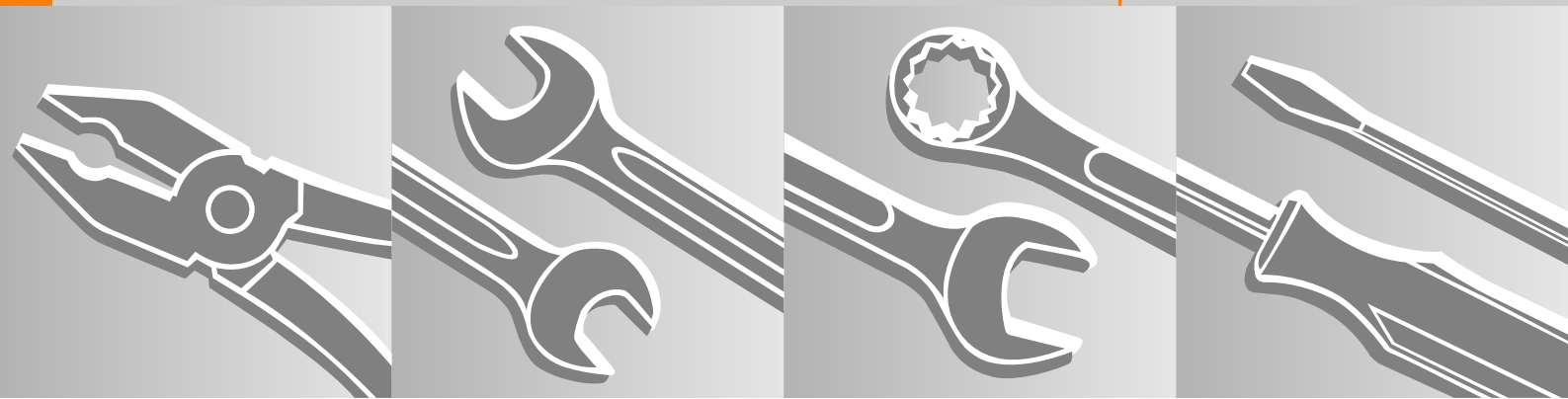


STIHL MS 460

2004-11



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1. Introduction

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

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

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

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

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

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

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

In the descriptions:

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

➡ = Situation applies from serial No.

➡ = Situation applies up to serial No.

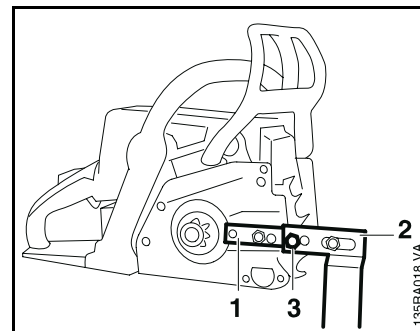
In the illustrations:

➡ Pointer (short arrow)

➡ Direction of movement (long arrow)

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

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




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

To service the underside of the machine (e.g. remove the oil pump), mount it upside down in the assembly stand.

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

Always use original STIHL replacement parts.

They can be identified by the STIHL part number, the **STIHL** logo and the STIHL parts symbol .

This symbol may appear alone on small parts.

2. Safety Precautions

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

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

Improper handling may result in burns or other serious injuries.

Warning!

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

3. Specifications

3.1 Engine

Displacement:	76.5 cm ³
Bore:	52 mm
Stroke:	36 mm
Engine power to ISO 7293:	4.4 kW (5.98 bhp) at 9,500 rpm
Max. permissible engine speed with bar and chain:	13,500 ± 150 rpm
Idle speed:	2,500 rpm
Clutch:	Three-shoe centrifugal clutch without linings
Clutch engages at:	3,500 rpm
Crankcase leakage test at gauge pressure:	0.5 bar
under vacuum:	0.5 bar

3.2 Fuel System

Carburetor leakage test at gauge pressure:	0.8 bar
Operation of tank vent at gauge pressure:	0.3 bar
Fuel:	as specified in instruction manual

3.3 Ignition System

Air gap between ignition module and fanwheel:	0.15 – 0.3 mm
Spark plug (suppressed):	Bosch WSR 6F NGK BPMR 7 A
Electrode gap:	0.5 mm

3.4 Chain Lubrication

Fully automatic, speed-controlled oil pump with rotary piston	
Oil delivery rate:	8 – 18 cm ³ at 10,000 rpm

3.5 Tightening Torques

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

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

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	IS-M4x8	Chain tensioner cover plate	3.0	
Starter post	M7x12.5	Starter post/fan housing	12.0	
Screw	IS-M4x12	Brake band/crankcase	3.0	2)
Collar screw	M8x21.5	Guide bar	23.0	2)
Screw	IS-M4x12	Cover on oil pump/sprocket side	3.0	
Screw	IS-M4x12	Cover/crankcase, sprocket side	3.0	
	M10x1	Decompression valve	14.0	
Nut	M5	Filter cover	1.0	
Collar nut	M5 SK6	Flange/air filter	6.0	
Screw	B 4.2x9.5	Spark arresting screen (Z version only)		6)
Screw	IS-M4x12	Generator (W version only)	3.5	1)7)
Screw	IS-P6x21.5	Handlebar, top	8.0	1)
Screw	IS-P6x19	Handlebar, bottom	8.0	1)
Screw	IS-P4x19	Handle molding	1.6	
Screw	IS-M5x35	Hand guard, left	7.0	
Screw	IS-M5x16	Shroud/crankcase	7.0	
Locknut	M5	Chain catcher/spiked bumper	6.0	3)
Screw	IS-M5x20	Chain catcher/spiked bumper/ crankcase, bottom	7.5	
Screw	IS-M5x12	Spiked bumper/crankcase, top/nut	7.5	2)
Locknut	M5	Chain sprocket cover/spiked bumper	7.5	
Screw	IS-M5x20	Crankcase	11.5	
Screw	IS-M5x20	Fan housing	7.0	
Carrier	M12x1L	Carrier	50.0	
Slotted nut	M5	Baffle/air filter/carburetor	2.5	
Nut	M8x1	Crankshaft (flywheel)	33.0	

Remarks:

- 1) Secure screw with Loctite 649
- 2) Secure screw with Loctite 243
- 3) Only machines with wrap-around handle
- 6) Only machines with spark arresting screen
- 7) Only machines with handle heating

Fastener	Thread size	For component	Torque	Remarks
Screw	IS-P6x32.5	Annular buffer/tank housing, top rear left	5.5	
Screw	IS-M4x16	Annular buffer/crankcase	5.0	
Screw	IS-P6x19	Annular buffer/tank housing, rear	5.5	
Screw	IS-P6x19	Annular buffer/tank housing, front	5.5	
Screw	IS-M5x20	Wrap-around handle with bracket	7.0	
Screw	IS-M5x6	Muffler, top	6.5	2)
Screw	IS-M5x6	Muffler, top	6.5	4)5)
Screw	IS-M5x30	Muffler, top/sleeve	6.5	4)5)
Screw	IS-M6x30	Muffler/crankcase	15.0	2)
Screw	IS-M6x30	Muffler/crankcase	12.0	4)5)
Screw	IS-M5x16	Muffler/cylinder	11.5	2)
Screw	IS-M5x16	Muffler/cylinder	11.5	4)5)
Screw	IS-B2.9x9.5	Switch housing	1.0	
Screw	IS-B3.9x13	Guard/tank housing	2.8	
Nut	M8x1	Flywheel	33.0	
Screw	IS-M4x12	Segment/fan housing	2.5	
Screw	IS-M4x8	Inner side plate	3.0	
Nut	M5	Carburetor	3.5	
Screw	IS-M6x30	Cylinder/Crankcase	15.0	
Spark plug	M14x1.25	Spark plug	25.0	
Screw	IS-M5x20	Ignition module	7.0	

Remarks:

- 2) Secure with Loctite 243
- 4) Secure with high strength Loctite 272
- 5) Only version with catalytic converter

Screws secured with adhesive are easier to loosen if the adhesive is heated first with a hot air blower.
Exercise caution on polymer components.

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

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

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

Power screwdriver speed setting for polymer:

- P screws: max. 500 rpm

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

Condition	Cause	Remedy
Saw chain stops under load at full throttle	Clutch shoes badly worn	Replace clutch shoes
	Clutch drum badly worn	Install new clutch drum
	Brake band stuck	Check freedom of movement and function of brake band
Saw chain rotates at idle speed	Engine idle speed too high	Readjust with idle speed screw (counterclockwise)
	Clutch springs stretched or fatigued	Replace the clutch springs
	Clutch spring hooks broken	Replace the clutch springs
Loud noises	Clutch springs stretched or fatigued	Replace all clutch springs
	Needle cage damaged	Fit new needle cage
	Clutch shoe retainer broken	Fit new retainer
	Clutch shoes and carrier worn	Install new clutch
Chain sprocket wears rapidly	Chain not properly tensioned	Tension chain as specified
	Wrong chain pitch	Fit chain of correct pitch
	Insufficient chain lubrication	Check chain lubrication
	Chain sprocket worn	Install new chain sprocket
Chain does not stop immediately when brake is activated	Brake spring stretched or broken	Fit new brake spring
	Brake band stretched / worn / broken	Fit new brake band

4.2 Rewind Starter

Condition	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge, i.e. not vertically	Fit new starter rope
	Normal wear	Fit new starter rope
Rewind spring broken (rope does not rewind)	Spring overtensioned – no reserve when rope is fully extended	Fit new rewind spring
	Very dirty or corroded	Clean or replace rewind spring
Starter rope can be pulled out almost without resistance (crankshaft does not turn)	Guide peg on pawls or pawls themselves are worn	Fit new pawls
	Spring clip fatigued	Fit new spring clip
Starter rope is difficult to pull and rewinds very slowly	Starter mechanism is very dirty (very dusty work area)	Clean complete starter mechanism
	Lubricating oil on rewind spring becomes viscous at very low outside temperatures (spring windings stick together)	Coat rewind spring with a standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons). Then pull rope carefully several times until normal action is restored

4.3 Chain Lubrication

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

Condition	Cause	Remedy
Chain receives no oil	Oil tank empty	Fill up with oil
	O-ring on oil line in crankcase seat faulty or oil line damaged	Remove oil pump, fit new O-ring and refit oil pump or install a new oil pump
	Oil inlet hole in guide bar is blocked	Clean oil inlet hole
	Intake hose or pickup body (strainer) clogged or intake hose ruptured	Clean suction hose and pickup body (strainer) with a little standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons) or replace if necessary
	Valve in oil tank blocked	Clean/replace valve
	Teeth on pump piston and/or worm worn	Install new oil pump and/or new worm
Machine losing chain oil	O-ring on oil line in crankcase seat faulty or oil line damaged	Remove oil pump, fit new O-ring and refit oil pump or install a new oil pump
	Bore in pump housing worn	Fit new oil pump
Oil pump delivers insufficient oil	Control screw and/or control edge on pump piston worn	Replace control screw and/or oil pump
	Bore in pump housing worn	Fit new oil pump

4.4 Ignition System

Warning!

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

Condition	Cause	Remedy
Engine runs roughly, misfires, temporary loss of power	Spark plug boot is loose	Press boot firmly onto spark plug and fit new spring if necessary
	Spark plug sooted, smeared with oil	Clean the spark plug or replace if necessary
	No ignition spark	Faulty insulation on ignition lead or short circuit wire. Use ohmmeter to check ignition lead for break. If break is detected or high resistance measured, fit a new ignition lead
	Incorrect air gap between ignition coil and flywheel	Set air gap correctly
	Flywheel cracked or has other damage or pole shoes have turned blue	Install new flywheel
	Crankcase damaged (cracks)	Replace crankcase
	Check operation of spark plug. Inspect Master Control lever, ignition coil/lead for damage insulation and leakage current.	Clean or replace spark plug, replace faulty parts of ignition system
	No ignition spark	Check operation of Master Control lever and ignition module
	Ignition timing wrong, flywheel out of adjustment, key in flywheel has sheared off	Install new flywheel
	Weak magnetization in flywheel – pole shoes have turned blue	Install new flywheel

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

Condition	Cause	Remedy
Engine will not idle, idle speed too high	Throttle shutter opened too wide by idle speed screw (LA)	Reset idle speed screw (LA) correctly
	Engine leaking	Seal the engine
Engine stalls at idle speed	Idle jet bores or ports blocked	Clean jet bores and ports and blow clear with compressed air
	Idle jet too rich or too lean	Set low speed screw (L) correctly
	Setting of idle speed (LA) incorrect – throttle shutter completely closed	Set idle speed screw (LA) correctly
	Small plastic plate in valve jet does not close	Clean or renew valve jet
Engine speed drops quickly under load – low power	Air filter dirty	Clean the air filter
	Tank vent faulty	Clean tank vent or replace if necessary
	Fuel pickup body dirty	Clean the pickup body, fit a new filter
	Fuel strainers dirty	Replace the fuel strainers
	Leak in fuel line between tank and fuel pump	Seal connections or install a new fuel line
	Pump diaphragm damaged or fatigued	Fit new pump diaphragm
	Main jet bores or ports blocked	Clean the bores and ports
	Setting of high speed screw (H) too rich	Rotate high speed screw (H) clockwise (leaner), no further than stop
	Throttle shutter not opened fully	Check linkage

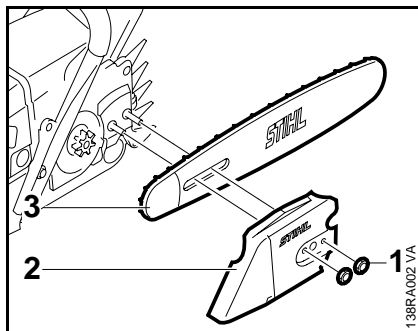
4.6 Engine

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

- Air filter
- Fuel system
- Carburetor
- Ignition system

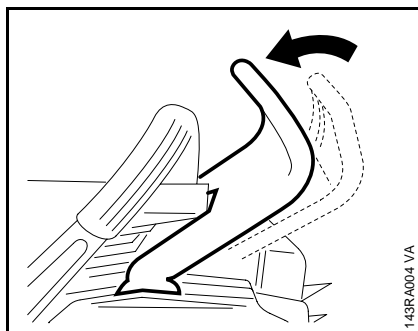
Condition	Cause	Remedy
Engine does not start easily, stalls at idle speed, but operates normally at full throttle	Oil seals in crankcase damaged	Replace the oil seals
	Crankcase leaking or damaged (cracks)	Seal or replace the crankcase
	Muffler leaking	Seal or replace the muffler
Engine does not deliver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

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



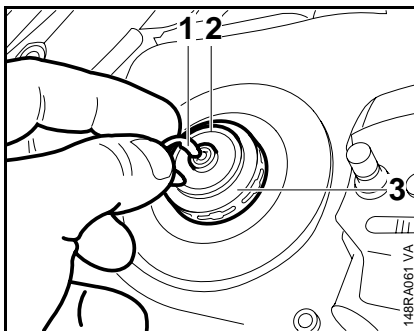
Wear work gloves to protect your hands from injury.

- Unscrew the hex nuts (1) and remove the chain sprocket cover (2) as well as the bar and chain (3).

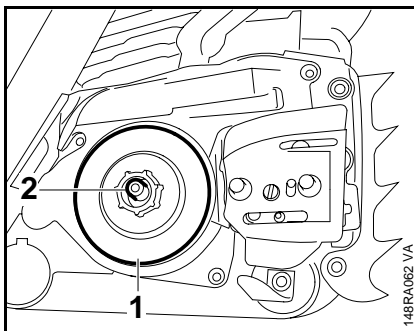


- Disengage the chain brake by pulling the hand guard towards the front handle.

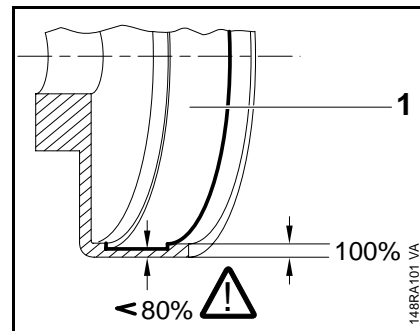
5.1 Clutch Drum/Chain Sprocket



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



- Pull off the clutch drum (1) with needle cage (2).
- Inspect the needle cage for damage.

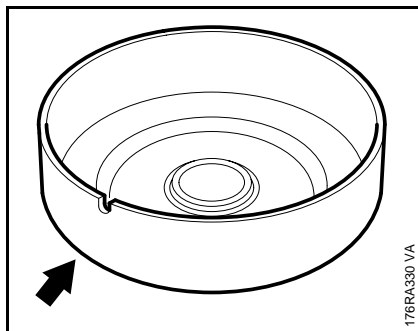


- Inspect the clutch drum (1) for signs of wear.

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, fit a new clutch drum.

If the clutch drum has to be replaced, also check the brake band, [5.4.2](#)

5.2 Replacing the Chain Catcher

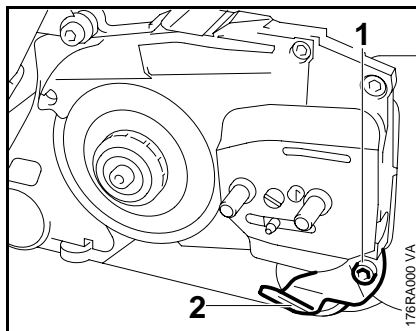


If the clutch drum is still serviceable, use No. 120 emery paper or emery cloth (grain size approx. 120 µm) to clean and roughen its friction surface.

Install in the reverse sequence.

Clean stub of crankshaft. Wash needle cage, examine it for damage and replace if necessary. Lubricate needle cage with STIHL multi-purpose grease, 16.

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



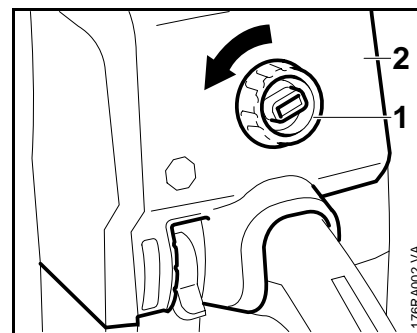
- Remove the chain sprocket cover – 5.1
- Remove screw (1) from chain catcher (2) and lift away the chain catcher.

Install in the reverse sequence.

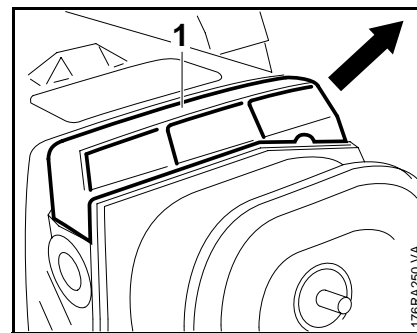
5.3 Clutch

Troubleshooting – 4.1

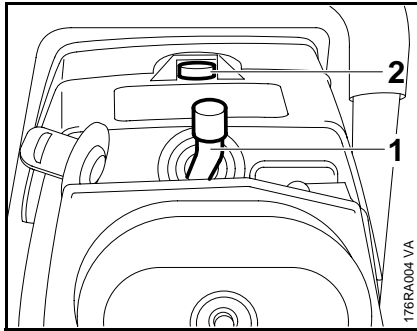
- Remove the clutch drum or chain sprocket, 5.1



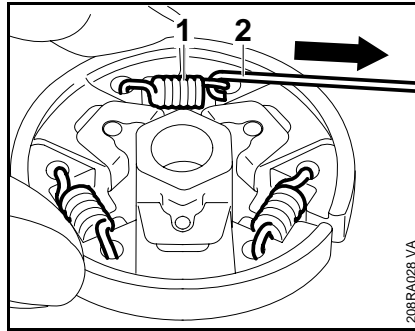
- Loosen the twist lock (1) and lift off the carburetor box cover (2) upwards.



- Remove the air baffle (1).
- Pull off the spark plug boot and unscrew the spark plug.

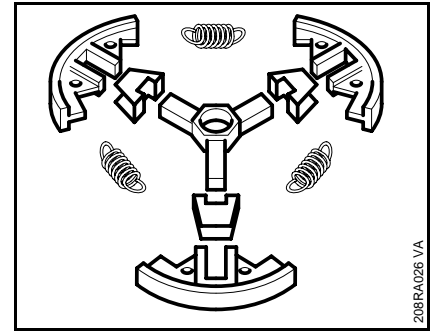


- Close the decompression valve (2) (if fitted).
- Push the locking strip (1) 0000 893 5903 into the cylinder so that "OBEN-TOP" faces up.

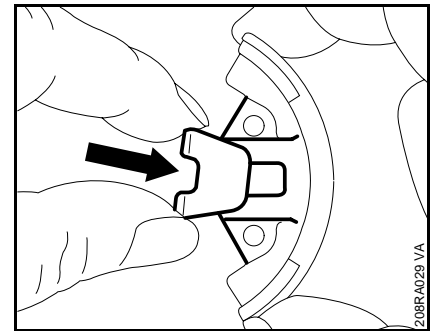


Disassembling

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

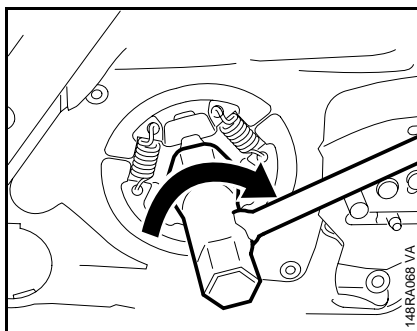


- Clean all parts, 16.
- Replace any damaged parts.



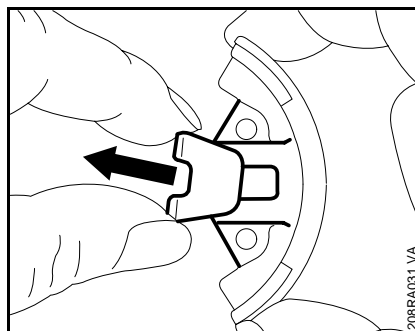
Installing

- Push the retainers onto the clutch shoes.

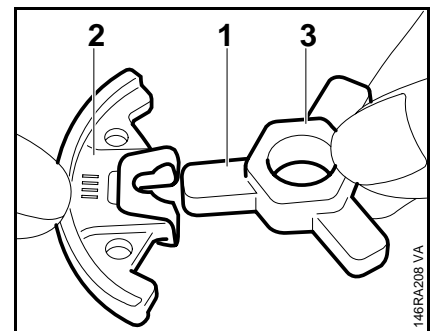


- Unscrew the clutch from the crankshaft.

Note that clutch has a left-hand thread.



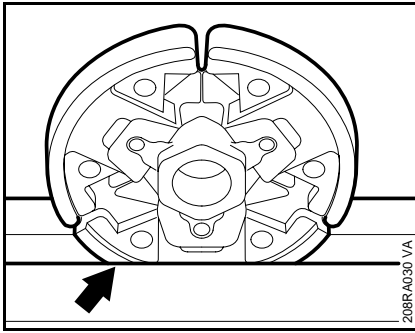
- Pull the retainers off the clutch shoes.



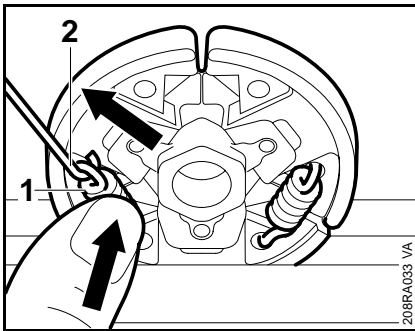
- Fit the clutch shoes over the arms (1) of the clutch carrier so that the series number (2) is on the same side as the longer hexagon (3).

5.4 Chain Brake

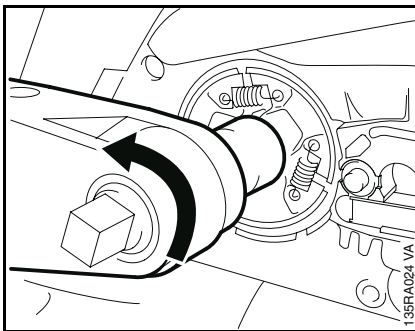
5.4.1 Checking Operation



- Clamp the clutch in a vise.



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



- Fit the clutch and tighten it down firmly, 3.5
- Remove locking strip from the cylinder.

- Install the spark plug and tighten it down firmly, 3.5
- Fit the boot on the spark plug.
- Fit the shroud.
- Install the clutch drum/chain sprocket, 5.1

Check correct position of grooves in the shroud.

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



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

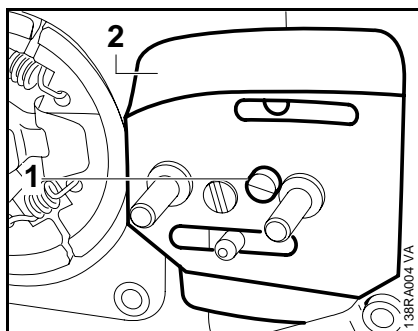
- Start the engine.
- With the chain brake activated (locked), open the throttle wide for a brief period (max. 3 seconds) – the chain must not rotate.
- With the chain brake released, open the throttle wide and activate the brake manually – the chain must come to an abrupt stop.

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

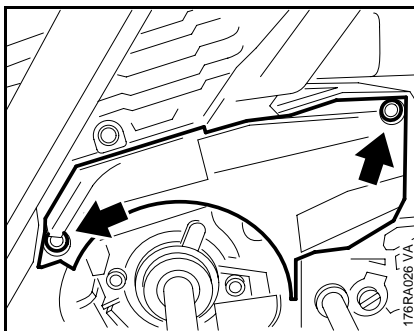
5.4.2 Removing

Troubleshooting –  4.1.

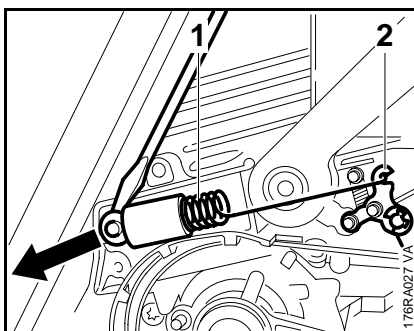
- Remove the chain sprocket cover, bar and chain,  5.1
- Remove the clutch drum or chain sprocket,  5.3



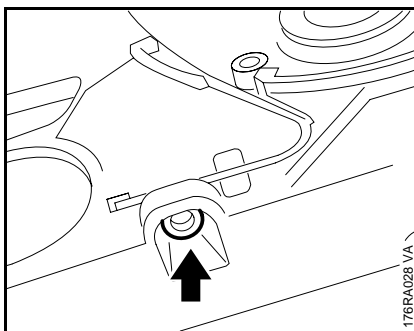
- Take screw (1) out of inner side plate (2).
- Remove the side plate.
- Engage the chain brake by pushing the hand guard away from the front handle.



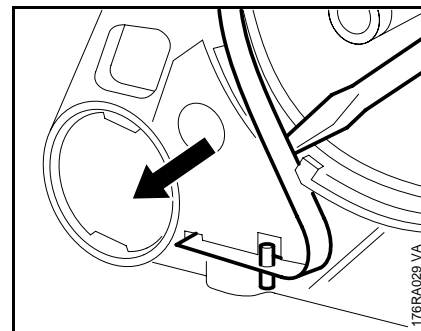
- Take out the screws (arrows).
- Remove the cover.
- Relieve tension of brake spring by pushing hand guard forward.



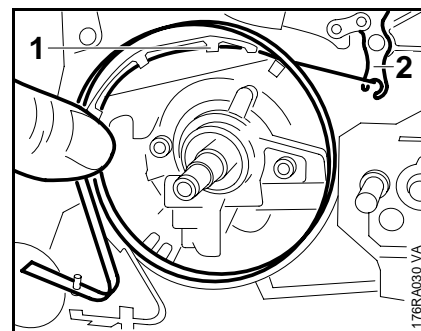
- Carefully ease the brake spring (1) off the anchor pin and take it off the bell crank (2).



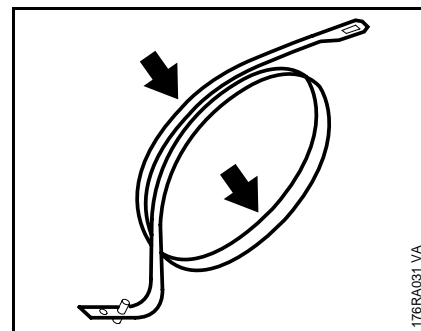
- Take out the screw (arrow).



- Pry the brake band out of the crankcase.



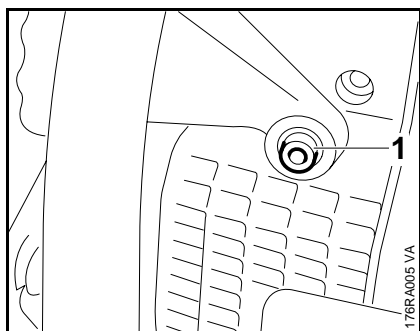
- Remove the brake band (1) from the lugs on the crankcase.
- Disconnect the brake band from the bell crank (2).



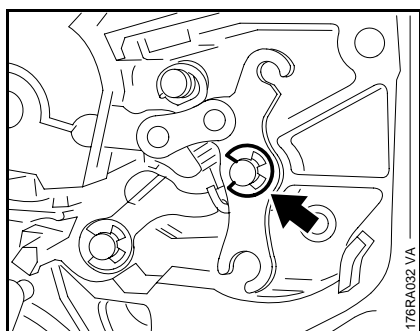
Install a new brake band if there are noticeable signs of wear (large areas on inside diameter and/or parts of outside diameter) and its remaining thickness is less than 0.6 mm.

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

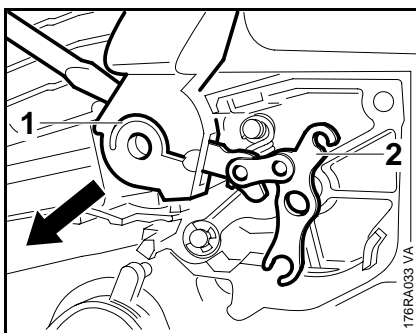
- If the brake band is still serviceable, use No. 120 emery paper or emery cloth (grain size approx. 120 µm) to clean and roughen its friction surface (inside diameter).



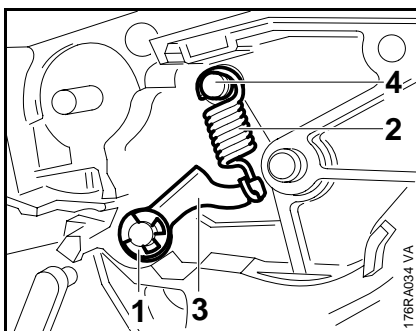
- Take out the screw (1).



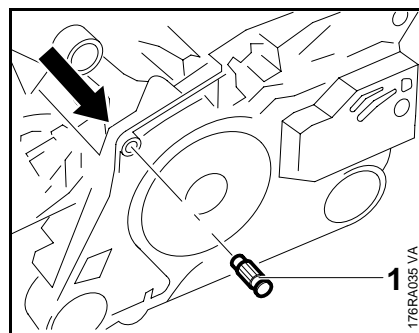
- Remove the E-clip (arrow).



