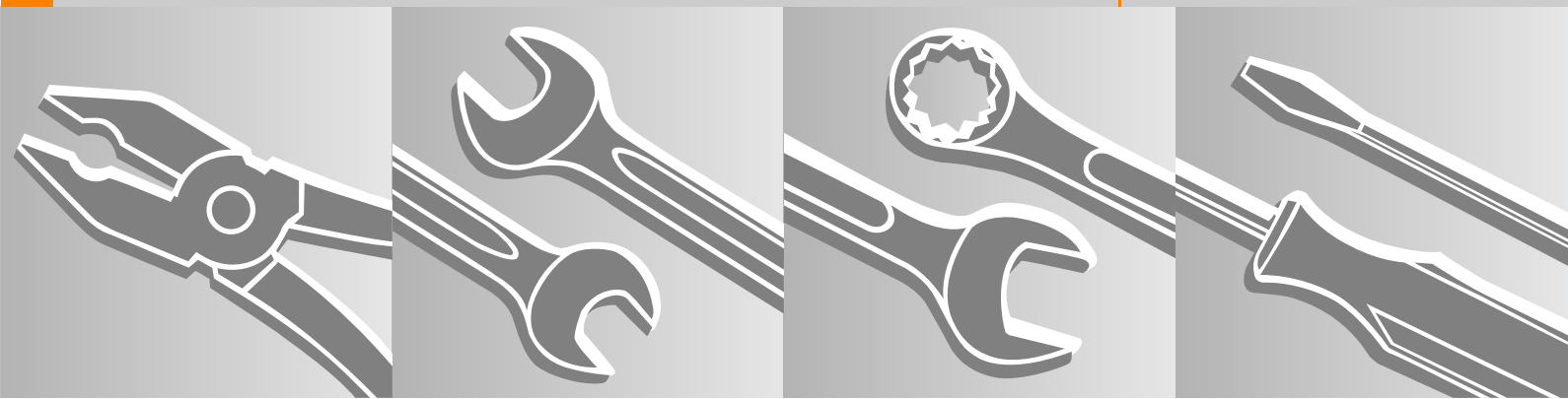


STIHL MS 461

2013-10



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1. Introduction and Safety Precautions

1.1 Introduction

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

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

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

A fault on the machine may have several causes. To help locate the fault, consult the chapter on "Troubleshooting" and the "STIHL Service Training System" for all assemblies.

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

The special tools mentioned in the descriptions are listed in the chapter on "Special Servicing Tools" in this manual. Use the part numbers to identify the tools in the "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 that is shown in the illustration (above the text)
- = Action to be taken that is not shown in the illustration (above the text)

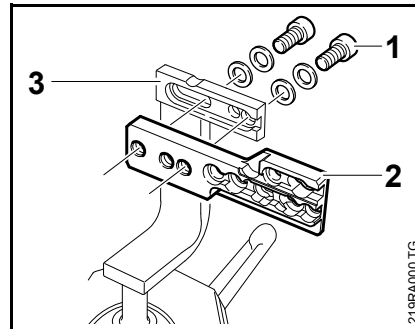
In the illustrations:

➔ Pointer (short arrow)

➡ Direction of movement

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

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



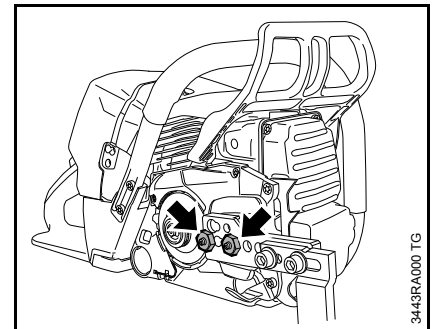
Servicing and repairs are made considerably easier if the machine is mounted to assembly stand (3) 5910 890 3100. To do this, secure the mounting plate (2) 5910 850 1650 to the assembly stand with two screws (1) and washers.

The above operation is not necessary with the new assembly stand 5910 890 3101 since the mounting plate is already fitted.


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

Preparations for servicing

The chain sprocket, saw chain and guide bar must be removed to mount the machine on the assembly stand for servicing.



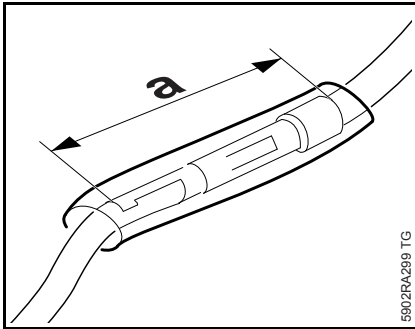
Engage the bar mounting studs in the lower holes in the mounting plate and secure the machine in position with the M 8 nuts (arrows).

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

Storing and disposing of fuels

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

Connectors in electrical wires



The insulating tube must be centered on the connector and completely cover it – there is otherwise a risk of a short circuit.

The connector is properly assembled when its overall length is a = no more than 30 mm.

Positioning wires

Always use punch down tool 5910 890 4000 to press electrical wires fully into their guides.

1.2 Safety Precautions

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

Fuel is extremely flammable and can be explosive in certain conditions.

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

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

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

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

Improper handling may result in burns or other serious injuries.

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

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

Remove the spiked bumper to reduce the risk of injury from contact with the sharp tips.


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

Fuel system – hose barb connectors

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

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

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

Install new fuel hoses either dry or with the aid of STIHL press fluid – coat the ends of hoses and the connectors,  15.

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

2. Specifications

2.1 Motor

MS 461, MS 461-R

Displacement:	76.5 cm ³
Bore:	52.0 mm
Stroke:	36.0 mm
Engine power to ISO 7293:	4.4 kW (6.0 HP) at 9,800 rpm
Max. speed (with cutting attachment): ¹⁾	13,500 rpm ¹⁾
Idle speed:	2,500 rpm
Clutch:	Centrifugal, without linings
Clutch engages at:	3,500 rpm
Crankcase leakage test at gauge pressure:	0.5 bar
under vacuum:	0.5 bar

2.2 Fuel System

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

2.3 Ignition System

Air gap between ignition module and fanwheel:	0.20 (+ 0.1/- 0.05) mm
Spark plug (resistor type):	BOSCH WSR 6 F NGK BPMR 7 A
Electrode gap:	0.5 mm

2.4 Chain Lubrication

Speed-controlled oil pump with reciprocating piston and manual flow control

Settings for oil delivery rate:

Standard / Up-rated	min.: 6.0 (+/- 2.0) cm ³ /min at 10,000 rpm
Standard	max.: 17.0 (+/- 3.0) cm ³ /min at 10,000 rpm
Up-rated	max.: 24.0 (+/- 3.0) cm ³ /min at 10,000 rpm

1) The engine reaches its maximum RPM and maximum power after the break-in period (5 to 10 tank fillings) – do not make any changes to the high speed screw (H) during the break-in period.

2.5 Tightening Torque

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**.

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

Insert the screw in the hole and rotate it counterclockwise until it drops down slightly and engages in the existing thread. 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.

Before reinstalling a micro-encapsulated screw, clean both threads (screw tap into female thread by hand and then blow out with compressed air, clean male thread with brush), coat clean screw with medium strength Loctite 242 or 243.

Power screwdriver setting for polymer: P and DG screws max. 500 rpm.

Do not use an impact wrench for releasing or tightening screws.

Do not mix up screws with and without binding heads.

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	M 4x8	Chain tensioner cover plate/crankcase	3.0	
Screw	M 4x12	Brake band/crankcase	3.0	4), 5)
Collar screw	M 8x21.5	Collar stud / crankcase, for bar	23.0	2)
Screw	M 4x12	Cover, chain brake/crankcase	3.0	4), 6)
Screw	M 4x12	Cover, oil pump/crankcase	3.0	4), 6)
	M 10x1	Decompression valve	14.0	
Collar nut	M 5	Filter cover / twist lock	1.0	
Collar nut	M 5	Flange / filter base / carburetor	3.5	
Screw	M 4x10	Flange / crankcase	2.5	5)
Screw	M 4x12	Generator / crankcase	3.0	4), 5), VW
Screw	P 6x21.5	Handlebar, top / tank housing	8.0	3)
Screw	P 6x32.5	Handlebar, top / tank housing	8.0	3), R
Screw	P 6x19	Handlebar, bottom / tank housing	8.0	3)
Screw	P 4x19	Handle Molding	1.6	
Screw	M 5x35x22	Hand guard, left	7.0	4), 6)
Screw	M 5x23	Shroud / crankcase	6.0	
Nut	M 5	Shroud / cylinder	3.5	
Locknut	M 5	Chain catcher / spiked bumper	6.0	R
Screw	M 5x20	Chain catcher / spiked bumper / crankcase, bottom	8.0	5)

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	M 5x20	Chain catcher / guard plate / crankcase, bottom	8.0	5), R
Locknut	M 5	Spiked bumper / chain sprocket cover / screw	6.0	
Screw	M 5x12	Spiked bumper / crankcase, top / locknut	8.0	4), 6)
Screw	M 5x12	Crankcase / guard plate / locknut	8.0	4), 6), R
Screw	M 5x25	Crankcase, sprocket side / fan side	10.0	4), 6)
Screw	M 5x20	Fan housing	7.0	4), 6)
Carrier	M 12x1 L	Carrier	50.0	
Screw	M 4x12	Oil pump / crankcase	3.5	4), 6)
Screw	M 4x16	Annular buffer / crankcase	4.5	1), 5)
Screw	P 6x19	Annular buffer / tank housing, rear	5.5	
Screw	P 6x32.5	Annular buffer / tank housing, rear / ignition side, top	5.5	
Screw	P 6x19	Annular buffer / tank housing, front	5.5	
Screw	M 5x20	Wrap-around handle with bracket	7.0	4), 6)
Screw	M 6x30	Muffler / crankcase	15	1), 4), 6)
Screw	M 5x16	Muffler / cylinder	11.5	1), 4)
Screw	M 5x6	Muffler, top	6.5	4), 5)
Screw	M 6x30	Muffler, ign. side / crankcase	15	1), R
Screw	B 2.9x9.5	Switch housing	1.0	
Screw	B 3.9x13	Guard / tank housing	2.8	
Screw	M 5x10	Guard plate / screw, muffler	7.5	4), 5), R
Nut	M 8x1	Flywheel / crankshaft	33.0	7)
Screw	M 4x8	Side plate / crankcase	3.0	
Screw	M 3x20	Clamp / manifold	0.5	
Nut	M 12x075	Tank housing / switch	2.0	VW
	M 14x1.25	Spark plug	25.0	
Screw	M 5x20	Ignition module / crankcase	7.0	4), 5)
Screw	M 6x30	Cylinder / crankcase	15.0	4), 6)

Remarks:

- 1) Loctite 242 or 243, medium strength
 - 2) Loctite 270, high strength
 - 3) Loctite 649, high strength
 - 4) Screws with binding head
 - 5) Micro-encapsulated screws
 - 6) Waxed screws
 - 7) Degrease crankshaft/flywheel and mount oil-free
- VW) Carburetor and handle heating system
R) Rescue saw

3. Troubleshooting

3.1 Clutch

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

3.2 Chain Drive, Chain Brake, Chain Tensioner

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

3.3 Chain Lubrication

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

Condition	Cause	Remedy
Chain receives no oil	Oil inlet hole in guide bar is blocked	Clean oil inlet hole
	Intake hose or pickup body clogged or intake hose ruptured	Fit new intake hose and pickup body
	Valve in oil tank blocked	Clean or replace valve
	Teeth on worm worn	Install new worm
	Oil pump damaged or worn	Install new oil pump
Machine losing chain oil	Oil pump damaged or worn	Install new oil pump
	Oil suction hose connection damaged	Install new oil suction hose
	Gasket between two halves of crankcase faulty or crankcase cracked	Install new gasket, inspect both halves of crankcase and replace if necessary
Oil pump delivers insufficient oil	Oil pump damaged or worn	Install new oil pump
	Oil pump delivery rate set too low	Adjust oil pump (only on machines with adjustable oil pump)
	Worm driver is loose	Install new worm
	Sealing ring between oil pump and crankcase damaged	Replace the sealing ring

3.4 Rewind Starter

Condition	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge, i.e. not vertically	Install new starter rope
	Normal wear	Install new starter rope
Starter rope does not rewind	Rewind spring very dirty or corroded	Clean or replace rewind spring
	Insufficient spring tension	Check rewind spring and increase tension
	Rewind spring broken	Install new rewind spring
Starter rope cannot be pulled out far enough	Spring overtensioned	Check rewind spring and reduce tension
Starter rope can be pulled out almost without resistance (crankshaft does not turn)	Guide pegs on pawls or pawls themselves are worn	Replace pawls
	Spring clip on pawl fatigued	Fit new spring clip
	Spring clip not installed properly	Install spring clip correctly
Starter rope is difficult to pull or rewinds very slowly	Starter mechanism is very dirty	Thoroughly clean complete starter mechanism
	At very low outside temperatures: Lubricating oil on rewind spring becomes viscous (spring windings stick together) or moisture has got onto the rewind spring (spring windings frozen together)	Coat rewind spring with a small amount of standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons), then pull rope carefully several times until normal action is restored

3.5 Ignition System

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

Condition	Cause	Remedy
Engine runs roughly, misfires, temporary loss of power	Spark plug boot is loose	Press boot firmly onto spark plug, fit new spring/spark plug boot if necessary
	Spark plug sooted, smeared with oil	Clean the spark plug or replace if necessary. If sooting keeps recurring, check air filter
	Ignition lead loose in ignition module	Install new ignition lead
	Fuel/oil mixture – too much oil	Use correct mixture of fuel and oil
	Incorrect air gap between ignition module and flywheel	Set air gap correctly
	Flywheel cracked or damaged or pole shoes have turned blue	Install new flywheel
	Ignition timing wrong, flywheel out of adjustment – key has sheared off or slot in flywheel is worn	Install new flywheel or key
	Weak magnetization in flywheel	Install new flywheel
	Irregular spark	Check operation of switch shaft/contact spring and ignition module Faulty insulation or break in ignition lead or short circuit wire. Check ignition lead/ignition module and replace as necessary. Check operation of spark plug. Clean the spark plug or replace if necessary.

The carburetor or engine may also be the cause of poor engine running behavior

3.6 Carburetor

Condition	Cause	Remedy
Carburetor floods; engine stalls	Inlet needle not sealing – foreign matter in valve seat or cone	Remove and clean the inlet needle, clean the carburetor
	Inlet needle worn	Fit new inlet needle
	Inlet control lever sticking on spindle	Check the inlet control lever and replace if necessary
	Helical spring not located on nipple of inlet control lever	Remove the inlet control lever and refit it correctly
	Perforated disc on diaphragm is deformed and presses constantly against the inlet control lever	Fit new metering diaphragm
	Metered diaphragm deformed	Fit new metering diaphragm
Poor acceleration	Setting of low speed screw too lean	Check basic carburetor setting, correct if necessary
	Setting of high speed screw too lean	Check basic carburetor setting, correct if necessary
	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Metering diaphragm or gasket damaged	Fit a new metering diaphragm and gasket
	Tank vent faulty	Fit new tank vent
	Leak in fuel hose between pickup body and carburetor	Seal connections or install new fuel hose

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

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

3.7 Engine

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

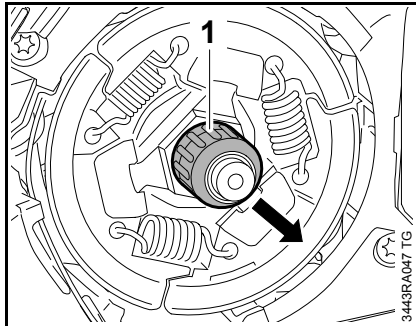
- Air filter
- Fuel system
- Carburetor
- Ignition system

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

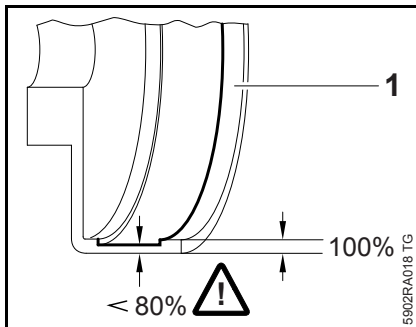
4. Clutch

4.1 Clutch Drum

- Remove and install the clutch drum, see instruction manual.



- Pull off the needle cage (1).
- Clean the needle cage and crankshaft stub, 15
- Lubricate needle cage and crankshaft stub with STIHL grease, 15



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

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

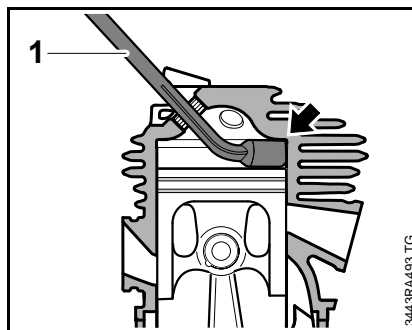
- Install the clutch drum.

4.2 Clutch

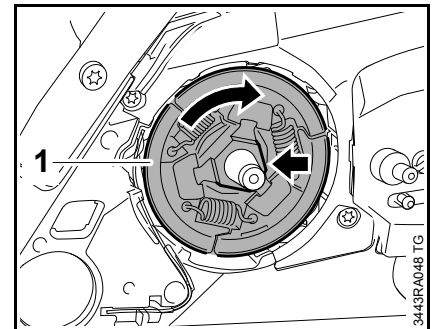
- Troubleshooting, 3
- Remove the filter cover
- Remove air baffle.
- Pull off the boot and unscrew the spark plug.



- Push the locking strip (1) 0000 893 5903 into the spark plug hole, wide end first, so that "OBEN-TOP" faces up.



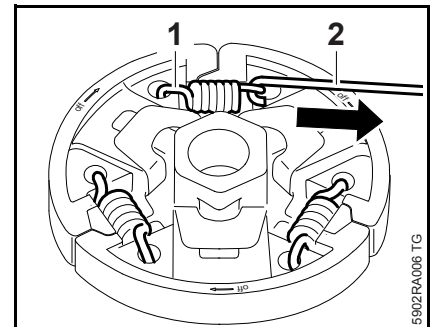
- The locking strip (1) 0000 893 5903 must butt against the cylinder wall (arrow) – as shown in the illustration.
- Remove the rim sprocket and clutch drum.



- Apply wrench to hexagon (arrow) and unscrew the clutch (1).

Note that the clutch has a left-hand thread.

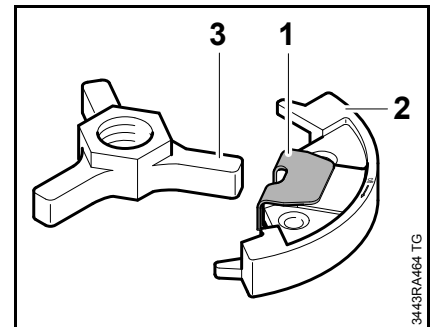
Disassembling



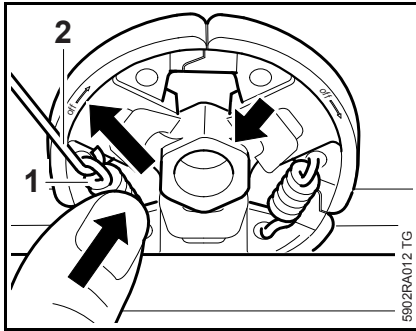
- Use hook (2) 5910 890 2800 to remove the clutch springs (1).

If clutch is seriously worn, install new set of 3 clutch shoes.

Assembling

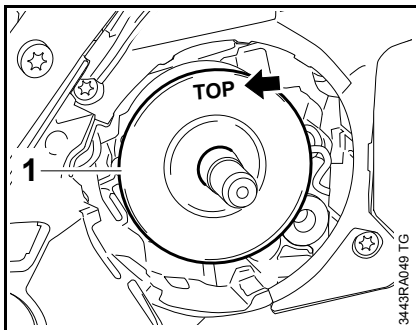


- Fit the retainers (1) and push the clutch shoes (2) over the arms (3) of the carrier.

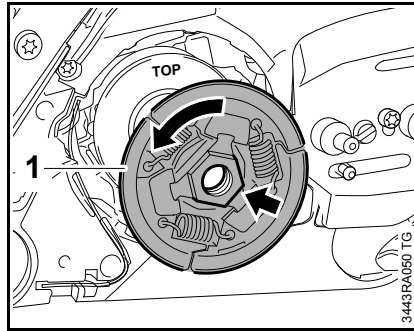


Attach the springs at the side with the raised hexagon (arrow).

- Clamp the clutch in a vise – one clutch shoe horizontal as shown.
- Attach one end of each spring (1) to the clutch shoes.
- Use the hook (2) 5910 890 2800 to attach the other ends of the springs and press them firmly into the clutch shoes.
- Check the clutch – all springs must be properly attached.



The washer (1) must be in place and the word "TOP" (arrow) must face outwards.



- Position the clutch (1) on the crankshaft stub so that the raised hexagon (arrow) faces outwards.
- Fit the clutch (1) and tighten it down firmly – left-hand thread.
- Remove the locking strip from the cylinder.
- Install the rim sprocket and clutch drum.
- Fit the spark plug and tighten it down firmly.
- Fit the boot on the spark plug.
- Fit the air baffle.
- Fit the filter cover.

5. Chain Brake


5.1 Checking Operation

The chain brake is one of the most important safety devices on the chain saw. Its efficiency is measured in terms of the chain braking time, i.e. the time that elapses between activating the brake and the saw chain coming to a complete standstill.


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

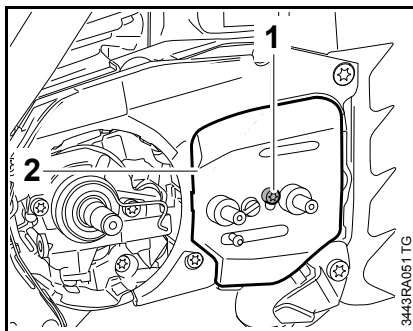
- Start the engine.
- With the chain brake activated (locked), open the throttle wide for a brief period (max. 3 seconds) – the chain must not rotate.
- With the chain brake released, open the throttle wide and activate the brake manually – the chain must come to an abrupt stop.

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

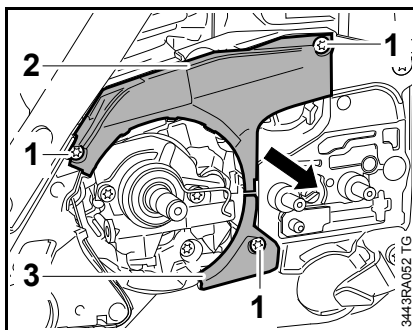
If the chain brake does not operate properly, refer to troubleshooting,  3.2.

5.2 Brake Band

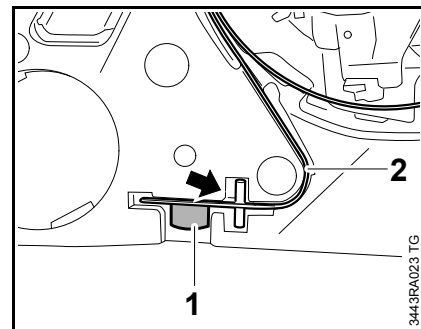
- Troubleshooting,  3.2
- Remove the clutch drum,



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



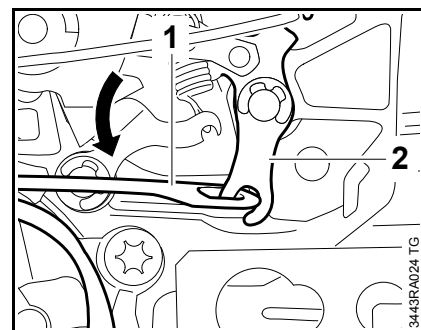
- Take out the screws (1).
- Remove covers (2) and (3).



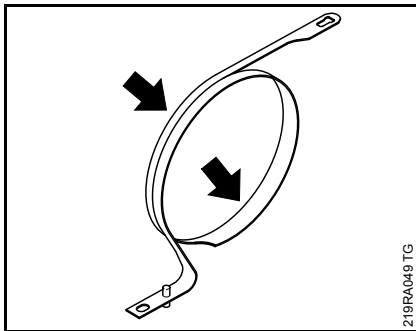
- Engage the chain brake
– Brake band no longer tensioned in its seat.
- Take out the screw (1).
- Ease the brake band (2) out of its seat (arrow) and lift it away.

Do not overstretch the brake band.

- Disengage the chain brake.
– the brake band can be disconnected when the brake lever is in this position.



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



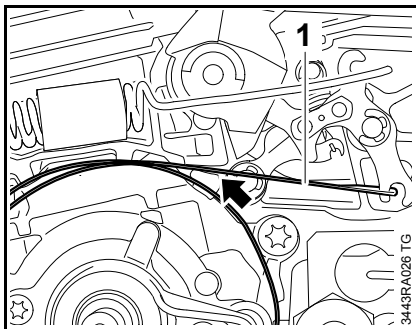
Install a new brake band if there are noticeable signs of wear (large areas on inside diameter and/or parts of outside diameter – arrows) and its remaining thickness is less than 0.6 mm.

Installing



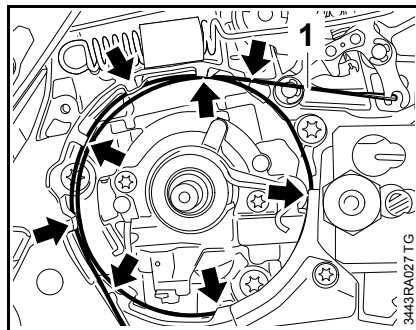
– Disengage the chain brake.

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

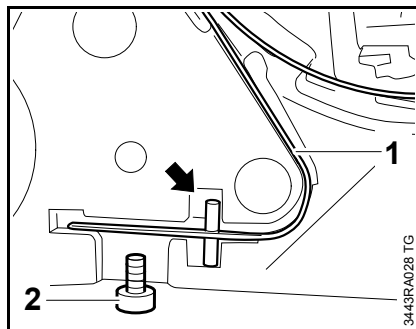


- Position the brake band (1) in the guide (arrow).

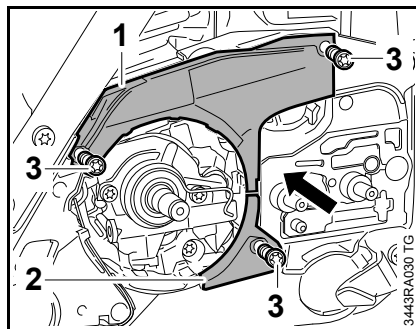
– Engage the chain brake



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



- Push the brake band (1) into its seat (arrow) as far as stop.
- Insert and tighten down the screw (2) firmly.



- Place the covers (1) and (2) in position.
- Insert and tighten down the screws (3) firmly.

– Install the clutch drum, 4.1

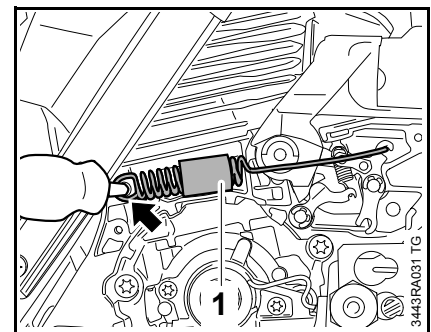
– Check operation, 5.1

– Reassemble all other parts in the reverse sequence.

5.3 Brake Lever

– Troubleshooting, 3.2

– Remove the brake band, 5.2

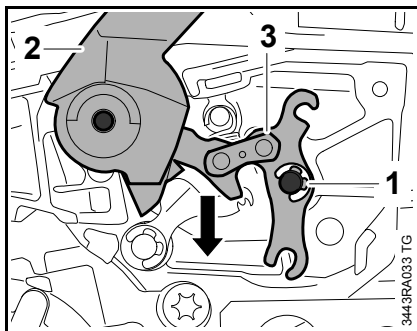


– Engage the chain brake
– this relieves spring tension.

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

– Remove the brake spring from the brake lever.

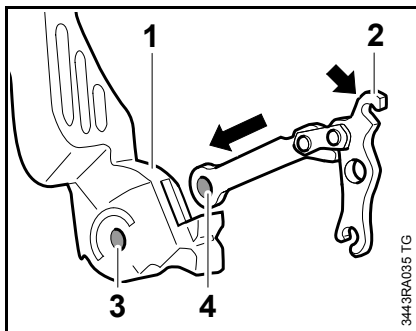
– Remove the rewind starter, 8.2



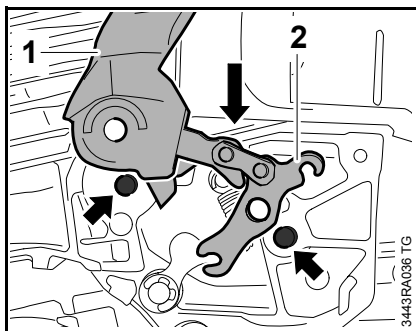
- Remove the E-clip (1).
- Pull the hand guard (2) and brake lever (3) off the pivot pins together.
- Remove the hand guard and brake lever.
- Pull the brake lever out of the hand guard.
- Check the pivot pin, replace if necessary, 5.5
- Inspect the cam lever and replace if necessary, 5.4

Installing

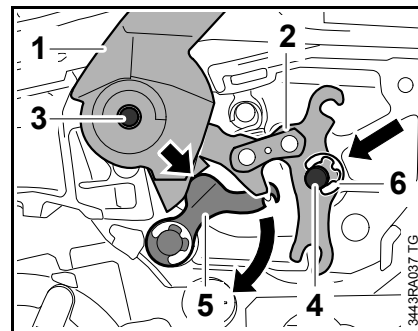
- Clean the pivot pins and disassembled parts, 15
- Lubricate the pivot pins with STIHL grease, 15



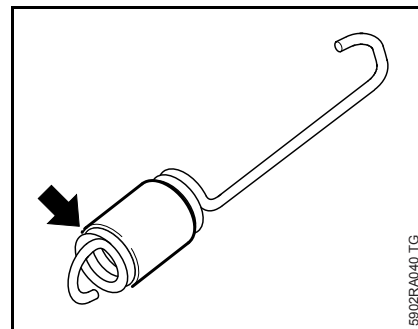
- Hold the brake lever so that the hook (2) for the brake spring is at the top.
- Push the brake lever into the hand guard (1) recess and line up the holes (3) and (4).



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

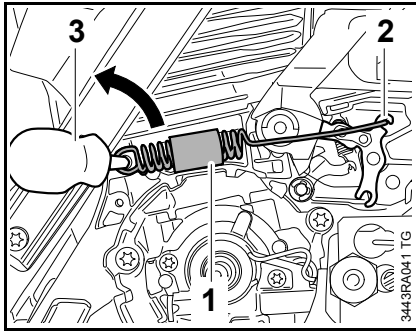


- Lift the bearing boss of the hand guard (1) and the brake lever (2) a little and position them over the pivot pins (3 and 4).
- Lubricate the brake lever, cam lever and hand guard slot with STIHL grease, 15
- Turn the cam lever (5) to one side until the cam of the hand guard (arrow) slips passed it.
- Push the hand guard bearing boss and the brake lever on to the pivot pins.
- Fit the E-clip (6).



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

- Position the protective tube so that it leaves the first turn (arrow) free.

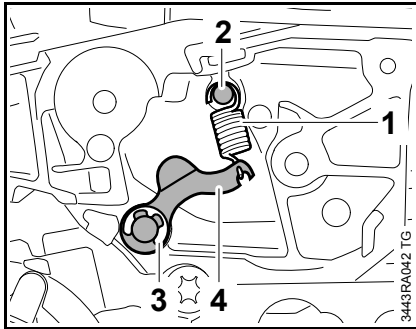


- Hook the brake spring (1) to the brake lever (2).
- Use the assembly tool (3) 1117 890 0900 to attach the brake spring (1) to the anchor pin.
- Reassemble all other parts in the reverse sequence.

5.4 Cam Lever

The cam lever defines the locked position of the hand guard.

- Remove the brake lever, 5.3

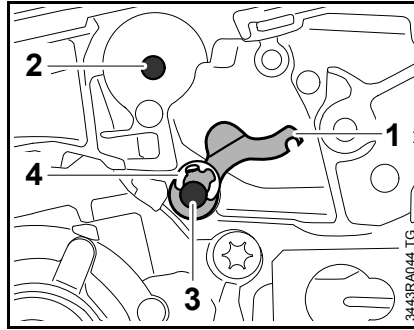


- Disconnect the spring (1) from the anchor pin (2) and cam lever (4).
- Remove the E-clip (3) and pull off the cam lever (4).
- Check the cam lever, spring and cam running face on the hand guard, and replace as necessary.

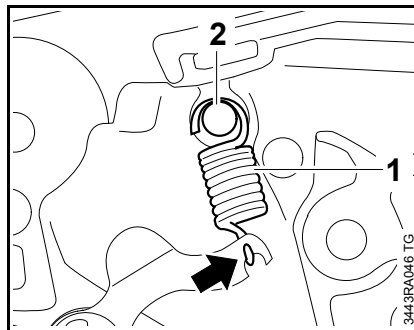
- Inspect all pivot pins and replace if necessary, 5.5

Installing

- Lubricate the pivot pins with STIHL grease, 15



- Position the cam lever (1) so that its cam faces the pin (2).
- Push the cam lever (1) on to the pivot pin (3).
- Fit the E-clip (4).



- Attach the spring (1) to the cam lever so that the open side of the spring hook (arrow) faces outwards.
- Attach the spring (1) to the anchor pin (2).

The cam lever is not yet under tension – the spring may become detached.

- Lubricate the pivot pins with STIHL grease, 15
- Reassemble all other parts in the reverse sequence.

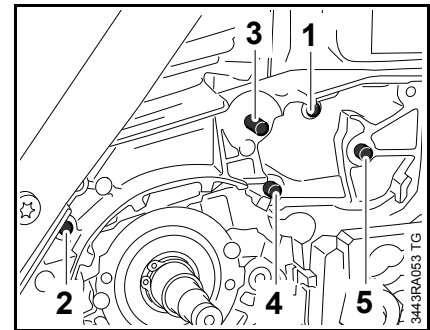
5.5 Pins

The anchor and pivot pins secure the springs. Worn pins must be replaced.

- The springs may otherwise become detached and pop out.

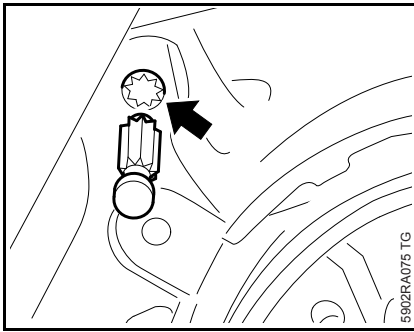
The pins must be driven home squarely.

- Remove the brake lever, 5.3
- Remove the cam lever, 5.4



- Remove the pins (1) to (5).

Installing

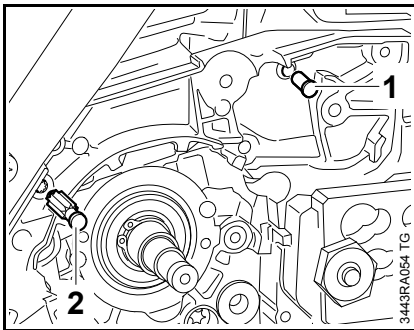


– Before installing the new pin, coat its knurled shank with threadlocking adhesive, 15

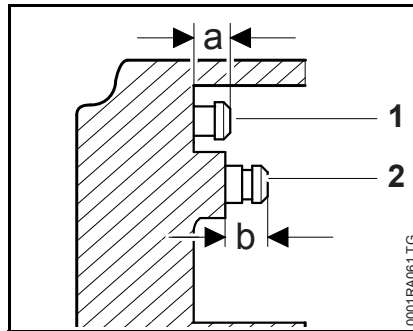
- Position the new pin in the bore (arrow) so that the knurling on the pin meshes with the existing knurling in the bore.

Turn pin back and forth as necessary.

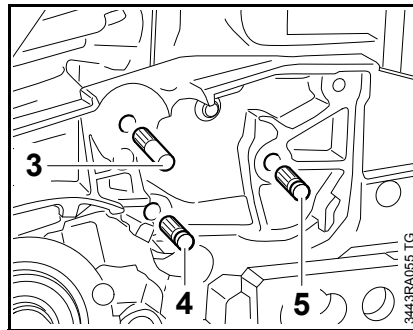
The pins must be driven home squarely.



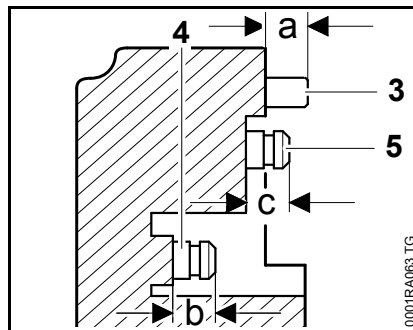
- Drive home the pins (1 and 2) as specified below.



- Pin (1) a = about 2.9 - 3.3 mm
Pin (2) b = about 4.3 - 4.7 mm



- Drive home the pins (3, 4 and 5) as specified below.



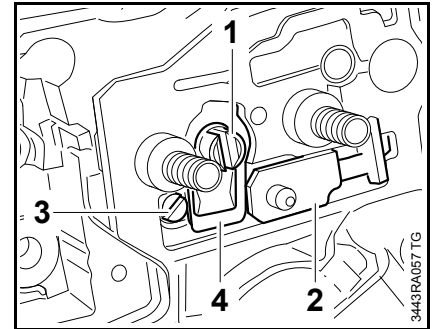
- Pin (3) a = about 10.3 - 10.5 mm
Pin (4) b = about 4.6 - 4.8 mm
Pin (5) c = about 5.1 - 5.3 mm

– Lubricate the brake lever and cam lever with STIHL grease, 15

– Reassemble all other parts in the reverse sequence.

5.6 Chain Tensioner

- Troubleshooting, 3.2
- Remove the side plate, 5.2



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

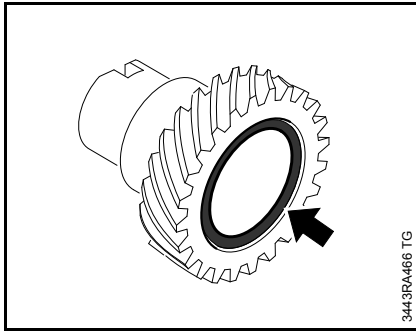
- Take out the screw (3).

- Pull out the cover plate (4) with spur gear and retainer.

- Take out the tensioner slide (2) with adjusting screw.

– Remove the O-ring.

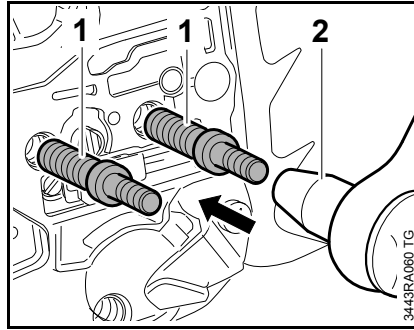
– Check individual parts of chain tensioner, replace if necessary



- Fit the O-ring in the spur gear recess (arrow).
- Clean all disassembled parts, 15
- Lubricate the threads, gears and O-ring with STIHL grease, 15
- Reassemble in the reverse sequence.

5.7 Bar Mounting Studs

- Remove the side plate, 5.2
- Use stud puller 5910 893 0501 to unscrew collar studs from crankcase.




- Before installing, coat the threads (1) of the collar studs with Loctite, 15
- Use stud puller (2) 5910 890 0501 to fit and tighten down the collar studs (1).
- Reassemble all other parts in the reverse sequence.

6. Engine

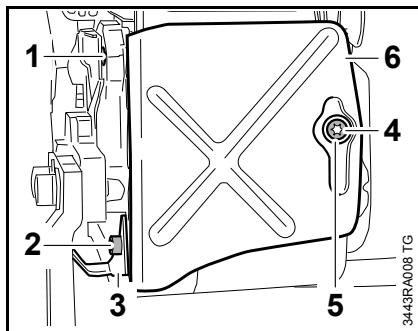
6.1 Muffler

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

– Troubleshooting,  3

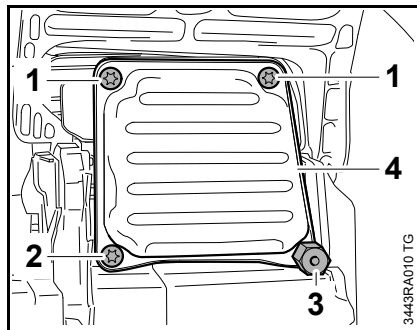
To ensure that no dirt particles enter the cylinder, set the piston to top dead center before removing the muffler – top dead center is reached when the magnet poles on the flywheel face upwards.

Rescue saw only



- Take out the screw (1) – hold the hex nut steady.
- Take out the screw (2) and remove together with the chain catcher (3).
- Take out the screw (4) with washer (5) and remove the guard plate (6).

All versions

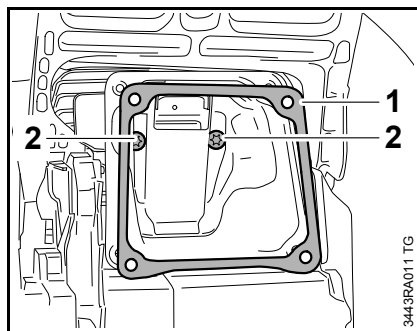


- Take out the screws (1) and (2) and special screw (3).

