

STIHL TS 400

1998-04

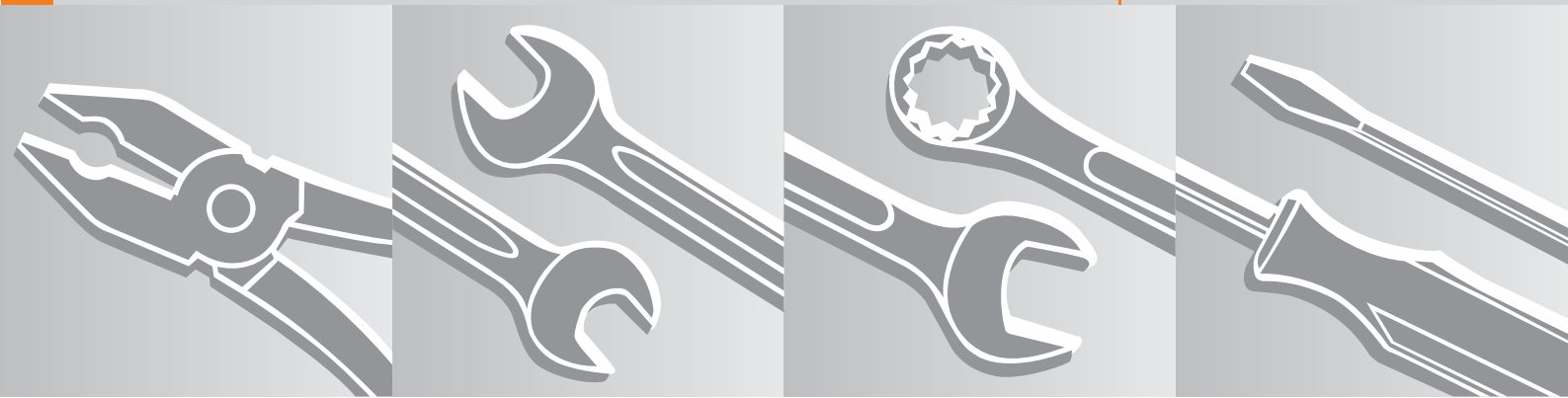


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STIHL®

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1. INTRODUCTION

This Repair Manual contains a detailed description of all the typical repair work required for this series of cut-off machines. Repairs to be undertaken on standard parts and assemblies which are used in several STIHL power tool series are described in separate repair manuals. Attention is drawn to these instructions at the relevant points in this Manual.

The illustrated spare parts lists should also be consulted when carrying out repairs, for they show the installed position and sequence of assembly for the individual parts.

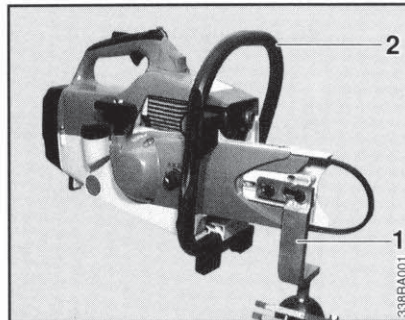
The latest edition of the respective parts lists should always be used when determining the part numbers of the required replacement parts. Microfilms are more up-to-date than printed replacement parts lists!

Faults in the cut-off machine may be due to several causes. Note the "Summary of faults" in the manual "Troubleshooting, standard repairs" for all function groups.

Note the "Technical Information" sheets, for they describe technical changes implemented after publication of this Repair Manual. The Technical Information sheets supplement the replacement parts list until a new edition is published.

The special tools mentioned in the text are listed in the last chapter of this Manual. The tools can also be identified in the manual of "STIHL tools" on the basis of this part number. The manual lists all tools available from STIHL.

Repair Manuals and Technical Information sheets should always be on hand wherever repairs are carried out. They must not be passed on to third parties.



Repairs can be carried out more easily by mounting the cut-off machine on an assembly stand (1). It is attached to the cast arm with two hex bolts (2) M8x25 after removing the bearing with guard.

The cut-off machine can then be swivelled into the most suitable working position, leaving both hands free for the work itself.

The following graphic symbols are used in the text and illustrations in order to make this Manual easier to use and understand:

In the text:

● = Activity to be carried out; corresponds to the activity in the picture above the text.


- = Activity to be carried out, but is not shown in the picture above the text.

In the illustrations:

➔ = Arrow indicating: Note

➔ = Arrow indicating: Go to

Always use original STIHL replacement parts.

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

The symbol may appear alone on small parts.

2. SPECIFICATIONS

2.1 Engine

STIHL single-cylinder two-stroke engine with specially impregnated cylinder bore

Displacement:	64.1 cm ³
Cylinder bore:	49 mm
Piston stroke:	34 mm
Compression:	9.5 :1
Power output to DIN 70020:	3.2 kW (4.4 HP)
Max. torque:	4.1 Nm at n = 6500 rpm
Max. spindle speed:	4800 rpm
Mean idle speed:	2500 rpm
Crankshaft bearings:	Two ball bearings
Big-end bearing:	Needle cage
Small-end bearing:	Needle cage
Piston pin:	Dia. 10 mm
Connecting rod length:	58 mm
Starter system:	Pawl engagement
Reserve pull in rope rotor:	At least 1/2 turn
Starter rope:	Dia. 3.5 mm
Clutch:	Centrifugal clutch without linings
Diameter:	75 mm
Clutch engages at:	3500 rpm
Leakage testing of the crankcase	
with excess pressure:	$p_{\bar{u}} = 0.5 \text{ bar}$
with negative pressure:	$p_u = 0.5 \text{ bar}$

2.2 Fuel system

Carburetor:	Diaphragm carburetor
Setting	
High-speed adjusting screw H:	Approx. 1 turn open
Low-speed adjusting screw L:	Approx. 1 turn open (standard setting)
Leakage testing of the carburetor with excess pressure:	$p_{\bar{u}} = 0.8 \text{ bar}$
Fuel tank capacity:	0.74 l (740 ccm)
Octane rating:	At least 90 ROZ
Fuel mix:	Brandname regular-grade petrol Brandname two-stroke engine oil
Mixing ratio:	1:50 for STIHL two-stroke engine oil 1:50 1:25 for all other brandname two-stroke engine oils
Air filter:	Prefilter (foam) Main filter (paper filter) and flocked auxiliary filter

2.3 Ignition system	Principle: Air gap: Ignition timing: Spark plug (suppressed): Electrode gap: Spark plug thread: Thread length: Heat range: Length of ignition lead	Transistor-controlled (non-contacting) magneto ignition with integrated controller and electronic speed limitation 0.15...0.3 mm 1.6...2.2 mm before UDC at n = 8000 rpm Bosch WSR 6F or NGK BPMR 7 A 0.5 mm M14x1.25 9.5 mm 200 370 mm
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2.4 Cutting wheels	Cutting wheel for stone Cutting wheel for steel Cutting wheel for stone Cutting wheel for asphalt Cutting wheel for stone Cutting wheel for steel Cutting wheel for stone Diamond cutting wheel for asphalt Cutting depth	Dia. 300x3.5x20 mm Dia. 300x3.5x20 mm Dia. 300x6.0x20 mm Dia. 300x3.5x20 mm Dia. 350x4.0x20 mm Dia. 350x4.0x20 mm Dia. 300x2.6x20 mm Dia. 300x3.2x20 mm Approx. 100 mm (for dia. 300 mm) Approx. 125 mm (for dia. 350 mm)
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2.5 Special accessories

2.5.1 For the user	STIHL cart Cart attachment kit Cutting depth limiter Water tank attachment Water attachment for wet cutting V-belt guard kit Bearing with guard D 300
2.5.2 For service engineer	Set of gaskets Set of carburetor parts Sealing panel

2.6 Tightening torques

DG screws are screwed into plastic and light metal parts. These screws cut a thread in the material when they are screwed in for the first time. The material is permanently deformed. The screws can then be removed at will and retightened without impairing the strength of the screw connection, provided that the specified tightening torque is maintained. It is therefore **essential to use a torque wrench**.

Connecting element	Size of thread	For component	Tightening torque (Nm)	Remark
Groove-headed screw	IS-DG 4x14	Starter cover	1.8	1)
Socket-head screw	IS-DG 4x15	Handle moulding / handle	1.8	
Socket-head screw	IS-DG 4x15	Retainer, stop rods	1.8	
Socket-head screw	IS-DG 5x20	Handle / handle mount	8.0	
Socket-head screw	IS-DG 5x20	Tank housing left / right	7.5	
Nut	M5	Filter base / carburetor	3.5	
Socket-head screw	IS-M 5x16	Cover, clamp / cast arm	4.5	
Socket-head screw	IS-M 5x16	Handle / tank housing	8.0	
Socket-head screw	IS-M 5x16	Air guide cover / crankcase	4.5	
Socket-head screw	IS-M 5x16	Muffler / crankcase	10.0	
Socket-head screw	IS-M 5x16	Muffler / cylinder	10.0	
Socket-head screw	IS-M 5x20	Cast arm / crankcase	10.0	
Socket-head screw	IS-M 5x20	Filter base / crankcase	6.0	
Socket-head screw	IS-M 5x20	Filter housing / filter base	4.0	
Socket-head screw	IS-M 5x20	Shroud / tank housing	6.0	
Socket-head screw	IS-M 5x20	Crankcase left / right	10.0	
Socket-head screw	IS-M 5x20	Fan cover / tank housing	6.0	
Socket-head screw	IS-M 5x20	Starter cover / cast arm	6.0	
Socket-head screw	IS-M 5x20	Cylinder / crankcase	10.0	
Socket-head screw	IS-M 5x20	Ignition module / crankcase	8.0	2)
Socket-head screw	IS-M 5x25	Support / handle / tank housing	8.0	
Socket-head screw	IS-M 6x16	AV element, cast arm / handle	6.0	
Socket-head screw	IS-M 6x16	AV element, tank housing / cast arm	6.0	
Socket-head screw	IS-M 6x16	AV element, tank housing / crankcase, left	6.0	
Grub screw	M 5x55	Tank housing / carburetor	4.0	
Nut	M 8x1	Flywheel	30.0	
Nut	M 8x1	Starter wheel	23.0	
Driver	M 12x1 L	Clutch	40.0	
	M 14x1.25	Spark plug	27.5	
Nut	M 10x.. L	V-belt pulley / bearing	37.5	
		Decompression valve	14.0	

When screwing the DG screws into an existing screw thread:

- Insert the DG screw in the hole and turn counterclockwise until it gently drops into the hole in axial direction.
- Turn the screw clockwise and tighten with the specified torque.

This procedure guarantees that the screw engages in the existing screw thread without cutting a new thread and thus prevents the strength of the screw connection being weakened.

- 1) Secure screw with adhesive 0786 111 1109 (Loctite 270).
- 2) A washer must be fitted under the head of the screw.

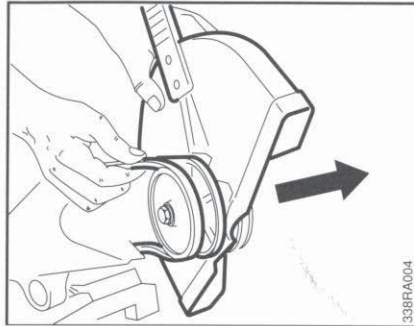
Note: Screws secured with adhesive must be heated with a hot-air fan (drier) in order to release them.

Great care must be exercised with plastic parts!

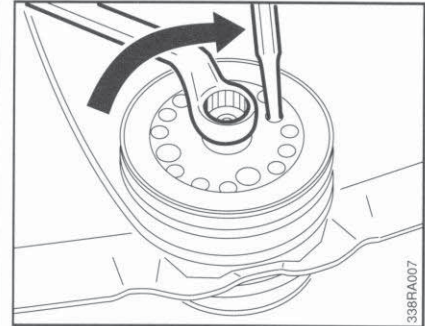
3. CUTTING WHEEL DRIVE

3.1 Bearing with guard

Check axial and radial runout, see chapter 3.2.

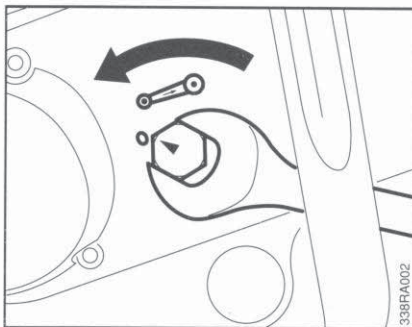


- Lever bearing with guard out of V-belt.

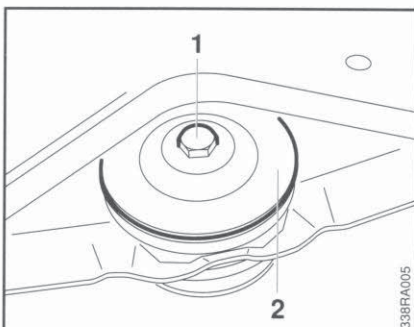


- Lock V-belt pulley in position.
- Unscrew nut and draw V-belt pulley off shaft.

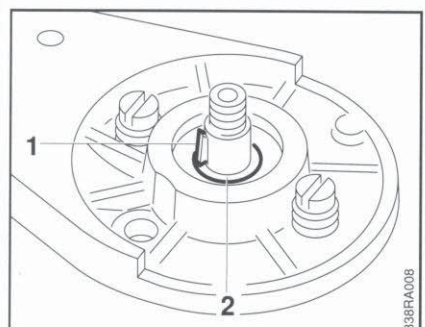
Important! Nut has left-hand thread.



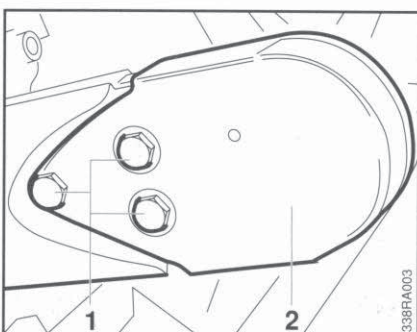
- Relax V-belt; turn hexagon on clamp counterclockwise until the arrow points to the left (to "0").



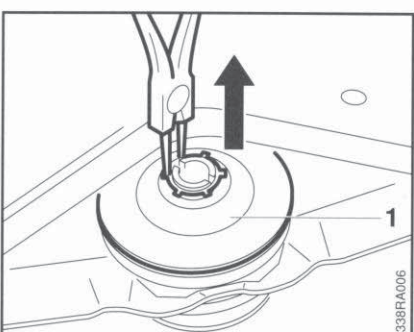
- Unscrew the screw (1) in the thrust washer (2).
- Remove thrust washer.



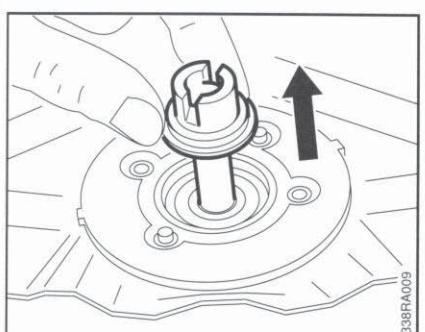
- Remove woodruff key (1) from groove in shaft.
- Remove washer (2) from shaft.



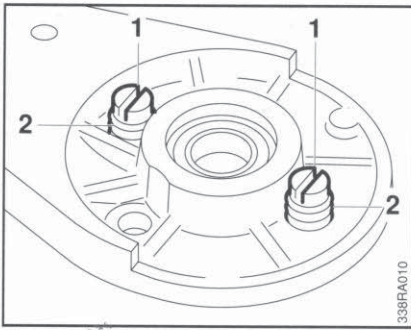
- Unscrew bearing screws (1).
- Remove guard (2).



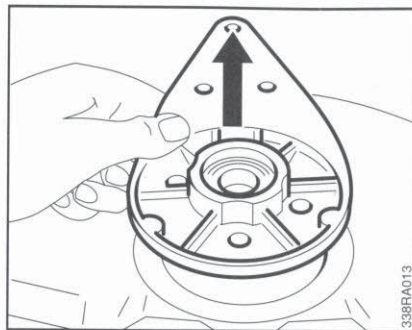
- Remove axial clamping ring from shaft.
- Remove thrust washer (1).



- Draw shaft out of deep groove ball bearings.

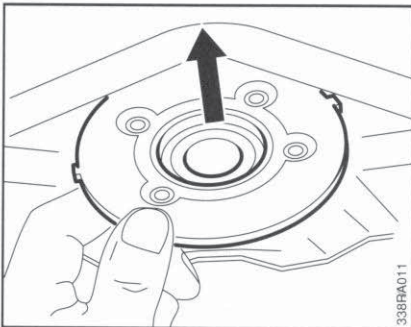


- Unscrew both screws (1) and remove with helical springs (2) and sleeves.

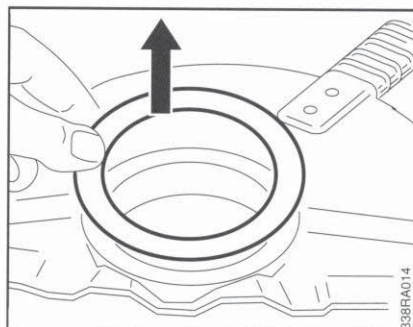


- Draw bearing out of rubber ring.

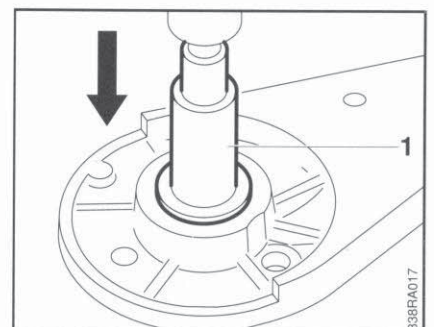
Important! Use pliers with shortened, rounded tips.



- Remove flange.

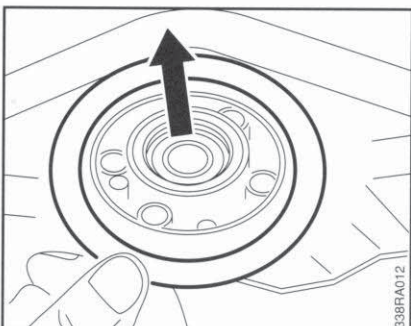


- Remove washer and rubber ring.

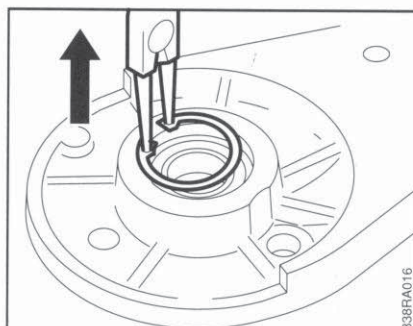


- Press both deep groove ball bearings and the ring out of the bearing with drift pin (1).

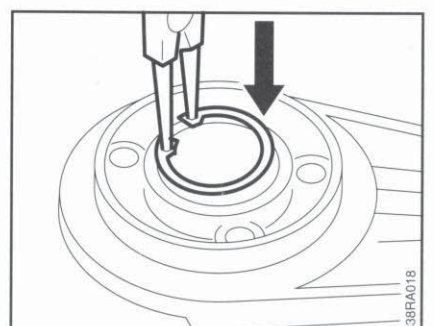
The parts are reassembled in reverse order.



- Remove washer with rubber ring.

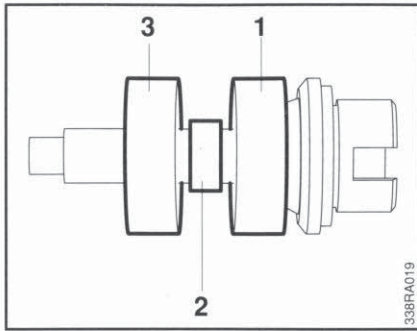


- Remove circlips from the grooves in front of the deep groove ball bearings.

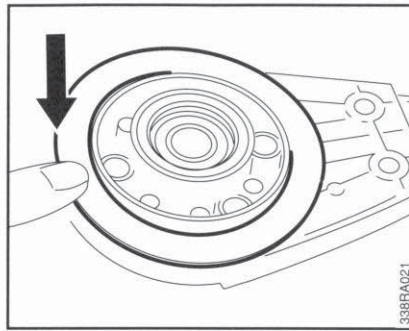


Note: Particular attention must be paid to the following points.

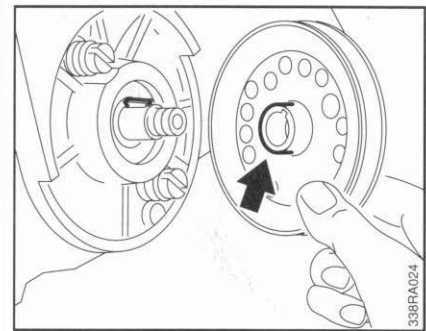
- Insert circlip in one of the grooves of the bearing.



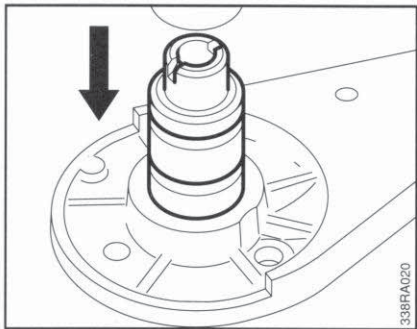
- Slide first deep groove ball bearing (1), ring (2) and second deep groove ball bearing (3) onto the shaft.



- Place washer on bearing.
- Place bearing in rubber bearing from the outside.

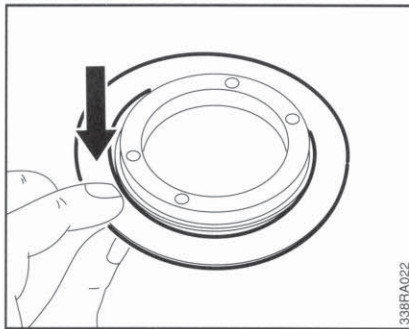


- Slide on V-belt pulley with the longer, machined-down collar first and secure nut with 37.5 Nm.

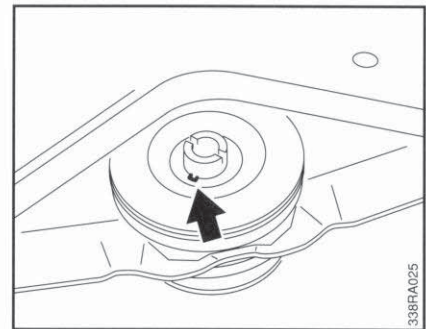


- Position the deep groove ball bearing and press in with shaft until it rests against circlip.
- Draw shaft out of deep groove ball bearings.
- Insert second circlip in groove of bearing.

