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STIHL®
® 1995, Andreas Stihl, Waiblingen

1. INTRODUCTION

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

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.

Always use the latest edition of the parts list to determine the part numbers of any replacement parts required. Microfilmed parts list are always more up to date than printed lists.

A fault on the machine 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:

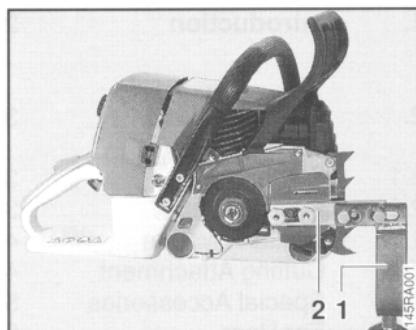
In the descriptions:

- = 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 powerhead is mounted to the assembly stand (1) 5910 890 3100. On saws with a clip type side plate, also use clamping rail (2) 5910 890 2005.

This enables the powerhead to be swivelled to the best position for the ongoing repair and 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	
Displacement:	76.5 cm ³ (4.67 cu.in)
Bore:	52 mm (2.05 in)
Stroke:	36 mm (1.42 in)
Engine power:	4.1 kW (5.6 bhp)
Max. torque:	4.8 Nm (3.54 lb.ft) at 6,500 rpm
Max. permissible engine speed:	13,500 rpm
Main bearings:	Two deep-groove ball bearings
Big end bearing:	Needle cage
Small end bearing:	Needle cage
Piston pin diameter:	12 mm (0.47 in)
Connecting rod length:	62 mm (2.44 in)
Rewind starter:	Pawl system
Reserve pull on rope rotor:	min. 1/2 turn
Starter rope:	3.5 mm (0.14 in) dia., 960 mm (37.8 in)
Clutch:	Centrifugal clutch without linings
Diameter:	73 mm (2.9 in)
Clutch engages at:	3,500 rpm
Crankcase leakage test	
at gauge pressure:	0.6 bar (8.7 psi)
under vacuum:	0.4 bar (5.8 psi)

2.2 Fuel System

Carburetor:	Diaphragm carburetor
Setting	
High speed screw H:	approx. 1 turn open
Low speed screw L:	approx. 1 turn open (standard setting)
Carburetor leakage test	
at gauge pressure:	0.4 bar (5.8 psi)
Fuel tank capacity:	0.94 l (2 US pt)
Octane number:	min. 90 RON (USA/CAN: pump octane min. 87 unleaded)
Fuel mixture:	Regular brandname gasoline and two-stroke engine oil
Mix ratio:	50:1 with STIHL 50:1 two-stroke engine oil 25:1 with other brand-name two-stroke, air-cooled engine oils
Air filter:	STIHL filter system with compensator and standard filter (green) with wire mesh element for normal operating conditions and winter operation or HD filter (black) for dry, very dusty operating sites

2.3	Ignition System	Type: Air gap: Spark plug (suppressed): Electrode gap: Spark plug thread: Length of thread: Heat range:	Electronic magneto ignition (breakerless) with integral trigger unit 0.15 - 0.30 mm (0.006-0.012 in) Bosch WSR 6F or NGK BPMR 7 A 0.5 mm (0.020 in) M14 x 1.25 9.5 mm (0.37 in) 200
2.4	Cutting Attachment	Guide bars: Bar tail: Bar lengths: Oilomatic chain: Chain sprockets: Chain speed: Chain lubrication: Oil delivery rate: Oil tank capacity:	STIHL Rollomatic with nose sprocket STIHL Duromatic with stellite-tipped nose. Both types with corrosion-resistant finish and induction hardened rails 3003 Rollomatic: 37, 40, 45, 50 and 63 cm (14, 16, 18, 20 and 25 in) Rollomatic S: 40, 45, 50, 63 and 75 cm (16, 18, 20, 25 and 30 in) Duromatic: 37, 40, 45, 50, 63 and 75 cm (14, 16, 18, 20, 25 and 30 in) 3/8" (9.32 mm) Rapid-Micro, Rapid-Micro 2, Rapid-Duro and Rapid-Super 7-tooth rim sprocket for 3/8" pitch 7-tooth spur sprocket for 3/8" pitch Options: 8-tooth rim and spur sprockets for 3/8" pitch 20.7 m/s (68 ft/s) at 9,500 rpm (with 7-tooth, 3/8" sprocket) Fully automatic, speed-controlled reciprocating oil pump; no oil feed at idle speed. Additional manual oil flow control (with E-matic mark) Adjustable 8 -18 cm ³ /min (0.3 - 0.6 fl.oz/min) at 10,000 rpm 0.325 l (0.7 US pt)

2.5 Special Accessories

2.5.1	For User	STIHL repair kit 046 3/8", 7-tooth rim sprocket kit 3/8", 8-tooth rim sprocket kit 3/8", 7-tooth spur sprocket kit 3/8", 8-tooth spur sprocket kit Chain scabbard extension	1128 900 5001 1128 007 1000 1128 007 1001 1128 640 2000 1128 640 2005 0000 792 9150
2.5.2	For Service	Gasket set 046 Carburetor parts kit	1128 007 1052 1128 007 1066

* Part may be standard equipment

2.6 Tightening Torques

Plastoform screws are used for polymer 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 Nm	lbf.ft	Remarks
Spline screw	IS-B2.9x9.5	Switch housing	1.0	0.75	
Spline screw	IS-B3.9x19	Handle molding	1.6	1.2	
Spline screw	IS-M4x12	Generator	3.5	2.6	1)
Spline screw	IS-M4x8	Chain tensioner cover plate	3.0	2.2	
Spline screw	IS-M4x12	Cover on oil pump/sprocket side	3.0	2.2	
Spline screw	M4x12	Brake band/crankcase	3.0	2.2	2)
Spline screw	IS-M4x12	Oil pump	3.5	2.6	
Spline screw	IS-M4x12	Segment/fan housing	2.5	1.8	
Spline screw	IS-M4x12	Cover on crankcase/ sprocket side	3.0	2.2	
Spline screw	IS-M4x16	Buffer/crankcase	5.0	3.7	2)
Collar nut	M5 SK6	Carburetor, filter base, flange	6.0	4.4	3)
Spline screw	IS-M5x6	Muffler (top)	6.5	4.8	2)
Spline screw	IS-M5x12	Spiked bumper (top, with nut)	7.5	5.5	
Spline screw	IS-M5x16	Spiked bumper (bottom, chain catcher)	7.5	5.5	
Spline screw	IS-M5x16	Muffler/cylinder	11.5	8.5	2)
Spline screw	IS-M5x16	Shroud/crankcase	7.0	5.2	
Spline screw	IS-M5x20	Wrap-around handle with bracket	7.0	5.2	
Spline screw	IS-M5x20	Crankcase	11.5	8.5	
Spline screw	IS-M5x20	Fan housing	7.0	5.2	
Spline screw	IS-M5x20	Ign.module/crankcase	7.0	5.2	2) 4)
Spline screw	IS-M5x30	Hand guard, left	7.0	5.2	2)
Spline screw	IS-M5x30	Muffler, top (Kat)	6.5	4.8	2)
Spline screw	IS-M6x18	Muffler/cylinder (Kat)	15.0	11.0	2)
Spline screw	IS-M6x25	Cylinder/crankcase	15.0	11.0	
Spline screw	IS-M6x18	Muffler/crankcase	15.0	11.0	

Fastener	Thread size	For component	Torque Nm	Ibf.ft	Remarks
Nut	M8x1	Flywheel	32.5	24.0	
	M8x21.5	Collar stud for guard bar	23.0	17.0	
	M10x1	Decompression valve	14.0	10.3	
Carrier M12x1 L	Clutch		50.0	37.0	
	M 14x1.25	Spark plug	25.0	18.5	
Spline screw	IS-P6x19	Front handle, top/bottom	8.0	5.9	1)
Spline screw	IS-P6x19	Buffer/tank housing, front	5.5	4.0	
Spline screw	IS-P6x19	Buffer/tank housing, rear	5.5	4.0	
Spline screw	IS-P6x32.5	Buffer/tank housing, rear left	5.5	4.0	
Nut (self-locking)	M5	Spiked bumper	7.5	5.5	
Nut (self-locking)	M5	Chain catcher/spiked bumper	6.0	4.4	

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

- Place the 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) Secure screw with Loctite 649.

2) Secure screw with Loctite 242.

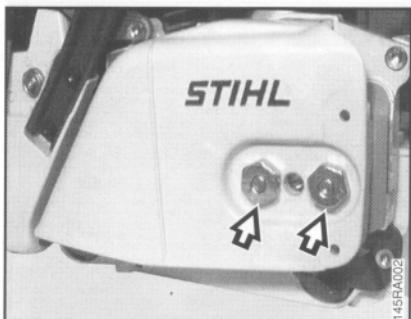
3) Secure screw with Loctite 270.

