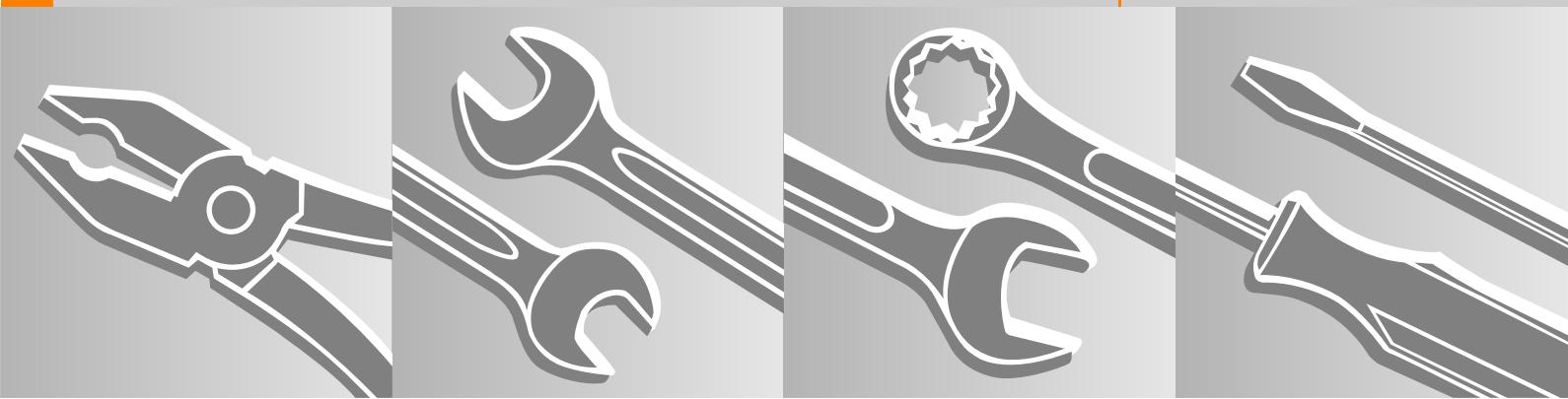


STIHL®

STIHL MS 240, 260

2008-07



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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 troubleshooting charts for all assemblies and systems in this manual and the "STIHL Service Training System".

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

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

Symbols are included in the text and pictures for greater clarity.

The meanings are as follows:

In the descriptions:

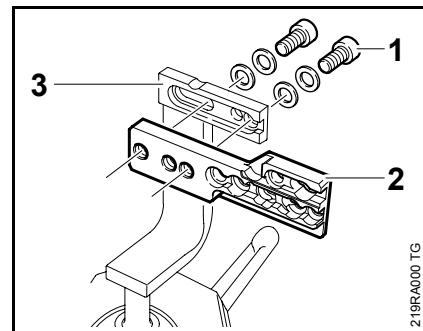
- = Action to be taken as shown in the illustration above the text
- = Action to be taken that is not shown in the illustration above the text

In the illustrations:

- Pointer
- Direction of movement

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

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

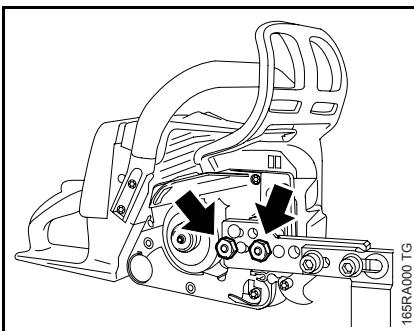


219R400 TG

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

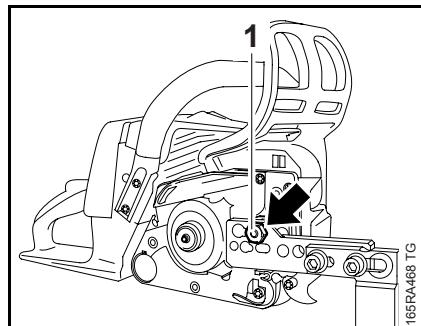
The above operation is not necessary with the new assembly stand 5910 890 3101 since the mounting plate is already fitted.



Engage the bar mounting studs in the outer bores in the mounting plate and secure the saw in position with the nuts (arrows).

The chain sprocket cover and cutting attachment have to be removed before mounting the saw to the assembly stand – pull the hand guard toward the handlebar.

Versions with Quick Chain Tensioner



There is only one bar stud on these versions. It is pushed through the upper hole (arrow) in the mounting plate and secured with the nut (1).

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

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

Storing and disposing of oils and fuels

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

2. Safety Precautions

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

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

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.

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.

3. Specifications

3.1 Engine

	MS 240	MS 260, MS 260 C
Displacement:	41.6 cm ³	50.2 cm ³
Bore:	42 mm	44.7 mm
Stroke:	30 mm	32 mm
Engine power to ISO 7293:	2.1 kW (2.85 bhp) at 9500 rpm	2.6 kW (3.5 bhp) at 9500 rpm
Maximum permissible engine speed (with bar and chain):	13000 rpm	14000 rpm
Versions with catalytic converter		
Maximum permissible engine speed (with bar and chain):		13000 rpm
Idle speed:	2800 rpm	2800 rpm
Clutch:	Centrifugal clutch without linings	Centrifugal clutch without linings
Clutch engages at:	3600 rpm	3600 rpm
Crankcase leakage test at gauge pressure: under vacuum:	0.5 bar 0.5 bar	

3.2 Fuel System

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

3.3 Ignition System

Air gap between ignition module and fanwheel:	0.15...0.30 mm
Spark plug (suppressed):	NGK BPMR 7 A
Electrode gap:	0.5 mm

3.4 Chain Lubrication

Speed-controlled oil pump with reciprocating piston and manual flow control	
Oil pump without adjustable delivery rate:	7.5 (+/- 2.5) cm ³ /min at 10000 rpm
Oil pump with adjustable delivery rate:	4.5...11.5 cm ³ /min at 10000 rpm

3.5 Tightening Torques

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

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

Fastener	Thread size	For component	Torque Nm	Letter
Countersunk screw	P 4x12	Cover plate/sprocket cover (quick chain tensioner)	2.5	
Screw	M 4x8	Cover plate/chain tensioner	3.0	4)
Collar screw	M 8x21.5	Bar mounting	23.0	1)
Collar screw	M10/M 8	Bar mounting/quick chain tensioner	30.0	1)
Screw	M 4x12	Cover, chain brake/crankcase	3.0	4)
	M 10x1	Decompression valve (MS 260)	14.0	
Screw	B 4.9x9.5	Spark arresting screen/muffler	2.0	
Screw	M 3.5x12	Generator/crankcase	2.0	1)
Screw	P 6x32.5	Handlebar, top (polymer)/tank housing	5.0	
Screw	P 6x21.5	Handlebar, bottom (polymer)/tank housing	5.0	
Screw	P 6x19	Handlebar, top and bottom/tank housing (version with handle heating)	7.0	
Screw	P 4x19	Handle molding	1.6	
Screw	M 5x12	Retaining plate/annular buffer	8.0	4)
Screw	M 4x16	Hand guard/crankcase (micro-encapsulated)	4.0	4)
Nut	M 5	Slotted nut, shroud/stud, cylinder	3.5	
Screw	P 6x19	Chain catcher/plug	2.8	
Screw	M 5x12	Spiked bumper (with self-locking nut)	7.5	4)
Screw	M 5x20	Crankcase	9.0	
Collar nut	M 5	Air filter/tank housing	2.0	
Screw	M 4x16	Fan housing	4.0	4)
	M 12x1L	Carrier (clutch)	50.0	
Screw	M 4x12	Oil pump/crankcase	3.0	4)
Screw	P 6x26.5	Annular buffer, tank housing/crankcase (ignition side)	5.0	
Screw	M 5x12	Annular buffer plate/crankcase (ignition side)	8.0	4)
Screw	P 6x19	Annular buffer, tank housing/crankcase (clutch side)	5.5	
Screw	M 5x16	Muffler/crankcase/cylinder (version with catalytic converter and MS 260)	10.0	1), 4)

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	M 5x12	Muffler/crankcase/cylinder (MS 240)	10.0	1), 4)
Nut	M 8x1	Flywheel	33.0	3)
Screw	M 4x8	Side plate/crankcase	3.0	4)
Screw	M 4x16	Side plate/crankcase (quick chain tensioner)	3.0	
Screw	M 3x20	Clamp/manifold	0.5	
	M 5x8.5	Stud/cylinder	1.4	2)
Nut	M 5	Carburetor	3.5	
Screw	M 5x20	Cylinder/crankcase	11.0	2), 4)
	M 14x1.25	Spark plug	25.0	
Screw	M 5x20	Ignition module/crankcase (micro-encapsulated)	7.0	4)

Remarks:

- 1) Loctite 242 or 243, medium strength
- 2) Loctite 270, high strength
- 3) Degrease crankshaft/flywheel and mount oil-free
- 4) Screws with binding head

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

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

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

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

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

Do not mix up screws with and without binding heads.

4. Troubleshooting

4.1 Clutch

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

4.2 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
	Chain sprocket worn	Fit new chain sprocket
Saw chain stops under load at full throttle	Clutch shoes badly worn	Install new clutch
	Clutch drum badly worn	Install new clutch drum
	Brake band blocked	Check freedom of movement and operation of brake band
Saw chain rotates at idle speed	Engine idle speed too high	Readjust 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
Saw chain does not stop immediately when brake is activated	Brake spring stretched or broken	Fit new brake spring
	Brake band stretched or worn	Fit new brake band
	Clutch drum worn	Install new clutch drum

4.3 Chain Lubrication

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

Condition	Cause	Remedy
Chain receives no oil	Oil tank empty Oil inlet hole in guide bar is blocked Intake hose or pickup body clogged or intake hose ruptured Valve in oil tank blocked Teeth on worm worn Oil pump damaged or worn	Fill up with oil and check setting of oil pump if necessary Clean oil inlet hole Fit new intake hose and pickup body Clean or replace valve Install new worm Install new oil pump
Machine losing chain oil	Oil pump body damaged Oil pump damaged or worn Oil suction hose connection damaged	Install new oil pump Install new oil pump Install new oil intake hose
Oil pump delivers insufficient oil	Oil pump worn Oil pump delivery rate set too low	Install new oil pump Adjust oil pump (only on version with adjustable oil pump)

Condition	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge, i.e. not vertically	Fit new starter rope
	Normal wear	Fit new starter rope
Starter rope does not rewind	Very dirty or corroded	Clean or replace rewind spring
	Insufficient spring tension	Check rewind spring and increase tension
	Rewind spring broken	Fit new rewind spring
Starter rope cannot be pulled out far enough	Spring overtensioned	Check rewind spring and reduce tension
Starter rope can be pulled out almost without resistance (crankshaft does not turn)	Guide peg on pawl or pawl itself is worn	Fit new pawl
	Spring clip on pawl fatigued	Fit new spring clip
Starter rope is difficult to pull or rewinds very slowly	Starter mechanism is very dirty	Thoroughly clean complete starter mechanism
	Lubricating oil on rewind spring becomes viscous at very low outside temperatures (spring windings stick together)	Coat rewind spring with a little standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons), then pull rope carefully several times until normal action is restored
	Decompression valve is not open	Open, check and replace decompression valve if necessary

4.5 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 Spark plug sooted, smeared with oil	Press boot firmly onto spark plug and fit new spring if necessary Clean the spark plug or replace if necessary. If sooting keeps recurring, check air filter
	Ignition lead loose in ignition module	Secure ignition lead properly
	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 has other damage or pole shoes have turned blue	Install new flywheel
	Ignition timing wrong, flywheel out of adjustment, key in flywheel has sheared off	Fit key if necessary and secure flywheel properly or install new flywheel
	Weak magnetization in flywheel	Install new flywheel
	Irregular spark	Check operation of switch shaft/contact springs and ignition module. Faulty insulation or break in ignition lead or short circuit wire. Check ignition lead/ignition module and replace ignition module if necessary. Check operation of spark plug. Clean the spark plug or replace if necessary.
	Crankcase damaged (cracks)	Install new crankcase

Condition	Cause	Remedy
No spark	Spark plug faulty	Install new spark plug
	Faulty insulation or short in short circuit wire	Check short circuit wire for short circuit to ground
	Break in ignition lead or insulation damaged	Check ignition lead and replace if necessary
	Ignition module faulty	Install new ignition module

4.6 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 control lever sticking on spindle	Check inlet control lever, replace if necessary
	Helical spring not located on nipple of inlet control lever	Remove the inlet control lever and refit it correctly
	Perforated disc on diaphragm is deformed and presses constantly against the inlet control lever	Fit a new metering diaphragm
	Metered diaphragm deformed	Fit a new metering diaphragm
Poor acceleration	Setting of low speed screw too lean	Check basic carburetor setting, correct if necessary
	Setting of high speed screw too lean	Check basic carburetor setting, correct if necessary
	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Diaphragm gasket leaking	Fit new diaphragm gasket
	Metering diaphragm damaged or shrunk	Fit a new metering diaphragm
	Impulse hose damaged or kinked	Install new impulse hose
	Tank vent faulty	Replace tank vent
	Leak on fuel hose from tank to 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 or replace oil seals/crankcase
Engine stalls at idle speed	Idle jet bores or ports blocked	Clean the carburetor
	Setting of 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	Replace tank vent
	Leak on fuel hose from tank to carburetor	Seal connections or install new fuel hose

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	Replace tank vent
	Fuel pickup body dirty	Install new pickup body
	Fuel strainer dirty	Clean fuel strainer in carburetor, replace if necessary
	Leak on fuel hose from tank to carburetor	Seal connections or install new fuel hose
	Setting of high speed screw 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
	Impulse hose damaged or kinked	Install new impulse hose
	Ignition timing wrong, flywheel out of adjustment, key in flywheel is missing or has sheared off	Fit key if necessary and secure flywheel properly or install new flywheel

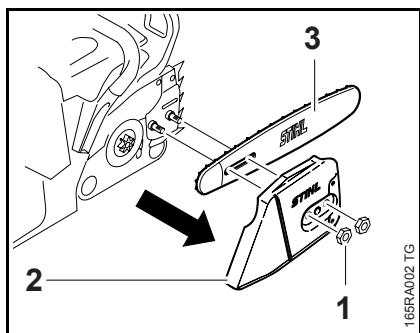
4.7 Engine

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	Fit new piston rings
	Muffler / spark arresting screen carbonized	Clean the muffler (inlet and exhaust), replace spark arresting screen, replace muffler if necessary
	Air filter dirty	Replace air filter
	Fuel/impulse hose severely kinked or damaged	Fit new hoses or position them free from kinks
	Decompression valve is not closed	Close, check and replace decompression valve 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

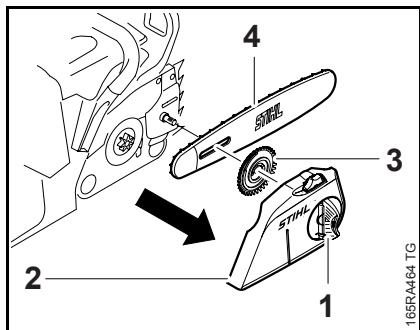
5. Cutting Attachment



Wear gloves to protect your hands from injury.

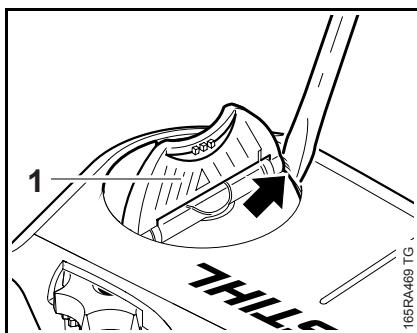
- Unscrew the hex nuts (1).
- Remove the chain sprocket cover (2).
- Remove the guide bar (3) with chain.
- Reassemble in the reverse sequence.

Versions with Quick Chain Tensioner



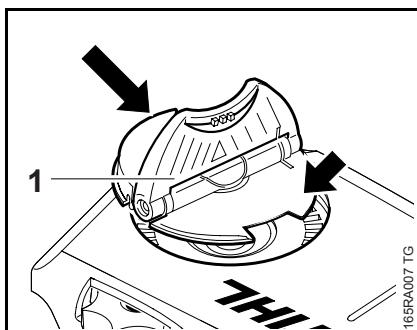
Wear gloves to protect your hands from injury.

- Swing the wing nut (1) upright and loosen it counterclockwise.
- Remove the sprocket cover (2) and tensioning gear (3) with guide bar (4).
- Reassemble in the reverse sequence.



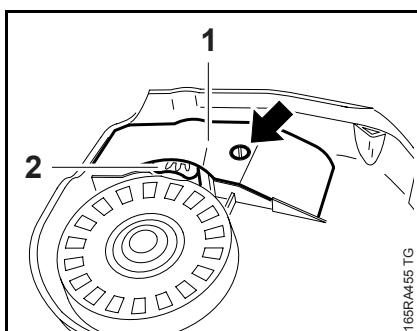
- Carefully pry the wing nut (1) out of the sprocket cover (arrow).

- Check the wing nut (1) and replace if necessary



- Swing the wing nut (1) upright.

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



- Take out the screw (arrow).

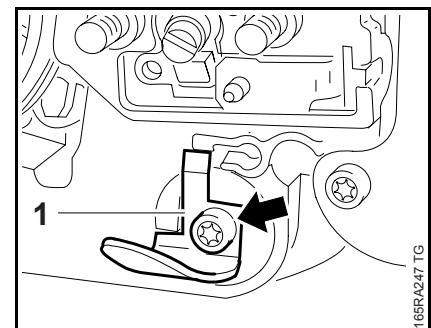
- Remove the cover plate (1) and adjusting wheel (2).

When installing the adjusting wheel, make sure its teeth point inboard.

- Reassemble in the reverse sequence.

5.1 Chain Catcher

- Remove the sprocket cover and cutting attachment, **5**



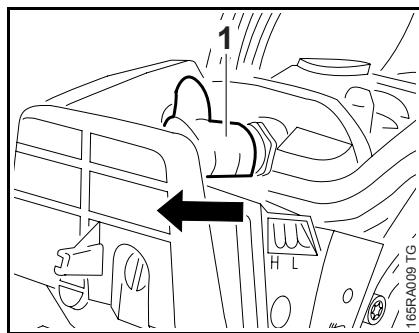
- Take out the screw (arrow) and remove the chain catcher (1).

- Reassemble in the reverse sequence.

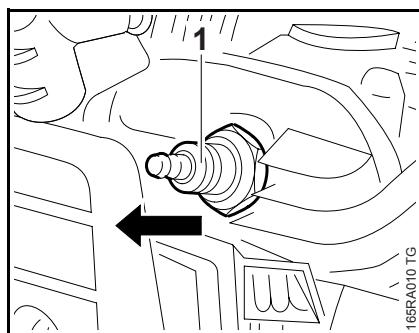
- Tightening torques, **3.5**

6. Clutch

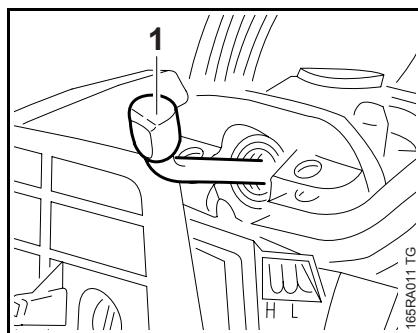
- Troubleshooting, **4.1**
- Remove the sprocket cover and cutting attachment, **5**
- Remove the clutch drum, **6.1**



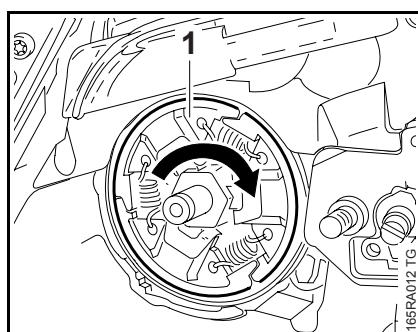
- Remove the air filter, **14.1**
- Remove the shroud, **8.4**
- Pull boot (1) off the spark plug.



- Unscrew the spark plug (1).

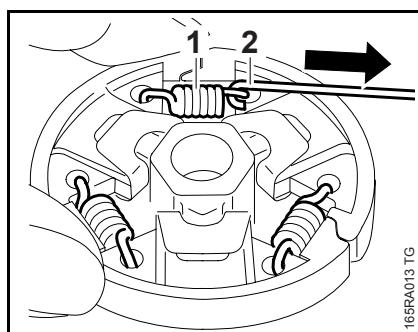


- Push the locking strip (1) 0000 893 5903 into the cylinder so that "OBEN-TOP" is visible.



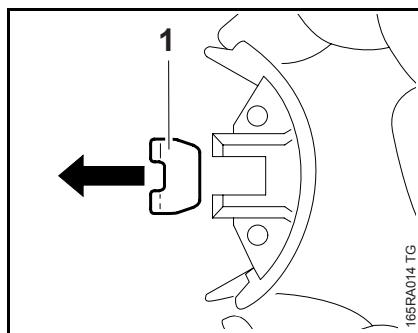
- Unscrew the clutch (1).

Note that the clutch has a left-hand thread.

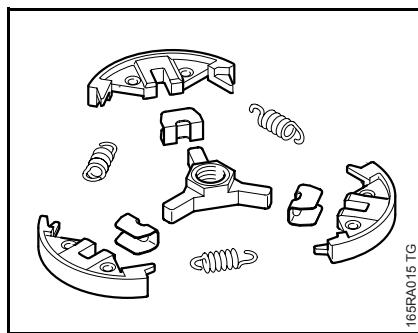


Disassembling

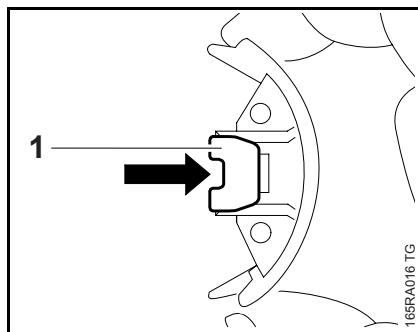
- Use hook (2) 5910 890 2800 to remove the clutch springs (1).



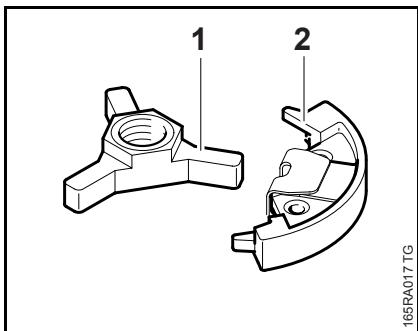
- Pull the clutch shoes off the carrier.
- Remove the retainers (1).



- Clean all parts..
- Replace any damaged parts.

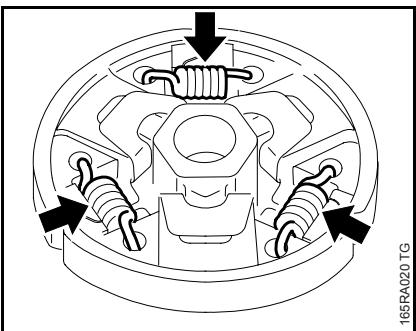


- Fit the retainers (1).



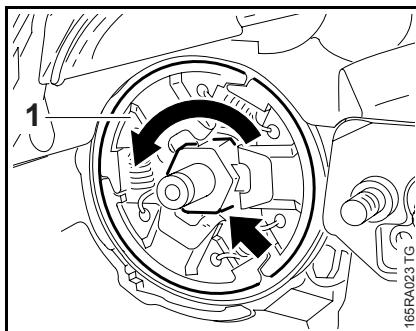
165RA017 TG

- Fit the clutch shoes (2) over the arms (2).



165RA020 TG

- Check the clutch – all springs (arrows) must be properly attached.



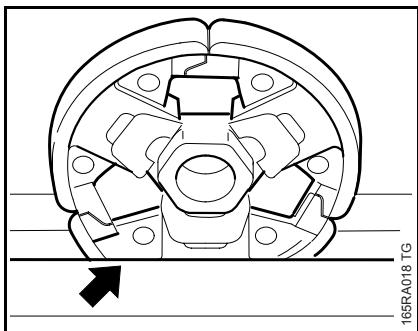
165RA023 TG

- Screw the clutch (1) on to the crankshaft stub and tighten down the hexagon (arrow) firmly – left-hand thread.

– Tightening torques, 3.5

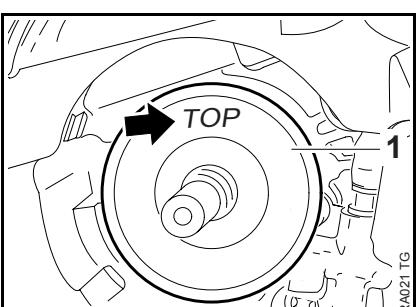
– Remove the locking strip from the cylinder.

– Reassemble all other parts in the reverse sequence.



165RA018 TG

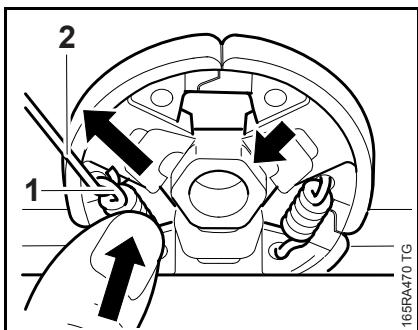
- Clamp the clutch in a vise (arrow).



165RA021 TG

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

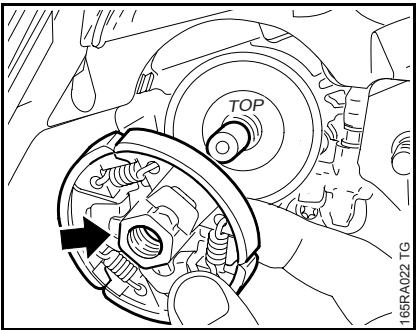
Installed position is correct when "TOP" (arrow) faces outwards.



165RA470 TG

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

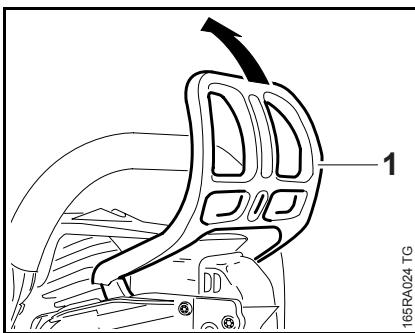
- Attach one end of each spring (1) to the clutch shoes.
- Use the hook (2) 5910 890 2800 to attach the other ends of the springs and press them firmly into the clutch shoes.



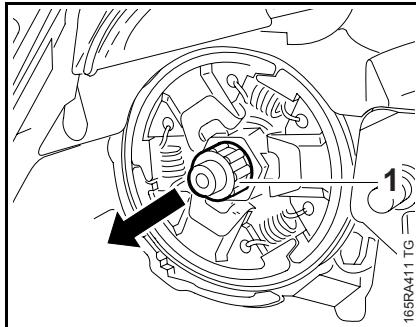
165RA022 TG

- Position the clutch on the crankshaft stub so that the raised hexagon (arrow) faces outwards.

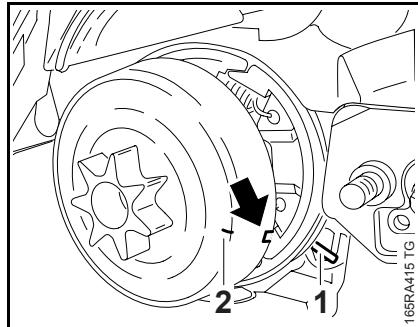
6.1 Clutch Drum



- Remove the sprocket cover and cutting attachment, **5**
- Pull the hand guard (1) towards the handlebar.



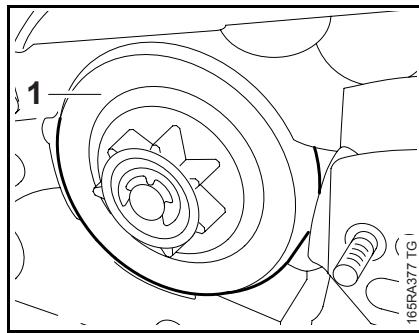
- Pull off the needle cage (1).
- Clean the needle cage (1) and crankshaft stub, **17**
- Lubricate the needle cage (1) and crankshaft stub, **17**



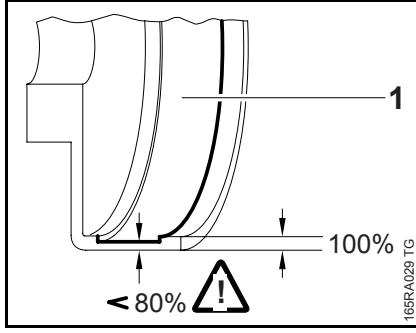
The notch (arrow) in the clutch drum must engage the worm gear's driver (1).

Use the mark (2) for orientation.

- Apply thin coating of oil to outside diameter of clutch drum and the brake band.
- Reassemble all other parts in the reverse sequence.



Remove and install the clutch drum (1), see instruction manual.



- 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.

7. Chain Brake

7.1 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.

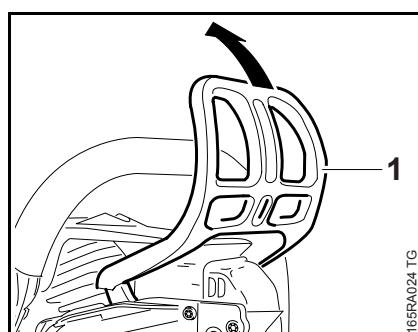
- Start the engine.
- With the chain brake activated (locked), open the throttle wide for a brief period (max. 3 seconds) – the chain must not rotate.
- With the chain brake released, open the throttle wide and activate the brake manually – the chain must come to an abrupt stop.

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

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

If the chain brake does not operate properly, refer to troubleshooting, **4.2**.

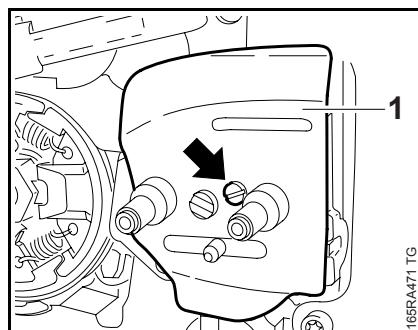
7.2 Removing and Installing the Brake Band



- Disengage the chain brake by pulling the hand guard (1) towards the front handle.

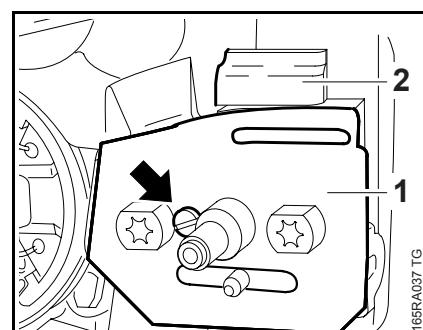
The brake band is no longer under tension.

- Remove the clutch drum, **6.1**

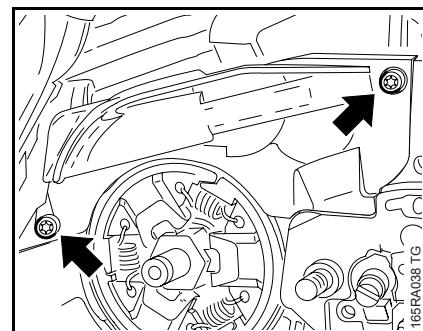


- Troubleshooting, **4.2**
- Remove the sprocket cover and cutting attachment, **5**
- Take out the screw (arrow) and remove the side plate (1).

Versions with Quick Chain Tensioner



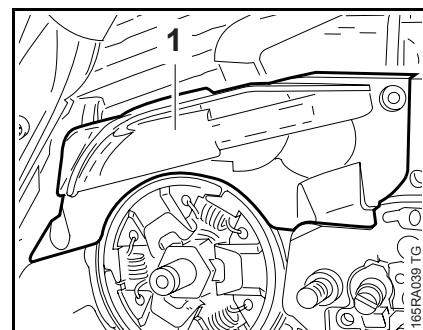
- Take out the screw (arrow) and remove the side plate (1).
- Remove the upper bumper strip (2).



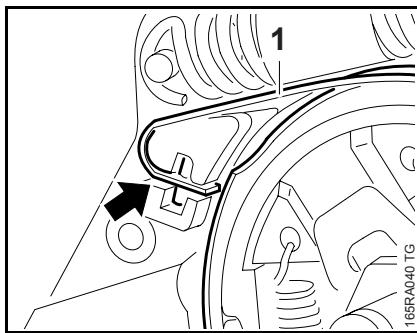
- Take out the screws (arrows).

On versions with handle heating

- Remove the ground wire, **15.4.1**.

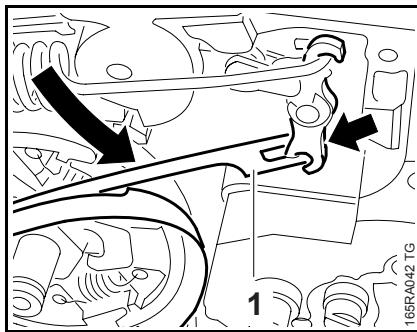


- Remove the cover (1).

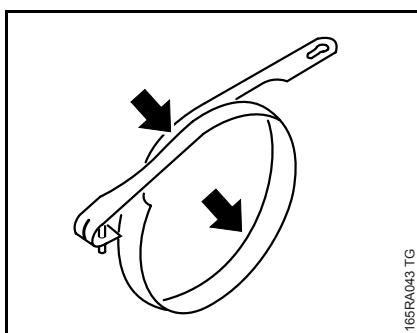


- Pry the brake band (1) out of its seat (arrow).
- Remove the brake band (1).

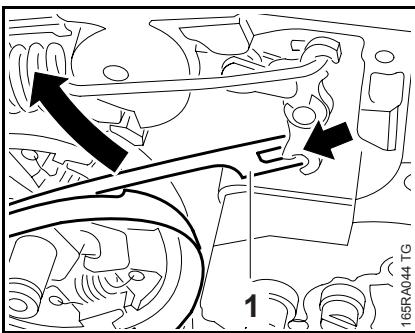
Do not over-stretch the brake band.



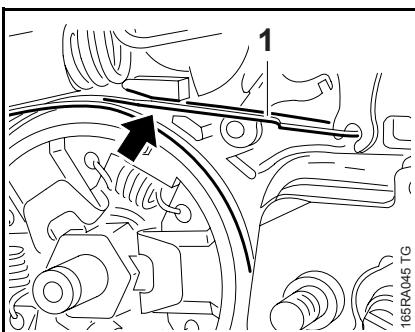
- Turn the brake band (1) to one side and disconnect it from the brake lever (arrow).



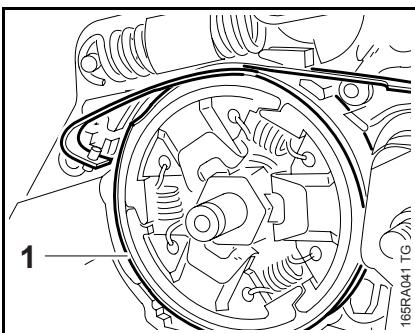
Install a new brake band if there are noticeable signs of wear (large areas on inside diameter and/or parts of outside diameter – arrows) and its remaining thickness is less than 0.6 mm.



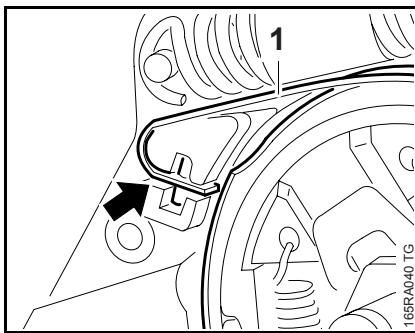
- Hold the brake band (1) sideways, attach it to the brake lever (arrow) and then swing it in the direction of its seat.



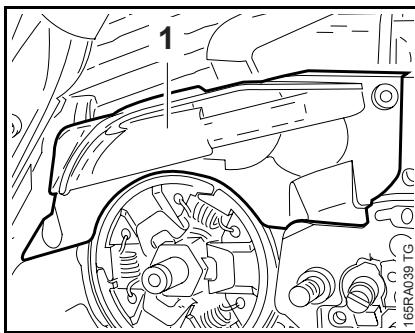
- Position the brake band (1) in the guide (arrow) first.



- Push the brake band (1) into its seat.

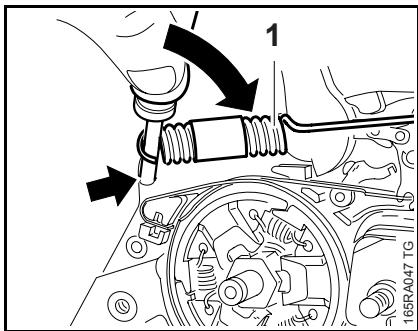


- Push the brake band (1) into its guide (arrow) as far as stop.



- Place the cover (1) in position.
 - On versions with handle heating, fit the ground wire, [15.4.1](#)
 - Insert screws and tighten them down firmly.
 - Tightening torques, [3.5](#)
 - On versions with quick chain tensioner, install the upper bumper strip.
 - Install the clutch drum, [6.1](#)
 - Check operation.
 - Reassemble all other parts in the reverse sequence.

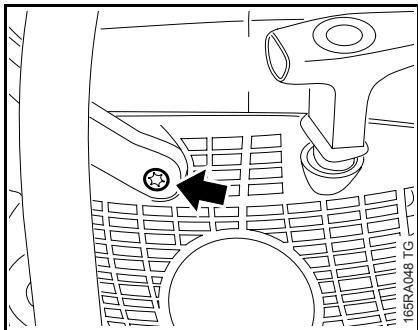
7.3 Brake Lever



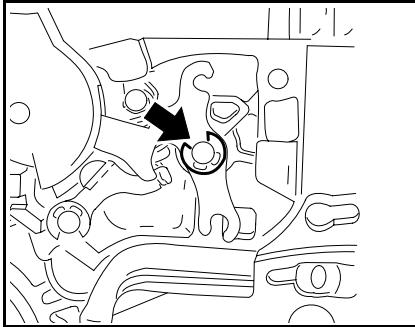
- Troubleshooting, **4.2**
- Push the hand guard towards the guide bar.

The brake spring (1) is now relaxed.

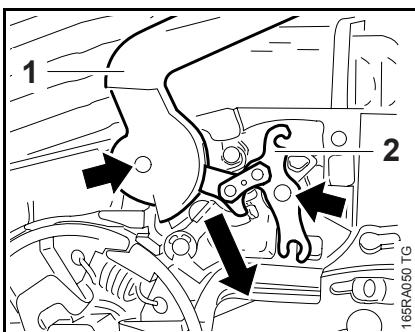
- Remove the brake band, **7.2**
- Use the assembly tool 117 890 0900 to disconnect the brake spring (1) from the anchor pin (arrow).
- Disconnect the brake spring (1) from the brake lever.



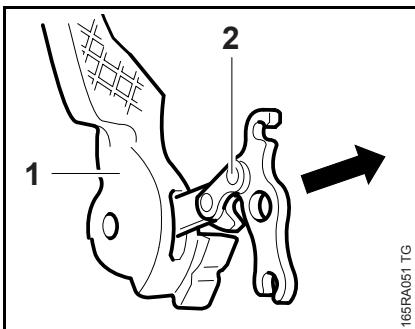
- Take out the screw (arrow).



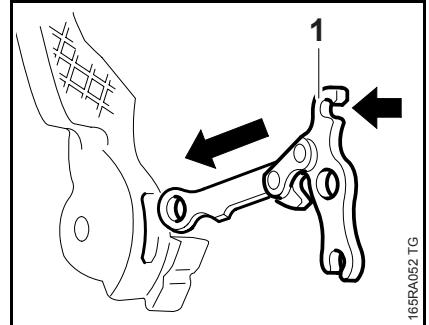
- Remove the E-clip (arrow).



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



- Take the brake lever (2) out of the hand guard (1).
- Inspect the brake lever (2) and hand guard (1) and replace if necessary.

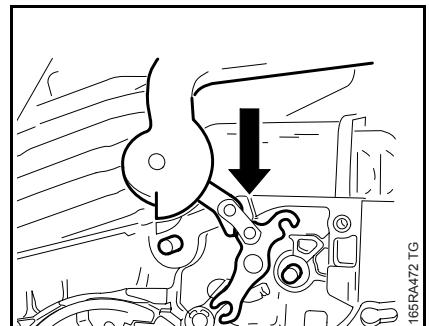


- Inspect the pivot pins and replace if necessary, **7.5**

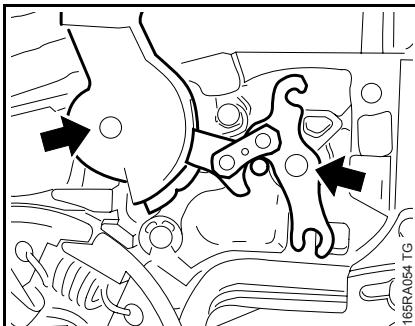
- Inspect the cam lever and replace if necessary, **7.4**

Clean all disassembled parts with a little standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons.

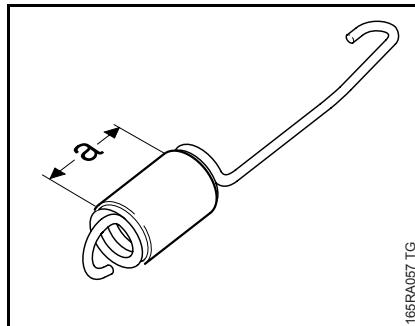
- Hold the brake lever (1) so that the brake spring attachment point (arrow) is at the top.
- Push the brake lever (1) into the hand guard recess and line up the holes.



- Push the hand guard with brake lever over the machine until it is positioned against the pivot pin.



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

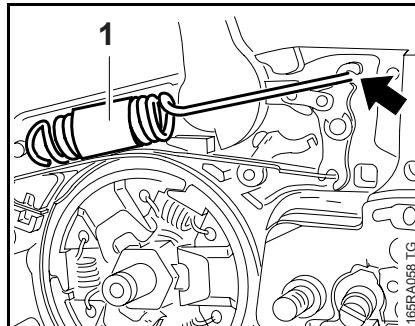


- The turns of brake spring must be tightly against one another in the relaxed condition. If this is not the case, replace the brake spring.

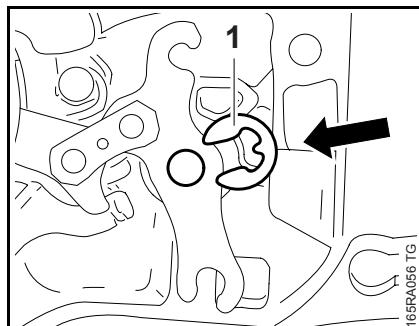
Check the correct position of the protective hose – it must be centered in the spring.

$$a = 20 \text{ mm}$$

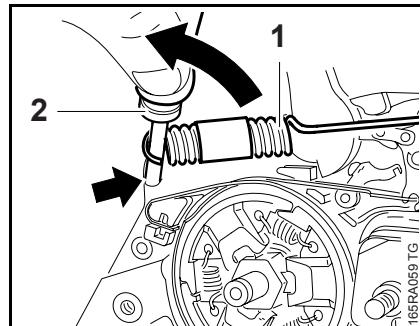
If the groove in the brake spring anchor pin is worn, install a new pin, **7.5**



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



- Fit the E-clip (1).



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

– Reassemble all other parts in the reverse sequence.

