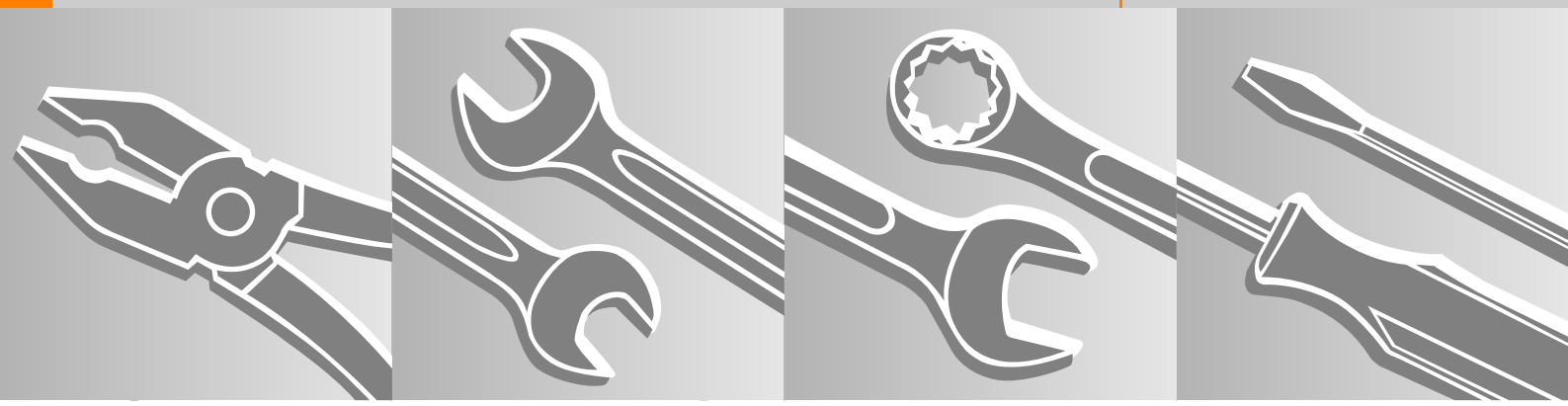
STIHL Components 4140
FC, FS, HL, KM

2003-10



Contents

STIHL®

This service manual contains detailed descriptions of all typical repair and servicing procedures for models FS 45, 46, 55, FC 55, HL 45 and KM 55, which are based on the series 4140 powerhead.

If there is no specific reference to individual machines, the procedure is the same for all machines. The illustrations may differ depending on the machine, but the methods used and the sequence of operations are identical.

You will find detailed descriptions of procedures for servicing and repairing engine components and associated CombiTools in the service manual for the “Series 4140 Powerhead“.

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" in this manual 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 servicing tools mentioned in the descriptions are listed in the chapter "Special Servicing Tools" of this manual. Use the part numbers to identify the tools in the "STIHL Special Tools” manual. The manual lists all special servicing tools currently available from STIHL.

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

In the descriptions:

● = Action to be taken as shown in the illustration (above the text)

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

→ = Situation applies from serial number

→| = Situation applies up to serial number

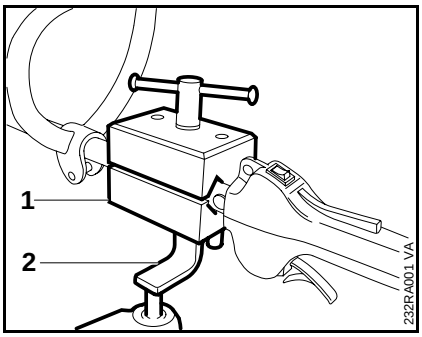
📖 4.2
Reference to another chapter, i.e. chapter 4.2 in this example.

In the illustrations:

➔ Pointer

➔ Direction of movement

Service manuals and 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 on assembly stand (**2**) 5910 890 3100 with the aid of clamping fixture (**1**) 5910 890 3100.

Mount the clamping fixture to the assembly stand with two washers and two M8 nuts.
The powerhead can then be swivelled to the best position for the ongoing repair. This leaves both hands free.

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

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

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

Improper handling may result in burns or other serious injuries.

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

3. Specifications

3.1 Fuel System

Carburetor:	Diaphragm carburetor
Carburetor leakage test at gauge pressure:	0.8 bar (11.6 psi)
Operation of tank vent	
at gauge pressure:	0.3 bar (4.4 psi)
under vacuum:	0.05 bar (0.725 psi)
Fuel:	see instruction manual
Octane number:	min. 90 RON (USA/CAN: pump octane min. 87 unleaded)
Fuel mixture:	Regular brand-name gasoline and STIHL 50:1 two-stroke engine oil or brand-name 25:1 two-stroke engine oil
Mix ratio:	50:1 with STIHL 50:1 two-stroke engine oil Fuel mix for units with catalytic converter: Use only STIHL 50:1 two-stroke engine oil with **unleaded** gasoline.

3.2 Gearboxes

3.2.1 FS Units

Type:	Spiral-toothed bevel drive gear
Gear ratio:	1:1.235
Bearings:	Deep groove ball bearings
Lubrication:	STIHL gear lubricant for brushcutters

3.2.2 HS 45

Type:	Straight-toothed spur gear drive gear
Gear ratio:	1:5.1
Bearings:	Deep groove ball bearings
Lubrication:	STIHL gear lubricant for hedge trimmers

3.3 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		Remarks
			lbf.ft	Nm	
Screw	B3.9x19	Control handle/right/left switch housing molding/US loop handle	1.8	2.5	1)2)
Screw	IS-P4x16	Control handle/right/left handle molding (bike handle)	0.75	1.0	1)
Screw	IS-M5x30	Control handle to handlebar with washer (bike handle)	1.5	2.0	1)
Nut	M5	Filter housing/carburetor/spacer flange	2.6	3.5	1)2)3)4)5)
Screw	IS-M6x35	Clamp/handle support/clamp (bike handle)	3.3	4.5	1)
Wing screw	M6x30	Coupling sleeve/wing screw (T model)	4.4	6.0	1)
Screw	IS-M6x25	Coupling sleeve/clamp nut (T model)	6.6	9.0	1)
Screw	IS-8-32	Clutch drum/crankshaft	3.0	4.0	1)2)3)4)5)
Screw	IS-M6x25	Clamp/loop handle/square nut (loop-handled machine)	3.3	4.5	1)4)5)
Carrier	3/8“-24	Carrier/crankshaft	12.5	17.0	1)2)3)4)5)
Screw	IS-DG5x24	Engine housing/clutch drum mounting	1.5	2.0	1)2)3)4)5)
Screw	IS-DG5x24	Engine housing/shroud	3.3	4.5	1)2)3)4)5)
Screw	IS-DG5x24	Engine housing/crankcase	5.9	8.0	1)2)3)4)6)
Collar screw	P3.5x9.0	Detent spring/slide control (bike handle)	0.8	1.1	1)
Screw	IS-DG5x60	Muffler/cylinder	6.6	9.0	1)2)3)4)5)
Screw	IS-DG5x24	Muffler/cylinder (catalytic converter)	6.6	9.0	1)2)3)4)
Screw	IS-DG5x12	Centering drive tube/engine housing	3.0	4.0	1)2)3)4)5)
	M14x1.25	Spark plug	15.0	20.0	

Remarks:

1) FS 55
2) FS 46
3) FS 45
4) KM 55, FC 55
5) HL 45
6) with binding head

Fastener	Thread size	For component	Torque		Remarks
			lbf.ft	Nm	
Screw	IS-M6x14	Clamp/drive tube/harness ring	3.3	4.5	1)
Screw	IS-DG5x20Z	Rewind starter/crankcase	4.4	6.0	1)2)3)4)5)
Screw	IS-DG5x20Z	Rewind starter/engine pan	4.4	6.0	1)2)3)4)5)
	M8x1	Starter cup/crankshaft	10.3	14.0	1)2)3)4)5)
	M14x7	Stub/muffler (version with spark arresting screen in muffler)	7.5	10.0	1)2)3)4)5)6)
Screw	IS-P5x20	Tank housing/retainer	1.5	2.0	1)2)3)4)5)
Screw	IS-DG5x24	Spacer flange/cylinder	4.4	6.0	1)2)3)4)5)6)
Screw	IS-M5x8	Clamp/drive tube/guide	5.9	8.0	2)3)
Screw	IS-DG5x24	Engine housing/crankcase	6.6	9.0	5)

Remarks:

1) FS 55
2) FS 46
3) FS 45
4) KM 55, FC 55
5) HL 45
6) with binding head

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.

Power screwdriver settings for polymer:	Plastoform screws	max. 600 rpm
	DG screws	max. 500 rpm

Important:
Do not mix up screws with and without binding head

4. Troubleshooting
4.1 Clutch, Blade Lock

Condition	Cause	Remedy
Tool stops at full throttle under load	Clutch shoes badly worn	Install new clutch shoes or a new clutch
	Clutch drum badly worn	Replace clutch drum
Tool runs at idle speed	Idle speed too high	Readjust idle speed screw (counterclockwise)
	Clutch springs stretched or fatigued	Fit new clutch springs
	Spring hooks broken	Fit new clutch springs
Loud noises	Clutch springs stretched or fatigued	Replace all clutch springs
	Clutch shoe retainer (carrier) broken	Fit new retainer (carrier) or clutch
	Clutch shoes and carrier worn	Install a new clutch
Hedge trimmer blades run in starting throttle positon with the blade lock engaged	Tension spring broken	Replace tension spring
	Brake band stretched/worn/broken	Replace brake band

Condition	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge, i.e. not vertically	Fit new starter rope
	Normal wear	Fit new starter rope
Rewind spring broken	Spring overtensioned – no reserve when rope is fully extended	Fit new rewind spring
	Very dirty or corroded	Fit new rewind spring
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 fatigued	Fit new spring clip
Starter rope is difficult to pull and rewinds very slowly	Starter mechanism very dirty (dusty conditions)	Thoroughly clean complete starter mechanism
	Lubricating oil on rewind spring becomes viscous at very low outside temperatures (spring windings stick together)	Coat rewind spring with a 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 stalls at idle speed	Idle jet bores or ports blocked	Clean jet bores and ports and blow clear with compressed air
	Idle jet (L) too rich or too lean	Reset low speed screw (L) correctly
	Setting of idle speed screw (LA) incorrect – throttle shutter completely closed	Reset idle speed screw (LA) correctly
Engine speed drops quickly under load – low power	Air filter plugged	Clean the air filter or replace if necessary
	Tank vent faulty	Fit new tank vent
	Leak in fuel line between tank and fuel pump	Seal or renew connections and fuel line
	Pump diaphragm damaged or fatigued	Fit new pump diaphragm
	Main jet bores or ports blocked	Clean the bores and ports
	Fuel pickup body dirty	Install new pickup body
	Setting of high speed screw (H) too rich	Reset high speed screw (H) correctly
	Throttle shutter not opened fully	Check linkage

Condition	Cause	Remedy
Poor acceleration	Idle jet too lean	Turn low speed screw (L) counter-clockwise (richer), no further than stop
	Main jet too lean	Turn high speed screw (H) counter-clockwise (richer), no further than stop
	Inlet control lever too low (relative to correct installed position)	Set inlet control lever flush with top of carburetor body
	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Connecting bore to atmosphere blocked	Clean the bore
	Diaphragm gasket leaking	Fit new diaphragm gasket
	Metering diaphragm damaged or shrunk	Fit new metering diaphragm
Engine will not idle – idle speed too high	Throttle shutter opened too wide by idle speed screw	Reset idle speed screw correctly

Condition	Cause	Remedy
Carburetor floods, engine stalls	Inlet needle not sealing. Foreign matter in valve seat or cone damaged	Remove and clean or replace inlet needle, clean fuel tank, pickup body and fuel line if necessary
	Inlet control lever sticking on spindle	Free off inlet control lever
	Helical spring not located on nipple of inlet control lever	Remove inlet control lever and refit correctly
	Perforated disc on diaphragm is deformed and presses constantly against inlet control lever	Fit new metering diaphragm
	Inlet control lever too low (relative to correct installed position)	Fit new inlet control lever

4.4 Engine

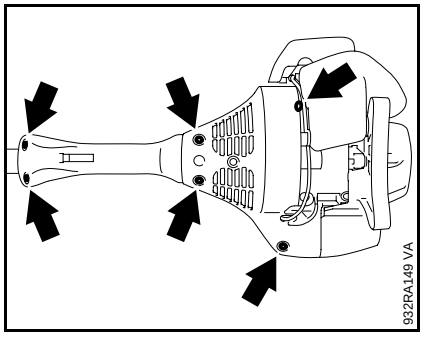
Always check and, if necessary, repair the following parts before looking for faults on the engine:

– Air filter
– Fuel system
– Carburetor
– Ignition system[1)]

Condition	Cause	Remedy
Engine does not start easily, stalls at idle speed, but operates normally at full throttle	Oil seals in crankcase faulty	Install new oil seals [1)]
	Crankcase leaking / damaged (cracks)	Seal / replace the crankcase [1)]
	Muffler leaking	Seal / replace the muffler
Engine does not deliver full power or runs erratically	Piston rings worn or broken	Install new piston rings [1)]
	Muffler / spark arresting screen carbonized	Clean muffler (inlet and exhaust openings), replace spark arresting screen
	Air filter element dirty	Fit new air filter element
	Fuel / impulse line kinked or cracked	Fit new lines or position without kinks
Engine overheating	Insufficient cylinder cooling. Air inlets in fan housing blocked or cooling fins on cylinder very dirty	Thoroughly clean all cooling air passages and cooling fins

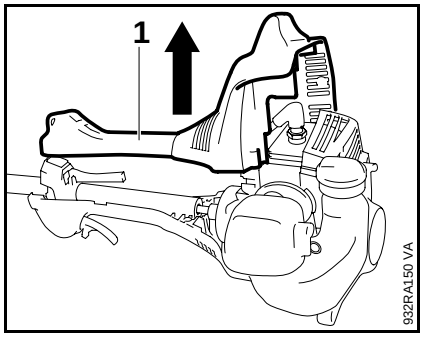
[1)] see "Series 4140 Powerhead" service manual

Only the **new** shrouds with reflector foil for catalytic converter units from 2003 are available as replacements for all machine versions (except HL 45). They are equipped with a reflector foil to protect the shroud from high temperatures. Read the instructions in this chapter before mounting the new version of the shroud.



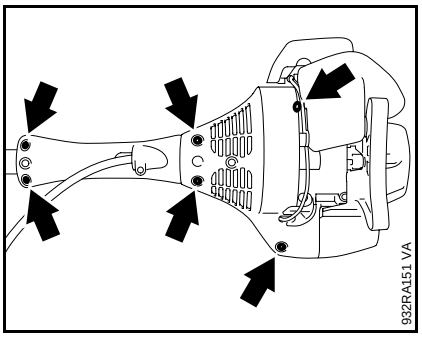
Machines with loop handle

- Remove the screws (arrows) from the shroud.



- Lift away the shroud (1).

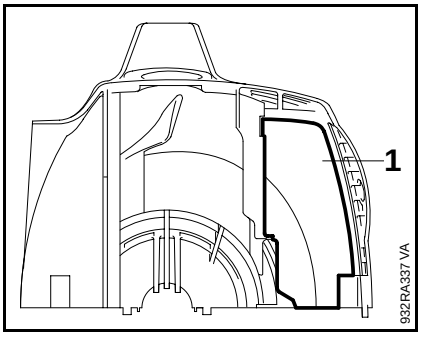
Install in the reverse sequence.



Machines with bike handle

- Remove the screws (arrows) and lift away the shroud.

Install in the reverse sequence.



Version with catalytic converter from 2003

- Check that reflector foil (1) is correctly seated before installing the shroud.

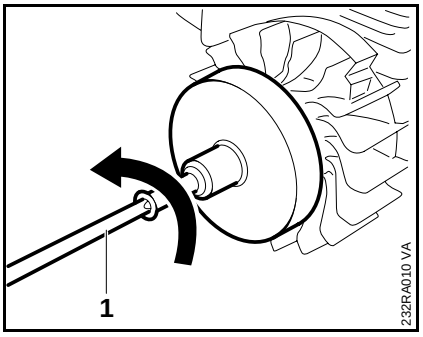
Troubleshooting, 🕮 4.1

Removing

Remove the engine, 🕮 5.3

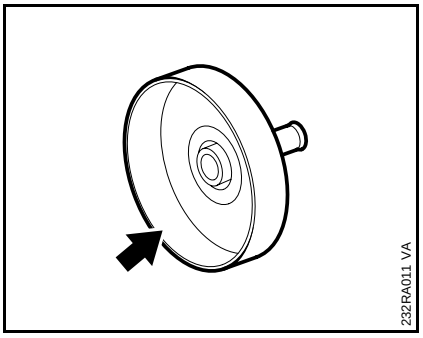
– Remove the spark plug.

– Use locking strip 4221 893 5900 to block the piston.

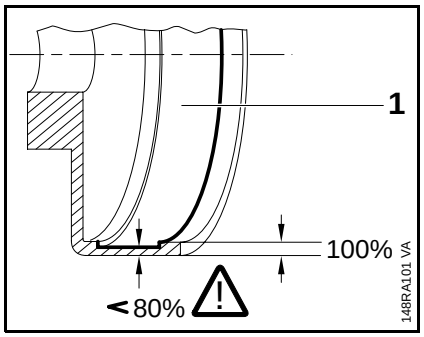


- Use screwdriver bit (1) 0812 540 1112 to unscrew the clutch drum.

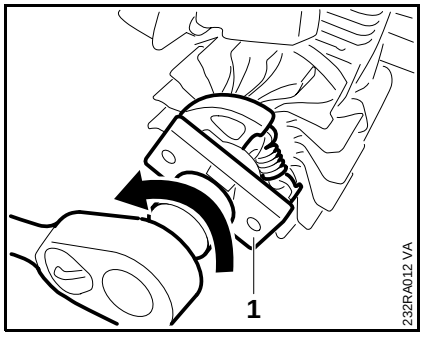
– Remove the clutch drum.



- Inspect the clutch drum. There should be no scores or signs of excessive wear.

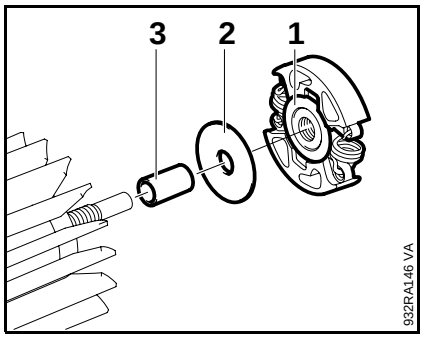


- If there are noticeable wear marks on the inside diameter of the clutch drum (1), check its wall thickness. If it is less than about 80% of the original thickness, fit a new clutch drum.



- Engage pins of wrench (1) 4130 890 3600 in the semi-circular recesses in the clutch.

– Unscrew the clutch.

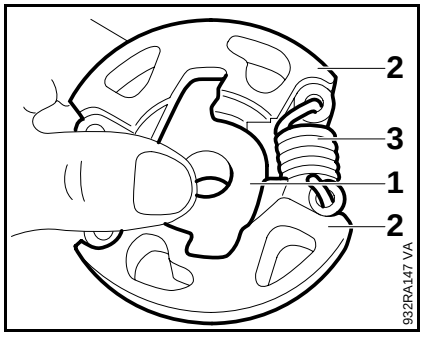


- If necessary, remove the washer (2) and spacer sleeve (3), and cup spring (1) (if fitted), from the crankshaft.

If a new clutch is installed, the washer (2) must also be replaced. The washer (2) in clutches with cup spring (1) is only 1.2 mm thick, while the washer in clutches without cup spring is 1.5 mm thick.

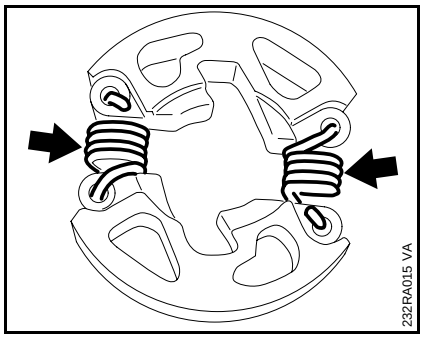
Clutch shoes, carrier, springs and cup spring as well as the required washer are supplied as a complete assembly (clutch). The clutch springs may be replaced.

Always replace clutch springs in pairs.



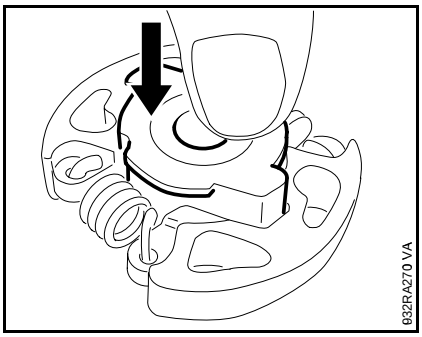
- Push the carrier (1) out of the clutch shoes (2).

- Use 5910 890 2800 to detach the clutch springs (3).

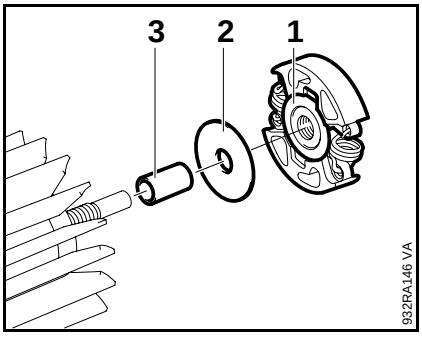


Installing

- Attach the springs (arrows) as shown in the illustration so that they do not project sideways.



- Hold the carrier at an angle and place it in position, pull the clutch shoes outwards a little and press home the carrier as far as stop.

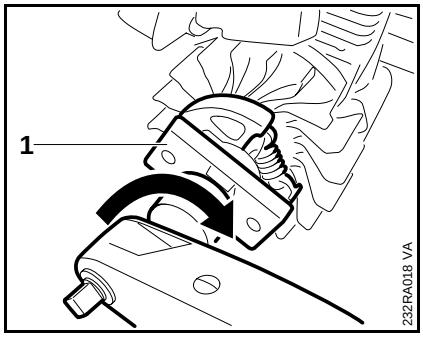


- Push the spacer sleeve (3) and washer (2), and cup spring (1) (if fitted) on to the end of the crankshaft.