4) A washer must be fitted under the screw head.

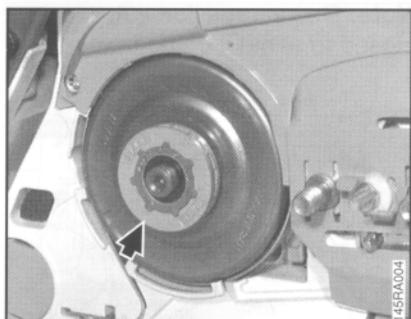
Note: Screws secured with adhesive (Loctite) are easier to release if they are heated with a hot air blower (hair dryer). **Take care on polymer components.**

3. CLUTCH, CHAIN DRIVE, CHAIN BRAKE AND CHAIN TENSIONER

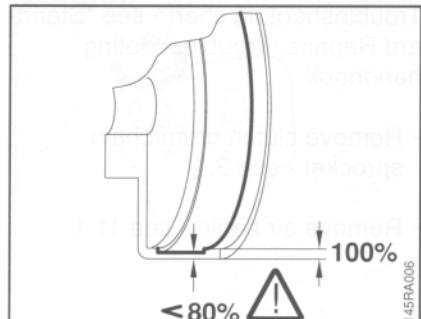
3.1 Clutch Drum and Chain Sprocket



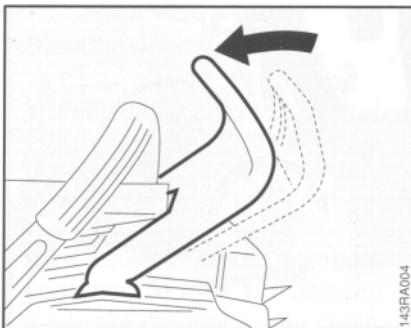
- Unscrew nuts and remove the chain sprocket cover.



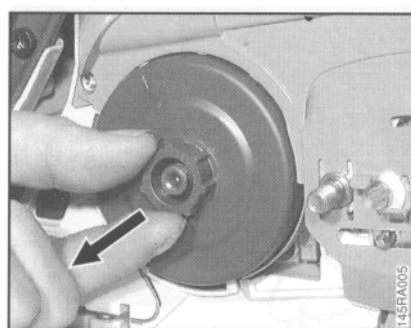
- If a rim sprocket is fitted, pull it off.



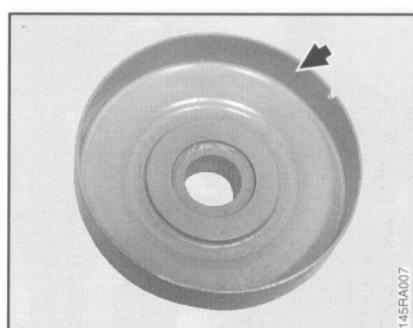
Important: If there are noticeable wear marks on the inside diameter of the clutch drum, check its wall thickness. If it is less than 80% of the original wall thickness, fit a new clutch drum.



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



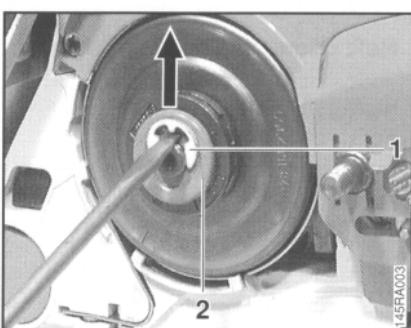
- Pull off the clutch drum/chain sprocket.



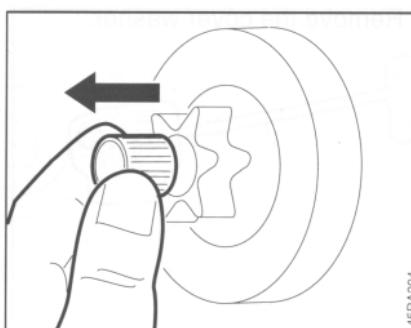
Note: If the clutch drum has to be replaced, also check the brake band - see 3.4.

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

Reassemble in the reverse sequence.



- Remove the E-clip (1).
- Remove the washer (2).



- Take the needle cage out of the sprocket.
- Clean and inspect the clutch drum/chain sprocket.

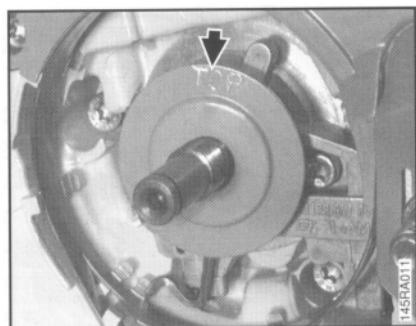
- Clean stub of crankshaft. Wash needle cage in clean white spirit and lubricate with grease – see 12.2.
- Replace damaged needle cage.
- Rotate clutch drum/chain sprocket and apply slight pressure at the same time until oil pump drive spring engages properly.

3.2 Clutch

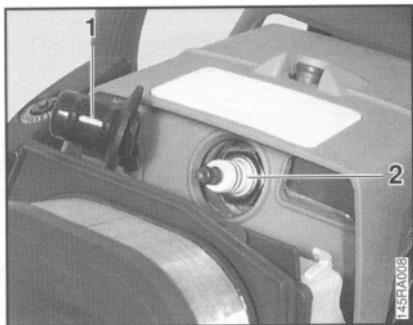
Troubleshooting chart - see "Standard Repairs, Troubleshooting" handbook.

- Remove clutch drum/chain sprocket - see 3.1.
- Remove air baffle - see 11.1.

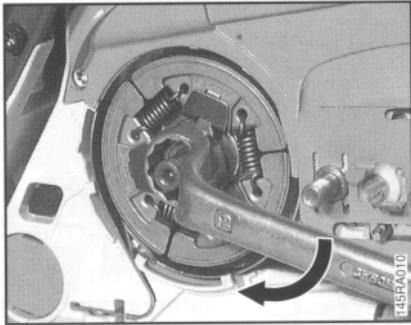
Note: Decompression valve is closed to avoid it being damaged.



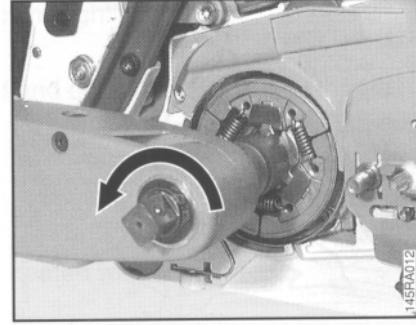
- Fit cover washer so that "TOP" faces outward.



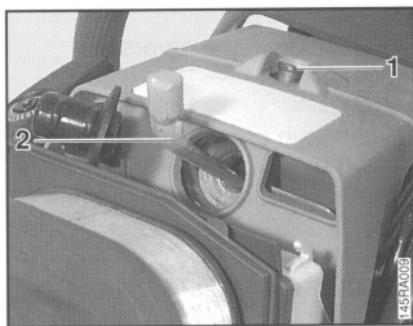
- Pull off the spark plug connector (1).
- Unscrew the spark plug (2).



- Unscrew the clutch from the crankshaft in the direction of the arrow (left-hand thread).
- Disassemble and reassemble the clutch - see "Standard Repairs, Troubleshooting" handbook.
- Remove the cover washer.



- Screw clutch onto crankshaft and torque down to 50 Nm (37 lbf.ft).
- Remove locking strip from cylinder.
- Install spark plug and torque down to 25 Nm (18.5 lbf.ft).
- Refit connector on spark plug.
- Install air baffle - see 11.1.
- Install clutch drum/chain sprocket - see 3.1.



- Close the decompression valve by carefully levering the button (1) upward.
- Push the locking strip (2) 0000 893 5903 into the cylinder.

3.3 Checking Function of Chain Brake

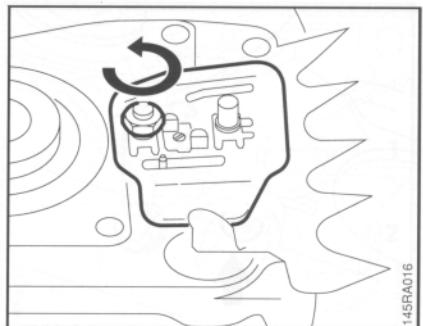
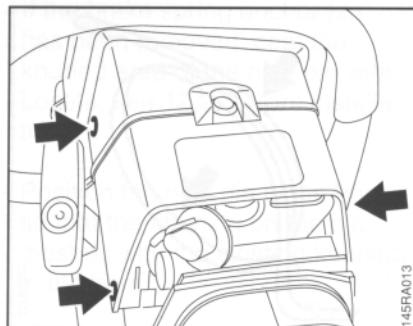
The chain brake is one of the most important safety devices on the chain saw. Its efficiency is measured in terms of braking time, i.e. the time that elapses between activating the brake and the saw chain coming to a standstill. The shorter the braking time, the better the efficiency and protection offered.

