models

- Relieve tension of rewind spring,  8.5

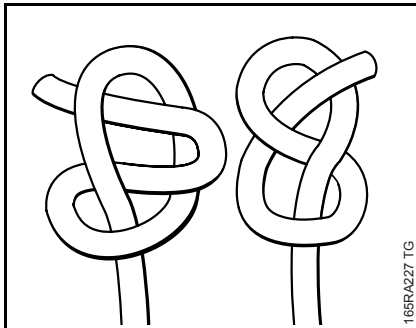
The system will not be under tension if the starter rope is broken.

- Remove any remaining rope from the rope rotor.

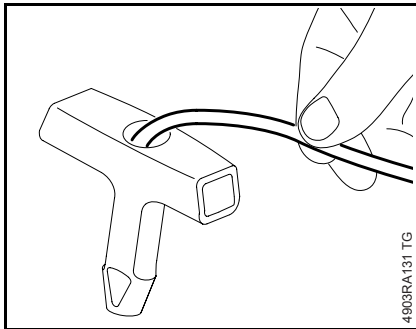
Do not shorten the starter rope.



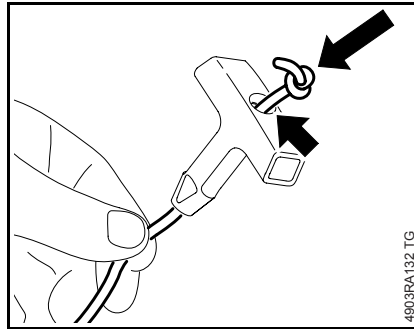
- Push the end of the starter rope (1) out a little and undo the knot.
- Pull the starter rope out of the rope rotor and fan housing.



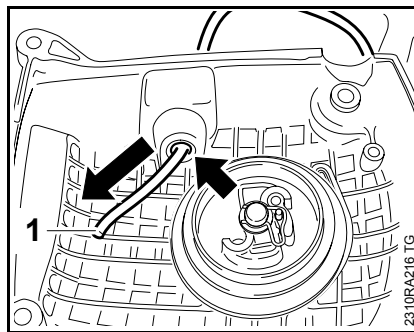
- Tie one of the special knots shown in the end of the rope.



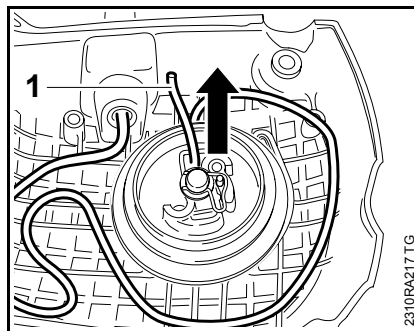
- Thread the rope through the top of the starter grip.



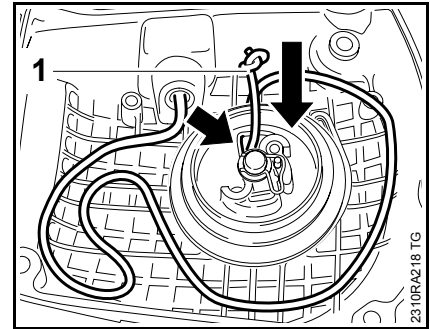
Pull the rope into the starter grip until the knot is properly seated in the grip (small arrow).



- Thread the starter rope (1) through the guide bushing (arrow).



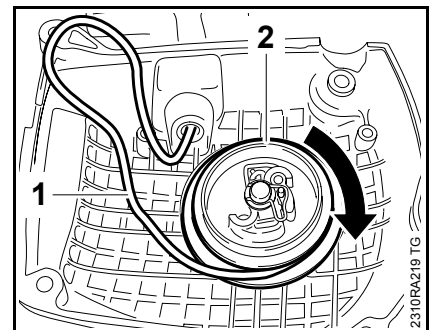
- Thread the starter rope (1) through the side of the rope rotor.
- Secure the rope (1) with a simple overhand knot.



- Pull the rope (1) back into the rotor until the knot locates in the recess (arrow).
- Tension the rewind spring, [8.7](#)
- Reassemble all other parts in the reverse sequence.

## 8.7 Tensioning the Rewind Spring

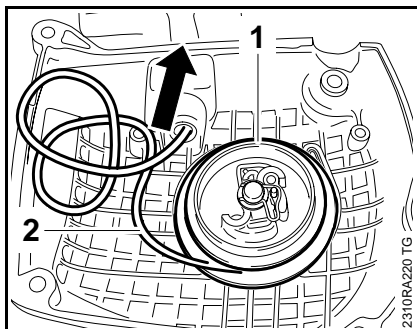
- Remove the fan housing and the segment, [8.2](#)



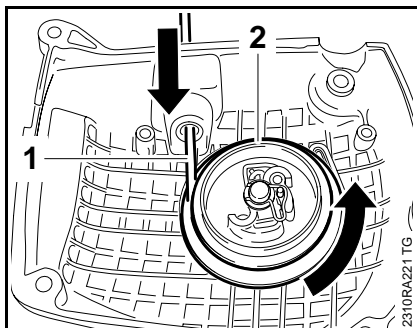
- Pull out a short length of starter rope (1).
- Use the starter rope (1) to rotate the rope rotor (2) six turns clockwise.

The rewind spring is now tensioned.

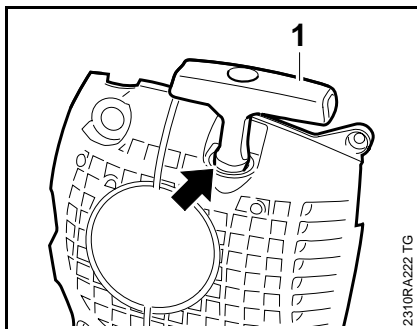
Hold the rope rotor steady since it will otherwise spin back and may damage the rewind spring.



- Hold the rope rotor (1) steady.
- Pull out the twisted rope (2) with the starter grip and straighten it out.



- Hold the starter grip (1) firmly to keep the rope tensioned.
- Let go of the rope rotor (2) and slowly release the starter rope so that it can rewind properly.



The starter grip (1) must sit firmly in the rope guide bushing (arrow) 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 another full turn before maximum spring tension is reached. If this is not the case, reduce spring tension since there is otherwise a risk of breakage.

#### To reduce spring tension:

Pull the rope out, hold the rope rotor steady and take off one turn of the rope.

- Reassemble all other parts in the reverse sequence.

### 8.8 Replacing the Rewind Spring

- Troubleshooting, [14](#) 3.4

The replacement spring, in a spring housing, comes ready for installation.

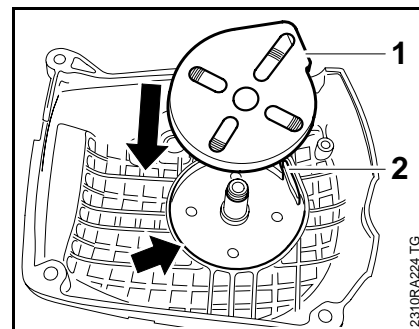
- Wear a face shield and work gloves to protect your eyes and hands from injury.
- Remove the fan housing and the segment, [14](#) 8.2
- Relieve tension of rewind spring if necessary and remove the rope rotor, [14](#) 8.5
- Remove any remaining pieces of the old rewind spring.

If the rewind spring can no longer be properly tensioned, install a new spring.

Even a worn rewind spring is still pre-loaded in the installed condition.

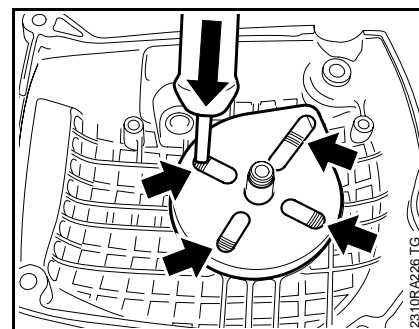
- Place a blanket over the work area and pull the rewind spring out of the fan housing.

### Installing new rewind spring



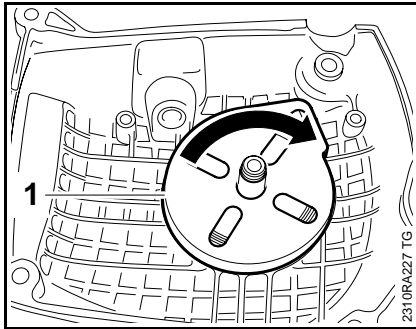
- Lubricate the replacement spring with frame with a few drops of STIHL special lubricant before installing, [14](#) 14

- Position the replacement spring with frame in the fan housing so that the anchor loop (1) is above the lug (2) and engages the seat (arrow).



- Starting at the anchor loop, apply suitable tool to the recesses (arrows) and push the rewind spring into its seat in the fan housing – the frame slips off during this process.

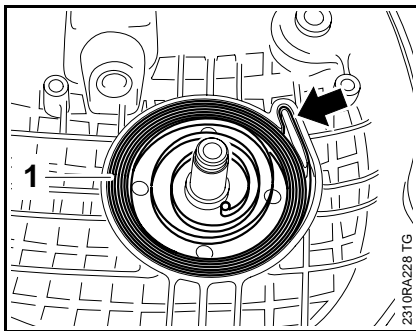




- Press the frame (1) against the rewind spring and rotate it slightly clockwise until the spring is properly seated.

The rewind spring may pop out and unwind.

- Carefully remove the frame and keep it in a safe place
  - the frame is used as an assembly tool for installing a rewind spring that has popped out and unwound.

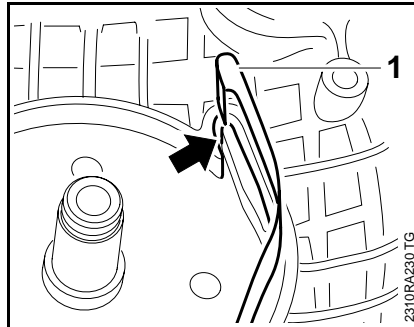


Make sure that the rewind spring (1) is properly seated and the outer anchor loop is engaged on the lug (arrow). If necessary, push the rewind spring fully into its seat in the fan housing.

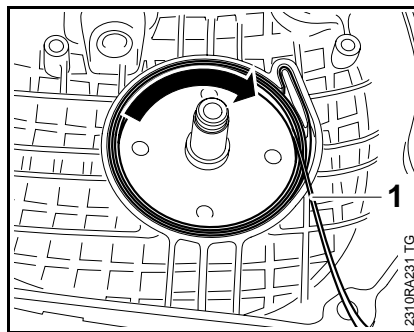
- Secure the spring so that it cannot pop out.
- Install the rope rotor, 8.5
- Reassemble all other parts in the reverse sequence.

## Installing unwound rewind spring

If the rewind spring has popped out, refit it in the fan housing as follows:



- Arrange the rewind spring (1) in its original position.
- Fit the anchor loop in its seat (arrow) in the fan housing.

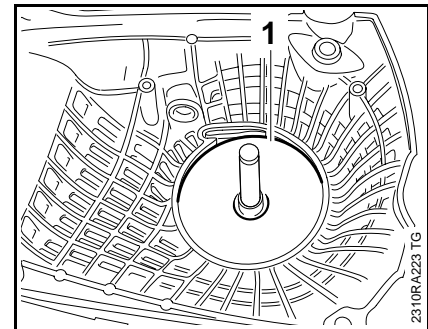


- Fit the rewind spring (1) clockwise in the housing, holding the windings steady in the process.

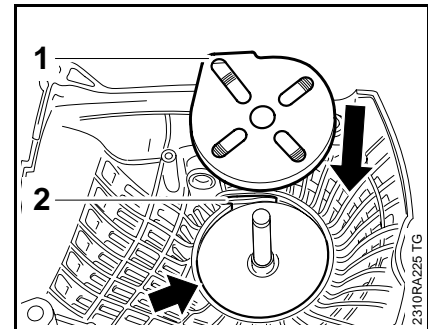
The procedure is otherwise the same as that for installing a new rewind spring.

## Models with ErgoStart

### Installing new rewind spring

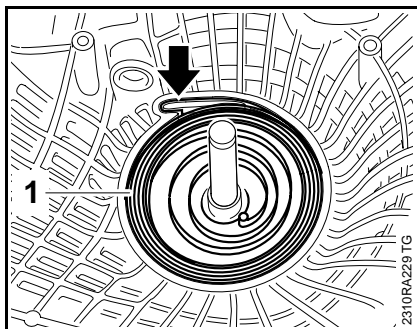


- Check the washer (1) and replace it if necessary.




- Lubricate the replacement spring with frame with a few drops of STIHL special lubricant before installing, 14
- Position the replacement spring with frame in the fan housing so that the anchor loop (1) is above the lug (2) and engages the seat (arrow).

The procedure is otherwise the same as that for installing a new rewind spring on models without ErgoStart.



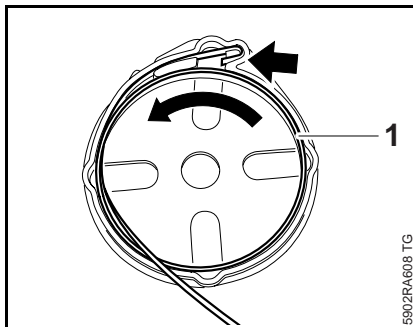
Make sure that the rewind spring (1) is properly seated and the outer anchor loop is engaged on the lug (arrow). If necessary, push the rewind spring fully into its seat in the fan housing.

- Secure the spring so that it cannot pop out.
- Install the rope rotor,  8.5
- Reassemble all other parts in the reverse sequence.

## Re-installing rewind spring in frame

As the spring seat is deeper on models with ErgoStart, the rewind spring can only be fitted directly in the fan housing if it is preassembled in a frame.

If the rewind spring has popped out, refit it in the frame as follows:



- Fit the anchor loop in its seat (arrow) in the frame.
- Fit the rewind spring (1) counterclockwise in the frame, holding the windings steady in the process.

The procedure is otherwise the same as that for installing a new rewind spring on models without ErgoStart.


## 9. Servicing the AV System

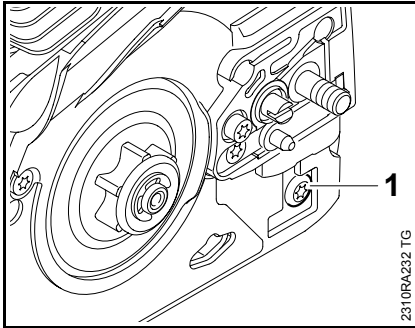
Vibration-damping springs, annular buffers and stop buffers are used for the connection between the handlebar, tank housing and engine housing.


Damaged springs and buffers must always be replaced.

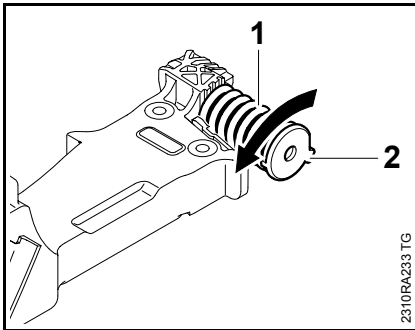
### 9.1 AV Spring on Oil Tank

The antivibration elements are located in the area of the oil tank and are secured to the underside of the machine.

- Remove the handlebar,  9.4



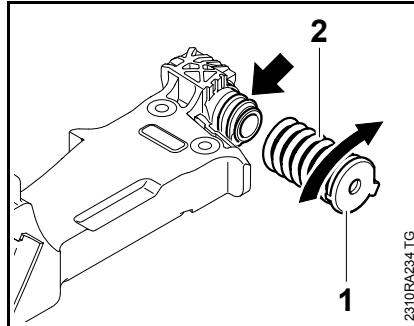
- Take out the screw (1).
- Remove the tank housing,  12.11.5




- Unscrew the AV spring (1) with bearing plug (2).

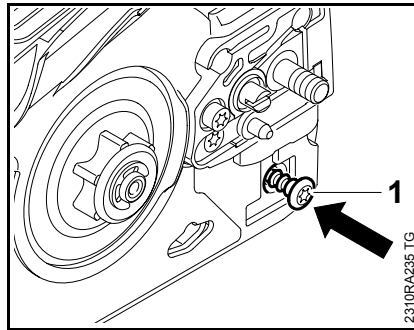
- Check the AV spring and plug, replace if necessary.

#### Installing




The bearing plug (1) must be screwed into the AV spring (2) as far as stop.

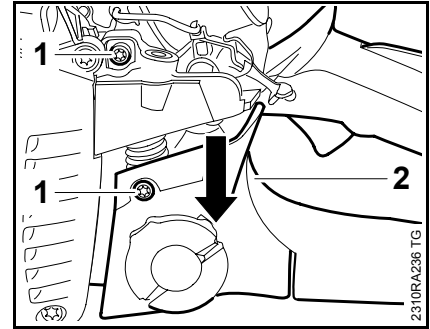
- Screw the AV spring (2) with bearing plug (1) onto the plug (arrow) as far as stop.
- Install the tank housing,  12.11.5



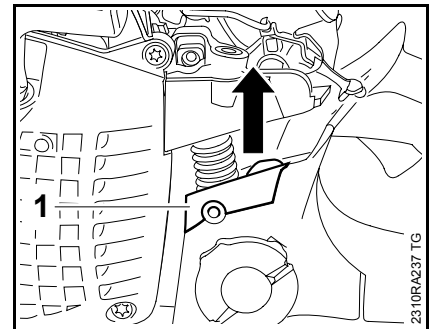
- Insert and tighten down the screw (1) firmly.
- Reassemble all other parts in the reverse sequence.

### 9.2 AV Spring on Fuel Tank

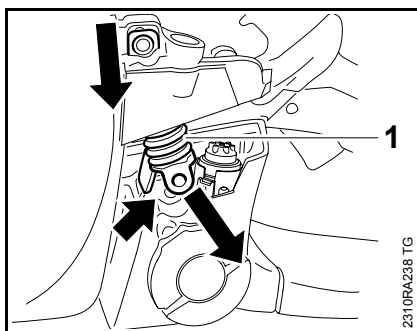
- Remove the handlebar,  9.3



- Take out the screws (1).
- Press the tank housing (2) down a little and hold it there.

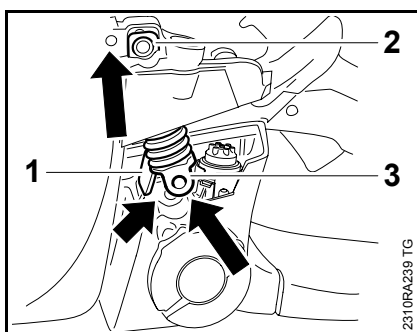


- Remove the cover (1).

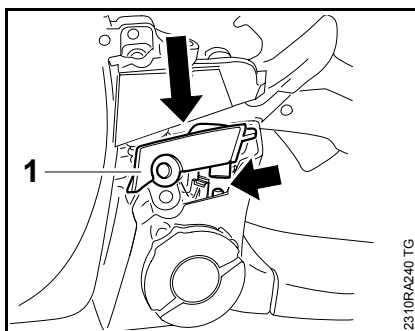


- Push the AV spring (1) upwards and lift it out of the guide (arrow).
- Remove the AV spring (1) between the engine housing and tank housing.
- Check the AV spring and plug, replace if necessary.

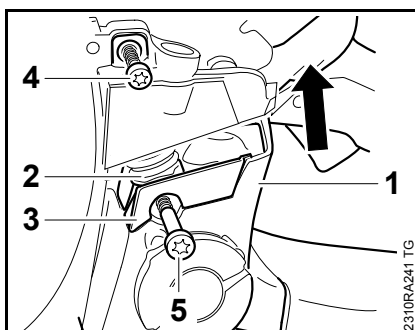
#### Installing



- Press the tank housing down a little and hold it there.
- Position the AV spring so that the tab (1) faces the engine housing and then push it, bearing plug (2) first, between the engine housing and tank housing.
- Push the bearing plug (2) through the opening.
- Push the bearing plug (3) into its seat (arrow).



- Fit the cover (1) so that it engages the peg (arrow).

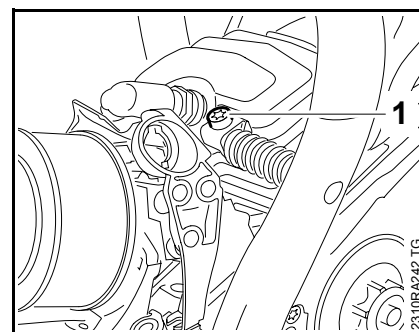


- Push the tank housing (1) upwards and hold it there.
- Position the bearing plug (2) and cover (3) so that their bores are in line with the bore in the tank housing.
- Insert and tighten down the screws (4) and (5) firmly.
- Reassemble all other parts in the reverse sequence.

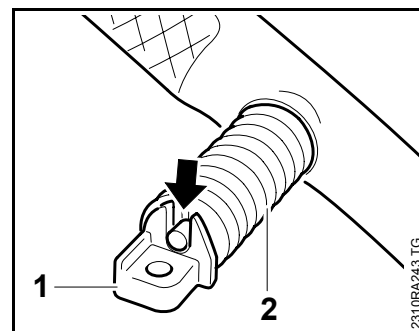
### 9.3 AV Spring on Handlebar

The AV spring is located between the handle frame and cylinder.

- Remove the shroud, [📖 6.4](#)
- Remove the air filter, [📖 12.1](#)

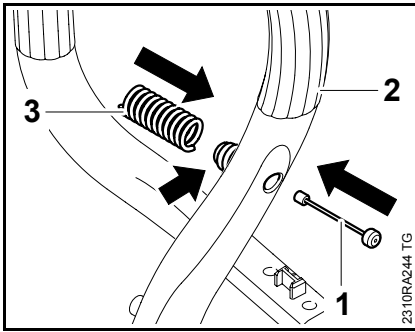


- Take out the screw (1).
- Remove the handlebar, [📖 9.4](#)

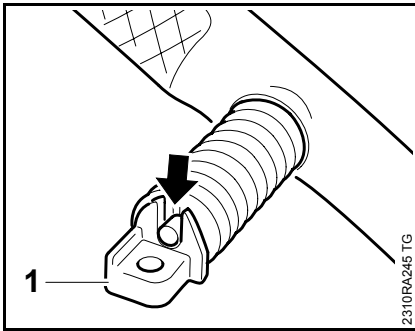


- Unscrew the bearing plug (1) and disconnect the retainer (arrow).
- Unscrew the spring (2) and pull the retainer (arrow) out of the handlebar.
- Inspect the spring, bearing plug and retainer, replace if necessary.

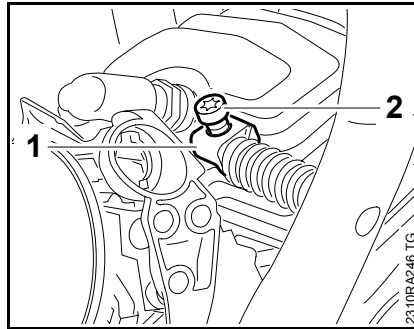
## Installing



- Push the retainer (1), small nipple first, through the hole in the handlebar (2).
- Screw the spring (3) onto the peg (arrow) as far as stop.