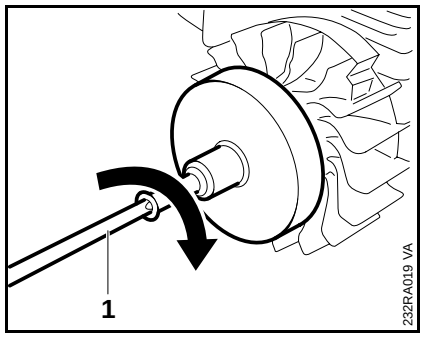
The washer (2) in clutches with cup spring (1) is only 1.2 mm thick, while the washer in clutches without cup spring is 1.5 mm thick.

- Screw home the clutch so that the arrow and "OFF" face outwards.

– On clutches with cup spring: Check that cup spring is properly seated in the clutch and does not slip out of position while installing the clutch.



- Fit wrench (1) 4130 890 3600 and tighten down the clutch firmly, 🕮 3.3



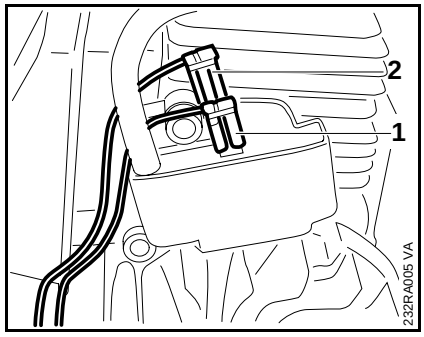
- Use screwdriver bit (1) 0812 540 1112 to tighten down the screw inside the clutch drum, 🕮 3.3

Reassemble all other parts in the reverse sequence.

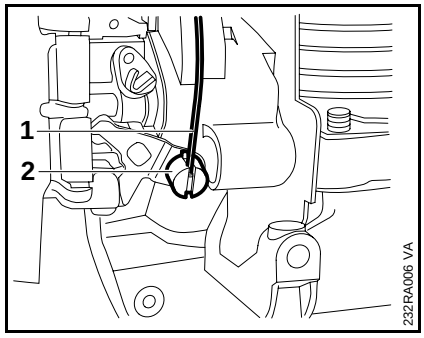
– Remove the drive tube, 🕮 10.1

– Remove the shroud, 🕮 5.1

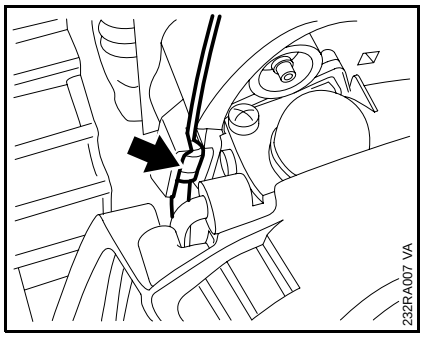
– Remove the fuel tank, 🕮 9.5.1



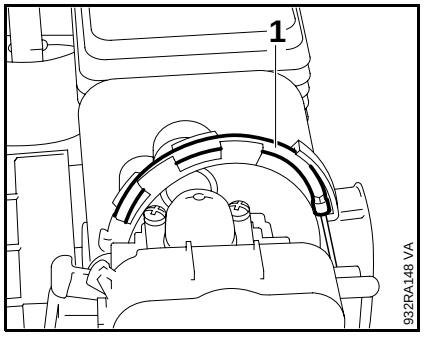
- Disconnect the short circuit wire (1) and ground wire (2) from the ignition module.



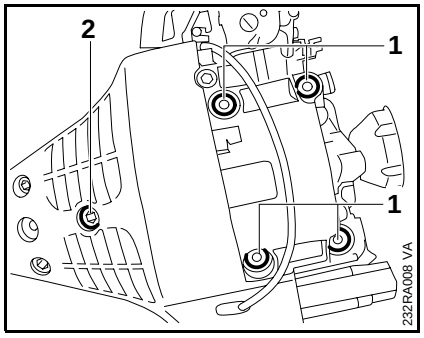
- Disconnect throttle cable (1) from slotted pin (2) on throttle lever.



- Ease the throttle cable (arrow) out of the tensioner (early type). Take care not to kink the throttle cable in the process.



- Ease the throttle cable (1) out of the guide in the tensioner. Take care not to kink the throttle cable in the process.



- Take out the screws (1) and remove the engine housing.
- Replace screw (2) only if it is damaged.

Install in the reverse sequence.

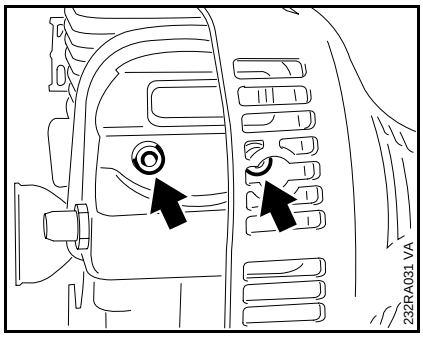
Always check and, if necessary, repair the fuel system, carburetor, air filter and ignition system before looking for faults on the engine.

Only version with catalytic converter

The catalytic converter integrated in the muffler is a device that helps reduce the amount of noxious emissions in the exhaust gas by initiating chemical reactions without being consumed in the process. The catalytic converter is maintenance-free. **Never** attempt to carry out repairs on the catalytic converter.

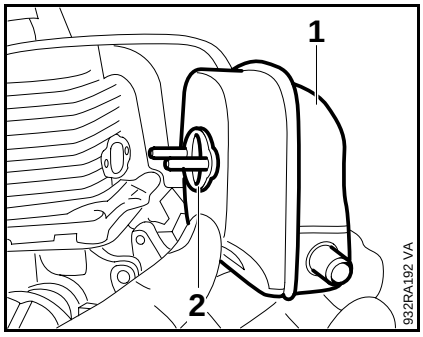
Troubleshooting, 🕮 4.4

5.4.1 Version without Catalytic Converter



– Remove the rewind starter, 🕮 6.2

● Take out the screws (arrows).



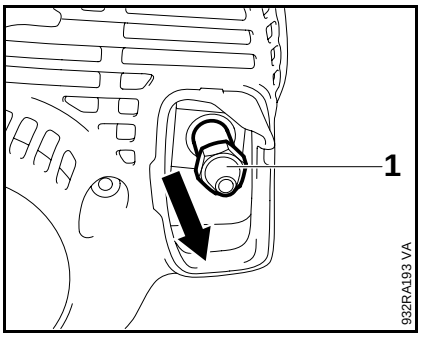
● Remove the muffler (1) and exhaust gasket (2).

Install in the reverse sequence.

– Install a new exhaust gasket.

– Apply sealant to the underside of the screw head, 🕮 12.

– Tighten down the screws firmly, 🕮 3.3



Spark arresting screen

● On machines with a removable stub (1) (with and without spark arresting screen), use a 15 mm wrench to unscrew the stub.

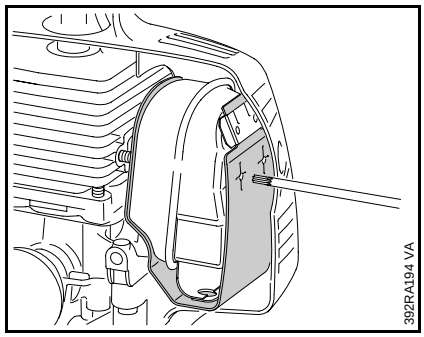
– Clean the spark arresting screen or install a new stub if necessary.

– Clean the thread of the stub and coat it with sealant, 🕮 12.

Follow the sealant manufacturer's instructions.

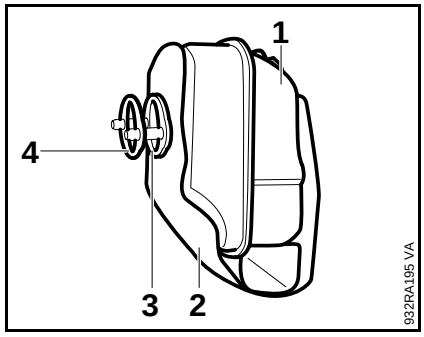
– Screw home the stub and tighten it down firmly, 🕮 3.3.

5.4.2 Version with Catalytic Converter (up to 2003)



– Remove the rewind starter, 🕮 6.2.

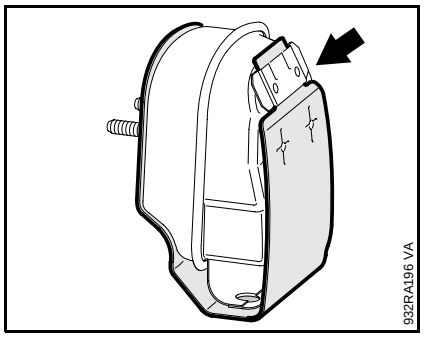
● Unscrew the screws through the openings in the gasket.



● Remove the muffler (1) with gasket (2).

● Remove the flange (3) and gasket (4).

The gasket (2) controls the exhaust gas flow. For this reason it is important to handle the gasket carefully so it is not damaged or deformed. It must not be pulled, twisted, knocked or bent. Replace a damaged or deformed gasket.



- If the gasket has to be replaced or removed (e.g. for access to the spark arresting screen), pull it out of the guide (arrow) and take it off the muffler.

To install, attach the gasket to the muffler.

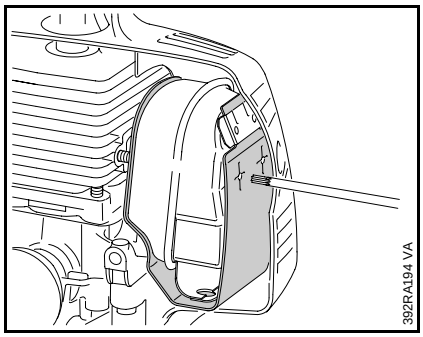
Make sure the screws are fitted in the muffler before the gasket is wrapped around the muffler.

– Clean the sealing faces before installation.

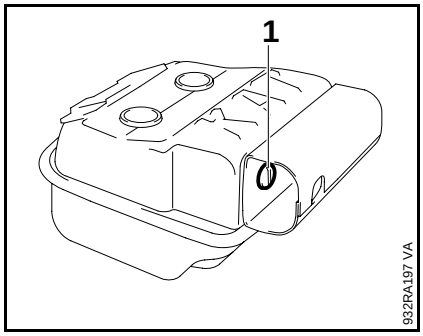
– Use a new exhaust gasket.

– To install, place the pre-assembled muffler with flange and exhaust gasket in position.

Always use muffler kit 4140 140 0651 as a replacement.



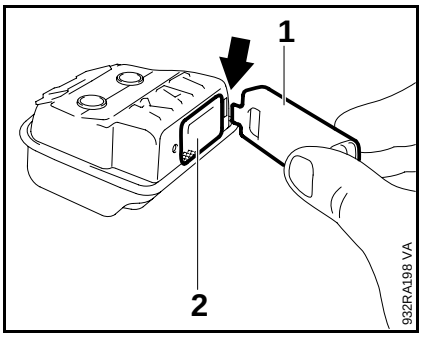
- Tighten down the screws firmly through the holes in the gasket, 🕮 3.3



Spark arresting screen

– Remove the muffler and take away the gasket.

- Take out the screw (1).



- Pull the exhaust duct (1) out of the guide (arrow).

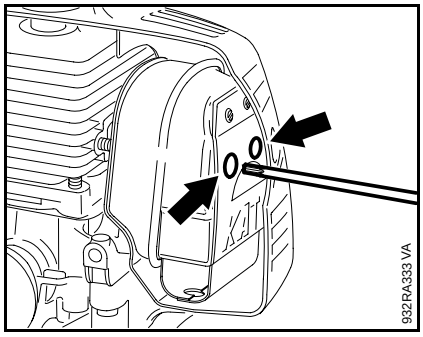
- Remove the spark arresting screen (2).

– Clean the spark arresting screen or fit a new one if necessary.

Install in the reverse sequence.

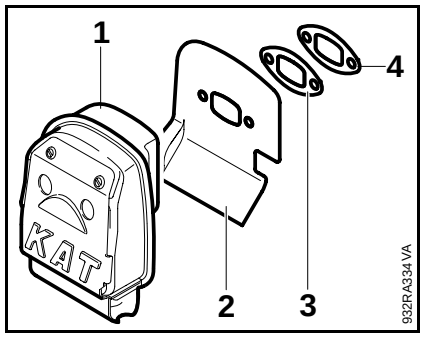
5.4.3 Version with Catalytic Converter (from 2003)

Always use muffler kit 4140 140 0653 as a replacement on machines with a catalytic converter muffler **from 2003**.

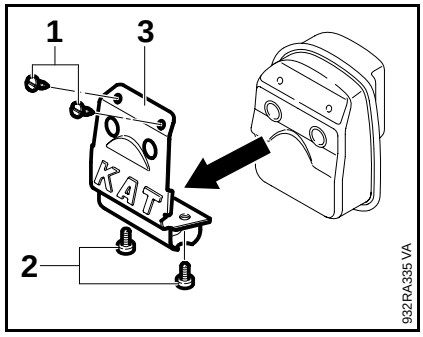


– Remove the rewind starter, 🕮 6.2

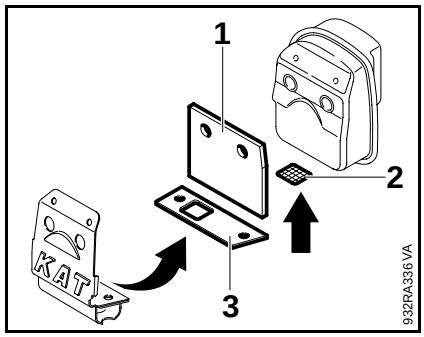
- Take out the screws (arrows).



- Remove the muffler (1) with gasket (2).
- Remove the flange (3) and gasket (4).



- Take out the screws (1 and 2).
- Remove the baffle plate (3).

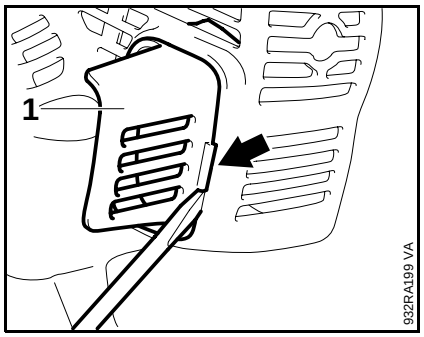


- Remove the insulating mat (1).
- Remove the exhaust gasket (3).
- Take the spark arresting screen (2) out of the muffler and clean it with a standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons. If the screen is damaged, fit a new one.

Install in the reverse sequence.

Always use muffler kit 4140 140 0653 as a replacement.

5.5 Spacer



Always replace a damaged spacer.

– Remove the rewind starter, 🕮 6.2, for access to the spacer.

● Use a screwdriver to lever the lug (arrow) on the spacer (1) behind the edge of the rewind starter housing and then remove the spacer by pushing it inwards.

Install in the reverse sequence.

– Check that the lugs engage properly in the rewind starter housing.

6. Rewind Starter

6.1 General

Troubleshooting, 🕮 4.2.

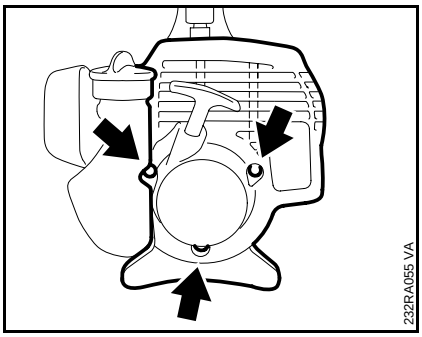
If the action of the starter rope becomes very stiff and the rope rewinds very slowly or not completely, it can be assumed that the starter mechanism is in order but plugged with dirt. At very low outside temperatures the lubricating oil on the rewind spring may thicken and cause the spring windings 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.

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 spring.

Clean all parts, 🕮 12.

Lubricate the rewind spring and starter post with STIHL special lubricant, see 🕮 12, before installing.

6.2 Removing and Installing



● Take out the screws (arrows).

– Remove the rewind starter.

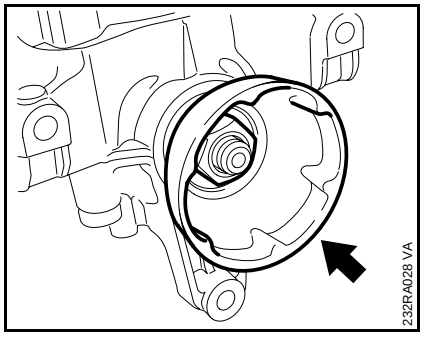
Reassemble in the reverse sequence.

6.3 Starter Cup

– Remove the rewind starter - 🕮 6.2

– Unscrew the spark plug.

– Use locking strip 4221 893 5900 to block the piston.



● Unscrew the starter cup (arrow) from the crankshaft.

Reassemble in the reverse sequence.

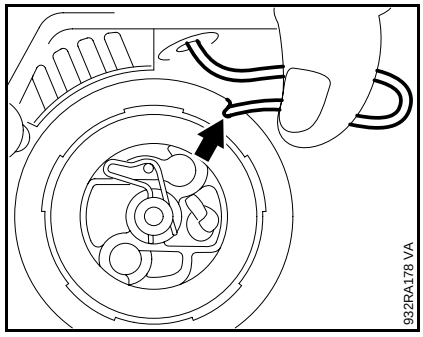
6.4 Rope Rotor

– Remove the rewind starter - 🕮 6.2

Relieving tension of rewind spring

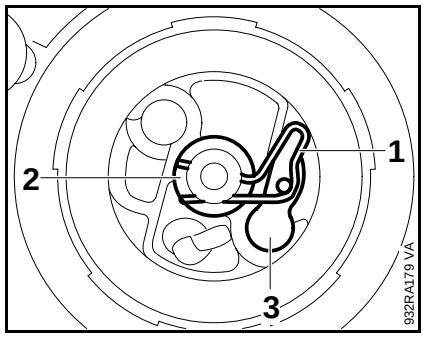
The rewind spring will not be under tension if the starter rope is broken.

– Pull out the starter rope about 20 cm and hold the rope rotor steady.



● Engage the rope in the notch (arrow) in the rotor and make a loop.

● Use the loop to rotate the rotor clockwise until the spring is no longer under tension.



Removing

The rewind spring must not be under tension.

● Remove the spring clip (1) from the starter post.

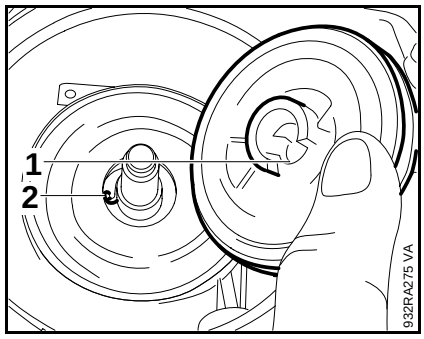
● Remove the washer (2) and pawl (3).

– Carefully pull the rope rotor off the starter post.

– Replace the broken or worn starter rope - 🕮 6.7

Installing

– Coat the bore in the rope rotor with STIHL special lubricant - 🕮 12.

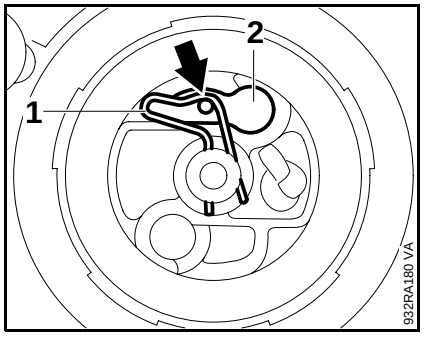


● Fit the rotor on the starter post so that the driver (1) on the rope rotor slips behind the inner spring loop (2).

6.5 Replacing the Rewind Spring

– Check that the spring loop has engaged by turning the rope rotor a little and letting it go. It must spring back.

– Coat pawl with special lubricant and install - 🕮 6.8



● Fit the washer and engage the spring clip (1) in the groove in the starter post.

● Make sure the spring clip (1) engages the guide peg (arrow) on the pawl (2) and points counterclockwise.

Handle the spring clip with care. The rewind starter may not function properly if the spring clip is deformed.

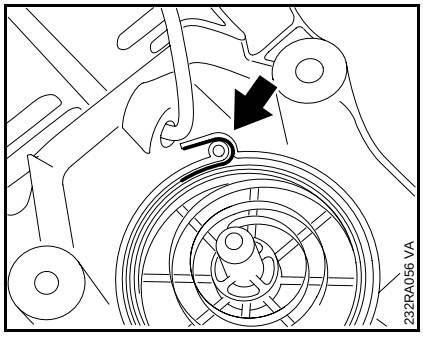
– Tension the rewind spring - 🕮 6.6

– Install the rewind starter - 🕮 6.2

– Remove the rope rotor - 🕮 6.4

– Remove the pieces of broken spring from the rope rotor and starter cover.

– Before installing, lubricate the new spring with a few drops of STIHL special lubricant - 🕮 12.

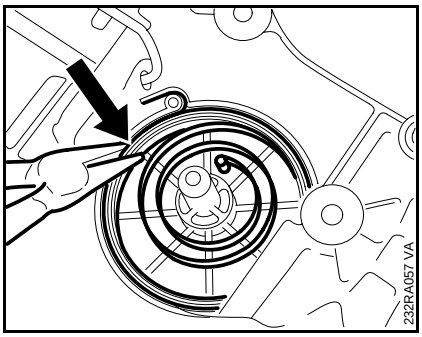


● Position the rewind spring in the starter and press the outer spring loop over the lug (arrow).

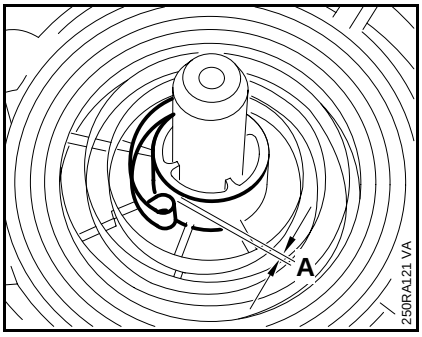
The rewind spring may pop out and uncoil if the rope rotor is not installed very carefully.

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

– Hold the spring it your hand and wind from the inside outwards and tension it to a diameter of 55 mm.



● Then grip the rewind spring with pointed nose pliers about 10 mm from the end of the outer loop and place it in the starter.

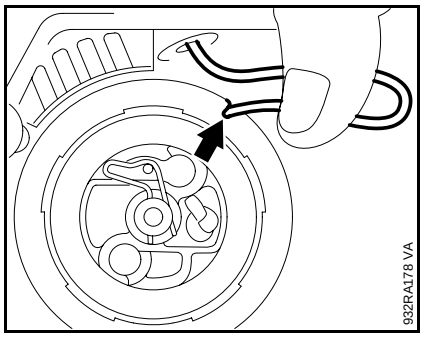


● Check the distance of the inner spring loop from the hub and correct if necessary. Dimension "A" must not be more than 2 mm.