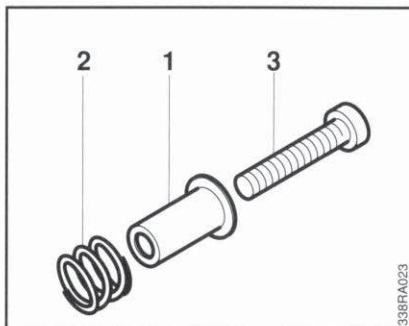
Important! The seal of the ball bearing must not be damaged.



- Place washer on flange.
- Insert flange from the inside.



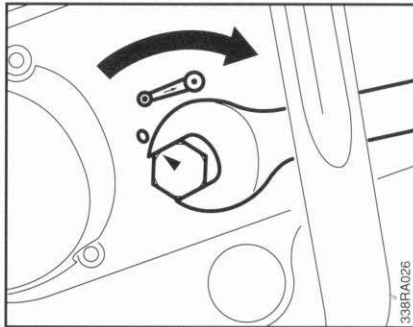
- Fit thrust washer so that the groove is located over the nose.
- Insert axial clamping ring.



- Slide sleeve (1) and spring (2) onto screw (3).
- Turn in and tighten screws.

3.2 Checking axial and radial runout

- Insert V-belt in V-belt pulley of bearing, fit guard and loosely screw in the fastening screws.



- Turn hexagon of clamp clockwise.
- The clamp comes within range of the spring force after approx. 1/8 of a turn. It must be then be turned to the limit (approx. 1/8 of a turn).

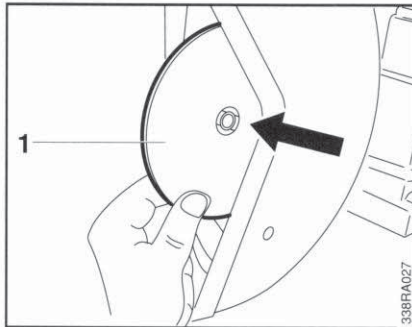
Note: The wrench must not be forcibly turned further.

- Tighten all three fastening screws, starting with the screw at the rear.

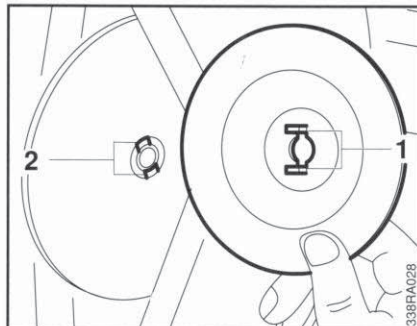
Since changes in the shaft diameter (due to scoring, etc.) affect the radial runout of the cutting wheel, it is sufficient carefully to inspect the shaft around the cutting wheel mount.

The axial runout, on the other hand, depends on the condition of several components and should therefore be determined by measurement.

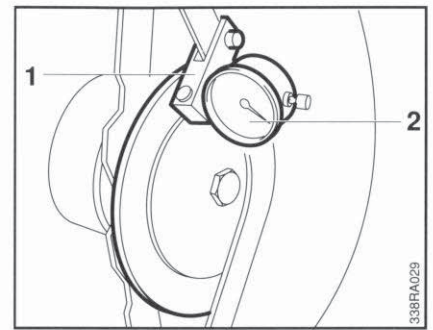
- Unscrew the screw and remove the thrust washer.



- Fit a test washer (1).



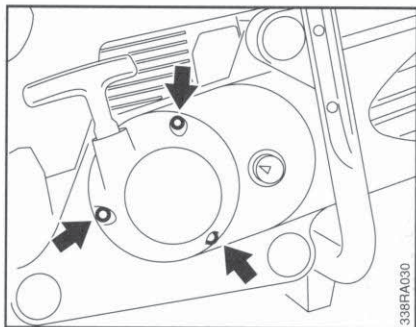
- Fit the thrust washer so that the catches (1) engage in the locking grooves (2) of the shaft.



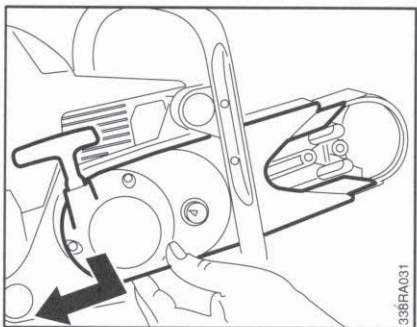
- Turn in and tighten the screw.
- Secure the gauge holder (1) with gauge (2) on the shroud so that the axial runout can be determined for a diameter of approx. 130 mm over a full revolution of the wheel. Refer to the test sequence table.
- Dismantle the test equipment after testing.

Test sequence	Actual condition	Possible causes	Remedy
Radial runout: Visual inspection, spindle (shaft)	Wear marks or scoring around the cutting wheel mount	Fastening screw loose during operation, wrong cutting wheels used (mount dia. > 20 mm or > 22 mm)	Replace spindle (shaft)
	Axial runout: Axial runout tested with STIHL test wheel or diamond cutting wheel (on 130 mm dia.)		None
	$\leq 0.15\text{ mm}$ > 0.15 mm Mating faces of the thrust washers damaged or uneven (particularly in the case of the inner thrust washer), mating faces not level, parts are not original STIHL parts	Dirt, thrust washers or cutting wheel fitted incorrectly, use of force during cutting or transport	Replace thrust washers
	Spindle (shaft) damaged	Incorrect handling, use of force	Replace spindle (shaft)
	Tangible radial play in the bearing seat → spindle bearing defective	Deep groove ball bearing damaged by dirt and/or seat of spindle bearing worn	Replace spindle and deep groove ball bearing

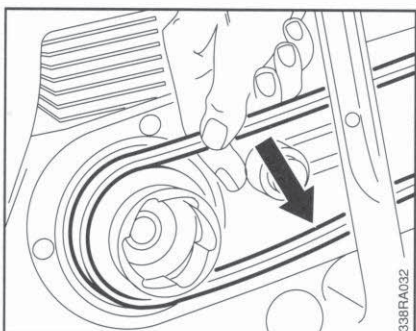
3.3 V-belt



- Remove bearing with guard, see chapter 3.1.
- Unscrew the screws of the starter cover.



- Remove starter cover.

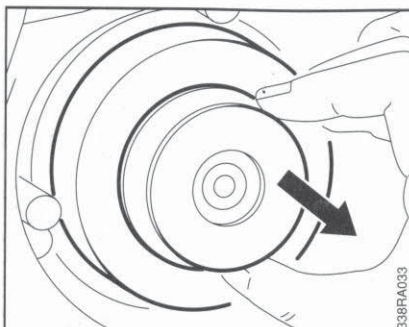


- Remove V-belt from V-belt pulley.

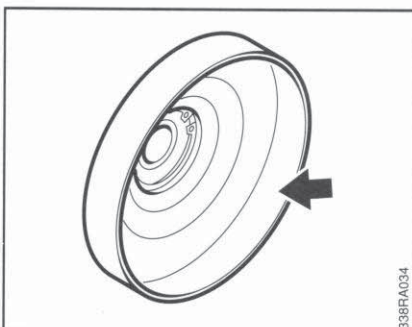
The parts are reassembled in reverse order.

Note: The screws of the starter cover must be tightened with a torque of 6 Nm.

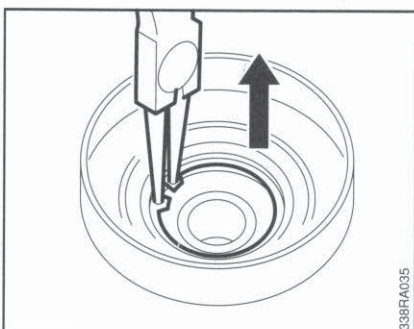
3.4 V-belt pulley / clutch drum



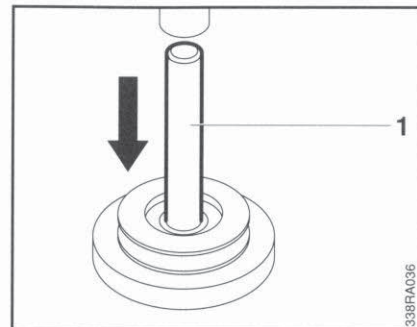
- Remove V-belt, see chapter 3.3.
- Remove starter wheel, see chapter 7.3.
- Draw V-belt pulley off crankshaft stub.



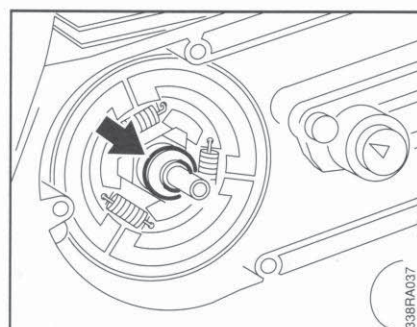
- Check clutch drum; it must not be scored or severely worn, otherwise the V-belt pulley must be replaced.



- Remove circlip.

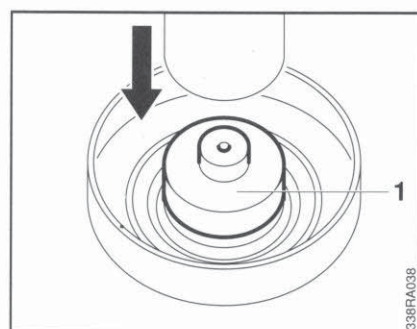


- Force out ball bearing with drift pin (1).



- Draw ring off crankshaft stub.

The parts are reassembled in reverse order.

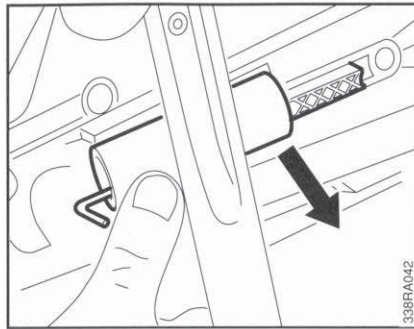


- Note:** The ball bearing must be pressed in as far as possible with drift pin (1).

3.5 Clamp

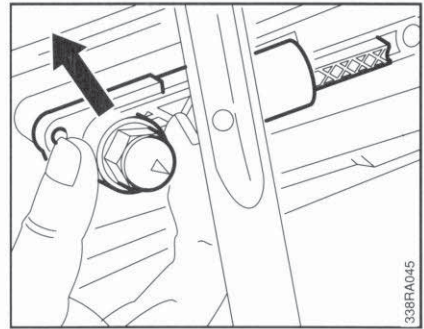


- Remove starter cover, see chapter 3.3.
- Turn hexagon on clamp clockwise until the internal helical spring is completely detensioned.

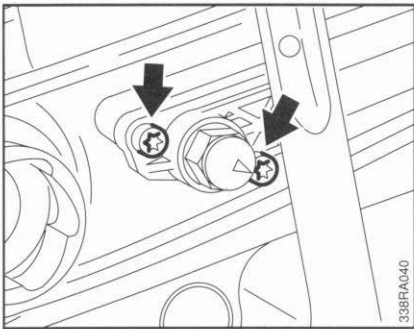


- Remove the clamping lever from the housing slot.

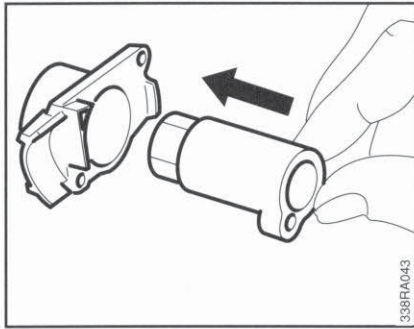
The parts are installed in reverse order.



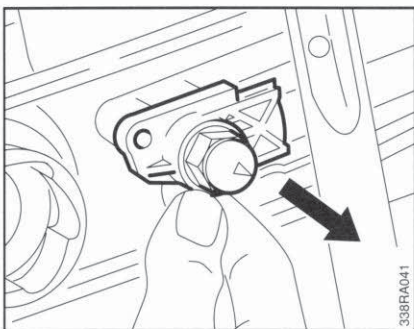
Insert both parts together. Tighten the fastening nuts with a torque of 4.5 Nm.



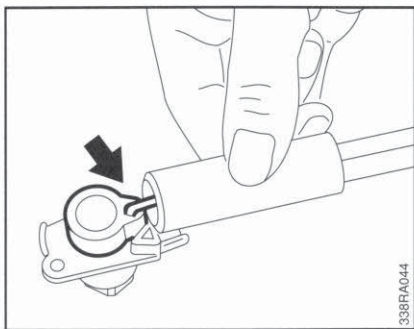
- Unscrew the fastening screws of the clamp.



Note: The clamp must be assembled if necessary.



- Remove the clamp.



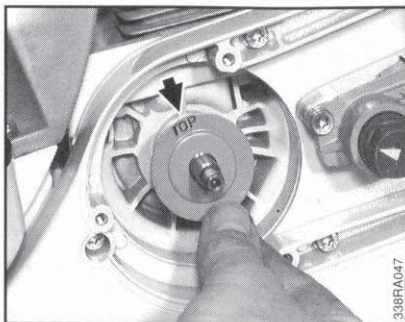
Insert the hook of the draw bar into the bore.

4. CLUTCH

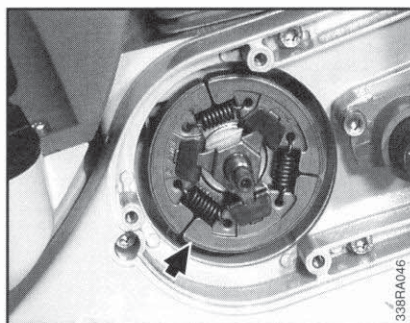
4.1 Removal and installation

Refer to the manual "Trouble-shootings, standard repairs" for troubleshooting procedures.

- Remove V-belt, see chapter 3.4.



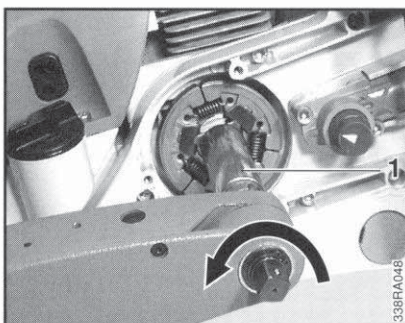
- Slip on cover washer with the word "TOP" pointing outwards.



- Unscrew clutch and attachment from the crankshaft.

Important! The clutch has a left-hand thread.

- Remove the cover washer from the crankshaft stub.
- Dismantle and reassemble clutch; see manual "Trouble-shooting, standard repairs".



- Screw on clutch and tighten to 40 Nm with insert (1).
- Attach V-belt pulley, see chapter 3.4.

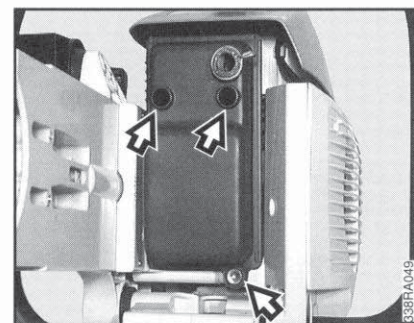
5. ENGINE

5.1 Muffler

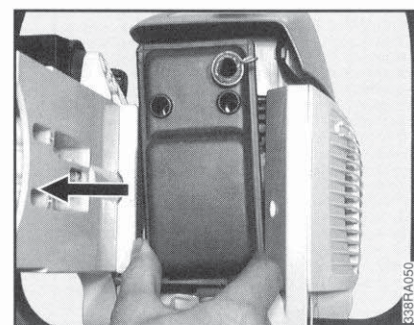
Refer to the manual "Trouble-shooting, standard repairs" for troubleshooting procedures.

Note: The spark arresting screen can also be replaced without removing the muffler.

- Remove bearing with guard, see chapter 3.1.

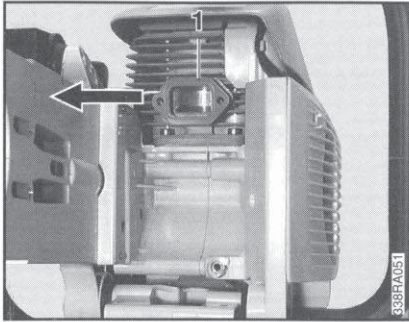


- Unscrew the muffler screws.



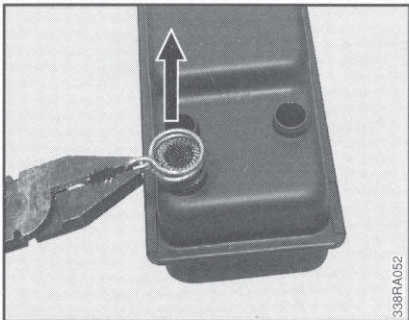
- Remove muffler.

5.2 Leakage testing



- Remove gasket.

Note: When fitting muffler, position new gasket so that the bead (1) points towards the muffler.



- Compress and remove the clip.



- Draw out the spark arresting screen.
- Clean the spark arresting screen; fit new screen if necessary.

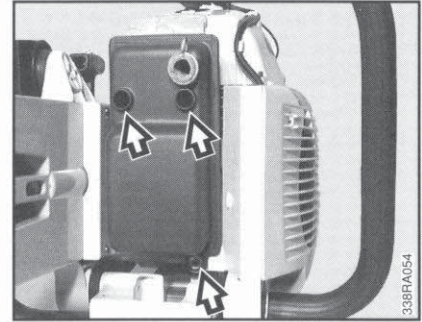
Defective rotary shaft seals and gaskets or cracks in the castings cause leaks through which supplementary air can enter and change the composition of the fuel/air mixture taken in.

Above all, this makes it very much more difficult, if not impossible, to set the correct idle speed.

In addition, it also prevents a faultless transition from idle to full or part-load operation.

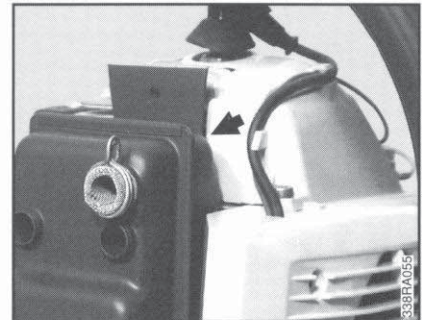
The crankcase can be tested to ensure it is absolutely tight with the aid of the carburetor / crankcase tester and the vacuum pump.

5.2.1 Preparatory steps



- Remove shroud, see chapter 5.5.

- Unscrew the muffler screws half-way.

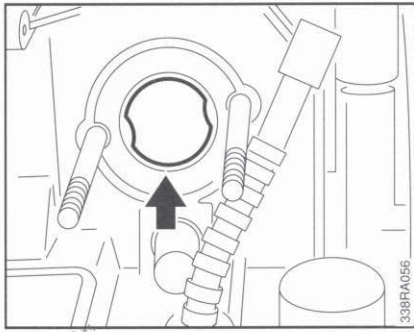


- Slide a sealing plate (1) between muffler and cylinder exhaust port and tighten both the upper screws.

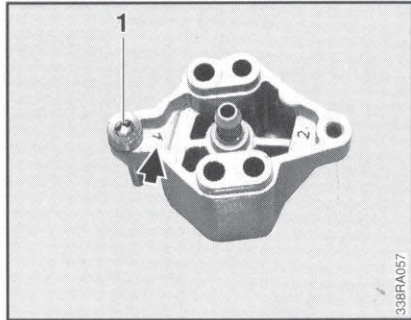
Note: The sealing plate must fill the full width between the screws.

- Remove carburetor, see chapter 10.3.
- Set piston to upper dead center (UDC) (can be seen through the inlet port).

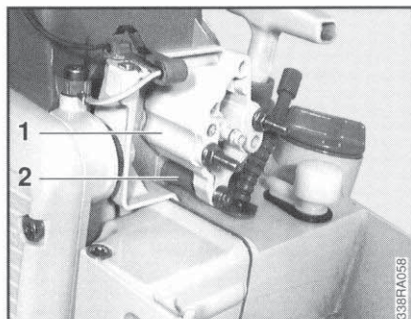
5.2.2 Testing with excess pressure



- Check that the sleeve is present in the manifold.

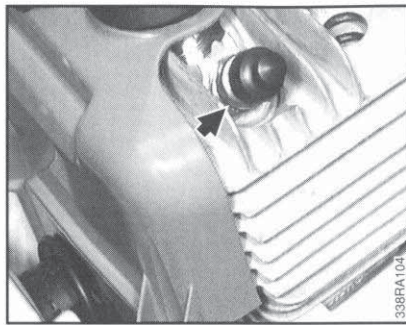


- Check whether pin (1) is located in bore No. 1 in the test flange and screw it in if necessary.

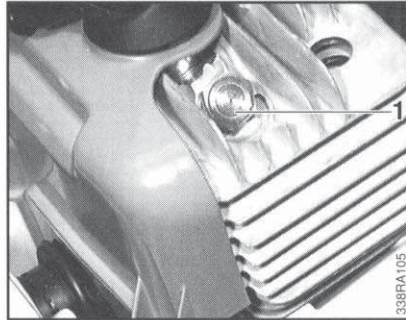


- Install test flange (1) instead of the carburetor.

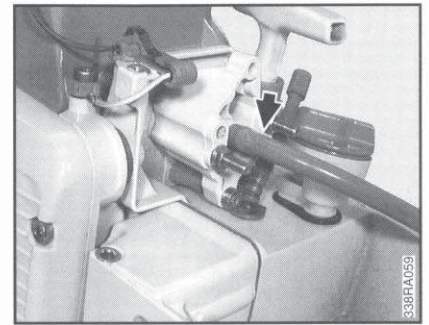
Important! The pin must be inserted in the impulse hose (2) correctly when installing the test flange.



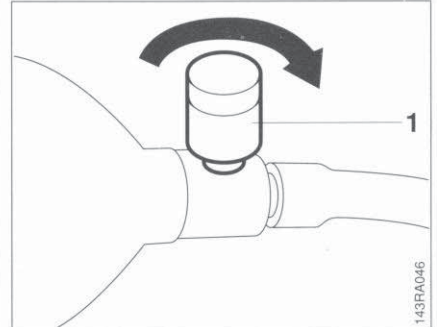
- Remove decompression valve.