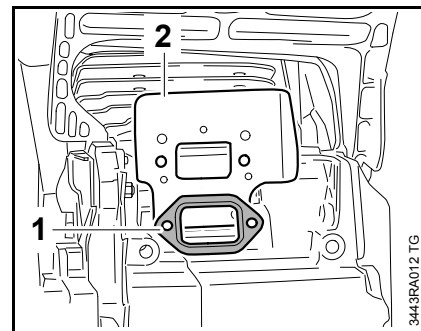
Special screw (3) is fitted only on the rescue saw. Screw (2) is used at the bottom left and right on all other models.

- Remove the top casing (4), check it and replace if necessary.

All versions

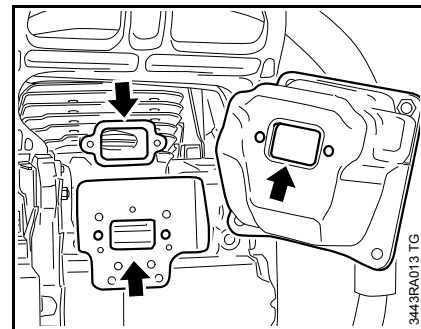


- Remove the gasket (1) and take out the screws (2)
 - always install a new gasket.
- Remove and inspect the muffler and replace it if necessary.



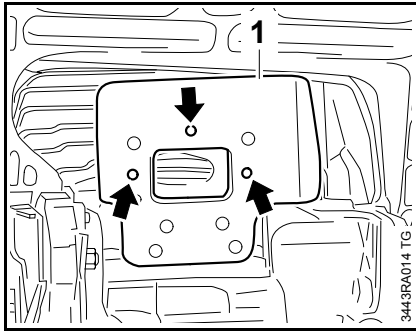
- Remove the muffler gasket (1) and heat shield (2).
- Remove and install the spark arresting screen – see instruction manual.

Installing

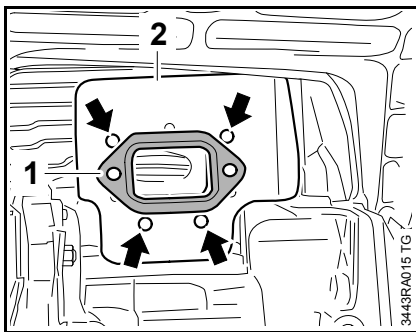


- Position the machine upright.
- Cover the exhaust port. Remove any dirt from around the cylinder and exhaust port.
- Check and clean the sealing faces (arrows) on exhaust port, heat shield and muffler, remove any gasket residue – make sure there is no gasket residue or dirt particles in the exhaust port.

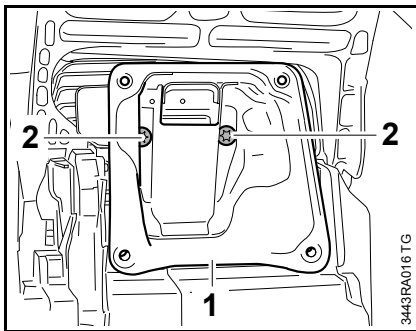
Always replace components with damaged sealing faces.



- Line up heat shield (1) with pegs (arrows) on cylinder exhaust port and place it in position.

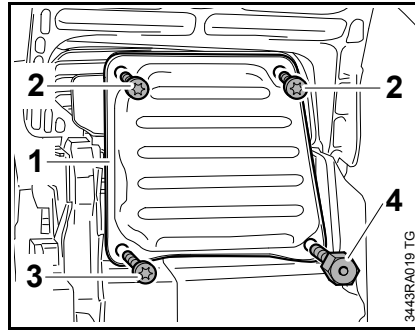


- Line up the muffler gasket (1) on the pegs (arrows) of the heat shield (2) and place it in position.



- Carefully place the muffler (1) in position.
- Coat screws (2) with threadlocking adhesive, 15
- Check the position of the heat shield and gasket and fit the screws (2).

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



- Fit a new gasket.

Special screw (4) is fitted only on the rescue saw. Screw (3) is used at the bottom left and right on all other models and coated with threadlocking adhesive.

- Coat screws (2 and 3) and special screw (4) with threadlocking adhesive, 15
- Fit top casing (1), insert the screws (2 and 3), screw (4) and tighten them down firmly.
- On rescue saw, fit the guard plate.

6.2 Leakage Test

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

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

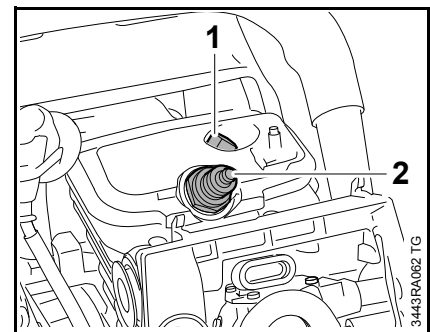
Moreover, the transition from idle speed to part or full throttle is not smooth.

Oil seals tend to fail when subjected to a vacuum. Therefore, always perform the vacuum test first and then the pressure test.

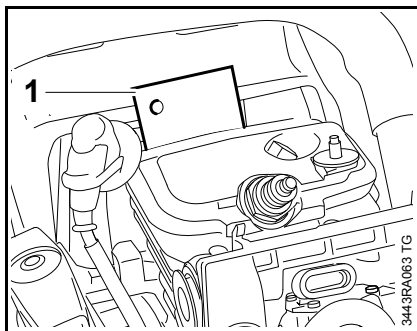
The engine can be checked thoroughly for leaks with the pump 0000 850 1300.

6.2.1 Preparations

- Remove the filter cover and air baffle.
- Remove the shroud, 6.4



- Pull off the boot and unscrew the spark plug.
- Set the piston to top dead center. This can be checked through the spark plug hole.
- Remove the decompression valve, 6.9
- Fit the plug (1) 1122 025 2200 and tighten it down firmly.
- Fit the spark plug (2) and tighten it down firmly.
- Remove the top casing and loosen the muffler screws, 6.1

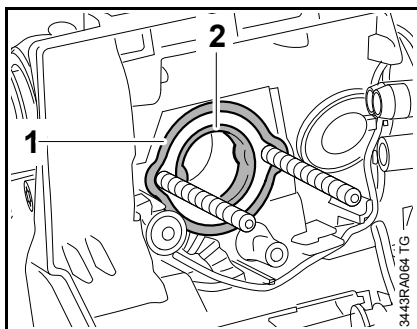


- Fit the sealing plate (1) 0000 855 8106 on the exhaust port – between the heat shield and cylinder.

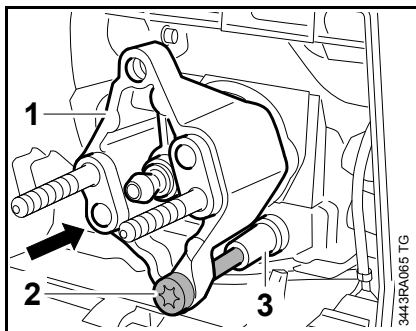
– Tighten the screws moderately.

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

– Remove the carburetor, 12.4



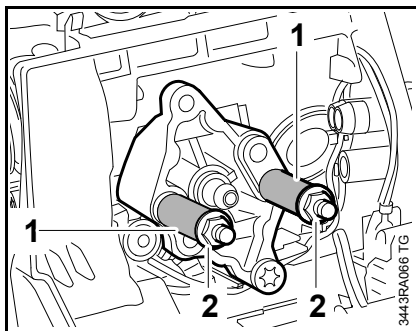
- Washer (1) and sleeve (2) must be in place.



- Line up the flange (1) 5910 850 4200 and fit it over the studs
– Screw (2) for impulse hose must be fitted at the bottom.

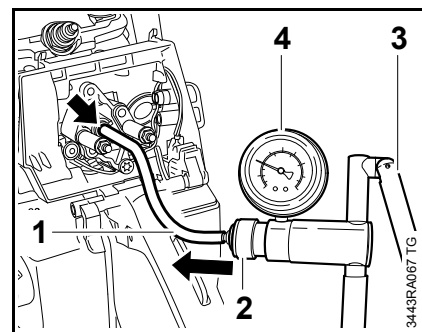
– Coat screw or inside of impulse hose with STIHL press fluid, 15

- Push the flange (1) 5910 850 4200 into position so that the screw (2) engages the impulse hose (3).



- Fit the sleeves (1) 5910 893 1701.
- Fit the nuts (2) and tighten them down firmly.

6.2.2 Vacuum Test




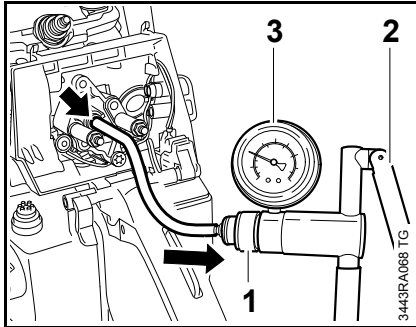
- Connect hose (1) of pump 0000 850 1300 to the nipple (arrow).
- Push ring (2) to the left – vacuum test.
- Operate the lever (3) until the pressure gauge (4) indicates a vacuum of 0.5 bar.

If the vacuum reading remains constant, or rises to no more than 0.3 bar within 20 seconds, it can be assumed that the oil seals are in good condition. However, if the pressure continues to rise (reduced vacuum in the engine), the oil seals must be replaced, 6.3.

- After finishing the test, push the ring to the right to vent the pump.
- Continue with pressure test, 6.2.3

6.2.3 Pressure Test



Carry out the same preparations as for the vacuum test,  6.2.2



- Connect hose of pump 0000 850 1300 to the nipple (arrow).
- Push ring (1) to the right – pressure test.
- Operate the lever (2) until the pressure gauge (3) indicates a pressure of 0.5 bar. If this pressure remains constant for at least 20 seconds, the crankcase is airtight.
- If the pressure drops, the leak must be located and the faulty part replaced.

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




- After finishing the test, push the ring to the left to vent the pump – disconnect the hose.
- Remove the flange 5910 850 4200.
- Loosen the muffler screws and remove the sealing plate 0000 855 8106.

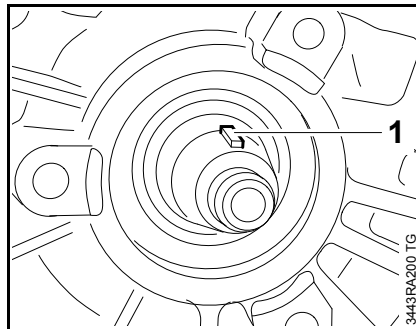
- Tighten down muffler screws firmly and fit the top casing,  6.1
- Install the carburetor,  12.4
- Reassemble all other parts in the reverse sequence.

6.3 Oil Seals

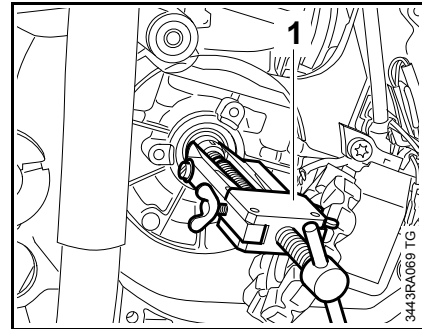
It is not necessary to disassemble the engine to replace the oil seals.

Ignition Side

- Remove the rewind starter,  8.2
- Remove the flywheel,  7.5
- On machines with heating, remove the generator and put it to one side,  13.7





- Remove the key (1) from the crankshaft stub.

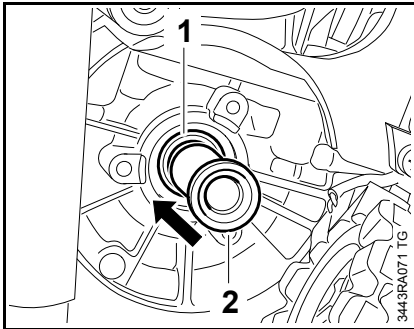


Take care not to damage the crankshaft stub.

- Free off the oil seal in its seat by tapping it with a suitable tube or a punch.
- Apply puller (1) 5910 890 4400 with No. 3.1 jaws 0000 893 3706.
- Clamp the puller arms.
- Pull out the oil seal.


Installing

- Clean the sealing face,  15
- Lubricate sealing lips of new oil seal with STIHL grease,  15





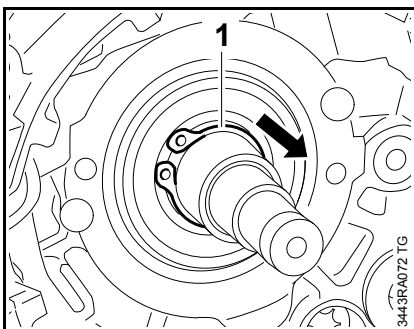
- Fit the new oil seal (1) with the sealing lip facing the crankcase.
- Use press sleeve (2) 1115 893 4600 to install the oil seal (1).

The seating face must be flat and free from burrs.

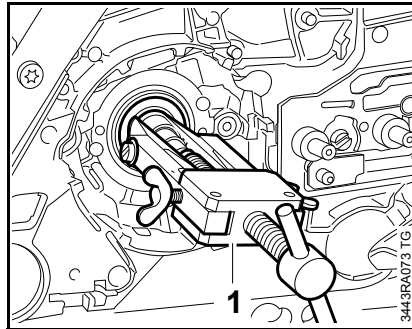
- Fit key in crankshaft stub.
- Degrease the crankshaft taper,  15
- Reassemble all other parts in the reverse sequence.

Clutch Side

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




- Remove the circlip (1).

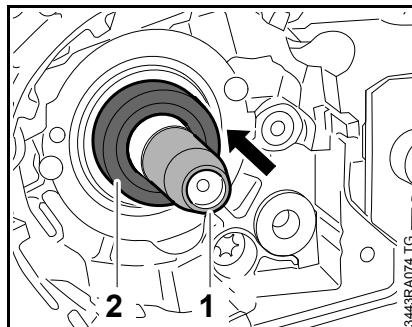


Take care not to damage the crankshaft stub.

- Free off the oil seal in its seat by tapping it with a suitable tube or a punch.
- Apply puller (1) 5910 890 4400 with No. 3.1 jaws 0000 893 3706.
- Clamp the puller arms.
- Pull out the oil seal.

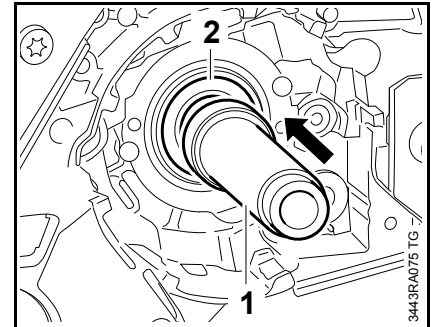
Installing

- Clean the sealing face.
- Lubricate sealing lips of new oil seal with STIHL grease,  15



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

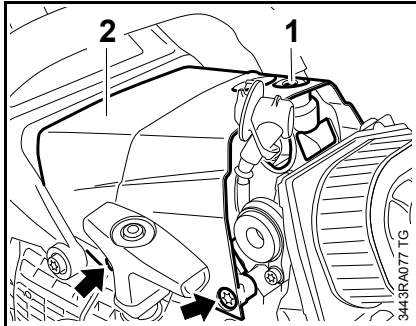
- Slip the oil seal (2), sealing lip facing the crankcase, over the installing sleeve (1).
- Remove the installing sleeve (1).



- Use press sleeve (1) 1118 893 2401 to install the oil seal (2).
- Install the circlip.
- Reassemble all other parts in the reverse sequence.

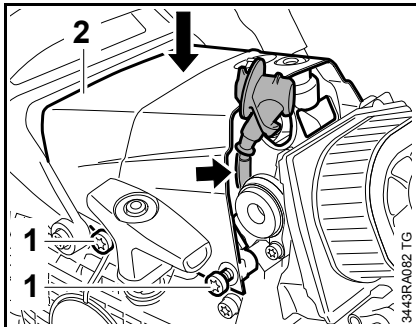
6.4 Shroud

- Remove the spark plug.

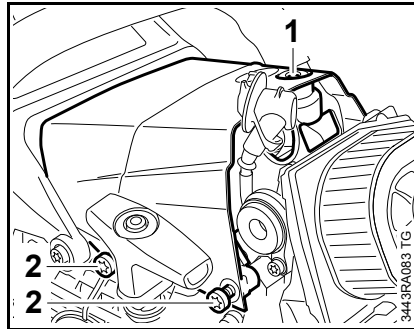


- Loosen the screws (arrows) – captive screws.
- Unscrew the slotted nut (1) and remove the shroud (2).

Installing



- Pull out the screws (1).
- Position the shroud (2) so that the ignition lead with its insulating tube locates in the guide (arrow).



- Fit the slotted nut (1) and tighten it down firmly.
- Fit the screws (2) and tighten them down firmly.
- Reassemble all other parts in the reverse sequence.

6.5 Cylinder

Before removing the cylinder, decide whether or not the crankshaft has to be removed as well.

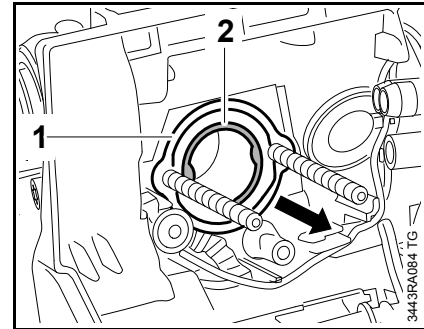
Cylinder installed

To remove the flywheel and clutch, the crankshaft has to be blocked by inserting the locking strip in the spark plug hole.

Cylinder removed

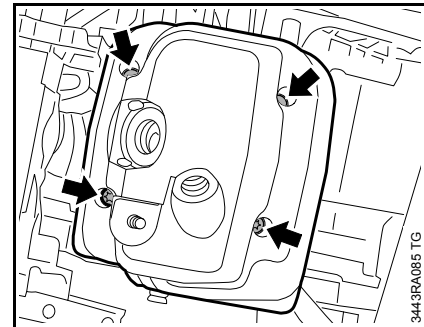
To remove the flywheel and clutch, the crankshaft has to be blocked by resting the piston on the piston support (special tool).

- Remove the shroud, 6.4
- Remove the rewind starter, 8.2
- Remove the filter base, 12.3
- Remove the carburetor, 12.4
- Remove the muffler, 6.1
- Remove the decompression valve, 6.9

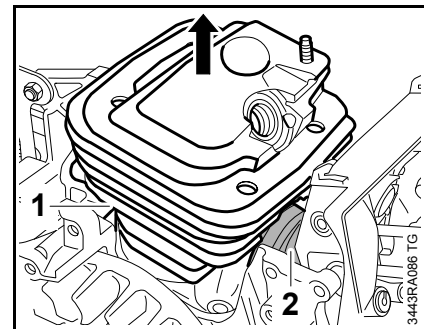


- Remove the washer (1) and sleeve (2).

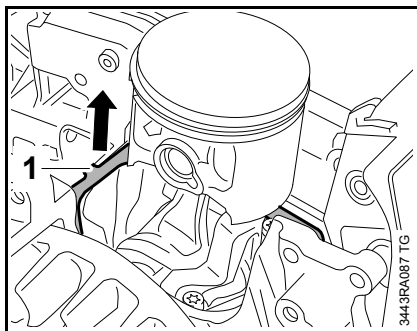
Push out the manifold flange in the direction of the cylinder.



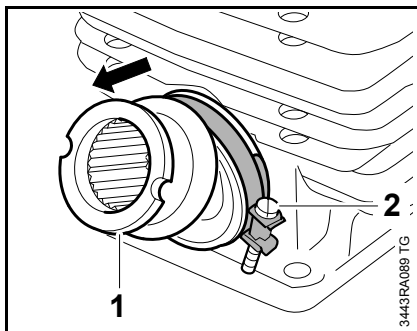
- Take out the cylinder base screws through the holes (arrows).



- Carefully lift the cylinder (1) away, pushing the manifold flange (2) out of the tank housing at the same time.



- Remove the cylinder gasket (1).

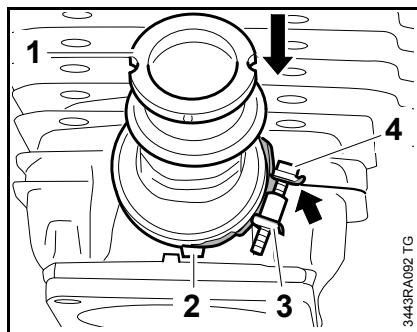


- Inspect the manifold (1) and replace it if necessary – even very minor damage can result in engine running problems, 3.7
- Loosen the screw (2) and remove the manifold (1).
- Clean the sealing faces, 15

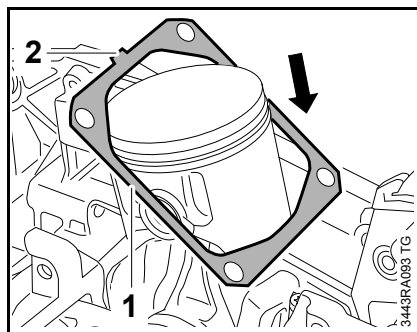
The sealing faces must be in perfect condition. Always replace components with damaged sealing faces.

Always use a new cylinder gasket when re-installing the cylinder.

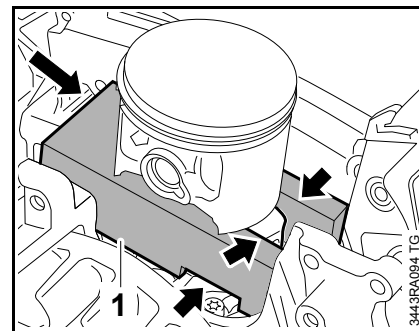
Installing



- Coat the inside of the manifold with STIHL press fluid, 15
- Push the manifold (1) onto the intake stub so that the tab (2) locates against the right-hand side of the lug.
- Fit the hose clamp (3) – the screw head (4) must be in line with the cylinder fin (arrow).
- Tighten down the screw (4) as far as stop.

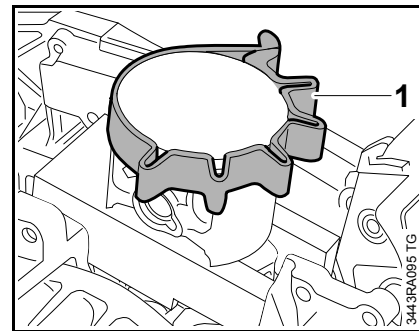


- Fit a new cylinder gasket (1) over the piston and into position, the tab (2) must point towards the spiked bumper.



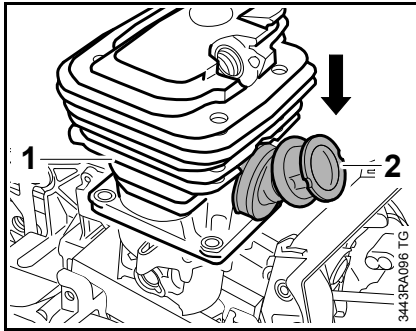
- Hold the piston support (1) 5910 893 5300 so that the recesses (arrows) engage the flange and then push it between the piston and crankcase.

Take care not to damage the cylinder gasket.



- Lubricate the piston, piston rings and cylinder wall with oil, 15
- Check correct installed position of rings, 6.8
- Use the clamping strap (1) 0000 893 2600 to compress the rings around the piston.

Apply the clamping strap (1) so that the piston rings do not project beyond the cylinder wall.

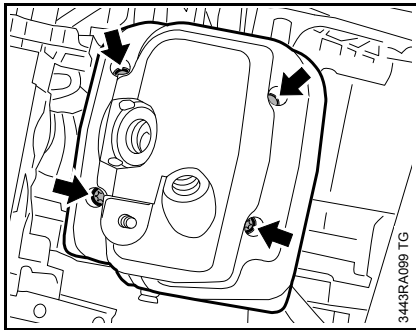


- Position the cylinder (1) so that the manifold (2) points towards the tank housing.

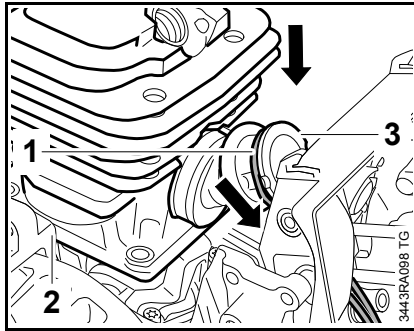
While sliding the cylinder over the piston, hold the clamping strap tightly around the piston so that the rings do not project – it might otherwise break.

- Slide the cylinder over the piston, the clamping strap moves downwards at the same time.

– Remove the clamping strap and piston support.



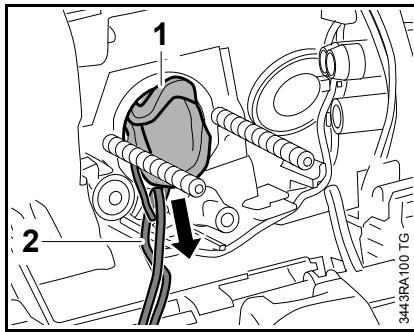
- Insert the screws (arrows) to hold the cylinder and gasket in position.
- Tighten down the screws through the holes (arrows) in the cylinder in a crosswise pattern.




- Wind a piece of string (1) around the manifold flange and pass the ends of the string through the opening in the tank housing.

Make sure the cylinder gasket is properly seated.

- Push the cylinder (2) into place and locate the manifold flange (3) against the tank housing.

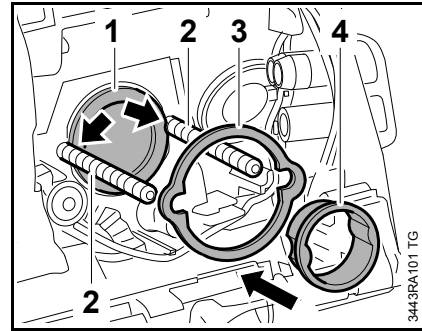


– Coat the outside of the manifold flange with STIHL press fluid,  15

– Push tank housing towards cylinder and hold it in that position.

- Grip the ends of the string (2) and pull the manifold flange (1) through the opening.

– Remove the string.

















- Position the manifold flange (1) – its flats (arrows) must locate against the studs (2).

- Fit the washer (3) and push the sleeve (4) into the manifold flange (1).

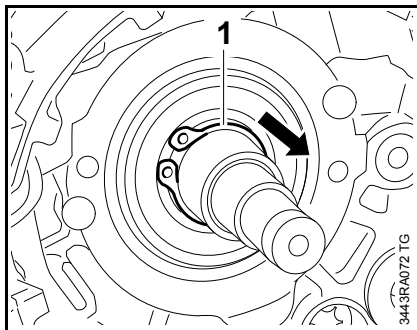
– Reassemble all other parts in the reverse sequence.

6.6 Crankshaft

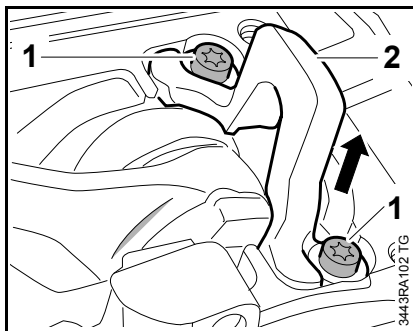
- Drain the fuel and oil tanks,  1.1
- Remove the brake band,  5.2
- Remove the oil pump,  11.3
- Remove the brake lever,  5.3
- Remove the handlebar,  9.2
Version with heating,  9.2.2
- Remove the flywheel,  7.5
- Machines with handle heating
Remove the generator,  13.7
- Remove the wiring harness,  7.6.3
- Remove the cylinder,  6.5
- Remove the piston,  6.7
- Remove the tank housing,  12.9.3

Always install new bearings and oil seals after removing the crankshaft,  6.6.1 and  6.3.

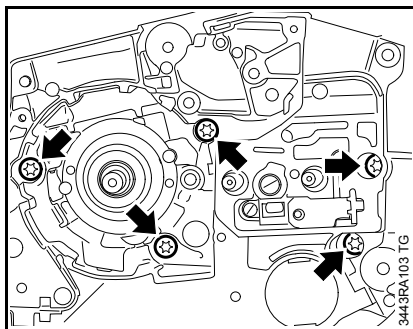
Clutch side of crankcase



- Remove the circlip (1).

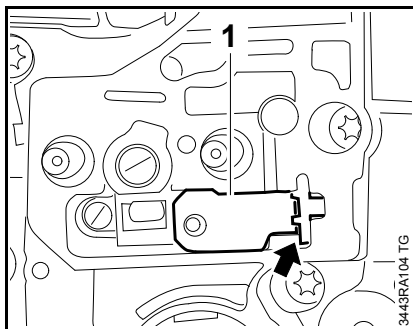


- Take out the screws (1) and remove the flange (2).

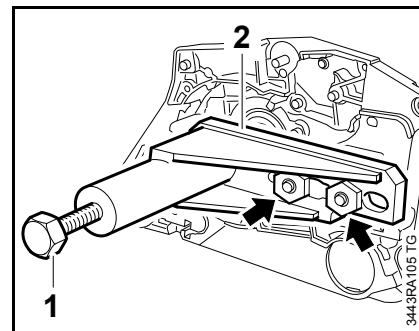




Use the tools in the service tool set 5910 007 2205 for removing and installing.

- Take out the screws (arrows).

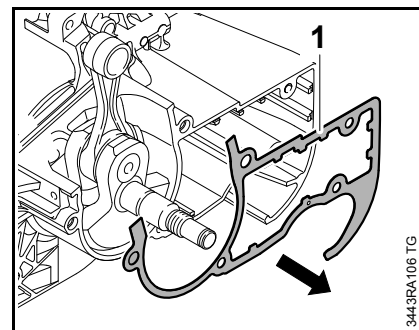


- The tensioner slide (1) must butt against the thrust pad (arrow).

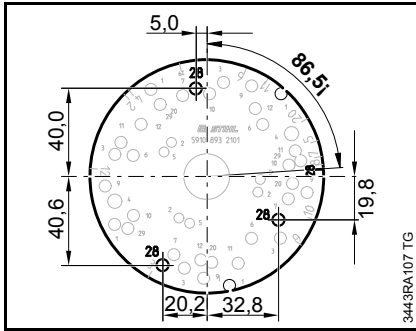


- Back off the spindle (1) in the puller until it is clear of the crankshaft stub.
- Slip the service tool (2), from set 5910 007 2205, over the collar studs (arrows), fit the nuts and tighten them down firmly.
- Turn the spindle (1) clockwise until the crankshaft stub is pushed out of the ball bearing.
- Install new ball bearings and oil seals,  6.6.1 and  6.3

Ignition side of crankcase



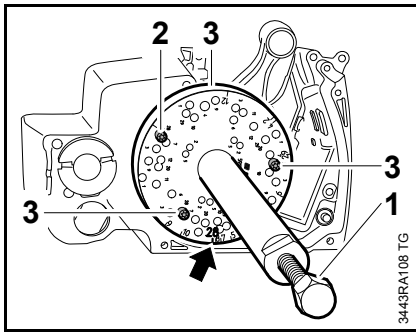
- Remove the gasket (1).



Drilled plate 5910 893 2101 without holes marked "28" can be updated with 5.5 mm holes as shown in the illustrated.

Dimensions are in millimeters.

The illustration shows the drilled plate from above.



Use the tools in the service tool set 5910 007 2201 for removing and installing – use drilled plate 5910 893 2101.

- Unscrew the spindle (1) until the drilled plate (2) butts against the crankcase
 - left-hand thread.

- Position service tool (1) with plate (2) 5910 893 2101 against the ignition side of the crankcase so that the number "28" (arrow) is at the bottom.
- Insert three M5x72 screws (3) in the holes marked "28" and tighten them down until they butt against the crankcase.
- Turn the spindle (1) counterclockwise until the crankshaft is pushed out of the ignition side of the crankcase.

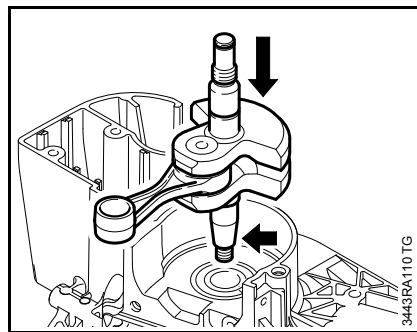
The crankshaft, connecting rod and needle bearing form an inseparable unit. Always replace as a complete unit.

- Check the two halves of the crankcase and ball bearings and replace if necessary, 6.6.1
- Before installing, clean the crankshaft, 15

Installing

Ignition side of crankcase

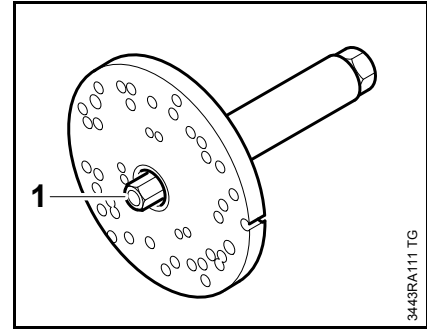
Take care not to damage the crankshaft stub.



- Heat the inner bearing race to about 160°C (320°F).

- Position the tapered stub of the crankshaft (arrow) above the ball bearing at the ignition side and push it home.

This operation must be carried out very quickly because heat is absorbed by the crankshaft, and the inner bearing race shrinks.

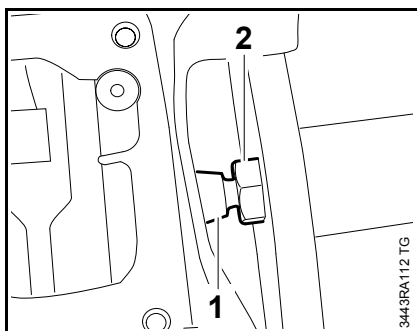


If it is not possible to heat the inner bearing race, use service tool 5910 007 2101 to install the crankshaft – use plate 5910 893 2101.

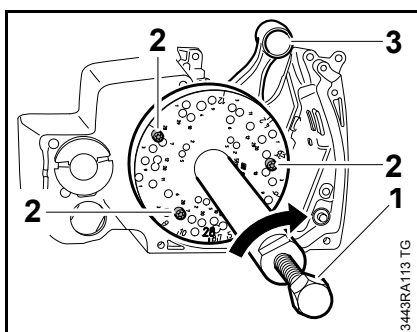
- Screw the threaded sleeve (1) 5910 893 2420 onto the spindle as far as stop.

Coat tapered stub of crankshaft with oil.

- Position the tapered stub of the crankshaft above the ball bearing at the ignition side and push it home.



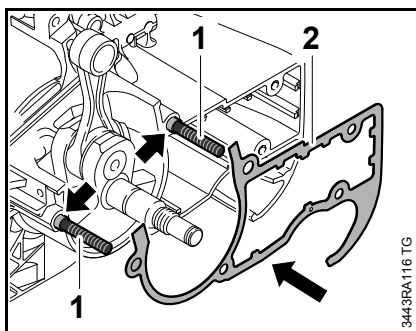
- Position the screw sleeve (2) on the crankshaft thread (1) and screw it into place.



- Turn the spindle (1) to position the drilled plate 5910 893 2101 against the ignition side of the crankcase and line it up so that the number "28" is at the bottom.
- Fit the M5x72 screws (2) through the holes marked "28" and tighten them down.
- Turn the spindle (1) clockwise.
- Install the ignition side of the crankcase as far as stop.

The crankshaft turns when it is being pulled into place with the service tool. Therefore, make sure the small end (3) of the connecting rod always points upward to the cylinder.

- Remove the installing tool.

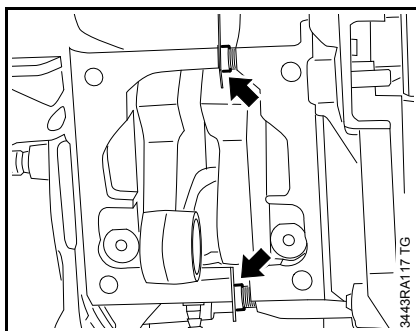


- Fit two M5x72 screws (1) in the holes at the ignition side – to act as guides and prevent twisting.
- Fit a new gasket (2) and locate it on the sleeves.
- Coat the straight stub of the crankshaft with oil.

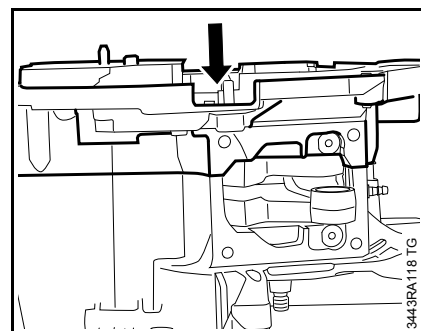
Clutch side of crankcase

Take care not to damage the crankshaft stub.

Inspect and clean the sealing faces on the clutch side of the crankcase (including the cylinder sealing face) – the sealing faces must not be damaged in any way.



Make sure the sleeves (arrows) engage the holes and the gasket is not pinched or twisted.

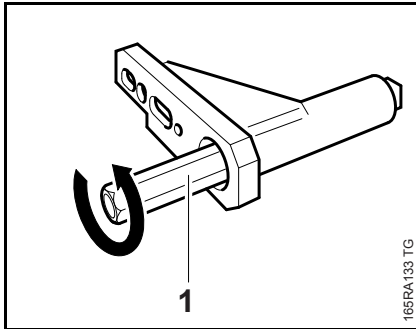


- Heat the inner bearing race to about 160°C (320°F).
- Position the clutch side of the crankcase on the straight crankshaft stub and the screws.
- Push the crankcase fully home.

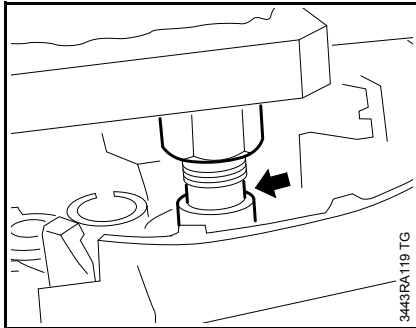
This operation must be carried out very quickly because heat is absorbed by the crankshaft, and the inner bearing race shrinks.

If it is not possible to heat the inner bearing ring, use the service tool from set 5910 007 2205 to install the crankcase.

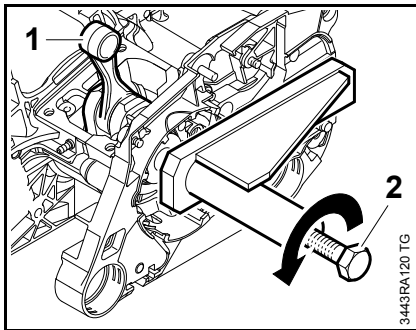
- Coat the straight stub of the crankshaft with oil.
- Position the clutch side of the crankcase on the straight crankshaft stub and the two screws.



- Screw the spindle fully into the service tool.
- Screw the threaded sleeve (1) 5910 893 2409 onto the spindle as far as stop
 - left-hand thread.

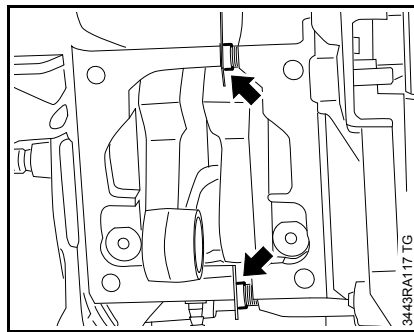


- Apply the screw sleeve to the crankshaft stub (arrow) and push the service tool over the bar studs.



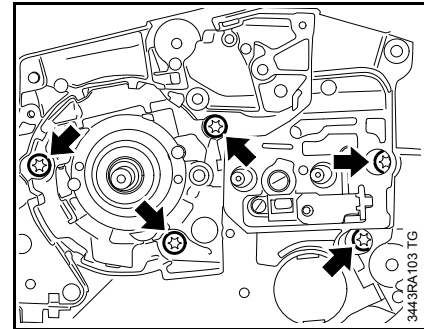
- Hold the crankshaft (1) steady and rotate the spindle (2) to screw the threaded sleeve onto the crankshaft stub.




- Release the crankshaft (1). Hold the service tool steady and continue turning the spindle (2) until the tool butts against the crankcase.
- Fit the nuts on the collar studs and screw them down finger-tight.
- Turn the spindle (2) counterclockwise until the crankcase locates against the guide sleeves.



Make sure the sleeves (arrows) engage the holes and the gasket is not pinched or twisted.

- Continue turning the service tool's spindle until the gap between the two halves of the crankcase is closed.
- Unscrew the mounting nuts.
- Unscrew the spindle clockwise and take away the service tool.
- Take out the M5x72 screws.



- Insert the screws (arrows) and tighten them down firmly in a crosswise pattern.
- Install the oil seals,  6.3
- Install the circlip.
- Check and install the piston,  6.7
- Check and install the cylinder,  6.5
- Reassemble all other parts in the reverse sequence.

6.6.1 Bearings / Crankcase

Each half of the crankcase can be replaced separately if it is damaged.

Inspect and clean the sealing faces on both halves of the crankcase (including the cylinder sealing face) – the sealing faces must not be damaged in any way.


New crankcase halves are supplied with the main parts preassembled – see the parts list.


Parts not supplied with the new crankcase must be transferred from the original crankcase – check the parts and replace if necessary.

If a new crankcase is installed, the machine's serial number must be stamped on it with 2.5 mm figure stamps.