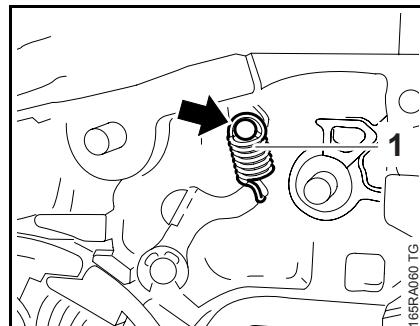
– Tightening torques, **3.5**

– Lubricate the brake lever, **17**

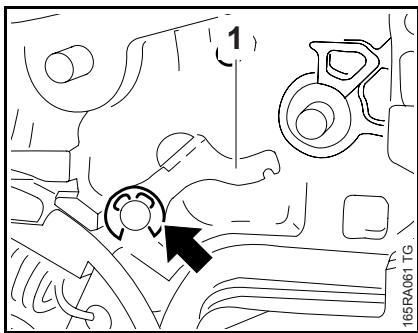
7.4 Cam Lever

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

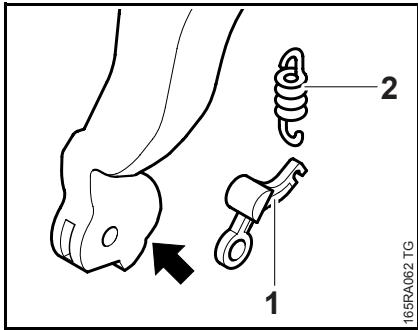
– Remove the brake lever, **7.3**



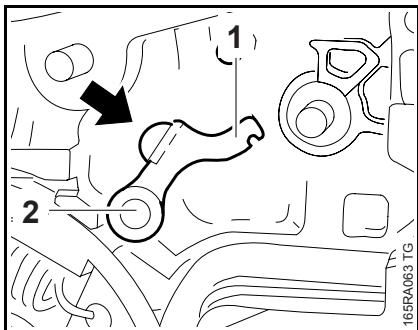
- Disconnect the spring (1) from the anchor pin (arrow).



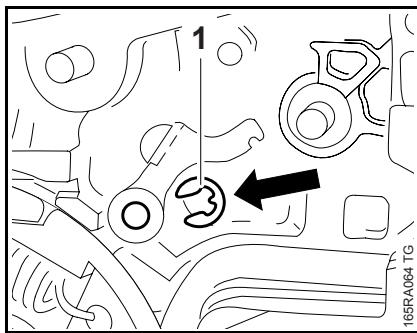
- Remove the E-clip (arrow).
- Pull the cam lever (1) off the pivot pin.



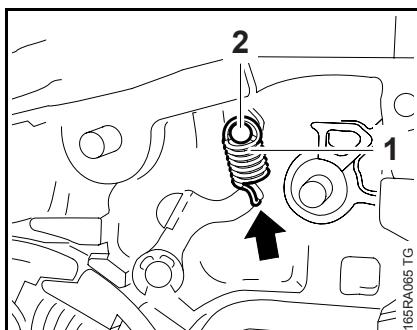
- Check the cam lever (1) and spring (2) and replace if necessary.
- Check the condition of the cam contour (arrow) and replace the hand guard if necessary.



- Position the cam lever (1) so that its cam (arrow) faces the cam on the hand guard.
- Push the cam lever (1) on to the pivot pin (2).



- Fit the E-clip (1).



- Attach the spring (1) to the cam lever so that the open side of the spring hook (Pfeil) points toward the housing.

If the groove in the spring's anchor pin is worn, install a new pin, **7.5**

- Attach the spring (1) to the anchor pin (2).

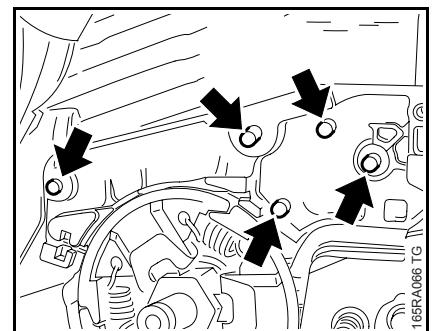
The cam lever is not yet under tension – the spring may become detached.

- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**
- Lubricate the cam lever, **17**

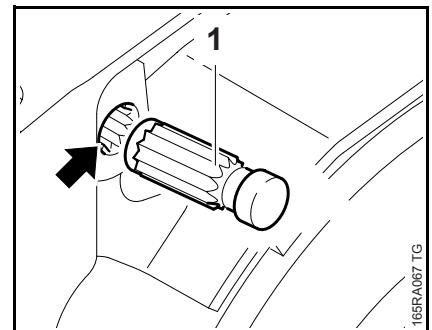
7.5 Pins

The anchor pins secure the springs. Worn pins must be replaced – the springs may otherwise become detached and pop out.

All parts have been removed from the pins in the following illustrations for greater clarity.

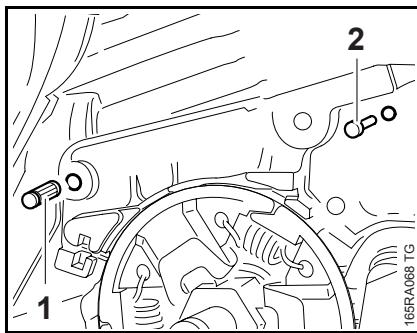


- Use a suitable tool to pull out the pins (arrows).

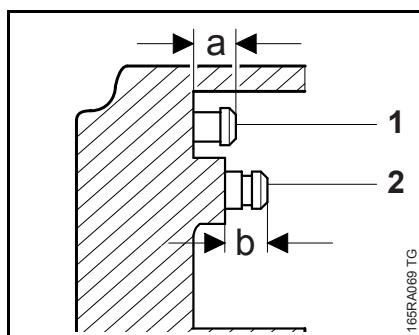


- Before installing the new pin (1), coat its knurled shank with Loctite, **17**
- Position the new pin (1) in the bore (arrow) so that the knurling on the pin meshes with the existing knurling in the bore.

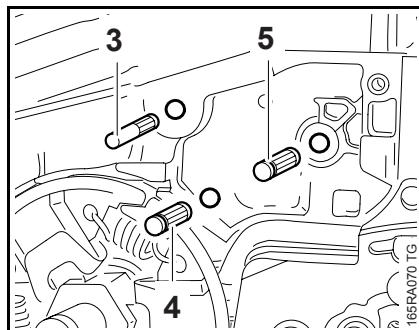
Turn the pin (1) back and forth as necessary.



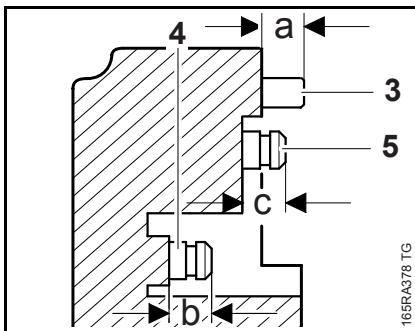
- Drive home the pins (1 and 2) as shown in the illustrations.



- Carefully tap home the pins to obtain the following dimensions:
Pin (1) a = 4.3 – 4.7 mm
Pin (2) b = 3.0 – 3.4 mm



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



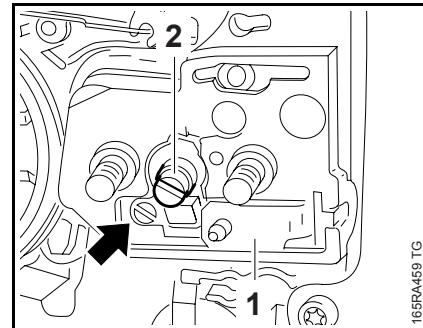
- Carefully tap home the pins to obtain the following dimensions:
Pin (3) a = 4.3 – 4.7 mm
Pin (4) b = 3.0 – 3.4 mm
Pin (5) = 3.0 – 3.4 mm

The pins must be driven home squarely.

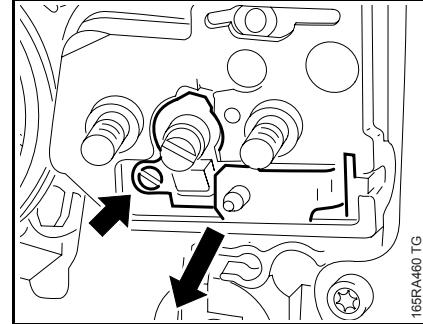
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**
- Lubricate the brake and cam levers, **17**

7.6 Side Chain Tensioner

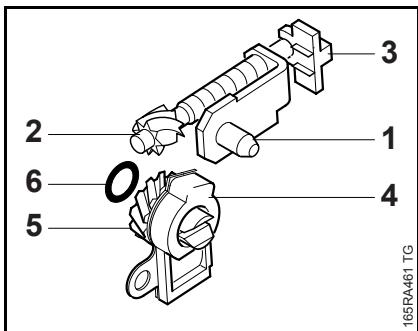
- Remove the sprocket cover and cutting attachment, **5**
- Troubleshooting, **4.2**



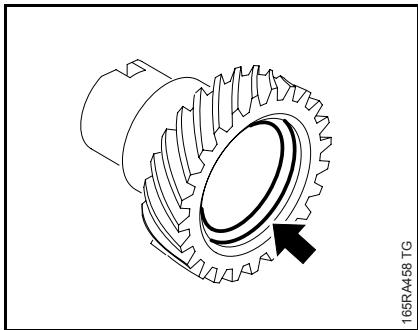
- Remove the side plate.
- Turn the spur gear (2) clockwise until the tensioner slide (1) butts against the right-hand end and the screw (arrow) is visible.



- Take out the screw (arrow).
- Pull out the tensioner side with adjusting screw, thrust pad and spur gear.



- Inspect the thrust pad (1), adjusting screw (2), tensioner slide (3), cover plate (4), spur gear (5) and O-ring (6) and replace as necessary.



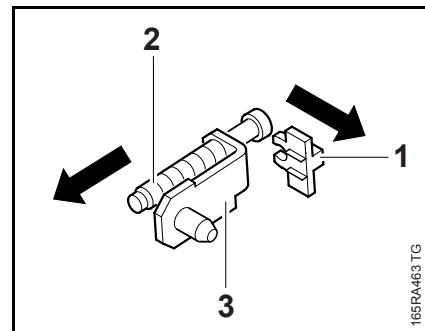
- Fit the O-ring in the spur gear recess (arrow).
- Clean all disassembled parts with a little standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons.

Always replace the adjusting screw and spur gear as a matching pair.

- Lubricate the threads, gears and O-ring with STIHL multipurpose grease, **17**
- Reassemble in the reverse sequence.

7.6.1 Front Chain Tensioner

- Remove the sprocket cover and cutting attachment, **5**
- Troubleshooting, **4.2**
- Remove the side plate, **7.2**

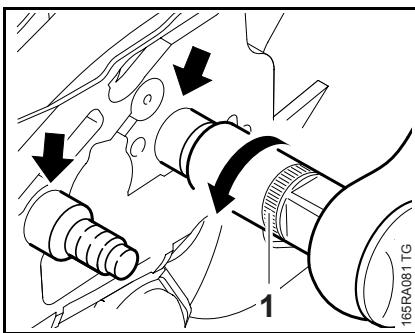


- Pull off the thrust pad (1) and unscrew the adjusting screw (2) from the tensioner slide (3).
- Check the individual parts and replace if necessary.
- Reassemble in the reverse sequence.
- Clean all disassembled parts with a little standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons.
- Lubricate thread with STIHL multipurpose grease, **17**
- Reassemble all other parts in the reverse sequence.

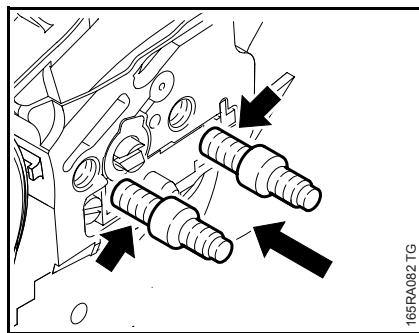
7.6.2 Quick Chain Tensioner

The quick chain tensioner is installed in the chain sprocket cover. See chapter on cutting attachment, **5**

7.7 Bar Mounting Studs

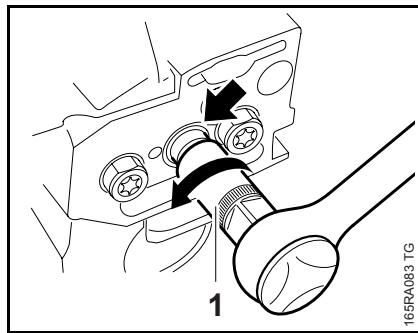


- Remove the sprocket cover and cutting attachment, **5**
- Remove the side plate, **7.6**
- Push stud puller 5910 893 0501 (1) over the collar studs (arrows) as far as it will go and unscrew the studs counterclockwise.

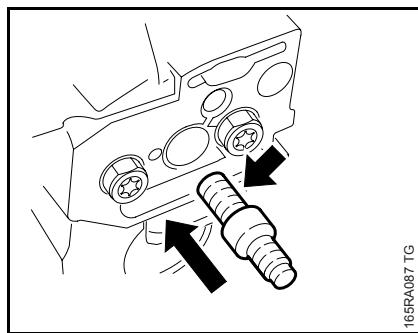


- Before installing, coat threads (arrow) of collar studs with Loctite, **17**
- Fit collar studs and tighten them down firmly.
- Tightening torques, **3.5**
- Reassemble all other parts in the reverse sequence.

Versions with Quick Chain Tensioner



- Remove the sprocket cover and cutting attachment, **5**
- Remove the side plate, **7.6**
- Push stud puller 5910 893 0501 (1) over the collar stud (arrow) as far as it will go and unscrew the stud counterclockwise.



- Before installing, coat thread (arrow) of collar stud with Loctite, **17**
- Fit collar stud and tighten it down firmly.
- Tightening torques, **3.5**

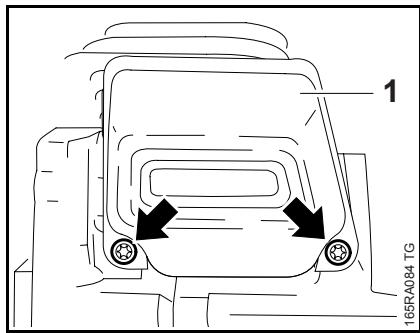
Reassemble all other parts in the reverse sequence.

8. Engine

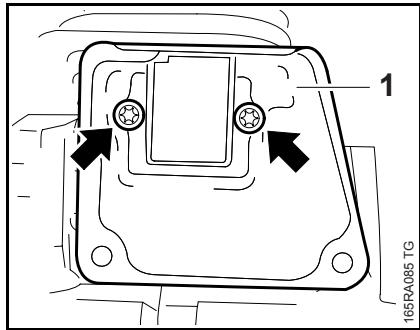
8.1 Muffler / Spark Arresting Screen

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

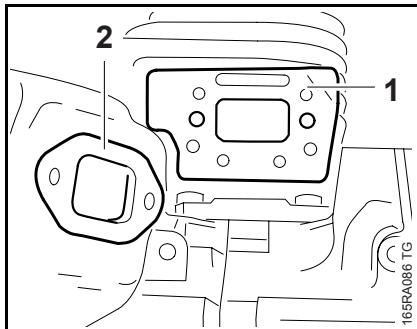
- Troubleshooting,  4



- Take out the screws (arrows).
- Remove the exhaust casing (1).

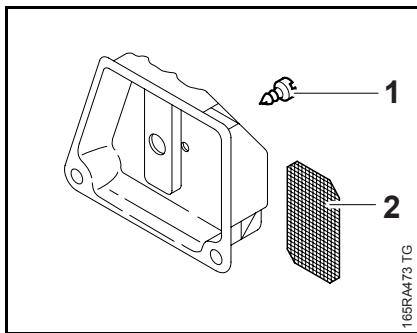


- Take out the screws (arrows).
- Remove the muffler (1), check and replace if necessary.

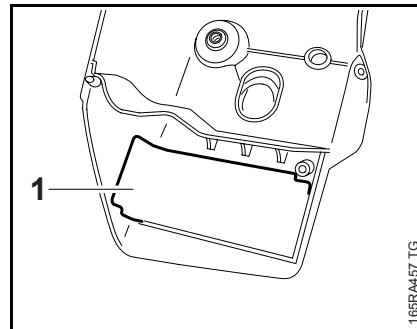


- Remove the heat shield (1), if fitted.
- Remove the gasket (2).

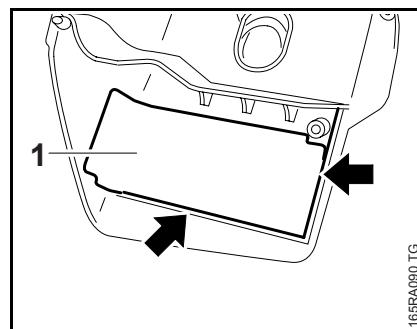
Spark arresting screen (if fitted)



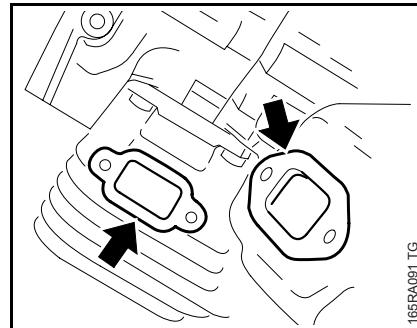
- Take out the screw (1).
- Pull out the spark arresting screen (2).
- Clean the spark arresting screen (2) or replace if necessary.
- Reassemble in the reverse sequence.



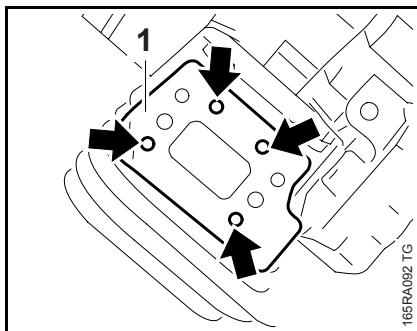
- Check the reflector foil (1), if fitted, and replace if necessary



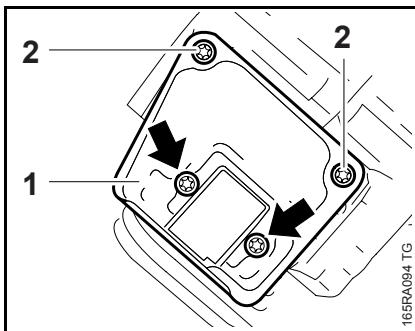
- Position the reflector foil (1) against the edges (arrows).



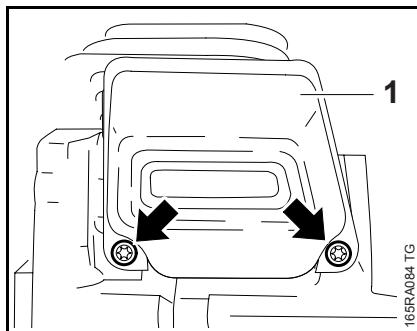
- Hold the machine upright.
- Inspect and clean the sealing faces (arrows) and remove any gasket residue.



- Place the heat shield (1) in position (if fitted) and use the indentations (arrows) to line it up on the sealing face of the cylinder exhaust port.

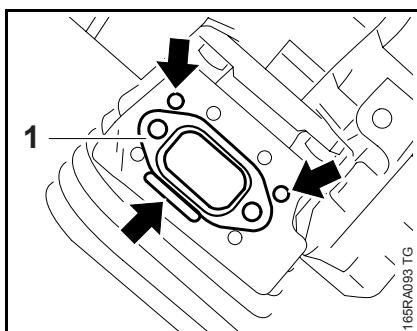


- Carefully place the muffler (1) in position.
- Line up the screws (arrows) and check the position of the gasket.
- Insert screws (2) to hold the muffler in position.
- Insert screws (arrows) and tighten them down firmly.

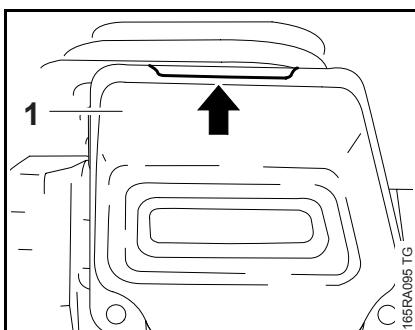


- Insert screws (arrows) and tighten them down firmly.

– Tightening torques, **3.5**



- If the heat shield is fitted, position the gasket (1) between the projections (arrows)
 - the gasket is now held in position.
- Versions without heat shield:
Place gasket (1) on the cylinder exhaust port, the raised edge must face the port and the holes must be in alignment.



- Remove the screws used to hold the muffler in position.
- Attach tab (arrow) of the exhaust casing (1) to the muffler first and then swing it into position.

8.2 Leakage Test

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

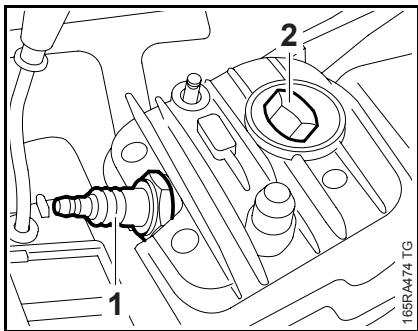
This makes adjustment of the prescribed idle speed difficult, if not impossible.

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

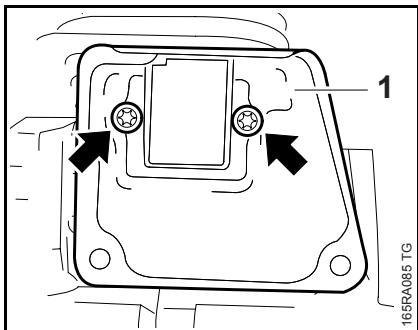
Always perform the vacuum test first and then the pressure test.

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

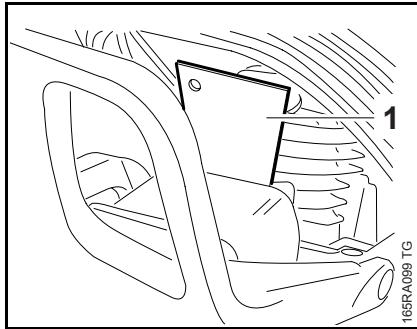
8.2.1 Preparations



- Remove the shroud, **8.4**
- Set the piston to top dead center. This can be checked through the spark plug hole.
- Remove the decompression valve, **8.9**
- Fit the plug (1) 1122 025 2200 and tighten it firmly.
- Fit the spark plug (2) and tighten it down firmly.
- Tightening torques, **3.5**



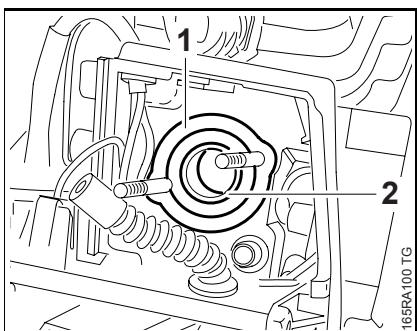
- Remove the muffler exhaust casing, **8.1**
- Loosen the screws (arrows).



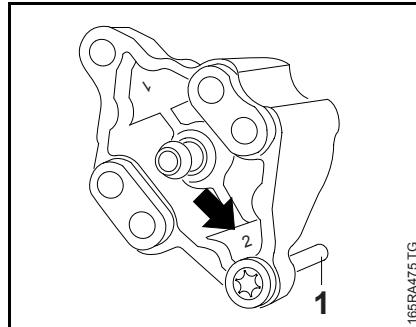
- Fit the sealing plate (1) 0000 855 8106 between the cylinder exhaust port and heat shield (if fitted) and tighten down the screws moderately.

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

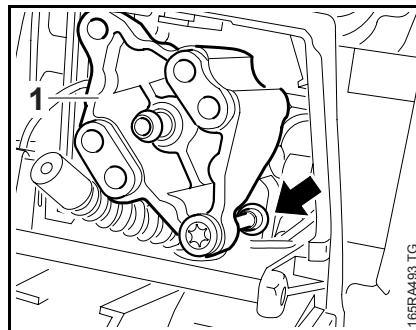
- Remove the carburetor, **14.2**



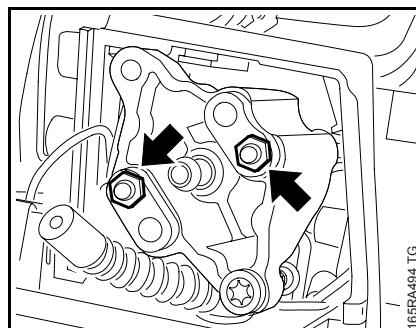
- Check that the sleeve (2) and washer (1) are in place.



- Pin (1) must be in the test flange 1128 850 4200
 - it seals the impulse hose.
- Make sure that the pin (1) is in hole "2" (arrow).



- Fit the test flange 1128 850 4200 (1).
- When pushing the test flange (1) into position, make sure the pin engages the impulse hose (arrow).

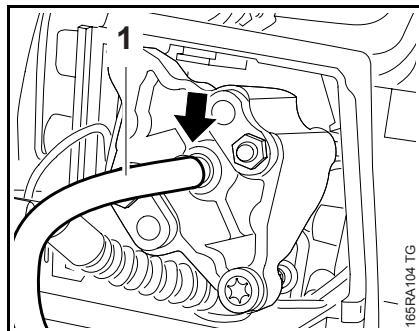


- Fit the nuts (arrows) and tighten them down firmly.

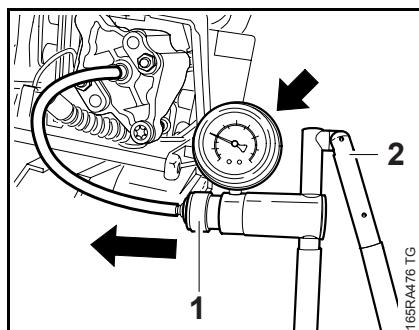
8.2.2 Vacuum Test

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

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



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



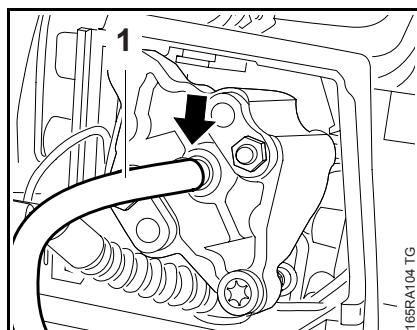
- Push ring (1) to the left.
- Operate the lever (2) until the pressure gauge (arrow) indicates a vacuum of 0.5 bar.

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, **8.3**.

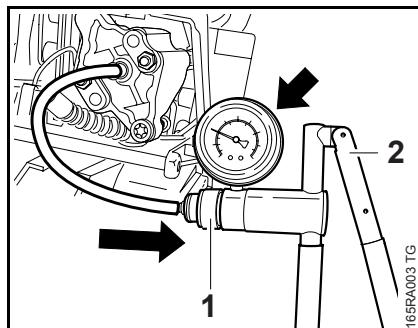
- After finishing the test, push the ring (1) to the right to vent the pump.
- Continue with pressure test, **8.2.3**

8.2.3 Pressure Test



Carry out the same preparations as for the vacuum test, **8.2.2**

- Always carry out the vacuum test, before the pressure test, **8.2.2**
- Connect pressure hose (1) of pump 0000 850 1300 to nipple (arrow).
- Push ring (1) to the right.
- Operate the lever (2) until the pressure gauge (arrow) 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 (1) to the left to vent the pump – disconnect the hose.
- Remove the test flange.
- Install the carburetor, **14.2**
- Loosen the muffler and pull out the sealing plate.
- Tighten down the muffler firmly.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**



165R2003 TG

- Push ring (1) to the right.
- Operate the lever (2) until the pressure gauge (arrow) 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.

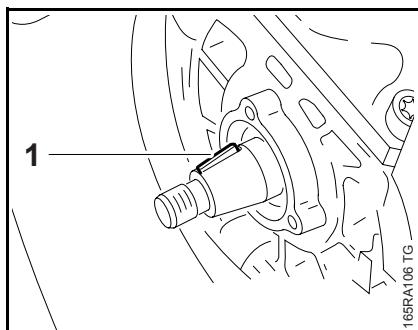
8.3 Oil Seals

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

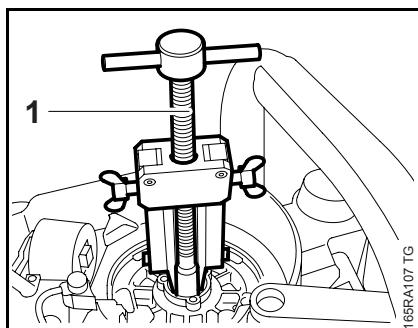
Ignition side

- Remove the fan housing, [10.2](#)
- Remove the flywheel, [9.5](#)
- Remove the generator, [15.7](#)

Versions with handle bearing



- Remove the Woodruff key (1).



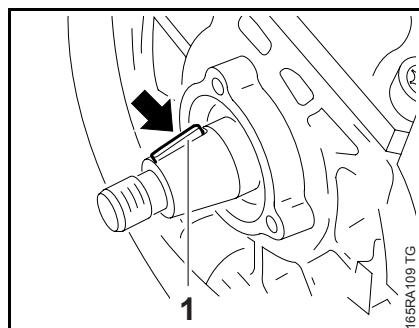
- Free off the oil seal in its seat by tapping it with a suitable tube or a punch.
- Apply puller (1) 5910 890 4400 with No. 3.1 jaws 0000 893 3706.

- Clamp the puller arms.

- Pull out the oil seal.

Take care not to damage the crankshaft stub.

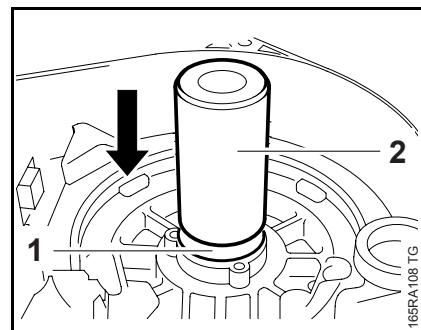
- Clean the sealing face with a little standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons.
- Lubricate sealing lips of new oil seal with grease, [17](#)



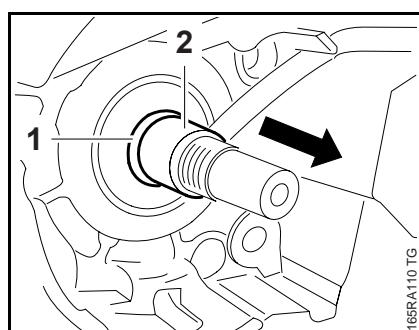
- Install the Woodruff key (1) – its straight side (arrow) must be in line with the taper.
- Reassemble all other parts in the reverse sequence.

Clutch side

- Remove the sprocket cover and cutting attachment, [5](#)
- Remove the clutch, [6](#)
- Remove the oil pump, adjustable, [13.5](#), non-adjustable, [13.4](#)



- Apply a thin coating of sealant to the outside diameter of the oil seal (1), [17](#)
- Slip the oil seal (1), open side facing the crankcase, over the crankshaft stub.
- Use press sleeve (2) 1121 893 2400 to install the oil seal (1).

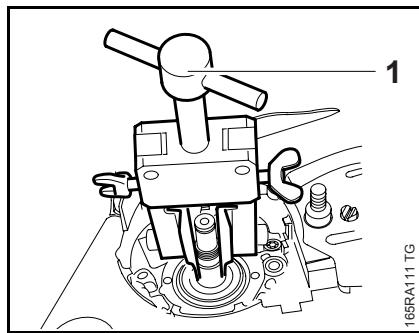


The seating face must be flat and free from burrs.

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

Clean the crankshaft with a little standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons.

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



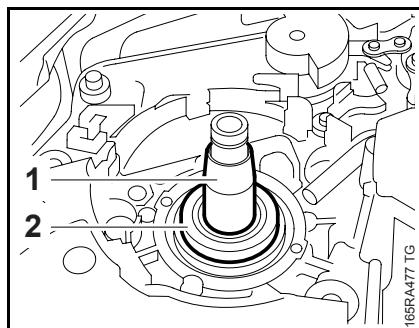
1

165RA111 TG

- 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.

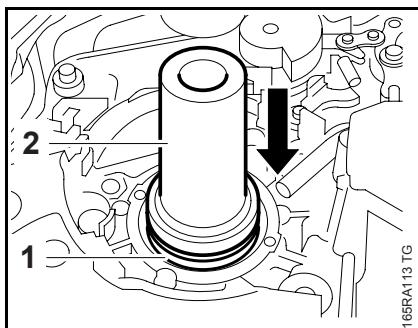
Take care not to damage the crankshaft stub.

- Clean the sealing face with a little standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons.
- Lubricate sealing lips of new oil seal with grease, 17

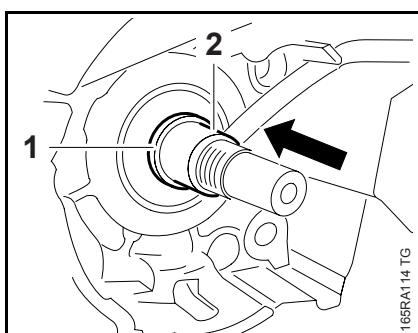


- Fit the installing sleeve (1) 1118 893 4602.
- Apply a thin coating of sealant to the outside diameter of the oil seal (2), 17

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

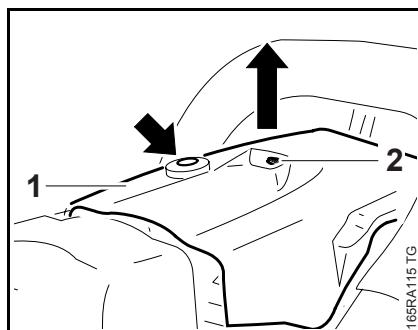


- Use press sleeve (2) 1120 893 2400 to install the oil seal (1).

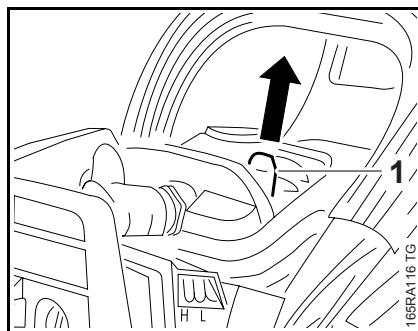


- Wait about one minute, then rotate the crankshaft several times.
- Fit the washer (1) and ring (2).
- Reassemble all other parts in the reverse sequence.

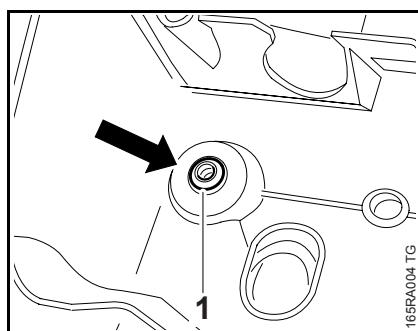
8.4 Removing and Installing the Shroud



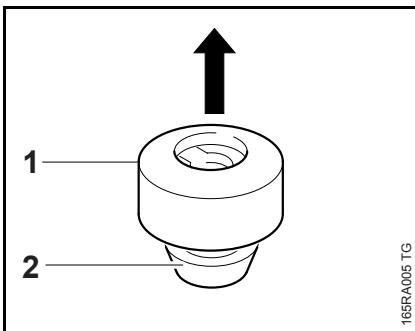
- Unscrew the slotted nut (arrow).
- Remove the shroud (1) over the decompression valve (2).



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

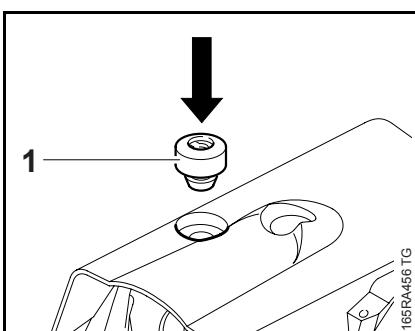


- Push out the slotted nut (1) with insulator.



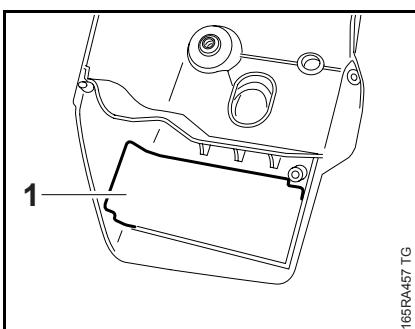
- Pull the insulator (1) off the slotted nut (2).
- Check the individual parts and replace if necessary.
- Reassemble in the reverse sequence.

165RA005 TG



- Push the slotted nut (1) with insulator into the bore until it engages in position.

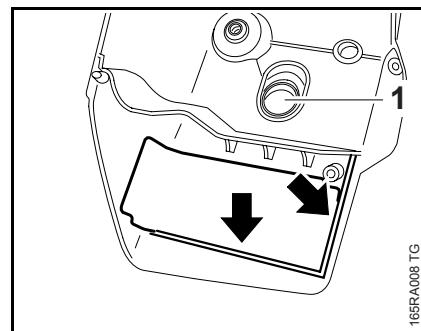
165RA456 TG



165RA457 TG

- Inspect the reflector foil (1) and replace it if it is damaged.

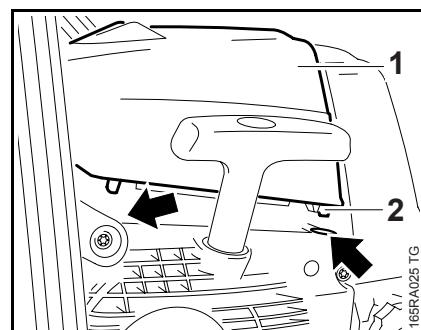
Versions with decompression valve



165RA008 TG

- Bond the new reflector foil in position along the ribs (arrows).
- Check the cap (1), if fitted, and replace if necessary

If a new shroud is fitted, the cap (1) must be removed.



165RA025 TG

- Fit the shroud (1). Push the lugs (2) into the holes (arrows).

Make sure the stud is located against the slotted nut.

- Screw home the slotted nut as far as stop.
- Reassemble all other parts in the reverse sequence.

8.5 Cylinder

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

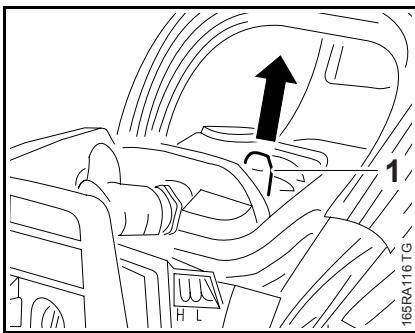
Cylinder installed

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

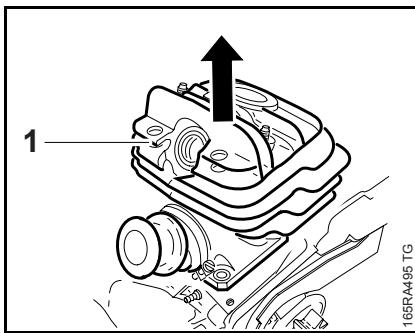
Cylinder removed

To remove the flywheel and clutch, the crankshaft has to be blocked by resting the piston on the wooden assembly block.

- Remove the shroud, **8.4**
- Pull off the boot and unscrew the spark plug, **6**
- Remove the fan housing, **10.2**
- Remove the carburetor, **14.2**
- Push the manifold out of the tank housing, **14.6.1**
- Remove the muffler, **8.1**
- Remove the decompression valve, **8.9**
- Remove the handlebar, **11.5**. On versions with handle heating, take out the screws and swing the handlebar to one side, **11.6**

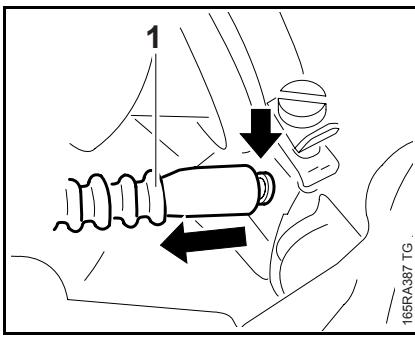


- Pull off the stop buffer (1).

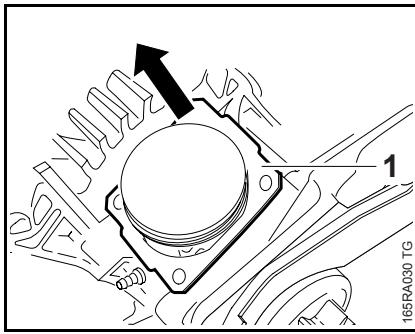


- Carefully lift the cylinder (1) away.

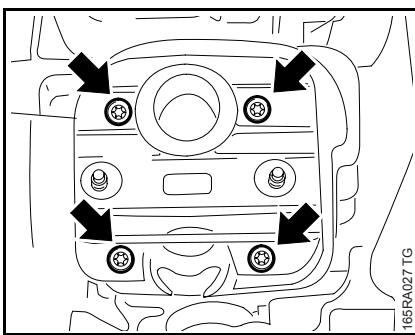
Do not use pointed or sharp-edged tools for this job.



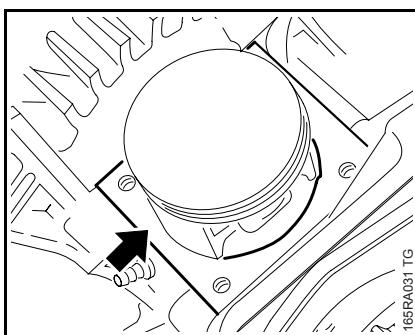
- Pull the impulse hose (1) off the nipple (arrow).



- Remove the cylinder gasket (1).



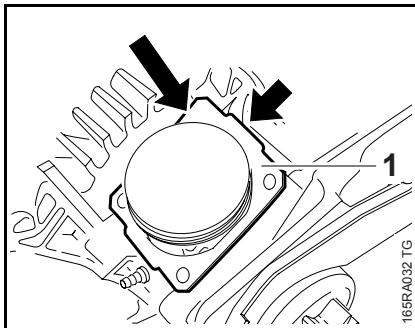
- Take out the four cylinder base screws through the holes (arrows) in the cylinder.



- Inspect and clean the sealing face (arrow), **4.7**

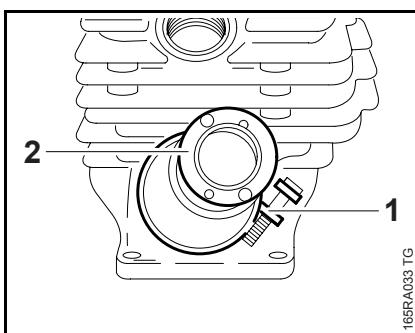
The sealing face must be in perfect condition. Always replace components with damaged sealing faces, **4.7**.

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



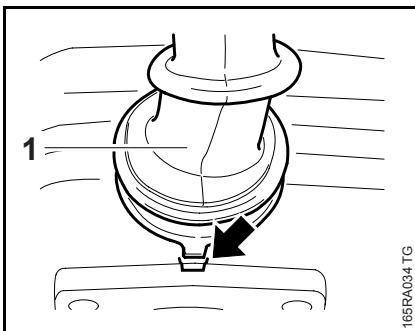
- Line up the cylinder gasket (1) so that the tabs (arrow) point toward the carburetor and cutting attachment.

- Place the cylinder gasket (1) in position.

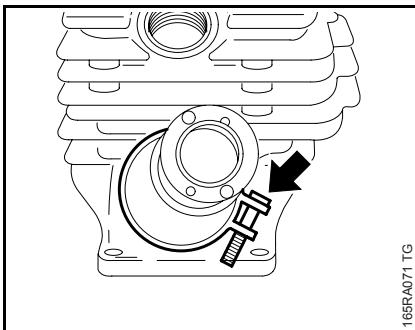


- Inspect the intake manifold (2) and replace it if necessary – even very minor damage can result in engine running problems, **4.7**

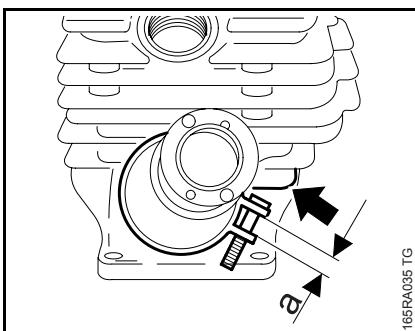
- Loosen the hose clamp (1) and pull off the manifold (2).