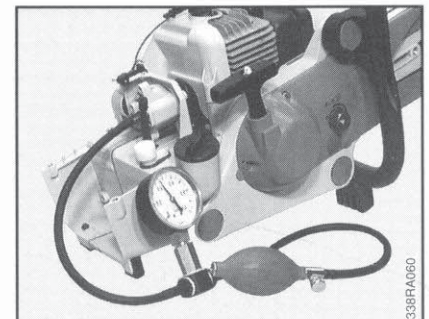
- Screw in and tighten plug (1) instead of the decompression valve.



- Connect the pressure hose of the tester to the nipple on the test flange.
- Check that the spark plug is secure.



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



- Pump air into the crankcase with the aid of the rubber bulb until an excess pressure of 0.5 bar is indicated on the pressure gauge. There are no leaks in the crankcase if this pressure is maintained for at least 20 seconds.

5.2.3 Testing with negative pressure

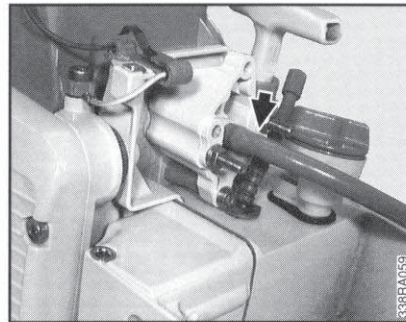
- The leak must be located and the defective part replaced if the pressure drops.

Note: Coat the supposedly defective area with oil and pressurize the crankcase again. Bubbles form in the oil-coated area if defective.

- Then test under vacuum as described in chapter 5.2.3.
- After testing, open venting screw and remove hose.
- Remove test flange and install carburetor, see chapter 10.2.2.
- Unscrew muffler screws.
- Draw out sealing plate.
- Tighten muffler screws with a torque of 10.0 Nm.
- Fit shroud, see chapter 5.5.

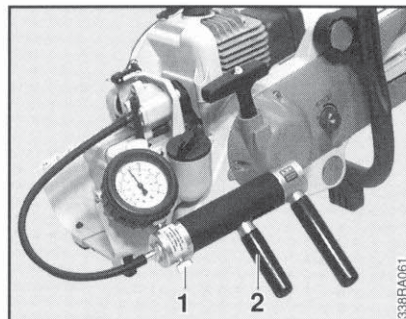
The rotary shaft seals usually fail in the presence of a negative pressure. Due to the absence of an inner counterpressure, the sealing lip lifts off the crankshaft during the piston's induction stroke.

This defect can be identified by additional testing with a vacuum pump. The preparatory steps for this test are the same as when testing with excess pressure as described in chapter 5.2.1.



- Connect the intake hose of the vacuum pump to the nipple of the test flange.

- Check that the spark plug is secure.



- Close venting screw (1) on the pump piston.
- Actuate lever (2) until a vacuum of 0.5 bar is indicated on the pressure gauge.

Note: The rotary shaft seals are in perfect working order if the indicated negative pressure is maintained or if the pressure does not rise above 0.4 bar within 20 seconds. If the pressure continues to increase (elimination of negative pressure in crankcase), however, the rotary shaft seals must be replaced even if the vacuum test did not reveal any leaks.

- Reopen venting screw and remove hose after testing.
- Remove test flange and install carburetor as described in chapter 10.2.2.
- Unscrew muffler screws.
- Draw out sealing plate.
- Tighten muffler screws with a torque of 10.0 Nm.
- Fit shroud, see chapter 5.5.

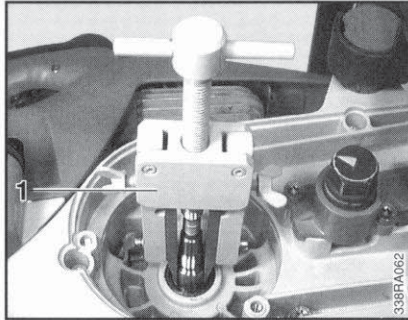
5.4 Rotary shaft seals

The engine need not be dismantled if only the rotary shaft seals are to be replaced.

Clutch side:

- Remove clutch, see chapter 4.1.

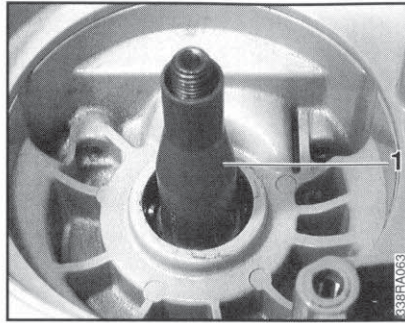
Note: Lightly knock against the rotary shaft seal with a suitable tube or punch to drive it out of its seat.



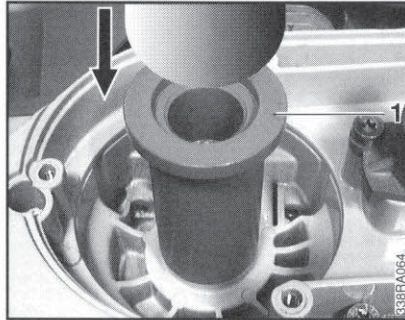
- Position extractor (1) (jaws with No. 1 profile).
- Tension arms.
- Draw out rotary shaft seal.

Important! The crankshaft stub must not be damaged.

- Clean the sealing face with a conventional solvent-based degreasing agent without CFCs and halogenated hydrocarbons as described in chapter 11.2.
- Coat the sealing lips of the rotary shaft seal with grease, see chapter 11.2.



- Slide assembly sleeve (1) over crankshaft stub.

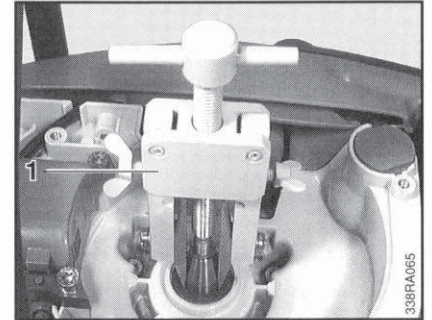


- Slide the rotary shaft seal over the assembly sleeve with the open side facing the crankcase.
- Press it into place with press sleeve (1).
- Remove assembly sleeve.
- Install clutch, see chapter 4.1.

Ignition side:

- Remove flywheel, see chapter 6.5.
- Install jaws with profile 3.1 on extractor.

Note: Lightly knock against the rotary shaft seal with a suitable tube or punch to drive it out of its seat.

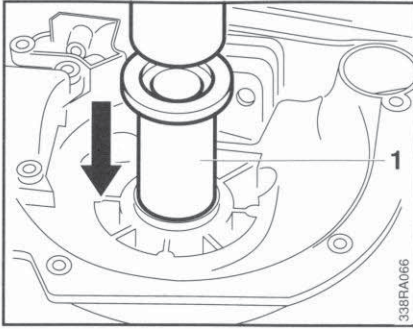


- Fit extractor (1).
- Tension arms.
- Draw out rotary shaft seal.

Important! The crankshaft stub must not be damaged.

- Clean the sealing face with a conventional solvent-based degreasing agent without CFCs and halogenated hydrocarbons as described in chapter 11.2.
- Coat the sealing lips of the rotary shaft seal with grease, see chapter 11.2.

5.5 Exposing the cylinder

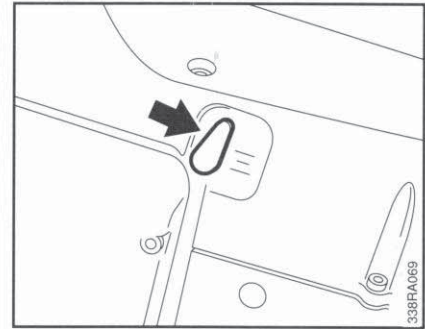


- Slide the rotary shaft seal over the crankshaft stub with the open side facing the crankcase.
- Press it into place with press sleeve (1).
- Install flywheel, see chapter 6.5.

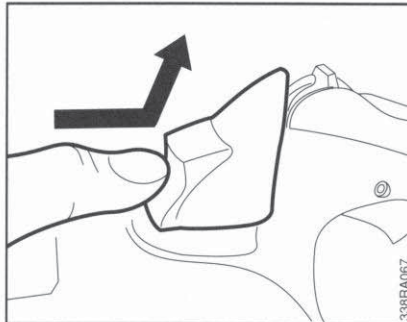
Check and repair the fuel supply, carburetor, air filter and ignition system before locating faults in the engine.

Refer to the manual "Troubleshooting, standard repairs" for troubleshooting procedures.

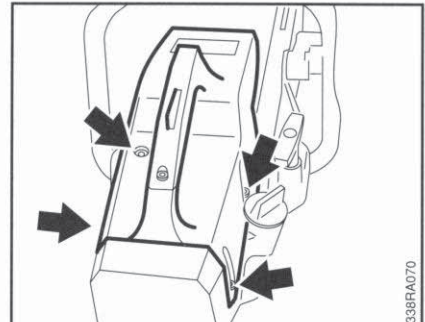
- Remove muffler, see chapter 5.1.



- Set choke lever to upward position.



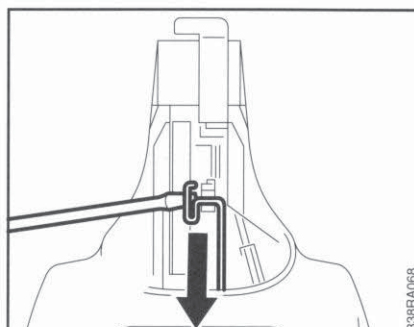
- Press cap in at bottom, slide upwards and remove.



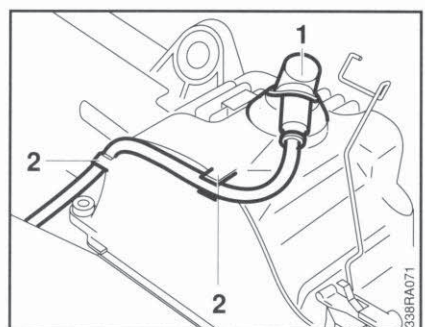
- Unscrew shroud screws.

Note: One of the screws is not shown in the picture.

- Remove shroud.



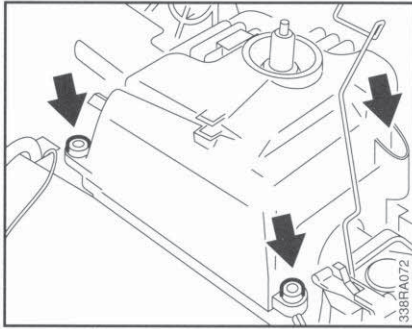
- Depress throttle trigger slightly and draw throttle rod out of trigger.



- Remove spark plug terminal (1) from spark plug.
- Remove ignition lead and stop switch lead from mount (2).

5.6 Cylinder and piston Removal

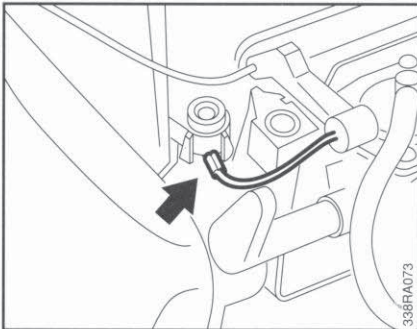
5.6.1 Removal



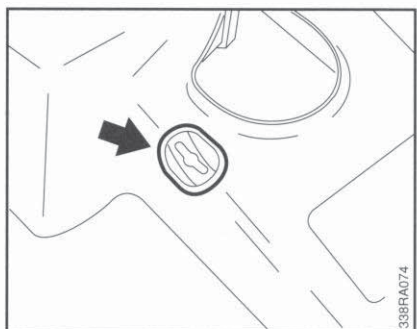
- Unscrew the screws of the air guide cover.

- Remove air guide cover.

The parts are reassembled in reverse order.

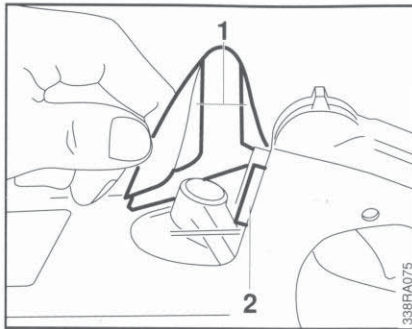


Note: A ground lead must be fitted between the air guide cover and the housing.

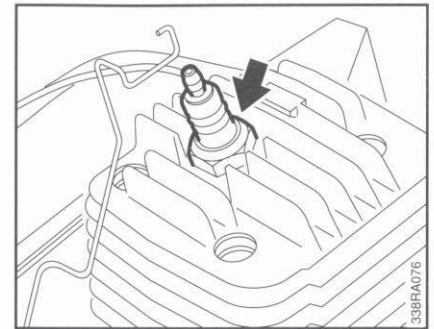


Check that spout for decompression valve is located correctly on the shroud.

Set the slide control to "I" before assembling the shroud.

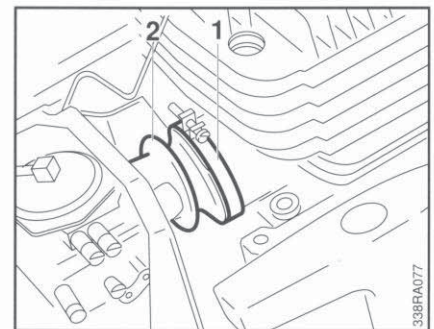


The tabs (1) on the cap must engage in the guides (2) in the shroud.



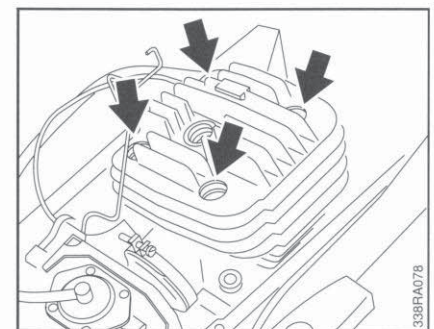
Preparatory steps are described in chapter 5.5.

- Unscrew spark plug.



- Disconnect hose clip (1) of manifold (2).

- Slide manifold off intake port.

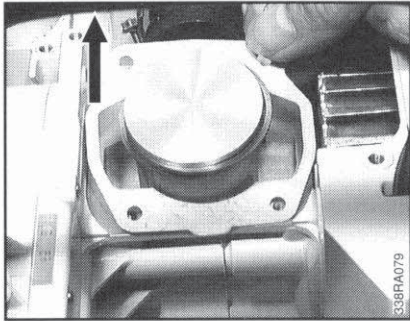


- Unscrew the cylinder base screws through the holes in the cylinder.

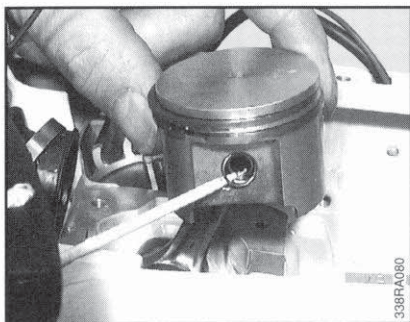
- Draw cylinder off piston.

- Remove decompression valve as described in chapter 5.8.
- Check cylinder and replace if necessary.

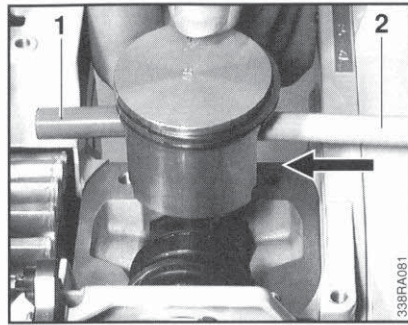
Note: The corresponding piston must also be fitted when installing a new cylinder. New cylinders are therefore only available with piston.



- Remove cylinder gasket.



- Lever the hookless snap rings out of the annular grooves with a drawing pin or similar implement.



- Press piston pin (1) out of the piston with assembly pin (2).

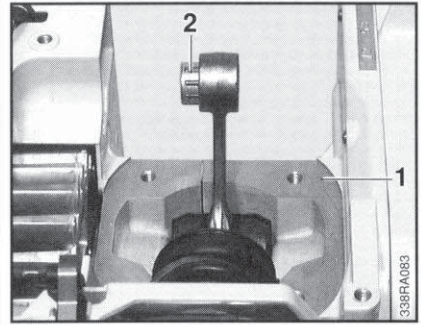
Note: If the piston pin is stuck, it can be released by **lightly** knocking against the assembly pin with a hammer. The pin **must be steadied** in order not to transmit the knocks to the conrod.

- Remove piston from conrod and draw needle cage out of the conrod eye.



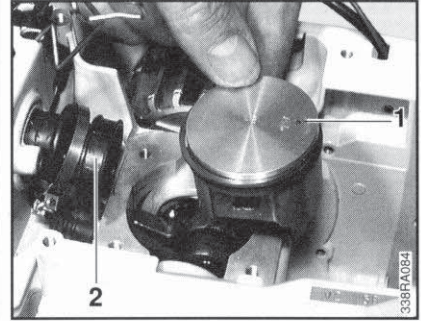
- Check and replace piston rings, see chapter 5.7.

5.6.2 Installation

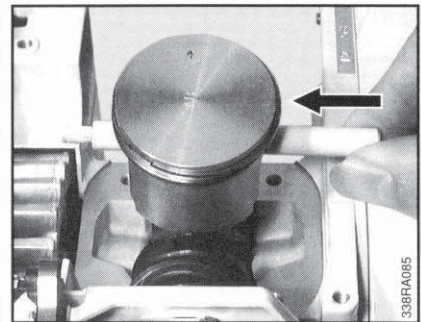


- Thoroughly clean sealing face (1).

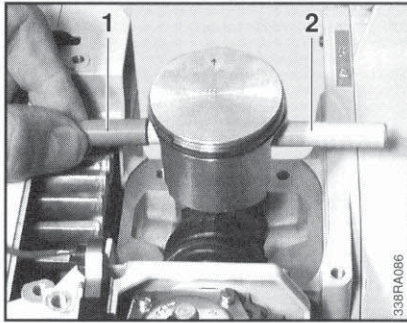
- Coat needle cage (2) with oil and insert in conrod eye.



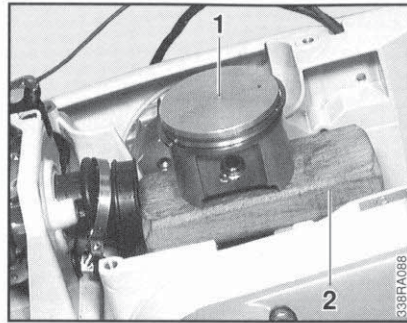
- Heat piston to approx. 60 °C on a hotplate and slide onto conrod. The mark (1) on the piston base must point away from the manifold (2).



- Insert the assembly pin through the piston bore and conrod eye (needle cage) with the stub first and align the piston.

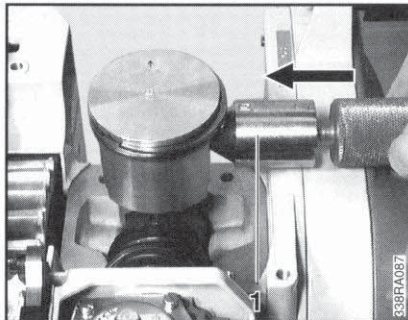


- Plug piston pin (1) into the stud of assembly pin (2) and insert in piston (the piston pin can be inserted without difficulty when the piston is warm).



- Coat the piston and piston rings with oil and place the piston (1) on the wooden assembly block (2).

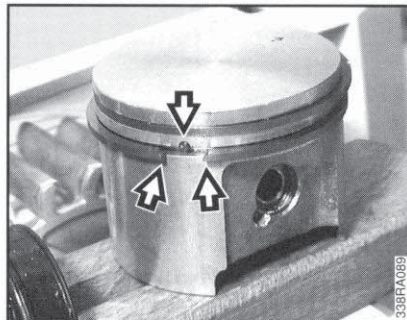
- Ensure that the piston rings are positioned correctly.
- Coat the inside of the cylinder with oil and line it up in accordance with its subsequent installation position. The piston rings may break if this is not done.



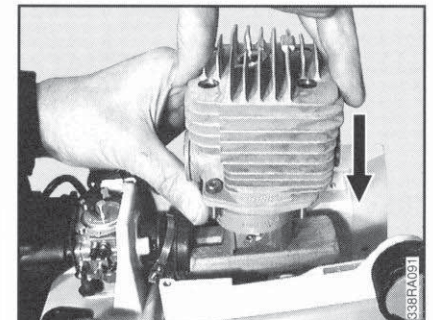
- Position the assembly tool (1) on the piston pin eye, steady the piston and press the tool shaft inwards parallel to the axis of the piston pin until the snap ring engages in the groove.

Note: Refer to the manual "Troubleshooting, standard repairs" for details on handling the assembly tool.

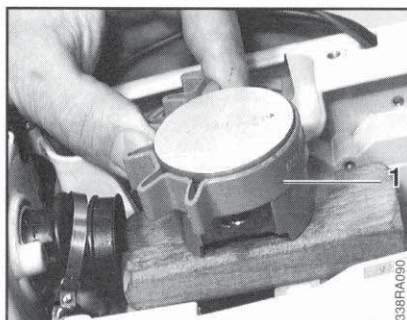
- Fit a new cylinder gasket.



- Line up the piston rings; the fixing pin must be engaged in the annular groove by the bevelled radii of the ring joint when compressed.

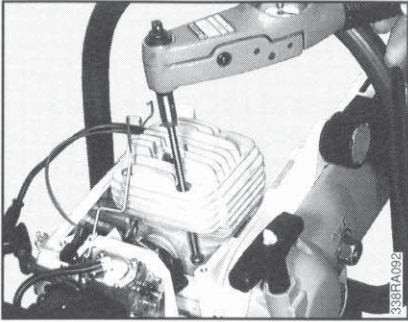


- Slide the cylinder over the piston; the strap retainer slips downwards and the piston rings slide into the cylinder.
- Remove the strap retainer and wooden assembly block.
- Precisely align the cylinder and cylinder gasket.

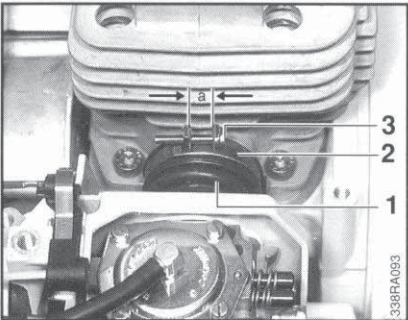


- Encircle the piston and piston rings with the strap retainer (1).