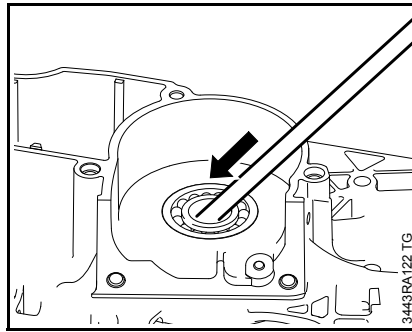
If the original crankcase is used again, replace the oil seals and ball bearings, remove any gasket residue and clean the sealing surfaces thoroughly. The sealing faces must be in good condition and clean to guarantee a perfect seal.

Inspect both halves of the crankcase for cracks and all sealing faces for signs of damage.

– See also Troubleshooting,  3.7

– Remove the crankshaft,  6.6

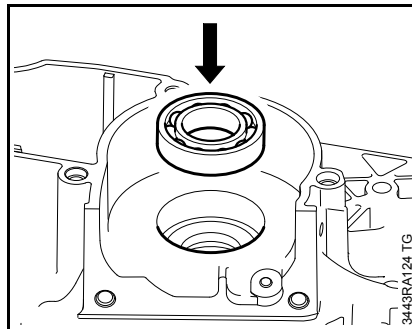
Ignition side of crankcase



- Use a punch to carefully drive out the oil seal.
- Check and clean the crankcase or replace if necessary.
- If this half of the crankcase is in order, install a new ball bearing.
- Heat area of bearing seat to about 160°C (320°F).

The bearing drops out as soon as this temperature is reached.

Installing

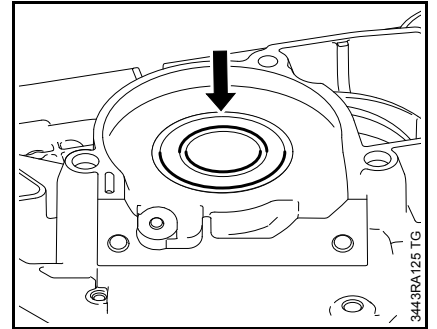


- Heat area of bearing seat to about 160°C (320°F).
- Position the ball bearing so that its open side (balls visible) faces the inside of the crankcase.
- Push the ball bearing home as far as stop.

This operation must be carried out quickly because the bearing absorbs heat and begins to expand.

- Check that the bearing is properly seated. If necessary, use press arbor 1120 893 7200 to press the bearing fully home.

Clutch side of crankcase




The oil seal is seated in the ball bearing and does not need to be removed separately.

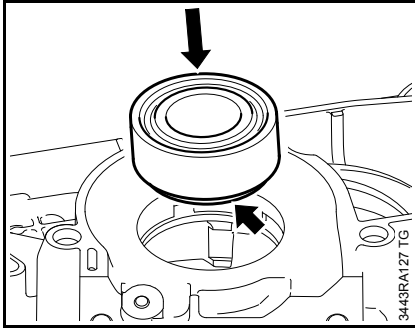
- Check and clean the crankcase or replace if necessary.
- If this half of the crankcase is in order, install a new ball bearing.
- Heat area of bearing seat to about 160°C (320°F).

The bearing with built-in oil seal drops out as soon as this temperature is reached.

Installing




As the bearing seat in the clutch half of the crankcase has no locating face, the oil pump must be installed first – it serves as the locating face.

- Install the oil pump,  11.3





- Heat area of bearing seat to about 160°C (320°F).
- Position the ball bearing so that the centering ring (arrow) points toward the oil pump.
- Push the ball bearing home as far as stop (oil pump).

This operation must be carried out quickly because the bearing absorbs heat and begins to expand.

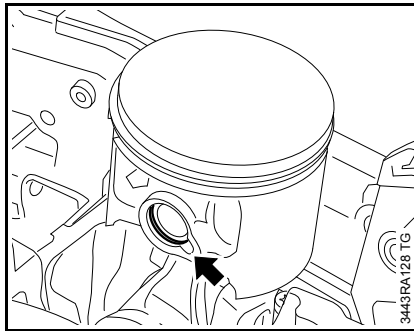
- Check that the bearing is properly seated. If necessary, use press arbor 1108 893 7200 to carefully press home the bearing until it butts against the oil pump.
- Remove the oil pump and lubricate the pump piston,  11.3
- Install the crankshaft,  6.6
- Install the oil seals,  6.3
- Reassemble all other parts in the reverse sequence.

6.7 Piston

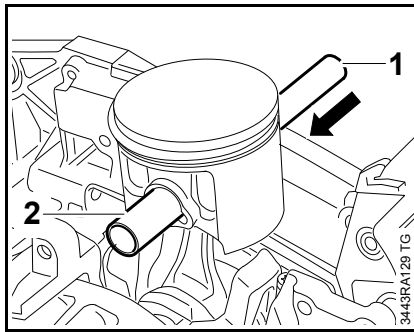
Before removing the cylinder, decide whether or not the crankshaft has to be removed as well,  6.6

- Remove the cylinder,  6.5

It is not necessary to remove the snap ring at the clutch side.




- Pry hookless snap ring out of boss at ignition side – apply tool to recess (arrow).

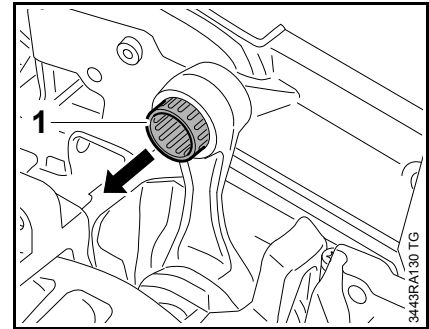


- Slide the assembly drift (1) 1108 893 4700 through the installed snap ring.
- Use the assembly drift (1) 1108 893 4700 to push the piston pin (2) out of the piston.

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

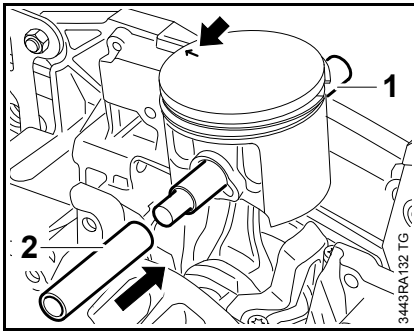
Hold the piston steady during this process to ensure that no jolts are transmitted to the connecting rod.

- Remove the piston.
- Inspect the piston rings and replace if necessary,  6.8



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

Installing

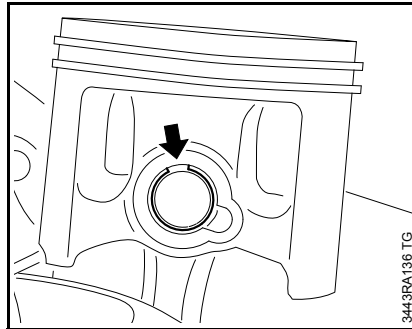


- Lubricate the needle cage with oil and push it into the connecting rod.

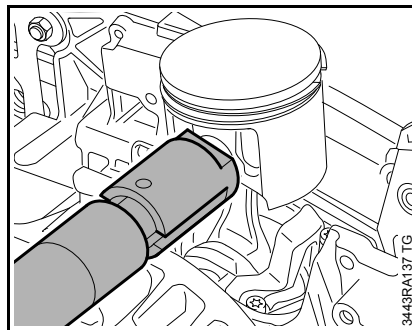
- Line up the piston so that the arrow (arrow) on the piston crown points towards the exhaust port.

The assembly drift (1) can be pushed through the installed snap ring.

- Place the piston on the connecting rod.
- Slide the assembly drift (1) 1108 893 4700, small diameter first, through the piston and small end (needle cage) and line up the piston.
- Lubricate the piston pin (2) with oil.
- Fit the piston pin (2) on the assembly drift (1) and slide it into the piston.
- Prepare snap ring for installation with installing tool 5910 890 2212.

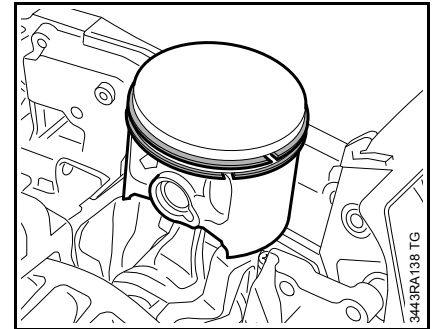


Fit the snap ring so that its gap (arrow) points up.



- Apply installing tool 5910 890 2212 with the sleeve's taper (flat facing up) against the piston boss, hold the piston steady, center the tool shank exactly and press home until the snap ring slips into the groove.

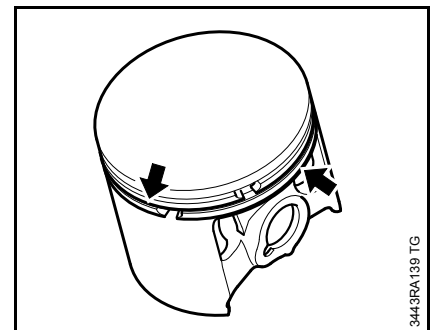
Make sure the tool is held square on the piston pin axis.



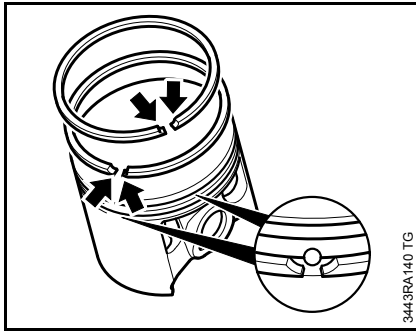
- Inspect the piston rings and replace if necessary, 6.8
- Install the cylinder, 6.5
- Reassemble all other parts in the reverse sequence.

6.8 Piston Rings

- Remove the piston, 6.7
- Remove the piston rings from the piston.




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




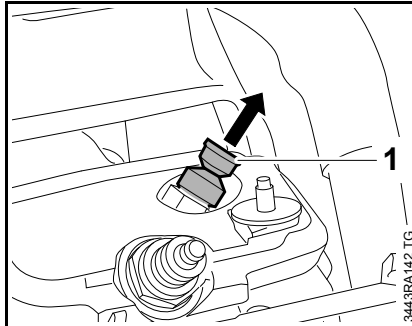
- Install the new piston rings in the grooves so that the radii face upward (arrows).
- Carefully fit the piston rings over the piston
 - they might otherwise break.
- Install the piston rings so that the radii at the ring gap meet at the fixing pins in the piston grooves.

Check correct installed position of the piston rings.

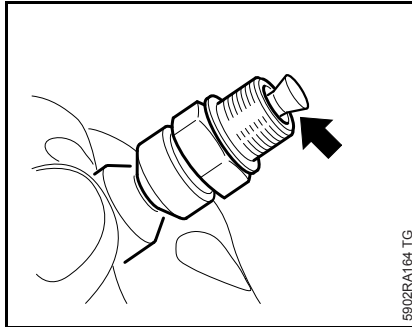
- Install the piston,  6.7
- Reassemble all other parts in the reverse sequence.

6.9 Decompression Valve

- Remove the shroud,  6.4




- Unscrew the decompression valve (1).




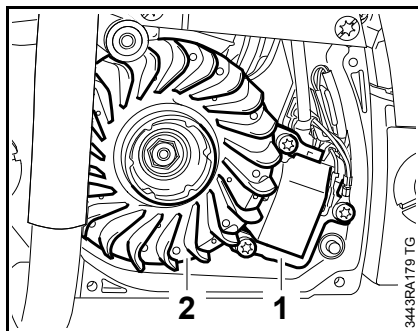
- Check the sealing cone (arrow) on the decompression valve for damage.
- If the sealing cone does not close completely or shows signs of damage, install a new decompression valve.
- Fit the decompression valve and screw it home by hand.
- Tighten down the decompression valve firmly.
- Reassemble all other parts in the reverse sequence.

7. Ignition System

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

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

- Remove the rewind starter,  8.2



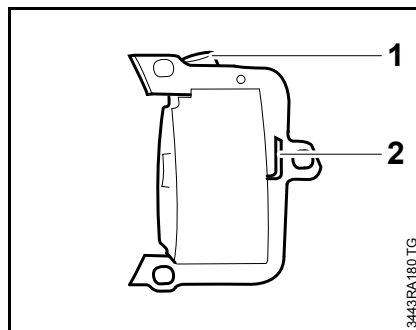
The electronic (breakerless) ignition system basically consists of an ignition module (1) and flywheel (2).

7.1 Ignition Timing

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

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


7.2 Install new ignition module

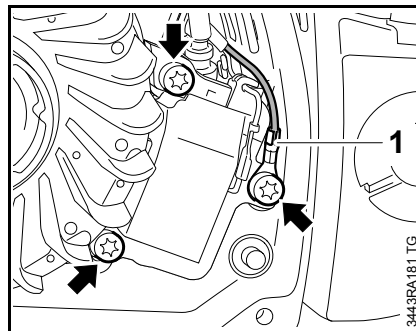


The ignition module accommodates all the components required to control ignition timing. There are two electrical connections on the coil body:

- the high voltage output (1) for the ignition lead
- the connector tag (2) for the short circuit wire

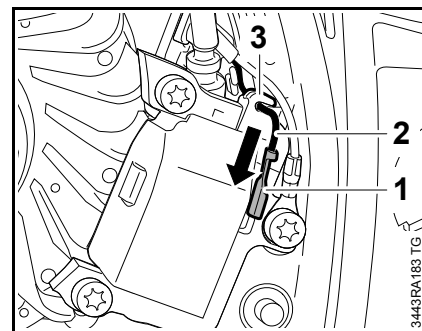
Testing in the workshop is limited to a spark test. A new ignition module must be installed if no ignition spark is obtained (after checking that wiring and stop switch are in good condition).

- Remove the rewind starter,  8.2
- Remove the filter cover and pull off the spark plug boot.



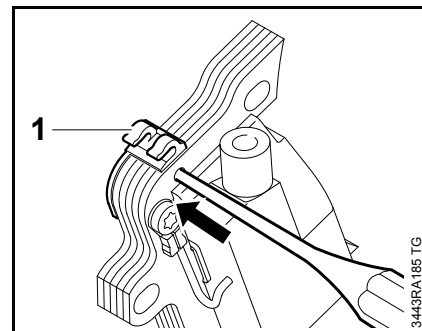
- Take out the screws (arrows).


- Remove the ground wire (1).
- Remove the ignition module.

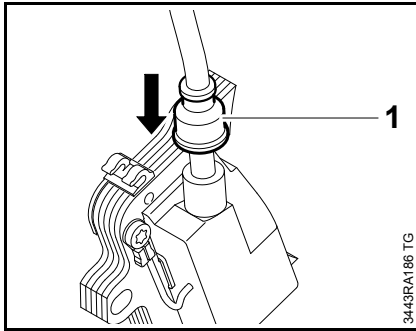



- Unlock and remove the short circuit wire's terminal (1).
- Disconnect the short circuit wire (2) from the retainer (3).
- Push back the grommet on the ignition module and unscrew the ignition lead.

A new ignition module is supplied with ignition lead, grommet and cable retainer.



- Check the cable retainer and replace if necessary.
- Use a suitable punch to drive out the retainer (1).
- Reassemble in the reverse sequence.
- Check the spark plug boot and ignition lead, and replace if necessary,  7.4



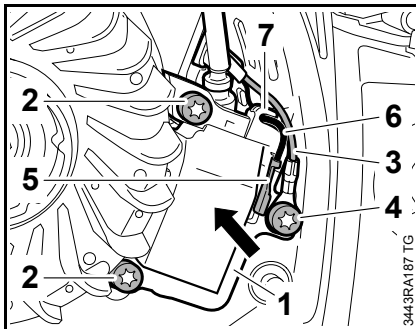
- Before installing the ignition lead, pack the high voltage output with STIHL multipurpose grease  15.

Do not use either graphite grease or silicone insulating paste.

- Screw the ignition lead into the module – the protective tube and grommet must be on the ignition lead.

- Push the grommet (1) into position.

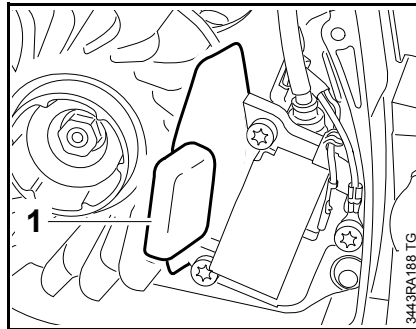
Make sure the grommet (1) is fitted properly to avoid ignition system problems that may be caused by contamination or moisture.



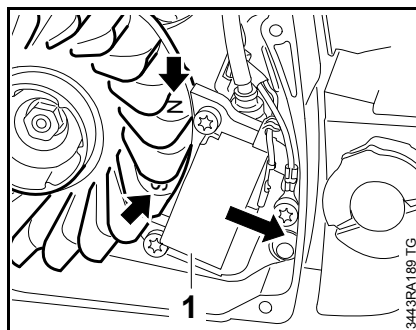
Position the short circuit and ground wires under the ignition lead.

- Place the ignition module (1) in position and fit the screws (2).
– do not tighten down yet.

- Place the ground wire (3) in position and fit the screw (4)
– do not tighten down yet.
- Fit short circuit wire terminal (5) with its crimped side facing the ground wire.
- Push the short circuit wire (6) into the retainer (7) and guide, making sure it is not under tension
– Connector tag and flat receptacle must be positioned parallel to the edge of the ignition module.



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

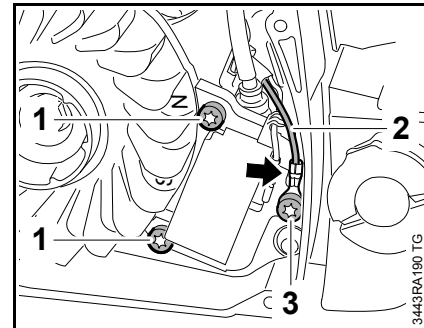


The setting gauge is not shown in the illustration.

- Push the ignition module (1) back and hold it there – the flywheel must turn freely.

- Rotate the flywheel until the raised magnet poles (arrows) are next to the ignition module.
– Setting gauge remains in place during this process.

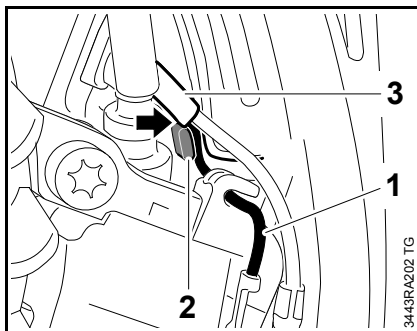
- Press the ignition module (1) against the setting gauge and hold it there.



- Tighten down the screws (1) firmly and remove the setting gauge.

- Position terminal (arrow) of ground wire (2) so that distance to flat receptacle and housing wall is the same, hold it steady and tighten down the screw (3) firmly.

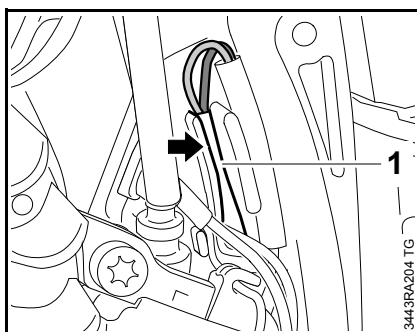
- Check operation
– Rotate the flywheel and make sure it does not touch the ignition module.



The loop in the short circuit wire (1) is between the crankcase and ignition module cable retainer.

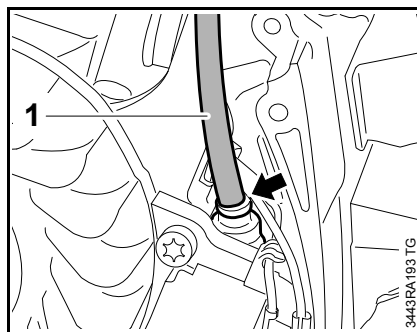
- Push the short circuit wire (1) into the guide (2) – the protective tube (3) must butt against the rib (arrow).

Models with heating

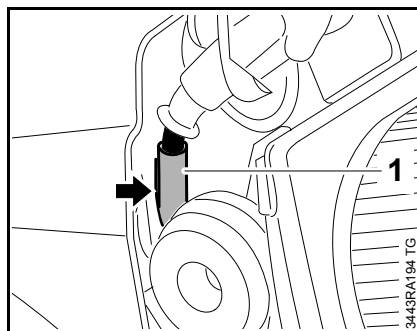


- The generator wire (1) must be properly seated in the guide (arrow) – push it into place if necessary.

All versions



- Position the insulating tube (1) so that it butts against the grommet (arrow).



The protective tube (1) with ignition lead must be in the guide (arrow) when the shroud is fitted.

- Fit the shroud, 6.4
- Reassemble all other parts in the reverse sequence.

7.3 Testing the Ignition Module

Install a new spark plug before starting the test.

The engine may start and accelerate during the test.

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

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

- If no spark is visible in the window, check the ignition system with the aid of the troubleshooting chart, 7.7

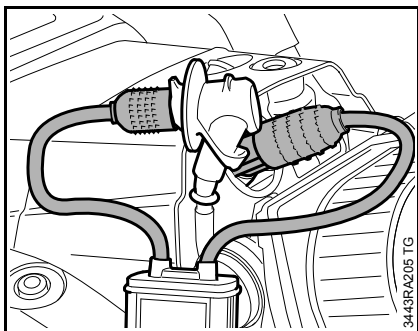
The test refers only to a spark test, not to ignition timing.

7.3.1 Testing Ignition Module with MDG 1 Engine Analyzer

The ignition module can be tested simply, reliably and quickly with the STIHL MDG 1.

The following points are checked during the test:

- Ignition voltage
- Ignition spark
- Short circuit
- Remove the filter cover and air baffle – secure the air filter in place with the twist lock.
- Before starting the test, check the spark plug and replace it if necessary – use only spark plugs recommended by STIHL.



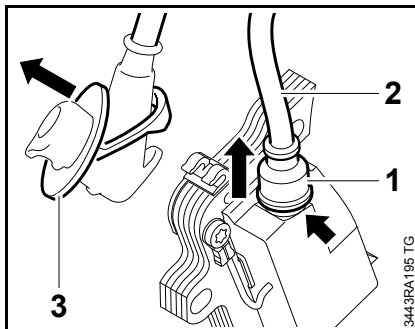
- Connect the MDG 1 between the spark plug and spark plug boot – ground clamps must engage hexagon on spark plug.
- To run diagnosis on MS 461, select "Other STIHL Products". Then start the diagnosis function and follow the steps in the diagnosis software.

To obtain an accurate result, pull the starter rope briskly.

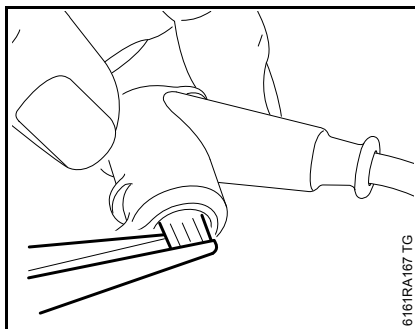
The engine may start and accelerate during the test.

7.4 Spark Plug Boot / Ignition Lead

- Remove the ignition module, 7.2

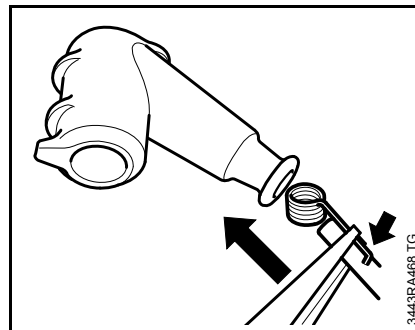


- Pull the grommet (1) off the high voltage output (arrow).
- Unscrew the ignition lead (2) from the ignition module and pull the grommet (1) off the ignition lead.
- Remove the cover (3) from the spark plug boot.

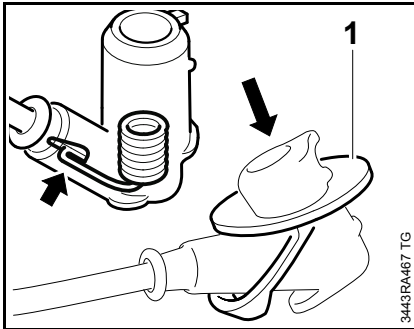


- Use suitable pliers to pull the leg spring out of the spark plug boot.
- Unhook the leg spring from the ignition lead.
- Pull the boot off the ignition lead.
- Cut a new ignition lead to the specified length, see parts list.


Installing



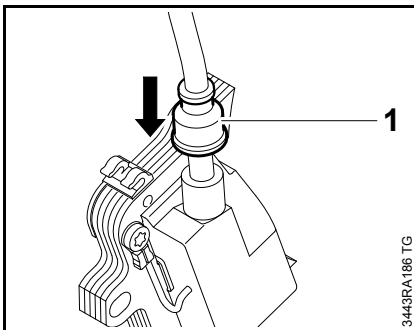
- Use a pointed tool to pierce the center of the new ignition lead's insulation, about 15 mm from the end of the lead.
- Pinch the hook of the leg spring into the pierced hole in the center of the lead (arrow).
-
- Coat the inside of the spark plug boot with STIHL press fluid, 15
- Hold the ignition lead and leg spring together and push them into the spark plug boot.




- Make sure the leg spring (arrow) locates properly inside the spark plug boot.
- Fit the cover (1) over the spark plug boot.
- Use a pointed tool to pierce the center of the other end of the ignition lead which screws into the module.

Before installing the ignition lead, pack the high voltage output with STIHL multipurpose grease  15.




Do not use either graphite grease or silicone insulating paste.

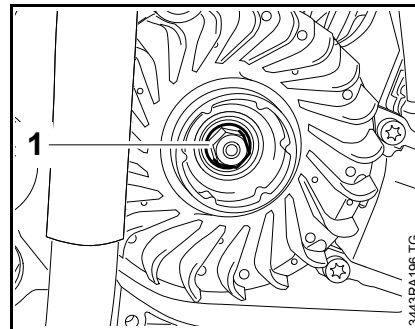


- Slide the grommet (1) onto the ignition lead.
- Screw the ignition lead into the ignition module.
- Push the grommet (1) into position.
- Install the ignition module and set the air gap between the module and flywheel,  7.2

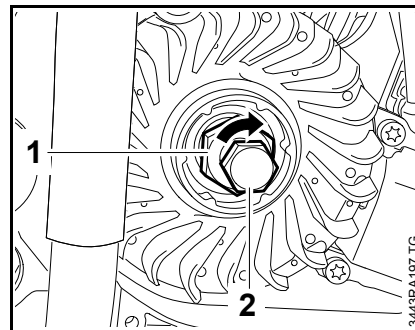
– Reassemble all other parts in the reverse sequence.

7.5 Flywheel

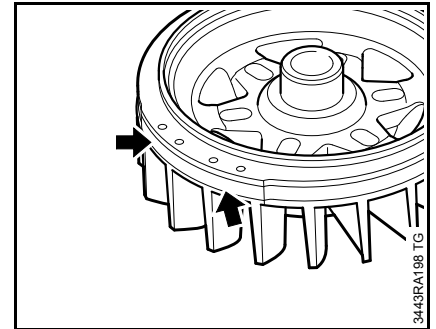
- Remove the shroud,  6.4
- Remove the rewind starter,  8.2
- Use locking strip to block the piston,  4.2



- Unscrew the flywheel nut (1).



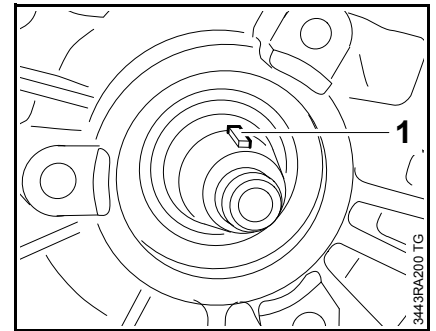
- Screw puller (1) 1110 890 4500 into flywheel as far as stop.
- Screw home the thrust bolt (2) clockwise until the flywheel is released from the crankshaft.
- Remove the puller (1) 1110 890 4500 from the flywheel.



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

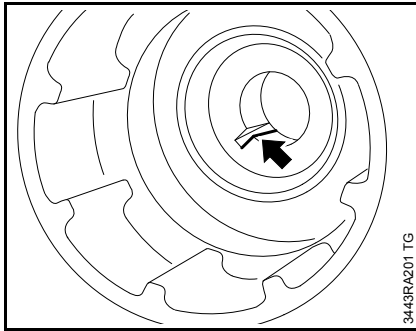
On versions with heating, also check the magnet ring for signs of damage.

- Inspect the magnet ring in the flywheel (inside) for cracks or other damage. If damage is found, replace the flywheel.



- Check the key (1) and replace if necessary.
- Check that key (1) is properly seated, readjust if necessary.

Crankshaft/flywheel joint must be free from grease and oil.



If slot (arrow) is worn, install a new flywheel.

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

- Set air gap between ignition module and flywheel, [7.2](#)
- Reassemble all other parts in the reverse sequence.

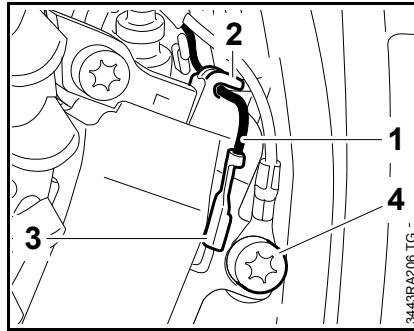
7.6 Wiring Harness

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

7.6.1 Testing

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

- Remove the rewind starter, [8.2](#)



- Pull the short circuit wire (1) out of the cable retainer (2).
- Remove the connector (3).
- Connect the ohmmeter to ground (4) and the short circuit wire (1).
- Set the Master Control lever to "0".

The resistance measured must be about 0 Ω . If it is much higher, the reason is a break and the wiring harness has to be replaced, [7.6](#)

- Set the Master Control lever to "I".

The resistance measured must be infinitely high. If not, replace the wiring harness, [7.6](#)

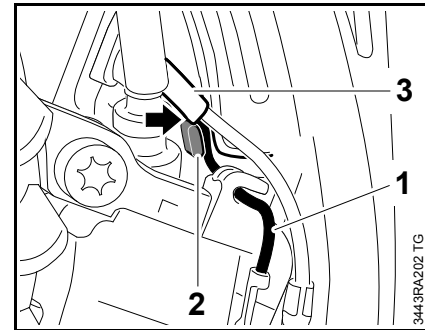
Perform the contact and continuity test on the ground wire too.

If the ground wire is damaged, the wiring harness must be replaced.

- If no fault can be found, check the ignition system with the aid of the troubleshooting chart, [7.7](#)

- Fit short circuit wire terminal (3) with its crimped side facing the ground wire.

- Push the short circuit wire (1) into the retainer (2), making sure it is not under tension
 - Connector tag and flat receptacle must be positioned parallel to the edge of the ignition module.



The loop in the short circuit wire (1) is between the crankcase and ignition module cable retainer.

- Push the short circuit wire (1) into the guide (2) – the protective tube (3) must butt against the rib (arrow).
- Reassemble in the reverse sequence.




7.6.2 Ground Wire

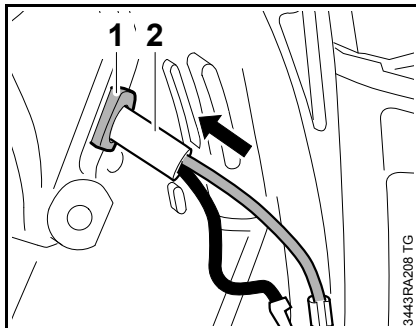
A faulty ground wire may impair or prevent operation of the short circuit wire.


The ground wire is combined with the short circuit wire in a wiring harness. If damaged, the complete wiring harness must be replaced.

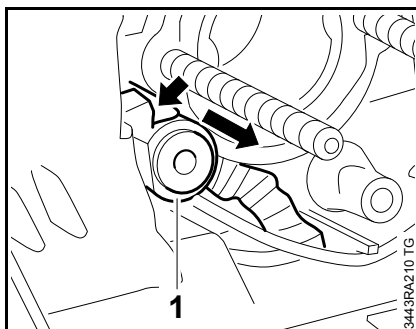
- Check ground wire for contact and continuity, replace wiring harness if necessary.

7.6.3 Wiring Harness Removing and Installing

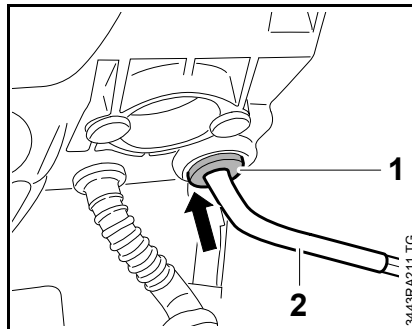
- Remove the shroud,  6.4
- Pull the boot off the spark plug.
- Remove the rewind starter,  8.2
- Remove the ignition module,  7.2



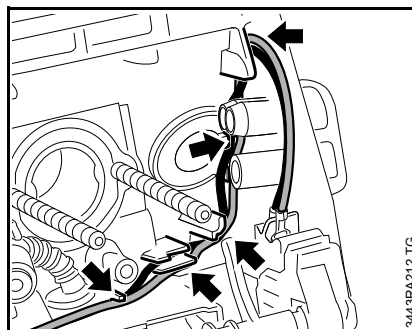
- Press grommet (1) grommet in direction of cylinder and pull wiring harness (2) out in direction of cylinder.
- Pull the grommet (1) off the wiring harness.
- Remove the tank housing,  12.9.3



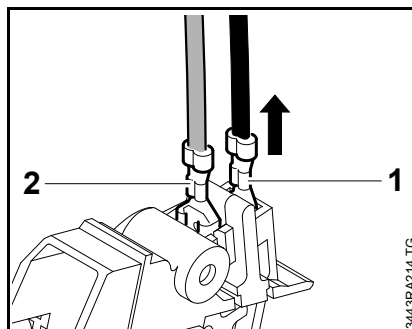
- Pull the fuel suction hose (1) out of the guide (arrow) and put it to one side.




- Press grommet (1) out in direction of carburetor box and pull wiring harness (2) out in direction of carburetor box.

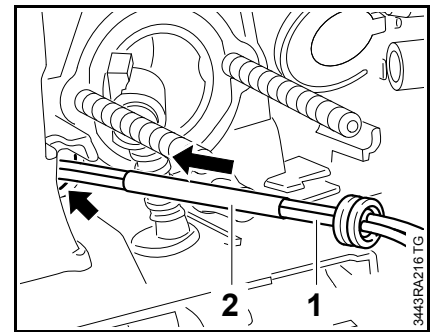


- Pull the wires out of the guides (arrows).

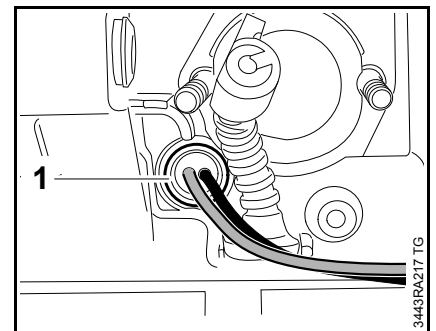



- Disconnect the short circuit wire (1) and ground wire (2).
- Inspect the contact springs and switch housing, replace if necessary,  7.6.5
- Check the wiring harness and replace if necessary.

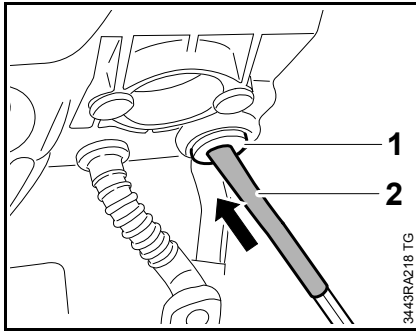
Installing



- Push the wiring harness (1), protective tube (2) first, through the bore (arrow) in the direction of the cylinder.

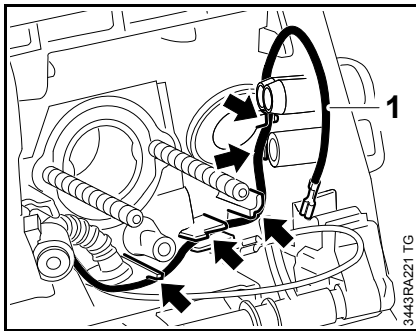


- Use STIHL press fluid to make installation easier,  15
- Fit the grommet (1) into the bore so that the wires are positioned horizontally next to one another.

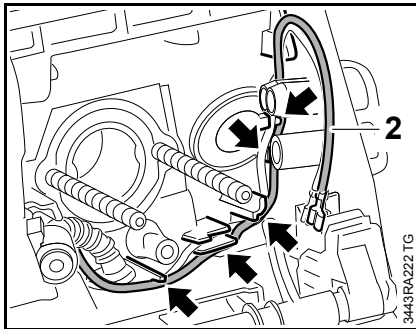


The grommet (1) must be properly seated in the bore at the other side.

- Push wiring harness in direction of arrow until protective tube (2) butts against grommet.

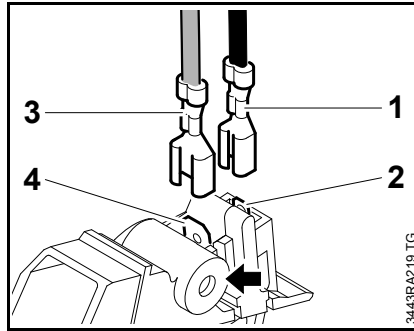


- Push the short circuit wire (1) into the guides (arrows).



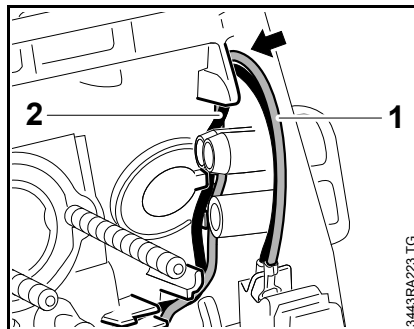
- Push the ground wire (2) into the guides (arrows).

Position the wires next to one another without crossing over.

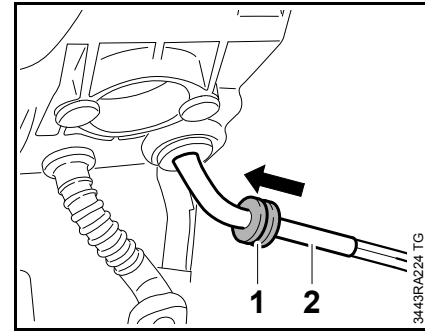


Crimped sides of connectors must point towards switch shaft mount (arrow).


- Fit narrow connector of short circuit wire (1) on contact spring (2) and wide connector of ground wire (3) on contact spring (4).

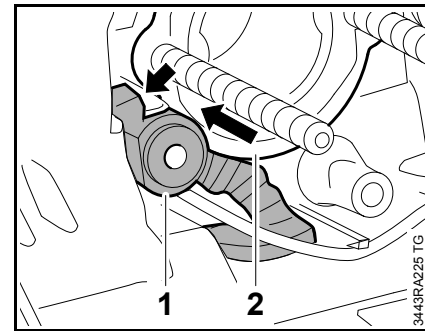


- Push the ground wire (1) and short circuit wire (2) between the rib (arrow) and housing wall – the ground wire must be under the short circuit wire.

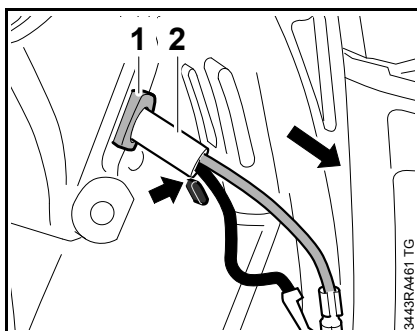


- Slide the grommet (1) onto the wiring harness (2).

– Install the tank housing,  12.9.3



- Push the fuel suction hose (1) into the guide (arrow) and between the wires and the edge of the manifold seat (2) – fuel suction hose is thus held in position.

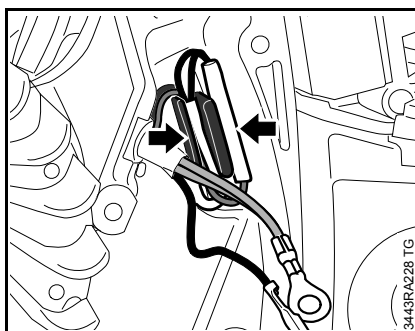


Make sure the grommet (1) is in place.

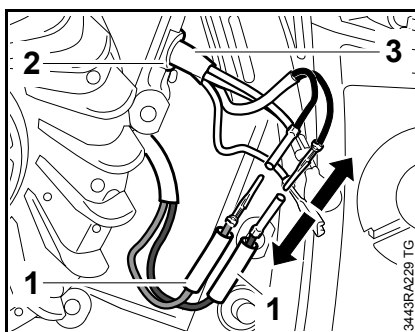
- Use STIHL press fluid to make installation easier, [15](#)
- Push the wiring harness (2) through the opening and engage the grommet (1) properly in the opening.
- Continue pulling the wiring harness (2) until the end of the protective tube locates against the rib (arrow).
- Install the ignition module, [7.2](#)
- Reassemble all other parts in the reverse sequence.