- Push the manifold (1) on to the intake stub.
- Line up the manifold (1)
 - the tab must be positioned as shown in the illustration (arrow).

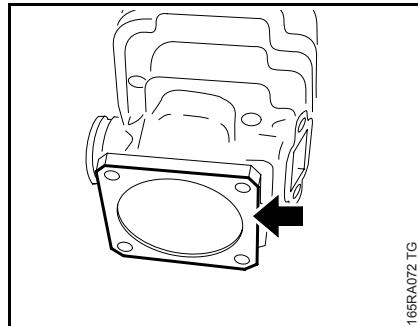


- Position the hose clamp so that the screw head (arrow) points toward the clutch side.
- Push the hose clamp on to the manifold.



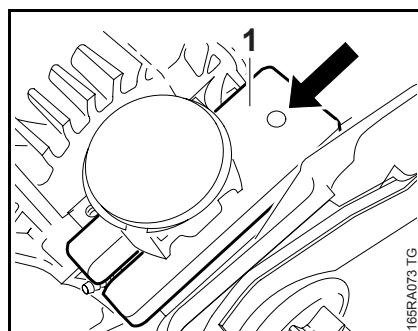
- Turn the hose clamp until the screw head is below the lower cylinder fin (arrow).

- Tighten the screw until the gap "a" between the two ends of the hose clamp is about 5 to 6 mm.

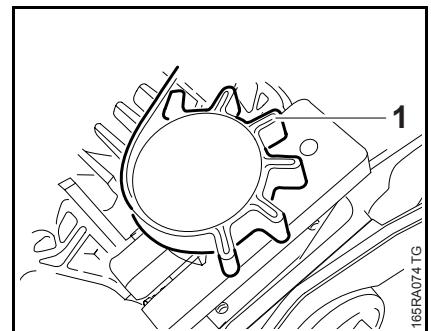


- Inspect and clean the sealing face (arrow) and remove any gasket residue.
- Check the sealing faces on the cylinder intake and exhaust ports.

The sealing faces must be in perfect condition. If the sealing faces are damaged, install a new cylinder.

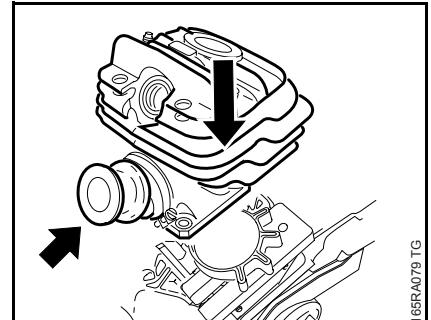


- Slide the wooden assembly block (1) 1108 893 4800 between the piston and crankcase.

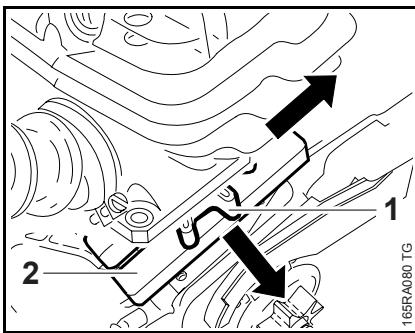


- Lubricate the piston, piston rings and cylinder wall with oil, **17**
- Use the clamping strap (1) 0000 893 2600 to compress the rings around the piston.
- Check correct installed position of rings, **8.8**

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

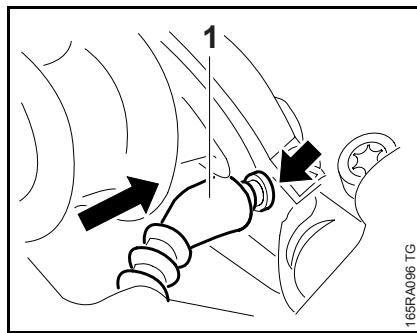


- Align the cylinder so that the intake port (arrow) points toward the rear handle.
- While sliding the cylinder over the piston, hold the clamping strap tightly around the piston so that the rings do not project – they might otherwise break.
- Slide the cylinder over the piston, the clamping strap moves downwards at the same time.

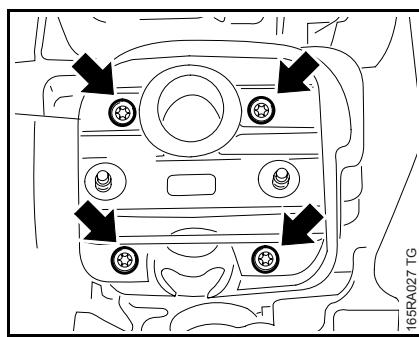


- Remove the clamping strap (1) and wooden assembly block (2).

Make sure the cylinder gasket is properly seated.



- Lift the tank housing a little.
- Push the impulse hose (1) on to the nipple (arrow).
- Reassemble all other parts in the reverse sequence.



- Push the cylinder fully home.
- Insert the screws (arrows) to hold the cylinder and gasket in position..
- Tighten down the screws in an alternate pattern.
- Tightening torques, **5.3.5**

8.6 Crankshaft

8.6.1 Removing and Installing

- Remove the sprocket cover and cutting attachment, **5**
- Remove the adjustable oil pump, **13.5**
- Remove the non-adjustable oil pump, **13.4**
- Remove the brake band, **7.2**
- Remove the brake lever, **7.3**
- Remove the handlebar, **11.5**. Remove the handlebar with handle heating, **11.6**
- Remove the cylinder, **8.5**
- Remove the piston, **8.7**
- Remove the flywheel, **9.5**

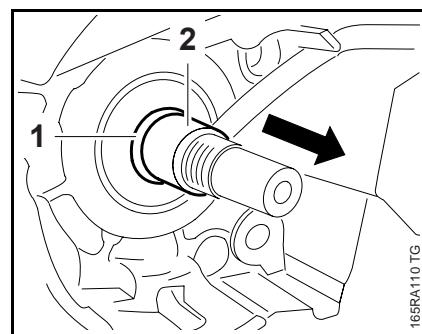
– On versions with handle heating, remove the generator, **15.7**

- Drain the fuel and oil tanks, **1**
- Remove the tank housing, **14.8.3**

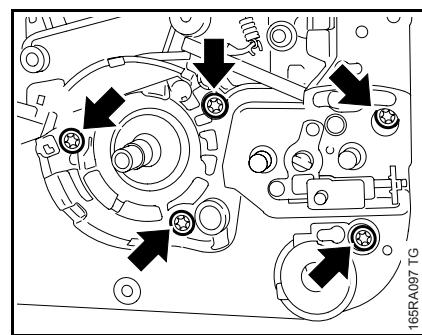
Always install new bearings and oil seals after removing the crankshaft, **8.6.2** and **8.3**

Removing – clutch side

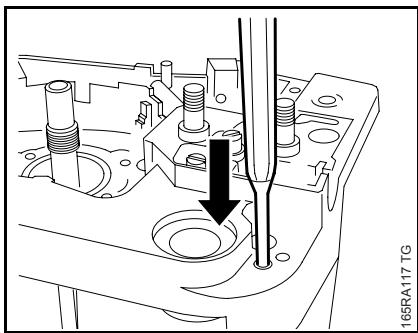
Use the tools in the service tool set 5910 007 2200 for removing and installing.



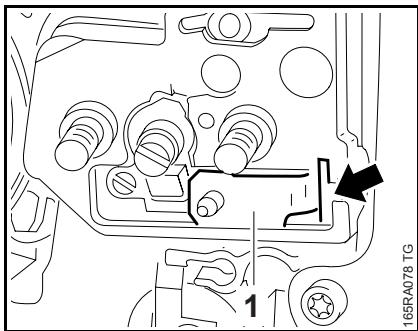
- Remove the washer (1) and ring (2).



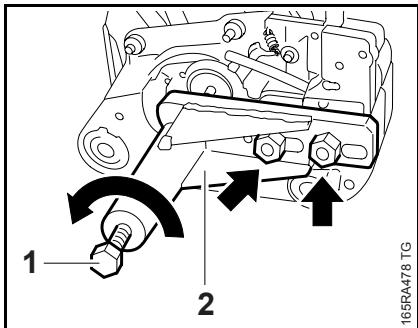
- Take out the screws (arrows).



- Use a 4 mm diameter drift to drive out the cylindrical pin at the chain tensioner side.

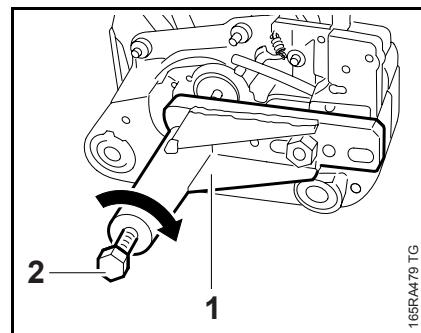


- The tensioner slide (1) must butt against the thrust pad (arrow).



- Back off the spindle (1) in service tool until it is clear of the crankshaft stub.
- Push the service tool (2) 5910 890 2205 over the collar screws, fit the nuts (arrows) and tighten them firmly.

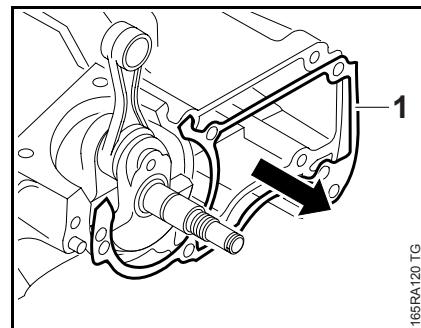
Versions with Quick Chain Tensioner



- Push the service tool (1) 5910 890 2205 over the collar screw, fit the nut and tighten it firmly.
- Turn the spindle (2) clockwise until the crankshaft stub is pushed out of the ball bearing.

This operation releases the clutch side of the crankcase and separates the two halves.

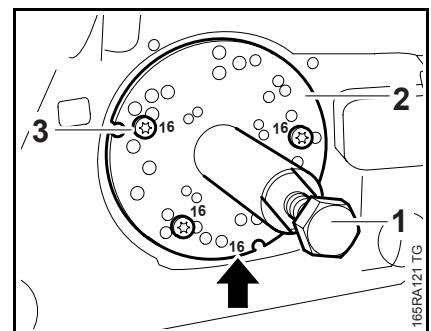
- Install new ball bearings and oil seals, 8.6.2 and 8.3



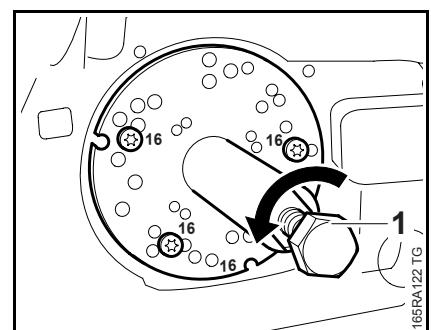
- Remove the gasket (1).

Removing – ignition side

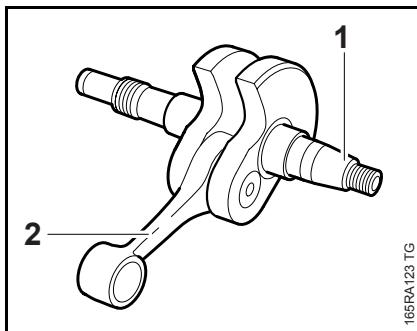
Use the tools in the service tool set 5910 007 2200 for removing and installing.



- Unscrew the spindle (1) of service tool 5910 890 2220 until the drilled plate (2) butts against the crankcase – left-hand thread.
- Fit the plate (2) 5910 893 2102 against the ignition side of the crankcase so that the number "16" (arrow) is at the bottom.
- Insert three M5x72 screws (3) in the holes marked "16" and tighten them down against the drilled plate.



- Turn the spindle (1) counterclockwise until the crankshaft is pushed out of the ignition side of the crankcase.



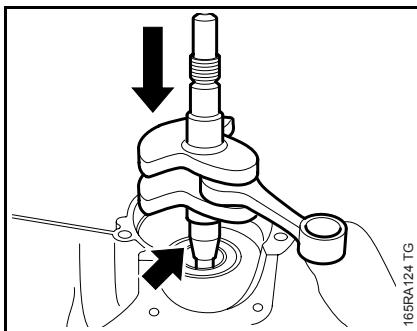
- The crankshaft (1), connecting rod (2) and needle bearing form an inseparable unit. Always replace as a complete unit.
- Check the two halves of the crankcase and ball bearings and replace if necessary, 8.6.2

Before installing, clean the crankshaft with a standard commercial, solvent-based degreasant containing no chlorinated or halogenated hydrocarbons.

Installing – ignition side

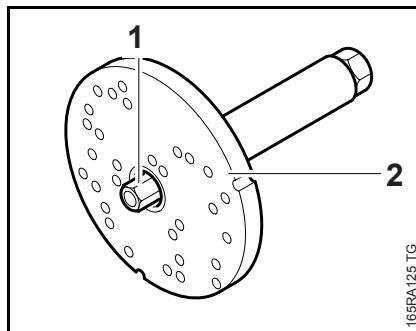
Take care not to damage the crankshaft stub.

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



- Position the tapered stub of the crankshaft (arrow) above the ball bearing at the ignition side.
- Wear protective gloves to reduce the risk of burn injury.
- Heat the inner bearing race to about 150°C (300°F).
- Push the crankshaft into the ball bearing at the ignition side as far as stop.

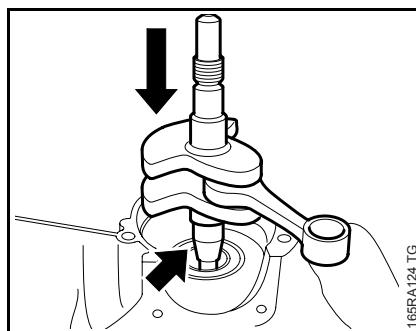
This operation must be carried out very quickly because heat is absorbed by the crankshaft, and the inner bearing race shrinks.



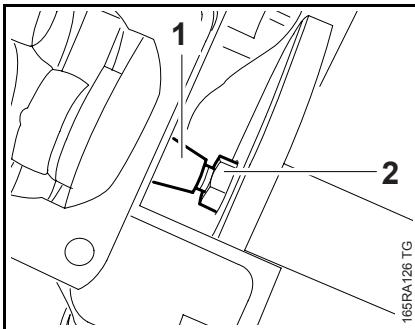
If it is not possible to heat the inner bearing ring, use the drilled plate 5910 893 2102 to install the crankshaft.

- Screw the screw sleeve (1) 5910 893 2421 as far as stop onto the fully extended spindle of service tool (2) 5910 893 2101.

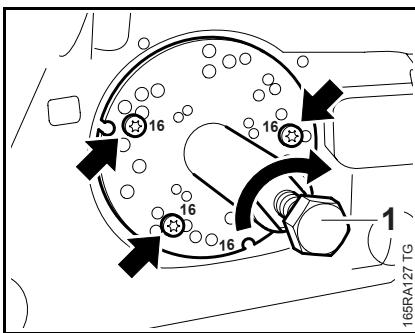
Coat tapered stub of crankshaft with oil.



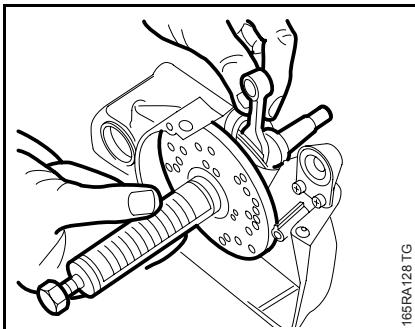
- Position the tapered stub of the crankshaft (arrow) above the ball bearing at the ignition side and push it home.



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

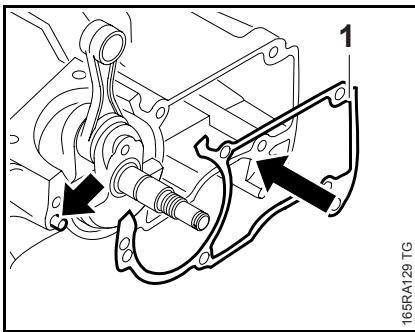


- Turn the spindle (1) until the drilled plate butts against the ignition side of the crankcase.
- Secure the drilled plate 5910 893 2102 in position by inserting three M5x72 screws (arrow) in the holes marked "16", then turn the spindle (1) clockwise.
- Install the ignition side of the crankcase as far as stop.



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

- Remove the service tool.

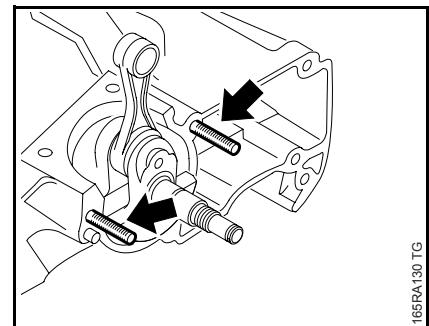


- Fit a new gasket (1) and locate it on the pin (arrow).

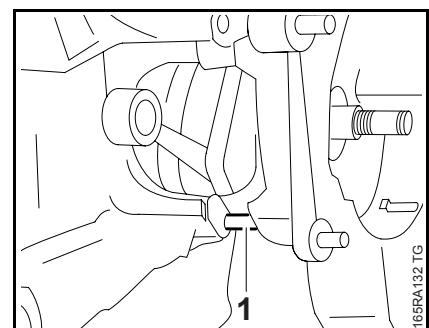
Installing – clutch side

Take care not to damage the crankshaft stub.

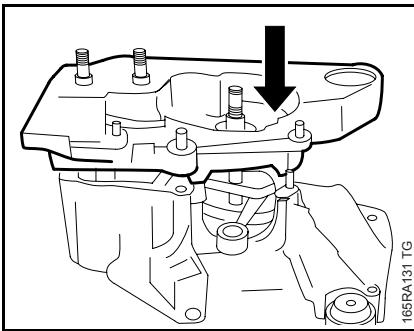
Inspect and clean the sealing faces on the clutch side of the crankcase (including the cylinder sealing face) – the sealing faces must not be damaged in any way.



- Fit two M5x72 screws (arrows) in the holes at the ignition side – to act as guides and prevent twisting.
- Coat straight stub of crankshaft with oil.



- Make sure the pin (1) engages the hole and the gasket is not pinched or twisted.



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

Wear protective gloves to reduce the risk of burn injury.

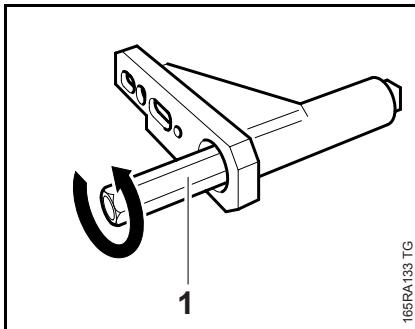
- Heat the inner bearing race to about 150°C (300°F).

- 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.

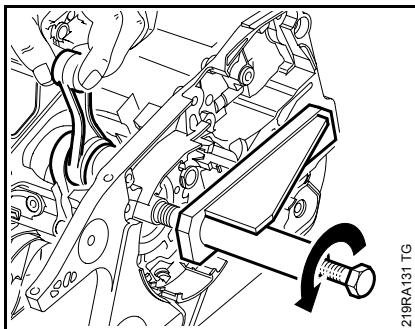
If it is not possible to heat the inner bearing ring, use the service tool 5910 007 2205 to install the crankcase.

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



- Screw the spindle (left-hand thread) fully into the service tool 5910 890 2205.

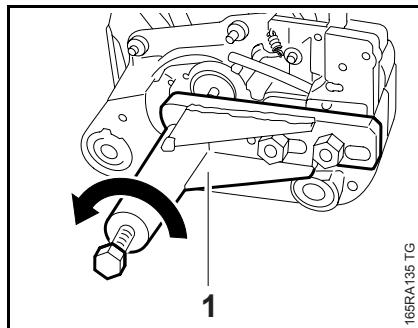
- Screw the screw sleeve (1) 5910 893 2409 onto the spindle of service tool 5910 890 2205 as far as stop (left-hand thread).



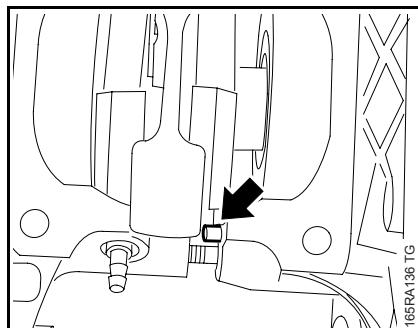
- Apply the screw sleeve to the crankshaft stub (arrows) and push the service tool over the bar studs.
- Hold the crankshaft steady and rotate the spindle counterclockwise to screw the screw sleeve onto the crankshaft stub.

– Release the crankshaft. Hold the service tool steady and continue turning the spindle until the tool butts against the crankcase.

- Fit the sprocket cover mounting nuts on the bar studs and screw them down finger-tight.

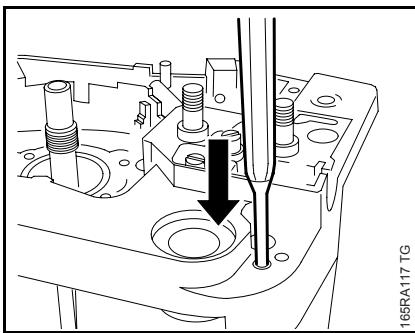


- Turn the spindle counterclockwise until the crankcase locates against the guide sleeves.

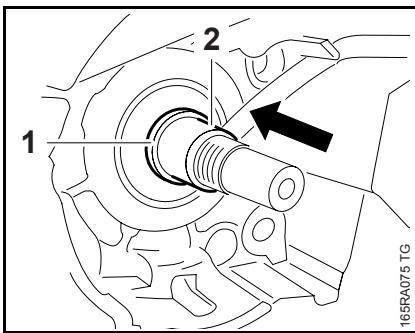


Make sure the pin (arrow) engages the hole and the gasket is not pinched or twisted.

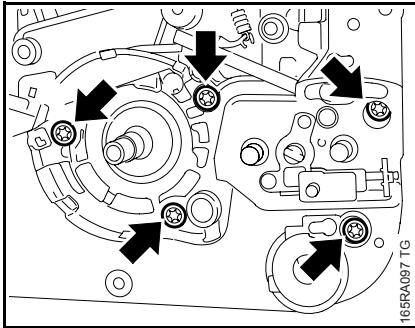
- Unscrew the mounting nuts.
- Unscrew the spindle clockwise and take away the service tool.
- Take out the two M5x72 screws.



- Use a 4 mm dia. drift to drive home the dowel pin at the chain tensioner side until the pin is flush with the hole at the other side.



- Fit the washer (1) and ring (2).
 - Check and install the piston, **8.7.2**
 - Check and install the cylinder, **8.5**
 - Reassemble all other parts in the reverse sequence.



- Insert the screws (arrows) and tighten them down firmly in an alternate pattern.
- Tightening torques, **3.5**

8.6.2 Bearings / Crankcase

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

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.

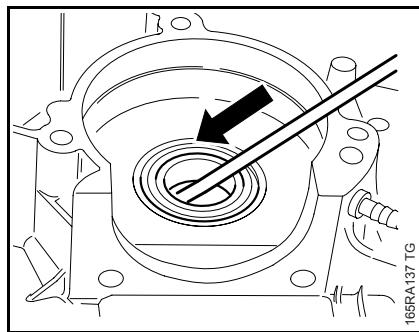
If a new crankcase is installed, the machine's serial number must be stamped on it with 2.5 mm figure stamps.

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 clean to guarantee a perfect seal.

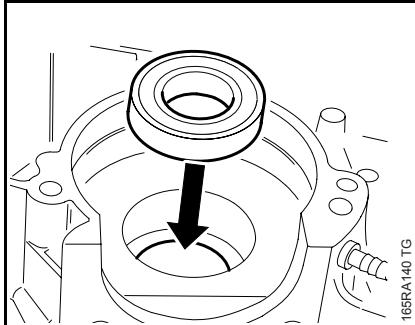
Inspect both halves of the crankcase for cracks and all sealing faces for signs of damage.

- See also Troubleshooting, **4.7**
- Remove the crankshaft, **8.6.1**
- Wear protective gloves to reduce the risk of burn injury.

Ignition side of crankcase



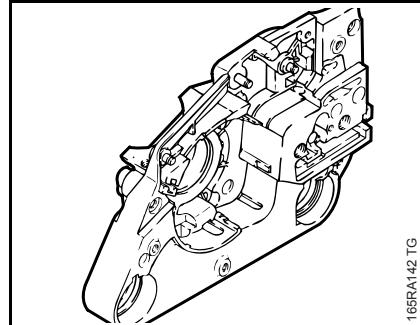
- Use a suitable punch to carefully drive out the oil seal.



- Heat the area of the bearing seat to about 150 °C (300 °F).
- Position the ball bearing so that its open side (balls visible) face the outside of the crankcase.
- Push the ball bearing home as far as stop.

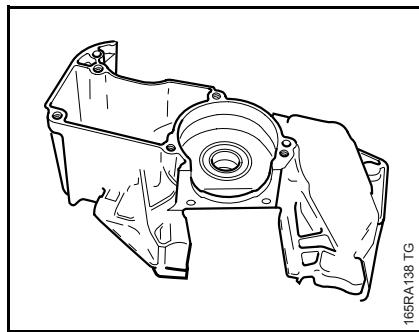
This operation must be carried out quickly because the bearing absorbs heat and begins to expand.

Check that the bearing is properly seated and, if necessary, use the press arbor 1120 893 7200 to press it fully into the bearing seat.



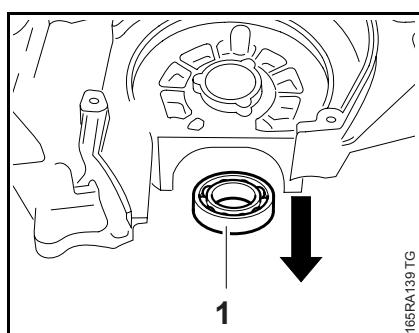
- Check and clean the crankcase or replace if necessary.

If this half of the crankcase is in order, install a new ball bearing.

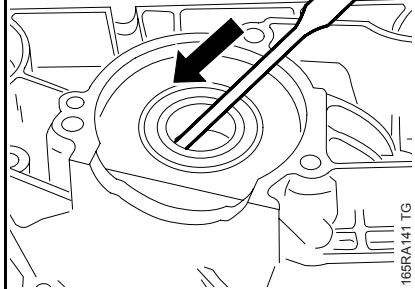


- Check and clean the crankcase or replace if necessary.

If this half of the crankcase is in order, install a new ball bearing.

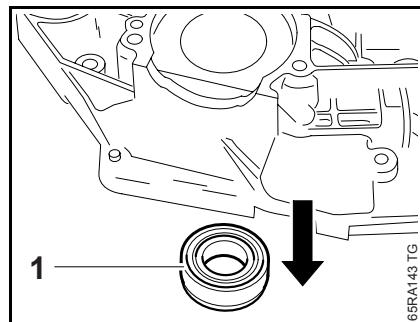


- Heat the area of the bearing seat to about 150 °C (300 °F).



- Use a suitable punch to carefully drive out the oil seal.

The bearing (1) drops out as soon as this temperature is reached.

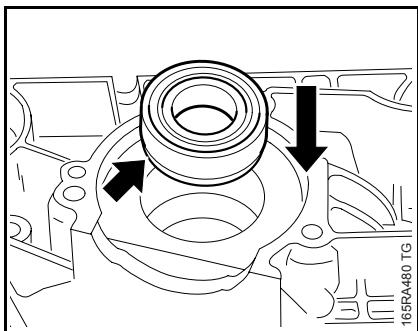


- Heat the area of the bearing seat to about 150 °C (300 °F).

The bearing (1) drops out as soon as this temperature is reached.

As the clutch side of the crankcase does not have a fixed bearing seat, the oil pump must be installed before the ball bearing – the oil pump then serves as the stop.

- Install the oil pump, adjustable, [13.5](#), non-adjustable, [13.4](#)



- Heat the area of the bearing seat to about 150 °C (300 °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 ball bearing is properly seated and, if necessary, use press arbor 1118 893 7200 to press it home against the oil pump – too much pressure may damage the oil pump.

- Remove the adjustable oil pump, **8.13.5**
- Remove the non-adjustable oil pump, **8.13.4**
- Install the crankshaft, **8.6.1**
- Install the oil seals, **8.3**
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

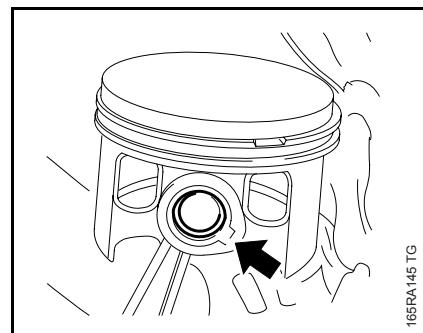
8.7 Piston

8.7.1 Removal

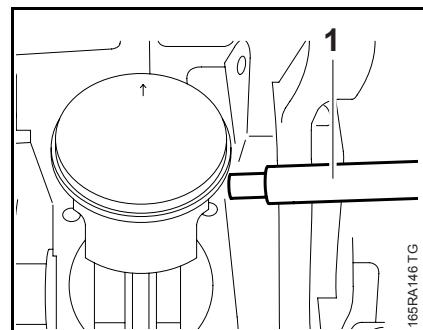
Before removing the cylinder, decide whether or not the crankshaft has to be removed as well, **8.6**.

- Remove the cylinder, **8.5**

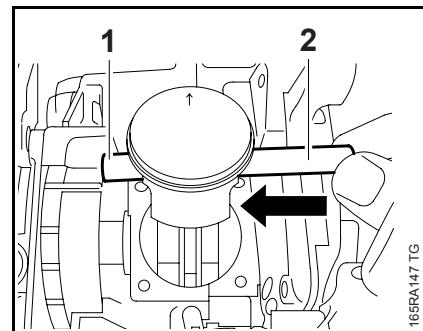
Note when removing the snap rings that the installing tool 5910 890 2210 can only be applied to the igniton side – the snap ring at the clutch side must be installed first.



- Pry both hookless snap rings out of their grooves by applying a suitable tool to the recess (arrow).

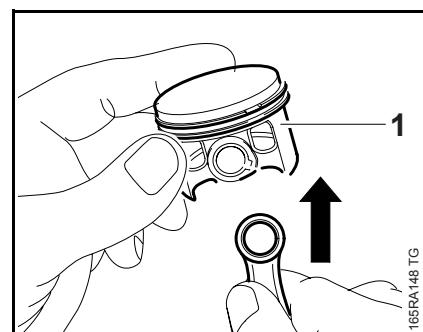


- Place the assembly drift (1) 1110 893 4700 in position.



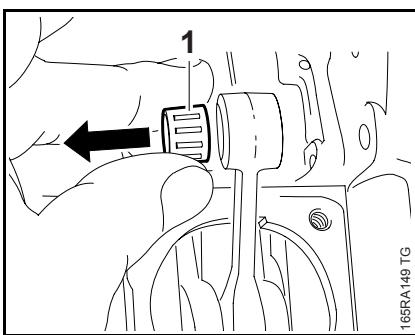
- Use the assembly drift (2) 1110 893 4700 to push the piston pin (1) out of the piston.

If the piston pin (1) is stuck, release it by tapping the end of the drift (2) lightly with a hammer. Hold the piston steady during this process to ensure that no jolts are transmitted to the connecting rod.

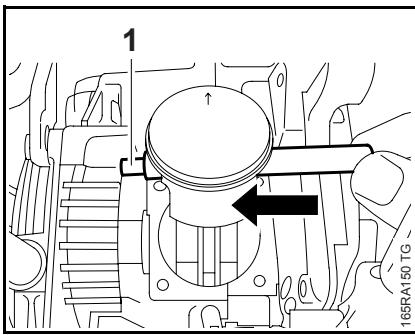


- Remove the piston (1) from the connecting rod.
- Inspect the piston rings and replace if necessary, **8.8**

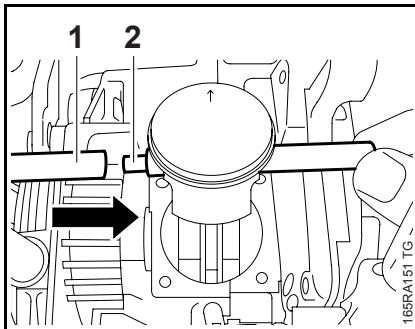
8.7.2 Installing



- Pull out the needle cage (1), check it and replace if necessary.
- Lubricate the needle cage (1) with oil and push it into the connecting rod.

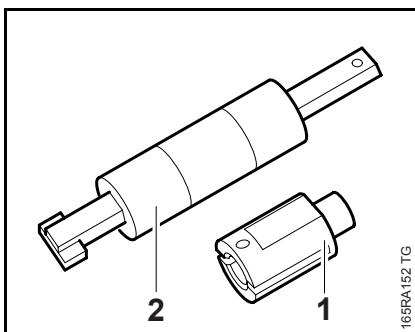


- Install the snap ring in the piston boss at the clutch side – the assembly drift 1110 893 4700 can be pushed through the installed snap ring.
- Line up the piston so that the arrow on the piston crown points toward the exhaust port/muffler.
- Place the piston on the connecting rod.
- Push the assembly drift (1) 1110 893 4700, small diameter first, through the piston and small end (needle cage) and line up the piston.

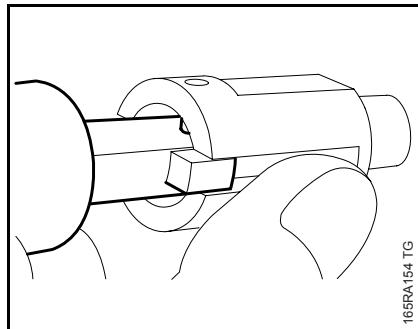


- Lubricate the piston pin with oil.
- Fit the piston pin (1) on the assembly drift (2) and slide it into the piston.

The piston has a snap ring at both sides. The snap ring at the clutch side must be installed first.

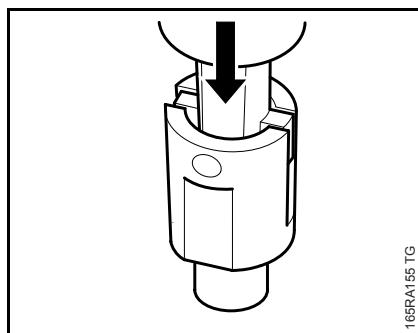


- Remove the sleeve (1) from the installing tool 5910 890 2210.



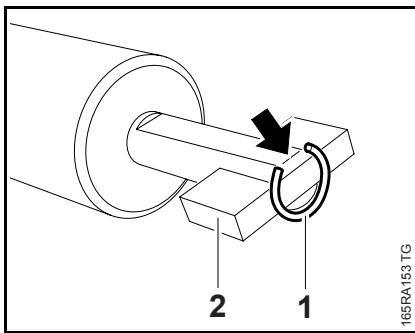
- Push the large slotted diameter of the sleeve over the magnet and snap ring.

The inner pin must point towards the flat face of the tool's shank.

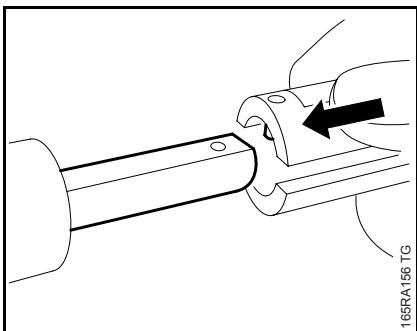


- Press the installing tool downwards into the sleeve until the magnet butts against the end of the guide slot.

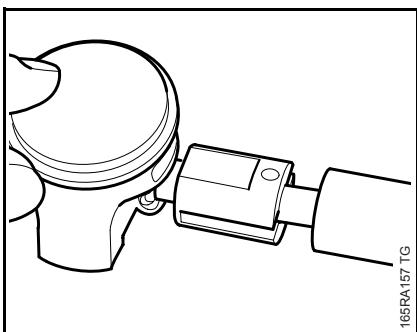
Use a suitable base.



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

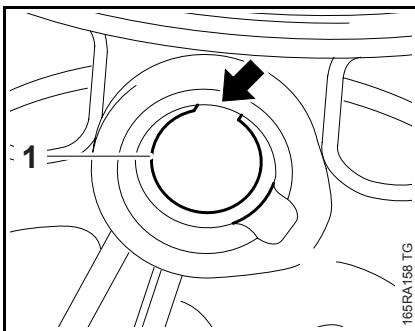


- Remove the sleeve and slip it onto the other end of the shank – the inner pin must point towards the flat face.

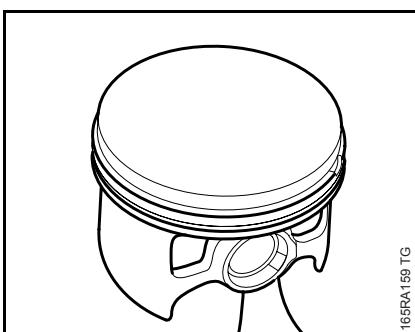


- Apply the installing tool 5910 890 2210 with the sleeve's taper against the piston boss, hold the piston steady, center the tool shank exactly and press home until the snap ring slips into the groove.

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



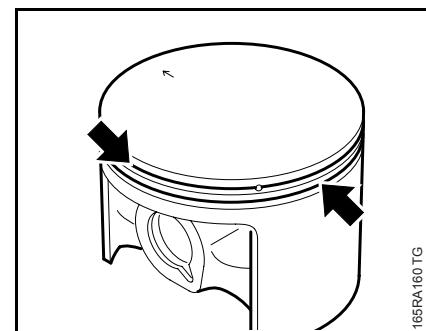
- Fit the snap ring (1) so that its gap (arrow) points either up or down.



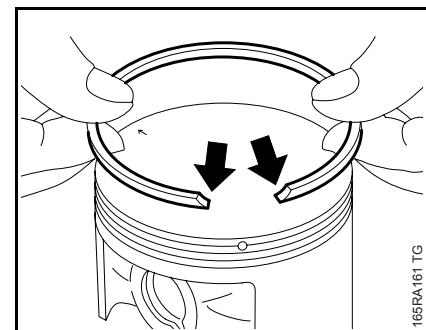
- Inspect the piston rings and replace if necessary, **8.8**
- Install the cylinder, **8.5**
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

8.8 Piston Rings

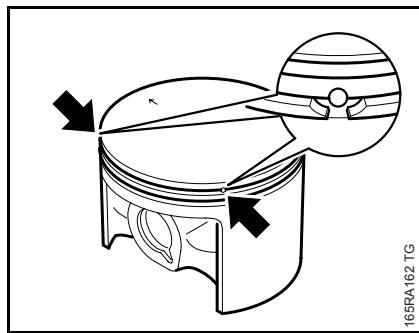
- Remove the piston, **8.7.1**
- Remove the piston rings from the piston.



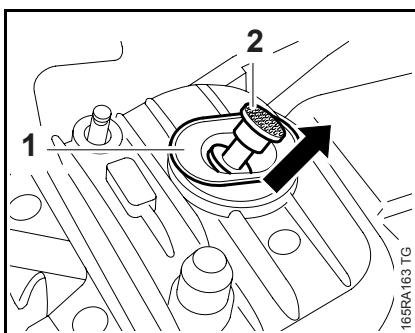
- Use a piece of old piston ring to scrape the grooves clean.



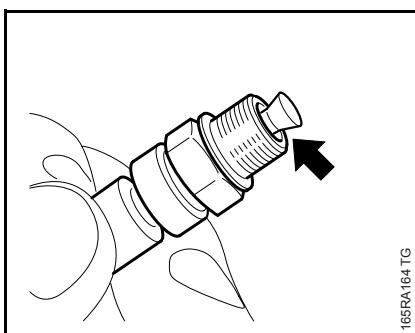
- Install the new piston rings in the grooves so that the radii face upward (arrows).



8.9 Decompression Valve



- Position the piston rings so that the radii at the ring gap meet at the fixing pin in the piston groove (arrows).
- Check correct installed position of the piston rings (arrows).
- Install the piston, **8.7.2**
- Reassemble all other parts in the reverse sequence.



- 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.

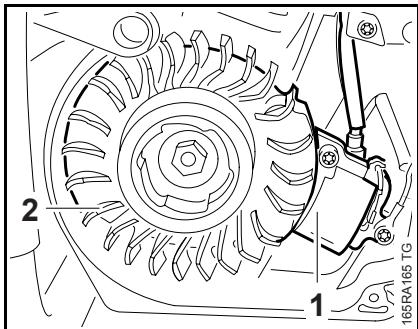
- Fit the decompression valve and screw it home by hand.
- Tighten down the decompression valve firmly.
- Tightening torques, **3.5**
- Reassemble all other parts in the reverse sequence.

9. 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, **4.5**

- Remove the fan housing, **10.2**



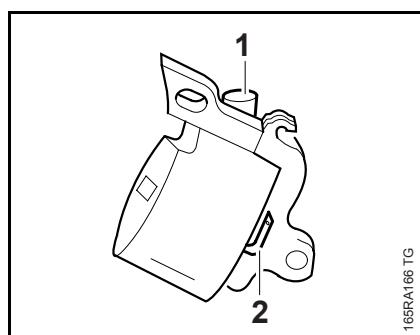
The electronic (breakerless) ignition system basically consists of an ignition module (1) and flywheel (2).

9.1 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.

9.2 Ignition Module



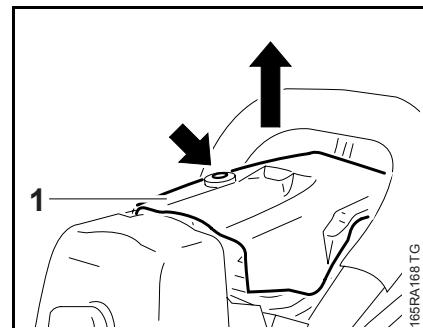
The ignition module accommodates all the components required to control ignition timing. There are two electrical connections on the coil body:

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

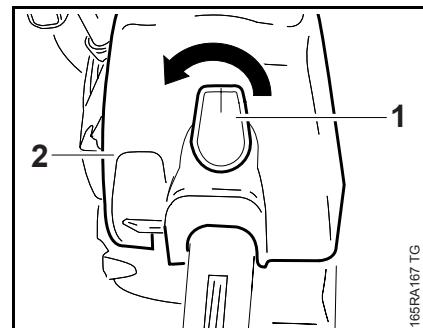
Testing in the workshop is limited to a spark test. A new ignition module must be installed if no ignition spark is obtained (after checking that wiring and stop switch are in good condition), **9.2.1**.

9.2.1 Removing and Installing

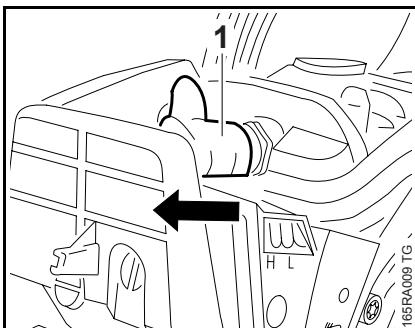
- Remove the fan housing, **10.2**



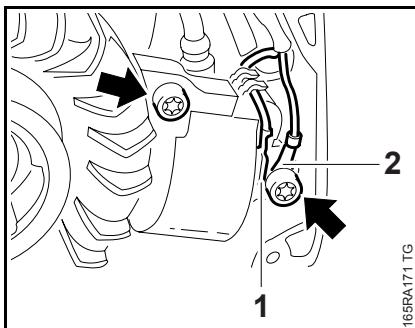
- Unscrew the slotted nut (arrow).
- Remove the shroud (1).