- Attach the retainer (arrow) to the bearing plug (1).
- Screw the bearing plug (1) into the spring as far as stop.
- Install the handlebar, 9.4

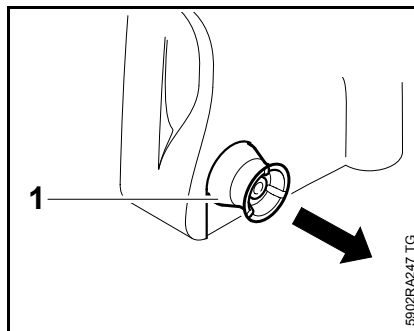


- Position the bearing plug (1) on the cylinder.
- Insert and tighten down the screw (2) firmly.
- Reassemble all other parts in the reverse sequence.

### 9.3.1 Stop Buffers

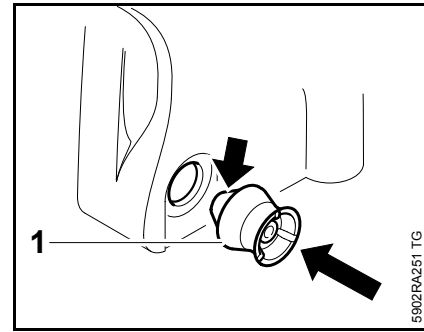
The stop buffers are installed between the engine housing and tank housing at the ignition and clutch sides.

- Remove the tank housing, 12.11.5



- Pry out the stop buffer (1) at the ignition and clutch sides.
- Install new stop buffers.

## Installing



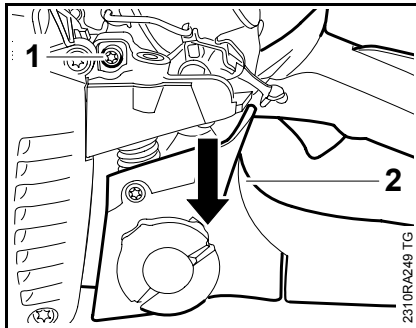
- Position the stop buffers (1) at both sides – the tapered ends (arrow) must face the engine housing.
- Use STIHL press fluid to simplify assembly, 14
- Push the stop buffers (1), tapered ends on the inside of the engine housing, fully into the bores while turning them back and forth to simplify installation.

The tapered ends must be properly engaged in the bores.

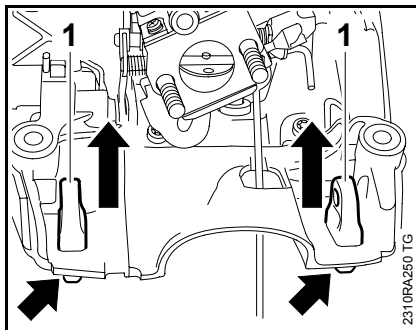
- Reassemble all other parts in the reverse sequence.

### 9.3.2 Buffers on Filter Base

- Remove the filter base, 12.3

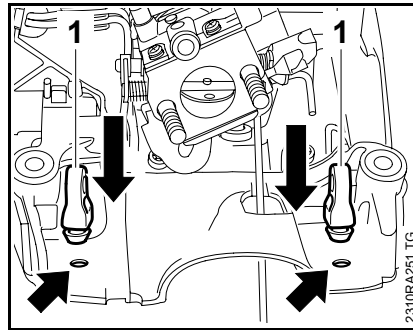


- Take out the screw (1).
- Press the tank housing (2) down a little and hold it there.

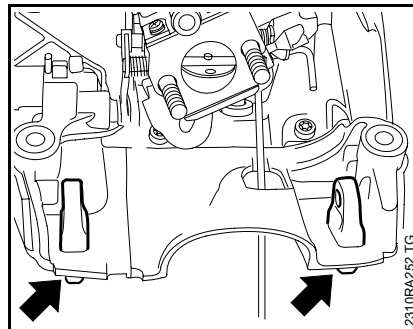


- Push out the buffers (1) from the underside (arrows).
- Check the buffers (1) and replace if necessary

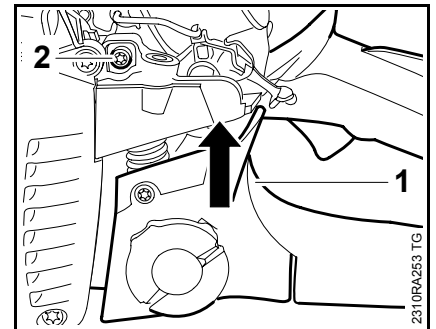
### Installing



- Position the buffers (1) with their tapered ends facing the bores (arrows).
- Use STIHL press fluid to simplify assembly, 14
- Push the tapered ends of the buffers (1) fully into the bores (arrows), turning them back and forth to simplify installation.



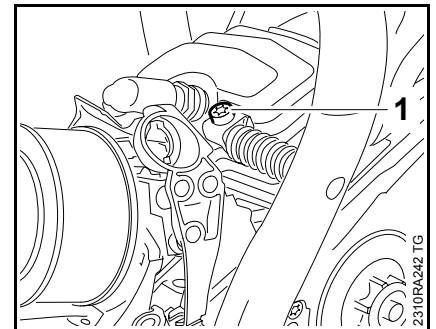
The tapered ends (arrows) must be properly seated on the other sides of the bores.



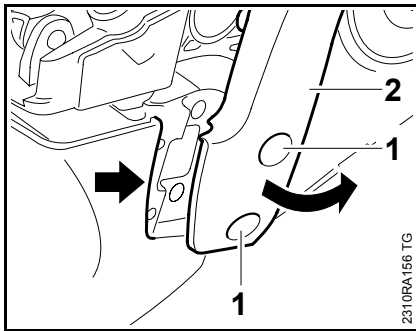
- Push the tank housing (1) upwards and hold it there.
- Insert and tighten down the screw (2) firmly.
- Reassemble all other parts in the reverse sequence.

### 9.4 Handlebar

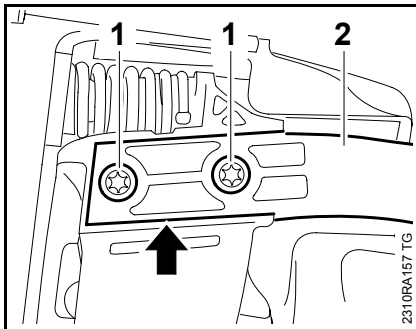
- Remove the shroud, 6.4



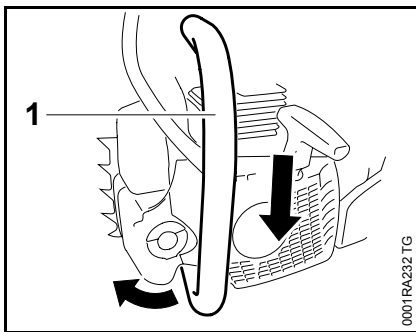
- Take out the screw (1).



- Take out the screws (1).
- Ease the handlebar (2) sideways and take it out of the guide (arrow).



- Remove the screws (1) from the underside of the machine and lift the handlebar (2) out of its seat (arrow).

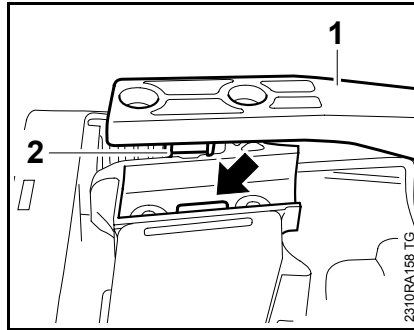


- Push the handlebar (1) out of the lower guide.
- Remove the handlebar (1), check it and replace if necessary.

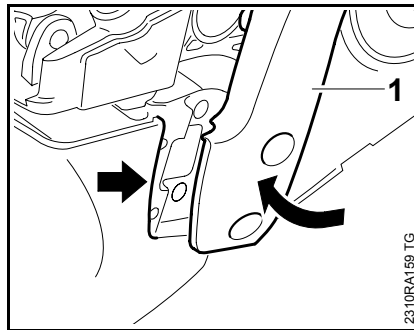
- Inspect the AV spring and replace if necessary, [9.3](#)

### Installing

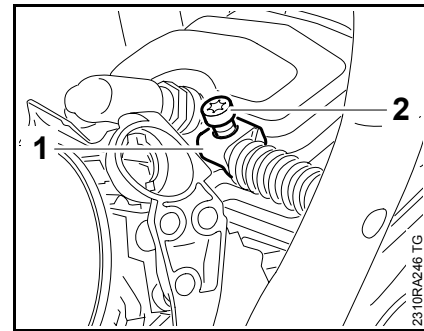
- Place the handlebar in position.



- Lift the handlebar (1), lug (2) first, into the recess (arrow) until it locates in the tank housing seat.
- Insert the screws and tighten them down firmly.



- Ease the handlebar (1) sideways and place it in the guide (arrow).
- Insert the screws and tighten them down firmly.







- Place plug (1) of AV spring on the cylinder.
- Insert and tighten down the screw (2) firmly.
- Reassemble all other parts in the reverse sequence.

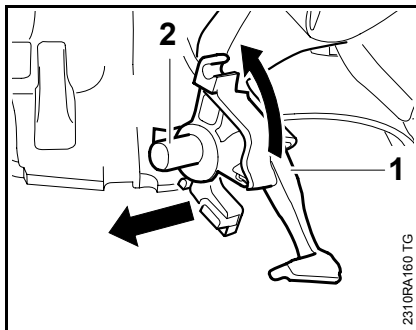
## 10. Control Levers

### 10.1 Master Control Lever

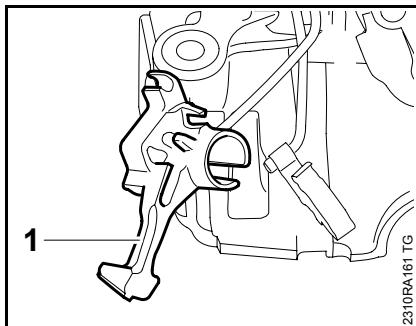
The positions of the Master Control lever are described in the instruction manual.


#### 10.1.1 Removing and Installing

- Remove the air filter,  12.1
- Remove the choke rod,  10.3.3
- Pull the filter base off the studs,  12.3
- Remove the contact spring,  7.7.4



- Rotate the switch lever (1) counterclockwise as far as stop and pull it off the filter base's shaft (2).

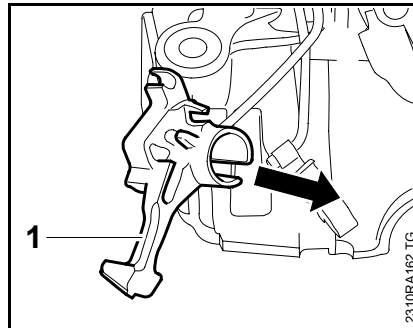



- Remove the short circuit wire from the switch lever,  7.7.2
- Remove the switch lever (1), check it and replace if necessary.

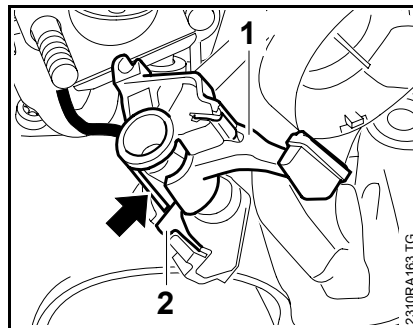
- Check the filter base and replace it if necessary

#### Installing

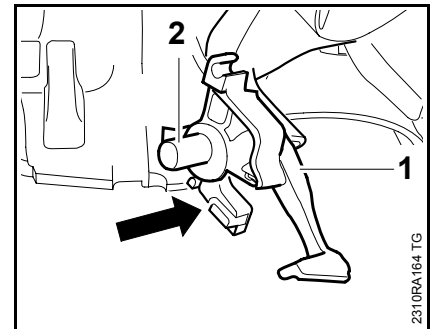
- Position filter base in the carburetor box.




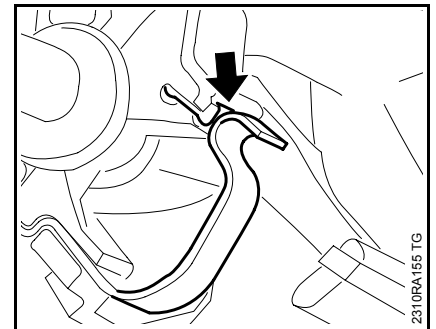
- Position the switch lever (1) in the carburetor box.
- Fit the short circuit wire on the switch lever,  7.7.2



- Position the switch lever (1) so that the short circuit wire points towards the filter base and the opening (arrow) lines up with the web (2).



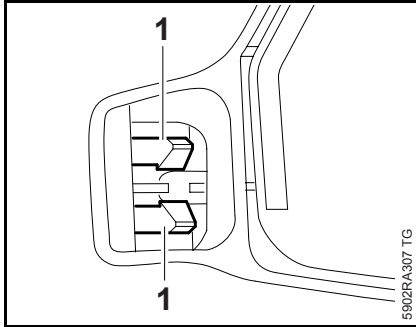
- Push the switch lever (1) onto the filter base's shaft (2) as far as stop.
- Fit the contact spring,  7.7.4



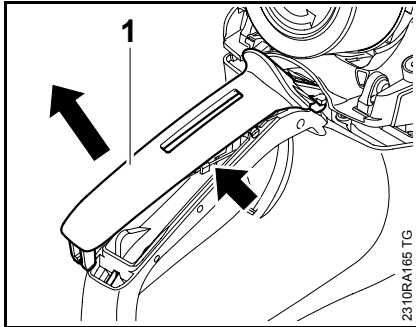
- Check operation
  - short circuit wire's terminal sleeve must touch the contact spring (arrow) in position "0".
- Reassemble all other parts in the reverse sequence.



## 10.2 Throttle Trigger/Lockout Lever

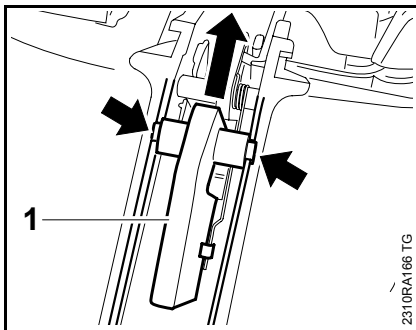


- To remove the handle molding, press the tabs (1) on the underside apart and push them through the rear handle.

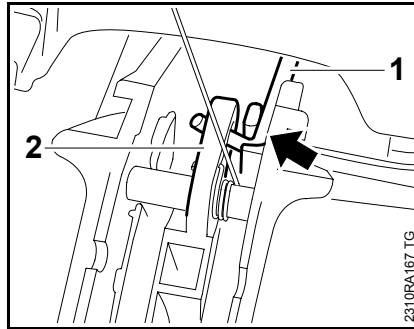


- Remove the handle molding (1).

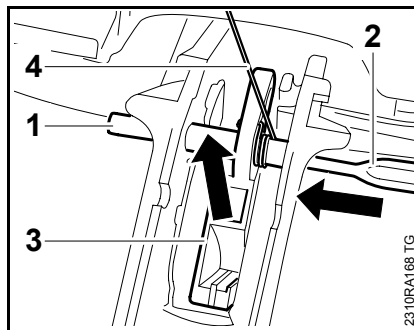
The lockout lever (arrow) may pop out.



- Pull the lockout lever (1) out of its mounts (arrows).



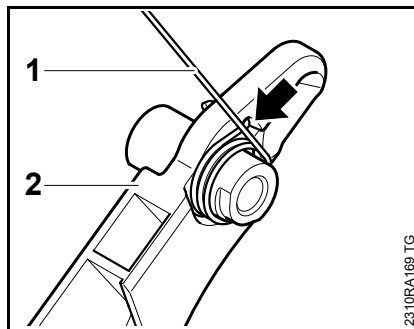
- Take the throttle rod (1) out of the guide (arrow) and disconnect it from the throttle trigger (2).



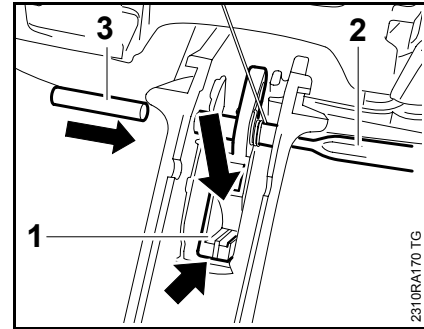
- Use a drift (2) to drive out the pin (1).
- Remove the throttle trigger (3) with torsion spring (4).

– Inspect the lockout lever, throttle trigger and torsion spring, replace as necessary.

### Installing

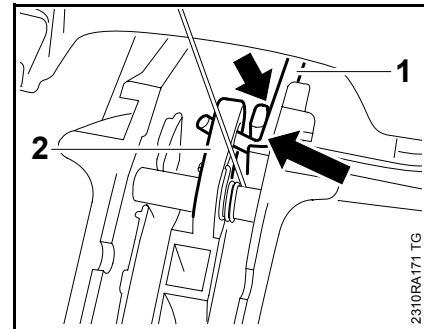


- Attach the torsion spring (1) to the trigger (2) – note the installed position (arrow).

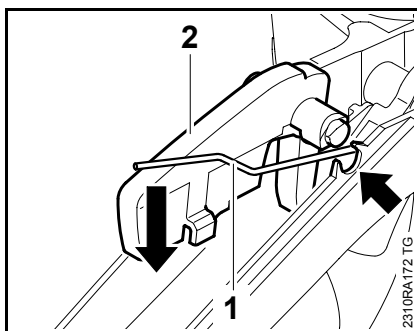


- Place the throttle trigger (1) in the rear handle so that the tongue (arrow) is within the handle and the holes in the throttle trigger and handle are in alignment.

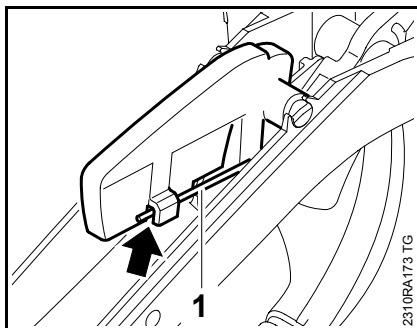
- Use a drift (2) to center the throttle trigger (1).
- Drive home the pin (3) until it is recessed by same amount at both sides.



- Attach the throttle rod (1) to the throttle trigger (2) and fit it in the guide (arrow).

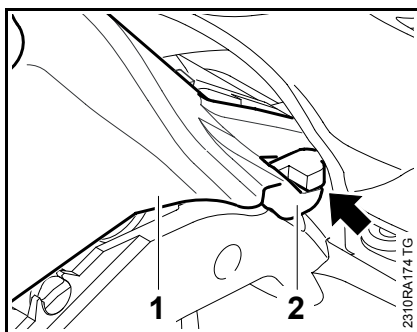


- Push leg (1) of torsion spring in direction of rear handle.
- Push the lockout lever (2) into its mounts (arrow).



- Attach the torsion spring (1) to the lockout lever (arrow).

The lockout lever may pop out.

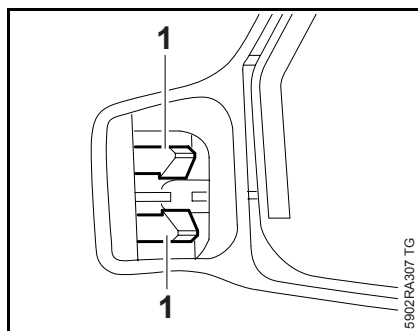


- Engage lugs (2) at front end of handle molding (1) in the recesses (arrow).
- Push down the handle molding (1) until it snaps into position.

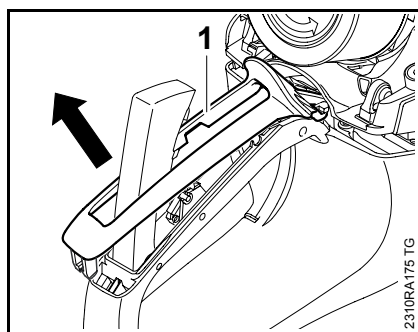
- Check operation
- Reassemble all other parts in the reverse sequence.

### 10.3 Throttle Trigger/Lockout Lever – QuickStop Super

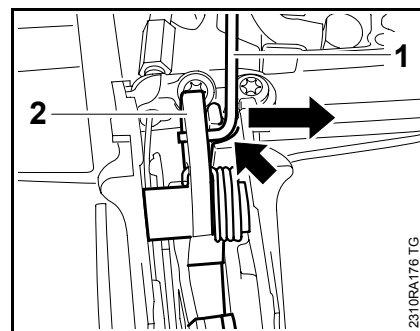
Lubricate sliding and bearing points with grease after disassembly.



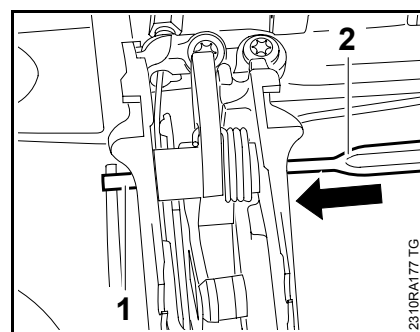
- To remove the handle molding, press the tabs (1) on the underside apart and push them through the rear handle.



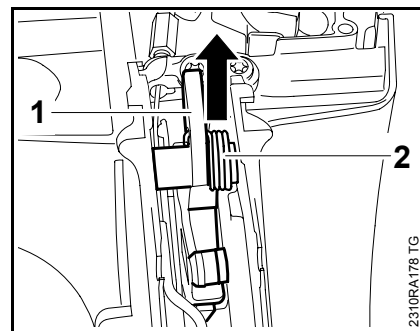
- Remove the handle molding (1).



- Take the throttle rod (1) out of the guide (arrow) and disconnect it from the throttle trigger (2).

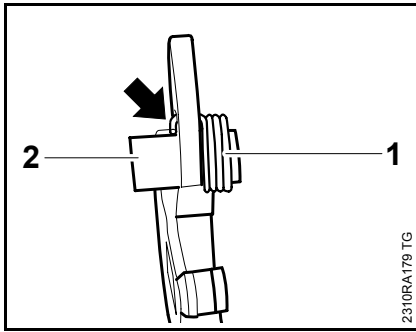


- Use a drift (2) to drive out the pin (1).

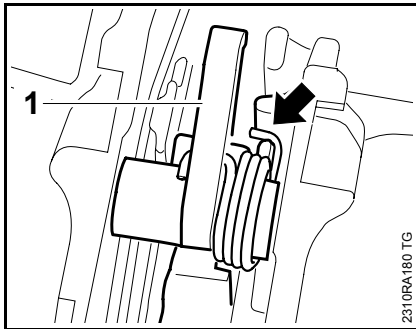


- Remove the throttle trigger (1) with torsion spring (2).
- Check that roller on throttle trigger turns freely, replace trigger if necessary.
- Check torsion spring and replace if necessary.