7.6.4 Wiring Harness Removing and Installing on Models with Heating System

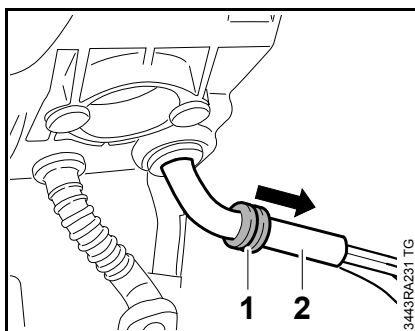
- Remove the shroud, [6.4](#)
- Pull the boot off the spark plug.
- Remove the rewind starter, [8.2](#)
- Remove the ignition module, [7.2](#)
- Remove the handle molding, [10.2](#)



- Pull the connectors and wires out of the guides (arrows).

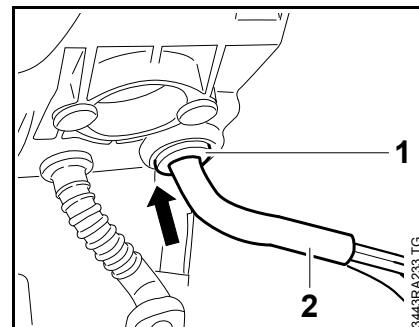


- Push back the insulating tubes (1) in the direction of the generator wire and separate the pin and socket connectors.
- Press grommet (2) in the direction of the cylinder and pull wiring harness (3) out in direction of cylinder.
- Remove the tank housing, [12.9.3](#)

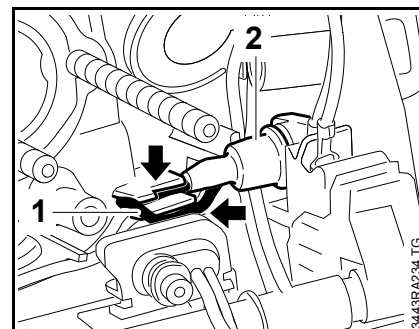


- Pull the grommet (1) off the wiring harness (2), check it and replace if necessary.

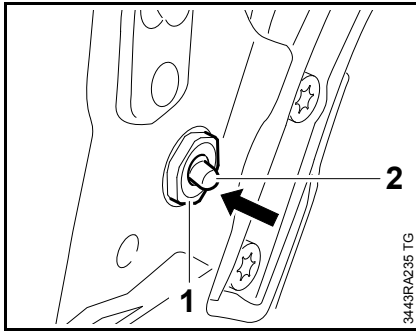
- Pull the fuel suction hose out of the guide and put it to one side.



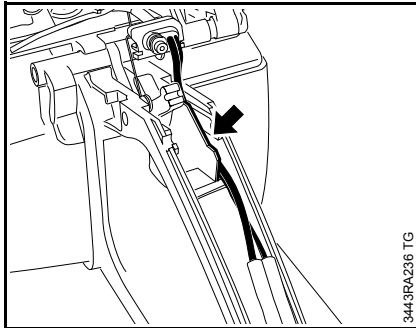
- Press grommet (1) out in direction of carburetor box and pull wiring harness (2) out in direction of carburetor box.



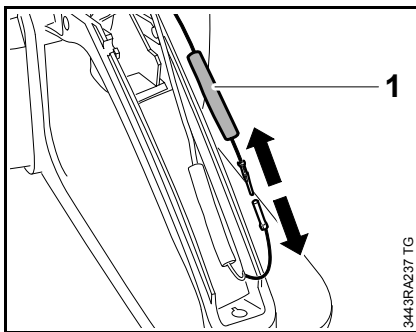
- Pull wire (1) of heater switch (2) out of the guides (arrows).



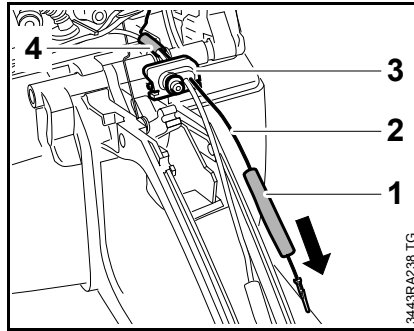
- Unscrew the nut (1), remove the washer and push the heater switch (2) out in direction of carburetor box.
- Leave the heater switch with wire to one side.



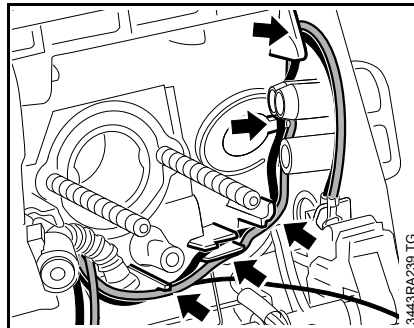
- Pull the wires out of the guide (arrow).



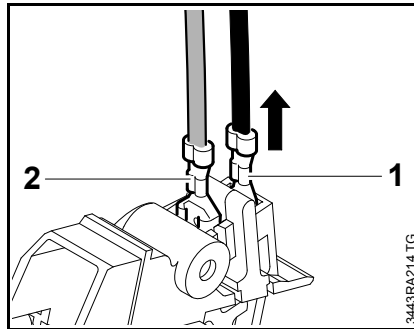
- Push insulating tube (1) of thinner black wire in direction of handlebar heating element and separate the pin and socket connector.



- Pull off the insulating tube (1).
- Pull the thinner black wire (2) in direction of handlebar heating element and out of grommet (3) and protective tube (4).

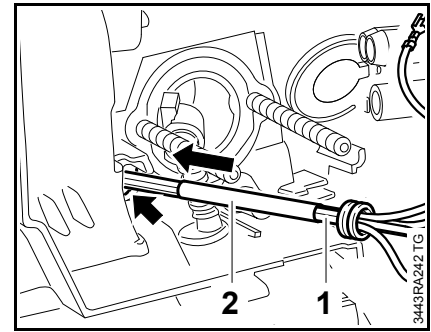


- Pull the wires out of the guides (arrows).

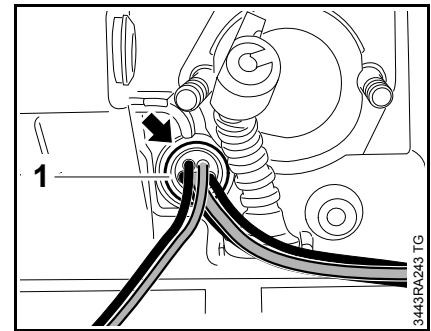


- Disconnect the short circuit wire (1) and ground wire (2).
- Inspect the contact springs and switch housing, replace if necessary, [7.6.5](#)
- Check the wiring harness and replace if necessary.

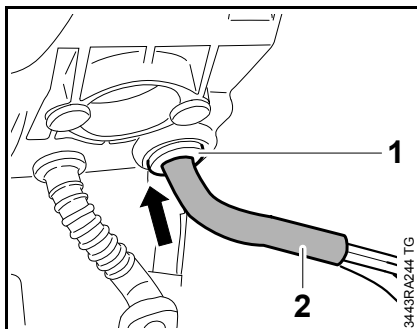
Installing



- Push the wiring harness (1), protective tube (2) first, through the bore (arrow) in the direction of the cylinder.

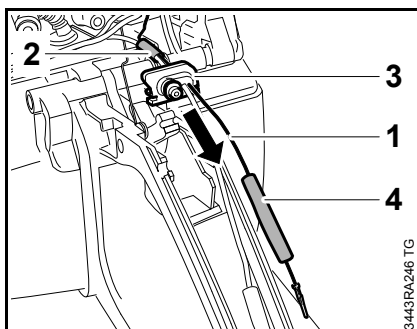


- Use STIHL press fluid to make installation easier, [15](#)
- Fit the grommet (1) into the bore (arrow) so that the wires are positioned horizontally next to one another.

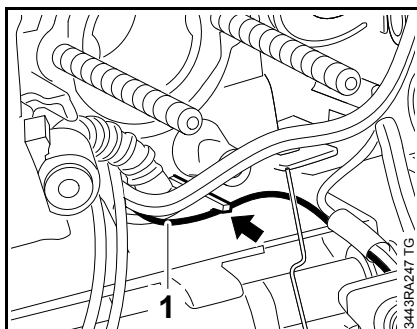


The grommet (1) must be properly seated in the bore at the other side.

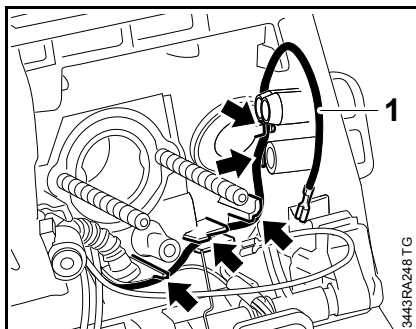
- Push wiring harness in direction of arrow until protective tube (2) butts against grommet.



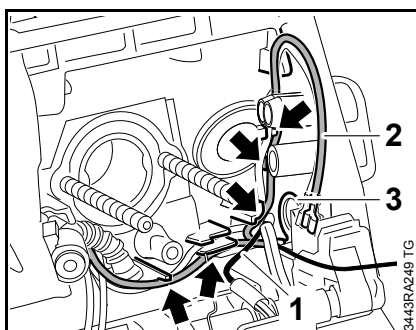
- Thread the thin black wire (1) through the protective tube (2) and grommet (3) in direction of rear handle.
- Fit the insulating tube (4).



- Push the thin black wire (1) into the guide (arrow).

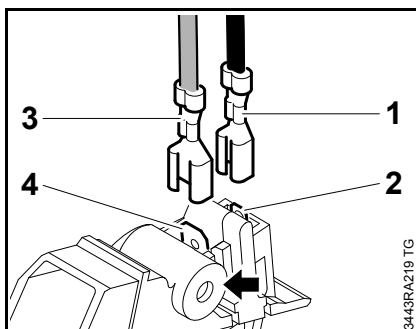


- Push the short circuit wire (1) into the guides (arrows).



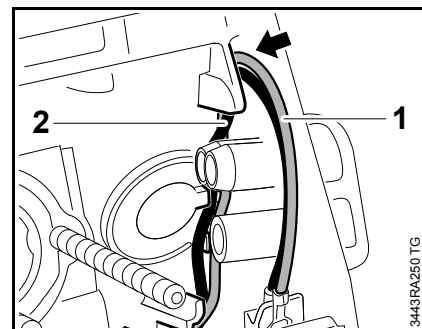
- Pass the ground wire (2) under the handlebar heating wiring harness (1) and position ring terminal (3) against hole for heater switch.
- Push the ground wire (2) into the guides (arrows).

Position the wires next to one another without crossing over.

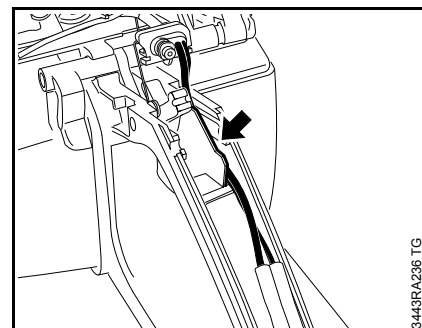


Crimped sides of connectors must point towards switch shaft mount (arrow).

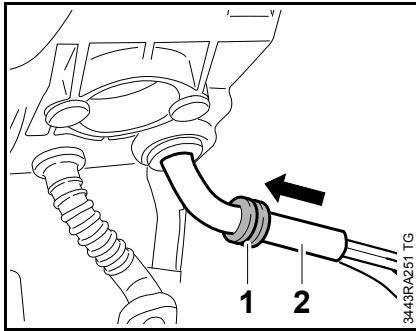
- Fit narrow connector of short circuit wire (1) on contact spring (2) and wide connector of ground wire (3) on contact spring (4).



- Ground wire (1) and short circuit wire (2) must be between the rib (arrow) and housing wall, push fully home if necessary.
 - Ground wire must be under the short circuit wire.
- Install the heater switch, 9.2.2

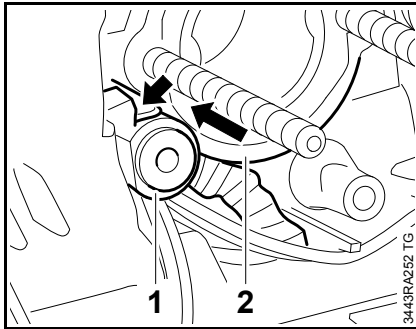


- Push the wires into the guide (arrow) – the thin wire must be under the thick wire.

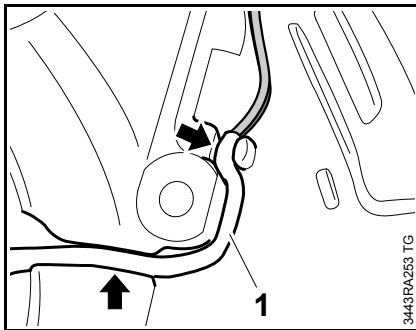


- Slide the grommet (1) onto the wiring harness (2).

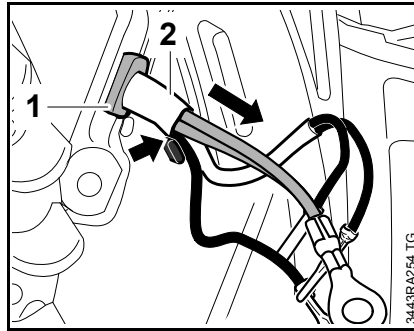
- Install the tank housing, 12.9.3



- Push the fuel suction hose (1) into the guide (arrow) and between the wires and the edge of the manifold seat (2) – fuel suction hose is thus held in position.



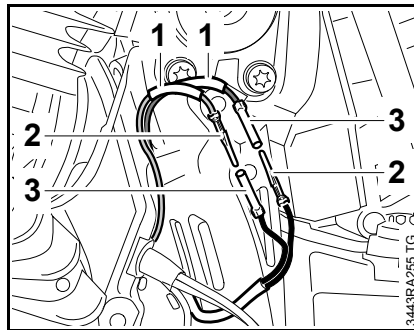
The generator wire (1) must run under the wiring harness and fit snugly in the guides (arrows).



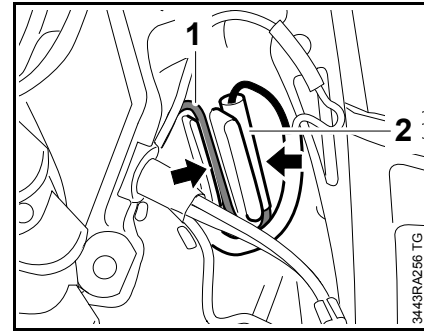
Make sure the grommet (1) is in place.

- Use STIHL press fluid to make installation easier, 15

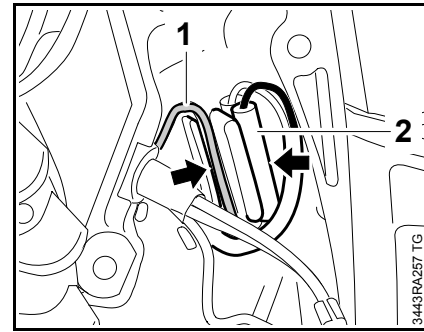
- Push the wiring harness (2) through the opening and engage the grommet (1) properly in the opening.
- Continue pulling the wiring harness (2) until the end of the protective tube locates against the rib (arrow).



- Push the insulating tubes (1) onto the generator wire.
- Connect the pin (2) and socket (3) connectors.
- Push the insulating tubes (1) over the connectors.





- Push the red generator wire (1) and connector (2) into the guide (arrows).

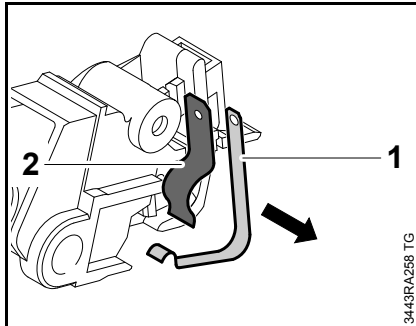


- Push the yellow generator wire (1) and connector (2) into the guide (arrows) – the red wire with connector must be laid under the yellow wire with connector.

- Install the ignition module, 7.2
- Reassemble all other parts in the reverse sequence.

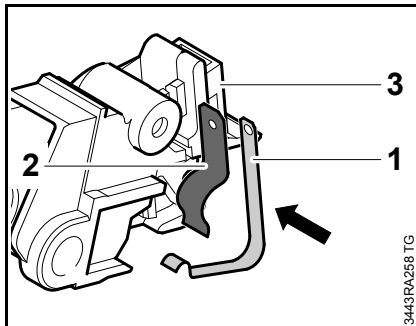
7.6.5 Contact Spring

- Remove the throttle rod,  10.3
- Remove the switch shaft and switch housing,  10.1
- Disconnect the short circuit and ground wires.

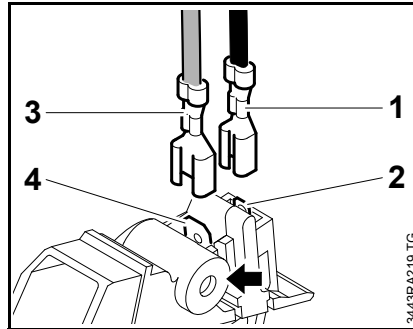


- Remove the contact spring (1) for the ground wire and contact spring for short circuit wire (2).
- Inspect the contact springs and switch housing, replace if necessary.

Installing

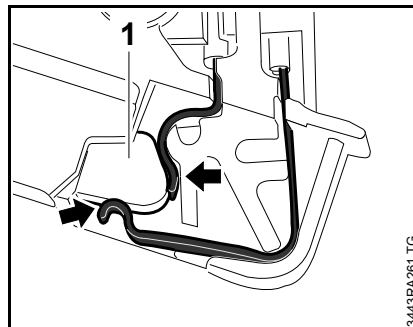



- Push the contact spring (1) for the ground wire and contact spring for short circuit wire (2) into guides of switch housing (3).

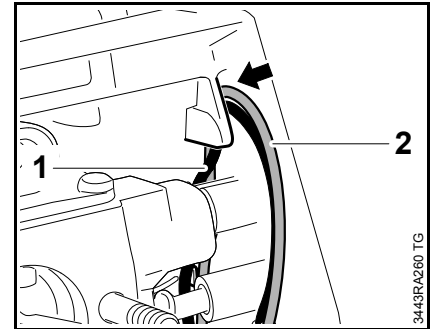


Crimped sides of connectors must point towards switch shaft mount (arrow).

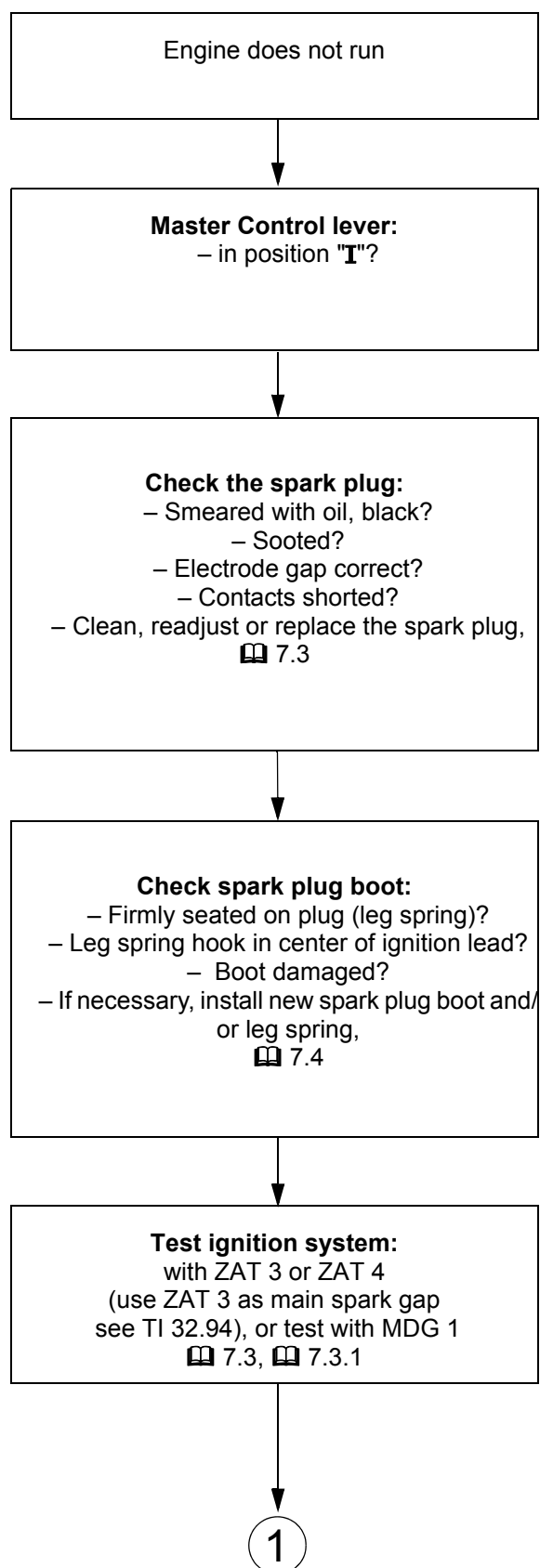
- Fit narrow connector of short circuit wire (1) on contact spring (2) and wide connector of ground wire (3) on contact spring (4).

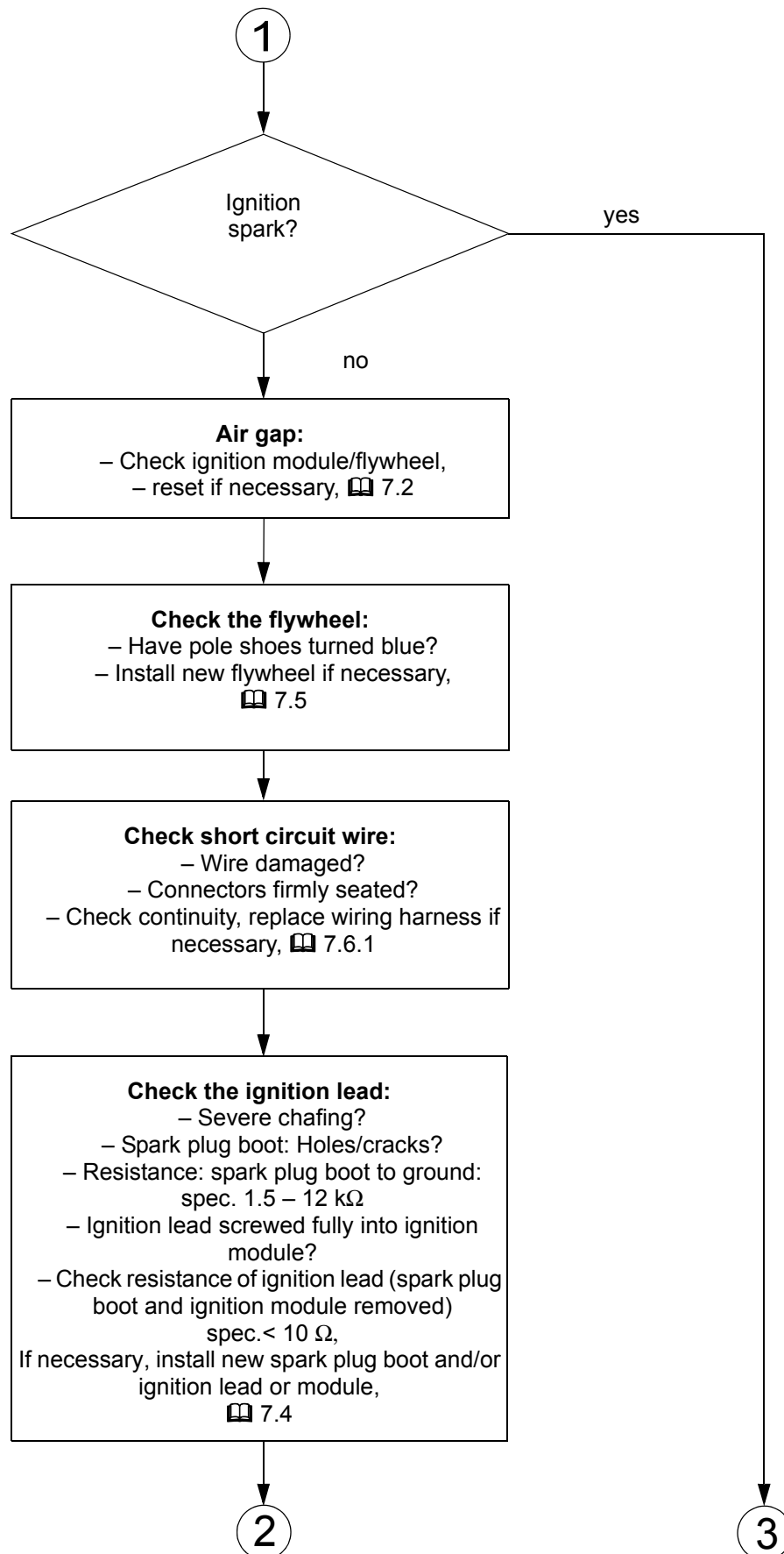


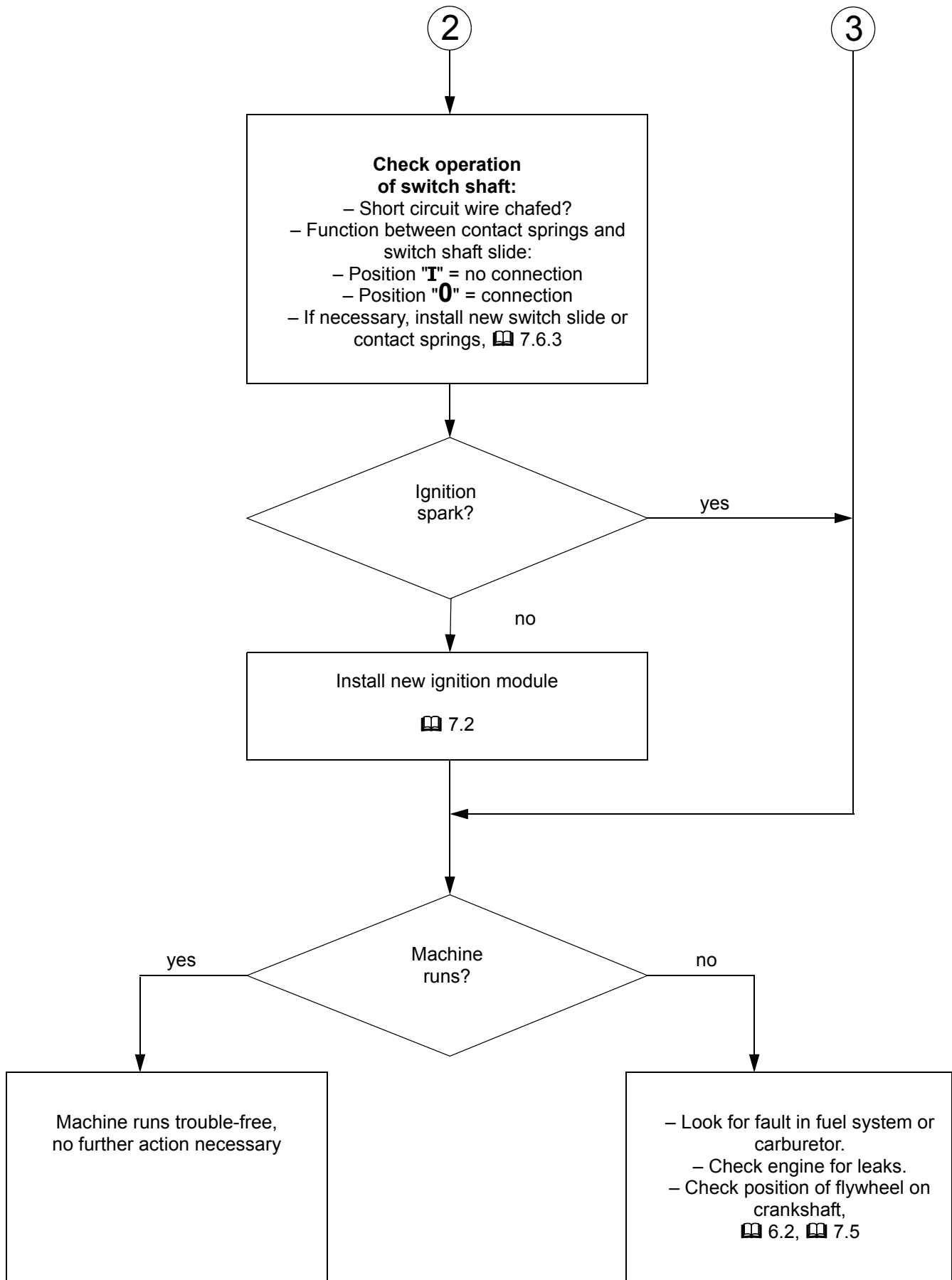
- Check operation
 - the switch slide (1) must touch the contact springs (arrows) in position "0".
- Install switch housing and switch shaft,  10.1



- Ground wire (1) and short circuit wire (2) must be between the rib (arrow) and housing wall, push fully home if necessary.
 - Ground wire must be under the short circuit wire.
- Reassemble all other parts in the reverse sequence.








8. Rewind Starter

8.1 General

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

In such a case it is sufficient to apply a few drops of a standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons) to the rewind spring.

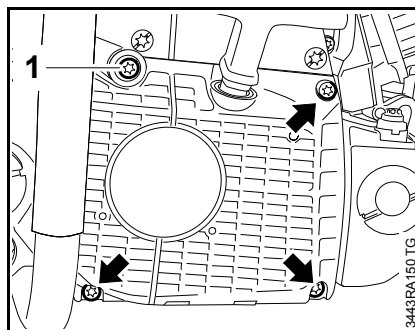
Carefully pull out the starter rope several times and allow it to rewind until its normal smooth action is restored.

Before installing, lubricate the rewind spring and starter post with STIHL special lubricant,  15.

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



- Clean all components.

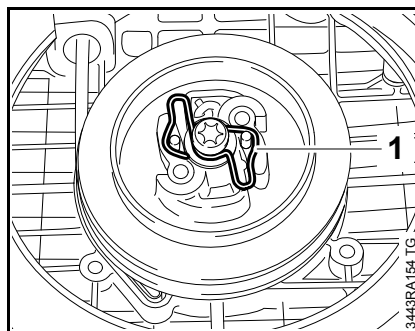
8.2 Rewind Starter Removing and Installing



- Take out the screw (1) and screws (arrows).
- Lift the hand guard a little and remove the fan housing.
- Reassemble in the reverse sequence.

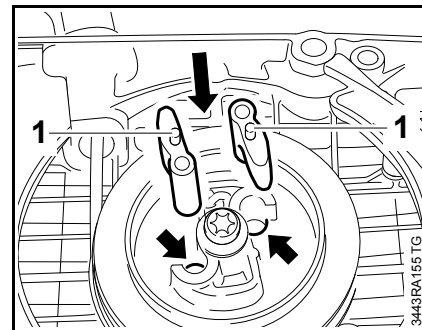
8.3 Pawls


- Remove the rewind starter,  8.2
- Relieve tension of rewind spring,  8.4

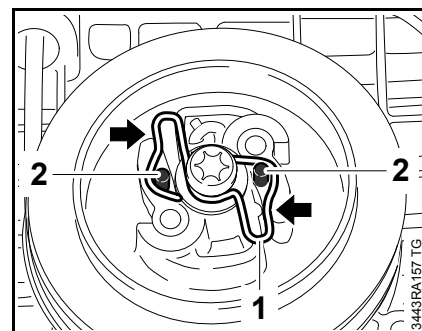


- Carefully ease the spring clip (1) off the starter post.
- Pull the pawls out of the rotor.

Installing



- Fit the new pawls in the bores (arrows) and lubricate the pegs (1) with STIHL grease,  15



- Install the spring clip (1) so that its loops (arrow) are parallel to the pawls and engage the pegs (2).


Check operation

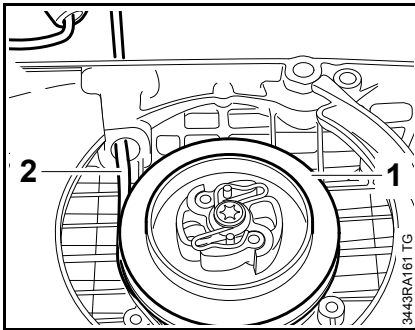
- Pull the starter rope, the rotor turns and the pegs on the pawls move in the direction of spring loops – the pawls move outwards.
- Reassemble all other parts in the reverse sequence.


8.4 Rope Rotor

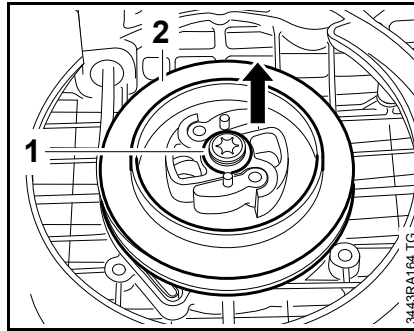
Relieving tension of rewind spring

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



- Remove the rewind starter,  8.2
- Pull out the rope a little with the starter grip and hold the rope rotor steady.





- While still holding the rope rotor (1) steady, unwind the starter rope (2).
- Pull out the twisted rope (2) in direction of starter grip and straighten it out.
- Keep the rope (2) under tension and slowly release the rope rotor.
- Remove the pawls,  8.3

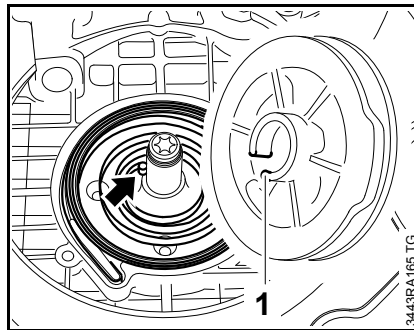


Rewind spring must be relaxed.



- Remove the washer (1) and carefully pull the rotor rope (2) off the starter post
 - the rewind spring may pop out and uncoil.
- Remove starter rope, or remaining rope, from rotor and install a new starter rope,  8.5
- Inspect the rewind spring and replace if necessary,  8.7

Installing



- Lubricate full length of starter post with STIHL special lubricant,  15
- Install starter rope in rope rotor,  8.5



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

- Install the pawls and spring clip,  8.3
- Tension the rewind spring,  8.6
- Reassemble all other parts in the reverse sequence.

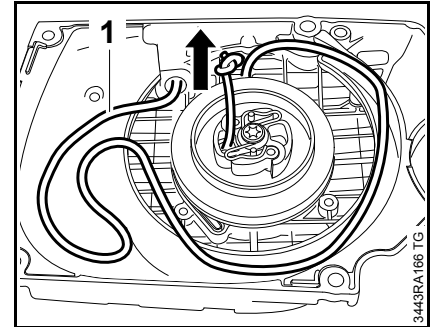
8.5 Starter Rope / Grip

- Remove the rewind starter and the segment,  8.2
- Relieve tension of rewind spring,  8.4

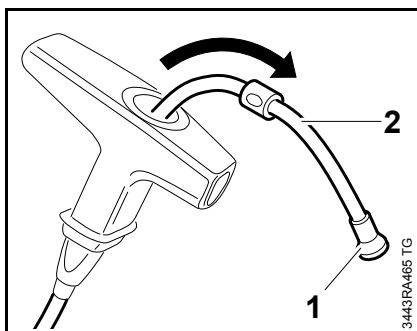
The spring will not be under tension if the starter rope is broken.

- Remove any remaining rope from the rope rotor.

Do not shorten the starter rope.

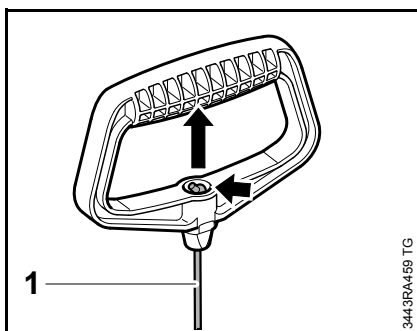


- Push the end of the starter rope (1) out a little, undo the knot and pull the rope out.



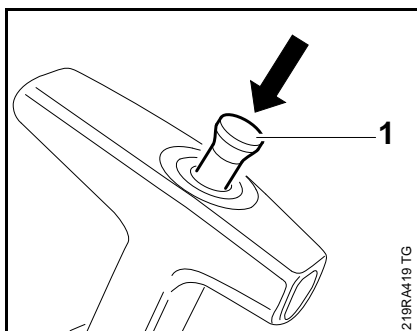
- Pry out the nipple (1) and pull starter rope (2) out of the grip.
- Check the starter rope and replace if necessary.

Rescue saw only



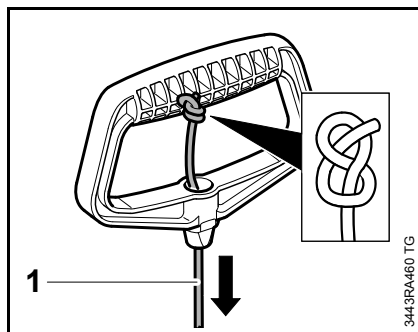
- Pull the starter rope (1) out of the grip (arrow).
- Check the starter rope and replace if necessary.

Installing



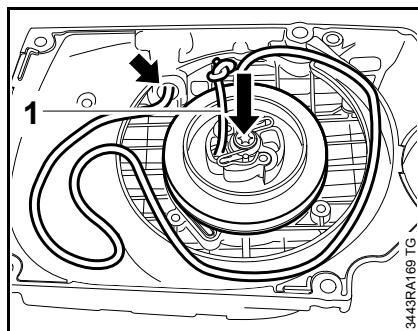
- Thread the new starter rope through the top of the starter grip, press the nipple (1) into the grip until it snaps into place.

Rescue saw only



- Tie the special knot shown in the end of the new rope and thread the rope (1) through the starter grip.

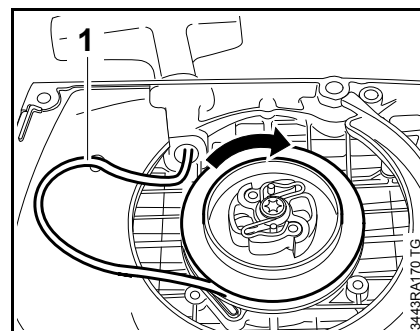
All versions



- Thread the starter rope (1) through the opening (arrow) in the rope rotor.
- Tie a simple overhand knot in the end of the new rope (1) and pull it back into the rotor.
- Tension the rewind spring, 8.6
- Reassemble all other parts in the reverse sequence.

8.6 Tensioning the Rewind Spring

- Remove the rewind starter, 8.2



- Pull out a short length of starter rope (1).
- Make a loop in the unwound starter rope and use it to turn the rope rotor six full revolutions in the direction of the arrow.

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

- Pull out the twisted rope (1) in direction of starter grip and straighten it out.
- Keep the rope (1) under tension and slowly release the rope rotor.

The starter grip must sit firmly in the rope guide bushing.

If it droops to one side: Tension the rewind spring by one additional turn.




When the starter rope is fully extended it must still be possible to rotate the rope rotor another half turn. If this is not the case, spring tension must be reduced – it might otherwise break.

To reduce spring tension:

Hold the rope rotor steady and take one turn off the rope.

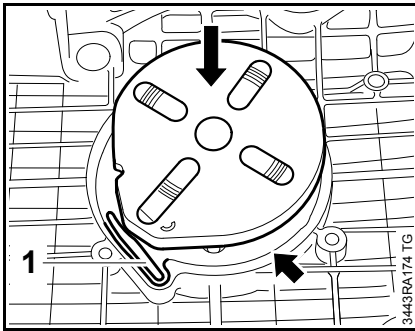
- Install the rewind starter, 8.2


8.7 Replacing the Rewind Spring

- Troubleshooting,  3.4
- Remove the rewind starter and the segment,  8.2
- Relieve tension of rewind spring if necessary and remove the rope rotor,  8.4
- Remove any remaining pieces of the old rewind spring.

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

Installing new rewind spring

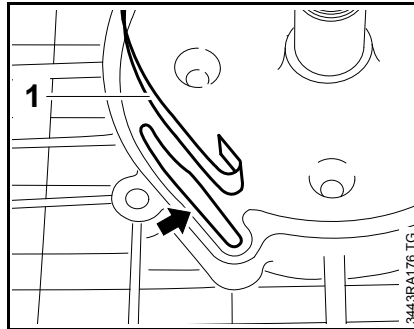


- Lubricate the replacement spring with frame with a few drops of STIHL special lubricant before installing,  15
- Position the replacement spring with frame in the fan housing and push it into its seat (arrow) – the anchor loop must be above the lug (1).
- Remove the frame – keep it if necessary.

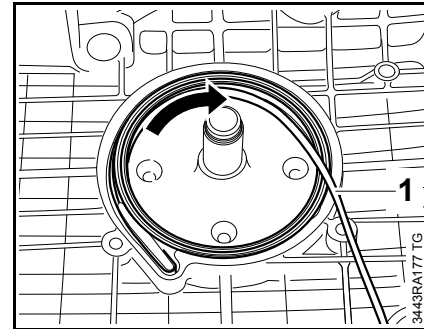
The rewind spring must be properly seated – if necessary, push it fully into its seat and onto the lug.

Installing unwound rewind spring

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




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



- Fit the rewind spring (1) clockwise in the housing.
- Hold the spring windings so that they cannot pop out.

The rewind spring must be properly seated – if necessary, push it fully into its seat and onto the lug.

- Lubricate the rewind spring with a few drops of STIHL special lubricant,  15
- Reassemble all other parts in the reverse sequence.