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




- Remove the E-clip (1).
- Disconnect and remove the spring (2).
- Pull off the cam lever (3).
- Inspect parts and replace if damaged.
- Clean the entire housing recess for the chain brake.
- If the groove in the anchor pin for the brake spring is worn, install a new pin.
- Remove the cylinder, 6.5.1

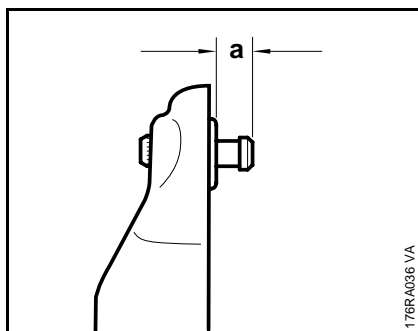


- Use a suitable punch to drive the anchor pin (1) out of the crankcase in the direction of the arrow.

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



5.4.3 Installing

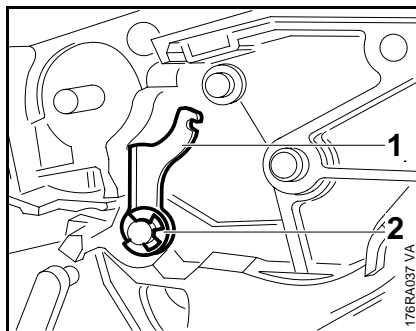
- If the brake spring anchor pin has been removed, coat the knurled shank of the new pin with Loctite before installing,  16.
- Position the new pin in the bore so that the knurling on the pin meshes with the existing knurling in the bore. Turn pin back and forth as necessary.



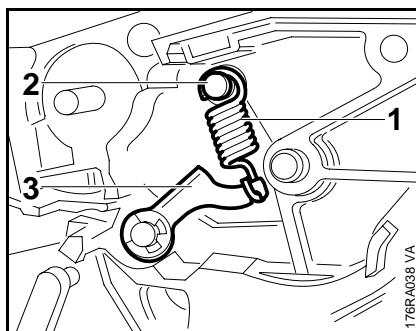
- Carefully tap home the pin squarely to obtain dimension "a" (about 4.3–4.7 mm).

Make sure the pin is installed completely square.

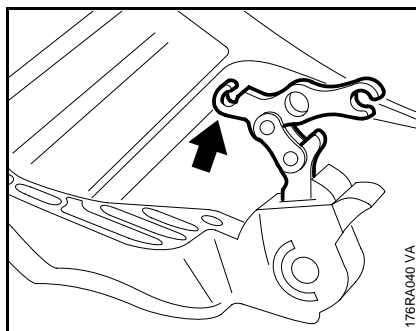
- Install the cylinder,  6.5.2
- Coat all sliding and bearing points with STIHL multipurpose grease,  16.



- Push the cam lever (1) onto the pivot pin.
- Fit the E-clip (2).

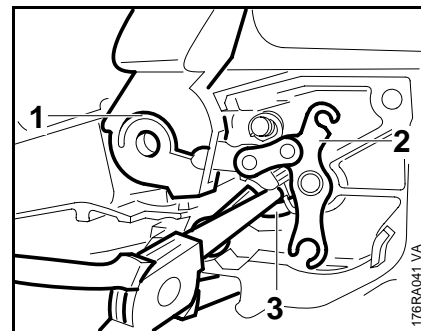



- Attach the spring (1) to the pivot pin (2) and cam lever (3).
- Inspect the heat reflecting foil on the hand guard and replace if necessary.

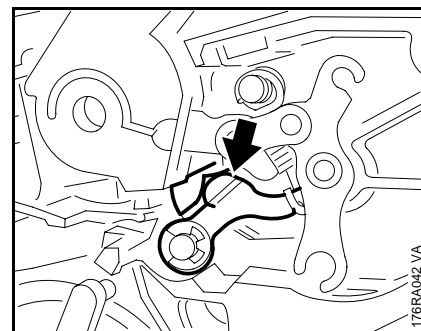


- Push bell crank into the side of the hand guard.

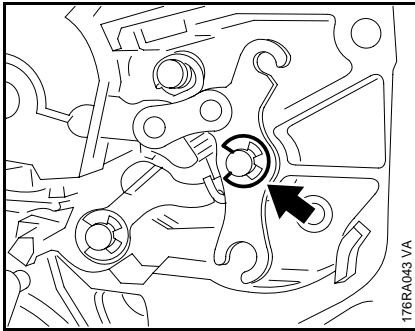
The short arm (arrow) of the bell crank must point to the top of the hand guard.



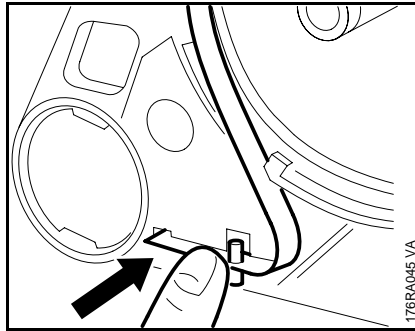
- Position the hand guard (1) against the pivot pin and fit the other side of the hand guard over the housing.
- Position bell crank (2) against the pivot pin.
- Press the cam lever (3) slightly downward and push the hand guard and bell crank onto their pivot pins.
- Tighten down hand guard mounting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



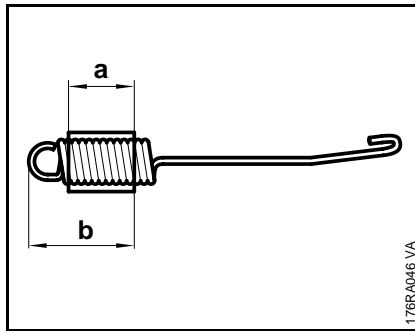
- Check that cam lever is properly positioned on face (arrow) of hand guard bearing boss.



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

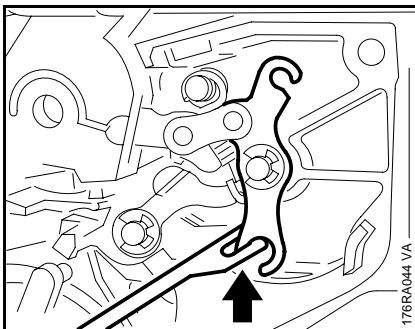


- Push brake band into slot.
 - Coat screw with Loctite and fit, 16.
 - Tighten down the screw firmly, 3.5

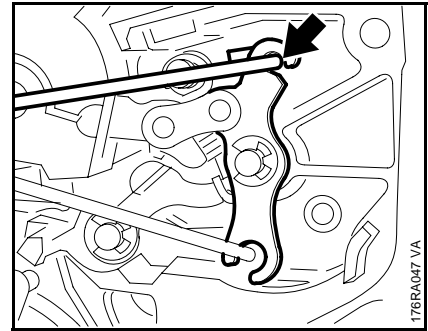


- The turns of brake spring must be tightly against one another in the relaxed condition. If this is not the case, replace the brake spring.
- Check correct position of protective tube:

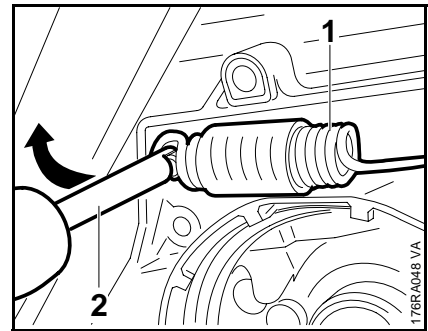
a = 20 mm
b = 32 mm



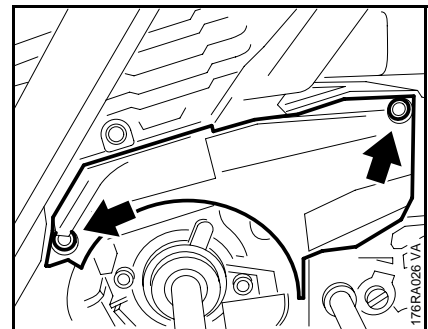
- Attach brake band to the bell crank (arrow).
- Position the brake band behind the lugs on the crankcase.



- Attach brake spring to bell crank (arrow).

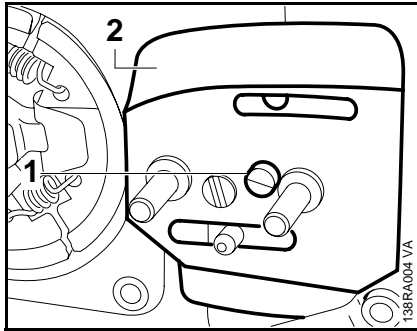


- Use assembly tool (2) 1117 890 0900 to attach the brake spring (1) to the anchor pin.

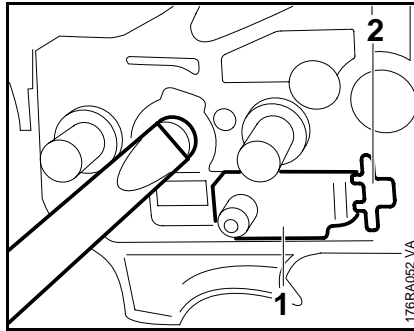


- Place cover in position.
- Insert screws (arrows) and tighten down firmly, 3.5
- Install clutch drum/chain sprocket, 5.1

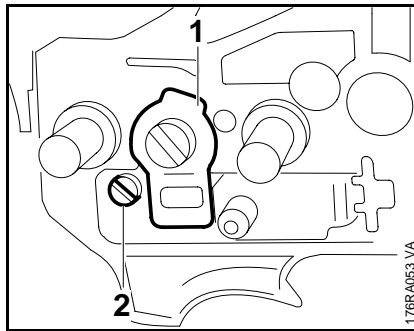
5.5 Chain Tensioner



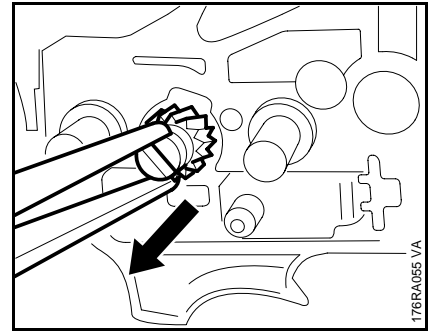
- Fit the side plate (2) over the collar screws and push it against the crankcase.
- Fit the screw (1) and tighten it down firmly.
- Mount the guide bar, saw chain and chain sprocket cover. Tighten down nuts on the chain sprocket cover, 3.5
- Check operation of chain brake, 5.4.1



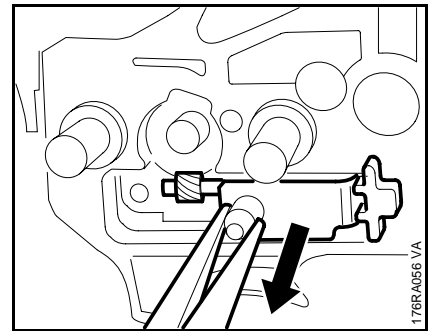
- Remove the inner side plate, 5.4.2
- Rotate the spur gear clockwise until tensioner slide (1) butts against the thrust pad (2).



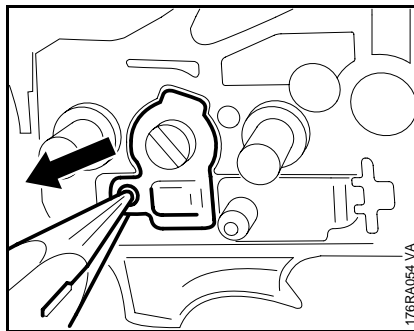
- Pull out the retainer (1).
- Take out the screw (2).



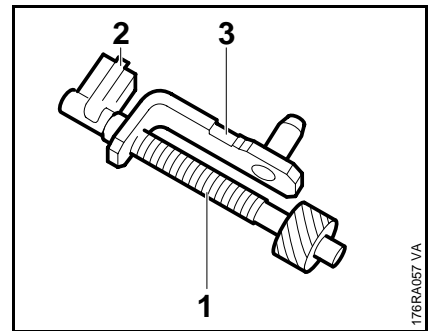
- Pull out the spur gear.



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



- Remove the cover plate.




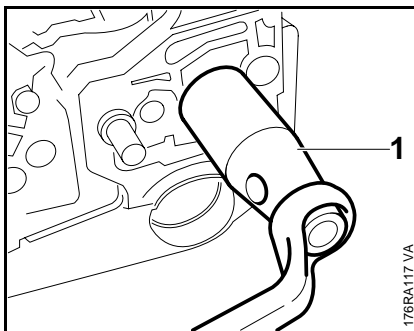
- Inspect the teeth on the spur gear and adjusting screw (1), replace both parts if necessary. To do this, pull off the thrust pad (2) and unscrew the tensioner slide (3).




5.6 Bar Mounting Studs

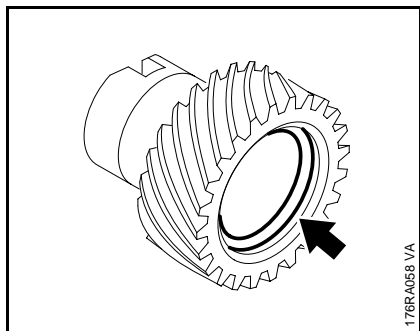
Install in the reverse sequence.

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

Coat teeth of adjusting screw and spur gear with grease,  16, before installing.



- Remove the chain sprocket cover, bar and chain,  5.1
- Push stud puller (1) 5910 893 0501 over the collar stud as far as it will go. Use a 15 mm wrench to unscrew the collar stud counterclockwise
- Before installing, coat thread of collar stud with Loctite,  16.
- Install and tighten down the collar stud,  3.5



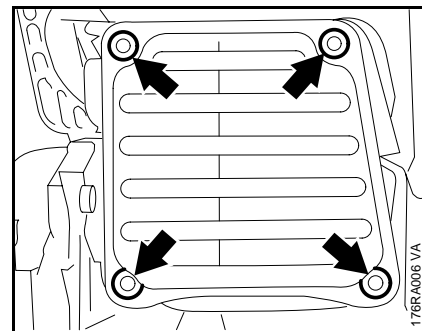
- When reassembling, check that O-ring (arrow) is fitted in spur gear and coat with oil before fitting the spur gear.

Install all other parts in the reverse sequence.

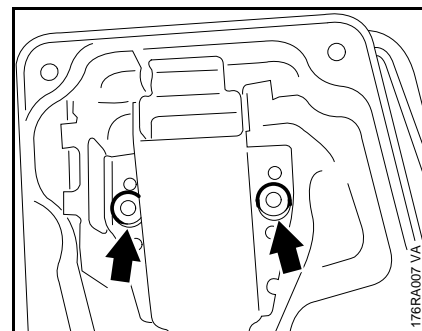
6. Engine 6.1 Muffler/Spark Arresting Screen

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

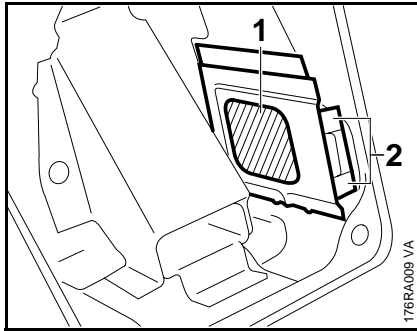
Troubleshooting –  4.6



- Take out the screws (arrows).
- Remove the top casing.

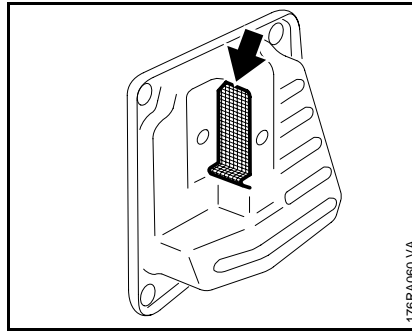


- Take out the screws (arrows).
- Remove the bottom casing.
- Remove the gasket and heat shield.

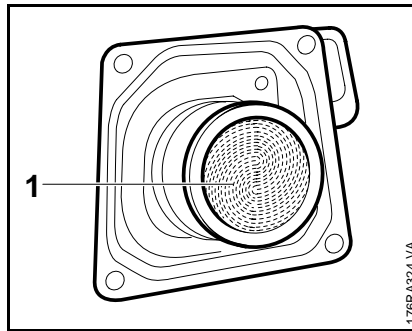


- Inspect spark arresting screen (1) (if fitted). If necessary, bend back the retaining tabs (2) and pull out the screen (not on MS 460 Magnum).
- Clean or replace the spark arresting screen if necessary.

On MS 460 Magnum, perform the two following steps to clean the spark arresting screen.

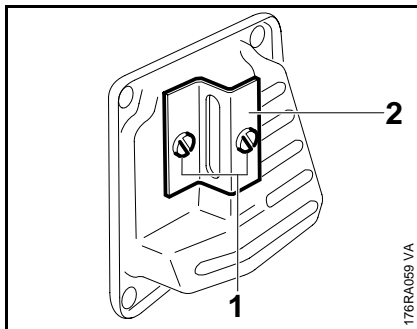


- Remove the spark arresting screen (arrow).
- Clean the spark arresting screen or fit a new one if necessary.



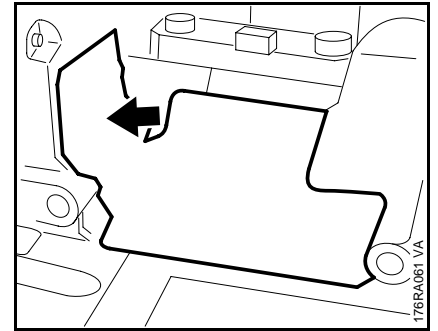
Catalytic converter machines only

- If there are signs of cracks in the honeycomb core (1), or if the steel jacket is damaged, the catalytic converter must be replaced to avoid the risk of engine damage.

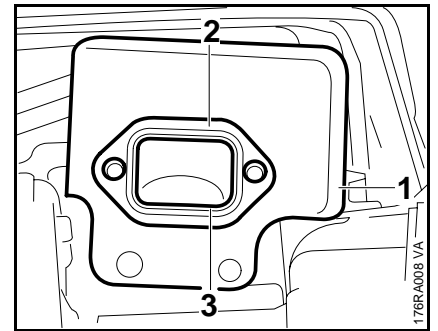


MS 460 Magnum only

- Take out the screws (1).
- Remove the cover plate (2).

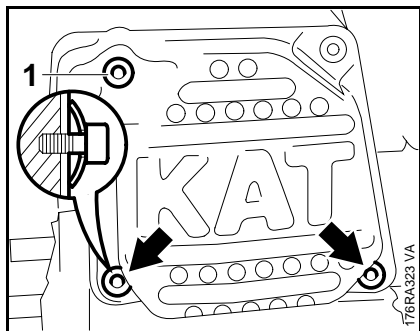


- Inspect the heat reflecting foil and replace if necessary, [16.7.2](#)



- Place heat shield (1) in position.
- Install a new gasket (2) so that its bead (3) points outward.
- Coat threads of screws with Loctite, [16](#).
- Tighten down the screws firmly – [3.5](#)

Note different sizes of mounting screws when fitting top casing:
Lower mounting screws are M6x20 and the upper mounting are M5x6.



Catalytic converter machines only

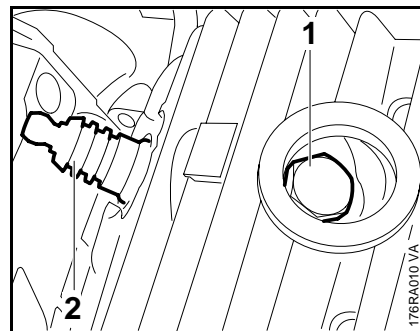
- Fit conical spring washers on the M6x30 screws (arrows).
- Fit M5x30 screw (1) with sleeve.

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

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

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

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

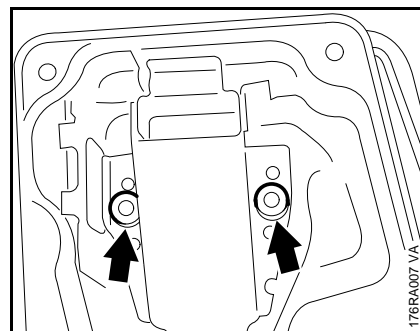


– Remove the decompression valve, 6.8

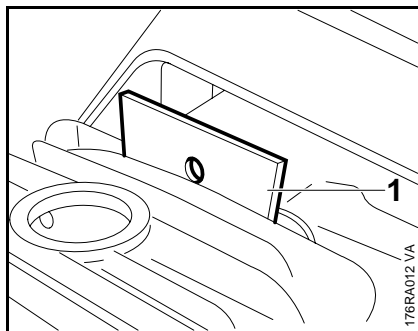
- Install plug (1) 1122 025 2200 and tighten down to 25 Nm.

- Fit spark plug (2) and tighten it down, 3.5

– Remove muffler top casing, 6.1



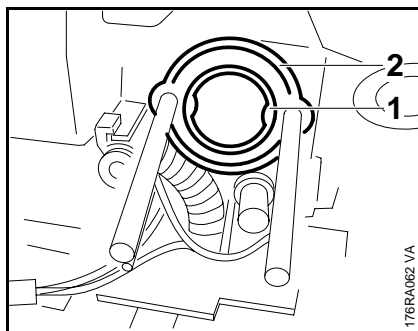
- Back off the screws (arrows) half way.



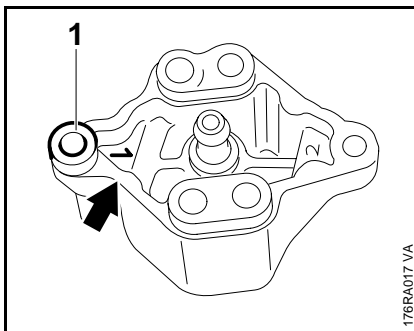
- Fit sealing plate (1) 0000 855 8106 between the heat shield and cylinder exhaust port and retighten the screws moderately.

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

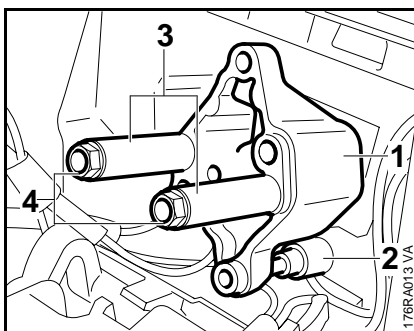
- Remove the carburetor, 12.2.1
- Set the piston to top dead center (T.D.C.). This can be checked through the intake port.



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



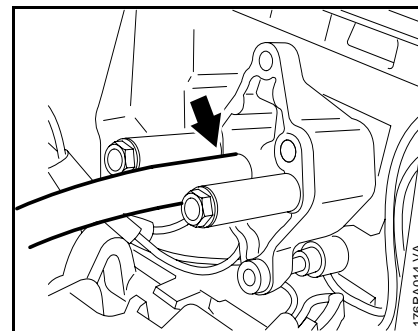
Check that the pin (1) in test flange 1128 850 4200 is in hole No. 1 (arrow), fit if necessary.



- Push the test flange (1) into position.

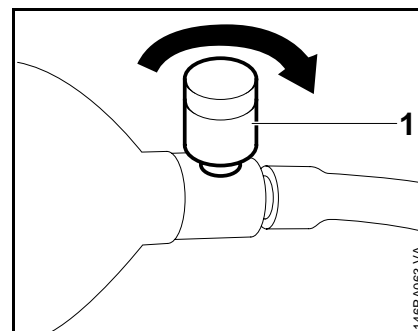
When fitting the test flange, make sure the pin locates properly in the impulse hose (2).

- Fit the sleeves (3) 0000 963 1008.
- Fit the nuts (4) and tighten them down firmly.

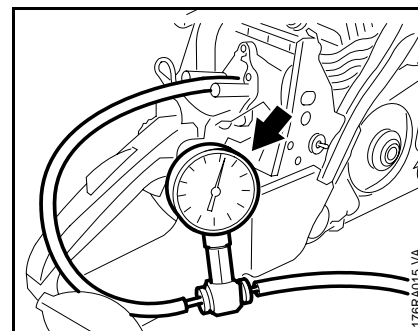


– Preparations, 6.2.1

- Connect pressure hose (1) of tester 1106 850 2905 to nipple (arrow) on test flange.



- Close vent screw (1) on the rubber bulb.




- Pump air into the crankcase with rubber bulb until the gauge (arrow) indicates a pressure of 0.5 bar. If this pressure remains constant for at least 20 seconds, the crankcase is airtight.


6.2.3 Vacuum Test

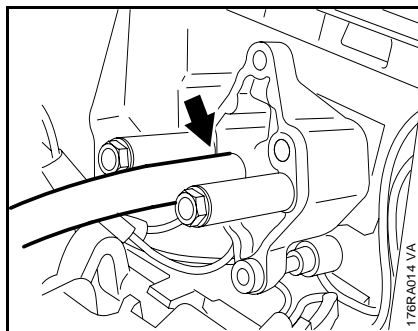
- If the pressure drops, the leak must be found and the faulty part replaced.

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

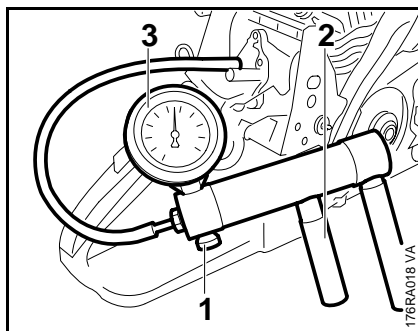
- After finishing the test, open the vent screw and disconnect the hose of tester 1106 850 2905.
- Continue with vacuum test,  6.2.3

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

An additional test can be carried out with the vacuum pump to detect this kind of fault. Carry out the same preparations as for the pressure test,  6.2.2







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



- Close the vent screw (1) on the pump.
- Operate lever (2) until pressure gauge (3) 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 crankcase), the oil seals must be replaced.

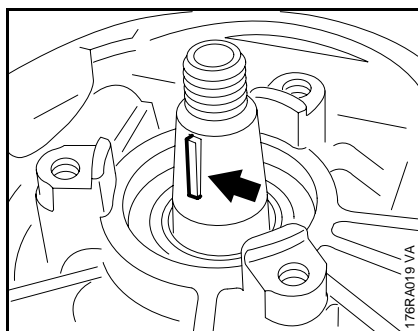
- After finishing the test, open the vent screw and disconnect the hose.
- Remove the test flange.
- Install the carburetor,  12.2.1
- Loosen the muffler screws and remove the sealing plate.
- Take out the screws one at a time and refit with Loctite,  16.
- Tighten down the screws firmly –  3.5
- Mount the muffler top casing.
- Unscrew the plug from the cylinder.
- Install the decompression valve,  6.8

6.3 Oil Seals

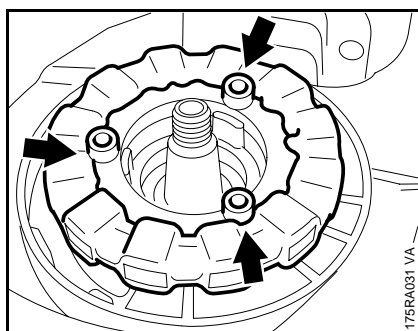
It is not necessary to disassemble the complete crankcase to replace the oil seals.

Flywheel side

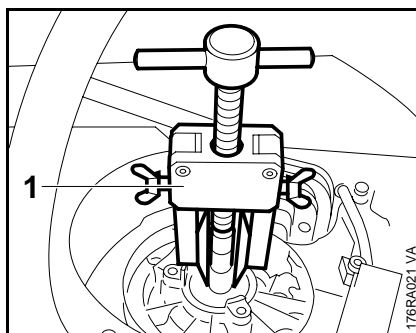
- Remove the flywheel,  7.3.1



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






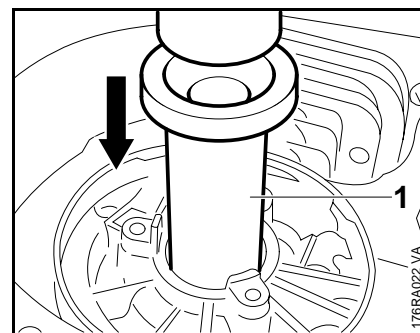
- On machines with heated handles, take out the screws (arrows).
- Put the generator to one side.



- 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. 6 jaws 0000 893 3711.
- Clamp the puller arms.
- Pull out the oil seal.



Take care not to damage the crankshaft stub.

- Clean sealing face with standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons,  16.
- Lubricate sealing lips of oil seal with grease,  16.
- Thinly coat the outside diameter of the oil seal with sealant,  16.
- Slip the oil seal, open side facing the crankcase, over the crankshaft stub.




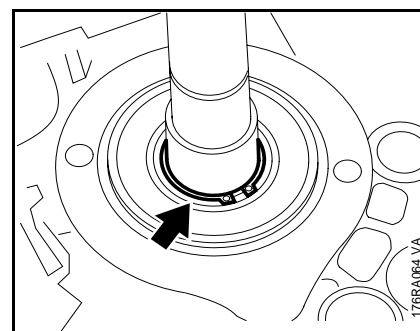
- Use press sleeve (1) 1115 893 4600 to install the oil seal.

The seating face must be flat and free from burrs.

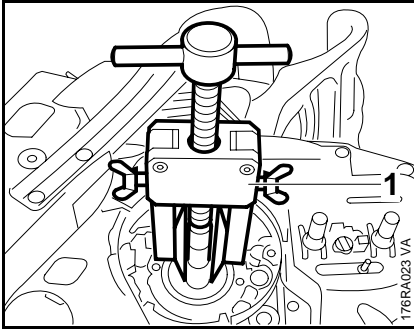
- Wait about one minute, then rotate the crankshaft several times.
- Install the generator (if fitted) and tighten down the screws firmly,  3.5
- Install the flywheel,  7.3.

Clutch side

- Remove the oil pump,  11.3.1
- Free off the oil seal in its seat by tapping it with a suitable tube or a punch.



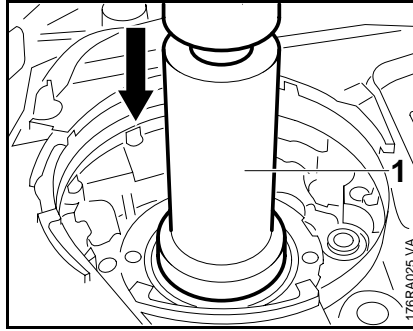
- Use pliers 0811 611 8380 to remove the retaining ring (arrow).



- 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.

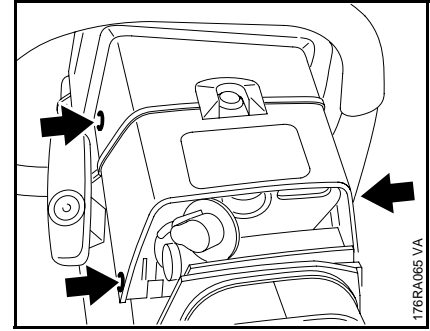
- Cleaning sealing face with standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons, 16.
- Lubricate sealing lips of oil seal with grease, 16.
- Thinly coat the outside diameter of the oil seal with sealant, 16.



- Slip the oil seal, open side facing the crankcase, over the crankshaft stub.
- Use press sleeve (1) 1118 893 2401 to install the oil seal.
- Remove the installing sleeve.
- Wait about one minute, then rotate the crankshaft several times.
- Install retaining ring in crankshaft groove.

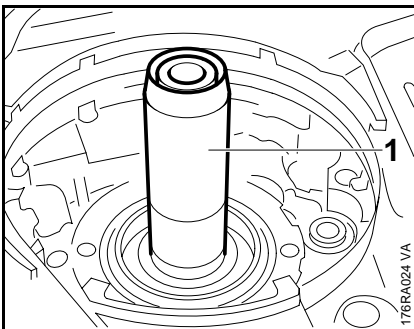
If the retaining ring is fatigued, fit a new one.