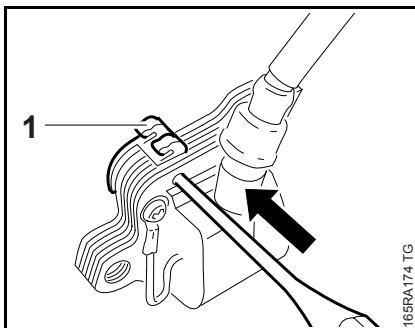
- Turn twist lock (1) counterclockwise.
- Remove the carburetor box cover (2).



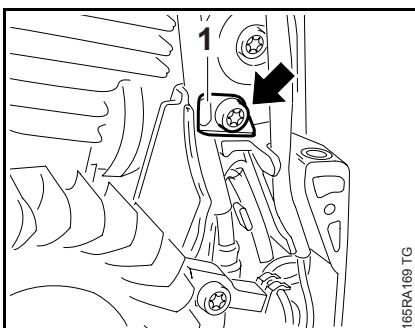
- Pull boot (1) off the spark plug.



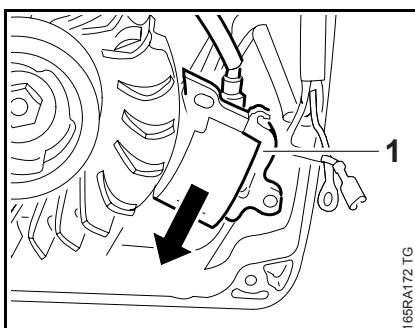
- Disengage the connector.
- Disconnect the short circuit wire (1) – do not pull it out of the retainer.
- Take out the screws (arrows).
- Remove the ground wire (2).



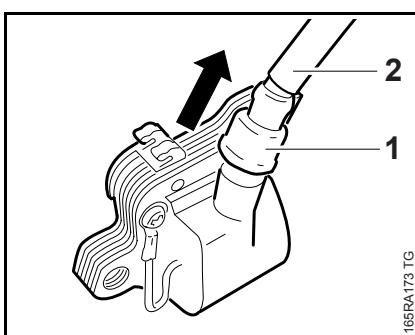
- Use a suitable punch to drive out the retainer (1).
- Check the retainer and replace if necessary
- Check the spark plug boot and ignition lead, and replace if necessary, **9.4**
- Reassemble in the reverse sequence.
- Troubleshooting, **4.5**



- Take out the screw (arrow).
- Remove the retaining plate (1).

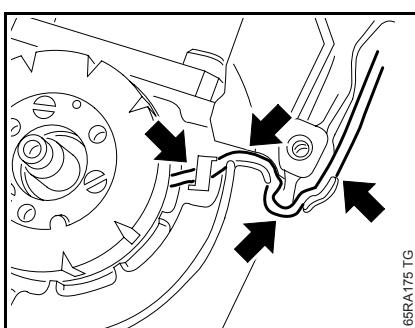


- Remove the ignition module (1).



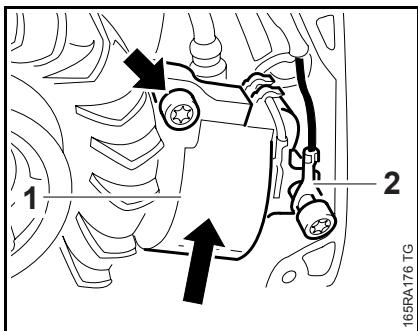
- Pull the grommet (1) off the ignition module.
- Unscrew the ignition module from the ignition lead (2).

Versions with handle heating

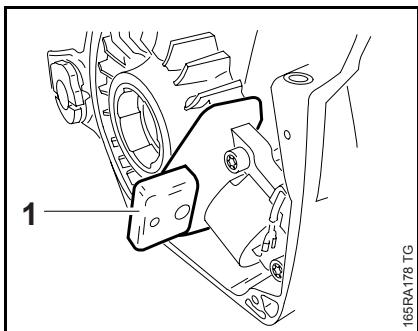


- Before installing the ignition module, check that the generator wire (arrows) is properly positioned, **15.7**

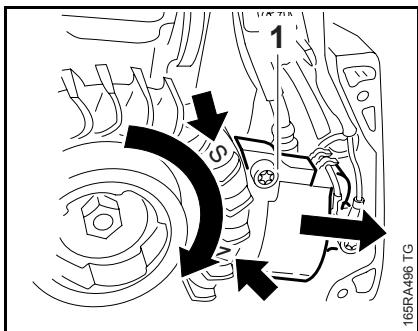
- Pull the ignition lead (1) out of its guide (arrow).



- Fit the ignition module (1) and insert the screw (arrow) – do not tighten down yet.
- Fit the ground wire (2) and insert the screw (arrow) – do not tighten down yet.



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

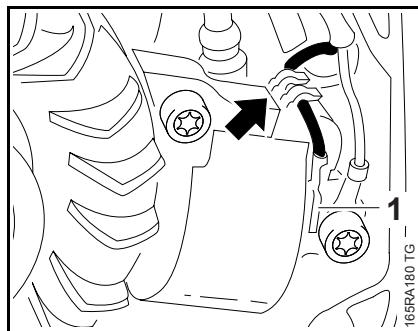


The setting gauge is not shown in the illustration.

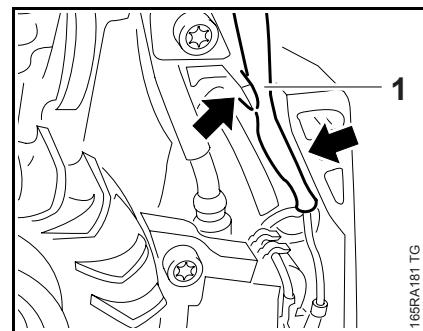
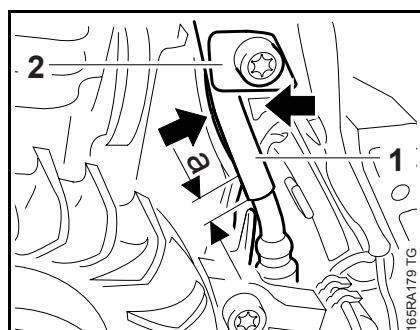
- Push the ignition module (1) back and hold it there – the flywheel must turn freely.

- Rotate the flywheel until the magnet poles (arrows) are next to the ignition module.

- Press the ignition module (1) against the setting gauge.
- Tighten down the screws firmly.
- Tightening torques, **3.5**
- Remove the setting gauge.
- Check operation
 - rotate the flywheel and make sure it does not touch the ignition module (1).

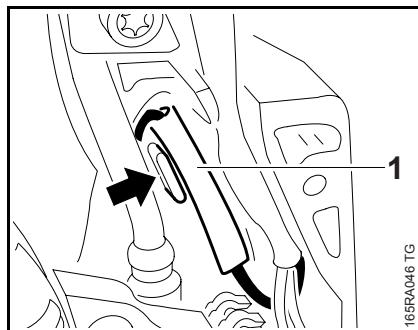


- Connect the short circuit wire (1) and push it into the retainer (arrow).



- Push the wiring harness (1) into the guides (arrows).

Versions with handle heating

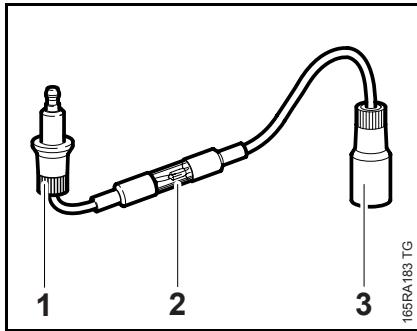


- Push the pin and socket connector (1) into the guide (arrow).
- Fit the wiring harness with short circuit wire in position, **15.8** and **9.6.2**

9.3 Testing the Ignition Module

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

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



Using the ZAT 4 ignition tester 5910 850 4503

- Before starting the test, install a new spark plug in the cylinder and tighten it down firmly.
- Tightening torques, **9.5**
- Connect spark plug boot to the input terminal (1). Push the tester's output terminal (3) on to the spark plug.

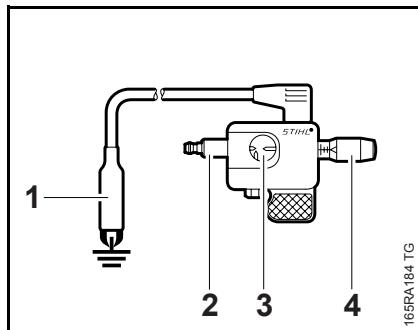
High voltage – risk of electric shock.

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

The engine may start and accelerate during the test.

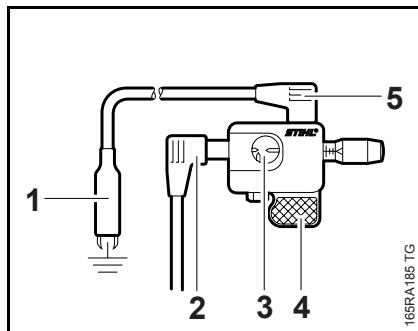
If a spark is visible, the ignition system is in order.

If no spark is visible in the window (2), check the ignition system with the aid of the troubleshooting chart, **9.7**.



Using the ZAT 3 ignition tester 5910 850 4520

- Before starting the test, install a new spark plug in the cylinder and tighten it down firmly.
- Tightening torques, **9.5**
- Connect spark plug boot to the input terminal (2).
- Attach the ground terminal (1) to the spark plug.
- Use adjusting knob (4) to set the spark gap to about 2 mm, see spark window (3).



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

High voltage – risk of electric shock.

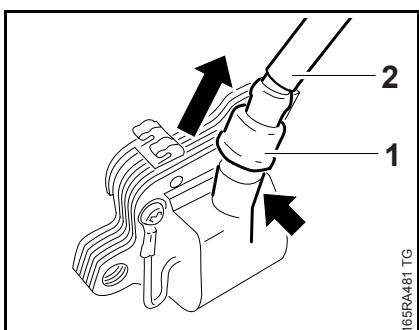
- Crank the engine quickly with the rewind starter and check spark in the tester's window (3).

The engine may start and accelerate during the test.

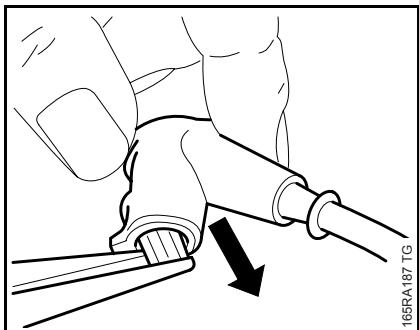
If a spark is visible in the window (3), the ignition system is in order.

If no spark is visible in the window (3), check the ignition system with the aid of the troubleshooting chart, **9.7**.

9.4 Spark Plug Boot / Ignition Lead



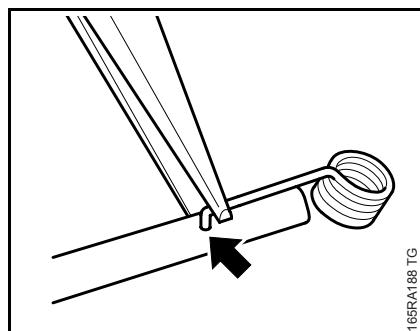
- Remove the ignition module, **9.2.1**
- Pull the grommet (1) off the high voltage output (arrow).
- Unscrew the ignition lead (2) from the contact pin and pull it out of the high voltage output.
- Pull the grommet (1) off the ignition lead.



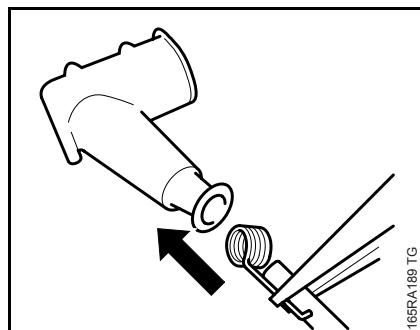
- Use suitable pliers to pull the leg spring out of the spark plug boot.
- Unhook the leg spring from the ignition lead.
- Pull the boot off the ignition lead.

- Cut a new ignition lead to the specified length, see parts list.

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

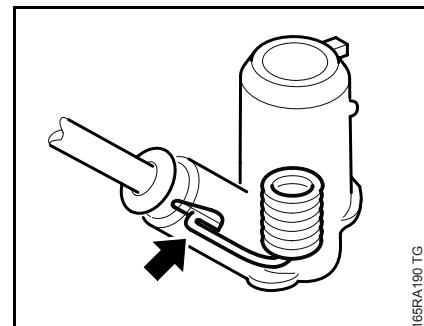


- Pinch the hook of the leg spring into the center of the lead (arrow).

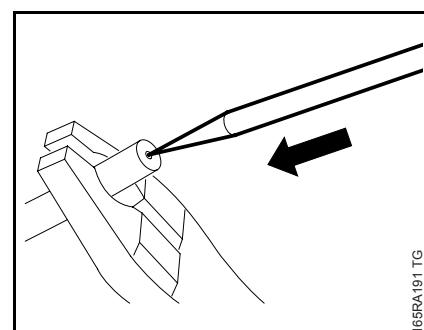


- Coat the inside of the spark plug boot with STIHL press fluid, **17**

- 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.



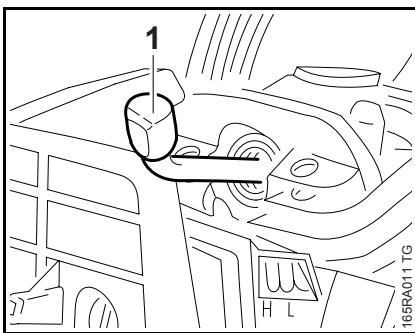
- Use a pointed tool to pierce the center of the other end of the ignition lead which screws into the module.

- Fit the grommet.

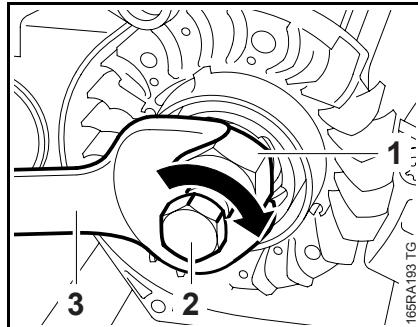
Do not use either graphite grease or silicone insulating paste.

- Install the ignition module and set the air gap between the module and flywheel, **9.2.1**
- Reassemble all other parts in the reverse sequence.

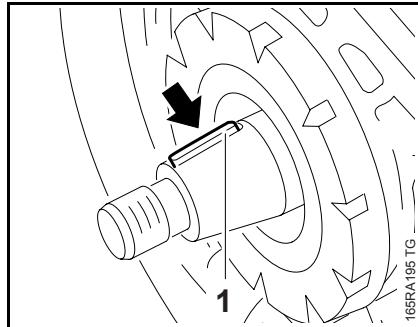
9.5 Flywheel



- Remove the carburetor box cover.
- Remove the shroud, **8.4**
- Block the piston with the locking strip (1) 0000 893 5903, **6**

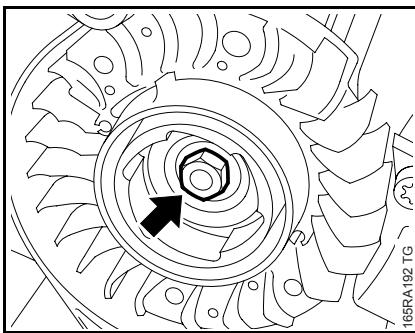


- Screw the puller (1) 1110 890 4500 clockwise into the flywheel as far as stop.
- Use 24 mm open end wrench (3) to hold the puller steady and screw home the thrust bolt (2) until the flywheel is released from the crankshaft.
- Remove the puller (1) 1110 890 4500 from the flywheel.

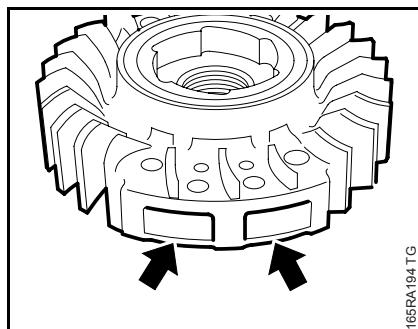


- Check the key (1) and replace if necessary
- Make sure the key (arrow) is properly seated.

Degrease the crankshaft stub and bore in flywheel with a standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons.



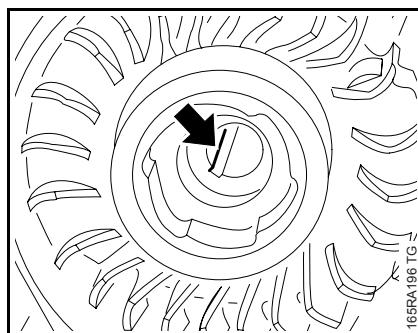
- Unscrew the flywheel nut (arrow).



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

On versions with handle heating, also check the magnet ring for signs of damage, **15.7**.

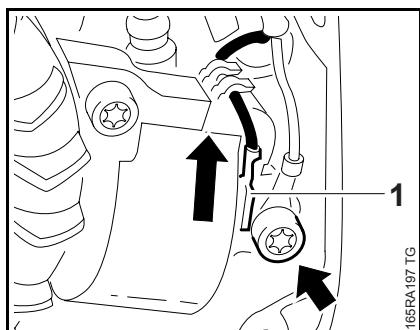
The flywheel and crankshaft stub must be free from grease before assembly.



- Make sure the key engages the slot (arrow) in the flywheel.
- Set the air gap between the ignition module and flywheel, **9.2.1**
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

9.6 Short Circuit Wire

9.6.1 Testing



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

- Remove the fan housing, **10.2**
- Disconnect the short circuit wire (1).
- Connect the ohmmeter to ground (arrow) and the short circuit wire (1).
- Set the switch shaft to "0".

The resistance measured must be about 0Ω . If it is much higher, the reason is a break and the wire has to be replaced, **9.6.2**.

- Set the switch shaft to "I".

The resistance measured must be infinitely high. If not, fit a new short circuit wire, **9.6.2**.

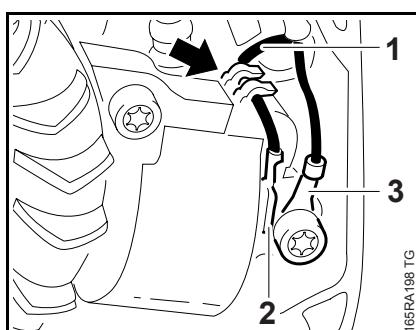
If no fault can be found, check the ignition system with the aid of the troubleshooting chart, **9.7**.

- Reassemble in the reverse sequence.

9.6.2 Removing and Installing

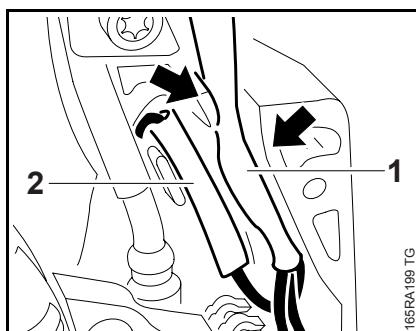
- Remove the shroud, **8.4**
- Remove the fan housing, **10.2**
- Remove the carburetor, **14.2**

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

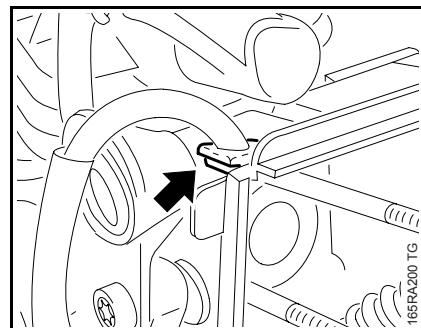


- Pull the short circuit wire (1) out of the retainer (arrow), disengage and remove the connector (2).
- Take out the screw and remove the ground wire (3).

Versions with handle heating

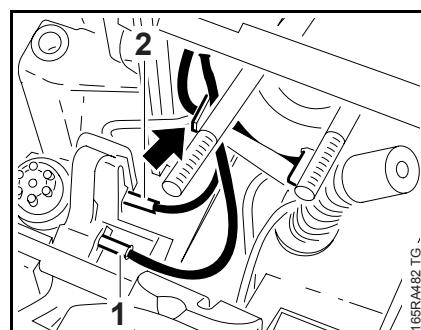


- Pull the wiring harness (1) out of the guides (arrows).
- Pull the pin and socket connector (2) out of the guide and separate it.

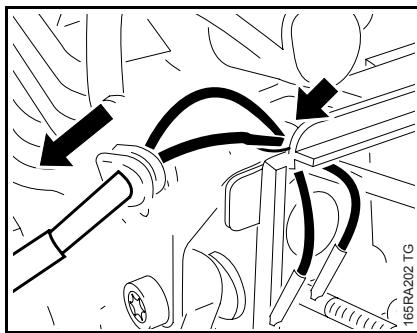


- Pry out the grommet (arrow).

The wire for handle heating is also included in the wiring harness and grommet, and has to be removed as well
15.8.



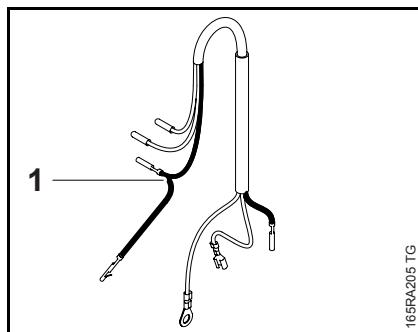
- Pull the short circuit wire out of the guide (arrow).
- Remove the connectors of the short circuit wire (1) and ground wire (2).



A faulty ground wire may impair or prevent operation of the short circuit wire, and the heating on versions with handle heating.

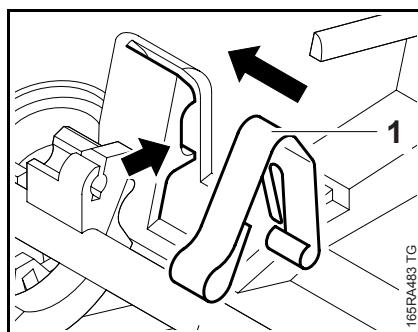
Perform the contact and continuity test on the ground wire too.

Versions with handle heating



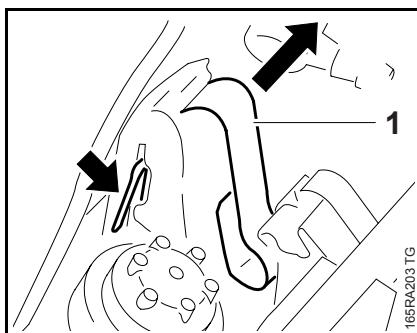
Check the additional wire (1) in the wiring harness and replace the wiring harness if necessary, **15.8**.

If any of the wires are damaged, always replace the complete wiring harness.

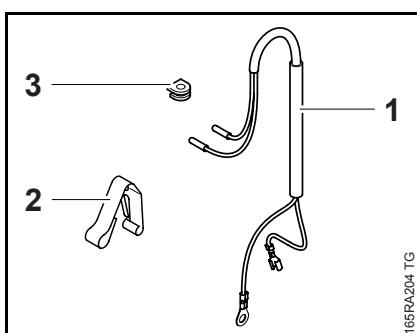


- Push the contact spring (1) into its guide (arrow) as far as stop.

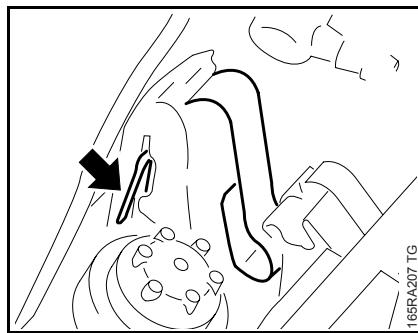
- Pull the wiring harness out of the opening (arrow).



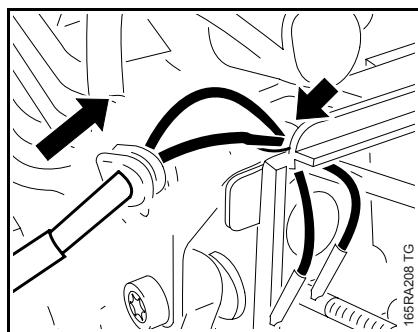
- Remove the switch shaft, **12.1.1**
- Push the retainer (arrow) carefully in the direction of the guide slot and pull out the contact spring (1).



- Inspect the wiring harness (1), contact spring (2), grommet (3) and all connectors, and replace wiring harness if necessary.

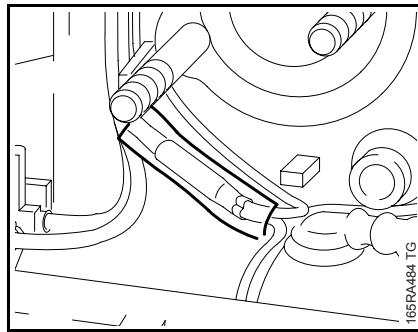


Make sure the retaining lug (arrow) locks the contact spring in position.

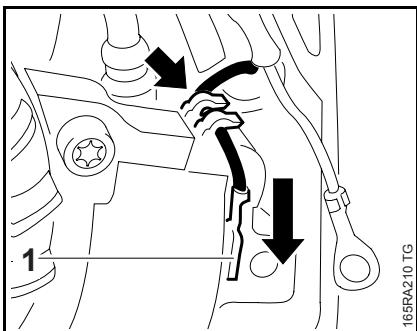


- Thread the end of the wiring harness with the sockets through the opening (arrow).

Versions with handle heating

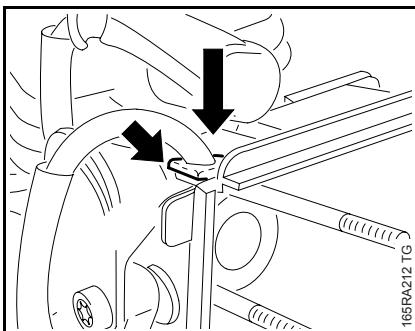


- Connect the pin and socket connector, push the insulating tube over the connector so that it is completely covered, **15.8**

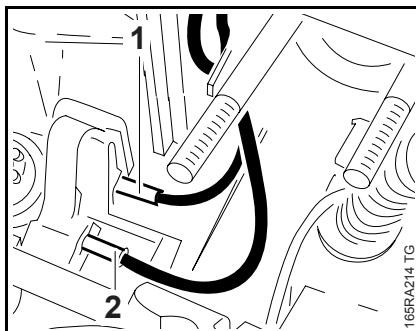


Start installation and connector of the short circuit wire at the ignition module.

- Connect the short circuit wire (1) and push it into the retainer (arrow).

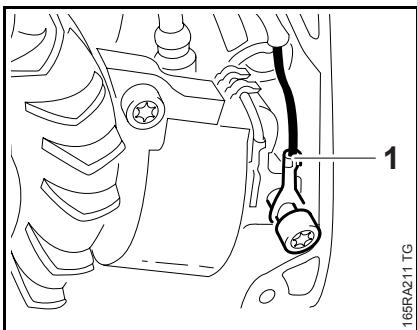


- Fit the grommet (arrow) in the opening and make sure it is properly seated.
 - Use STIHL press fluid to simplify assembly, **17**



- Push connector (1) of ground wire (green/yellow) into the contact spring as far as stop.
- Push connectot (2) of short circuit wire into the switch shaft as far as stop.

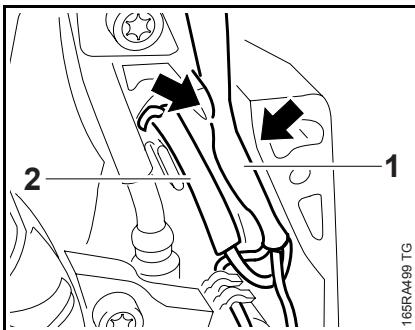
– Install the switch shaft, **12.1.1**



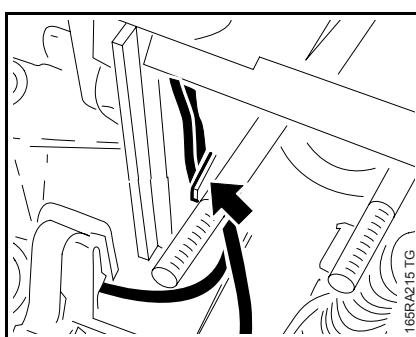
- Fit the ground wire (1), insert the screw and tighten it down firmly.

When tightening, make sure the terminal does not butt against the housing.

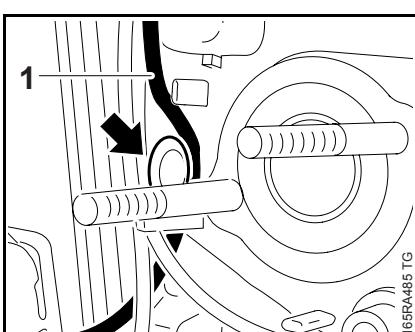
- Check air gap on ignition module and reset if necessary, **9.5**



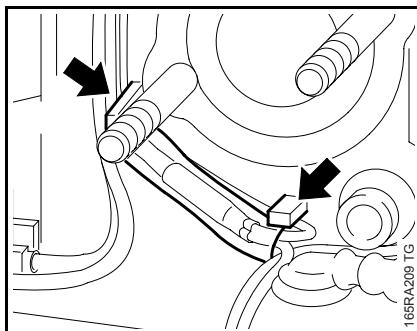
- Push the short circuit wire with insulating tube (1) into the guides (arrows).
- Push the pin and socket connector (2) into its guide.



- Push the wire into the guide (arrow).



- Position the ground wire (1) behind the stop buffer (arrow).



9.6.3 Ground Wire

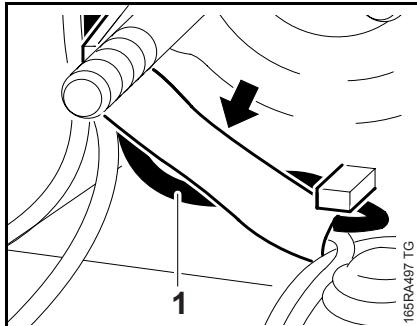
A faulty ground wire may impair or prevent operation of the short circuit wire.

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

- Check for contact and continuity and
replace wiring harness if
necessary, **9.6.2**
Versions with handle heating,
15.8

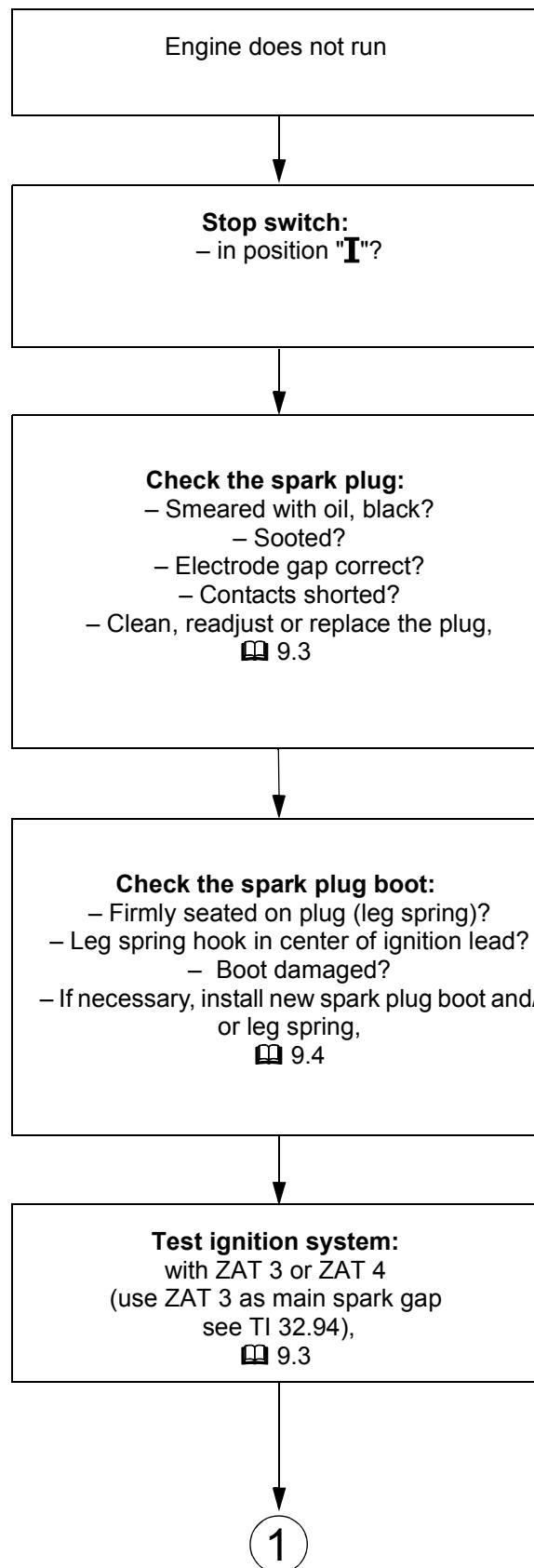
Versions with handle heating

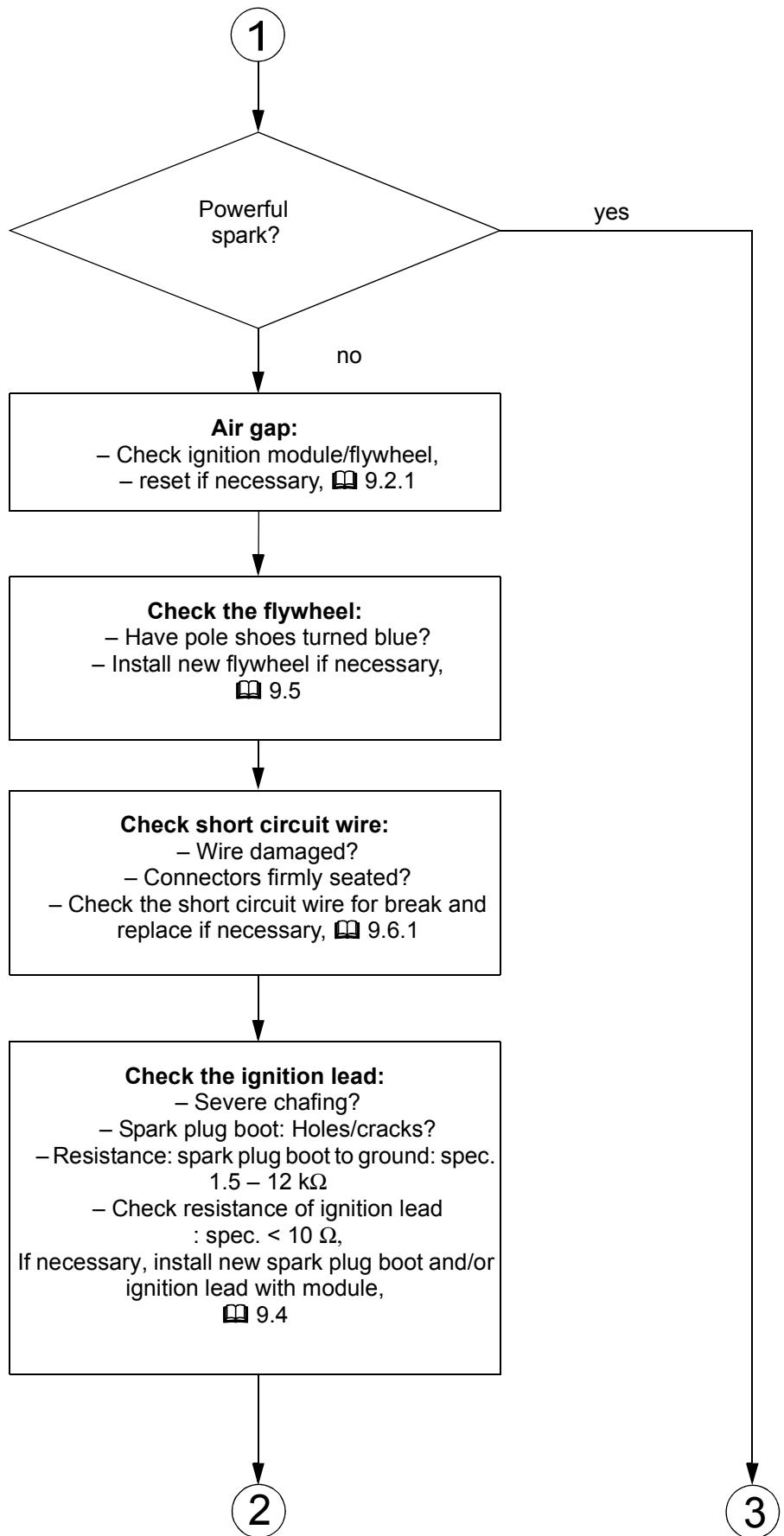
- Push the pin and socket connector into the guides (arrows).

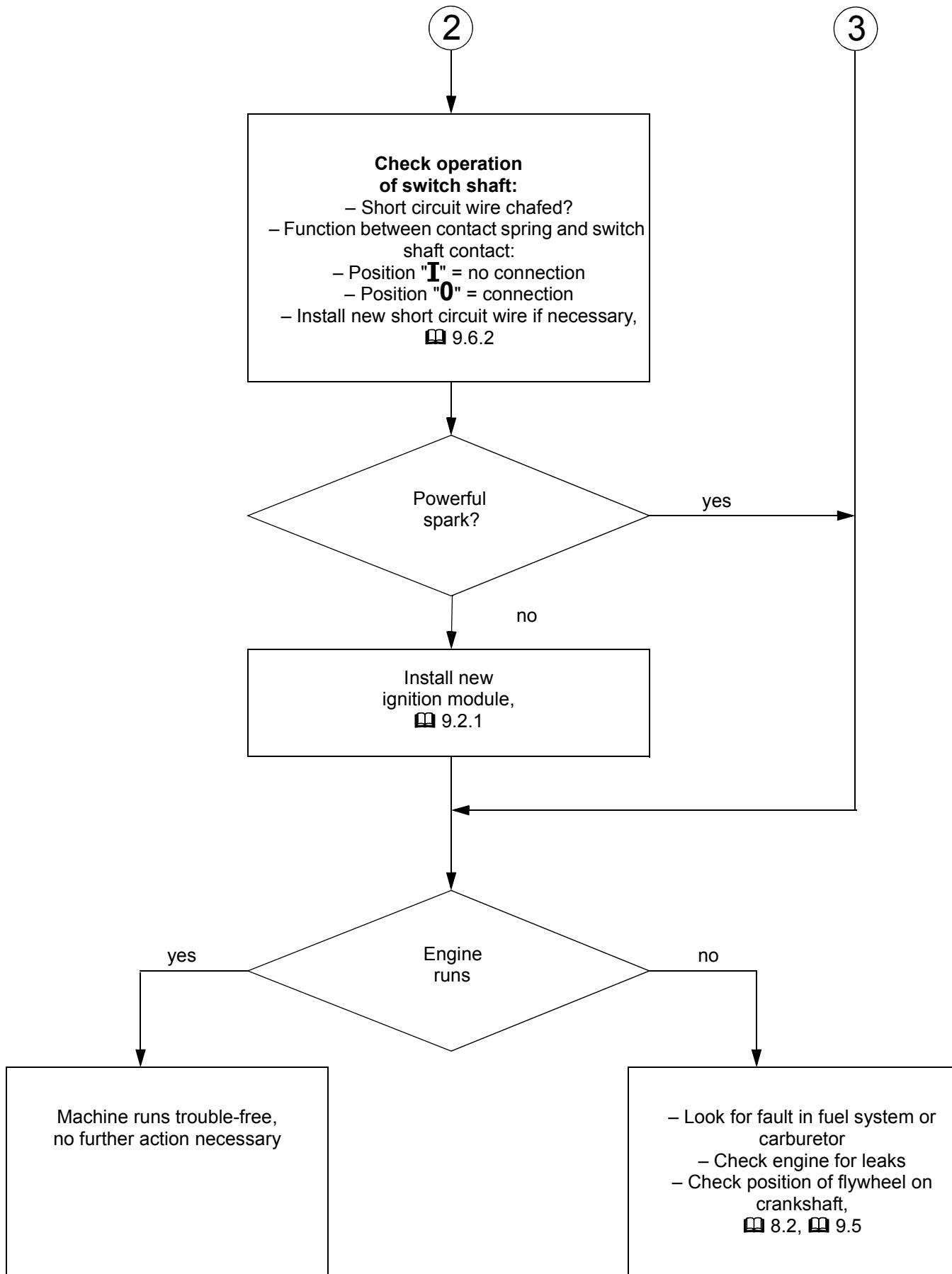


- Position the wire (1) behind the pin and socket connector.
- Install the carburetor, **14.2**
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**
- Check operation.

9.7 Ignition System Troubleshooting







10. Rewind Starter

10.1 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.

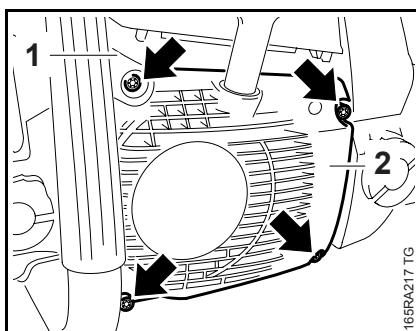
Carefully pull out the starter rope several times and allow it to rewind until its normal smooth action is restored.

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

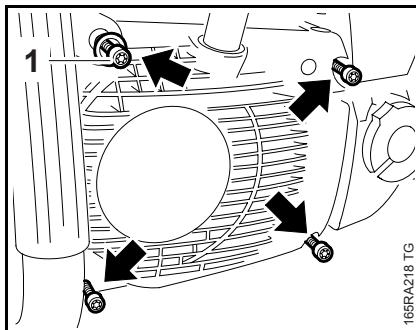
If clogged with dirt or pitch, the entire starter mechanism, including the rewind spring, must be removed and disassembled. Take particular care when removing the spring.

- Clean all components.

10.2 Removing and Installing

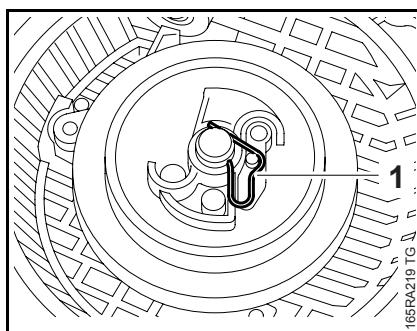


- Take out the screws (arrows).
- Lift the hand guard (1) a little and remove the fan housing (2).

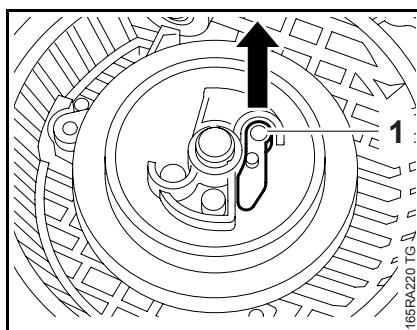


- Lift the hand guard a little and fit the fan housing in position.
- Insert the screws (arrows)
 - screw (1) with sleeve secures the hand guard as well.
- Tighten down the screws firmly.
- Tightening torques, [3.5](#)

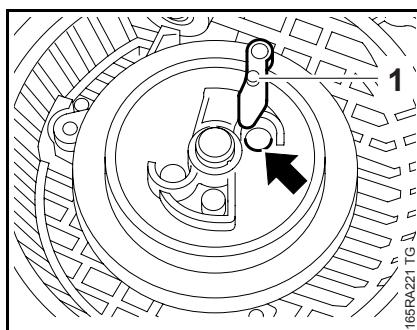
10.3 Pawl



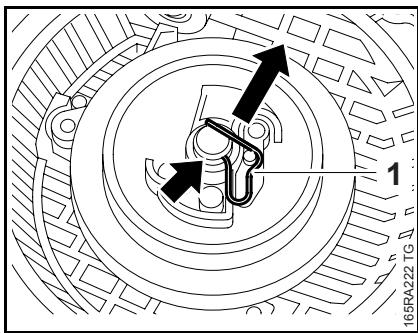
- Remove the fan housing, [10.2](#)
- Carefully ease the spring clip (1) off the starter post.



- Remove the pawl (1).