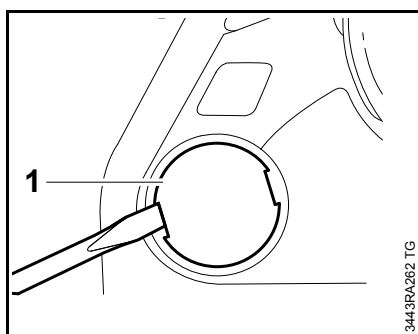
9. AV Elements

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

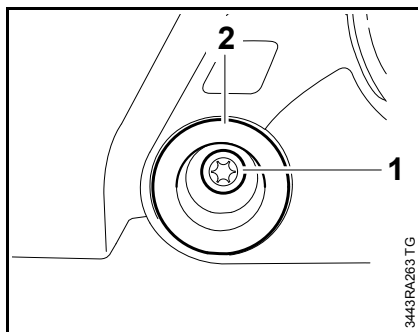
Damaged annular buffers must always be replaced.

9.1 Annular Buffer on Fuel Tank / Clutch Side

- Remove the chain sprocket cover.

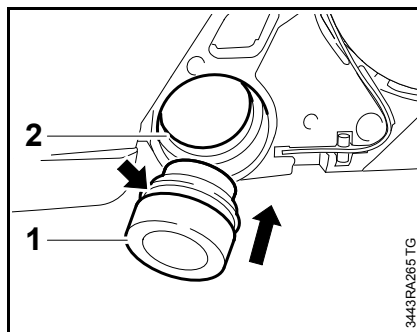



- Pry out the plug (1).




- Take out the screw (1) and pry out the annular buffer (2).
- Check the buffer and replace it if necessary.

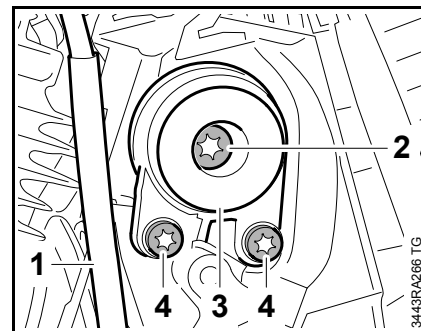
Installing



- Line up the annular buffer (1)
 - small diameter facing the crankcase.
- Use STIHL press fluid to make installation easier,  15
- Push the annular buffer (1) into the bore until its groove (arrow) engages the housing rib (2).
- Insert screw and tighten it down firmly.
- Push the plug into the annular buffer as far as stop.
- Reassemble all other parts in the reverse sequence.

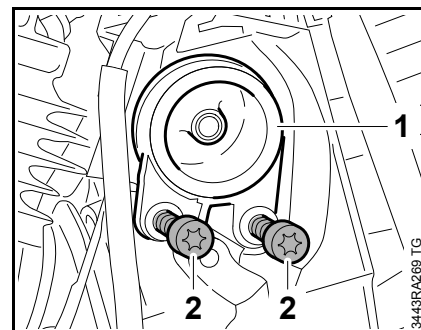
9.1.1 Annular Buffer on Fuel Tank / Ignition Side

- Remove the shroud,  6.4

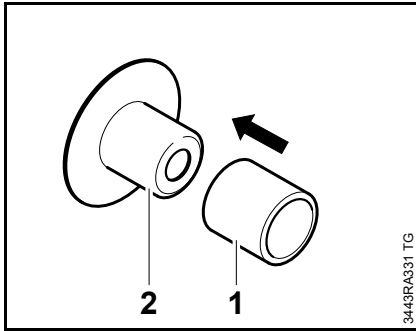



- Push the ignition lead (1) to one side.
- Take out the screw (2) and remove the sleeve (3) with hose.
- Take out the screws (4) and remove the annular buffer.
- Check the buffer and replace it if necessary.
- Check plug in tank housing / carburetor box and replace if necessary.

Installing

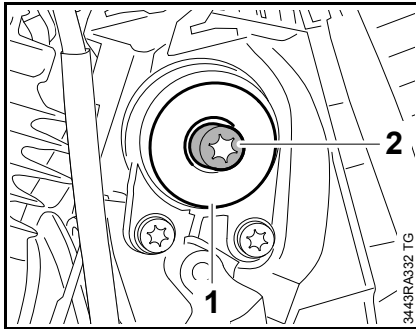


- Hold the annular buffer (1) with its tapered end facing the crankcase and place it in position.
- Check that the ignition lead is in its guide and not pinched.
- Insert and tighten down the screws (2) firmly.



– Use STIHL press fluid to make installation easier,  15

- Push the hose (1) onto the sleeve (2) as far as stop.

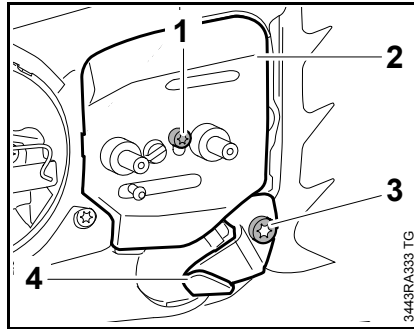


– Position the tank housing against the annular buffer – the holes must line up.

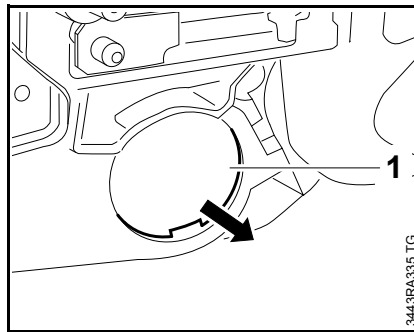
- Push sleeve (1) with hose into the annular buffer, fit the screw (2) and tighten it down firmly.

– Reassemble all other parts in the reverse sequence.

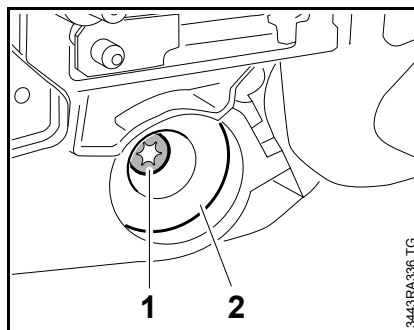
9.1.2 Annular Buffer on Spiked Bumper / Clutch Side



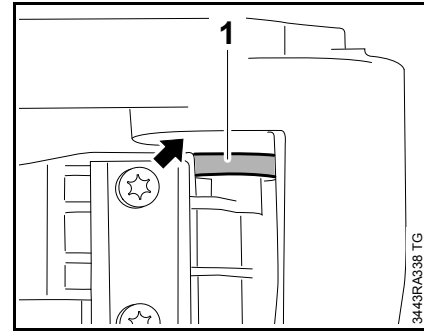
- Take out the screw (1) and remove the side plate (2).
- Take out the screw (3) and remove the chain catcher (4).



- Pry out the plug (1).



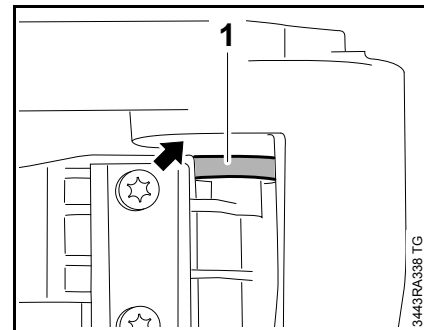
- Take out the screw (1) and pry out the annular buffer (2).
- Check the buffer and replace it if necessary.




- Pull the rubber ring (1) off the tank housing stub and push it out through the crankcase bore (arrow).

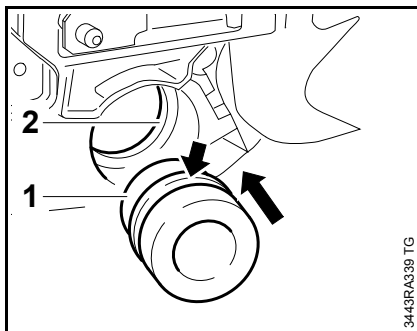
– Inspect the rubber ring and replace if necessary.

Installing



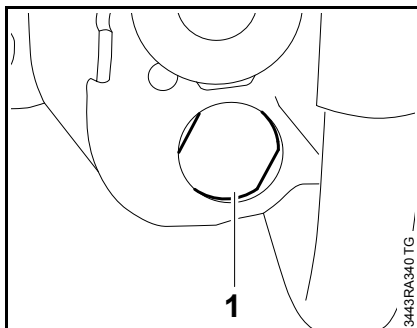
- Use STIHL press fluid to make installation easier,  15
- Push the rubber ring (1) through the crankcase bore (arrow) and onto the tank housing stub until it is properly seated.

The rubber ring must not be pinched between the annular buffer and tank housing.

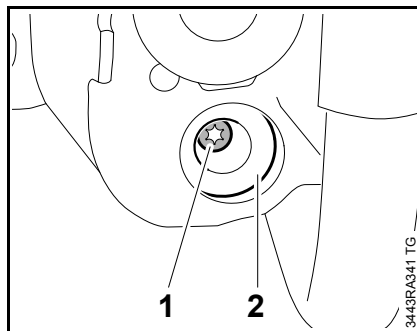


- Use STIHL press fluid to make installation easier, 15
- Push the annular buffer, small diameter (1) facing the housing, into the bore until its groove (arrow) engages the housing rib (2).
- Insert screw and tighten it down firmly.
- Push the plug into the annular buffer as far as stop.
- Reassemble all other parts in the reverse sequence.

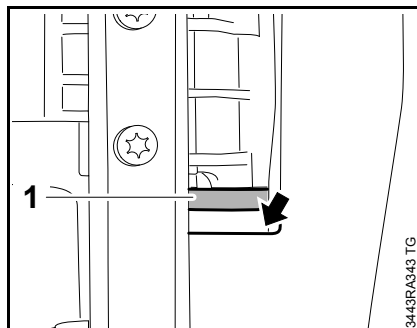
9.1.3 Annular Buffer on Oil Tank / Ignition Side



- Pry out the plug (1).

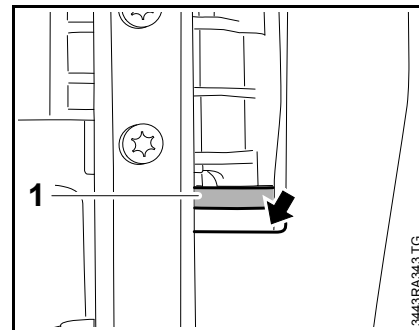


- Take out the screw (1) and pry out the annular buffer (2).
- Check the buffer and replace it if necessary.



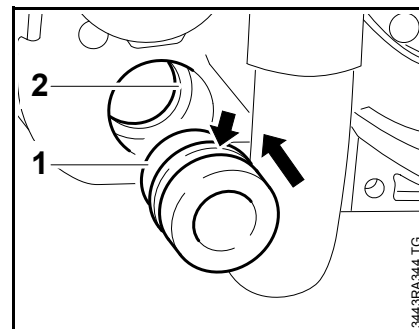
- Pull the rubber ring (1) off the tank housing stub and out through the crankcase bore (arrow).
- Inspect the rubber ring and replace if necessary.

Installing



- Use STIHL press fluid to make installation easier, 15
- Push the rubber ring (1) through the crankcase bore (arrow) and onto the tank housing stub until it is properly seated.

The rubber ring must not be pinched between the annular buffer and tank housing.



- Use STIHL press fluid to make installation easier, 15
- Push the annular buffer, small diameter (1) facing the housing, into the bore until its groove (arrow) engages the housing rib (2).

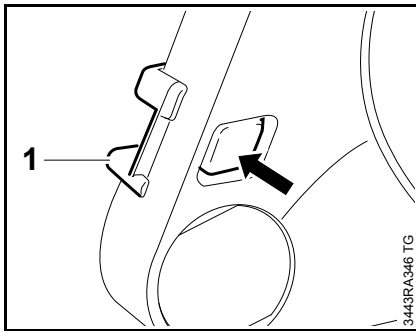


Rubber ring (1) must be installed between tank housing and crankcase.

- Insert screw and tighten it down firmly.
- Push the plug into the annular buffer.
- Reassemble all other parts in the reverse sequence.

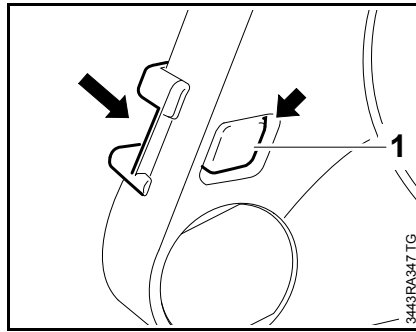
9.1.4 Stop Buffer at Clutch Side

- Remove the tank housing, 12.9.3



- Push out the stop buffer (1), from the outside inwards.
- Inspect the stop buffer and replace if necessary.

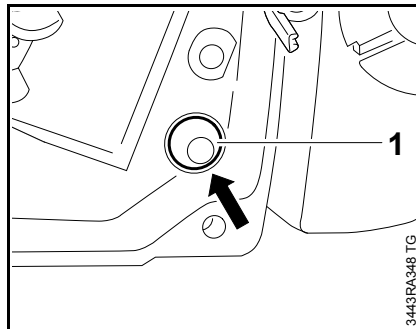
Installing



- Position the stop buffer so that the lug (1) faces the opening (arrow) in the tank housing.
- Use STIHL press fluid to make installation easier, 15
- Push the stop buffer into the guide and the lug (1) into the opening (arrow) until it engages properly.
- Reassemble all other parts in the reverse sequence.

9.1.5 Stop Buffer at Ignition Side

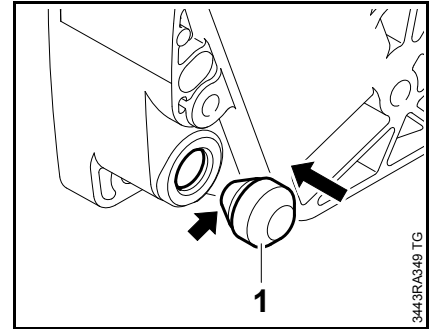
- Remove the ignition module, 7.2
- Remove the tank housing, 12.9.3



- Ease the stop buffer (1) out of the bore.

- Inspect the stop buffer and replace if necessary.

Installing

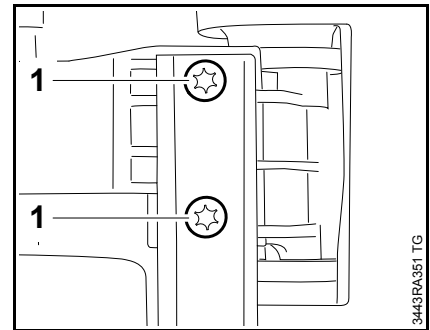


- Use STIHL press fluid to make installation easier, 15
- Position the stop buffer (1) with its small tapered end (arrow) facing the crankcase and push it into the bore while turning it slightly at the same time.

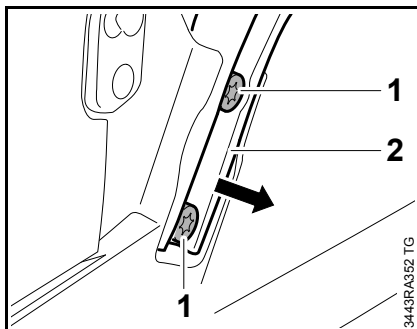
The tapered end must be properly seated in the bore at the ignition side.

- Reassemble all other parts in the reverse sequence.

9.2 Handlebar




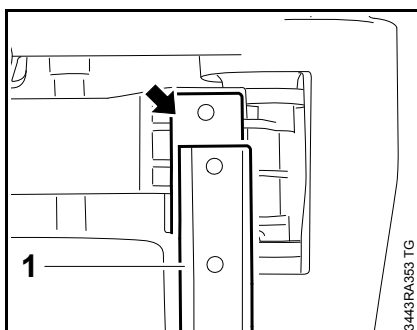
- Remove the screws (1) from the underside of the tank housing.



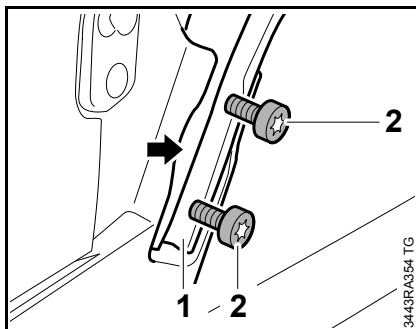
- Take out the screws (1) and remove the handlebar (2).

Installing

- Coat handlebar mounting screws with threadlocking adhesive,  15



- Position handlebar (1) in its seat (arrow) on the underside of the tank housing and fit the screws.




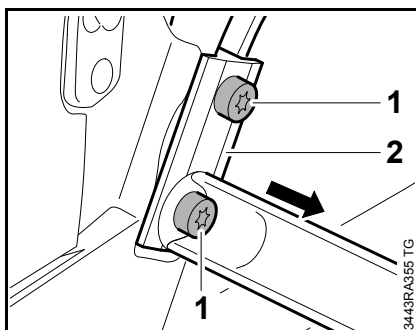
- Position the handlebar (1) in its seat (arrows) on the side of the machine.

- Fit the screws (2)

- Tighten down all 4 screws firmly.

9.2.1 Wrap Around Handlebar on Rescue Saw

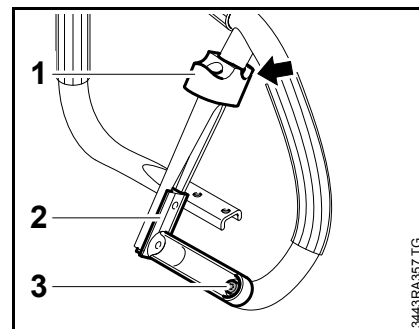
- Remove the screws from the underside of the tank housing,  9.2




- Take out the screws (1) and remove the handlebar (2).

- Check individual parts, replace if necessary


Installing

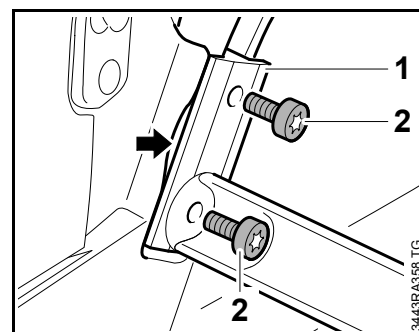


- Use STIHL press fluid to make installation easier,  15

- Push retainer (1) into place so that the recess (arrow) engages the handlebar.

- Fit the bracket (2), insert the screw (3) and tighten it down firmly.

- Position handlebar in its seat (arrow) on the underside of the tank housing and fit the screws  9.2











- Position the handlebar (1) in its seat (arrows) on the side of the machine.

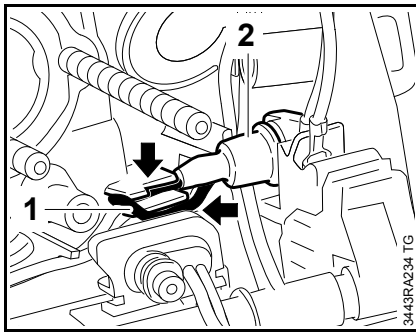
- Fit the screws (2)

- Tighten down all 4 screws firmly.

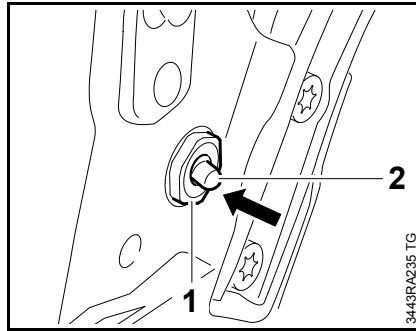
9.2.2 Handlebar with Heating

The handlebar on this version is equipped with a heating system – therefore, the electrical wires have to be disconnected as described below.

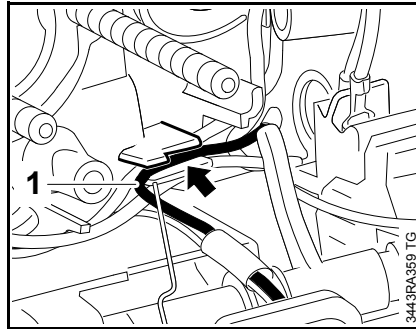
- Troubleshooting,  13.8.1
- Remove the shroud,  6.4
- Remove the rewind starter,  8.2
- Remove the ignition module,  7.2
- Remove the throttle rod,  10.3
- Remove the carburetor,  12.4
- Remove the lockout lever,  10.2
- Remove the tank housing,  12.9.3



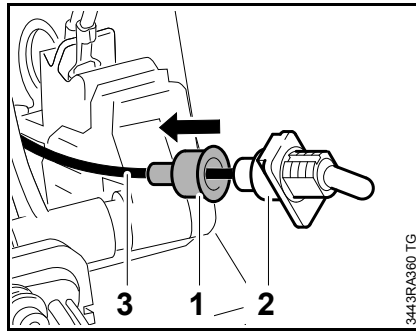
- Pull wire (1) of heater switch (2) out of the guides (arrows).



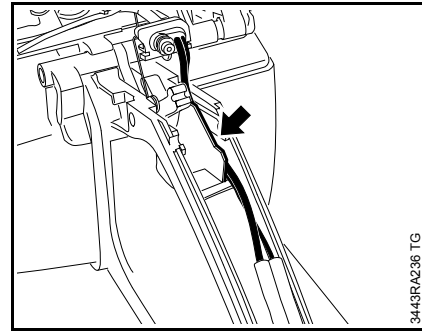
- Unscrew the nut (1), remove the washer and push the heater switch (2) out in direction of carburetor box.



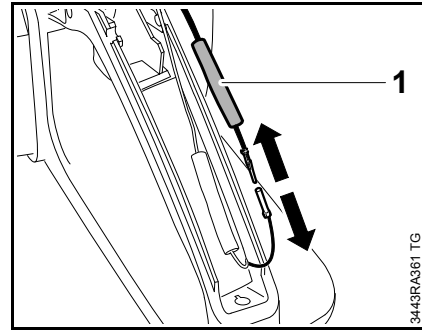
- Pull the thick black wire (1) out of the guide (arrow).



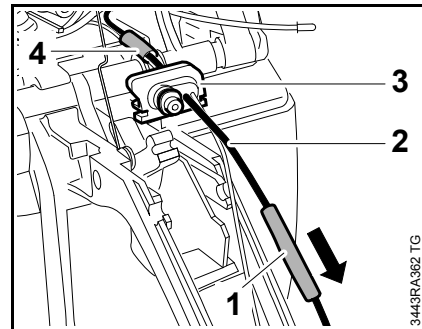
- Pull the grommet (1) off the heater switch (2) and disconnect wire (3) (connector sleeve).
- Pull the grommet off the wire.




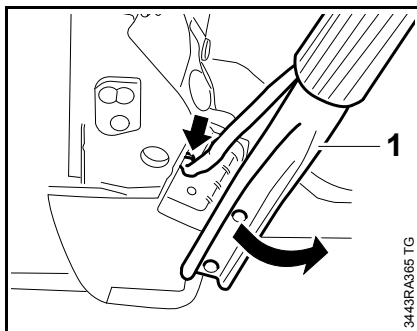
- Pull the wires out of the guide (arrow).



- Push insulating tube (1) of thick black wire in direction of handlebar heating element and separate the pin and socket connector.



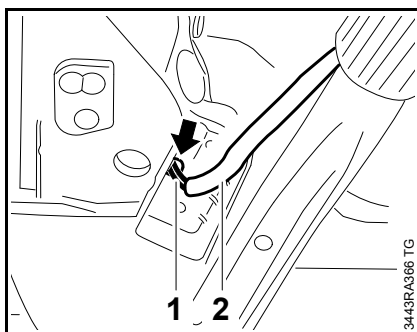
- Pull off the insulating tube (1).
- Pull the thick black wire (2) in direction of handlebar heating element and out of grommet (3) and protective tube (4).
- Take out all 4 handlebar mounting screws,  9.2



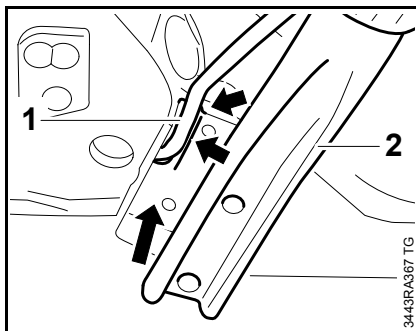
- Lift the handlebar (1) sideways a little and take it out of the guide, pulling the wiring harness out of the bore (arrow) at the same time.

– Remove and inspect the handlebar and replace it if necessary, 13.6

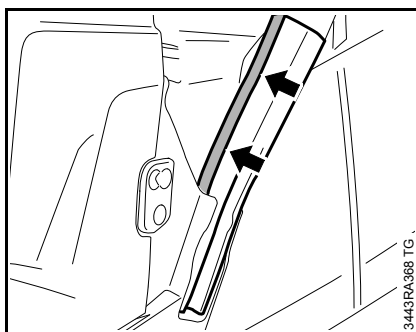
Installing



- Thread the wiring harness (1) through the bore (arrow) in direction of carburetor box until the protective tube (2) projects 5-8 mm into the carburetor box.

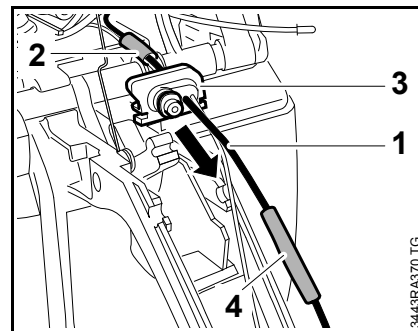


- Fit protective tube (1) with wiring harness in the guide (arrows) and place handlebar (2) in position.

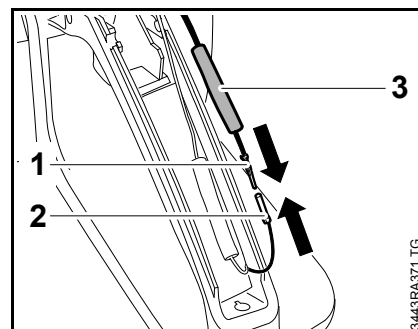


The wiring harness (arrows) must locate snugly against the handlebar – if necessary, pull wiring harness a little more in direction of carburetor box.

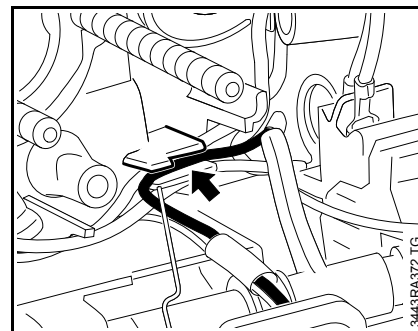
- Position handlebar in the guides, insert all 4 mounting screws and tighten them down firmly, 9.2



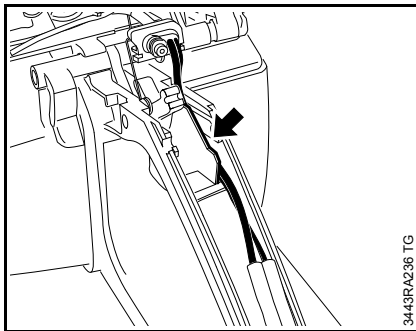
- Thread the thick black wire (1) through the protective tube (2) and grommet (3) in direction of rear handle.
- Fit the insulating tube (4).



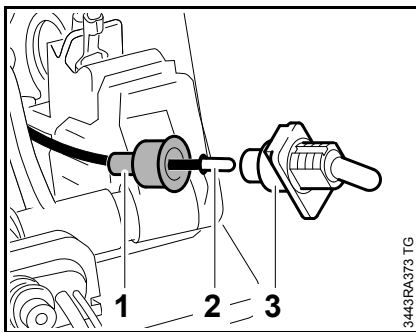
- Connect the pin (1) and socket (2).
- Push the insulating tube (3) over the connector.



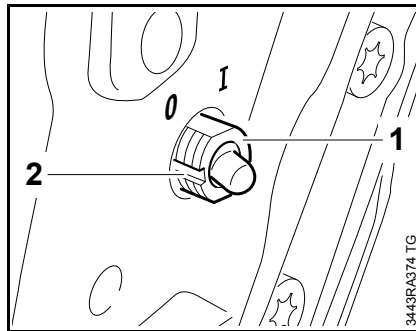
- Push the wire fully into the guide (arrow).



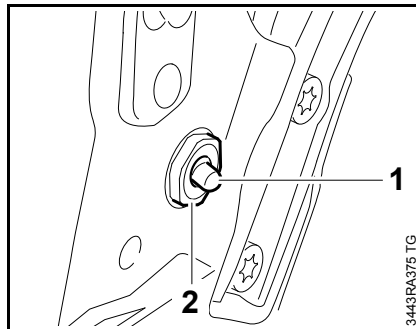
- Push the wires into the guide (arrow) – the thin wire must be under the thick wire.



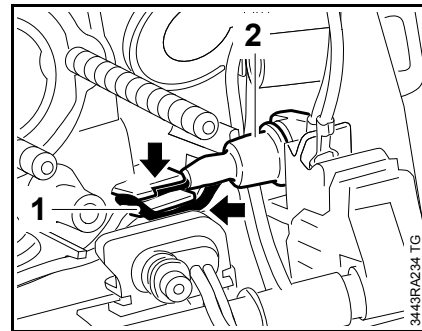
- To ensure the wire is not twisted during installation, hold the heater switch with its slot facing the throttle trigger.
- Fit the grommet (1) on the wire, push the connector sleeve (2) into the heater switch (3) as far as stop.
- Push the grommet onto the heater switch.




- Push the heater switch (1) from inside the carburetor box through the ground wire's contact ring and the hole in the tank housing so that the slot (2) is horizontal and points in the direction of "0".



- Hold the heater switch (1) in that position, fit the washer, then the nut (2) and tighten it down firmly.






- Push the wire (1) to heater switch (2) into the guides (arrows).
- Install the tank housing,  12.9.3
- Reassemble all other parts in the reverse sequence.

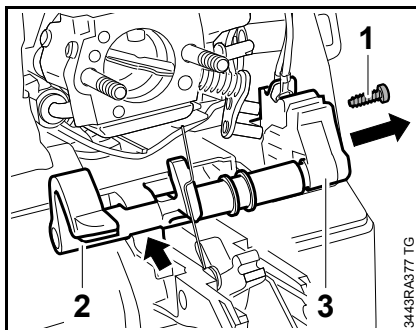
10. Control Levers

10.1 Master Control Lever

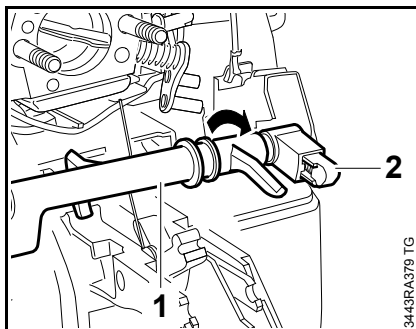
The positions of the Master Control lever are described in the instruction manual.

10.1.1 Removing and Installing

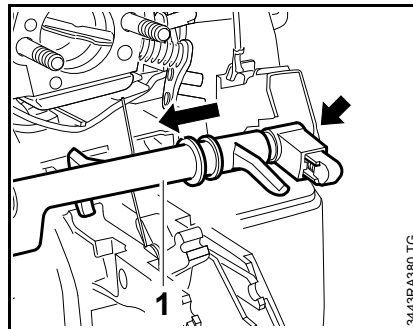
- Remove the filter base,  12.3
- Remove the throttle rod,  10.3, models with heating,  10.3.1



- Set the switch shaft (2) to "0" and take out the screw (1).
- Ease the switch shaft (2) out of its mount (arrow) and pull it with the switch housing (3) part way out of the guide – do not pull the wires out of the guides.

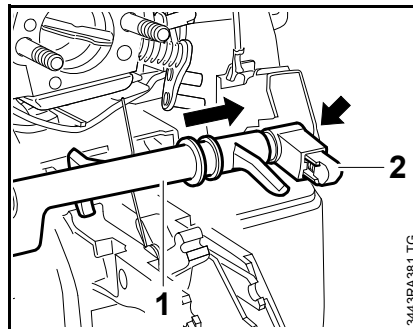


- Rotate the switch shaft (1) until the seat of the switch slide (2) faces away from the switch housing.

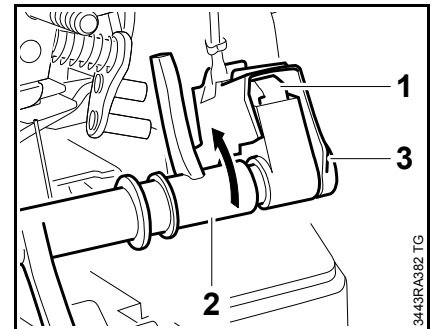


- Lift the switch shaft (1) a little and pull it out of the mount (arrow).
- Inspect the switch shaft and switch slide, replace if necessary.


Installing

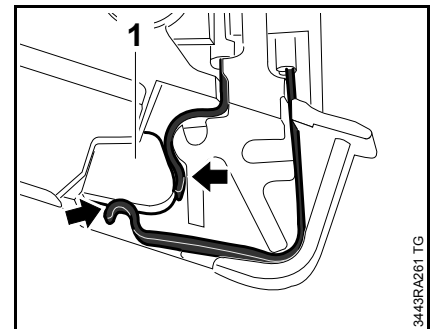


- Line up the switch shaft (1) so that the switch slide (2) points away from the switch housing.
- Push the switch shaft (1), pivot pin first, into the mount (arrow) and place it in position.



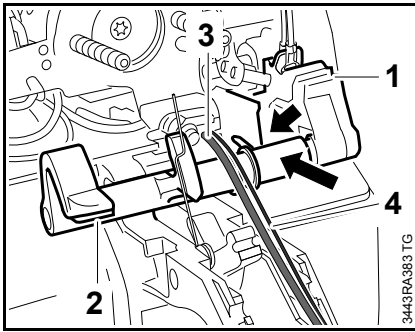
- Push the switch slide (1) into its seat and rotate the switch shaft (2) into the switch housing (3) as far as stop.

Short circuit and ground wire connectors must be pushed fully onto the contact springs,  7.6.3.



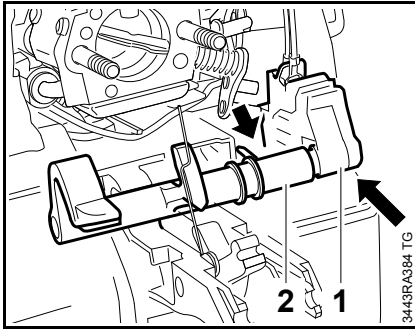
- Check operation – the switch slide (1) must touch the contact springs (arrows) in position "0".

Models with heating system

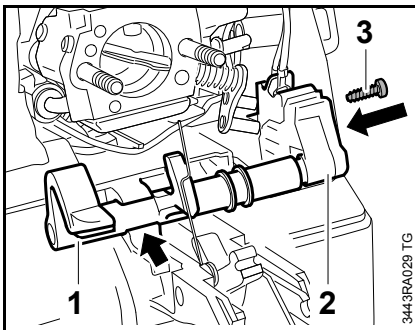


- Fit the switch housing (1) with switch shaft (2) under the wires (3) and (4) and push it into the guide (arrow).

All versions

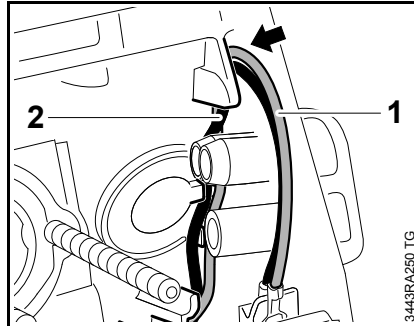


- Push switch housing (1) with switch shaft (2) into the guide (arrow).



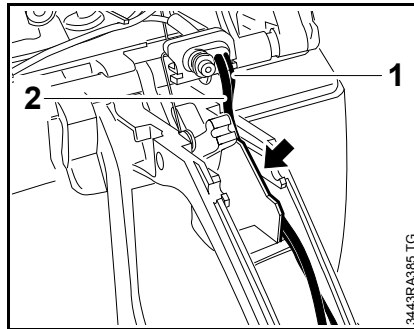
- Push the switch shaft (1) into the guide (arrow) until it snaps into position.

- Push switch housing (2) in direction of cylinder, insert screw (3) and tighten it down firmly.



- Ground wire (1) and short circuit wire (2) must be between the rib (arrow) and housing wall, push fully home if necessary.
– Ground wire must be under the short circuit wire.

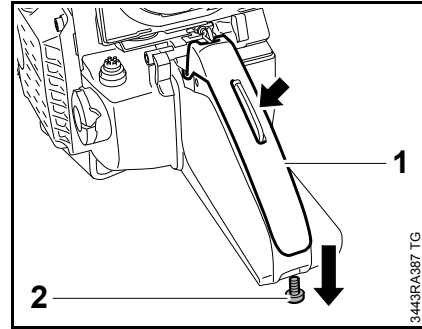
Models with heating system



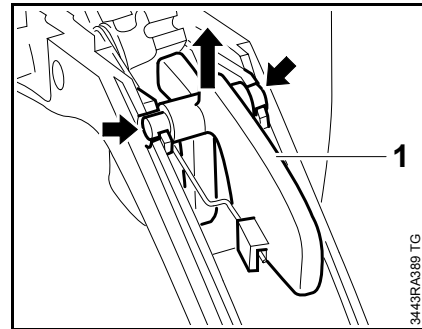
- Push the thin wire (1) and then the thick wire (2) into the guide (arrow).
- Reassemble all other parts in the reverse sequence.

10.2 Throttle Trigger / Lockout Lever

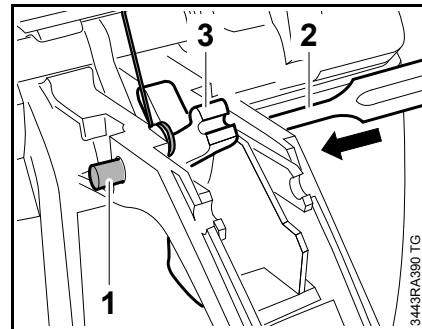
- Remove the air filter, 12.1
- Open throttle wide and hold trigger in that position, then disconnect throttle rod from trigger.



- Take out the screw (2) and remove the handle molding (1) – the lockout lever (arrow) may pop out.

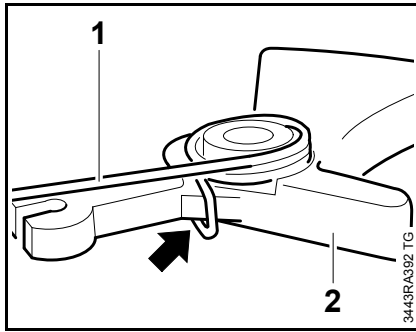


- Pull the lockout lever (1) out of its mounts (arrows).

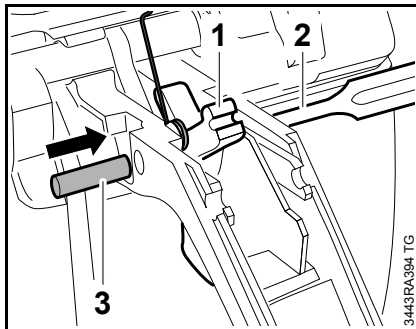


- Use a punch (2) to drive out the pin (1) and remove the throttle trigger (3) with torsion spring.
- Inspect the lockout lever, throttle trigger and torsion spring, replace as necessary.

Installing

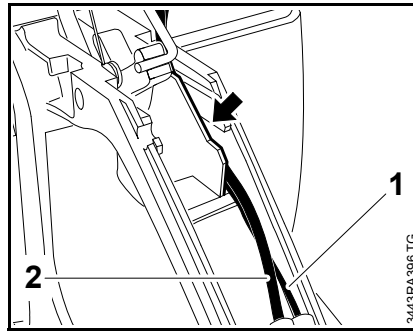


- Attach the torsion spring (1) to the trigger (2)
– note the installed position (arrow).



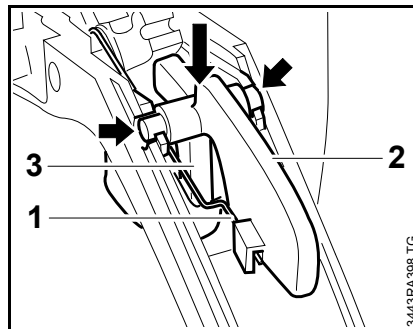
- Place the throttle trigger (1) in the handle and line up the holes in the trigger and handle.
- Use punch (2) to center the throttle trigger (1) and drive home the pin (3) until it is recessed to the same depth at both sides.

Models with heating system



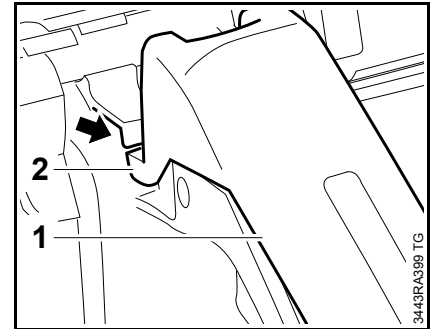
- Thin wire (1) and thick wire (2) must be seated in the guide (arrow), push fully home if necessary – the thin wire must be positioned under the thick wire.

All versions



- Push leg of torsion spring (1) in direction of rear handle.
- Position the lockout lever (2) so that stop (3) engages the trigger.
- Attach the torsion spring (1) to the lockout lever.
- Push lockout lever (2) into the mounts (arrows) until it snaps into place.

The lockout lever may pop out.