- Install the oil pump, 11.3.1

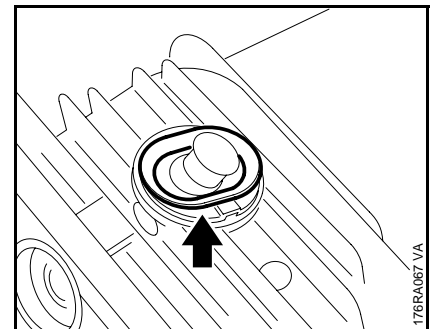


- Remove the spark plug, 5.3
- Take the screws (arrows) out of the shroud.
- Lift away the shroud.

Install in the reverse sequence.



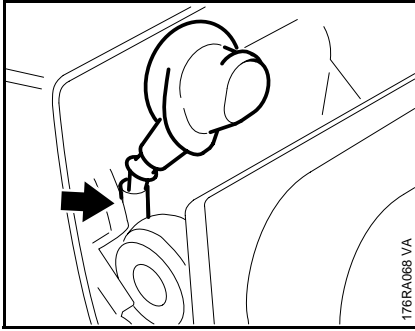
- Slip the installing sleeve (1) 1118 893 4602 onto the crankshaft stub.



- If a decompression valve is fitted, check that the cover (arrow) is properly seated.

6.5 Cylinder and Piston

6.5.1 Removing

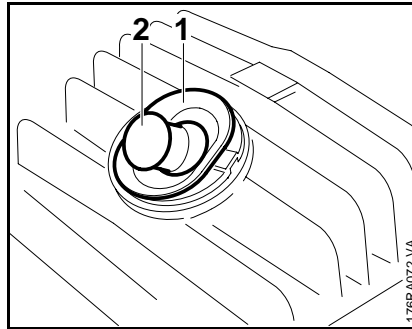


- Fit the shroud, making sure that the ignition lead is properly located in the recess (arrow).

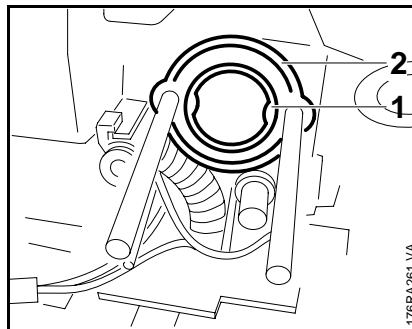
Install all other parts in the reverse sequence.

Before removing the piston, decide whether or not the crankshaft has to be removed as well. The crankshaft has to be blocked to remove the flywheel and clutch by resting the piston on the wooden assembly block with the cylinder removed or loosened.

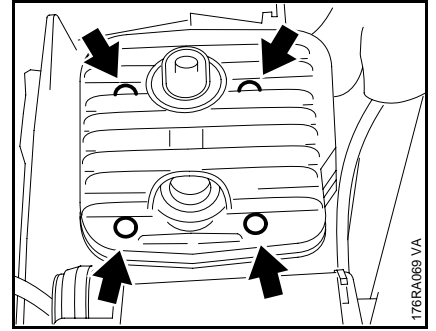
- Remove the muffler, 6.1
- Remove the spark plug, 5.3
- Remove the shroud, 6.4
- Remove the carburetor, 12.2.1



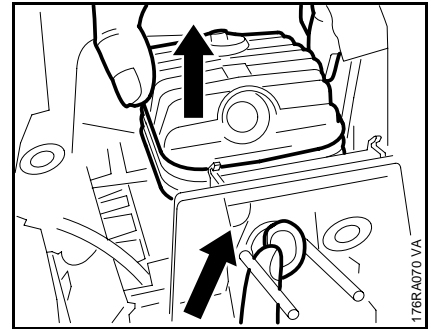
- If a decompression valve is fitted, remove the cover (1) and unscrew the valve (2).



- Take the sleeve (1) out of the manifold.
- Remove the washer (2) from the studs.

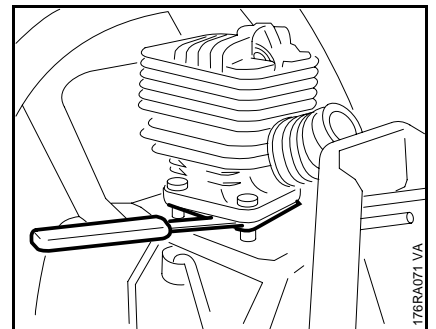


- Take out the cylinder base screws through the holes (arrows) in the cylinder.

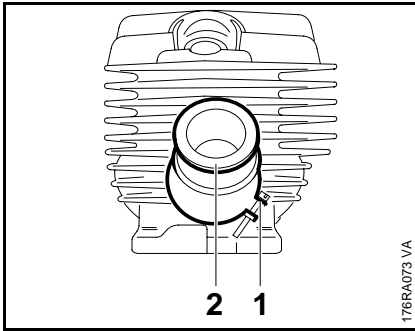


- Carefully lift the cylinder and, at the same time, push the manifold through the tank housing opening.

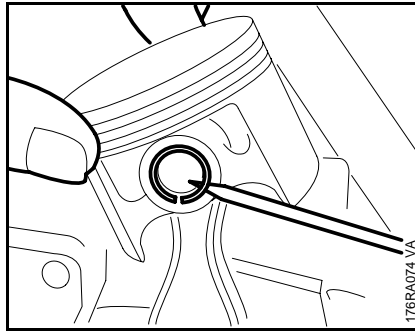
Do not use pointed or sharp-edged tools for this job.



- Carefully separate the cylinder gasket from the cylinder base.
- Pull the cylinder off the piston.

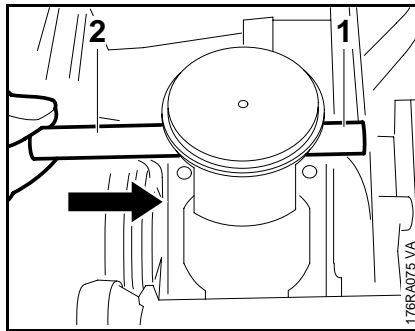


- Loosen the hose clamp (1).
- Pull the manifold (2) off the intake stub.
- Inspect the cylinder for damage and scores and replace if necessary.
- If a new cylinder has to be installed, **always** fit a new matching piston.
- Before removing the piston, decide whether or not the crankshaft has to be removed as well. The crankshaft has to be blocked to remove the flywheel and clutch by resting the piston on the wooden assembly block with the cylinder removed or loosened.
- Remove the clutch, 5.3
- Remove the flywheel, 7.3.1



- Remove the hookless snap rings from the piston.

Wear safety glasses to protect your eyes when working with spring washers and snap rings.

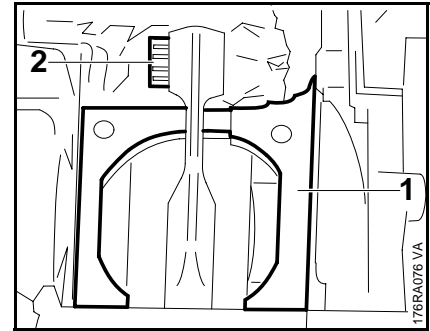


- Use the assembly drift (2) 0000 893 4700 to push the piston pin (1) out of the piston.

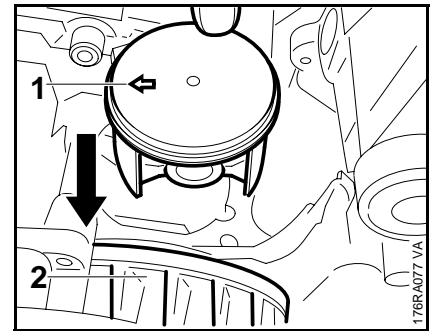
If the piston pin is stuck, tap the end of the drift **lightly** with a hammer if necessary.

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

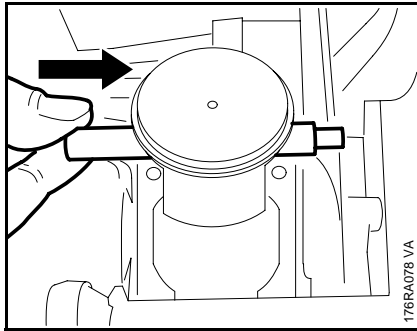
- Remove the piston from the connecting rod and take the needle cage out of the small end.
- Inspect the piston rings and replace if necessary, 6.6



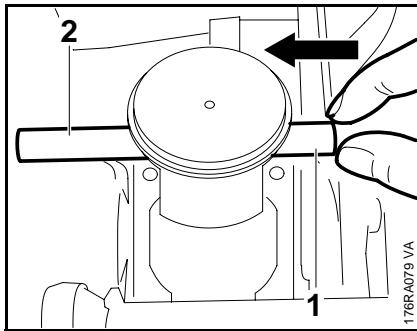
- Thoroughly clean the gasket seating surface (1).
- Lubricate the needle cage (2) with oil and fit it in the small end.



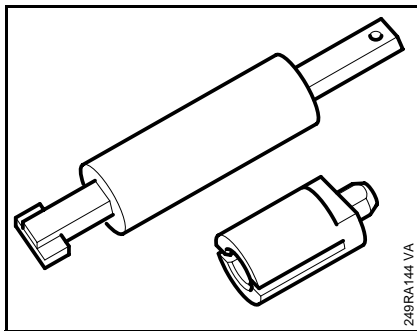
- Check installed position of piston:
1 = Mark
2 = Flywheel
- Heat the piston on an electric heating plate to approx. 60°C (140°F) and slip it over the connecting rod.



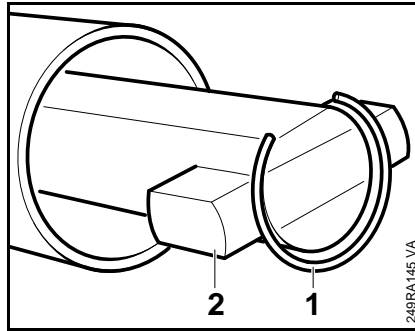
- Push the assembly drift 1110 893 4700, small diameter first, through the piston and small end (needle cage) and line up the piston.



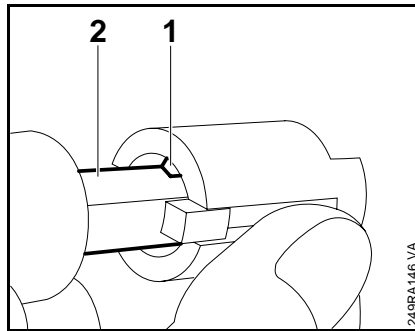
- Fit the piston pin (1) on the assembly drift (2) and slide it into the piston.



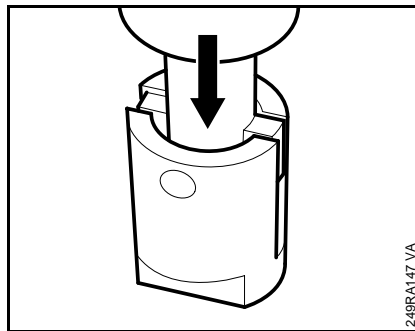
- Remove the sleeve from installing tool 5910 890 2212.



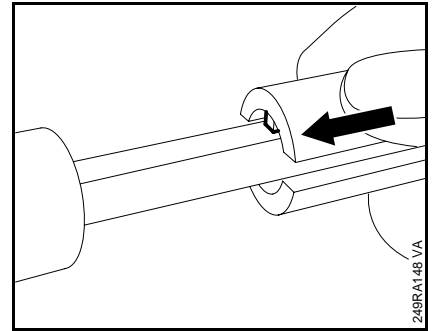
- Attach the snap ring (1) to the magnet (2) so that the snap ring gap is on the flat side of the tool's shank.



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

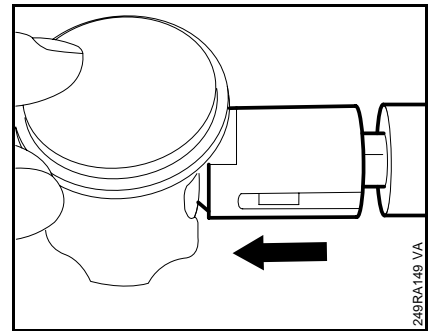


- Stand the installing tool, sleeve downward, on a flat surface (wooden board) and press vertically downwards until the sleeve butts against the tool's shoulder.

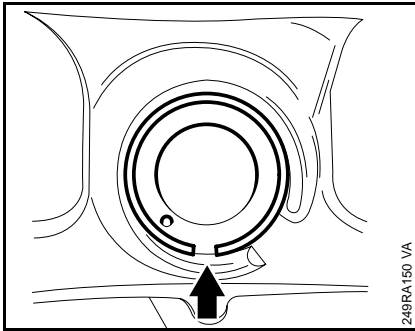


- Remove the sleeve and slip it onto the other end of the shank.

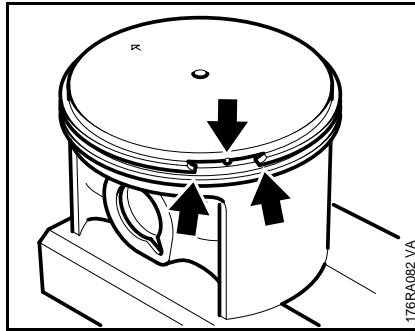
Inner pin must again point toward flat face.



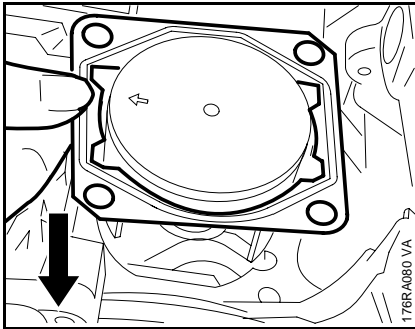
- Apply the installing tool 5910 890 2212 to the piston boss, hold the piston steady, center the tool shank exactly and press home until the snap ring slips into the groove.



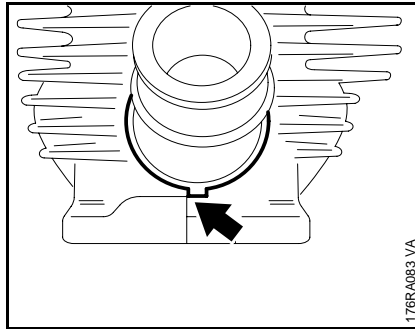
Fit the snap rings so that their gaps are on the piston's vertical axis (they must point either up or down – see arrow).



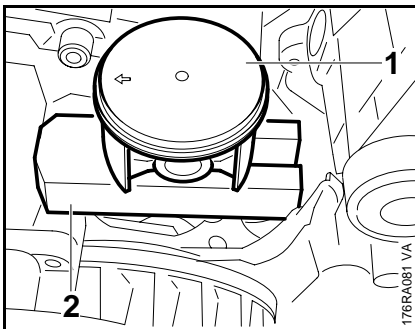
- Align the piston rings so that the radii at the ring gap meet at the fixing pin.



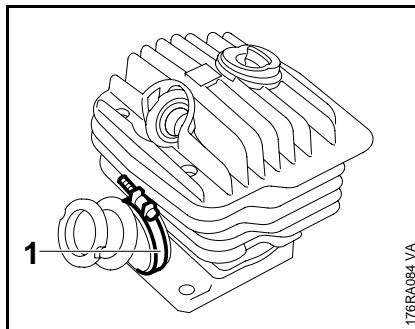
- Fit new cylinder gasket, curvature facing down, on the crankcase.



- Push the manifold on to the intake port.
- Pay attention to the correct installed position (arrow).

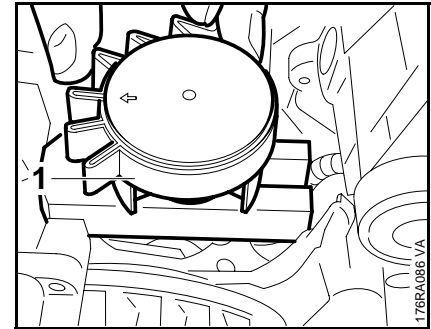


- Lubricate piston and piston rings with oil and rest the piston (1) on the wooden assembly block (2) 1108 893 4800.

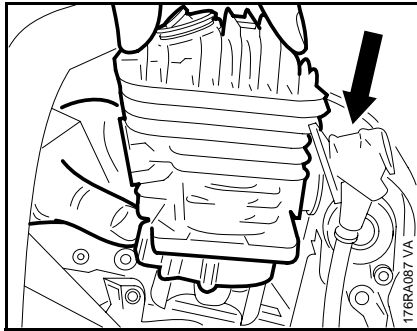


- Push the hose clamp (1) over the manifold. The screw head must point to the right.
- Tighten down the clamp so that it closes against the spacer sleeve.

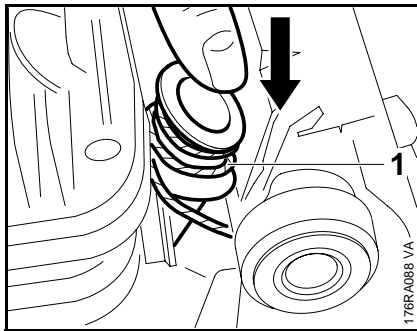
On hose clamps without spacer sleeve, tighten the screw until the gap between the two ends of the clamp is 5 – 6 mm.



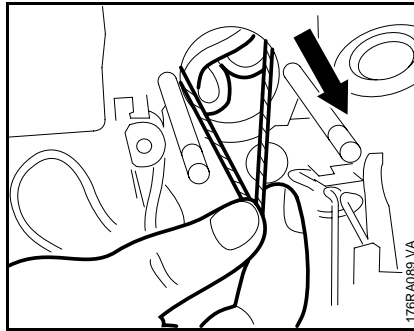
- Use the clamping strap (1) 0000 893 2600 to compress the rings around the piston.
- Check correct installed position of rings once again.
- Lubricate the inside of the cylinder with oil and line it up so that it is positioned as it will be in the installed condition. It is important to observe this point as the piston rings might otherwise break.



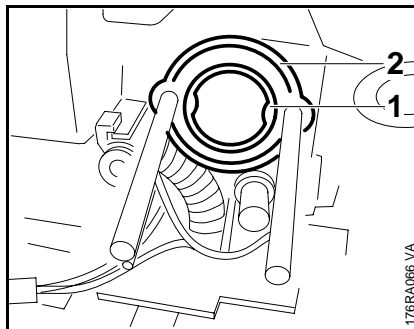
- Carefully slide the cylinder over the piston, the clamping strap moves downwards at the same time.
- Remove the clamping strap and wooden assembly block.



- 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 intake opening.
- Press the manifold down.

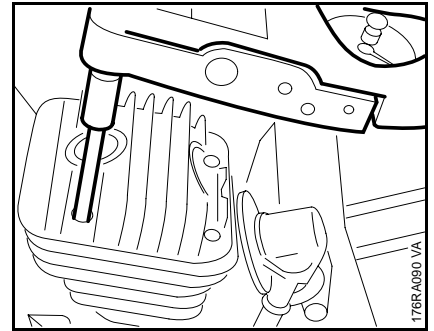


- Pull the ends of the string outward.
- The manifold flange is pulled through the tank housing intake opening without damaging the manifold.
- Check that flange is properly seated in the tank housing.

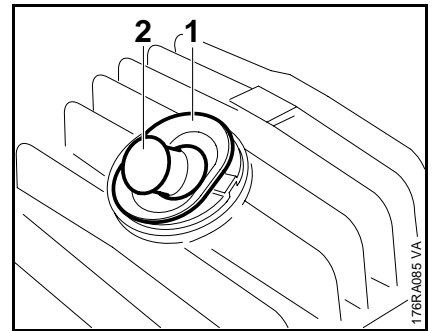


- Fit sleeve (1) in manifold.
- Fit the washer (2) on the studs.

Install all other parts in the reverse sequence.



- Line up the cylinder and gasket.
- Tighten down the cylinder base screws in an alternate pattern, 3.5

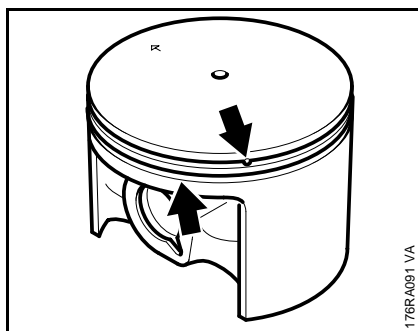


- Screw home the decompression valve (2), if fitted, and tighten it down firmly, 3.5
- Fit the cover (1).

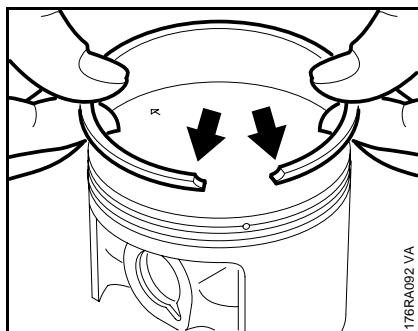
Install all other parts in the reverse sequence.

6.6 Piston Rings

- Remove the piston, 6.5.1
- Remove the rings from the piston.



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



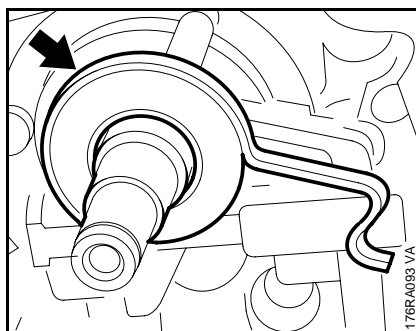
- Install the new piston rings in the grooves so that the radii at the ends of the rings face upward.
- Install the piston, 6.5.2

6.7 Crankcase

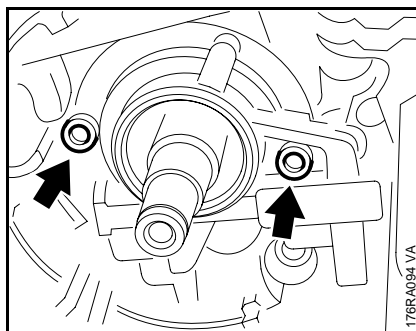
6.7.1 Removing the Crankshaft

- Remove the brake band, 5.4.2
- Remove the chain catcher, 5.2
- Remove the flywheel, 7.3
- Remove the cylinder, 6.5.1
- Drain the oil tank.
- Drain the fuel tank.

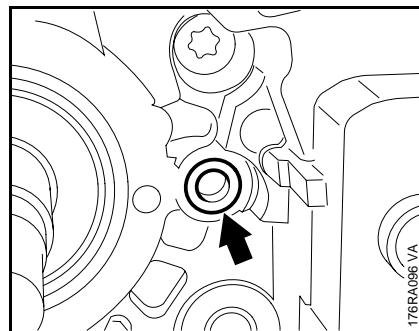
Dispose of fuels and lubricants properly in accordance with local environmental requirements.



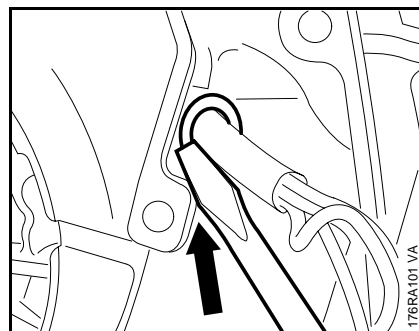
- Pull the worm with drive spring (arrow) out of the oil pump and off the crankshaft.



- Take out the screws (arrows).
- Remove the oil pump.

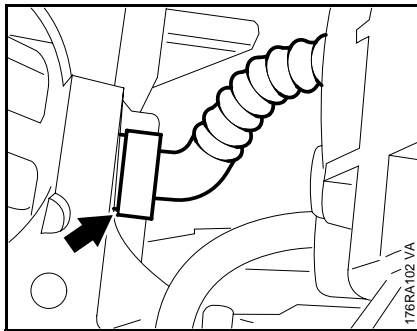


- Take the sealing ring (arrow) out of the housing bore.
- Remove the piston, 6.5.1
- Remove the ignition module, 7.1.2
- Remove the oil seals, 6.3
- On machines with heated handles, remove the generator, 14.5

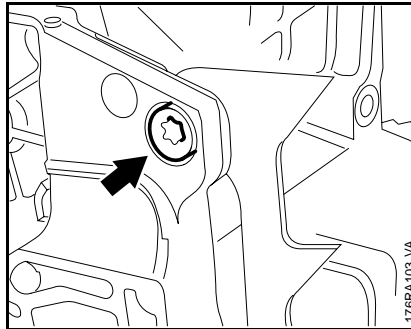


- Remove the piston, 6.5.2

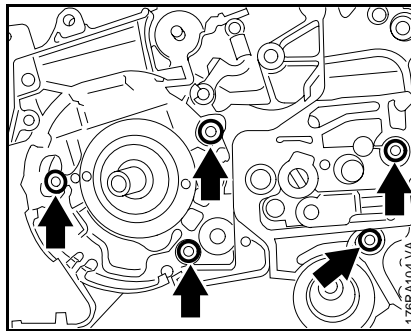
- Pull short circuit and ground wires out of the housing.



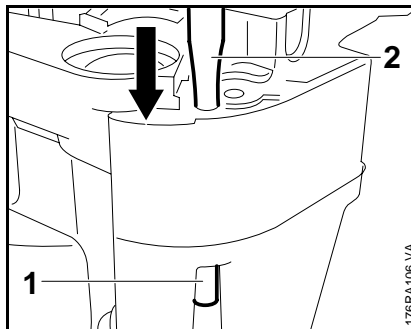
- Pull impulse hose off the nipple (arrow).
- At the clutch side, take the screws out of the annular buffers, 12.8
- At the flywheel side, take the screw out of the lower annular buffer, 12.8
- Remove the crankcase from the tank housing.
- Remove the oil seals, 6.3



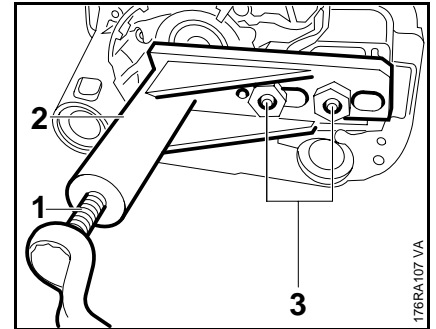
- Hold the self-locking nut steady and take out the screw (arrow).
- Remove the spiked bumper.



- Take out the screws (arrows) that join the two halves of the crankcase.
- Pull the heat reflecting foil off the crankcase.



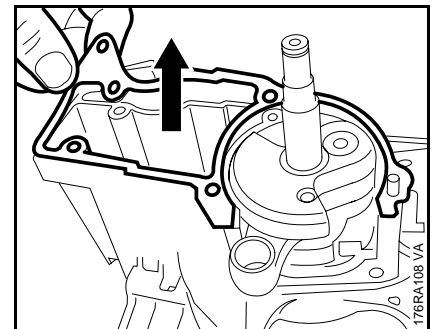
- At the chain tensioner side of the crankcase, use a 5 mm drift (2) to drive the dowel pin out of the two halves of the crankcase.



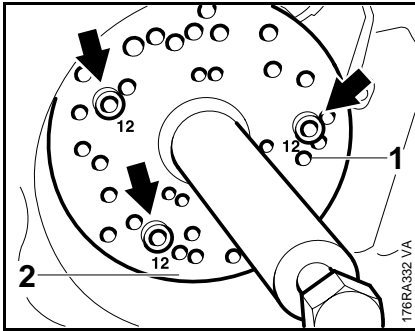
- Back off the spindle (1) of service tool AS 5910 007 2205 all the way.
- Slip service tool AS (2) over the two collar studs.
- Fit the hex nuts (3) (for sprocket cover) and tighten them down by hand.
- Turn the spindle (1) of the service tool clockwise until the crankshaft is pressed out of the ball bearing.

The two halves of the crankcase separate during this process.

- Remove the service tool AS.



- Remove the gasket from the crankcase.



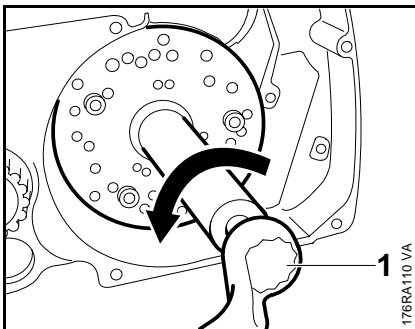
- Unscrew the spindle of service tool ZS (1) 5910 007 2220 a little (left-hand thread).

Make sure the retaining ring at the clutch side has been removed, 6.3

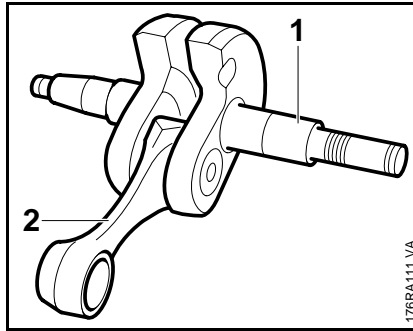
- Position the service tool ZS (1) 5910 007 2220 against the starter side so that the number 12 on the plate is at the bottom.

The cylinder flange faces up.

- Fit three M5x72 screws (arrows) in the holes marked “12” and tighten them down against the drilled plate.

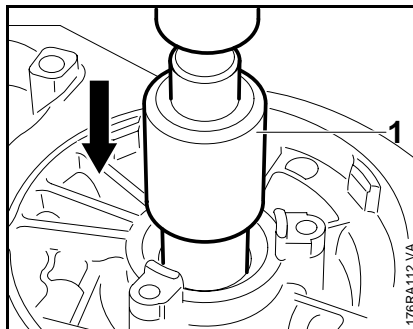


- Turn spindle (1) counter-clockwise until the crankshaft is pushed out of the ball bearing.

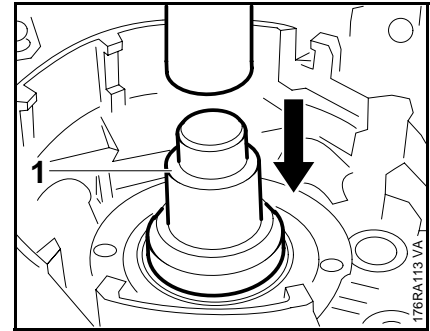


- The crankshaft (1), connecting rod (2) and needle bearing form an inseparable unit. It must always be replaced as a complete unit.

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



- Use press arbor (1) 1120 893 7200 to press the ball bearing out of the crankcase, from the outside inwards.



- Use press arbor (1) 1118 893 7200 to press the ball bearing out of the crankcase, from the inside outwards.

- Inspect both halves of the crankcase for cracks and replace if necessary.

The crankcase must be replaced as a complete unit even if only one half is damaged.

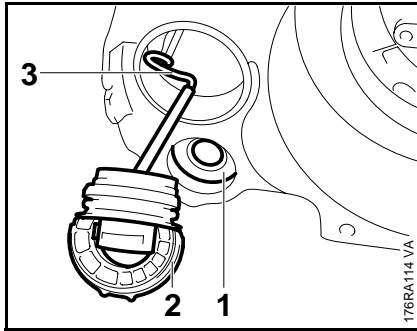
Check the condition of all other parts, replace if necessary and transfer to the new crankcase.

If only the ball bearings are replaced, all rubber and polymer components, such as oil suction hose, stop buffers and annular buffers may be left in position.