5.7 Piston rings

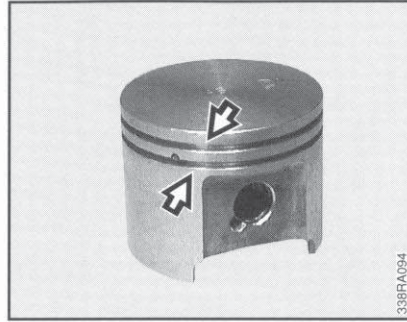


- Screw in the cylinder base screws and alternately tighten them crosswise with a torque of 10.0 Nm.

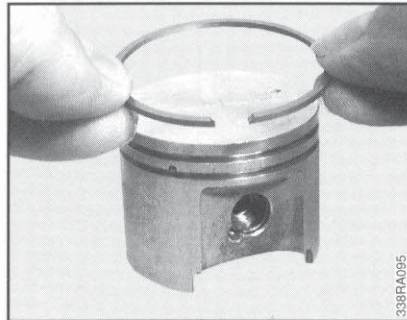


- Slide manifold (1) onto the intake port.
- Slip on the hose clip (2) so that the tensioning screw (3) is at the top.
- Tighten the tensioning screw until a gap of $a = 6 \pm 0.5$ mm remains between the tabs.

The remaining parts are installed and reassembled in reverse order.

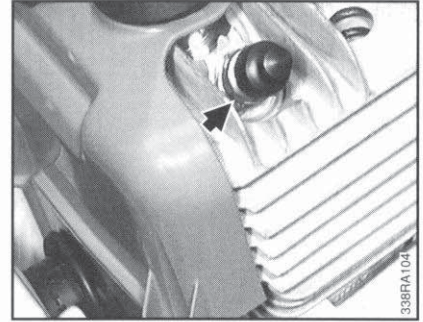


- Remove piston, see chapter 5.6.1.
- Remove piston rings from piston.
- Scratch carbonized residues out of the grooves with an old piece of piston ring.



- Fit new piston rings in the annular grooves with the bevelled slopes at the ends facing towards the piston head.
- Install piston, see chapter 5.6.2.

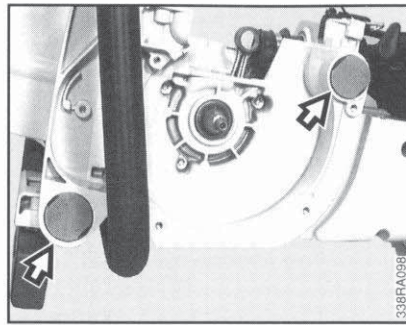
5.8 Decompression valve



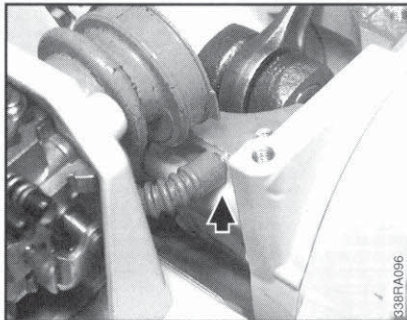
- Remove shroud, see chapter 5.5.
- Unscrew decompression valve from cylinder.
- Screw in decompression valve and tighten with a torque of 14 Nm.
- Install shroud, see chapter 5.5.

5.9 Crankcase
5.9.1 Removing the crankshaft

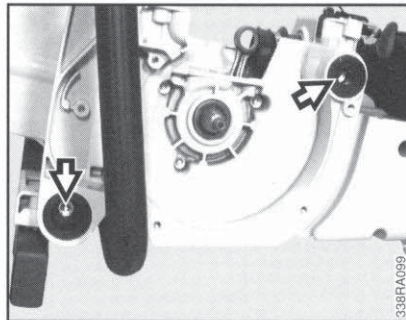
- Remove clutch, see chapter 4.1.
- Remove flywheel, see chapter 6.5.
- Remove cylinder and piston, see chapter 5.6.1.



- Prise stoppers out of the rubber buffers on the ignition side.



- Draw impulse hose off connector.

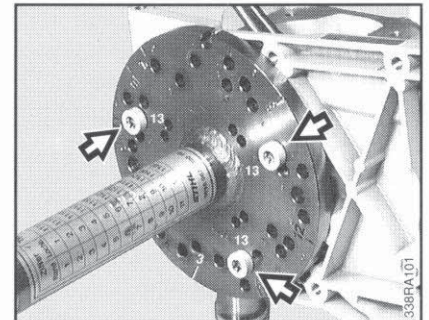


- Unscrew the screws in the rubber buffers.
- Remove crankcase.

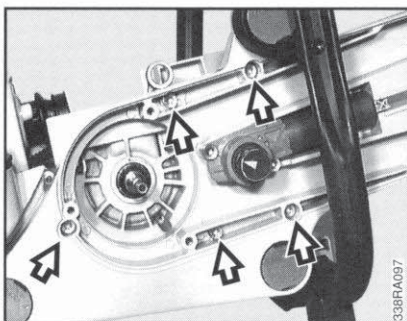
- Partly unscrew the spindle of assembly tool ZS.

Note: The spindle has a left-hand thread.

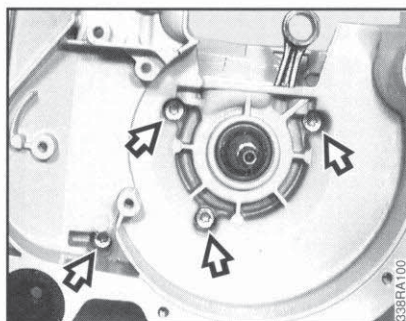
- Hold assembly tool ZS against the clutch-side half of the housing so that the notch marked "3" is at the bottom.



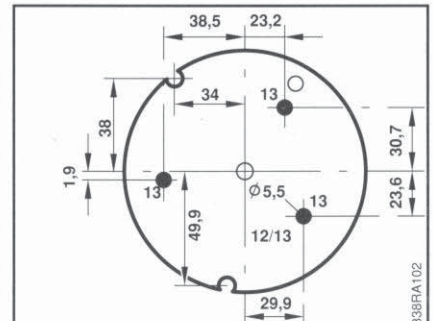
- Insert three M5x72 screws into the holes marked "13" and screw them in until they rest against the drilled plate.



- Unscrew the screws from the cast arm.

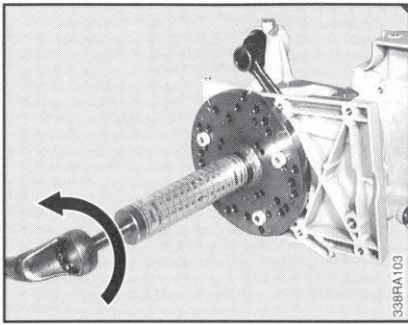


- Unscrew the screws in the two halves of the housing.



Note: Assembly devices without the holes marked "13" can be modified as illustrated.

The drilled plate is viewed from below in the diagram.

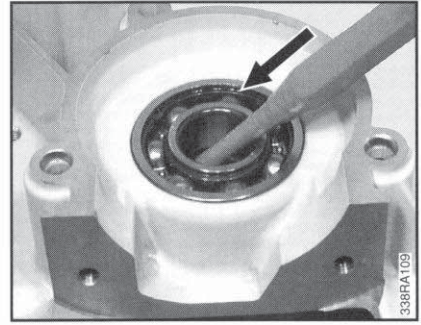


- Turn the spindle of the assembly tool counterclockwise until the crankshaft has been forced out of the ball bearing on the clutch-side half of the housing.

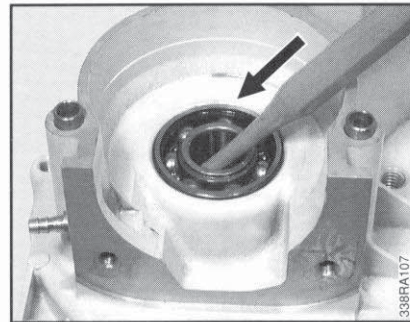
Note: The two halves of the housing now come apart.

- Remove the housing gasket.
- Fit the assembly tool to the ignition-side half of the housing with M5x72 bolts and nuts.
- Turn the spindle of the assembly tool counterclockwise until the crankshaft has been forced out of the ignition-side half of the housing.

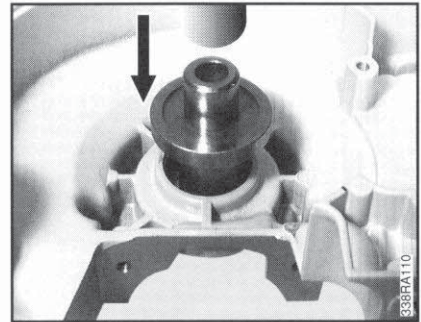
- The deep groove ball bearings and rotary shaft seals must also be replaced when fitting a new crankshaft.



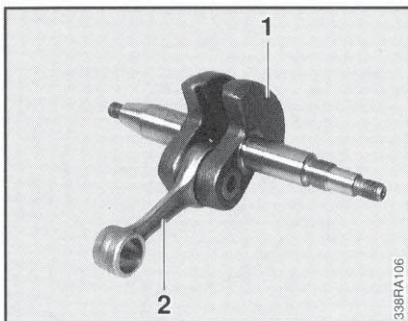
- Carefully drive the rotary shaft seal out of the housing half.



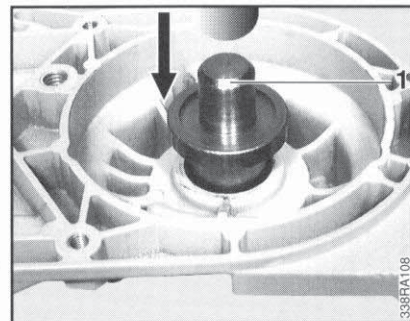
- Carefully drive the rotary shaft seal out of the housing half.



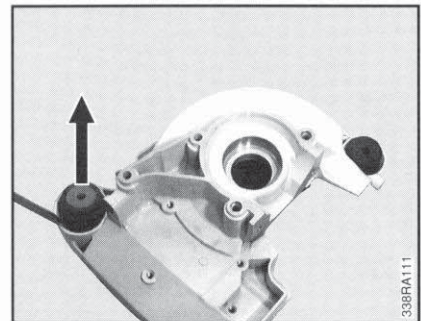
- Drive the deep groove ball bearing out with drift pin (1).
- Check the crankcase halves for cracks and replace if necessary.



- The crankshaft (1), conrod (2) and needle bearing form an inseparable unit. The complete assembly must be replaced if any of these parts are damaged.



- Drive the deep groove ball bearing out with drift pin (1).



- Drive out the rubber buffers when replacing the two halves of the crankcase.

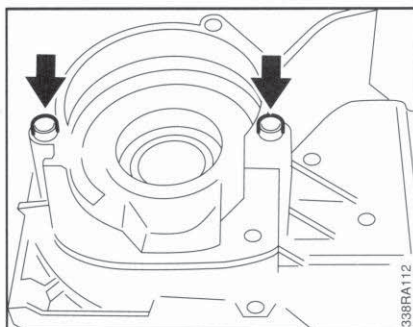
5.9.2 Installing the crankshaft

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

New crankcase halves are supplied complete with fitted deep groove ball bearings and rotary shaft seals.

The serial number must be stamped into the number strip of the new crankcase with 2.5 mm figure stamps.

If the old crankcase is reused, gasket scraps must be removed and the sealing faces cleaned. These faces must be absolutely clean in order to ensure a perfect seal.

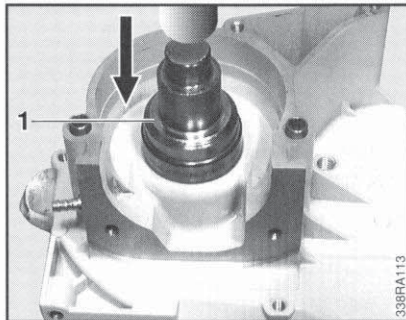


- Sleeves must be present; they must be driven into the housing half if necessary.

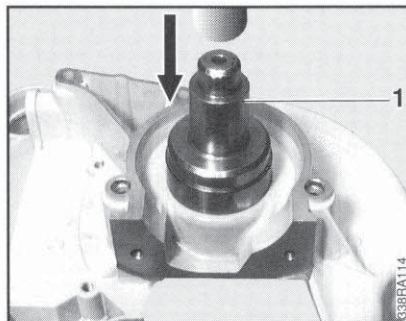
- Heat the housing halves to approx. 150 °C around the seats of the deep groove ball bearings.

- Press the deep groove ball bearings into the housing halves as far as possible.

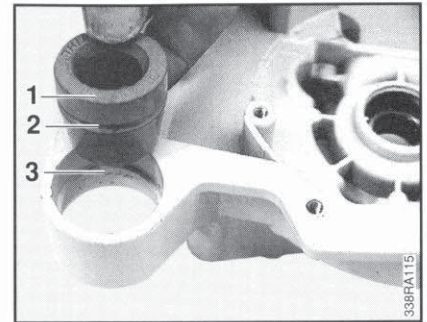
Note: The deep groove ball bearings can be inserted as far as possible by hand if the housing halves have been heated as specified. This must be done quickly, since the deep groove ball bearings immediately heat up and expand.



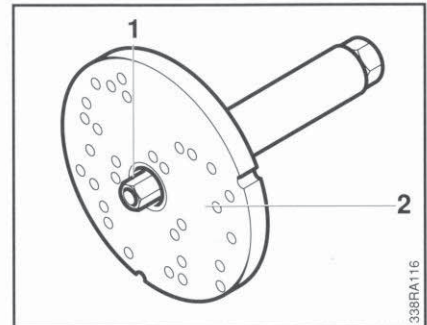
- If the clutch-side housing half cannot be heated, the deep groove ball bearing must be driven in as far as possible with drift pin (1).



- If the ignition-side housing half cannot be heated, the deep groove ball bearing must be driven in as far as possible with drift pin (1).

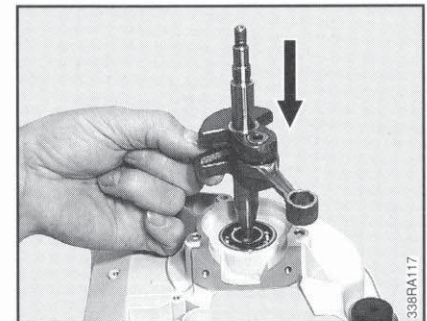


- Press both rubber buffers in with the smaller hole (1) facing towards the inside of the housing half until the outer groove (2) engages the edge of the housing (3).

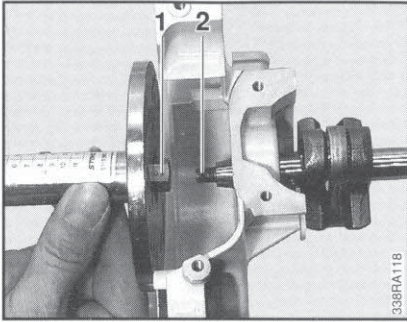


- Screw the threaded sleeve (1) as far as possible onto the fully retracted spindle of assembly tool ZS (2).

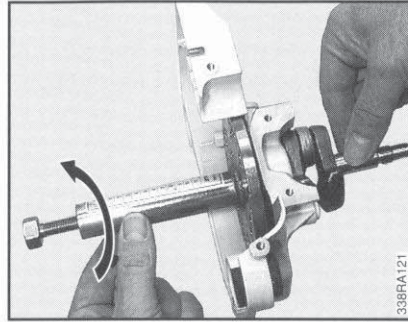
- Coat the tapered crankshaft stub with oil.



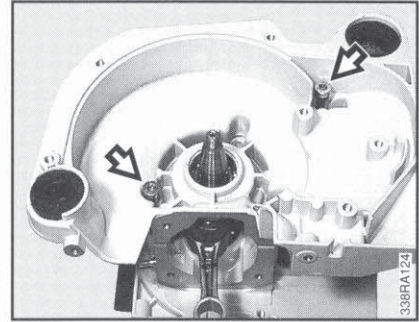
- Insert the crankshaft with the tapered stub in the deep groove ball bearing of the ignition-side half of the housing.



- Screw the threaded sleeve (1) onto the screw thread (2) of the crankshaft stub.



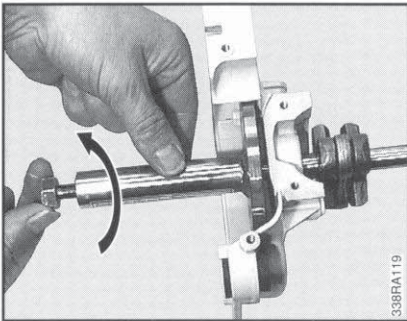
- To remove the assembly tool, unscrew the spindle counter-clockwise and release the assembly tool by turning it counterclockwise too (the crankshaft must be steadied at the same time).



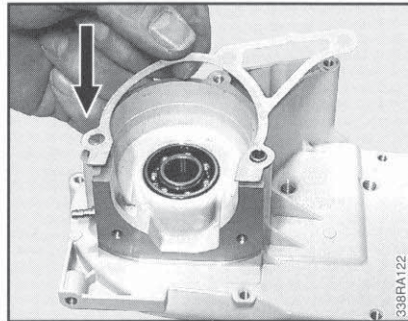
- Screw M5x72 screws (from the set of assembly tools ZS) into two holes of the crankcase connection to prevent the housing from twisting and to guide the two halves of the housing and the gaskets.

Note: The sleeves must engage in the holes in the ignition-side half of the housing.

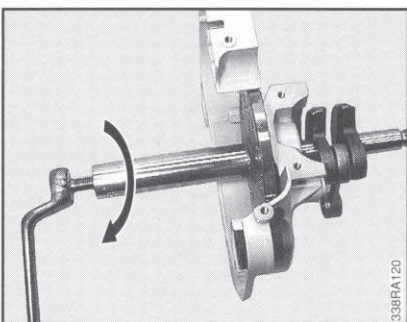
- Fit assembly tool ZS as on the ignition-side half of the housing.



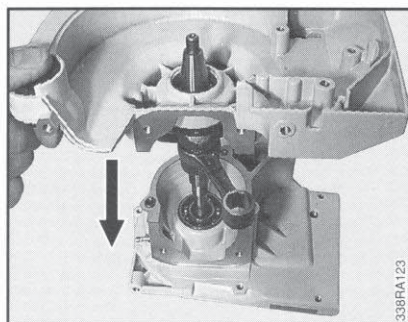
- Steady the spindle and turn the assembly tool counterclockwise until the drilled plate rests against the housing.



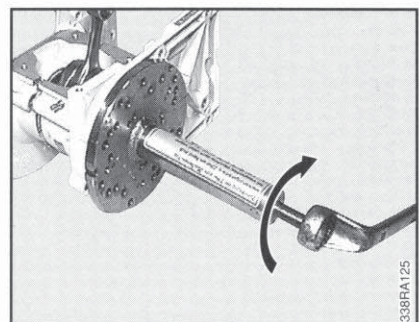
- Place a new housing gasket on the sealing face of the clutch-side half of the housing.
- Coat the cylindrical crankshaft stub with oil.



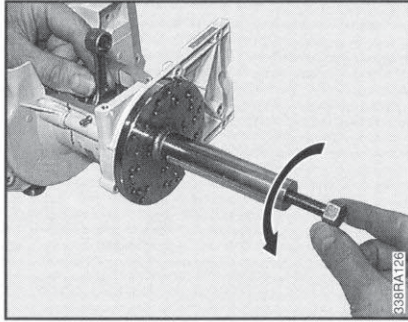
- Draw the crankshaft as far as possible into the deep groove ball bearing by turning the spindle clockwise.



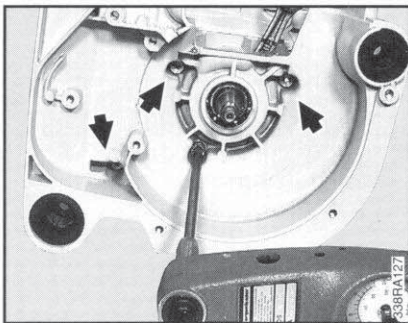
- Insert the crankshaft stub in the deep groove ball bearing.



- Draw the crankshaft as far as possible into the deep groove ball bearing by turning the spindle clockwise.



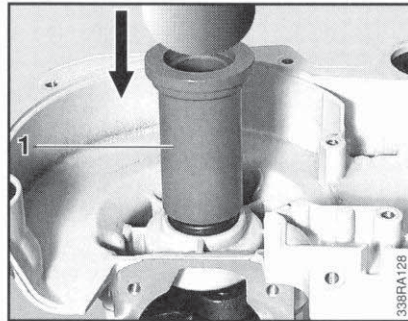
- Hold the crankshaft and remove the assembly tool by turning the spindle counterclockwise.
- Unscrew the M5x72 screws fitted to prevent twisting.



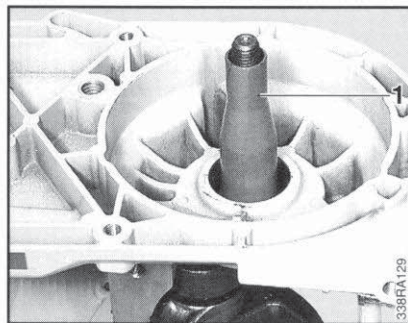
- Screw in the screws and alternately tighten them cross-wise with a torque of 10.0 Nm.

Note: Remove the protruding housing gasket on the assembly face for the cylinder.

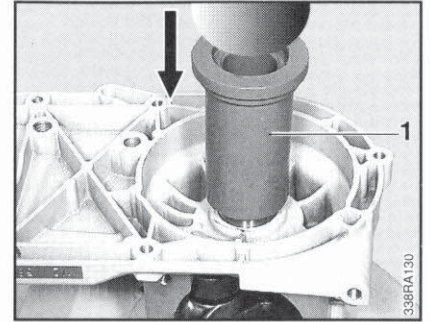
- Coat the sealing lips of the rotary shaft seals with grease, see chapter 11.2.



- Slide the rotary shaft seal over the ignition-side crankshaft stub with the open side facing the crankcase.
- Drive in with press sleeve (1).



- Slide assembly sleeve (1) over the clutch-side crankshaft stub.



