

**STIHL FS 500, 550
CONTENTS**

1.	Introduction	2	5.	Ignition System	22	9.	AV System	41
2.	Specifications	3	5.1	Spark Plug Boot	23	9.1	Repair	41
2.1	Engine	3	5.2	Ignition Module	24			
2.2	Fuel System	3	5.2.1	Ignition Timing	24	10.	Shaft	43
2.3	Ignition System	4	5.2.2	Removing and Installing	24	10.1	Bike Handle	43
2.4	Gearhead	4	5.3	Ignition Lead	26	10.2	Drive Shaft/ Flexible Liner	43
2.5	Special Accessories	4	5.4	Flywheel	27	10.3	Drive Tube	44
2.5.1	For User	4	5.5	Short Circuit Contact	27			
2.5.2	For Service	4	6.	Rewind Starter	28	11.	Cutting Tool Drive	45
2.6	Tightening Torques	5	6.1	General	30			
3.	Clutch	7	6.2	Rewind Spring	28	11.1	Gearhead	45
3.1	Removing and Disassembling	7	6.2.1	Replacing	28	11.1.1	Disassembling	45
3.2	Assembling and Installing	8	6.2.2	Tensioning	29	11.1.2	Assembling	46
4.	Engine	9	6.3	Starter Cup	30	11.2	Clutch Drum	48
4.1	Exhaust Muffler/ Spark Arresting Screen	9	7.	Throttle Control	30	12.	Special Servicing Tools and Aids	49
4.2	Leakage Test	10	7.1	Throttle Trigger/ Interlock Lever	30	12.1	Special Servicing Tools	49
4.2.1	Preparations	10	7.2	Contact Springs/Detent Spring in Control	31	12.2	Servicing Aids	51
4.2.2	Pressure Test	11	7.3	Throttle Cable	32			
4.2.3	Vacuum Test	11	7.3.1	Replacing	32			
4.3	Oil Seals	12	7.3.2	Adjusting	32			
4.4	Exposing the Cylinder	13	8.	Fuel System	33			
4.5	Cylinder and Piston	14	8.1	Air Filter	33			
4.5.1	Removal	14	8.2	Carburetor	34			
4.5.2	Installation	15	8.2.1	Leakage Test	34			
4.6	Piston Rings	17	8.2.2	Removing and Installing	35			
4.7	Crankcase	17	8.2.3	Adjusting	36			
4.7.1	Removing Crankshaft	17	8.3	Tank Vent	37			
4.7.2	Installing Crankshaft	20	8.4	Pickup Body/Fuel Hoses	38			
4.8	Decompression Valve	22	8.5	Tank Housing	39			
			8.6	Manual Fuel Pump	40			

STIHL®

© 1998, Andreas Stihl, Waiblingen

1. INTRODUCTION

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

There are separate handbooks for servicing procedures on standardized parts and assemblies that are installed in several STIHL power tool models. Reference is made to these handbooks in the appropriate chapters of this manual.

As the design concept of models FS 500 and FS 550 is almost identical, the descriptions and servicing procedures in this manual generally apply to both models. Differences are described in detail.

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

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

Parts lists on microfiche and CD-ROM are always more up to date than printed lists.

A fault on the power tool may have several causes. Consult the troubleshooting charts for all assemblies in the "Standard Repairs, Troubleshooting" handbook.

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

The special servicing tools mentioned in the descriptions are listed in the last chapter of this manual.

Use the part numbers to identify the tools in the "STIHL Special Tools" manual.

The manual lists all special servicing tools currently available from STIHL.

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

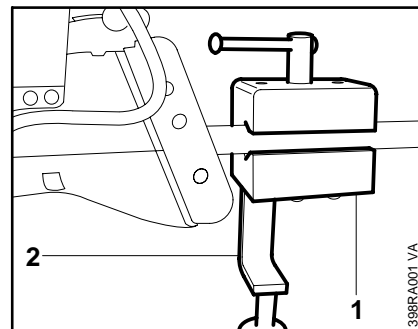
In the descriptions:

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

In the illustrations:

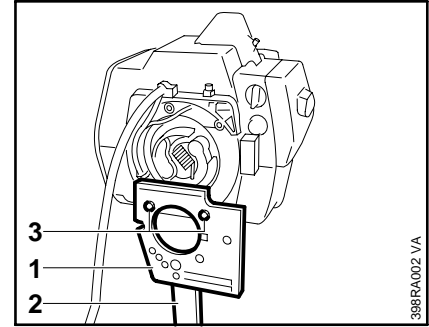
- ➔ = Pointer
- ➡ = Direction of movement

Service manuals and all technical information bulletins describing engineering changes are intended exclusively for the use of STIHL servicing dealers. They must not be passed to third parties.



Servicing and repairs are made considerably easier if the machine is mounted on assembly stand (2) 5910 890 3100 with the aid of clamp (1) 5910 890 8800.

Secure the clamp to the assembly stand with two washers and two M8 nuts.



Servicing and repairs to the powerhead are considerably easier if it is mounted on assembly stand (2) 5910 890 3100 with the aid of clamping plate (1) 5910 890 2100.

First remove the clutch housing and secure the powerhead to the stand with two M5x30 hex. head screws (3).

The complete machine or powerhead can then be swivelled to the best position for the ongoing repair and this leaves both hands free.

Always use original STIHL replacement parts.

They can be identified by the STIHL part number, the **STIHL** logo and the STIHL parts symbol . The symbol may appear alone on small parts.

2. SPECIFICATIONS

2.1 Engine

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

	FS 500	FS 550
Displacement:	51.7 cm ³ (3.15 cu.in)	56.5 cm ³ (3.45 cu.in)
Bore:	44 mm (1.73 in)	46 mm (1.81 in)
Stroke:	34 mm (1.34 in)	34 mm (1.34 in)
Power output:	2.4 kW (3.3 bhp) at 9,400 rpm	2.8 kW (3.8 bhp) at 9,400 rpm
Cut-off speed without cutting tool (electronic speed limiter):	12,500 rpm (± 800 rpm)	
Idle speed:	2,500 rpm	
Bearings:	Crankshaft supported in heavy-duty ball bearings, needle cages on small and big ends	
Piston pin diameter:	10 mm (0.39 in)	
Rewind starter:	ElastoStart	
Pawls:	Single pawl system	
Reserve pull on rope rotor:	min. 1/2 turn	
Starter rope:	3.5 mm (0.14 in) dia.	
Clutch:	Centrifugal clutch with press-fitted linings	
Clutch engages at:	3,250 rpm	
Crankcase leakage test		
at gauge pressure:	0.5 bar (7.25 psi)	
under vacuum:	0.5 bar (7.25 psi)	

2.2 Fuel System

Carburetor:	Diaphragm carburetor
Standard setting of carburetors with three adjusting screws	
High speed screw H:	Open approx. 1 turn
Low speed screw L:	Open approx. 1 turn
Carburetor leakage test	
at gauge pressure:	0.8 bar (11.6 psi)
Function of tank vent	
at gauge pressure:	≤ 0.3 bar (4.35 psi)
under vacuum:	≤ 0.05 bar (0.725 psi)
Fuel tank capacity:	0.755 l (1.6 US pt)
Octane rating:	min. 90 RON (US/CAN; pump octane min. 87)
Fuel mixture:	Regular brand name gasoline and two-stroke engine oil
Mix ratio:	50:1 with two-stroke engine oil 25:1 with other brand name two-stroke, air-cooled engine oils
Air filter:	Plastic filter element Auxiliary filter (felt)

2.3 Ignition System	Type:	Electronic magneto ignition (breakerless) with integral trigger unit and electronic speed governor
	Air gap: Spark plug (suppressed):	0.2 - 0.3 mm (0.008 - 0.012 in) Bosch WSR 6F, NGK BPMR 7 A or Champion RCJ 6Y
	Electrode gap: Spark plug thread: Length of thread:	0.5 mm (0.020 in) M14x1.25 9.5 mm (0.37 in)
<hr/>		
2.4 Gearhead	Type:	Spiral-toothed bevel gear drive
	Gear ratio:	1:1.33
	Bearings:	Deep groove ball bearings
	Lubrication:	STIHL gear lubricant 0781 120 1117
<hr/>		
2.5 Special Accessories		
2.5.1 For User	Full harness Safety glasses Transport guard for metal cutting tools STIHL gear lubricant (80 g/3 oz tube) STIHL gear lubricant (80 g/3 oz tube)	0781 120 1109 0781 120 1117
2.5.2 For Service	Carburetor parts kit Set of gaskets for FS 500, 550	4116 007 1061 4116 007 1051
<hr/>		

2.6 Tightening Torques

DG and P screws (Plastoform) are used in polymer and lightmetal components. These screws form a permanent thread when they are installed for the first time. They can be removed and installed as often as necessary without detrimentally affecting the strength of the screwed assembly, providing the specified tightening torque is observed. For this reason it is **essential to use a torque wrench**.

Fastener	Thread size	For component	Torque		Remarks
			Nm	lbf.ft	
Spline screw	IS-M4x25x10	Cover on spark plug boot/shroud	2.5	1.8	
Spline screw	IS-M4x6	Heat shield/crankcase	5.0	3.7	
Spline screw	IS-M5x28	AV housing, bottom/top	4.5	3.3	
Plastoform screw	IS-P4x16	Control handle/handle moldings	1.0	0.75	
Collar screw	IS-P3.5x10.6	Detent spring/slide control	1.1	0.8	
Spline screw	IS-M5x30	Control handle	2.0	1.5	1)
Plastoform screw	IS-P4x16	Cover/guide	1.0	0.75	
	M10x1	Decompression valve	14.0	10.3	
Spline screw	IS-M5x25	Guide/crankcase	4.5	3.3	
Spline screw	IS-M5x30	Gear housing/drive tube	10.0	7.5	1)
Grub screw	IS-M6x8	Gear housing (centering screw)	4.5	3.3	2)
Spline screw	IS-M4x16	Shroud/crankcase	3.5	2.6	
Spline screw	IS-M4x20	Clamp/handlebar/tube	4.0	3.0	
Spline screw	IS-M5x18	Clamp/handlebar	4.5	3.3	
Spline screw	IS-M5x28	Clamp/AV housing	7.5	5.5	
Spline screw	IS-M8x25	Clutch shoe/flywheel	20.0	15.0	
Spline screw	IS-M6x25	Drive tube/clutch housing (clamp screw)	8.0	5.9	
Spline screw	IS-M5x12	Drive tube/clutch housing (centering screw)	4.5	3.3	
Spline screw	IS-M5x20	clutch housing/crankcase	9.5	7.0	
Spline screw	IS-M5x20	Crankcase	9.5	7.0	
Spline screw	IS-M5x18	Perforated rail/AV housing, top	4.5	3.3	
Spline screw	IS-M5x18	Annular buffer/AV housing	3.5	2.6	
Spline screw	IS-M5x20	Muffler/crankcase	10.0	7.5	
Spline screw	IS-M5x20	Muffler/cylinder	10.0	7.5	
Nut	M14x1.5 L	Cutting tool	25.0	18.5	
Spline screw	IS-M6x50x24	Cutting tool deflector/clamp/ drive tube	4.5	3.3	1)
Spline screw	IS-M5x20	Screen/crankcase	4.5	3.3	
Self-tapping screw	BZ4.2x14	Screen/shroud	1.5	1.1	
Self-tapping screw	B4.2x9.5	Spark arresting screen	2.5	1.8	

Fastener	Thread size	For component	Torque		Remarks
			Nm	lbf.ft	
	M8x1	Flywheel	30.0	22.0	
Spline screw	IS-M5x20	Starter cover/crankcase	4.5	3.3	
Nut	M8x1	Starter cup	24.0	17.7	
Plastoform screw	IS-P4x16	Connector tag/guide	1.5	1.1	
Plastoform screw	IS-P6x19	Backing plate/tank housing	6.5	4.8	
Nut	M5	Backing plate/carb/tank housing	5.5	4.0	
Spline screw	IS-M5x20	Support/clutch housing	5.5	4.0	
Spline screw	IS-M5x20	Tank housing/crankcase	5.5	4.0	
Collar screw	M5	Carburetor box cover	3.5	2.6	
Screw plug	M11x10	Gearhead	10.0	7.5	
Spline screw	IS-M6x14	Grass shield	11.0	8.1	
Spline screw	IS-M5x28	Cylinder/crankcase	9.5	7.0	
Spline screw	IS-M5x20	Ignition module/crankcase	7.5	5.5	1)
	M14x1.25	Spark plug	20.0	15.0	

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

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

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

- 1) with washer
- 2) Secure with adhesive 0786 111 1101 (Loctite 242).

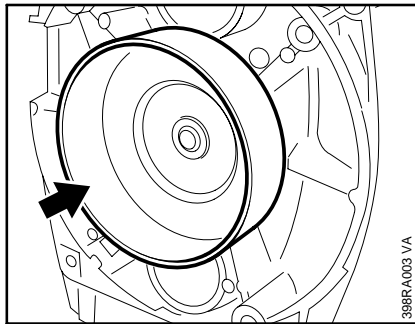
Note: Heat screws secured with adhesive with a hot air blower (hair dryer) before releasing.
Power screwdriver speed settings for polymer: Plastoform screws max. 600 rpm
DG screws max. 500 rpm

3. CLUTCH

3.1 Removing and Disassembling

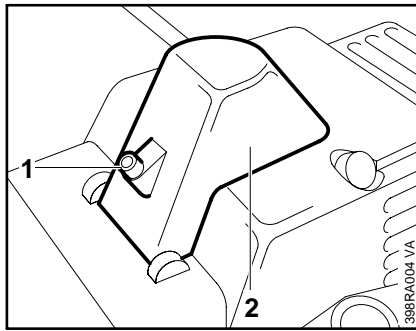
Troubleshooting chart - see "Standard Repairs, Troubleshooting" handbook.

- Remove clutch housing with drive tube - see 9.1.

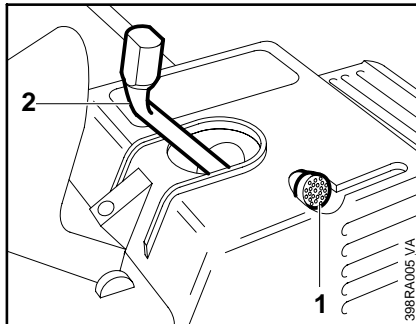


- Inspect clutch drum. There should be no scores or signs of excessive wear.

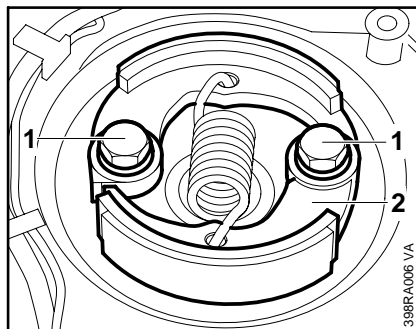
Important: If there are signs of serious wear on the inside diameter, fit a new clutch drum - see 11.2.



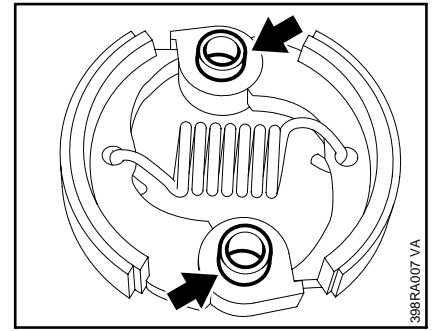
- Take out screw (1).
- Swing the cover (2) open.
- Pull off the spark plug boot.
- Unscrew the spark plug.



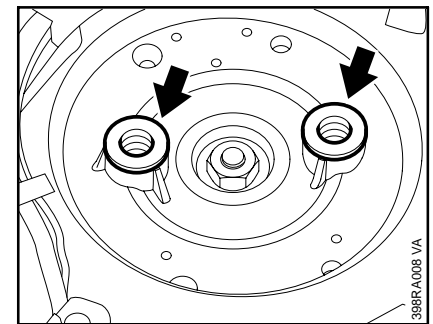
- Close the decompression valve (1).
- Fit locking strip (2) 0000 893 5903.



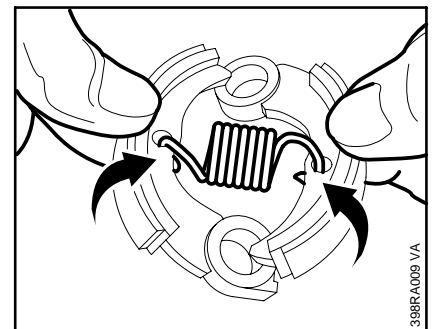
- Take out screws (1).
- Remove clutch shoes (2) with washers and bushes.



- Take bushes out of the clutch shoes.



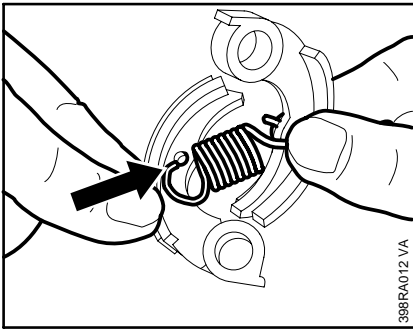
- Remove the washers.



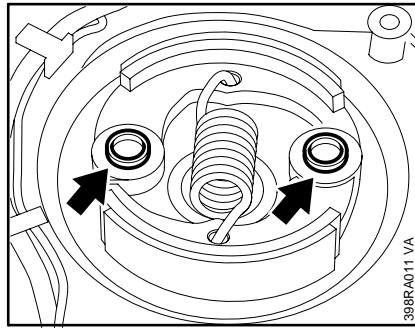
- Twist the clutch shoes and detach the spring.

Important: Clutch shoes must always be replaced in pairs.

3.2 Assembling and Installing



- Attach spring to clutch shoes.

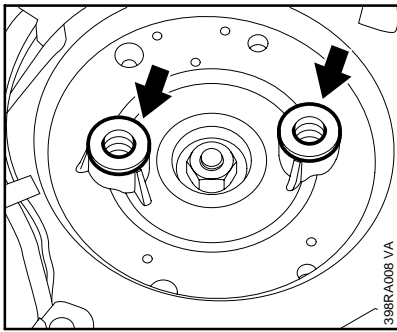


- Insert bushes in the clutch shoes.

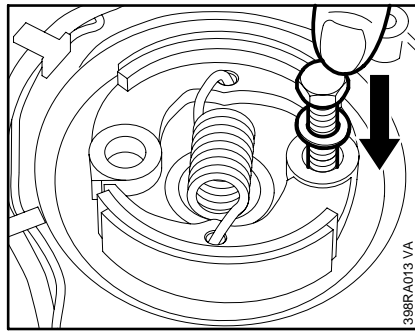
- Pull locking strip out of cylinder.
- Fit spark plug and tighten down to 20 Nm (15 lbf.ft).

Important: If the spark plug comes with a separate terminal nut, always fit the nut on the thread and tighten it down securely.

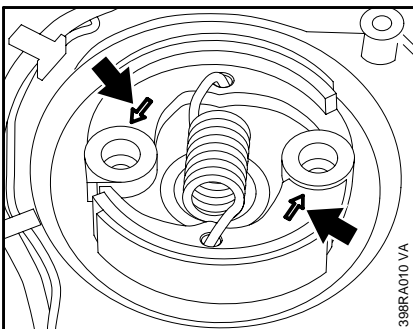
- Fit the boot on the spark plug.
- Close the cover and tighten screw to 2.5 Nm (1.8 lbf.ft).
- Fit clutch housing with drive tube
- see 9.1.



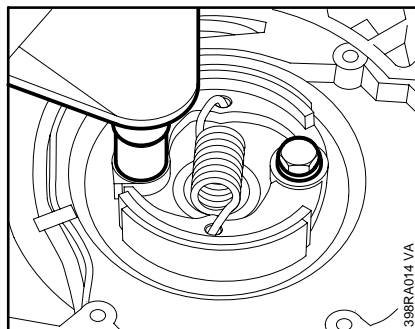
- Fit the washers.



- Fit screws with washers.



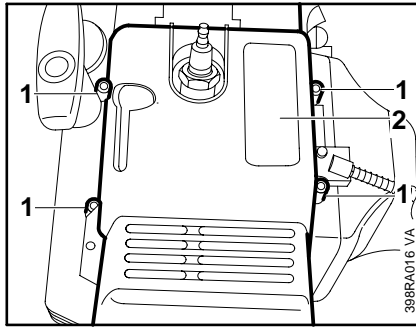
- Fit clutch shoes with spring so that the arrows point counterclockwise.



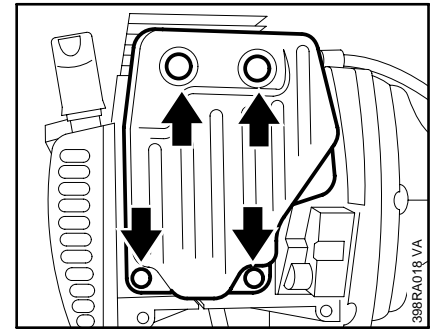
- Tighten down screws to 20 Nm (15 lbf.ft).