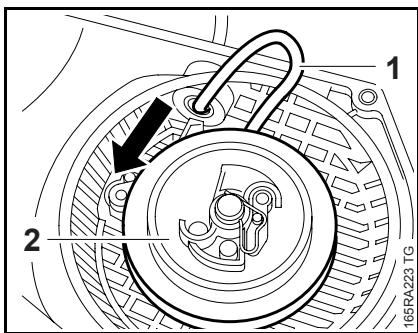
- Fit the new pawl in the bore (arrow) and lubricate its peg (1), [17](#)



- Position the spring clip (1) so that its loop engages the peg on the pawl and its curved end (arrow) is in the starter post's groove.
- Push the straight part of the spring clip over the starter post until it snaps into the groove.
- Reassemble all other parts in the reverse sequence.

10.4 Rope Rotor

Relieving tension of rewind spring



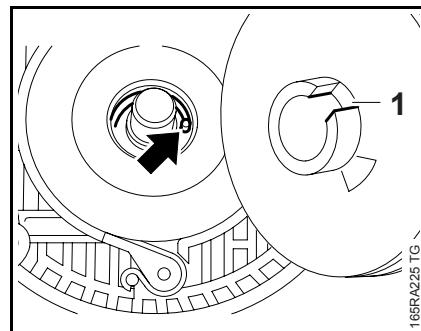
- Remove the fan housing, **10.2**
- Pull out the starter rope (1) about 5 cm and hold the rope rotor (2) steady.
- Take three full turns of the rope off the rope rotor.

– Pull out the rope with the starter grip and slowly release the rope rotor.

– Remove the starter rope or remaining rope from the rotor, **10.5**

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

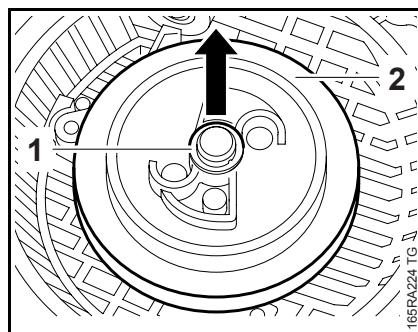
– Remove the spring clip and pawl, **10.3**



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

The opening (1) in the hub of the rope rotor is the anchor point for the spring.

- Fit the washer.
- Install the pawl and spring clip, **10.3**
- Install the starter rope, **10.5**
- Tension the rewind spring, **10.6**
- Lubricate peg on pawl with grease, **17**



- Remove the washer (1).

Rewind spring must be relaxed.

- Carefully remove the rope rotor (2).
- Check the rope rotor and replace if necessary.
- Coat bore in rope rotor with STIHL special lubricant, **17**

10.5 Starter Rope / Grip

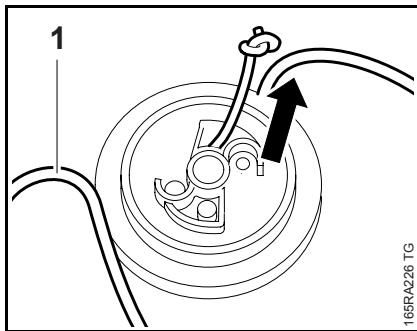
- Remove the fan housing and the segment, **10.2**
- Relieve tension of rewind spring, **10.4**

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

- Remove remaining rope from the rope rotor and starter grip.

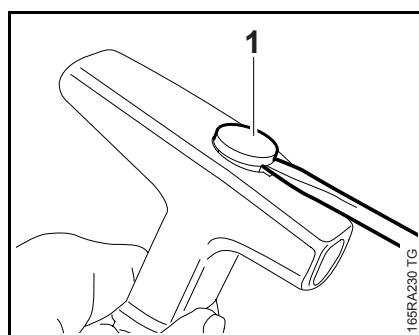
Do not shorten the starter rope.

- Remove the rope rotor, **10.4**

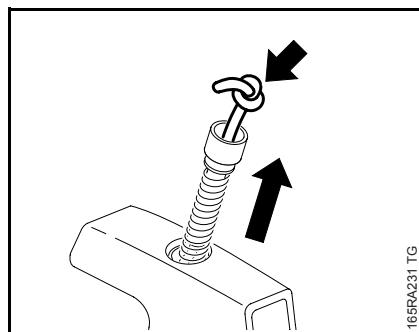


- Push the end of the starter rope (1) out a little and undo the knot.
- Pull the starter rope out of the rope rotor and fan housing.

Machines with ElastoStart Grip

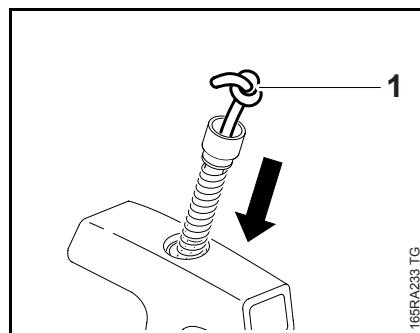


- Use a suitable tool to pry the cap (1) out of the starter grip.



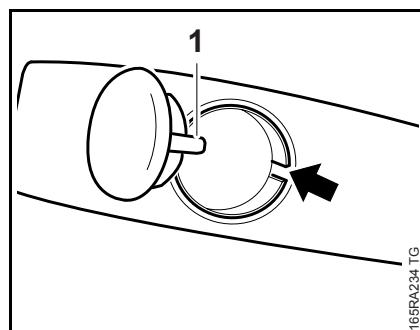
- Pull the sleeve, washers, spring and remaining rope (arrow) out of the grip.
 - Pull any remaining rope out of the sleeve. Inspect the individual parts and replace if necessary.

Do not shorten the starter rope.



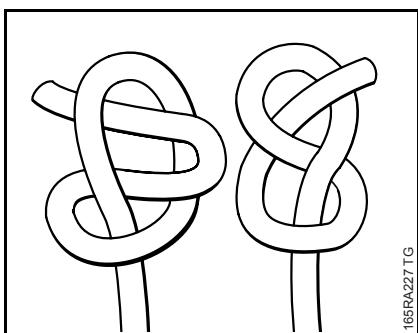
- Thread the new starter rope (1) through the sleeve.
 - Tie a simple overhand knot in the end of the rope.
 - Fit the washers and spring.
 - Pull the starter rope with sleeve, spring and washers into the starter grip (1).

Make sure the washers and spring remain on the sleeve while the rope is being pulled into the grip.

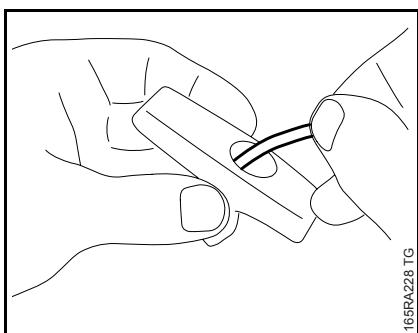


- Position cap so that its lug (1) engages the slot (arrow) in the starter grip.
 - Press the cap into the starter grip.

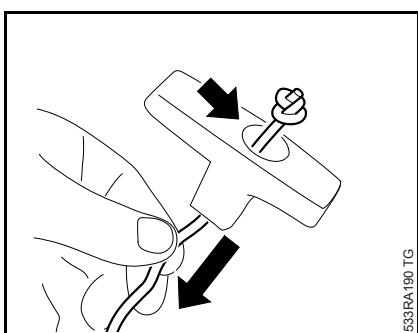
Machines with Standard Starter Grip



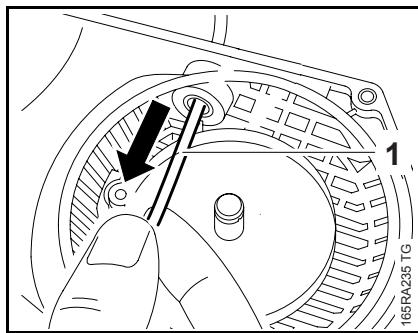
- Pull the rope out of the starter grip.
- Tie one of the special knots shown in the end of the rope.



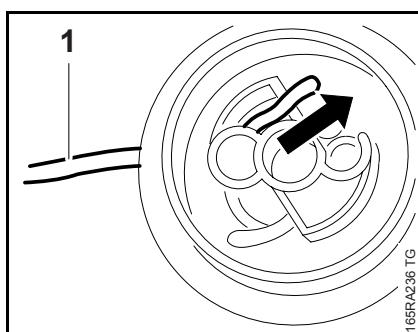
- Thread the rope through the top of the starter grip.



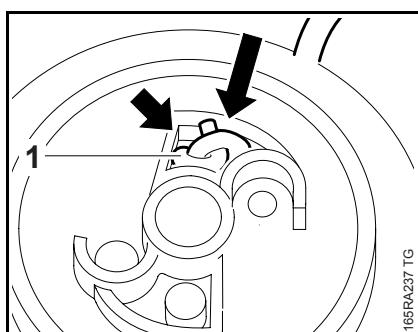
- Pull the rope with knot into the starter grip until it is properly seated in the grip (small arrow).



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



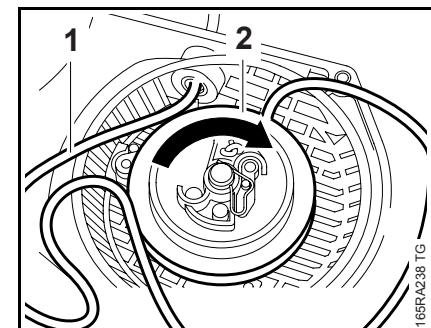
- Thread the starter rope (1) through the side of the rope rotor.
- Secure the rope (1) with a simple overhand knot.



- Pull rope back until knot (1) locates in recess (arrow) in rope rotor.

- Install the rope rotor and tension the rewind spring, **10.4**
- Install the fan housing, **10.2**
- Tightening torques, **3.5**

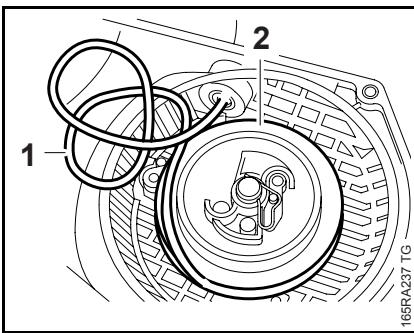
10.6 Tensioning the Rewind Spring



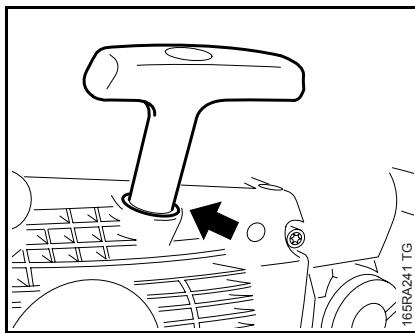
- Remove the fan housing, **10.2**
- Pull out a short length of starter rope (1).
- Use the starter rope (1) to rotate the rope rotor (2) six turns clockwise,

Rotating the rope and rope rotor causes the rope to become twisted. The rewind spring is now tensioned.

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



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



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

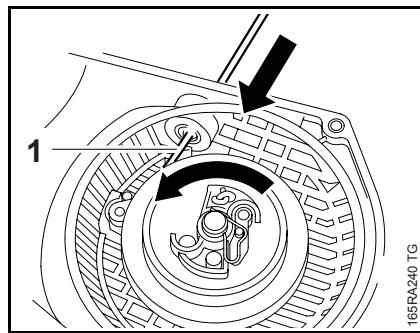
When the starter rope is fully extended, it must still be possible to rotate the rope rotor at least another half turn before maximum spring tension is reached. If this is not the case, reduce spring tension since there is otherwise a risk of breakage.

To reduce spring tension:

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

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

- Install the fan housing, **10.2**
- Tightening torques, **3.5**



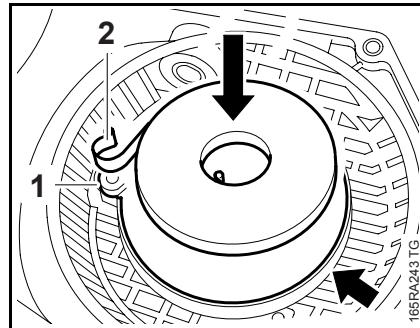
10.7 Replacing the Rewind Spring

- Troubleshooting, **4.4**

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

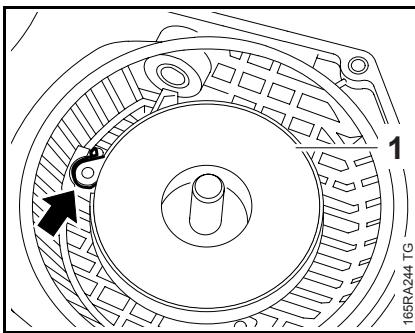
Wear a face shield and work gloves.

- Remove the fan housing, **10.2**
- Relieve tension of rewind spring if necessary and remove the rope rotor, **10.4**
- Remove any remaining pieces of old spring.
- Lubricate the spring with a few drops of STIHL special lubricant before installing, **17**



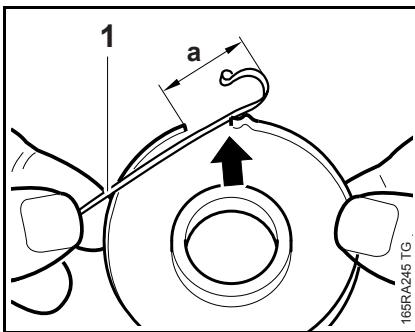
- Line up the replacement spring and spring housing – the anchor loop (2) must be above the lug (1).
- Push the rewind spring with spring housing into its seat (arrow) in the fan housing.

The rewind spring may pop out and unwind.



Check that the rewind spring (1) is properly seated and the anchor loop engages the lug (arrow).

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

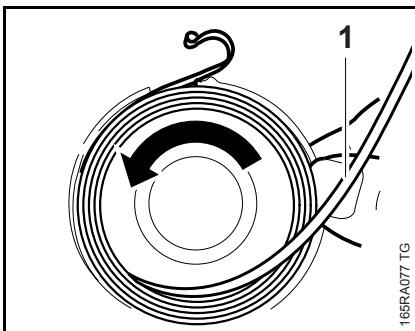


- Arrange the spring (1) in its original position.

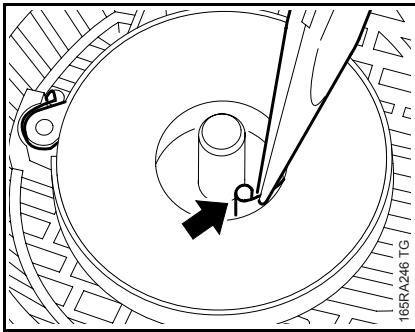
The position of the anchor loop cannot be changed after the rewind spring is fitted in the spring housing.

- Place the anchor loop in the spring housing (arrow).

Distance from the end of the anchor loop to the edge of the spring housing
 $a = 20 \text{ mm}$.



- Fit the rewind spring (1) counterclockwise in the housing, starting from outside and working inwards.
 - Hold the spring windings so that they cannot pop out.



- Secure the spring so that it cannot pop out.
- Use suitable pliers to position the inner spring loop (1) so that it is against the starter post.
 - Install the rope rotor, [10.4](#)
 - Reassemble all other parts in the reverse sequence.

11. Servicing the AV System

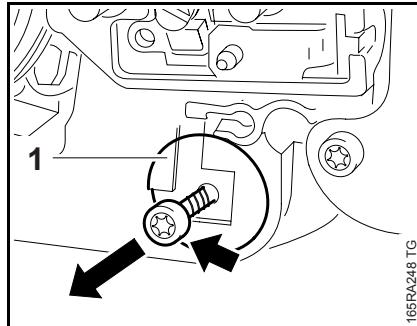
Vibration-damping rubber buffers are used for the connection between the handlebar, tank housing and engine housing.

Damaged rubber buffers (annular buffers) must always be replaced.

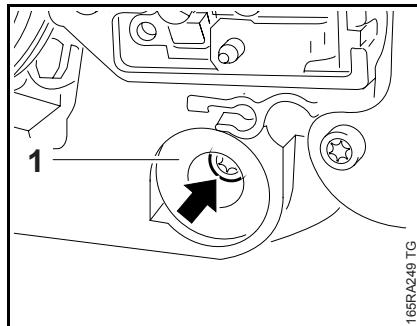
11.1 Annular Buffer on Chain Catcher

Always replace a damaged annular buffer.

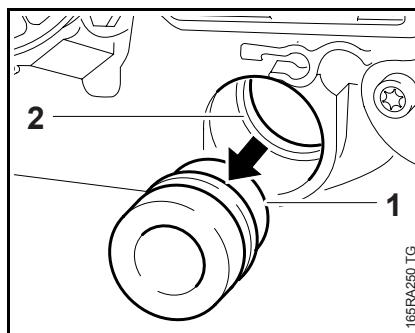
- Remove the sprocket cover and cutting attachment, **5**
- Remove the side plate, **7.6**



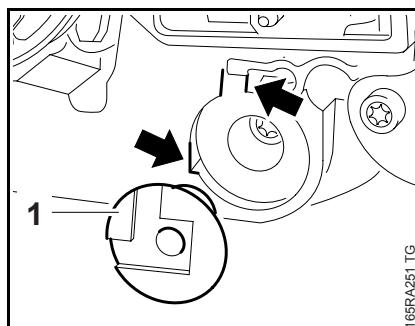
- Insert screw (arrow) part way and pull out the plug (1).



- Take out the screw (arrow).
- Pry out the annular buffer (1).



- Use STIHL press fluid to simplify assembly, **17**
- Hold annular buffer with its small diameter (1) facing the housing.
- Push the annular buffer (1) into the bore until its groove (arrow) engages the housing rib (2).
- Insert screw and tighten it down firmly.

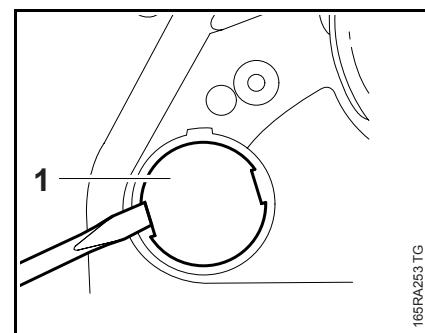


- Position the plug (1) so that its recesses match those on the housing (see arrows).
- Push the plug into the annular buffer as far as stop.
- Use STIHL press fluid to simplify assembly, **17**

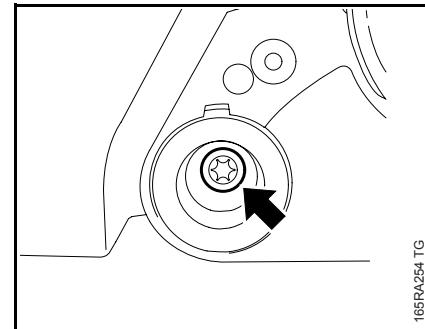
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

11.2 Annular Buffer at Clutch Side

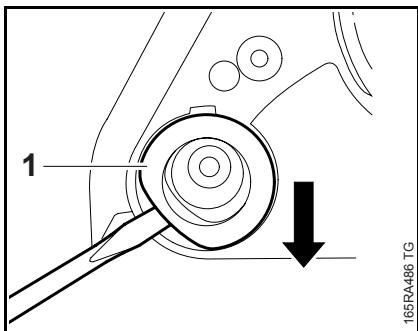
- Remove the sprocket cover and cutting attachment, **5**



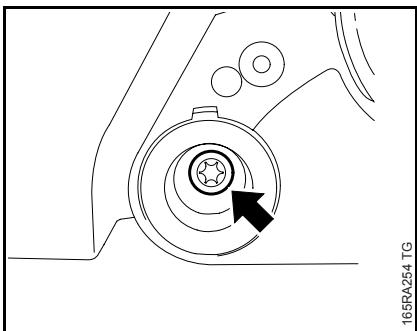
- Pry out the plug(1).



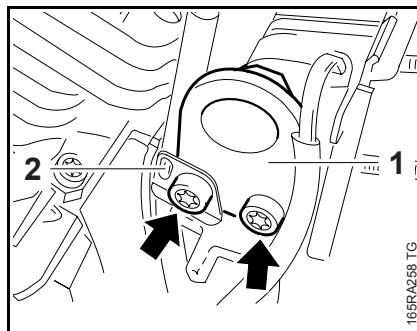
- Take out the screw (arrow).



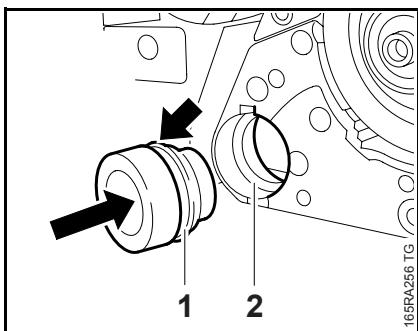
- Pry out the annular buffer (1).
- Check the annular buffer (1) and replace if necessary



- Position the tank housing on the annular buffer – the holes must line up.
- Insert screw (arrow) and tighten it down firmly.
- Push the plug into the annular buffer as far as stop.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**



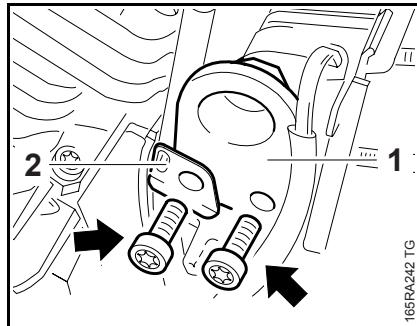
- Take out the screws (arrows) and remove the retaining plate (2).
- Remove the annular buffer (1).
- Check the annular buffer (1) and replace if necessary



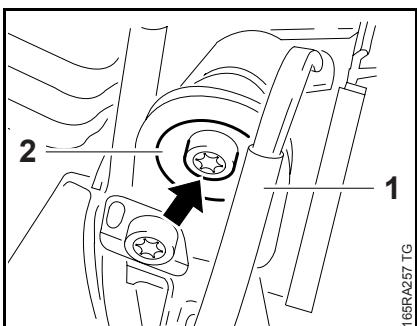
- Hold the annular buffer (1) with its small diameter facing the crankcase.
- Use STIHL press fluid to simplify assembly, **17**
- Push the annular buffer (1) into the bore until its groove (arrow) engages the housing rib (2).

11.3 Annular Buffer at Ignition Side

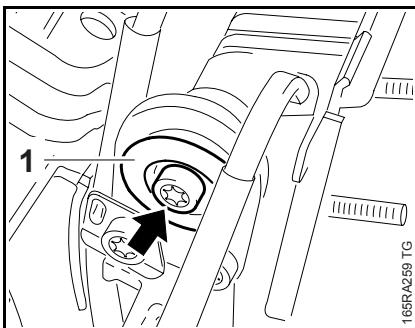
- Remove the shroud, **8.4**



- Hold the annular buffer (1) with its tapered side facing the crankcase.
- Fit the annular buffer (1) in position.
- Fit the retaining plate (2) in position.
- Check that the ignition lead is in its guide and not pinched.
- Insert screws (arrows) and tighten them down firmly.



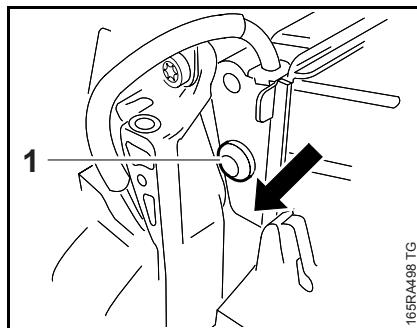
- Push the wiring harness (1) to one side.
- Take out the screw (arrow) and remove the washer (2).



- Position the tank housing on the annular buffer – the holes must line up.
- Fit the washer (1).
- Insert screw (arrow) and tighten it down firmly.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

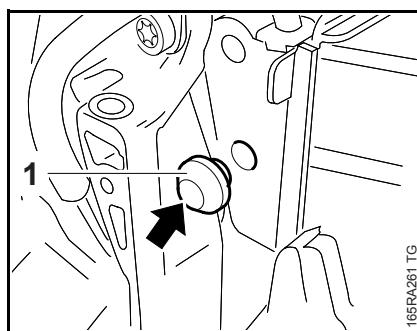
11.4 Stop Buffer

- Remove the carburetor, **14.2**
- Take out the annular buffer/tank housing mounting screws.
Annular buffer at ignition side, **11.3**.
Annular buffer at clutch side, **11.2**
- Push the manifold out of the tank housing, **14.6.1**
- Pull off the impulse hose, **14.6.2**



Lower the tank housing a little – check that the impulse is pushed fully onto the connector on the crankcase.

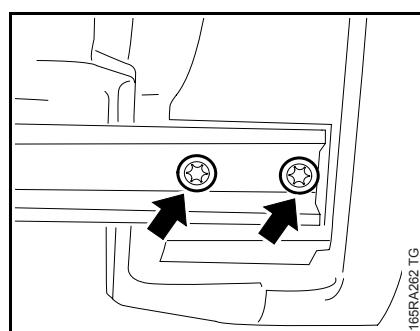
- Ease the stop buffer (1) out of the bore.
- Check the stop buffer (1) and replace if necessary



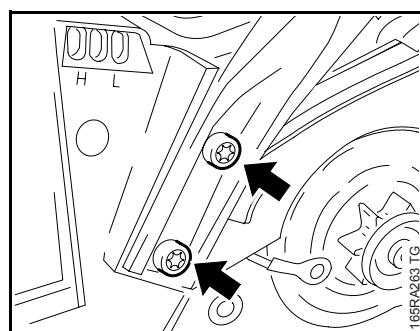
- Position the stop buffer (1) so that its tapered side (arrow) faces away from the tank housing.
- Push the stop buffer (1) into the bore and make sure it is properly seated.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

11.5 Handlebar

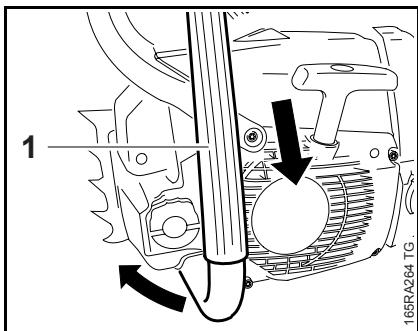
- Remove the sprocket cover and cutting attachment, **5**
- Remove the shroud, **8.4**



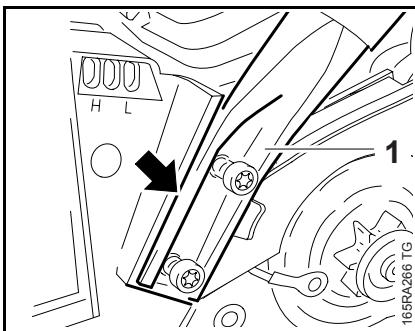
- Remove the screws (arrows) from the underside of the machine.



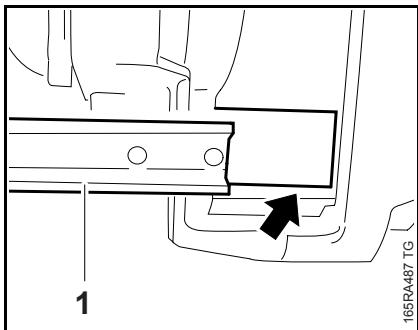
- Take out the screws (arrows).



- Push the handlebar (1) out of its seat on the underside of the machine.
- Remove the handlebar (1), check it and replace if necessary.



- Position the handlebar (1) in its seat on the side of the machine (arrow) and insert the screws.
 - Check that the handlebar is properly seated and then tighten down all four screws firmly.
 - Reassemble all other parts in the reverse sequence.
 - Tightening torques, [3.5](#)



- Position the handlebar (1) in its seat (arrow) and insert the screws.

11.6 Handlebar with Handle Heating

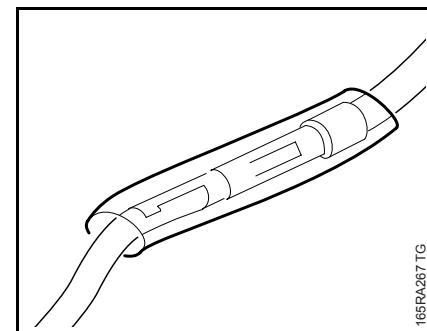
The handlebar in these versions is equipped with a heating system – the electrical wires have to be disconnected.

- Troubleshooting, [15.3.1](#)

Apart from the electrical connections, the removing and installing procedures are the same as for the handlebar without heating, [11.5](#).

- Remove the carburetor, [14.2](#)

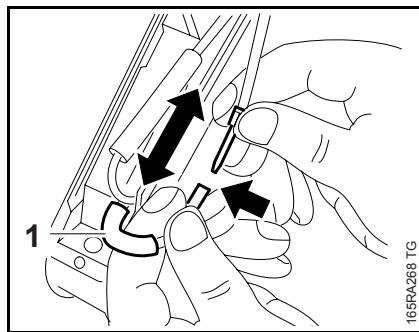
- Take out the annular buffer/tank housing mounting screws.
 - Annular buffer at ignition side, [11.3](#).
 - Annular buffer at clutch side, [11.2](#)
- Remove the interlock lever, [12.2](#)
- Remove the switch shaft, [12.1.1](#)
- Push the manifold out of the tank housing, [14.6.1](#)
- Pull off the impulse hose, [14.6.2](#)
- Remove the heater switch, [15.4](#)
- Remove the ground wire from the housing cover, [15.4.1](#)
- Lower the tank housing for easier access.



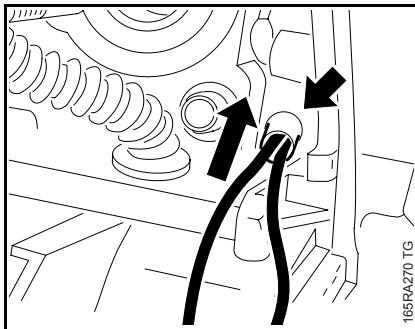
During all the following procedures:

- To reduce the risk of a short circuit, make sure the insulating tubes completely cover the connections.

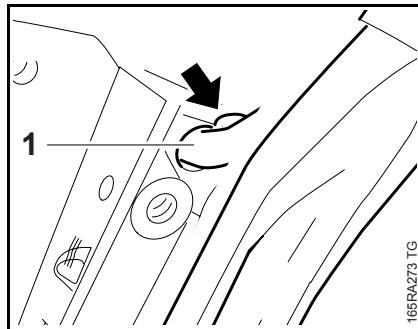
Removing the Handlebar



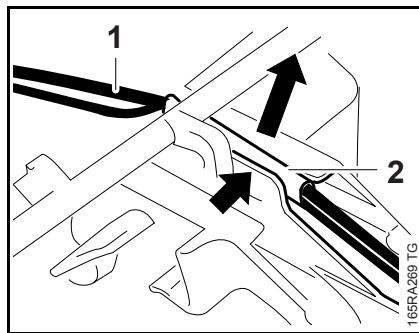
- Push the insulating tube (1) in the direction of the heating element.
- Separate the pin and socket connector (arrow).



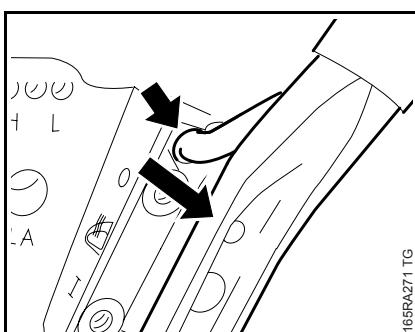
- Pull the wiring harness out of the hole (arrow) in the housing in the direction of the cylinder.



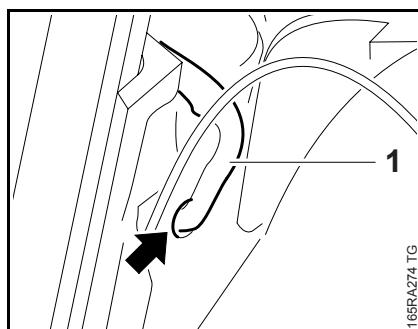
- Place the handlebar in position and continue pulling the wiring harness (1) through the hole until it is snugly seated in the recess (arrow).



- Take the wire (1) with insulating tube (2) out of the guide (arrow).
- Pull the handle heating wire (1) out of the insulating tube (2).

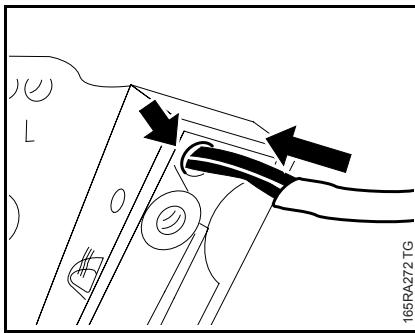


- Pull the wiring harness out of the hole (arrow).
- Remove the handlebar, check it and replace if necessary
- Test the handle heating system, **11.6**

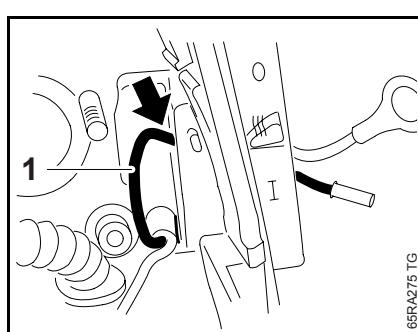


- Thread the wiring harness (1) through the hole (arrow) until it locates snugly against the tank housing.

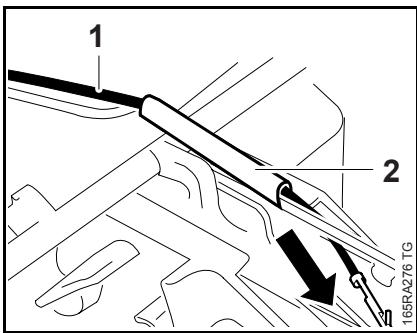
Installing the Handlebar



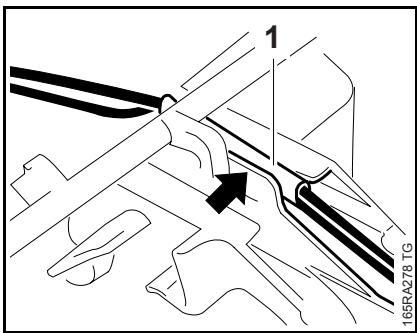
- Thread the wiring harness through the hole (arrow).



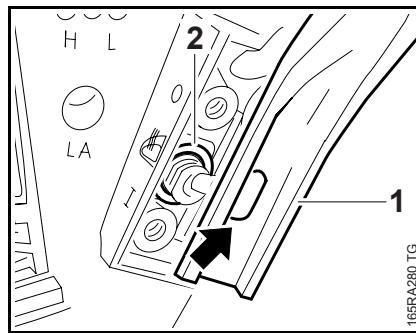
- Push the wire with connector sleeve (1) through the hole (arrow) and position it in the guide.
- Install the heater switch, **15.4**



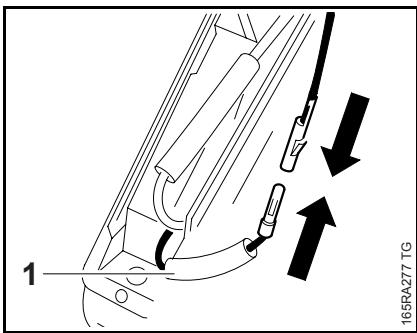
- Push the wire (1) through the insulating tube (2).



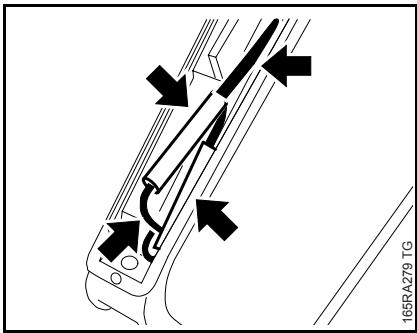
- Push the wires with the insulating tube (1) into the guide.



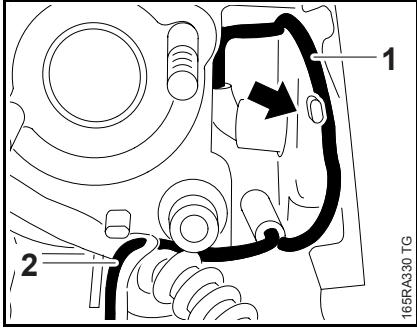
- The ground wire ring terminal (2) must be in position on the heater switch.



- Push the pin and socket together until they lock.
 - Push the insulating tube (1) over the connectors.

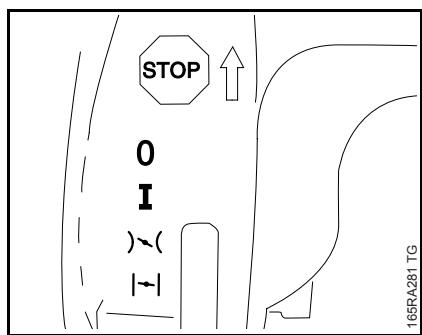


- Position the wires without loops.



- Push the wire (1) into the guide (arrow) – position the wire snugly against the housing.
- Position the wire (2) behind the fuel hose.

12.1 Switch Shaft



The following positions can be selected with the switch shaft:

- Position **0** = engine off
– ignition is switched off
- Position **I** = normal run position
– engine runs or may start in this position

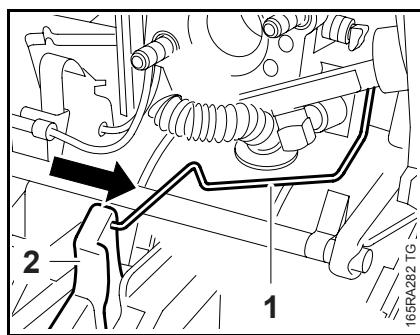
To move the switch shaft from **I** to **|** or **||** depress the interlock lever and throttle trigger at the same time.

- Position **|** = warm start
– warm engine is started in this position

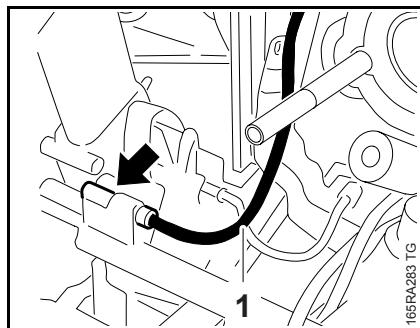
The switch shaft returns to the run position when the throttle trigger is operated.

- Position **||** = cold start
– cold engine is started in this position

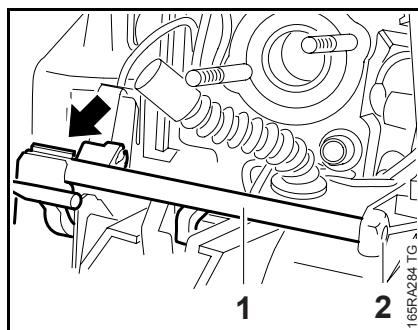
12.1.1 Removing and Installing



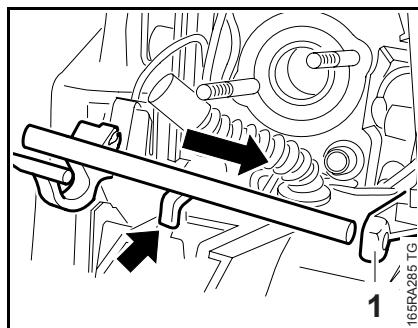
- Remove the air filter, **14.1**
- Remove the handle molding, **12.2**
- Disconnect the throttle rod (1) from the trigger (2).



- Pull terminal sleeve (arrow) of short circuit wire (1) out of the switch shaft.

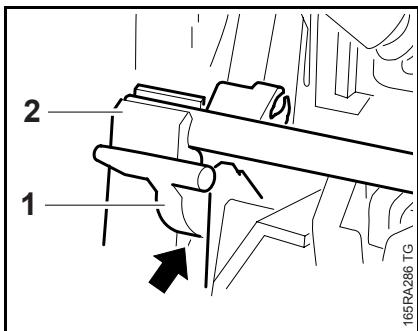


- Pry the switch shaft (1) out of its mount (arrow).
- Lift the switch shaft (1) a little and pull it out of the mount (2).
- Check the switch shaft (1) and replace if necessary

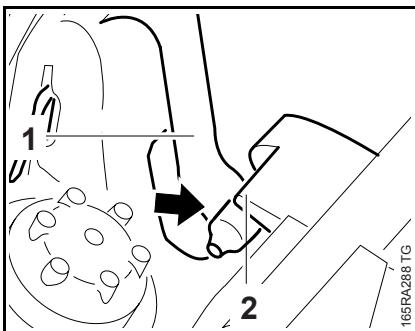


- Line up the switch shaft
 - the arm (arrow) must point in the direction of the throttle trigger.
- Push the switch shaft into the mount (1).

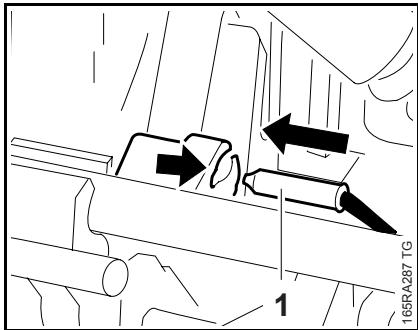
12.2 Throttle Trigger/Interlock Lever



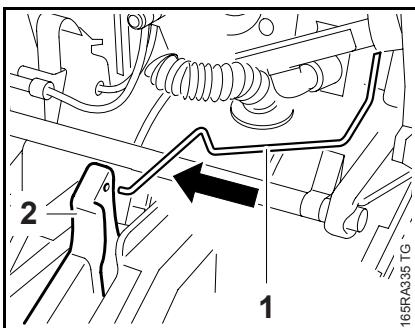
- Line up the switch shaft
 - the lever (1) must locate in the guide (arrow).
- Press the switch shaft into the mount (2) until it snaps into position.



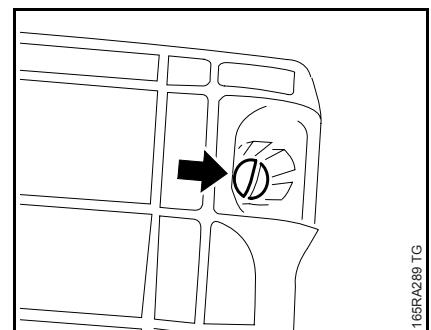
- The contact spring (1) must butt against the switch shaft's (2) guide.
- Move switch shaft to "0" – contact between the short circuit wire and contact spring (arrow) must be made.



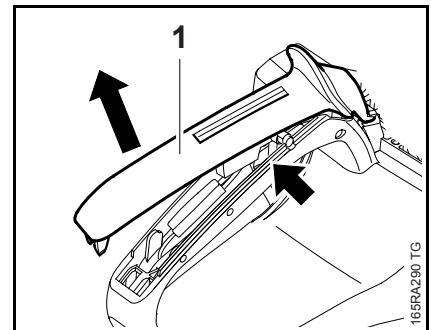
- Push terminal sleeve (1) of short circuit wire into the bore (arrow) as far as stop.



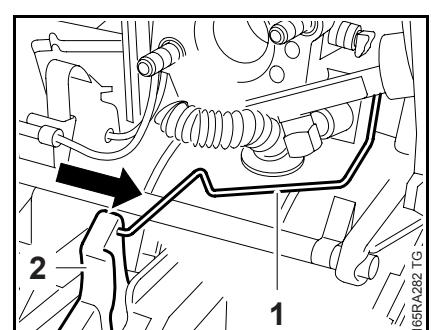
- Attach the throttle rod (1) to the trigger (2).
- Fit the handle molding, **12.2**
- Check correct position of short circuit wire, **9.6.2**
- Check operation.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**



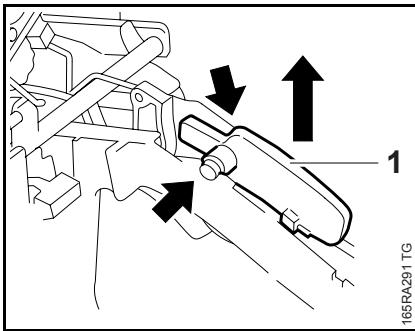
- Remove the air filter, **14.1**
- Take out the screw (arrow).