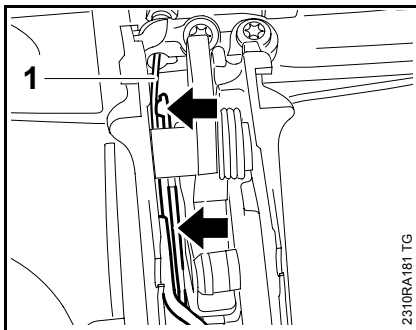
## Installing



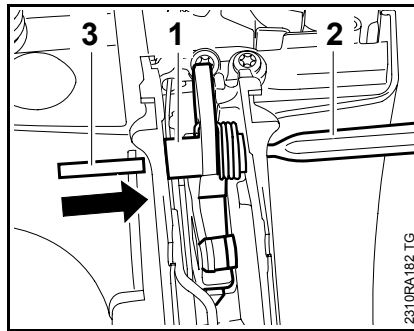
- Attach the torsion spring (1) to the trigger (2) – note the installed position (arrow).



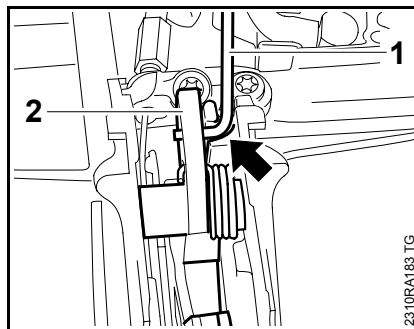
- Place the throttle trigger (1) in the rear handle so that the bent leg of the torsion spring engages its seat (arrow) and the holes in the throttle trigger and handle are in alignment.



The brake cable (1) must be fully engaged in the guide (arrows) or be below the drift – take care not to damage the brake cable.

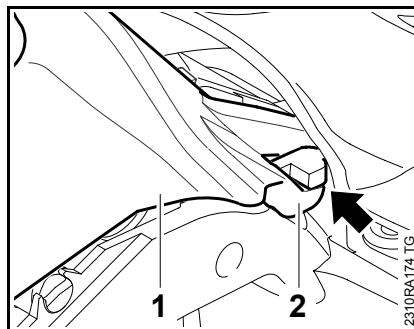


- Use a drift (2) to center the throttle trigger (1).
- Drive home the pin (3) until it is recessed by the same amount at both sides.



- Attach the throttle rod (1) to the throttle trigger (2) and fit it in the guide (arrow).

– Lubricate roller on throttle trigger with grease, 14



- Engage lugs (2) at front end of handle molding (1) in the recesses (arrow).

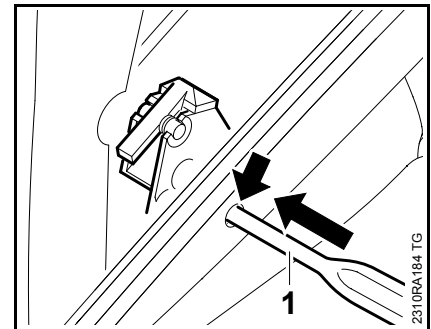
– Press the lockout lever down.

- Push down the handle molding (1) until it snaps into position.
- Check operation
- Reassemble all other parts in the reverse sequence.

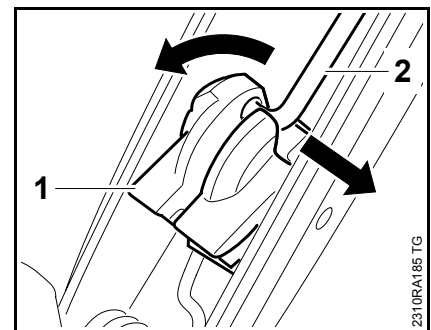
### 10.3.1 Switch Lever QuickStop Super

Lubricate sliding and bearing points with grease after disassembly.

- Remove the handle molding, 10.3

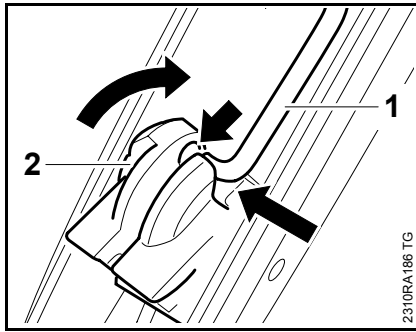


- Use a drift (1) to drive out the pin (arrow).

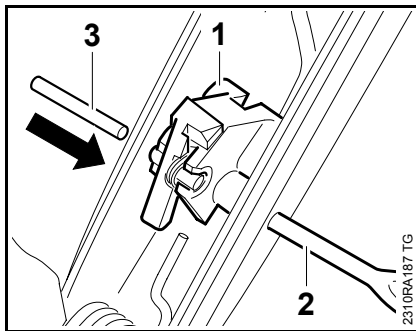


- Lift the switch lever (1) a little, turn it about 90° and then pull off the brake cable (2).
- Check the switch lever and replace it if necessary

## Installing



- Connect the brake cable (1) to the bore (arrow) in the switch lever.
- Turn the switch lever (2) so that it faces up.

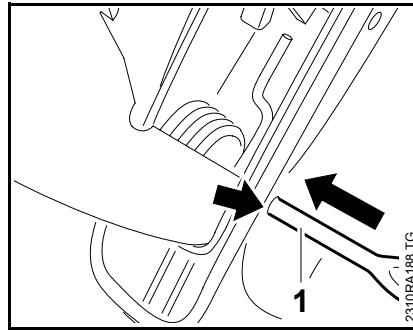


- Use a drift (2) to center the switch lever (1).
  - Drive home the pin (3) until it is recessed by the same amount at both sides.
- Lubricate lever, 14
  - Reassemble all other parts in the reverse sequence.
  - Check operation of switch lever by operating the lockout lever.

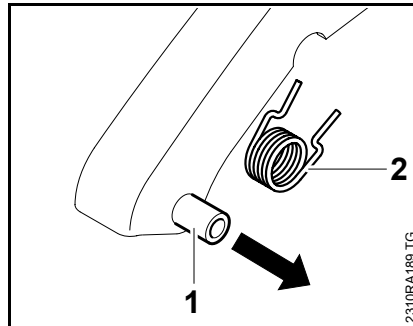
## 10.3.2 Lockout Lever – QuickStop Super

Lubricate sliding and bearing points with grease after disassembly.

- Remove the handle molding, 10.3

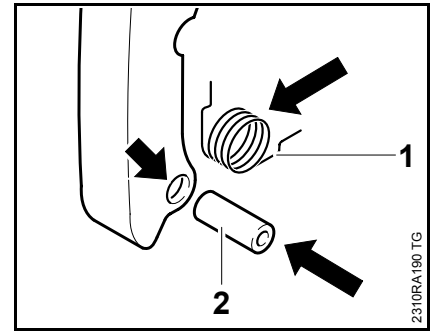


- Use a drift (1) to drive out the pin (arrow).
- Take out the lockout lever.

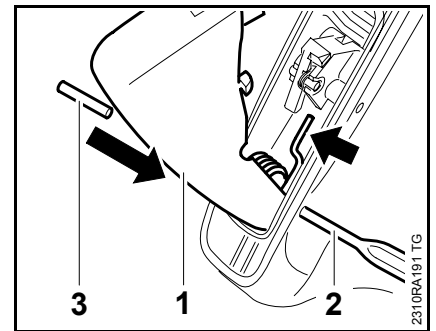


- Push out the bushing (1).
- Remove the torsion spring (2).
- Inspect the lockout lever, torsion spring and bushing, replace as necessary.

## Installing



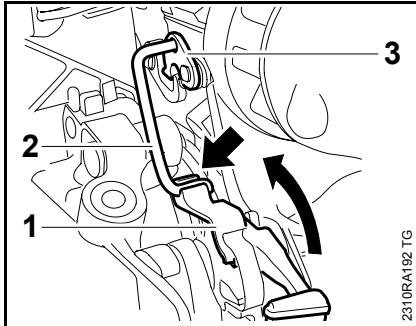
- Position the torsion spring (1) and fit it in the lockout lever.
- Push the bushing (2) into the bore (arrow) – the torsion spring is held in position.



- The torsion spring (arrow) must locate against the tank housing.
- Use a drift (2) to center the lockout lever (1).
  - Drive home the pin (3) until it is recessed by the same amount at both sides.
  - Reassemble all other parts in the reverse sequence.
  - Check operation

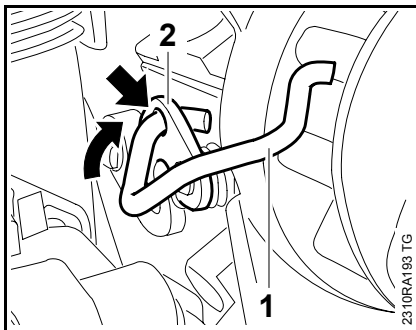
### 10.3.3 Choke Rod

- Remove the air filter, 12.1

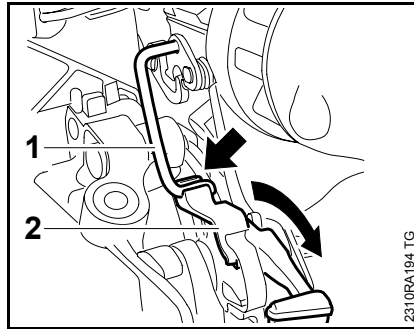


- Set the switch lever (1) to "I" and ease the choke rod (2) out of its seat (arrow).
- Disconnect the choke rod (2) from the lever (3).
- Check the choke rod and replace it if necessary

#### Installing



- Engage the choke rod (1) in the bore (arrow) in the choke shaft (2).



- Position the choke rod (1) in the guide (arrow).
- Set the switch lever (2) to "I", hold it in that position and then push the choke rod (1) fully into its seat (arrow).

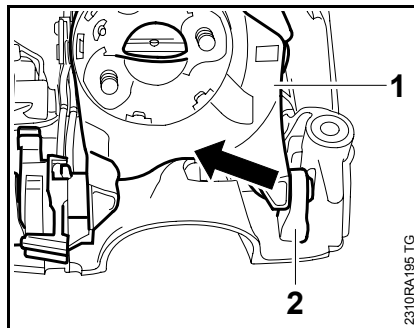
- Check operation

Check that the choke rod is properly seated.

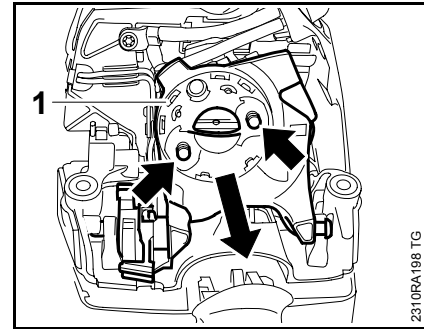
- Reassemble all other parts in the reverse sequence.

### 10.3.4 Throttle Rod

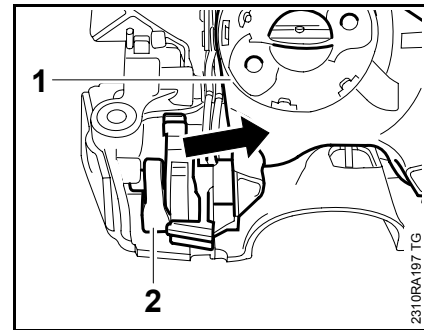
- Remove the throttle trigger, 10.2, QuickStop Super, 10.3
- Remove the choke rod, 10.3.3
- Remove the baffle, 12.2



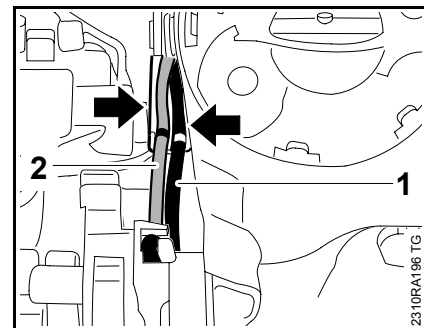
- Pry the filter base (1) out of the buffer (2).



- Pull the filter base (1) off the studs (arrows).

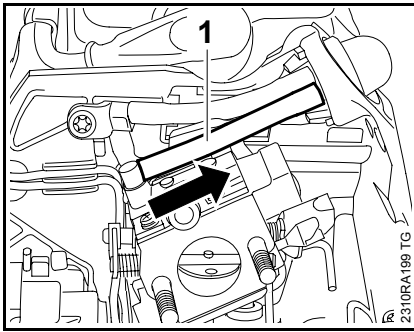


- Pull the filter base (1) out of the buffer (2).



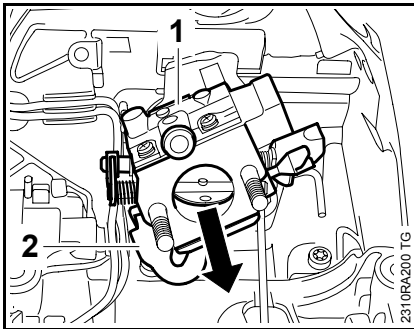
- Pull the short circuit wire (1) and ground wire (2) out of the guides (arrows).
- Put the filter base to one side so that the wires are not under tension.

## Models with manual fuel pump

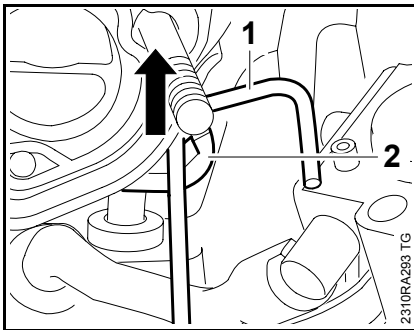


- Remove the fuel hose (1).

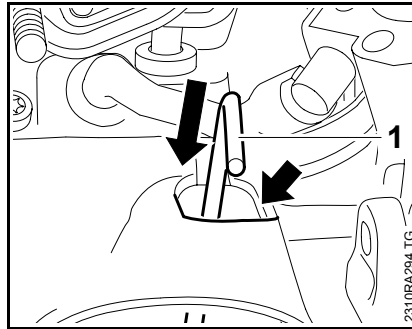
## All models



- Carefully pull the carburetor (1) off the studs – take care not to overstretch the fuel hose (2).
- Put the carburetor with fuel hose still attached to one side.



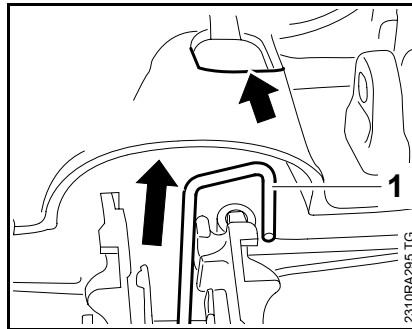
- Pry the throttle rod (1) out of the carburetor carrier (2).



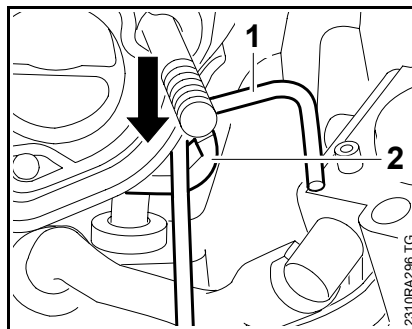
- Pass the throttle cable (1) through the opening (arrow) in the direction of the rear handle.

- Check the throttle rod and replace if necessary

## Installing

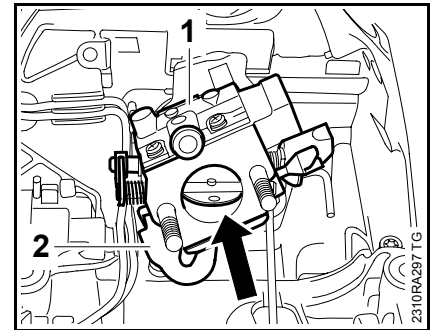


- Pass the throttle cable (1) between tank and engine housings and through the opening (arrow) in the direction of the rear handle.



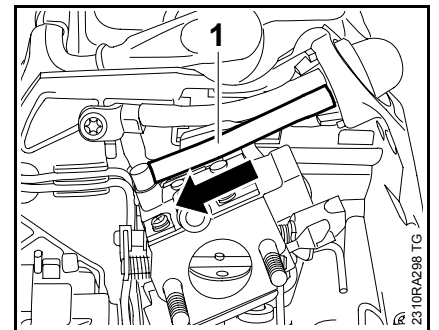
- Push the throttle rod (1) into the guide (2) in the carburetor carrier until it snaps into position.

- Install the throttle trigger,  10.2




- Push the carburetor (1) with fuel hose (2) over the studs
- take care not to overstretch the fuel hose (2).

## Models with manual fuel pump



- Fit the new fuel hose (1).




## All models

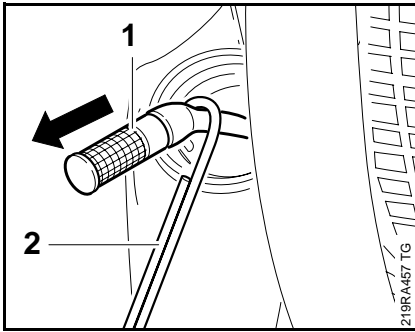
- Install the filter base,  12.3
- Check operation
  - the throttle lever on the carburetor must move upwards when then throttle trigger is pulled.
- Reassemble all other parts in the reverse sequence.

## 11. Chain Lubrication

### 11.1 Pickup Body

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

- Troubleshooting,  3.3
- Open the oil tank cap and drain the oil tank.
- Collect the oil in a clean container,  1
- Clean the oil tank if necessary,  1







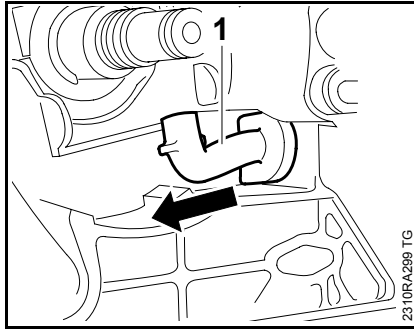
- Use hook (2) 5910 893 8800 to remove the pickup body (1) from the oil tank.


Do not overstretch the suction hose.

- Pull off the pickup body (1), check it and replace if necessary.
- Reassemble in the reverse sequence.

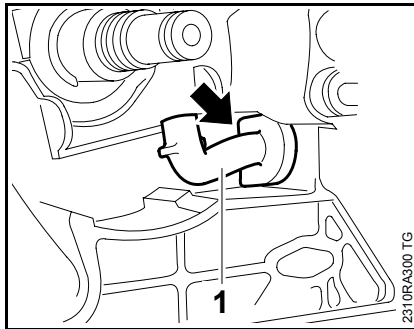
### 11.2 Oil Suction Hose

- Open the oil tank cap and drain the oil tank  1.
- Remove the clutch,  4
- Remove the brake band,  5.2
- Remove the oil pump,  11.3




- Remove the oil suction hose (1) together with the pickup body.
- Check the oil suction hose and pickup body and replace if necessary.
- Fit the pickup body,  11.1




#### Installing

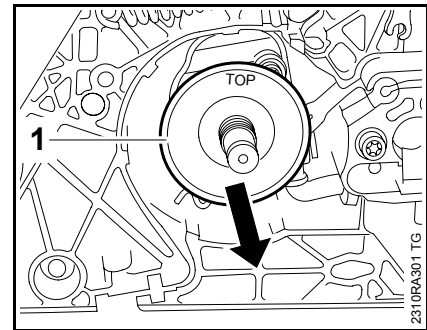


- Push the oil suction hose (1), pickup body first, through the housing bore (arrow).

- Line up the oil suction hose (1)
  - the straight side of the tab (arrow) must locate against the housing.
- Push home the oil suction hose (1) until its groove is properly seated in the engine housing.
- Check position of the pickup body and, if necessary, use the hook 5910 893 8800 to re-position it.
- Install the oil pump,  11.3
- Reassemble all other parts in the reverse sequence.

### 11.3 Oil Pump

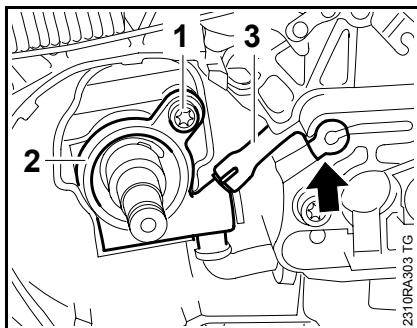
- Troubleshooting,  3.3
- Remove the clutch,  4
- Remove the brake band,  5.2



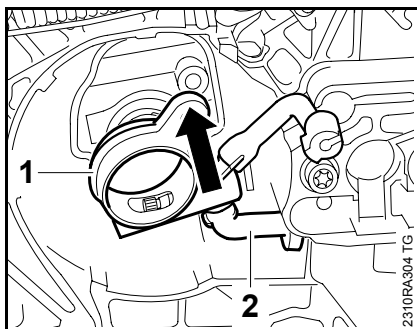
- Remove the shim (1).



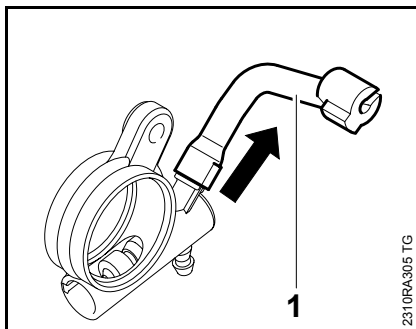
- Pull the worm (1) with drive spring (2) out of the oil pump.
- Check the spring and worm and replace if necessary.



- Take out the screw (1), lift the oil pump (2) and push the hose (3) out of its seat (arrow).

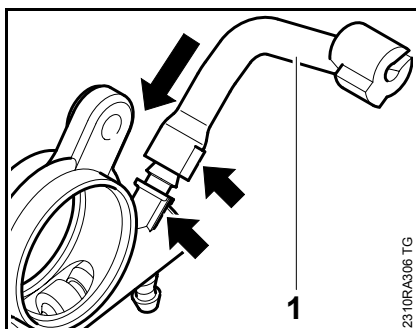


- Pull the oil pump (1) off the oil suction hose (2).

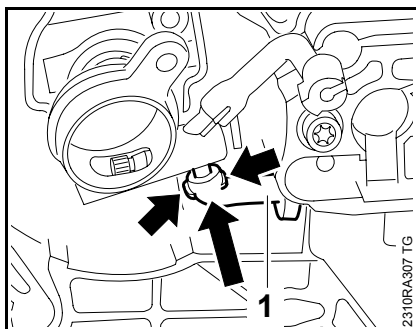


- Pull the hose (1) off the nipple.
- Check the oil pump and replace it if necessary

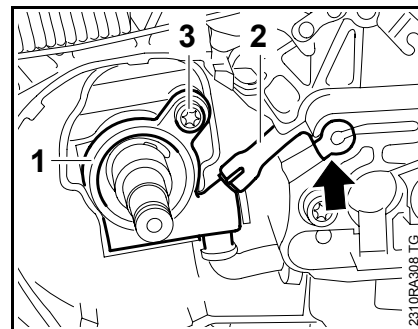
### Installing



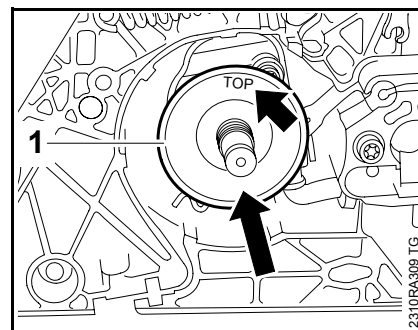
- Position the hose (1) so that the ribs (arrows) are in alignment.