4. ENGINE
4.1 Exhaust Muffler/Spark Arresting Screen

Troubleshooting chart - see "Standard Repairs, Troubleshooting" handbook.

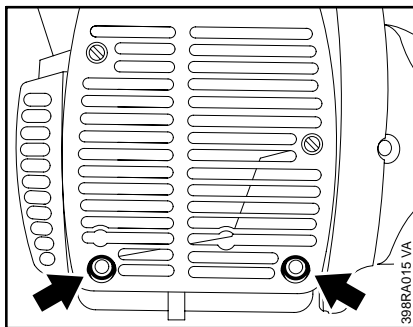


- Remove upper screws (1) from shroud (2).
- Lift away shroud with guard screen.



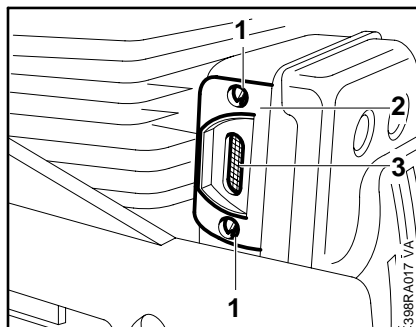
Muffler

- Remove the shroud.
- Take out the screws.
- Lift away the muffler.

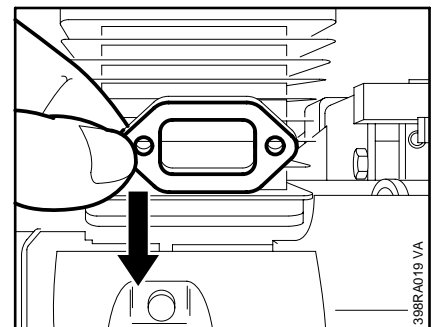


Spark arresting screen

- Remove lower screws from guard screen.



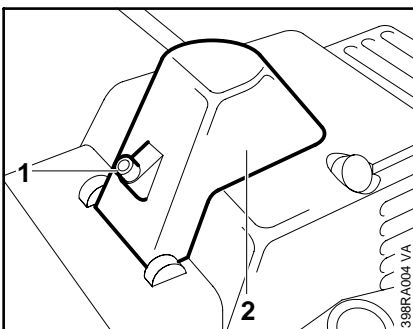
- Take out screws (1).
- Remove baffle (2).
- Remove spark arresting screen (3).
- Clean or replace spark arresting screen if necessary.
- Tighten down screws to 2.5 Nm (1.8 lbf.ft).
- Tighten down shroud screws to 3.5 Nm (2.6 lbf.ft) and lower screws on guard screen to 4.5 Nm (3.3 lbf.ft).



- Remove the gasket.

Reassemble in the reverse sequence.

- Use a new gasket.
- Tighten down screws to 10 Nm (7.5 lbf.ft).



- Take out screw (1).
- Swing the cover (2) open.
- Pull off the spark plug boot.

4.2 Leakage Test

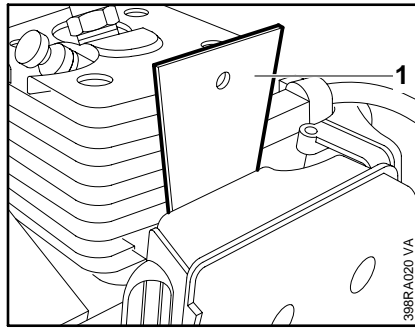
Defective oil seals, gaskets, cracks in castings or a faulty sealing ring between the carburetor housing and cylinder are the usual causes of leaks. Such faults allow air to enter the engine and thus upset the fuel-air mixture.

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

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

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

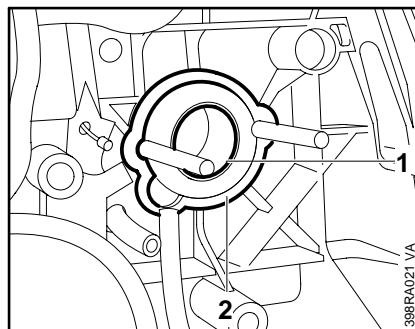
4.2.1 Preparations



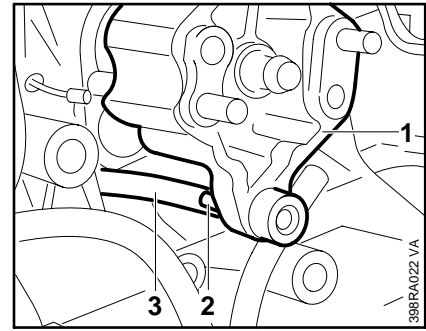
- Back off the muffler mounting screws half-way - [see 4.1](#).
- Slide the sealing plate (1) 0000 855 8106 between the gasket and cylinder exhaust port and retighten the mounting screws moderately.

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

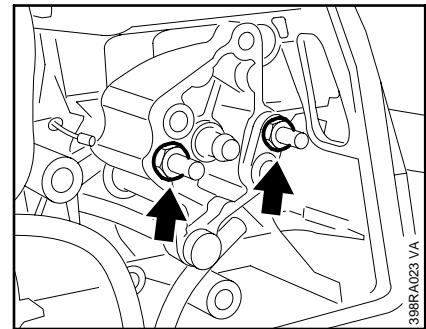
- Remove the carburetor - [see 8.2.2](#).
- Set the piston to top dead center (T.D.C.). This can be checked through the inlet port.
- Make sure the spark plug is properly tightened down.
- Close the decompression valve.



- Check that sleeve (1) is in manifold and washer (2) is in position.

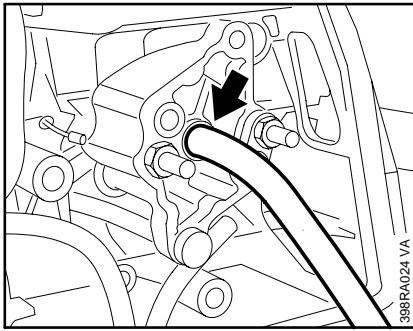


- Locate the test flange (1) 1128 850 4200 on the studs and push the pin (2) into the impulse hose (3) at the same time.

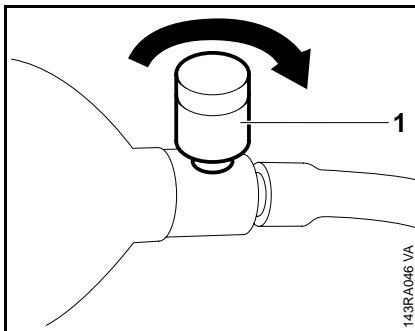


- Push the test flange fully home.
- Fit and tighten down the nuts firmly.

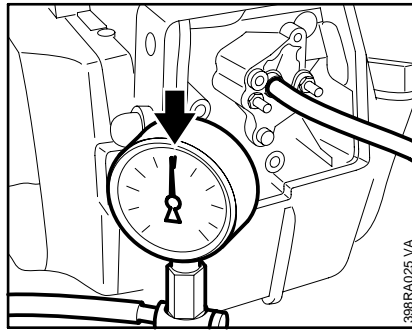
4.2.2 Pressure Test



- Carry out preparations - [see 4.2.1.](#)
- Connect pressure hose of tester 1106 850 2905 to nipple on test flange.



- Close the vent screw (1) on the rubber bulb.
- Use rubber bulb to pump air into the crankcase until the gauge indicates a pressure of 0.5 bar (7.25 psi). If this pressure remains constant for at least 20 seconds, the crankcase and decompression valve are airtight.



- However, if the indicated pressure drops, the leak must be located and the faulty part replaced.

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

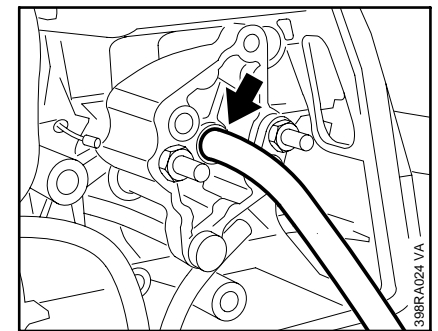
- If the decompression valve is not airtight, install a new one - [see 4.8.](#)
- Repeat the pressure test.
- Carry out the vacuum test - [see 4.2.3.](#)
- After finishing the test, open the vent screw and disconnect the hose.
- Remove the test flange.
- Slacken off the muffler mounting screws.
- Pull out the sealing plate and tighten down the screws to 10 Nm (7.5 lbf.ft).
- Install carburetor - [see 8.2.2.](#)

4.2.3 Vacuum Test

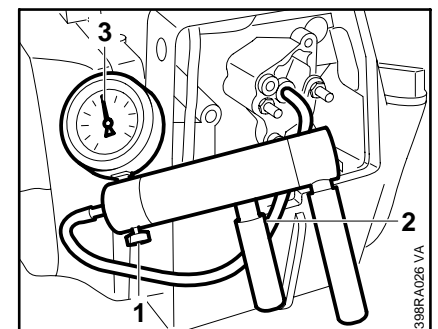
Oil seals tend to fail when subjected to a vacuum, i.e. the sealing lip lifts away from the crankshaft during the piston's induction stroke because there is no internal counterpressure.

An additional test can be carried out with the vacuum pump to detect this kind of fault.

- Carry out preparations - [see 4.2.1.](#)



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



- Close vent screw (1) on pump cylinder.
- Operate lever (2) until the gauge (3) indicates a vacuum of 0.5 bar (7.25 psi).

4.3 Oil Seals

Note: If the vacuum reading remains constant, or rises to no more than 0.3 bar (4.25 psi) within 20 seconds, it can be assumed that the oil seals are in good condition.

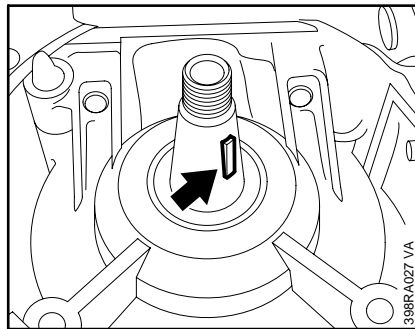
However, if the pressure continues to rise (reduced vacuum in the crankcase), the oil seals must be replaced.

- After finishing the test, open the vent screw and disconnect the hose.
- Remove the test flange.
- Slacken off the muffler screws.
- Remove the sealing plate and tighten down the screws to 10 Nm (7.5 lbf.ft).
- Install carburetor - [see 8.2.2](#).

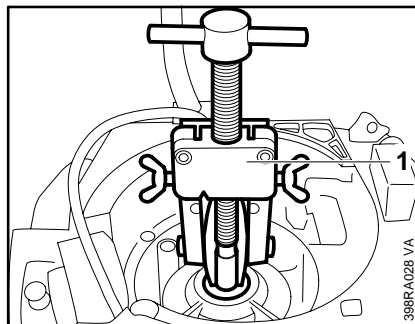
It is not necessary to disassemble the complete engine to replace the oil seals.

Clutch side:

- Remove the flywheel - [see 5.4](#).



- Remove key from crankshaft.
- Tap the oil seal with a suitable piece of pipe or a punch to release it from its seat.

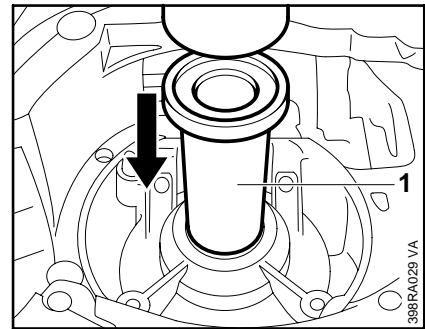


- Apply the puller (1) 5910 890 4400 (with No. 3.1 jaws 0000 893 3706).

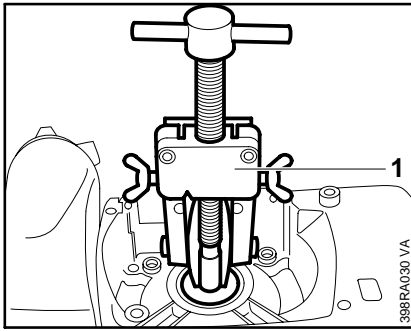
- Tension the arms.
- Pull out the oil seal.

Important: Take care not to damage crankshaft stub.

- Clean sealing surface with a standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons - [see 12.2](#).
- Lubricate sealing lips of oil seal with grease - [see 12.2](#).
- Slip the oil seal, open side facing the crankcase, over the crankshaft stub.



- Press home with press sleeve (1) 1108 893 2405.
- Fit the key in the crankshaft.
- Install the flywheel - [see 5.4](#).

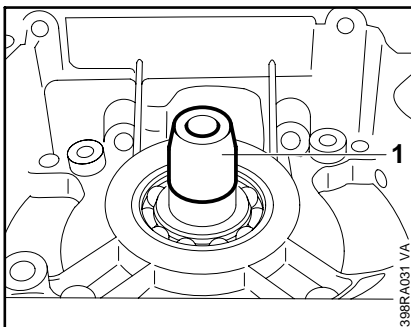


Starter side:

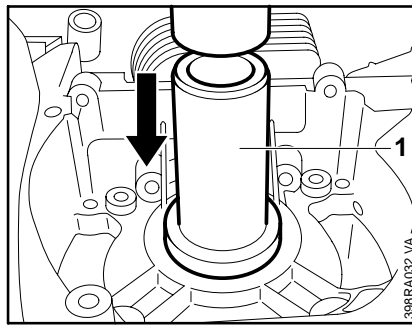
- Remove the starter cup - [see 6.3](#).
- Tap the oil seal with a suitable piece of pipe or a punch to release it from its seat.
- Apply the puller (1) 5910 890 4400 (with No. 3.1 jaws 0000 893 3706).
- Tension the arms.
- Pull out the oil seal.

Important: Take care not to damage crankshaft stub.

- Clean sealing surface with a standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons - [see 12.2](#).
- Lubricate sealing lips of oil seal with grease - [see 12.2](#).



- Slip installing sleeve (1) 4116 893 4601 over the end of the crankshaft.

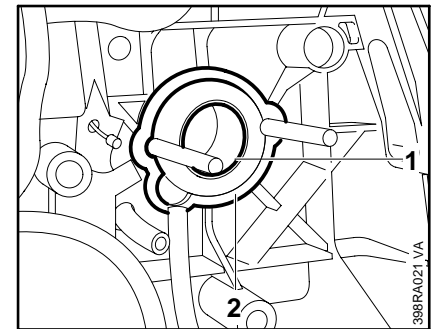


- Push the oil seal, open side facing the crankcase, over the installing sleeve.
- Press home with press sleeve (1) 1108 893 2405.
- Remove the installing sleeve.
- Fit the starter cup - [see 6.3](#).

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

Troubleshooting chart - see "Standard Repairs, Troubleshooting" handbook.

- Remove the muffler - [see 4.1](#).
- Remove the carburetor - [see 8.2.2](#).

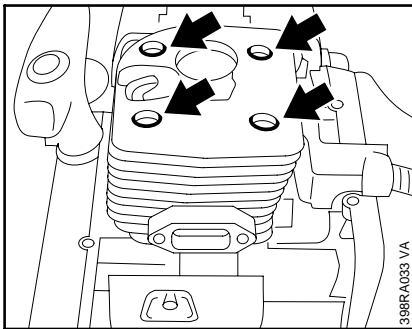


- Take the sleeve (1) out of the manifold.
- Take the washer (2) off the studs.

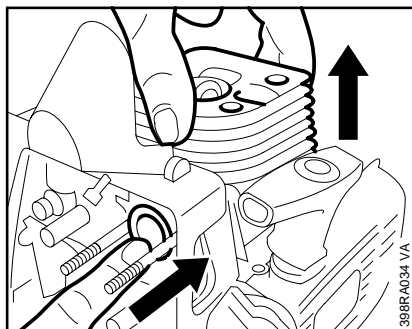
4.5 Cylinder and Piston Removal

4.5.1

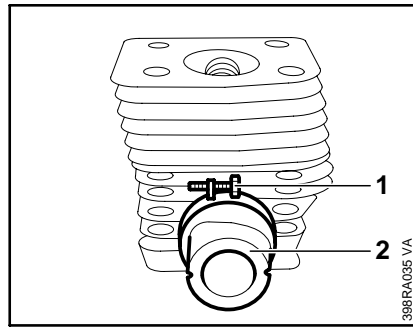
- Preparations - [see 4.4.](#)
- Remove the spark plug.
- Unscrew the decompression valve.



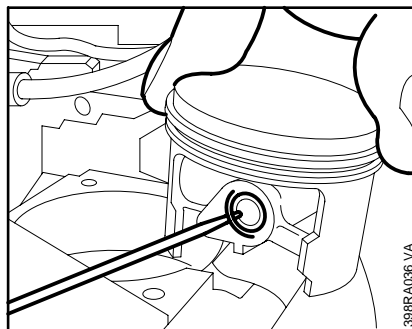
- Unscrew the four cylinder base screws through the holes in the cylinder.



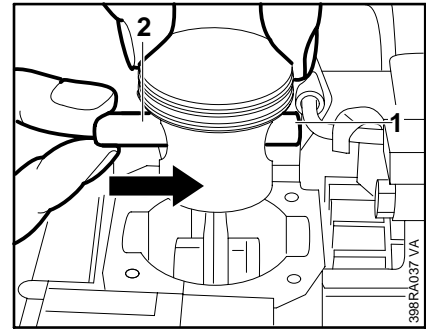
- Carefully lift the cylinder up and, at the same time, push the manifold through the tank housing opening.



- Pull the cylinder off the piston.
- Release the hose clamp (1).
- Pull the manifold (2) off the intake port.
- Inspect the cylinder and replace it if necessary.
- If a new cylinder has to be installed, always fit the matching piston. New cylinders are only supplied complete with piston for this reason.
- Before removing the piston, decide whether or not the crankshaft has to be removed as well. To remove the nuts for the starter cup and flywheel, block the crankshaft by sliding the wooden assembly block between the piston and crankcase.
- Remove the cylinder gasket.



- Ease the hookless snap rings out of the grooves in the pistons.

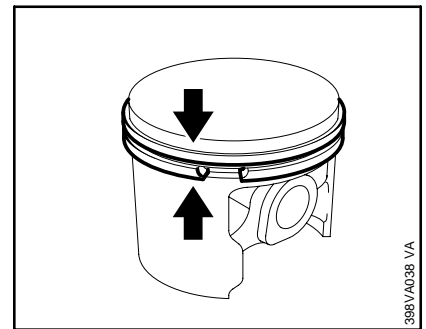


- Use the assembly drift (2) 4116 893 4700 to push the piston pin (1) out of the piston.

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

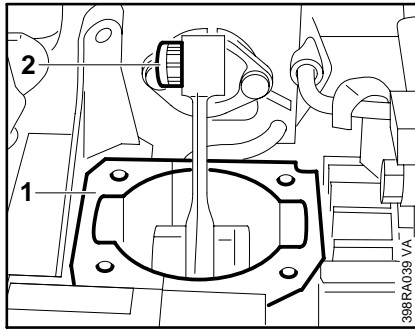
Important: Hold the piston steady during this process to ensure that no jolts are transmitted to the connecting rod.

- Remove the piston and take the needle cage out of the connecting rod.

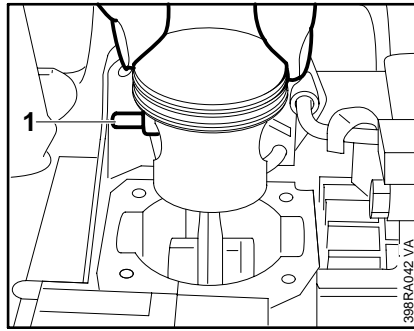


- Inspect piston rings and replace if necessary - [see 4.6.](#)

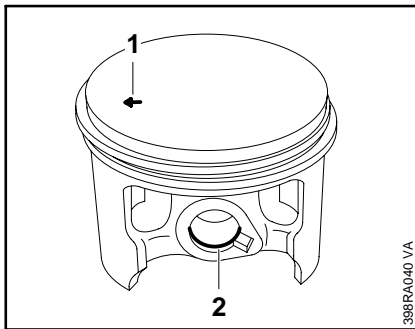
4.5.2 Installation



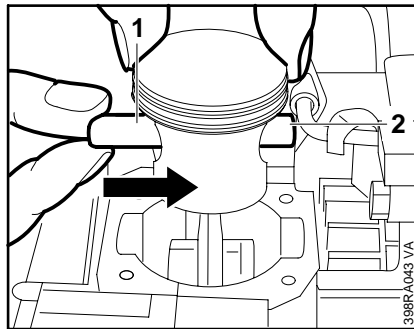
- Thoroughly clean the gasket seating surface (1).
- Lubricate the needle cage (2) with oil and fit it in the small end.