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

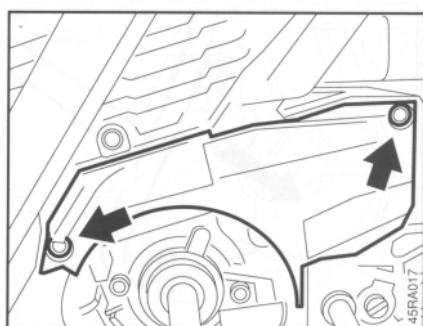
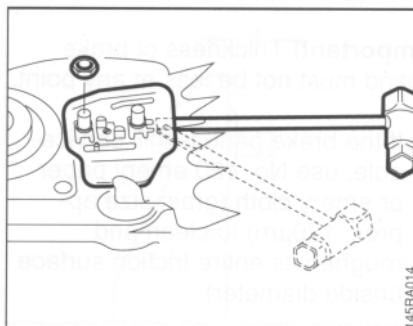
- Start the engine.
- With the chain brake activated (locked), open throttle wide for brief period (max. 3 seconds) – the chain must not rotate.
- With the chain brake released, open throttle wide and activate the brake manually – the chain must come to an abrupt stop.

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

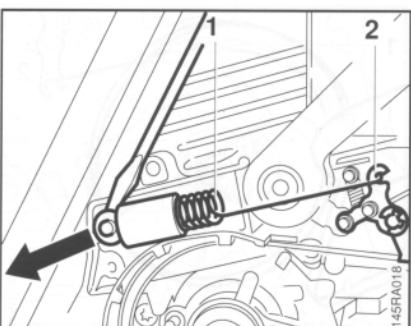
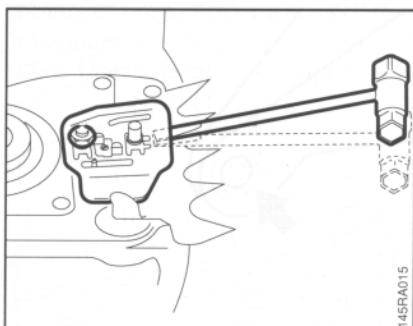
3.4 Disassembling Chain Brake



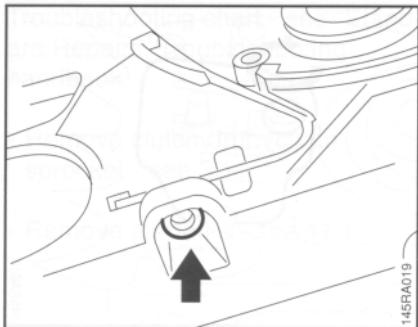
- Remove the clutch - see 3.2.
- Take out the screws.
- Remove the shroud.



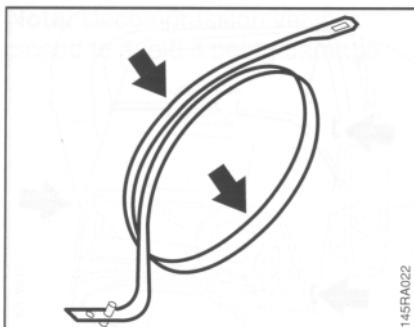
- Fit M8 nut on the left-hand collar stud.
- Slide the combination wrench under the side plate and rotate it about 45 degrees counterclockwise.
- Take out the screws.
- Lift away the cover.
- Relieve tension of brake spring by pushing the hand guard forward.



- Ease the combination wrench upward approx. 10 - 15 mm (1/2") until the side plate is released from the collar studs.
- Carefully pry the brake spring (1) off the anchor pin and unhook it from the bell crank (2).



- Take out the brake band fastening screw.

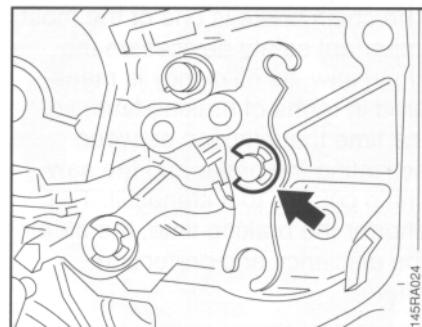


Replace the brake band if:

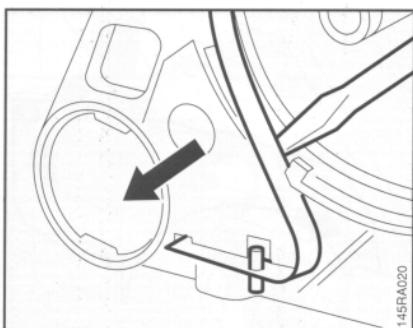
- there are noticeable signs of wear (large areas on inside diameter and/or parts of outside diameter) and
- its remaining thickness is < 0.6 mm (0.024").

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

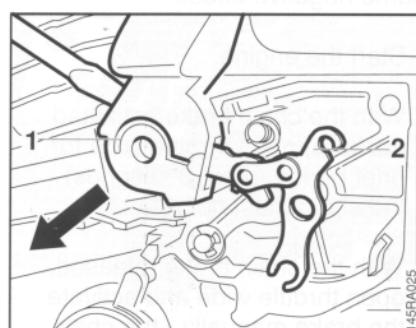
- If the brake band is still serviceable, use No. 120 emery paper or emery cloth (grain size approx. 120pm) to clean and roughen its entire friction surface (inside diameter).



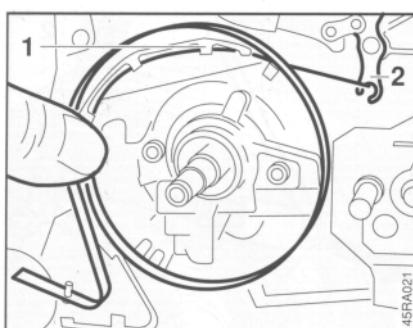
- Ease the E-clip off the bell crank pivot pin.



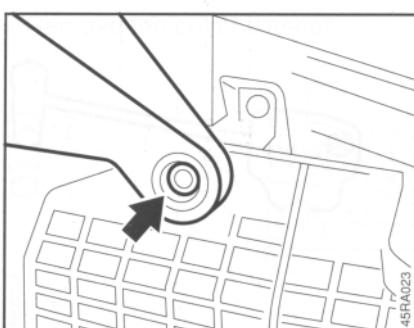
- Lever the brake band out of the crankcase.



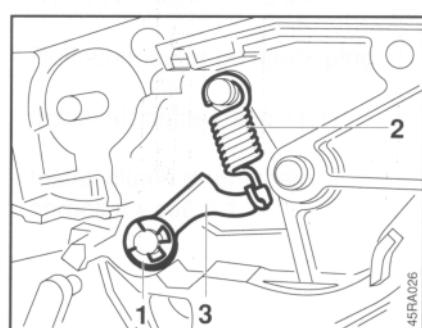
- Carefully ease the hand guard (1) and bell crank (2) off the pivot pins and lift them away together.
- Pull the bell crank out of the hand guard.



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



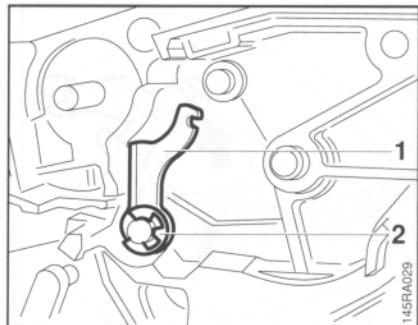
- Take out the screw.



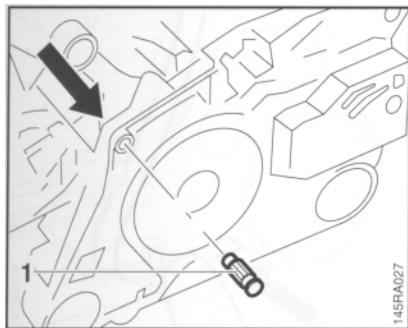
- Remove the E-clip (1).

3.5 Assembling Chain Brake

- Unhook the spring (2) and take it away.
- Pull off the cam lever (3).
- Inspect parts. Replace any worn or damaged parts.
- Clean chain brake seat in crankcase.
- If the groove of the brake spring anchor pin is worn, the anchor pin must be replaced.
- Remove the cylinder - see 4.6.1

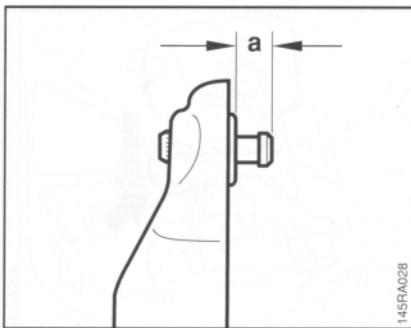


- Push the cam lever (1) onto the pivot pin.
- Fit the E-clip (2).