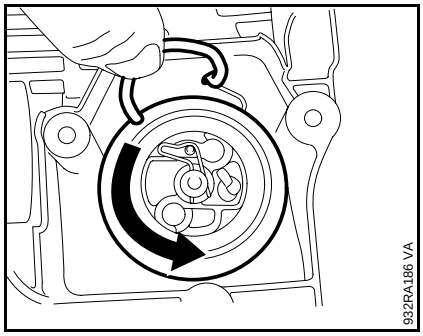
– Install the rope rotor - 🕮 6.4

– Tension the rewind spring - 🕮 6.6

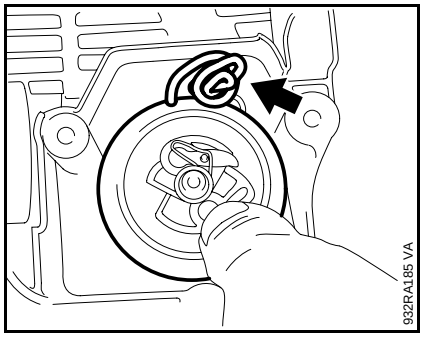
6.6 Tensioning the Rewind Spring



- Make a loop in the unwound starter rope.
- Engage the starter rope in the notch (arrow) in the rotor.



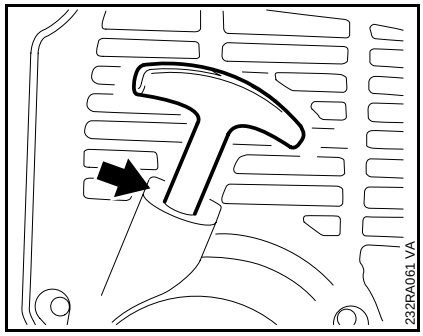
- Grip the rope close to the rotor and use it to turn the rotor seven full turns counterclockwise.



- Hold the rope rotor steady.
- Pull out the rope with the starter grip and straighten it out.

– Hold the starter grip firmly to keep the rope tensioned.

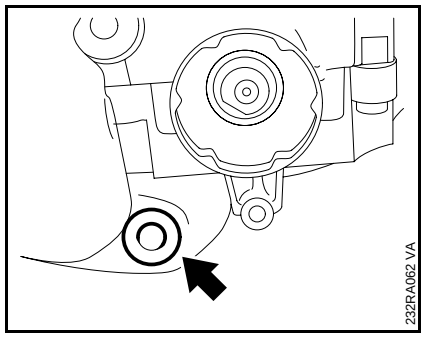
– Let go of the rope rotor and slowly release the starter grip so that the rope winds itself onto the rotor.



The starter grip must sit firmly in the rope guide bush without drooping to one side. If this is not the case, tension the spring by one additional turn.

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

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



- Make sure the plug (arrow) in fuel tank is in place.

– Place the rewind starter in position, insert the screws and tighten them down firmly - 🕮 3.3

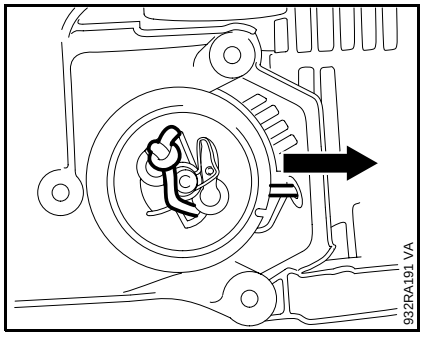
6.7 Starter Rope

– Remove the rewind starter - 🕮 6.2

– If the starter rope is broken, remove the remaining rope from the rope rotor and starter grip.

– If the starter rope is worn, relieve tension of rewind spring - 🕮 6.4.

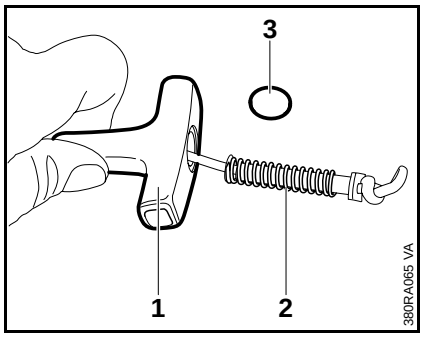
Pull the end of the rope out of the rotor and undo the knot. Then pull the worn rope out of the starter grip, starter housing and rotor.



- Thread one end of the new rope through the rotor and starter housing. Tie a simple overhand knot in the end of the rope.

– Pull the rope back into the rotor until the knot locates in the recess.

– Thread the other end of the rope through the starter grip. Tie a simple overhand knot in the end of the rope.

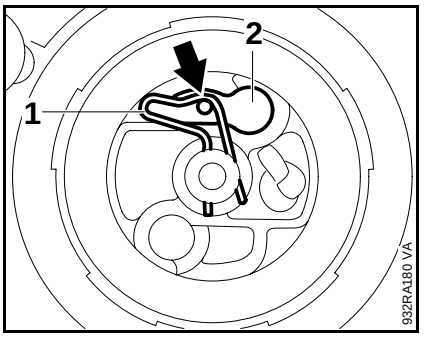


- On machines with "ElastoStart": Thread end of new starter rope through the grip (1) and the spring element (2). Tie a simple overhand knot in the end of the rope. Pull the rope and spring element into the grip and then fit the cap (3).

– Tension the rewind spring - 🕮 6.6.

– Install the rewind starter - 🕮 6.2.

6.8 Pawl



– Remove the rewind starter - 🕮 6.2.

- Ease the spring clip (1) off the starter post and pull the pawl (2) out of the rope rotor.

Do not pull the rope rotor off the starter post.

– Coat the new pawl with special lubricant, 🕮 12, and fit it in position.

- Push the spring clip (1) into the groove in the starter post.

- Make sure the spring clip (1) engages the guide peg (arrow) on the pawl (2).

The spring clip must point counterclockwise.

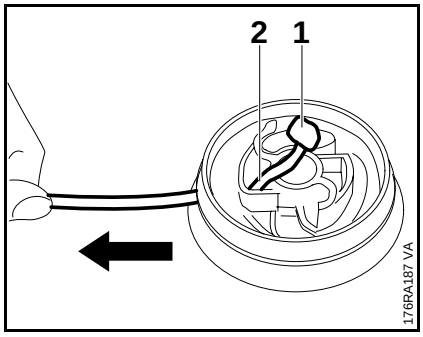
Handle the spring clip with care. The rewind starter may not function properly if the spring clip is deformed.

– Install the rewind starter - 🕮 6.2.

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

– Remove any remaining rope from the starter mechanism.

– Remove the rope rotor - 🕮 6.4.



● Pull the knot (1) out of the recess (2) in the rope rotor.

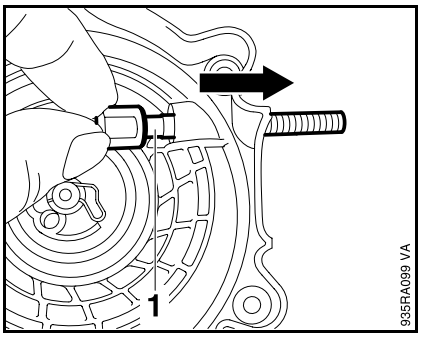
– Undo the knot.

● Pull the starter rope out of the rotor and guide bush.

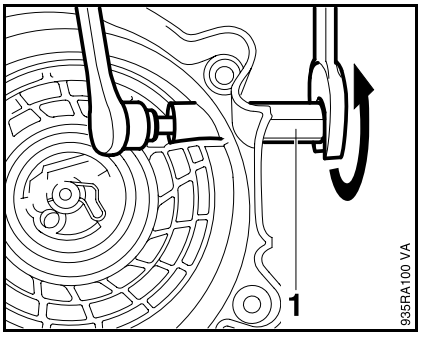
– Use a suitable tool to pry the damaged bush out of the fan housing/starter cover.

Installing the rope bush

– Place the new bush in its seat in the fan housing/starter cover.



● Insert the screw spindle (1) of installing tool 0000 890 2201 through the bush from inside the housing.

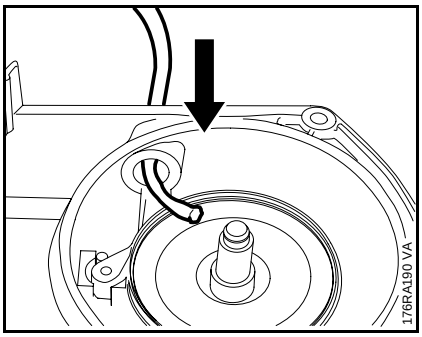


– Fit the thrust sleeve (1), tapered end first, and fit the hex nut.

● Tighten down the hex nut until the bush is firmly seated.

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

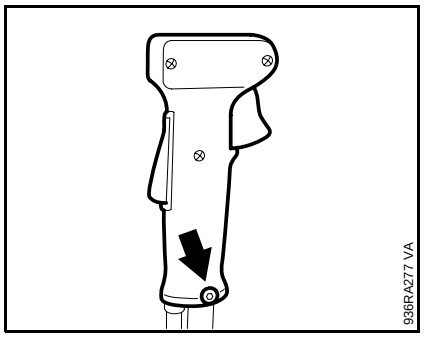
– Remove the installing tool.



● Thread the starter rope through the guide bush from outside and fit it on the rope rotor - 🕮 6.7.

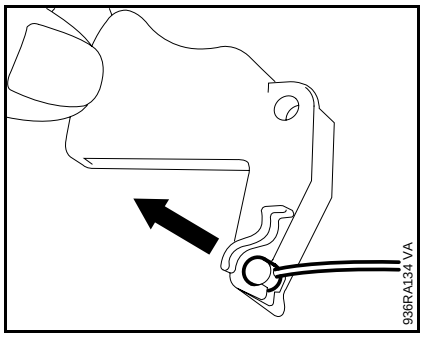
– Install the rope rotor - 🕮 6.4.

7. Throttle Control
7.1 Control Handle on Bike Handle (except HL)
7.1.1 Throttle Trigger/Interlock Lever (up to 2001)

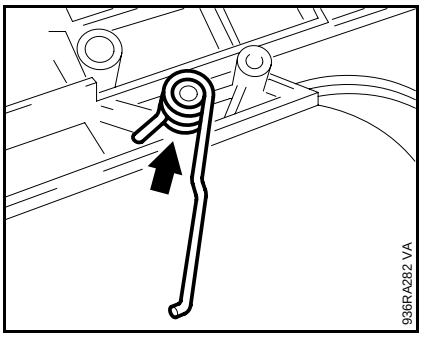


- Take the screw (arrow) out of the control handle.

– Pull the control handle off the handlebar.

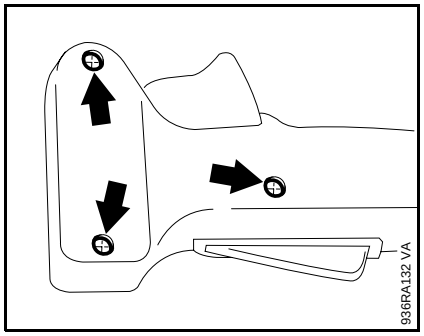


- Disconnect the throttle cable.



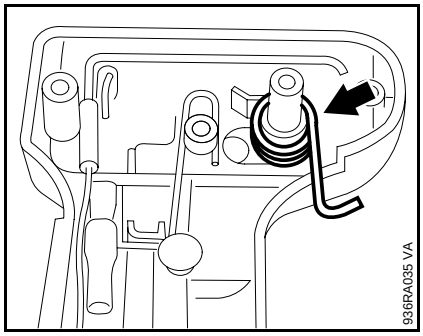
- Remove the torsion spring (arrow) from its pivot.

Install in the reverse sequence.

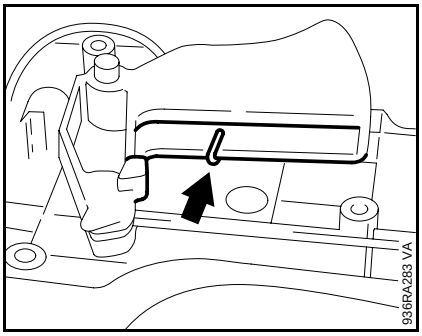


- Remove the screws (arrows) from the handle moldings.

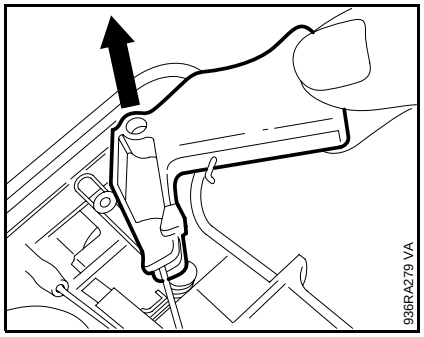
– Separate the two halves of the handle.



- Remove the torsion spring (arrow) from its pivot.

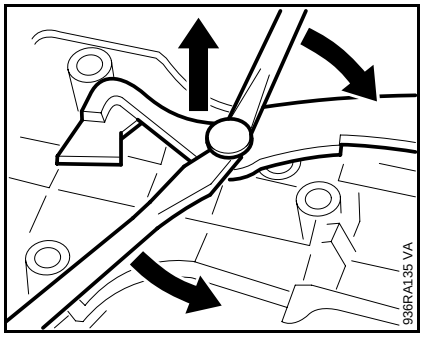


- Make sure the torsion spring (arrow) engages the throttle trigger.



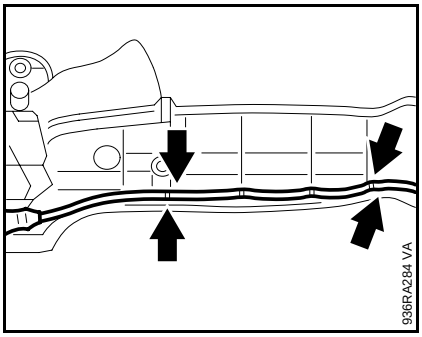
- Lift the throttle trigger a little and turn it to one side to relieve the tension on the torsion spring.

– Pull the throttle trigger off the pivot.



- Carefully pry the rivet in the interlock lever out of the out handle molding.

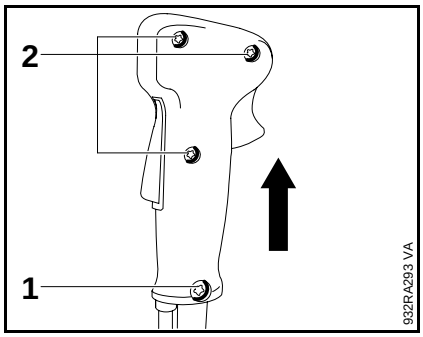
– Remove the interlock lever from its pivot.



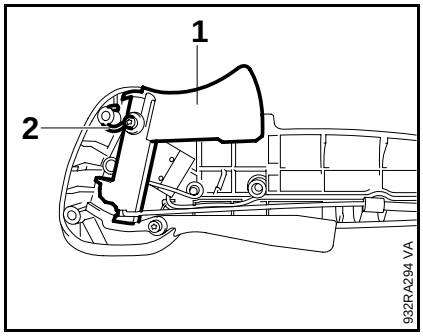
- Position the short circuit wires and throttle cable correctly in the handle molding.

Install as other parts in the reverse sequence.

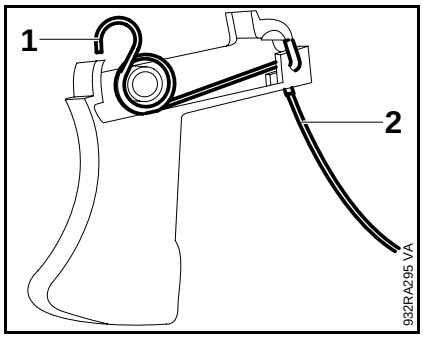
7.1.2 Throttle Trigger/Interlock Lever (from 2001)



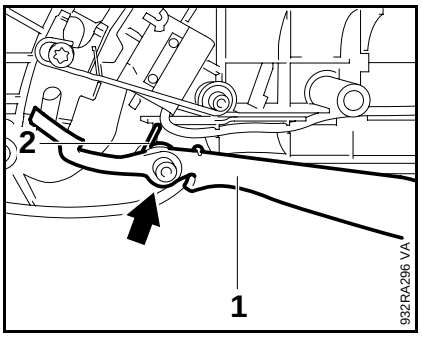
- Take out the screw (1) and pull the control handle off the handlebar.
- Take out the screws (2) and separate the two halves of the control handle.



- Remove the throttle trigger (1) with torsion spring (2) from the pivot.



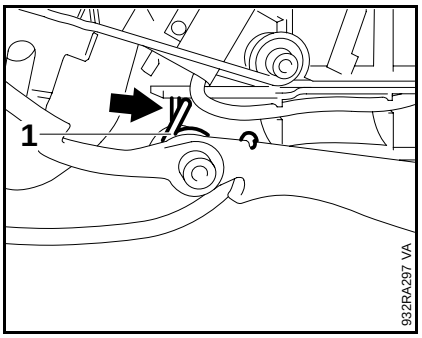
- Remove the torsion spring (1).
- Disconnect the throttle cable (2) from the trigger.



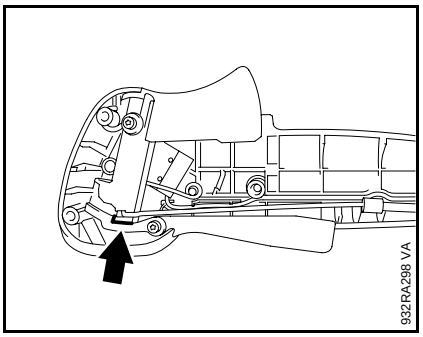
- Pull the interlock lever (1) with torsion spring (2) from the pivot (arrow).

– Remove the torsion spring from the interlock lever.

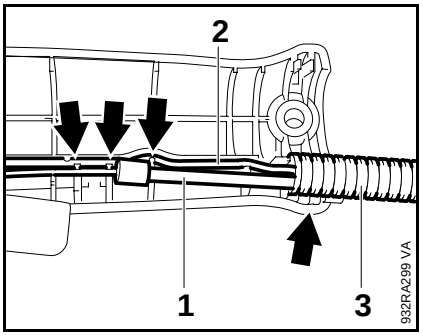
Install in the reverse sequence.



- The torsion spring (1) must engage the interlock lever and locate behind the web (arrow) in the handle molding.



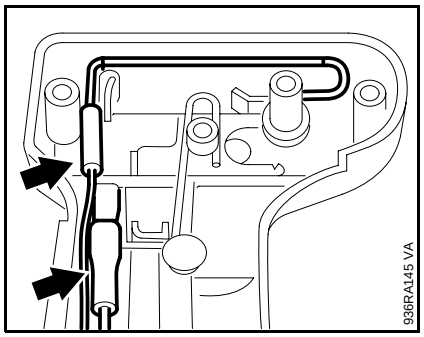
- When fitting the throttle trigger, make sure it engages behind the interlock lever.



- Place the throttle cable (1) in its seat in the handle molding.
- Position the short circuit wires (2) correctly in the handle molding.
- Place tube (3) in its seat in the handle molding.

Reassemble all other parts in the reverse sequence.

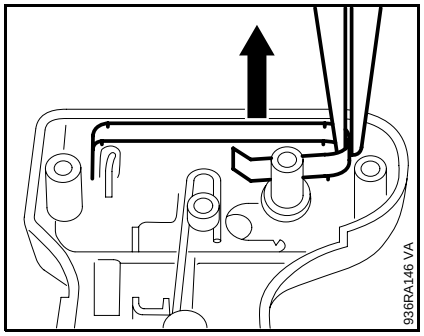
7.1.3 Contact/Detent Springs (up to 2001)



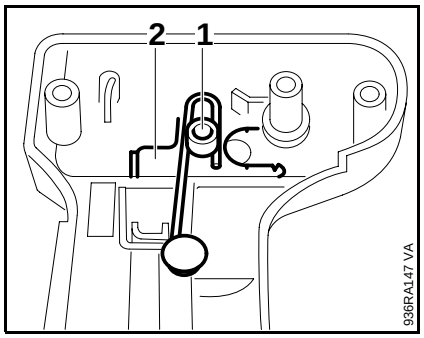
FS models only

– Remove the throttle trigger - 🕮 7.1.1

● Disconnect the short circuit wires (arrows) from the contact springs.

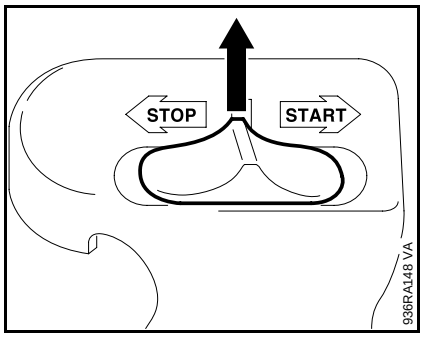


● Pull the contact spring out of the handle molding.

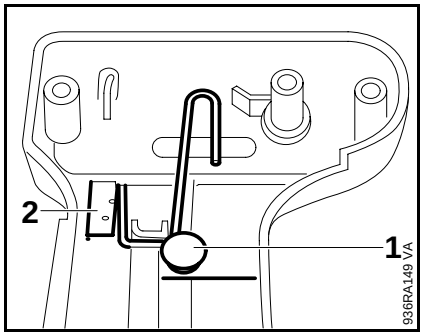


● Remove the collar screw (1) from the slide control.

● Remove the detent spring (2).



● Pull the slide control out of the handle molding.



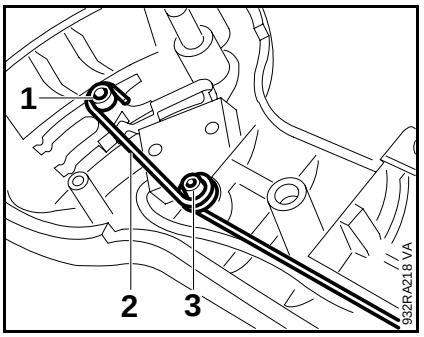
● Pull out the rivet (1).

● Take out the contact spring (2).

Reassemble in the reverse sequence.

The contact spring must engage the groove in the collar screw.