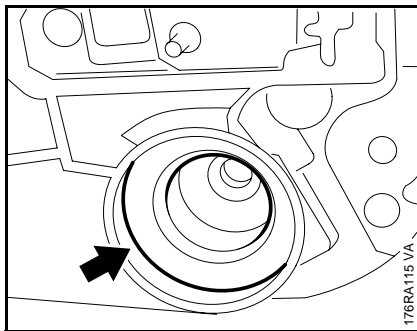
If the crankcase has to be replaced, all the components still fitted must be removed and checked for damage. This involves the following operations:

- Remove the suction hose with pick-up body, 11.1
- Remove the chain tensioner, 5.5
- Unscrew the bar mounting studs, 5.6
- Remove the chain brake, 5.4.2

6.7.2 Installing the Crankshaft



- Remove the annular buffer (1) at the flywheel side of the crankcase.
- Unscrew the oil tank cap (2).
- Disconnect the tank cap cord (3) and remove it together with the oil tank cap.



- Push the annular buffer (arrow) out of the clutch side of the crankcase.

New crankcases are supplied with preassembled ball bearings and oil seals.

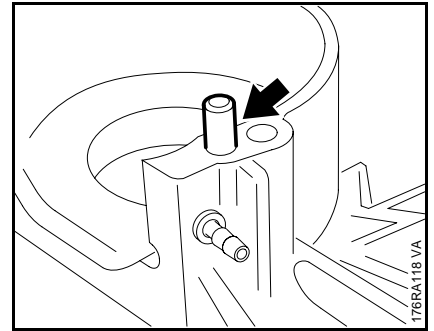
It is necessary to stamp the machine's serial number on the crankcase with 2.5 mm figure stamps.

If only the ball bearings have to be replaced, make sure the annular/stop buffers, the suction hose and oil tank cap are removed before the crankcase is heated.

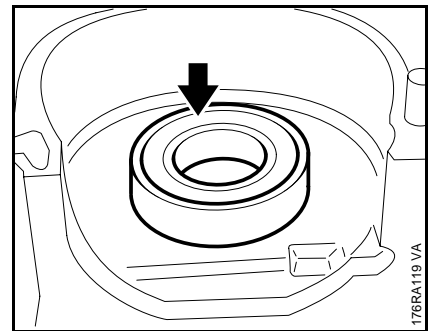
If the original crankcase is used again, remove all gasket residue and clean the mating surfaces thoroughly to guarantee a perfect seal.

If a new crankcase is installed, the following additional operations are necessary:

- Install the chain brake, 5.4.3
- Fit the bar mounting studs, 5.6
- Install the chain tensioner, 5.5

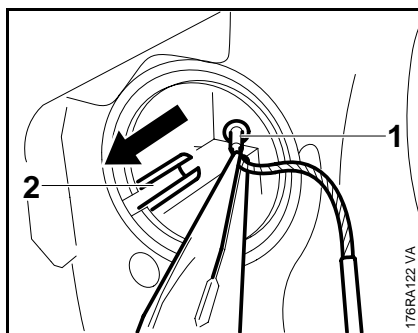


- The pin (arrow) must be in place. Drive it into the crankcase if necessary.
- Heat the area of the ball bearing seat on the flywheel side of the crankcase to about 150 °C (302 °F).

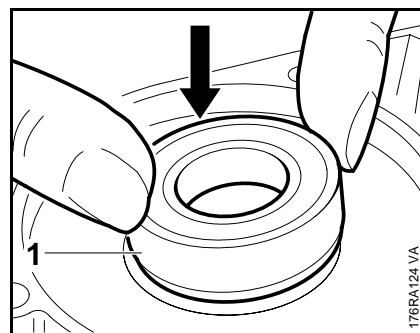


- Place the ball bearing, open side facing up, on the inside of the crankcase and push it home by hand as far as stop.

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

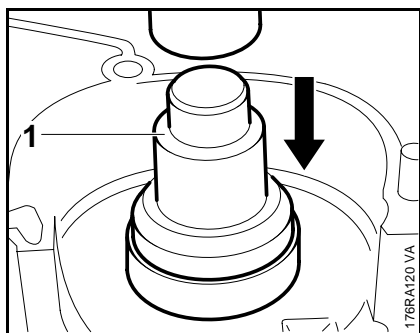


- Fit the tank cap's cord (1) in the groove (2) and pull it forward.

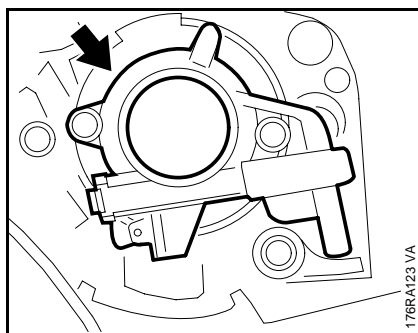


- Place the ball bearing, with shoulder (1), on the inside of the crankcase and push it home by hand against the oil pump.

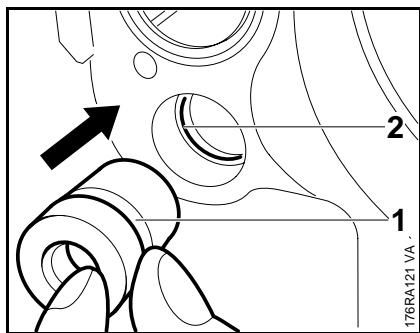
This operation must be carried out very quickly because the bearing absorbs heat immediately and begins to expand.



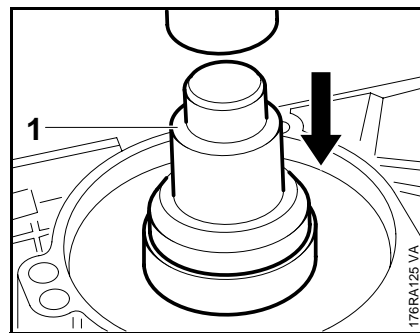
- If it is not possible to heat the flywheel side of the crankcase, use press arbor (1) 1118 893 7200 to press home the ball bearing as far as stop.



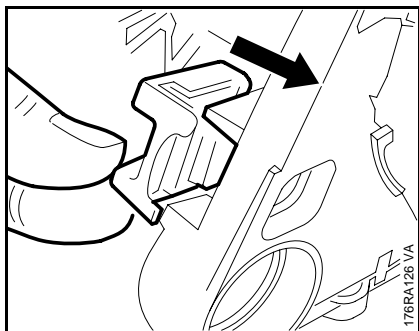
- Place the oil pump in position.
 - Insert screws and tighten them down firmly, 3.5
 - Heat the area of the ball bearing on the clutch side of the crankcase to about 150 °C (302 °F).



- Wait for crankcase to cool down.
- Push the annular buffer home so that its annular groove (1) engages the housing rib (2).

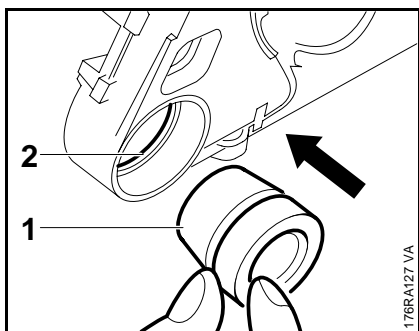


- If it is not possible to heat the clutch side of the crankcase, use press arbor (1) 1118 893 7200 to press home the ball bearing as far as stop.

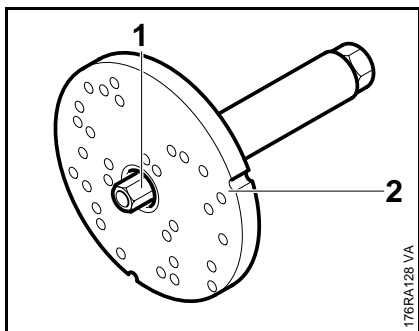


– Wait for crankcase to cool down.

- Push the stop buffer into the guide so that its lugs are behind the housing rib.

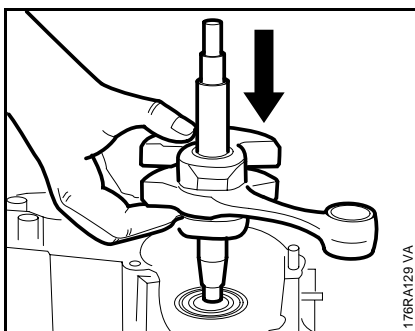


- Push the two annular buffers, tapered end first, into position so that their annular grooves (1) engage the housing rib (2).
- Install the suction hose, 11.1

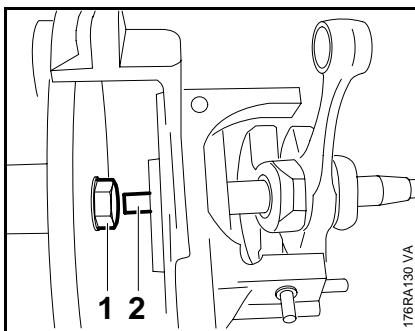


- Screw spindle of service tool ZS (2) 5910 007 2200 fully home and then screw the threaded sleeve (1) 5910 893 2420 onto the spindle.

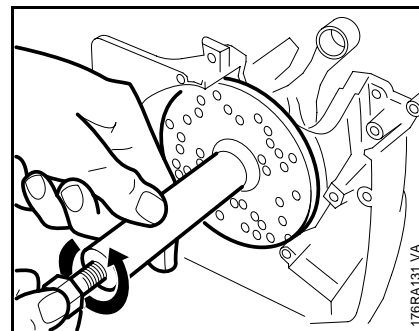
– Lubricate tapered stub of crankshaft with oil.



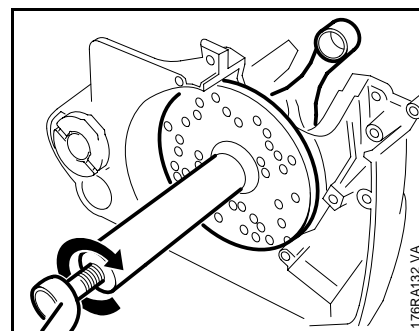
- Place tapered stub of crankshaft in ball bearing at the flywheel side of the crankcase.



- Screw threaded sleeve (1) to thread (2) of crankshaft stub.

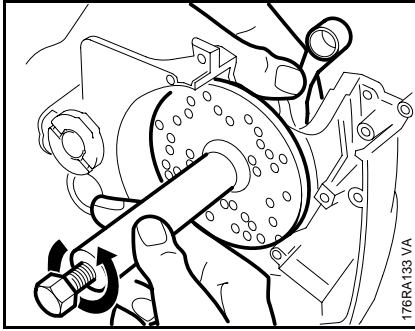


- Hold the spindle steady and rotate the service tool counter-clockwise until the drilled plate butts against the crankcase.

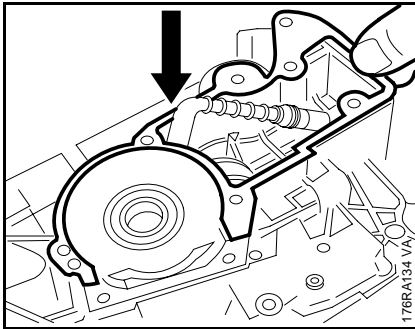


- Turn the spindle clockwise until the crankshaft locates against the ball bearing.

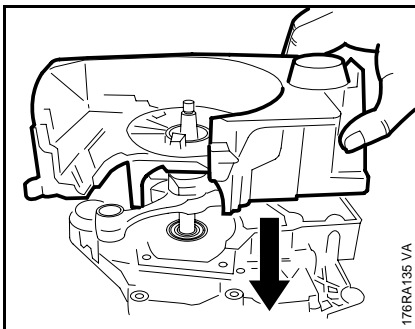
The connecting rod must point toward the cylinder flange while the crankshaft is being installed.



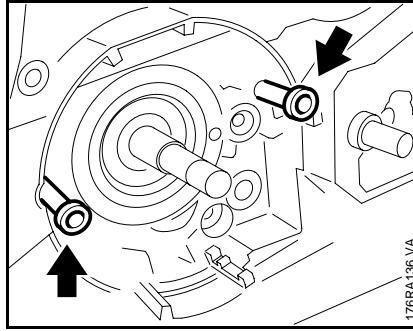
- Hold the crankshaft steady, release the spindle counter-clockwise and then unscrew the service tool, also counter-clockwise.



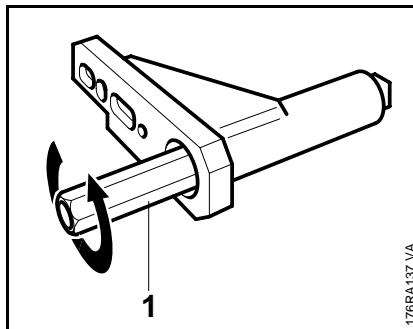
- Place new gasket on clutch side of crankcase.



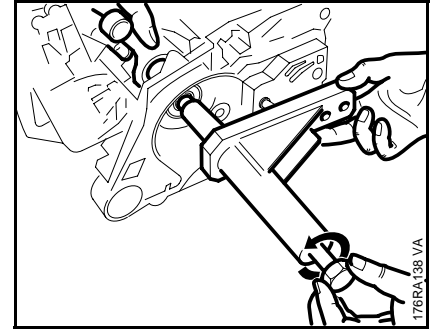
- Lubricate straight stub of crankshaft with oil.
- Fit crankshaft stub in the ball bearing.



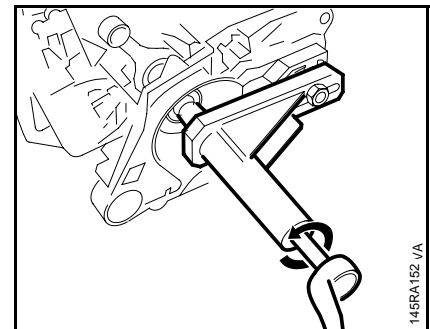
- To prevent the crankcase and gasket twisting, fit M5x72 screws (arrows) in two crankcase holes and tighten them down as far as stop.
- Screw the spindle (left-hand thread) fully into the service tool AS 5910 890 2205.



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

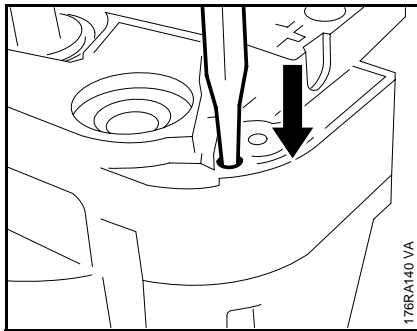


- Push the threaded sleeve over the crankshaft stub.
- Hold the crankshaft steady and rotate the spindle counter-clockwise to screw the threaded sleeve onto the crankshaft.
- Release the crankshaft. Hold the service tool steady and continue turning the spindle until the tool locates against the guide bar mounting face.
- Fit the hex nut (for chain sprocket cover) on the collar stud and screw it down finger-tight.

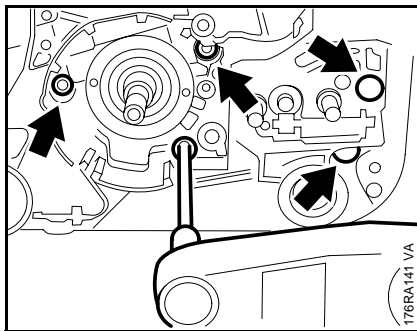


- Turn the spindle counterclockwise until the crankshaft locates against the ball bearing.
- Unscrew the hex nut.

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



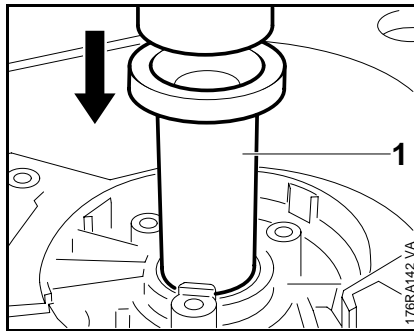
- Use a 5 mm drift to drive home the dowel pin from the sprocket side.



- Fit the screws (arrows) and tighten them down firmly in an alternate pattern, 16 3.5

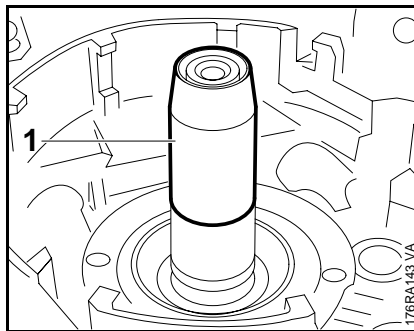
Trim away any excess gasket material in the area of the cylinder mounting face.

- Coat sealing lips of oil seals with grease, 16.
- Apply thin coating of sealant, 16, to outside diameter of oil seals.
- Slide the oil seal, open side facing the crankcase, over the ignition end of the crankshaft.

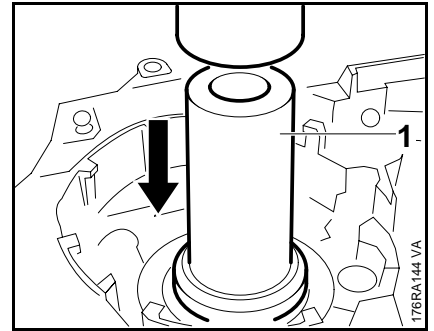


- Use press sleeve (1) 1115 893 4600 to press home the oil seal.

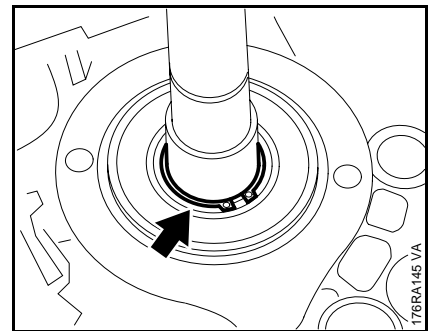
The press surface must be flat and free from burrs.



- Fit the assembly sleeve (1) 1118 893 2401 over the clutch end of the crankshaft.

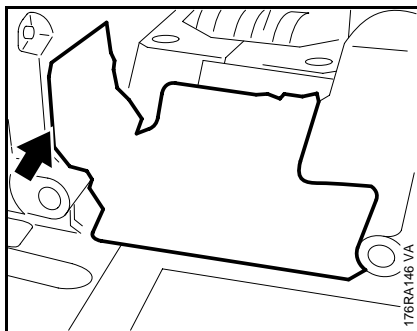


- Slide the oil seal, open side facing the crankcase, over the assembly sleeve.
- Use press sleeve (1) 1118 893 4602 to press home the oil seal.
- Remove the assembly sleeve.
- Wait about one minute, then turn the crankshaft several times.



- Use pliers 0811 611 8380 to fit the retaining ring in groove on crankshaft stub.

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

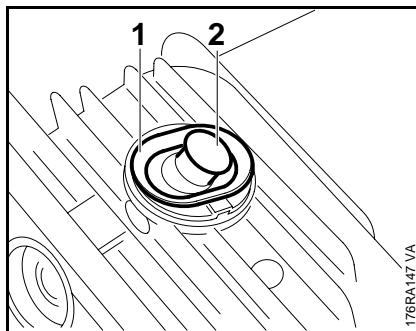


- Clean both halves of the crankcase.
- Stick the heat reflecting foil in position, without creases, so that it covers the housing wall at the clutch side.

If the crankcase is new, perform the following additional operations.

- Install the chain brake, 5.4.3
- Fit bar mounting studs, 5.6
- Install chain tensioner, 5.5

Install all other parts in the reverse sequence.



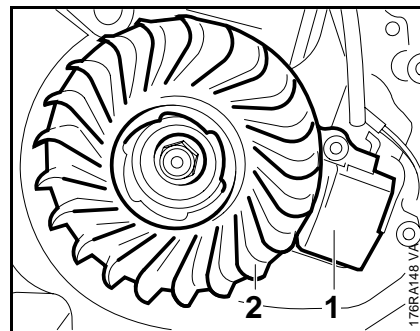
- Remove the shroud, 6.4
- Remove the cover (1).
- Unscrew the decompression valve (2).

Install in the reverse sequence.

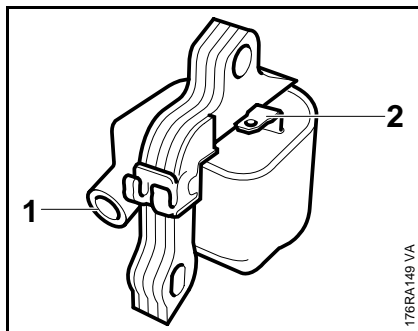
- Fit the decompression valve and tighten it down firmly, 3.5
- Fit the cover (1).
- Fit the shroud, 6.4

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

Troubleshooting on the ignition system should always begin at the spark plug, 4.4



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



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

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

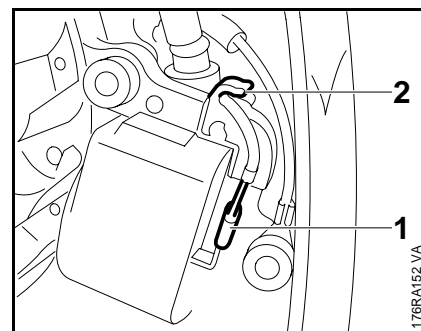
Testing in the workshop is limited to a spark test.

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

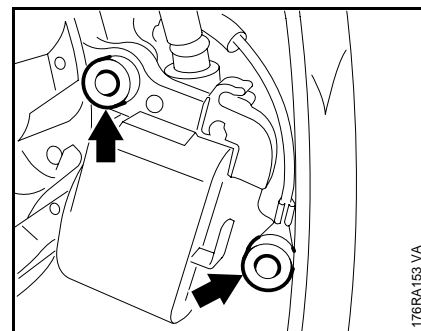
Ignition timing is fixed and cannot be adjusted during repair or servicing work

Since there is no mechanical wear in these systems, ignition timing cannot get out of adjustment as a result of wear.


- Remove the shroud, 6.4
- Remove the fan housing with rewind starter, 8.2

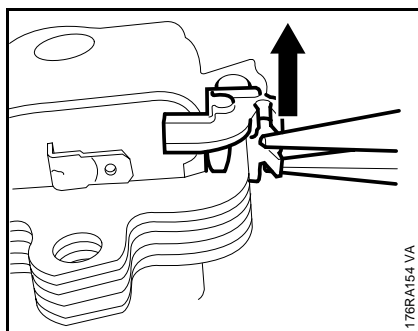




- Pull the short circuit wire (1) off the connector tag on the ignition module and out of the wire retainer (2).



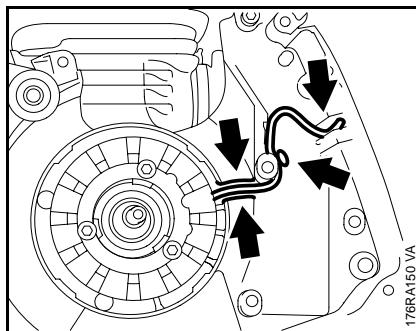
- Take out the screws (arrows).
- Remove the ignition module.

If the ignition lead or spark plug boot is damaged, install new parts,  7.2

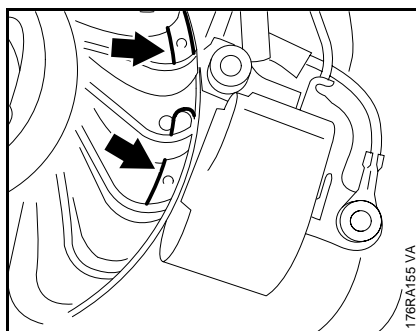


- If necessary, pry peg of the wire retainer out of the ignition module.
- Remove the wire retainer.
- If necessary, install ignition lead,  7.2, before fitting wire retainer.
- Coat threads of screws with Loctite 242,  16, before installing.

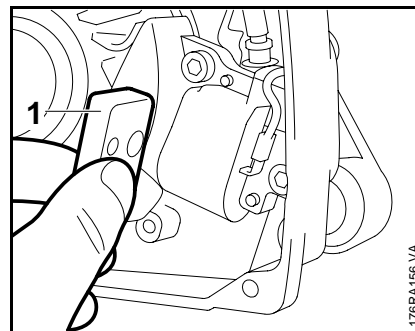
Secure ground wire under ignition module's right-hand mounting screw.





- On machines with heated handles, position the wire with connector under the ignition module and in the retainers (arrows).



- Rotate the flywheel until the two raised portions (arrow) are in line with the ignition module.



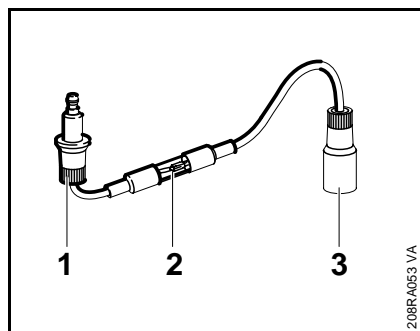
- Slide the setting gauge (1) 1111 890 6400 between the arms of the ignition module and the raised edge of the flywheel.
- Press the ignition module against the setting gauge.
- Tighten down the screws firmly,  3.5
- Remove the setting gauge and use a feeler gauge to check the air gap. It should be 0.2 mm.
- Reconnect the short circuit wire.
- Fit the shroud,  6.4

Install all other parts in the reverse sequence.

7.1.3 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.



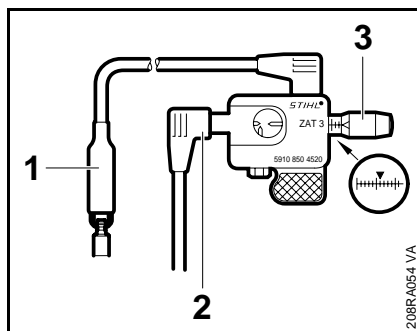
Using the ZAT 4 ignition tester 5910 850 4503

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

Warning!

The engine may start and accelerate during the test.

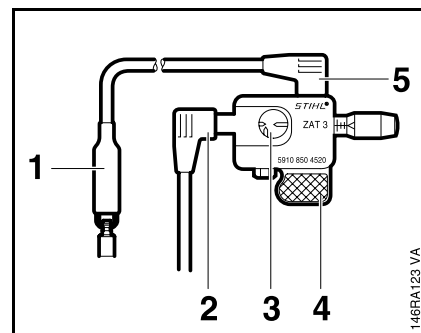
If a spark is visible, the ignition system is in order. If no spark is visible in the window (2), check the ignition system with the aid of the troubleshooting chart, 7.6



Using the ZAT 3 ignition tester 5910 850 4520

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

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



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

Warning!

High voltage – risk of electrocution.

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

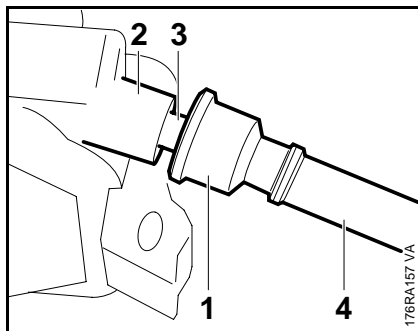
Warning!

The engine may start and accelerate during the test.

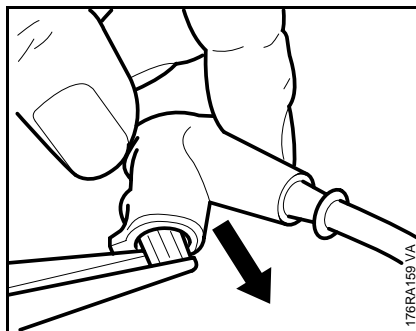
If a spark is visible, the ignition system is in order.

If no spark is visible in the window (3), check the ignition system with the aid of the troubleshooting chart, 7.6

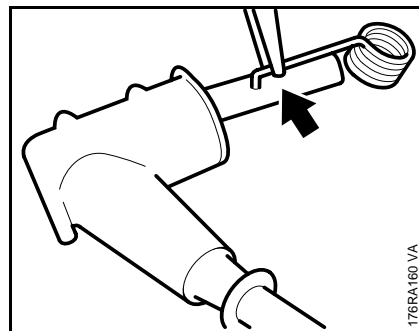
7.2 Spark Plug Boot/ Ignition Lead



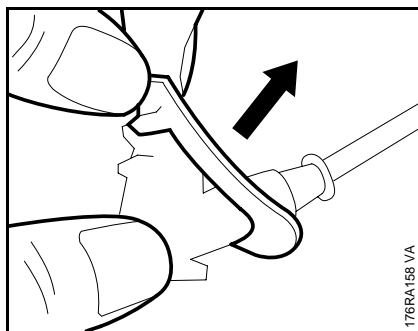
- Remove the ignition module, 7.1.2
- Pull the grommet (1) off the high voltage output (2).
- Unscrew the ignition lead (3) from the contact pin and pull it out of the high voltage output.
- Remove the grommet and insulating tube (4) from the ignition lead.



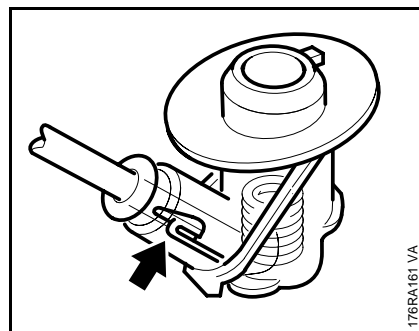
- Use suitable pliers to pull the leg spring out of the spark plug boot.
- Unhook the leg spring from the ignition lead.
- Pull the boot off the ignition lead.
- Cut new ignition lead to a length of 150 mm.
- Coat end of ignition lead (about 20 mm) with oil.
- Fit the spark plug boot over the ignition lead.
- Use suitable pliers to grip the end of the ignition lead inside the spark plug boot and pull it out.



- Use a pointed tool to pierce the center of the ignition lead's insulation, about 15 mm from the end of the lead.
- Pinch the hook of the leg spring into the center of the lead (arrow).



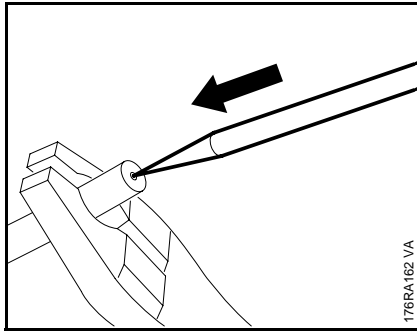
- Pull the cover off the spark plug boot.



- Pull the lead back into the spark plug boot so that the leg spring locates properly inside it.
- Push the cover over the spark plug boot.

7.3 Flywheel

7.3.1 Removing

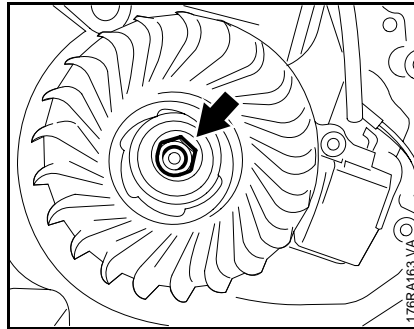


- Use a pointed tool to pierce the center of the other end of the ignition lead which screws into the module.
- Slip the insulating tube and grommet over the ignition lead.
- Pack the high voltage output with STIHL multipurpose grease, 16.

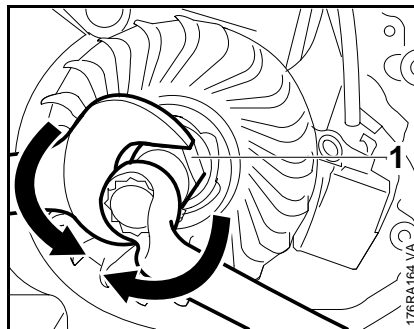
Do not use either graphite grease or silicone insulating paste.