- Position the oil suction hose (1) so that the straight sides of the lugs (arrows) locate against the engine housing.
- Push the oil suction hose (1) onto the nipple.



- Place oil pump (1) in position and push the tube (2) into its seat (arrow) until it is flush with the engine housing.
- Fit the screw (3) and tighten it down firmly.
- Push the worm home as far as stop – it must rotate freely.



- Push the washer (1) into position.


Installed position is correct when "TOP" (arrow) faces outwards.

- Reassemble all other parts in the reverse sequence.



## 11.4 Valve

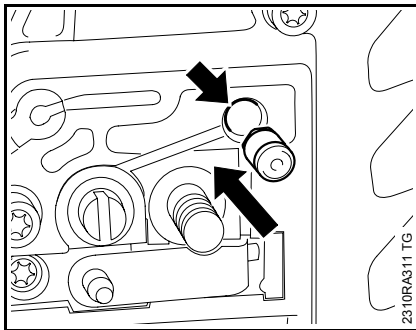
A valve is installed in the tank wall to keep internal tank pressure equal to atmospheric pressure. The valve must be replaced if it is faulty.

- Open the oil tank cap and drain the oil tank  1.



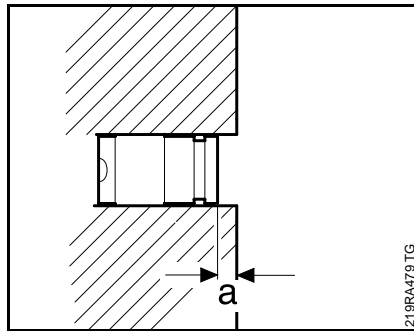
- Use a thin drift to carefully drive the valve out of the housing from inside the tank.

### Installing



Check correct installed position.

- Insert the valve in the housing bore (arrow).
- Use a 6 mm drift to carefully drive in the new valve from outside – note installed depth.






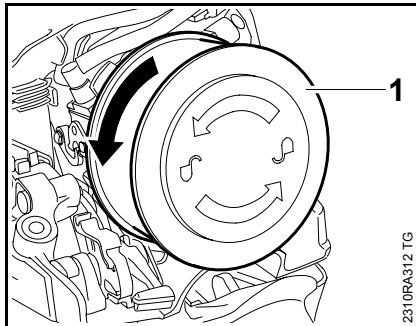
- Drive the new valve into the bore to a depth of  $1 \pm 0.1$  mm (a).
- Reassemble all other parts in the reverse sequence.

## 12. Fuel System

### 12.1 Air Filter


Dirty air filters reduce engine power, increase fuel consumption and make starting more difficult. The air filter should be checked when there is a noticeable loss of engine power.

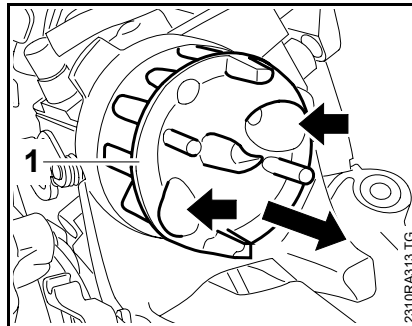
- See also Troubleshooting,  3.6,  3.7
- Remove the shroud,  6.4



- Rotate the air filter (1) counterclockwise and lift it away.
- Check the air filter and clean or replace if necessary
  - see instruction manual.
- Reassemble in the reverse sequence.




### 12.2 Baffle

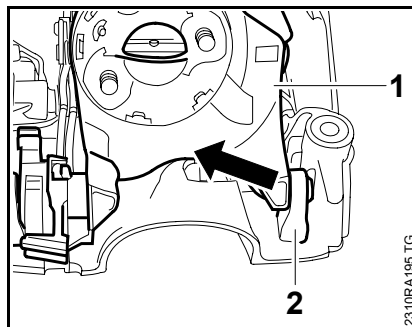
- Remove the air filter,  12.1



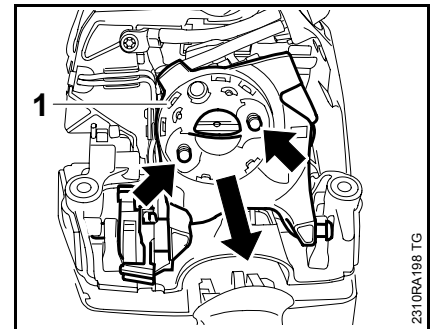
- Unscrew the nuts (arrows).
- Remove the baffle (1).
- Check the baffle and replace it if necessary
- Reassemble in the reverse sequence.

### 12.3 Filter Base

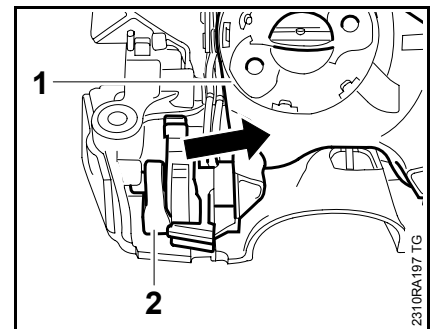
- Remove the air filter,  12.1
- Remove the choke rod,  10.3.3
- Remove the baffle,  12.2



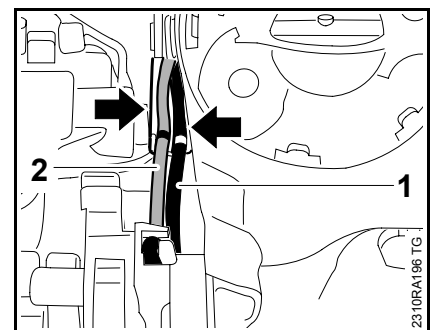
- Pry the filter base (1) out of the buffer (2).





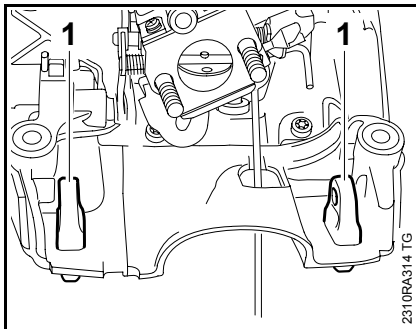
- Pull the filter base (1) off the studs (arrows).



- Pull the filter base (1) out of the buffer (2).



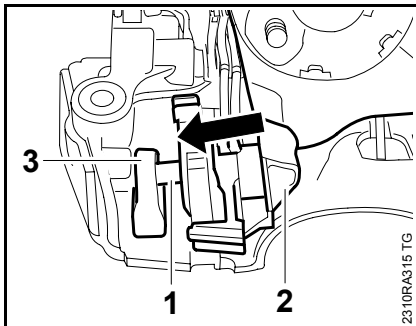
- Pull the short circuit wire (1) and ground wire (2) out of the guides (arrows).
- Remove the contact spring,  7.7.4
- Remove the switch shaft,  10.1
- Remove the filter base.



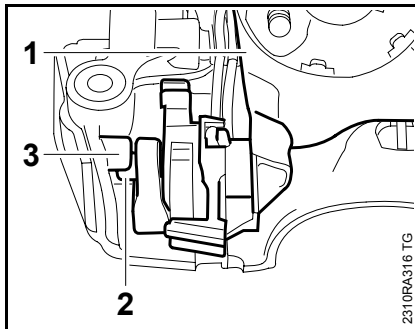
- Check the buffers (1) and replace if necessary, [10.3.2](#)

### Installing

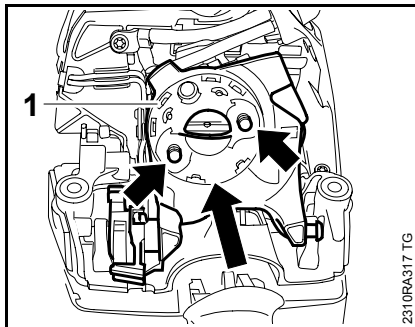
- Position filter base in the carburetor box.
- Install the switch lever, [10.1](#)
- Fit the contact spring, [7.7.4](#)



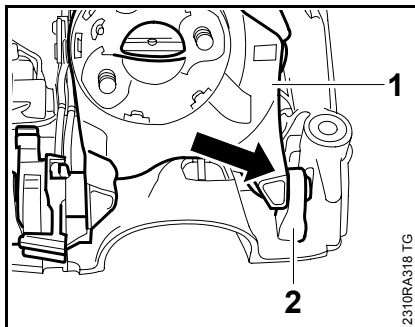
- Use STIHL press fluid to simplify assembly, [14](#)
- Push peg (1) on filter base (2) into the bore in the buffer (3) as far as stop.



- Line up the filter base (1) so that the peg (2) is under the lug (3).

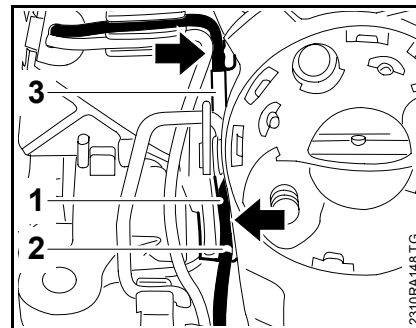


- Push the filter base (1) onto the studs (arrows) and the carburetor.

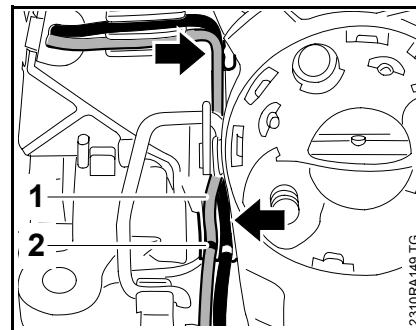


- Use STIHL press fluid to simplify assembly, [14](#)
- Push the filter base (1) into the buffer (2) – collar of peg must project fully on the other side of the buffer.

- Install the choke rod, [10.3.3](#)








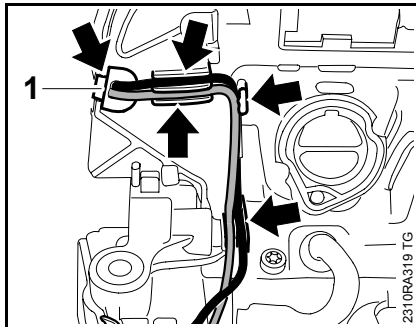
- Use punch-down tool 5910 890 4000 to press the short circuit wire (1) into the guides (arrows) so that the marking (2) is at the edge of the guide and the protective tube (3) locates below the guide rib.



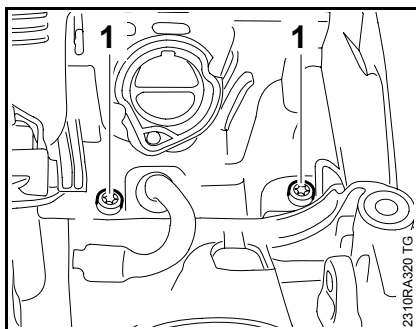
- Use punch-down tool 5910 890 4000 to press the ground wire (1) into the guides (arrows) so that the marking (2) is at the edge of the guide.
- Check operation of switch lever.
- Reassemble all other parts in the reverse sequence.

## 12.4 Air Guide Shroud

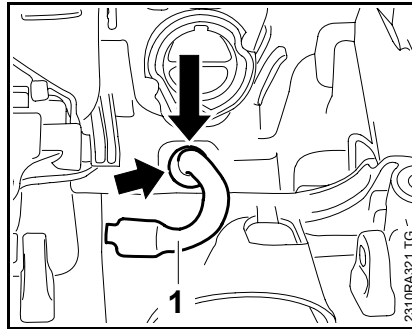
- Remove the fan housing,  8.2
- Pull the filter base off the studs and put it to one side with the wiring harness still attached,  12.3
- Remove the carburetor,  12.5
- Remove the throttle rod,  10.3.4
- Remove the carburetor carrier,  12.8
- Pull the boot off the spark plug.



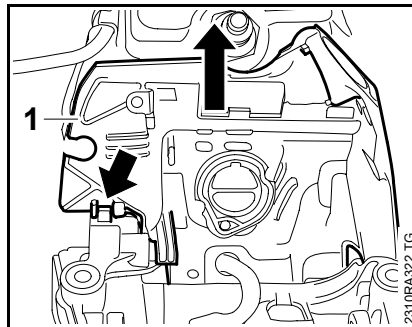
- Pull the rubber grommet (1) and wiring harness out of the guides (arrows).
- Put the wiring harness with filter base to one side.



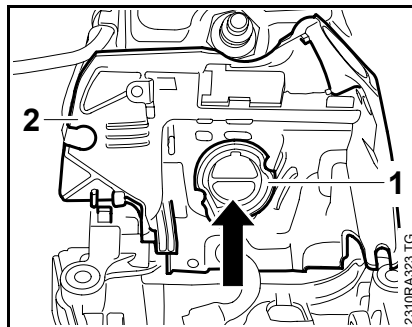
- Take out the screws (1).



- Push the grommet (arrow) of the fuel hose (1) downwards and out.



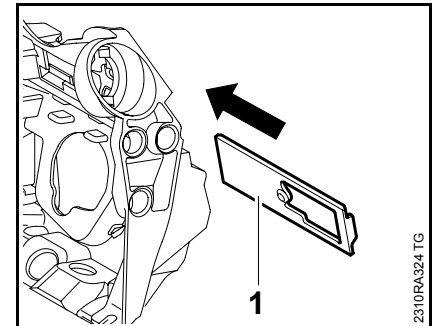
- Ease the air guide shroud (1) over the stop (arrow) and lift it a little.



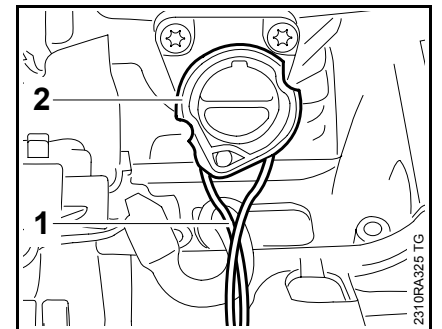
- Push the manifold flange (1) out of the air guide shroud (2) in the direction of the cylinder and pull the air guide shroud away at the same time.
- Pull the fuel hose out of the air guide shroud.
- Remove the air guide shroud.


- Pull out the shutter, check it and replace if necessary.

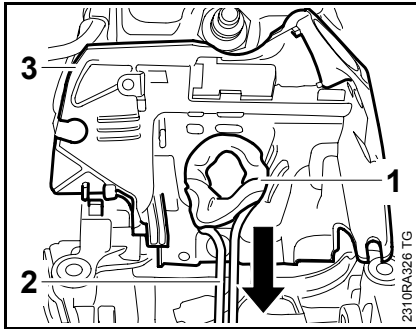
## Installing



- Push the shutter (1) into the guide until it snaps into place.

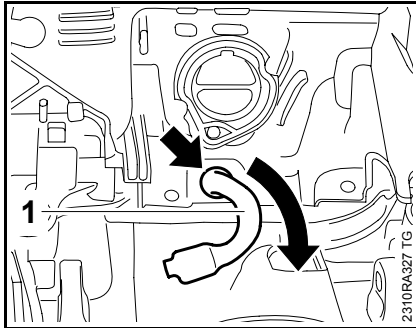


- To fit the manifold (2) through the air guide shroud's opening, wind a piece of string (1) (about 15 cm long) around the back of manifold flange.
- Coat manifold flange with STIHL press fluid to simplify installation,  14

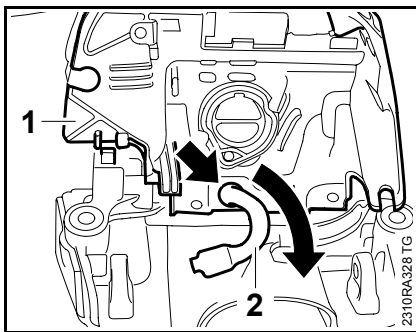


- Use the ends of the string (2) to pull the manifold flange (1) through the intake opening while pushing the air guide shroud (3) against the manifold flange.

– Remove the string.

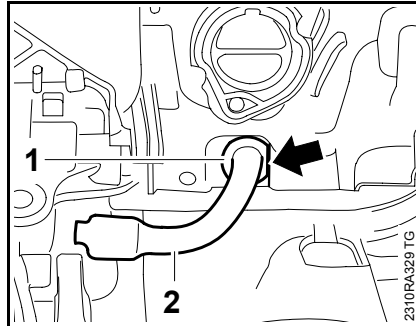


- Push the new fuel hose (1) through the bore (arrow).

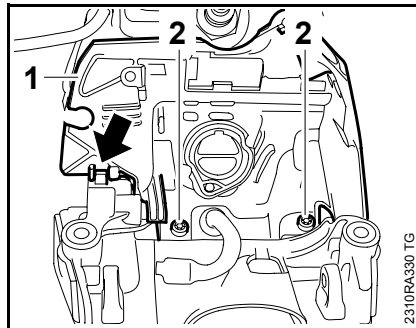


- Coat the grommet with STIHL press fluid to simplify installation, 14

- Place the air guide shroud (1) in position and pull the grommet of fuel hose (2) into the bore (arrow) until it is properly seated.



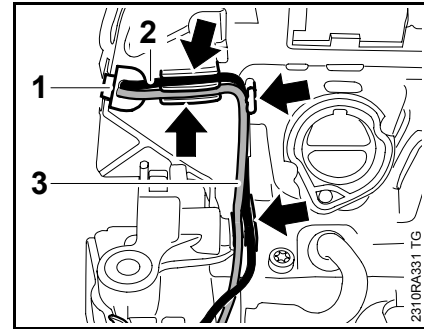
- Line up grommet (1) of fuel hose (2) so that its straight side (arrow) butts against the edge of the air guide shroud.



- Ease the air guide shroud (1) over the stop (arrow) and push it into its seat.

- Insert and tighten down the screws (2) firmly.

- Install the carburetor carrier, 12.8
- Install the throttle rod, 10.3.4
- Install the carburetor, 12.5






- Push the rubber grommet (1) into its seat until it is flush with the edge of the air guide shroud.

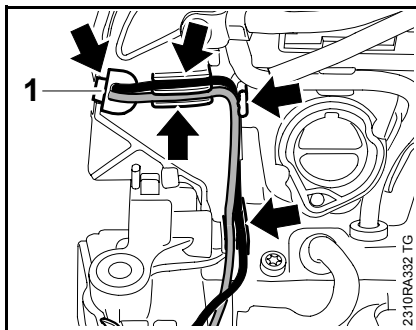
- Push the short circuit wire (2) and ground wire (3) into the guides (arrows).



– Install filter base with wiring harness, 12.3

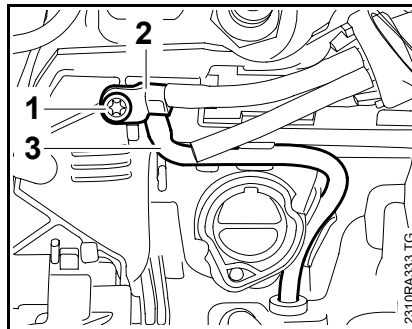
– Reassemble all other parts in the reverse sequence.

### 12.4.1 Air Guide Shroud – Models with Manual Fuel Pump

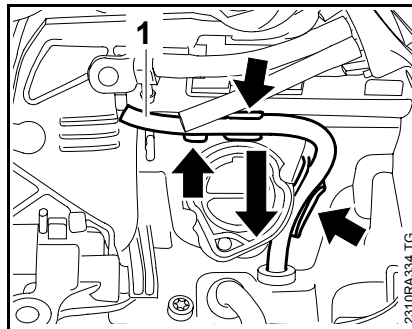
- Remove the fan housing,  8.2
- Pull the filter base off the studs and put it to one side with the wiring harness still attached,  12.3
- Remove the carburetor,  12.5
- Pull the boot off the spark plug.



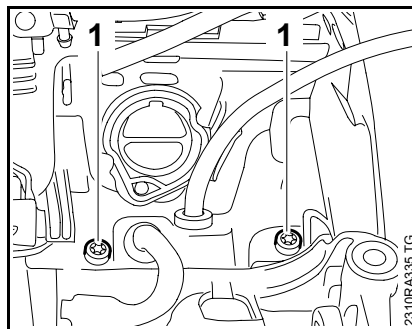
- Pull the wiring harness and rubber grommet (1) out of the guides (arrows).
- Put the wiring harness with filter base to one side.
- Remove the throttle rod,  10.3.4
- Remove the carburetor carrier,  12.8



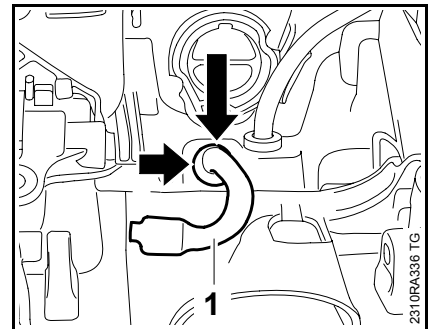
- Take out the screw (1).
- Remove the connector (2) and disconnect it from the fuel return hose (3).



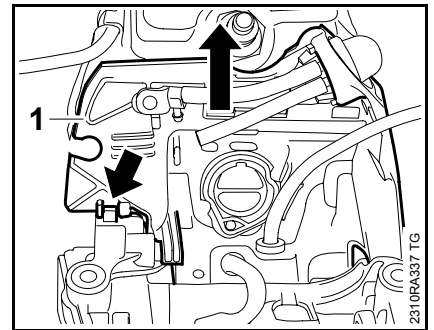
- Pull the fuel return hose (1) out of the guides (arrows).



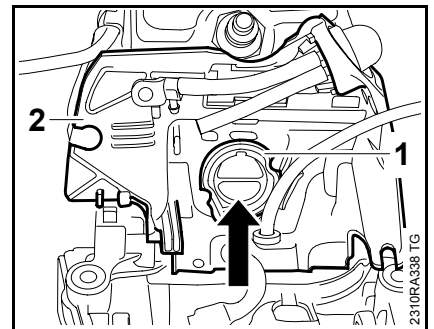
- Take out the screws (1).



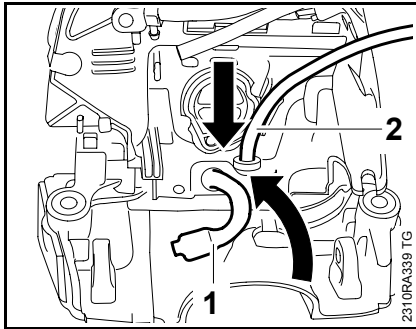
- Push the grommet (arrow) of the fuel hose (1) downwards and out.



- Ease the air guide shroud (1) over the stop (arrow) and lift it a little.