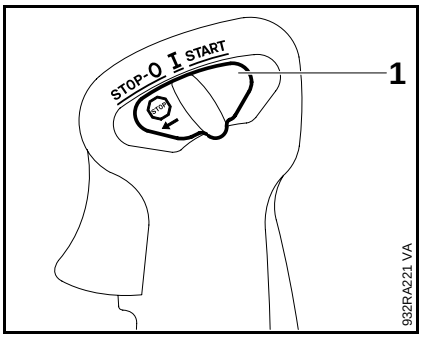
7.1.4 Contact/Detent Springs (from 2001)



– Remove the throttle trigger with interlock lever - 🕮 7.1.2

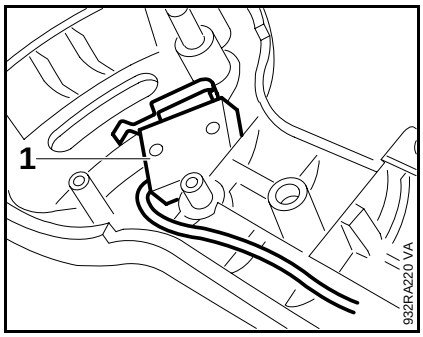
● Remove the collar screw (1) from the slide control.

● Take the contact spring (2) off the pivot (3).



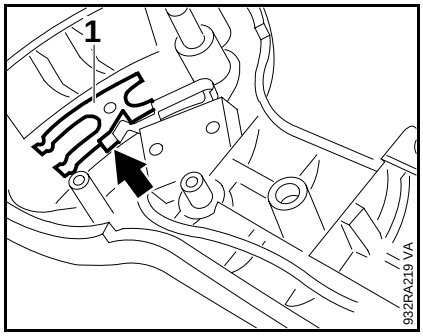
● Pull the slide control (1) out of the handle molding.

7.1.5 Replacing the Throttle Cable



- Pry the stop switch (1) with wires out of the handle molding.

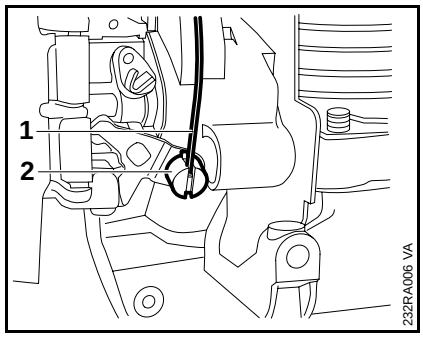
Reassemble in the reverse sequence.



When reassembling, check that the short circuit wires are correctly positioned.

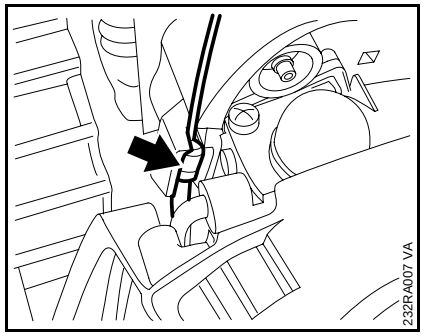
- When fitting the contact plate (1), make sure the tag (arrow) points up in the direction of the stop switch.

Reassemble all other parts in the reverse sequence.

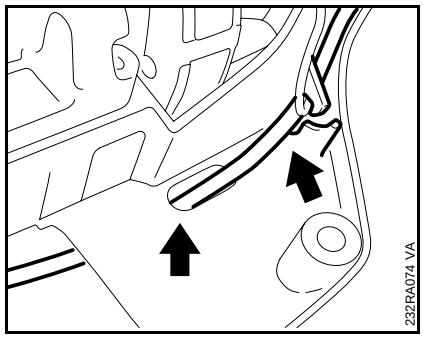


– Remove the shroud - 🕮 5.1

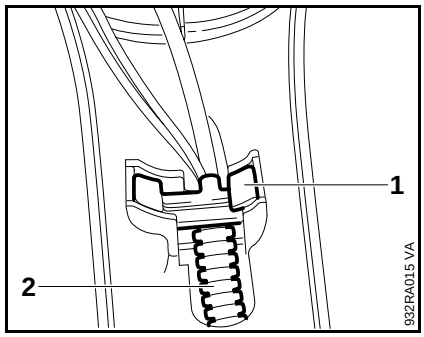
- Disconnect the throttle cable (1) from the slotted pin (2) on the carburetor's throttle lever.



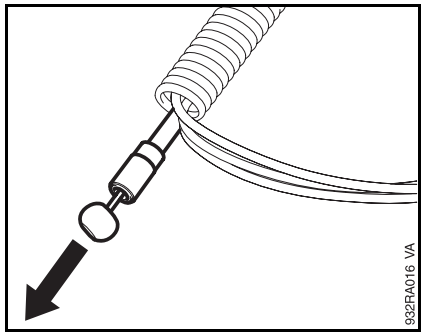
- Ease the throttle cable sleeve (arrow) out of the adjuster. Do not kink the throttle cable in this process.



- Remove the throttle cable from the rear of the engine housing.



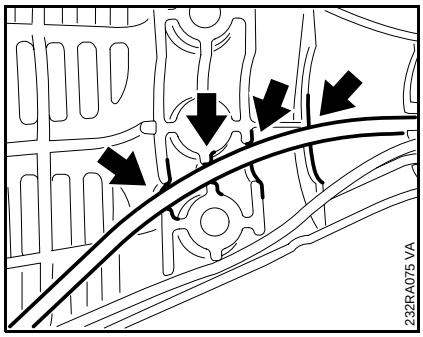
- Pull out the cable retainer (1) and take the tube with throttle cable (2) out of the front of the engine housing.



– Disconnect the throttle cable from the trigger - 🕮 7.1.1 and 7.1.2

- Pull the throttle cable out of the tube.

Install in the reverse sequence.

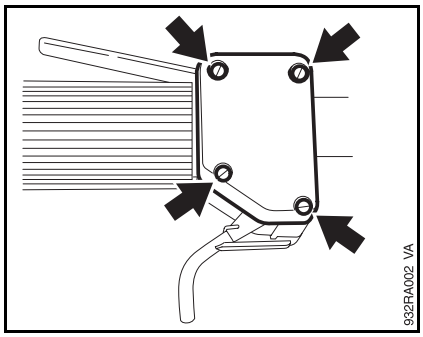


– On version with catalytic converter from 2003, insulate the throttle cable – 🕮 7.5

● Place the throttle cable in the guides (arrows).

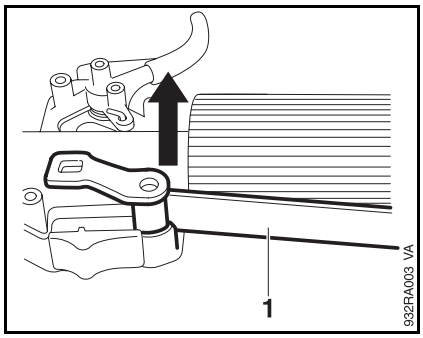
– Adjust the throttle cable – 🕮 7.4

Install all other parts in the reverse sequence.

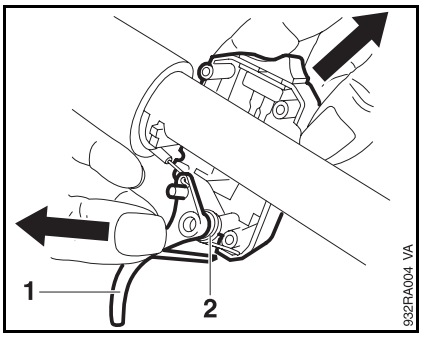


FS 46 and FS 55 only (USA, Canada, Australia)

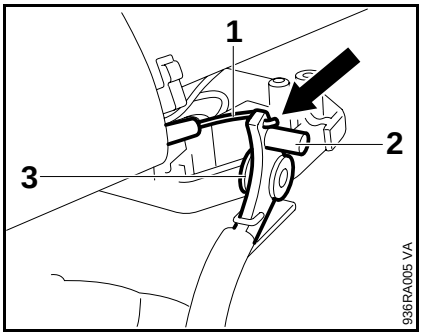
● Take out the screws (arrows), pull away the right-hand half of the housing. If necessary, remove the lever and spring from the right-hand half of the housing.



● Pull the interlock lever (1) off its pivot in the left-hand half of the housing.

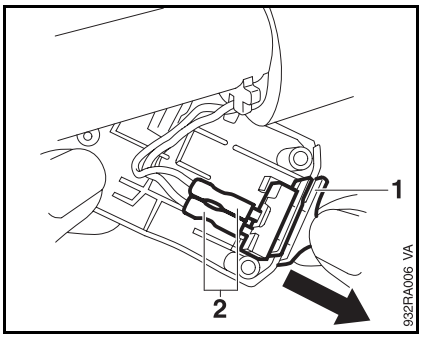


● Remove the left-hand half of the housing and pull the throttle trigger (1) and torsion spring (2) off the pivot at the same time.

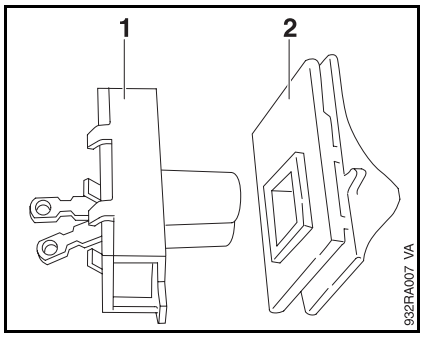


● Disconnect the throttle cable (1) from the throttle trigger (2).

● Unhook the torsion spring (3) from the throttle trigger (2).

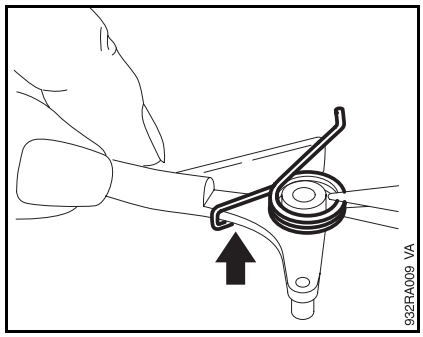


● Take the stop switch (1) out of the left-hand half of the housing and disconnect the short circuit wires (2).

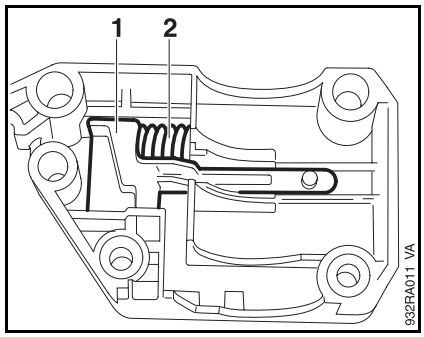


- Remove the slide (2) from the stop switch (1).

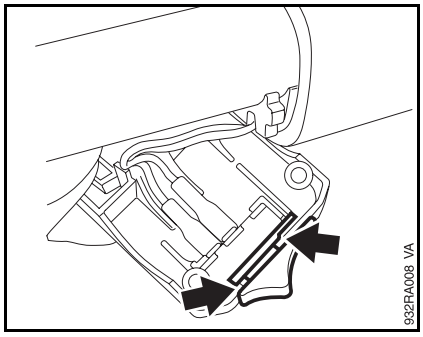
Install in the reverse sequence.



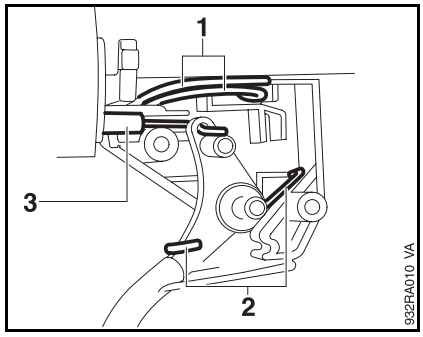
- Attach the torsion spring to the throttle trigger.



- Place the lever (1) and spring (2) in the right-hand half of the housing.



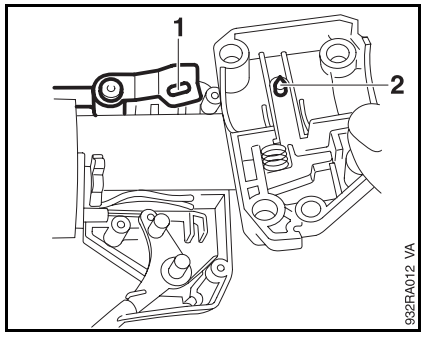
- Push the slide on to the stop switch, connect the short circuit wires and place stop switch in the left-hand half of the housing so that the housing edge engages the groove (arrows) in the slide control.



- Attach the throttle cable (3) to the throttle trigger and then push the throttle trigger over the peg in the left-hand half of the housing.
- Position the left-hand half of the housing against the drive tube.

Both halves of the housing must engage the groove in the handle support. Check that the short circuit wires (1) and torsion spring (2) are correctly positioned as shown. The throttle cable (3) must be properly seated in the left-hand half of the housing.

– Fit the interlock lever on its pivot.

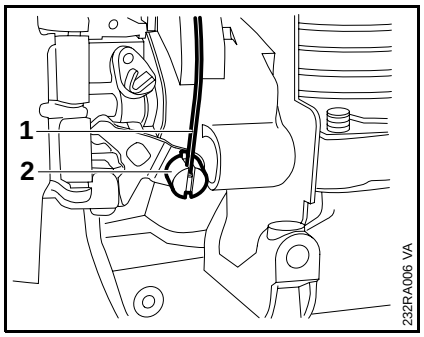


- Fit the right-hand half of the housing so that the peg (2) engages the hole (1) in the interlock lever.

– Insert the screws and tighten them down firmly, 🕮 3.3.

Install all other parts in the reverse sequence.

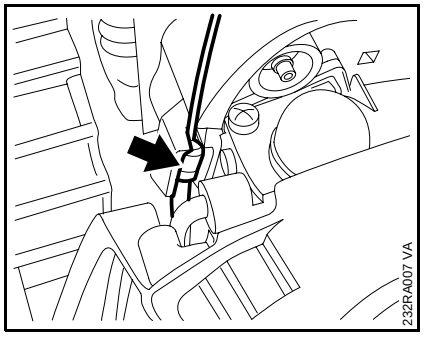
7.2.2 Replacing the Throttle Cable



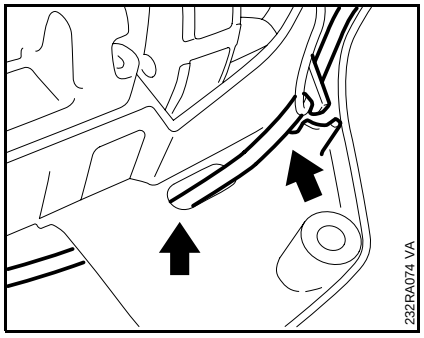
– Remove the drive tube, 🕮 10.1

– Remove the shroud, 🕮 5.1

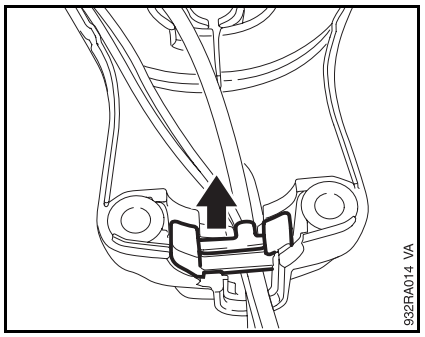
● Disconnect throttle cable (1) from slotted pin (2) on the carburetor's throttle lever.



● Ease sleeve (arrow) of throttle cable out of the tensioner. Do not kink the throttle cable in the process.

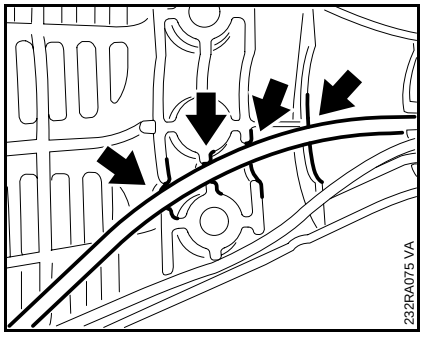


● Take the throttle cable out of the rear part of the engine housing.



● Push out the retainer from below and remove the throttle cable from the engine housing.

– Disconnect throttle cable from the throttle trigger, 🕮 7.2.1



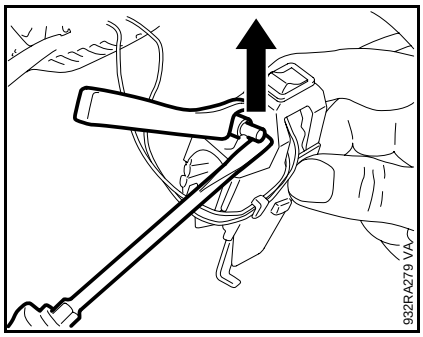
– On version with catalytic converter from 2003, insulate the throttle cable – 🕮 7.5

● Fit throttle cable in the retainers (arrows).

Check that throttle cable is correctly seated.

Reassemble all other parts in the reverse sequence.

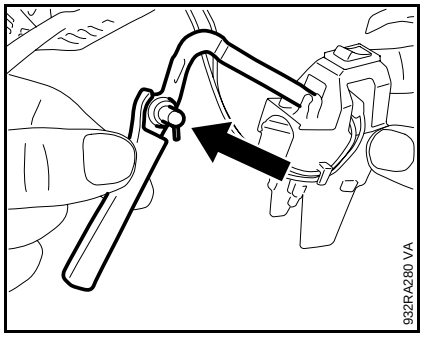
– Adjusting the throttle cable – 🕮 7.4



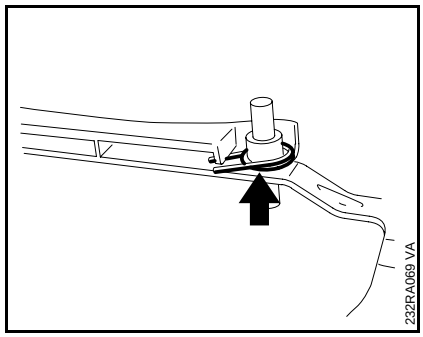
– Remove support for stop switch and interlock lever – 🕮 7.3.2

Interlock lever

- Pry the interlock lever out of its mounts in the support.

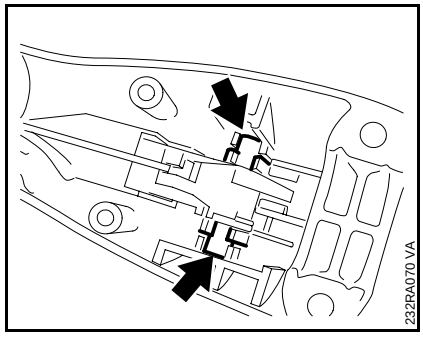


- Take the interlock lever out of the support.



- Inspect torsion spring (arrow) and replace if necessary.

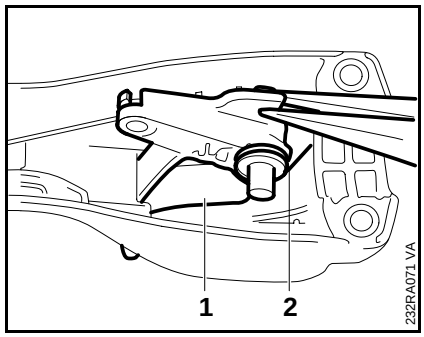
Install in the reverse sequence.



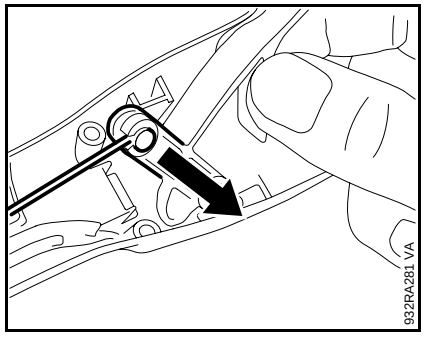
Throttle trigger

– Remove support for stop switch and interlock lever – 🕮 7.3.2

- Pull the throttle trigger (arrows) out of its seat in the engine housing.

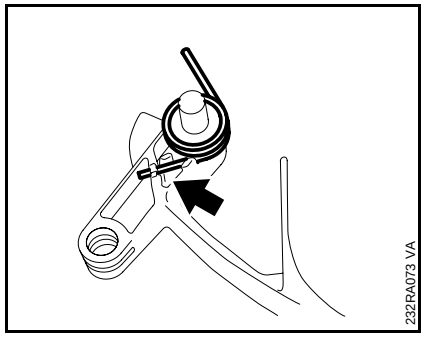


- Push lock lever (1) slightly toward the throttle trigger and remove the throttle trigger from the engine housing.
- Remove the torsion spring (2).



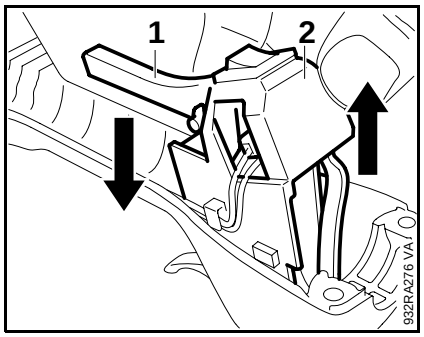
- Disconnect the throttle cable from the throttle trigger.

Install in the reverse sequence.



- Engage the torsion spring in the throttle trigger as show (arrow).

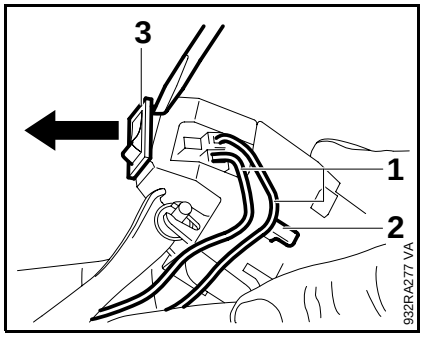
7.3.2 Stop Switch



– Remove the shroud or housing components – 🕮 5.1

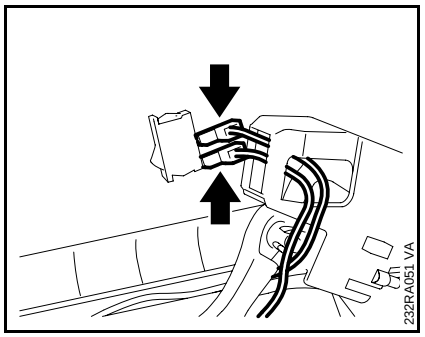
● Press down interlock lever (1),

● Pull the support (2) out of the engine housing.



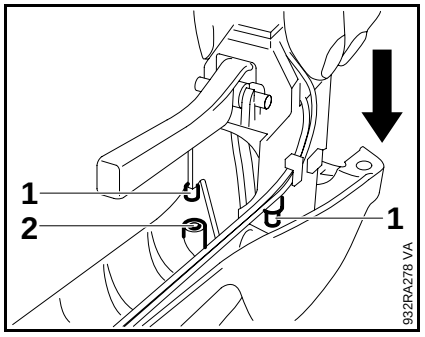
● Remove the wires (1) from the retainer (2).