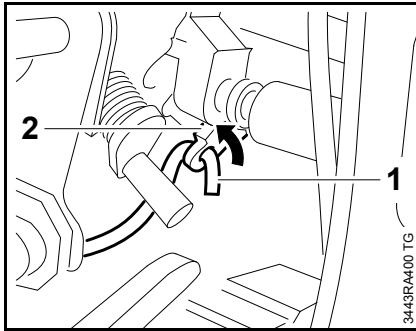
- Engage lugs (2) at front end of handle molding (1) in the recesses (arrow).
- Insert screw and tighten it down firmly.

Check operation

- Open throttle wide and hold trigger in that position, then attach throttle rod to trigger – the trigger may operate only when the lockout lever is depressed.
- Squeeze trigger all the way, the throttle lever on the carburetor must then be in the full throttle position. It should not be possible to open it any further.
- Reassemble all other parts in the reverse sequence.

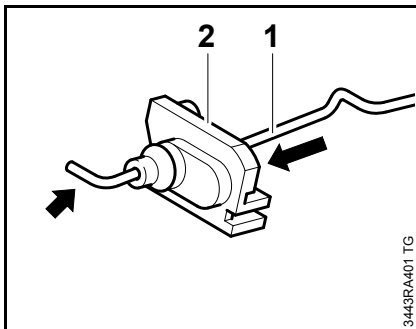
10.3 Throttle Rod

- Remove the filter base, 12.3
- Remove the handle molding, 10.2
- Open throttle wide and hold trigger in that position, then disconnect throttle rod from trigger.

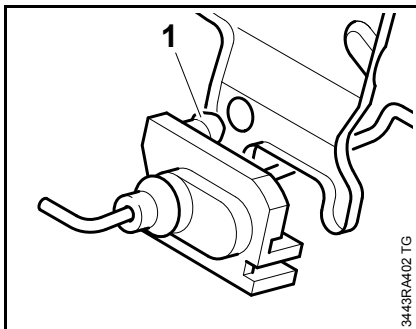


- Rotate throttle rod (1) counterclockwise and disconnect it from the carburetor's throttle lever (2).
- Remove throttle lever with grommet and baffle.
- Check individual parts, replace if necessary

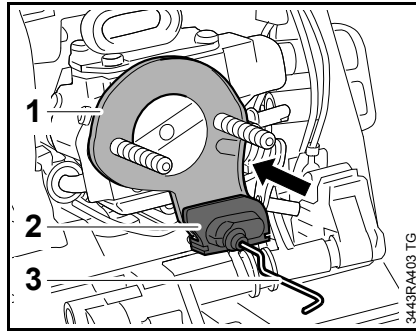
Installing



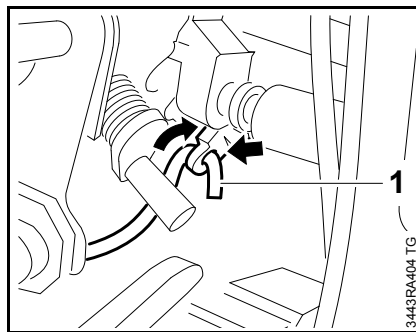
- Push angled end (arrow) of throttle rod (1) through the back of the grommet (2).



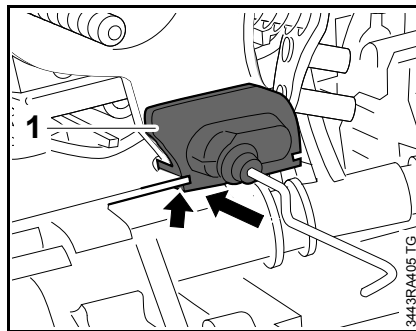
- Push knob (1) into hole in baffle.



- Fit the baffle (1) with grommet (2) and throttle rod (3) over the studs and locate it in position.



- Rotate throttle rod (1) clockwise to attach it to the lever (arrow) on the throttle shaft.



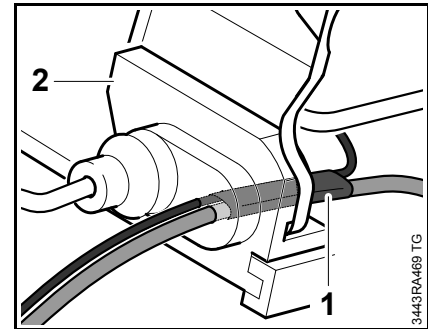
- Push the grommet (1) into its seat (arrow) and locate it in position.

Check operation

- Open throttle wide and hold trigger in that position, then attach throttle rod to trigger – the trigger may operate only when the lockout lever is depressed.
- Squeeze trigger all the way, the throttle lever on the carburetor must then be in the full throttle position. It should not be possible to open it any further.
- Reassemble all other parts in the reverse sequence.

10.3.1 Throttle Rod on Models with Heating

- Throttle rod removal and installation procedures are the same as for models without heating, [10.3](#)



In addition, make sure the insulating tube (1) locates against the grommet (2).




- Reassemble all other parts in the reverse sequence.

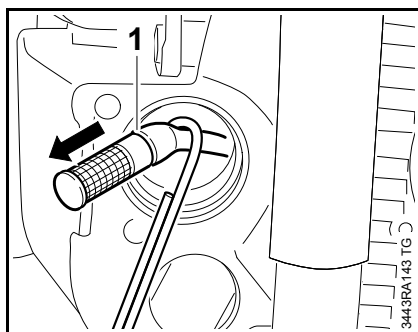
11. Chain Lubrication

11.1 Pickup Body

Impurities gradually clog the fine pores of the filter. This prevents the oil pump from supplying sufficient oil.

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

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







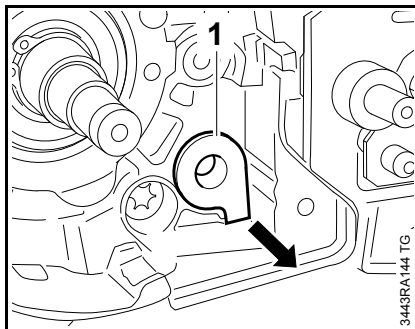
- Use hook (2) 5910 893 8800 to remove the pickup body (1) from the oil tank.


Do not overstretch the suction hose.

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

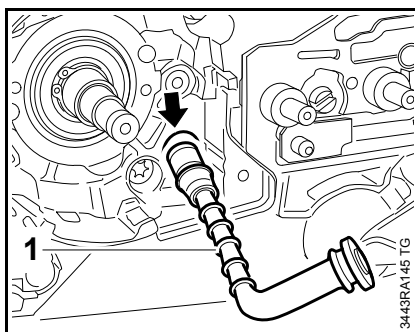
11.2 Oil Suction Hose

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

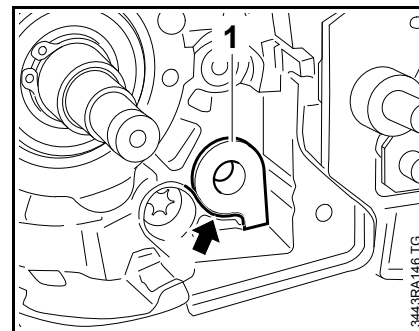



- Remove the oil suction hose (1) together with the pickup body.
- Check the oil suction hose and pickup body and replace if necessary.
- Fit the pickup body,  11.1

Installing






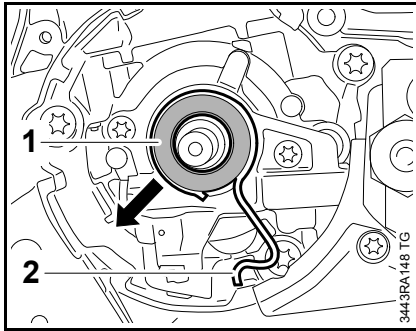
- Push the oil suction hose (1), pickup body first, through the housing bore (arrow).



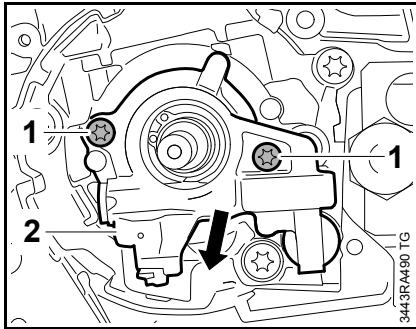
- Line up the oil suction hose (1)
 - the tab (arrow) must locate against the radius on the housing.
- Push home the oil suction hose (1) until its groove is properly seated in the crankcase bore.
- Check position of the pickup body and, if necessary, use the hook 5910 893 8800 to re-position it.
- Install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

11.3 Oil Pump

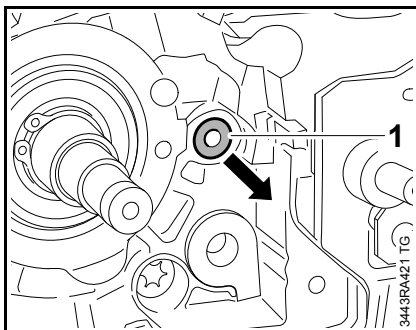
- Troubleshooting,  3.3
- Remove the clutch,  4
- Remove the brake band,  5.2
- Remove the washer.



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



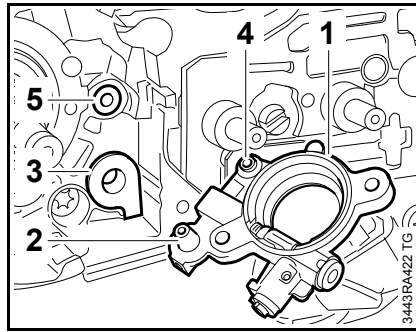
- Take out the screws (1).
- Pull off the oil pump (2), check and replace if necessary.



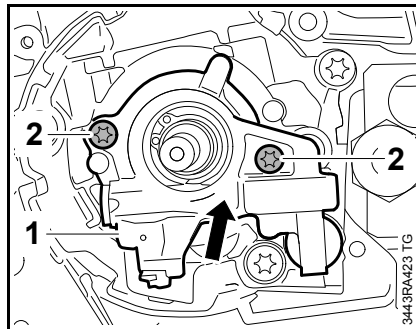
- Install a new sealing ring (1).

Always use a new sealing ring.

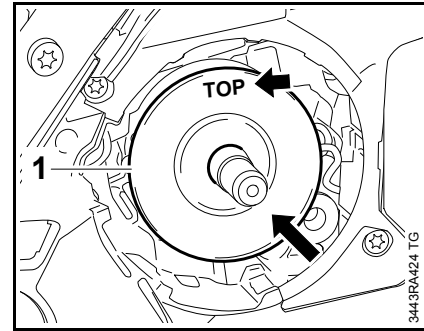
Installing



- Lubricate the pump piston with STIHL multipurpose grease, 15
-
- Line up the oil pump (1) so that the stub (2) engages the oil suction hose (3) and face (4) with hole locates against the sealing ring (5).
- Coat stub and sealing ring with STIHL press fluid, 15



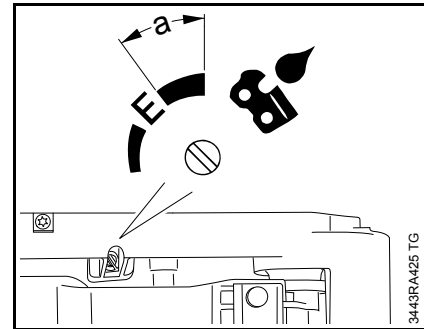
- Push oil pump (1) into position.
- Fit the screws (2) and tighten them down firmly.
- Push the worm fully home.



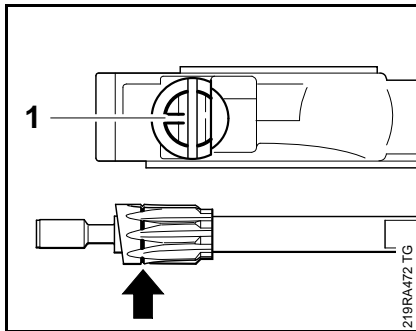
- Push the washer (1) into position.
 - The word "TOP" (arrow) must face outwards.
- Reassemble all other parts in the reverse sequence.

11.3.1 Adjusting Up-rated Oil Pumps

See owner's manual for most suitable settings for different uses.



When oil pumps with an increased oil flow rate are set within range "a", note that the oil tank runs dry before the fuel tank and the saw chain will then have insufficient lubrication. Therefore, if pump is set to range "a", fill fuel tank to half full mark only or refill oil tank when fuel tank is half empty.



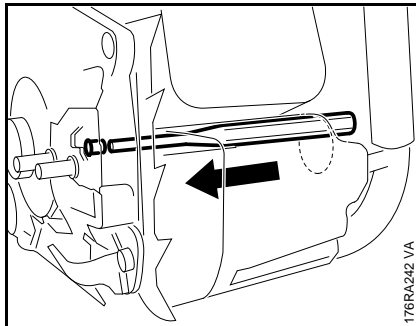
An uprated oil pump (increase oil flow rate) can be identified by the slot (1) or the annular groove (arrow) on the pump piston.

11.4 Valve

A valve is installed in the tank wall to keep internal tank pressure equal to atmospheric pressure. Always replace a defective valve.

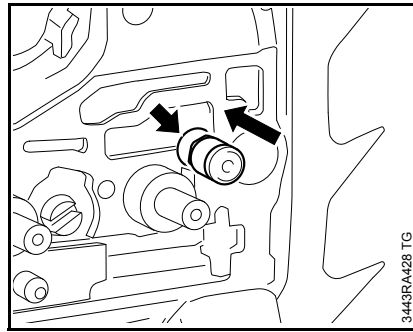
Removing

- Open the cap and drain the oil tank, 1
- Remove the side plate, 5.2



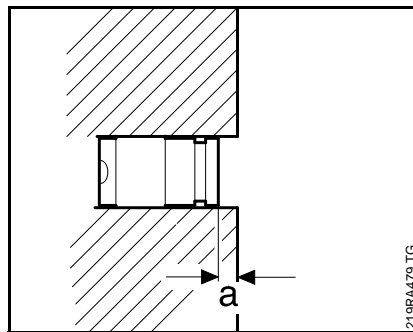
- Use a 5 mm drift to carefully drive the valve out of the crankcase from inside the oil tank.

Installing



Check correct installed position.

- Insert the new valve in the crankcase bore (arrow).
- Use a 5 mm drift to carefully drive the valve into the crankcase bore from outside – note installed depth.





- New valve must be recessed to a depth of 1 mm +/- 0.1 (a).

Reassemble all other parts in the reverse sequence.


12. Fuel System

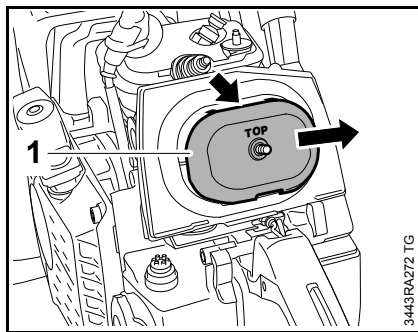
12.1 Air Filter

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

- See also Troubleshooting,  3.6,  3.7
- Loosen the twist lock and lift away the filter cover.
- Remove the air filter.
- Check the air filter and clean or replace if necessary – see owner's manual.
- Reassemble in the reverse sequence.

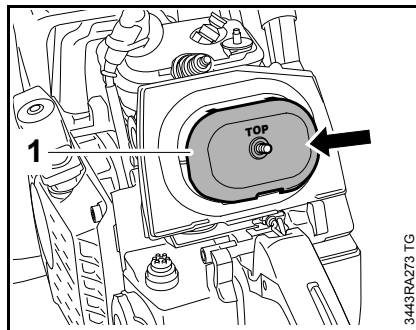
12.2 Baffle

- Remove the air filter,  12.1




- Lift retaining tab (arrow) and pull off the baffle (1).
- Check the baffle and replace if necessary.

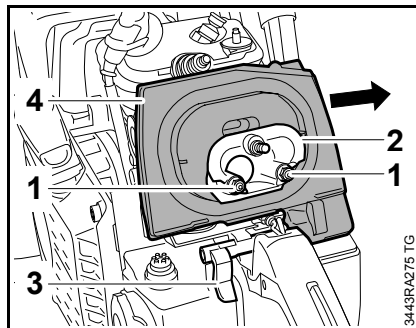
Installing



- Push baffle (1) into position until retaining tab engages flange – the word "TOP" must be at the top.
- Reassemble all other parts in the reverse sequence.

12.3 Filter Base

- Remove the baffle,  12.2

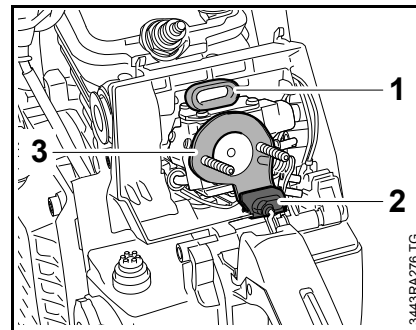


- Unscrew the nuts (1) and pull off the flange (2).

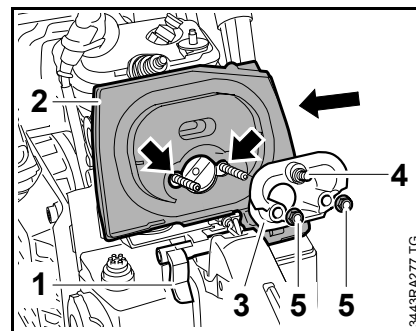
Switch shaft (3) must be in cold start position.

- Remove the filter base (4) from the studs.

Installing



Sleeve (1) must be in place and grommet (2) must engage the baffle (3).







Switch shaft (1) must be in cold start position.

- Fit the filter base (2) over the studs (arrows) and into position.
- Fit the flange (3) with the stud (4) at the top.
- Fit the nuts (5) and tighten them down firmly.

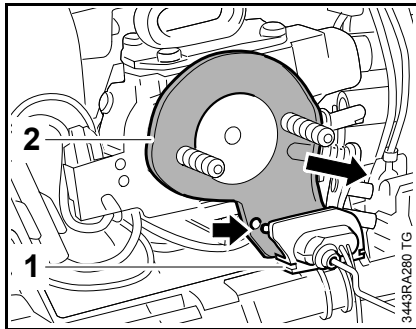
- Reassemble all other parts in the reverse sequence.

12.4 Carburetor

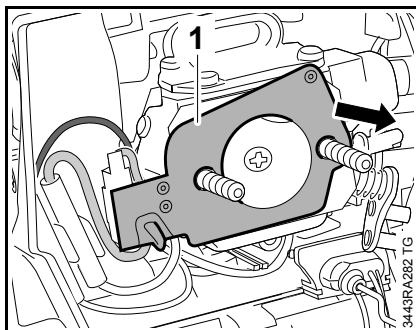
- Open the fuel tank cap and drain the fuel tank.
- Collect the fuel in a clean container,  1
- Remove the filter base,  12.3
- Remove baffle plate with throttle rod,  10.3, models with heating, remove throttle rod,  10.3.1

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

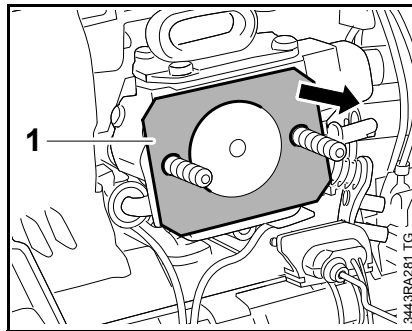
Models with heating system



- Pull knob (arrow) on grommet (1) out of bore and remove the baffle plate (2).

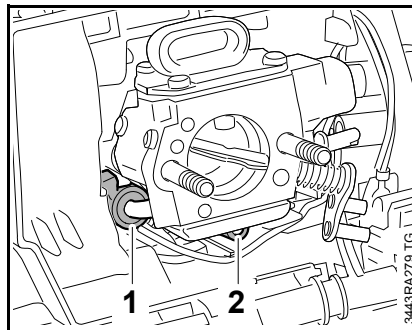


- Remove the heating element (1) and put it to one side

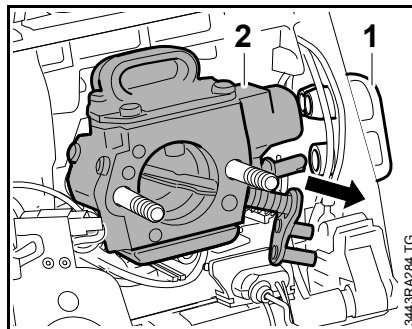


- Remove the gasket (1) – always install a new gasket.

All versions

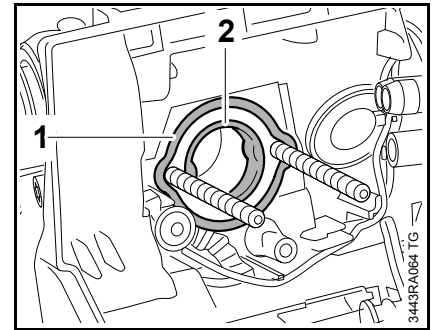


- Push the fuel hose (1) and impulse hose (2) back a little – the fuel hose and impulse hose are disconnected.

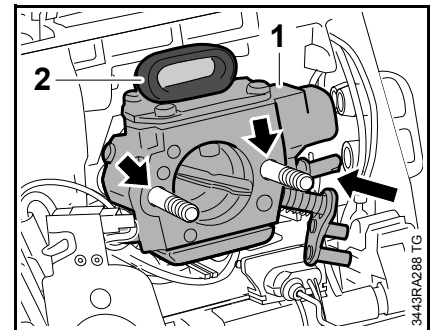


- Push the grommet (1) out and pull off the carburetor (2).
- Check the carburetor and service or replace it if necessary.
- Check the sleeve, remove and replace it if necessary.

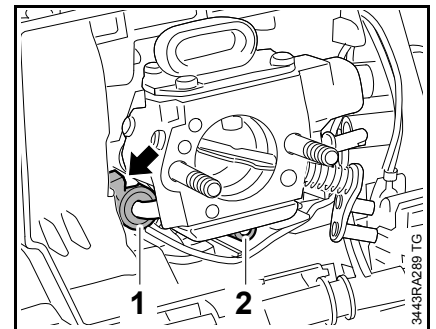
Installing



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



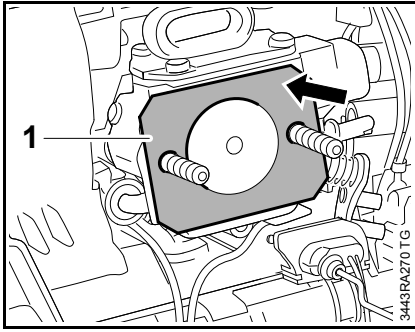
- Push the carburetor (1) onto the studs (arrows) – sleeve (2) must be in place.



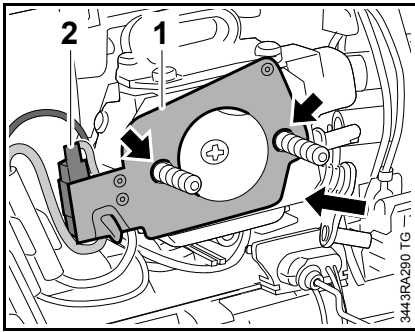
The fuel hose must be located in its seat (arrow).

- When positioning the carburetor, make sure the stub is pushed into the fuel hose (1) and impulse hose (2).

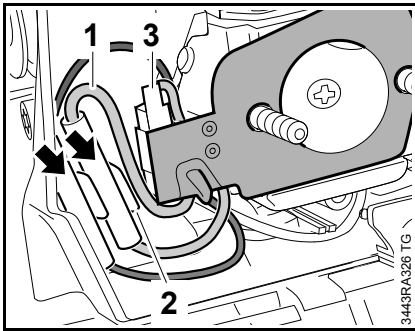
Models with heating system



- Fit the new gasket (1).

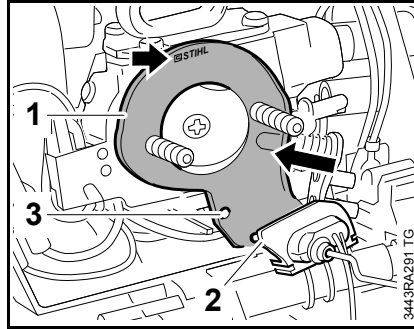


- Fit the heating element (1) over the studs (arrows) so that the thermocouple (2) faces inwards.

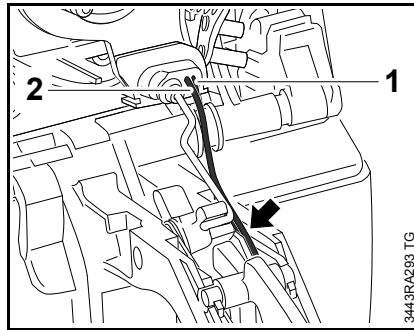


The connections with insulating tubes must be properly seated in the guides (arrows).

Wire (1) must be positioned between the guide (2) and the thermocouple (3).



- Fit the baffle plate (1) over the studs so that the lettering (arrow) faces outwards.
- Push the knob of grommet (2) fully into the bore (3).
- Install the throttle rod, [10.3.1](#)

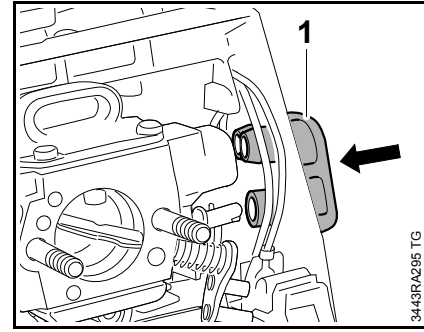


- Push the thin wire (1) and then the thick wire (2) into the guide (arrow).

Models without heating


- Install the throttle rod and check its operation, [10.3](#)

All versions



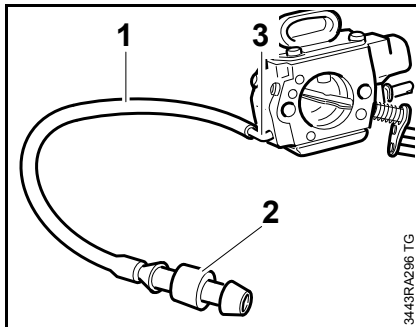
- Use STIHL press fluid to make installation easier, [15](#)
- Push grommet (1) into holes in handle housing and make sure it is properly seated.
- Install the filter base, [12.3](#)
- Install the air filter, [12.1](#)
- Check operation
- Reassemble all other parts in the reverse sequence.

12.4.1 Leakage Test

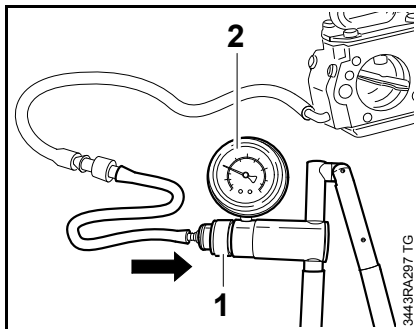
In the case of problems with the carburetor or fuel supply system, also check and clean or replace the tank vent,  12.8

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

- Remove the carburetor,  12.4










- Push the fuel hose (1) 1110 141 8600 onto the nipple (2) 0000 855 9200 and then onto the carburetor's connector (3).





- Push the pressure hose of pump 0000 850 1300 onto the nipple.
- Push the ring (1) to the right and pump air into the carburetor until the pressure gauge (2) indicates a pressure of about 0.8 bar (80 kPa).

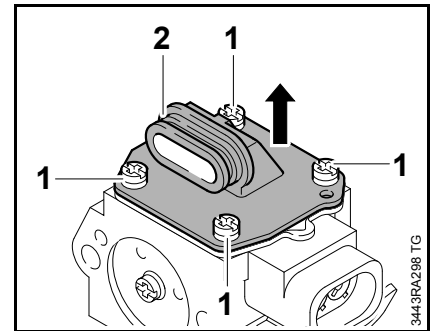
If this pressure remains constant, the carburetor is airtight. However, if it drops, there are three possible causes:

1. The inlet needle is not sealing (foreign matter in valve seat, sealing cone of inlet needle is damaged or inlet control lever is sticking), remove to clean,  12.5.2 or  12.8.1
 2. Metering diaphragm or gasket damaged, replace as necessary,  12.5.1 or  12.8.1
 3. Pump diaphragm or gasket damaged, if necessary,  12.5.3 or  12.8.1
- After completing the test, push the ring (1) to the left to vent the system and then pull the fuel hose off the carburetor.
 - Install the filter base,  12.3
 - Reassemble all other parts in the reverse sequence.

12.5 Servicing the Carburetor

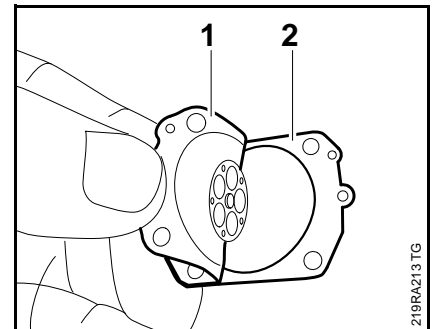
12.5.1 Metering Diaphragm

- Troubleshooting,  3.6
- Remove the carburetor,  12.4
- Check the sleeve, remove and replace it if necessary.



- Take out the screws (1) and remove the end cover (2).

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

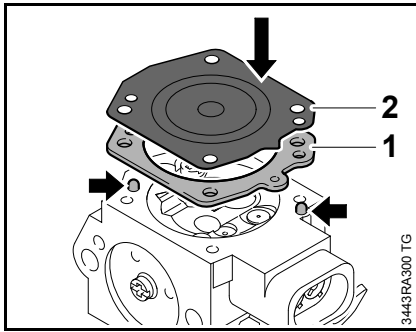


- Carefully separate the metering diaphragm (1) and gasket (2).

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

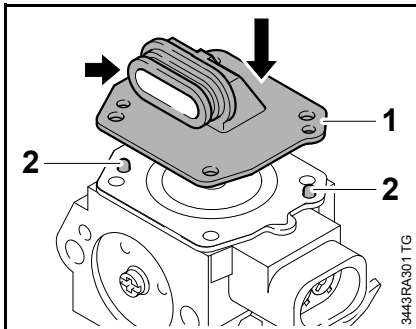
- Check the metering diaphragm for signs of damage and wear. Install a new gasket.

Installing

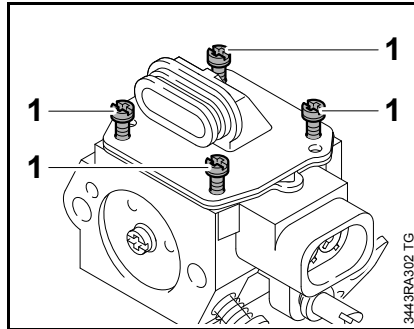


Note installed positions of gasket (1) and metering diaphragm (2).

- Position the gasket (1) and metering diaphragm (2) so that the pegs (arrows) engage the holes.




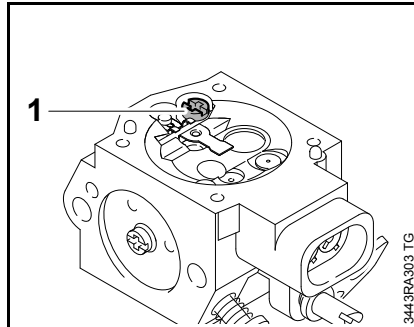
- Position the end cover (1) so that the stub (arrow) points in the direction of the choke shutter.
- Line up the end cover (1) so that the holes engage the pegs (2).



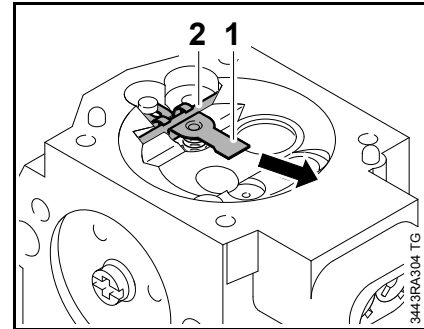
- Fit the screws (1).
- Check position of metering diaphragm and gasket, then tighten down the screws firmly in a crosswise pattern.
- Push the sleeve onto the stub.
- Reassemble all other parts in the reverse sequence.

12.5.2 Inlet Needle

- Remove the metering diaphragm,  12.5.1

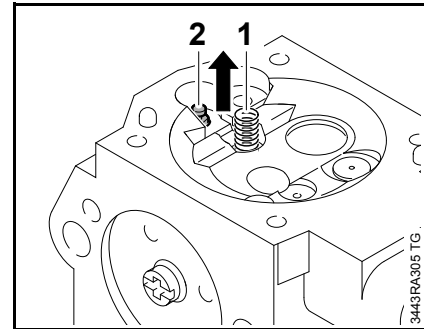


- Take out the screw (1).

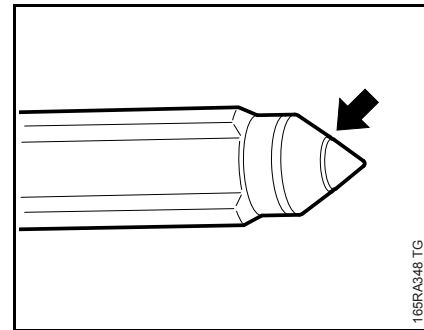


- Remove the inlet control lever (1) with spindle (2) out of the inlet needle's groove.

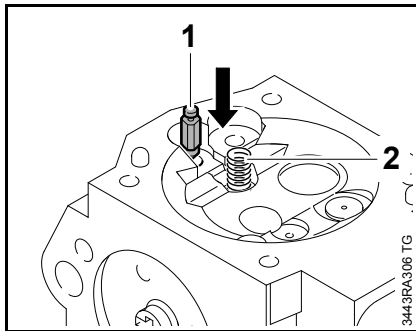
The small spring under the inlet control lever may pop out.



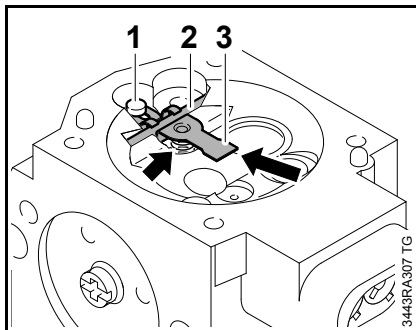
- Remove the inlet needle (2).
- Remove the spring (1). Inspect and replace if necessary.



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



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



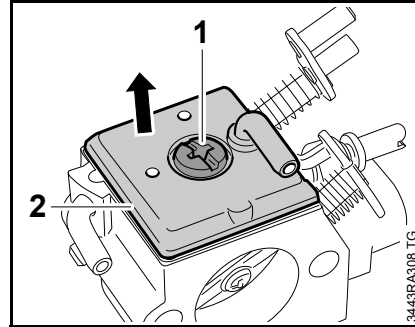
- Position the inlet control lever (3) with spindle (2) on the spring (1) first, then slide the inlet control lever's clevis into the groove in the inlet needle (1).

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

- Press the inlet control lever down and secure it with the screw.
- Check that the inlet control lever moves freely.
- Install the metering diaphragm, 12.5.1

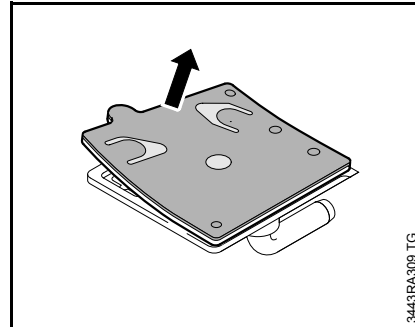
12.5.3 Pump Diaphragm

- Troubleshooting, 3.6
- Remove the carburetor, 12.4

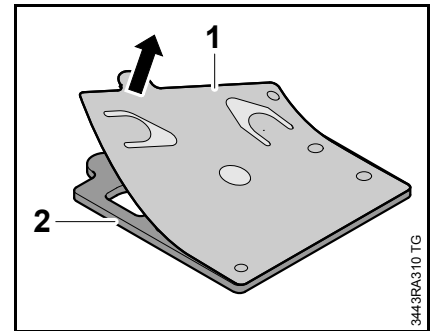


- Take out the screw (1) and remove the end cover (2).

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



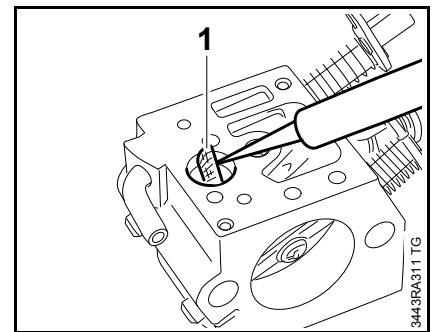
- Carefully remove the pump diaphragm with gasket.



- Carefully separate the pump diaphragm (1) and gasket (2)

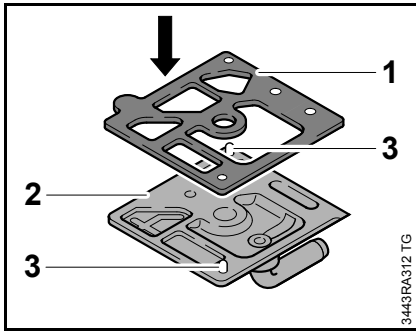
The diaphragm material is subjected to continuous alternating stresses and eventually shows signs of fatigue, i.e. the diaphragm distorts and swells and has to be replaced.

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

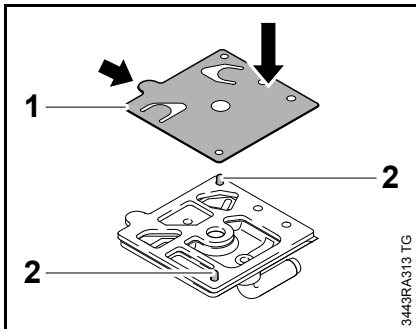


- Use a needle to remove the fuel strainer (1) from the carburetor body. Clean or replace the fuel strainer.
- Reassemble in the reverse sequence.

Installing

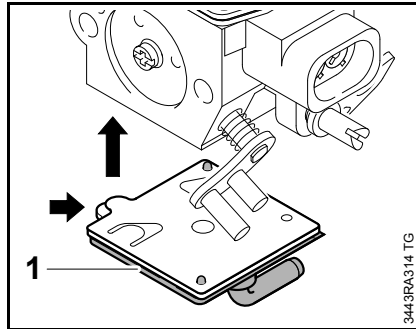


- Fit the new gasket (1) so that its contours match the end cover (2) and its holes engage the pegs (3).

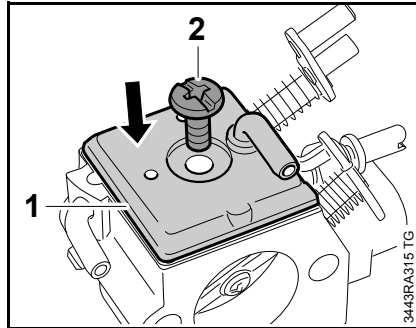


- Fit the pump diaphragm (1) on the gasket so that their tabs (arrow) are in alignment and its holes engage the pegs (2).

Gasket and pump diaphragm are now held in position.



- Fit the end cover (1) from below so that the pump diaphragm and gasket remain in position.
- Align the end cover (1) so that the tabs (arrow) are facing away from the choke lever.



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

12.5.4 Adjusting Screws

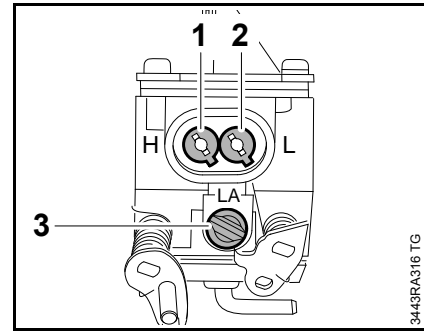


Illustration shows limiter caps.

Positions of adjusting screws are the same on version without limiter caps.

There are three adjusting screws on the carburetor:

– Adjusting screws (1) and (2) with limiter caps

H = high speed screw (1)

L = low speed screw (2)

LA = idle speed screw (3)

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

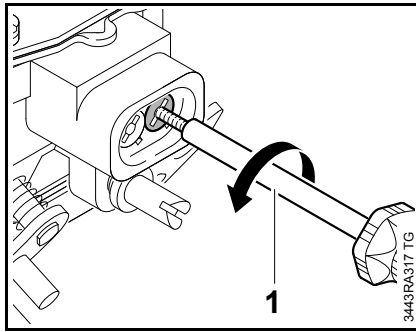
The high speed screw **H** and low speed screw **L** have limiter caps, which have to be removed before the screws are removed.

Always install new limiter caps.

– Remove the carburetor, 12.4

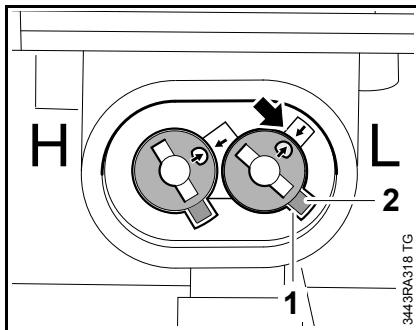
– See also carburetor troubleshooting, 3.6

Low speed screw



- Screw the puller (1) 5910 890 4500 about 5 turns counterclockwise into the limiter cap
 - left-hand thread.

Do not turn the puller (1) any further
– the low speed screw (L) may otherwise be damaged.