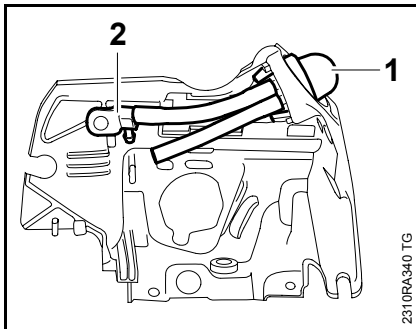


- Push the manifold flange (1) out of the air guide shroud (2) in the direction of the cylinder and pull the air guide shroud away at the same time.



- Pull the fuel hose (1) and fuel return hose (2) out of the air guide shroud.

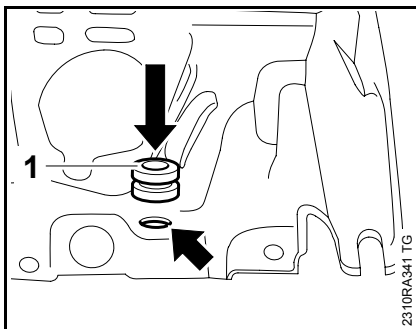
- Remove the air guide shroud.



- Remove the fuel pump (1) with the fuel hoses and elbow connector (2), inspect and replace if necessary, 12.11.4

- Pull out the shutter, check it and replace if necessary.

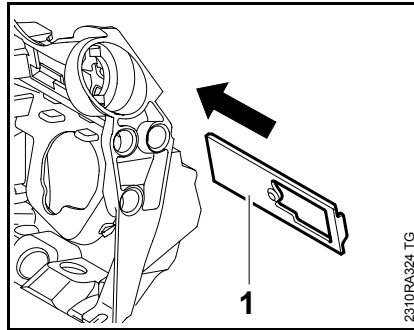
## Installing



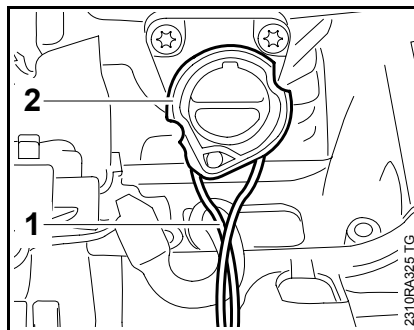
- Remove the grommet, check and replace if necessary.

- Coat outside of grommet with STIHL press fluid to simplify installation, 14

- Fit the grommet (1) in the hole (arrow) and make sure it is properly seated.

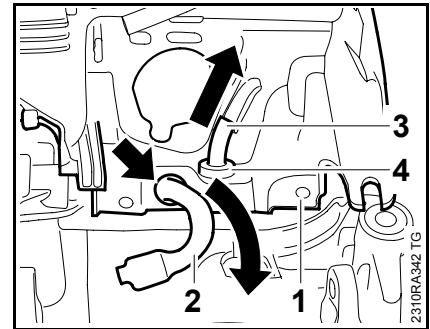


- Install fuel pump with fuel hoses and elbow connector, 12.11.4



- To fit the manifold (2) through the air guide shroud's opening, wind a piece of string (1) (about 15 cm long) around the back of manifold flange.

- Coat manifold flange with STIHL press fluid to simplify installation, 14

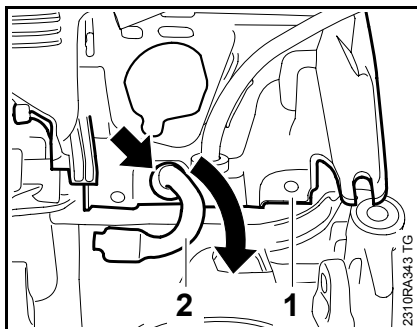


- Place the air guide shroud (1) in position.

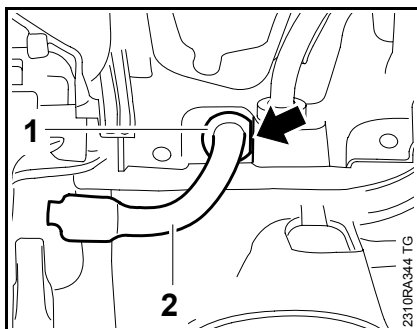
- Push the new fuel hose (2) through the bore (arrow).

- Use STIHL press fluid to simplify assembly, 14

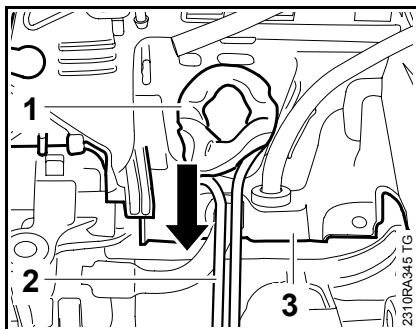
- Push the new fuel hose (3) through the grommet (4).



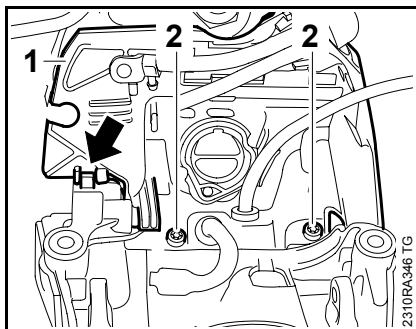
- Coat the grommet with STIHL press fluid to simplify installation, 14
- Place the air guide shroud (1) in position and pull the grommet of fuel hose (2) into the bore (arrow) until it is properly seated.



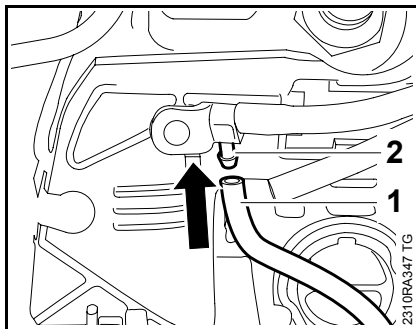
- Line up grommet (1) of fuel hose (2) so that its straight side (arrow) butts against the edge of the air guide shroud.



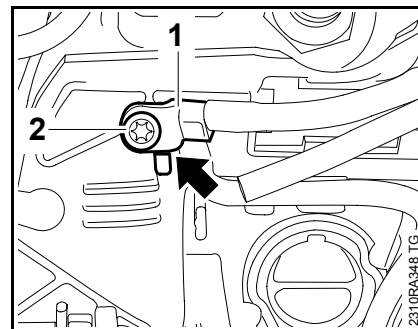
- Use the ends of the string (2) to pull the manifold flange (1) through the intake opening while pushing the air guide shroud (3) against the manifold flange.
- Remove the string.



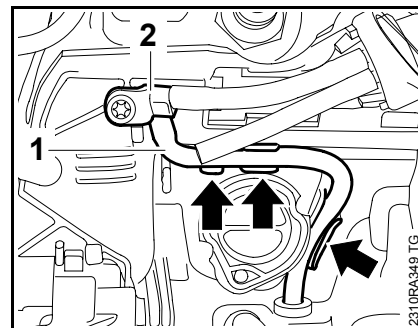
- Ease the air guide shroud (1) over the stop (arrow) and push it into its seat.
- Insert and tighten down the screws (2) firmly.



- Push the fuel return hose (1) onto the connector (2) as far as stop.



- Position the elbow connector (1) against the stop (arrow).
- Insert and tighten down the screw (2) firmly.

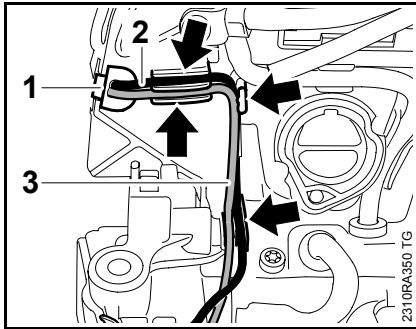


- Starting at the elbow connector (2), push the fuel return hose (1) into the guides (arrows).
- Position the fuel return hose snugly – without a loop between the air guide shroud and grommet.

Do not kink or pinch the fuel return hose.

- Install the carburetor carrier, 12.8
- Install the throttle rod, 10.3.4
- Install the carburetor, 12.5



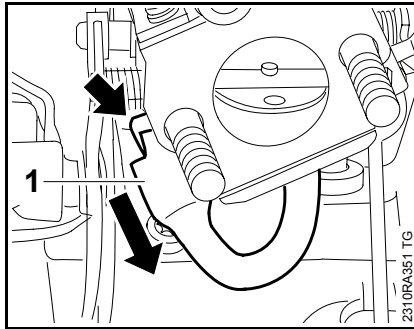


- Push the rubber grommet (1) into its seat until it is flush with the edge of the air guide shroud.
- Push the short circuit wire (2) and ground wire (3) into the guides (arrows) – position short circuit wire under the ground wire.
- Install filter base with wiring harness, 12.3
- Reassemble all other parts in the reverse sequence.

## 12.5 Carburetor

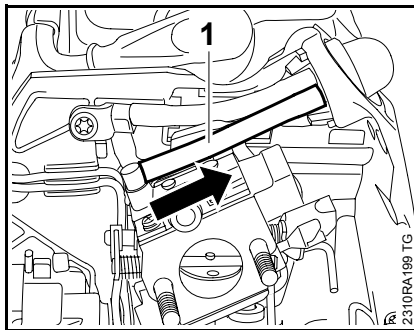
- Pull the filter base off the studs and put it to one side with the wiring harness still attached, 12.3
- Open the fuel tank cap and drain the fuel tank.
- Collect the fuel in a clean container, 1

Disconnect the fuel hose only when the tank cap is open.



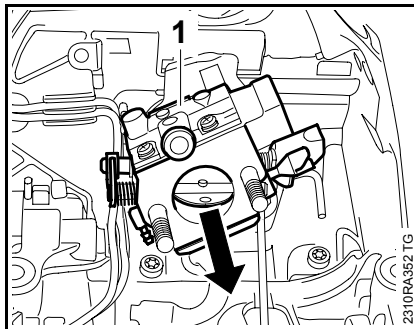
- Pull the fuel hose (1) off the nipple (arrow).

## Models with manual fuel pump



- Remove the fuel hose (1).

## All models

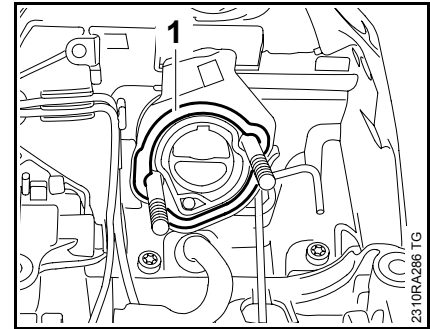


- Remove the carburetor (1).
- Check the carburetor and service or replace if necessary.
- Install a new fuel hose, 12.11.2

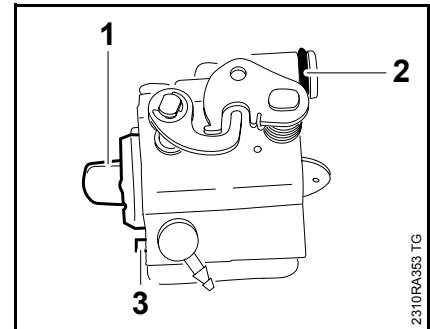
## Models with manual fuel pump

- Install new fuel intake hose, 12.11.3

## Installing



Make sure the washer (1) is in place.

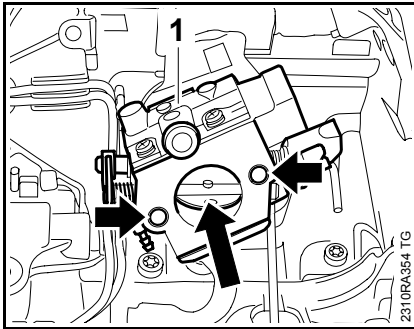


Make sure the ring (1) is in place.

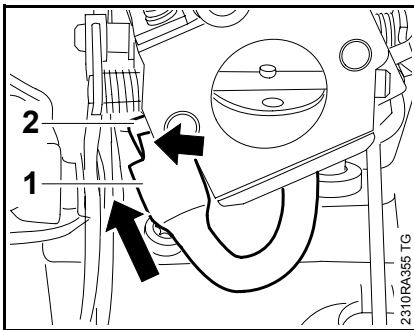
Make sure sealing ring (2) is in place.

- Check the components and replace as necessary.

Stub (3) must engage bore in manifold flange.

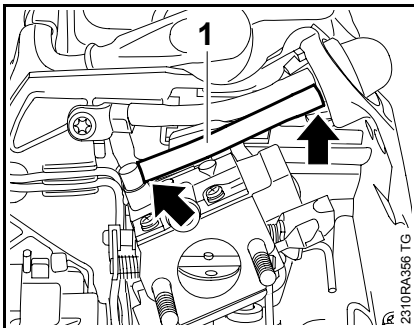


- Push the carburetor (1) over the studs (arrows) so that ends of studs are flush with carburetor body.



- Push the fuel hose (1) onto the nipple (2) so that the tab (arrow) faces the throttle shaft lever and locates uniformly on the nipple.
- Push the carburetor fully home.

#### Models with manual fuel pump



- Push the new fuel hose (1) onto the nipples (arrows).

#### All models

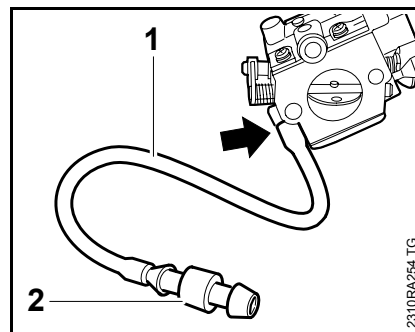
- Install the filter base, 12.3
- Install the air filter, 12.1
- Check operation
  - Set throttle trigger to full throttle position, the throttle shutter must be fully open.
- Reassemble all other parts in the reverse sequence.

#### 12.5.1 Leakage Test

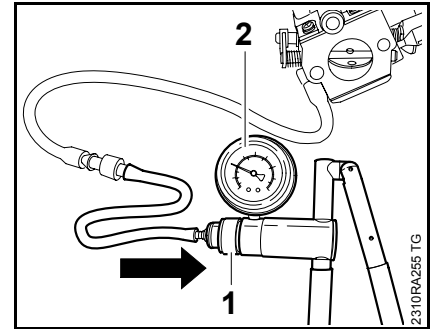
In the case of problems with the carburetor or fuel supply system, also check and clean or replace the tank vent, 12.10

The carburetor can be tested for leaks with the pump 0000 850 1300.

- Remove the carburetor, 12.5



- Push the fuel hose (1) 1110 141 8600 on to the nipple (2) 0000 855 9200.
- Push the fuel hose with nipple onto the carburetor's fuel stub (arrow).



- Push the pressure hose of pump 0000 850 1300 onto the nipple.

- Push the ring (1) to the right and pump air into the carburetor until the pressure gauge (2) indicates a pressure of about 0.8 bar (80 kPa).



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

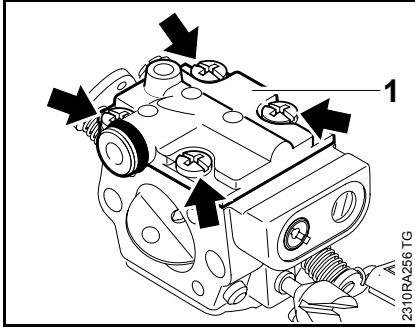
1. Metering diaphragm or gasket damaged, replace if necessary, 12.6.1
2. The inlet needle is not sealing (foreign matter in valve seat, sealing cone of inlet needle is damaged or inlet control lever is sticking, remove to clean, 12.6.2)
3. Pump diaphragm or gasket damaged, replace if necessary, 12.6.3

- Test the tank vent if necessary, 12.10.1
- After completing the test, push the ring (1) to the left to vent the system and then pull the fuel hose off the carburetor.
- Install the filter base, 12.3
- Reassemble all other parts in the reverse sequence.

## 12.6 Servicing the Carburetor

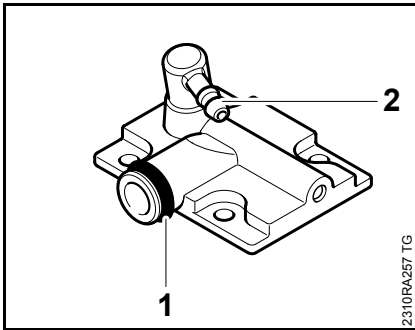
### 12.6.1 Metering Diaphragm

- Troubleshooting,  3.6
- Remove the carburetor,  12.5

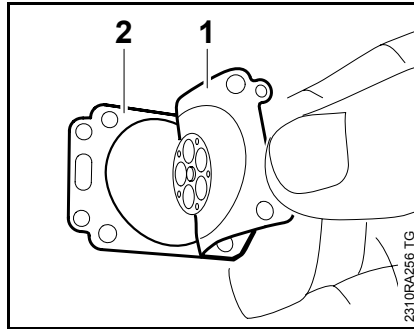


- Take out the screws (arrows).
- Remove the end cover (1).

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



- Check the O-ring (1) and replace it if necessary
- On versions with a manual fuel pump, check the nipple (2) and replace the end cover if necessary.

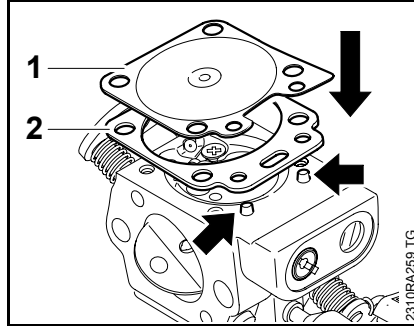


- Carefully separate the metering diaphragm (1) and gasket (2).

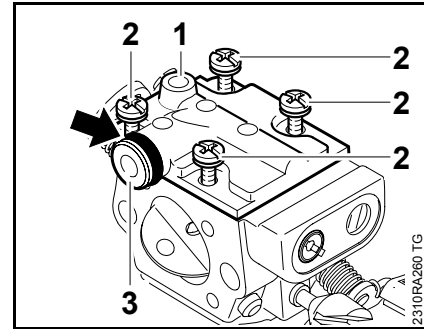
The diaphragm material is subjected to continuous alternating stresses and eventually shows signs of fatigue. i.e. the diaphragm distorts and swells and has to be replaced.

- Check the metering diaphragm for signs of damage and wear. Install a new gasket.

#### Installing



- Note installed positions of metering diaphragm (2) and gasket (1).
- Position the gasket (1) and metering diaphragm (2) so that pegs (arrows) engage the small holes in the tabs.




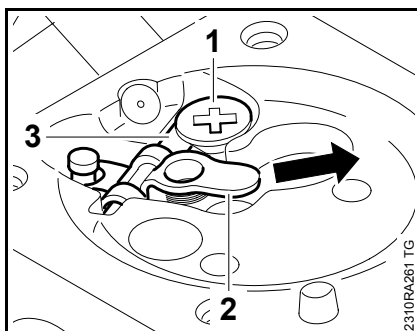
- Position the end cover (1) so that the stub (3) points in the direction of the choke shutter and the holes line up.
- Fit the screws (2) but do not tighten them down yet.
- Check position of metering diaphragm and gasket, then tighten down the screws firmly in a crosswise pattern.

Take care not to damage the O-ring (arrow).

- Reassemble all other parts in the reverse sequence.

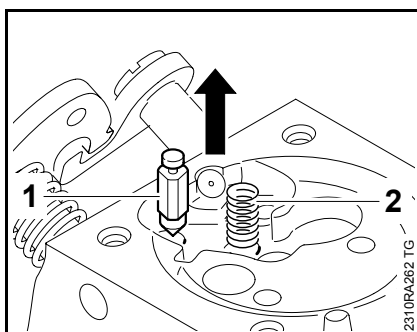
### 12.6.2 Inlet Needle

- Remove the metering diaphragm,  12.6.1

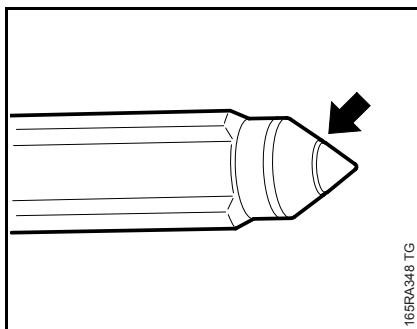


- Take out the screw (1).
- Remove the inlet control lever (2) with spindle (3) out of the inlet needle's groove.

The small spring under the inlet control lever may pop out.

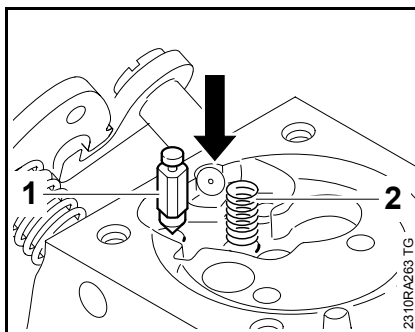


- Remove the inlet needle (1).
- Remove the spring (2). Inspect and replace if necessary.

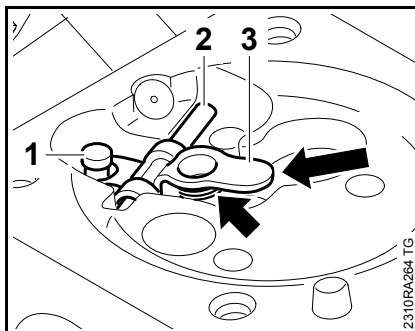


- If there is an annular indentation (arrow) on the sealing cone of the inlet needle, fit a new inlet needle.

## Installing



- Fit the inlet needle (1).
- Fit the spring (2) in the bore.



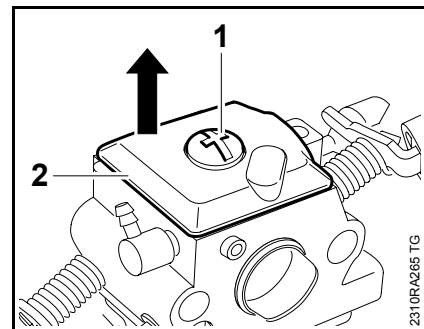
- Position the inlet control lever (3) with spindle (2) on the spring (1) first, then slide the inlet control lever's clevis into the groove in the inlet needle (1).

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

- Press the inlet control lever down and secure it with the screw.
- Check that the inlet control lever moves freely.
- Install the metering diaphragm, 12.6.1

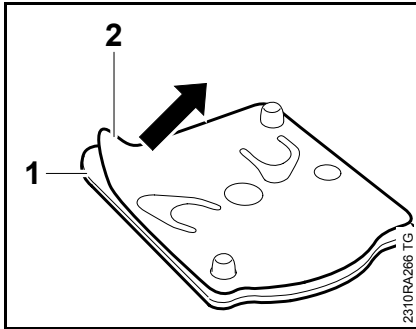
## 12.6.3 Pump Diaphragm

- Troubleshooting, 3.6
- Remove the carburetor, 12.5



- Take out the screw (1).
- Remove the end cover (2).