● Pry the stop switch (3) out of the support.



● Disconnect short circuit wire and ground wire (arrows) from the stop switch.

Install in the reverse sequence.

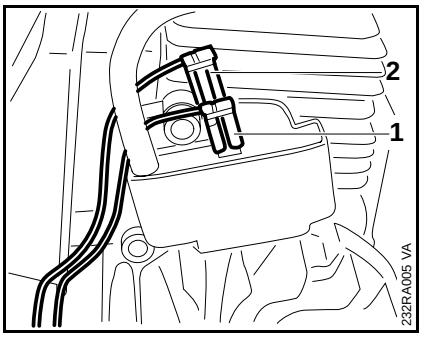


– Press down the interlock lever.

● Fit the support so that pegs (1) engage the holes (2).

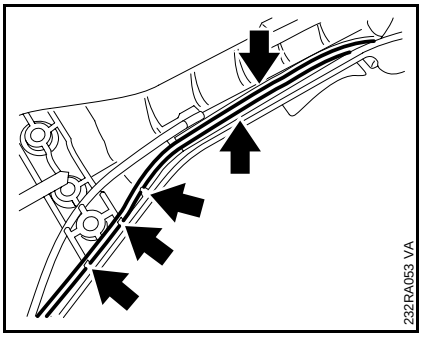
Install all other parts in the reverse sequence.

7.3.3 Short Circuit Wire/ Ground Wire



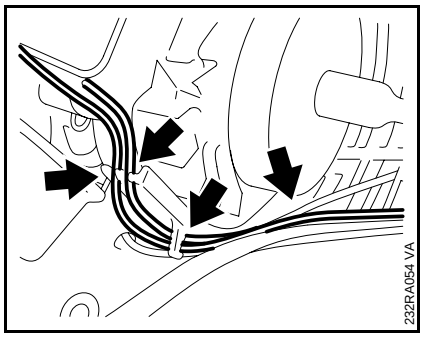
– Remove the stop switch – 🕮 7.3.2

● Disconnect the short circuit wire (1) and ground wire (2) from the ignition module.



● Remove the wires from the guides (arrows) in the engine housing.

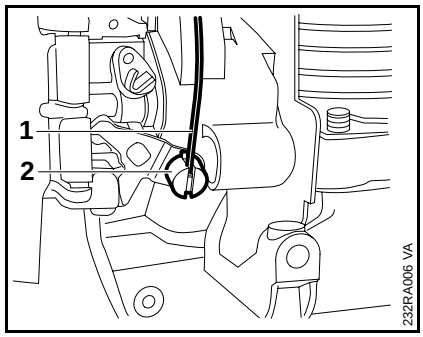
7.3.4 Replacing the Throttle Cable



- In the area of the flywheel, pull the wires out of the retainers (arrows).

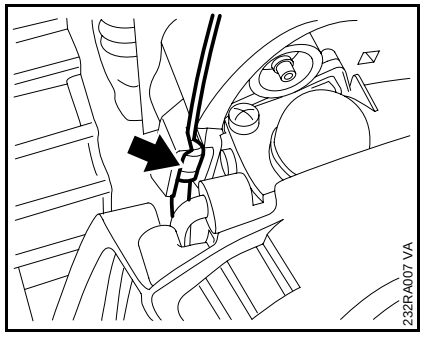
Install in the reverse sequence.

– Make sure the wires are properly seated in the guides in the engine housing.



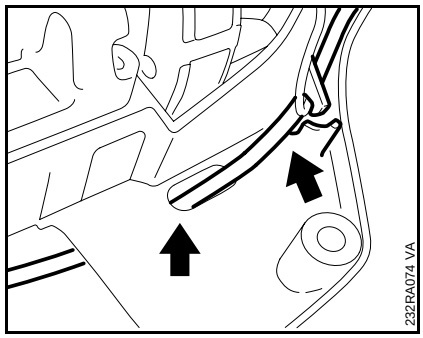
– Remove the throttle trigger – 🕮 7.3.1

- Disconnect throttle cable (1) from slotted pin (2) on carburetor's throttle lever.



- Ease throttle cable sleeve (arrow) out of the tensioner. Do not kink the throttle cable in the process.

– Disconnect throttle cable from the throttle trigger – 🕮 7.3.1

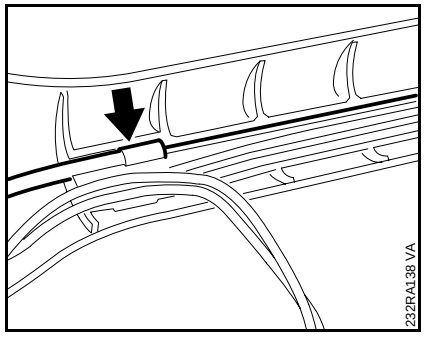


- Take the throttle cable out of the rear part of the engine housing.

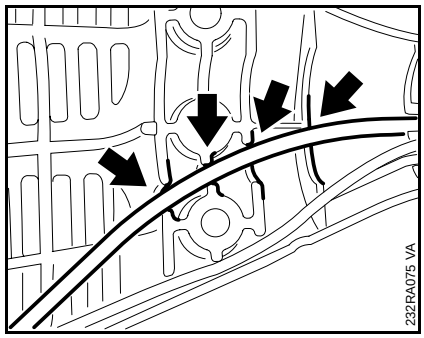
– Take the throttle cable out of the front part of the engine housing.

Install in the reverse sequence.

– On version with catalytic converter from 2003, insulate the throttle cable – 🕮 7.5



- Push the throttle cable sleeve into its seat (arrow) in the engine housing.

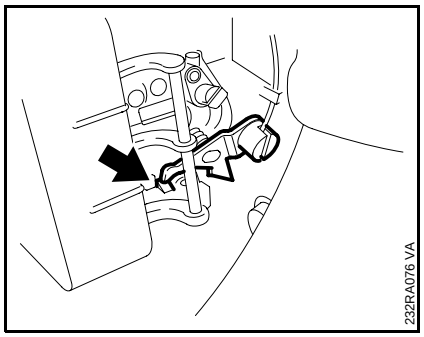


- Fit the throttle cable in the retainers (arrows).

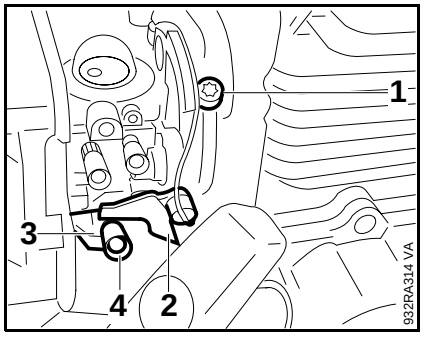
Reassemble all other parts in the reverse sequence.

– Adjust the throttle cable – 🕮 7.4

7.4 Adjusting the Throttle Cable



- On carburetors without an idle speed screw, the throttle lever must butt against the stop (arrow) on the end cover when the throttle trigger is in the full throttle position.



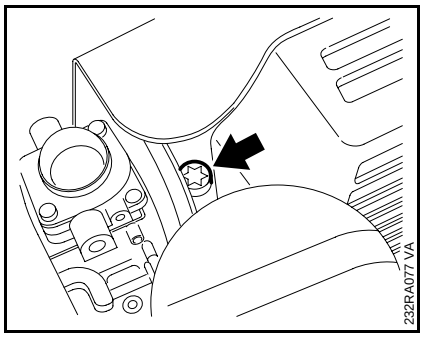
- On carburetors with idle speed screw (4), the throttle lever (2) must butt against the stop (3) on the end cover when the throttle trigger is in the full throttle position. In addition, the throttle lever (2) must butt against the idle speed screw (4) at idle speed.

– Remove the shroud – 🕮 5.1

– On carburetors with idle speed screw (4), check that it is correctly adjusted – 🕮 9.3.2

The throttle cable is adjusted by moving the tensioner on the adjusting screw (1)

– To make the adjustment, squeeze the throttle trigger as far as stop (full throttle position).



- Rotate the adjusting screw (arrow) clockwise until the throttle lever butts against the stop on the end cover.

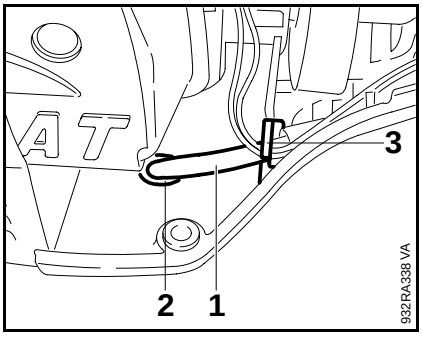
– On carburetors with idle speed screw (LA), make sure the throttle lever butts against the idle speed screw at idle speed.

– Fit the shroud, 🕮 5.1

7.5 Insulating the Throttle Cable

On machines with a catalytic converter from 2003 or if a catalytic converter from 2003 is installed as a replacement, an insulating tube **must** be fitted over the throttle cable in the area below the muffler to protect it from radiated heat.

– Disconnect throttle cable at carburetor end – 🕮 7.1.5, 7.2.2 or 7.3.4



- Starting from the carburetor end, push the insulating tube (1) over the throttle cable.

– Install the throttle cable.

– Push the insulating tube as far as the slot (2).

- Fix the insulating tube in position on the cable retainer (3).

Install all other parts in the reverse sequence.

8.1.1 Removing and Installing

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

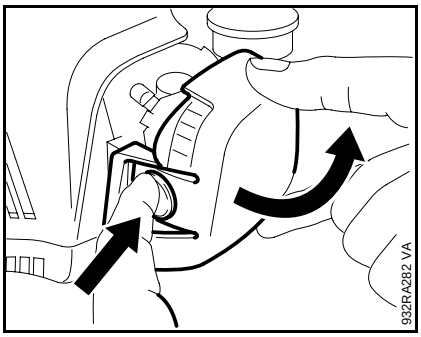
If there is a noticeable loss of engine power, check to see if the air filter is plugged with dirt.

– Before removing the air filter, close the choke shutter and remove all loose dirt from around the filter.

– Wash foam filter (if fitted) in a clean, non-flammable solution (e.g. soapy water) and then dry.

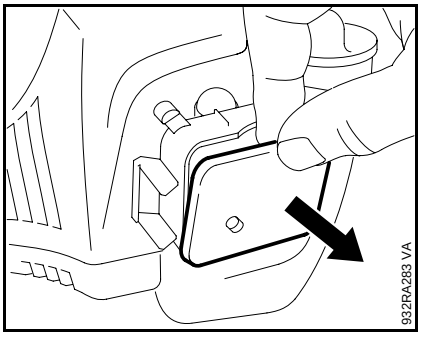
– Replace the felt filter. As a temporary measure, knock the filter out on the palm of your hand or blow clear with compressed air. Do not wash.

Replace a damaged air filter immediately.



● Press in the tab on the filter cover.

● Swing the filter cover to the side and take it off the lugs on the housing.



– Take the prefilter, if fitted, out of the filter cover.

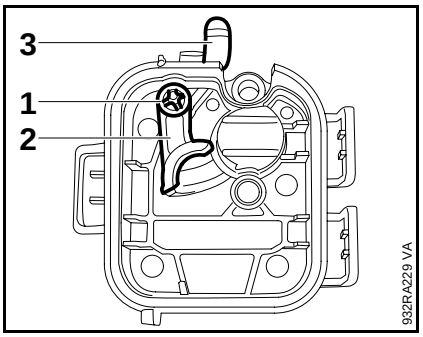
● Remove the felt filter element.

– Knock out the filter on the palm of your hand or blow it clear with compressed air, do not wash. If the filter is heavily loaded with dirt, install a new one.

Always replace a damaged air filter immediately.

Install in the reverse sequence.

8.1.2 Choke Shutter



– Remove the filter housing – 🕮 8.1.1

● Remove the push nut (1).

● Pull the choke shutter (2) out of the lever (3).

Install in the reverse sequence.

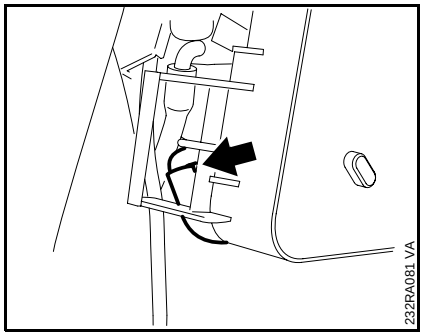
– When installing, make sure the choke shutter is properly located in the lever's guide.

Use a new push nut.

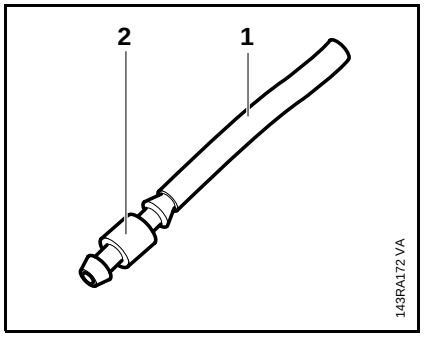
8.2 Carburetor
8.2.1 Leakage Test

If you suspect a fault in the fuel system, see 🕮 4.3. In the case of problems with the carburetor or fuel supply system, also check and clean or replace the tank vent – 🕮 9.4.
The carburetor can be tested for leaks with the carburetor and crankcase tester 1106 850 2905.

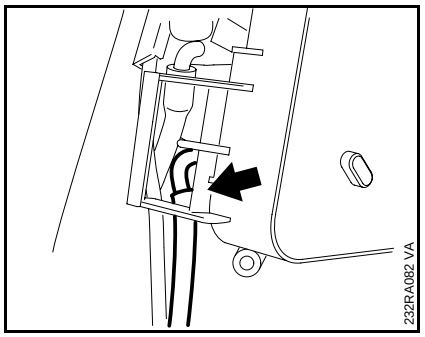
– Remove the filter cover – 🕮 8.1.1



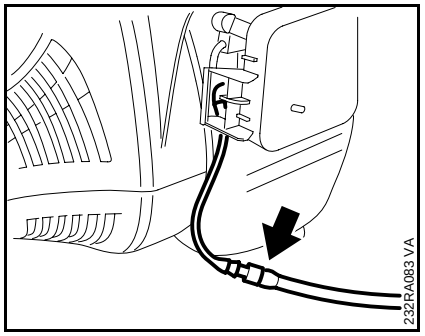
● Disconnect the fuel hose from the carburetor’s elbow connector (arrow).



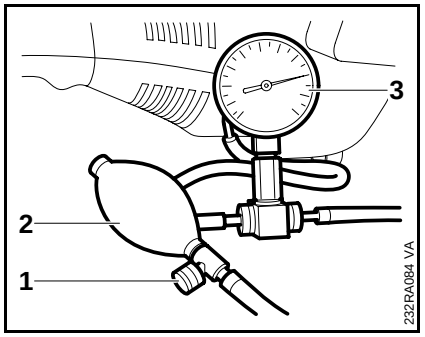
● Push the fuel line (1) 1110 141 8600 onto the nipple (2) 0000 855 9200.



● Push the fuel line with nipple onto the carburetor’s elbow connector (arrow).



● Connect the tester's pressure hose to the nipple.



● Close the vent screw (1) on the rubber bulb (2) and pump air into the carburetor until the pressure gauge (3) shows a reading of approx. 0.8 bar.

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

1. The inlet needle is not sealing (foreign matter in valve seat or sealing cone of inlet needle is damaged or inlet control lever sticking).

2. Metering diaphragm is damaged.

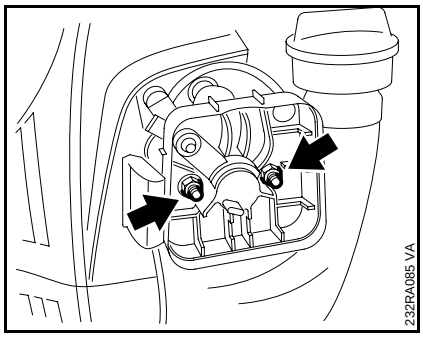
In either of these cases the carburetor has to be serviced.

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

– Push the fuel hose onto the carburetor’s elbow connector.

Assemble all other parts in the reverse sequence.

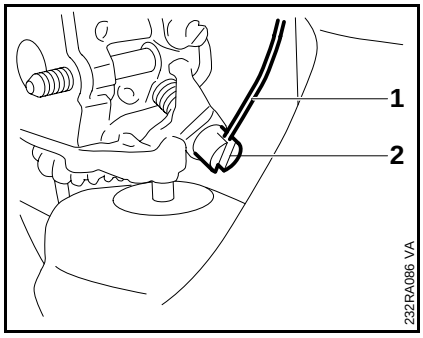
– Use a new gasket if necessary.



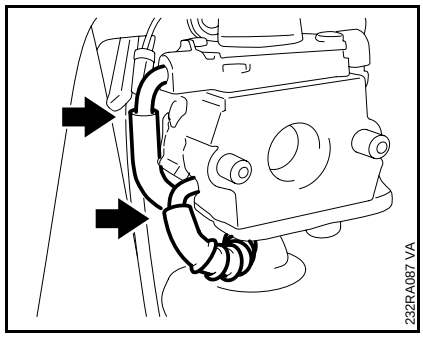
– Remove the air filter – 🕮 8.1.1

● Use screwdriver 5910 890 2420 to unscrew the nuts (arrows).

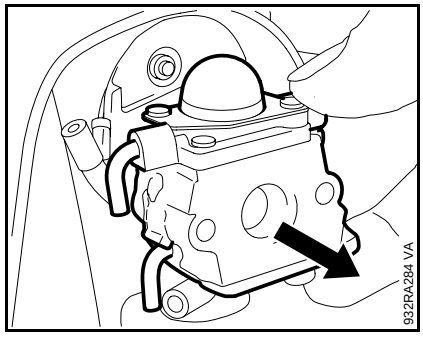
– Remove the filter housing and gasket behind it.



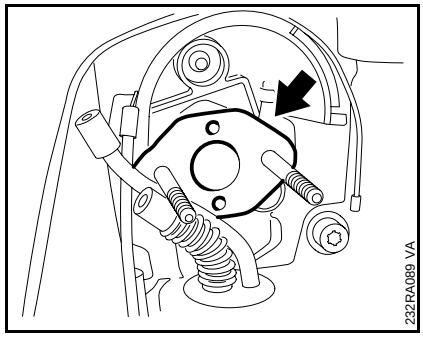
● Disconnect throttle cable (1) from slotted pin (2) on carburetor's throttle lever.



● Disconnect the fuel hoses from the elbow connectors on the carburetor.



● Pull the carburetor off the screws.

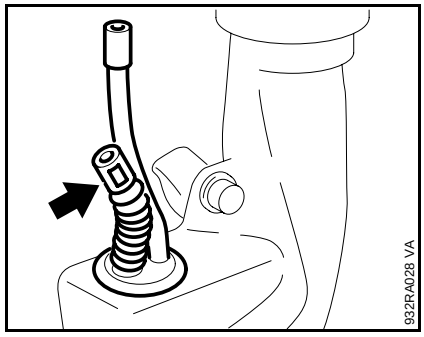


● Remove the gasket (arrow).

Install in the reverse sequence.

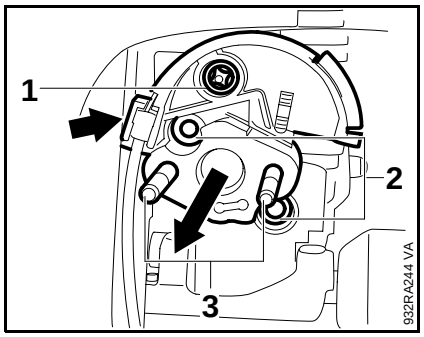
– Use a new gasket.

Position the fuel hoses so that they are not kinked.



FS 45, 46, 55 only

● Position the fuel hose on the elbow connector so that the orientation bead (arrow) on the hose points towards the drive tube.



– Remove the carburetor – 🕮 8.2.2

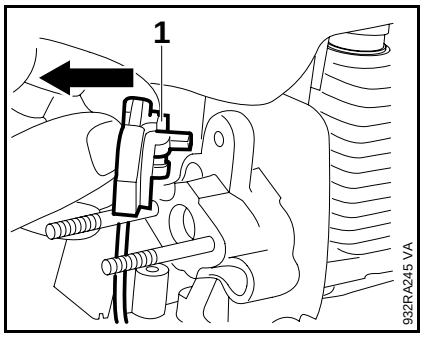
– Remove the fuel tank – 🕮 9.5.1

Use the following procedure on machines in which the tensioner is secured to the spacer flange by a pin and push nut (1):

- Pull the throttle cable (arrow) out of the tensioner.
- Take out the screws (2).
- Remove the spacer flange with tensioner and hex head screws (3).

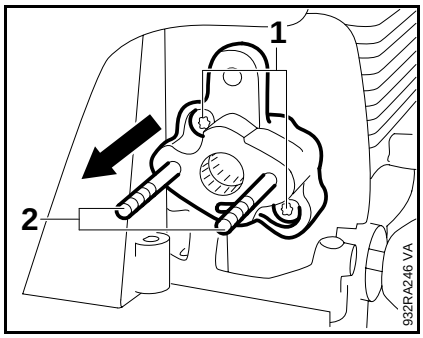
If necessary, lever off the push nut and remove the tensioner from the spacer flange.

Install with a new push nut.

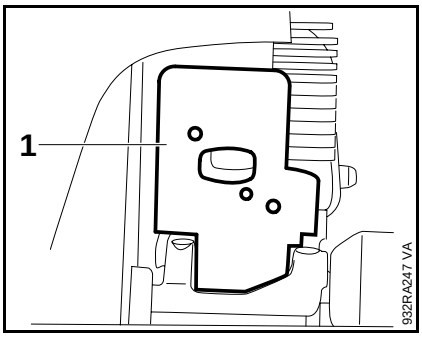


Use the following procedure on machines in which the tensioner (1) is loosely mounted in the spacer flange:

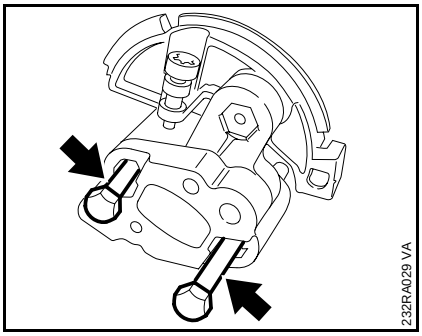
- Pull the tensioner with throttle cable out of the spacer flange.



- Take out the screws (1).
- Remove spacer flange with hex head screws (2).