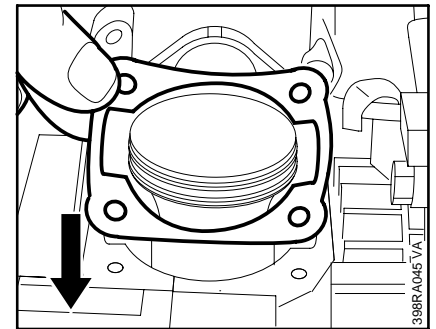
- Push the assembly drift, small diameter (1) first, through the piston and small end (needle cage) and line up the piston.



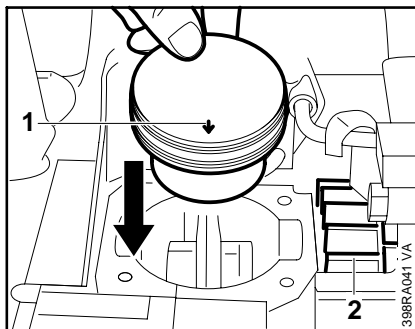
- Use the installing tool 5910 890 2210 to fit hookless snap ring (2) in the forward facing piston boss - arrow (1) must point left.



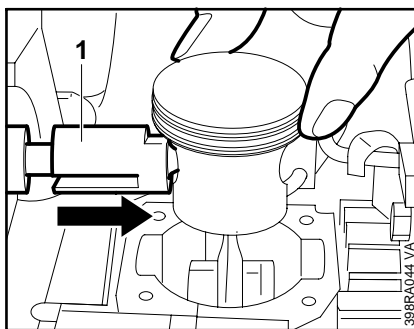
- Fit the piston pin (1) on the assembly drift (2) and slide it into the piston (the pin slides home easily if the piston is heated).



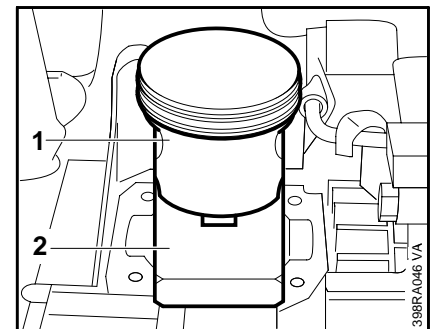
- Place new cylinder gasket in position.



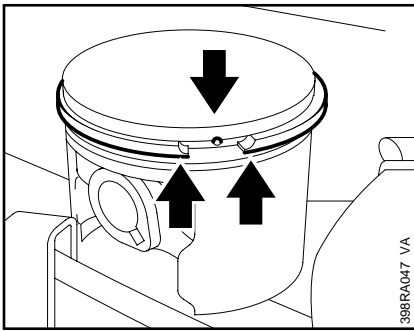
- To ease assembly, heat the piston slightly and slip it over the connecting rod.
- Installed position of piston:
1 = Arrow
2 = Flywheel



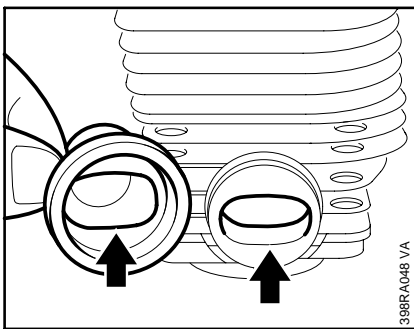
- Use installing tool (1) 5910 890 2210 to fit the snap ring.



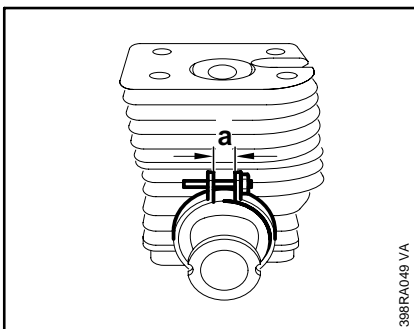
- Lubricate the piston and piston rings with oil and place the piston (1) on the wooden assembly block (2) 1108 893 4800.



- Install the new piston rings in the grooves so that the radii at the ring gap face upward and meet at the fixing pin.

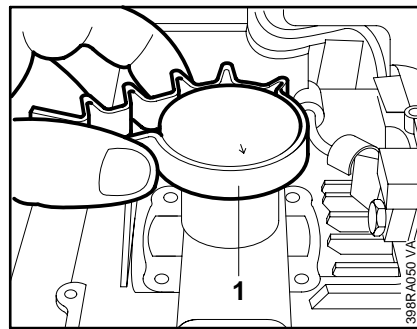


- Push the manifold onto the intake port.
- Note installed position of manifold.

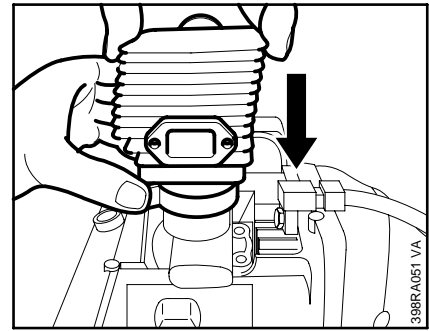


- Push the hose clamp over the manifold. The screw must be horizontal and the screw head must point to the right.

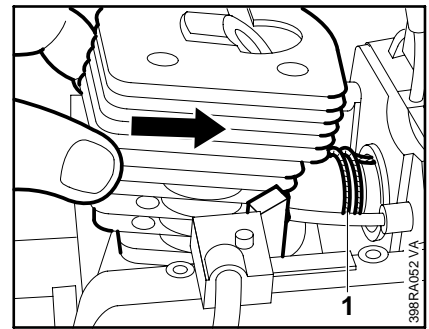
- Tighten the screw until the gap "a" between the two ends of the hose clamp is 5 - 6 mm (0.20 - 0.24 in).



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

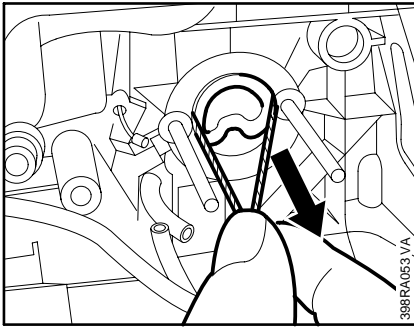


- Slide the cylinder over the piston - the clamping strap is pushed downward as the piston rings slip into the cylinder.
- Remove the clamping strap and wooden assembly block.



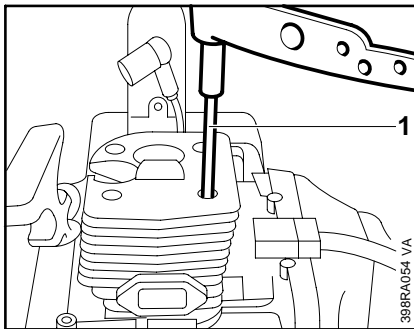
- To fit the manifold in the tank housing intake opening, wind a piece of string (1) (about 15cm/6" long) around the back of the manifold flange and pass the ends of the string through the intake opening.
- Push cylinder towards tank housing so that manifold flange locates against intake opening.

4.6 Piston Rings



- Pull the ends of the string outward.

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



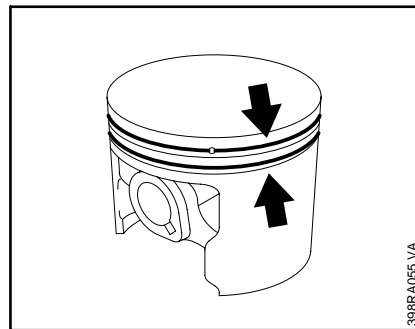
- Carefully line up the cylinder and gasket.
- Use socket (1) 0812 542 2104 to tighten down cylinder base screws to 9.5 Nm (7 lbf.ft).

Assembly is now a reversal of the disassembly sequence.

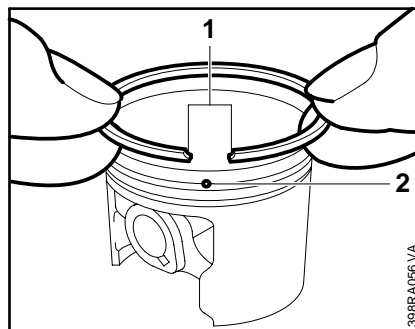
- Remove the piston - see 4.5.1.

Note: The piston must be removed to make sure that no residue can fall into the crankcase when installing the piston rings and cleaning their grooves.

- Remove rings from piston.



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



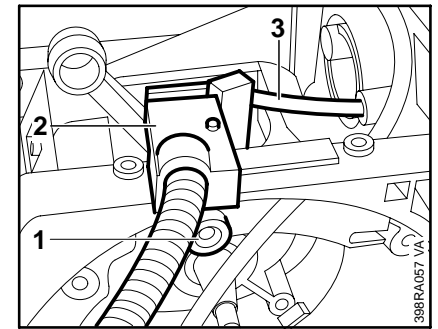
- Install the new piston rings in the grooves so that the radii (1) face the fixing pin (2).

- Install the piston - see 4.5.2.

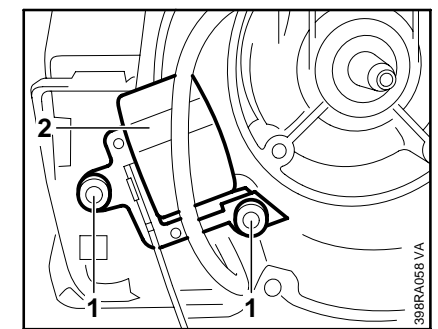
4.7 Crankcase 4.7.1 Crankshaft

- Remove the cylinder and use wooden assembly block 1108 893 4800 to hold the piston - see 4.5.1.

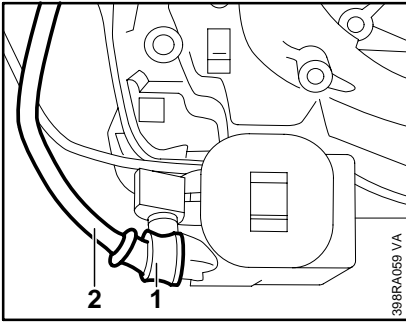
- Remove the starter cup - see 6.3.
- Remove the flywheel - see 5.4.
- Remove the piston - see 4.5.1.



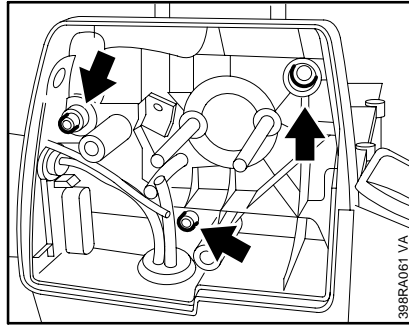
- Take out screw (1).
- Remove cable guide (2) with throttle cable (3).



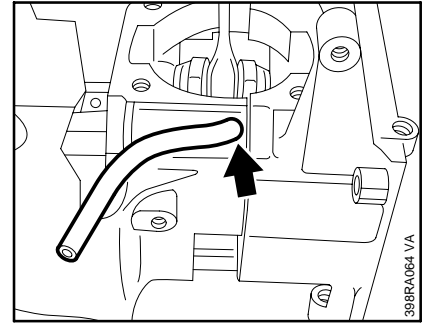
- Take out screws (1).
- Remove the ignition module (2).



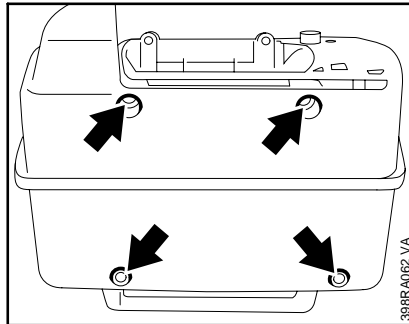
- Pull the rubber boot (1) off the high-voltage output.
- Unscrew the ignition lead (2) from the contact pin and pull it out of the high voltage output.
- Slip the rubber boot off the ignition lead.



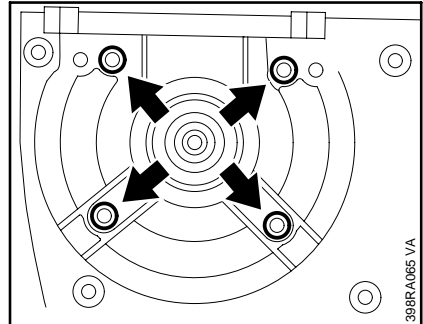
- Remove upper fuel tank mounting screws.



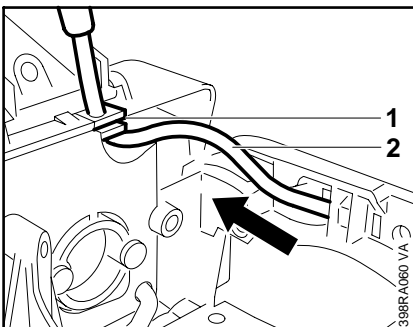
- Pull the impulse hose off the elbow connector.



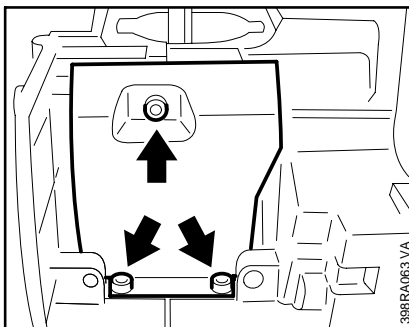
- Remove lower fuel tank mounting screws.
- Take the crankcase off the fuel tank.



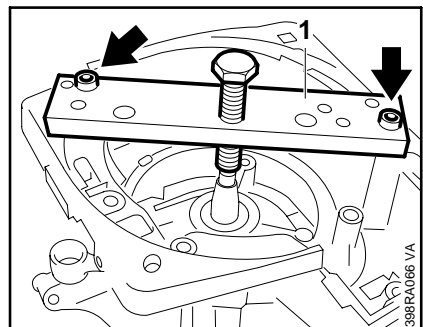
- Take out the screws.



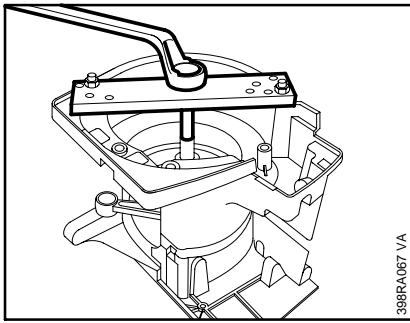
- Ease the grommet (1) out of the tank housing.
- Pull ignition lead (2) out of the housing.



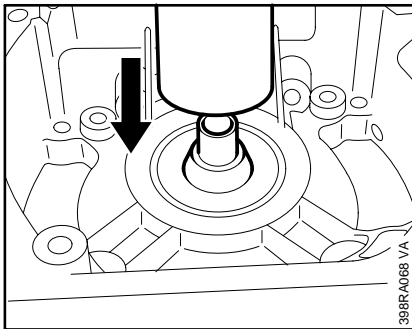
- Take out the screws.
- Remove the heat shield.



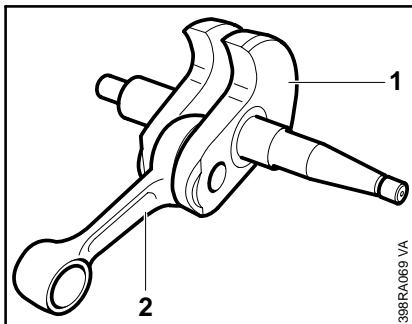
- Mount the puller (1) 4119 890 4600 to the clutch side of the crankcase.



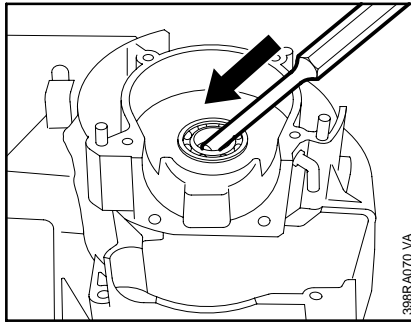
- Turn thrust bolt clockwise until the crankshaft is released from the ball bearing. The two halves of the crankcase separate in this process.
- Remove the crankcase gasket.



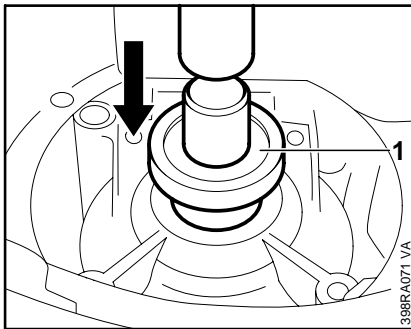
- Press the crankshaft out of the starter side of the crankcase.



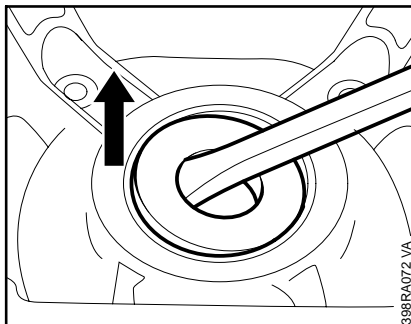
- The crankshaft (1), connecting rod (2) and needle bearing form an inseparable unit. It must always be replaced as a complete unit.



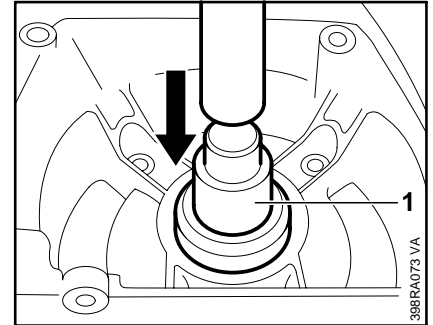
- When fitting a replacement crankshaft always install new oil seals and ball bearings.
- Carefully knock the oil seal out of the clutch side of the crankcase.



- Use press arbor (1) 1118 893 7200 to remove ball bearing.



- Pry the oil seal out of the starter side of the crankcase.



- Use press arbor (1) 1118 893 7200 to remove ball bearing.
- Inspect both halves of the crankcase for cracks and replace if necessary.

Note: The complete crankcase must be replaced even if only one half is damaged.

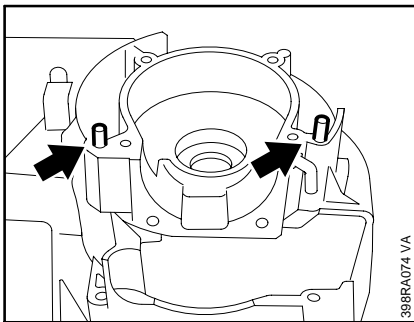
- If necessary, take the snap ring out of the crankcase.

4.7.2 Installing Crankshaft

New crankcases come with factory-installed ball bearings.

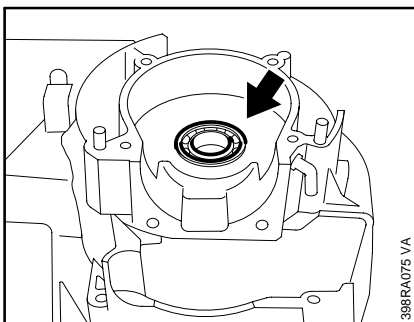
Stamp the machine number on the new crankcase with 2.5 mm (0.1") figure stamps.

If the original crankcase is used again, remove the gasket residue and clean the mating surfaces - they must be cleaned very thoroughly to ensure a perfect seal.



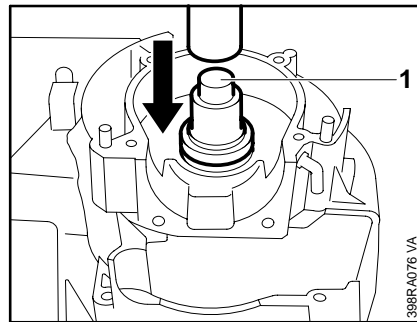
- Check that dowel pins are in position. If necessary, drive the pins into the crankcase.

- Heat area of bearing seat on clutch side of crankcase to approx. 120°C (250°F).

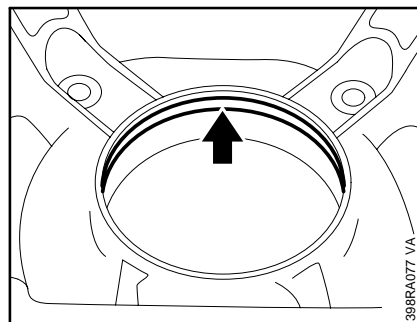


- Fit ball bearing in crankcase by hand and push it home as far as stop.

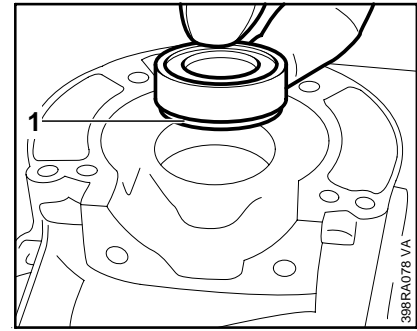
Note: This operation must be carried out very quickly because the bearing absorbs heat immediately and begins to expand.