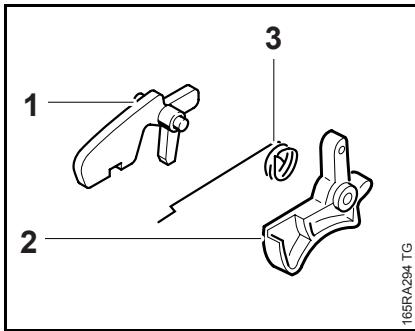
- Remove the handle molding (1).
- The interlock lever (arrow) may pop out.



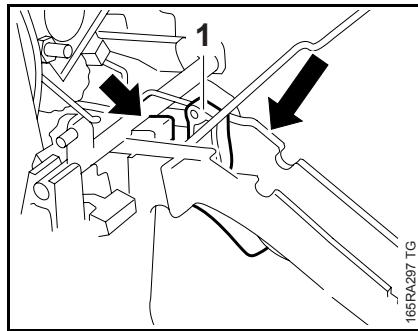
- Disconnect the throttle rod (1) from the trigger (2).



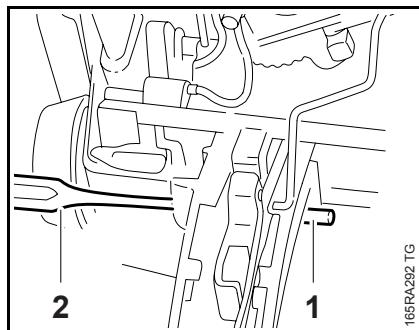
- Ease the interlock lever (1) out of its mounts (arrows).
- Disconnect the torsion spring and remove the interlock lever.



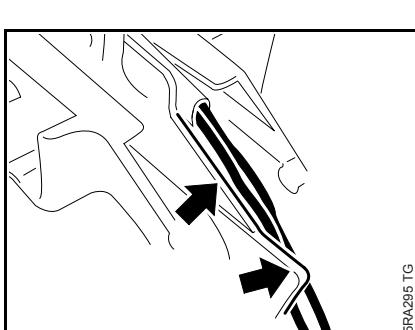
- Check the interlock lever (1), throttle trigger (2) and torsion spring (3) and replace if necessary



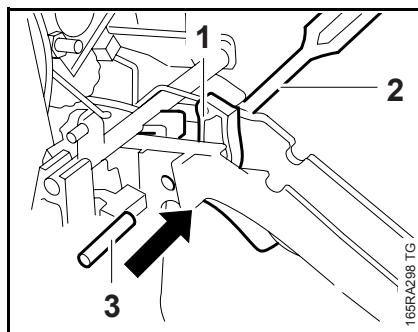
- Fit the throttle trigger (1) in the rear handle so that its lug is behind the arm on the switch shaft (arrow).



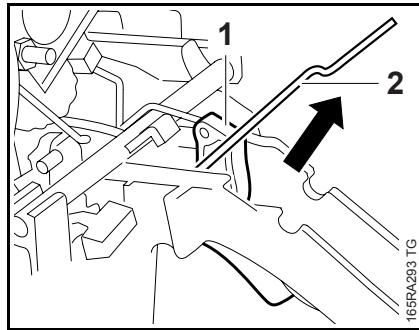
- Use a drift (2) to drive out the pin (1).



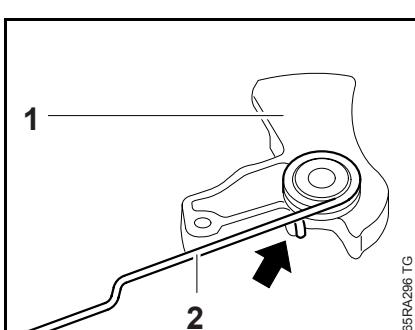
Make sure the wires are properly positioned in the guide (arrows).



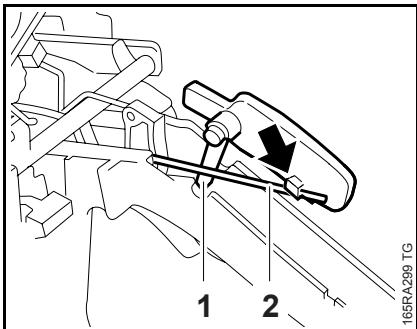
- Use a drift (2) to line up the throttle trigger (1).
- Drive home the pin (3) until it is centered (recessed by same amount at both sides).



- Set the switch shaft to "0".
- Remove the throttle trigger (1) with torsion spring (2).

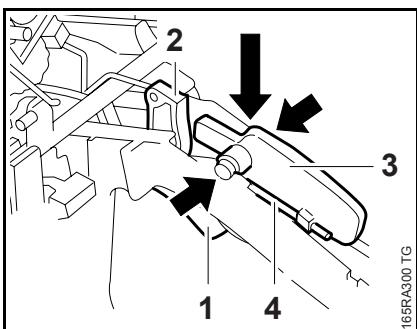


- Attach the torsion spring (1) to the throttle trigger (2)
 - note installed position (arrow).



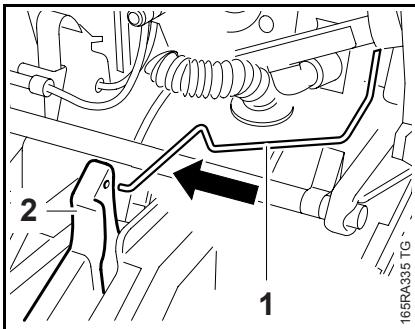
When installing the interlock lever, make sure its stop (1) engages the recess in the throttle trigger.

- Attach the torsion spring (2) to the interlock lever (arrow).



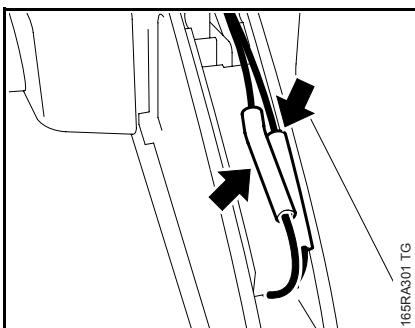
- Squeeze the throttle trigger (1) until the lever (2) is vertical and hold it there.
- Push the interlock lever (3) into its pivot mounts (arrows) until it snaps into position – check that torsion spring (4) is in position.

The interlock lever may pop out.

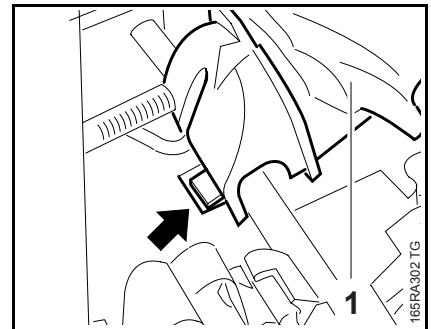


- Attach the throttle rod (1) to the trigger (2).

Versions with handle heating



- Arrange the connectors and wires (arrows) on the heating element so that they are not pinched.



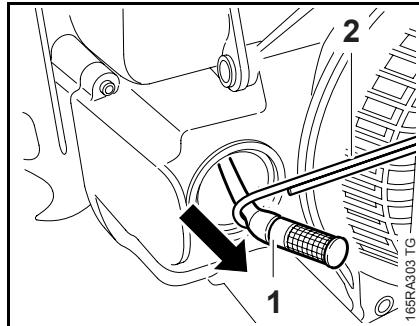
- Engage tab of handle molding (1) in the opening (arrow).

- Position the handle molding (1) over the switch shaft and interlock lever, making sure the throttle rod remains attached to the trigger – the handle molding holds the throttle rod in place.
- Hold the handle molding in position.
- Insert screw from below and tighten it down firmly.
- Check operation.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

13.1 Pickup Body

Impurities gradually clog the fine pores of the filter with minute particles of dirt. This prevents the oil pump from supplying sufficient oil. In the event of problems with the oil supply system, first check the oil tank and the pickup body. Clean the oil tank if necessary, **1**

- Troubleshooting, **4.3**
- Open the oil tank cap and drain the oil tank.
- Collect chain oil in a clean container, **1**

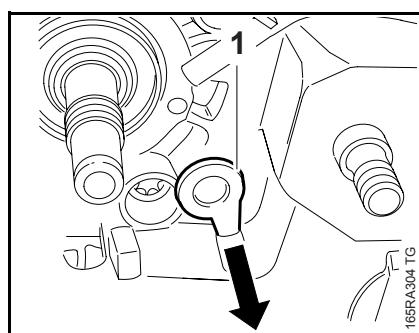


- Use hook (2) 5910 893 8800 to remove the pickup body (1) from the oil tank.

Do not overstretch the suction hose.

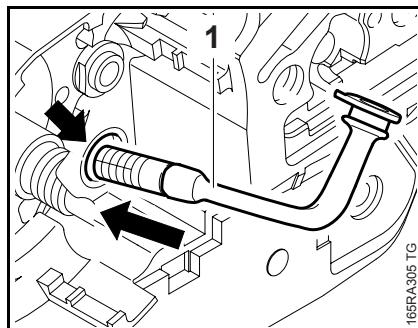
13.2 Oil Suction Hose

- Remove the sprocket cover and cutting attachment, **5**
- Remove the clutch, **6**
- Remove the brake band, **7.2**
- Remove the adjustable oil pump, **13.5**
- Remove the non-adjustable oil pump, **13.4**
- Open the oil tank cap and drain the oil tank.
- Collect chain oil in a clean container, **1**

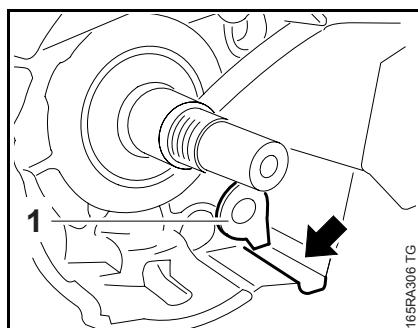


- Remove the oil suction hose (1).

- Check the oil suction hose and pickup body and replace if necessary. Install the pickup body, **13.1**



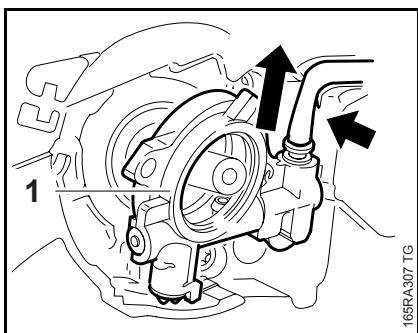
- Push the oil suction hose (1), pickup body first, through the housing bore (arrow).



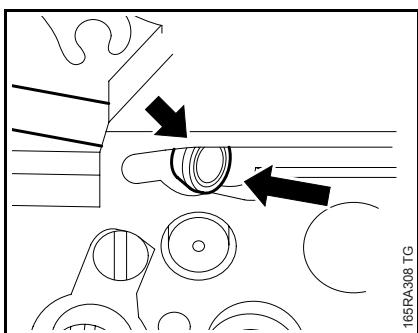
- Line up the oil suction hose (1)
 - the tab (arrow) must be in the guide.
- Push home the oil suction hose (1) until its groove is properly seated in the crankcase.
- Check position of pickup body. If necessary, use hook 5910 893 8800 to position it properly.
- Install the oil pump, adjustable, **13.5**, non-adjustable, **13.4**
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

13.3 Oil Delivery Hose

- Remove the worm, [13.5](#)



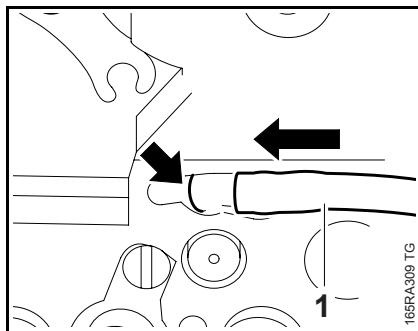
- Take out the screws.
- Remove the oil pump (1) and disconnect the oil delivery hose (arrow).
- Check the oil pump (1) and replace if necessary



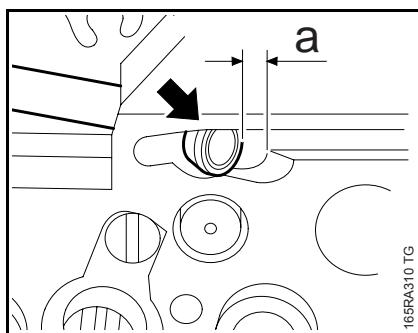
- Use a suitable tool to push the sleeve and oil delivery hose through the bore (arrow).

Take care not to damage the bore (arrow).

The oil delivery hose with sleeve is damaged during the removal process and has to be replaced – the new hose comes with the sleeve already fitted.

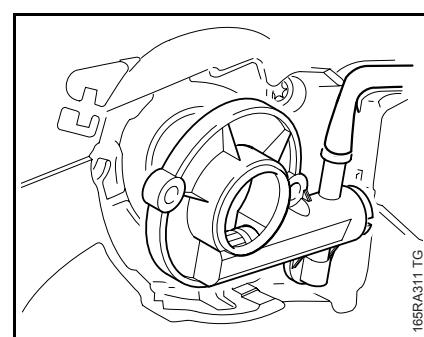


- Fit the new oil delivery hose (1) through the bore (arrow) from outside.



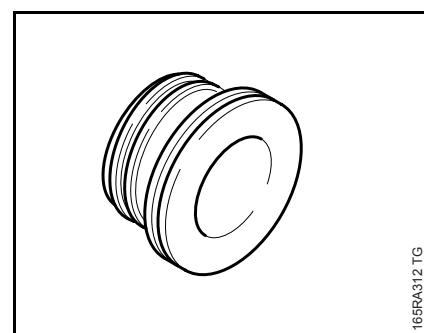
- Use a suitable tool to carefully push the oil delivery hose into the bore until it is recessed $a = 2$ mm behind the edge of the bore (arrow).
- Reassemble all other parts in the reverse sequence.

13.4 Non-Adjustable Oil Pump



The procedures for removing and installing the non-adjustable oil pump are the same as those for the adjustable oil pump, [13.5](#).

Non-adjustable oil pumps cannot be repaired and must be replaced in the event of a fault.

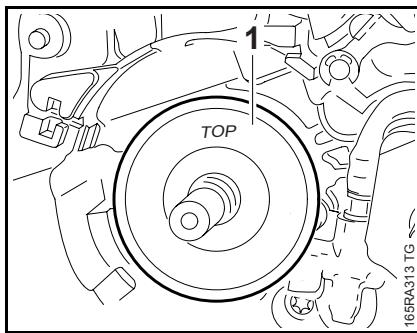


This version has no driver on the worm.

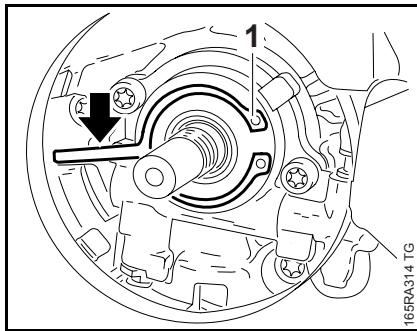
- Check the worm and replace if necessary.

13.5 Adjustable Oil Pump

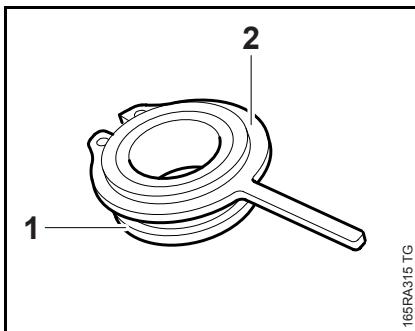
- Troubleshooting, **4.3**
- Remove the clutch, **6**
- Remove the brake band, **7.2**
- Remove the side plate, **7.6**



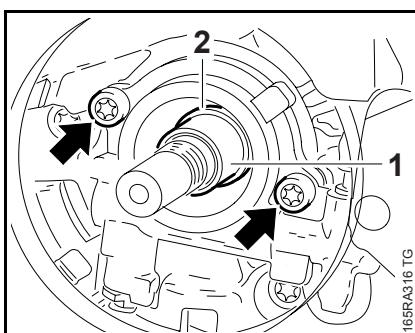
- Remove the cover washer (1).



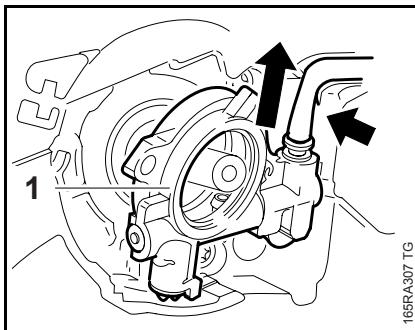
- Unscrew the worm (1) with driver (arrow) from the oil pump.



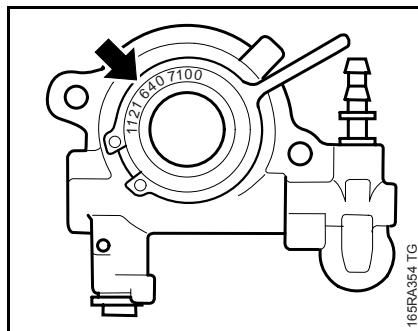
- Check the worm (1) and driver (2) and replace if necessary



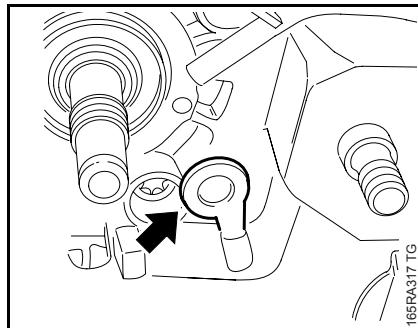
- Remove the ring (1) and washer (2) – only on adjustable oil pump.
- Take out the screws (arrows).



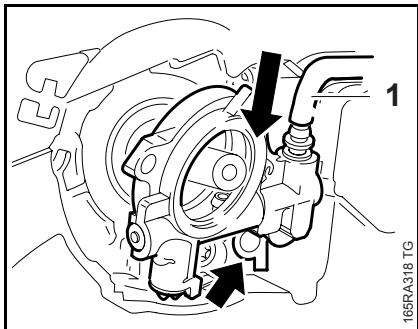
- Remove the oil pump (1) and disconnect the oil delivery hose (arrow).
 - Check the oil pump (1) and replace it if necessary
 - Inspect the oil delivery hose and replace if necessary, **13.3**



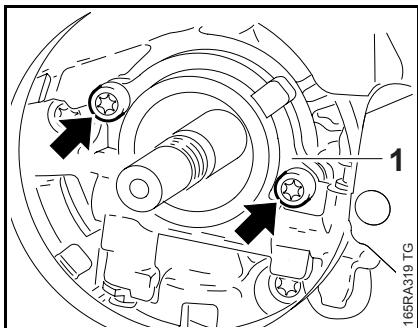
If a new oil pump is installed, worms with the number 1121 640 7100 (arrow) must also be replaced. Worms with the number 1121 640 7102 may be used with the new pump. (The numbers shown are not part numbers.)



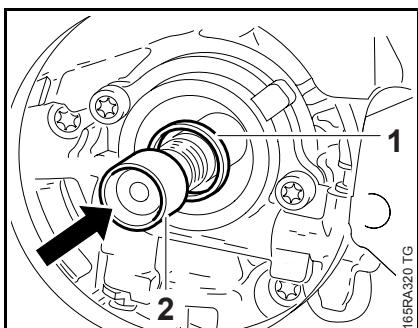
- Check oil suction hose connection (arrow) and replace hose if necessary, **13.2**



- Line up the oil pump so that the intake stub points toward the oil suction hose (arrow).
- Push the oil delivery hose (1) on to the stub.

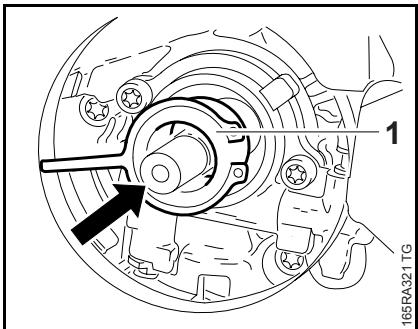


- Place the oil pump (1) in position.
- Insert screws (arrows) and tighten them down firmly.

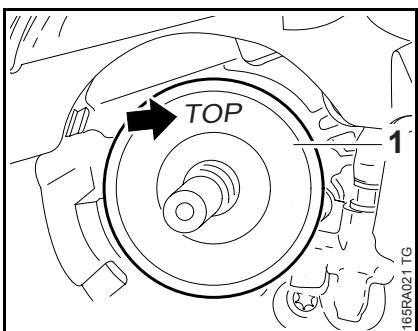


- Fit the washer (1) and ring (2).

Only on adjustable oil pump.



- Push the worm (1) into the oil pump.

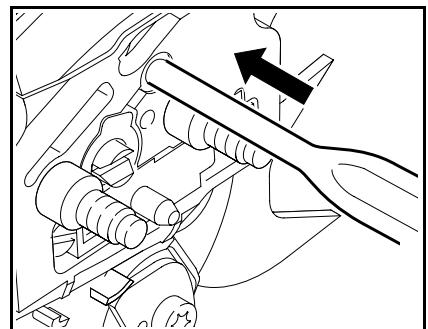


- Fit the cover washer (1) so that the word "TOP" (arrow) faces outwards.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **5** 3.5
- Check adjustment of oil pump and readjust if necessary, **13.5**

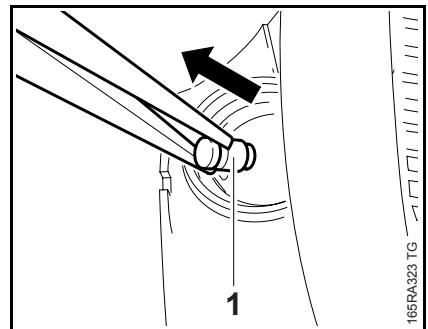
13.6 Valve

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

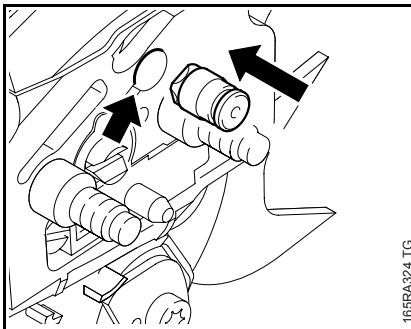
- Remove the sprocket cover and cutting attachment, **5**
- Open the oil tank cap and drain the oil tank.
- Collect chain oil in a clean container, **1**



- Use a 6 mm drift to carefully drive the valve out of its seat in the housing and into the oil tank.

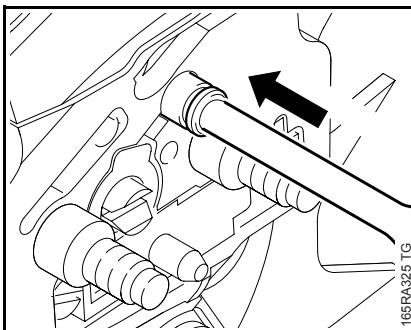


- Remove the old valve (1) from the oil tank.

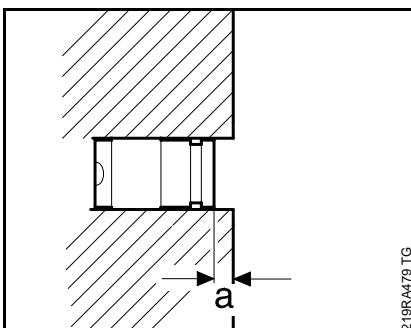


Check correct installed position.

- Insert the valve in the housing bore (arrow).



- Use a 6 mm drift to carefully drive in the new valve from outside – note installed depth.



- Installed depth of new valve:
 $a = \text{about } 2 - 3 \text{ mm}$

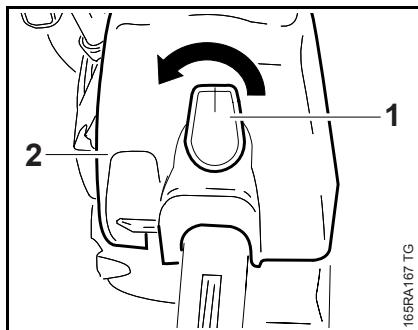
- Reassemble all other parts in the reverse sequence.

14. Fuel System

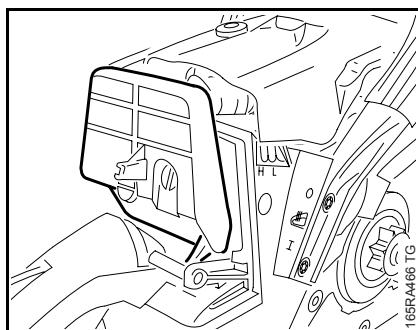
14.1 Air Filter

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, **4.5**, **4.6**



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

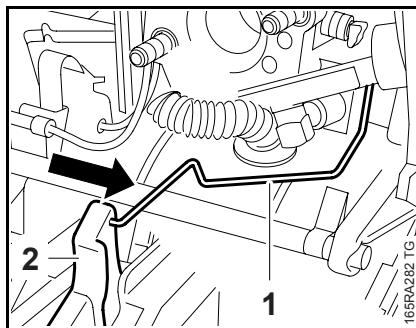


- Removing and installing the air filter – see instruction manual.
- Reassemble in the reverse sequence.

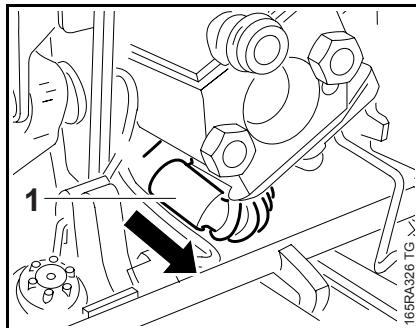
14.2 Removing and Installing the Carburetor

- Remove the air filter, **14.1**
- Open the fuel tank cap and drain the fuel tank.
- Collect the fuel in a clean container, **1**

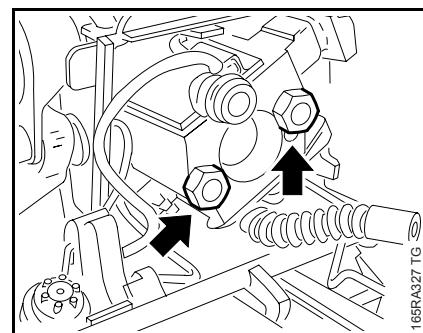
Pull off the carburetor only when the tank cap is open.



- Remove the handle molding, **12.2**
- Disconnect the throttle rod (1) from the trigger (2).

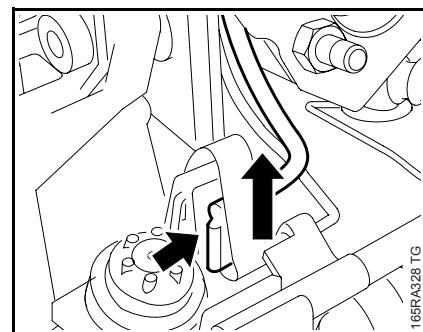


- Remove the fuel hose (1).

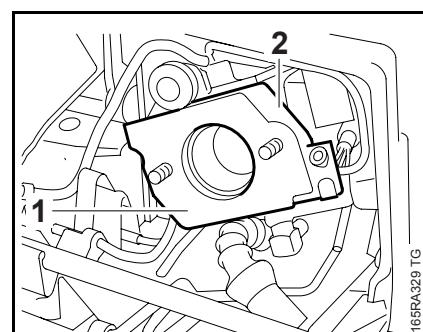


- Unscrew the nuts (arrows).

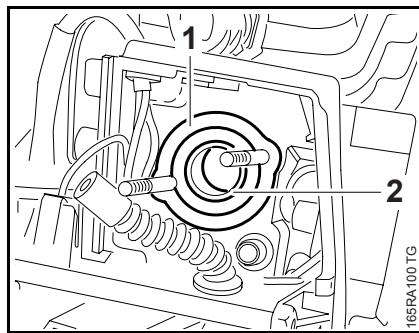
Versions with handle and carburetor heating



- Remove connector (arrow) from contact spring.

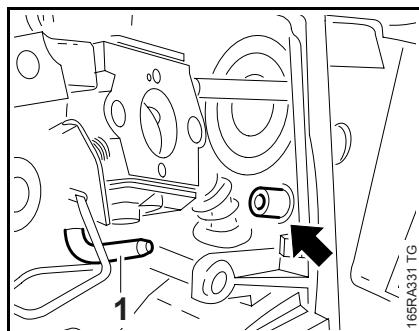


- Remove the heating plate (1) and heating element (2).
- Remove the carburetor, check it and service or replace if necessary.
- Check the throttle rod and replace if necessary, **14.6**

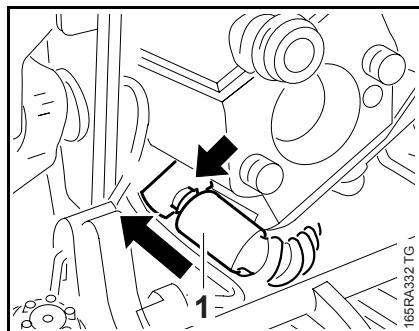


Check that the sleeve (2) and washer (1) are in place.

The throttle rod must be attached to the carburetor.

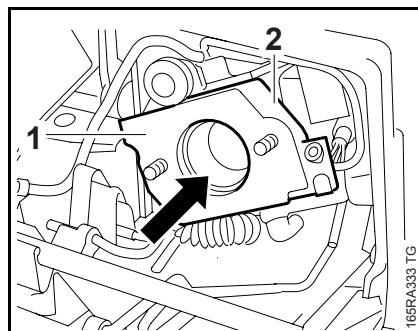


- Push the carburetor into position.
- Make sure the stub (1) slips into the impulse hose (arrow).

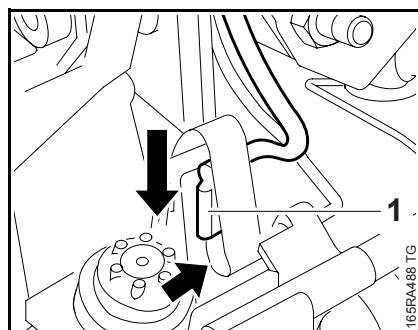


- Push the fuel hose (1) on to the stub (arrow).

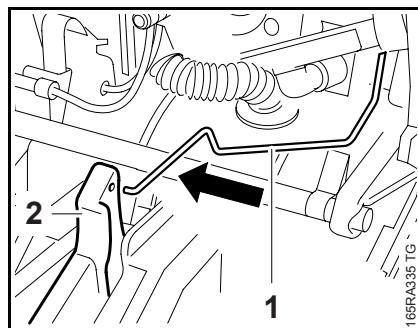
Versions with handle and carburetor heating



- Fit the heating element (1) and heating plate (2).
- Fit the nuts and tighten them down firmly.
- Position the wires, **15.8**



- Push the connector (1) on to the contact spring (arrow) as far as stop.



- Attach the throttle rod (1) to the trigger (2).

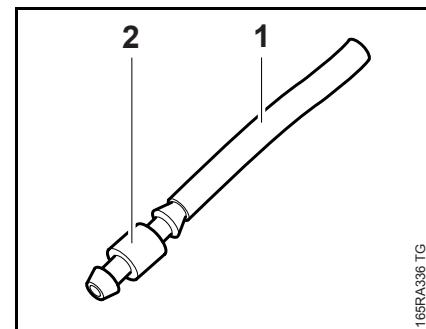
- Fit the handle molding, **12.2**
- Check operation.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

14.3 Leakage Test

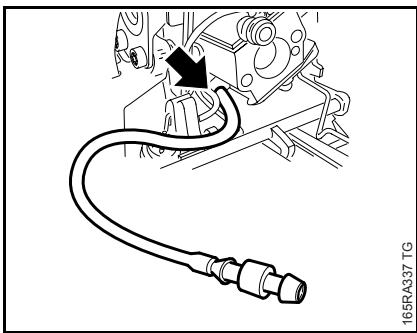
In the case of problems with the carburetor or fuel supply system, also check and clean or replace the tank vent, **14.7**

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

- Remove the carburetor, **14.2**

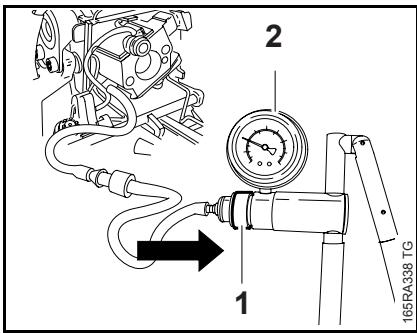


- Push the fuel hose (1) 1110 141 8600 on to the nipple (2) 0000 855 9200.



165RA337 TG

- Push the fuel hose with nipple onto the carburetor's fuel stub (arrow).



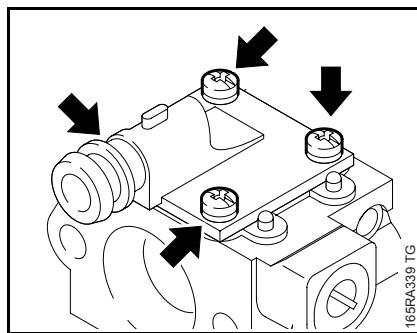
165RA338 TG

- Push the pressure hose of pump 0000 850 1300 on to 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, **14.4.1**
 2. Metering diaphragm or gasket damaged, replace if necessary, **14.4**
 3. Pump diaphragm or gasket damaged, replace if necessary, **14.4.3**
- 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 carburetor, **14.2**
- Tightening torques, **3.5**
- Reassemble all other parts in the reverse sequence.

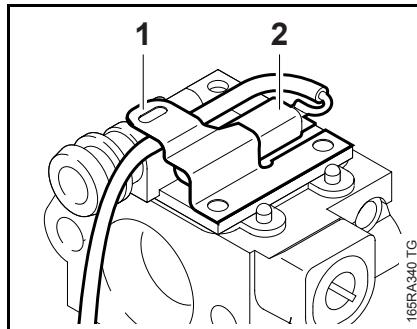
14.4 Servicing the Carburetor



165RA339 TG

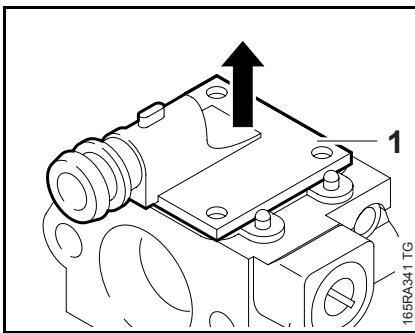
- Troubleshooting, **4.6**
- Remove the carburetor, **14.2**
- Disconnect the throttle rod, **14.6**
- Take out the screws (arrows).

Versions with handle and carburetor heating



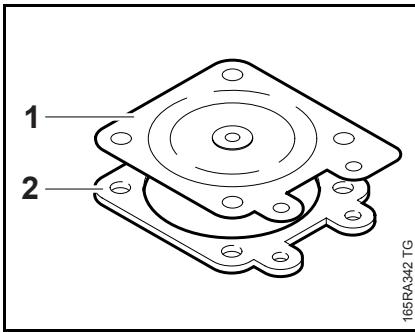
165RA340 TG

- Remove the retainer (1) and thermostatic switch (2).



- Remove the end cover (1).

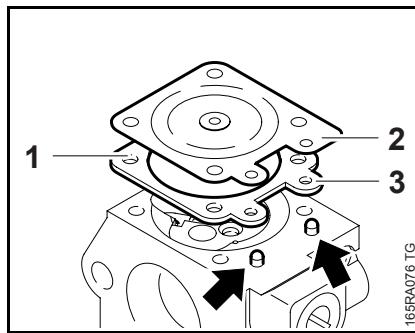
If the gasket and diaphragm are stuck to the carburetor, remove them very carefully.



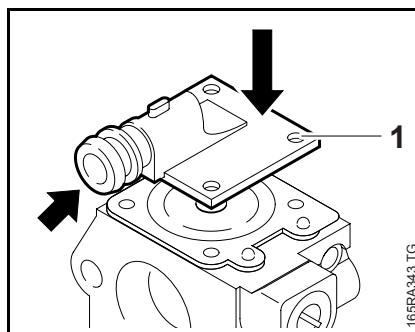
- Carefully separate the metering diaphragm (1) and gasket (2).

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 (1) for signs of damage and wear. Install a new gasket.

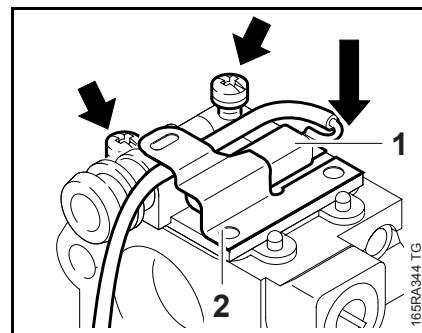


- Note installed positions of metering diaphragm (2) and gasket (1).
- Place the gasket (1) and metering diaphragm (2) on the pegs (arrows) and check that the tabs (3) are at the same side as the adjusting screws.

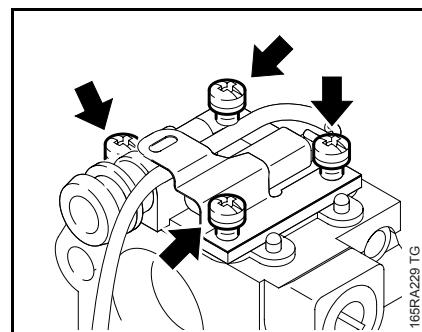


- Position the end cover (1) so that the stub (arrow) points towards the air filter.
- Fit the end cover (1) carefully – the holes must be in alignment.

Versions with handle and carburetor heating

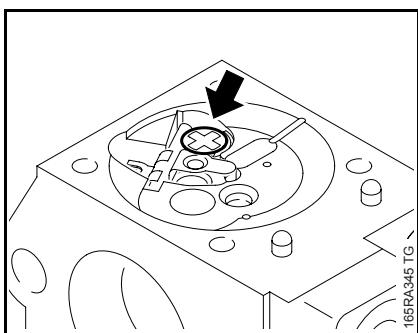


- Insert two screws (arrows) to hold the end cover, gasket and metering diaphragm in position.
- Fit the thermostatic switch (1) and retainer (2).

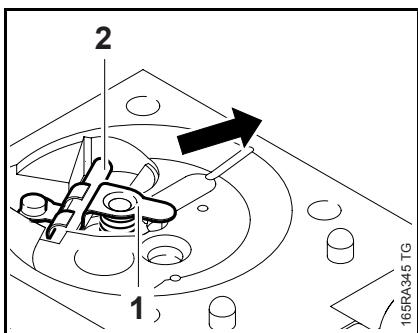


- Fit the screws (arrows).
- Check position of diaphragm and gasket, then tighten down all screws firmly in a crosswise pattern..
- Reassemble all other parts in the reverse sequence.

14.4.1 Inlet Needle

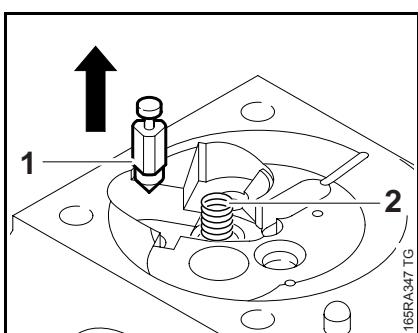


- Remove the metering diaphragm, **14.4**
- Take out the screw (arrow).

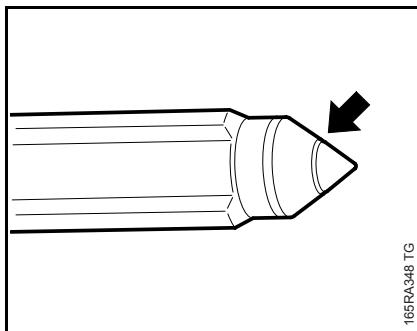


- Pull the inlet control lever (1) with spindle (2) out of the inlet needle's groove.

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



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

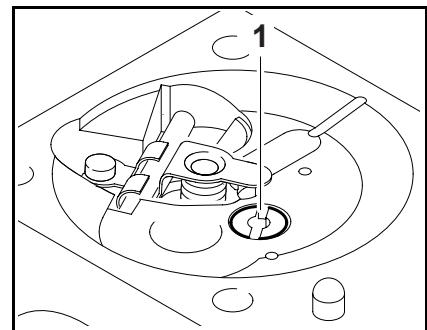


- If there is an annular indentation (arrow) on the sealing cone of the inlet needle, fit a new inlet needle.

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 inlet control lever moves freely.
- Install the metering diaphragm, **14.4**

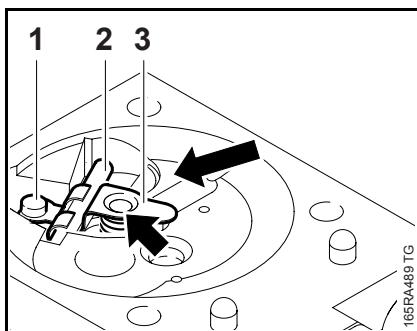
14.4.2 Fixed Jet



- Remove the metering diaphragm, **14.4**
- Unscrew the fixed jet (1) with a suitable screwdriver.

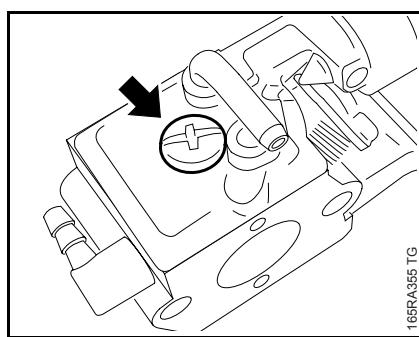
Take care not to damage the fixed jet (1).

- Check the fixed jet (1) and replace if necessary
- Reassemble in the reverse sequence.

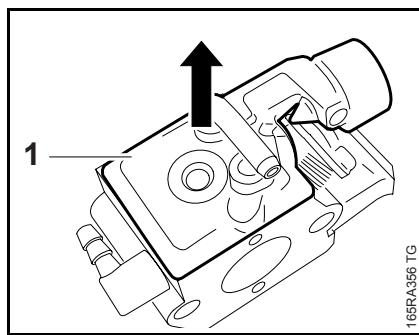


- Position the inlet control lever (3) with spindle (2) on the spring's seat (arrow) first, then slide the inlet control lever's clevis into the groove in the inlet needle (1).

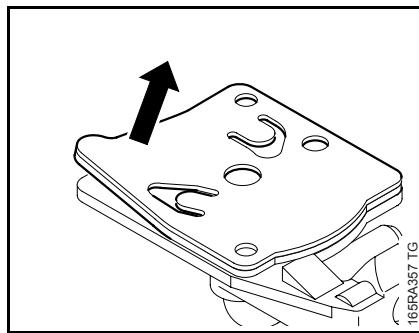
14.4.3 Pump Diaphragm



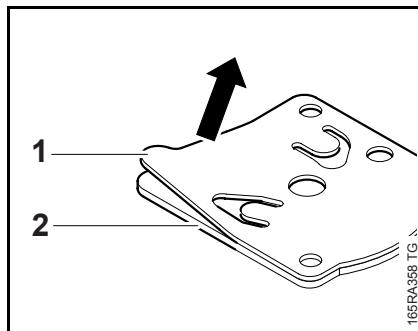
- Remove the carburetor, 14.2
- Take out the screw (arrow).



- Carefully remove the end cover (1).



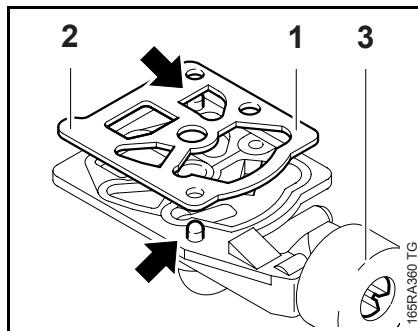
- Carefully remove the gasket with pump diaphragm from the end cover.