- Slide the rotary shaft seal over the assembly sleeve with the open side facing the crankcase.
- Drive in with press sleeve (1).
- Remove the assembly sleeve after pressing in the rotary shaft seal.
- Wait approx. one minute and then turn the crankshaft over several times.

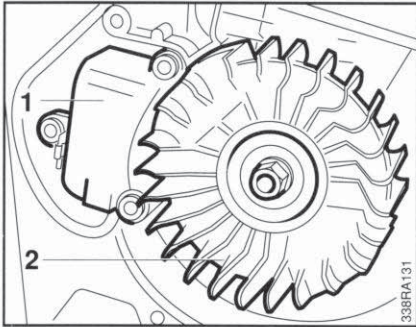
The remaining parts are reassembled in reverse order.

Note: The screws of the cast arm must be tightened with a torque of 10.0 Nm and those of the rubber buffer with 6.0 Nm.

6. IGNITION SYSTEM

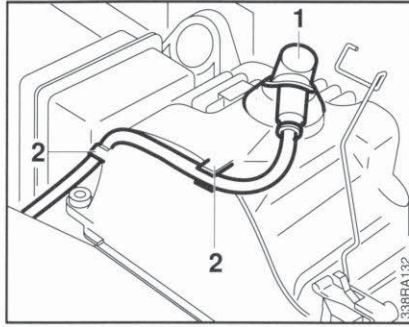
Important! Great care must be exercised during troubleshooting, maintenance and repair work on the ignition system. The high voltages can maim or kill!

Troubleshooting in the ignition system should always start with the spark plug; refer to the manual "Troubleshooting, standard repairs".

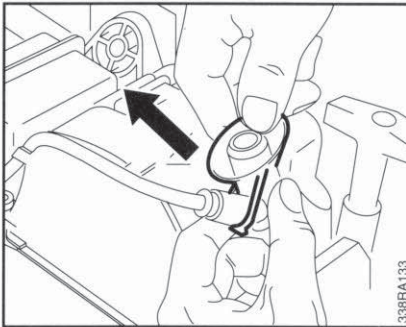


Note: The transistor-controlled (non-contacting) ignition system essentially comprises the ignition module (1) and flywheel (2) and is easily accessible.

6.1 Spark plug terminal

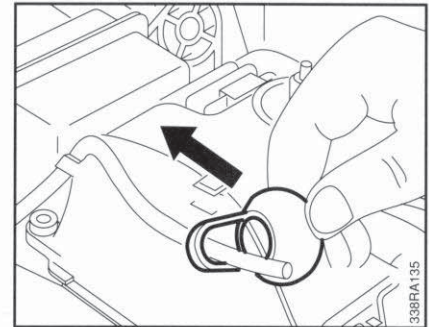


- Remove shroud, see 5.5.
- Disconnect spark plug terminal (1) from spark plug.
- Draw ignition lead out of holder (2).

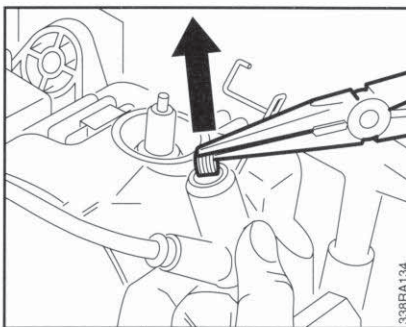


- Draw cover off spark plug terminal and slide it down over the ignition lead.

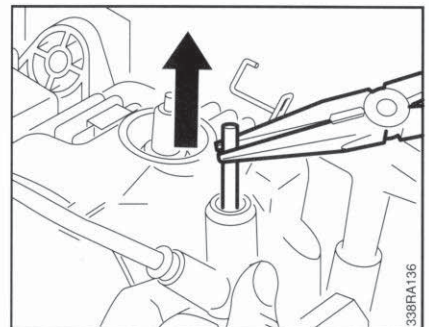
- Draw spark plug terminal off ignition lead.
- Remove cover from ignition lead.



- Slide cover over ignition lead.
- Coat end of ignition lead (approx. 20 mm) with oil.
- Slide spark plug terminal onto lead.

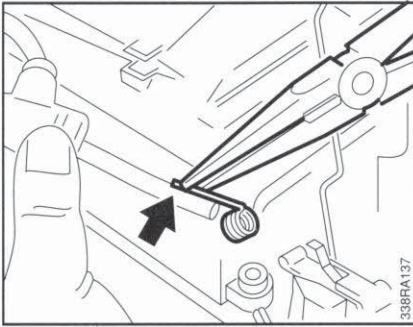


- Grasp torsion spring with pliers and draw it out of the spark plug terminal.
- Unhook the torsion spring from the ignition lead.

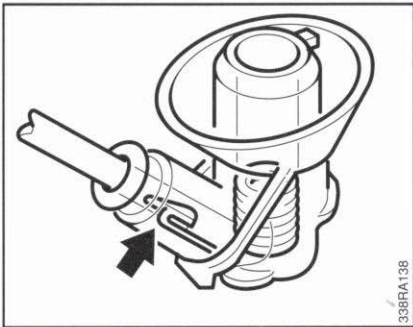


- Grasp ignition lead with pliers and draw it out of the spark plug terminal.

6.2 Ignition lead

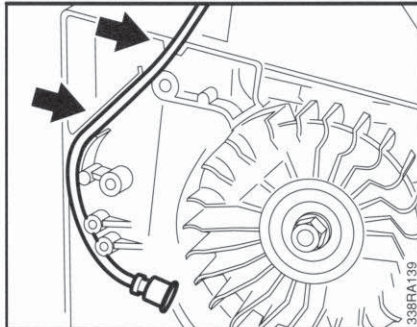


- Press hook of torsion spring into middle of wire cross-section approx. 15 mm from the end of the ignition lead.

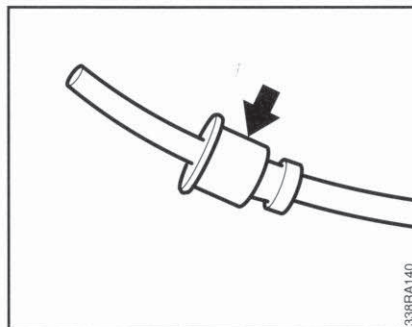


- Pull back ignition lead until torsion spring rests in the slot in the spark plug terminal.
- Slide cover over spark plug terminal.
- Press ignition lead into holder.
- Plug spark plug terminal onto spark plug.
- Install shroud, see 5.5.

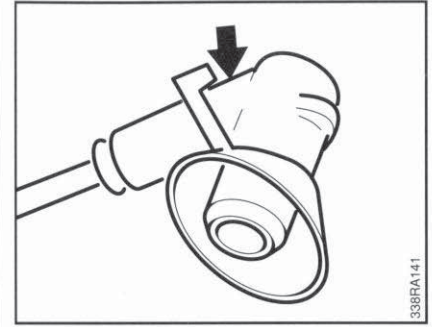
- Draw spark plug terminal off spark plug, see 6.1.
- Dismantle ignition module, see 6.3.2.



- Draw ignition lead out of retainers.

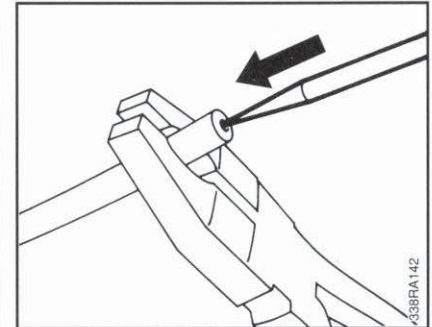


- Draw protective sleeve off ignition lead.



- Dismantle spark plug terminal, see 6.1.

- Cut new ignition lead to correct length (as specified in spare parts list or same length as former lead).



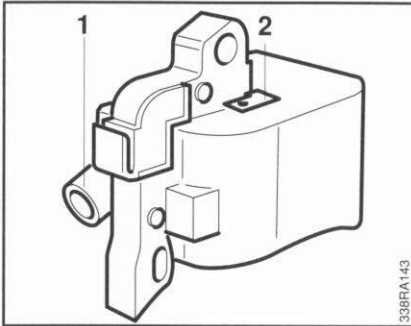
- Use a sharp implement to pierce the centre at the end of the ignition lead which is to be turned into the ignition module.

Note: Before turning in the ignition lead, the high-voltage output must be filled with STIHL multi-purpose grease, see 11.2.

Caution! Graphite (Molykote) grease and silicone insulating paste must not be used.

- Install ignition module, see 6.3.2.
- Insert ignition lead in retainers.
- Plug spark plug terminal onto spark plug.
- Install shroud, see 5.5.

6.3 Ignition module



All the functional parts for ignition timing control are combined in the ignition module. Only two electrical leads emerge from the coil body:

1. High-voltage output (1)
2. Connector tab (2) for connecting the stop switch lead

Correct functioning of the ignition module can only be tested in detail with the aid of a tester. Repair-shop testing should therefore be limited solely to spark testing. The complete ignition module must be replaced if the ignition spark fails although the leads and stop switch are intact.

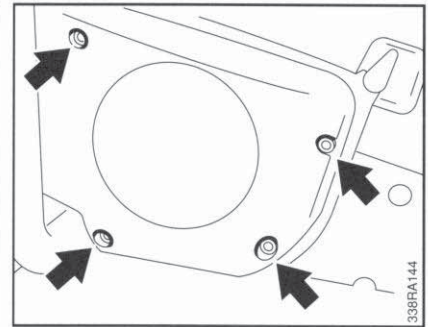
6.3.1 Ignition timing

Ignition in the transistor-controlled (non-contacting) magneto ignition is timed at 1.9 mm before UDC at $n = 8000$ rpm and cannot be adjusted.

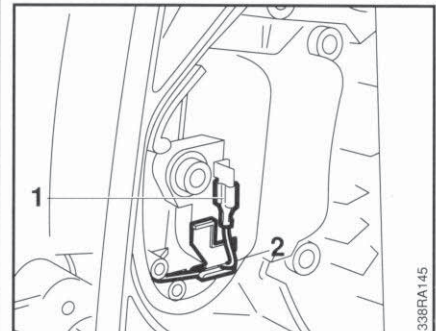
Taking into account the permissible variation in electrical control, this value may vary from 1.6 to 2.2 mm before UDC at $n = 8000$ rpm.

These systems are not subject to mechanical wear. It is therefore impossible for the ignition timing to change during operation on account of wear. Internal defects can, however, change the switching point so that spark testing yields a positive result although the ignition timing is outside the permissible range and therefore impairs the machine's starting and running characteristics.

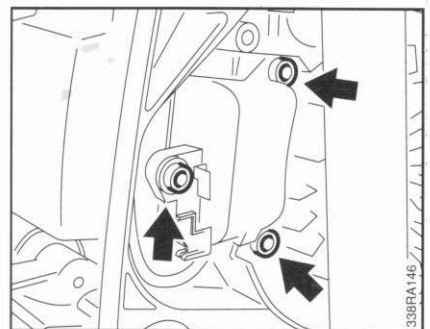
6.3.2 Removal and installation



- Unscrew the fan cover screws.
- Remove fan cover.

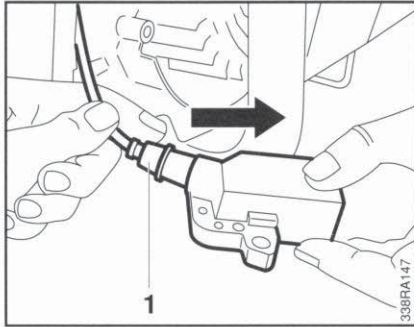


- Disconnect stop switch lead (1) from the connector tab on the ignition module.
- Draw the stop switch lead out of the harness (2).

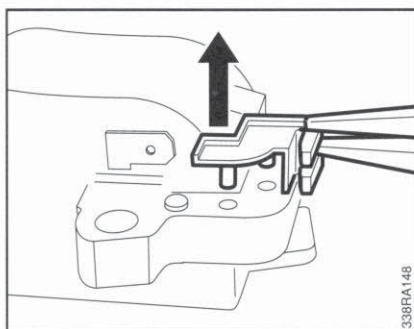


- Unscrew the ignition module screws.

6.4 Stop switch lead / ground lead



- Draw protective sleeve (1) off the high-voltage output.
- Unscrew the ignition lead from the contact pin, turning the ignition module and drawing the ignition lead out of the high-voltage output.



- If necessary, press out the tabs of the wire harness and remove the wire harness.

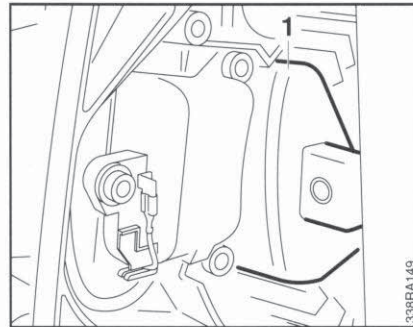
Note: Before screwing in the ignition lead, the high-voltage output must be filled with STIHL multi-purpose grease, see 11.2.

Caution! Graphite (Molykote) grease and silicone insulating paste must not be used.

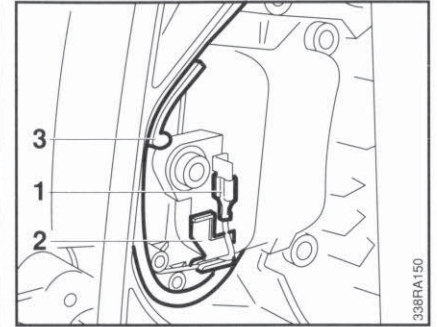
- Slide protective sleeve over the high-voltage output.
- Position the ignition module and loosely turn in the screws.

Important! A washer must be fitted under the head of every screw.

- Slide on stop switch lead.

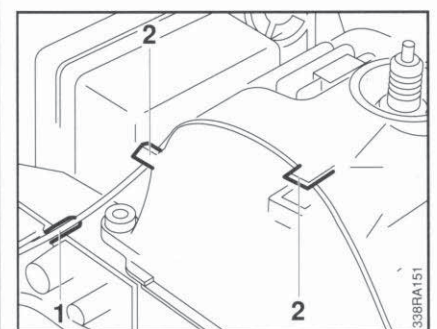


- Insert a gauge (1) between the arms of the ignition module and the magnetic poles of the flywheel.
- Press the ignition module against the gauge and tighten the screws with a torque of 8.0 Nm.
- Remove the gauge and check the air gap with calipers; the gap should be 0.15 ... 0.3 mm.
- Replace fan cover.
- Insert screws and tighten with a torque of 6.0 Nm.



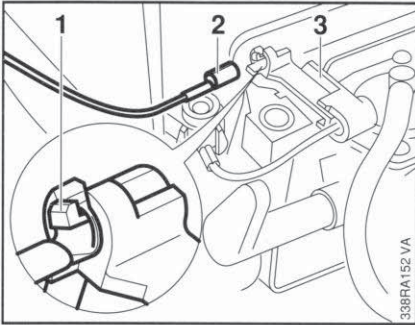
Stop switch lead:

- Remove shroud, see 5.5.
- Install fan cover, see 6.3.2.
- Disconnect plug (1) on stop switch lead from ignition module.
- Draw stop switch lead out of wire harness (2) and mount (3).
- Disconnect spark plug terminal from spark plug.
- Draw ignition lead out of retainers.



- Remove stop switch lead from slot (1) and retainers (2).

6.5 Flywheel

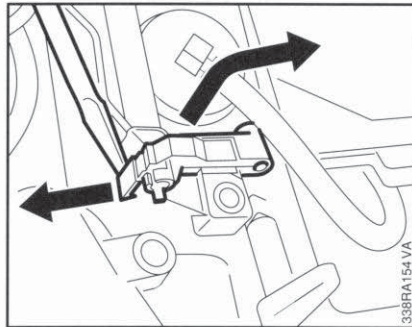


- Press catch (1) down and draw contact sleeve (2) of stop switch lead out of the mount for retainer (3).

Ground wire, contact spring:

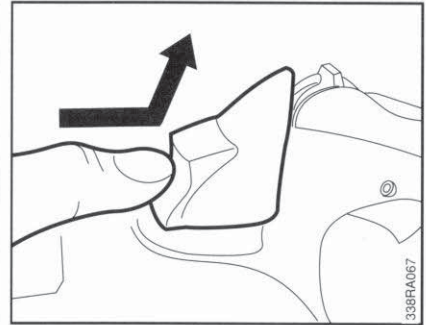
- Draw contact sleeve of ground wire out of the mount for the contact spring.

- Draw out the ground lead (2).



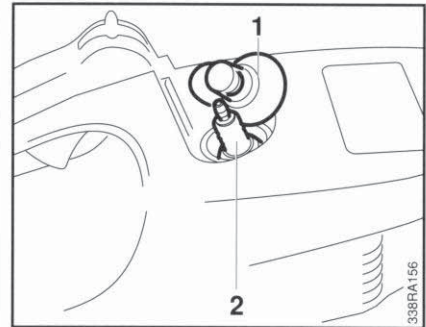
- Press contact spring retainer out of slot and remove it.
- Press contact spring out of retainer.

Reassemble parts in reverse order.

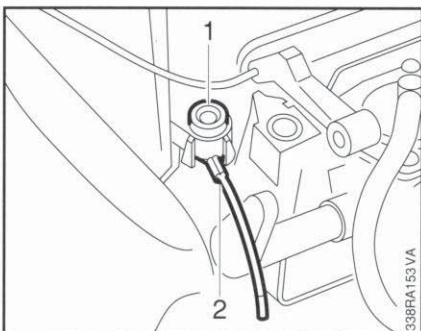


Removing the flywheel:

- Press the cap in at the bottom, slide it upwards and remove it.

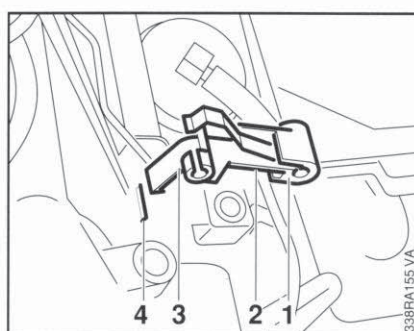


- Disconnect spark plug terminal (1) from spark plug (2).
- Unscrew spark plug.

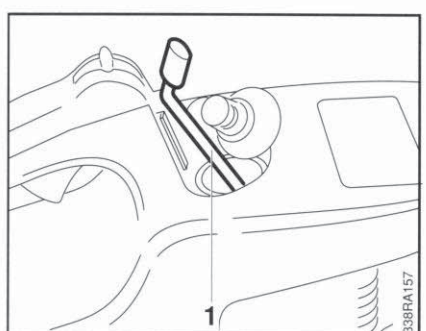


- Unscrew the screw (1) in the cover.

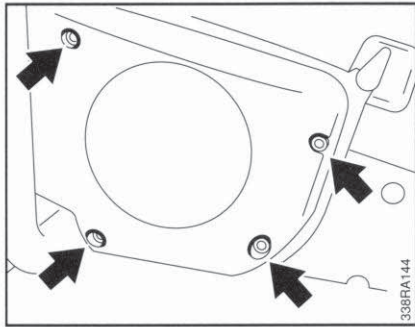
Note: Unscrew the other two screws too.



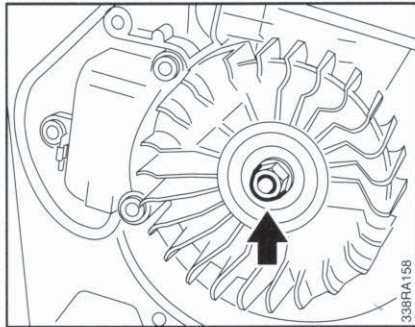
Note: Slide the tab (1) under the housing and press the retainer (2) down until the sloping edge (3) engages in the slot (4).



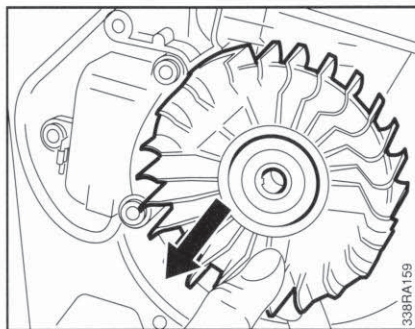
- Insert locking strip (1) in the cylinder with the lateral tabs pointing outwards to block the crankshaft.



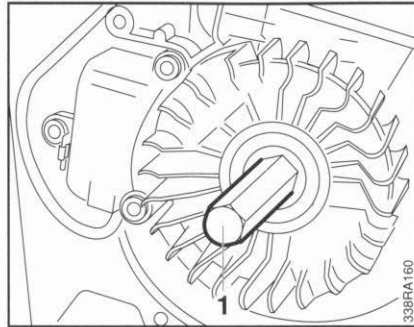
- Unscrew the fan cover screws.
- Remove fan cover.



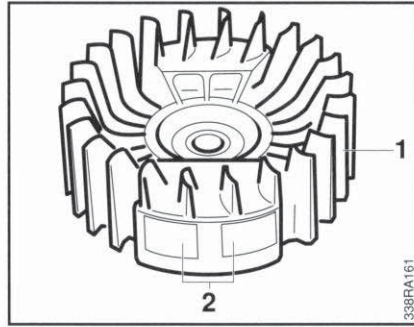
- Turn flywheel so that the magnetic poles are opposite the ignition module.
- Unscrew collar nut on flywheel.



- Remove flywheel.



Note: If the flywheel cannot be removed by hand, screw on extractor (1) and lightly tap against the face of the extractor. Unscrew the extractor when the flywheel has become unstuck.



- There must not be any cracks or other signs of damage in the flywheel (1) and magnetic poles (2), otherwise the flywheel must be replaced.

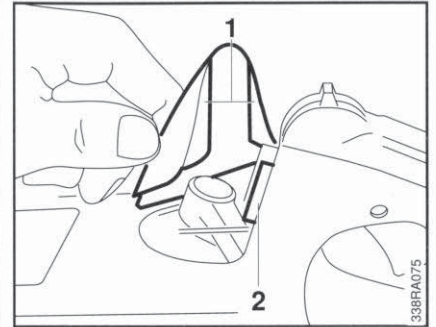
Installing the flywheel:

Important! The crankshaft stubs and bore of the flywheel hub must be degreased with a solvent-based degreasing agent, see 11.2.

- Fit flywheel.
- Screw on collar nut and tighten with a torque of 30.0 Nm.