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



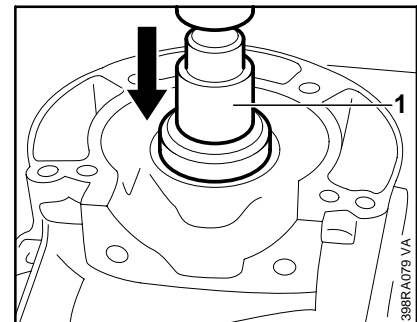
- Check that snap ring is in position in starter side of crankcase or fit if necessary.



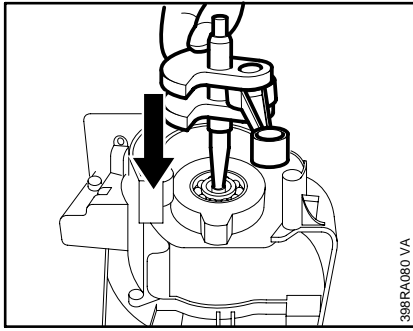
- Heat area of bearing seat on starter side of crankcase to approx. 120°C (250°F).

- Fit ball bearing, shoulder (1) first, in crankcase by hand and push it home until it butts against the snap ring.

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



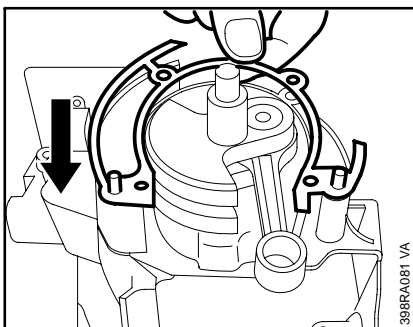
- If it is not possible to heat the starter side of the crankcase, use press arbor (1) 1118 893 7200 to press in the ball bearing as far as stop.



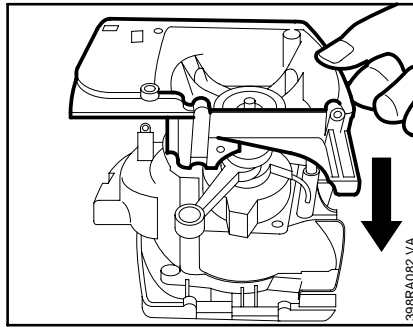
- Use soldering iron with suitable copper attachment to heat inner race of ball bearing in clutch side of crankcase to approx. 150°C (300°F).

- Push tapered stub of crankshaft squarely into the ball bearing.

Note: This operation must be carried out very quickly because the crankshaft absorbs heat immediately and will not otherwise butt against the ball bearing.



- Wait for crankcase to cool down, then place a new gasket on the mating face.

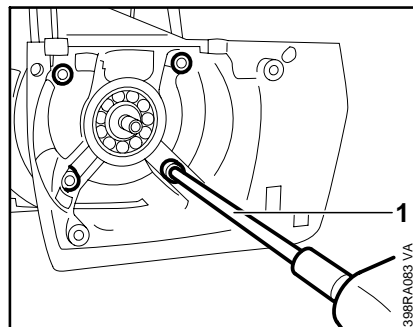


- Use soldering iron with suitable copper attachment to heat inner race of ball bearing in starter side of crankcase to approx. 150°C (300°F).

- Position crankcase above the crankshaft stub.

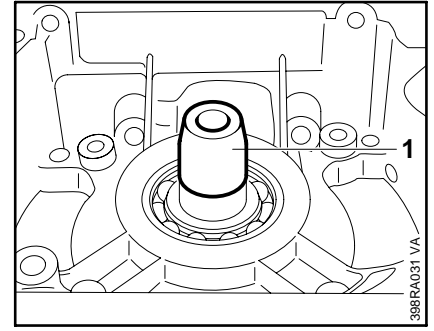
- Push the ball bearing squarely over the crankshaft stub.

Note: This operation must be carried out very quickly because the crankshaft absorbs heat immediately and will not otherwise butt against the ball bearing.

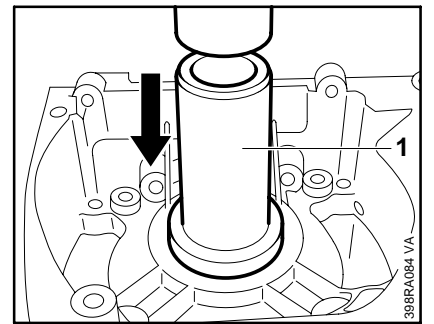


- Insert screws and use socket (1) 0812 542 2104 to tighten them down to 9.5 Nm (7.0 lbf.ft).

- Lubricate sealing lips of oil seals with grease - [see 12.2](#).



- Fit installing sleeve (1) 4116 893 2400 over the starter end of the crankshaft.

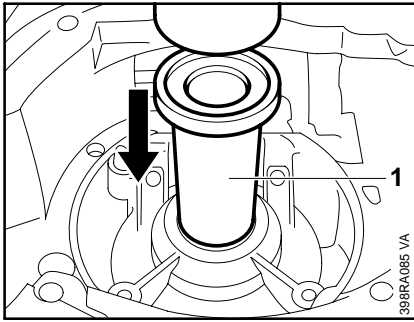


- Slide the oil seal, open side facing the crankcase, over the installing sleeve.

- Press home with press sleeve (1) 1108 893 2405.

- Remove the installing sleeve.

4.8 Decompression Valve

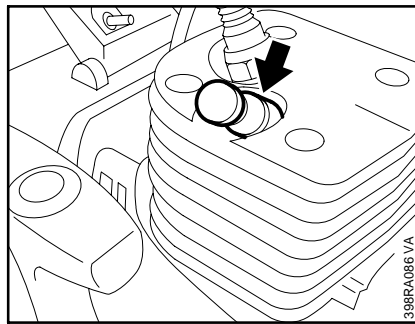


- Slide the oil seal, open side facing the crankcase, over the clutch end of the crankshaft.

- Press home with press sleeve (1) 1108 893 2405.

Assemble all other parts in the reverse sequence.

- Tighten screws on heat shield to 5.0 Nm (3.7 lbf.ft).
- Place cable guide with throttle cable in position, insert screw and tighten down to 4.5 Nm (3.3 lbf.ft).
- Install and adjust ignition module - see 5.2.2.
- Fit the tank housing - see 8.5.

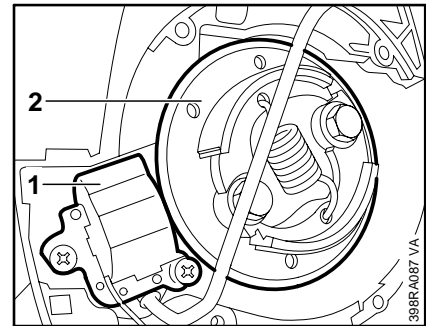


- Remove the shroud- see 4.1.
- Use standard commercial long-reach 13 mm socket to unscrew the decompression valve.
- Install new decompression valve and tighten down to 14 Nm (10.3 lbf.ft).
- Fit the shroud.

5. IGNITION SYSTEM

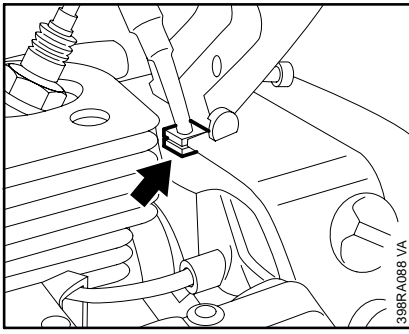
Warning! Exercise extreme caution when carrying out maintenance and repair work on the ignition system. The high voltages which occur can cause serious or even fatal accidents!

Troubleshooting on the ignition system should always begin at the spark plug. See "Standard Repairs, Troubleshooting" handbook.

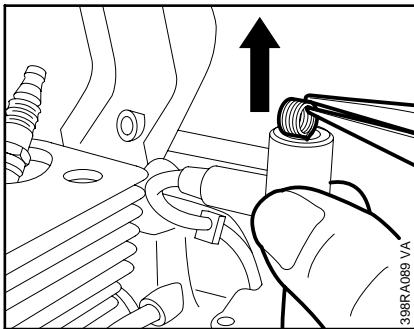


Note: The electronic (breakerless) ignition system basically consists of an ignition module (1) and flywheel (2).

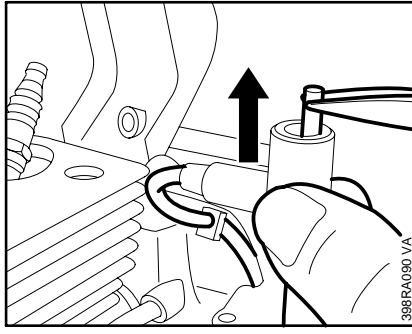
5.1 Spark Plug Boot



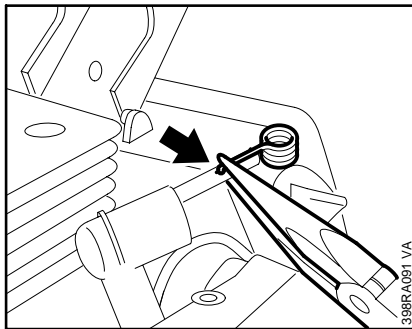
- Remove the shroud - [see 4.1](#).
- Pull grommet out of the tank housing.



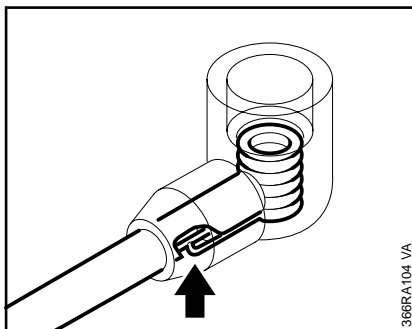
- Use pliers to grip the leg spring and pull it out of the spark plug boot.
- Unhook the leg spring from the ignition lead.
- Pull spark plug boot off the ignition lead.
- Coat end of the ignition lead (about 20 mm/3/4") with oil.
- Fit spark plug boot over the ignition lead.



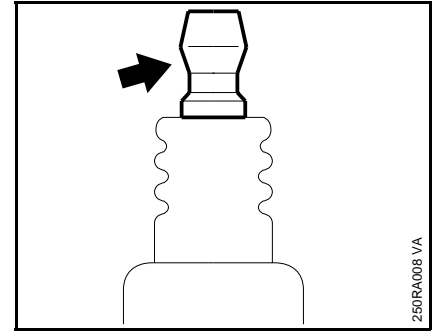
- Use pliers to grip the end of the ignition lead inside the spark plug boot and pull it out.



- Pinch hook of leg spring into the center of the lead, i.e. about 15 mm (9/16") from the end of the lead.



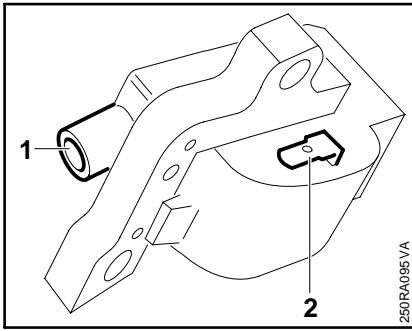
- Pull the lead back into the boot so that the leg spring locates properly inside it.



Important: If the spark plug comes with a separate terminal nut, always fit the nut on the thread and tighten it down securely.

- Push grommet into the recess in the tank housing.
- Fit the boot on the spark plug.
- Fit the shroud - [see 4.1](#).

5.2 Ignition Module



The ignition module accommodates all the components required to control ignition timing.

There are two electrical connections on the coil body:

1. the high voltage output (1)
2. the connector tag (3) for the short circuit wire

Accurate testing of the ignition module is only possible with sophisticated test equipment. For this reason it is only necessary to carry out a spark test in the workshop. A new ignition module must be installed if no ignition spark is obtained (after checking that wiring and stop switch are in good condition).

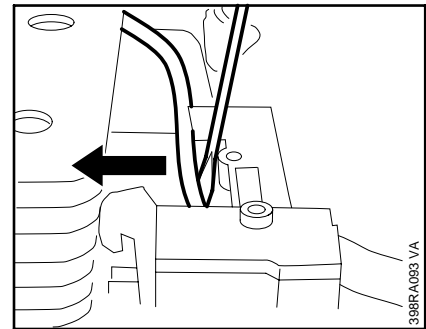
5.2.1 Ignition Timing

Ignition timing is not adjustable.

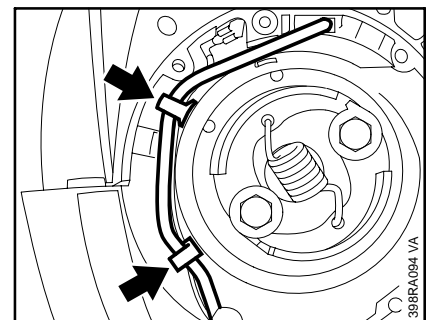
Since there is no mechanical wear in these systems, ignition timing cannot get out of adjustment. However, an internal fault in the circuit can alter the switching point in such a way that a spark test will still show the system to be in order although timing is outside the permissible tolerance. This will impair engine starting and running behavior.

5.2.2 Removing and Installing

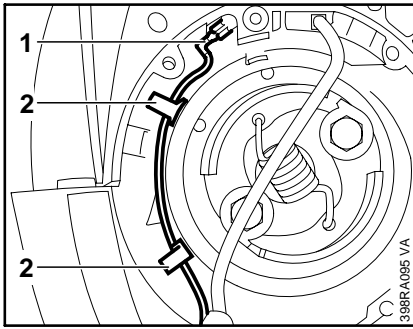
- Remove clutch housing - see 9.1.
- Ease ignition lead grommet out of recess in tank housing - see 5.1.



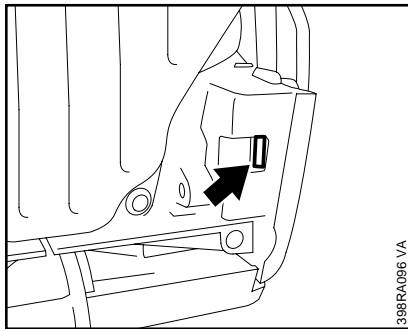
- Lever ignition lead out of guide in crankcase.



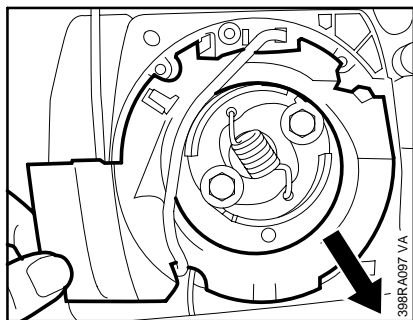
- Remove ignition lead from the retainers.



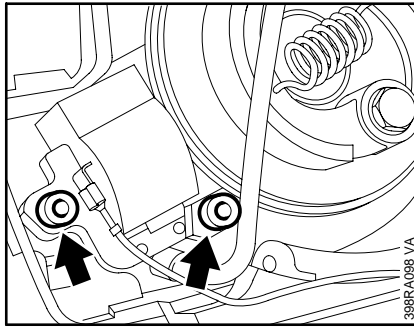
- Pull short circuit wire connector (1) off tag.
- Remove short circuit wire from retainers (2).



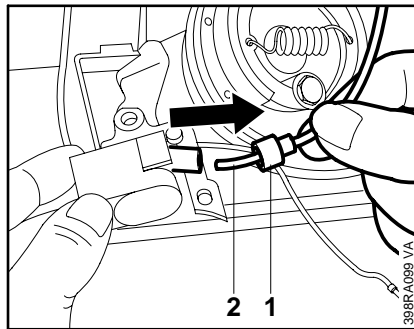
- Ease lug of segment out of crankcase opening.



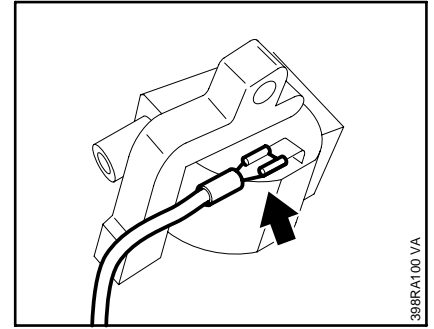
- Remove the segment.



- Take out the screws.



- Remove the ignition module.
- Pull the rubber boot (1) off the high voltage output.
- Unscrew ignition lead (2) from the contact pin and pull it out of the high voltage output.

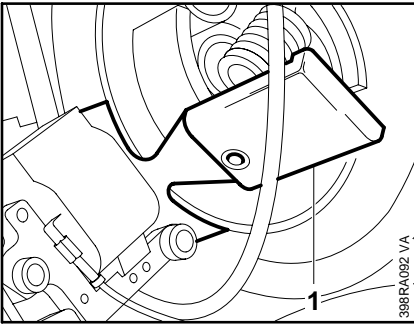


- Pull short circuit wire off the ignition module.
- Pack the high voltage output with STIHL multipurpose grease - see 12.2.

Important: Do not use a graphite grease (Molykote) or silicone insulating paste.

- Screw ignition lead into high voltage output.
- Slide rubber boot over the high voltage output.

5.3 Ignition Lead



- Place the module in position, insert the screws but do not tighten them down yet.

Important: A washer must be fitted under each screw head.

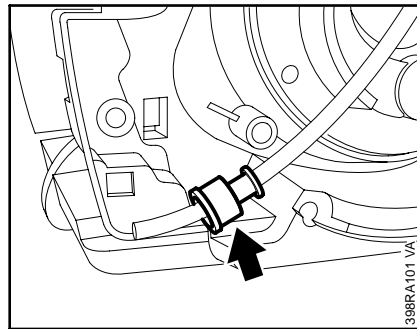
- Slide the setting gauge (1) 1127 890 6400 between the arms of the ignition module and the flywheel magnet poles.

- Press the ignition module against the gauge and tighten down the mounting screws to a torque of 7.5 Nm (5.5 lbf.ft).

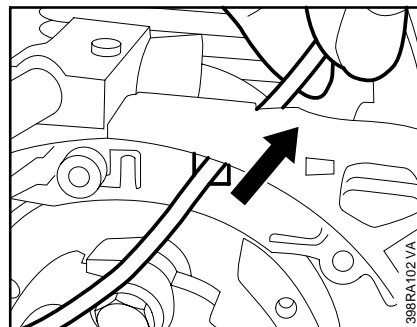
Reassemble all other parts in the reverse sequence.

- Fit ignition lead in the retainers.

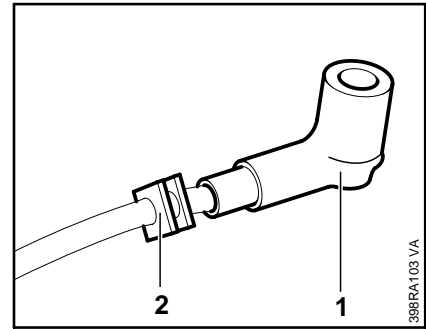
- Remove the ignition module and take the ignition lead out of the high voltage output - see 5.2.2.



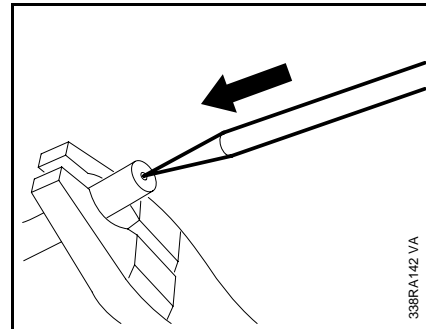
- Pull the rubber boot off the ignition lead.



- Pull the ignition lead out of the crankcase.



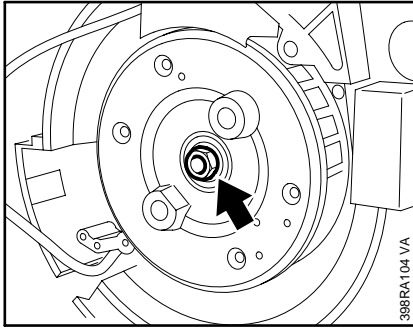
- Remove the spark plug boot (1) - see 5.1.
- Pull the grommet (2) off the ignition lead.



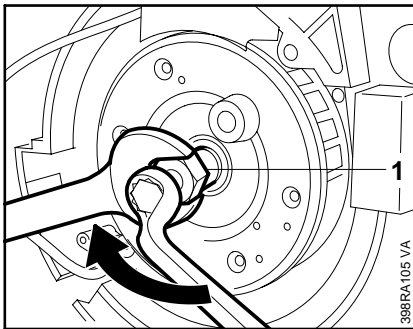
- Cut new ignition lead to length (see parts list or cut to same length as old lead).
- Use a pointed tool (awl or gimlet) to pierce the center of the ignition lead at the end which screws into the module.

Reassemble all other parts in the reverse sequence.