- Screw the ignition lead into the ignition module.
- Push the grommet over the high voltage output.
- Install the ignition module, 7.1.2

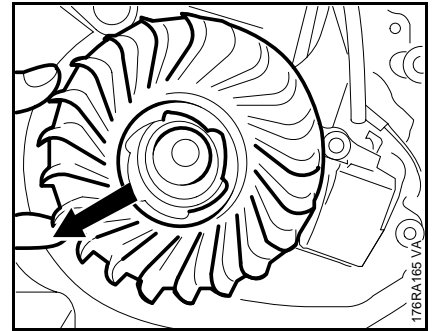
- Remove the fan housing with rewind starter, 8.2
- Use locking strip to block the piston, 5.3



- Unscrew the flywheel nut (arrow).



- Screw puller (1) 1110 890 4500 into the flywheel.
- Screw home the thrust bolt until the flywheel is released.

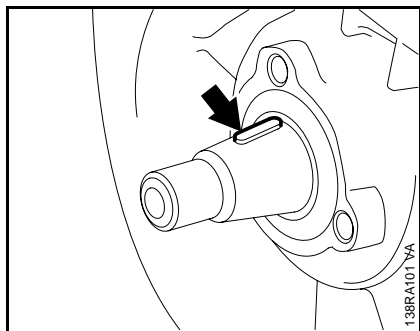


- Pull off the flywheel.
- Remove the puller from the flywheel.

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

7.3.2 Installing

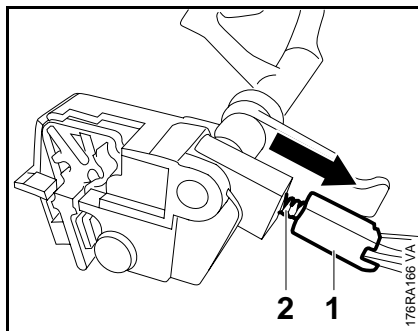
Degrease crankshaft stub and bore in flywheel hub with standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons, 16.



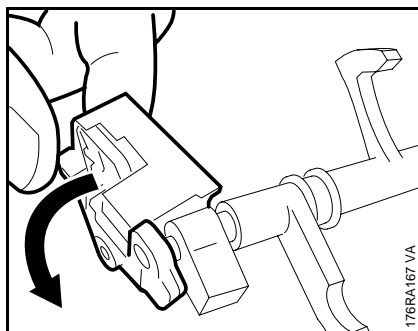
- Check that key (arrow) is properly seated.
- Fit the flywheel in position.
- Fit and tighten down the flywheel nut firmly, 3.5

Assemble all other parts in the reverse sequence.

7.4 Stop Switch

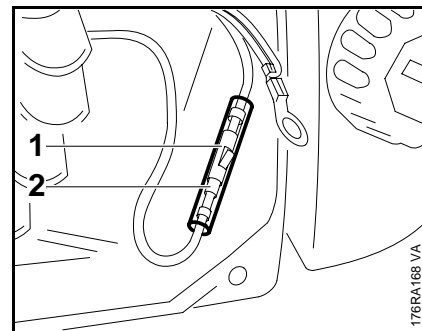


- Remove the switch shaft, 10.1
- Rotate the switch housing until the switch actuator is exposed.
- Pull out the switch actuator (1) and spring (2).

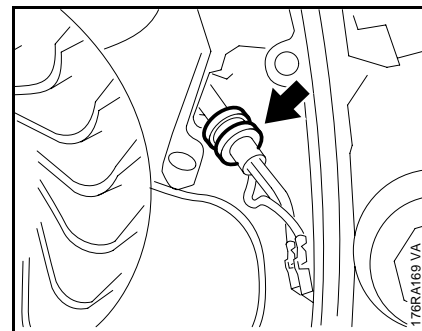


- Carefully push the switch housing sideways and lift it away.
- When installing, push home the switch actuator until it snaps into position.

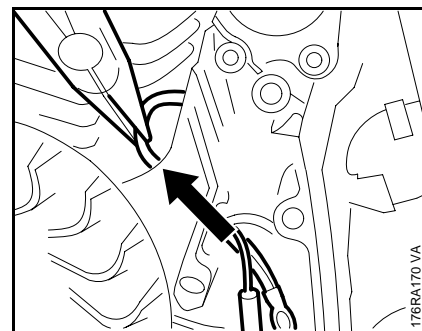
7.5 Wiring Harness



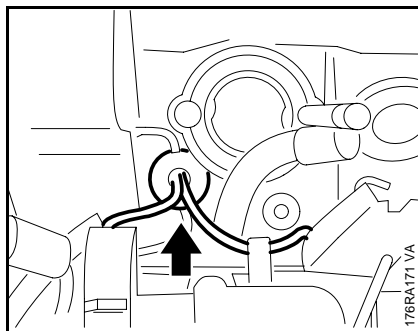
- Remove the ignition module, 7.1
- On machines with heated handles, pull pin connector (1) out of the socket (2).



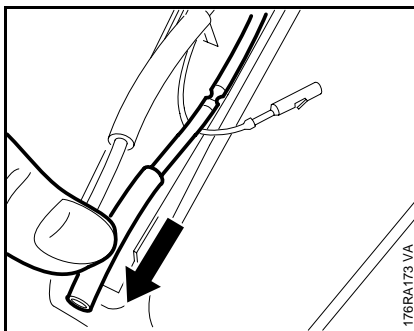
- Pull the grommet (arrow) out of the tank housing and off the wires.



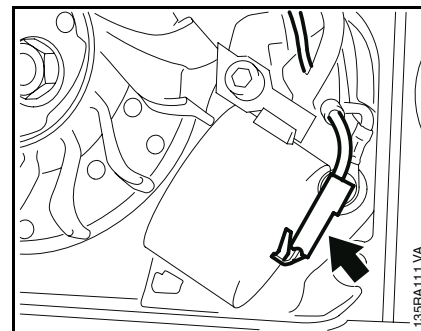
- Pull the wires sideways out of the tank housing.
- Remove the carburetor, 12.2.1



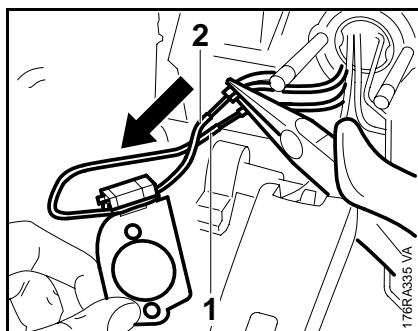
- Pull the grommet and wires (arrow) out of the tank housing.



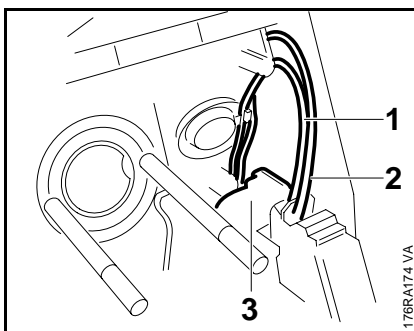
- Separate pin and socket connections of both wires and pull off the insulating tube.
- Pull the wire out of the grommet.



If the spark plug and ignition lead with spark plug boot are in order, check the resistance of the short circuit wire, ground wire and contact spring.



- On machines with carburetor heating, push back the insulating tubes and unplug the connectors (1 + 2).
- Remove the interlock lever, 10.2
- Pull the insulating tube off the connector of the wire between the generator and handle heating element.



- Pull the short circuit wire (1) and ground wire (2) off the contact springs.
- On machines with heated handles, remove the heater switch (3), 14.2

– Remove the wiring harness.

Install in the reverse sequence.

- After fitting the wiring harness, press the wires into their retainers.
- Fit the grommets properly in the openings in the tank housing.

- Pull the short circuit wire (arrow) off the tag on the ignition module.
- Connect the ohmmeter to ground and the short circuit wire.
- Set Master Control lever to “”

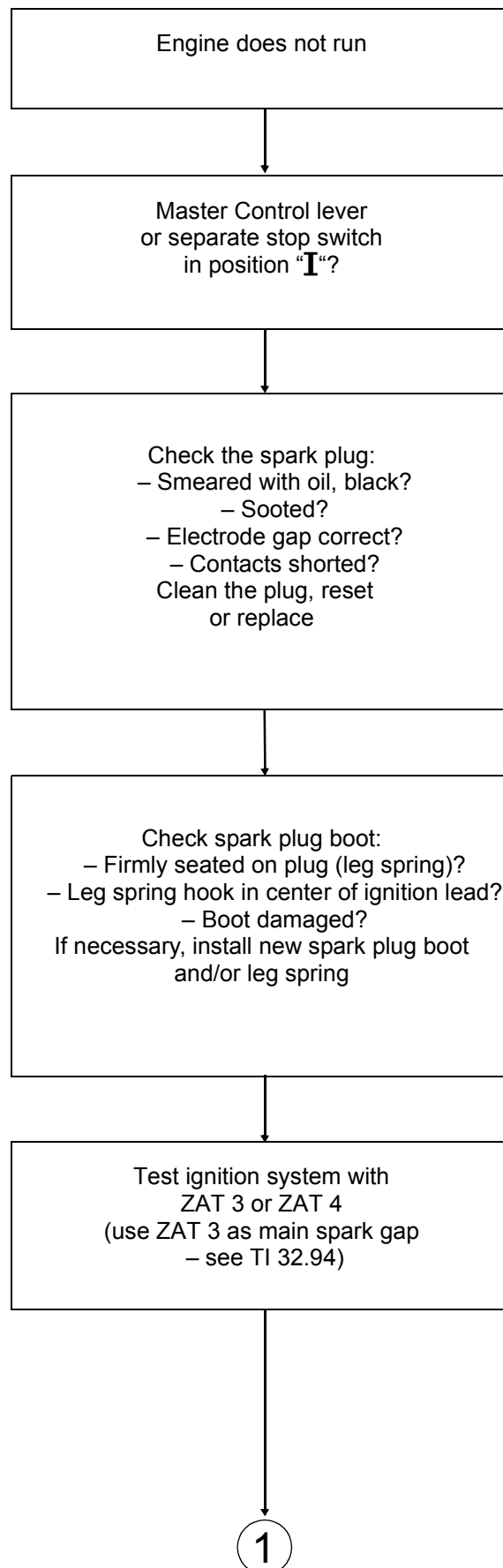
The resistance measured must be about 0 Ohm. If it is much higher, the reason is a break in the wire. The wire or contact spring has to be replaced.

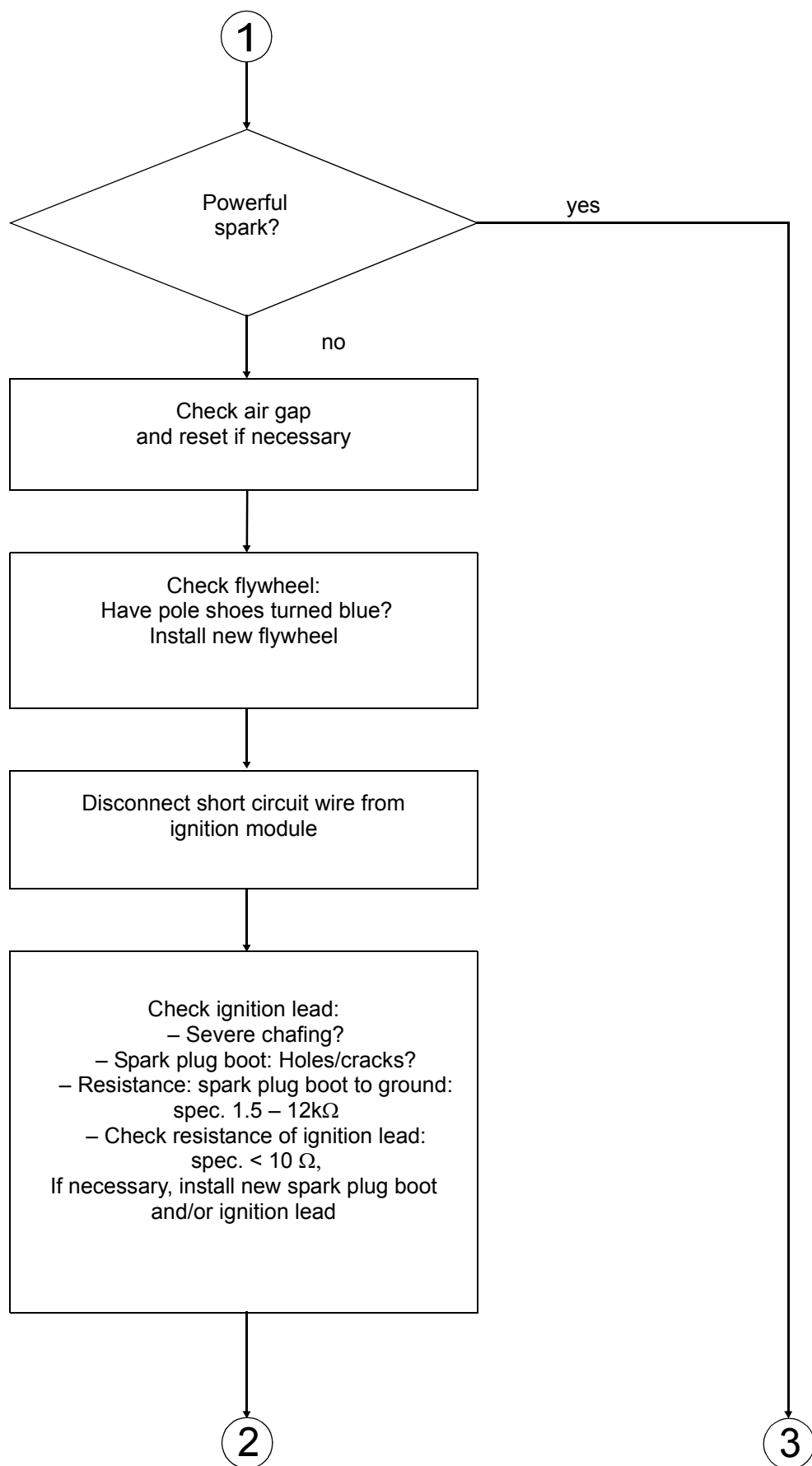
- Set Master Control lever to “”

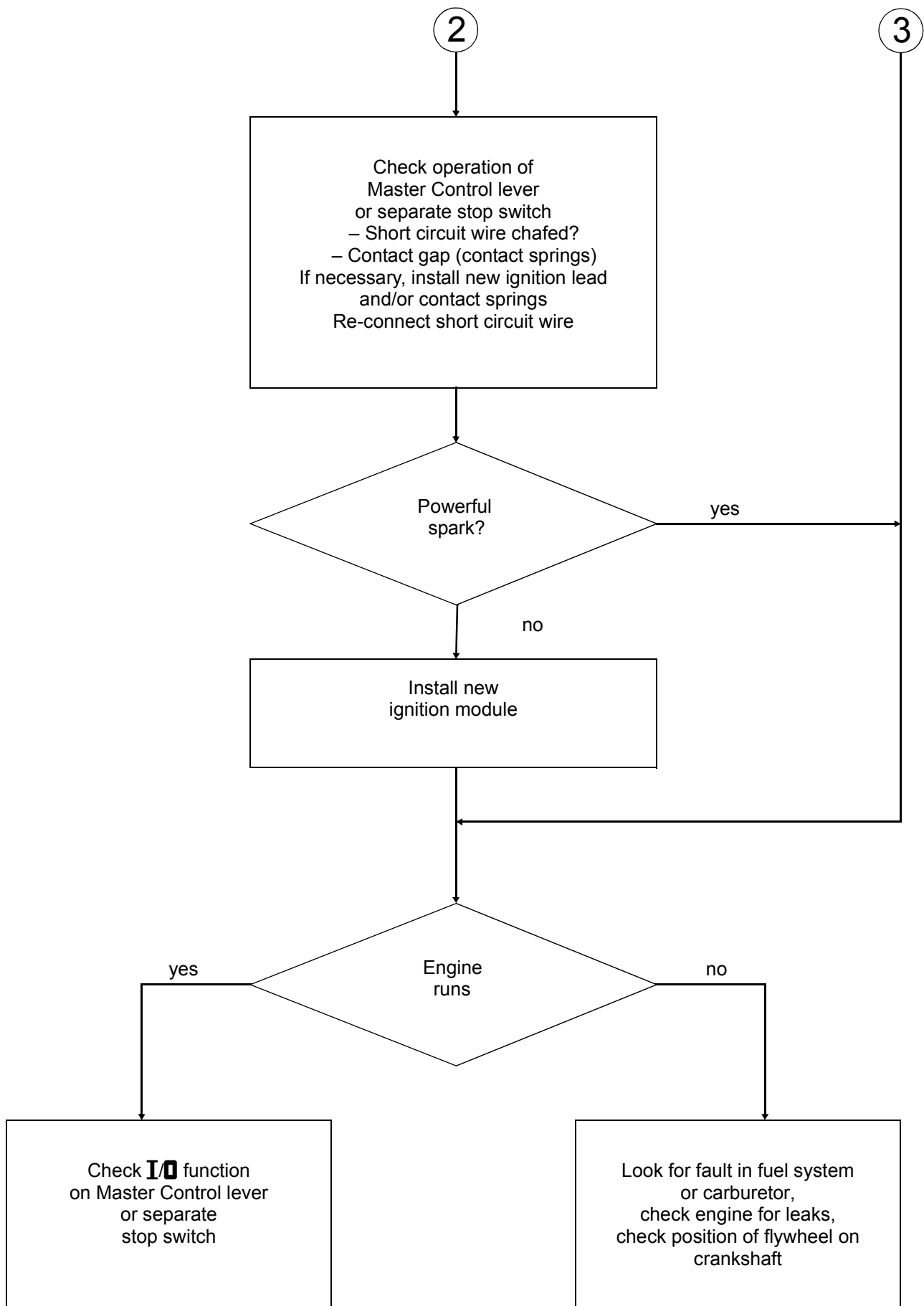
The resistance measured must be infinitely high. If not, fit a new short circuit wire. If no fault can be found, carry out further checks:

- Examine flywheel for damage, 7.3
- Check air gap between flywheel and ignition module, 7.3.2

If neither of these checks reveals a fault, install a new ignition module, 7.1.2







8. Rewind Starter


8.1 General

If the action of the starter rope becomes very stiff and the rope rewinds very slowly or not completely, it can be assumed that the starter mechanism is in order but plugged with dirt. At very low outside temperatures the lubricating oil on the rewind spring may thicken and cause the spring windings to stick together. This has a detrimental effect on the function of the starter mechanism. In such a case it is sufficient to apply a few drops of a standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons) to the rewind spring.

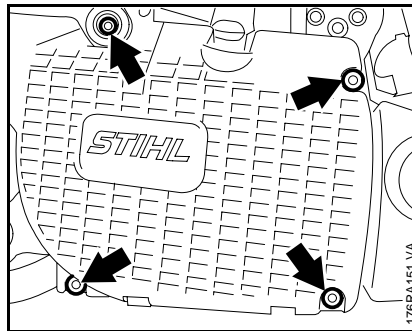
Carefully pull out the starter rope several times and allow it to rewind until its normal smooth action is restored.

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,  16.

Before installing, lubricate the rewind spring and starter post with STIHL special lubricant,  16.


8.2 Removing and Installing



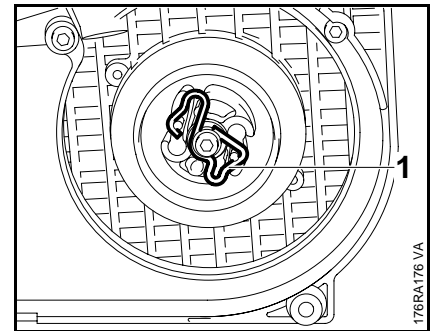
- Remove the screws (arrows) from the fan housing.
- Remove the fan housing with rewind starter.


Install in the reverse sequence.

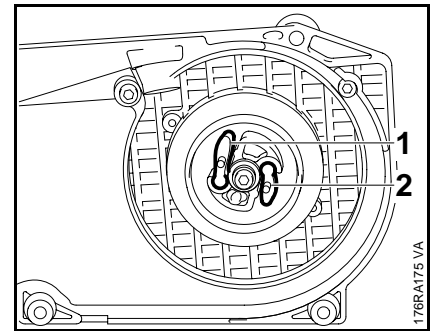
The hand guard is secured to the fan housing and crankcase with the IS-M5x35 screw.


- Tighten down the screws firmly,  3.5

8.3 Pawls




- Remove the fan housing with rewind starter,  8.2
- Carefully ease the spring (1) off the starter post.



- Pull the pawls (1 + 2) out of the rope rotor.
- Lubricate pegs of new pawls with grease,  16.

Install in the reverse sequence.

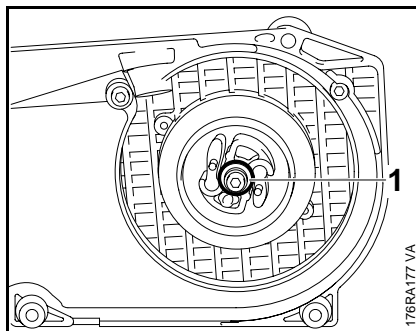
8.4 Rope Rotor




- Remove the fan housing with rewind starter,  8.2

Relieving tension of rewind spring

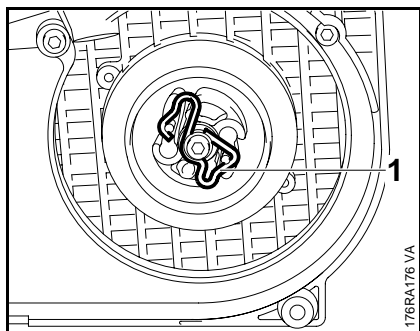
- Pull out the starter rope about 5 cm and hold the rope rotor steady.
- While still holding the rope rotor steady, take three full turns off the rope rotor.
- Pull out the rope with the starter grip and slowly release the rope rotor.

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




- Remove the washer (1) from the starter post.
- Remove the pawls.
- Carefully pull the rope rotor off the starter post.
- Remove the starter rope from the rotor,  8.4
- Install a new starter rope,  8.5
- Tension the rewind spring,  8.5.1

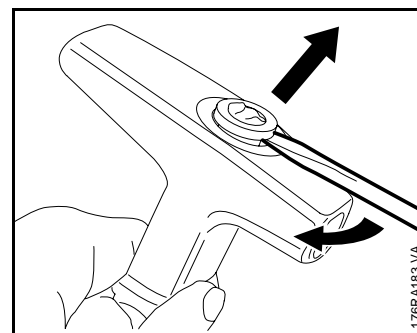
Install in the reverse sequence.



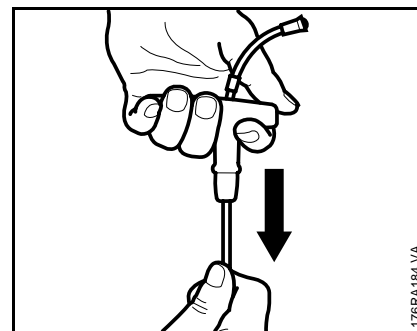
- Use a screwdriver or pliers to carefully remove the spring (1) from the starter post.


8.5 Starter Rope

- Remove the fan housing with rewind starter,  8.2

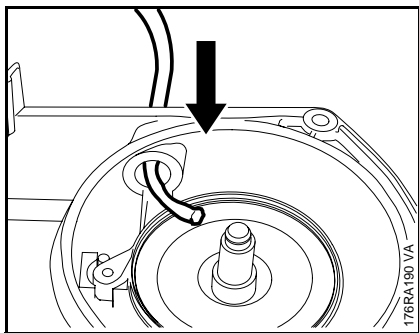


- Pry nipple of starter rope out of the starter grip.
- Remove remaining rope from starter grip.

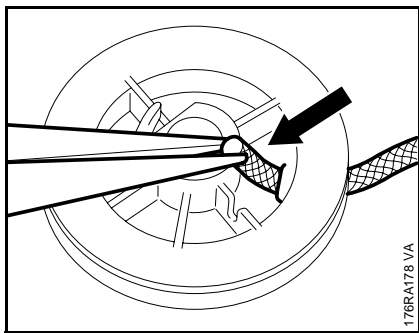


- Thread the new starter rope through the top of the starter grip.
- Remove the rope rotor,  8.4

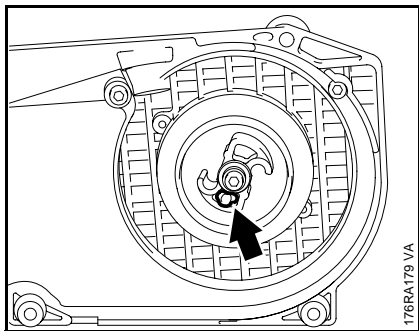
8.5.1 Tensioning



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

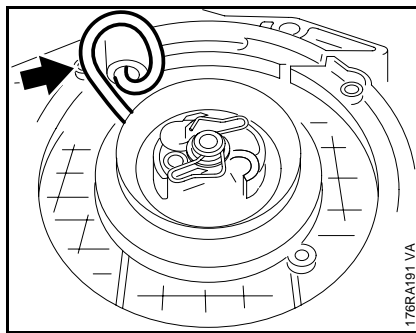


- Thread end of rope through hole in the side of the rotor, pull it out.
- Secure the rope with a simple overhand knot and pull it back.
- Install the rope rotor, 8.4

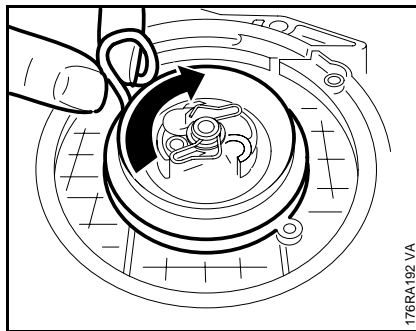


- Press knot into recess (arrow).
- Tension the rewind spring, 8.5.1

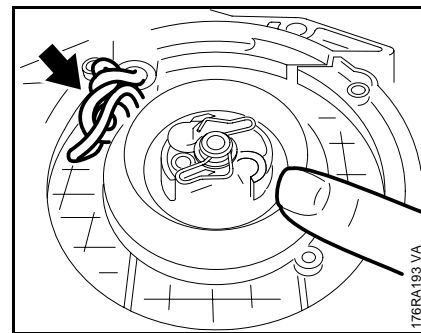
- Remove the fan housing with rewind starter, 8.2
- Relieve tension of rewind spring, 8.4



- Make a loop in the starter rope.

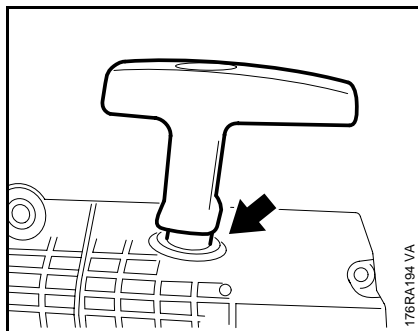


- Grip the rope next to the rotor and use it to turn the rope rotor six times clockwise.



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

8.6 Starter Rope Guide Bushing



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.

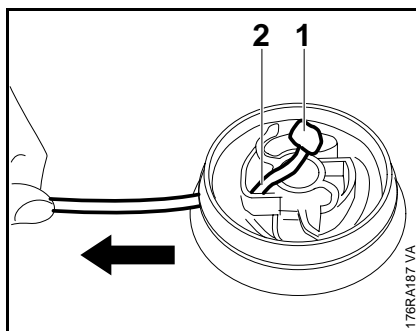
When the starter rope is fully extended, it must still be possible to rotate the rope rotor at least another half turn before maximum spring tension is reached. If this is not the case, pull the rope out, hold the rope rotor steady and take off one turn of the rope.

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

- Fit the fan housing with rewind starter, 8.2

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

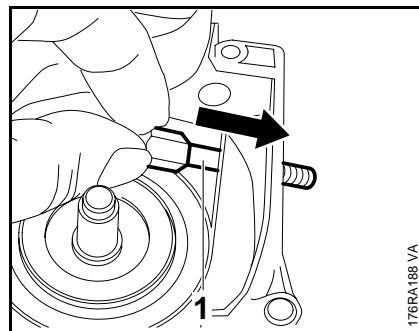
- Remove the fan housing with rewind starter, 8.2
- Remove the rope rotor, 8.4



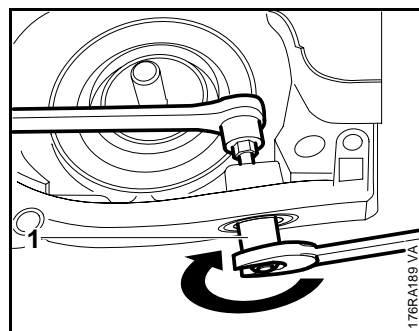
- Pull knot (1) out of recess (2) in rope rotor.
- Undo the knot.
- Pull the starter rope out of the rotor and guide bushing.
- Use a suitable tool to pry the damaged bushing out of the fan housing.

Installing the rope guide bushing

- Place the new bushing in its seat in the fan housing/starter cover.



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



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

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

- Remove the installing tool.
- Fit the starter rope, 8.5
- Install all other parts in the reverse sequence.


8.7 Replacing Rewind Spring

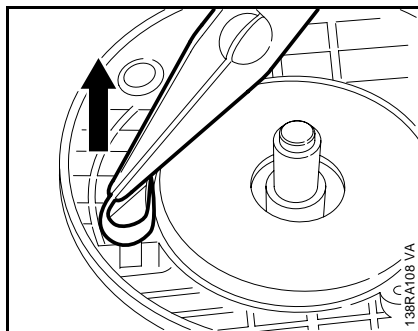
Troubleshooting,  4.2

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

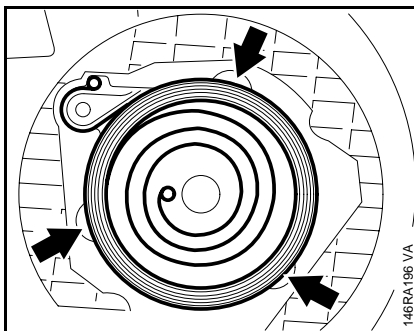
Removing

Wear a face shield and work gloves.


- Remove the rope rotor,  8.4



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



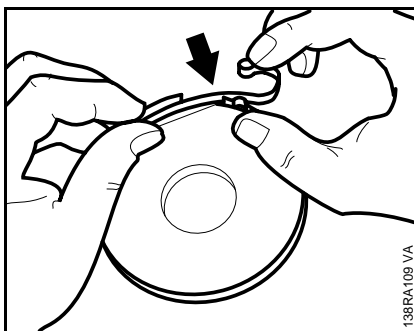
Installing

- Lubricate the spring with a few drops of STIHL special lubricant before installation,  16.
- Position replacement spring with frame (1) in the fan housing.

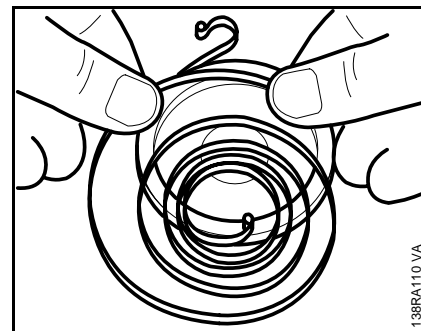
The anchor loop must be above the lug in the fan housing.