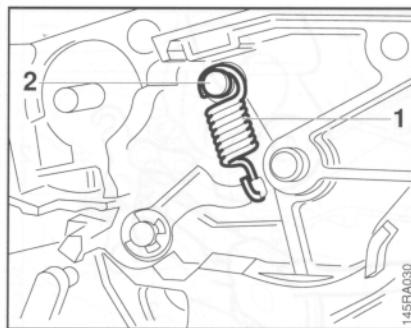


- Use a suitable punch to drive the anchor pin out of the crankcase in the direction of the arrow.

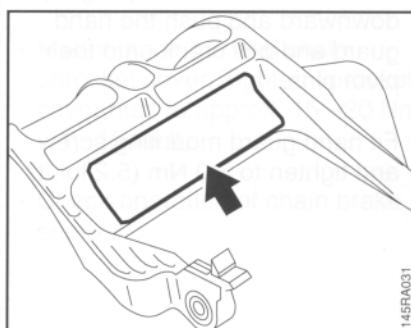
Important! Do not drive out the pin in the other direction as this would damage the annular bead which was formed in the crankcase bore when the pin was originally installed. In such a case neither the new anchor pin nor the brake spring would locate properly. Furthermore, the crankcase could be damaged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



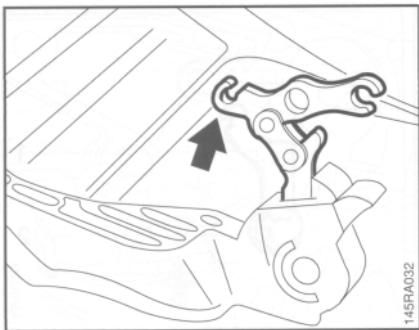
- Carefully tap home the pin squarely to obtain dimension "a" = 4.3 - 4.7 mm (11/64").
- Install the cylinder - see 4.6.2.
- Lubricate sliding and bearing points of chain brake with STIHL multipurpose grease or, preferably, Molykote grease - see 12.2.



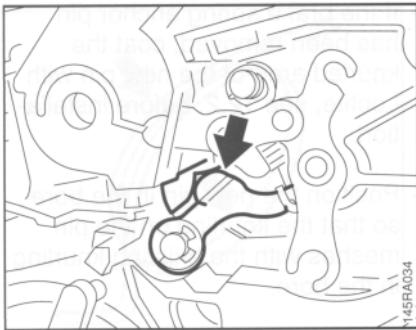
- Attach the spring (1) to the pivot pin (2) and cam lever.
- Inspect heat reflecting foil on hand guard and replace if necessary.



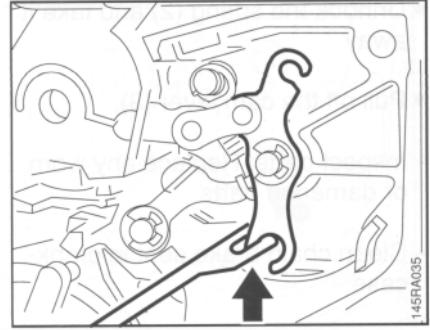
- Clean and degrease the hand guard, pull backing off new heat reflecting foil and stick the foil in position (without creases).



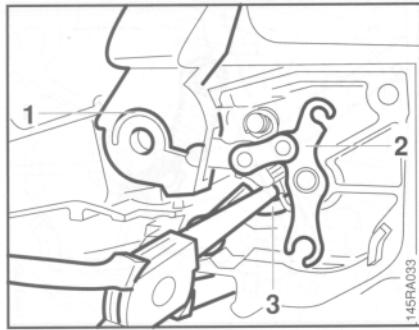
- Insert the bell crank in the side of the hand guard so that the short arm of the bell crank points up.



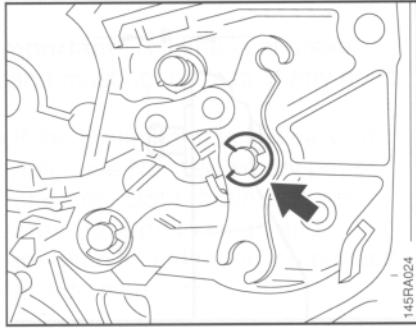
- Check that cam lever is properly located on face of hand guard bearing boss.



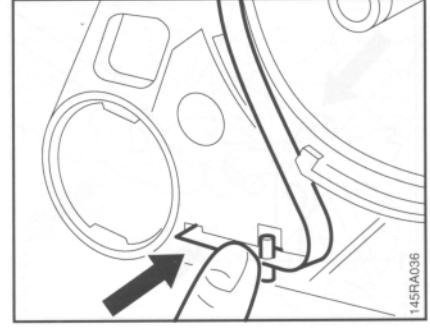
- Hook the brake spring onto the bell crank.
 - Position the brake band behind the lugs on the crankcase.



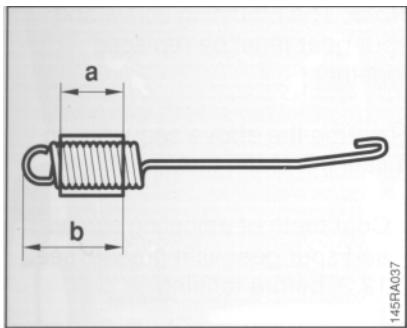
- Position the hand guard (1) against the pivot pin and fit the other side of the hand guard over the fan housing.
- Position the bell crank (2) next to pivot pin.
- Press the cam lever (3) slightly downward and push the hand guard and bell crank onto their pivot pins.
- Fit hand guard mounting screw and tighten to 7.0 Nm (5.2 lbf.ft).



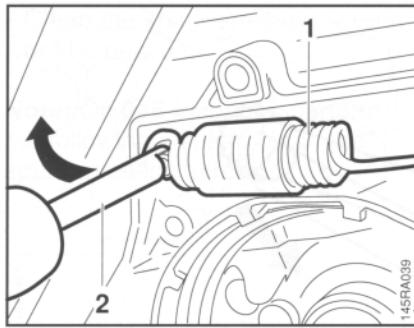
- Secure bell crank with E-clip.
- Coat brake band with chain oil (STIHL Bioplus), see 12.2, to protect it from corrosion and cushion the brake's hard response during the first few applications.



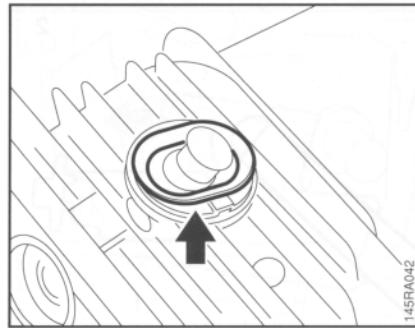
- Press brake band into slot.
- Coat the mounting screw with Loctite, see 12.2, and torque down to 3.0 Nm (2.2 lbf.ft).



145RA037



145RA039

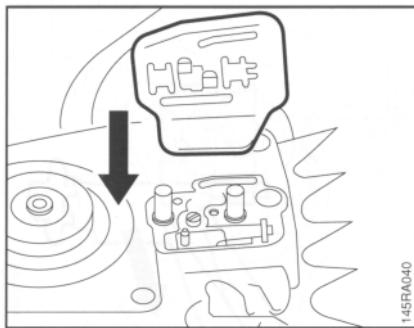


145RA042

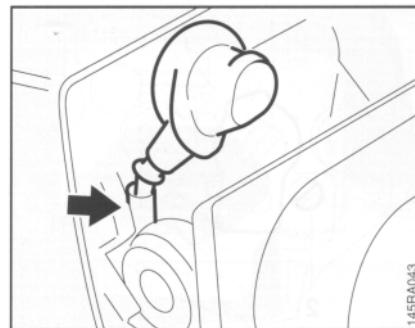
- Coils of brake spring must locate tight against one another in relaxed condition. Install a new brake spring if necessary.
- Check that protective tube is correctly positioned:
 $a = 20 \text{ mm (3/4")}$
 $b = 32 \text{ mm (1 1/4")}$

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

- Check that grommet is properly positioned on decompression valve.



145RA040



145RA043

- Push the side plate onto the collar studs and locate it against the crankcase.

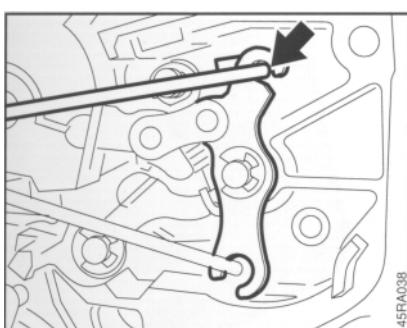
- Fit the shroud, making sure that the ignition lead is properly located in the recess.

- Tighten shroud screws to 7.0 Nm (5.2 lbf.ft).