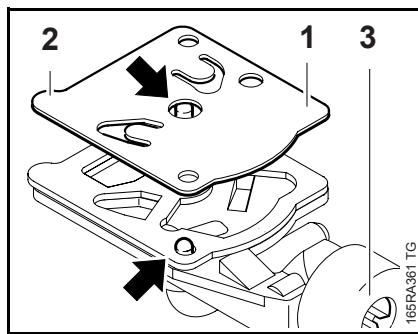
- Carefully separate the pump diaphragm (1) and gasket (2).

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.

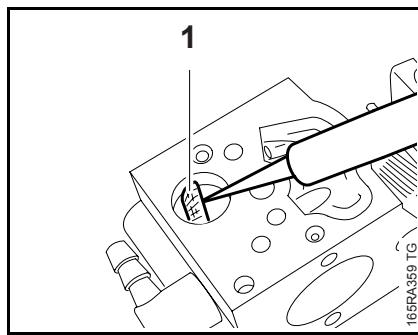
- Check the pump diaphragm for signs of damage and wear. Install a new gasket.
- Check fuel strainer for contamination and damage. Clean or replace if necessary.



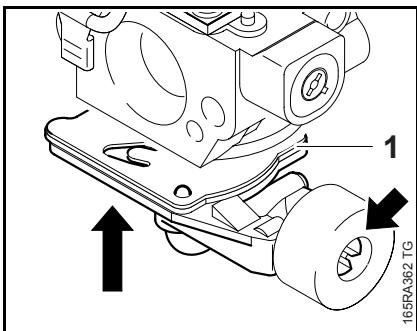
- Fit the gasket (1) so that the tab (2) is opposite the idle speed screw (3) and is held in position by the pegs (arrows).



- Fit the diaphragm (1) on the gasket so that the tab (2) is opposite the idle speed screw (3) and is held in position by the pegs (arrows).



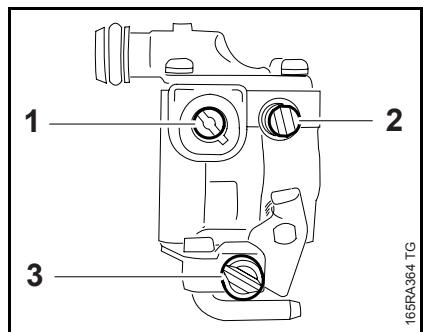
- Use a needle to remove the fuel strainer (1) from the carburetor body.
- Reassemble in the reverse sequence.



14.4.4 Choke Shaft / Choke Shutter

The choke shutter is in the air filter – see chapter on 'Air Filter' and instruction manual.

14.4.5 Adjusting Screws



Grommets have been removed for the sake of clarity.

There are three adjusting screws on the carburetor:

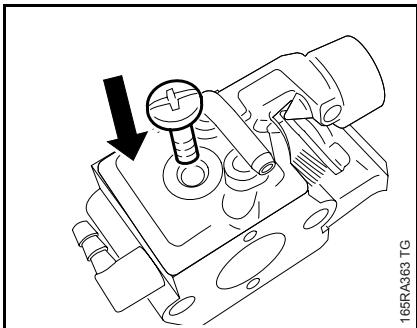
H = high speed screw (1)
L = low speed screw (2)
LA = idle speed screw (3)

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

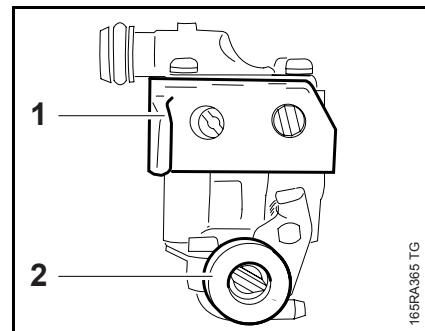
The high speed screw **H** has a limiter cap, which has to be removed before the screw is removed.

Always install a new limiter cap.

- Remove the carburetor, **14.2**
- See also carburetor troubleshooting, **4.6**

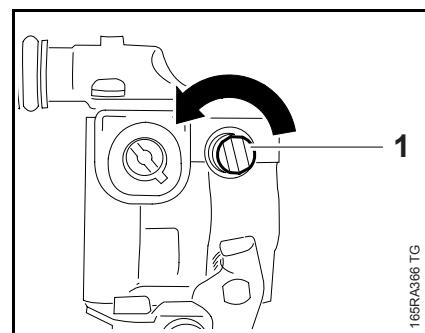


- Check that diaphragm and gasket are properly seated.
- Insert screw and tighten it down firmly.
- Reassemble all other parts in the reverse sequence.

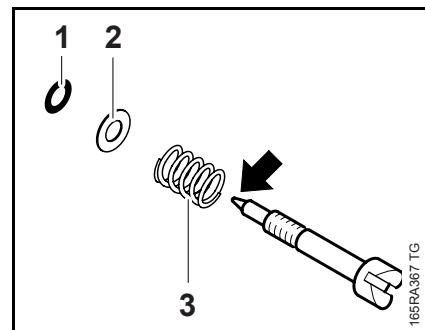


- Pull off the grommets (1 and 2).

Low speed screw

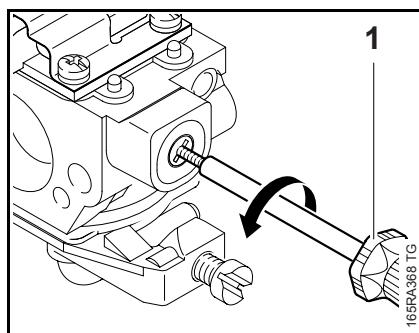


- Take out the low speed screw (1).

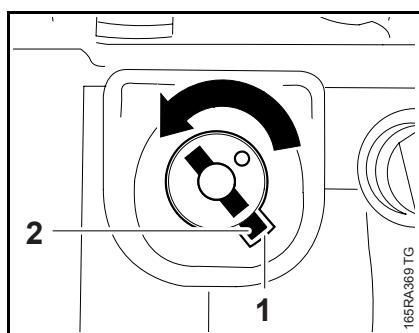


- Inspect the sealing ring (1), washer (2) and spring and replace if necessary.
- Inspect the tip (arrow) for damage or wear and replace the screw (**L**) if necessary.
- Screw down the low speed screw (**L**) as far as stop.
- Continue with high speed screw.

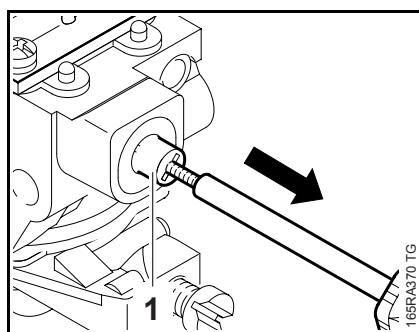
High speed screw



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

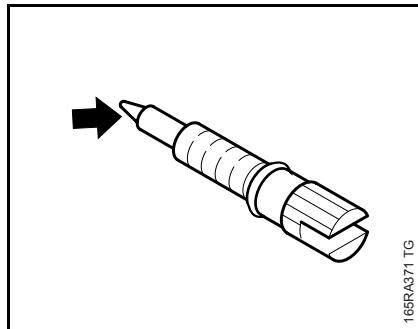


- Rotate the limiter cap until the lug (2) is in line with the slot (1).



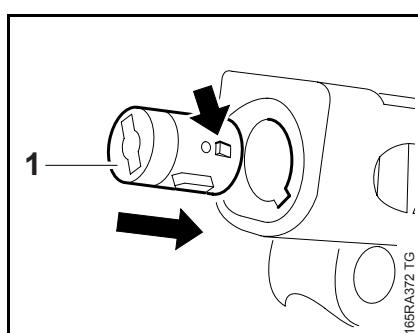
- Pull out the limiter cap (1).
- Take out the high speed screw (H).

Always install a new limiter cap.



- Inspect the tip (arrow) for damage or wear and replace the screw (H) if necessary.
- Screw down the high speed screw (H) as far as stop.
- Continue with installing limiter cap.

Pre-installing limiter cap



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

The basic setting with the pre-installed limiter cap is carried out with screwdriver 5910 890 2304.

- Reassemble in the reverse sequence.
- Carry out basic setting, [14.5.1](#)

14.5 Adjusting the Carburetor

14.5.1 Basic Setting

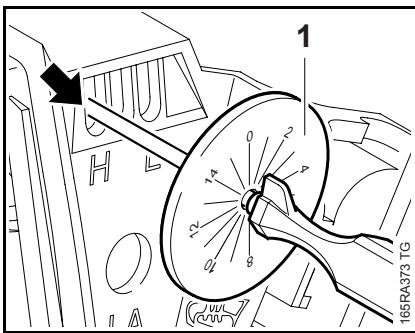
The basic setting is necessary only if the high speed screw (H) or low speed screw (L) has to be replaced or after cleaning and adjusting the carburetor from scratch.

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

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

- Check chain tension and adjust if necessary.
- Inspect the spark arresting screen (if fitted) and clean or replace if necessary. [8.1](#)
- Check the air filter and clean or replace if necessary. [14.1](#)
- Starting with the low speed and high speed screws against their seats, turn them 1 full turn counterclockwise.
- Allow engine to warm up.

Setting disk 5910 893 6600 may be fitted on the screwdriver 5910 890 2305 to simplify adjustments.



- Push the screwdriver (1) 5910 890 2304 through the opening (arrow) and the pre-installed limiter cap and into the high speed screw
– the low speed screw does not have a limiter cap and can be adjusted with screwdriver 5910 890 2305.

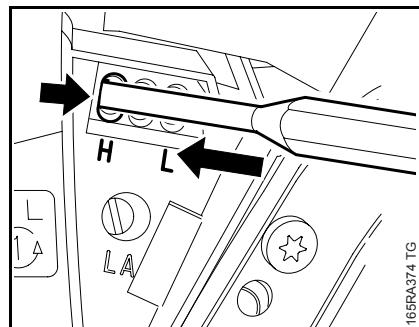
Adjust idle speed with a tachometer.
Adjust specified engine speeds within tolerance of ± 200 rpm.

1. Adjust engine speed with idle speed screw (LA) to 3,600 rpm.
2. Turn the low speed screw (L) clockwise or counterclockwise to obtain the maximum engine speed.

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

3. Use the idle speed screw (LA) to set engine speed again to 3,300 rpm.
4. Set the engine speed to 2,800 rpm with the low speed screw (L)
- .
5. Set maximum engine speed with the high speed screw (H) (see Specifications), **3**

On machines with a catalytic converter, make sure the engine speeds do not drop below the minimums specified, **3.1**.

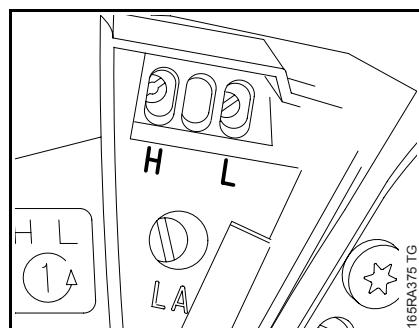


- Push a suitable drift through the opening (arrow) and push home the limiter cap until it is flush with the carburetor body.

The basic setting of the high speed screw (H) is now fixed.

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

14.5.2 Standard Setting



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

Always perform the following steps before carrying out any adjustments:

- Troubleshooting, **4.6**
- Check chain tension and readjust if necessary (see MS 240, 260 instruction manual).
- Inspect the spark arresting screen (if fitted) and clean or replace if necessary, **8.1**
- Check the air filter and clean or replace if necessary, **14.1**

Standard Setting

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

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

Adjusting engine idle speed

- Carry out standard setting.
- Allow engine to warm up.

Engine stalls at idle speed

- Turn the idle speed screw (LA) clockwise as far as stop or until the saw chain begins to move. Then turn it back one quarter turn.

Saw chain rotates at idle speed

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

Erratic idling behavior, poor acceleration

(although standard setting is correct)

Idle setting too lean.

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

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

Adjustment for operation at high altitude

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

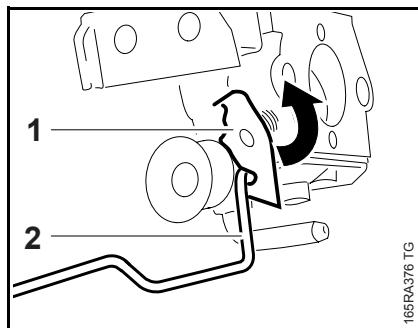
- Check standard setting.
- Allow engine to warm up.
- Turn the high speed screw (**H**) clockwise (leaner) – no further than stop.

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

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

If the adjustments produce no improvement, see the troubleshooting charts for the ignition system, carburetor and engine, **4.5**, **4.6** and **4.7**.

14.6 Throttle Rod

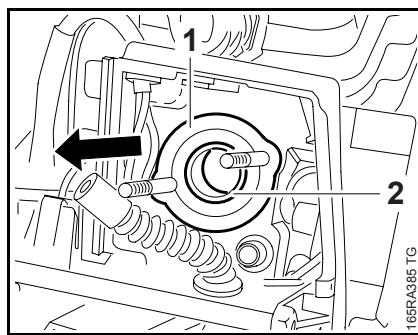


- Remove the carburetor, **14.2**
- Turn the throttle trigger (1) slightly and disconnect the throttle rod (2).
- Check the throttle rod and replace if necessary
- Reassemble in the reverse sequence.
- Turn the throttle trigger (1) slightly and attach the throttle rod (2).
- Install the carburetor, **14.2**
- Reassemble all other parts in the reverse sequence.

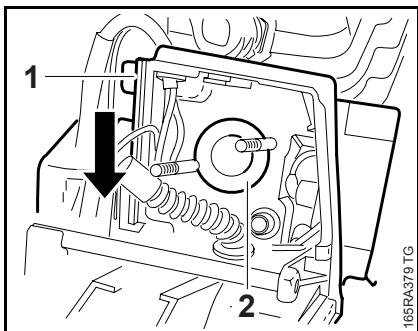
14.6.1 Removing and Installing the Intake Manifold

A damaged intake manifold can result in engine running problems.

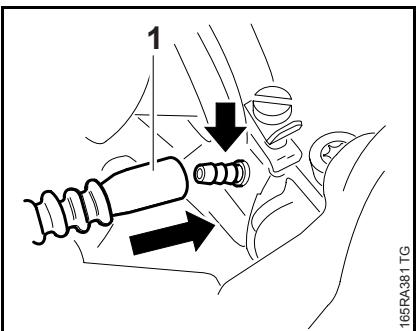
- Troubleshooting, **4.6** or **4.7**
- Remove the shroud, **8.4**
- Remove the carburetor, **14.2**
- Take out the annular buffer/tank housing mounting screws.
Annular buffer at ignition side, **11.3**.
Annular buffer at clutch side, **11.2**



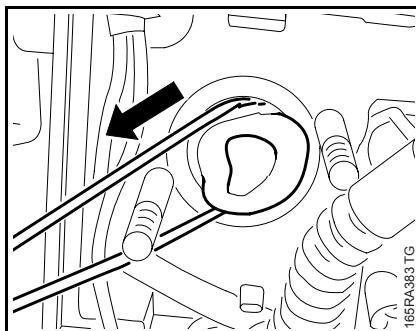
- Remove the washer (1) and ring (2).



- Press the tank housing (1) down slightly and push the manifold flange (2) out of the tank housing in the direction of the cylinder.
- Pull the impulse hose off the connector.

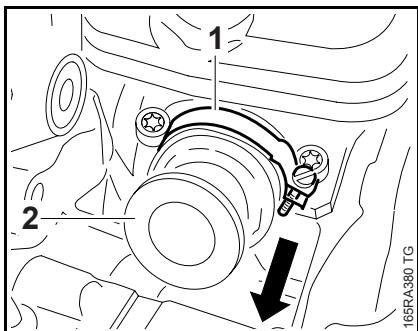


- Push the impulse hose (1) on to the connector (arrow).

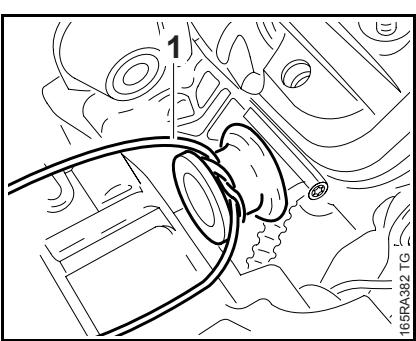


- Pull the ends of the string with the manifold flange through the opening.

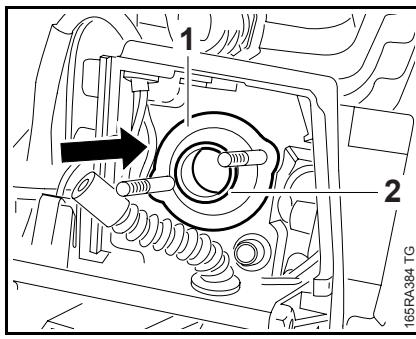
This method ensures that the manifold flange is pulled into place without any damage.



- Loosen and remove the hose clamp (1).
- Pull off the intake manifold (2).
- Inspect the intake manifold (2) and replace it if necessary – even very minor damage can result in engine running problems, **4.7**
- Coat the manifold flange (2) with STIHL press fluid, **17**
- Push on the intake manifold (2) position, line it up and secure it in position, **8.6**

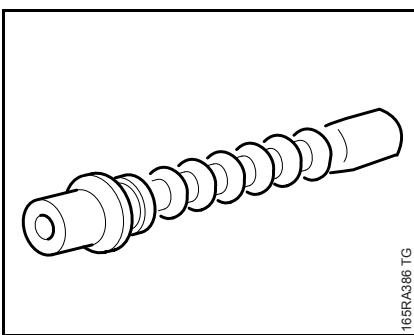


- To pull the manifold flange through the intake opening in the tank housing, wind a piece of string (1) (about 15 cm long) around the back of the flange and pass the ends of the string through the opening.
- Position the manifold flange against the tank housing.



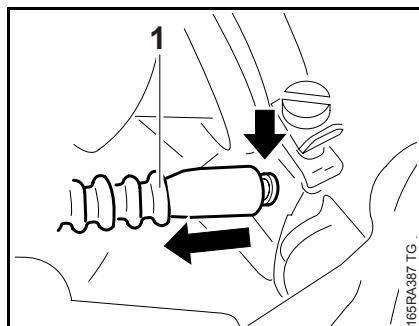
- Remove the string.
 - Fit the washer (1) and ring (2).
- When reassembling, check that all wires are properly seated in their guides.
- Reassemble all other parts in the reverse sequence.
 - Tightening torques, **3.5**

14.6.2 Impulse Hose

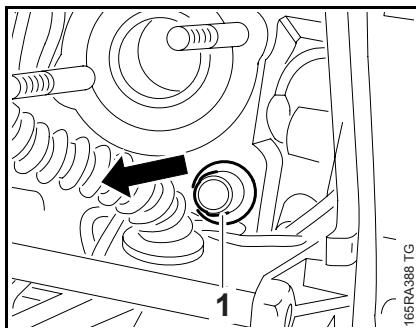


A damaged impulse hose can result in engine running problems.

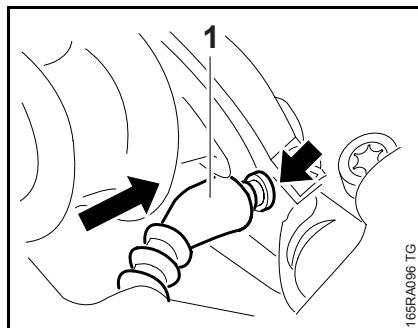
- Remove the carburetor, **14.2**
- Take out the annular buffer/tank housing mounting screws.
Annular buffer at ignition side, **11.3**.
Annular buffer at clutch side, **11.2**
- Push the manifold flange out of the tank housing, and lower the tank housing slightly, **14.6.1**



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



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

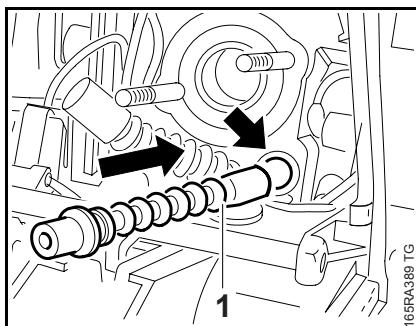


- Push the impulse hose (1) on to the connector (arrow).
- Reassemble all other parts in the reverse sequence.

14.7 Tank Vent

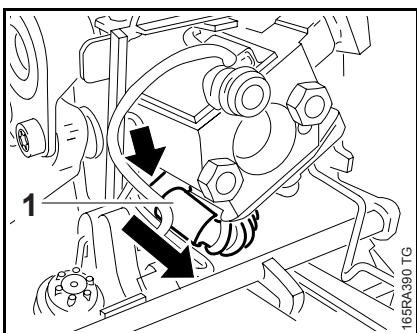
14.7.1 Testing

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

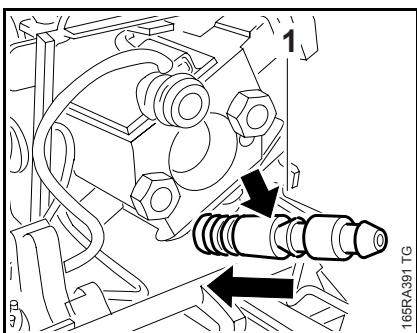


- Push the impulse hose (1) through the opening (arrow) and pull it in until its rubber lip is properly seated.
- Coat with STIHL press fluid, **17**

- Open the fuel tank cap and drain the fuel tank.
- Collect the fuel in a clean container, **1**
- Close the tank cap.

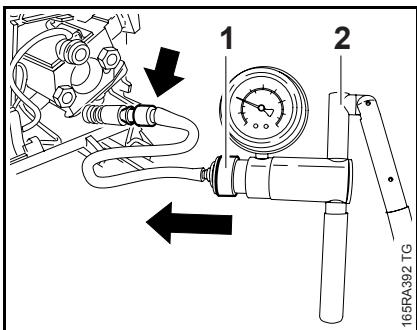


- Pull the fuel hose (1) off the stub (arrow).



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

Vacuum test

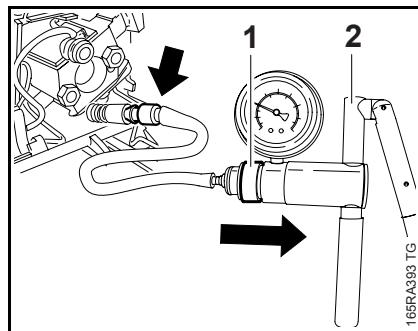


- Push the ring (1) to the left and connect the pump (2) 0000 850 1300 to the nipple (arrow) – subject the fuel tank to a vacuum.

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

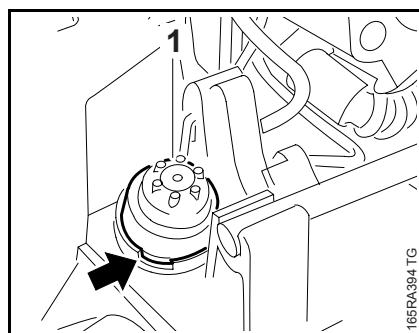
- Clean the area around the tank vent.
- If necessary, install a new tank vent or tank, **14.7** or **14.8.3**

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 (2) 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.

14.7.2 Removing and Installing



- Remove the carburetor box cover, **9.2.1**
- Pry out the tank vent (1) at the recess (arrow).

Always install a new tank vent.

- Coat sealing ring of new tank vent (1) with STIHL press fluid, **17**
- Press the new tank vent (1) into the bore as far as stop.
- Reassemble all other parts in the reverse sequence.

14.8 Fuel Intake

14.8.1 Pickup Body

Any impurities mixed with the fuel are retained by the pickup body (filter). The fine pores of the filter eventually become clogged with minute particles of dirt. This restricts the passage of fuel and results in fuel starvation.

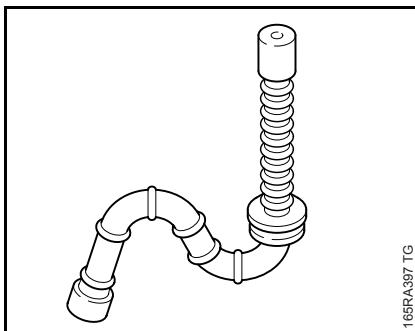
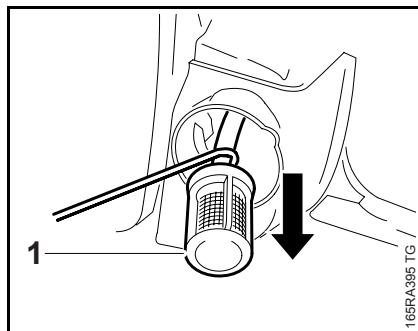
In the event of problems with the fuel supply system, always check the fuel tank and the pickup body first.

- Troubleshooting, **4.6** or **4.7**

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**

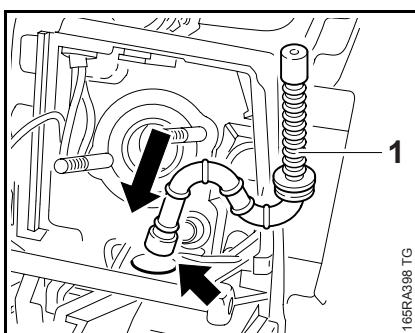
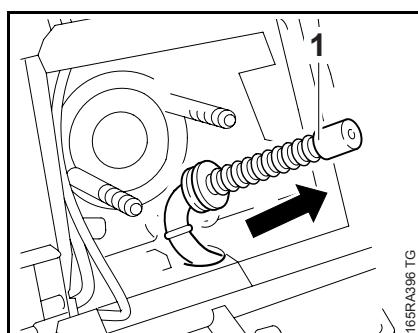
Use only unleaded fuel in machines with a catalytic converter.



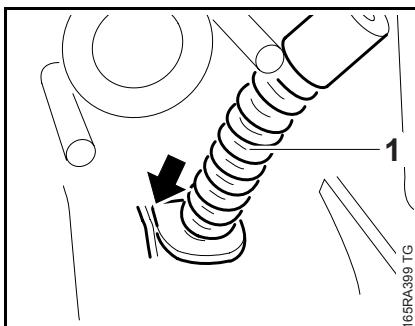
- Open the tank cap.
- Use hook 5910 893 8800 to remove the pickup body (1) from the fuel tank.

Do not overstretch the fuel hose.

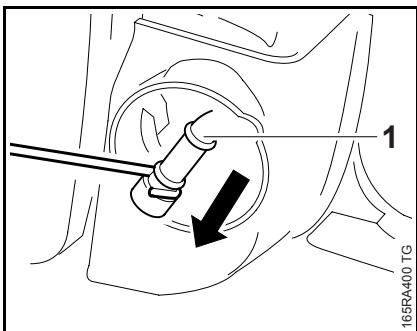
14.8.2 Fuel Suction Hose



- Remove the carburetor, **14.2**
- Remove the pickup body, **14.8.1**
- Pull the fuel suction hose (1) out of the fuel tank.



- Line up the fuel hose (1) and push it into the housing bore – the flange must butt against the rib (arrow).
- Coat with STIHL press fluid, **17**



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

Do not overstretch the fuel hose.

- Fit the pickup body, **14.8.1**
- Close the tank cap.

14.8.3 Removing and Installing the Tank Housing

If a mounting thread for plastic tapping screws is damaged, the tank housing can be repaired by fitting a thread insert.

- Drain the fuel tank, **1**
- Remove the handlebar, **11.5** or **11.6**
- Remove the carburetor, **14.2**

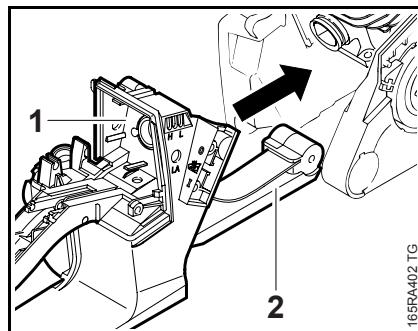
Use only unleaded fuel in machines with a catalytic converter.

- Take out the annular buffer/tank housing mounting screws.
Annular buffer at ignition side, **11.3**.
Annular buffer at clutch side, **11.2**.
Annular buffer/chain catcher, **11.1**.

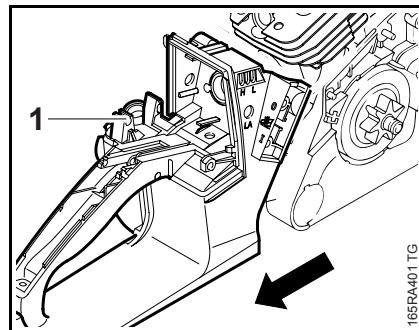
- Push the manifold flange out of the tank housing and pull the impulse hose off the connector, **14.6.2**
- Remove the control levers, **12**
- Remove the short circuit wire, **9.6.2**

Versions with handle heating

- Remove the wiring harness, **15.8**
- Remove the handle heating system, **15.3**



- Fit the front end (2) of the tank housing (1) between the two halves of the crankcase and line it up with annular buffer bores.
- Insert the annular buffer/chain catcher mounting screw.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**



- Pull out the tank housing (1).
- Inspect the tank housing and replace if necessary

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

15.1 Carburetor Heating

Current is supplied via wires to the heating element which is installed between the air filter and carburetor.

The heating element is controlled by the thermostat on 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.

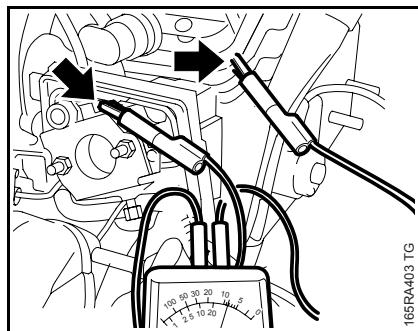
Idling problems with a hot engine are also an indication of a fault in the heating element or thermostatic switch.

15.1.1 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, **15.2**
- Remove the air filter, **14.1**
- Set the ohmmeter to measuring range "Ω".



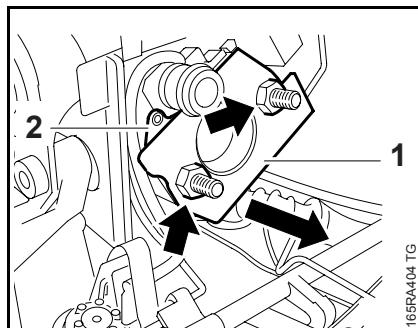
165RA403 TG

- Clip one of the two test leads to the carburetor body and the other to a cylinder fin (ground).
- If the system is in good condition the ohmmeter will indicate a value of about 8 Ω in measuring range "Ω".

To ensure good electrical contact, press the heating plate and the heating element against the carburetor during the measurement.

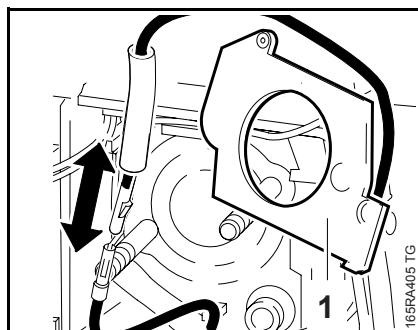
If the reading obtained is outside this tolerance, test each component separately.

15.1.2 Testing the Heating Element



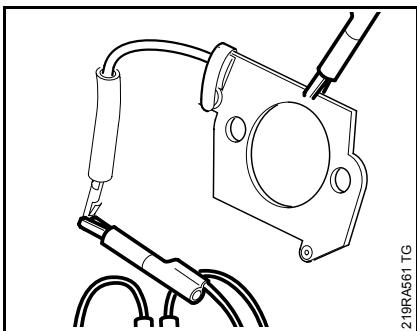
165RA404 TG

- Remove the air filter, **14.1**
- Unscrew the nuts (arrows).
- Remove the heating plate (1) and heating element (2).
- Remove the carburetor, **14.2**



165RA405 TG

- Push back the insulating tube in the direction of the heating element and separate the pin and socket connector.
- Remove the heating element (1).

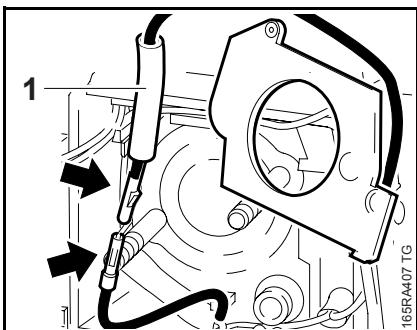


219RA681 TG

- Clip one test lead to the heating element and the other to the terminal pin.

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

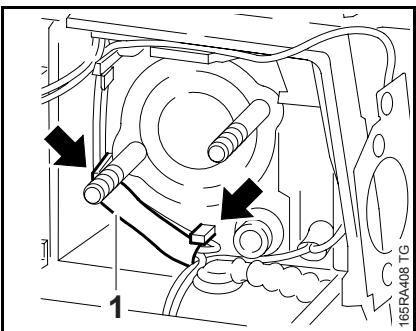
- Check operation, **15.2**



165RA407 TG

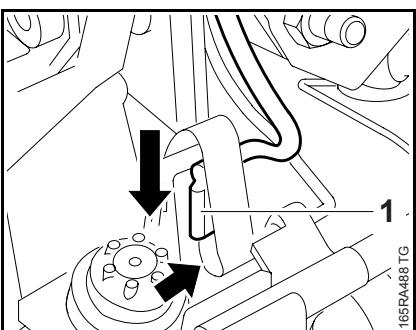
- Push the pin and socket (arrow) together until they lock.
- Push the insulating tube (1) over the connectors.

To reduce the risk of a short circuit, make sure the insulating tube completely covers the connectors.



165RA408 TG

- Push the pin and socket connectors (1) into the guides (arrows).



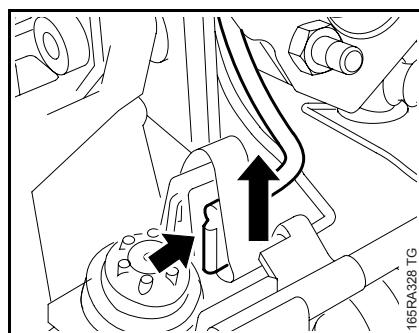
165RA488 TG

- Position heating element wire in the guides (arrows).

- Install the carburetor, **14.2**

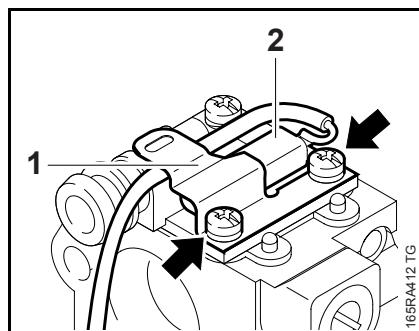
The wire must not touch the lever on the throttle shaft.

15.1.3 Thermostatic Switch



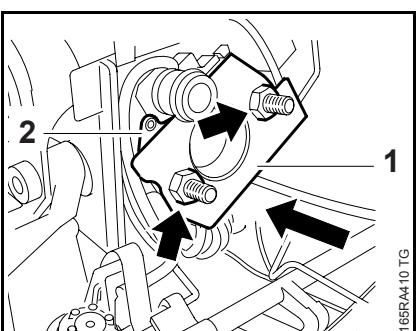
165RA328 TG

- Remove connector (arrow) from the contact spring.
- Remove the carburetor, **14.2**



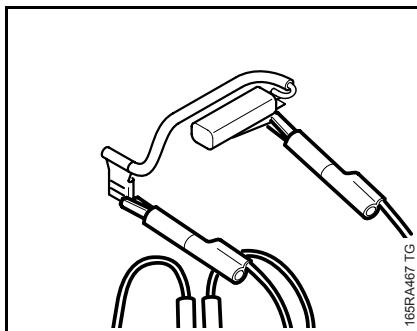
165RA412 TG

- Take out the screws (arrows).
- Remove the retainer (1) and thermostatic switch (2).



165RA4410 TG

- Fit the heating element (1) and heating plate (2).
- Fit the nuts (arrows) and tighten them down firmly.

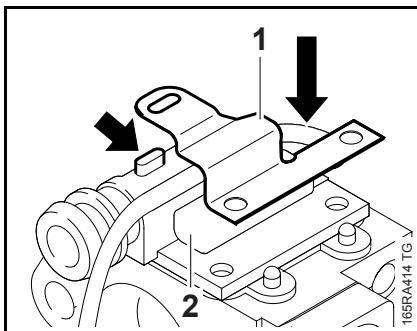


Testing the thermostatic switch

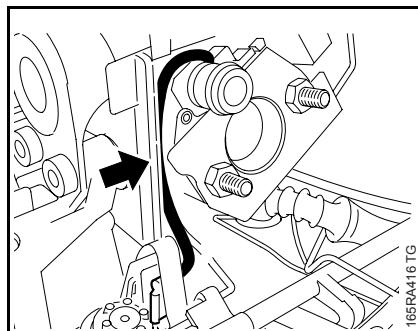
The thermostatic switch may open or close within the tolerance range between +13°C and +6°C, i.e. the switch must open at + 6°C and close at 13°C at the latest in each case.

- Clip one test lead to the contact spring and the other to the flag terminal.

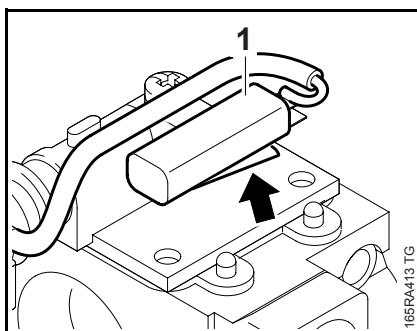
Check operation, **15.2**



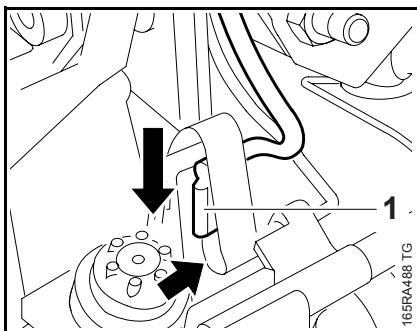
- Position the retainer (1) so that its tab engages the lug (arrow).
- Insert the screws.
- Line up the thermostatic switch (2) so that it is flush with the retainer.
- Tighten down the screws firmly.



- Position the wire in the guide (arrow) between the tank housing and carburetor.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**
- Check operation.

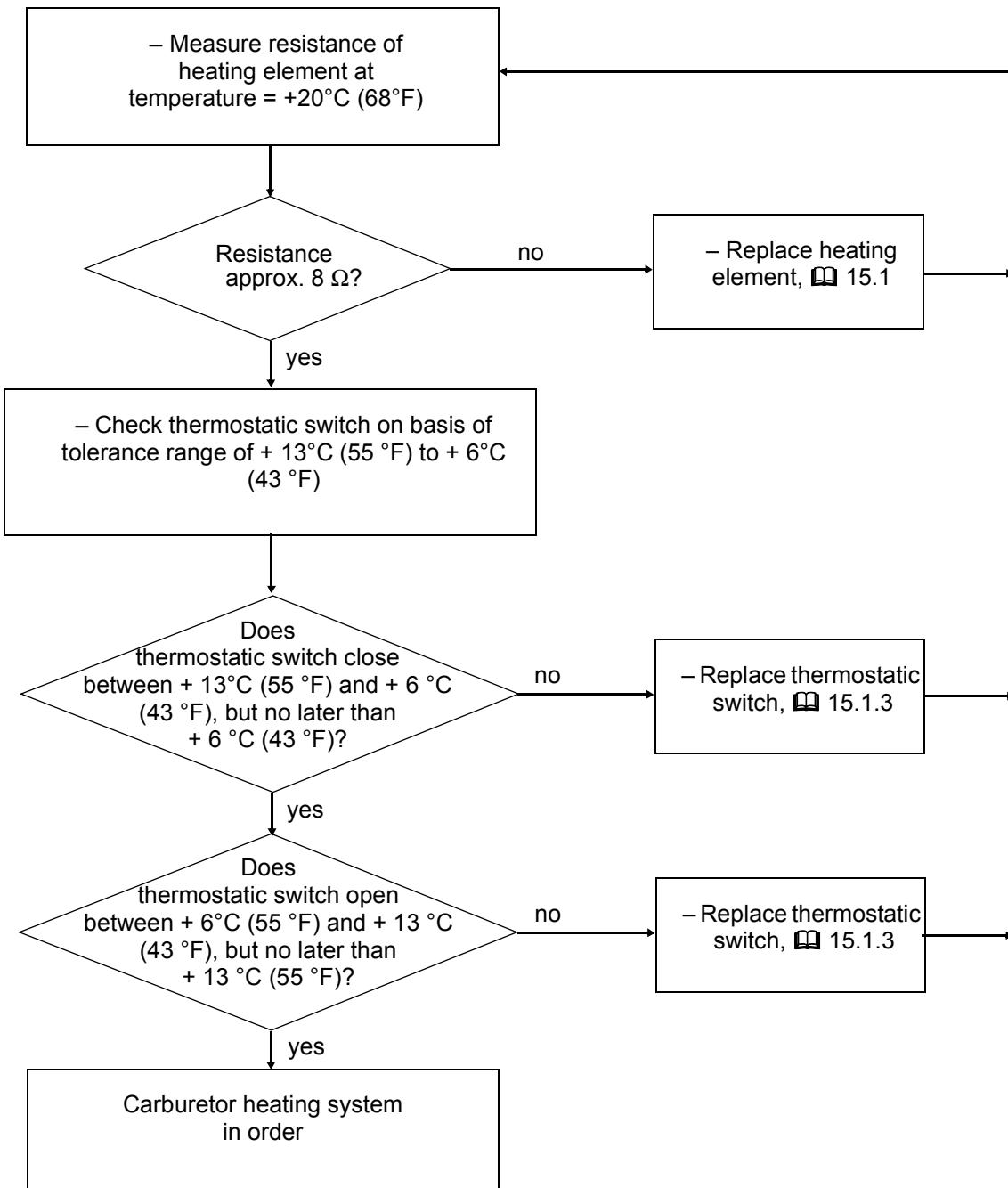


- Fit the new thermostatic switch (1) so that the ring (arrow) faces the carburetor.

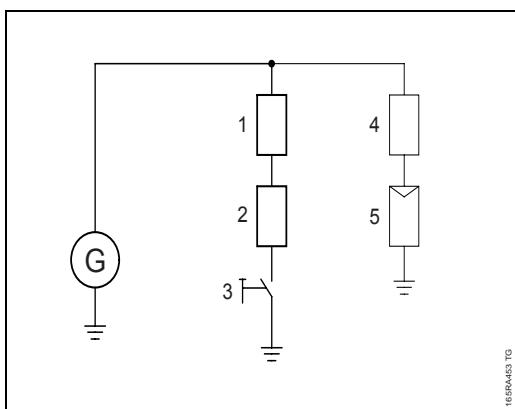


- Install the carburetor, **14.2**
- Push the connector (1) on to the contact spring (arrow) as far as stop.

15.2 Carburetor Heating System Troubleshooting Chart



Circuit diagram



- G Generator
- 1 Handlebar
- 2 Rear handle
- 3 Heater switch
- 4 Heating element (carburetor)
- 5 Thermostatic switch

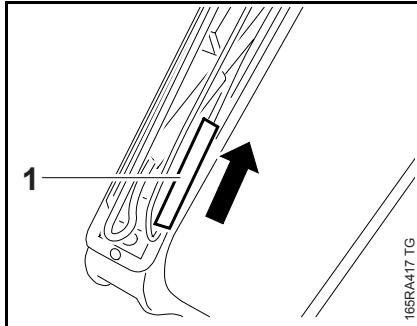
15.3 Handle Heating System

15.3.1 Troubleshooting

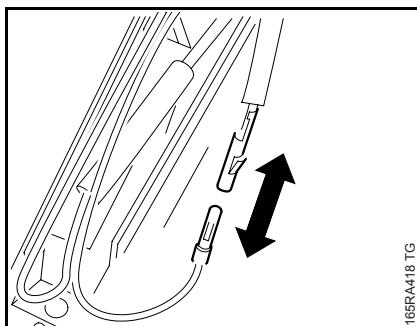
The entire handle heating system is maintenance-free and subject to practically no wear. Faults in the generator, heating elements and wiring are generally caused by mechanical damage.