The remaining parts are assembled in reverse order.

Note: Tighten the fan cover screws with a torque of 6.0 Nm.



Tighten spark plug with a torque of 27.5 Nm.

The tabs (1) on the cap must engage in the guides (2) on the shroud.

7. STARTER

7.1 General

If the starter rope can be pulled out and then rewinds very slowly or incompletely, the starter system is mechanically OK but severely soiled. If the cut-off machine is used at very low temperatures, the oil on the rewind spring may have become ropy so that the spring windings stick together and the starter no longer functions correctly. In this case, it is sufficient to apply a few drops of petroleum to the rewind spring.

Carefully pull the starter rope several times and let it rewind smoothly until it functions correctly again.

The soiled or resinous starter mechanism must be dismantled completely, including the rewind spring. Great care must be taken when removing the spring!

All parts must be cleaned in petroleum or cleaners' naphtha.

7.2 Rewind spring Replacement

7.2.1

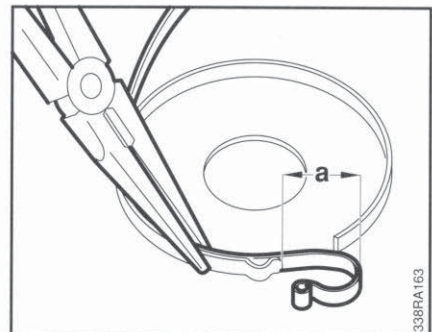
Refer to the manual "Troubleshooting, standard repairs" for troubleshooting procedures.

- Remove starter cover, see 3.3.
- After removing the rope rotor (see manual "Troubleshooting, standard repairs"), remove the spring housing and pick the fragmented rewind spring out of the starter cover with pliers.

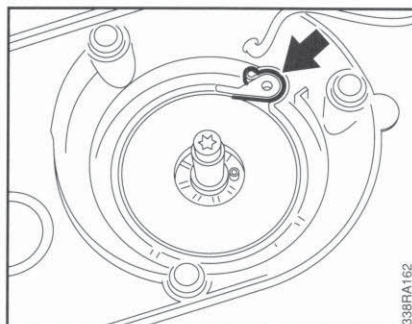
Note: The replacement spring is supplied with spring housing, ready for installation.

Caution! The rewind spring may pop out if it is inserted without due care.

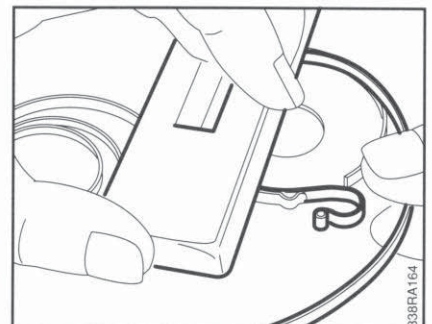
- Proceed as follows to replace the rewind spring if it has popped out:



- Position the outer spring loop at a distance of $a = 20$ mm from the edge of the spring housing.

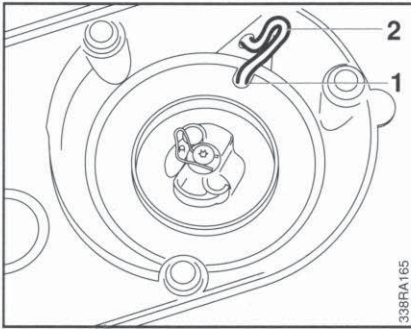


- Insert the rewind spring with spring housing (bottom upwards) into the starter cover, pressing the outer spring loop into the slot in the starter cover.

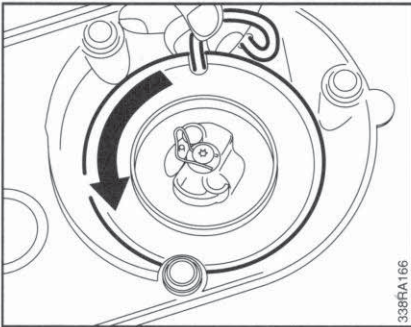


- Insert the rewind spring in clockwise direction.
- Install rope rotor, see manual "Troubleshooting, standard repairs"!

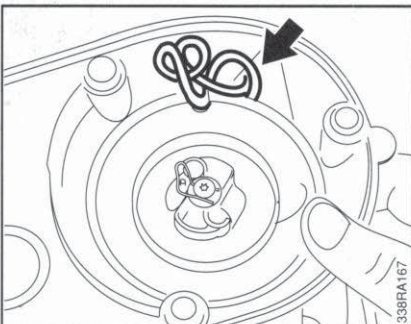
7.2.2 Tensioning



- Pull out the starter rope, place it in the recess (1) in the rope rotor and form a loop (2).

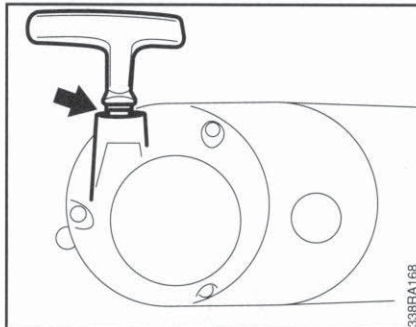


- Hold a **short** length of starter rope near the rope rotor and turn the rope rotor six times counterclockwise with it.



- Hold the rope rotor.
- Pull out and untangle the twisted rope at the starter handle.

- Use the starter handle to keep the starter rope taut.
- Let the rope rotor go and slowly pay back the starter rope so that it is rewound on the rope rotor.



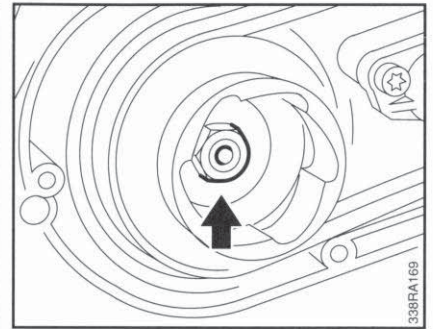
Note: The rewind spring is correctly tensioned when the starter handle sits securely in the rope guide bush without tipping to the side. If this is not the case, the spring must be tensioned another turn.

The rope rotor must still be able to turn at least one-half turn before reaching the maximum spring travel when the rope has been pulled out completely. If this is not possible, draw out the starter rope, hold the rope rotor and remove one turn of the rope.

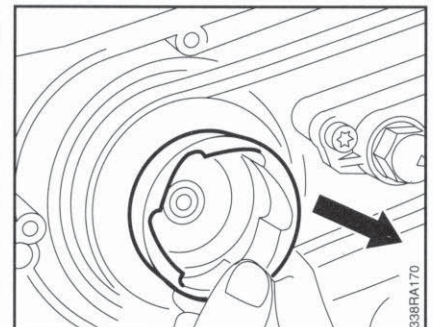
The spring may break if it is too tightly tensioned.

- Install starter cover, see 3.3.

7.3 Starter wheel

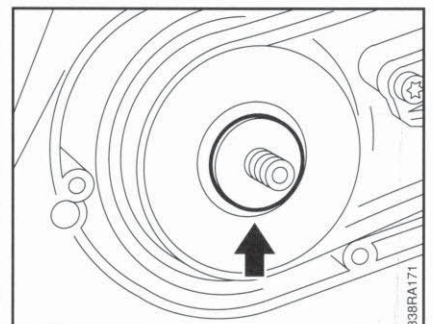


- Remove starter cover, see 3.3.
- Block piston with locking strip, see 6.5.
- Unscrew nut on starter wheel.



- Draw off starter wheel.

The parts are fitted in reverse order.



Note: Ensure that the washer is present.

Tighten the nut with a torque of 23 Nm.

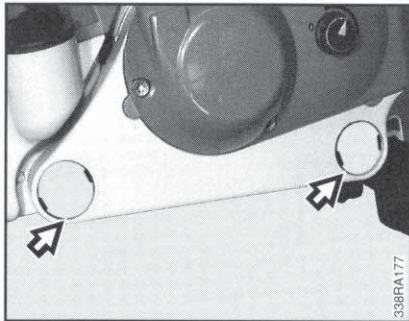
8. AV HANDLE SYSTEM

The handle and engine housings are connected by vibration-damping, ring-shaped rubber buffers. Damaged rubber buffers must always be replaced.

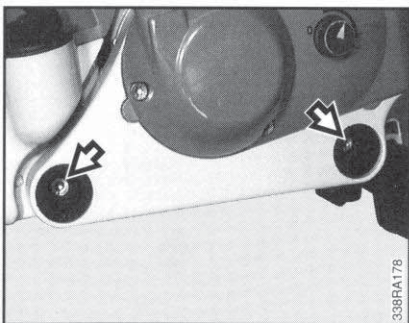
Upper rubber buffers, clutch side:

Note: See chapter 9.5 for information on replacement.

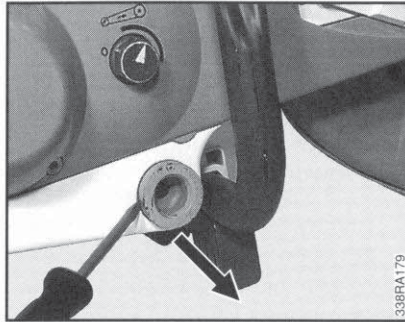
Lower rubber buffers, clutch side:



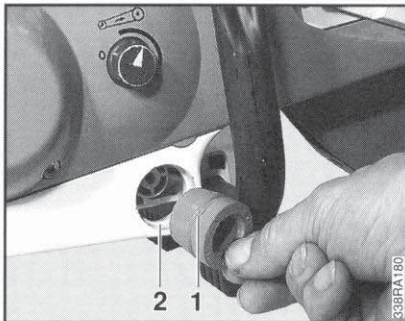
- Prise stoppers out of rubber buffers.



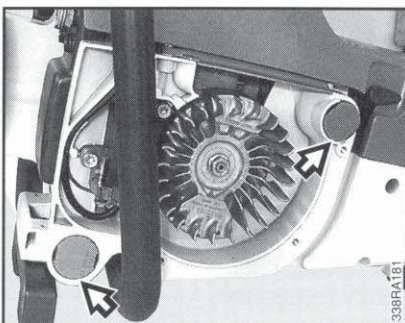
- Unscrew screws from rubber buffers.



- Prise rubber buffers out of cast arm.

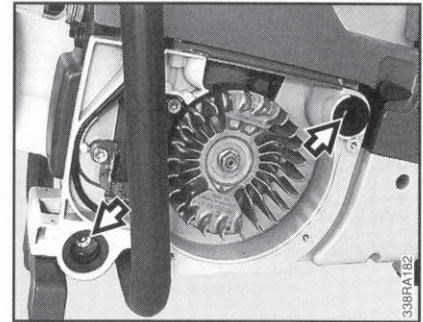


- Press rubber buffers into cast arm until outer groove (1) engages chamfer (2).
- Tighten screws with a torque of 6.0 Nm.

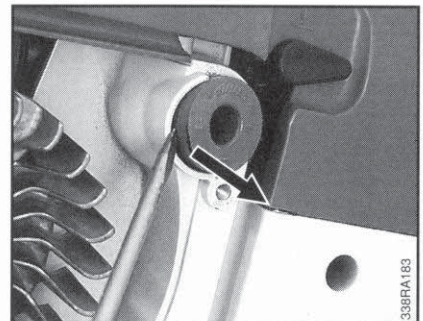


Rubber buffers, ignition side:

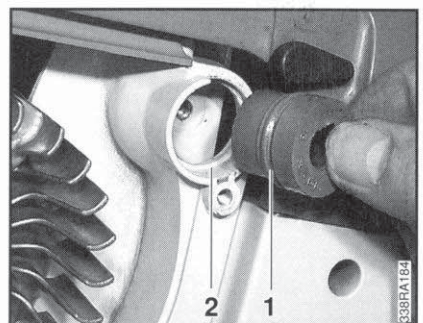
- Remove fan cover, see 6.3.2.
- Prise stoppers out of rubber buffers.



- Unscrew screws from rubber buffers.

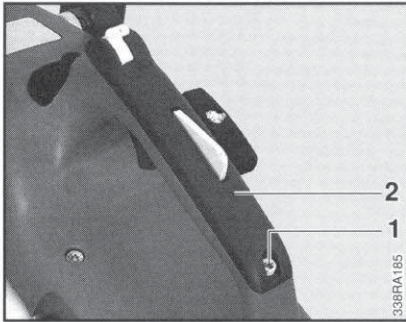


- Prise rubber buffers out of crankcase.

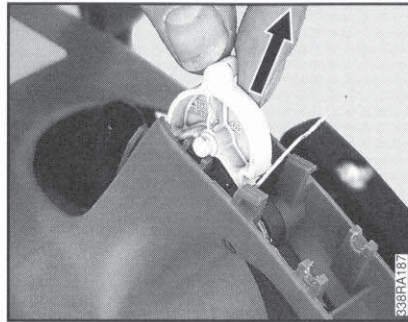


- Press rubber buffers in from the outside until outer groove (1) engages housing chamfer (2).
- Tighten screws with a torque of 6.0 Nm.

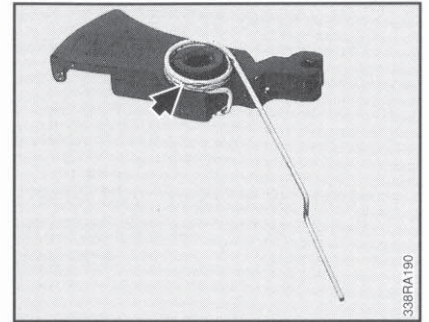
9. THROTTLE CONTROL
 9.1 Throttle trigger interlock, throttle trigger



- Remove cap from shroud, see 6.5.
- Unscrew screw (1) in handle moulding (2).
- Move slide control forwards to "0" (STOP).
- Draw handle moulding back slightly and remove it.

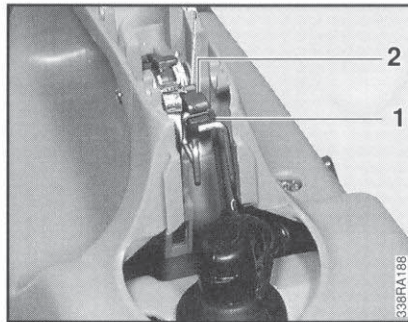


- Remove slide control from bearing.

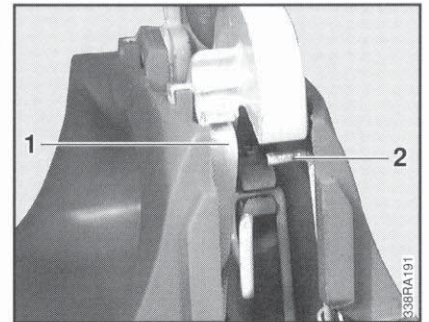


- Remove torsion spring from throttle trigger.

The parts are installed in reverse order.

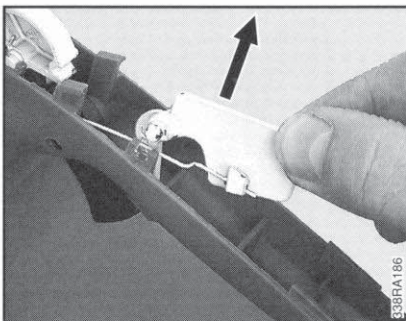


- Prise throttle rod (1) out of throttle trigger (2).

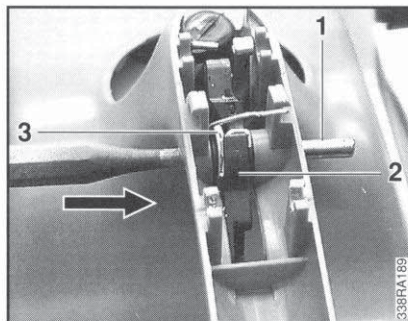


Note: The leaf spring (1) must be located in front of the slide control and the stop rod (2) below it.

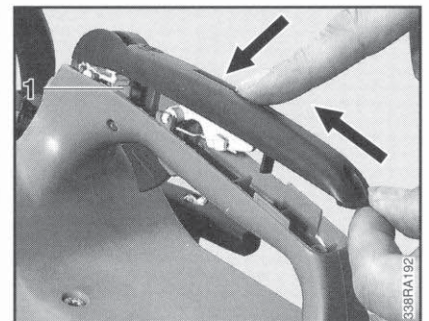
Set the slide control to "I".



- Remove throttle trigger interlock from bearing.



- Drive out straight pin (1) with a drift, dia. 4 mm.
- Remove throttle trigger (2) with torsion spring (3).

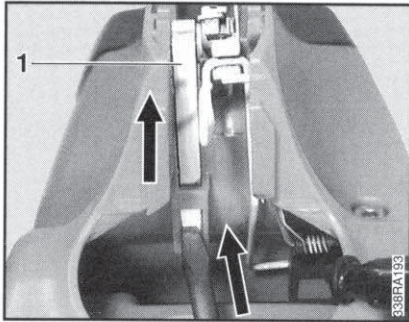


Press throttle trigger interlock downwards.

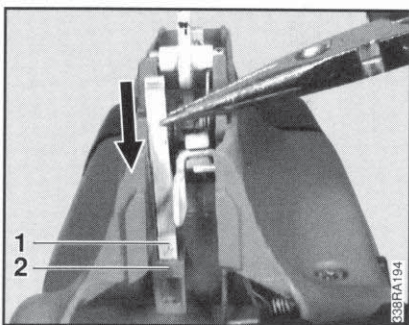
Slide handle moulding up so that the tabs rest in the mounts (1).

9.2 Leaf spring

- Unscrew spark plug, see 6.5.
- Remove slide control, see 9.1.

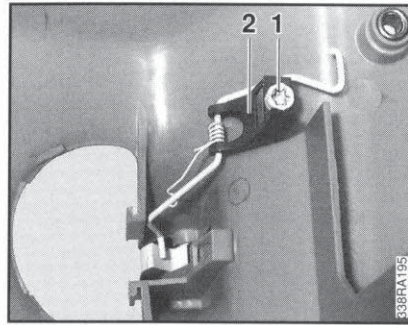


- Press spring leaf (1) together at bottom and draw it out to the top.

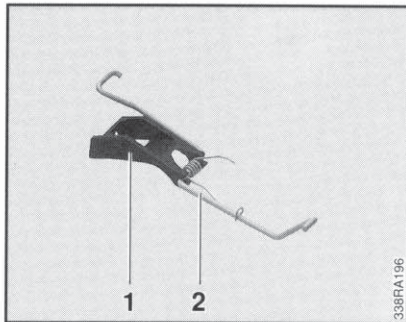


- Press the leaf spring down until the short part (1) is located below the tab (2).

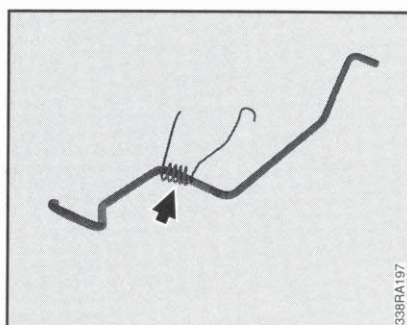
9.3 Rod



- Remove shroud, see 5.5.
- Unscrew the screw (1) on retainer (2).
- Remove retainer with rod.

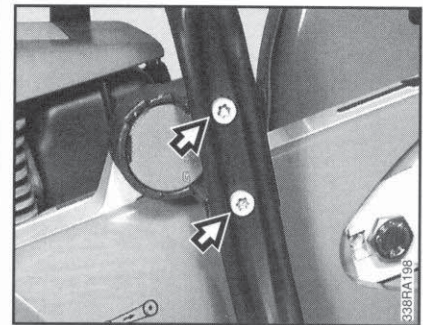


- Press retainer (1) off rod (2).

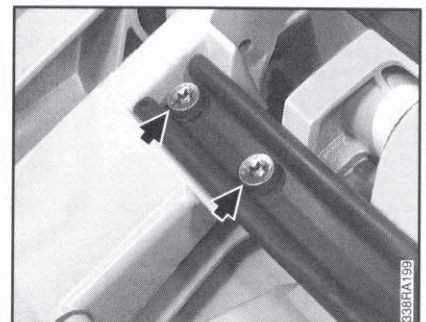


- Remove torsion spring from rod.
- The rod is installed in reverse order.

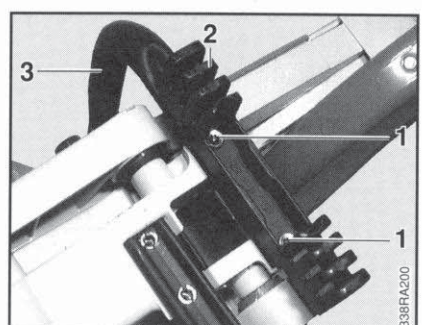
9.4 Handle



- Unscrew the screws from the handle mount.

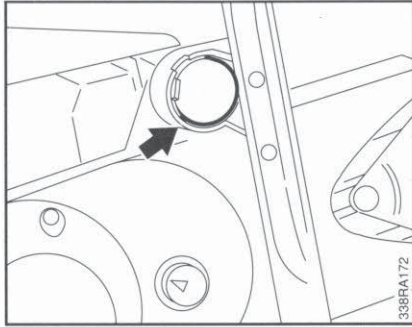


- Unscrew the lower screws.

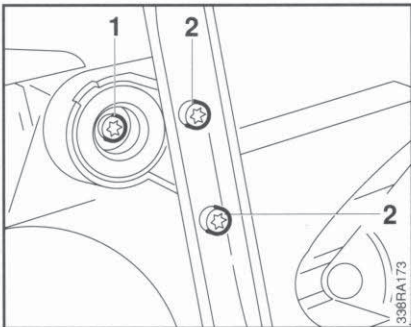


- Unscrew the screws (1) in support (2).
- Remove support and handle (3).

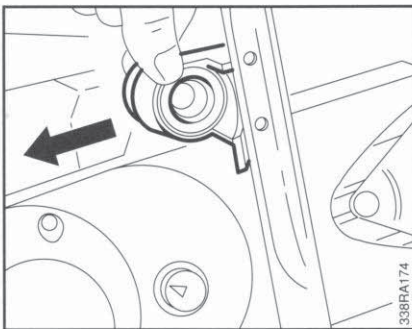
9.5 Handle mount



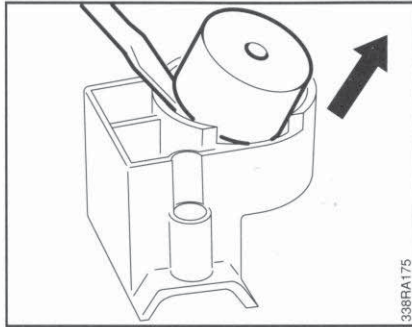
- Prise stopper out of rubber buffer.