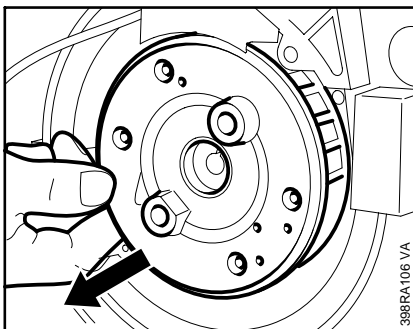
5.4 Flywheel



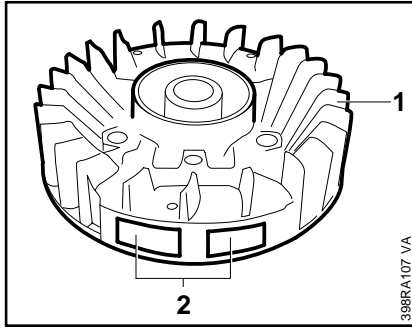
- Remove the clutch - [see 3.1](#).
- Remove segment from flywheel - [see 5.2.2](#).
- Unscrew the flywheel nut.



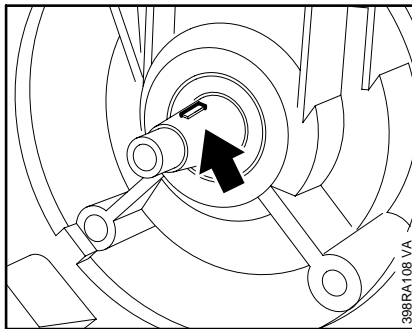
- Screw the puller (1) 1110 890 4500 into the flywheel.
- Screw home the thrust bolt until the flywheel is released.



- Pull off the flywheel.



Inspect the flywheel (1) and magnet poles (2). If you find any damage, install a new flywheel.



Installing the flywheel:

Important: Clean the stub of the crankshaft and the flywheel hub bore with a standard commercial, solvent-based degreasant which contains no chlorinated or halogenated hydrocarbons - [see 12.2](#).

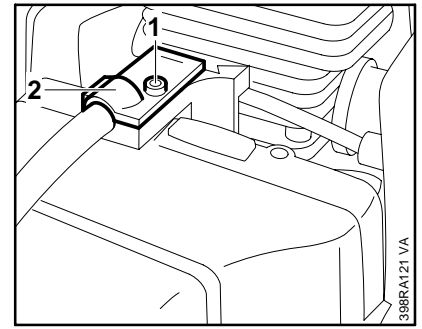
- Make sure Woodruff key is properly seated.
- Fit the flywheel.

Note: Check position of slot.

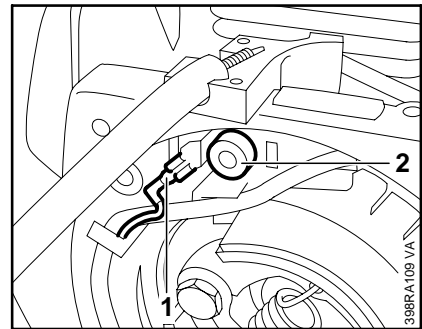
Assemble all other parts in the reverse sequence.

- Fit and tighten down flywheel nut to 30 Nm (22 lbf.ft).

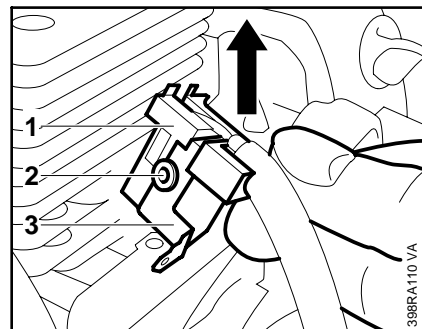
5.5 Short Circuit Contact



- Remove clutch housing - [see 9.1](#).
- Take out the screw (1).
- Remove top (2) of cable guide.



- Remove short circuit wire (1) from connector tag.
- Take out the screw (2).



- Pull off the guide (1).
- Take out the screw (2).
- Remove the short circuit contact (3).

6. REWIND STARTER
6.1 General

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

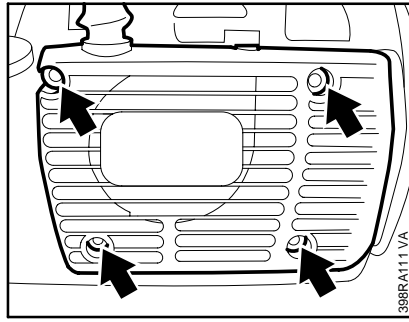
Then carefully pull out the starter rope several times and allow it to rewind until its normal smooth action is restored.

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

Wash all parts in paraffin or white spirit.

Lubricate the rewind spring and starter post with STIHL special lubricant, **see 12.2**, before installing.

6.2 Rewind Spring
6.2.1 Replacing

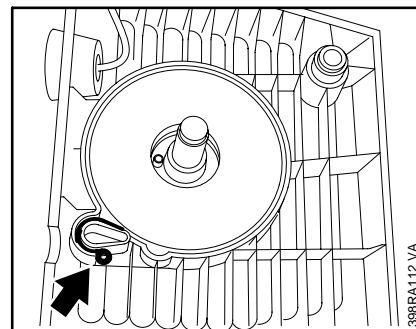


Troubleshooting chart - see "Standard Repairs, Troubleshooting" handbook.

- Take out the screws.
- Remove the starter cover.
- Remove the rope rotor - see "Standard Repairs, Troubleshooting" handbook.
- Take out the screw and remove any remaining pieces of spring from the starter cover.

Note: The replacement spring comes ready for installation with spring housing.

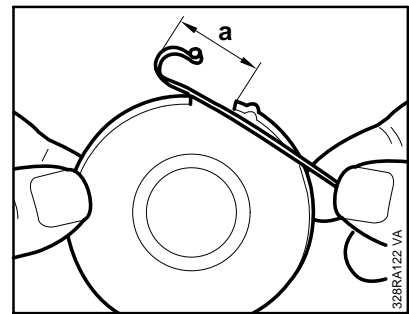
- It should be lubricated with a few drops of STIHL special lubricant before installation - **see 12.2**.



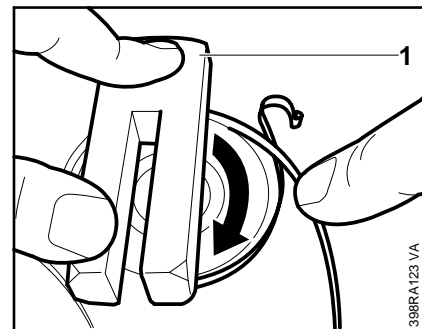
- Place the rewind with spring housing (bottom facing up) in the starter cover. Engage the outer spring loop as shown in the illustration (see arrow).

Caution: The rewind spring may pop out and uncoil during installation.

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



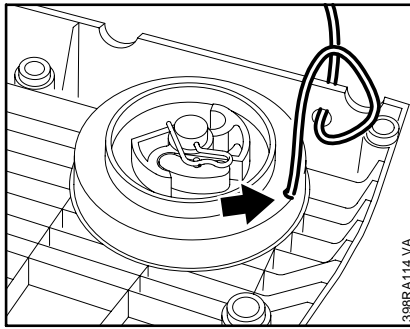
- Position the outer spring loop about 20 mm (3/4") from the edge of the spring housing (distance "a").



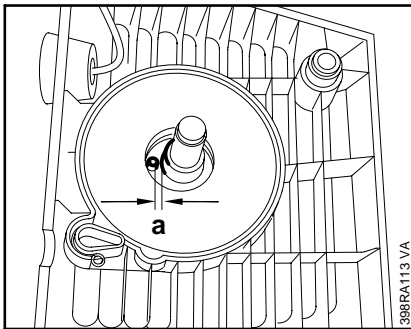
- Refit rewind spring in fan housing in the clockwise direction, starting outside and working inwards.

6.2.2 Tensioning

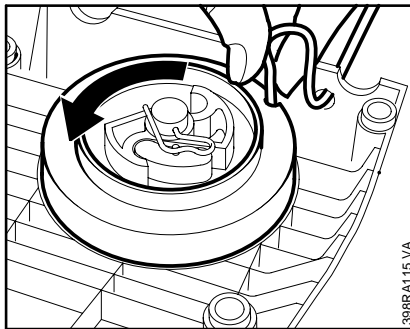
- Place the wooden assembly block (1) 1108 893 4800 across the spring housing to simplify refitting.



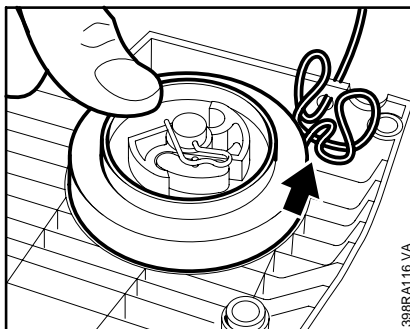
- Make a loop in the starter rope.
- Push starter rope into notch in the rotor.



- Check the position of the inner spring loop. It should be 2 mm (0.08") away from the starter post.
- Install the rope rotor - see "Standard Repairs, Troubleshooting" handbook.
- Tension the rewind spring - see 6.2.2.

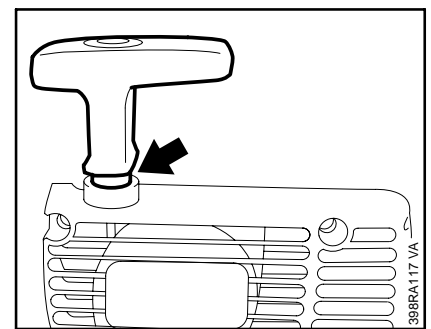


- Grip the rope **close** to the rotor and use it to turn the rope rotor seven full turns counterclockwise.



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

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



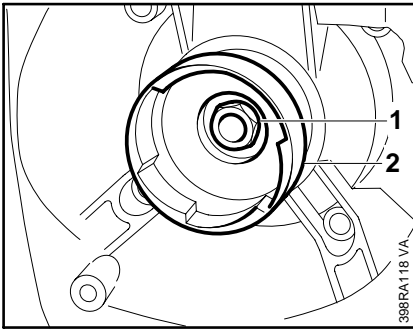
Note: The rewind spring is correctly tensioned when the starter grip sits firmly in the rope guide bush without drooping to one side. If this is not the case, tension the spring by one additional turn.

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

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

- Fit starter cover, insert screws and tighten down to 4.5 Nm (3.3 lbf.ft).

6.3 Starter Cup

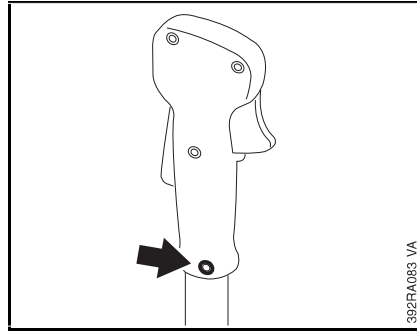


- Remove the starter cover - see 6.2.1.
- Block piston with locking strip - see 3.1.
- Unscrew the nut (1).
- Pull off the starter cup (2).

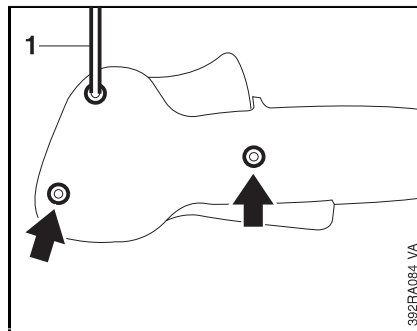
Reassemble in the reverse sequence.

- Tighten down nut to 24 Nm (17.7 lbf.ft).

7. THROTTLE CONTROL 7.1 Throttle Trigger/Interlock Lever

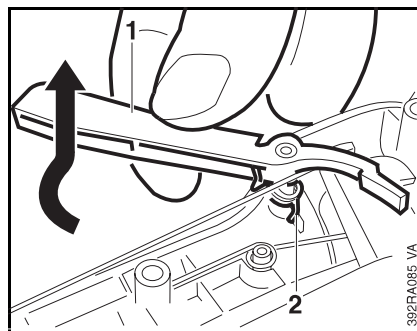


- Take out screw and washer.
- Pull off the control handle.

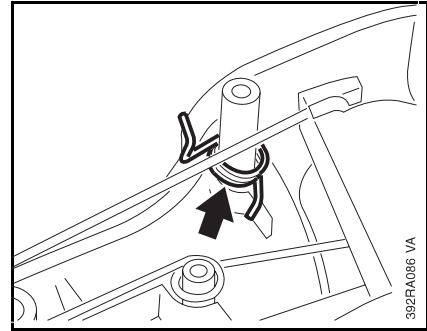


Warning: To avoid risk of electric shock, do not start the unit while the control handle is open.

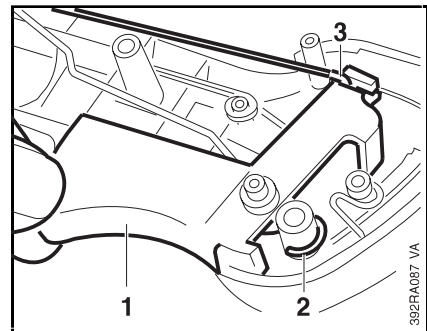
- Remove screws with screwdriver (1) 5910 890 2301.
- Separate the control handle.



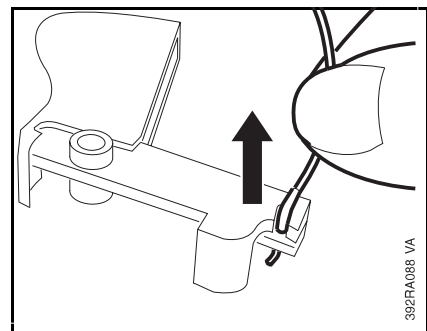
- Lift the interlock lever (1) slightly and turn it to one side until the torsion spring (2) is relaxed.
- Pull the interlock lever off the peg.



- Remove the torsion spring.



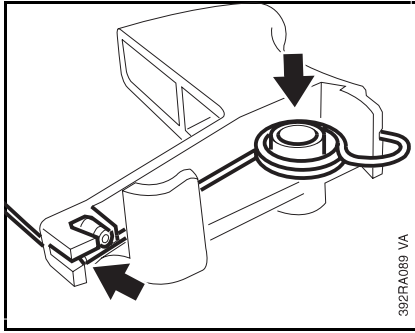
- Take the throttle trigger (1) with torsion spring (2) and throttle cable (3) off the peg.



- Disconnect throttle cable from trigger.

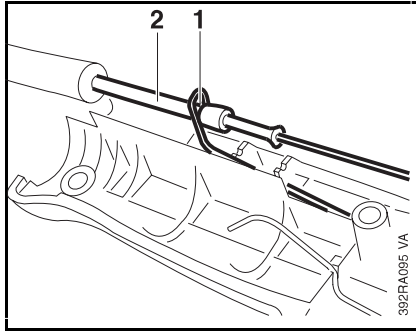
Assemble in the reverse sequence.

7.2 Contact Springs/Detent Spring in Control Handle



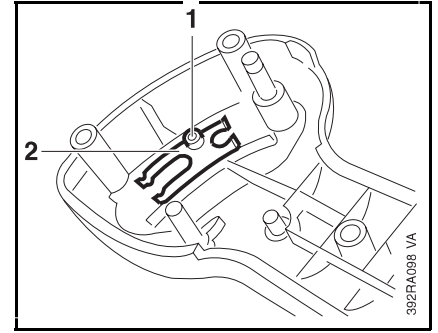
392FA089 VA

- Attach the throttle cable, then position torsion spring as shown and push its long arm into the slot.



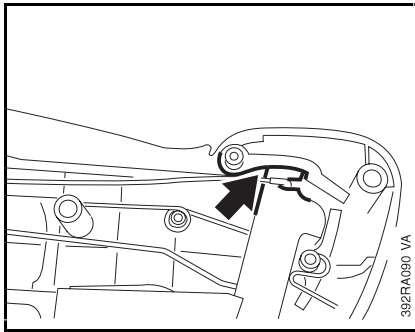
392FA095 VA

- Remove the throttle trigger - see 7.1.
- Lift contact spring (1) a little and remove the throttle cable (2).



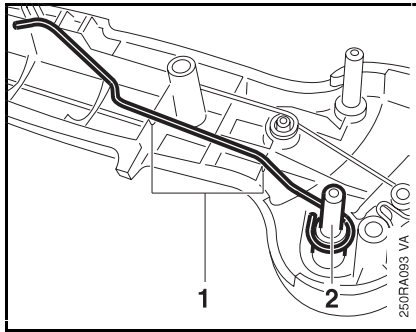
392FA098 VA

- Take out slide control's collar screw (1).
- Remove detent spring (2).



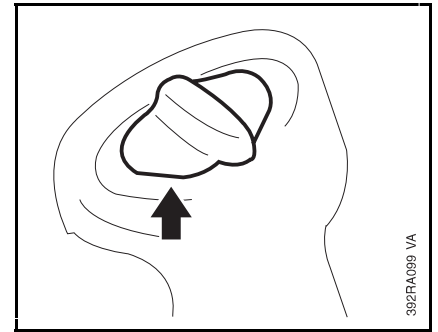
392FA090 VA

- The interlock lever must be behind the throttle trigger.



250FA083 VA

- Remove spring from recesses (1) and peg (2).

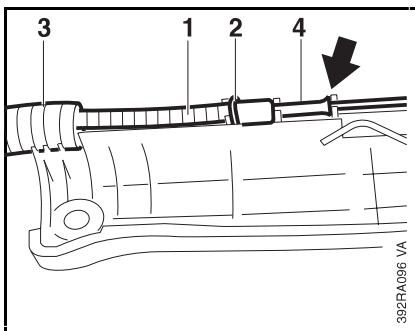


392FA099 VA

- Pull slide control out of handle molding.

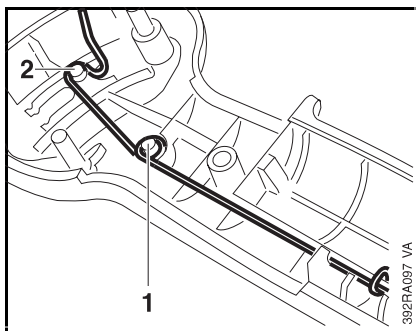
Assemble in the reverse sequence.

- Engage contact spring correctly in groove of collar screw.



392FA096 VA

- Check correct positions of throttle cable (1), contact spring (2), protective tube (3) and insulator (4).



392FA097 VA

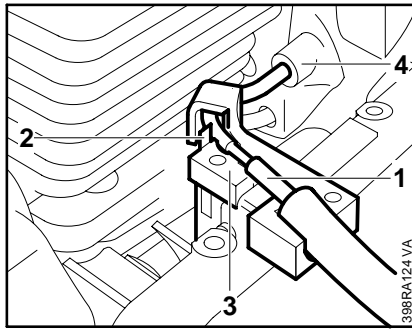
- Remove contact spring from peg (1) and collar screw (2).

7.3 Throttle Cable

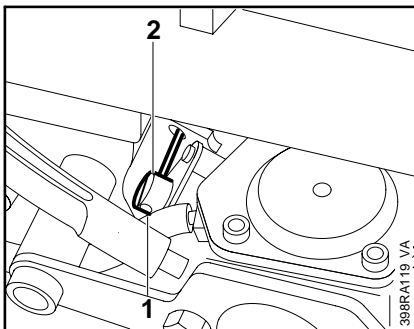
7.3.1 Replacing

All models

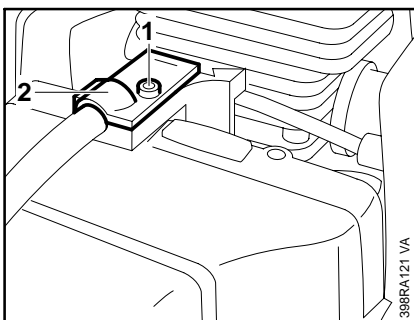
- Remove the shroud - [see 4.1.](#)
- Remove the air filter - [see 8.1.](#)
- Take throttle cable off the contact spring - [see 7.2.](#)



- Take throttle cable (1) out of retainer (2) and guide (3) and pull it out of the tank housing (4).
- Adjust throttle cable - [see 7.3.2.](#)

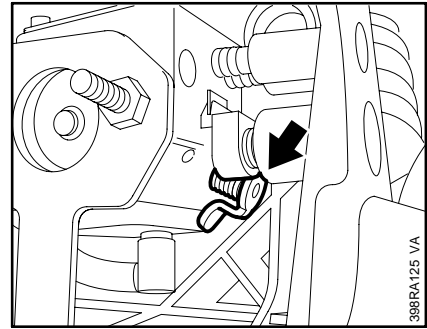


- Disconnect throttle cable nipple (1) from slotted pin (2) on throttle lever.