There are two reasons for failures in the heating system:

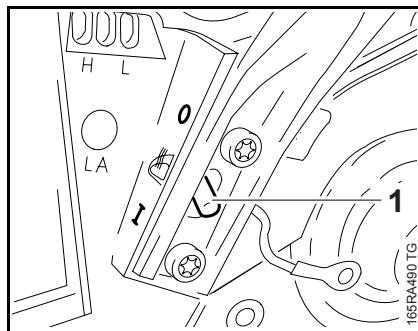
1. A break in the circuit due to a faulty wire or component.
2. A short circuit resulting from damage to the insulation.



- Remove the handle molding, **12.2**
- Push back the insulating tube (1) of the thin wire in the direction of the wiring harness.

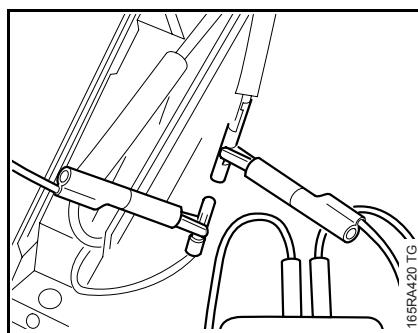


- Separate the pin and socket connector.



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

- Set the ohmmeter to " Ω ".



- Set the switch shaft to "0".

- Clip test leads to the wire from the wiring harness and the rear handle heating element wire.

Versions with carburetor heating

- Separate the pin and socket connector to the heating element, **15.1**

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 ".

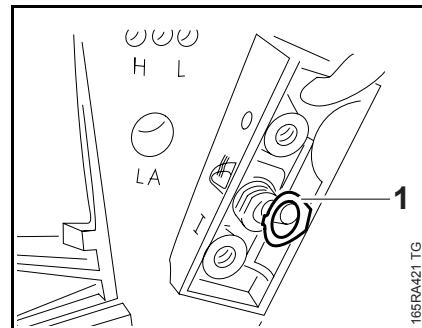
If no reading is obtained, there is a break in the circuit.

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

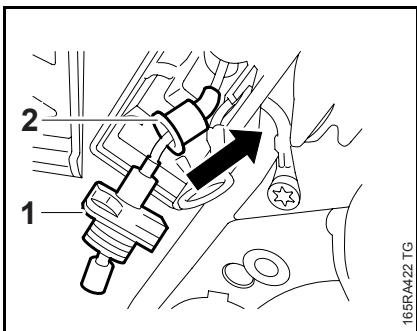
In either case it is necessary to check each component separately. The generator wire remains disconnected from the heating element during this check.

- Use handle heating and generator troubleshooting chart to check the system, **15.7.1**
- Check resistance on handlebar, **15.6**
- Check resistance on rear handle, **15.5**
- After completing the test, reconnect the wires and push the insulating tube over the pin and socket connector.
- Reassemble in the reverse sequence.

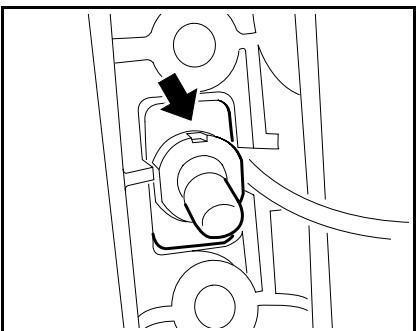
15.4 Removing and Installing the Heater Switch



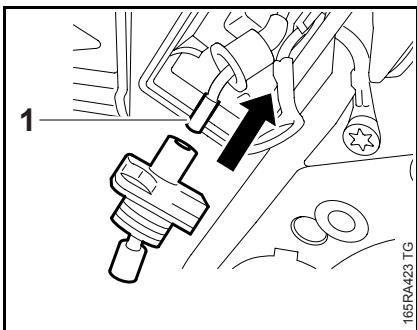
- Remove the carburetor, **14.2**
- Unscrew the handlebar and turn it to one side, **11.5**
- Remove the ground wire (1).



- Pull the heater switch (1) out a little.
- Pull the grommet (2) off the heater switch (1).

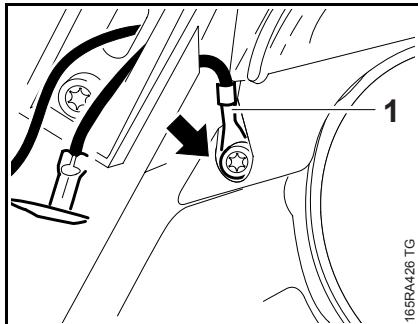


- Position the heater switch with the groove (arrow) facing up.
- Push the heater switch into the tank housing recess.
- Fit the ground wire on the heater switch, **15.4.1**
- Secure the handlebar, **11.5**
- Install the carburetor and, on versions with carburetor heating, connect up the thermostatic switch, **14.2**, **15.1**
- Check operation.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

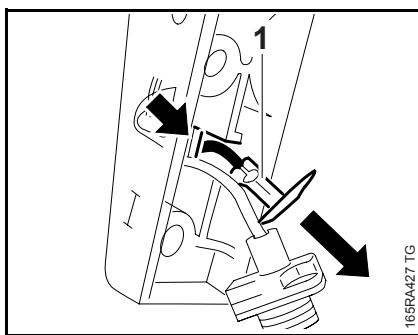


- Pull the connector sleeve (1) out of the heater switch.
- Check the heater switch and replace it if necessary.

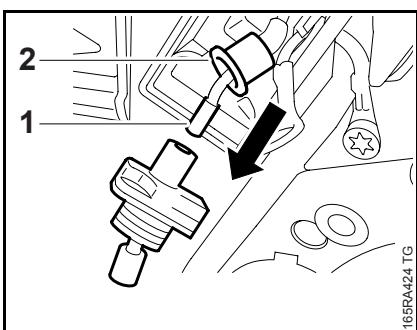
- Remove the sprocket cover and cutting attachment, **5**



- Take out the screw (arrow).
- Remove the ground wire (1).
- Unscrew the handlebar and turn it to one side, **11.5**



- Pull the ground wire (1) out of the opening (arrow) in the tank housing.

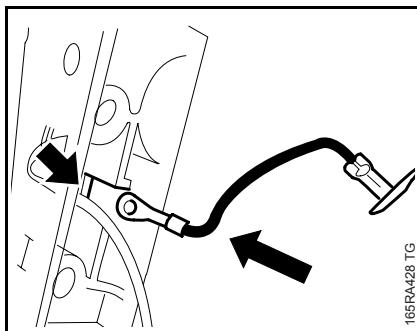


- Push the connector sleeve (1) into the switch.
- Push the grommet (2) over the switch.

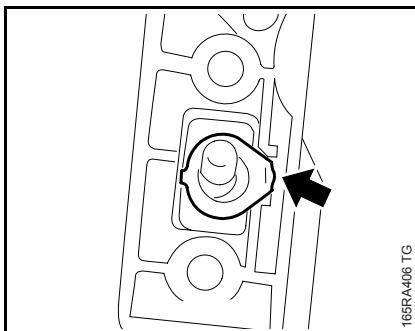
15.4.1 Heater Switch Ground Wire

A faulty ground wire may impair or prevent operation of the heating system.

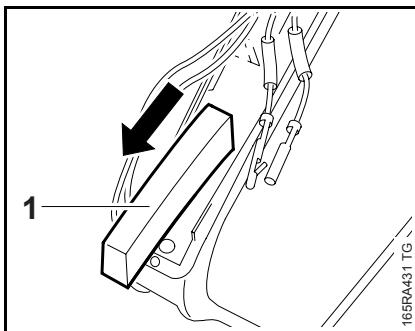
- Check for contact and continuity and replace ground wire if necessary,



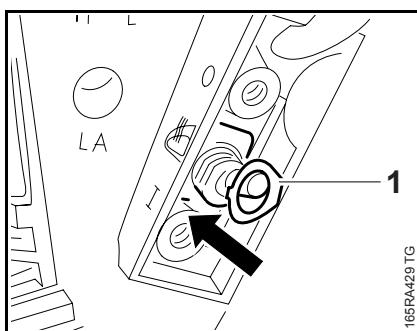
- Push the small ring terminal of the new ground wire through the opening (arrow).
- Fit the ground wire on the crankcase.
- Insert screw and tighten it down firmly.



- Push the ground wire into its guide (arrow) as far as stop.
- Secure the handlebar, **11.5**
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**



- Pull out the pressure pad (1).

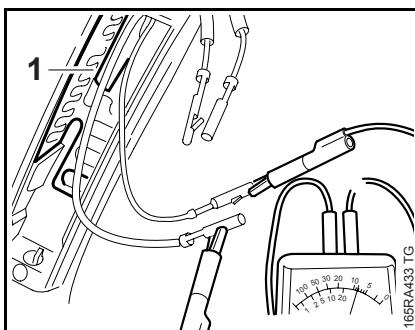


- Fit the ground wire (1) on the heater switch.

15.5 Removing and Installing Heating Element in Rear Handle

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

If a heating element is removed, it must always be replaced by a new element.



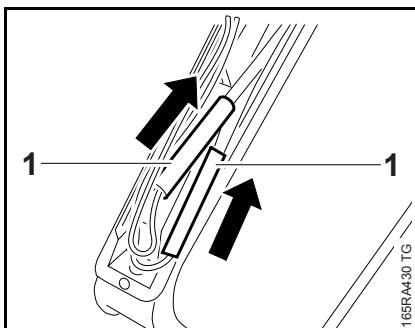
- Check the heating element (1) and replace if necessary.

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

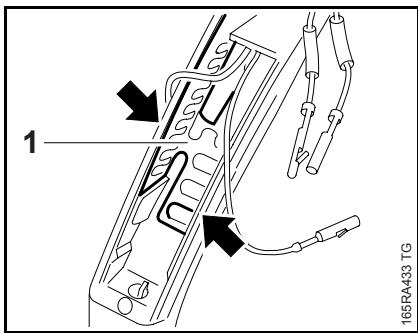
If the reading is outside this range, install a new heating element.

Heating element does not operate even though resistance measurement is in order?

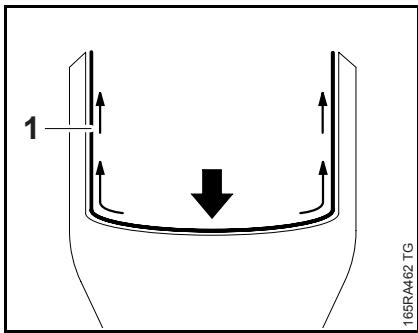
- Test the generator and heater switch, **15.3**



- Remove the handle molding, **12.2**
- Push back the insulating tubes (1) in the direction of the wiring harness and separate the pin and socket connectors.

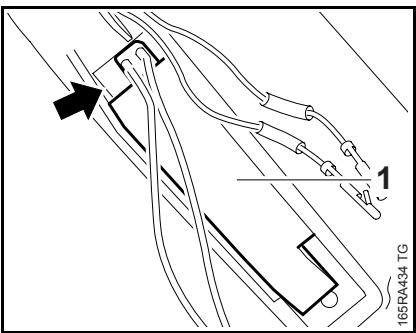


- Remove the backing from the new element.
- The new heating element (1) must be bonded in position so that its wings are in line with the edges (arrows) of the handle and it lies perfectly flat.

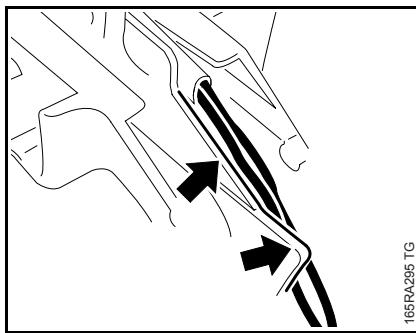


- Place the heating element (1) in the center of the handle (arrow) and press firmly and uniformly into position, from the center outwards.

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

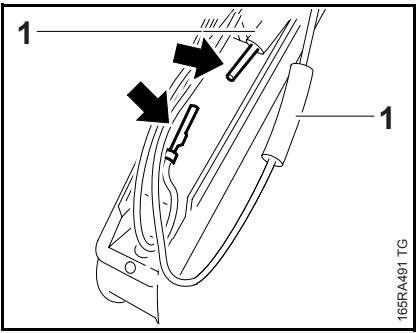


- Fit the pressure pad (1) in the handle so that the heating element is completely covered and only the tab (arrow) projects.



The wires must be in the guide (arrow).

- When fitting the handle molding, check that the wires are not pinched, 15.5
- Reassemble all other parts in the reverse sequence.

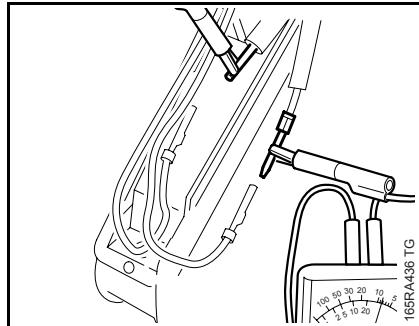


- Reconnect the pin and socket connectors (arrows).
- Push the insulating tubes (1) over the connectors.
- To reduce the risk of a short circuit, make sure the insulating tubes completely cover the connections.

15.6 Removing and Installing the Heating Element in the Handlebar

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

- Remove the handle molding, [12.2](#)
- Remove the heater switch, [15.4](#)
- Expose and separate the wires for the handlebar, [11.6](#)



- Clip the ohmmeter test leads to both pin terminals.

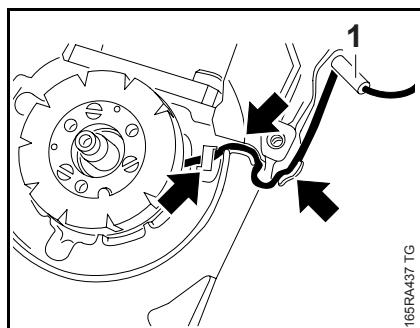
If the heating element is in good condition the ohmmeter will indicate a value of about $7\ \Omega$ in measuring range " Ω ".

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

Heating element does not operate even though resistance measurement is in order?

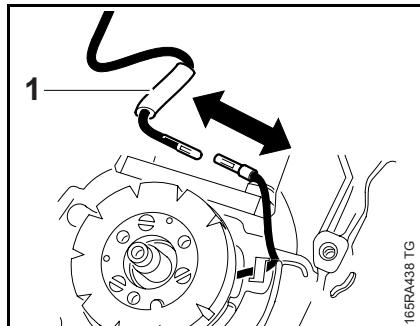
- Test the generator and heater switch, [15.3](#)
- Reassemble in the reverse sequence.

15.7 Removing and Installing the Generator

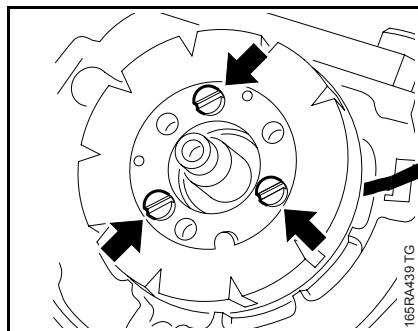


- Remove the ignition module, [9.2.1](#)
- Remove the flywheel, [9.5](#)
- Pull the connector (1) and wire out of the guides (arrows).

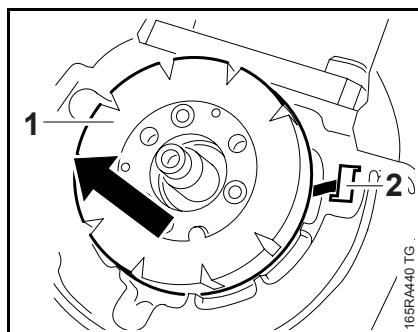
Parts of the wire are bonded in the guide.



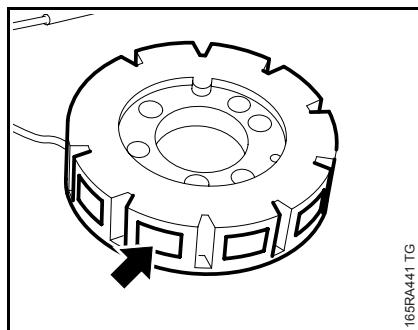
- Push back the insulating tube (1) in the direction of the wiring harness and separate the pin and socket connector.



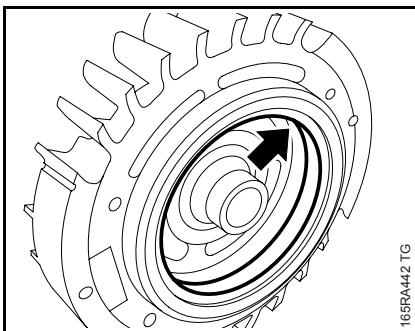
- Take out the screws (arrows).



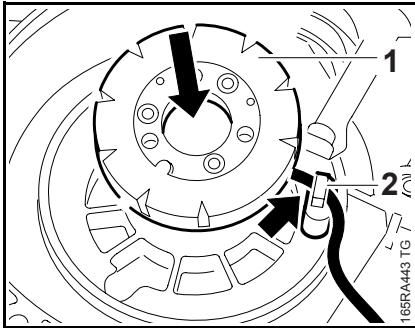
- Remove the generator (1) and pull the retainer (2) out of the housing at the same time.



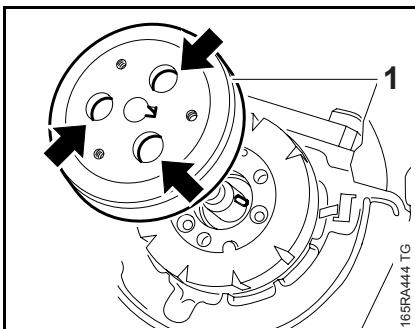
- Inspect the generator and poles (arrow) for cracks or other damage. If damage is found, replace the generator.



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

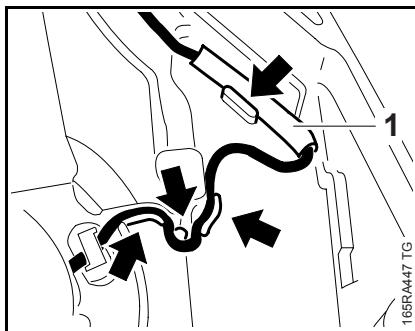


- Place the generator (1) in position with the connecting wire (arrow) facing the crankcase and push the retainer (2) into its seat at the same time.

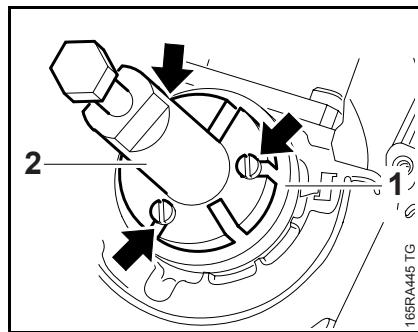


- Push the centering tool (1) 1118 893 3500 onto the crankshaft so that the slot engages the Woodruff key – the generator is now centered.

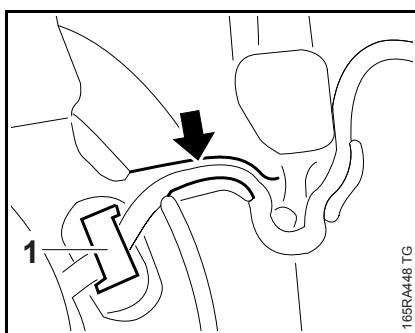
- Use threadlocking adhesive, **17**.
- Insert the screws through the holes (arrows) and tighten them down firmly.
- Tightening torques, **3.5**



- Push the generator wire and connector (1) into the guides (arrows) as far as stop.



- Remove the centering tool (1).
- If necessary, secure the puller (2) 1107 890 4500 with screws (arrows) and pull off the centering tool.

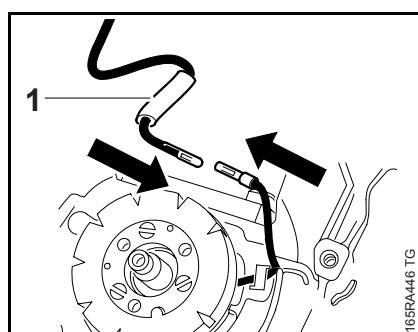


- The wire must be properly seated in the guide and must not project – bond in position if necessary (arrow).

The retainer (1) must be pushed fully home.

The flywheel must not touch the generator wire.

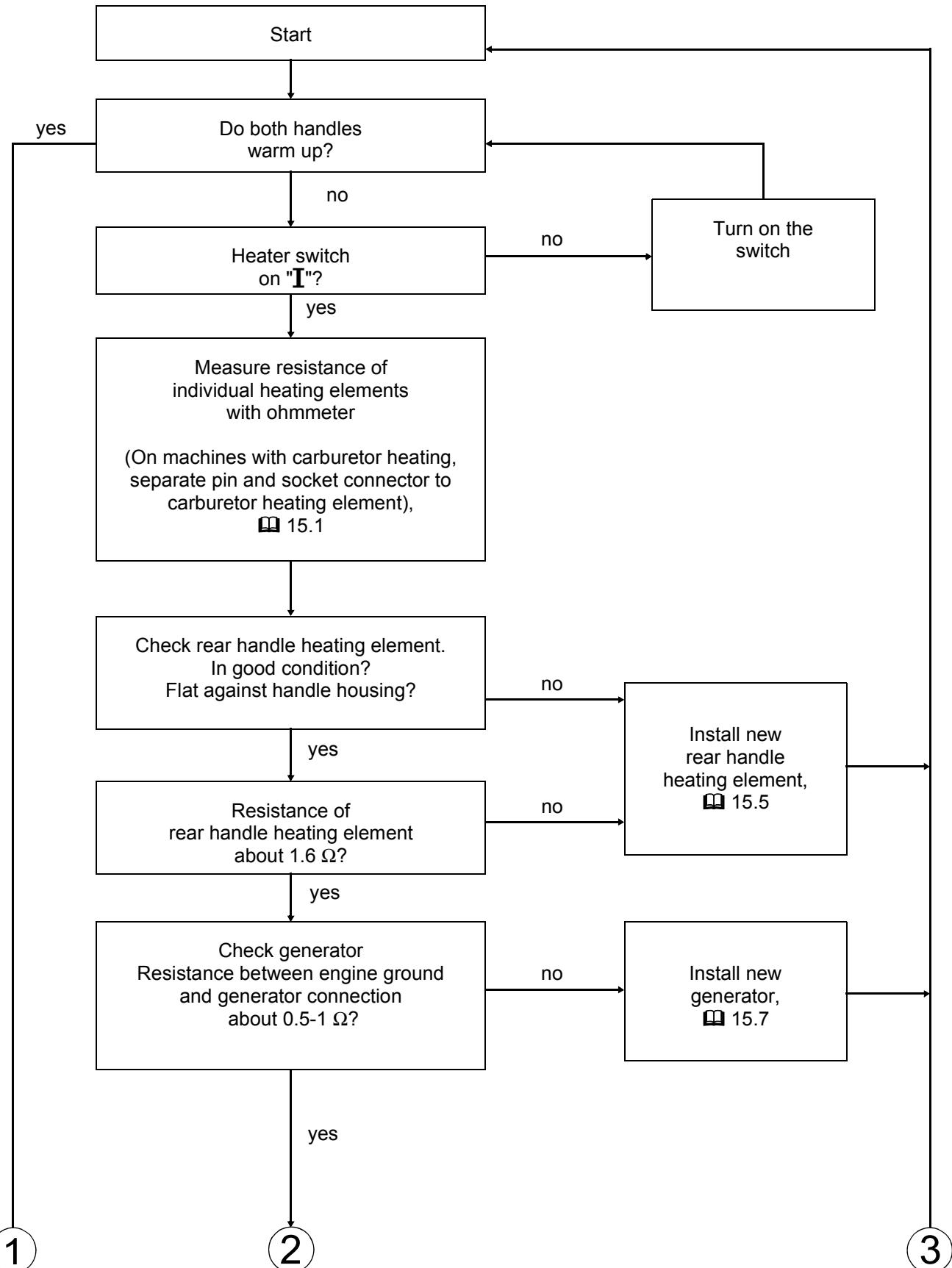
- Reassemble all other parts in the reverse sequence.

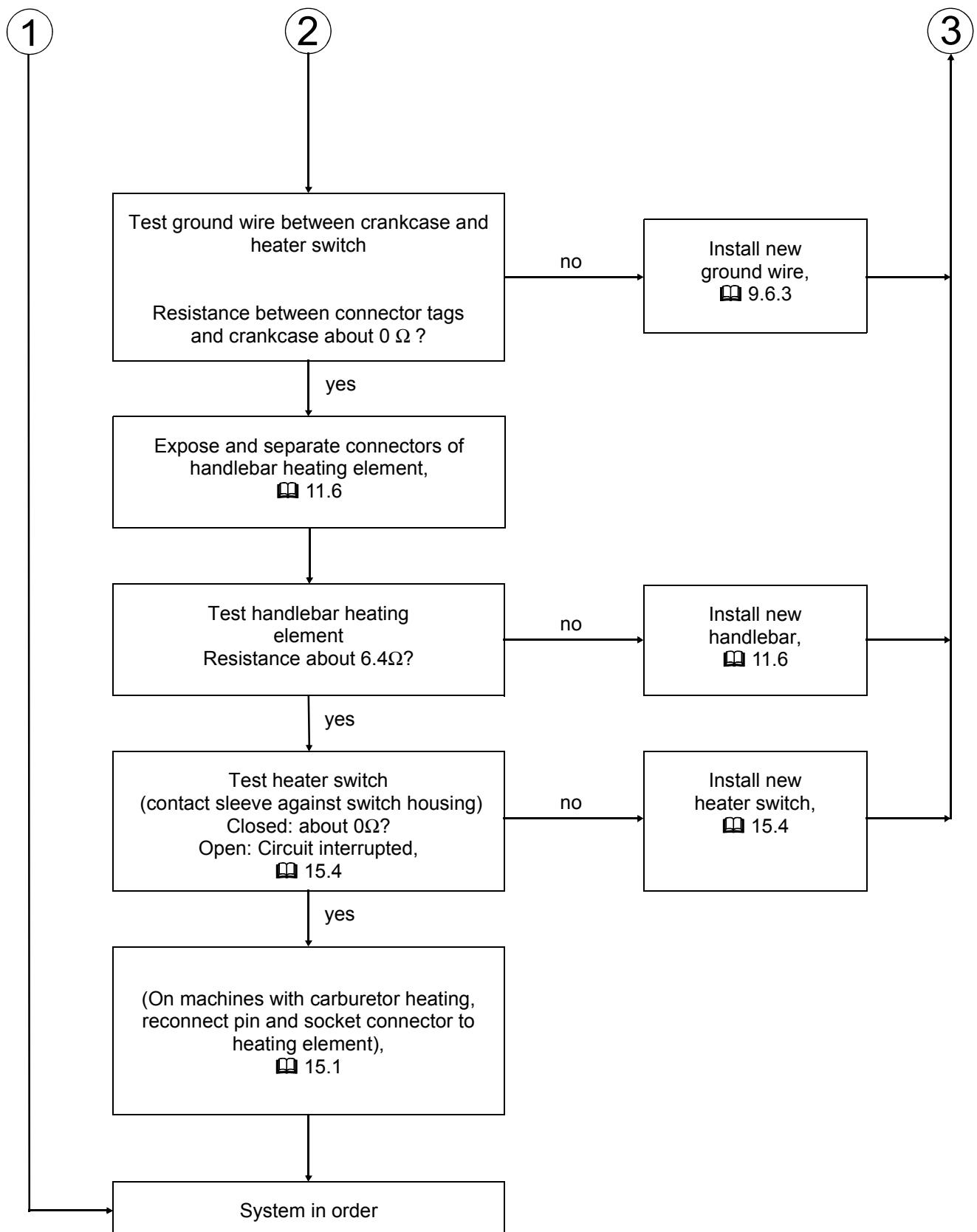


- Reconnect the pin and socket connector.
- Push the insulating tube (1) over the connector.

To reduce the risk of a short circuit, make sure the insulating tube completely covers the connector.

15.7.1 Handle Heating and Generator Troubleshooting Chart





15.7.2 Test Connections and Test Values

- The pin and socket connections of the wires in the rear handle must be disconnected to test the individual components.

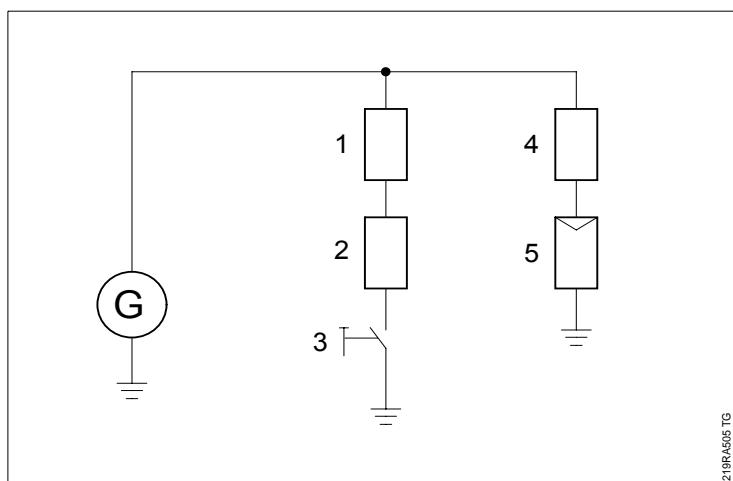
Component	Ohmmeter connection (use either test lead)		Resistance Ω		If faulty	
	Lead 1	Lead 2	Spec.	Actual	Cause	Remedy
Switch	Switch terminal ¹⁾	Switch housing	< 0.5	-	Switch faulty	Replace switch
Heating element in rear handle	Connector on wire from heating element	Connector on wire from heating element	1.6	1.5 - 2.0	Heating element OK	
				-	Break in wire, heating element damaged	Install new heating element or repair insulation
				0	Short circuit – damaged insulation	
Heating element in handlebar	Connector on wire from handlebar heating element	Connector on wire from handlebar heating element	6.4	6.0...8.0	Heating element OK	
				-	Break in wire, heating element damaged	Install new handlebar
				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	Connector on generator wire	Ground	0.6	0.5 - 1	Generator OK	
					Break in wire, generator damaged	Install new generator
					Short circuit – damaged insulation	Repair insulation

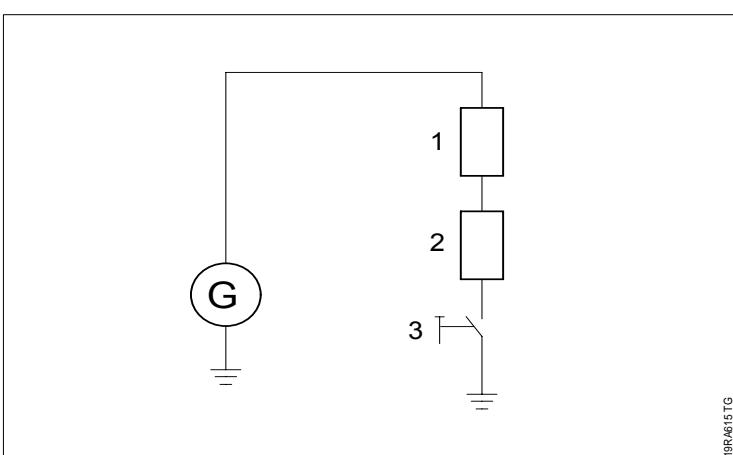
Circuit diagram

Carburetor and handle heating system



- G Generator
- 1 Handlebar
- 2 Rear handle
- 3 Heater switch
- 4 Heating element (carburetor)
- 5 Thermostatic switch

Handle heating system

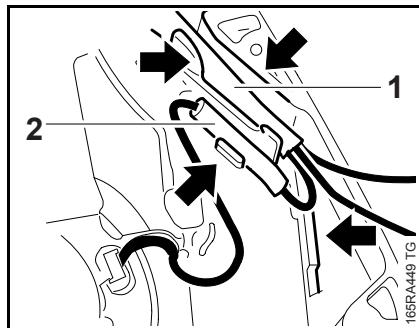


- G Generator
- 1 Handlebar
- 2 Rear handle
- 3 Heater switch

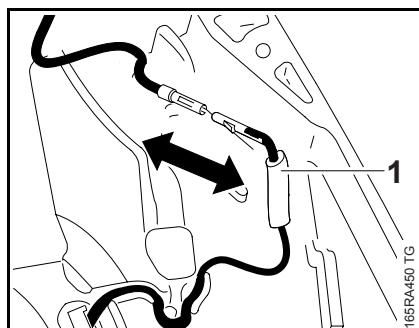
15.8 Wiring Harness

- Remove the shroud, **8.4**
- Remove the ignition module, **9.2.1**
- Remove the carburetor, **14.2**
- Remove the handle molding, **12.2**
- Remove the switch shaft, **12.1.1**
- Remove the interlock lever, **12.2**

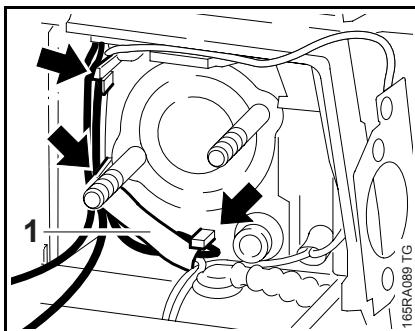
Removing



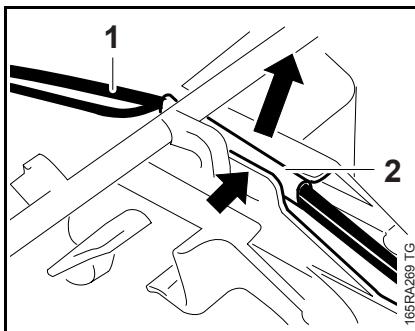
- Pull the wiring harness (1) and connector (2) out of the guides (arrows).



- Push back the insulating tube (1) in the direction of the generator wire and separate the pin and socket connector.

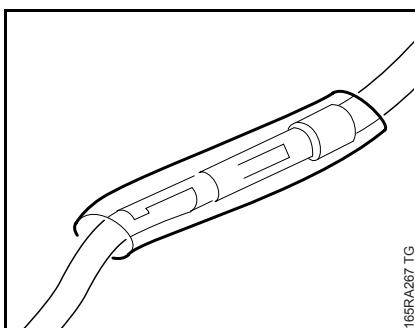


- Remove the short circuit wire, **9.6.2**
- Pull the connector (1) and wires out of the guides (arrows).

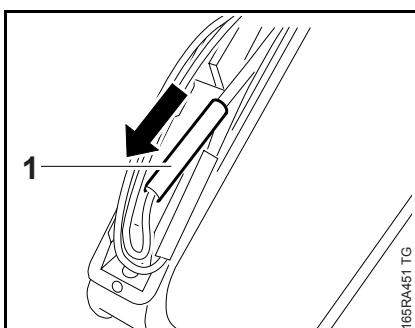


- Take the wire (1) with insulating tube (2) out of the guide (arrow).
- Pull the heating element/wiring harness wire (1) out of the insulating tube (2).
- Remove the wiring harness, check it and replace if necessary.

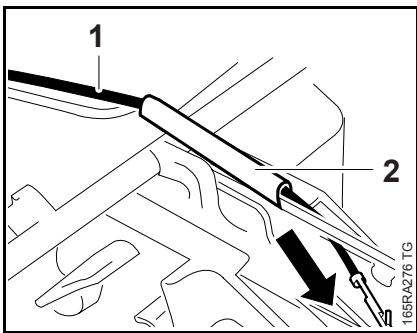
Installing



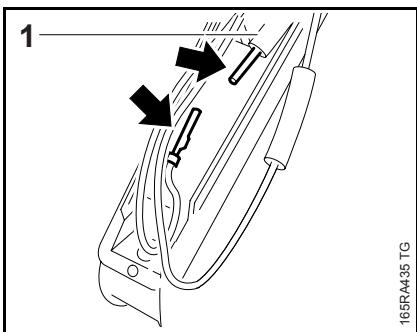
During all the following procedures:



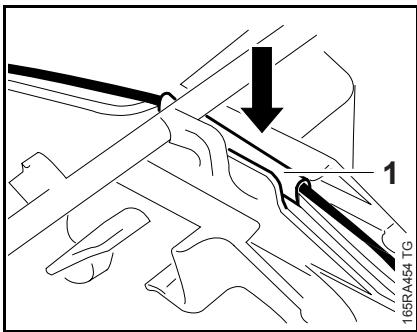
- Select wire to wiring harness.
- Push back the insulating tube (1) in the direction of the heating element and separate the pin and socket connector.



- Push the heating element/wiring harness wire (1) through the insulating tube (2).



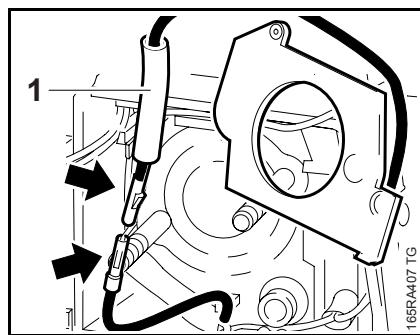
- Push the pin and socket (arrow) together until they lock.
- Push the insulating tube (1) over the connector.



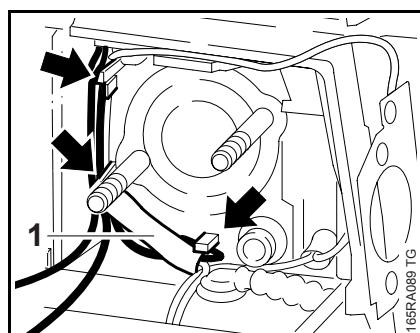
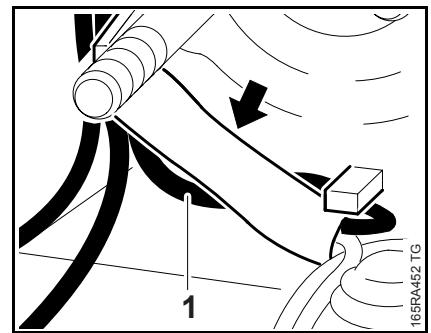
- Push the wires with the insulating tube (1) into the guide.

The wires and insulating tube (1) must not project – risk of chafing on switch shaft or throttle rod.

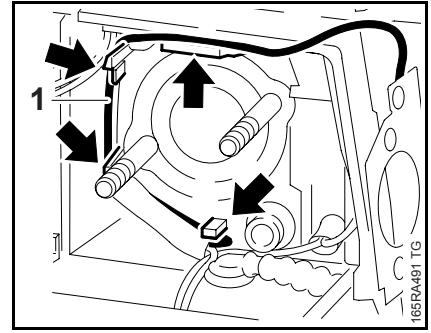
- Install the switch shaft, **12.1.1**
- Install the interlock lever, **12.2**



- Position the wire (1) behind the pin and socket connector (arrow).
- Install the short circuit wire, **9.6.2**
- Install the carburetor, **14.2**



- Push wire (1) of the carburetor heating element into the guide (arrow).



- Push wire (1) of the carburetor heating element into the guide (arrow).

The wire must not touch the lever on the throttle shaft.

- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.5**

16. Special Servicing Tools

No.	Description	Part No.	Application	Rem.
1	Assembly stand	5910 890 3101	Holding saw for repairs (includes mount 5910 850 1650)	
2	Mount for assembly stand	5910 850 1650	Clamping saw to assembly stand (only for assembly stand 5910 890 3100)	
3	Pump	0000 850 1300	Testing engine and carburetor for leaks	
4	Sealing plate	0000 855 8106	Sealing the exhaust port	
5	Test flange	1128 850 4200	Leakage test	
	- Hose for leakage test	1110 141 8600	Testing carburetor for leaks	
	- Plug for leakage test	1122 025 2200	Leakage testing decompression valve	
	- Nipple	0000 855 9200	Testing carburetor for leaks	
6	Puller	5910 890 4500	Removing limiter caps	
7	Screwdriver	5910 890 2304	Adjusting carburetor with limiter cap	
	- Setting disk	5910 893 6600	Add-on for screwdriver (adjusting carburetor)	
8	Screwdriver	5910 890 2305	Adjusting carburetor	
9	Socket, 13 mm, long	5910 893 2804	Removing and installing decompression valve	
10	Locking strip	0000 893 5903	Blocking the crankshaft	
11	Socket DIN 3124-S 19 x12.5L	5910 893 5613	Spark plug / clutch nut	
12	Hook	5910 890 2800	Detaching springs on clutch shoes	
13	Socket DIN 3124, 13 mm	5910 893 5608	Removing flywheel nut	
14	Puller	1110 890 4500	Releasing flywheel	1
15	Setting gauge	1111 890 6400	Adjusting air gap between the ignition module and flywheel	
16	Ignition system tester, ZAT 4	5910 850 4503	Testing ignition system	
17	Ignition system tester, ZAT 3	5910 850 4520	Testing ignition system	
18	Centering tool	1118 893 3500	Centering the generator	
19	Puller	1107 890 4500	Removing the centering tool	
20	Puller	5910 890 4400	Removing oil seals	1
	- Jaws (No. 3.1)	0000 893 3706	Removing oil seal(s)	1
	- Jaws (No. 6)	0000 893 3711	Removing oil seal(s)	1
21	Press sleeve	1121 893 2400	Installing oil seal (ignition side)	
22	Press sleeve	1120 893 2400	Installing oil seal (clutch side)	
23	Installing sleeve	1118 893 4602	Protects oil seal at clutch side	
24	Assembly drift	1114 893 4700	Removing and installing piston pin	
25	Installing tool 10	5910 890 2210	Installing hookless snap rings in piston	
26	Clamping strap	0000 893 2600	Compressing the piston rings	
27	Wooden assembly block	1108 893 4800	Supporting the piston	

No.	Description	Part No.	Application	Rem.
28	Service tool AS (set)	5910 007 2205	Removing and installing crankshaft (clutch side)	
	- Installing tool	5910 890 2205	Pulling two halves of crankcase together	
	- Screw sleeve	5910 893 2409	Pulling two halves of crankcase together	
29	Service tool ZS (set)	5910 007 2200	Removing and installing crankshaft (ignition side)	
	- Washer	5910 893 2102	Installing crankshaft	
	- Screw sleeve	5910 893 2421	Installing crankshaft	
30	Press arbor	1118 893 7200	Removing and installing ball bearings	
31	Press arbor	1120 893 7200	Removing and installing ball bearing (clutch side)	
32	Assembly tube	1117 890 0900	Attaching springs	
33	Stud puller M8	5910 893 0501	Removing bar mounting studs	
34	Installing tool	0000 890 2201	Installing rope guide bushing	
35	Hook	5910 893 8800	Removing pickup body	
36	Torque wrench	5910 890 0302	0.5 to 18 Nm	
37	Torque wrench	5910 890 0312	6 to 80 Nm	
38	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	
39	Screwdriver bit, T 27 x 150	5910 890 2400	IS-P screws (4 mm)	
40	Crimping tool	5910 890 8210	Attaching connectors to electrical wires	
41	Pliers DIN 5254-A 19	0811 611 8380	Removing and installing external circlips	

Remarks:

- 1) Use for releasing only.

17. Servicing Aids

No.	Description	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 buffers
4	STIHL multipurpose grease	0781 120 1109	High voltage output on ignition module
5	Dirko HT red sealant	0783 830 2000	Crankcase, oil seals (outside)
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

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0455 165 0123. M2,5. J8. Rei. Printed in Germany