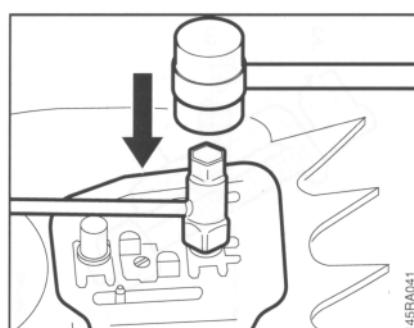
- Install clutch drum/chain sprocket - see 3.1.

- Mount guide bar and chain sprocket cover. Tighten sprocket cover nuts to approx. 15 - 20 Nm (11 - 15 lbf.ft).

- Check operation of chain brake - see 3.3.



145RA038

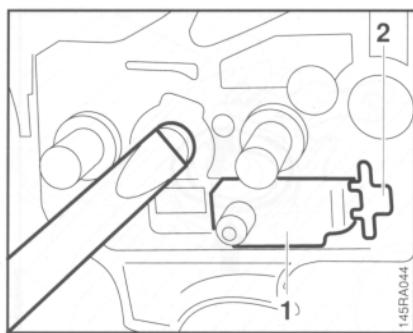


145RA041

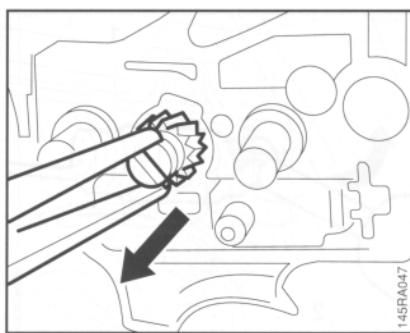
- Attach the brake spring to the bell crank.

- Fit combination wrench over the collar studs and tap firmly with a plastic mallet to push the side plate into the crankcase.

3.6 Chain Tensioner



- Remove inner side plate – see 3.4.

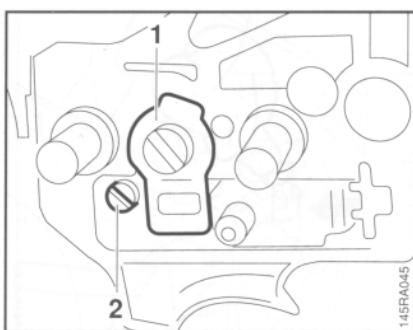


- Pull out the spur gear.

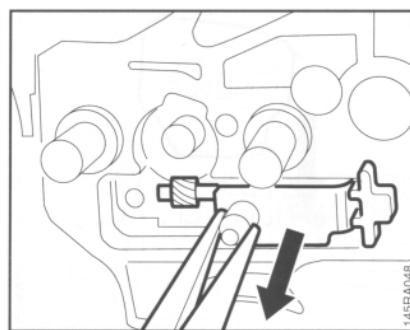
Note: The adjusting screw and spur gear must be replaced together.

Reverse the above sequence to install the chain tensioner.

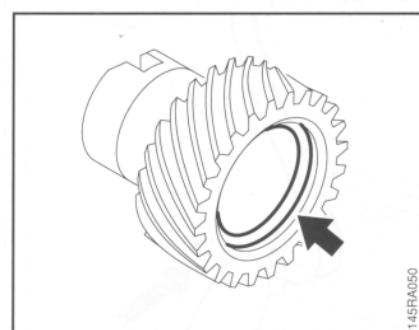
- Coat teeth of adjusting screw and spur gear with grease, - see 12.2, before refitting.



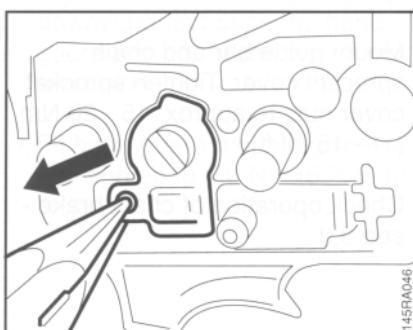
- Pull out the retainer (1).
- Take out the screw (2).



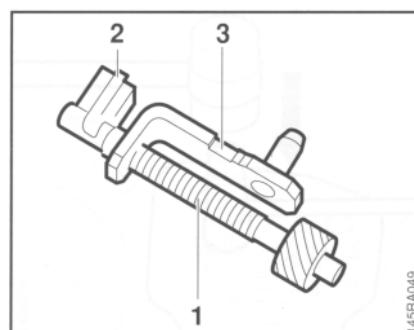
- Take out the tensioner slide with adjusting screw and thrust pad.



- Check that O-ring is fitted in spur gear and lubricate it with a little oil before installing.



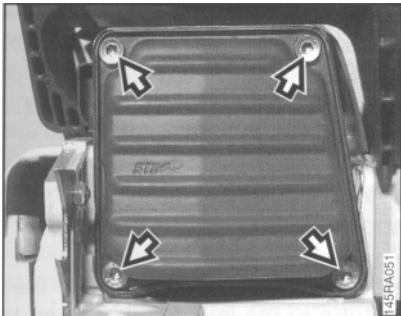
- Remove the cover plate.



- Inspect the teeth on the spur gear and adjusting screw (1). If the teeth are damaged, pull off the thrust pad (2), take the adjusting screw out of the tensioner slide (3) and replace both parts.

4. ENGINE

4.1 Exhaust Muffler

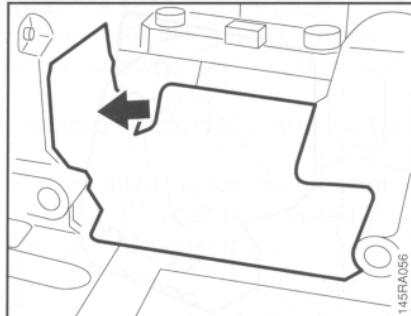


Troubleshooting chart -
see "Standard Repairs, Troubleshooting" handbook.

- Take out the screws.
- Remove the exhaust casing.

- Clean the spark arresting screen or fit a new one.

Note: On 046 Magnum, perform the following steps to clean the spark arresting screen.

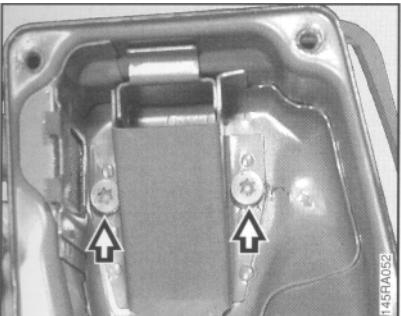


All models

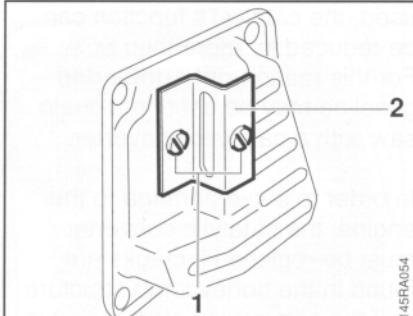
- Inspect heat reflecting foil and replace if necessary - see 4.8.2.

Reassemble in the reverse sequence.

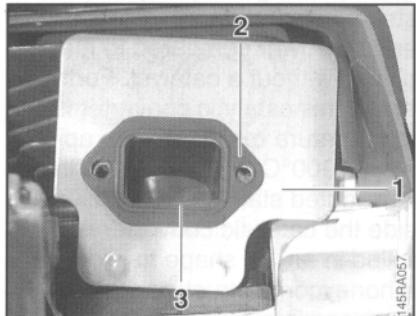
046 Magnum only



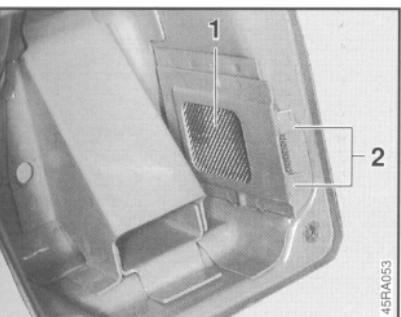
- Take out the screws.
- Remove the lower casing.
- Remove the gasket and heat shield.



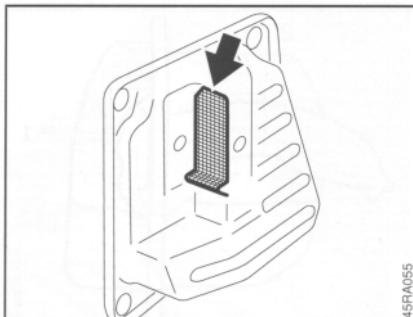
- Take out the screws (1).
- Remove cover plate (2).



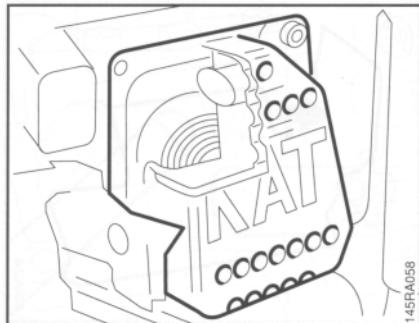
- Place heat shield (1) in position.
- Install new gasket (2) so that its bead (3) points outward.
- Coat threads of screws with Loctite, - see 12.2.
- Tightening torques - see 2.6.