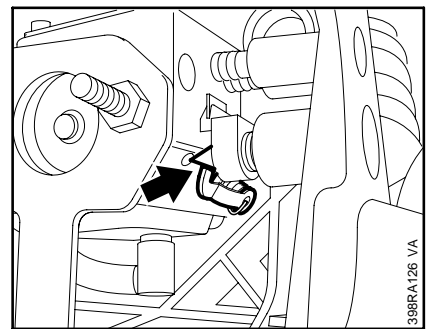


- Take out the screw (1).
- Remove top (2) of cable guide.

7.3.2 Adjusting



- Throttle lever must butt against the idle speed screw's holder when the throttle trigger is in the full throttle position.

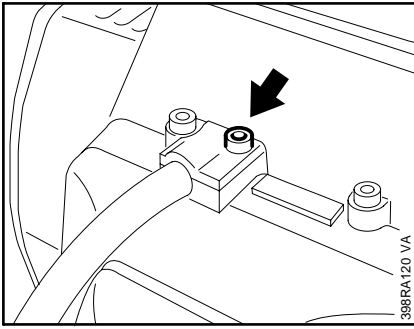


- On carburetors with an idle speed screw: Throttle lever must butt against the idle speed screw when the trigger is in the idle position.
- Check correct setting of idle speed screw.

Important: Note adjustment range of idle speed screw.

8. FUEL SYSTEM

8.1 Air Filter

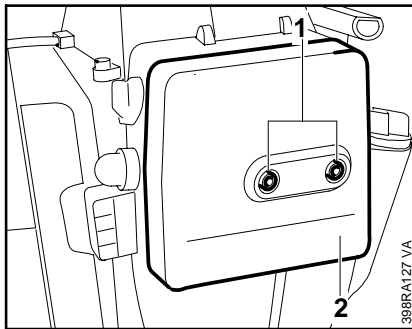


- Slacken the screw.
- Squeeze the throttle trigger as far as stop (full throttle), hold it there and tighten down screw to 1.0 Nm (0.75 lbf.ft).
- Release the throttle trigger (idle position). The throttle lever must butt against idle speed screw's holder, if fitted.

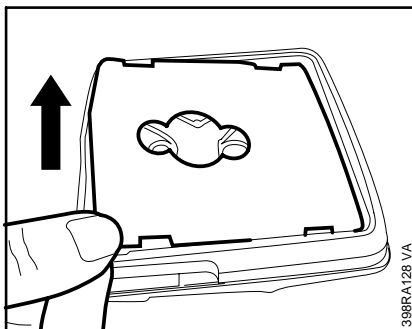
Dirty and clogged air filters reduce engine power, increase fuel consumption and make starting more difficult.

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

- Close the choke shutter.
- Clean away any loose dirt from around the filter and carburetor box cover.

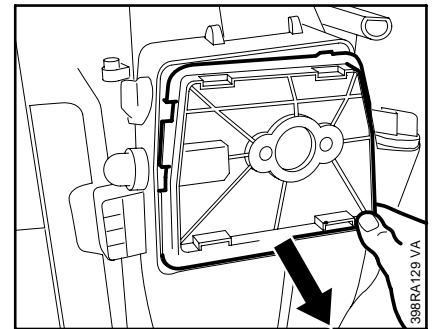


- Unscrew the nuts (1).
- Remove the carburetor box cover (2).



- Take auxiliary filter out of carburetor box cover.

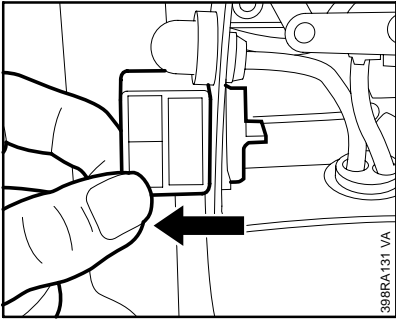
- Dry a wet auxiliary filter - then shake it clean or blow it out with compressed air.
- If the filter is heavily loaded with dirt or damaged, fit a new one.



- Remove the air filter.
- Wash the filter in a fresh, non-flammable cleaning solution (e.g. warm soapy water) and shake dry or, if possible, blow out with compressed air.
- Soften encrusted dirt by soaking the filter in cleaning solution.
- Always replace a damaged air filter.

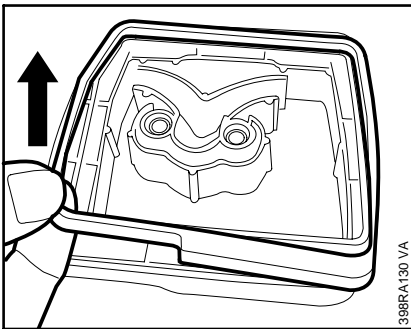
8.2 Carburetor

8.2.1 Leakage Test



- Pull out the air diverter and clean it thoroughly.

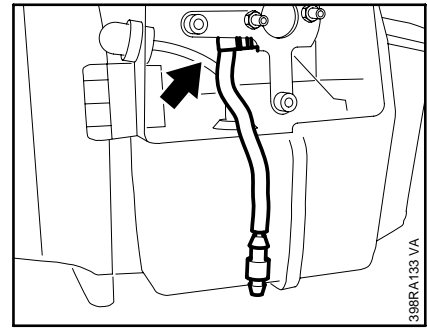
Reassemble in the reverse sequence.



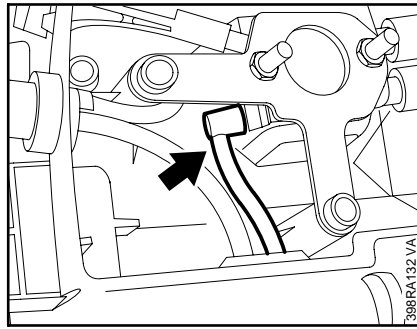
- Inspect gasket in carburetor box cover and replace if necessary.
- Tighten down nuts to 4.5 Nm (3.3 lbf.ft).

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

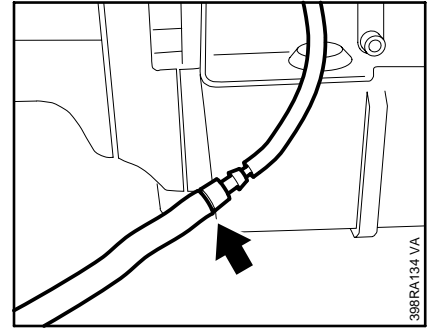
- Remove the air filter - see 8.1.



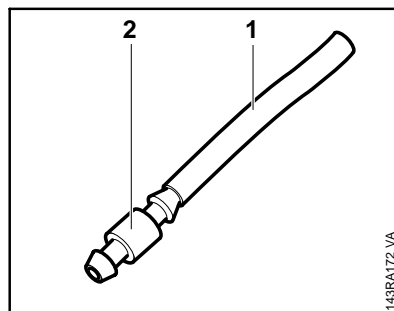
- Push the fuel line with nipple onto the carburetor elbow connector.



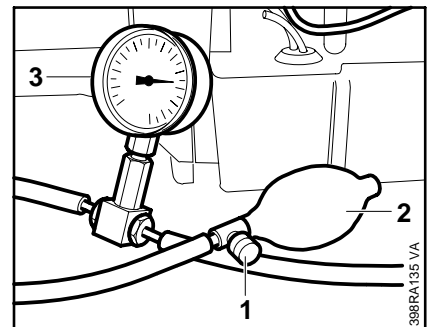
- Pull fuel hose off carburetor's elbow connector.



- Push the nipple into the tester's pressure hose.



- Fit fuel line (1) 1110 141 8600 on nipple (2) 0000 855 9200.



- Close the vent screw (1) on the rubber bulb (2) and pump air into the carburetor until the pressure gauge (3) shows a reading of approx. 0.8 bar (11.5 psi).

8.2.2 Removing and Installing

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

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

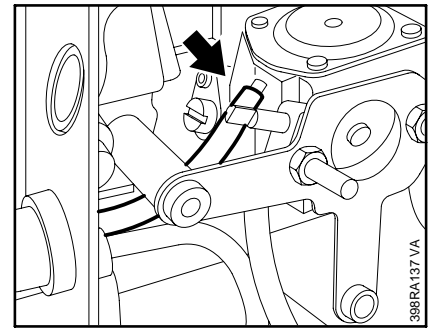
In either case the carburetor must be removed and serviced - see "Carburetor" handbook.

- After completing test, open the vent screw and pull the fuel line off the elbow connector.
- Push the fuel hose onto the elbow connector.
- Install the air filter - see 8.1.

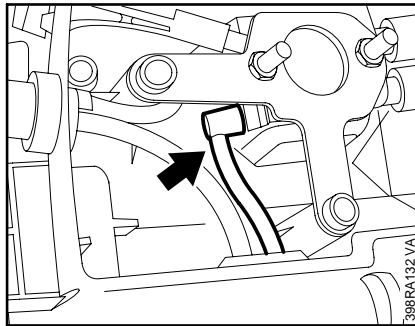
Troubleshooting chart - see "Standard Repairs, Troubleshooting" handbook.

Important: In the event of trouble with the carburetor or the fuel supply system, always check and clean the tank vent - see 8.3.

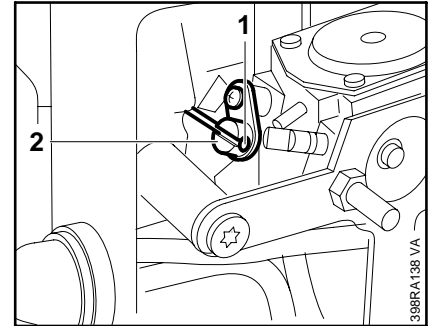
- Remove the air filter - see 8.1.



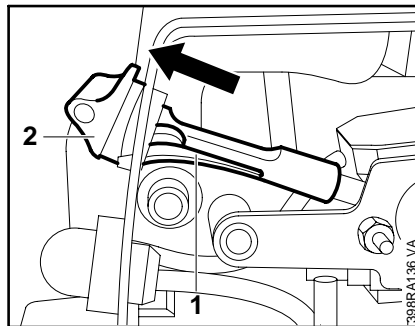
- Disconnect manual fuel pump hose from the carburetor.



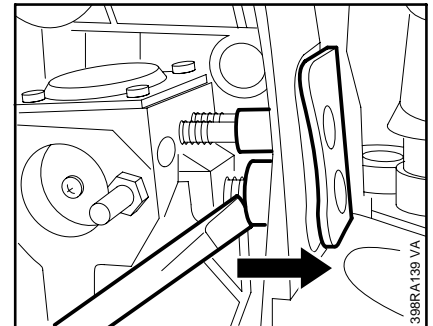
- Pull fuel hose off carburetor's elbow connector.



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

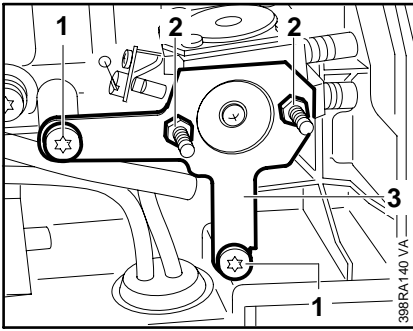


- Push retaining rib (1) upward.
- Pull choke knob (2) off the shaft.

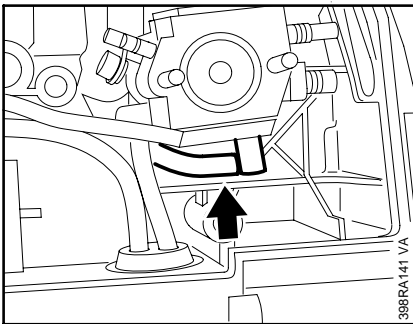


- Remove the fuel filler cap.
- Ease the grommet off the adjusting screws and take it out of the tank housing.

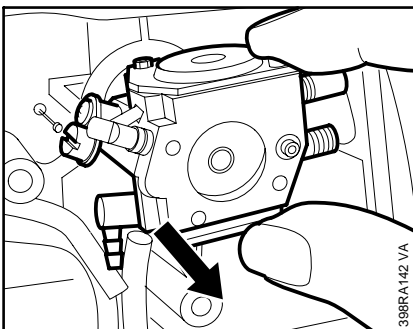
8.2.3 Adjusting



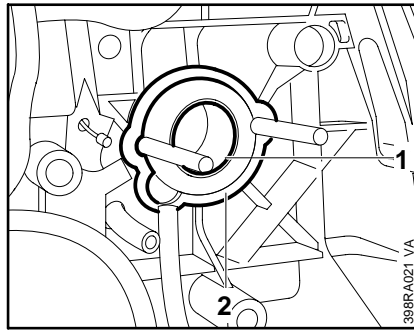
- Take out the screws (1) and unscrew the nuts (2).
- Remove the backing plate (3).



- Pull impulse hose off the elbow connector.



- Pull carburetor off the studs.



Reassemble in the reverse sequence.

- Check that sleeve (1) is in manifold and washer (2) is in position.
- Tighten down screws on backing plate to 6.5 Nm (4.8 lbf.ft) and nuts to 5.5 Nm (4 lbf.ft).

The machines are equipped with an electronic speed limiter that operates via the ignition system.

Therefore, the carburetor cannot be adjusted to increase the maximum engine speed beyond the preset limit.

Similarly, the machine cannot be tuned for "best performance" by way of engine speed.

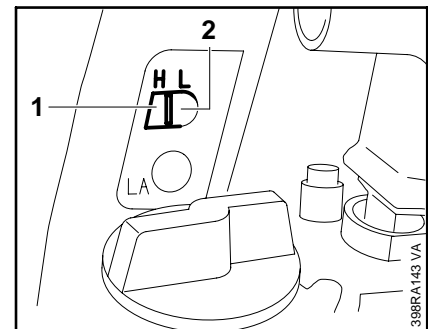
An excessively lean carburetor setting increases neither the engine speed nor its performance, it simply increase the risk of engine damage.

Standard setting

If the carburetor has to be adjusted from scratch, first carry out the standard setting.

- Carefully screw in both adjusting screws clockwise until they are hard against their seats.

Now make the following adjustments:



- H** = Open high speed screw (1) one full turn
- L** = Open low speed screw (2) one full turn

A slight correction to this setting may be necessary at high altitudes (mountains) or near sea level. Use the following procedure:

- Mount approved cutting tool.
- Check the air filter, replace if necessary.
- Check spark arresting screen, clean or replace as necessary.
- Start the engine and allow it to warm up.

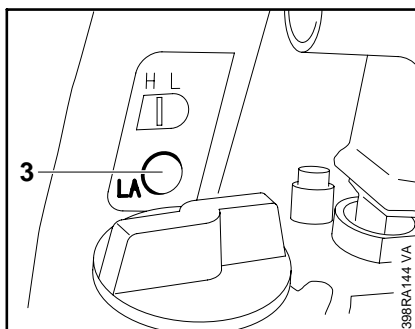
Turn high speed screw **(H)** clockwise for leaner mixture at high altitude, or counterclockwise for richer mixture at sea level.

Turn screw slowly and carefully – slight changes have a noticeable effect on engine running behavior.

Adjusting idle speed

Engine stops while idling:

- Carry out standard setting.



Turn the idle speed screw **(LA)** clockwise until cutting tool begins to rotate, and then turn screw back one half turn.

Cutting tool rotates while engine is idling:

- Carry out standard setting.

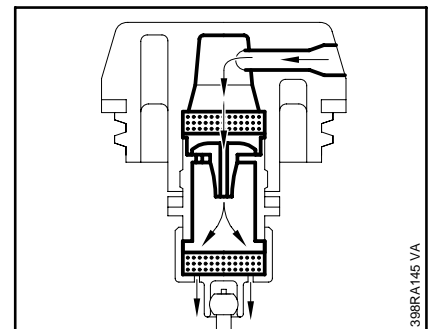
Turn the idle speed screw **(LA)** counterclockwise until cutting tool stops rotating – and then turn it about another half turn in the same direction.

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

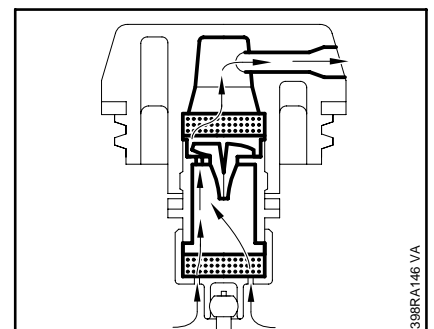
Important: If problems occur on the carburetor or the fuel supply system, always check and clean the tank vent.

Check function by performing pressure and vacuum tests on the tank via the fuel hose.

Equalization of pressure

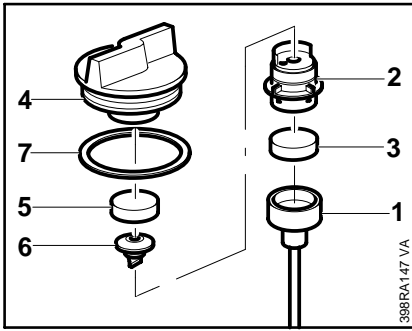


Equalization of pressure from the outside inwards takes place via the hole in the fuel filler cap, the sintered filter, the valve and holes in the cap.



Equalization of pressure from the inside outwards takes place via the holes in the cap, the hole in the valve body, the sintered filter and the hole in the fuel filler cap.

8.4 Pickup Body/Fuel Hoses



Cleaning

- Unscrew the fuel filler cap.
- Ease the cap (1) off the valve body (2).
- Take sintered filter (3) out of cap.
- Pry valve body out of fuel filler cap (4).
- Pry sintered filter (5) out of fuel filler cap.
- Wash valve body in clean gasoline.
- If diaphragm in the valve (6) is damaged, pull it out of valve body and fit new one.
- Push new sintered filter (5) into filler cap.
- Fit sealing ring (7) over valve body.
- Fit valve body in filler cap and press it home until it snaps into position.
- Fit new sintered filter in the cap.
- Fit cap on valve body and press it down until it snaps into position.
- Refit the fuel filler cap.

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

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

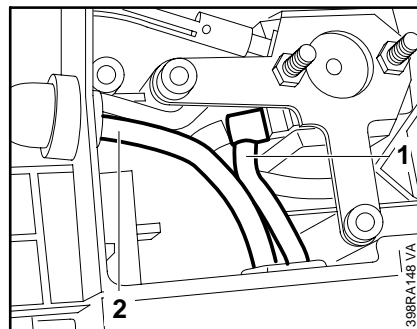
Cleaning the fuel tank

- Unscrew the filler cap and drain the tank.
- Pour a small amount of clean gasoline into the tank.
- Close the tank and shake the unit vigorously.
- Open the tank again and drain it.

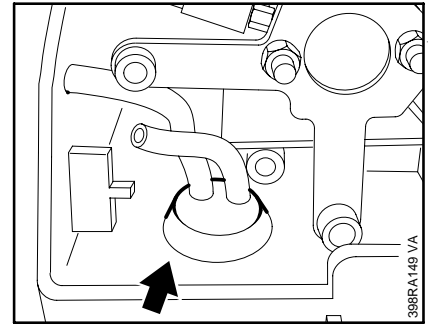
Note: Dispose of fuel properly.

Pickup body

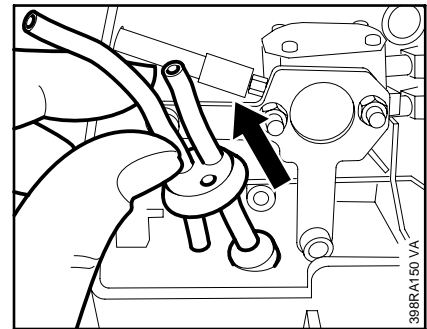
- Remove the air filter - [see 8.1](#).



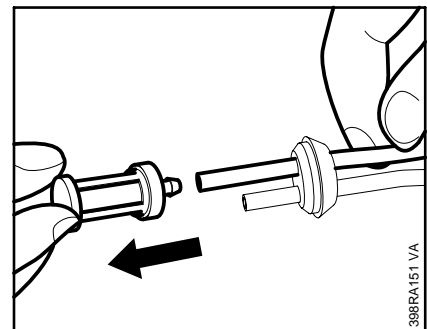
- Pull the fuel hose (1) off the elbow connector.
- Pull hose (2) off the manual fuel pump.



- Ease the grommet out of the tank housing.

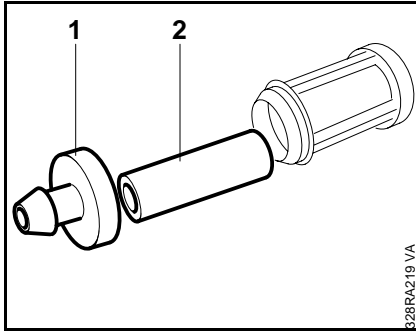


- Remove the fuel hoses with pickup body.