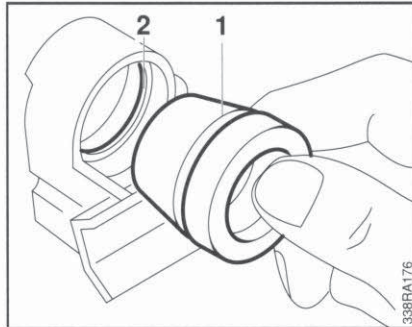
- Unscrew the screw (1) in the rubber buffer.
- Unscrew the screws (2) in the handle mount.



- Remove handle mount.



- Prise rubber buffer out of handle mount.



- Press rubber buffer in until outer groove (1) engages chamfer (2) in handle mount.
- Tighten the screws of the handle mount with a torque of 8.0 Nm and the screw in the rubber buffer with 6.0 Nm.

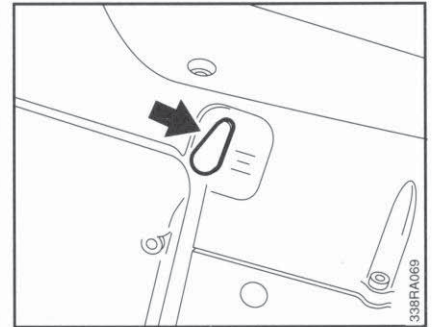
10. FUEL SYSTEM

10.1 Air filter

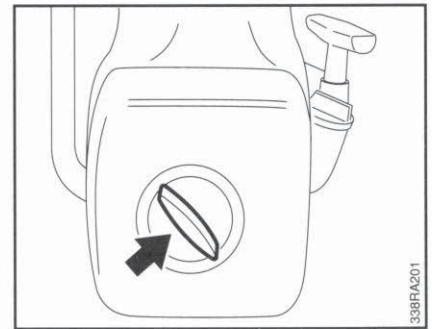
The engine performance deteriorates, fuel consumption increases and starting is made more difficult when the filters are soiled.

The air filter must be cleaned when engine performance declines.

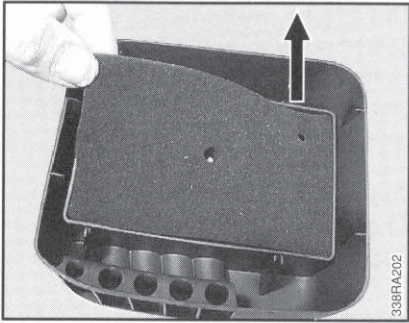
- Remove coarse dirt around the air filter.



- Close choke shutter by moving choke lever upwards.



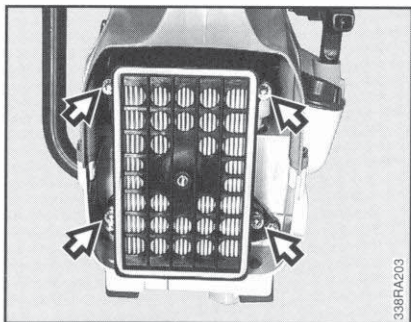
- Unscrew fastener for filter cover.
- Remove filter cover.



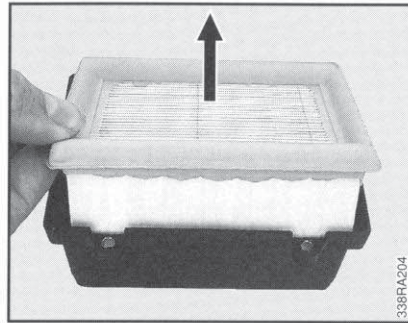
- Remove prefilter from filter cover.
- Wet prefilter must be dried, then knocked or blown clean.

Note: The prefilter must be replaced immediately if damaged.

- Remove coarse dirt on inside of filter cover.
- Replace prefilter in filter cover so that the fixing pin projects into the opening in the prefilter.



- Unscrew the filter housing screws.
- Remove filter housing.



- Draw main filter out of filter housing.

Note: The main filter must be replaced if soiled. The auxiliary filter must be replaced at the same time.

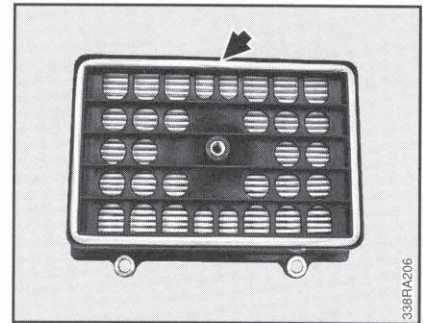


- Remove auxiliary filter from filter base.

Note: Auxiliary filter must be replaced immediately if flock covering is damaged.

- Clean filter chamber.

The parts are reassembled in reverse order.



Note: Check gasket in filter housing and replace if necessary.

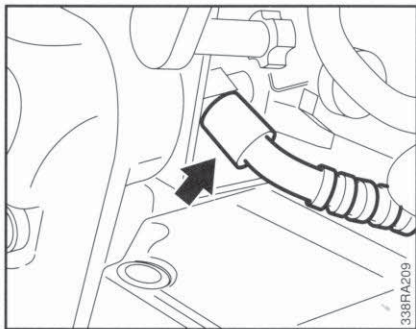
10.2 Carburetor

10.2.1 Leakage testing

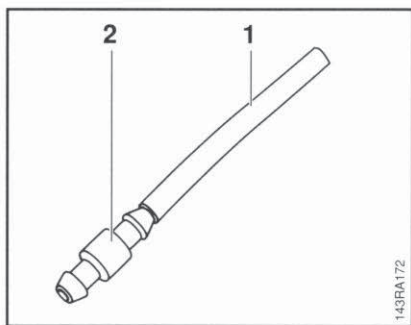
Refer to the manual "Troubleshooting, standard repairs" for troubleshooting procedures.

The carburetor can be tested for leaks with the aid of the carburetor / crankcase tester.

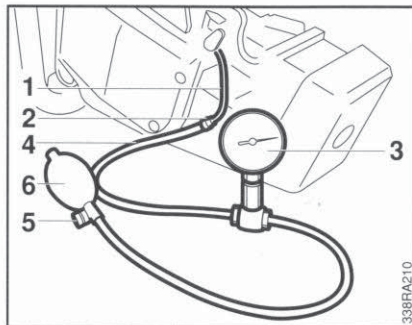
- Remove shroud, see 5.5.



- Press fuel hose off elbow connector.



- Slide fuel line (1) onto connector (2).



- Push fuel line (1) onto the elbow connector using connector (2) as adapter between tester (3) and carburetor.
- Fit pressure hose (4) of tester onto connector.
- Close venting screw (5) on rubber bulb (6) and pump air into the carburetor until an excess pressure of approx. 0.8 bar is indicated on the pressure gauge.

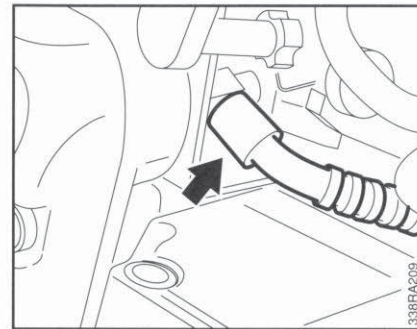
There are no leaks in the carburetor if this pressure is maintained. If it drops, however, this is primarily due to two reasons:

1. The inlet needle valve is not sealed (impurities in valve seat, cone of inlet needle damaged or inlet control lever jammed).
2. Metering diaphragm damaged.

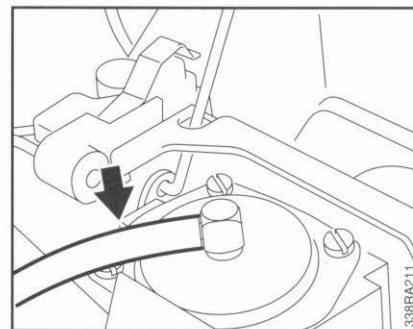
In both cases, the carburetor must be repaired, refer to the "Carburetor" manual.

- After testing, open the venting screw and disconnect the fuel line from the elbow connector.
- Connect fuel line to elbow connector of carburetor.
- Install shroud, see 5.5.

10.2.2 Removal and installation

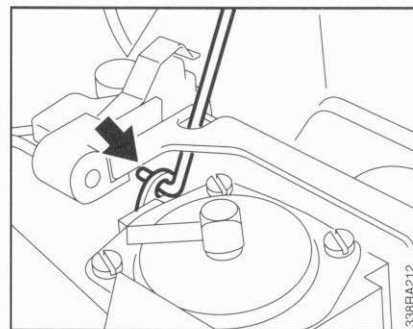


- Remove shroud, see 5.5.
- Remove air filter, see 10.1.
- Press fuel hose off elbow connector.

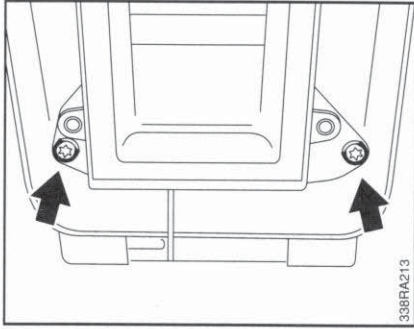


- Disconnect compensating hose from elbow connector.

Note: The mechanical design and function of the compensator are described in the "Carburetor" manual.

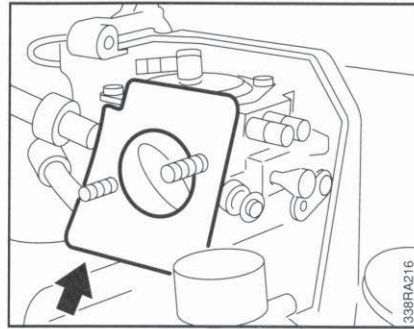


- Unhook throttle rod from throttle shaft and remove it.



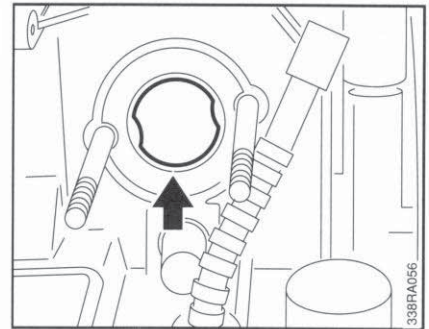
338RA213

- Unscrew the screws in the filter base.



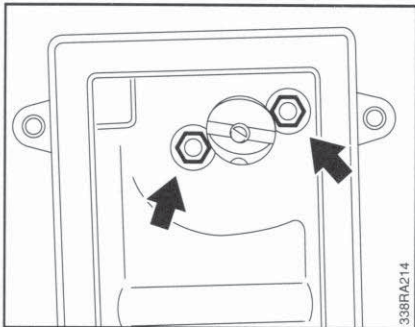
338RA216

- Remove gasket.



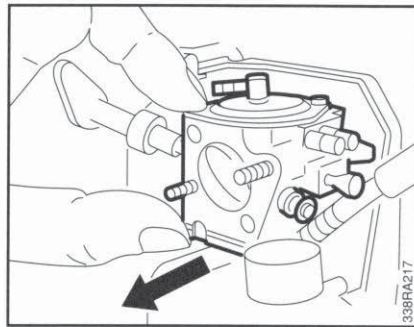
338FA056

Note: Before fitting the carburetor, ensure that the sleeve is present in the manifold.



338RA214

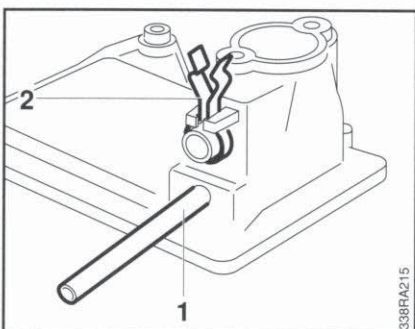
- Unscrew nuts.
- Remove air filter housing.



338RA217

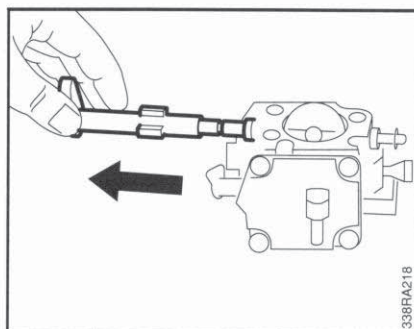
- Draw carburetor off stud bolts.

Note: Refer to the "Carburetor" manual for information on repairing the carburetor.



338RA215

- Pull off compensation hose (1).
- Compress and remove leaf spring (2).



338RA218

- Draw choke lever off choke shaft.

The parts are reassembled in reverse order.

10.3 Carburetor adjustment

The ignition system of this cut-off machine has been equipped with an electronic maximum speed limiter. Unlike the case in machines with conventional ignition system, the maximum speed cannot be set beyond a predetermined limit by adjusting the carburetor.

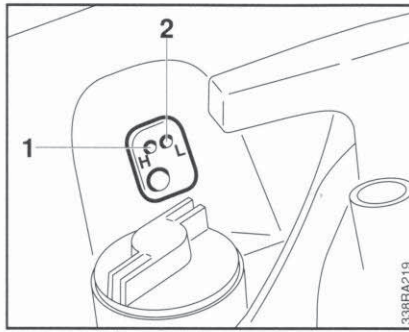
The machine similarly cannot be trimmed to maximum performance by adjusting the speed. Neither the speed nor the power is increased by setting an unduly lean carburetor mixture; in fact, this merely increases the risk of engine damage.

The carburetor is set to the standard setting by the manufacturer before delivery of the machine. This setting represents the optimum setting for the atmospheric and climatic conditions prevailing at the manufacturing plant. However, it may be necessary to adjust the carburetor setting in order to obtain optimum performance in conditions differing from those at the site of manufacture.

Standard setting

The standard setting must be set first if the carburetor has to be readjusted completely.

- Carefully turn both adjusting screws clockwise as far as possible.



They must then be adjusted as follows:

- H** = High-speed adjusting screw (1)
1 turn open
- L** = Low-speed adjusting screw (2)
1 turn open

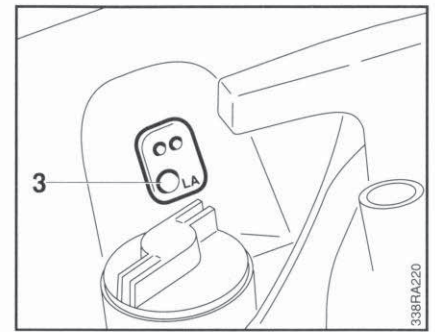
Note: If a tachometer is not available, the high-speed adjusting screw must not be set to a leaner setting than standard.

Minor adjustment **may** be necessary if the machine is used at high altitudes (mountains) or at sea level.

- Check air filter and clean it if necessary
- Start engine and let machine warm up
- Set correct idle speed (cutting wheel must not rotate)

- H** = Turn high-speed adjusting screw clockwise (leaner) at high altitudes and counterclockwise (richer) at sea level.

The screws should only be adjusted marginally and very carefully - the slightest change leads to a tangible change in engine performance.



Adjust idle speed

Whenever the

- L** = low-speed adjusting screw is adjusted, the
- LA** = idle-speed adjusting screw (3) must usually also be adjusted.

Engine stops when idling – set standard setting!

- LA** = Turn idle-speed adjusting screw clockwise until the cutting wheel also begins to turn - then turn it back one-half turn.

Cutting wheel rotates at idle speed – set standard setting!

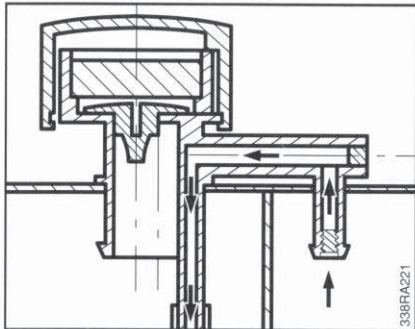
- LA** = Turn idle-speed adjusting screw counterclockwise until the cutting wheel stops - then turn it on approx. another one-half turn.

10.4 Tank vent

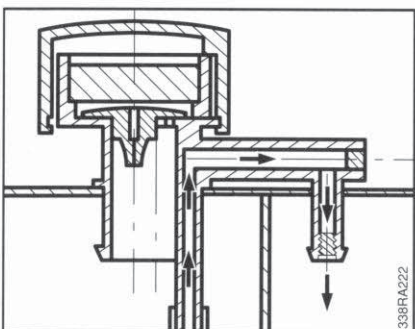
A pressure balance must always be maintained between the inside of the fuel tank and the atmosphere outside in order to ensure troublefree operation of the carburetor. This pressure balance is maintained by the tank vent.

Important! The tank vent must also be inspected and cleaned if malfunctions occur in the carburetor or fuel supply.

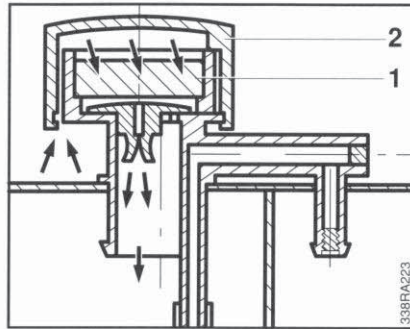
The fuel tank is vented via a compensator reservoir.



If an excess pressure builds up in the fuel tank, fuel enters the compensator reservoir via a connector and hose.

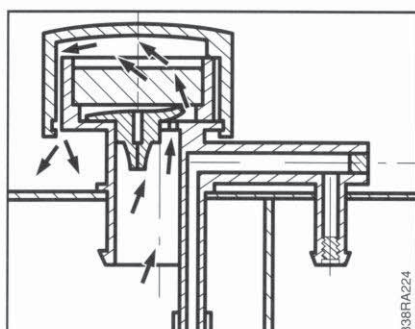


It is returned to the fuel tank when a negative pressure is established.

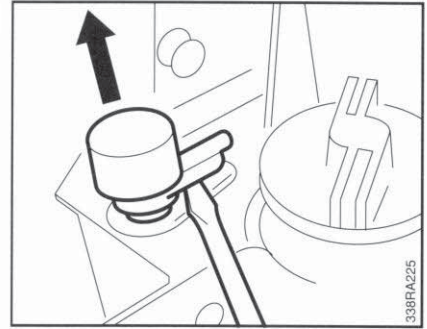


The pressure in the compensator reservoir is compensated from the outside inwards via a filter (1) and valve.

Note: The filter prevents dirt from entering the valve and compensator reservoir. The cap (2) protects the filter against damage and contamination.

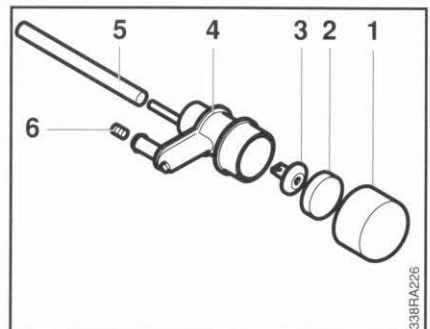


The pressure in the compensator reservoir is compensated from the inside outwards via the holes in the tank vent and the filter.



- Remove shroud, see 5.5.

- Prise out and remove tank vent.

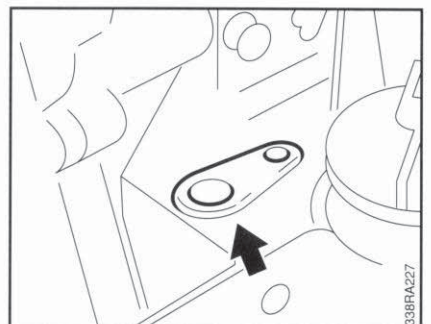


- Prise off cap (1).

- Remove filter (2) and valve (3) from tank vent (4).

- Remove connecting hose (5).

- Unscrew vent insert (6).



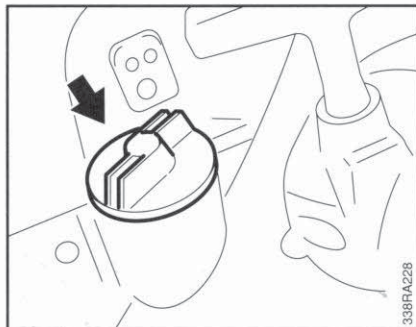
- Check and replace spout.

The parts are reassembled and installed in reverse order.

10.5 Pick-up body

Fuel is transferred from the fuel tank to the carburetor via the fuel line by the diaphragm pump. Any impurities entering the fuel tank with the fuel are trapped by the pick-up body (filter). The fine filter pores become clogged with minute dirt particles in the course of time. The intake area is reduced and the pump no longer delivers sufficient fuel.

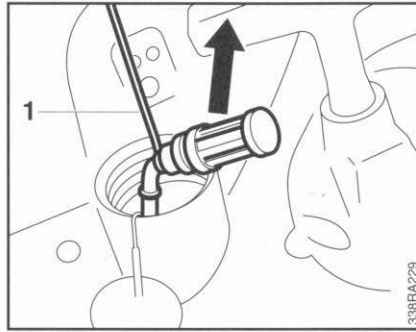
Important! The fuel tank and pick-up body must always be inspected first if any malfunctions develop in the fuel supply. The fuel tank must be cleaned if necessary.



Cleaning the fuel tank

- Unscrew filler cap and drain tank.
- Fill with a little fresh petrol.
- Close the filler cap and shake the cut-off machine vigorously.
- Reopen and drain the tank.

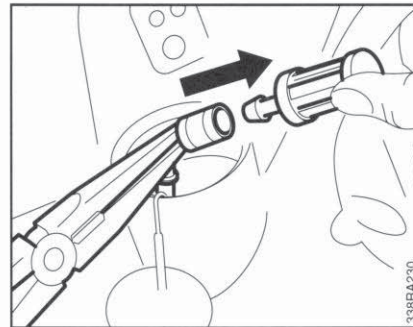
Note: Fuel must be disposed of correctly!



Pick-up body

- Draw the pick-up body out of the fuel tank with assembly hook (1).