- Inspect the spark arresting screen (1). If necessary, bend back the retaining tabs (2) and pull out the screen.



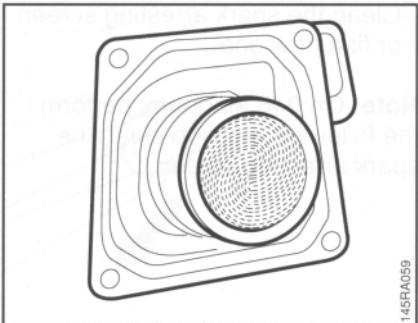
- Remove the spark arresting screen.
- Clean the spark arresting screen or fit a new one.



The catalytic converter is integrated in the exhaust casing of the muffler and helps reduce the amount of noxious emissions in the exhaust gas by means of a chemical reaction (afterburning).

A metal carrier catalyst is used. The advantage of this type of construction is that there is no loss of engine power compared to machines without a catalyst. Furthermore, this catalytic converter is temperature resistant up to approx. 1300°C (2375°F). Very thin corrugated stainless steel foil inside the catalytic converter is rolled in an "S" shape to produce a honeycomb structure which is enclosed in a round steel jacket.

The honeycomb cells are coated with the noble metal platinum which acts as the actual catalyst. A chemical reaction takes place when hot exhaust gas flows through the catalytic converter. Approximately 80% of the hydrocarbons (HC) and up to 20% of the carbon monoxide (CO) are transformed into water (H_2O) and non-poisonous carbon dioxide (CO_2).



A catalyst is a component which initiates chemical reactions **without** being consumed in the process.

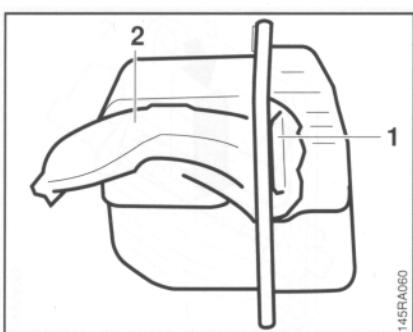
The platinum coating of the honeycomb cells is sensitive to lead, i.e. lead collects on platinum. This inhibits the chemical reaction. If several tankfuls of leaded fuel are used, the catalyst's function can be reduced by more than 50%. For this reason **only unleaded** gasoline may be used in a chain saw with a catalytic converter.

In order to avoid damage to the engine, the catalytic converter must be replaced if cracks are found in the honeycomb structure or if the converter's steel jacket is damaged in any way.

The special construction of the muffler brings the exhaust gas temperature down to about the same as that of a standard muffler.

Owing to the high gas flow speed a relatively large volume of fresh air is sucked in and used for cooling at this point. The temperature of the gas leaving the jet tube (sideways above the chain sprocket cover) is reduced to approx. 350°C (660°F) in this way.

Never attempt to modify either the jet tube or the injector nozzle. In the event of damage to the jet tube, replace the lower casing. If the injector nozzle is damaged, fit a new exhaust casing. Damage to either of these parts can cause an increase in the temperature of the exhaust gas leaving the jet tube.



Exhaust gas leaving the injector nozzle (1) in the exhaust casing flows into the jet tube (2) located at the side of the lower casing.

4.3 Leakage Test

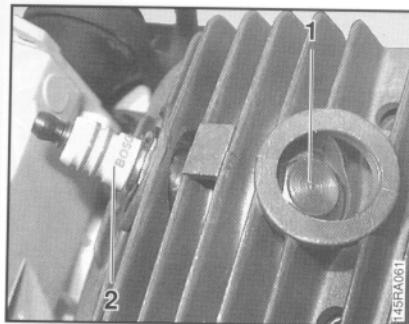
Defective oil seals and gaskets or cracks in castings are the usual causes of leaks. Such faults allow supplementary air to enter the engine and thus upset the fuel/air mixture.

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

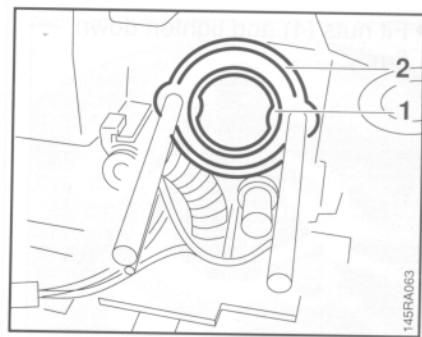
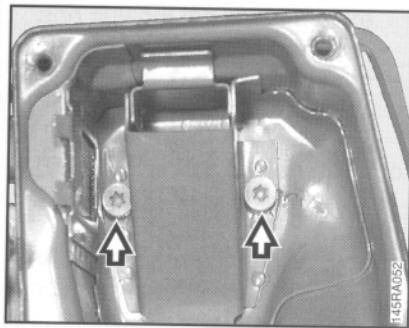
4.3.1 Preparations



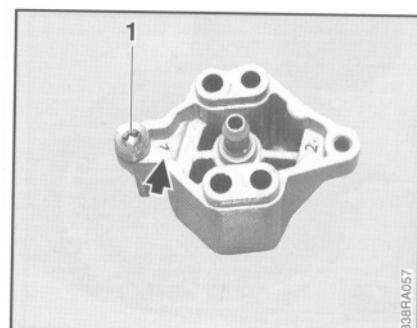
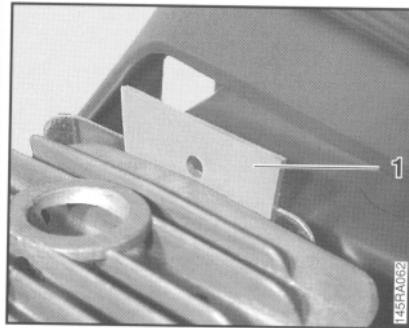
Note: The sealing plate must completely fill the space between the two screws.

- Remove carburetor - see 11.2.1.
- Set the piston to top dead center (T.D.C.). This can be checked through the intake port.

- Remove decompression valve – see 4.9.
- Install plug (1) 1122 025 2200 and tighten to 14 Nm (10.3 lbf.ft).
- Fit spark plug (2) and tighten down to 25 Nm (18.5 lbf.ft).

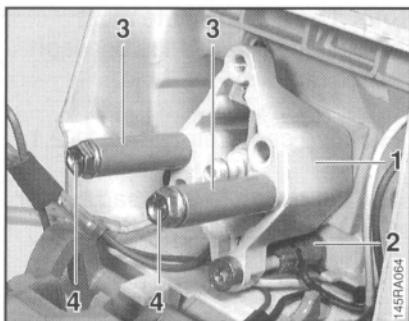


- Remove muffler exhaust casing – see 4.1.
- Back off the screws half way.



- Fit the sealing plate (1) 0000 855 8106 between the heat shield and exhaust port and then retighten the screws moderately.
- Check that the pin (1) in test flange 1128 850 4200 is in hole No. 1, fit if necessary.

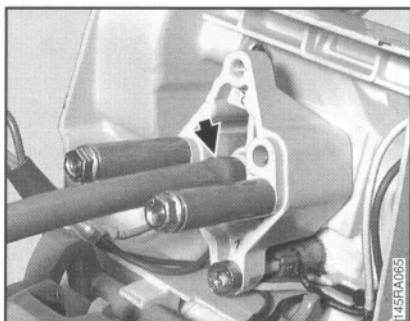
4.3.2 Pressure Test



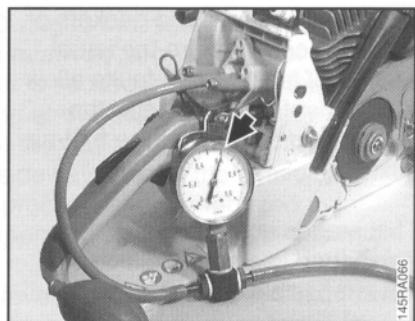
- Push the test flange (1) into position.

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

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



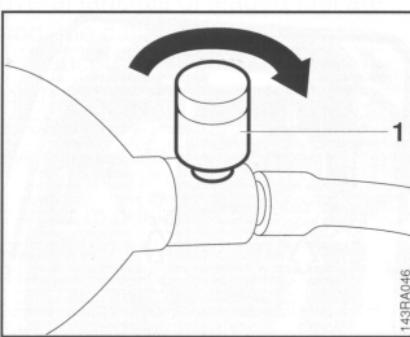
- Connect pressure hose of tester 1106 850 2905 to nipple on test flange.



- 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.