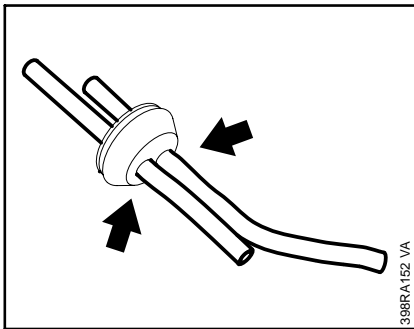
- Pull the pickup body off the fuel hose.

8.5 Tank Housing



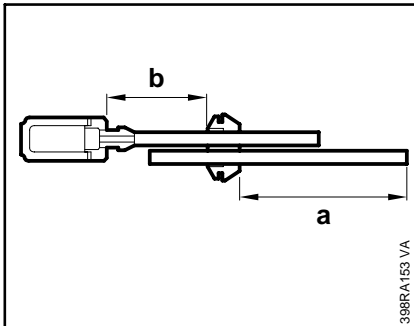
- Remove the cap (1).
- Remove the filter (2) and fit a new one.

Fuel hoses



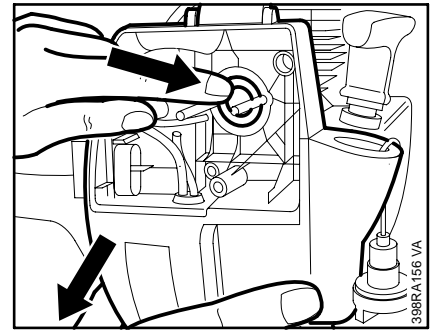
- Pull off the pickup body.
- Pull fuel hoses out of the grommet.

Reassemble in the reverse sequence.

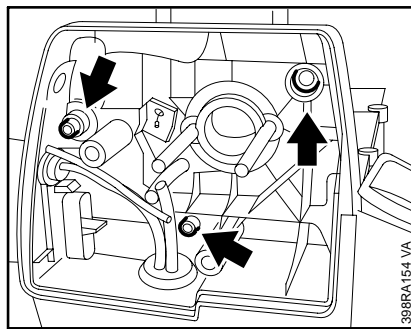


- Pass fuel hoses through the grommet so that distance "a" is 65 ± 1 mm (2.55 in), and "b" is 40 ± 1 mm (1.57 in).

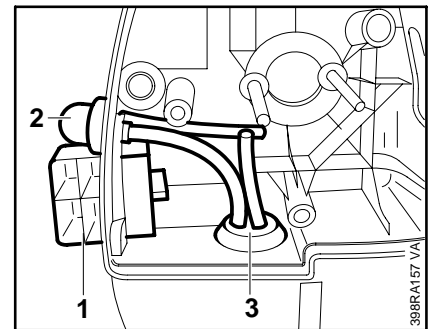
- Drain the tank housing.
- Remove the shroud - see 4.1.
- Remove the carburetor, take out the sleeve and washer - see 8.2 .2.
- Pull grommet with ignition lead out of tank housing - see 5.1.



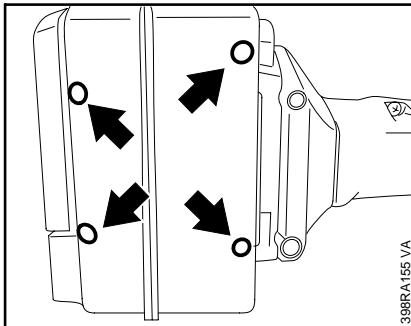
- Pull away the tank housing and push the manifold flange out of the intake opening at the same time.



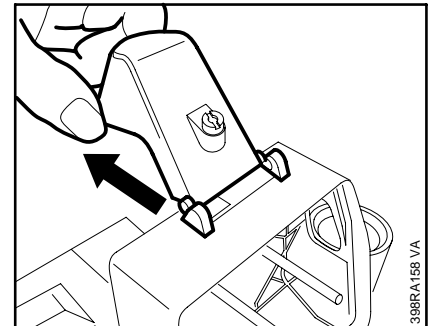
- Take out the screws.



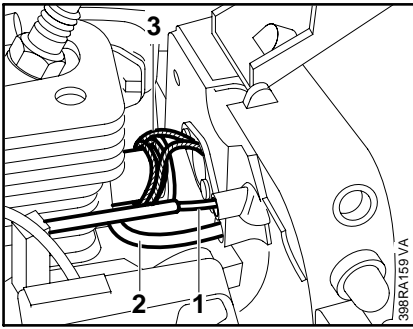
- Take out the air diverter (1) and remove the manual fuel pump (2) and grommet (3) with fuel hoses.



- Remove screws from underside.

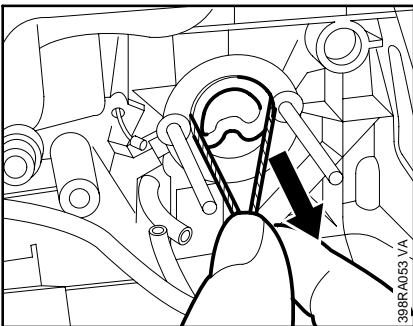


- Pull the cover out of its mounts.



Reassemble in the reverse sequence.

- Place tank housing in position.
- Pass throttle cable (1) and impulse hose (2) through the bores.
- To fit the manifold in the tank housing intake opening, wind a piece of string (1) (about 15cm/ 6" long) around the back of the manifold flange and pass the ends of the string through the intake opening.
- Push tank housing towards cylinder so that manifold flange locates against intake opening.

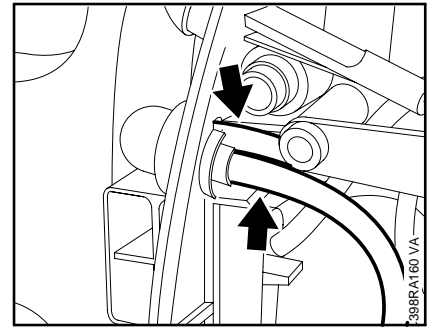


- Pull the ends of the string outward.

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

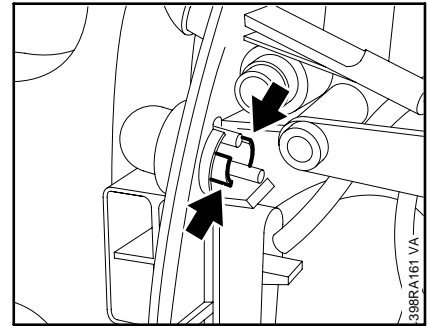
Important: There must be no internal stresses in the tank housing when the seven screws are tightened down.

- To avoid this, screw home the three side screws only fingertight first.
- Then push the crankcase and underside of the tank housing firmly together.
- Insert the four screws in the underside and tighten them down to 5.5 Nm (4 lbf.ft).
- Finish off by tightening down the three side screws to 5.5 Nm (4 lbf.ft).

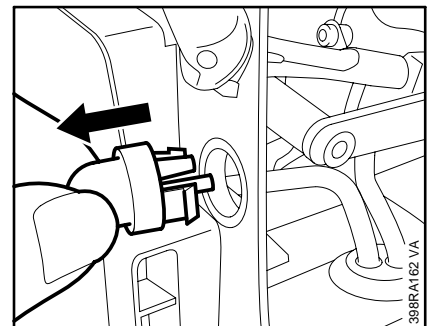


- Remove the air filter - see 8.1.

- Disconnect hoses from connectors.



- Carefully push back the retaining tabs.



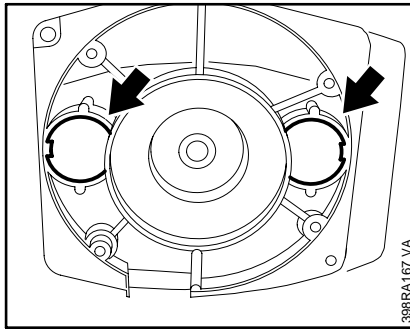
- Pull fuel pump out of its seat in the tank housing.

Install in the reverse sequence.

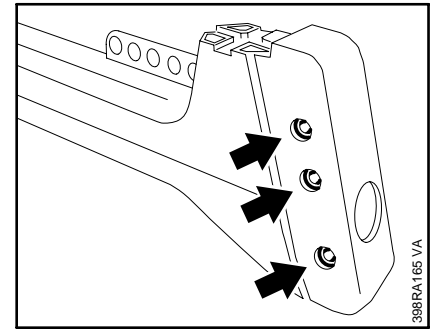
9. AV SYSTEM
9.1 Repair

The anti-vibration (AV) connection between the engine and drive tube consists of four rubber buffers (annular buffers) and two stop buffers in the AV housing.

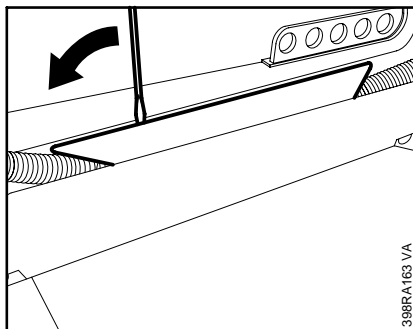
- Remove the drive tube - see 10.3.
- Remove the bike handle - 10.1.



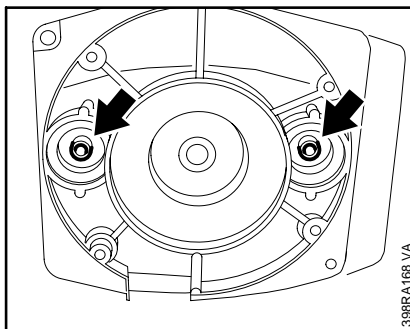
- Pry the plugs out of the annular buffers.



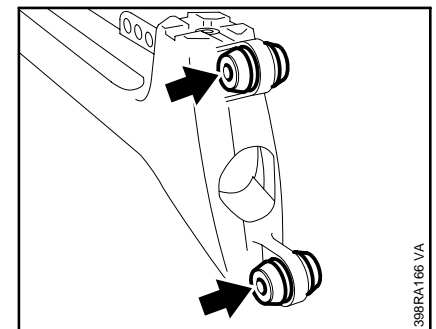
- Take out the screws.
- Remove the two halves of the clamp.



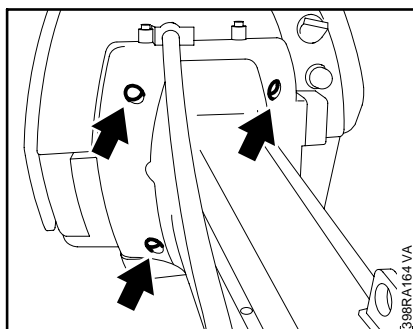
- Ease locking tabs of cover strip out of the AV housing.
- Remove the cover strip.



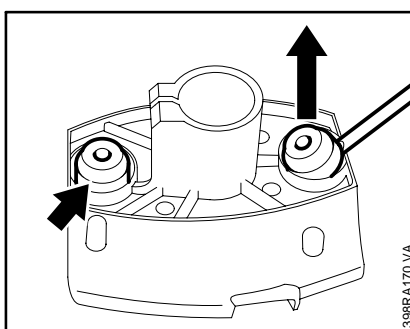
- Take out the screws.
- Remove the clutch housing.



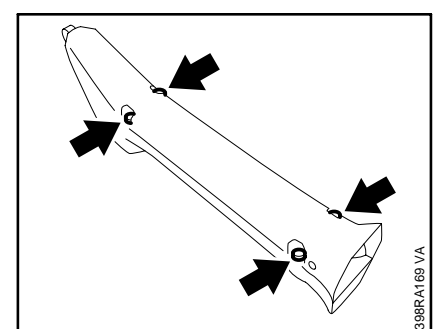
- Push the annular buffers out of their seats in the AV housing.



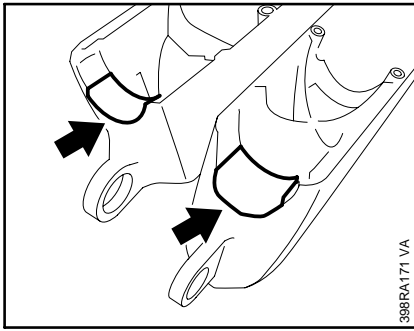
- Take out the screws.
- Note:** Fourth screw not visible in this view.
- Remove the clutch housing.



- Pry the annular buffers out of the clutch housing.

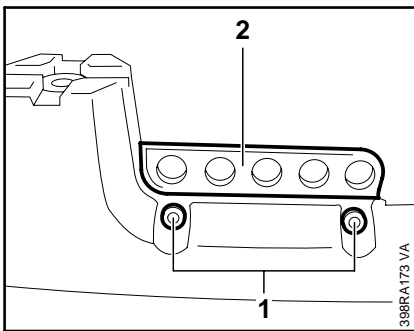


- Take out the screws.
- Separate the two halves of the AV housing.



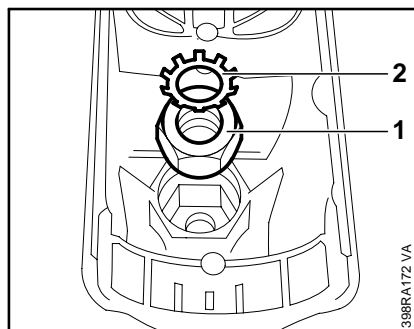
398RA171 VA

- Take the stop buffers out of the housing moldings.



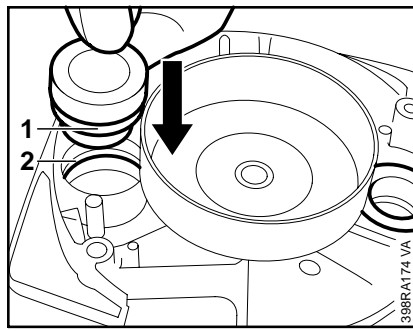
398RA173 VA

- To replace the upper half of the housing, take out the screws (1).
- Remove the perforated rail (2).



398RA172 VA

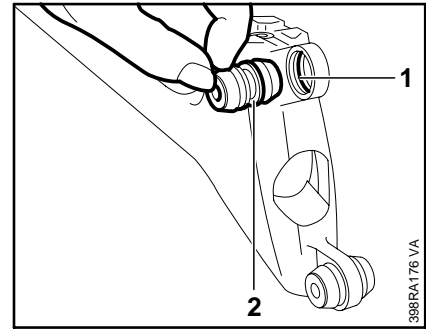
- To replace the nut (1), remove shakeproof washer (2) with the nut.



398RA174 VA

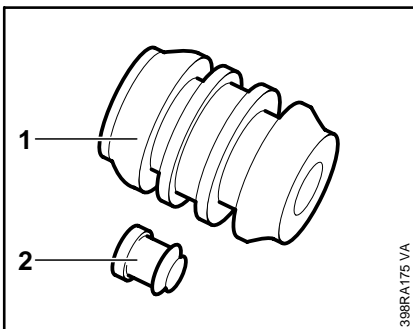
Reassemble in the reverse sequence.

- Insert annular buffer, small diameter first, from the clutch side until its groove (1) engages the housing rib (2).
- Tighten down AV housing screws to 4.5 Nm (3.3 lbf.ft).
- Tighten down screws on perforated rail to 4.5 Nm (3.3 lbf.ft).
- Tighten down screws in annular buffers in the clutch housing to 3.5 Nm (2.6 lbf.ft).



398RA176 VA

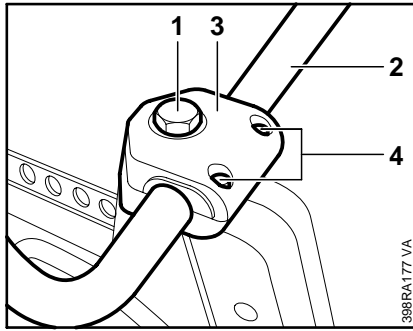
- Install annular buffers so that the housing rib (1) locates in the center groove (2).
- Do not tighten the screws in the two halves of the clamp until the drive tube has been fitted - see 10.3.
- Tighten down clutch housing screws to 9.5 Nm (7 lbf.ft).



398RA175 VA

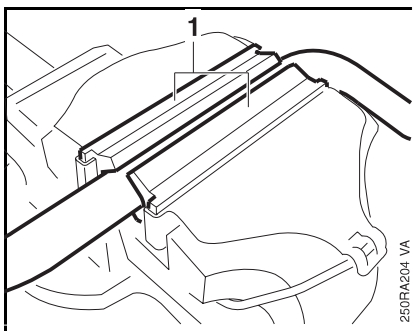
- Plugs (2) have to be fitted in the annular buffers (1) in the AV housing - press them home as far as center.

10. SHAFT
10.1 Bike Handle



- Remove the control handle - see 7.1.

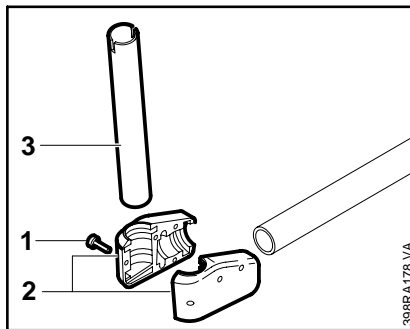
- Take out the screw (1).
- Remove bike handle (2) with clamp (3).
- Take out the screws (4).
- Remove the top and base of clamp (3).



- Use jaws (1) 5910 893 2700 to clamp bike handle tube in vice.

- To replace left grip, carefully cut it open and pull it off.
- Coat inside of new grip with a little lubricant (e.g. washing-up liquid).

Note: If too much lubricant is used, the grip will twist on the tube. Always leave it to dry for a while after fitting.



- Take out the screws (1), remove clamp moldings (2) and short tube (3).

Assemble all parts in the reverse sequence.

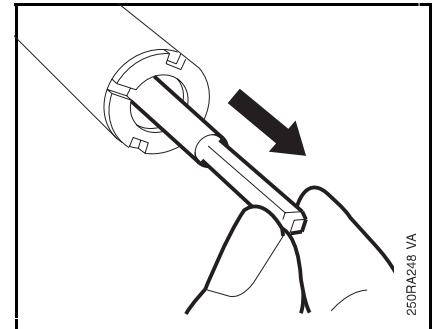
- Tighten down screws on bike handle clamp to 4.5 Nm (3.3 lbf.ft) and screws of clamp moldings on short tube to 4 Nm (3 lbf.ft).

**10.2 Drive Shaft/
Flexible Liner**

The drive shaft is supported in a flexible liner inside the drive tube. The ends of the drive tube are sealed with plugs.

- Remove the gearhead - see 11.1.

Drive shaft



- Pull the drive shaft out of the drive tube.

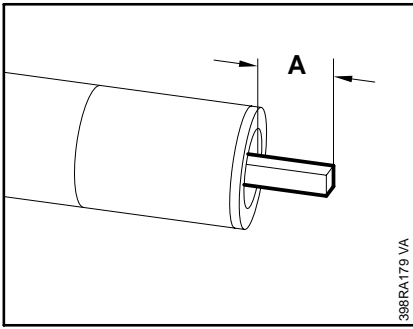
Note: If the shaft has turned blue, fit a new one.

- Coat the drive shaft with STIHL gear lubricant 0781 120 1109, see 12.2, before installation.

Important: Apply the grease uniformly and thinly to the whole drive shaft. Do not pump grease directly into the drive tube.

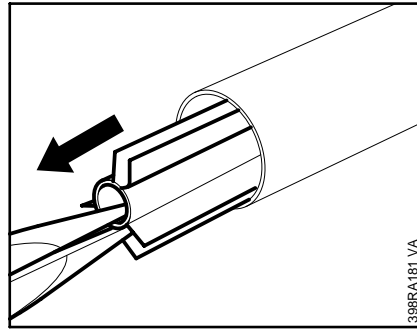
- Push the drive shaft into the drive tube.

10.3 Drive Tube

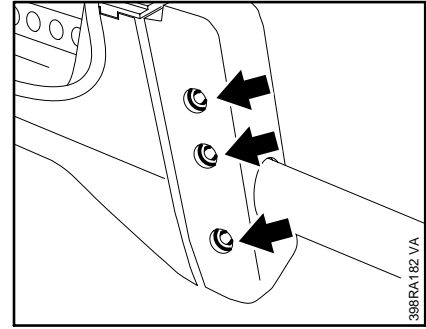


- Push the drive shaft into the drive tube until dimension "A" is 25 mm/1". If necessary, apply slight pressure to the shaft and rotate it slowly until it can be pushed in to the specified dimension.

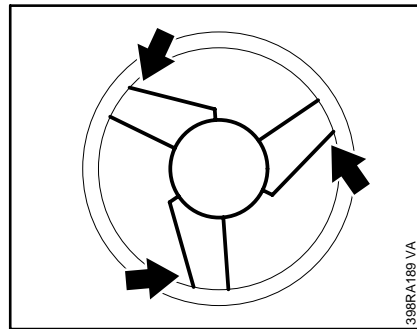
- Fit the gearhead - [see 11.1](#).



- Pull out the flexible liner.



- Slacken off screws on clamp.