- Position suitable tools on the recesses (arrows) and push the spring into its seat in the fan housing.

If the rewind spring pops out during installation, fit it in the installing tool 1116 893 4800 as follows:





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

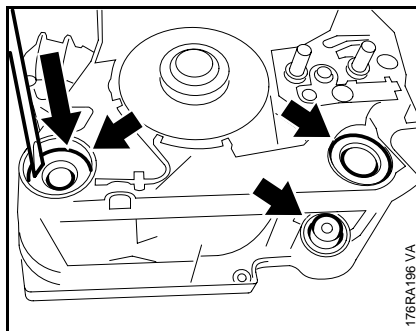


- Fit the rewind spring in the spring housing in the counterclockwise direction, starting from outside and working inwards.
- Place the spring housing in the fan housing.
- Press the anchor loop into the recess in the fan housing at the same time.
- Remove tools.
- Install the rope rotor,  8.4
- Tension the rewind spring,  8.5.1

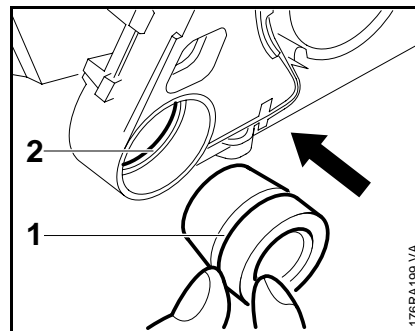
9. AV Handle System

The handle housing and crankcase are connected by vibration damping rubber buffers. Damaged rubber buffers (annular buffers) must always be replaced.

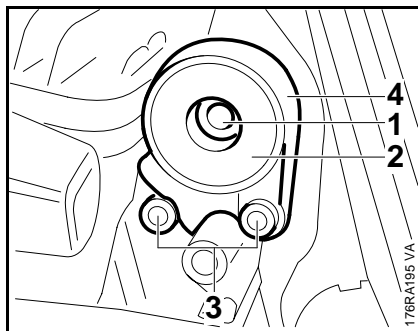
- Remove the air filter,  12.2.1
- Remove the shroud,  6.4




- Pry the annular buffers (arrows) out of the crankcase.

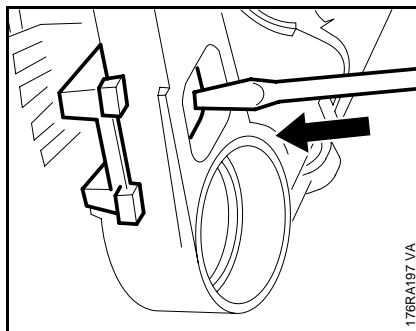


- At the clutch side, push the annular buffer home from the outside so that its groove (1) engages the housing rib (2).

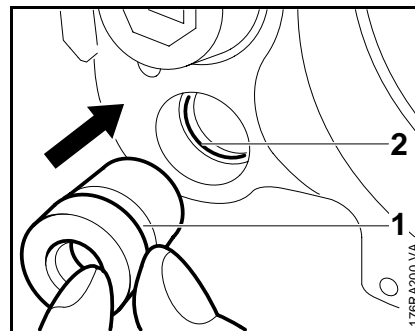


- Take out the screw (1).
- Remove the sleeve (2).
- Take out the screws (3).
- Remove the annular buffer (4).

Remove the tank housing for access to the other rubber buffers,  12.8

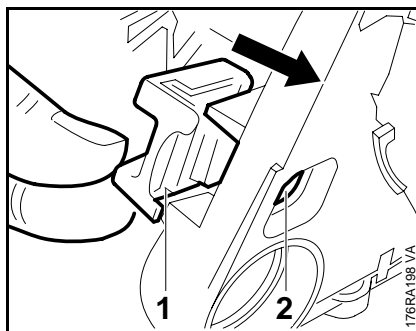


- Push the stop buffer out of its seat and take it away.



- At the starter side, push the annular buffer home from outside so that its groove (1) engages the housing rib (2).

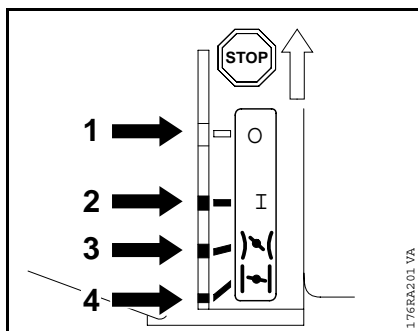
Install all other parts in the reverse sequence.



- Push the stop buffer into the guide so that the groove (1) engages the housing rib (2).

10. Master Control/ Handle System

10.1 Switch Shaft



The Master Control lever moves the switch shaft to select the required function.

The following positions can be selected with the Master Control lever:

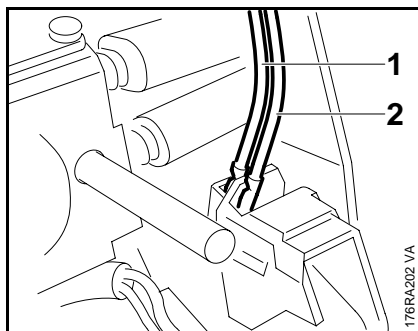
“STOP” (1) closes short circuit contact, interrupts ignition

“RUN” (2) is the normal operating position

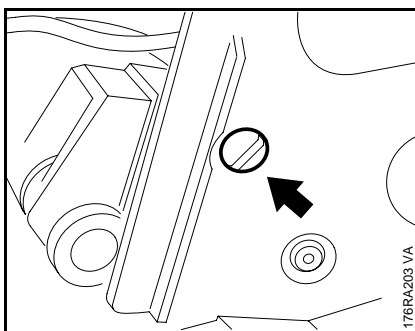
“START” (3) is the starting throttle position / choke shutter open (warm start)

“CHOKE” (4) is the starting throttle position / choke shutter closed (cold start)

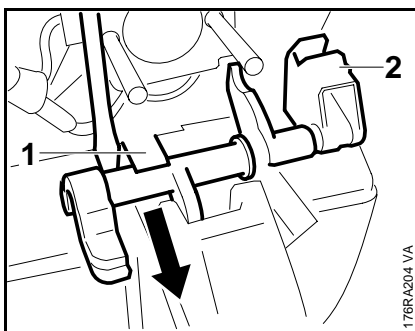
- Disconnect throttle rod from carburetor, 12.2.1



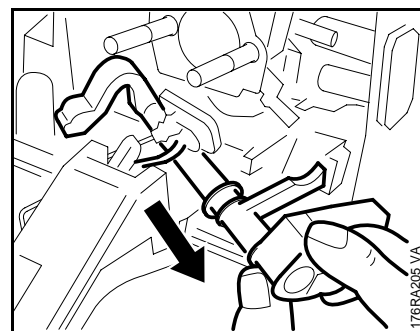
- Disconnect short circuit wire (1) and ground wire (2) from the contact springs.



- Take out the switch shaft mounting screw (arrow).



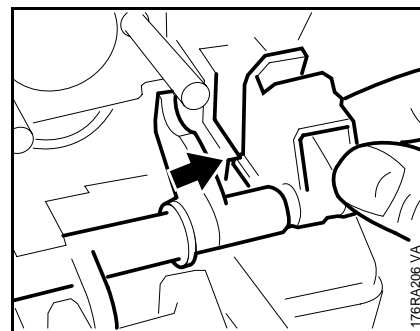
- Carefully ease the switch shaft out of its left-hand mount (1) and then pull the switch housing (2) out of the right-hand mount.



Machines with heated handles

- Remove the switch shaft from under the wire to the rear handle heating element.

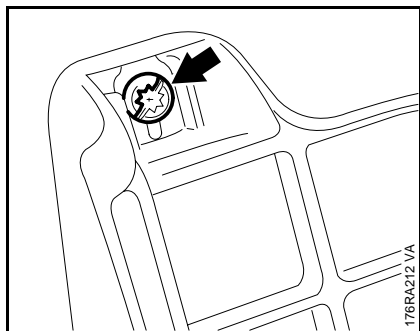
Install in the reverse sequence.



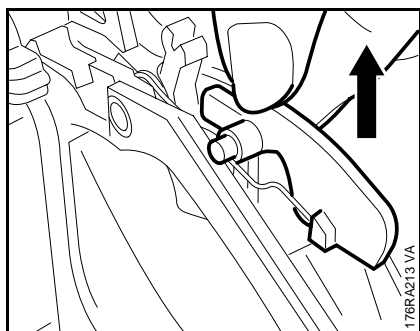
- Slide the switch housing into its guide before fitting the switch shaft in its pivot mount.

Install all other parts in the reverse sequence.

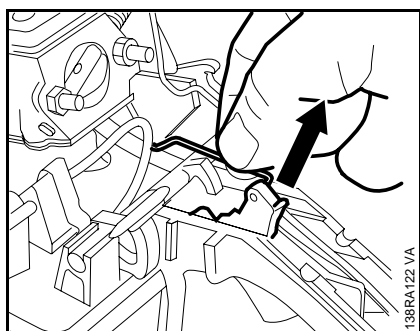
10.2 Throttle Trigger/Interlock Lever



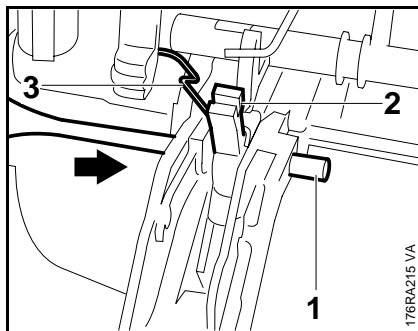
- Remove the filter base, 12.1
- Remove the screw (arrow) from the underside of the rear handle.
- Remove the handle molding upwards.



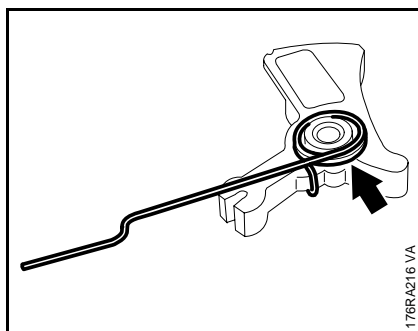
- Move Master Control lever to “RUN” position.
- Take out the interlock lever.



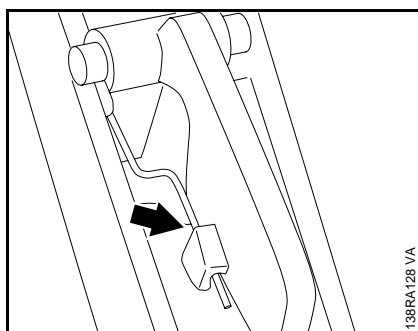
- Pull the throttle rod out of the throttle trigger.



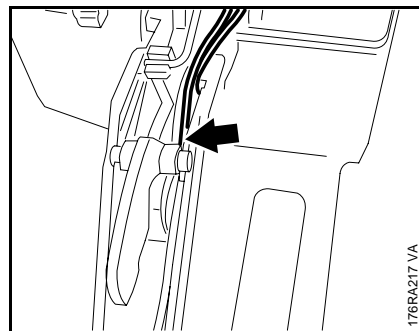
- Use a 5 mm drift to drive out the dowel pin (1).
- Take out the throttle trigger (2) with torsion spring (3).



- Remove the torsion spring from the throttle trigger.

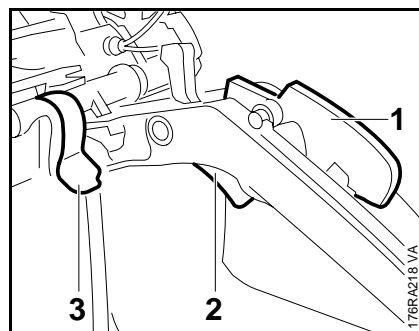


The torsion spring must be fitted under the interlock lever and locate in the notch (arrow).

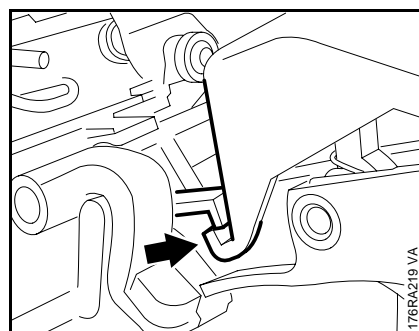


Machines with heated handles

- The wires from the heating element must be under the interlock lever (arrow) and locate in the channel.



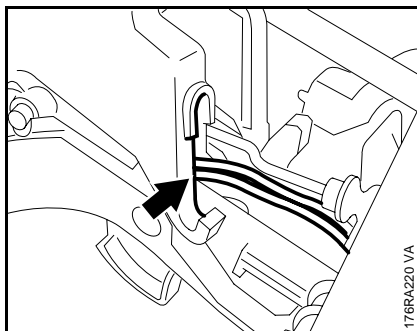
- Press the interlock lever (1) down.
- Pull the throttle trigger (2) up and move the Master Control lever (3) to “CHOKE” position.



- Fit the handle molding, making sure it engages behind the lugs as shown.

11. Chain Lubrication

11.1 Pickup Body/Suction Hose



Machines with heated handles

- Wires must locate in slot in handle molding.
- Fit the filter base, 12.1

Install all other parts in the reverse sequence.

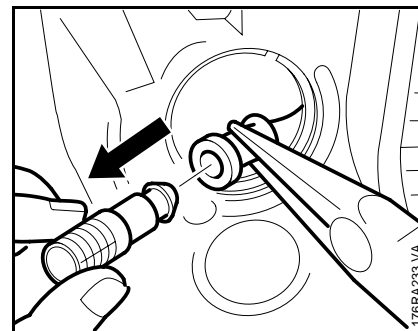
Impurities gradually clog the fine pores of the filter with minute particles of dirt. This prevents the oil pump from supplying sufficient oil to the bar and chain. In the event of problems with the oil supply system, first check the oil tank and the pickup body. Clean the oil tank if necessary.

Troubleshooting – 4.3

Pickup body

- Drain the oil tank.

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

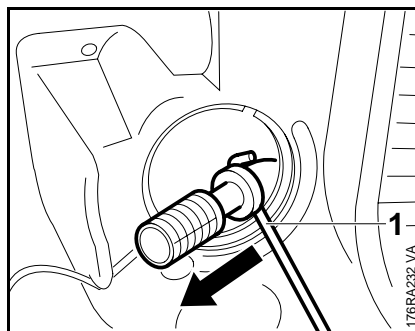


- Pull the pickup body out of the suction hose.
- Fit a new pickup body.
- Flush out the oil tank.

Install in the reverse sequence.

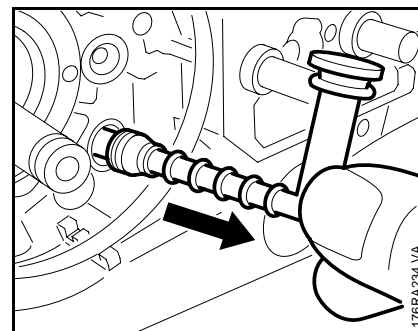
Suction hose

- Remove the oil pump, 11.3.1
- Grip the tab on the suction hose with pliers and pull the grommet out of the bore.



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

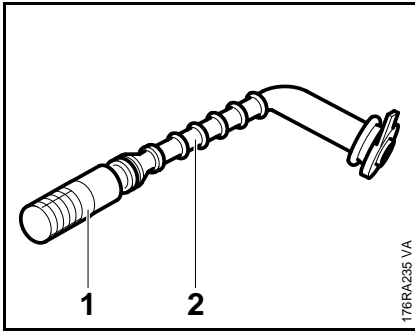
Do not stretch the oil hose during this operation.



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

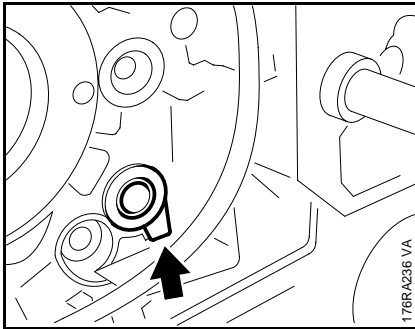
11.2 Valve

11.2.1 Cleaning



- Pull the pickup body (1) off the suction hose (2).

Install in the reverse sequence.



- Insert the suction hose in the crankcase.
- Lubricate grommet with a little oil.
- Use a blunt tool to push the suction hose into the crankcase so that the tab locates in its seat at the bottom right (arrow).

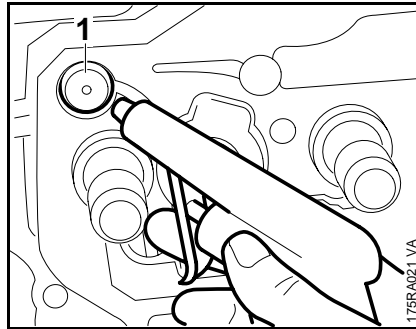
A valve is installed in the tank wall to keep internal tank pressure equal to atmospheric pressure.

- Remove the oil tank cap.
- Drain the oil tank.

Note:

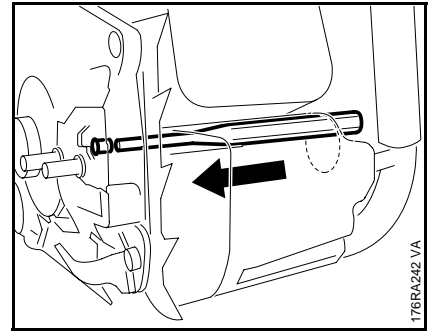
Collect chain oil in a clean container or dispose of it properly at an approved disposal site.

- Remove the inner side plate, 5.4.2

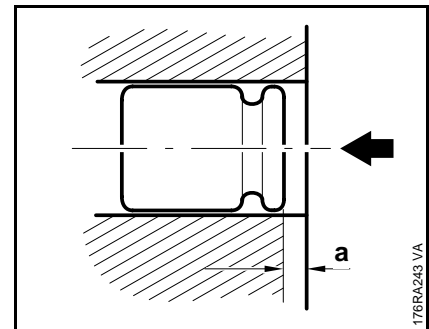


- Blow the valve (1) clear with compressed air (from outside to inside of tank).
- Flush out the oil tank.
- Fit the inner side plate, 5.4.2
- Fit the oil tank cap.

11.2.2 Replacing



- Unscrew the oil tank cap.
- Remove the inner side plate, 5.4.2
- Use a 5 mm drift to carefully drive the valve out of the crankcase from inside the oil tank.

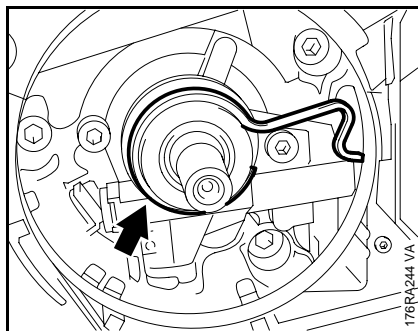


- Use a 7 mm drift to carefully press home the new valve from outside until it is about 1 mm below the housing face ('a' in illustration).

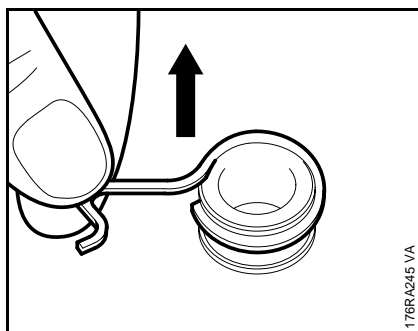
Reassemble all other parts in the reverse sequence.

11.3 Oil Pump

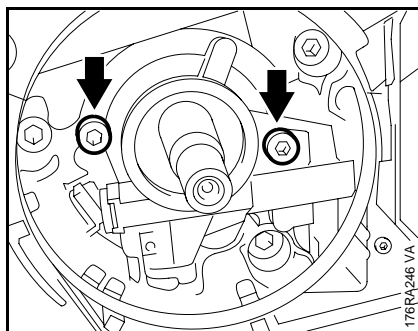
11.3.1 Removing and Installing



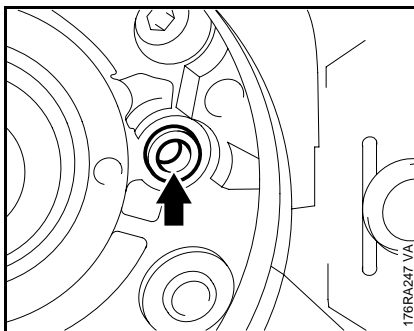
- Remove the clutch, 5.3
- Pull the worm with drive spring (arrow) out of the oil pump and off the crankshaft stub.



- If necessary, take the drive spring off the worm.



- Take out the screws (arrows).
- Pull the oil pump out of its seat.

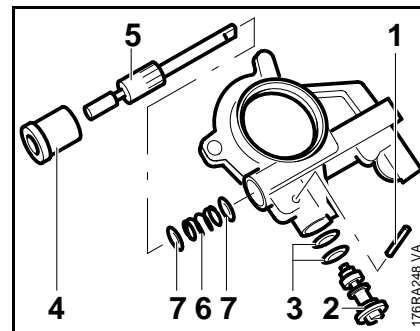


- Take the sealing ring (arrow) out of the housing bore.

Install in the reverse sequence.

- Lubricate the worm with grease before installing, 16.

11.3.2 Servicing



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

- Remove the oil pump, 11.3.1
- Use a 2 mm drift to drive out the spring pin (1).
- Pull out the control bolt (2).
- Remove the O-rings (3).
- Pry out the plug (4).
- Remove the pump piston (5) with spring (6) and washers (7).
- Clean all parts and examine for serviceability, 16.

Install in the reverse sequence.

Always install new O-rings.

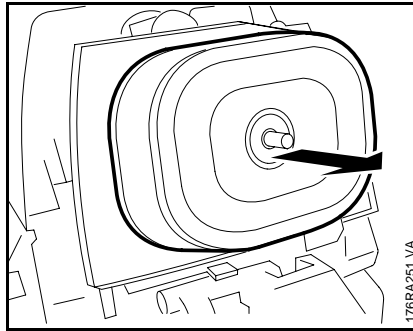
- Lubricate the pump piston and worm with grease before installing, 16.

12. Fuel System

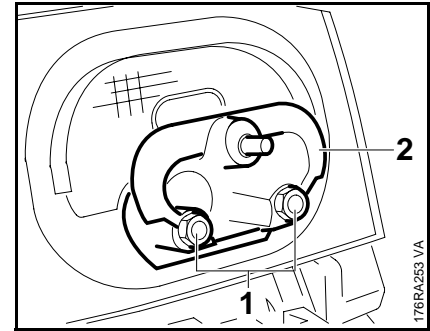
12.1 Air Filter

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

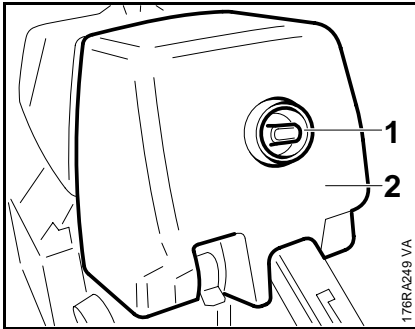
The air filter should be cleaned when there is a noticeable loss of engine power.



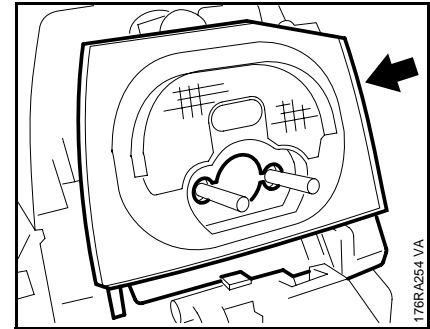
- Remove the air filter.
- Wash the air filter thoroughly in a fresh, non-flammable cleaning solution and blow out with compressed air. Replace if damaged.



- Unscrew the collar nuts (1).
- Pull off the flange (2).



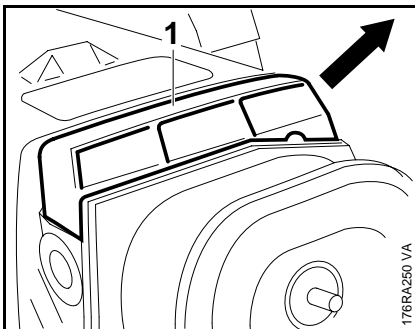
- Unscrew the twist lock (1).
- Remove the carburetor box cover (2).



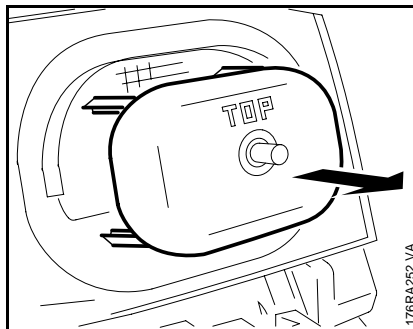
- Remove the filter base (arrow).
- Wash the filter mesh in the filter base thoroughly in a fresh, non-flammable cleaning solution and blow out with compressed air.

If filter mesh is damaged, install a new filter base.

Install in the reverse sequence.



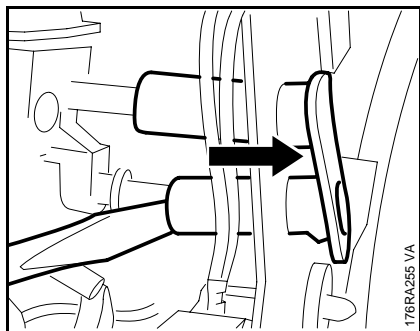
- Pull off the air baffle (1) to the rear.



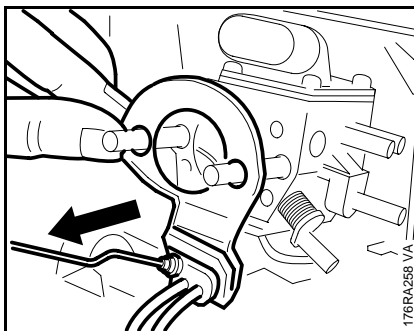
- Pull off the baffle in the direction of the arrow.

12.2 Carburetor

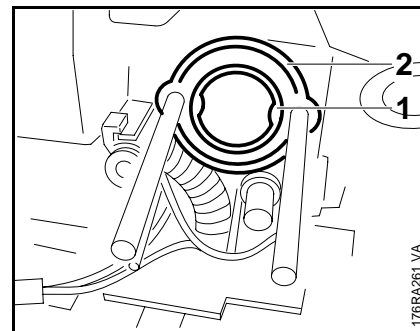
12.2.1 Removing and Installing



- Remove the filter base, 12.1
- Pull the grommet off the adjusting screws and out of the housing.

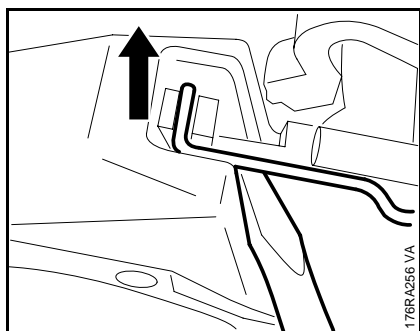


- Remove the baffle plate with grommet and throttle rod.

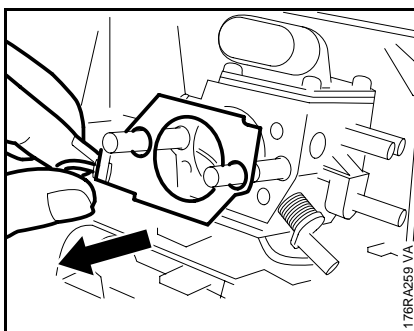


- Before fitting the carburetor, check that the sleeve (1) and washer (2) are in place.

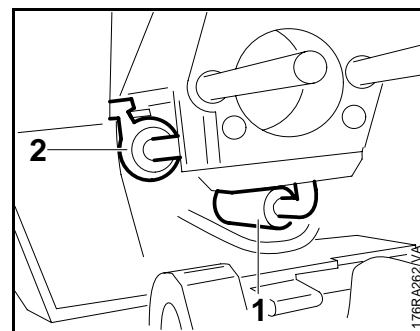
Machines with carburetor heating



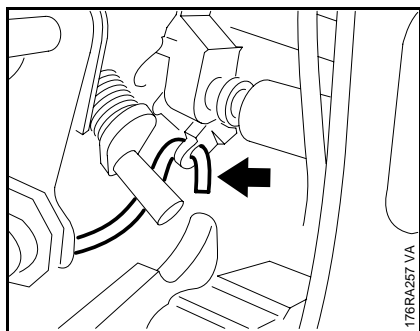
- Open the throttle wide.
- Disconnect the throttle rod from the throttle trigger.



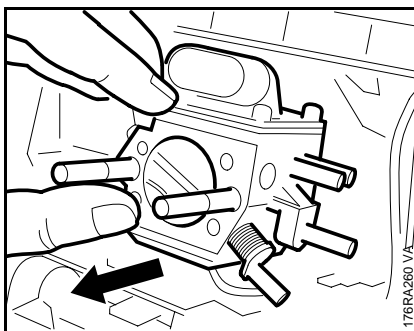
- Pull the heating element off the studs.
- Separate pin and socket connection for thermostatic switch, 13.3



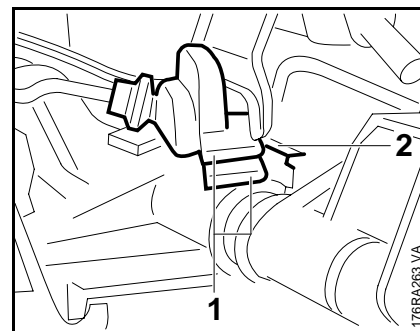
- When pushing the carburetor into position, check that the impulse hose (1) and fuel hose (2) are correctly seated.



- Disconnect the throttle rod from the throttle shaft.




- Pull off the carburetor.
- Reassemble in the reverse sequence.




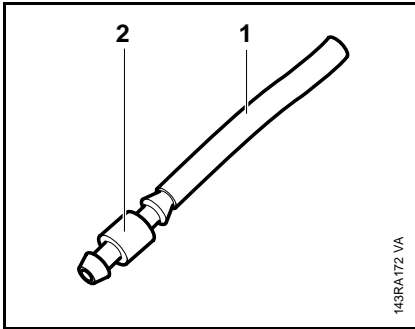
- Fit the grommet so that the rubber tabs (1) locate between the housing rib (2).

12.2.2 Leakage Test

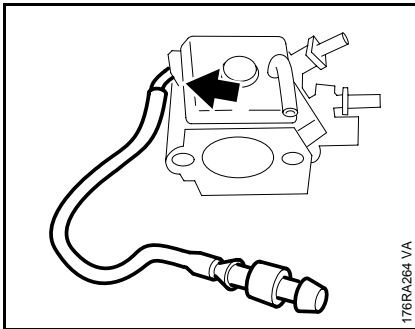
In the case of problems with the carburetor or fuel supply system, also check and clean,  12.5

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

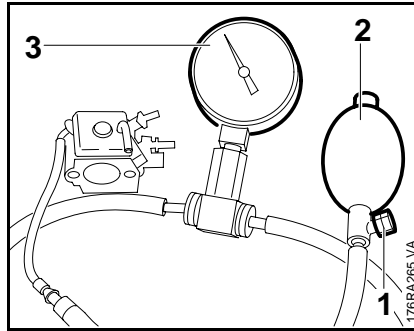
- Remove the carburetor,  12.2.1



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





- Push the fuel line with nipple onto the carburetor's elbow connector.