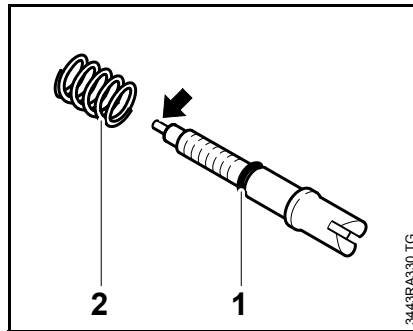
- Use the puller to turn the limiter cap clockwise until the lug (2) or screw slot is in line with slot (1).

The dot on the limiter cap must line up with the mark (arrow).

- Pull out the limiter cap.
- Remove the low speed screw (L).

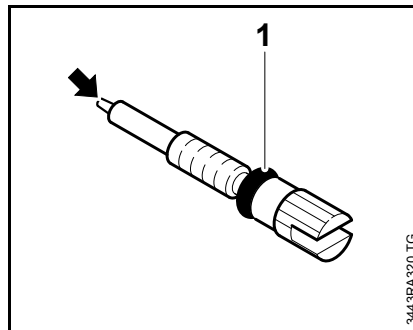
Version without limiter caps

- Remove the low speed screw (L) with spring.



- Inspect the tip (arrow) for damage or wear and replace the low speed screw (L) if necessary.
- Check the O-ring (1) and spring (2) and replace if necessary.
- Screw down the low speed screw (L) with spring (2) as far as stop.
- Continue with the high speed screw (H).

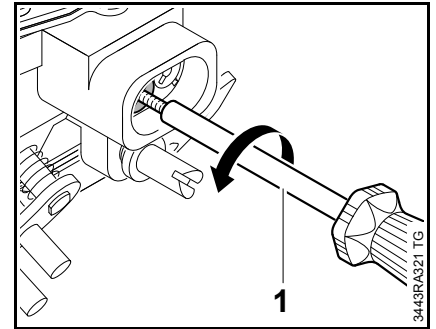
Version with limiter caps



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

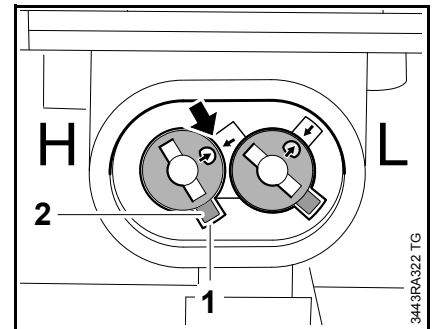
High speed screw

Version with limiter caps



- Screw the puller (1) 5910 890 4500 about 5 turns counterclockwise into the limiter cap
 - left-hand thread.

Do not turn the puller (1) any further
– the high speed screw (H) may otherwise be damaged.



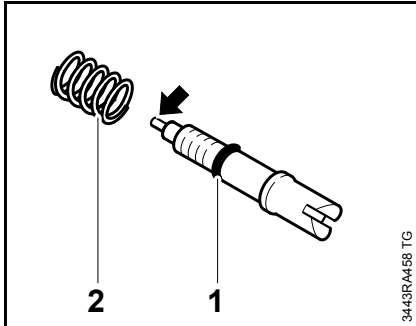
- Check position of limiter cap. If necessary, use the puller to turn the limiter cap counterclockwise until the lug (2) or screw slot is in line with slot (1).


The dot on the limiter cap must line up with the mark (arrow).

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

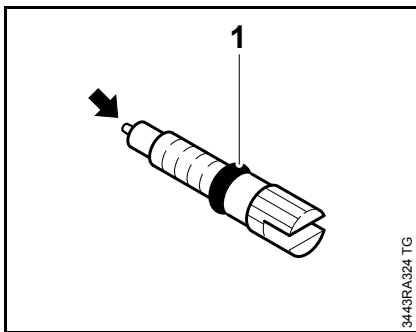
Version without limiter caps

- Take out the high speed screw (H) with spring.



- Inspect the tip (arrow) for damage or wear and replace the high speed screw (H) if necessary.
 - Check the O-ring (1) and spring (2) and replace if necessary.
 - Screw down the high speed screw (H) with spring (2) as far as stop.
- Go to "Basic Setting",  12.6.1

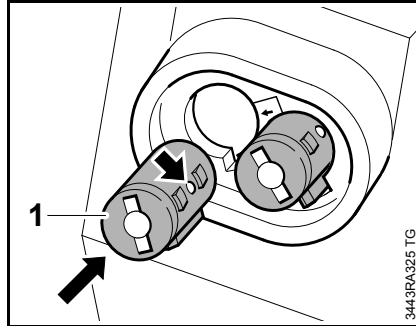
Version with limiter caps



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


- Continue with "Pre-installing limiter cap".

Pre-installing limiter caps



- Push the new limiter caps (1) onto the high speed screws as far as the first detent (arrow) – do not push them fully home.

If the screwdriver 5910 890 2304 is not available, the basic setting must be carried out without pre-installed limiter caps.




- Carry out the basic setting,  12.6.1

12.6 Adjusting the Carburetor

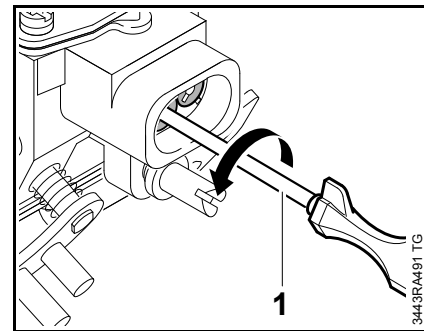
12.6.1 Basic Setting

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


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

- Install the carburetor and air filter
 - adjusting screws must be preset and the new limiter caps pre-installed.
- Check chain tension and adjust if necessary.
- Inspect the spark arresting screen (if fitted) and clean or replace if necessary,  3.7 or  6.1
- Check the air filter and clean or replace if necessary,  12.1

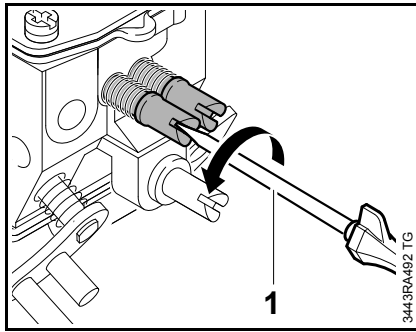
Version with limiter caps



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

- Insert the screwdriver (1) 5910 890 2304 through the pre-installed limiter caps of high speed screw (H) and low speed screw (L).
 - Starting with the high speed screw H against its seat, open it **1 1/2 turns** counterclockwise.
 - Starting with the low speed screw L against its seat, open it **1 full turn**.
- Go to "Setting",  12.6.2

Version without limiter caps



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

Carry out adjustments with screwdriver (1) 5910 890 2305.

- Starting with the high speed screw (H) and low speed screw (L) against their seats, open them each **1 full turn**.

– Go to "Setting",  12.6.2

12.6.2 Setting

Version with limiter caps

- Push screwdriver 5910 890 2304 through the grommet and the pre-installed limiter caps of high speed screw (H) and low speed screw (L).

Version without limiter caps

- Push screwdriver 5910 890 2305 through the grommet and into the low speed screw (L) and high speed screw (H).

All versions

Adjust engine speeds with tachometer or STIHL MDG 1 engine analyzer (select "Other STIHL Products" / "Tachometer"). Adjust specified engine speeds within a tolerance of ± 200 rpm.

- Start the engine and warm it up for 1 minute at varying speeds. If necessary, turn idle speed screw (LA) slowly clockwise until the engine runs smoothly – the saw chain must not rotate.

Adjusting idle speed

1. Turn the low speed screw (L) counterclockwise or clockwise to obtain the highest engine idle speed.

If this speed is **between** 2,900 rpm and 3,100 rpm, continue with **step 3**.

If this speed is **outside the range between** 2,900 rpm and 3,100 rpm, continue with **step 2**.

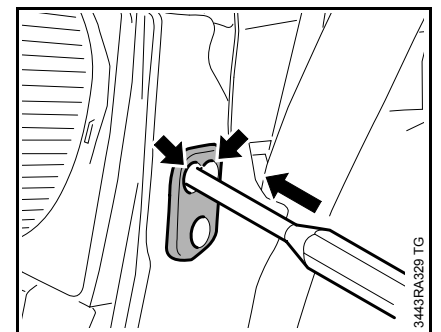
2. Use the idle speed screw (LA) to set engine speed to 3,000 rpm and repeat **step 1**.
3. Turn the low speed screw (L) to set engine speed to 2,500 rpm.
4. Use the high speed screw (H) to set engine speed to 13,000 rpm.

5. Remove tachometer after obtaining engine speed of 13,000 rpm. Turn high speed screw (H) another **1/8 turn clockwise** (leaner), a maximum engine speed of 13,500 rpm is obtained – making the setting any leaner increases the risk of engine damage.

The ignition module limits maximum engine speed to 13,500 rpm. For this reason the maximum permissible engine speed cannot be adjusted with a tachometer.

- Continue with "Securing limiter caps".

Securing limiter caps

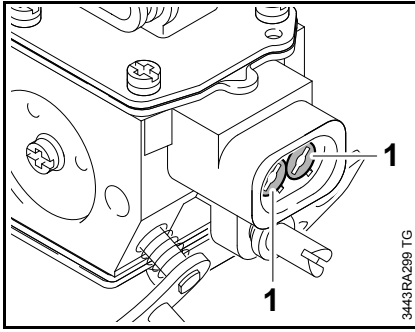


- Insert a suitable punch through the holes (arrows) in the grommet and push the limiter caps home as far as stop.

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





Version without limiter caps: The high speed screw (H) and the low speed screw (L) are now set.

12.6.3 Standard Setting



The limiter caps (1) must not be removed for the standard setting.

Always perform the following steps before carrying out any adjustments:

- Troubleshooting,  3.6
- Check chain tension and adjust if necessary.
- Inspect the spark arresting screen (if fitted) and clean or replace if necessary,  3.7 or  6.1
- Check the air filter and clean or replace if necessary,  12.1

Standard setting with limiter caps

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

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

Standing setting without limiter caps

- Shut off the engine
- Starting with the high speed screw (H) and low speed screw (L) against their seats, open them both **1 full turn.**

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

Adjusting idle speed

- Carry out "Setting".
- Warm up the engine.

Engine stops while idling

- Turn the idle speed screw (LA) clockwise until the chain begins to run, then turn it back **1 1/2 turns.**

Saw chain runs while engine is idling

- Turn the idle speed screw (LA) counterclockwise until the chain stops running, then turn it back **1 1/2 turns.**

Erratic idling behavior, poor acceleration

(although low speed screw = 1/4)

Idle setting too lean.

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

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

Adjustment for operation at high altitude

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


- Check "Setting".
- Warm up the engine.
- Turn the high speed screw (H) slightly clockwise (leaner) – no further than stop on versions with limiter caps.






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

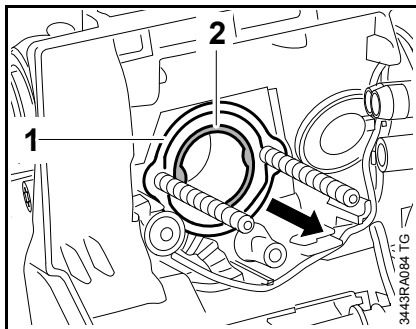
If the setting is made too lean there is a risk of engine damage as a result of lack of lubrication and overheating.

Readjust carburetor to "Standard Setting" after returning from high altitude.

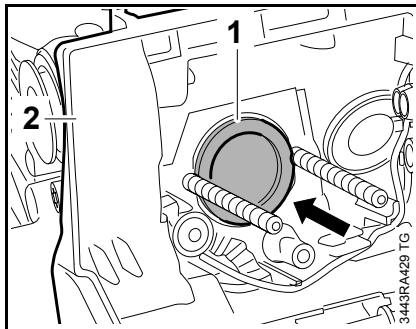
12.7 Intake Manifold

A damaged intake manifold can cause engine running problems,  3.7

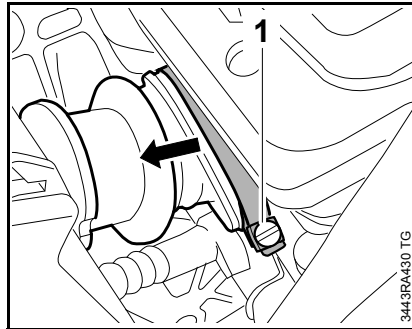
- Troubleshooting,  3.6 or  3.7
- Remove the shroud,  6.4
- Remove the carburetor,  12.4
- Take out the annular buffer mounting screws and loosen the tank housing,  12.9.3



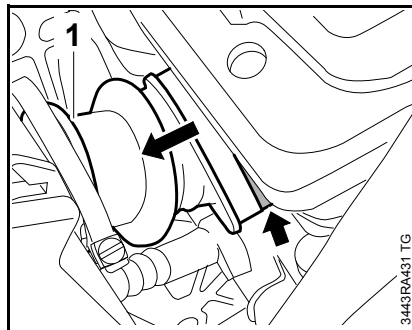
- Remove the washer (1) and sleeve (2).




- Push the manifold flange (1) out of the tank housing (2) in the direction of the cylinder.
- Pull out the tank housing (2) a little – making sure the wiring harness is not under tension.




- Loosen the screw (1) and push the hose clamp over the manifold in the direction of the tank housing.

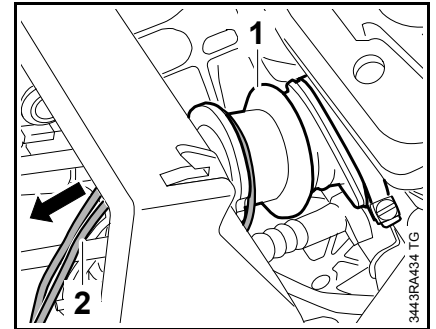



- Pull the manifold (1) off the intake stub (arrow).
- Inspect the intake manifold and replace it if necessary – even very minor damage can cause engine running problems,  3.7

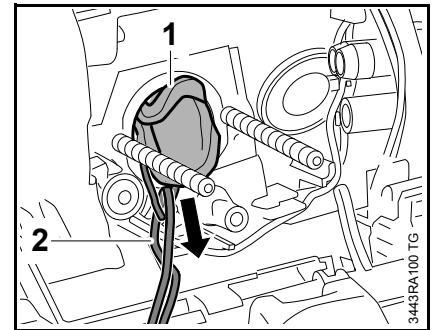
The sealing faces must be in perfect condition. Always replace components with damaged sealing faces.

Installing

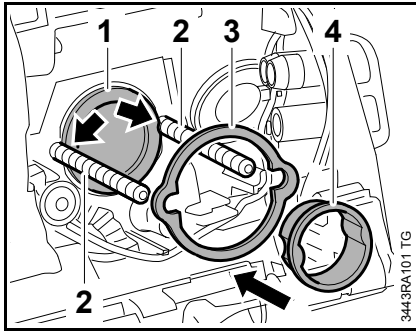
- Fit the manifold on the cylinder,  6.5



- Coat the outside of the manifold flange (1) with STIHL press fluid,  15
- To pull the manifold flange (1) through the intake opening, wind a piece of string (2) (about 15 cm long) around the flange and pass the ends of the string through the intake opening.



- Press the tank housing against the manifold and hold it there.
- Grip the ends of the string (2) and pull the manifold flange (1) through the opening.
- Remove the string.

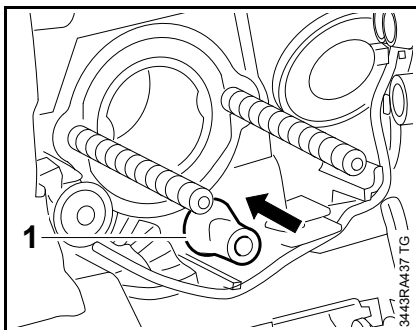


- Position the manifold flange (1) – its flats (arrows) must locate against the studs (2).
- Fit the washer (3) and push the sleeve (4) into the manifold (1).
- Install the carburetor, [12.4](#)
- Reassemble all other parts in the reverse sequence.

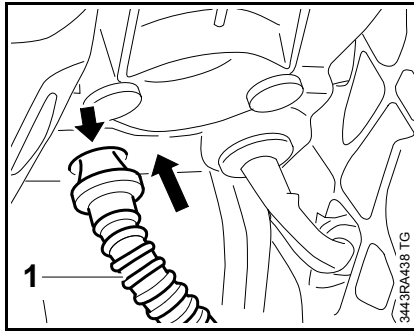
12.7.1 Impulse Hose

A damaged impulse hose can cause engine running problems.

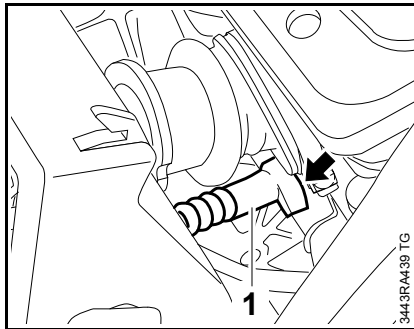
- Remove the carburetor, [12.4](#)
- Remove the tank housing, [12.9.3](#)



- Pull the impulse hose (1) out of the tank housing in the direction of the cylinder.
- Check the impulse hose and replace if necessary.



- Coat tapered outside of new impulse hose with STIHL press fluid, [15](#)
- Push the impulse hose (1) through the hole (small arrow) and push it home until its rubber lip is properly seated.



- Position the impulse hose (1) so that the rounded side (arrow) of the flange faces up.
- Install the tank housing, pushing the impulse hose onto the stub at the same time, [12.9.3](#)
- Install the carburetor, [12.4](#)
- Reassemble all other parts in the reverse sequence.

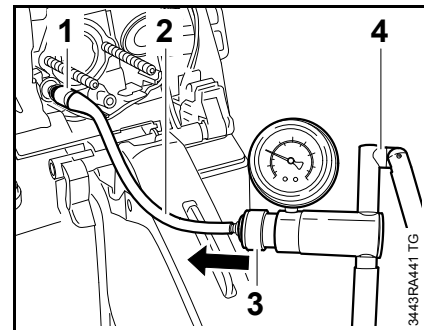
12.8 Tank Vent

12.8.1 Testing

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

- Open the fuel tank cap and drain the fuel tank, [1](#).
- Close the tank cap.
- Remove the carburetor, [12.4](#)

Vacuum test

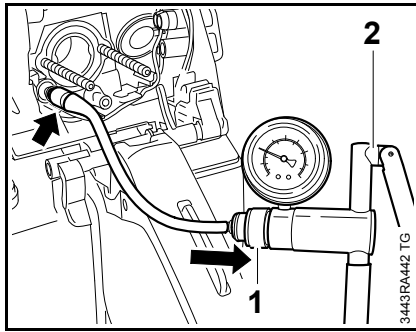


- Push nipple (1) 0000 855 9200 with hose (2) into the fuel suction hose.
- Push the ring (3) to the left and connect the pump (4) 0000 850 1300 to the hose (2) – create a vacuum in the fuel tank.

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


- Clean the area around the tank vent.
- If necessary, install a new tank vent or tank housing, [12.8](#) or [12.9.3](#)

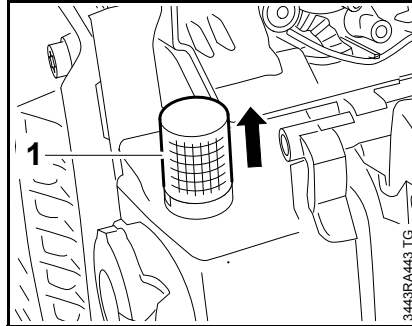
Pressure test



- Push the ring (1) to the right and connect the pump (2) 0000 850 1300 to the nipple (arrow) – pressurize the fuel tank.
- Operate the pump until the pressure gauge indicates a pressure of 0.5 bar. If this pressure remains constant for at least 20 seconds, the tank, including the tank vent, is airtight. If the pressure drops, the leak must be located and the faulty part replaced.
- Reassemble in the reverse sequence.

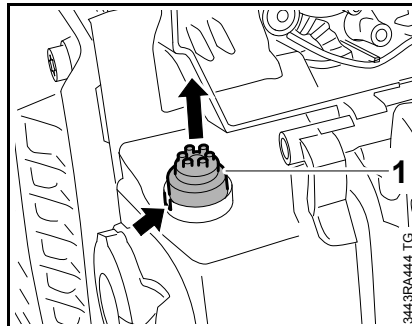
12.8.2 Removing and Installing

- Remove the air filter cover,  12.1




An optional fine dust filter is recommended in work areas with a high level of fine dust.

- Pull off the fine dust filter (1) (if fitted).



- Pry the tank vent (1) out of its seat using the rib (arrow) for leverage – always install a new tank vent.

Installing



- Coat sealing ring of new tank vent with STIHL press fluid,  15
- Push home the tank vent by hand until it snaps into position.
- Reassemble all other parts in the reverse sequence.

12.9 Fuel Intake


12.9.1 Pickup Body

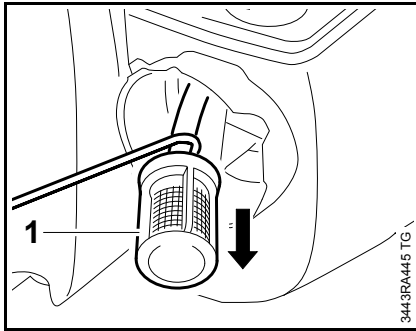
Impurities gradually clog the fine pores of the filter. This restricts the passage of fuel and results in fuel starvation.

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

- Troubleshooting,  3.6 or  3.7

Clean the fuel tank if necessary.

- Open the tank cap and drain the tank.
- Pour a small amount of clean gasoline into the tank. Close the tank and shake the saw vigorously.
- Open the tank again and drain it.
- Dispose of fuel properly in accordance with environmental requirements,  1
- Open the tank cap.



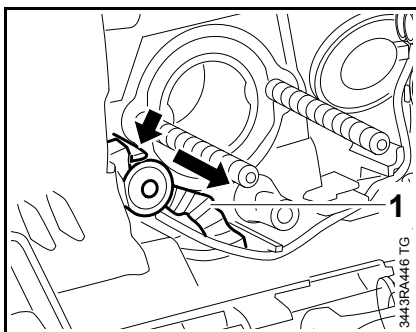
- Use hook 5910 893 8800 to remove the pickup body (1) from the fuel tank.

Do not overstretch the fuel hose.

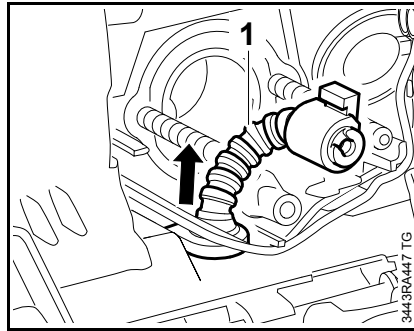
- Pull off the pickup body (1), check it and replace if necessary.
- Reassemble in the reverse sequence.

12.9.2 Fuel Hose

- Open the tank cap.
- Remove the carburetor, 12.4
- Remove the pickup body, 12.9.1

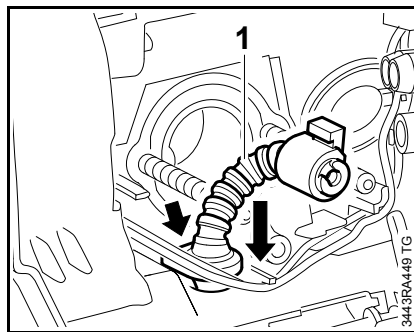


- Pull the fuel suction hose (1) out of the guide (arrow).



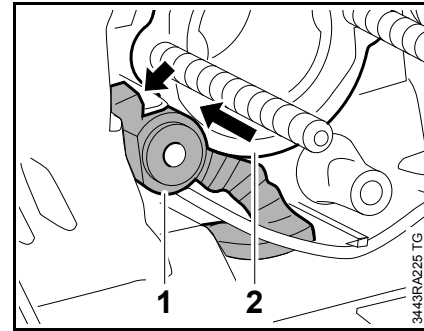
- Insert suitable levering tool under the wires.
- Pry hose flange out of bore and pull fuel suction hose (1) out of the tank.
- Check the fuel suction hose and replace if necessary.

Installing

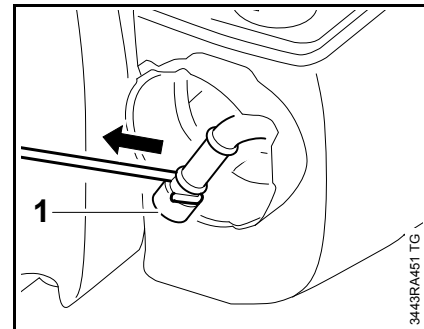


- Use STIHL press fluid to make installation easier, 15
- Push the fuel suction hose (1) through the bore in the fuel tank.
- Position the fuel suction hose (1) so that the straight side (arrow) of the flange faces the housing wall, then push it fully into the bore.

Take care not to damage the wiring harness.



- Push the fuel suction hose (1) into the guide (arrow) and between the wires and the edge of the manifold seat (2) – fuel suction hose is thus held in position.











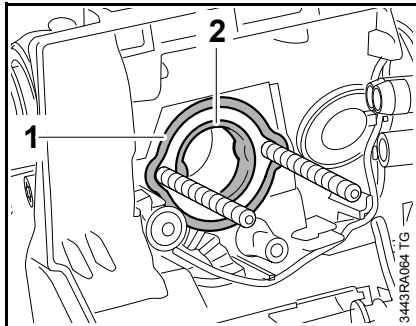
- Use hook 5910 893 8800 to remove the fuel suction hose (1) from the fuel tank.

Do not overstretch the fuel suction hose.

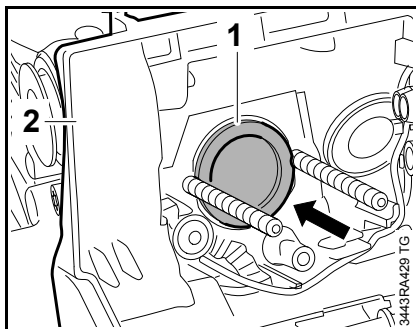
- Fit the pickup body, 12.9.1
- Close the tank cap.
- Reassemble all other parts in the reverse sequence.

12.9.3 Tank Housing

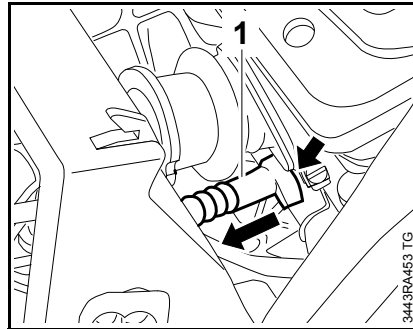
- Drain the fuel tank,  1
- Remove the carburetor,  12.4
- Remove the ignition module,  7.2
- On models with heating, separate generator wire connectors,  7.6.4
- Take out annular buffer mounting screws, Annular Buffer on Fuel Tank / Clutch Side,  9.1, Annular Buffer on Fuel Tank / Ignition Side,  9.1.1, Annular Buffer on Oil Tank / Ignition Side,  9.1.3, Annular Buffer on Spiked Bumper / Clutch Side,  9.1.2



- Remove the washer (1) and sleeve (2).

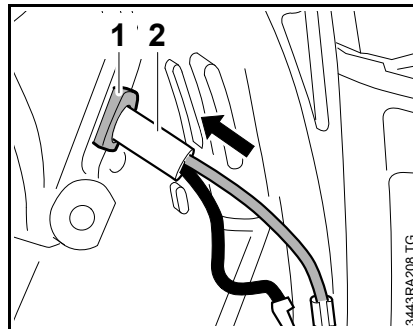


- Push the manifold flange (1) out of the tank housing (2) in the direction of the cylinder.

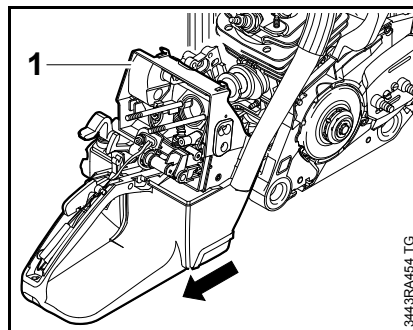


- Pull out the tank housing about 30 mm.

- Pull the impulse hose (1) off the connector (arrow).










- Push grommet (1) out in direction of cylinder and pull wiring harness (2) out in direction of cylinder.

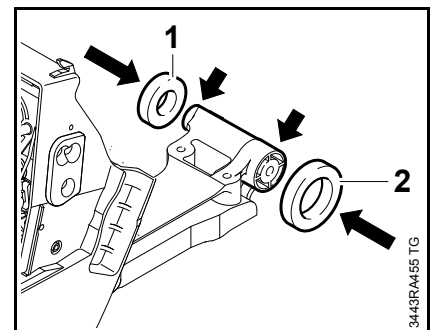


- Pull out the tank housing (1), check it and replace if necessary.

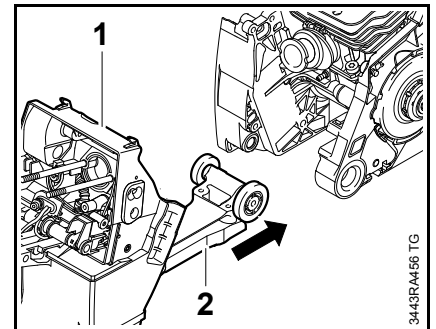
Only transfer those parts from the old tank housing that are not included with the replacement – see parts list.

- Transfer the handlebar,  9.2,  9.2.1, Version with heating,  9.2.2
- Transfer the switch shaft,  10.1
- Transfer the wiring harness,  7.6 Version with heating,  7.6.4
- Transfer the lockout lever and throttle trigger,  10.2

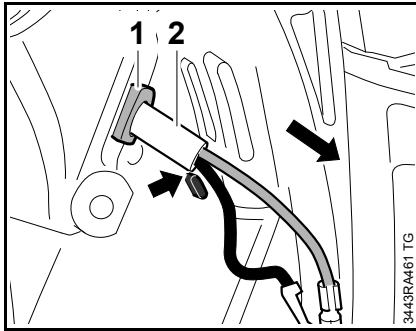
Installing




- Push rubber ring (1) with inside diameter of 12 mm and rubber ring (2) with inside diameter of 18 mm onto the bosses (arrows).



- Slide the tank housing (1), narrow part (2) first, between the two halves of the crankcase until it butts against the intake manifold.

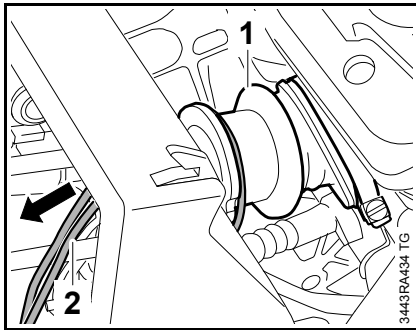


Make sure the grommet (1) is in place.

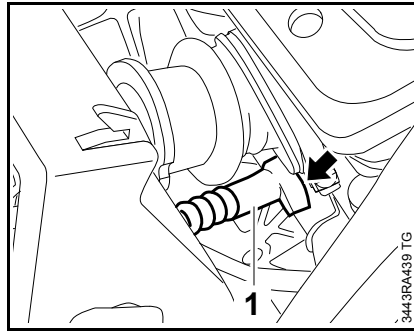
– Use STIHL press fluid to make installation easier,  15

● Thread the wiring harness (2) through the opening and push the grommet (1) into position, making sure it is properly seated on both sides of the opening.

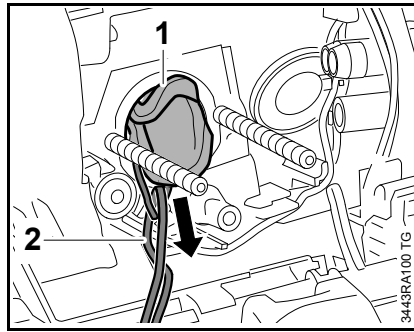
● Pull the wiring harness (2) through until the end of the protective tube locates against the rib (arrow).



● To pull the manifold flange (1) through the intake opening, wind a piece of string (2) (about 15 cm long) around the flange and pass the ends of the string through the intake opening.



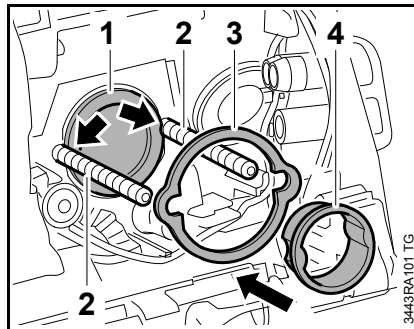
● Position the impulse hose (1) so that the rounded side (arrow) of the flange faces up.



– Push tank housing towards cylinder and hold it in that position.

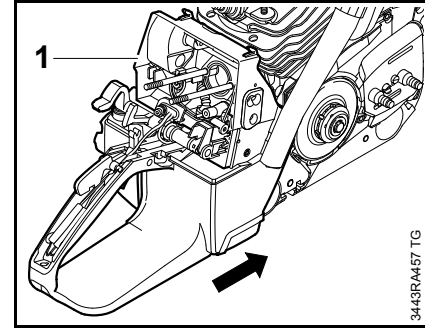
● Grip the ends of the string (2) and pull the manifold flange (1) through the opening.

– Remove the string.

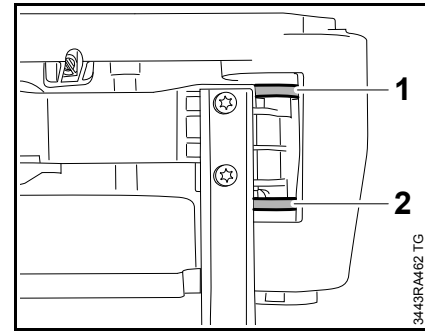


● Position the manifold flange (1) – its flats (arrows) must locate against the studs (2).





● Fit the washer (3) and push the sleeve (4) into the manifold (1).



● Push the tank housing (1) in direction of cylinder until the bores are in alignment with the annular buffers.



Rubber rings (1) and (2) must be between the tank housing and crankcase.

– Fit and tighten down the annular buffer mounting screws, Annular Buffer on Fuel Tank / Clutch Side,  9.1, Annular Buffer on Fuel Tank / Ignition Side,  9.1.1, Annular Buffer on Oil Tank / Ignition Side,  9.1.3, Annular Buffer on Spiked Bumper / Clutch Side,  9.1.2

– Reassemble all other parts in the reverse sequence.

13. Heating System

13.1 Carburetor Heating

The heating element is installed between the filter base and carburetor. Current is supplied via wires to the heating element.

The heating element is controlled by a thermostatic switch on the underside of the carburetor.





The heating element and thermostatic switch should be checked if running problems occur when the cold engine is idling or running at part load, particularly at temperatures below freezing.

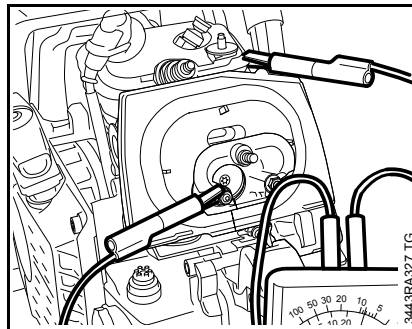
Idling problems with a hot engine are also an indication of a fault in the heating element or thermostatic switch.

13.1.1 Testing the Complete System

The generator and heating element are checked in the following test which should be performed at an ambient temperature of at least + 20°C (68°F).

If the temperature is lower than + 13°C (55°F), the thermostatic switch may close and produce false readings.



- Test the heating system as specified in the carburetor heating troubleshooting chart,  13.2
- Remove the shroud,  6.4
- Remove the air filter,  12.1
- Remove the baffle,  12.2
- Set the ohmmeter to measuring range "Ω".

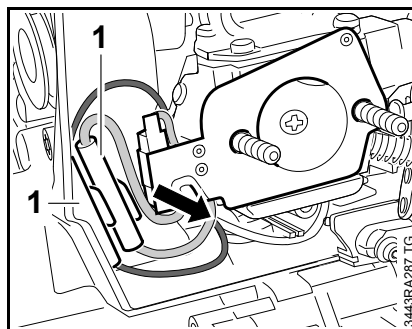


- Clip one of the two test leads to a nut on the flange and the other to a cylinder fin.
- If the system is in good condition the ohmmeter will indicate a value of about 8 Ω in measuring range "Ω".

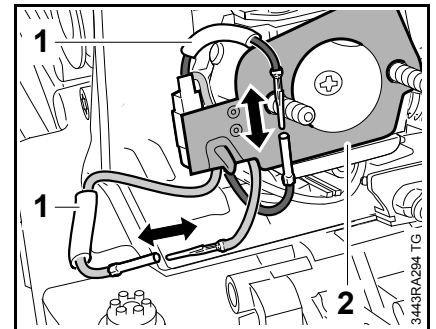
If the reading obtained is outside this tolerance, test each component separately.

13.1.2 Testing the Heating Element

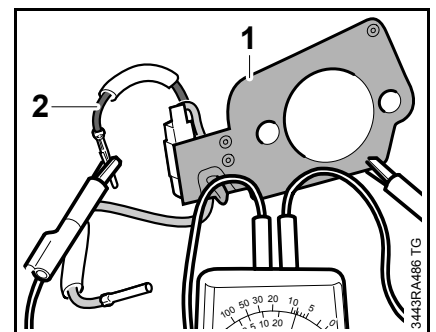
- Remove the filter base,  12.3
- Remove the baffle plate,  12.4



- Pull the insulating tubes (1) with connectors out of the guides.



- Push back the insulating tubes (1) in the direction of the heating element (2) and separate the pin and socket connectors.
 - Insulating tubes may be left on the wires.
- Remove the heating element (2).
- Inspect the gasket and replace if necessary.

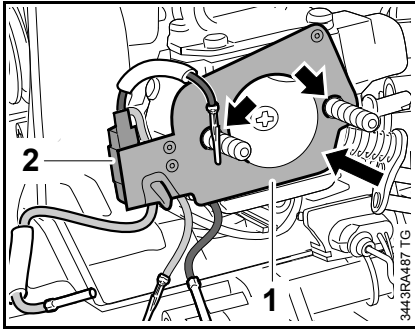


- Clip one test lead to the heating element (1) and the other to the connector pin of the black wire (2).

If the heating element is in good condition the ohmmeter will indicate a value of about 8 Ω in measuring range "Ω".

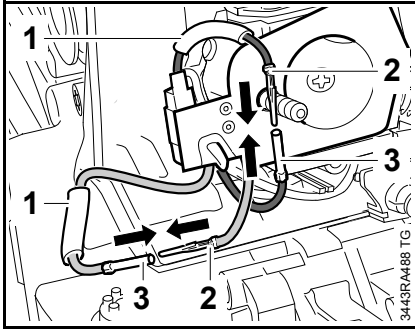
- If these readings are not obtained, install a new heating element.

Installing



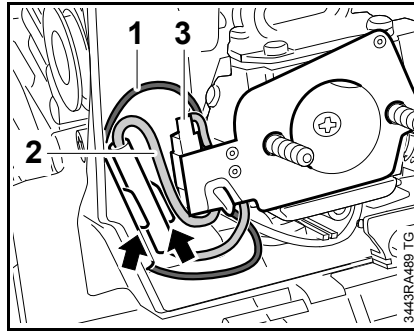
The gasket must be in place.

- Fit the heating element (1) over the studs (arrows) so that the thermocouple (2) faces inwards.



Insulating tubes (1) must be fitted.

- Connect the pins (2) and sockets (3) and center the insulating tubes (1) over the connectors.



- Push the insulating tube with connector of black wire (1) and insulating tube with connector of green / yellow wire (2) into the center of the guides (arrows).

The green / yellow wire (2) must be run between the guide and thermocouple (3).

- Install the baffle plate, 12.4
- Reassemble all other parts in the reverse sequence.