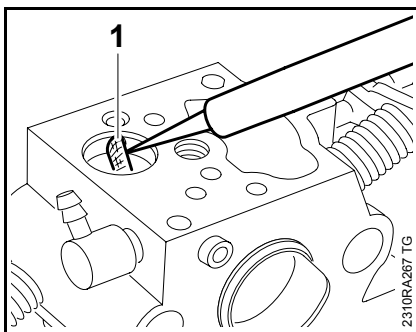
If the gasket and pump diaphragm are stuck to the carburetor, remove them very carefully.



- Carefully remove the pump diaphragm with gasket from the end cover.
- Carefully separate the pump diaphragm (1) and gasket (2)
  - always install a new gasket.

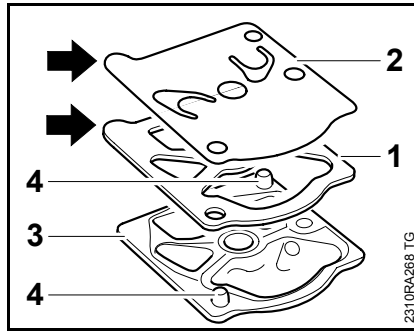
The diaphragm material is subjected to continuous alternating stresses and eventually shows signs of fatigue. i.e. the diaphragm distorts and swells and has to be replaced.

- Check the pump diaphragm for signs of damage and wear. Install a new gasket.
- Check fuel strainer for contamination and damage. Clean or replace if necessary.

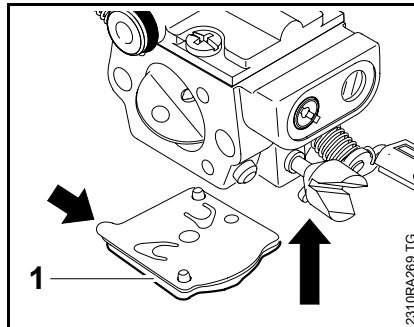


- Use a needle to remove the fuel strainer (1) from the carburetor body. Clean or replace the fuel strainer.
- Reassemble in the reverse sequence.

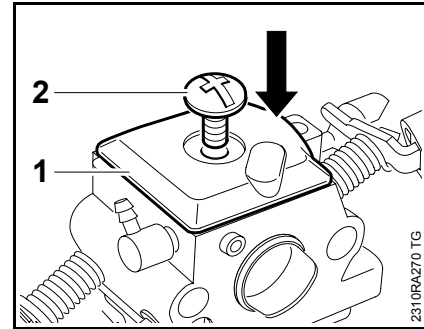
## Installing



- Place the gasket (1) and pump diaphragm (2) on the end cover (3) so that the contours (arrows) are in alignment and make sure they are held in position by the pegs (4).



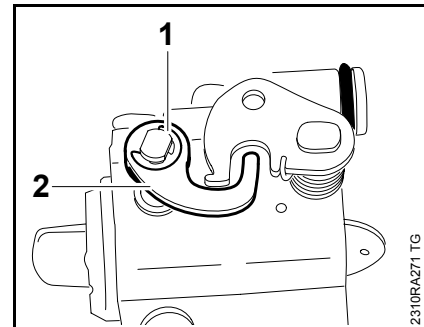
- Fit the end cover (1) from below so that the pump diaphragm and gasket are still held in position.
- Align the end cover (1) so that the contour (arrow) points in the direction of the throttle and choke shaft levers.



- Move the end cover (1) back and forth until its pegs engage the holes in the carburetor body.
- Check that the pump diaphragm and gasket are properly seated.
- Insert and tighten down the screw (2) firmly.
- Reassemble all other parts in the reverse sequence.

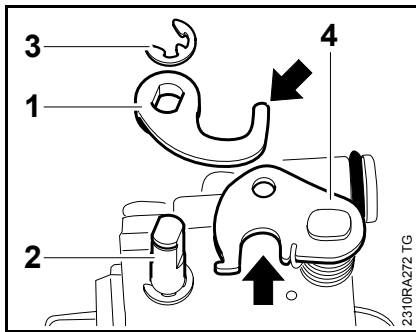
## 12.6.4 Lever on Throttle Shaft

- Remove the carburetor, [12.5](#)
- Carburetor troubleshooting, [3.6](#)



- Remove the retaining ring (1).
- Pull off the lever (2).

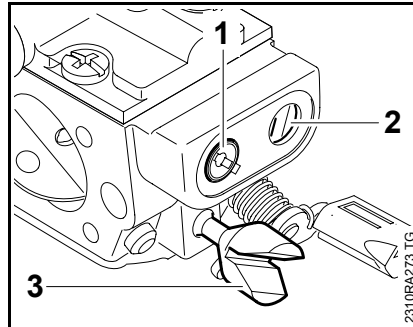
## Installing



- Position the lever (1) so that its hook engages the lever on the choke shaft (arrows).
- Push the lever (1) onto the throttle shaft (2) so that it engages the flats on the end of the shaft.
- Fit the retaining ring (3).
- Check operation
  - lever (1) must engage lever (4) (arrows).
- Reassemble all other parts in the reverse sequence.

## 12.6.5 Adjusting Screws

- Remove the carburetor, 12.5
- See also carburetor troubleshooting, 3.6



There are three adjusting screws on the carburetor:

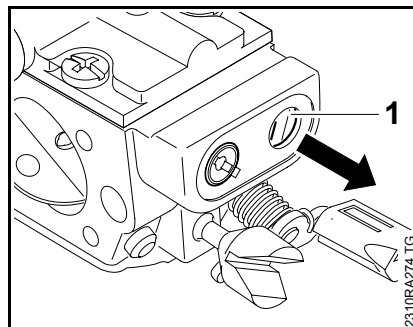
- H** = high speed screw (1)
- L** = low speed screw (2)
- LA** = idle speed screw (3)

If the carburetor cannot be adjusted properly, the problem may be the adjusting screws.

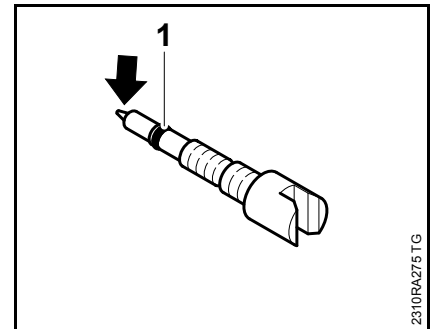
The high speed screw **H** has a limiter cap, which has to be removed before the screw is removed.

Always install a new limiter cap.

### Low speed screw



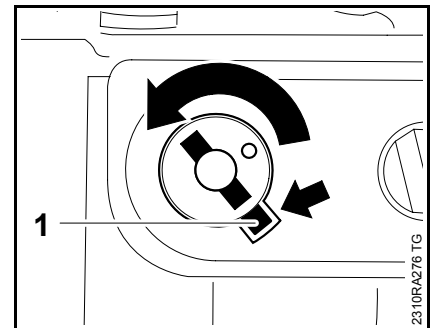
- Take out the low speed screw **L** (1).



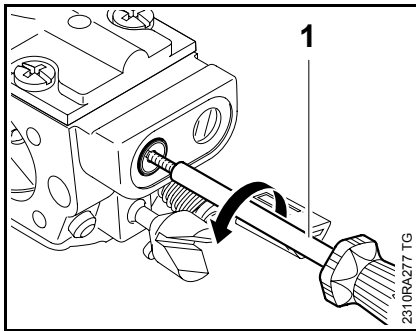
- Inspect the tip (arrow) and O-ring (1) for damage or wear and replace the low speed screw (**L**) if necessary.
- Screw down the low speed screw (**L**) as far as stop.
- Continue with the high speed screw **H**.

### High speed screw

The high speed screw **H** has a limiter cap, which has to be removed before the screw is removed.

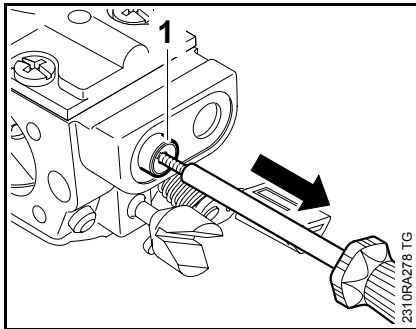


- Rotate the limiter cap until the lug (1) is in line with the slot (arrow).



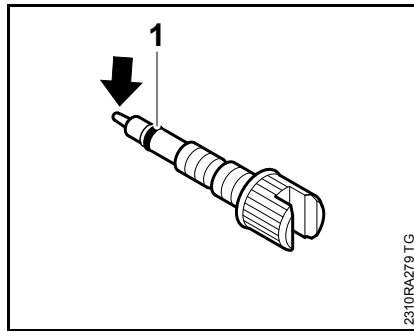
- Screw the puller (1) 5910 890 4502 about 5 turns counterclockwise into the limiter cap – left-hand thread.

Do not turn the puller any further – the high speed screw (H) may otherwise be damaged.

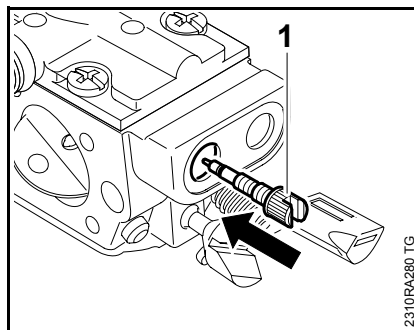


- Pull out the limiter cap (1).
- Take out the high speed screw (H).

Always install a new limiter cap.

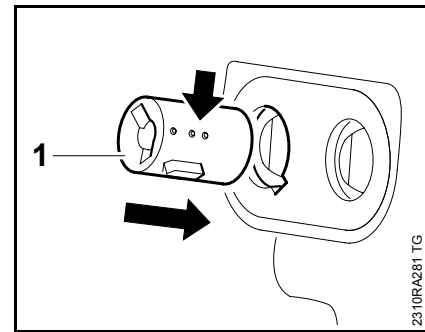


- Inspect the tip (arrow) and O-ring (1) for damage or wear and replace the high speed screw (H) if necessary.



- Screw down the high speed screw H (1) as far as stop.


## Pre-installing limiter cap



Always install a new limiter cap.

- Push the new limiter cap (1) on to the high speed screw (H) as far as the detent (arrow) – do not push fully home.

The basic setting is performed through the pre-installed limiter cap with screwdriver 5910 890 2306.

- Reassemble in the reverse sequence.
- Carry out the basic setting,  12.7.1

## 12.7 Adjusting the Carburetor

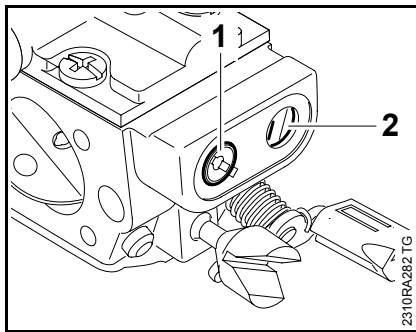
### 12.7.1 Basic Setting

The basic setting is necessary only if the high speed screw (**H**) or low speed screw (**L**) has to be replaced or after cleaning and adjusting the carburetor from scratch.

It is necessary to carry out the basic setting after removing the limiter cap.

The carburetor and air filter are installed, the adjusting screws fitted and the new limiter cap pre-installed.

- Check chain tension and adjust if necessary.
- Inspect the spark arresting screen (if fitted) and clean or replace if necessary, [3.7](#) or [6.1](#)
- Check the air filter and clean or replace if necessary, [12.1](#)



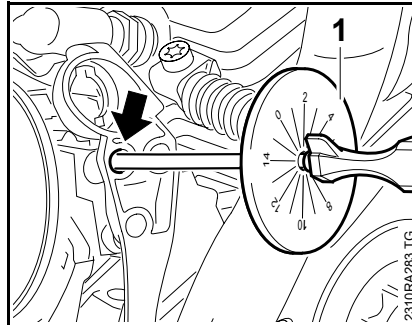
For the sake of clarity the adjusting screws are shown on the exposed carburetor.

- Starting with the high speed screw **H** (1) against its seat, open it **1 1/2 turns** counterclockwise – this is the basic setting.

- Starting with the low speed screw **L** (2) against its seat, open it **1 full turn** counterclockwise – this is the basic setting.

- Warm up the engine.

The setting disc 5910 893 6600 may be fitted on the screwdriver 5910 890 2306 to aid adjustment.



- Insert the screwdriver (1) 5910 890 2306 through the opening (arrow) and into the low speed screw **L** and high speed screw **H**
  - push the screwdriver through the pre-installed limiter cap on the high speed screw **H**.

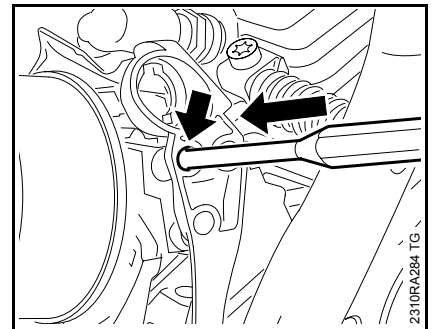
Adjust idle speed with a tachometer. Adjust specified engine speeds within a tolerance of  $\pm 200$  rpm.

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

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

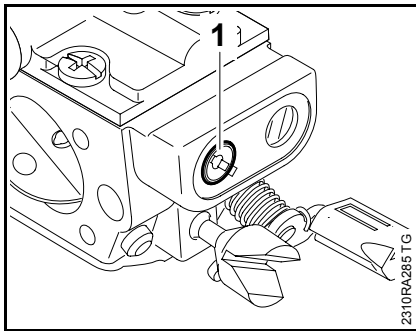
3. Use the idle speed screw (**LA**) to set the engine speed again to 3,300 rpm.
4. Use the low speed screw (**L**) to set engine speed to 2,800 rpm.
5. Use the high speed screw (**H**) to set the engine's maximum speed to 13,000 rpm. (starting with  $H = 1 \frac{1}{2}$  turns open).

As soon as a maximum engine speed of 13,000 rpm is obtained, do not attempt to make the mixture any leaner – the ignition module limits maximum engine speed to 13,000 rpm. This speed cannot be increased by making the setting leaner. Making the mixture over-lean increases the risk of engine damage.



- Insert a drift through the opening (arrow) and then push home the limiter cap until it engages.





This completes the basic setting of the high speed screw **H** and the low speed screw **L**.

The setting of the high speed screw **H** is fixed when the limiter cap (1) is flush with the carburetor body.

### 12.7.2 Standard setting

The limiter cap must not be removed for the standard setting.

Always perform the following steps before carrying out any adjustments:

- Troubleshooting, 3.6
- Check chain tension and adjust if necessary.
- Inspect the spark arresting screen (if fitted) and clean or replace if necessary, 3.7 or 6.1

- Check the air filter and clean or replace if necessary, 12.1

### Standard setting

- Shut off the engine.
- Turn the high speed screw (**H**) slowly counterclockwise as far as stop, but not more than a 3/4 turn.
- Turn the low speed screw (**L**) slowly clockwise as far as stop, then turn it back 1 full turn.

Check running behavior:  
The engine must idle and accelerate smoothly.

### Adjusting engine idle speed

- Carry out standard setting.
- Warm up the engine.

### Engine stops while idling

- Turn the idle speed screw (**LA**) clockwise until the chain starts running, then turn it back 1 full turn.

### Saw chain runs while engine is idling

- Turn the idle speed screw (**LA**) counterclockwise until the chain stops running, then turn it back 1 full turn.

### Erratic idling behavior, poor acceleration

(although standard setting is correct)

Idle setting too lean.

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

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

### Adjustment for operation at high altitude


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

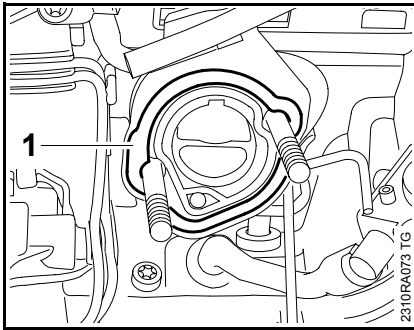
- Check standard setting.
- Warm up the engine.
- Turn the high speed screw (**H**) clockwise (leaner) – no further than stop.

Turn the adjusting screws only very slightly. Even minor adjustments can noticeably affect engine running behavior.

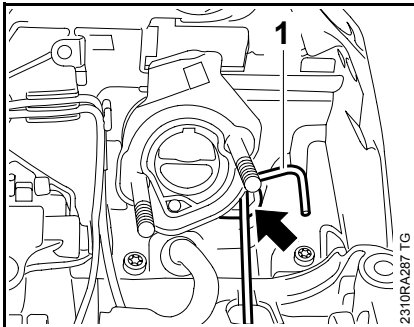
If the setting is made too lean there is a risk of engine damage as a result of lack of lubrication and overheating.

## 12.8 Carburetor Carrier

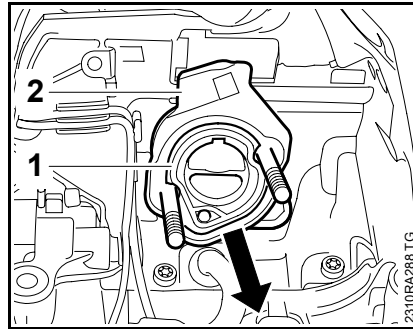
- Disconnect the filter base from the rubber buffers and put it to one side.
- Remove the carburetor and put it to one side,  12.5




- Remove the shim (1).

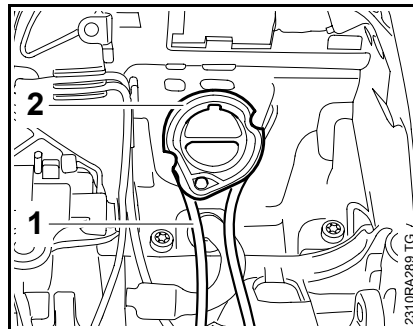


- Pull the throttle rod (1) out of the guide (arrow) and put it to one side.

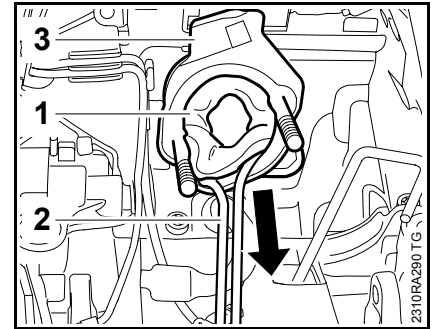



- Push the manifold flange (1) out of the carburetor carrier (2) in the direction of the cylinder, pulling the carburetor carrier away at the same time.
- Remove the carburetor carrier, check it and replace if necessary.
- Check the intake manifold and replace if necessary,  12.9

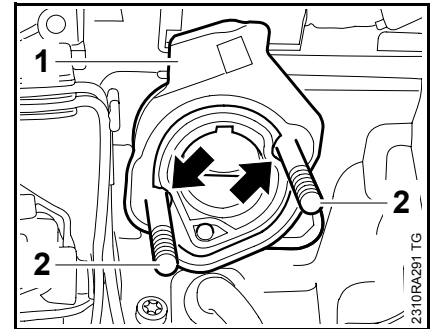
### Installing



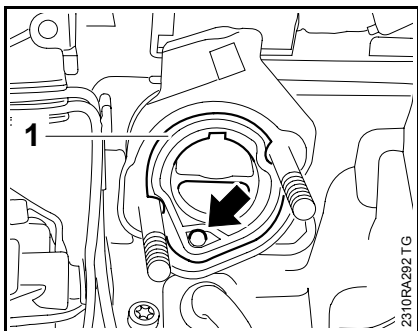
- To fit the manifold (2) through the carburetor carrier's opening, wind a piece of string (1) (about 15 cm long) around the back of manifold flange.



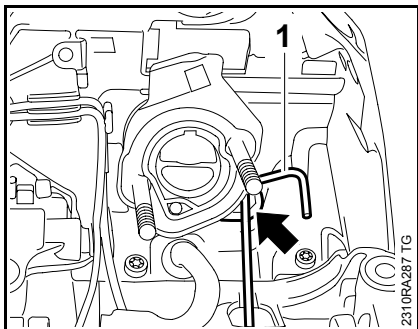
- Coat manifold flange with STIHL press fluid,  14
- Use the ends of the string (2) to pull the manifold flange (1) through the intake opening while pushing the carburetor carrier (3) against the manifold flange.
- Remove the string.



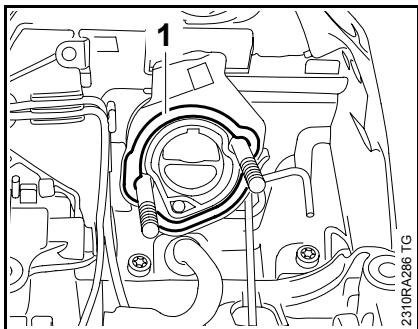
- Position the carburetor carrier (1) so that the semi-circles (arrows) locate against the studs (2).



- The bore (arrow) in the intake manifold (1) must be clear, clean if necessary – a dirty bore can cause engine running problems, [3.7](#)



- Push the throttle rod (1) into the guide (arrow) until it snaps into position.

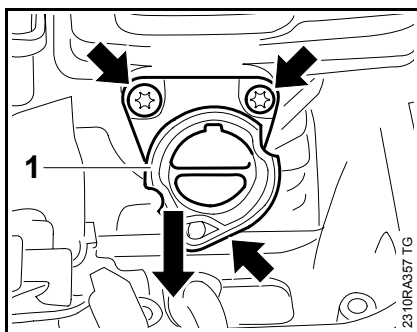


- Push the washer (1) into position.
- Reassemble all other parts in the reverse sequence.

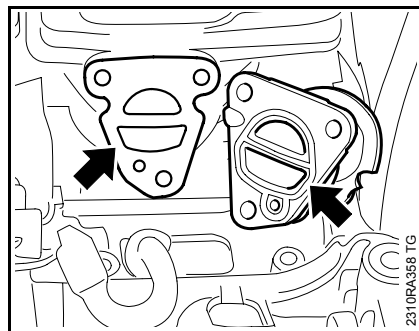
## 12.9 Intake Manifold

A damaged intake manifold can result in engine running problems.

- Troubleshooting, [3.6](#) or [3.7](#)
- Remove the shroud, [6.4](#)
- Remove the carburetor, [12.5](#)
- Remove the carburetor carrier, [12.8](#)
- Remove the air guide shroud, [12.4](#)  
Models with manual fuel pump, [12.4.1](#)

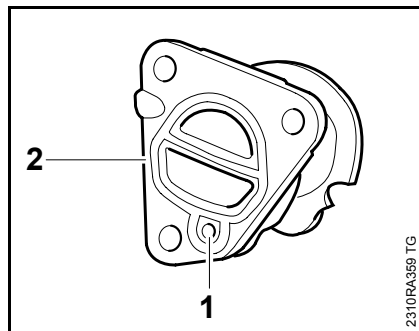


- Take out the screws (arrows).
- Remove the intake manifold (1).
- Inspect the intake manifold and replace it if necessary – even very minor damage can cause engine running problems, [3.7](#)



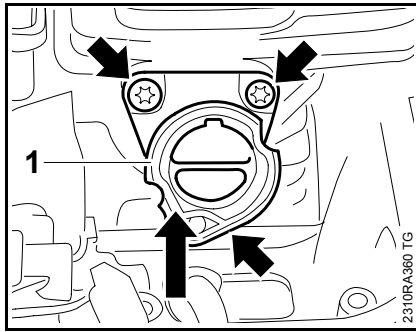
- Inspect and clean the sealing faces (arrows), [14](#)

The sealing faces must be in perfect condition. Always replace components with damaged sealing faces.