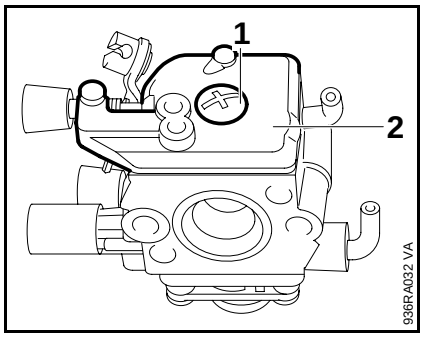
- Remove the gasket (1).



- Fit the hex head screws (arrows) in the spacer flange before installing.

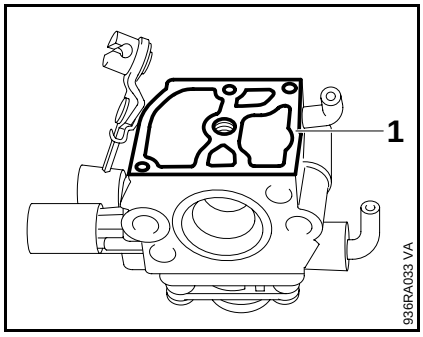
Reassemble all other parts in the reverse sequence.

Use new gaskets and observe tightening torques – 🕮 3.3

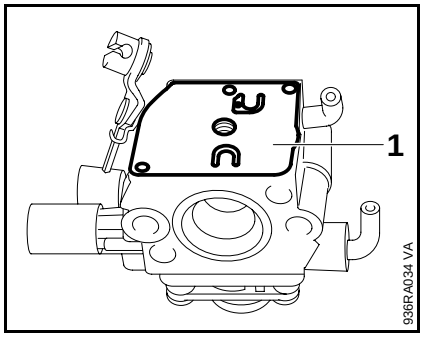


– Remove the carburetor – 🕮 8.2.2

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



- Remove the gasket (1).

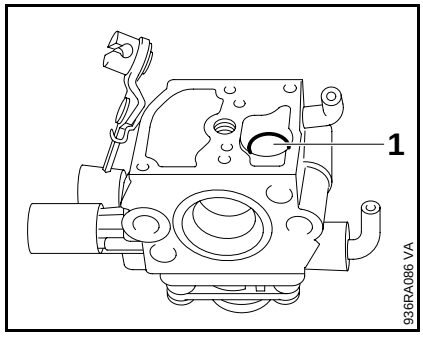


- Remove pump diaphragm (1).

If the gasket and pump diaphragm are stuck together, remove and separate them very carefully.

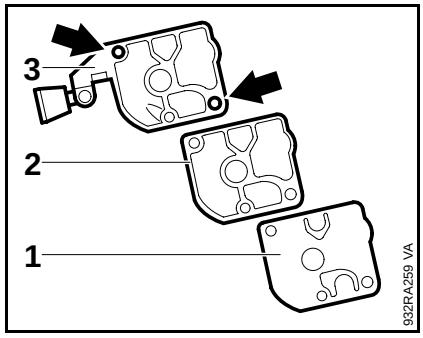
The diaphragm is a very delicate component. As a result of the alternating stresses the material eventually shows signs of fatigue, i.e. the diaphragm distorts and swells and has to be replaced.

– Inspect the diaphragm and gasket and replace if necessary.



- Examine the fuel strainer (1) for contamination and damage and replace if necessary.

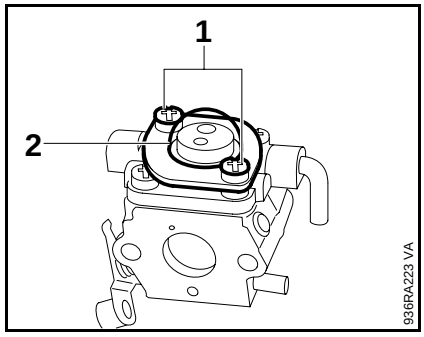
Install in the reverse sequence.



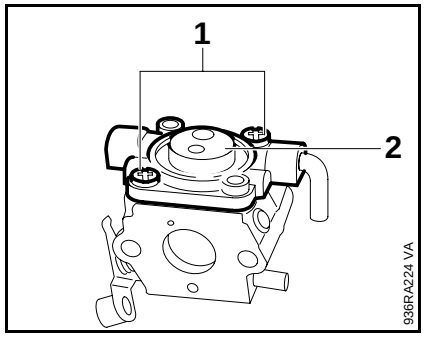
- The pump diaphragm (1) and gasket (2) are held in position by the pegs (arrows) on the end cover (3).

– Carry out leakage test – 🕮 8.2

– Remove the carburetor – 🕮 8.2.2

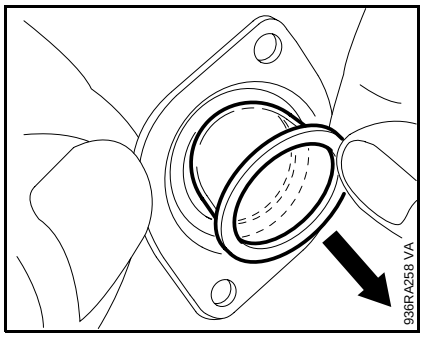


- Take out the M3x12 screws (1).
- Remove the end cover with cap (2).

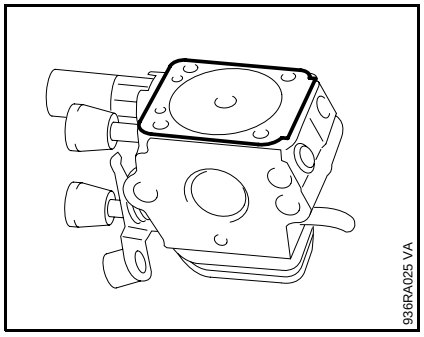


- Take out the M3x8 screws (1).
- Remove the flange (2).

9.2.1 Manual Fuel Pump with Square End Cover



● Take the cap out of the end cover.



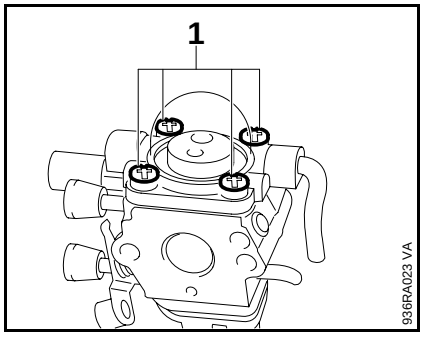
● Inspect the metering diaphragm and gasket and replace if necessary – 🕮 9.2.2

Reassemble in the reverse sequence.

Additional holes in the gasket and diaphragm (if there are any) must line up with those in the carburetor and flange.

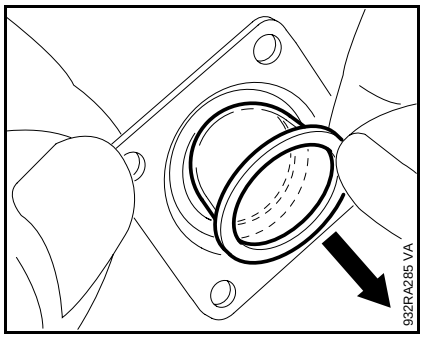
– Carry out leakage test – 🕮 8.2

– Remove the carburetor – 🕮 8.2.2

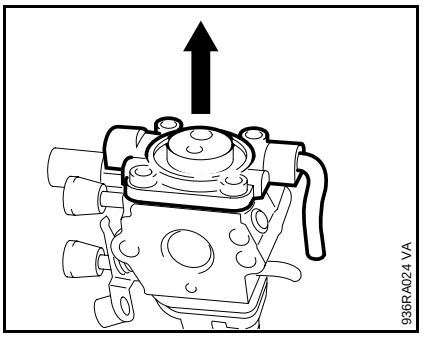


● Take out the screws (1).

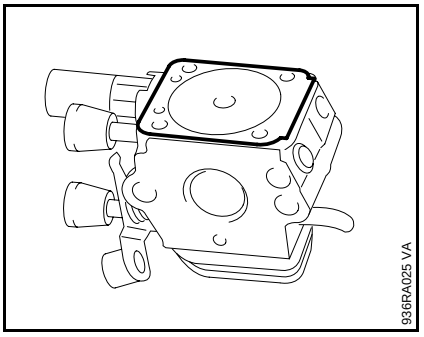
– Remove the end cover with cap.



● Take the cap out of the end cover.

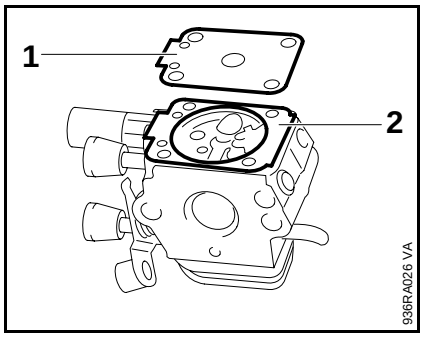


● Remove the flange.



● Inspect the metering diaphragm and gasket and replace if necessary – 🕮 9.2.2

Reassemble in the reverse sequence.



– Remove flange from manual fuel pump with oval end cover – 🕮 9.2

– Remove flange from manual fuel pump with square end cover – 🕮 9.2.1

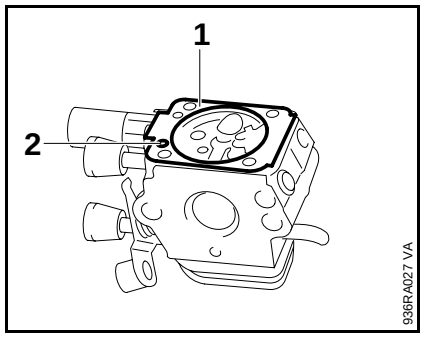
● Remove the metering diaphragm (1) and gasket (2) from the carburetor body.

If the gasket and diaphragm are stuck together, remove and separate them very carefully.

● Inspect the diaphragm and gasket and replace if necessary.

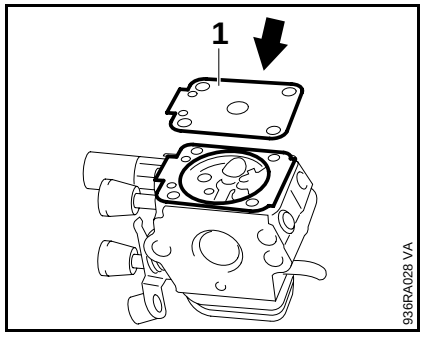
The diaphragm is a very delicate component. As a result of the alternating stresses the material eventually shows signs of fatigue, i.e. the diaphragm distorts and swells and has to be replaced.

Reassemble in the reverse sequence.



● Fit the gasket (1) on the carburetor body.

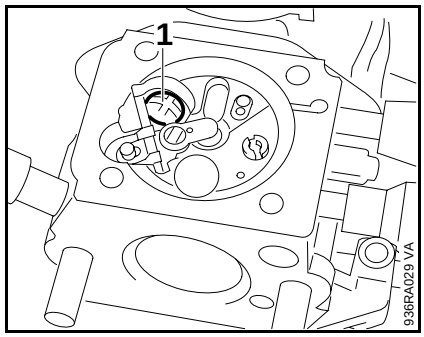
Line up the hole in the gasket (2) with the compensating bore in the carburetor.



● Place metering diaphragm (1) on the gasket.

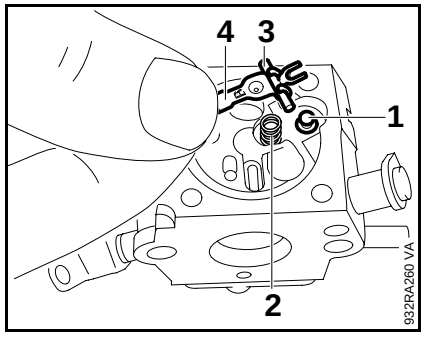
Line up the hole in the metering diaphragm (1) with the compensating bore in the carburetor and gasket.

Reassemble all other parts in the reverse sequence.



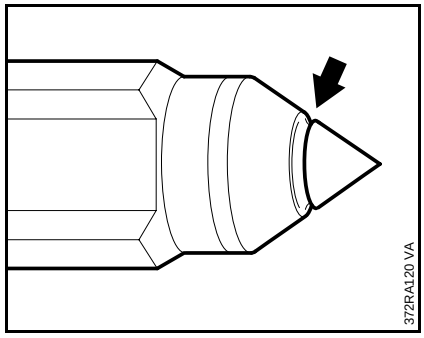
– Remove the metering diaphragm – 🕮 9.2.2

● Take out the screw (1).



● Remove the inlet control lever (4), spindle (3), spring (2) and inlet needle (1).

Spring (2) may pop out during disassembly. Make sure it is not lost.



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

Reassemble in the reverse sequence.

– Engage clevis in annular groove on head of the inlet needle.

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

– Check that inlet control lever moves freely.

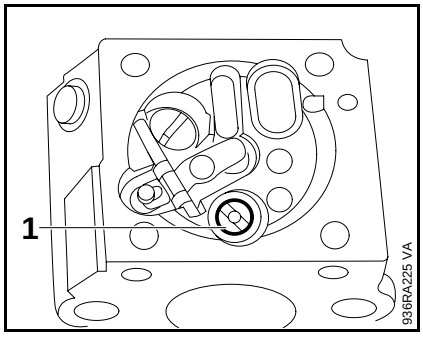
Important:
The upper edge of the inlet control lever must be flush with the top of the carburetor body.

– Install the metering diaphragm – 🕮 9.2.2

9.2.4 Fixed Jet

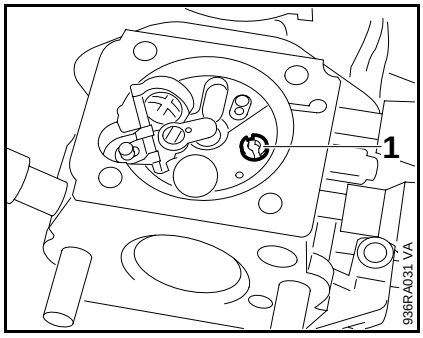
Take care not to damage the fixed jet when removing.

– Remove the metering diaphragm – 🕮 9.2.2



C1Q-S44A, C1Q-53A, C1Q-S58 carburetors only:

- Unscrew the fixed jet (1).



C1Q-S44, C1Q-S53, C1Q-S66 carburetors only:

- Unscrew the fixed jet (1).

Install in the reverse sequence.

9.3 Adjusting the Carburetor

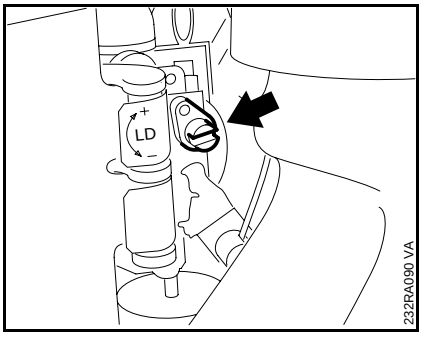
9.3.1 Carburetor with LD Screw

The carburetor with idle speed screw **(LD)** has **no** adjusting screws for maximum engine **(H screw)** or idle mixture **(L screw)**.

The carburetor is tuned so that the engine receives an optimum fuel-air mixture under **all** operating conditions.

Standard setting

When adjusting from scratch, first carry out the standard setting.



- Carefully turn the idle speed screw **(LD)** (arrow) counterclockwise (left-hand thread) down onto its seat.

- Then turn the idle speed screw **(LD) two** full turns clockwise.

– Check the air filter and replace if necessary – 🕮 8.1

– Check the spark arresting screen, clean or replace as necessary – 🕮 5.4

FS units only

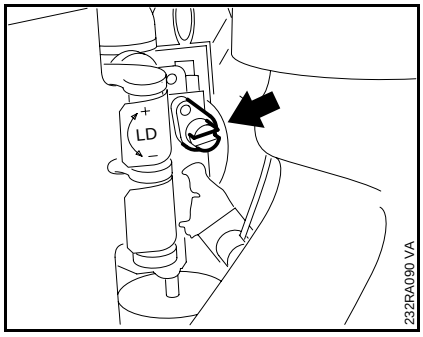
– Mount approved cutting tool. If a nylon line mowing head is used, make sure the cutting lines extend as far as the line limiter blade on the deflector.

FC units only:

– Mount the cutting tool. It must be clean and in good condition (not bent).

HL units only:

– Inspect cutting blades and clean them if necessary. They must be clean, move freely and not be warped.



Adjusting idle speed

– Carry out the standard setting.

– Start the engine and warm it up.

Engine stops while idling:

● Turn the idle speed screw **(LD)** (arrow) slowly clockwise until the engine runs smoothly.

The cutting tools of **FS** and **FC units** must not rotate.

HL units:

– Turn the idle speed screw **(LD)** slowly clockwise until the cutting blades begin to run, then turn the screw back half a turn from that position.

FS and FC units only:

Cutting tool rotates when engine is idling:

– Turn the idle speed screw **(LD)** counterclockwise until cutting tool stops rotating, then turn the screw about another **one** turn in the same direction.

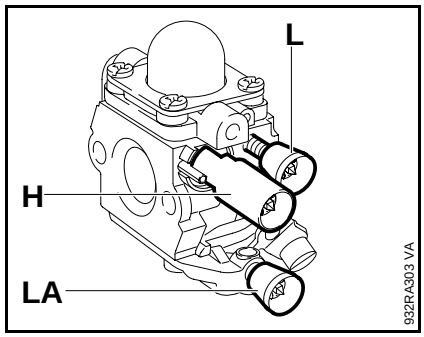
HL units only:

Cutting blades run when engine is idling:

– Turn the idle speed screw **(LD)** counterclockwise until the cutting blades stop moving, then turn the screw about another one and a half turns in the same direction.

Erratic idling behavior, poor acceleration:

● Turn the idle speed screw **(LD)** slowly no more than half a turn counterclockwise.



Standard setting

The limiter cap must not be removed from the high speed screw **(H)** to carry out the standard setting.

With this carburetor it is only possible to correct the setting of the high speed screw **(H)** within fine limits

– Check the air filter and replace if necessary – 🕮 8.1

– Check the spark arresting screen, clean or replace it if necessary – 🕮 5.4

FS units only:

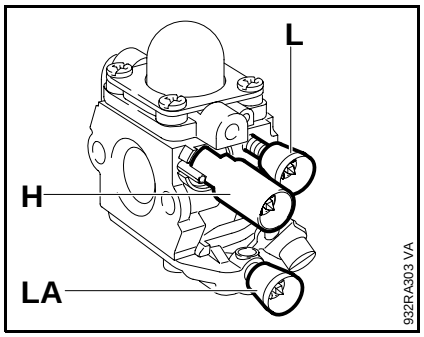
– Mount approved cutting tool. If a nylon line mowing head is used, make sure the cutting lines extend as far as the line limiter blade on the deflector.

FC units only:

– Mount the cutting tool. It must be clean and in good condition (not bent).

HL units only:

– Inspect cutting blades and clean them if necessary. They must be clean, move freely and not be warped.



Now make the following adjustments:

- Turn the high speed screw (**H**) counterclockwise as far as stop (no more than 3/4 turn)
- Carefully turn the low speed screw (**L**) clockwise until it is against its seat, then open it one full turn counterclockwise.

– Start the engine and allow it to warm up.

- Use the idle speed screw (**LA**) to adjust idle so that the tool does not rotate.

Fine tuning

A minor correction may be necessary when operating at high altitude or at sea level. Note that even very slight corrections to the high speed screw (**H**) produce a noticeable change in engine running behavior.

– Carry out the standard setting.

– Start the engine and allow it to warm up.

– Open the throttle wide.

– At high altitude (mountains): Turn the high speed screw (**H**) clockwise (leaner), but no further than stop, until there is no noticeable increase in engine speed.

– At sea level: Turn the high speed screw (**H**) counterclockwise (richer), but no further than stop, until there is no noticeable increase in engine speed.

It is possible that the standard setting produces the highest engine rpm in both the above cases.

Adjusting idle speed

– Open the idle speed screw (**L**) one full turn.

– Allow the engine to warm up.

Engine stops while idling

– Turn the idle speed screw (**LA**) slowly clockwise until the engine runs smoothly. The tool must not rotate.

Tool runs when engine is idling:

– Turn the idle speed screw (**LA**) counterclockwise until the tool stops running. Then turn the screw about another half to one full turn in the same direction.

Erratic idling behavior, poor acceleration

– Idle setting is **too lean**. Turn the low speed screw (**L**) counter-clockwise (about a quarter turn) until the engine runs and accelerates smoothly.

Erratic idling behavior

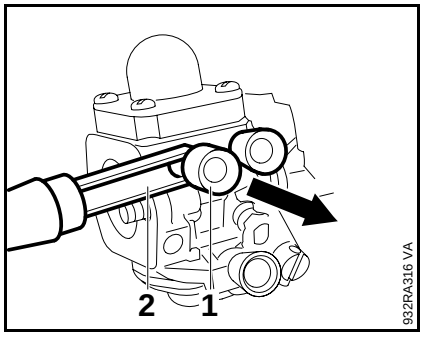
– Idle setting is **too rich**. Turn the low speed screw (**L**) clockwise (about a quarter turn) until the engine runs and accelerates smoothly.

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

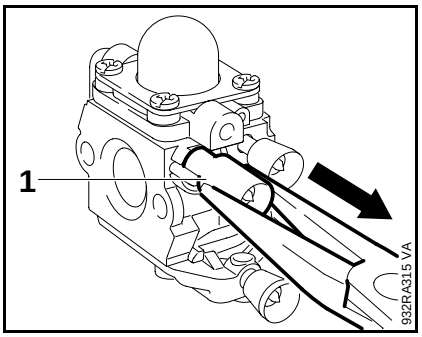
9.3.3 Basic Setting on Carburetor with H, L and LA screws

The limiter cap has to be removed from the high speed screw (**H**) only if it is necessary to replace the high speed screw (**H**), clean the carburetor or adjust it from scratch.

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



- On carburetors with a short limiter cap (1): Push the puller (2) 5910 890 4501, with the groove facing you, between the limiter cap (1) and carburetor body and pry the cap off. If the limiter cap is stuck on the screw, turn the puller over so that its groove faces the carburetor body. Pry off the limiter cap.

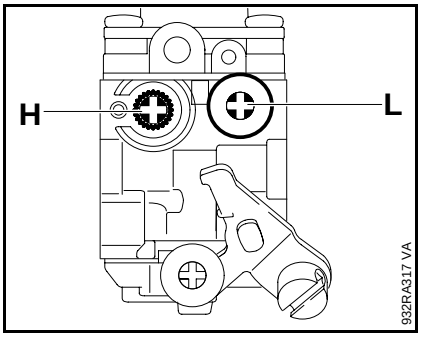


- On carburetors with a long limiter cap (1):
  Use suitable pliers to pull off the limiter cap.