13.1.3 Thermostatic Switch

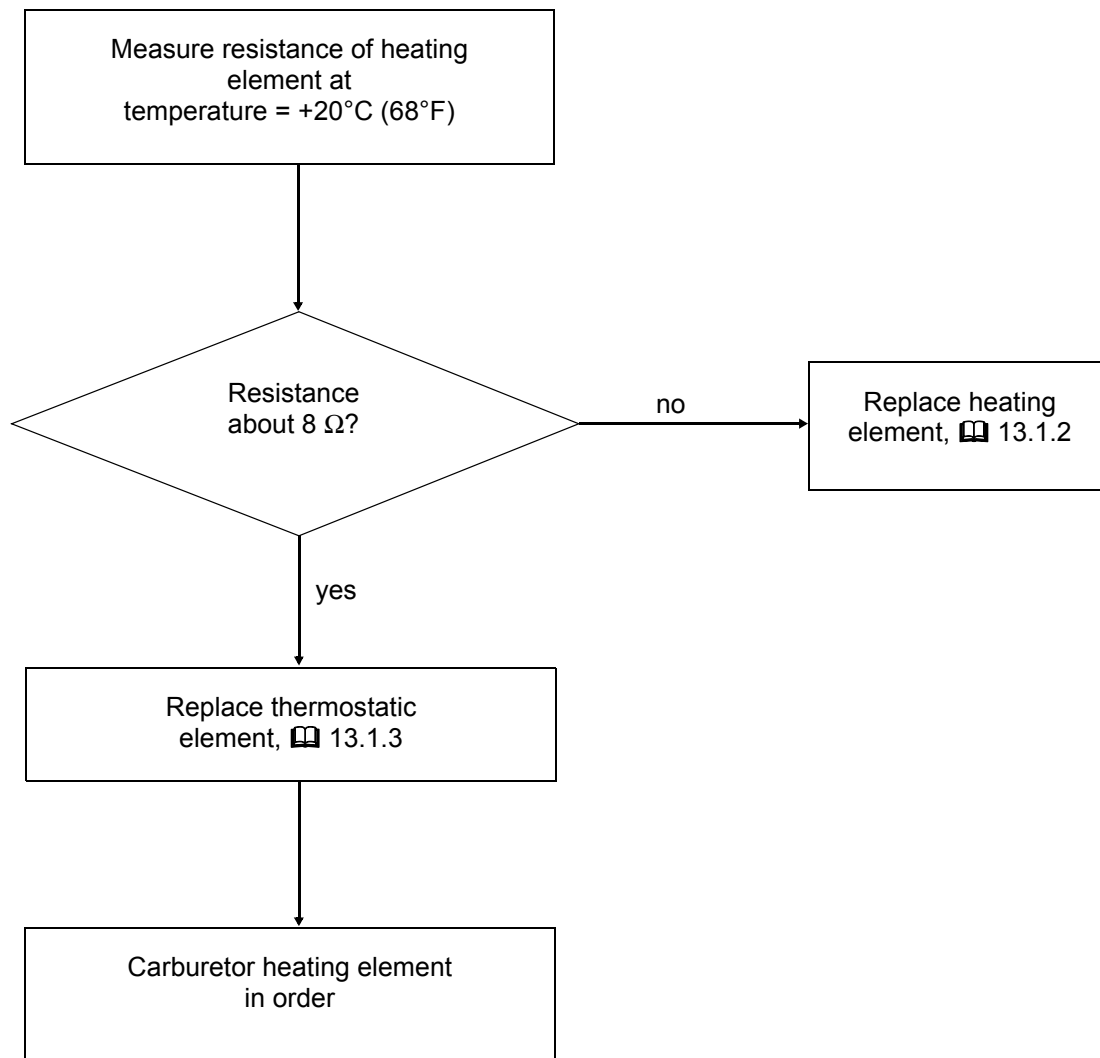
The thermostatic switch is an electronic component that cannot be tested directly. Its operation can be checked with the aid of the troubleshooting chart, 13.2

The thermostatic switch and the heating element form a single unit. If the switch is faulty, the heating element must be replaced.

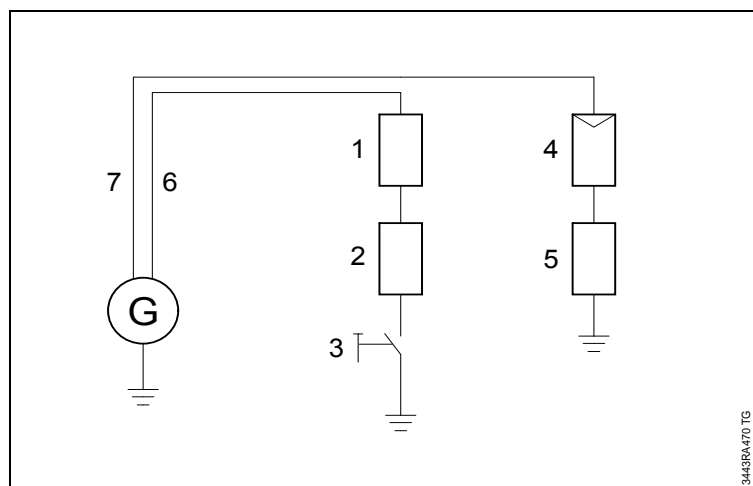
Removal and installation are described in the chapter on "Heating Element", 13.1.2

- Check operation

13.2 Carburetor Heating System Troubleshooting Chart



Circuit diagram of handle and carburetor heating system





- G = Generator
- 1 = Rear handle
- 2 = Handlebar
- 3 = Heater switch
- 4 = Thermostatic switch
- 5 = Heating element (carburetor)
- 6 = yellow wire
- 7 = red wire

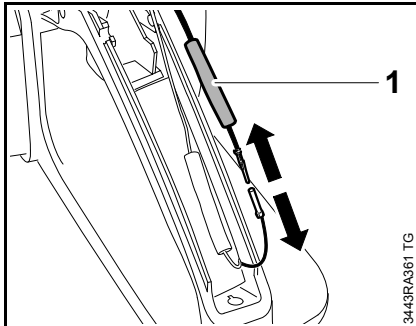
13.3 Handle Heating System

13.3.1 Troubleshooting

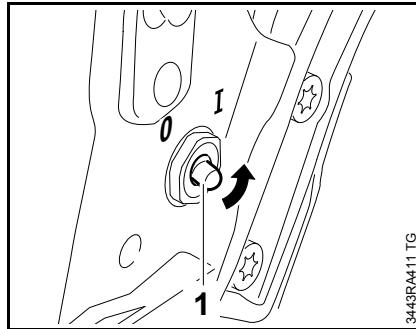
The entire handle heating system is maintenance-free and subject to practically no wear. Faults in the generator, heating elements and wiring are generally caused by mechanical damage.

There are two reasons for failures in the heating system:

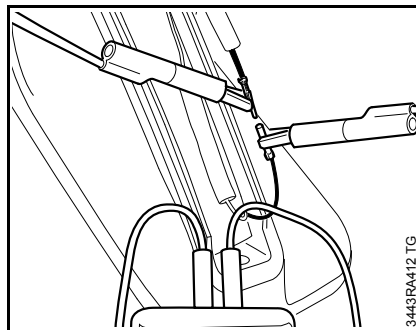
1. A break in the circuit due to a faulty wire or component.
 2. A short circuit resulting from damage to the insulation.
- Remove the handle molding,  10.2
 - Remove the filter base,  12.3



- Push insulating tube (1) of thick black wire in direction of handlebar heating element and separate the pin and socket connector.




- Set the heater switch (1) to "I".
- Set the ohmmeter to " Ω ".



- Set the Master Control lever to "0".
- Clip the test leads to the wire from the wiring harness and the rear handle heating element wire.

Carburetor Heating

- Separate the pin and socket connector to the thermostatic switch,  13.1.2




All electrical components of the handle heating system are connected in series with the ohmmeter.

If the system is in order, the ohmmeter will indicate a value of about 10Ω in measuring range " Ω ".

If no reading is obtained, there is a break in the circuit.

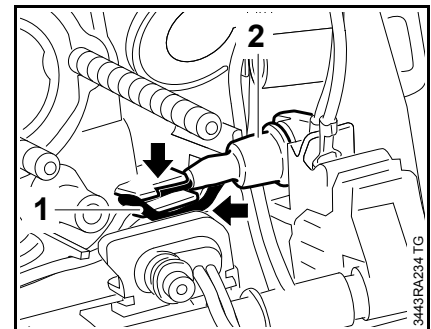
If the ohmmeter shows a very low value, there is a short circuit in one of the components.

In either case it is necessary to check each component separately. The thermostatic switch wire remains disconnected during this check.

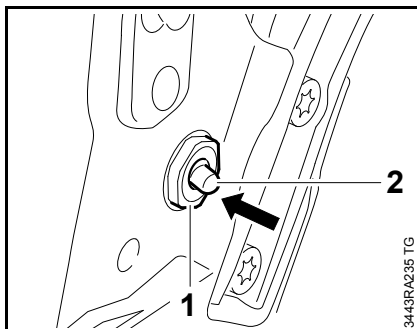
- Use handle heating and generator troubleshooting chart to check the system,  13.8.1
- Check resistance on handlebar,  13.6
- Check resistance on rear handle,  13.5
- After completing the test, reconnect the wires and push the insulating tube over the pin and socket connector.
- Reassemble all other parts in the reverse sequence.

13.4 Heater Switch

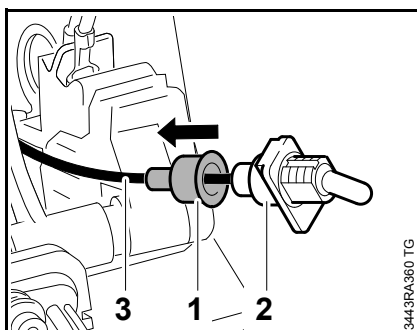
- Remove the carburetor,  12.4



- Pull wire (1) of heater switch (2) out of the guides (arrows).

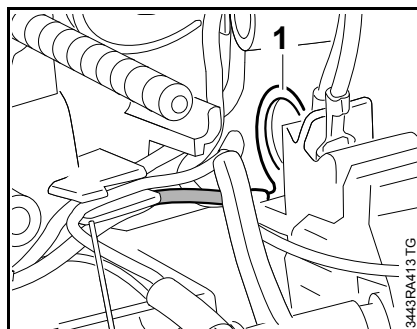


- Unscrew the nut (1), remove the washer and push the heater switch (2) out in direction of carburetor box.

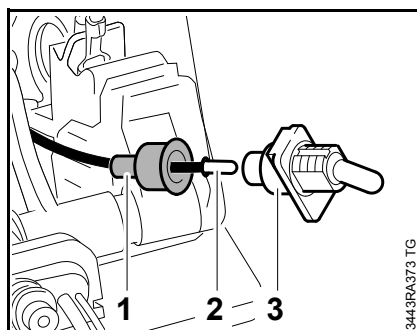


- Pull the grommet (1) off the heater switch (2) and disconnect wire (3) (connector sleeve).
- Inspect the grommet and heater switch and replace if necessary.
- Test ground wire contact ring and ground for break.

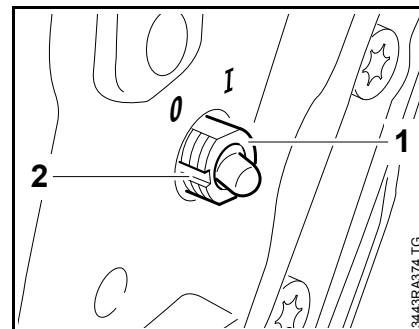
Installing



- Fit contact ring (1) of ground wire in position.

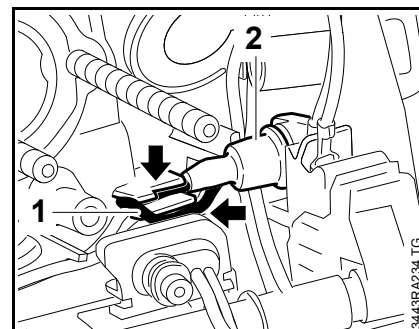


- To ensure the wire is not twisted during installation, hold the heater switch with its slot facing the throttle trigger.
- Fit the grommet (1) on the wire, push the connector sleeve (2) into the heater switch (3) as far as stop.
- Push the grommet onto the heater switch.



- Push the heater switch (1) through the ground wire contact ring and into the bore – slot (2) must be horizontal and point in direction of "0".


- Fit the washer, then the nut and tighten it down firmly.



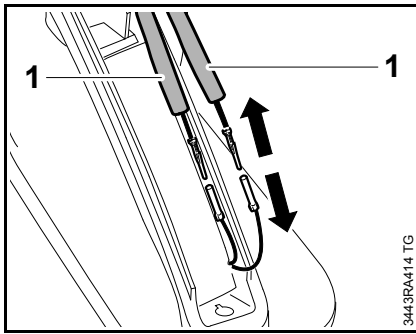
- Push the wire (1) to heater switch (2) into the guides (arrows).
- Install the carburetor, [12.4](#)
- Reassemble all other parts in the reverse sequence.

13.5 Heating Element in Rear Handle

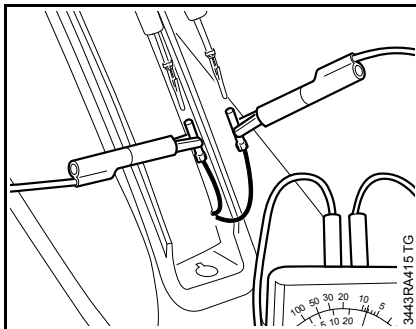
The heating element must lie completely flat on the inside of the rear handle to guarantee trouble-free operation. Therefore, make sure the heating element needs to be replaced before detaching it.

- Remove the handle molding,  10.2

Testing the heating element



- Push back the insulating tubes (1) in the direction of the wiring harness and separate the pin and socket connectors.




- Test the heating element, replace it if necessary.

If the heating element is in good condition the ohmmeter will indicate a value of about 2 Ω in measuring range " Ω ".


If the reading is outside this range, install a new heating element.

Heating element does not operate even though resistance measurement is ok?

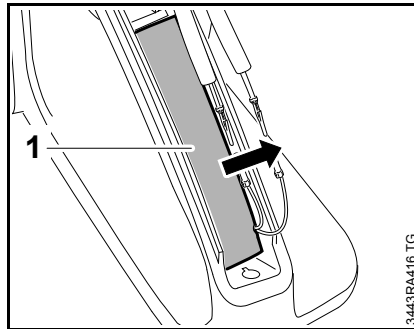
- Test the generator and heater switch,  13.3

Replacing the heating element

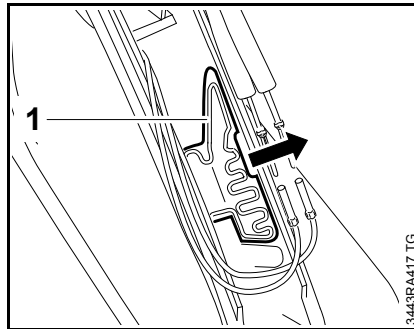
The ambient temperature during removal and installation should not be less than + 15°C.

- Remove the lockout lever,  10.2

Pin and socket connectors are already disconnected.

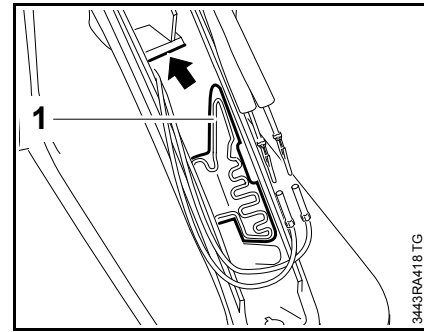


- Pull out the pressure pad (1).



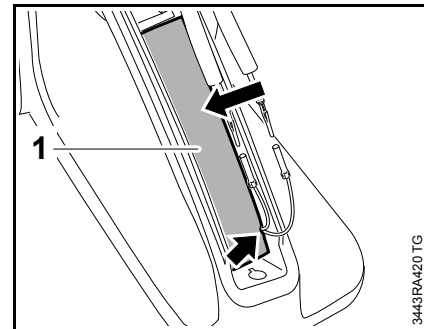
- Detach heating element (1) from inside the rear handle and remove any adhesive residue – hollows created by adhesive residue may prevent heat being transferred to the handle and cause the new heating element to overheat.

Installing

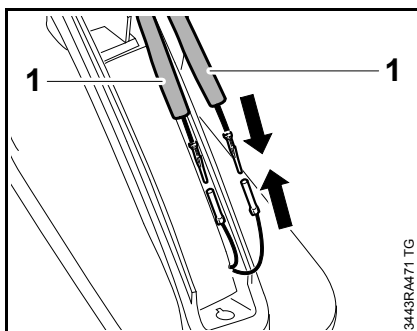


- Hold the new heating element (1) so that the wire connection faces the edge (arrow) and the contours of the heating element match those in the rear handle.
- Bond the new heating element (1) to the bottom of the rear handle first, then to the sides – the heating element must lie flat without bubbles.

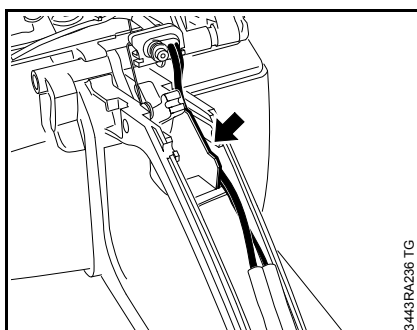
If the heating element is not properly bonded, heat transfer to the handle will be interrupted and the element may fail as a result of overheating.



- Push the pressure pad (1) into the rear handle so that its straight side butts against the handle's edge and the wires project at the recess (arrow) - take care not to detach the heating element while pushing the pressure pad into position.



- Connect the pin and socket connectors.
- Push the insulating tubes (1) over the connectors.
- The insulating tubes (1) must completely cover the connectors to avoid the risk of a short circuit.



The thin wire must be under the thick wire.

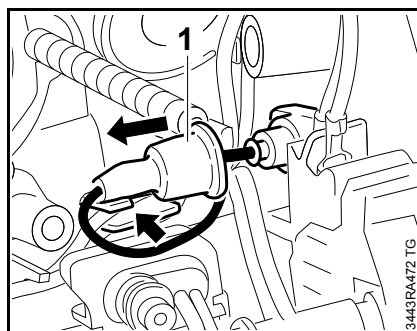
- Press the wires into the guide (arrow).
- Reassemble all other parts in the reverse sequence.

13.6 Heating Element in Handlebar

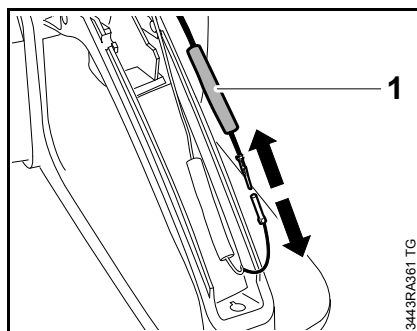
The heating element in the handlebar (front handle) is not replaceable. A new handlebar must be fitted if the heating element is faulty.

Testing the heating element

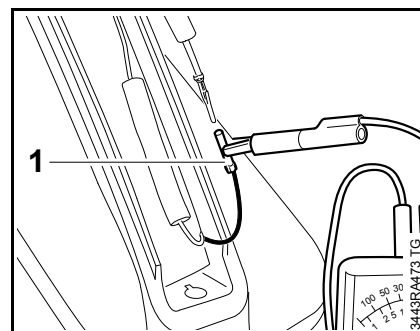
- Remove the handle molding, 10.2
- Remove the carburetor, 12.4



- Pull the wire out of the guide (arrow) and pull the grommet (1) away from the heater switch.



- Push insulating tube (1) of thick wire in direction of wiring harness and separate the pin and socket connector.
- Set the heater switch to I, 9.2.2.



- Measurements between terminal socket (1) and heater switch's contact sleeve.



If the heating element is in good condition the ohmmeter will indicate a value of about 6.4Ω in measuring range " Ω ".

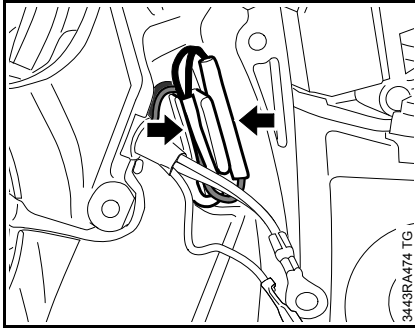
If the reading is outside this range, install a new handlebar with heating element, 9.2.2

Heating element does not operate even though resistance measurement is ok?

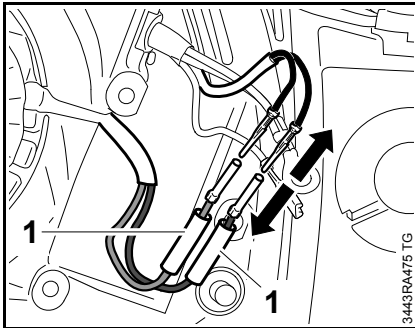
- Fit the grommet and push wire into guide, 13.4
- Test the generator and heater switch, 13.3
- Reassemble in the reverse sequence.

13.7 Generator

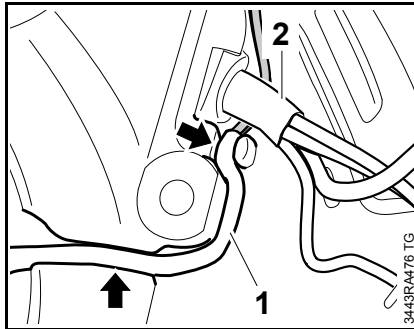
- Remove the ignition module,  7.2
- Remove the flywheel,  7.5



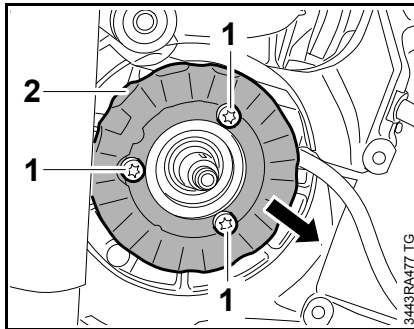
- Pull the connectors and wires out of the guides (arrows).



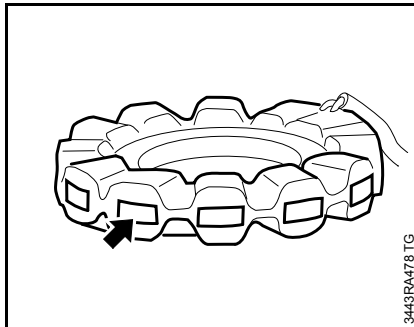
- Push back the insulating tubes (1) in the direction of the generator wire and separate the pin and socket connectors.
- Remove the insulating tubes.



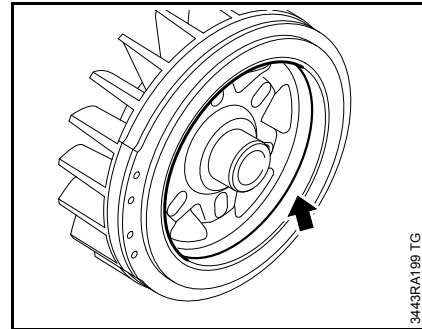
- Pull generator wire (1) out from under wiring harness (2) and out of the guides (arrows).



- Take out the screws (1) and remove the generator (2).

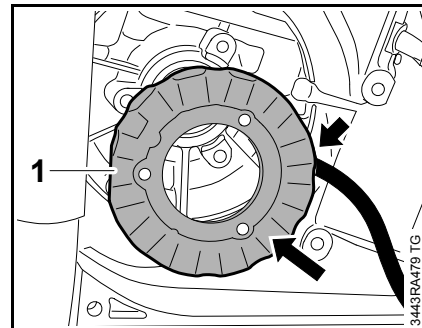


- Inspect the generator and poles (arrow) for cracks or other damage. If damage is found, replace the generator.

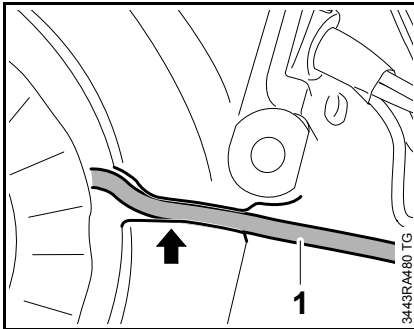


Inspect the magnet ring (arrow) in the flywheel for cracks or other damage. If damage is found, replace the flywheel.

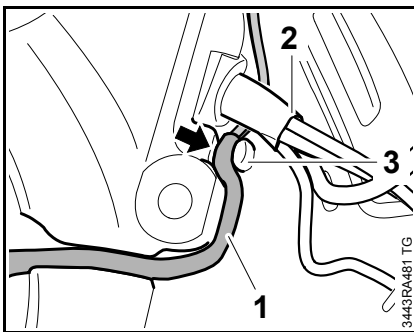
Installing



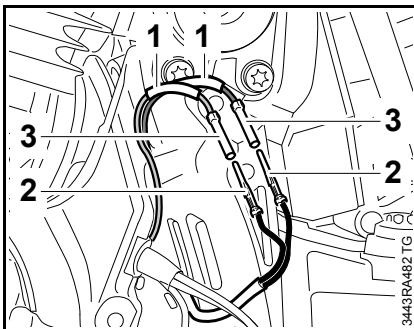
- Position the generator (1) with the wire (arrow) facing the crankcase.
- Check that the generator is properly seated.
- Fit the screws and tighten them down firmly.



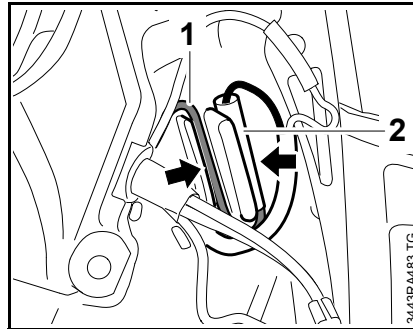
- Fit generator wire (1) in the guide (arrow) and position snugly against the crankcase.



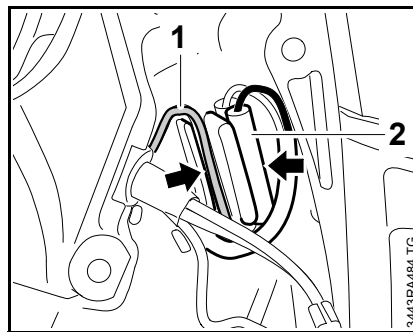
- Pass the generator wire (1) under the wiring harness (2) and fit it in the guide (arrow) so that the protective tube lines up with the guide rib (3).



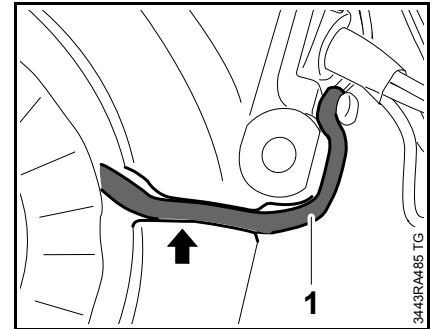
- Push the insulating tubes (1) onto the generator wire.
- Connect the pins (2) and sockets (3) and center the insulating tubes (1) on the connectors.



- Push the red generator wire (1) and connector (2) into the guide (arrows).



- Push the yellow generator wire (1) and connector (2) into the guide (arrows) – the red wire with connector must be laid under the yellow wire with connector.



The wire (1) must be properly seated in the guide (arrow) and must not project.

The flywheel must not touch the generator wire – this could cause a break in power supply.

- Install the flywheel, [7.5](#)
- Install the ignition module, [7.2](#)
- Reassemble all other parts in the reverse sequence.

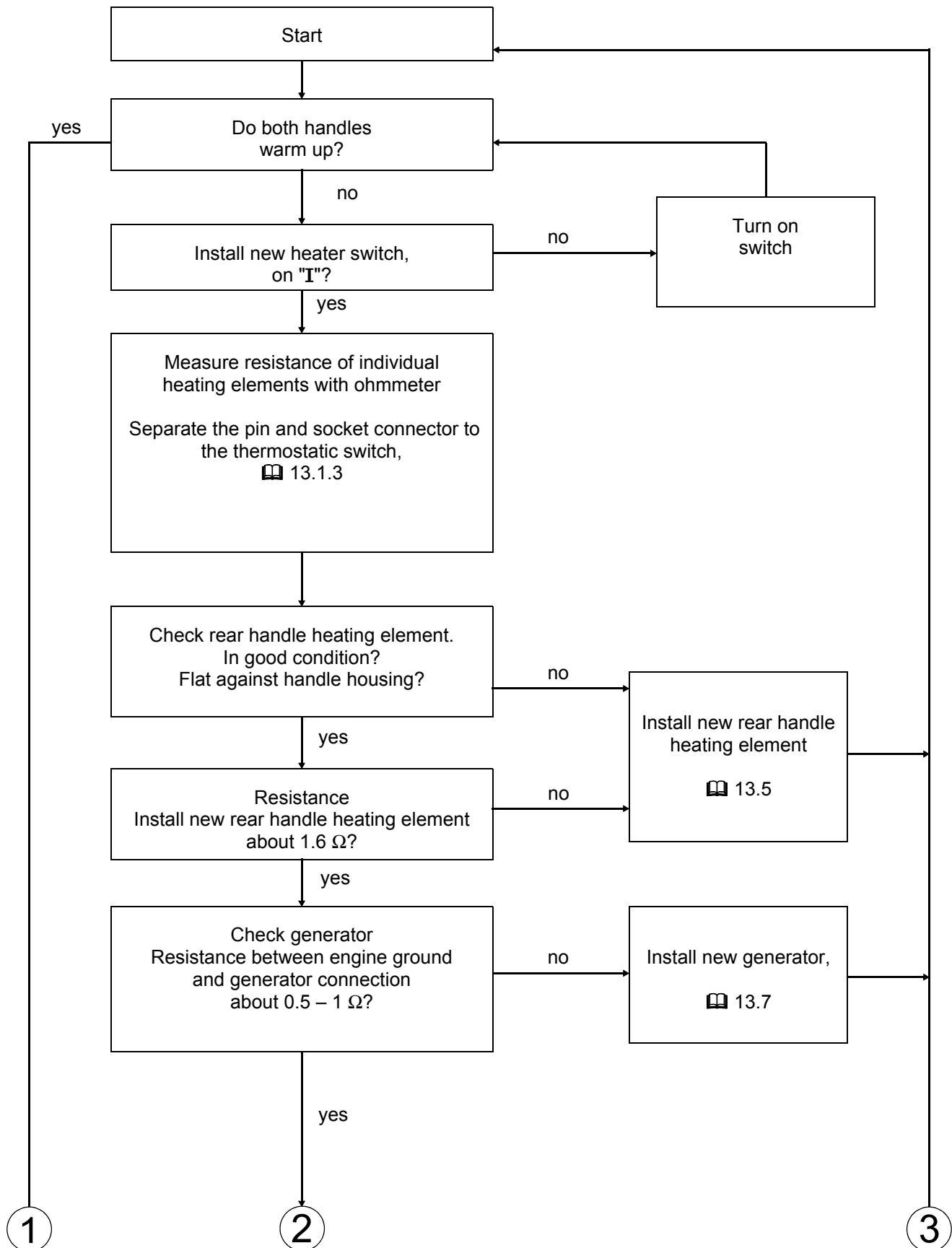
13.8 Wiring Harness

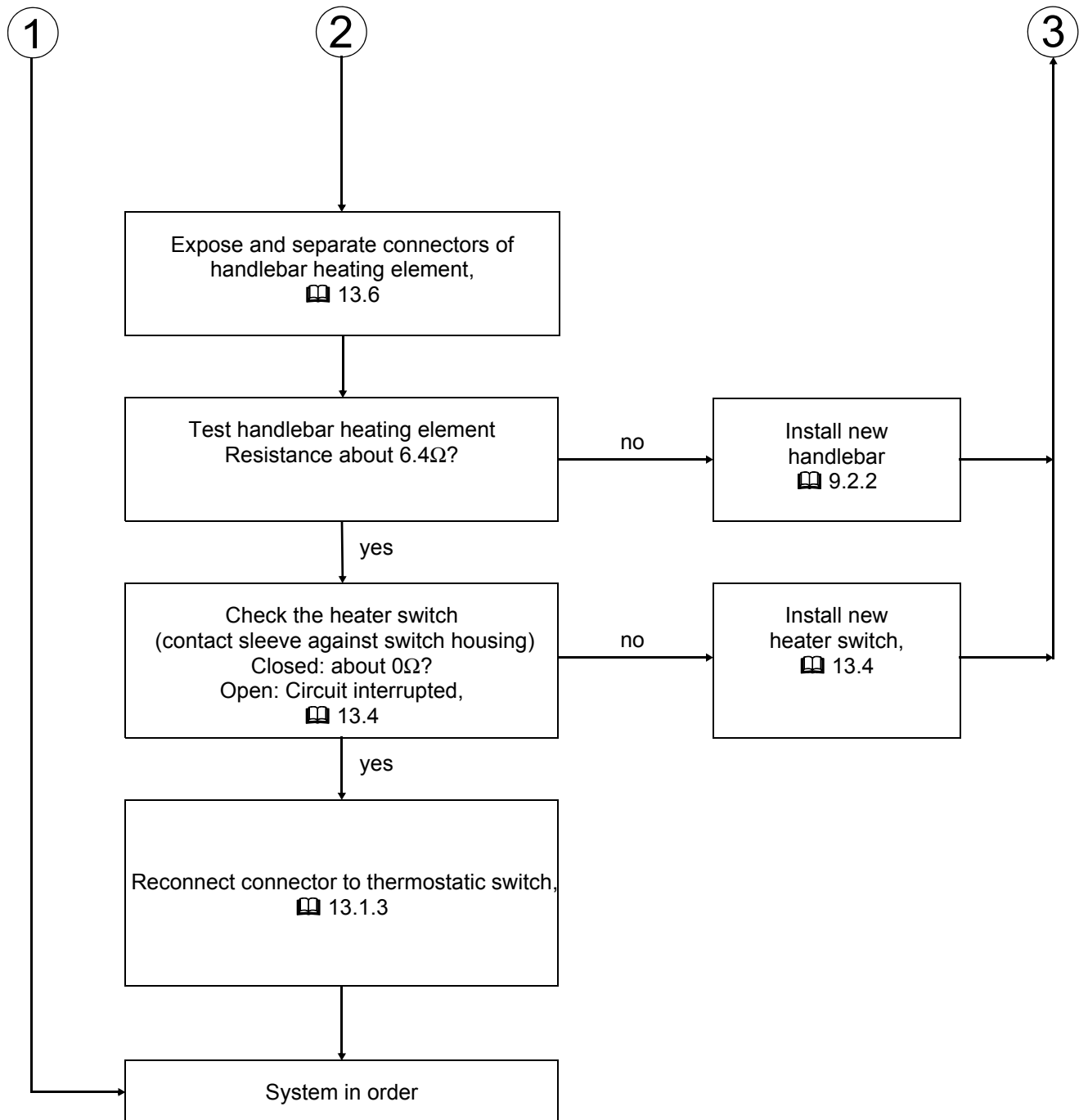
The short circuit wire and the wires for the heating system form a single unit.

If one wire is faulty, the wiring harness must be replaced.

Removal and installation are described in chapter on "Wiring Harness, Removing and Installing on Models with Heating System", [7.6.4](#)

13.8.1 Handle Heating and Generator Troubleshooting Chart





13.8.2 Test Connections and Test Values

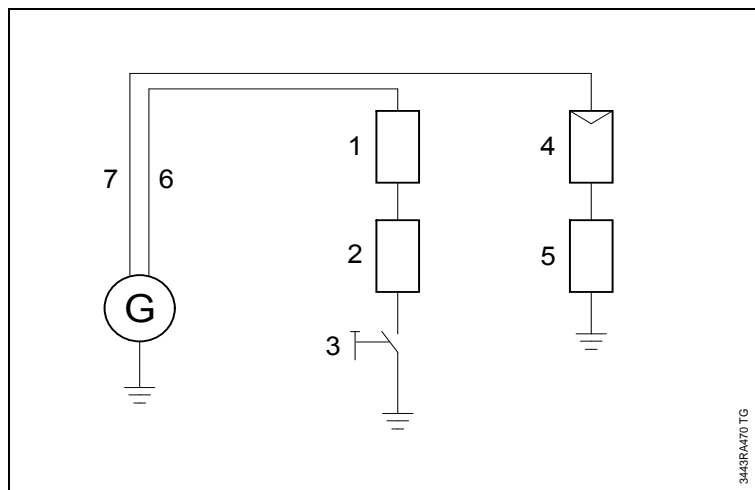
- The pin and socket connections must be disconnected to test the individual electrical components.

Component	Ohmmeter connection (use either test lead)		Resistance Ω		If faulty	
	Lead 1	Lead 2	Spec.	Actual	Cause	Remedy
Switch	Switch terminal ¹⁾	Switch housing	< 0.5	-	Switch faulty	Replace switch
Heating element in rear handle	Terminal pin on wire from heating element	Terminal socket on wire from heating element	1.6	1.5 - 2.0	Heating element OK	
				-	Break in wire, heating element damaged	
				0	Short circuit – damaged insulation	
Heating element in handlebar	Terminal pin on wire from handlebar heating element	Terminal socket on wire from handlebar heating element	6.4	6.0...8.0	Heating element OK	
				-	Break in wire, heating element damaged	
				0	Short circuit – damaged insulation	

¹⁾ Pull out wire for this purpose

Component	Ohmmeter connection (use either test lead)		Resistance Ω		If faulty	
	Lead 1	Lead 2	Spec.	Actual	Cause	Remedy
Generator	Yellow wire with terminal pin on wire from handlebar heating element		0.85	0.6 - 1.1	Generator OK	
		Red wire with terminal socket on wire from handlebar heating element	0.65	0.5 - 0.8	Generator OK	
				-	Break in wire, generator damaged	Install new generator
				0	Short circuit – damaged insulation	Install new generator

Circuit diagram of handle and carburetor heating system



- G = Generator
- 1 = Rear handle
- 2 = Handlebar
- 3 = Heater switch
- 4 = Thermostatic switch
- 5 = Heating element (carburetor)
- 6 = yellow wire
- 7 = red wire

14. Special Servicing Tools

New Special Tools

No.	Part Name	Part No.	Application	Rem.
1	Piston support	5910 893 5300	Supporting the piston	

Existing Special Tools

No.	Part Name	Part No.	Application	Rem.
1	Carburetor and engine tester	0000 850 1300	Testing engine and carburetor for leaks	
	- Nipple	0000 855 9200	Testing carburetor for leaks	
	- Hose for leakage test	1110 141 8600	Testing carburetor for leaks	
	- Plug for leakage test	1122 025 2200	Leakage testing decompression valve	
2	Sealing plate	0000 855 8106	Testing crankcase for leaks	
3	Apply installing tool	0000 890 2201	Installing rope guide bushing	
4	Clamping strap	0000 893 2600	Compressing the piston rings	
5	Locking strip	0000 893 5903	Blocking the crankshaft	
6	Screwdriver bit, T 27 x 125	0812 542 2104	Removing and installing spline socket screws with electric or pneumatic screwdrivers; tightening down screws with torque wrench	
7	Assembly drift	1108 893 4700	Removing and installing piston pin	
8	Puller	1110 890 4500	Removing flywheel	
9	Setting gauge	1111 890 6400	Adjusting air gap between the ignition module and flywheel	
10	Press sleeve	1115 893 4600	Installing oil seal (ignition side)	
11	Assembly tube	1117 890 0900	Attaching springs	
12	Press sleeve	1118 893 2401	Installing oil seal (clutch side)	
13	Installing sleeve	1118 893 4602	Protecting the oil seal (clutch side)	
14	Press arbor	1118 893 7200	Installing ball bearing (clutch side)	
15	Press arbor	1120 893 7200	Installing ball bearing (ignition side)	
16	Combination wrench	1129 890 3401	Spark plug	1)
17	Service tool ZS (set) including drilled plate 5910 893 2103	5910 007 2201	Removing and installing crankshaft (ignition side)	
	- Drilled plate	5910 893 2101	Pulling two halves of crankcase together	
	- Screw sleeve	5910 893 2420	Installing crankshaft	

No.	Part Name	Part No.	Application	Rem.
18	Service tool AS (set)	5910 007 2205	Removing and installing crankshaft (clutch side)	
	- Screw sleeve	5910 893 2409	Pulling two halves of crankcase together	
19	Engine analyzer, STIHL MDG 1	5910 840 0200	Performing engine diagnosis	
20	Clamping strap for assembly stand	5910 850 1650	Clamping machine to assembly stand	
21	Test flange	5910 850 4200	Leakage Test	
	- Sleeve	5910 893 1701	Spacer sleeves for test flange	
22	Ignition system tester, ZAT 4	5910 850 4503	Testing ignition system	
23	Ignition system tester, ZAT 3	5910 850 4520	Testing ignition system	
24	Torque wrench	5910 890 0302	0.5 to 18 Nm	
25	Torque wrench	5910 890 0312	6 to 80 Nm	
26	Installing tool 12	5910 890 2212	Installing hookless snap rings in piston	
27	Screwdriver	5910 890 2304	Adjusting carburetor with limiter caps	
28	Screwdriver	5910 890 2305	Adjusting carburetor without limiter caps	
	- Setting disk	5910 893 6600	For use with screwdrivers 5910 890 2304 and 5910 890 2305	
29	Screwdriver bit, T 27 x 150	5910 890 2400	IS-P screws (4 mm)	
30	Hook	5910 890 2800	Detaching springs on clutch shoes	
31	M8 stud puller	5910 890 3001	Installing and tightening bar mounting studs	
32	Assembly stand	5910 890 3101	Holding saw for repairs	
33	Punch-down tool	5910 890 4000	Installing electrical wires	
34	Puller	5910 890 4400	Removing oil seals	
	- Jaws (No. 3.1)	0000 893 3706	Removing oil seal(s)	
35	Puller	5910 890 4500	Pulling out limiter caps	
36	Tensioning wrench	5910 893 0300	Relieving tension of rewind spring	
37	Stud puller M8	5910 893 0501	Removing bar mounting studs	
38	Socket, 13 mm, long	5910 893 2804	Removing and installing decompression valve	
39	Hook	5910 893 8800	Removing pickup body	

Remarks:

1) Use for releasing only.

15. Servicing Aids

No.	Part Name	Part No.	Application
1	Lubricating grease (225 g tube)	0781 120 1111	Oil seals, sliding and bearing points
2	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in fan housing
3	STIHL press fluid OH 723	0781 957 9000	Rubber components, AV elements
4	STIHL multipurpose grease	0781 120 1109	High voltage output on ignition module
5	Medium-strength threadlocking adhesive (Loctite 242)	0786 111 2101	
6	High-strength threadlocking adhesive (Loctite 270)	0786 111 2109	
7	High-strength threadlocking adhesive (Loctite 648)	0786 111 2117	
8	Standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons		Cleaning sealing faces and carburetor, crankshaft stubs and flywheel taper