The bore (1) in the intake manifold (2) must be clear, clean if necessary – a dirty bore can cause engine running problems, [3.7](#)

## Installing



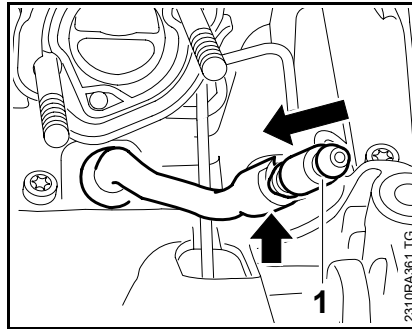
- Position the intake manifold (1) on the cylinder.
- Insert the screws (arrows) and tighten them down firmly.
- Install the air guide shroud, 12.4  
Models with manual fuel pump, 12.4.1
- Install the carburetor carrier, 12.8
- Reassemble all other parts in the reverse sequence.

## 12.10 Tank Vent

### 12.10.1 Testing

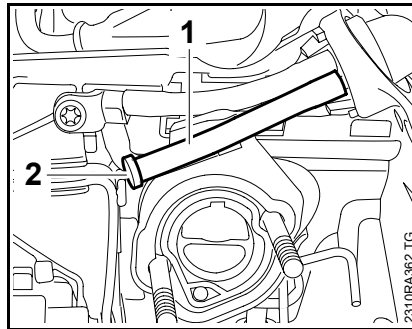
If problems occur on the carburetor or the fuel supply system, also check and clean the tank vent and replace it if necessary. Check function by performing pressure and vacuum tests on the tank via the fuel hose.

- Open the fuel tank cap and drain the fuel tank, 1.
- Close the tank cap.
- Remove the carburetor, 12.5



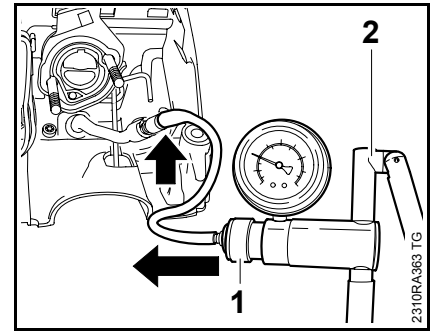
- Push the nipple (1) 0000 855 9200 into the fuel hose (arrow).

### Models with manual fuel pump



- Use a suitable plug (2) to seal the fuel suction hose (1).

## Vacuum test

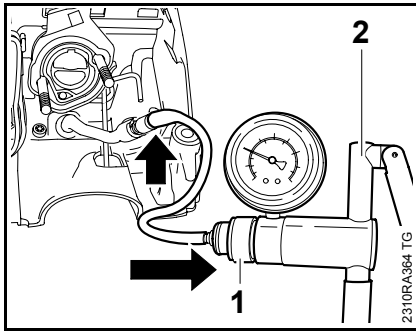


- Push the ring (1) to the left and connect the pump (2) 0000 850 1300 to the nipple (arrow)  
– create a vacuum in the fuel tank.

Equalization of pressure takes place via the tank vent. There must be no buildup of vacuum in the fuel tank.

- Clean the area around the tank vent.
- If necessary, install a new tank vent or fuel tank, 12.10 or 12.11.5

## Pressure test



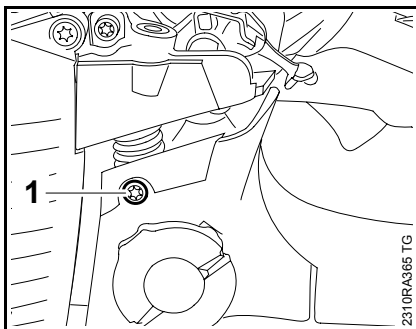
- Push the ring (1) to the right and connect the pump (2) 0000 850 1300 to the nipple (arrow) – pressurize the fuel tank.

– Operate the pump until the pressure gauge indicates a pressure of 0.5 bar. If this pressure remains constant for at least 20 seconds, the tank, including the tank vent, is airtight. If the pressure drops, the leak must be located and the faulty part replaced.

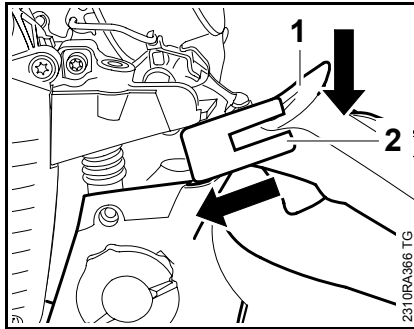
– Reassemble in the reverse sequence.

## 12.10.2 Removing and Installing

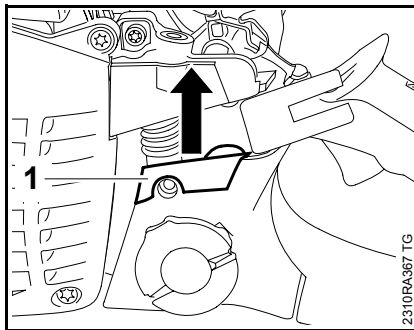
- Remove the shroud, 6.4



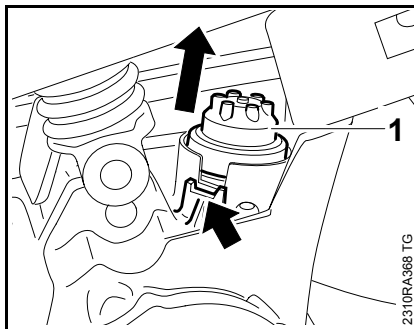
- Take out the screw (1).



- Press the tank housing (1) downwards and use wooden block (2) 1108 893 4800 to maintain the gap.



- Remove the cover (1).

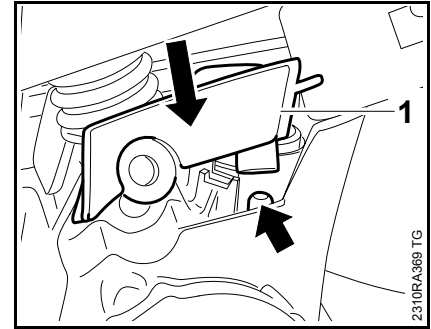


- Pry the tank vent (1) out of its seat using the rib (arrow) for leverage.

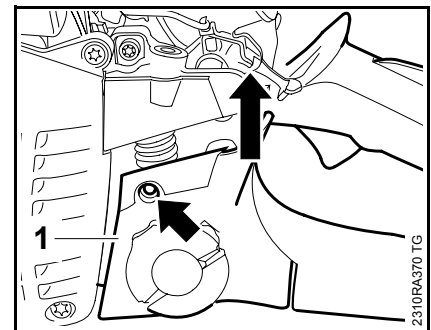
Always install a new tank vent.

- Coat sealing ring of new tank vent with STIHL press fluid, 14

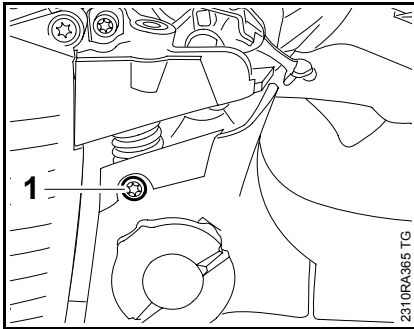
- Push home the tank vent by hand until it snaps into position.



- Fit the cover (1) so that it engages the peg (arrow).



- Pull out the wooden block and lift the tank housing (1) until the holes (arrow) in the tank housing, cover and AV spring are in alignment.



- Insert and tighten down the screw (1) firmly.
- Reassemble all other parts in the reverse sequence.

## 12.11 Fuel Intake

### 12.11.1 Pickup Body

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.

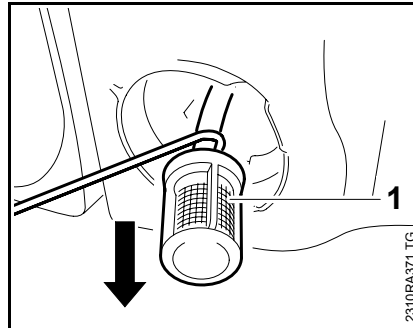
In the event of problems with the fuel supply system, always check the fuel tank and the pickup body first.

- Troubleshooting, 3.6 or 3.7

Clean the fuel tank if necessary.

- Open the tank cap 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 in accordance with environmental requirements, 1
- Open the tank cap.



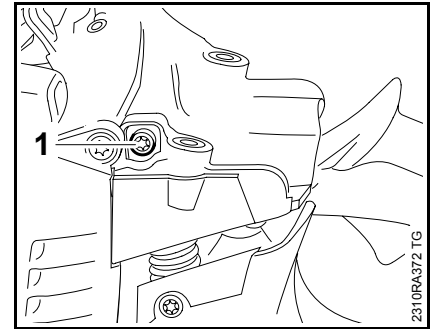
- Use hook 5910 893 8800 to remove the pickup body (1) from the fuel tank.

Do not overstretch the fuel hose.

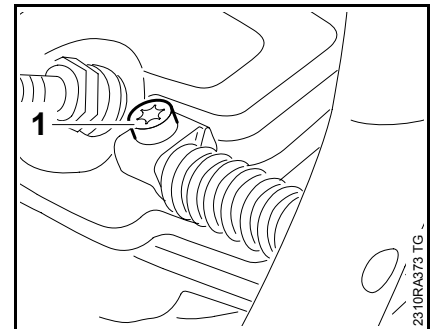
- Pull off the pickup body (1), check it and replace if necessary.
- Reassemble in the reverse sequence.

### 12.11.2 Fuel Hose

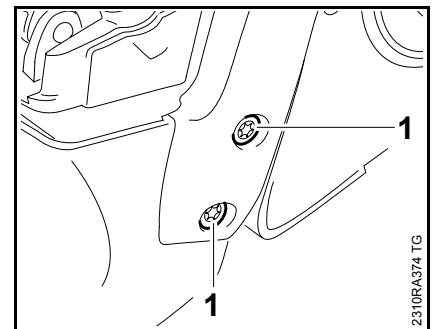
- Open the tank cap.
- Remove the pickup body, 11.1
- Remove the carburetor carrier, 12.8
- Remove the air guide shroud, 12.4  
Models with manual fuel pump, 12.4.1



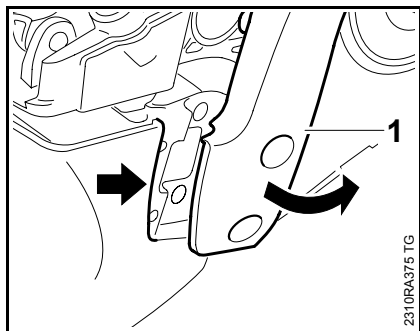
- Take out the screw (1).



- Take out the screw (1).

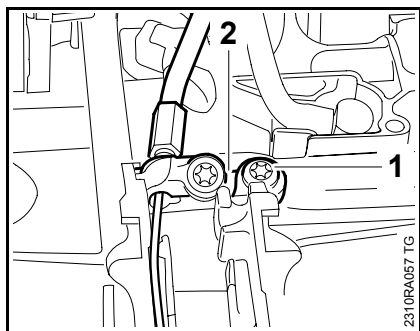


- Take out the screws (1).



- Ease the handlebar (1) sideways and take it out of the guide (arrow).

#### Machines with QuickStop Super

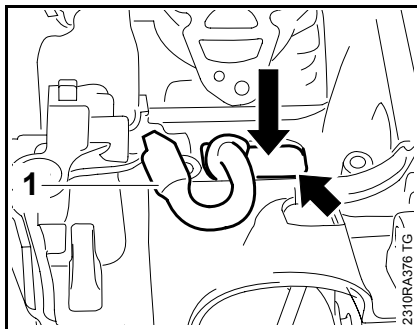


When the tank housing is lowered, the brake cable grommet is pulled out of the adjusting screw – this may change the adjustment of the brake cable.

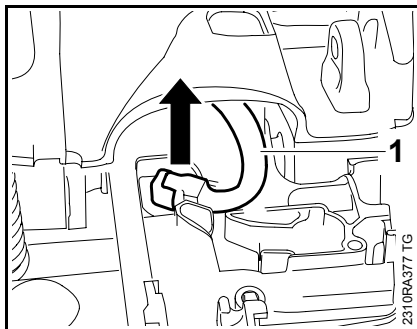
- Take out the screw (1) and pull the retainer (2) out of its seat.

#### All models

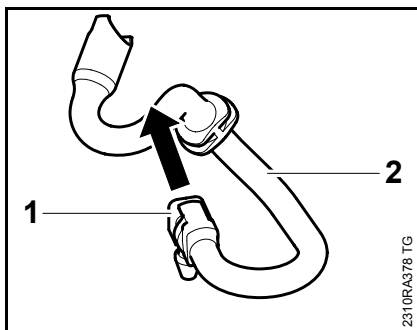
- Lower the tank housing.



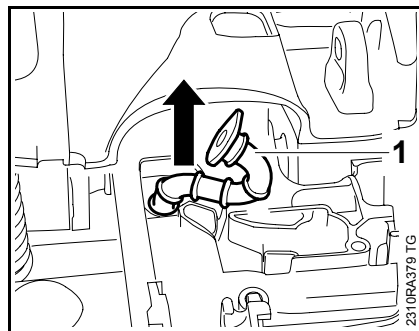
- Pull the fuel hose (1) downwards and out through the opening (arrow).



- Pull out the fuel hose (1) with connector.



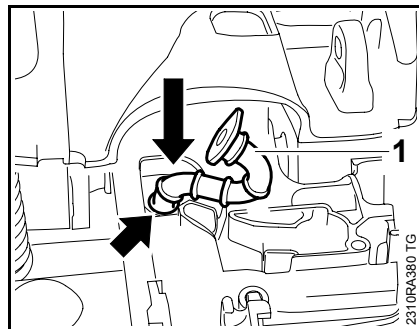
- Pull the connector (1) off the fuel hose (2).
- Remove the pickup body, 12.11.1



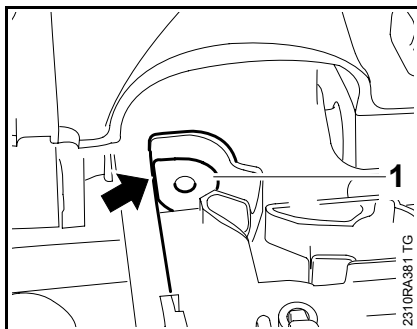
- Pull the fuel suction hose (1) out of the fuel tank.

- Replace the fuel hose and fuel return hose. Check the connector and replace if necessary.

#### Installing

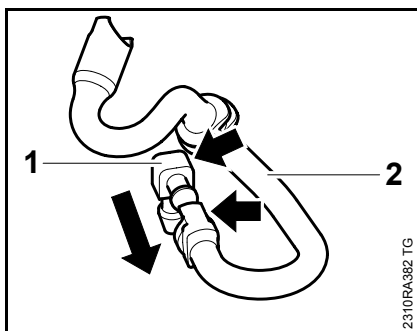


- Push the fuel hose (1) through the bore (arrow) in the fuel tank.

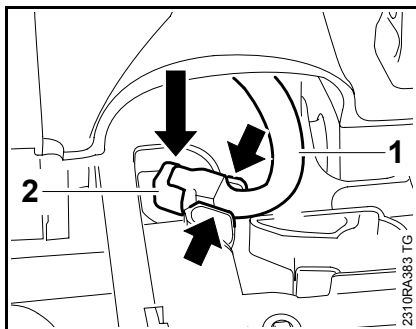


– Use STIHL press fluid to simplify assembly,  14

- Line up the fuel suction hose (1) and push it into the housing bore as far as stop – the flange must engage the guide (arrow).

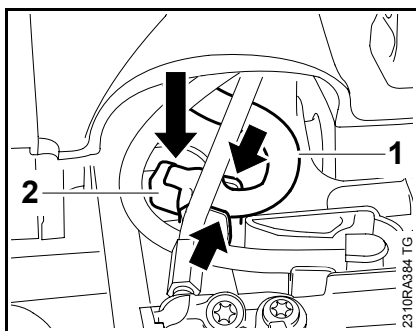


- Line up straight face of connector (1) with the lug on the fuel hose (2) (see arrows) – lug must locate snugly against connector.
- Push the connector (1) into the fuel hose (2) as far as stop.

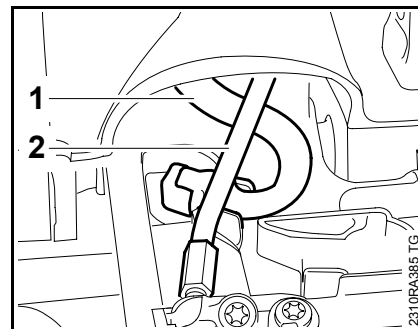


- Push the fuel hose (1), connector (2) first, into the fuel suction hose so that it locates between the ribs (arrows).

#### Machines with QuickStop Super

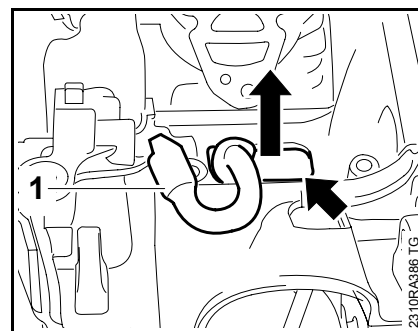


- Pass the fuel hose (1), connector (2) first, under the brake cable and push it into the fuel suction hose so that it locates between the ribs (arrows).



- Position the fuel hose (1) so that it is below the brake cable (2), as shown in the illustration, and points towards the ignition side.

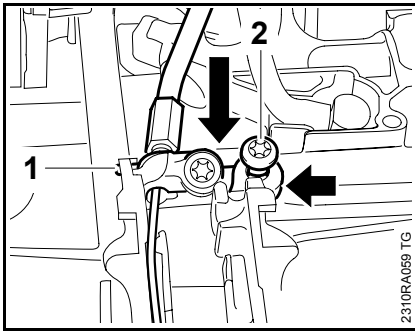
#### All models



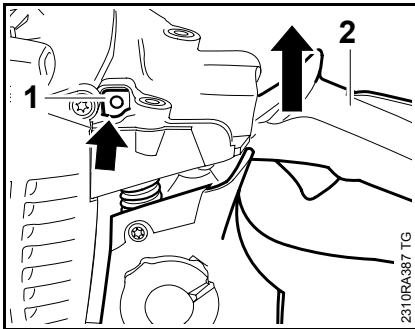
- Pass the fuel hose (1) upwards through the opening (arrow) in the engine housing.



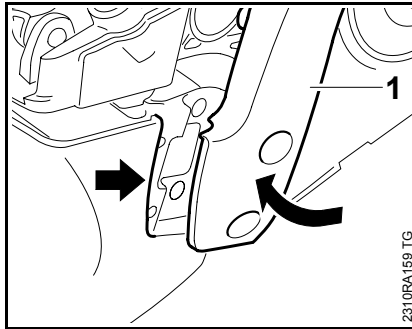
## Machines with QuickStop Super



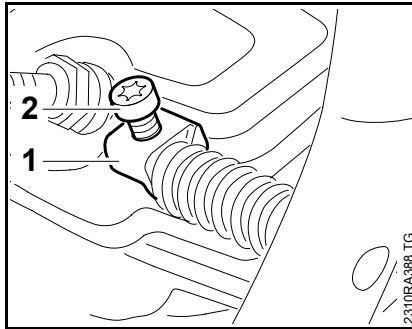
- Push the retainer (1) into its seat (arrow) and hold it in position.
- Insert and tighten down the screw (2) firmly.



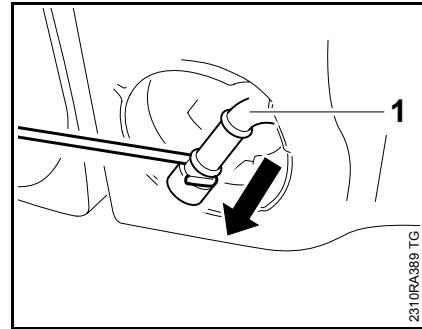
- Pass the AV spring (1) through the opening (arrow).
- Lift the tank housing (2).
- Insert screw and tighten it down firmly.



- Ease the handlebar (1) sideways and place it in the guide (arrow).
- Insert the screws and tighten them down firmly.



- Fit the AV spring (1) in position.
- Insert and tighten down the screw (2) firmly.
- Check position of fuel hose and correct if necessary, 12.11.2





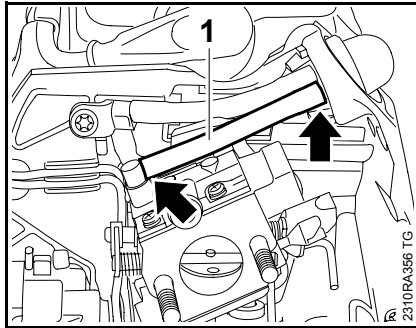
- Use hook 5910 893 8800 to remove the fuel suction hose (1) from the fuel tank.





Do not overstretch the fuel suction hose.

- Fit the pickup body, 12.11.1
- Install the air guide shroud, 12.4  
Models with manual fuel pump, 12.4.1
- Install the carburetor carrier, 12.8
- Close the tank cap.
- Reassemble all other parts in the reverse sequence.

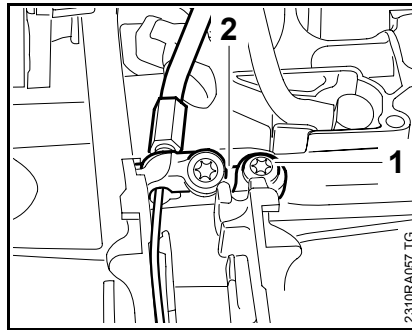
### 12.11.3 Fuel Hoses – Manual Fuel Pump

- Open the tank cap.
- Remove the pickup body,  11.1
- Remove the filter base,  12.3



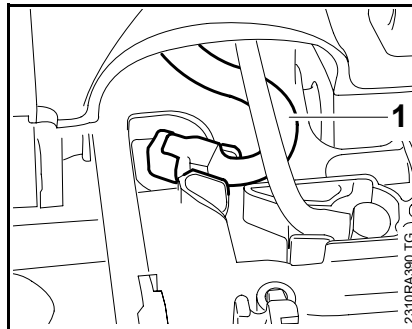
- Pull the fuel suction hose (1) off the nipples (arrows).
- Remove the carburetor,  12.5
- Remove the carburetor carrier,  12.8
- Remove the air guide shroud,  12.4.1
- Lower the tank housing,  12.11.2


### Machines with QuickStop Super

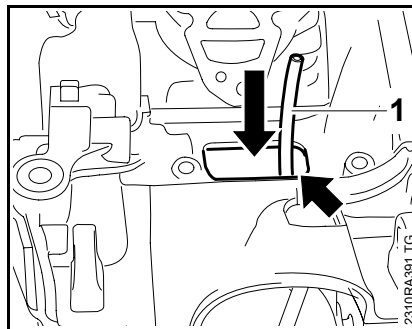


When the tank housing is lowered, the brake cable grommet is pulled out of the adjusting screw – this may change the adjustment of the brake cable.