- Carry out the vacuum test – see 4.3.3.
 - After finishing the test, open the vent screw and disconnect the hose.
 - Remove the test flange.
 - Install the carburetor - see 11.2.1.
 - Slacken lower casing screws and pull out the sealing plate.
 - Take out one screw and coat its thread with Loctite - see 12.2.
 - Refit screw and tighten down to 11.5 Nm (8.5 lbf.ft).
- Note:** Remove and install the second screw in the same way.
- Fit the exhaust casing.
 - Unscrew the plug from the cylinder.
 - Install the decompression valve – see 4.9.



- Close the vent screw (1) on the rubber bulb.
- Pump air into the crankcase with rubber bulb until the gauge indicates a pressure of 0.6 bar (8.7 psi). If this pressure remains constant for at least 20 seconds, the crankcase is airtight.

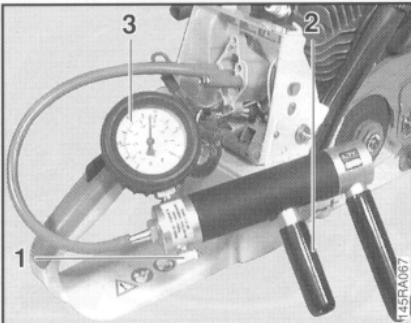
4.3.3 Vacuum Test

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. The preparations for this test are the same as for the pressure test - see 4.3.2.



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



- Close the vent screw (1) on the pump.
- Operate lever (2) until pressure gauge indicates a vacuum of 0.4 bar (5.8 psi).

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.
- Install the carburetor – see 11.2.1.
- Slacken the lower casing screws and pull out the sealing plate.
- Take out one screw and coat its thread with Loctite – see 12.2.
- Refit screw and tighten down to 11.5 Nm (8.5 lbf.ft).

Note: Remove and install the second screw in the same way.

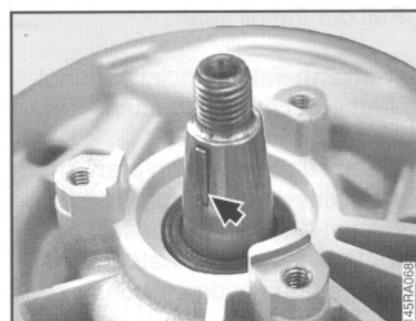
- Fit the exhaust casing.
- Unscrew the plug from the cylinder.
- Install the decompression valve – see 4.9.

4.4 Oil Seals

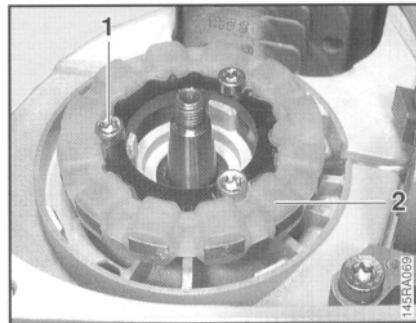
It is not necessary to disassemble the complete crankcase if only the oil seals have to be replaced.

Starter side:

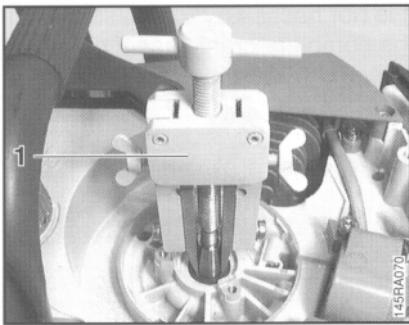
- Remove the flywheel - see 5.3.



- Remove key from crankshaft stub.



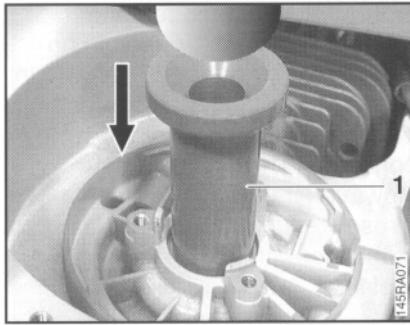
- On machines with heated handles, remove the screws (1) from the generator (2).
- Put generator to one side.



- Use a suitable pipe or punch to carefully tap the oil seal and free it off.
- Apply puller (1) 0000 890 4400 (with No. 6 jaws 0000 893 3711).
- Clamp the arms.
- Pull out the oil seal.

Important: Take special care not to damage crankshaft stub.

- Clean sealing face on crankshaft stub with standard commercial, solvent-based degreasant containing no chlorinated or halogenated hydrocarbons – see 12.2.
- Lubricate sealing lips of oil seal with grease - see 12.2.
- Thinly coat the outside diameter of the oil seal with sealant – see 12.2.
- Push the oil seal over the crankshaft stub - the open side must face the crankcase.



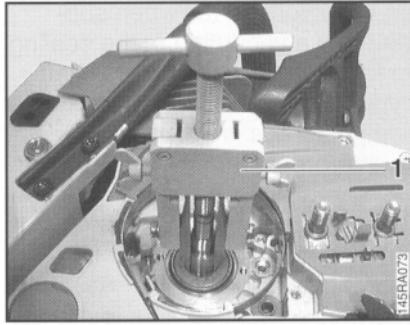
- Use the press sleeve (1) 1115 893 4600 to install the oil seal.

Note: The press surface must be flat and free from burrs.

- After about one minute, turn the crankshaft several times.
- Remove the generator (if fitted) – see 9.5.
- Install the flywheel - see 5.3.

Clutch side:

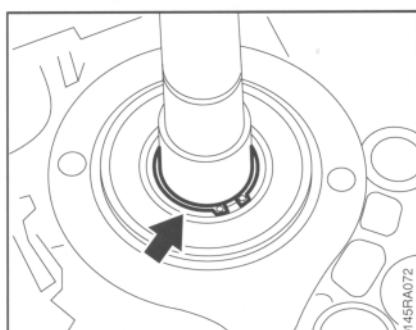
- Remove the oil pump - see 10.3.
- Use a suitable pipe or punch to carefully tap the oil seal and free it off.
- Fit No. 3.1 jaws 0000 893 3706 to the puller.



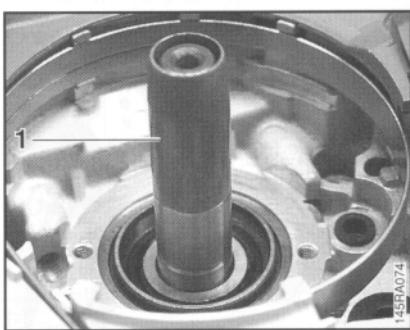
- Apply puller (1) 0000 890 4400 ansetzen.
- Clamp the arms.
- Pull out the oil seal.

Important: Take special care not to damage crankshaft stub.

- Clean sealing face on crankshaft stub with standard commercial, solvent-based degreasant containing no chlorinated or halogenated hydrocarbons – see 12.2.
- Lubricate sealing lips of oil seal with grease - see 12.2.
- Thinly coat the outside diameter of the oil seal with sealant – see 12.2.

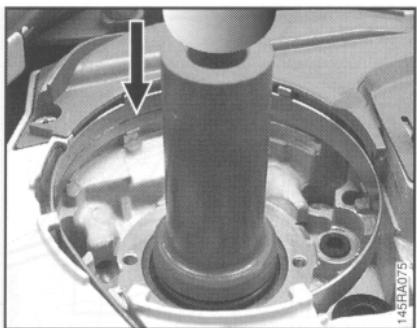


- Remove retaining ring with pliers 0811 611 8380.



- Slip assembly sleeve (1) 1118 893 2401 over the crankshaft stub.

4.5 Exposing the Cylinder

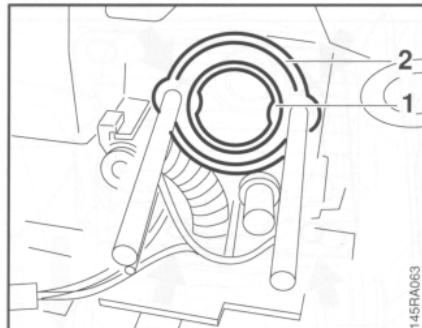


- Push the oil seal, open side facing the crankcase, over the assembly sleeve.
 - Press oil seal home with press sleeve (1) 1118 893 4602.
 - Remove the assembly sleeve.
 - After about one minute, turn the crankshaft several times.
 - Fit the retaining ring in the crankshaft groove.
- Note:** If the retaining ring is fatigued, fit a new one.
- Install the oil pump - see 10.3.

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

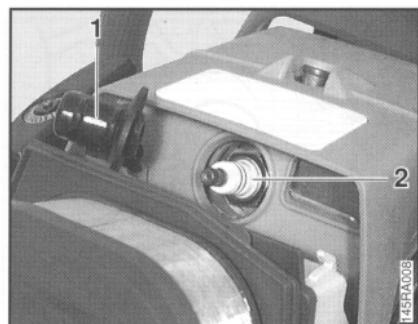
Troubleshooting chart - see "Standard Repairs, Troubleshooting" handbook.