Limiter caps that have been removed once may be damaged and must not be re-used. Always install a new limiter cap.

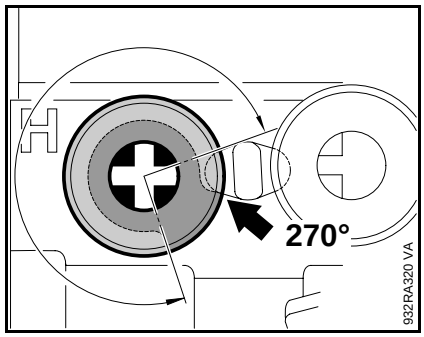
– Screw down both adjusting screw (**H** and **L**) clockwise until their are against their seats.

Now make the following adjustments:



– Open the high speed screw (**H**) 1 1/2 turns counterclockwise.

– Open the low speed screw (**L**) one full turn counterclockwise.



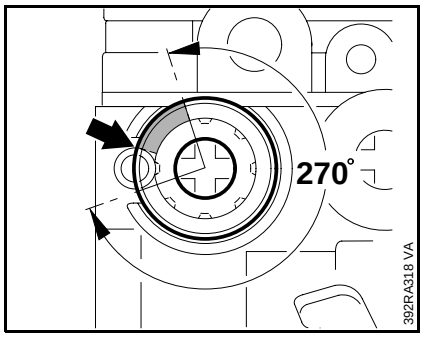
- On carburetor with short limiter cap:
  Line up the new cap for the high speed screw (**H**) against the rich stop and press it on only as far as the **second noticeable detent position.**

The stop limits the adjustment range of the high speed screw (**H**) to a 3/4 turn. Do not press the cap against the carburetor body as it will otherwise be damage.

Carry out the standard setting – 🕮 9.3.2

9.4 Tank Vent

9.4.1 General



- On carburetor with long limiter cap :
  Line up the **new** cap for the high speed screw (**H**) against the rich stop so that the high speed screw **(H)** can only be rotated a 3/4 turn clockwise.

- Push on the limiter cap until it butts against the carburetor body.

Carry out the standard setting – 🕮 9.3.2

Correct operation of the carburetor is only possible if atmospheric pressure and internal fuel tank pressure are equal at all times. This is ensured by the tank vent.
In the event of trouble with the carburetor or the fuel supply system, always check the tank vent and replace it if necessary.

Testing the tank vent

– Open the tank cap slowly and drain the tank. Refit the tank cap, making sure it is tight.

– Disconnect the two fuel hoses from the carburetor – 🕮 8.2.2

– Seal one of the fuel hoses with a suitable plug.

– Connect vacuum pump 0000 850 3501 to the other fuel hose and produce a vacuum in the fuel tank by operating the pump quickly.

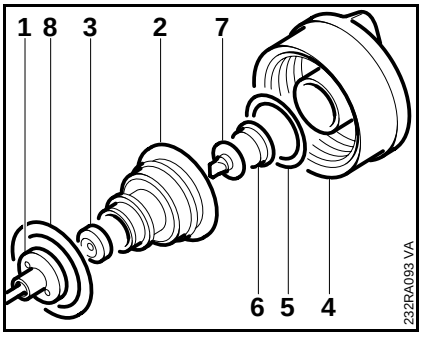
– If the vacuum remains unchanged, install a new tank vent.

If the vacuum slowly disappears, the tank vent is in order.

9.4.2 Replacing

On these machines the tank vent is integrated in the fuel filler cap.

If no equalization of pressures takes place in the tank vent test, the tank filler cap must be replaced.



As a temporary measure, the fuel filler cap can be disassembled and the individual parts (see below) cleaned with a little standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons – 🕮 12.

- Cap (1), valve body (2), sintered filter (3), fuel filler cap (4), cup spring (5), sintered filter (6), valve (7), sealing ring (8)

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

Always observe all safety precautions when working on the fuel system – 🕮 2.

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

Cleaning the fuel tank

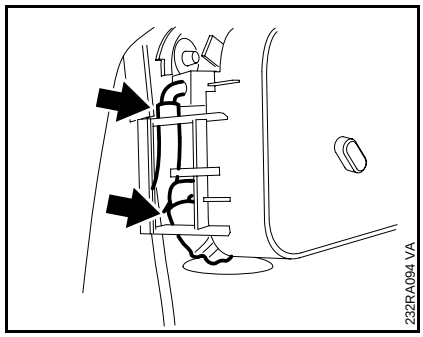
– Unscrew the fuel filler cap and drain the tank.

– Pour a small amount of clean gasoline into the tank.

– Close the tank and shake the machine vigorously.

– Open the tank again and drain it.

Dispose of fuel properly.



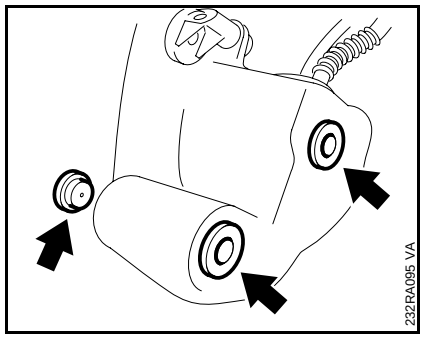
– Unscrew the fuel filler cap and drain the tank.

– Remove the air filter cover – 🕮 8.1.1

● Pull the fuel hoses off the elbow connectors (arrows).

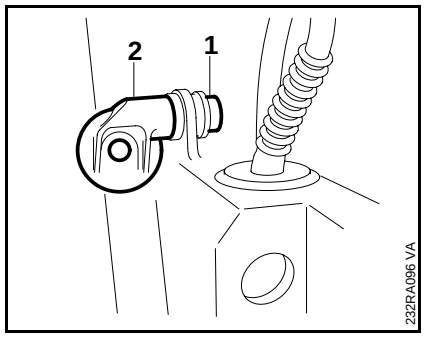
– Remove the rewind starter, 🕮 6.2

– Remove the fuel tank.



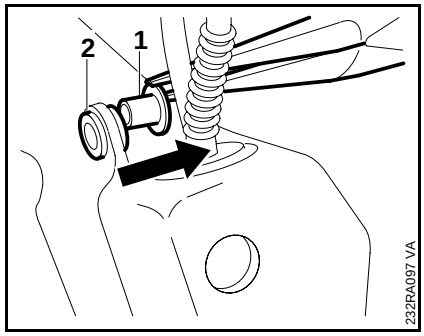
● Remove the plugs (arrows) from the fuel tank.

Replace worn plugs.



● Take out the screw (1) and remove the retainer (2).

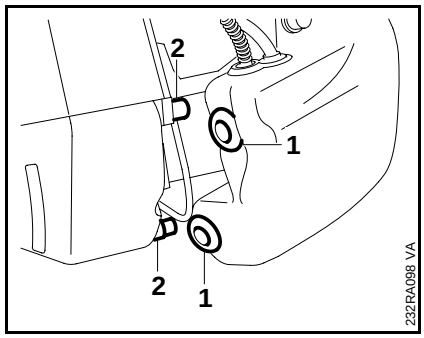
Tighten down the screw only after installing the starter cover.



● Pull out the sleeve (1).

● Remove the grommet (2) from the tank.

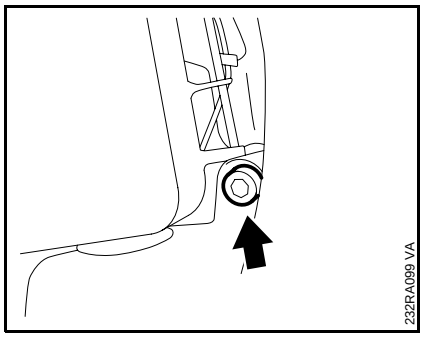
– Remove the fuel hoses – 🕮 9.5.2



Install in the reverse sequence.

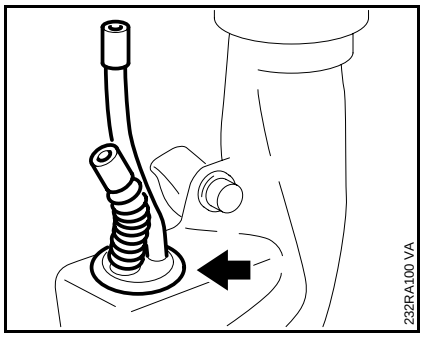
● The plugs (1) must engage over the lugs (2).

– Make sure the throttle cable is not pinched.



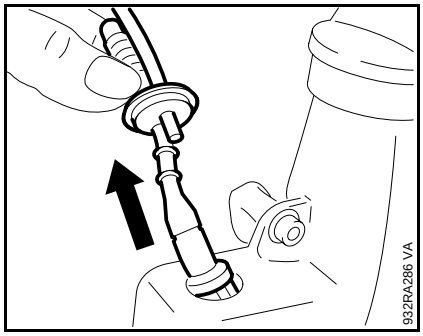
● Tighten down the screw (arrow) on the retainer.

Reassemble all other parts in the reverse sequence.

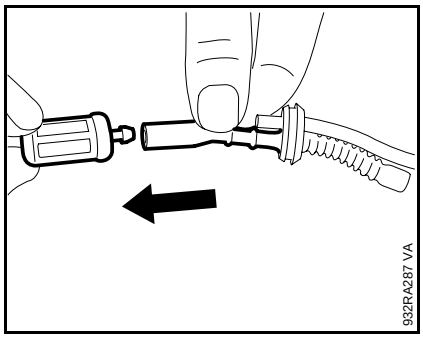


– Remove the fuel tank, 🕮 9.5.1

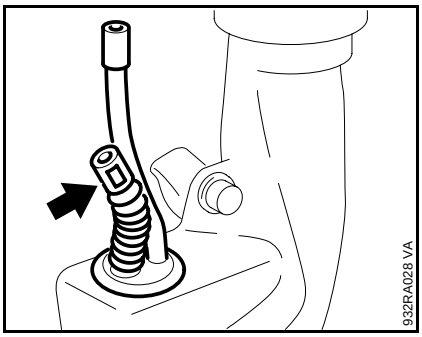
● Pry the grommet (arrow) out of the tank housing.



● Pull out the fuel hoses with pickup body.



● Pull the pickup body off the fuel hose and check it for contamination, replace if necessary.



Reassemble in the reverse sequence.

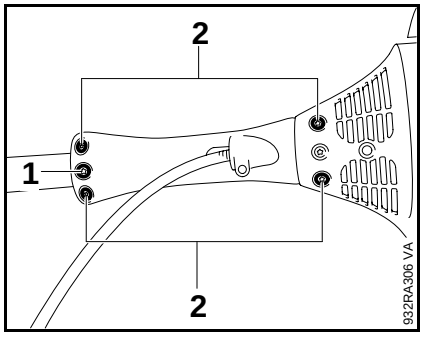
– Coat the lower half of the grommet with oil to ease installation.

● Position the fuel hose on the carburetor’s elbow connector so that the orientation bead (arrow) on the hose points towards the drive tube.

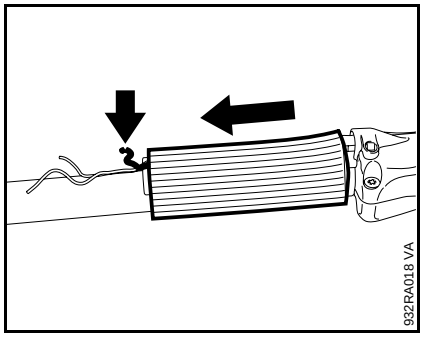
10. Drive Tube
10.1 Removing and Installing

All components can be left on the drive tube if it is only necessary to separate it from the powerhead for repair work. Exceptions are machines on which the control handle is not integrated in the engine housing.

– On machines on which the control handle is not integrated in the engine housing, first remove the control handle – 🕮 7.1.1, 7.1.2 or 7.2.1

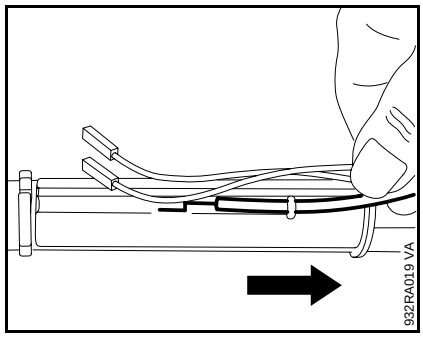


● On machines with a bike handle, take out screw (1), loosen screws (2) and pull out the drive tube.



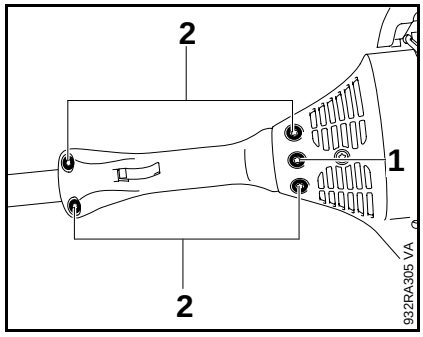
FS 46, 55 only (USA, CAN, AUS version)

● Pull the handle hose off the handle support, taking care not to bend the offset end of the throttle cable.



FS 46, 55 only (USA, CAN, AUS version)

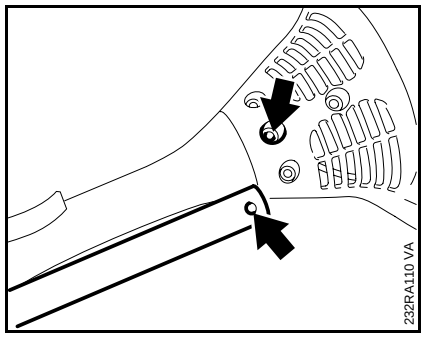
● Pull the short circuit wires out of the slot and the throttle cable out of its seat in the handle support.



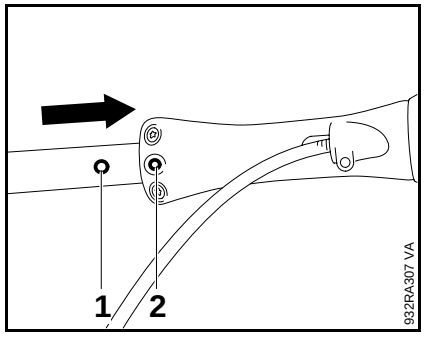
● On machines with a loop handle, take out screw (1), loosen screws (2) and pull out the drive tube.

Install in the reverse sequence.

– Degrease clamp area with a little standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons – 🕮 12.



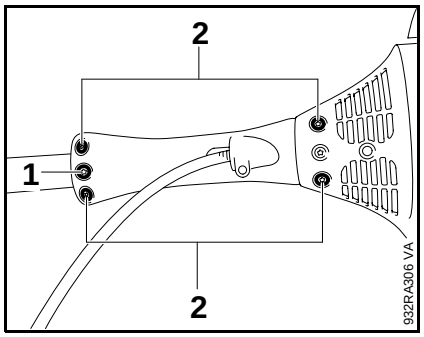
● On machines with a loop handle, push home the drive tube until the holes (arrows) line up (drive tube is next to engine housing in illustration to show position of hole).



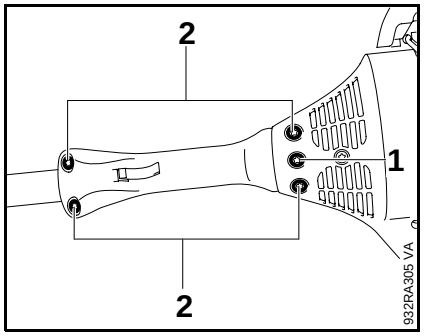
● On machines with a bike handle, push home the drive tube until hole (1) (about 18 cm from end of drive tube) lines up with hose (2).

Turn the drive shaft to and fro (rotate the cutting tool) while pushing it into position so that the square end of the drive shaft engages the square recess in the clutch drum.

10.2 Parts on Drive Tube
10.2.1 Bike Handle



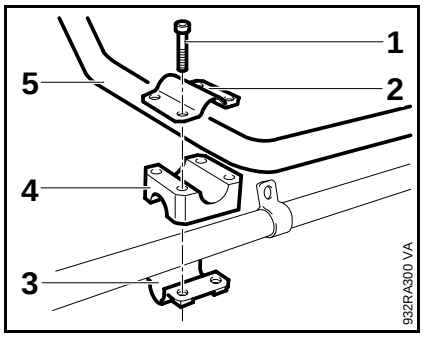
- On machines with a bike handle, fit and tighten the screw (1). Then tighten down the screws (2) – 🕮 3.3



- On machines with a loop handle, fit and tighten the screw (1). Then tighten down the screws (2) – 🕮 3.3

– Check instruction label on drive tube for damage and legibility, replace if necessary.

Reassemble all other parts in the reverse sequence.



– Remove the control handle – 🕮 7.1.1 and 7.1.2

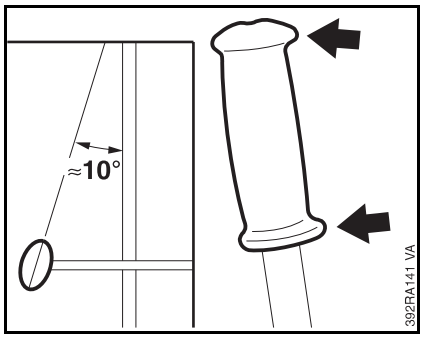
- Take out the screws (1).

- Remove lower clamp (3), clamp block (4), bike handle (5) and upper clamp (2).

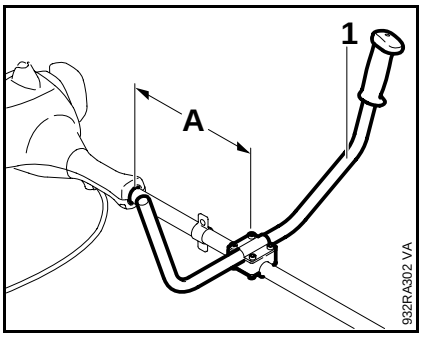
– To replace left grip, carefully cut it open and pull it off.

– Use protective jaws (prism jaws) to clamp the bike handle in a vise.

– Coat inside of opening in new grip with a little STIHL OH 723 press fluid – 🕮 12.



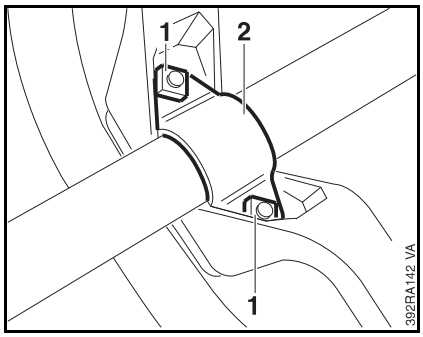
- Push the grip into position so that the longer ends (arrows) point towards the gearbox at an angle of 10 - 15 degrees to the drive tube.



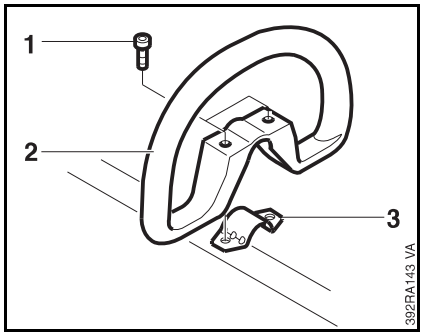
Install in the reverse sequence.

- Position the bike handle (1) about 15 cm (distance “A“) forward of the engine housing and tighten it down firmly.

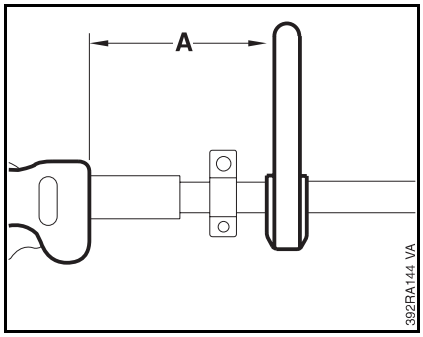
10.2.2 Loop Handle without Barrier Bar (not KM 55)



- Unscrew the square nuts (1).
- Remove lower clamp (2).



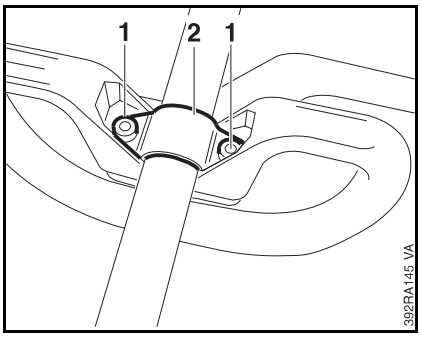
- Take out the screws (1).
- Remove the loop handle (2) and upper clamp (3).



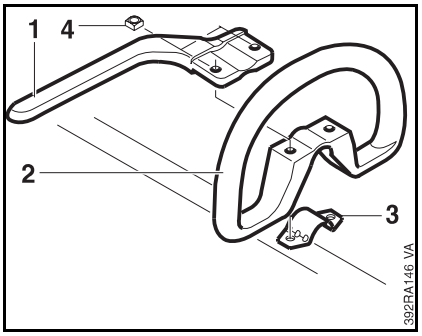
Install in the reverse sequence.

- Position the loop handle about 20 cm (distance “A“) forward of the control handle and tighten it down firmly.

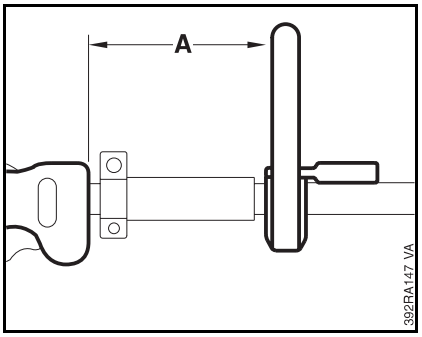
10.2.3 Loop Handle with Barrier Bar



- Take out the screws (1).
- Remove lower clamp (2).



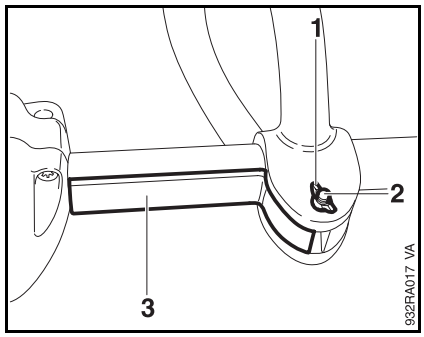
- Remove the barrier bar (1), loop handle (2) and upper clamp (3).
- Take the square nuts (4) out of the barrier bar.