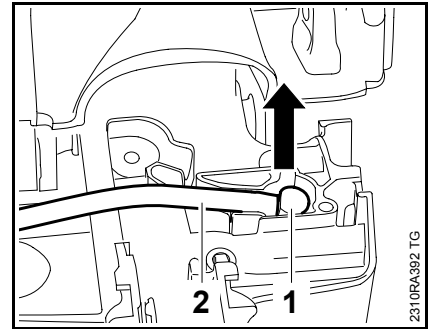
- Take out the screw (1) and pull the retainer (2) out of its seat.



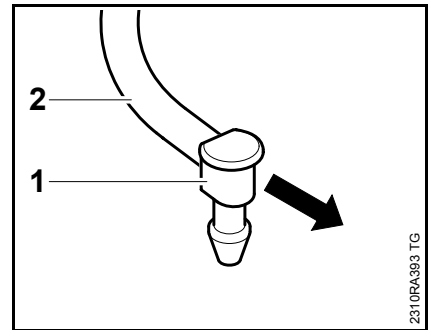
- Remove the fuel hose (1),  12.11.2.



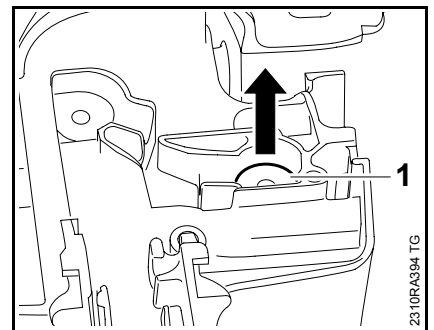
- Pull the fuel return hose (1) downwards and out through the opening (arrow).



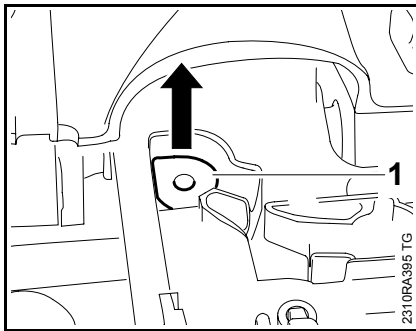
- Pull out the connector (1) with fuel return hose (2).



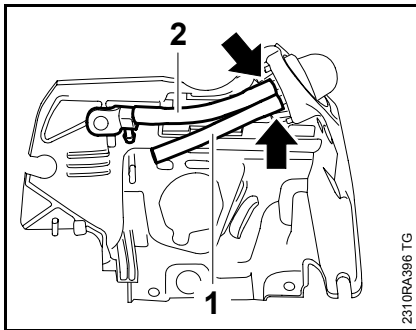
- Pull the connector (1) off the fuel return hose (2).



- Pry out the grommet (1).
- Replace the fuel return hose. Check the connector and grommet and replace if necessary.

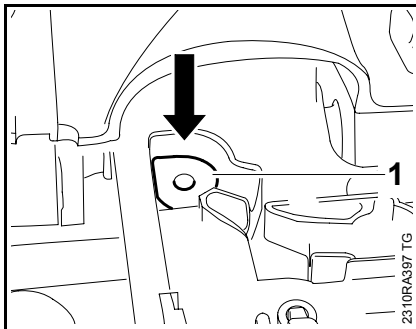


- Remove the fuel suction hose (1), 12.11.2

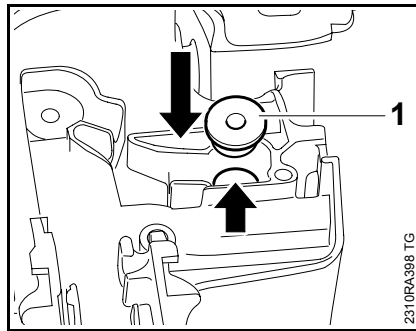


- Disconnect the fuel suction hose (1) and fuel return hose (2) from the nipples (arrows).

## Installing

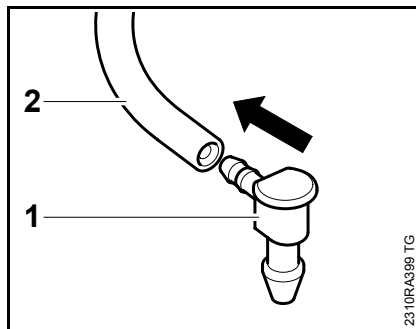


- Install the fuel suction hose (1), 12.11.2



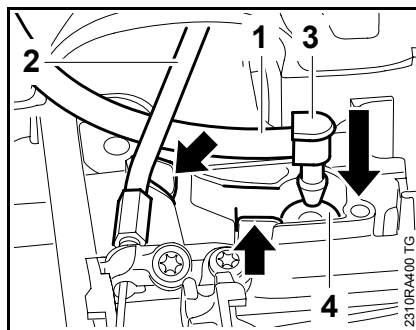
- Use STIHL press fluid to simplify assembly, 14

- Fit the grommet (1) in the hole (arrow) in the fuel tank and make sure it is properly seated.



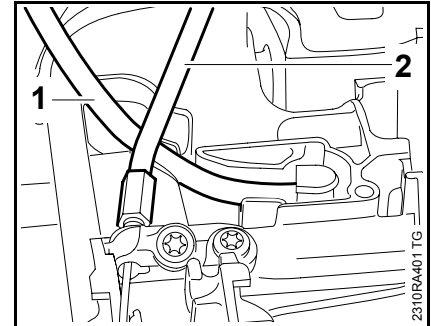
- Push the connector (1) into the fuel return hose (2) as far as stop.

## Machines with QuickStop Super

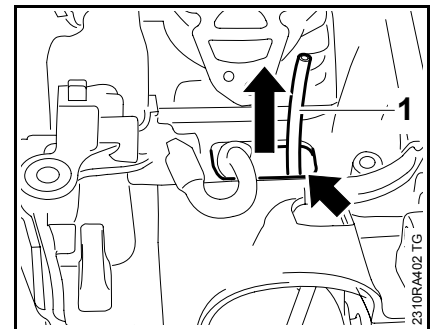


- Pass the fuel return hose (1), connector first, under the brake cable (2).

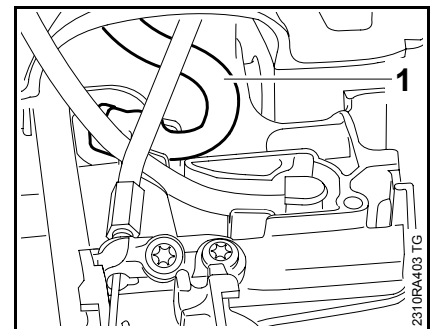
- Fit the connector (3) with fuel return hose (1) between the ribs (arrows) and push it into the grommet (4).





The fuel return hose (1) must be under the brake cable (2) and run to the left as shown in the illustration.

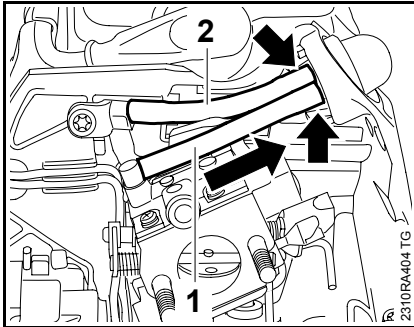



- Pass the fuel return hose (1) upwards through the opening (arrow) in the engine housing.



- Install the fuel hose (1), 12.11.2

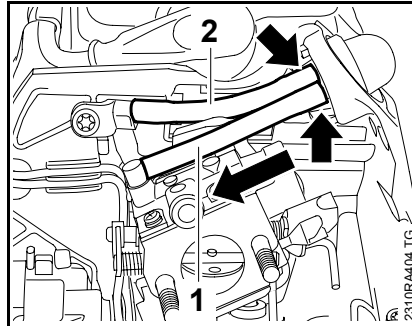
- Install the air guide shroud,  12.4.1
- Install the carburetor,  12.5



- Push the fuel suction hose (1) and fuel return hose (2) onto the nipples (arrows) as far as stop.
- Check operation of manual fuel pump,  12.11.4
- Reassemble all other parts in the reverse sequence.

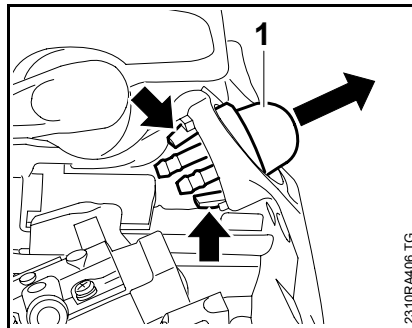
#### 12.11.4 Manual Fuel Pump

- Remove the filter base,  12.3



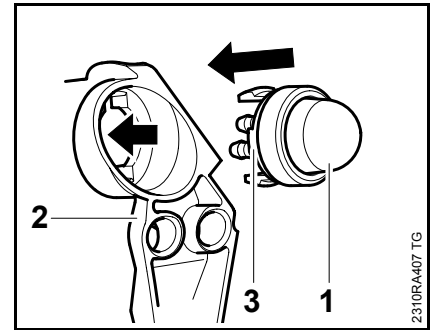
- Disconnect the fuel suction hose (1) and fuel return hose (2) from the nipples (arrows).

- Install new fuel hoses.

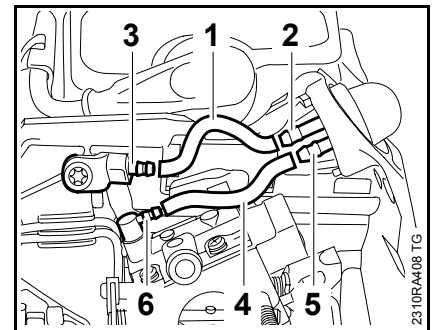


- Squeeze the tabs (arrows) together and pull out the manual fuel pump (1).
- Check the oil fuel pump and replace if necessary.

#### Installing











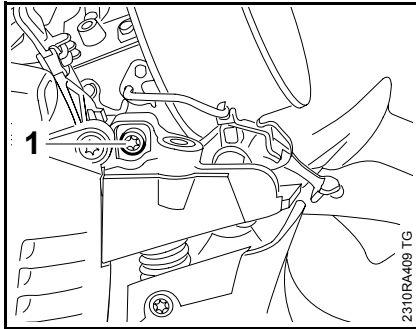
- Position the fuel pump (1) so that the lug (3) points towards the recess (arrow).
- Push the fuel pump (1) into the air guide shroud (2) until the tabs engage.



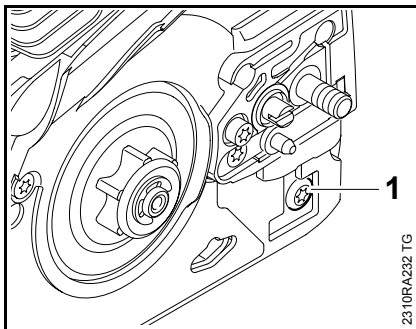
- Push the fuel return hose (1) onto the long nipple (2) and elbow connector (3).
- Push the fuel suction hose (4) onto the short nipple (5) and the carburetor connector (6).
- Check operation
  - fuel must flow when the fuel pump is operated.
- Reassemble all other parts in the reverse sequence.

### 12.11.5 Tank Housing

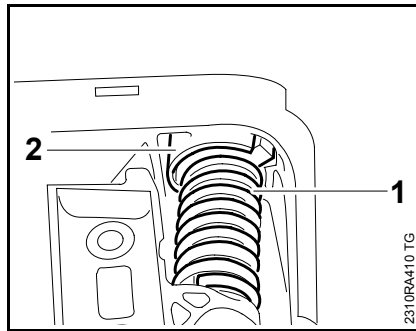
- Drain the fuel tank,  1
- Remove the handlebar,  9.4
- Remove the carburetor,  12.5
- Remove the carburetor carrier,  12.8
- Remove the air guide shroud,  12.4  
Models with manual fuel pump,  12.4.1
- On models with QuickStop Super, disconnect the brake cable from the brake lever,  5.4.2
- Remove the control levers,  10



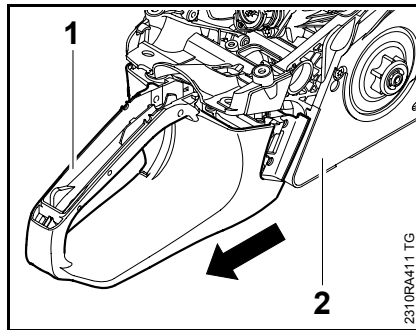
- Take out the screw (1).



- Take out the screw (1).



- Pry the AV spring (1) out of its seat (2).



- Pull out the tank housing (1) and pull the fuel hose or hoses out of the engine housing (2) at the same time.

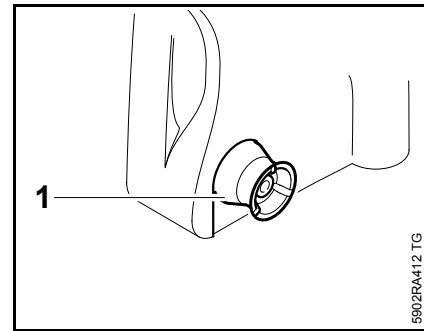
#### Machines with QuickStop Super


- Pull out the tank housing and pull the brake cable out of the engine housing at the same time.

#### All models

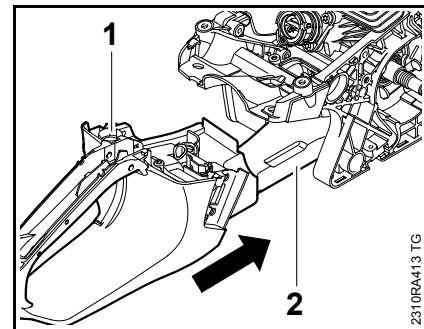
- Inspect the tank housing and replace if necessary

Only transfer those parts from the old tank housing that are not included with the replacement – see parts list.

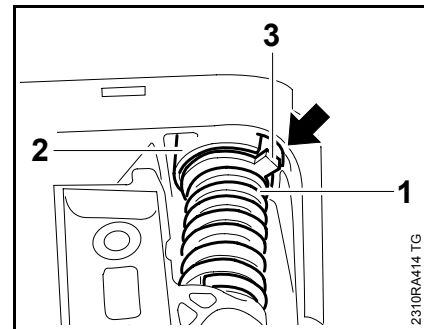


- Inspect stop buffer (1) at ignition and clutch sides and replace if necessary,  9.3.1

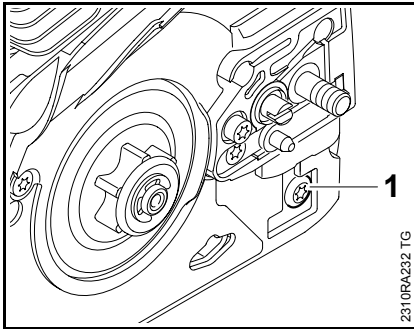
#### Installing



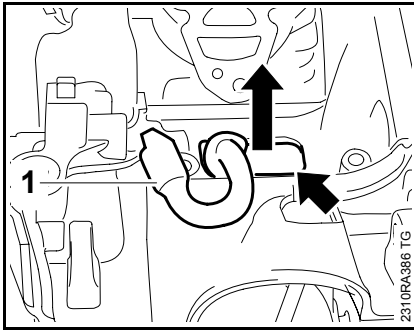
- Slide the tank housing (1), narrow part (2) first, into the engine housing.



- Push the AV spring (1) into the bearing seat (2) so that the lug (3) engages the recess (arrow).

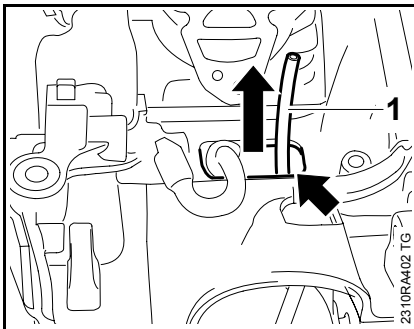


- Insert and tighten down the screw (1) firmly.



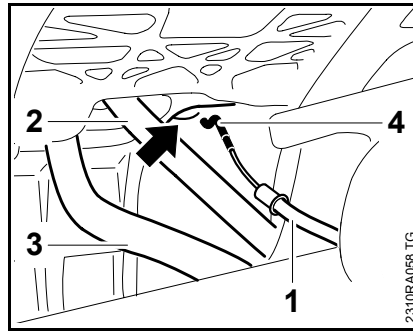
- Pass the fuel hose (1) upwards through the opening (arrow) and into the engine housing.

#### Models with manual fuel pump



- Pass the fuel return hose (1) upwards through the opening (arrow) and into the engine housing.

#### Machines with QuickStop Super

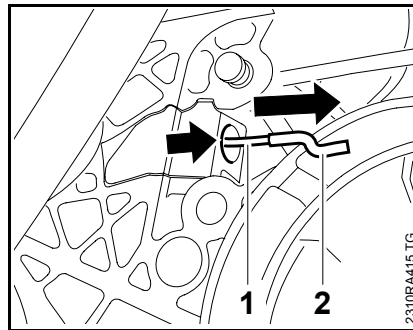


- Push the brake cable (1), short hook (4) first, passed the right-hand side of the fuel hose (3) and through the opening (arrow).

#### Models with manual fuel pump

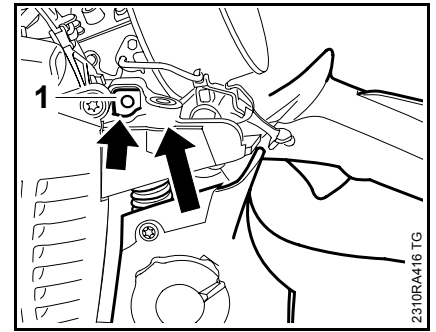
- Push the brake cable (1), short hook (4) first, passed the right-hand side of the fuel hose (3) and the fuel return hose (2) and through the opening (arrow).

#### Machines with QuickStop Super



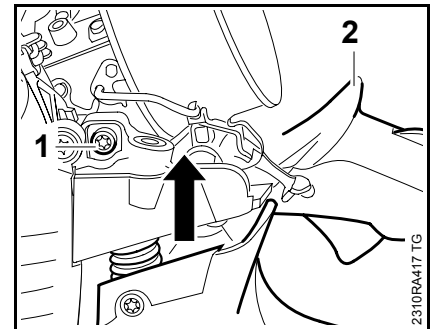
- Push the brake cable (1), short hook (2) first, through the bore (arrow) in the engine housing.

#### All models



- Fit the antivibration spring (1) in the recess (arrow) in the engine housing.

– Install the handlebar, [9.4](#)



- Lift the tank housing (2).
- Insert and tighten down the screw (1) firmly.
- On models with QuickStop Super, connect the brake cable to the brake lever, [5.4.2](#)
- Install the air guide shroud, [12.4](#)  
Models with manual fuel pump, [12.4.1](#)
- Reassemble all other parts in the reverse sequence.

### 13. Special Servicing Tools

#### New Special Tools

No.	Description	Part No.	Application	Rem.
1	Punch-down tool	5910 890 4000	Fitting electrical wires in guides	

#### Existing Special Tools

No.	Description	Part No.	Application	Rem.
1	Carburetor and engine tester	0000 850 1300	Testing engine and carburetor for leaks	
	- Nipple	0000 855 9200	Testing carburetor for leaks	
	- Hose for leakage test	1110 141 8600	Testing carburetor for leaks	
2	Sealing plate	0000 855 8106	Testing engine for leaks	
3	Installing tool	0000 890 2201	Installing rope guide bushing	
4	Locking strip	0000 893 5904	Blocking the crankshaft	
5	Screwdriver bit, T 27 x 125	0812 542 2104	Removing and installing spline socket screws with electric or pneumatic screwdrivers; tightening down screws with torque wrench	
6	Wooden assembly block	1108 893 4800	Lowering tank housing, maintaining clearance	
7	Assembly drift	1110 893 4700	Removing and installing piston pin	
8	Setting gauge	1111 890 6400	Adjusting air gap between the ignition module and flywheel	
9	Installing tool	1116 893 4800	Installing rewind spring	
10	Assembly tube	1117 890 0900	Attaching springs	
11	Test flange	1118 850 4200	Leakage Test	
12	Installing sleeve	1118 893 4602	Protecting the oil seal (clutch side)	
13	Press sleeve	1122 893 2405	Installing oil seal (clutch side/ignition side)	
14	Combination wrench	1129 890 3401	Spark plug	1)
15	Installing sleeve	1141 893 4600	Protecting the oil seal (ignition side)	
16	Clamping strap for assembly stand	5910 850 1650	Clamping machine to assembly stand	
17	Ignition system tester, ZAT 4	5910 850 4503	Testing ignition system	
18	Ignition system tester, ZAT 3	5910 850 4520	Testing ignition system	

No.	Description	Part No.	Application	Rem.
19	Flange	5910 855 4201	Sealing exhaust port for leakage test	
20	Torque wrench	5910 890 0302	0.5 to 18 Nm	
21	Torque wrench	5910 890 0312	6 to 80 Nm	
22	Installing tool 10	5910 890 2210	Installing hookless snap rings in piston	
	– Sleeve	5910 893 1707	Sleeve for installing tool 10	
23	Screwdriver	5910 890 2306	Adjusting the carburetor	
24	Screwdriver bit, T 27 x 150	5910 890 2400	IS-P screws	
25	Hook	5910 890 2800	Detaching springs on clutch shoes	
26	Assembly stand	5910 890 3101	Holding saw for repairs	
27	Puller	5910 890 4400	Removing oil seals	
	- Jaws (No. 3.1)	0000 893 3706	Removing oil seals	
	- Jaws (No. 6)	0000 893 3711	Removing oil seals	
28	Puller	5910 890 4502	Pull off the limiter cap.	
29	Stud puller M8	5910 893 0501	Removing bar mounting studs	
30	Puller	5910 893 0801	Removing flywheel	
31	Setting disk	5910 893 6600	Add-on for screwdriver (adjusting carburetor)	
32	Hook	5910 893 8800	Removing pickup body	

**Remarks:**

1) Use for releasing only.



## 14. Servicing Aids

No.	Description	Part No.	Application
1	STIHL multipurpose grease	0781 120 1109	
2	Lubricating grease (225 g tube)	0781 120 1111	Oil seals, sliding and bearing points
3	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in fan housing
4	STIHL press fluid OH 723	0781 957 9000	Rubber components, AV buffers
5	Dirko HT red sealant	0783 830 2000	Sealing engine pan / cylinder
6	Standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons		Cleaning sealing faces and carburetor, crankshaft stubs and flywheel taper