- Push the nipple into the pressure hose of tester 1106 850 2905.
- Close the vent screw (1) on the rubber bulb (2) and pump air into the carburetor until the pressure gauge (3) shows a reading of approx. 0.8 bar (80 kPa).


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

1. The inlet needle is not sealing (foreign matter in valve seat or sealing cone of inlet needle is damaged or inlet control lever sticking). Remove to clean,  12.3.2

2. Metering diaphragm damaged, replace if necessary,  12.3.1

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

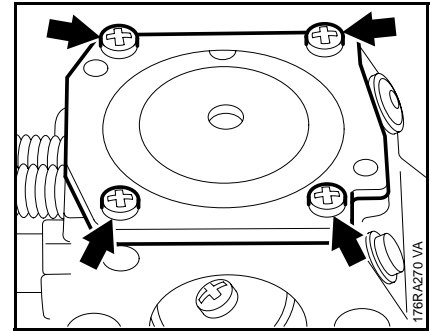
- Push the fuel hose onto the elbow connector.


- Install the carburetor,  12.2.1

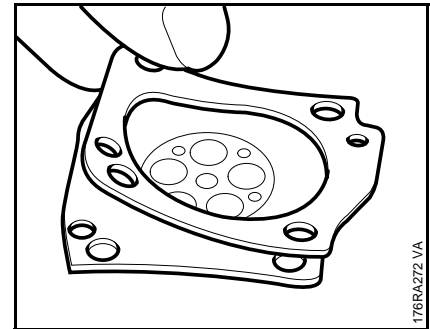
Reassemble all other parts in the reverse sequence.

12.3 Servicing the Carburetor

12.3.1 Metering Diaphragm



- Remove the carburetor,  12.2.1
- Take out the screws (arrows).
- Remove the end cover.
- Carefully remove the gasket and pump diaphragm from the end cover.

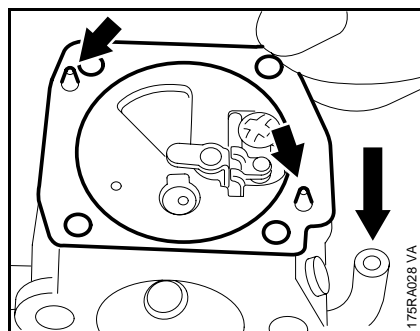


- Carefully separate the diaphragm and gasket.
- Inspect diaphragm for damage and wear and replace if necessary.

12.3.2 Inlet Needle

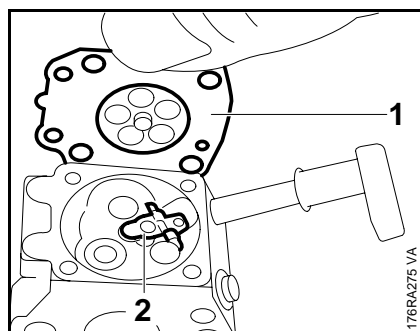
The diaphragm material as well as the inlet and outlet valves are subjected to continuous alternating stresses and eventually show signs of fatigue, i.e. the diaphragm distorts and swells and has to be replaced.

Install in the reverse sequence.



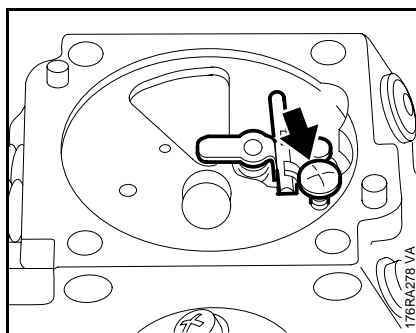
- Place the gasket on the carburetor body.

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

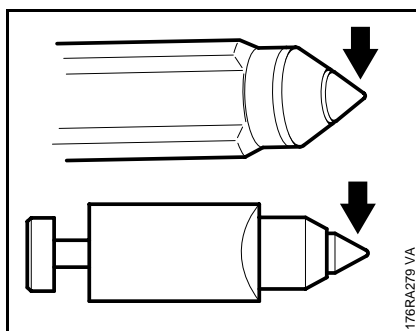


- Fit the metering diaphragm so that the perforated plate (1) faces the inlet control lever (2).

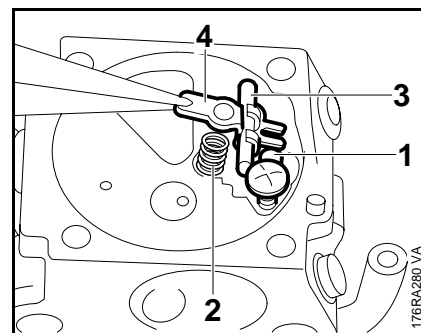
Install all other parts in the reverse sequence.



- Remove the metering diaphragm, 12.3.1
 - Take out the screw (arrow).
 - Remove the inlet control lever with spindle.
- There is a small spring under the inlet control lever which may pop out during disassembly.
- Take out the inlet needle.



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



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

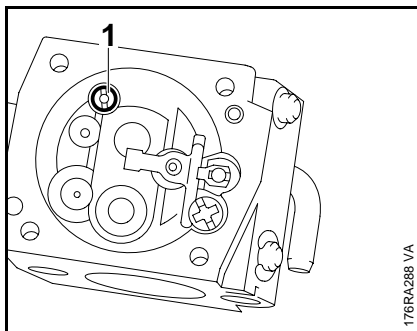
Make sure the helical spring locates on the control lever's nipple.

- Check that inlet control lever moves freely.

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

- Install the metering diaphragm, 12.3.1

12.3.3 Fixed Jet



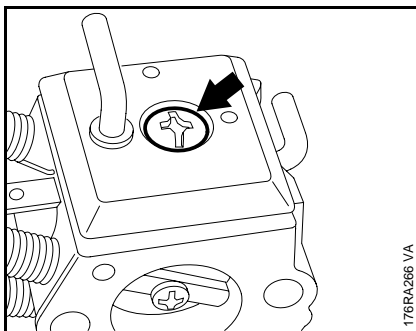
– Remove the metering diaphragm, 12.3.1

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

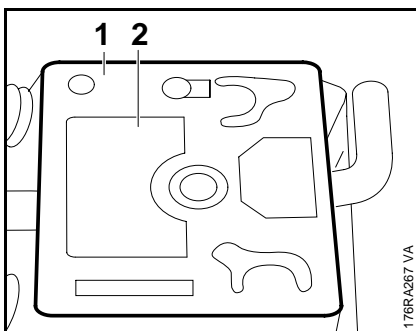
Take care not to damage the fixed jet with the screwdriver.

Install in the reverse sequence.

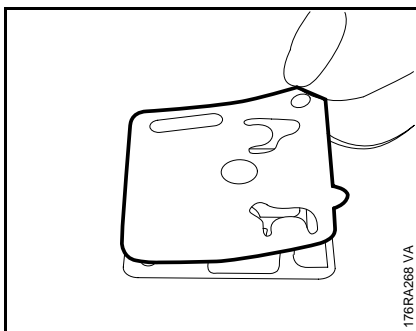
12.3.4 Pump Diaphragm



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

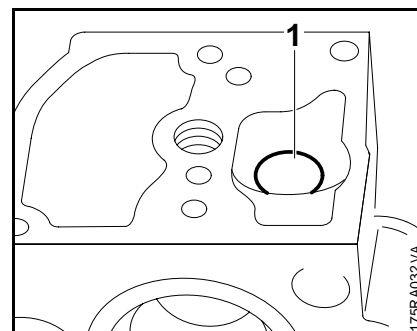


- Remove the gasket (1) and pump diaphragm (2) from the end cover or carburetor body.

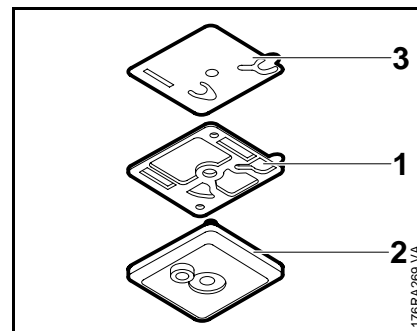


- Carefully separate the diaphragm and gasket.
- Inspect diaphragm for damage and wear, fit a new gasket.

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



- Check fuel strainer (1) for contamination and damage. If necessary, use a needle to take it out of the carburetor and clean or replace.



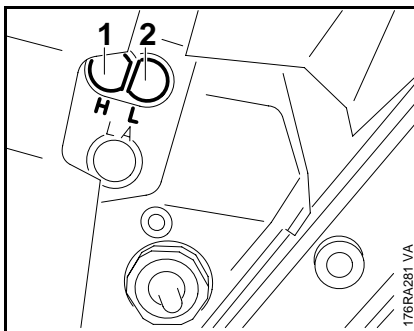
- Place the gasket (1) on the end cover (2).
- Wet the pump diaphragm (3) with fuel and place it on the gasket.

12.4 Adjusting (Carburetor without Limiter Cap)

- Place the end cover on the carburetor body.

The pump diaphragm, gasket and end cover are held in position by integrally cast pegs.

- Fit the screw and tighten it down firmly.



Standard setting (without tachometer)

To readjust the carburetor, start with the standard setting.

- Carefully screw down both adjusting screws (H and L) until they are against their seats.

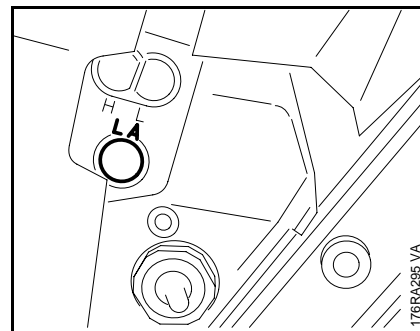
Then make the following adjustments:

- Open high speed screw (H) one full turn.
- Open low speed screw (L) one full turn.

If no tachometer is available, do not turn the high speed screw (H) beyond the standard setting to make the mixture leaner.

Standard setting (with tachometer)

- Check the air filter and clean or replace as necessary.
- Check and clean or replace spark arresting screen (if fitted).
- Check chain tension.
- Warm up the engine.
- Adjust idle speed.



Adjusting idle speed

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

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

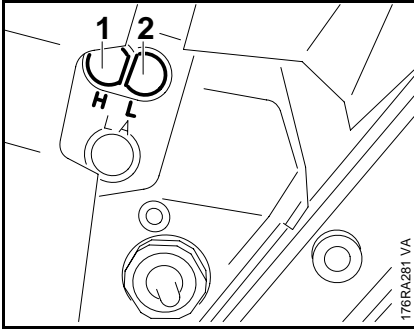
If this speed is higher than 3,700 rpm, abort the procedure and start again with step 1.

3. Use the idle speed screw (LA) to set engine speed again to 3,300 rpm.
4. Set the engine speed to 2,500 rpm with the low speed screw (L).

Starting from the standard setting, use the high speed screw (H) to adjust the maximum engine speed to 13,500 rpm.

If the setting is **too lean** there is a risk of engine damage due to insufficient lubrication and overheating.

12.4.1 Adjusting (Carburetor with Limiter Cap)



Standard setting

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

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

Make the following adjustments:

- Turn high speed screw (H) counterclockwise (max. 3/4 turn) as far as stop.
- Screw low speed screw (L) down onto its seat clockwise, then open it 1/4 turn from that position.

Adjusting idle speed

- Check the air filter and clean or replace as necessary.
- Check and clean or replace spark arresting screen (if fitted).
- Check chain tension.
- Warm up the engine.
- Adjust idle speed with a tachometer. Adjust specified engine speeds within tolerance of +/- 200 rpm.

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

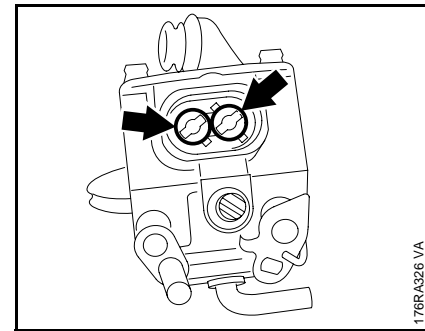
If this speed is higher than 3,700 rpm, abort the procedure and start again with step 1.

3. Use the idle speed screw (LA) to set engine speed again to 3,300 rpm.
4. Set the engine speed to 2,500 rpm with the low speed screw (L).

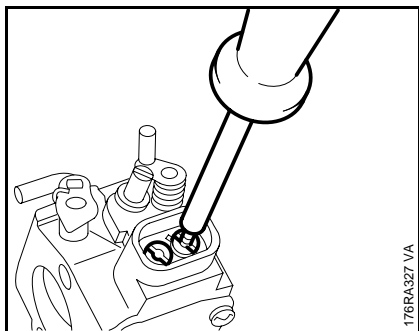
12.4.2 Basic Setting (Carburetor with Limiter Caps)

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

Carry out the two following steps:



- Turn the limiter caps (arrows) counterclockwise as far as stop so that the lugs can be seen in the carburetor openings.



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

After removing the limiter caps, first carry out the basic setting.

Make the following adjustments:

- Open the high speed screw (H) one full turn.
- Open the low speed screw (L) one full turn.
- Set the engine speed to 2,500 rpm with the low speed screw (L).
- If no tachometer is available, mount the limiter caps, see step 6

Fine tuning

- Check the air filter and clean or replace as necessary.
- Check and clean or replace spark arresting screen (if fitted).
- Check chain tension.
- Warm up the engine.

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

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

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

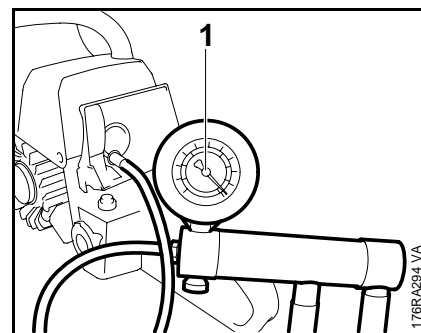
3. Use the idle speed screw (LA) to set engine speed again to 3,300 rpm.
4. Set the engine speed to 2,500 rpm with the low speed screw (L).
5. Set engine's maximum speed to 13,500 rpm with the high speed screw (H)
6. Install new limiter caps, noting that the stop lugs on the limiter caps must line up with the openings in the carburetor.


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

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

In the event of trouble with the carburetor or the fuel supply system, always check and clean the tank vent.

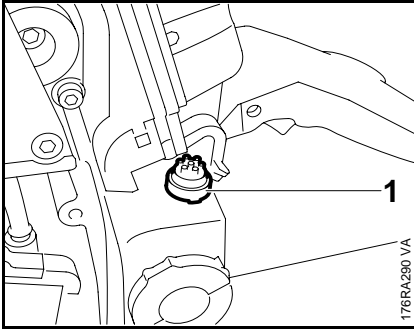
Check function by performing vacuum test on the tank via the fuel hose.



- Remove the carburetor,  12.2.1

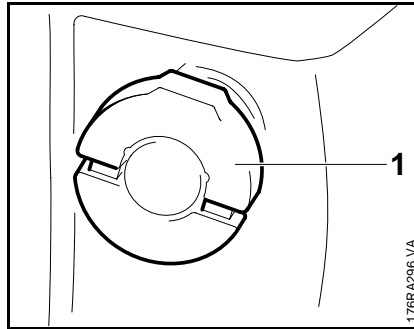
- Connect vacuum pump 0000 850 3501 (1) to fuel hose and generate vacuum in fuel tank.

12.6 Pickup Body



- Equalization of pressure takes place via the tank vent valve (1). There must be no build-up of vacuum in the tank. In the event of a malfunction, use a screwdriver to pry out the tank vent valve and install a new one with a new O-ring.

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

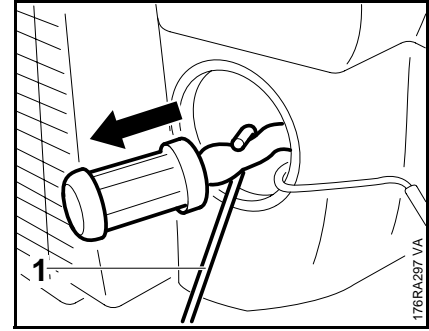


In the event of trouble with the fuel supply system, always check the fuel tank and the pickup body first. Clean the fuel tank if necessary.

Cleaning the fuel tank

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

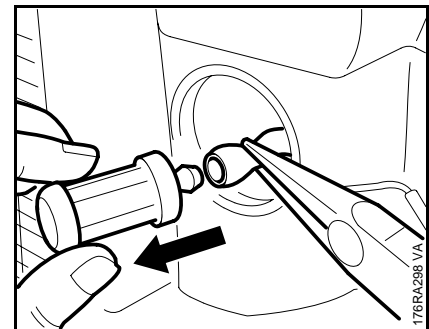
Dispose of fuel properly in accordance with environmental requirements.



Pickup Body

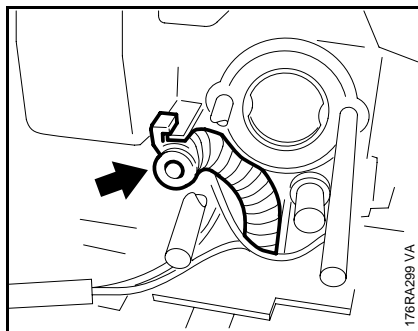
- Use hook (1) 5910 893 8800 to pull the pickup body out of the fuel tank.

Do not overstretch the suction hose.

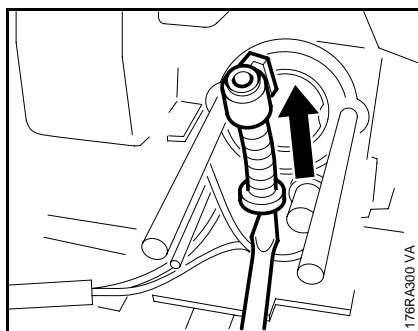


- Pull the pickup body off the suction hose.
 - Fit a new pickup body.

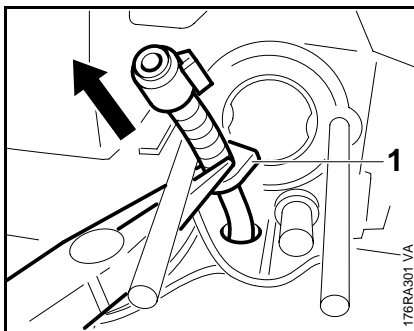
Install in the reverse sequence.



- Remove the carburetor, 12.2.1
- Pull off the pickup body, 12.6
- Pull the fuel hose out of the retainer in the tank housing.



- Pry fuel hose flange out of the fuel tank.

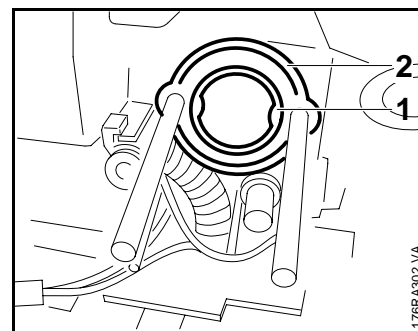


- Pull out the fuel hose.
- Install in the reverse sequence.
- Coat the hose flange with a little oil.
 - Straight side (1) of flange must locate against the tank housing.

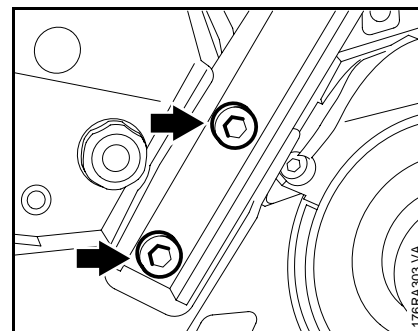
- Drain the fuel tank.
- Drain the oil tank.

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

- Remove the carburetor, 12.2.1

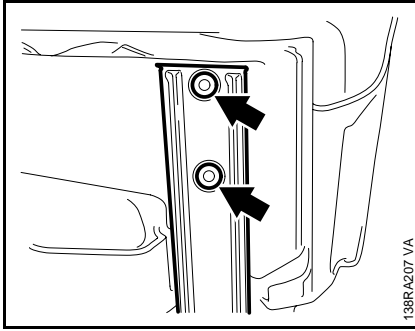


- Take the sleeve (1) out of the manifold, and pull the washer (2) off the studs.



- Remove the mounting screws from the side of the front handle.

Heat the screwed joints. Do not overheat polymer.

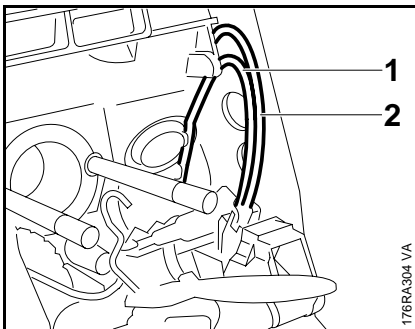


- Remove front handle mounting screws from underside of machine.

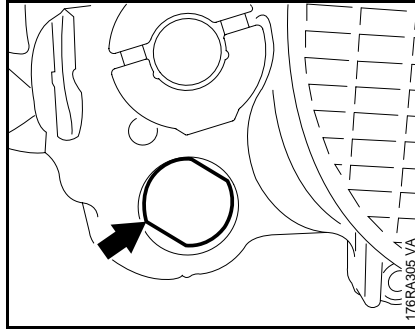
– Remove the front handle.

On machines heated handles, disconnect the heating element, 14.4

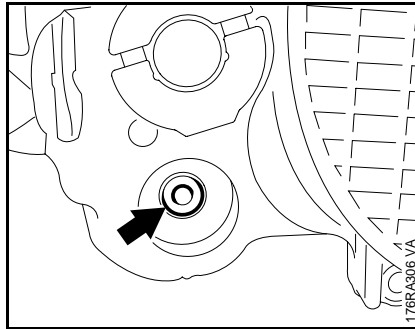
- Disconnect connector between generator and rear handle heating element, 7.5
- On machines with carburetor heating, disconnect connector of wire to heating element, 7.5
- On machines heated handles, remove the heater switch, 14.2



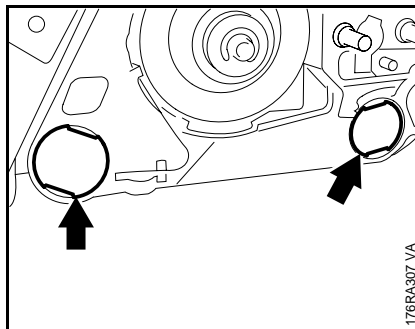
- Disconnect short circuit wire (1) and ground wire (2) from the contact springs.



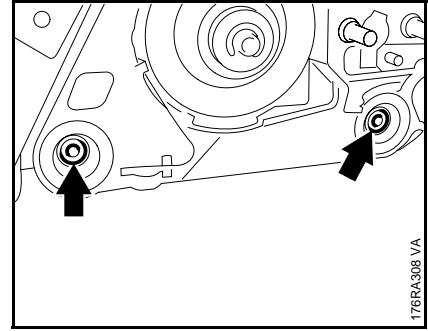
- Ease the plug (arrow) out of the annular buffer at the starter side.



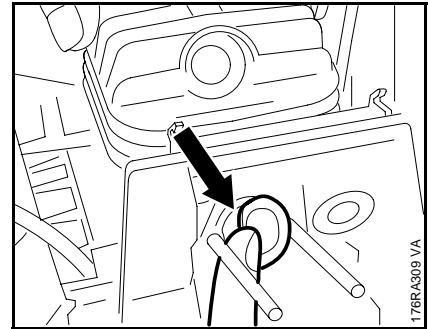
- Take the screw (arrow) out of the buffer.
- Remove the inner side plate, 5.4.2



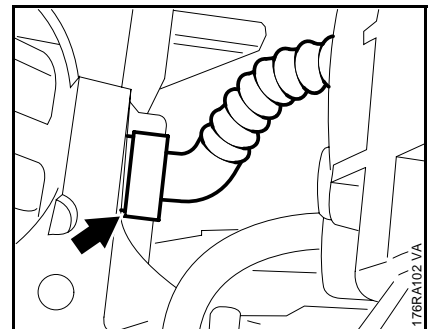
- Remove the chain catcher, 5.2
- Take the plugs (arrows) out of the annular buffers at the clutch side.



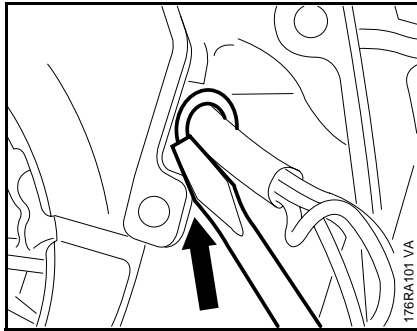
- Take out the annular buffer mounting screws (arrows).



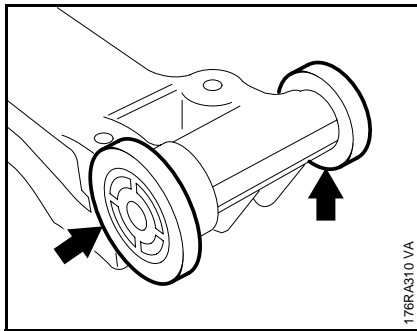
- Pull the tank housing forward and push the manifold flange out of the tank housing at the same time.



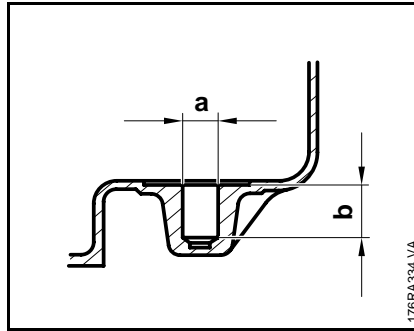
- Pull the impulse hose off the nipple.



- Turn the tank housing to one side.
- Pry the grommet out of the housing and pull out the wiring harness.



- Remove the rings (arrows) from the tank housing.
- To replace the impulse hose, remove the fuel hose, switch shaft, throttle trigger and tank vent.

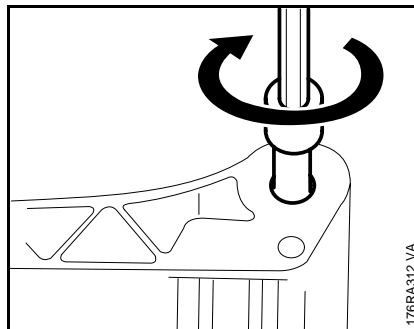


If a screw thread is stripped in one of the mounting holes for special self-threading screws, the tank housing can be repaired by installing a thread insert.

- Drill out stripped thread to a diameter of 'a' = \varnothing 8.5 mm and a depth of 'b' = 15 mm.

Caution!

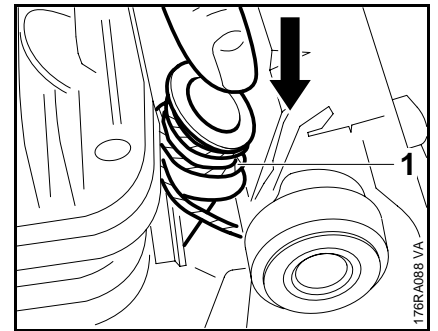
Do not exceed the specified hole depth of 15 mm.



- Fit an M6x10 screw with washer in the thread insert.
- Screw the thread insert into the tank housing.

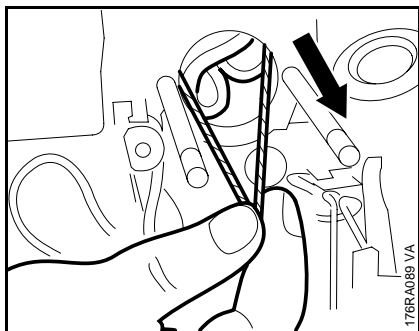
- An M6x18 screw must then be used in place of the original self-threading screw.

Install in the reverse sequence.



- 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.
- Pass the ends of the string through the intake opening.
- Press the manifold down.

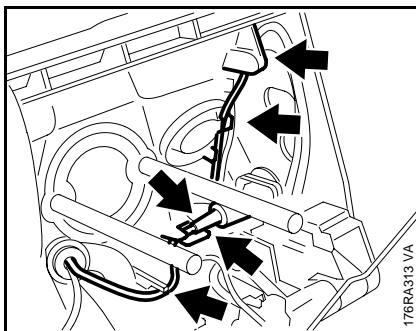
13. Carburetor Heating System





- Pull the ends of string outwards.

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

- Check that flange is properly seated in the tank housing.



- All wires must be properly located in their retainers (arrows).

- Coat threads of front handle mounting screws with Loctite,  16.
- Tighten down the screws firmly,  3.5

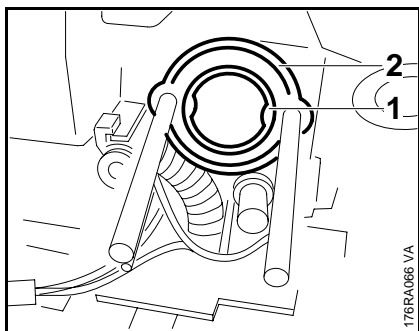
Install all other parts in the reverse sequence.

Current is supplied via wires to the heating element installed between the baffle plate and carburetor.

Carburetor heating is controlled by a thermostatic switch on the heating element.

The carburetor heating system 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 carburetor heating system.



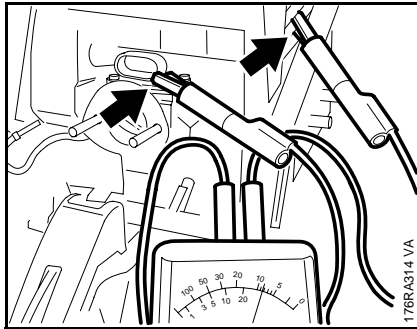
- Fit the sleeve (1) in the manifold.
- Push the washer (2) over the studs.

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).

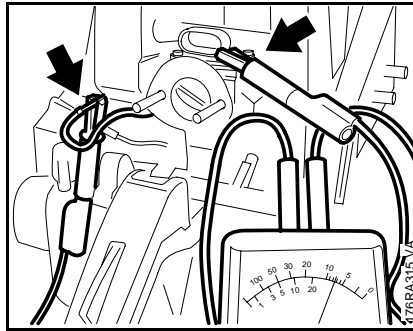
If the temperature is lower than + 13 °C (55 °F), the thermostatic switch may close and produce false readings.

Test the thermostatic switch separately.



- Remove the filter base, 12.1
- Set the ohmmeter to measuring range “Ω”.
- 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 about 8 Ω in measuring range “Ω”.

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



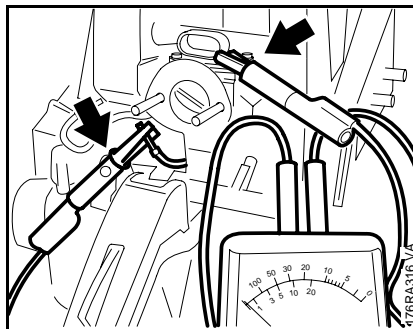
Heating element

- Disconnect pin and socket connector to heating element.
- Clip one test lead to the metal of the heating element, and the other test lead to the wire that goes to the heating element.
- If the heating element is in good condition the ohmmeter will show a reading of about 8 Ω in measuring range “Ω”.