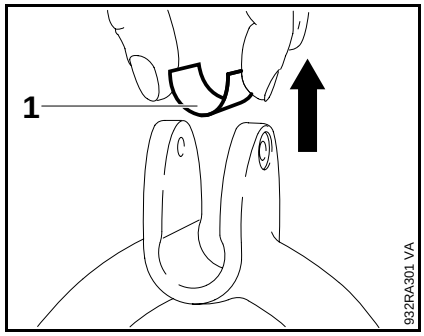
Install in the reverse sequence.

- Position the loop handle about 20 cm (distance “A“) forward of the control handle and tighten it down firmly.

10.2.4 Loop Handle

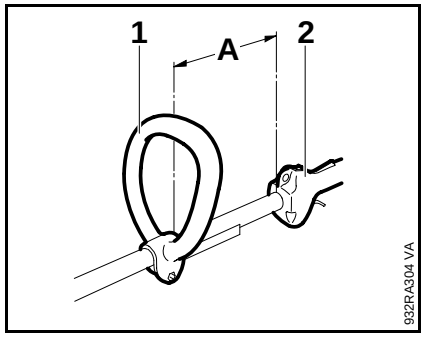


- Unscrew the wingnut (1) and remove the washer.
- Take out the screw (2) and remove the spacer (3) (if fitted).



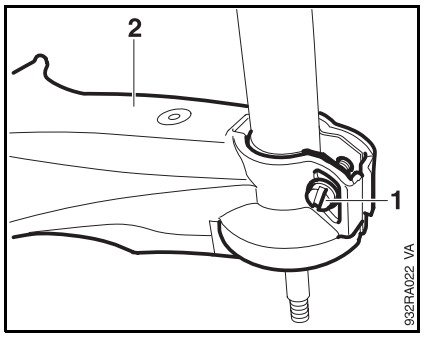
- Pull the loop handle off the drive tube and remove the friction pad (1).

Install in the reverse sequence.

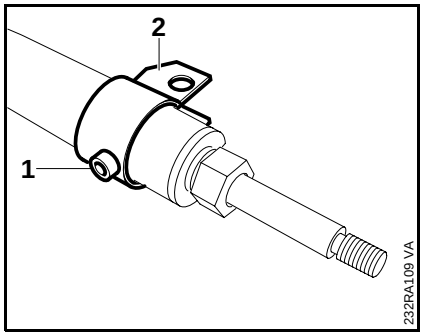


- Position the loop handle (1) about 20 cm (distance “A“) forward of the engine housing (2) and tighten it down firmly.

10.2.5 Deflector (FS 45, 46 only)



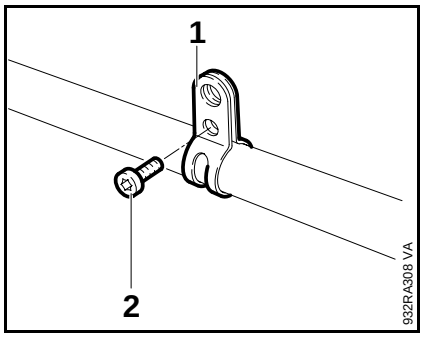
- Take out the clamp screw (1).
- Pull the deflector (2) forwards and off.



- Take out the screw (1).
- Pull off the clamp (2).

Install in the reverse sequence.

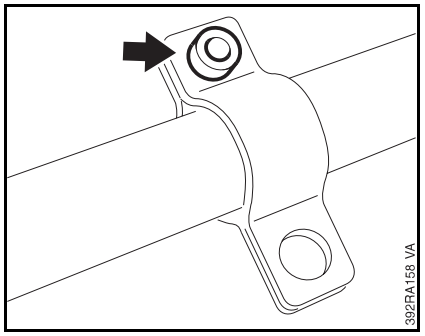
10.2.6 Carrying Rings



One-piece carrying ring

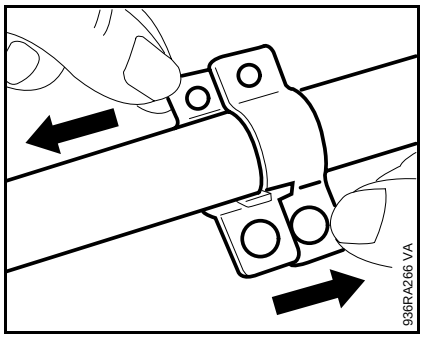
- Take out the screw (2), bend open the clamp (1) and remove it.

Install in the reverse sequence.



Two-piece carrying ring

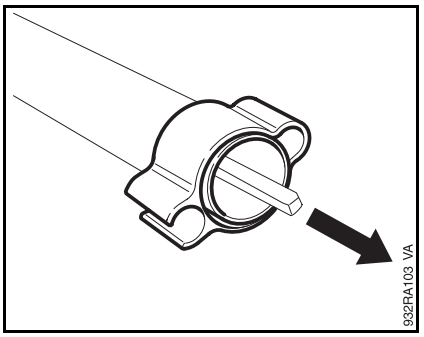
- Remove the screw (arrow) from the carrying ring.



- Pull the carrying ring apart and take it off the drive tube.

Install in the reverse sequence.

10.2.7 Throttle Cable Retainer .... and Sleeve

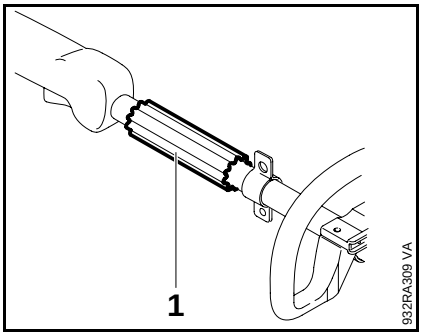


Throttle cable retainer

– Remove the drive tube , 🕮 10.1

- Pull off the throttle cable retainer.

Install in the reverse sequence.

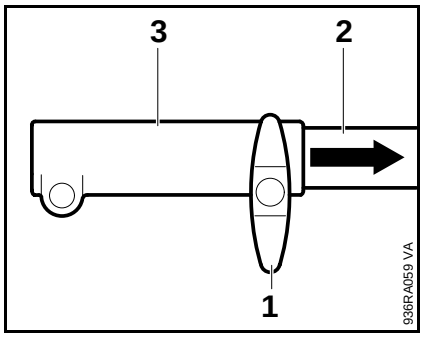


Sleeve

– Remove the drive tube – 🕮 10.1

- Pull off the sleeve (1).

Install in the reverse sequence.



Lower end of drive tube

Repairs to the lower end of the drive tube are described in the service manual for "CombiTools" in the chapter on "Drive Tube (Boom)".

- Loosen the wing screw (1).
- Pull the lower end of the drive tube (2) out of the coupling sleeve (3).

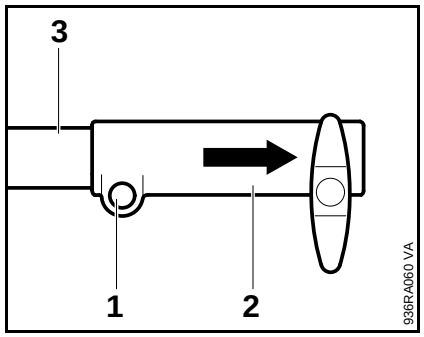
Upper end of drive tube

– Remove the lower end of the drive tube.

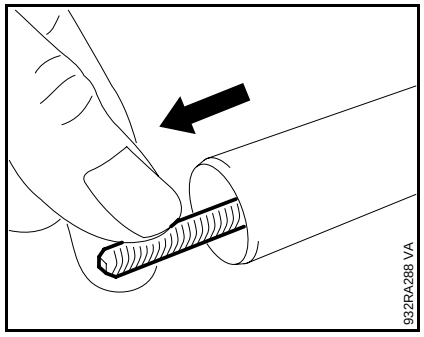
– Remove the drive tube – 🕮 10.1

– Remove the bike handle or loop handle – 🕮 10.

– Remove the parts mounted to the drive tube – 🕮 10.2

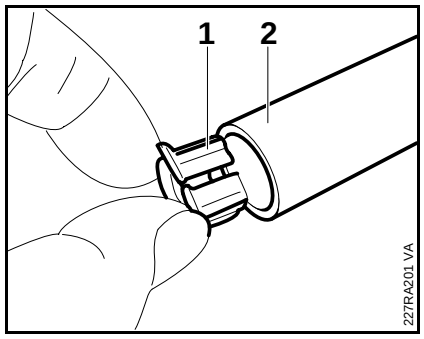


- Loosen the screw (1).
- Pull the coupling sleeve (2) off the upper end of the drive tube (3).

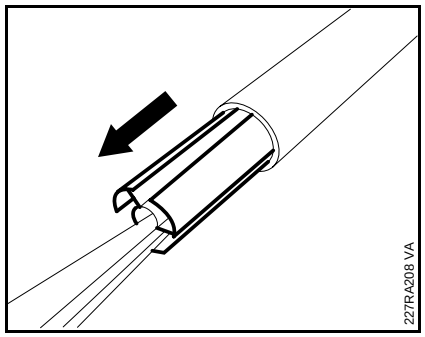


- Pull the drive shaft out of the drive tube.

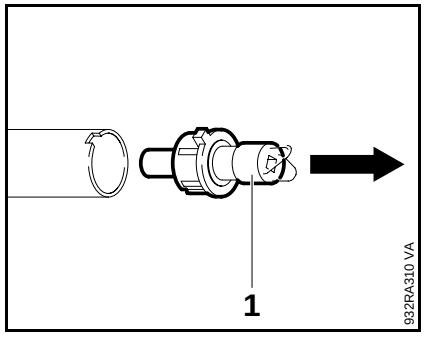
If the drive shaft has turned blue, install a new one.



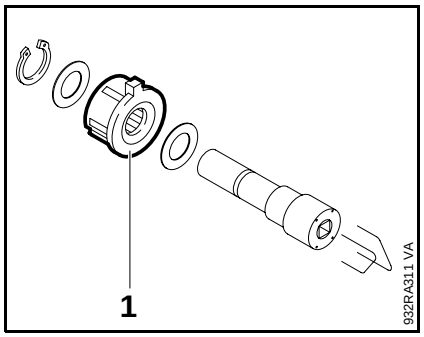
- Pull the plug (1) out of the drive tube (2).



- Pull the flexible liner out of the drive tube.

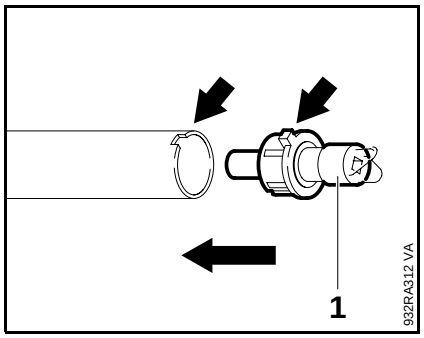


- Pull the complete driver (1) out of the drive tube.

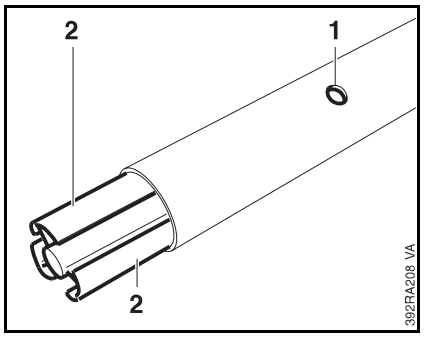


- Disassemble the driver. If individual parts are badly worn, replace the complete assembly.
- Clean the needle bearing in the bushing (1) with a little standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons, and then lubricate with STIHL grease – 🕮 12.

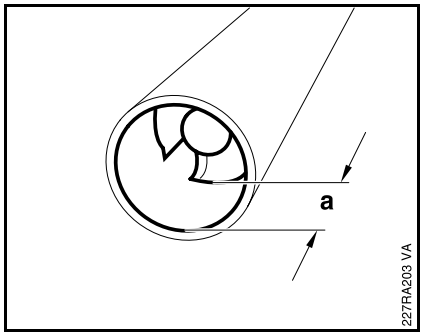
– Reassemble the driver.



- Push the driver (1) into the drive tube as far as stop so that the notch (arrow) in the drive tube engages the lug (arrow) on the bushing.



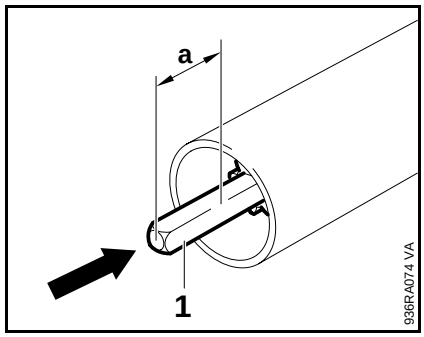
- Coat the flexible liner with a little STIHL OH 723 press fluid, 🕮 12, and push it into the drive tube so that the hole (1) is between the spokes (2).



- Push the flexible liner home until dimension “a“ is 40 mm, measured from the end of the drive tube (plug end).

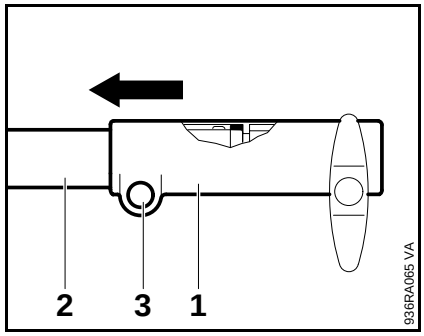
– Before installing the drive shaft, coat it with STIHL gear lubricant for hedge trimmers – 🕮 12.

– Apply the grease evenly to the drive shaft. Do not pump grease directly into the drive tube.



- Push the drive shaft (1) into the drive tube so that it protrudes no more than 8 mm (dimension "a").

– Fit the plug.



– Check that the driver rotates.

- Line up the coupling sleeve (1) so that the notch engages the lug on the bushing and the gap in the clamp points down.
- Push the coupling sleeve (1) onto the drive tube (2) as far as stop.
- Tighten down the screw (3) firmly.

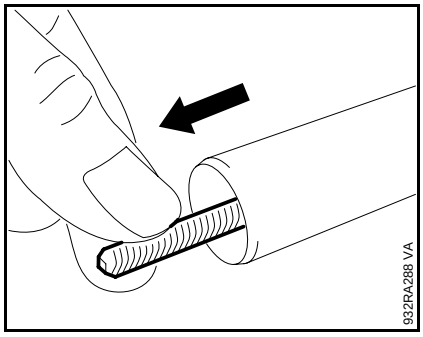
Reassemble all other parts in the reverse sequence.

10.3.2 Drive Tube (FS 45, 46 only)

– Remove the drive tube – 🕮 10.1

– Remove the loop handle – 🕮 10.2.4

– Remove the cutting tool and deflector – 🕮 10.2.5



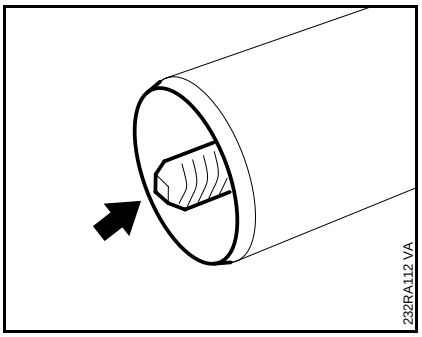
The drive shaft is supported in a flexible liner inside the drive tube.

● Pull the drive shaft out of the drive tube.

If the shaft has turned blue, install a new one.

– Before installing the drive shaft, coat it with STIHL gear lubricant for hedge trimmers – 🕮 12.

– Apply the grease evenly to the drive shaft. Do not pump grease directly into the drive tube.



● Push the drive shaft (arrow) into the drive tube as far as stop. Check that the cutting tool rotates.

Reassemble all other parts in the reverse sequence.

10.3.3 Drive Tube (FS 55, FC 55, HL 45 only)

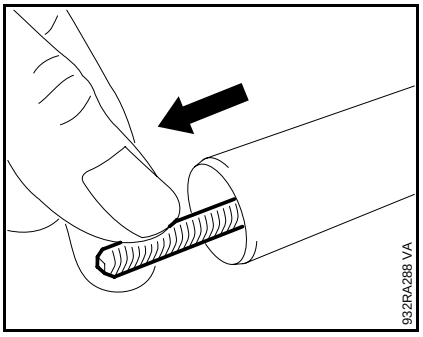
– Remove the drive tube , 🕮 10.1

– Remove the bike handle (if fitted) – 🕮 10.2.1

– Remove the loop handle (if fitted) – 🕮 10.2.2 or 10.2.3

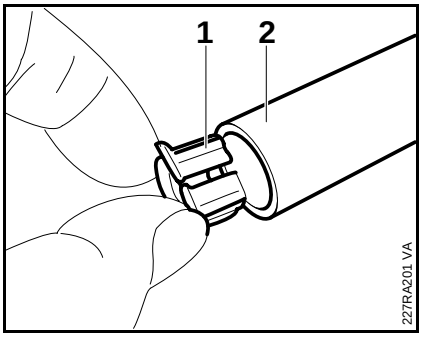
– Remove the loop handle (if fitted) – 🕮 10.2.4

– Remove the gearbox – 🕮 10.4



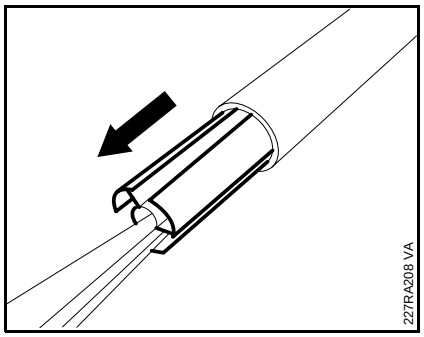
● Pull the drive shaft out of the engine end of the drive tube.

If the shaft has turned blue, install a new one.



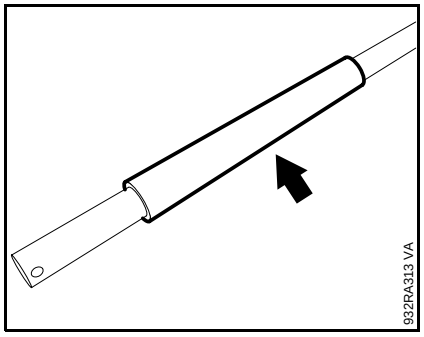
● On **HL 45**: Pull the plugs (1) out of both ends of the drive tube (2).

– On **FS 55**: Pull the plug out of the engine end of the drive tube.



- Pull the flexible liner out of the drive tube.

The illustration shows the flexible liner of the HL 45; the other flexible liners are star-shaped.

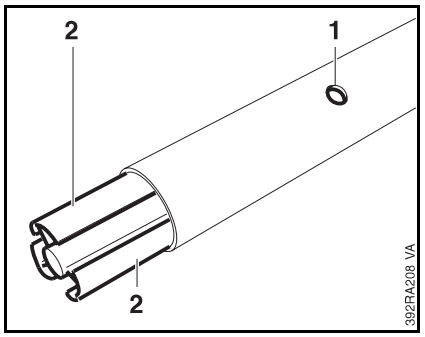


- On **HL 45:** If necessary, carefully cut open and remove the hose (arrow) from the drive tube. When installing, coat the inside of the new hose with a little STIHL press fluid – 🕮 12.
- Push the hose (arrow) onto the drive tube.

– Check the instruction label on the drive tube for damage and legibility, replace if necessary.

Reassemble in the reverse sequence.

– Coat the flexible liner with a little press fluid to ease installation – 🕮 12.



- On **HL 45**: Push the flexible liner into the drive tube so that the hole (1) is between the spokes (2).

– Before installing, coat the drive shaft with STIHL gear lubricant for hedge trimmers – 🕮 12.

– Apply the grease evenly to the drive shaft. Do not pump grease directly into the drive tube.

– After installing the drive shaft, check that the cutting tool rotates.

The procedures for removing and installing as well as disassembling and reassembling the gearbox are described in the "CombiTools" service manual.

11. Special Servicing Tools

No.	Part Name	Part No.	Application	Rem.
1	Locking strip	0000 893 5903	Blocking crankshaft	
2	Socket	0812 540 1112	Installing and removing spline socket head screws with electric or pneumatic screwdrivers, removing clutch drum	
3	Wrench	4130 890 3600	Unscrewing and tightening the clutch (FS units)	
4	Carburetor and crankcase tester	1106 850 2905	Testing crankcase and carburetor for leaks	
5	Nipple	0000 855 9200	Testing carburetor for leaks	
6	Hose for leakage test	1110 141 8600	Testing carburetor for leaks	
7	Screwdriver, Q-SW 8 x 200	5910 890 2420	Carburetor nuts	
8	Crimping tool	5910 890 8210	Attaching connectors to electrical wires	
9	Torque wrench	5910 890 0301	0.5 to 18 Nm	1) 2)
10	Torque wrench	5910 890 0311	6 to 80 Nm	1) 3)
11	Socket, T 27 x 125	0812 542 2104	Installing and removing spline socket head screws with electric or pneumatic screwdrivers, tightening with torque wrench	
12	T-handle screwdriver, Q - T 27 x 150	5910 890 2400	IS screws	4)
13	Assembly stand	5910 890 3100	Mounting FS units	
14	- Clamp	5910 890 8800	Holding FS units by drive tube for repairs (in conjunction with assembly stand)	
15	Hook	5910 890 2800	Detaching springs from clutch shoes	
16	Hook	5910 893 8800	Removing pickup body	
17	Installing tool	5910 890 2204	Installing and flaring rope guide bush	

Remarks:

1) Always use torque wrench for tightening DG or P screws.
2) Alternative: Torque wrench 5910 890 0302 with optical/acoustic signal.
3) Alternative: Torque wrench 5910 890 0312 with optical/acoustic signal.
4) Only use for releasing/removing DG or P screws.

No.	Part Name	Part No.	Application
1	Dirko gray sealant (100 g tube)	0783 830 2120	Guard on muffler
2	Dirko HT red sealant	0783 830 2000	Muffler screws
3	STIHL special lubricating oil	0781 417 1315	Bearing bore in rope rotor, rewind spring
4	STIHL gearlubricant for hedge trimmers - 80 g tube - 225 g tube	 0781 120 1109 0781 120 1110	
5	STIHL lubricating greaset	0781 120 1111	Needle bearing in bushing of driver in drive tube
6	Standard commercial, solvent-based degreasant containing no chlorinated or halogenated hydrocarbons		Cleaning sealing faces
7	STIHL OH 723 press fluid	0781 957 9000	Installing rubber elements of AV system

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0455 241 0123. M10. K3. Fi. Printed in Germany