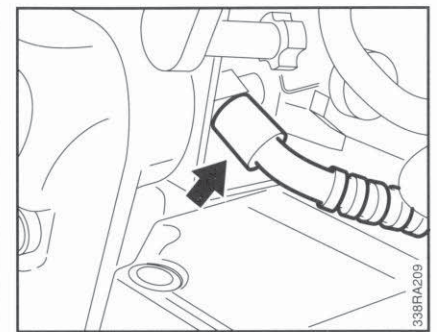
Note: Do not overextend the fuel hose.



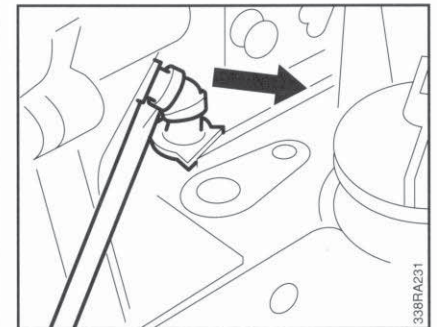
- Draw the pick-up body off the fuel hose.
- Replace pick-up body.

The parts are installed in reverse order.

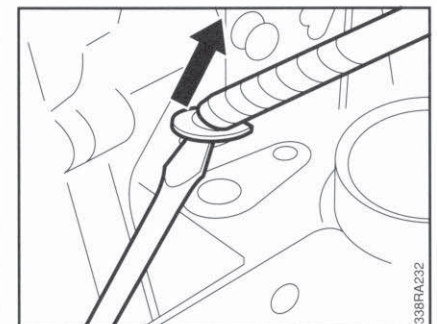
10.6 Fuel hose



- Remove tank vent, see 10.4.
- Remove pick-up body, see 10.5.
- Press fuel hose off elbow connector.

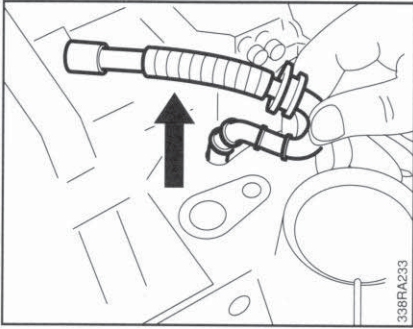


- Press fuel hose out to the side under the carburetor.



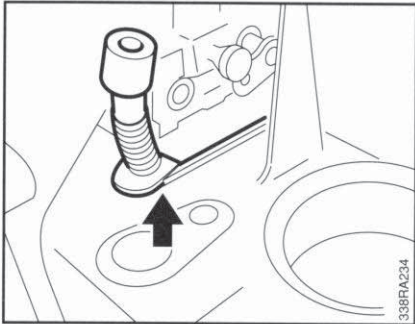
- Prise the hose flange out of the fuel tank.

10.7 Impulse hose



- Draw out fuel hose.

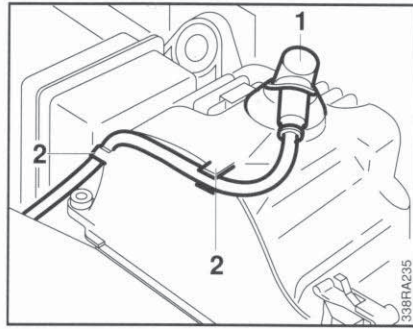
The parts are installed in reverse order.



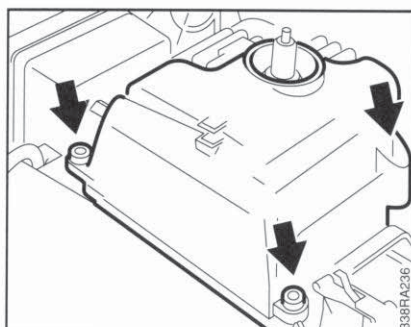
Note: Installation is facilitated by coating the hose flange with a little oil.

The straight edge of the flange must rest against the web of the tank housing.

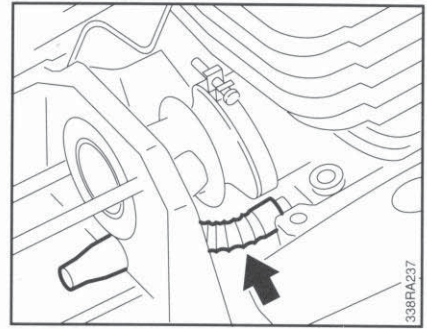
The fuel hose must not be buckled or damaged when it is pushed under the carburetor.



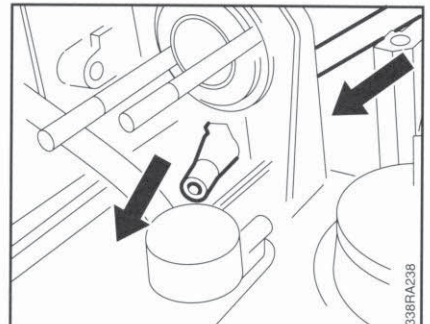
- Remove carburetor, see 10.2.2.
- Disconnect spark plug terminal (1) from spark plug.
- Remove ignition lead and stop switch lead from holder (2).



- Unscrew the screws of the air guide cover.
- Remove air guide cover.

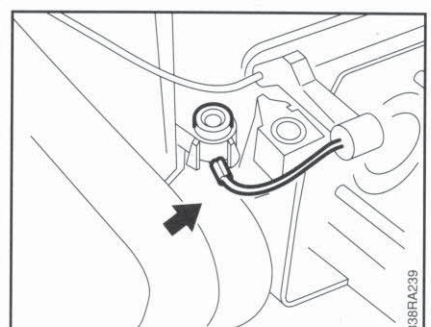


- Draw impulse hose off connector.



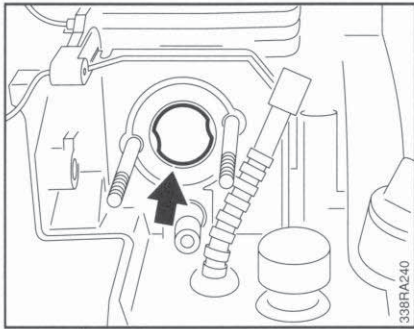
- Press flange of impulse hose out of the hole and pull out the impulse hose.

The parts are installed in reverse order.

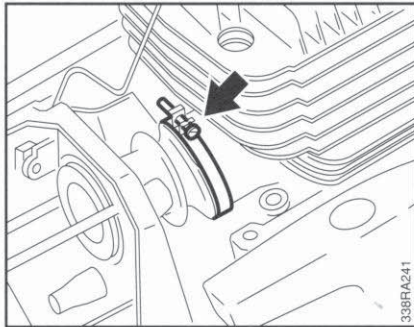


Note: Secure a ground lead between air guide cover and housing.

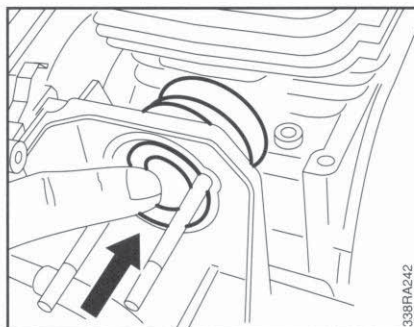
10.8 Manifold



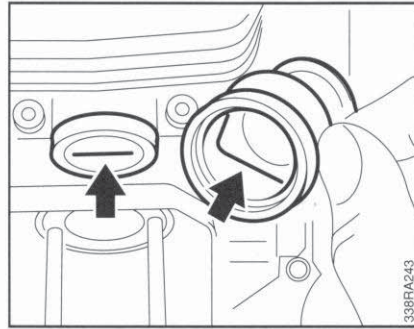
- Remove carburetor, see 10.2.2.
- Remove air guide cover, see 10.7.
- Remove sleeve from manifold.



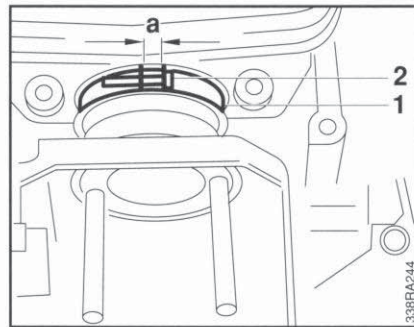
- Remove hose clip for manifold.



- Press flange of manifold out of the opening in the tank housing.
- Remove manifold from intake port.



- Position manifold on the intake port so that the straight edges of the manifold and intake port are lined up.



- Fit hose clip (1) so that tensioning screw (2) is at the top.
- Tighten tensioning screw so that a gap of $a = 6 \pm 0.5$ mm remains between the tabs.

The parts are reassembled in reverse order.

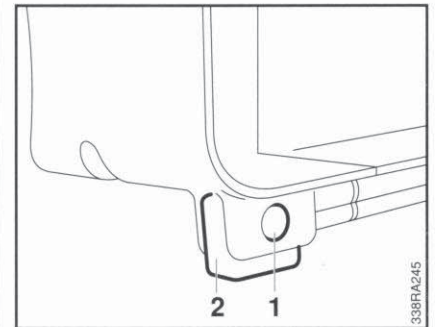
10.9 Tank housing

The (small) left-hand half of the housing can be replaced separately if damaged.

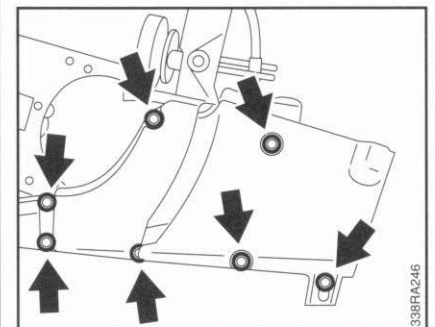
The complete tank housing must be replaced if the (large) right-hand half of the housing is damaged.

- Remove crankcase, see 5.9.1.
- Drain tank.

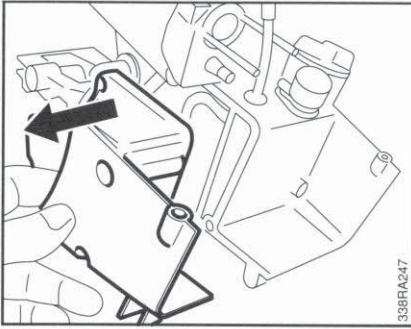
Note: Fuel must be disposed of correctly.



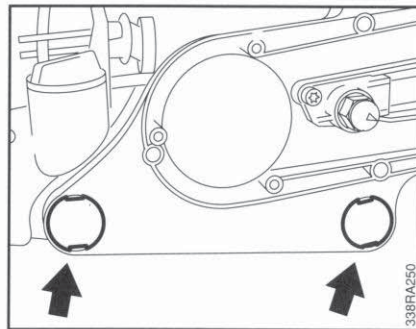
- Draw out pin (1).
- Draw rubber buffer (2) out of mount.



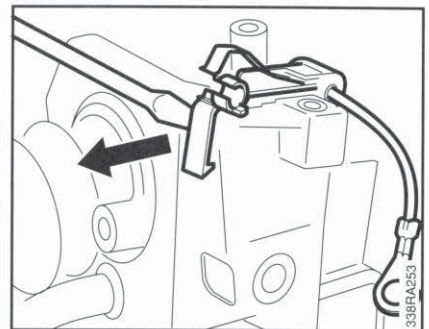
- Unscrew the screws in the left half of the housing.



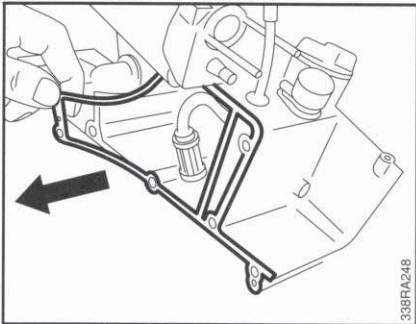
- Remove that half of the housing.



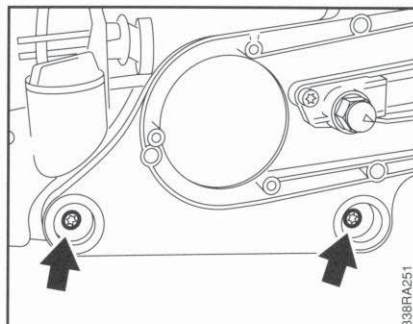
- Prise stoppers out of lower rubber buffers.



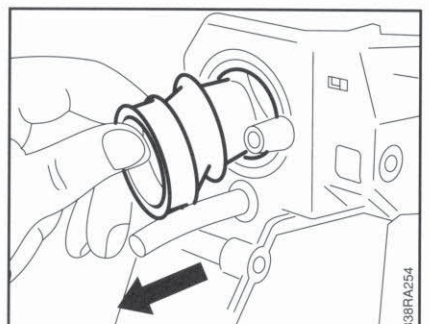
- Press contact spring holder out of slot.
- Remove holder.



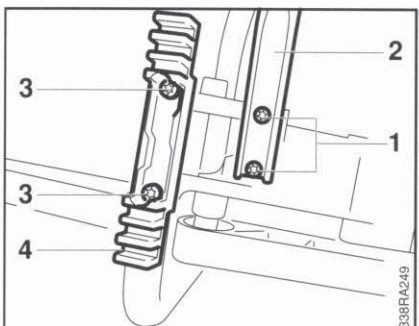
- Remove gasket.



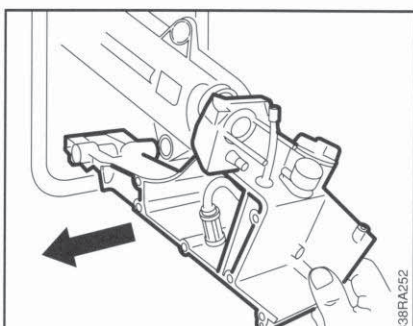
- Unscrew the screws in the rubber buffers.



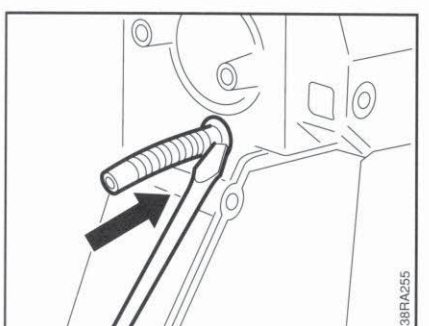
- Remove manifold.



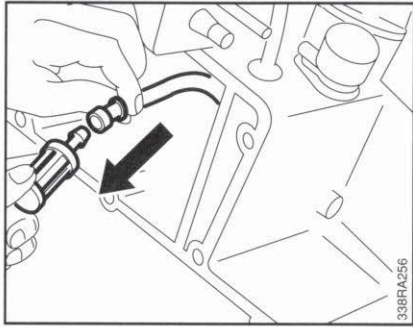
- Unscrew the screws (1) of handle (2).
- Unscrew the screws (3) on support (4).
- Remove support.



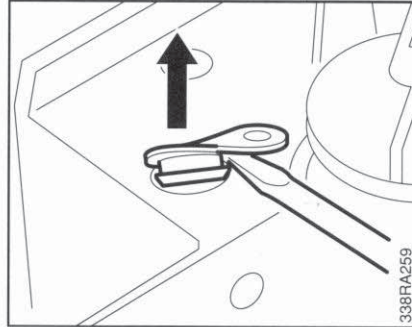
- Remove that half of the housing.



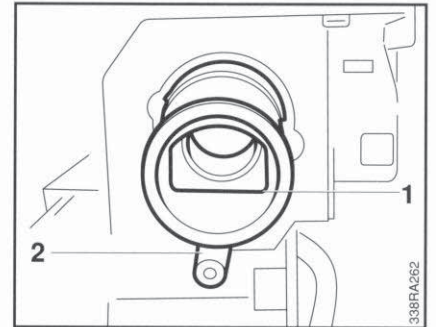
- Force out impulse hose.



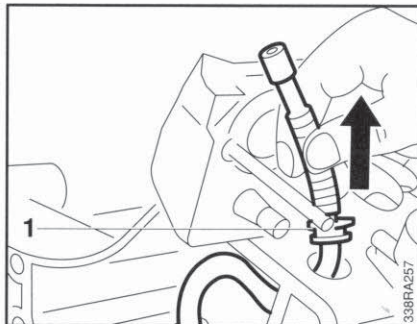
- Pull pick-up body off fuel hose.



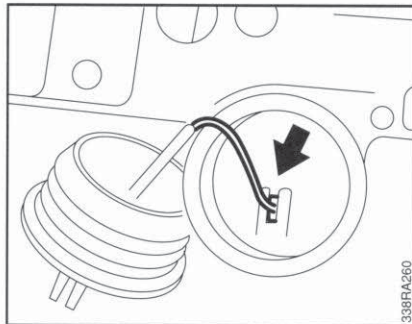
- Prise out spout.



Insert manifold so that the straight edge (1) points towards the impulse hose (2).

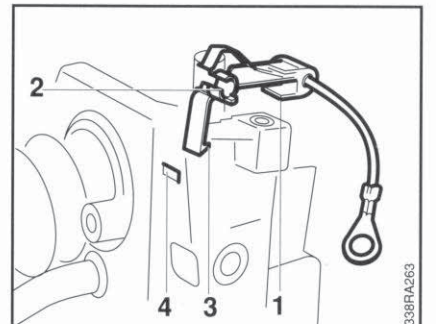


- Lever out flange (1) of fuel hose.
- Pull out fuel hose.



- Unscrew filler cap.
- Disconnect chain holding cap.

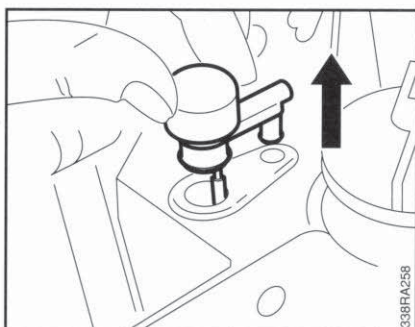
The parts are reassembled in reverse order.



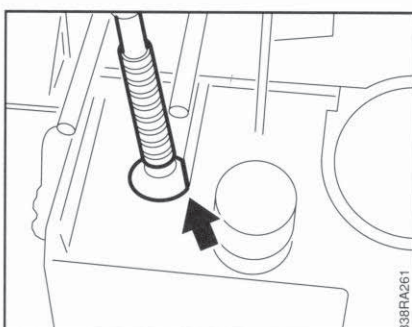
Slide web (1) of holder (2) under the housing. Press holder down until the sloping edge (3) engages in slot (4).

Use a new gasket.

Tighten the screws in the two housing halves with a torque of 7.5 Nm.



- Prise tank vent out of spout.
- Pull out tank vent.



Note: The straight edge of the hose flange must rest against the web of the tank housing.

11. Special tools and service accessories
11.1 Special tools

No.	Designation	Part No.	Use	Rem.
1	Locking strip for piston	0000 893 5903	Locking the crankshaft	
2	Sealing plate	0000 855 8106	Sealing the exhaust during leakage tests	
3	Wooden assembly block	1108 893 4800	Mounting the piston	
4	Strap retainer	0000 893 2600	Tensioning the piston rings	
5	Test flange	1128 850 4200	Leakage testing	
6	Carburetor and crankcase tester	1106 850 2905	Leakage tests on the crankcase and carburetor	
7	Vacuum pump	0000 850 3501	Leakage tests on the crankcase	
8	- Connector	0000 855 9200		
9	- Fuel line	1110 141 8600		
10	Stopper		Leakage testing (with decompression valve)	
11	Extractor	0000 890 4400	Removing the rotary shaft seals	
12	- Jaws (No. 3.1)	0000 893 3706		
13	- Jaws (No. 1)	0000 893 3700		
14	Press sleeve	1127 893 2400	Pressing in the rotary shaft seals	
15	Assembly sleeve	1122 893 4600	To protect the rotary shaft seal on the clutch side	
16	Assembly pin	1110 893 4700	Fitting the piston pin	
17	Assembly tool 10	5910 890 2210	Inserting the hookless snap rings in the piston	
18	Pliers A10	0811 611 8200	Outer circlip on thrust washer	
19	Pliers C19	0811 641 8380	Inner circlip on spindle bearing and in V-belt pulley	
20	Drift pin	4119 893 7200	Driving out the deep groove ball bearings in the spindle bearing	
21	Setting gauge	1127 890 6400	Adjusting the air gap between ignition module and flywheel	
22	Test wheel	5910 851 6100	Checking axial runout of cutting wheel mount	
23	Dial gauge holder	5910 850 6000	Checking axial runout	
24	Dial gauge	0000 890 9100	Checking axial runout	
25	Assembly hook	5910 893 8800	Extracting the pick-up body (fuel)	
26	Assembly block	5910 850 3100	Mounting the cut-off saw for repair	
27	Drift pin	4110 893 7800	Driving the ball bearing out of the V-belt pulley	

No.	Designation	Part No.	Use	Rem.
28	Torque wrench	5910 890 0301 5910 890 0302	Screw connections (0.5 to 18 Nm)	1) 2)
29	Torque wrench	5910 890 0311 5910 890 0312	Screw connections (6 to 80 Nm)	1) 2)
30	Screwdriver QI-T27x150	5910 890 2400	For all IS screws	3)
31	Crimping tool	5910 890 8210	Attaching plugs to electrical leads	
32	Extractor	1116 893 0800	Extracting the flywheel	
33	Insert, size 13	5910 893 5608	Nut for flywheel	
34	Insert, size 19	5910 893 5613	Clutch	
35	Insert, T 27x125	0812 542 2104	Tightening the IS screws	
36	Drift pin	4116 893 7205	Driving the ball bearing into the V-belt pulley	
37	Assembly tool ZS (set)	5910 007 2220	Removing the crankshaft	
38	- Threaded sleeve	5910 893 2420	Installing the crankshaft	
39	Drift pin	1118 893 7200	Fitting and removing the deep groove ball bearing (clutch side)	
40	Drift pin	1119 893 7200	Fitting and removing the deep groove ball bearing (ignition side)	

Remarks:

- 1) DG screws may only be tightened with a torque wrench.
- 2) The version is equipped with an optical/acoustic signalling device.
- 3) May only be used to loosen DG screws.

11.2 Service accessories

No.	Designation	Part No.	Use
1	Lubricant grease	0781 120 1111	Rotary shaft seals
2	Conventional solvent-based degreasing agent without CFCs and halogenated hydrocarbons		Cleaning the crankshaft stub
3	HTR ignition lead (10 m)	0000 930 2251	
4	STIHL multipurpose grease	0781 120 1109	High-voltage output in ignition module

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