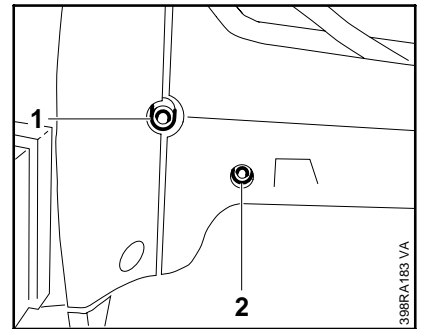


- Fit the flexible liner into the drive so that the 'spokes' point counterclockwise, viewed from the gearhead.

- Push flexible liner about 27 mm (1.1") into the drive tube.

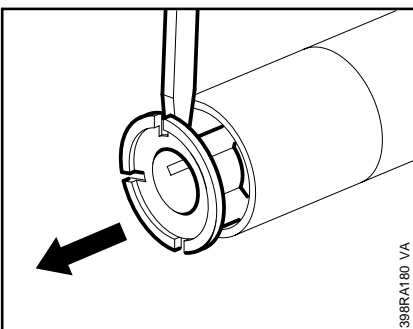
- Insert the plug.

- Install the drive tube - [see 10.3](#).



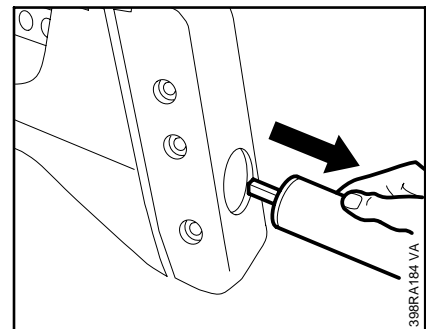
- Take the fixing screw (1) out of the clutch housing.
- Release the clamp screw (2).

Flexible liner



- Remove the drive tube - [see 10.3](#).

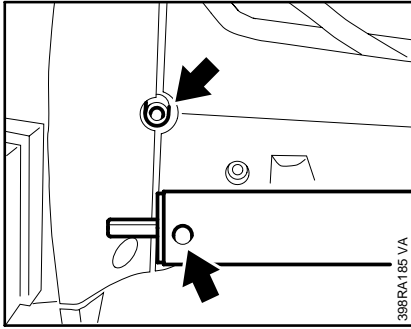
- Pry the plug out of the drive tube.



- Pull the drive tube out of the clutch housing and the AV housing.

11. CUTTING TOOL DRIVE

11.1 Gearhead



- Remove the drive shaft or flexible liner - [see 10.2](#).

Install in the reverse sequence.

- Degrease clamp mounting area.

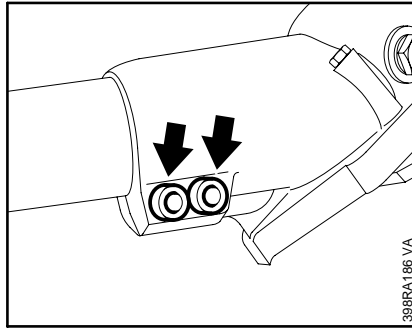
- Push home drive tube until the holes line up.

Note: Drive tube is shown next to AV housing to illustrate position of hole.

- Push home the drive tube and turn gearhead output shaft back and forth at the same time so that square end of drive shaft engages the square socket in drive pinion.

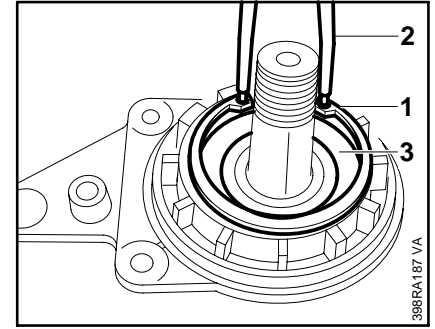
- Tighten down centering screw to 4.5 Nm (3.3 lbf.ft) and clamp screw to 8.0 Nm (5.9 lbf.ft).

- Tighten down screws on clamp to 7.5 Nm (5.5 lbf.ft).

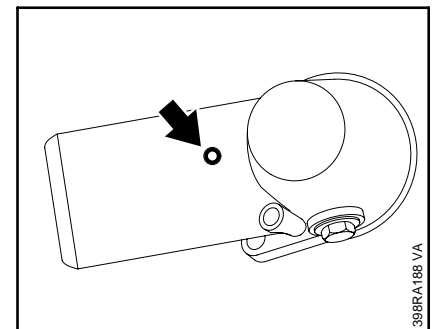


- Release clamp screws.
- Pull gearhead off the drive tube.
- Degrease clamp mounting area.
- Slide the gearhead onto the drive tube and turn output shaft back and forth at the same time so that square end of drive shaft engages the square socket in drive pinion.
- Push the gearhead as far as stop and line it up.
- Tighten down clamp screws to 10 Nm (7.5 lbf.ft).

11.1.1 Disassembling



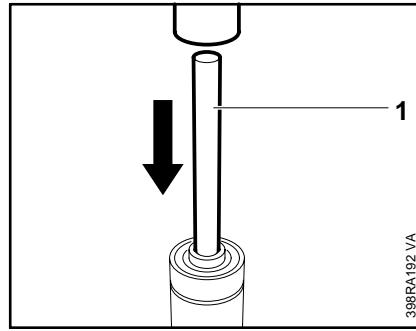
- Remove the gearhead - [see 11.1](#).
- Remove the deflector or limit stop - if fitted.
- Remove the grass shield - if fitted.
- Use pliers (2) 0811 641 8380 to remove retaining ring (1).
- Remove the spacer washer (3).



- Take out the grub screw.

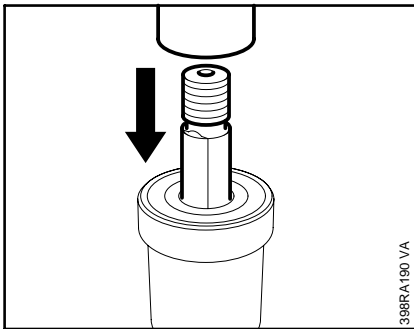
11.1.2 Assembling

- Heat gear housing to approx. 180-200°C (350-390°F) and remove parts from input end of gearhead first and then the output end by knocking it against a wooden base.

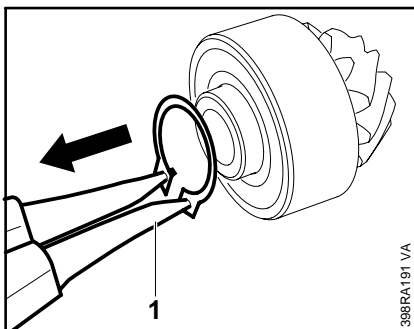


- Use drift (1) 1108 893 4700 to drive pinion out of ball bearing.
- Remove spacer washer, if fitted, from the drive pinion.
- Clean all parts and check their serviceability.

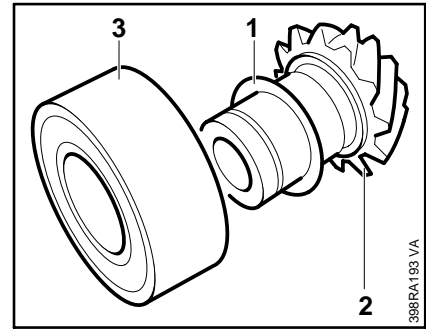
Note: Drive shaft with bevel gear and drive pinion can only be replaced as a complete assembly (set of pinions).



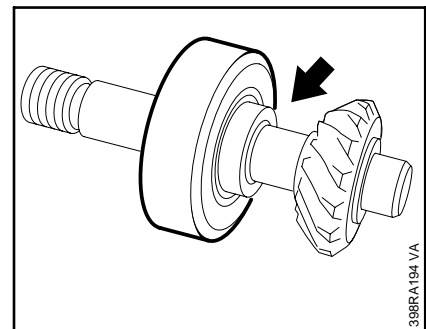
- Press the output shaft out of the ball bearing.



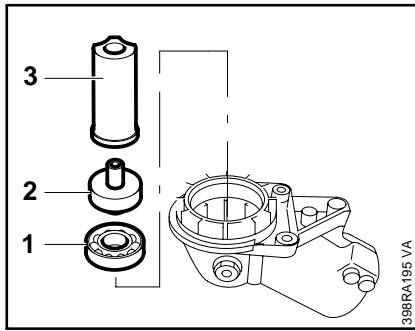
- Use pliers (1) 0811 611 8200 to remove retaining ring from drive pinion.



- Slip spacer washer (1), if it was originally fitted, over the drive pinion (2).
- Heat ball bearing (3) to approx. 50°C (120°F) and push it on as far as stop.
- Fit retaining ring in the groove.

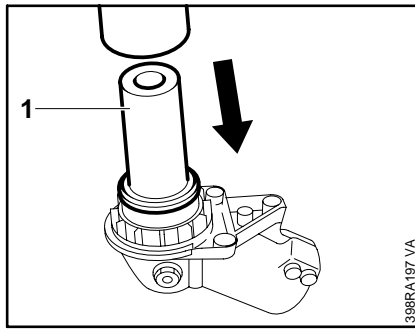


- Heat ball bearing to approx. 50°C (120°F) and push it on to output shaft as far as stop.

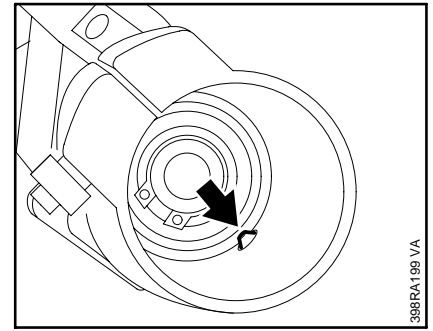


- Heat gear housing to approx. 180-200°C (350-390°F).
- Place ball bearing (1) in housing and press it home as far as stop with the press arbor (2) 4116 893 7205 and installing sleeve (3) 1114 893 4601.

Note: Installing sleeve is used only as an extension.

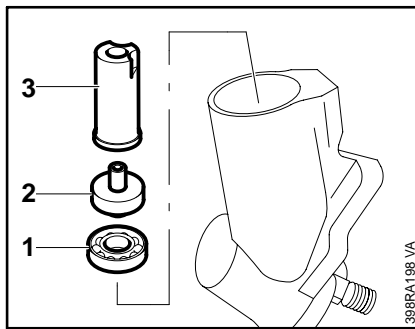


- Use installing sleeve (1) 1119 893 2401 to press output shaft into housing as far as stop.



- Insert grub screw in the housing and tighten it down to 4.5 Nm (3.3 lbf.ft).

Note: If pinion shaft bearing is properly seated, the cone of the grub screw should be visible in the neck of the gearhead.

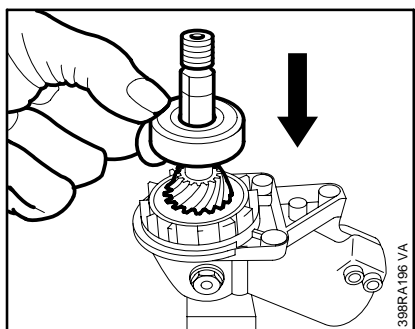


- Place preassembled drive pinion (1) in the housing.
- Use press arbor (2) 4116 893 7200 and installing sleeve (3) 1114 893 4601 to press home drive pinion as far as stop.

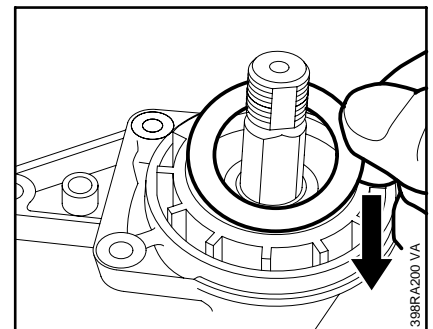
Important: Check that teeth of pinions engage properly during installation process.

Note: Installing sleeve is used only as an extension.

- Coat grub screw with Loctite - see 12.2.

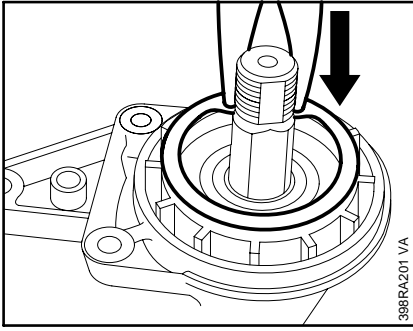


- Place preassembled output shaft in the housing.



- Install the spacer washer, if it was originally fitted.

11.2 Clutch Drum



- Install the retaining ring.
- Check running clearance (rotate output shaft), add or remove shim as necessary.
- Remove screw plug from gear housing and pack gear housing with grease.

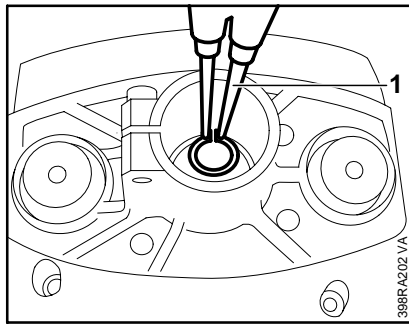
Note: Use STIHL gear lubricant 0781 120 1117 to lubricate the bevel gear drive - [see 12.2](#).

Important: Pack gear housing with about 20 g (3/4 oz) grease.

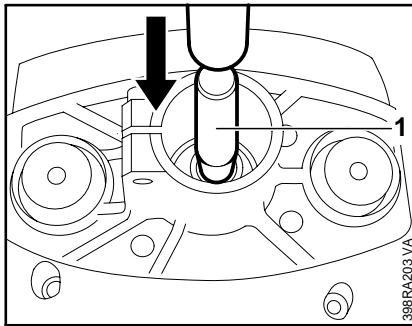
Service note:

When carrying out maintenance work, add grease (max. 5 - 10 g/ 1/4 oz) only if no grease can be seen on the inside of the screw plug.

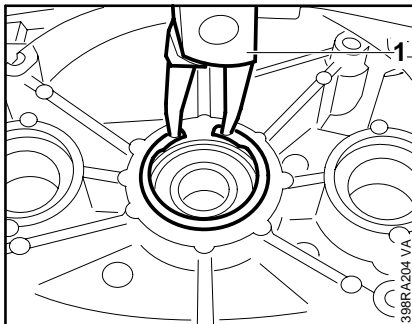
- Unscrew the tube of grease.
- Refit the screw plug and tighten it down to 10 Nm (7.5 lbf.ft).
- Refit the grass shield, if fitted.
- Refit the deflector or stop, if fitted.



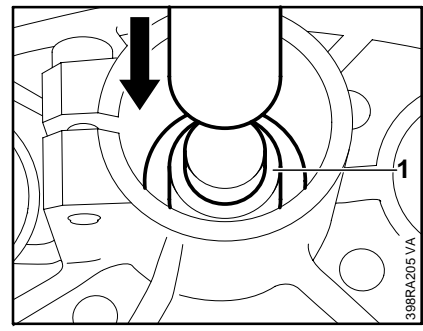
- Remove the clutch housing - [see 9.1](#).
- Use pliers (1) 0816 610 1495 to remove the retaining ring from stub of clutch drum.



- Use drift (1) 1108 893 4700 to press the clutch drum out of the ball bearing.

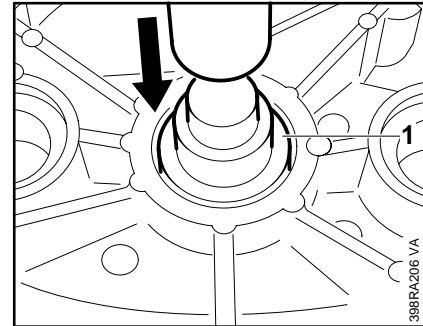


- Use pliers (1) 0811 641 8380 to take retaining ring out of clutch housing.

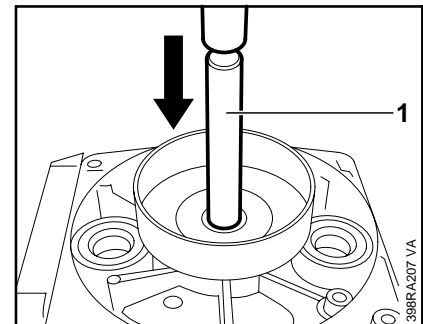


- Remove ball bearing from clutch housing with press arbor (1) 1118 893 7200.

Install in the reverse sequence.



- Use press arbor (1) 1118 893 7200 to press home ball bearing as far as stop.



- Press home clutch drum as far as stop with drift (1) 1108 893 4700.

- Install the clutch housing - [see 9.1](#).

12. Special Servicing Tools and Aids
12.1 Special Servicing Tools

No.	Part Name	Part No.	Application	Rem.
1	Locking strip for piston	0000 893 5903	Blocking crankshaft	
2	Press sleeve	1108 893 2405	Fitting oil seal	
3	Installing sleeve	4116 893 4601	Protecting oil seal (starter side)	
4	Puller	5910 890 4400	Removing oil seals	1)
5	- Jaws (No. 3.1 + 4)	0000 893 3706		
6	Puller	1110 890 4500	Releasing flywheel	
7	Crimping tool	5910 890 8210	Attaching connectors to electrical wires	
8	Assembly drift	4116 893 4700	Removing and fitting piston pin, removing and installing clutch drum	
9	Clamping strap	0000 893 2600	Compressing piston rings	
10	Wooden assembly block	1108 893 4800	Fitting piston	
11	Carburetor and crankcase tester	1106 850 2905	Testing carburetor for leaks	
12	Vacuum pump	0000 850 3501	Testing crankcase for leaks	
13	- Nipple	0000 855 9200		
14	- Fuel line	1110 141 8600		
15	Sealing plate	0000 855 8106	Sealing exhaust port for leakage test	
16	Test flange	1128 850 4200	For leakage test	
17	Setting gauge	1127 890 6400	Setting air gap between ignition module and flywheel	
18	Socket, 13 mm	5910 893 5608	Screws for clutch, flywheel nut and unscrewing starter cup	
19	Torque wrench	5910 890 0301	0.5 - 18 Nm (0.4 - 13.5 lbf.ft)	5)
		5910 890 0302		3)
20	Torque wrench	5910 890 0311	6 - 80 Nm (4.4 - 60 lbf.ft)	5)
		5910 890 0312		3)
21	Spline screw socket T27x125	0812 542 2104	IS screws	
22	Installing tool	5910 890 2210	Installing hookless snap rings in piston	
23	Press arbor	1118 893 7200	Removing and installing ball bearings	
24	Puller	4119 890 4600	Removing crankshaft	
25	Circlip pliers	0816 610 1495	External circlip on clutch housing	
26	Circlip pliers C19	0811 641 8380	Internal circlip in clutch housing and gearhead	
27	Circlip pliers A10	0811 611 8200	External circlip on drive pinion	

No.	Part Name	Part No.	Application	Rem.
28	T-handle screwdriver QI-T27x150	5910 890 2400	For all IS screws	4)
29	Screwdriver T20x100	5910 890 2301	Separating handle moldings	
30	Assembly drift	1108 893 4700	Removing and installing clutch drum, pressing drive pinion out of ball bearing	
31	Press arbor	4116 893 7205	Installing ball bearing in gear housing	
32	- Installing sleeve	1114 893 4601		
33	Press arbor	4116 893 7200	Installing preassembled drive pinion in gear housing	
34	Press sleeve	1119 893 2401	Installing preassembled output shaft in gear housing	
35	Press arbor	1118 893 7200	Removing and installing ball bearing in clutch housing	
36	Vice jaws	5910 893 2700	Holding drive tube and bike handle	
37	Assembly stand	5910 890 3100	Holding FS units	
38	- Clamp	5910 890 8800	Holds drive tube of FS units for repairs (in conjunction with assembly stand)	
39	- Clamping plate	5910 890 2100	Holds powerhead of FS units for repairs (in conjunction with assembly stand)	

Remarks:

- 1) Equivalent to puller 0000 890 4400, but with longer spindle 5910 890 8400.
- 2) Always use torque wrench to tighten DG/P screws.
- 3) Wrench has optical/acoustic signal.
- 4) On DG/P screws, use for releasing only.

12.2 Servicing Aids

No.	Part Name	Part No.	Application
1	Lubricating grease (370 g/13 oz tube)	0781 120 1111	Oil seals
2	Standard commercial, solvent-based degreasant containing no chlorinated or halogenated hydrocarbons		Cleaning crankshaft stub
3	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in rope rotor
4	Ignition lead HTR (10 m/33')	0000 930 2251	
5	Medium-strength threadlocking (Loctite 242)	0786 111 1101	Grub screw in gearhead, annular buffers in AV housing
6	STIHL gear lubricant - 80 g/3 oz tube: - 225 g/8 oz tube:	0781 120 1109 0781 120 1110	Drive shaft in drive tube
7	STIHL gear lubricant - 80 g/3 oz tube: - 225 g/8 oz tube:	0781 120 1117 0781 120 1118	Gearhead lubrication