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

Thermostatic switch

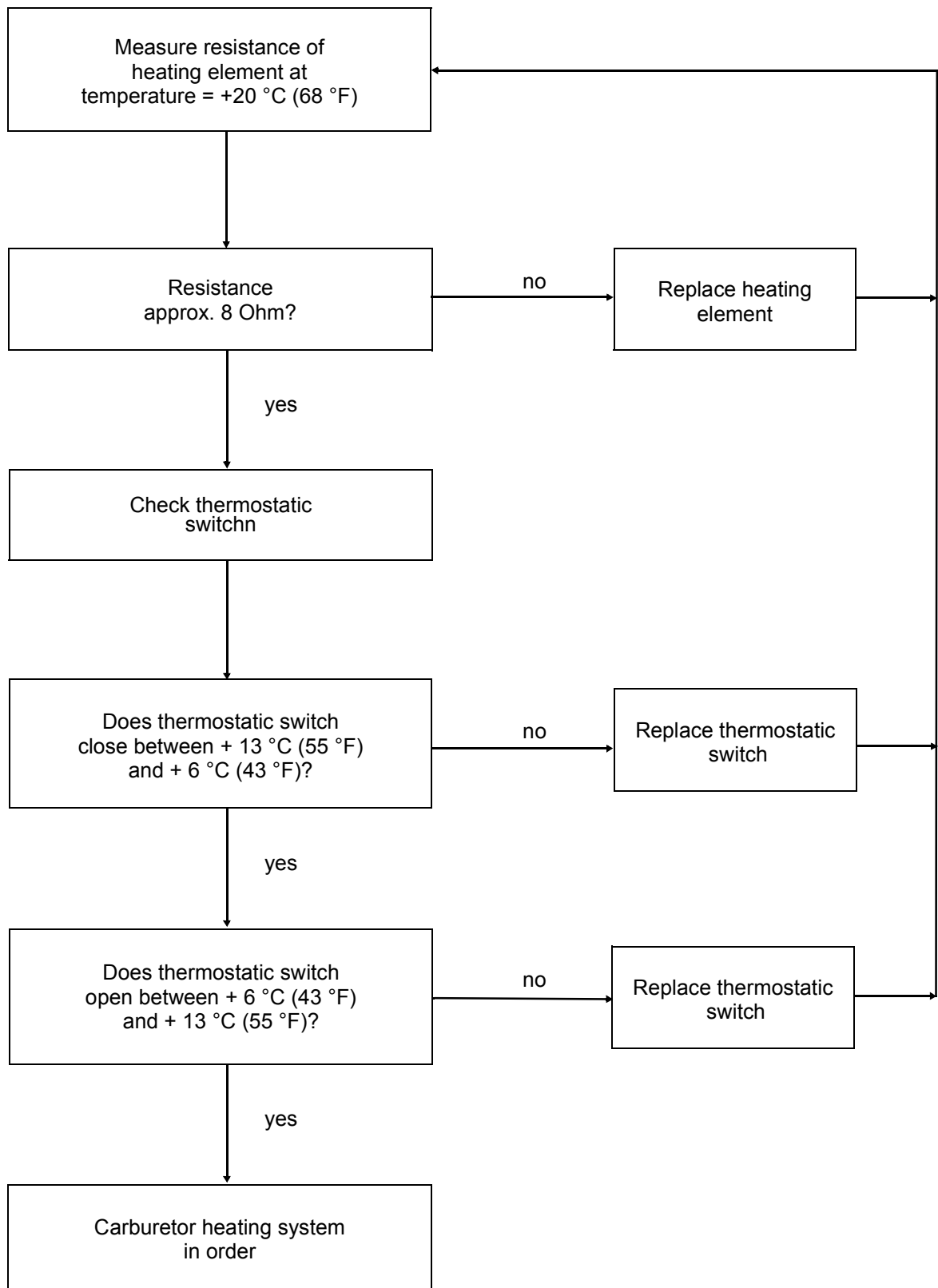
- Disconnect pin and socket connector to thermostatic switch.



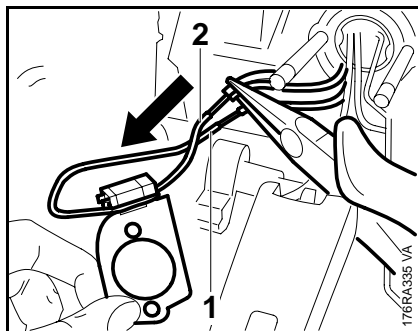
- Clip one test lead to the metal of the heating element, and the other test lead to the wire that goes to the thermostatic switch.

At temperatures above + 20 °C (68 °F), the ohmmeter must indicate an infinitely high value in measuring range “Ω”.

Cool the switch down to below + 6 °C (42 °F). The ohmmeter must indicate a value of about 0.5 Ω in measuring range “Ω”. If a higher value is indicated, install a new thermostatic switch.



13.3 Heating Element with Thermostatic Switch



- Remove the heating element,
12.2.1
- Disconnect the pin and socket
connectors (1 + 2) of both wires.

Do not bend or twist the pin and
socket connectors during removal
or installation.

Reassemble in the reverse
sequence.

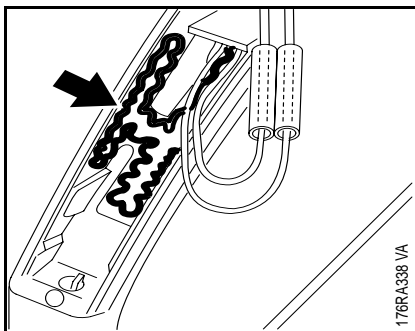
After fitting the baffle plate, position
the pin and socket connector so that
it is straight.

14. Handle Heating System 14.1 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.

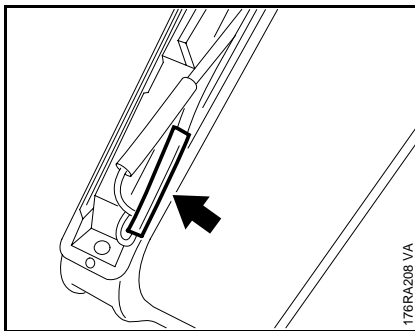
There are two reasons for failures in
the heating system:

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

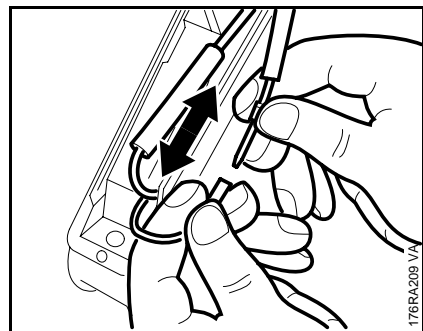


The heating element in the rear
handle may overheat and fail if it is
not bonded firmly in position, i.e.
completely flat (no creases).

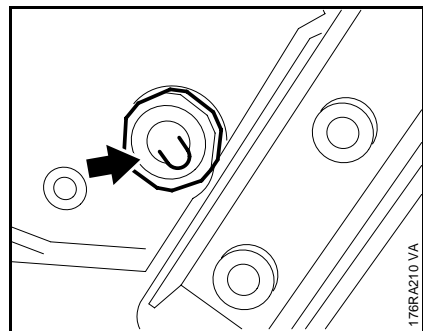
Tracing the cause of a fault



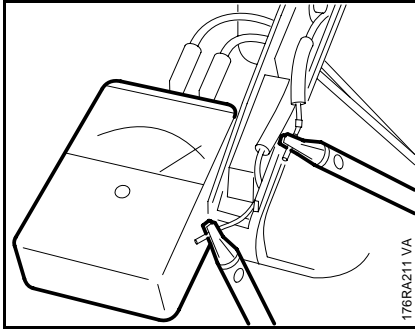
- Remove the interlock lever,
10.2
- Push back the insulating tube
(arrow) on the pin and socket
connector of the wire between
the generator and rear handle
heating element.



- Separate the pin and socket
connector.



- Set the heater switch (arrow)
to “I”
- Set the ohmmeter to “Ω”.




- Clip one ohmmeter test lead to the generator wire and the other test lead to the rear handle heating element wire.

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


If the system is in order, the ohmmeter will show a reading of about $8\ \Omega$ in measuring range “ Ω ”.

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

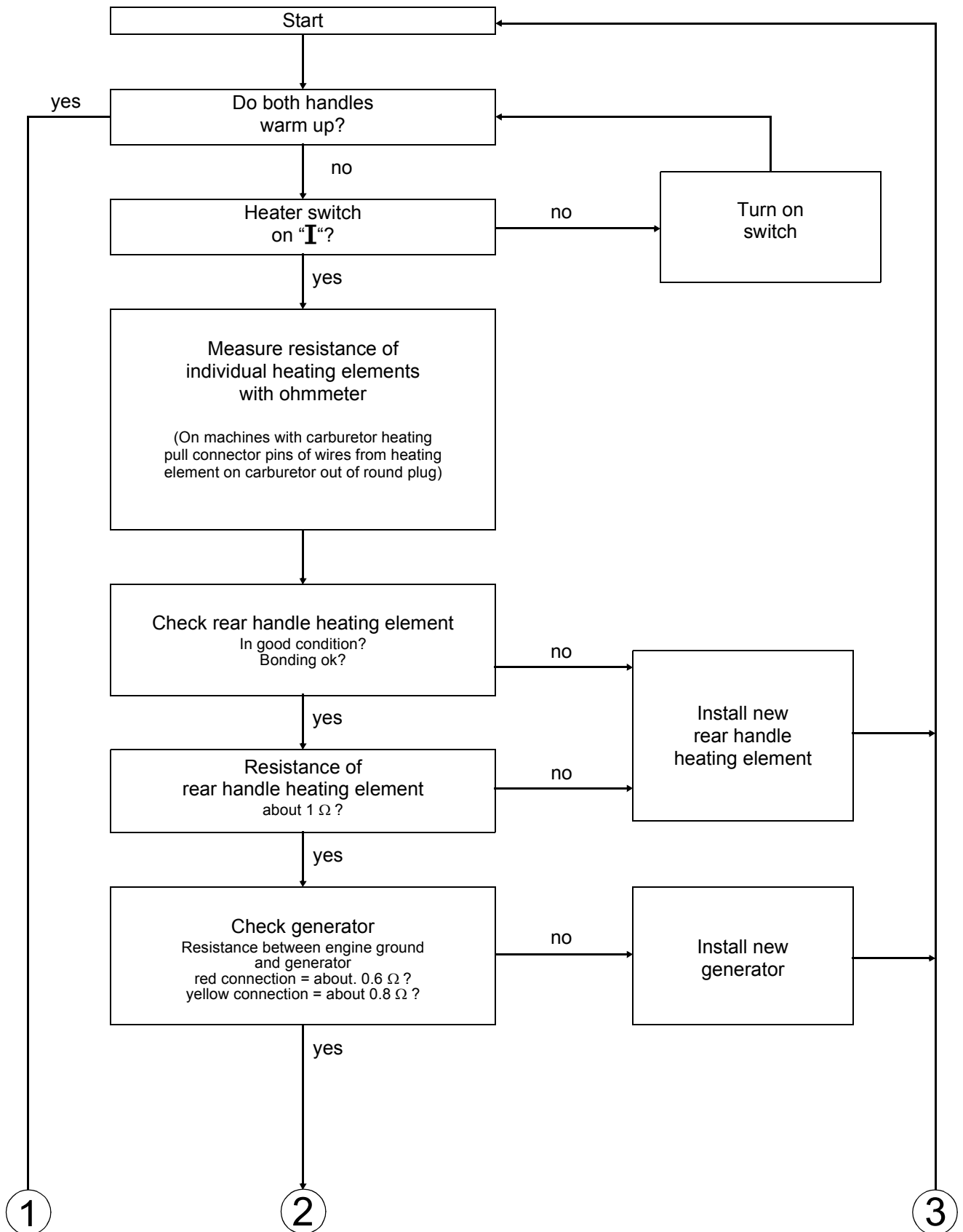
If the ohmmeter shows a very low value, there is a short circuit in one of the components.

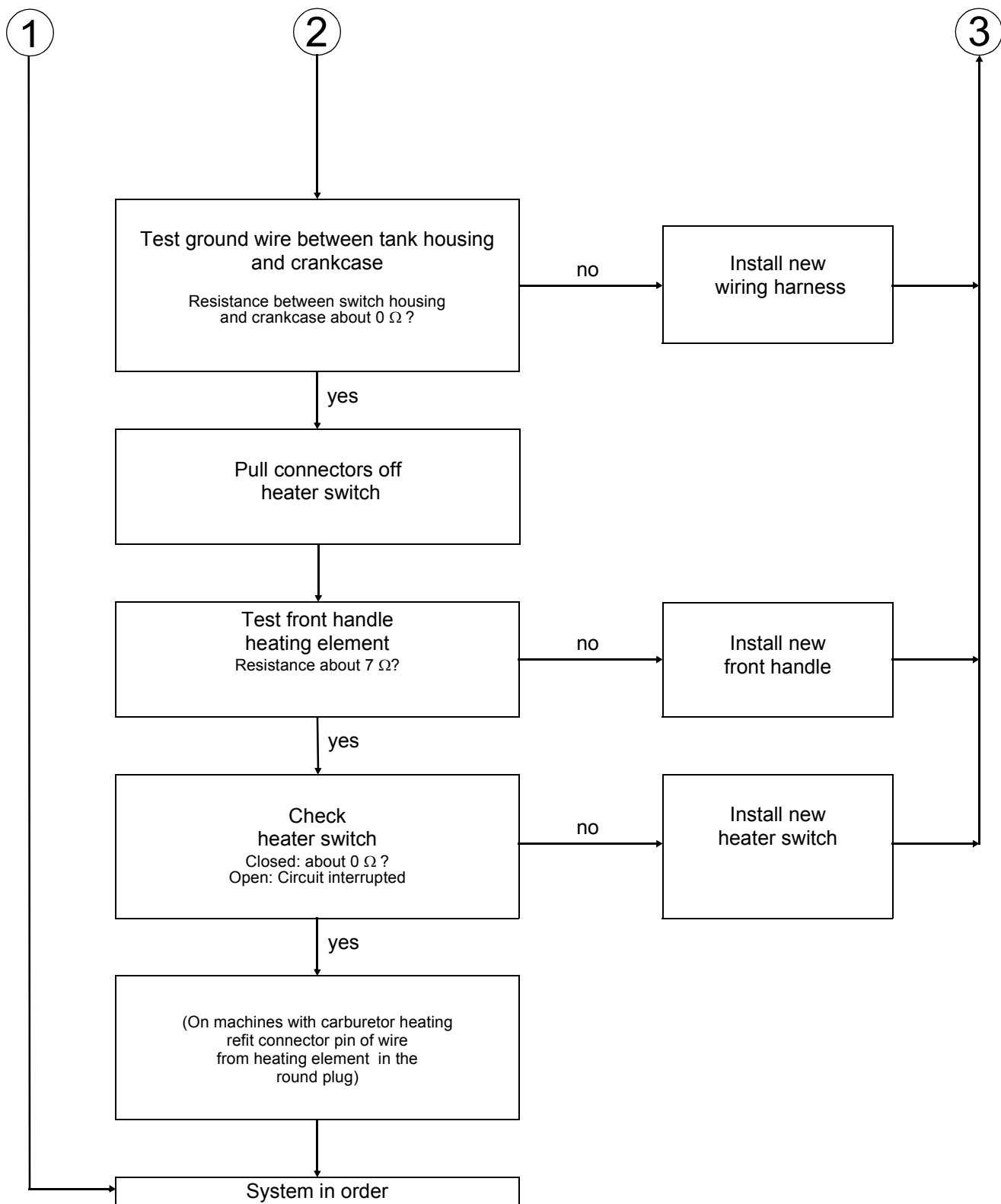
In either case it is necessary to check each component separately,  14.1

The generator wire remains disconnected from the heating element during this check.

- After completing the test, reconnect the wires and push the insulating tube over the pin and socket connector.
- Install the interlock lever and handle molding,  10.2

14.1.1 Troubleshooting Chart





14.1.2 Test Connections and Test Values

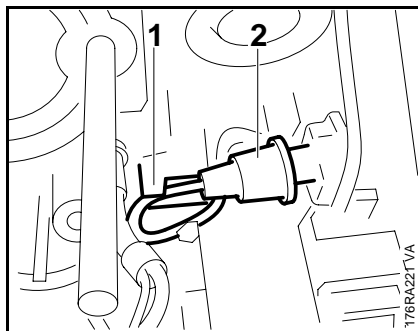
- The pin and socket connections of the wires in the rear handle must be disconnected to test the individual components separately.

Component	Ohmmeter connection (use either test lead)		Resistance Ω		If faulty	
	Lead 1	Lead 2	Spec.	Actual	Cause	Remedy
Switch	Switch terminal ¹⁾	Ground	< 0.5	-	Switch faulty	Replace switch
Heating element in rear handle	Terminal socket on wire from rear handle heating element	Terminal pin on wire from rear handle heating element	1.0	0.8...1.2	Heating element OK	Install new heating element or repair insulation
				-	Break in wire, heating element damaged	
				0	Short circuit – damaged insulation	
Heating element in front handle	Connector on wire from front handle heating element	Ground	7.0	6.0...8.0	Heating element OK	Install new front handle
				-	Break in wire, heating element damaged	
				0	Short circuit – damaged insulation	Repair insulation
Generator W	Connector on wire	Ground	0.8	0.6...1.0	Generator OK	

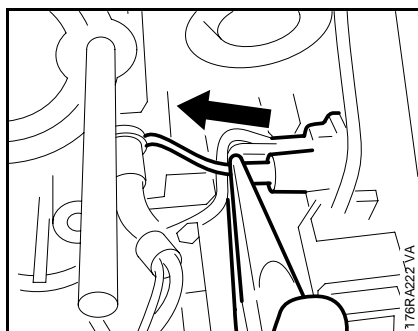
¹⁾ Disconnect the wire

Component	Ohmmeter connection (use either test lead)		Resistance Ω		If faulty	
	Lead 1	Lead 2	Spec.	Actual	Cause	Remedy
Generator WVH	Connector on gen's red wire	Ground	0.8	0.6...1.0	Generator OK	
Generator WVH and W				-	Break in wire, generator damaged	Install new generator
				0	Short circuit – damaged insulation	Repair insulation

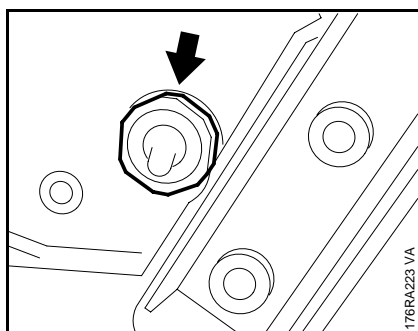
14.2 Heater Switch



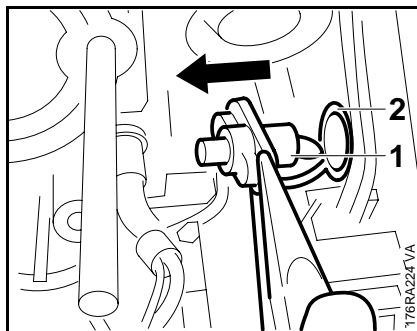
- Remove the carburetor, 12.2.1
- Pull wire out of retainer (1).
- Push back the rubber grommet (2) a little.



- Pull the connector sleeve out of the heater switch.

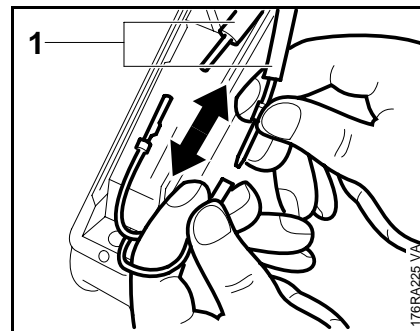


- Unscrew the nut (arrow) from the switch.
- Remove the washer.

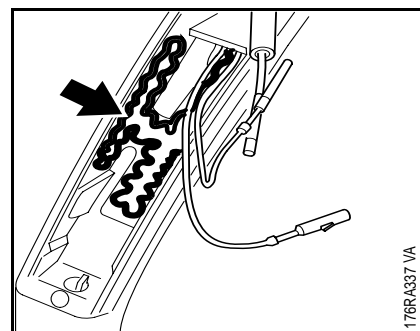


- Remove the heater switch (1) inwards.
- Fit new heater switch in the ground wire's cable lug (2).
- Position the heater switch in the housing bore.
- Fit the washer.
- Fit the nut and tighten it down firmly.
- Plug the connector sleeve into the switch.
- Push the rubber grommet over the switch.
- Push the wire into the retainer.
- Install the carburetor, 12.2.1

14.3 Heating Element in Rear Handle

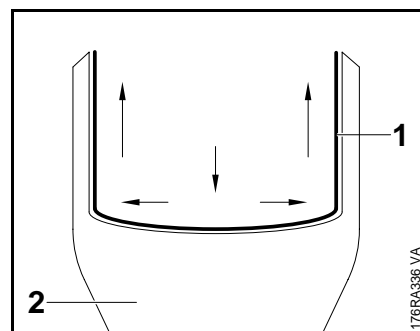


- Remove the interlock lever, 10.2
- Slide the two insulating tubes (1) off the pin and socket connectors and separate the connectors.



- Take pressure pad and heating element out of the handle recess.

Before fitting the new heating element, clean the surface inside the handle so that it is free from grease, dirt and moisture.





- Removing the backing from the new heating element.
- Place heating element (1) in handle housing (2) and press firmly and uniformly into position, from the center outwards.

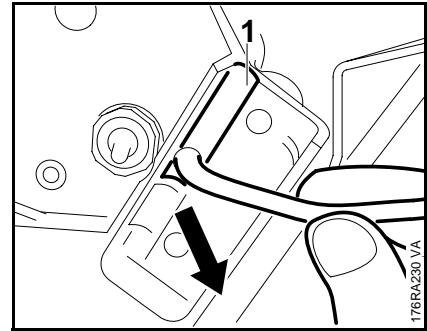
14.4 Heating Element in Front Handle

Avoid creases. If the heating element is not fitted perfectly flat, heat transfer will be interrupted and the element may fail as a result of overheating. The ambient temperature during installation should not be less than + 15 °C (59 °F).

Install in the reverse sequence.

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

- Remove the carburetor,  12.2.1
- Remove the interlock lever,  10.2
- Slide the insulating tube off the pin and socket connector of the wire between the front handle heating element and the rear handle heating element.

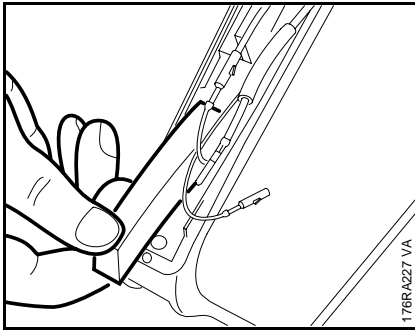


- Remove the front handle,  12.8

- Pull the connecting wire out of the bore.

Reassemble in the reverse sequence.

- When installing the front handle, position the connecting wires in the recess (1).

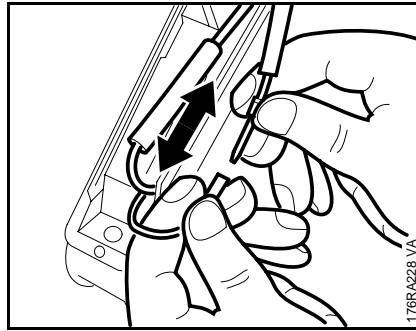


- Fit a new expanded rubber pressure pad on top of the heating element. The heating element must be completely covered.

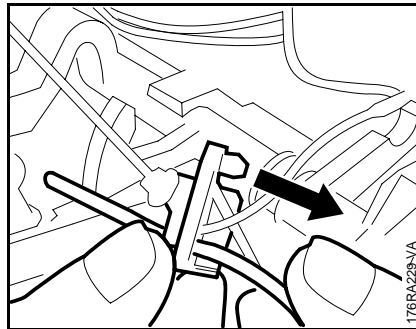
Reassemble all other parts in the reverse sequence.


Check operation of heating element

Run the saw at maximum revs for no more than 30 seconds with the heating switched on.

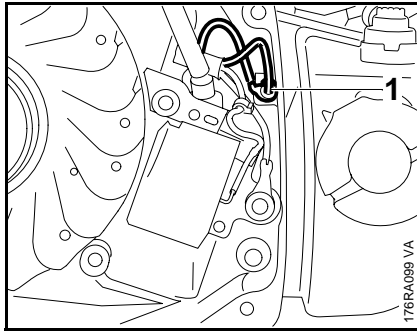


- Separate the pin and socket connector.



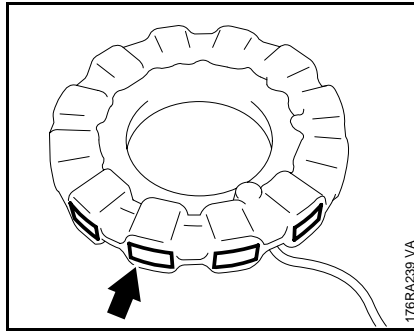
- Pull the wires out of the rubber grommet.
- Pull the connecting wire out of the heater switch,  14.2

14.5 Generator

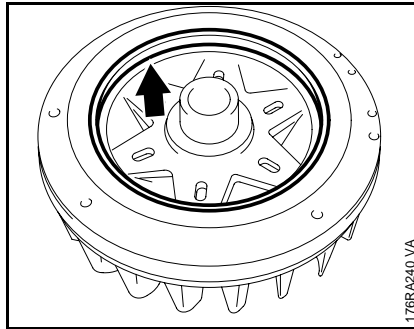


- Remove the ignition module, [7.1.2](#)
- Remove the flywheel, [7.3](#)
- Separate the pin and socket connector (1).

There are two connectors on generator WVH, disconnect both.

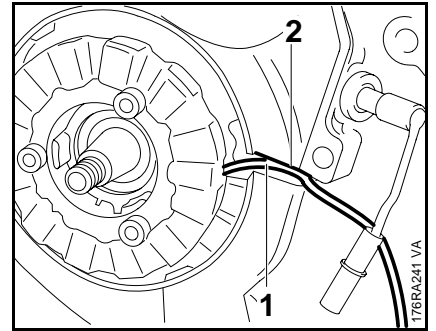


- Inspect the generator and poles for cracks or other damage. If damage is found, replace the generator.

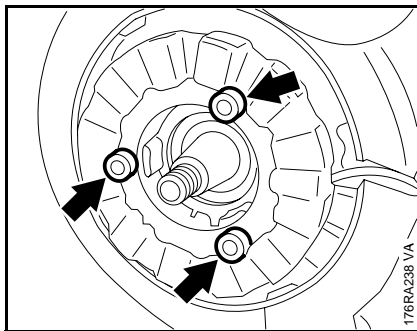


- Inspect the magnet ring (arrow) in the flywheel for cracks or other damage. If damage is found, replace the flywheel.

Reassemble in the reverse sequence.



- Place the generator in position with the connecting wire (1) facing the crankcase.
- Connecting wire must locate in the crankcase recess (2).
- Coat screw threads with Loctite 242, [16](#).
- Tighten down the screws firmly, [3.5](#)



- Take out the screws (arrows).
- Remove the generator.

15. Special Servicing Tools

No.	Part Name	Part No.	Application	Rem.
1	Locking strip	0000 893 5903	Blocking the crankshaft	
2	Sealing plate	0000 855 8106	Sealing exhaust port	
3	Wooden assembly block	1108 893 4800	Fitting piston	
4	Clamping strap	0000 893 2600	Compressing piston rings	
5	Test flange	1128 850 4200	Leakage test	
6	- Sleeve	0000 963 1008	Used together with test flange 1106 850 4201	
7	Carburetor and crankcase tester	1106 850 2905	Testing crankcase and carburetor for leaks	
8	Vacuum pump	0000 850 3501	Testing crankcase for leaks, checking tank vent	
9	- Nipple	0000 855 9200	Testing carburetor for leaks	
10	- Fuel line	1110 141 8600	Testing carburetor for leaks	
11	- Plug	1122 025 2200		
12	Puller	5910 890 4400	Removing oil seals	
13	- Jaws (No. 3.1 + 4)	0000 893 3706	Removing oil seal(s)	
14	- Jaws (No. 6)	0000 893 3711	Removing oil seal(s)	
15	Press sleeve	1115 893 4600	Installing oil seal (starter side)	
16	Assembly sleeve	1118 893 4602	Protecting oil seal at clutch side	
17	Press sleeve	1118 893 2401	Installing oil seal (clutch side)	
18	Assembly drift	1111 893 4700	Removing and installing piston pin	
19	Installing tool 12	5910 890 2212	Fitting hookless snap rings in piston	
20	Stud puller M8	5910 893 0501	Removing bar mounting studs	
21	Assembly tool	1116 893 4800	Rewinding the rewind spring	
22	Setting gauge	1111 890 6400	Setting air gap between ignition module and flywheel	
23	Hook	5910 893 8800	Removing pickup body	
24	Assembly stand	5910 890 3100	Holding saw for servicing/repairs	
25	Service tool AS	5910 890 2005	Removing and installing crankshaft	
26	Assembly tube	1117 890 0900	Detaching and attaching brake spring	
27	Service tool AS (set)	5910 007 2205	Removing crankshaft (clutch side)	
28	Screw sleeve	5910 893 2420	Installing crankshaft	
29	Service tool ZS (set)	5910 007 2220	Removing crankshaft (starter side)	
30	Screw sleeve	5910 893 2409	Pulling crankcase halves together	
31	Puller	5910 890 4500	Removing limiter cap	

No.	Part Name	Part No.	Application	Rem.
32	Puller for flywheel	1110 893 4500		
33	Torque wrench	5910 890 0301	0.5 to 18 Nm Alternative: Torque wrench 5910 890 0302 with optical/acoustic signal	
34	Torque wrench	5910 890 0311	6 to 80 Nm Alternative: Torque wrench 5910 890 0312 with optical/acoustic signal	
35	Crimping tool	5910 890 8210	Attaching connectors to electrical wires	
36	Socket, 13 mm, DIN 3124	5910 893 5608	Flywheel nut	
37	Socket, 19 mm, DIN 3124	5910 893 5613	Clutch	
38	Screwdriver bit T 27 x 125	0812 542 2104	Removing and installing spline socket head screws with electric or pneumatic screwdrivers; tighten down screws with torque wrench	
39	T-handle screwdriver, T 27 x 150	5910 890 2400	IS-P screws (4 mm)	1)
40	Press arbor	1118 893 7200	Removing and installing ball bearing (clutch side)	
41	Press arbor	1120 893 7200	Removing and installing ball bearing (flywheel side)	
42	Circlip pliers DIN 5254-A 19	0811 611 8380	Removing and installing external retaining rings	

Remarks:

1) Use for releasing P screws only.

16. Servicing Aids

No.	Part Name	Part No.	Application
1	Lubricating grease (225 g tube)	0781 120 1111	Oil seals, oil pump drive, chain sprocket bearing, sliding and bearing points of brake band, pawl pegs
2	Ignition lead HTR (10 m)	0000 930 2251	
3	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in fan housing
4	Dirko sealant, grey (100 g tube)	0783 830 2120	Oil seals (outside)
5	Standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons		Cleaning sealing faces
6	STIHL multipurpose grease	0781 120 1109	High voltage output on ignition module
7	Medium-strength threadlocking adhesive (Loctite 242)	0786 111 1101	
8	High-strength threadlocking adhesive (Loctite 270)	0786 111 1109	
9	High-strength threadlocking adhesive (Loctite 649)	0786 110 0126	