- Remove the muffler - see 4.1.
- Remove the carburetor box cover - see 11.2.1.

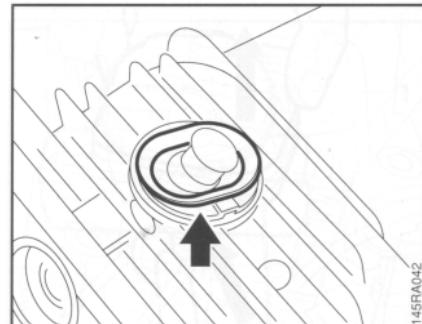


- Take the sleeve (1) out of the manifold.
- Pull the washer (2) off the studs.

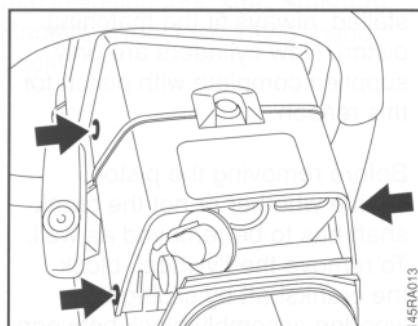
Reassemble in the reverse sequence.



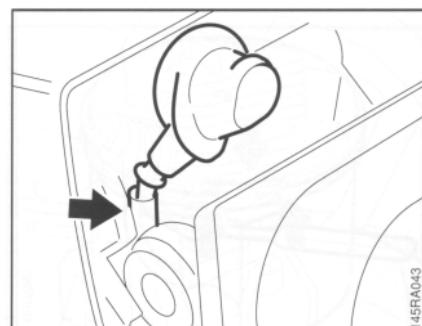
- Pull off the spark plug connector (1).
- Unscrew the spark plug (2).



- Check that grommet is properly seated.



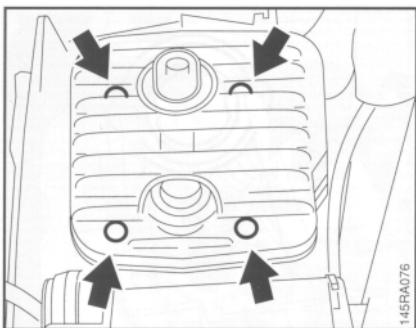
- Take out shroud mounting screws.
- Lift away the shroud.
- Remove carburetor - see 11.2.1.



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

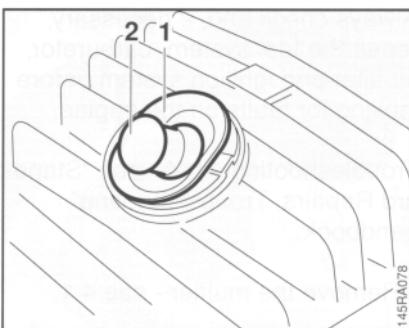
4.6 Cylinder and Piston Removal

4.6.1 Removal

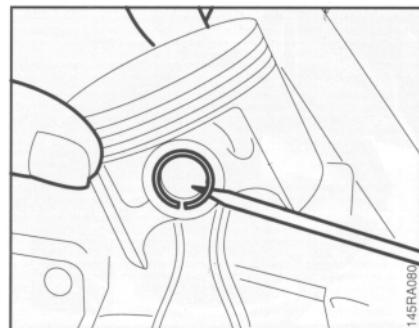


Preparations - see 4.5.

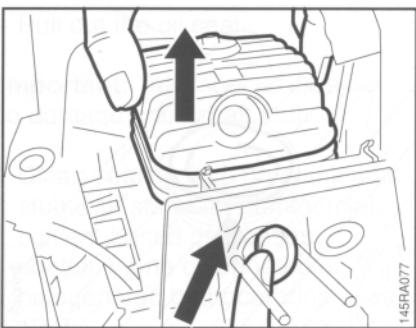
- Unscrew the four cylinder base screws.



- Remove the grommet (1).
- Unscrew the decompression valve (2).

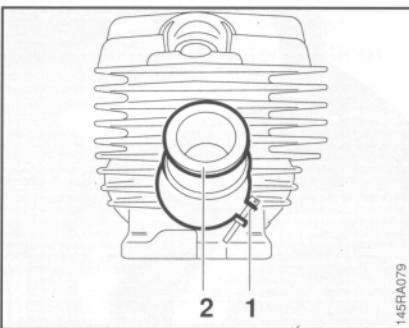


- Ease the hookless snap rings out of the grooves in the pistons.



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

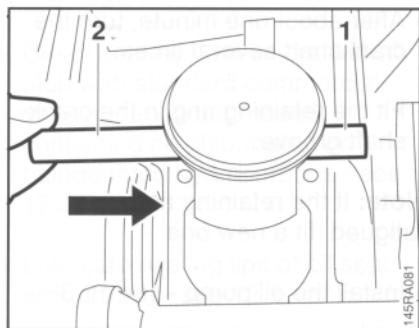
Caution: Do not use pointed or sharp-edged tools.



- 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 flywheel, block the crankshaft by sliding the wooden assembly block between the piston and crankcase.

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

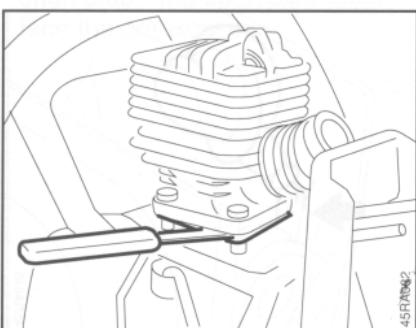


- Use the assembly drift (2) 1111 893 4700 to push the piston pin (1) out of the piston.

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

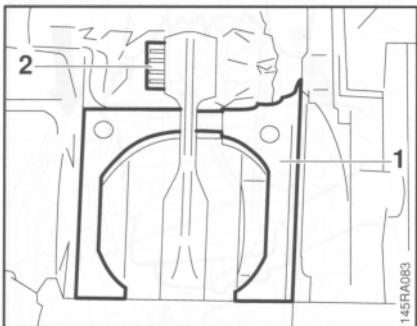
Important: Hold the piston steady during this process to ensure that no jolts are transmitted to the connecting rod.

- Remove piston and take the needle cage out of the connecting rod.
- Inspect piston rings and replace if necessary - see 4.7.

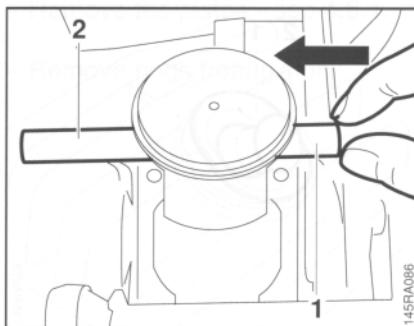


- Remove the cylinder gasket.

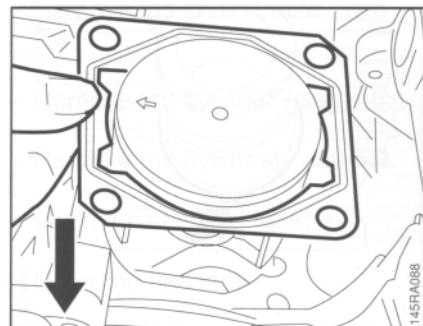
4.6.2 Installation



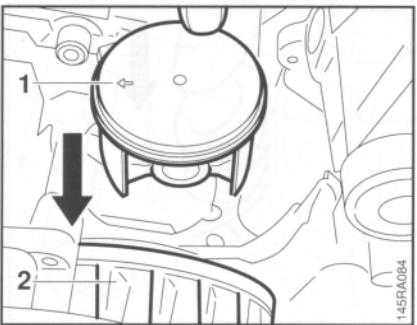
- Thoroughly clean the gasket seating surface (1).
- Lubricate the needle cage (2) with oil and fit it in the small end.



- 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 hot).

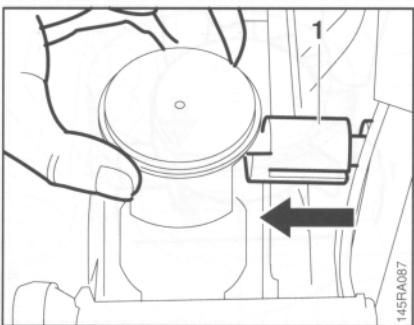


- Place new cylinder gasket in position - raised center must face crankcase.

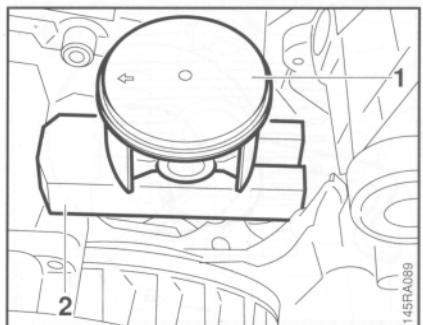


- Check installed position of piston:
1 = Mark
2 = Flywheel

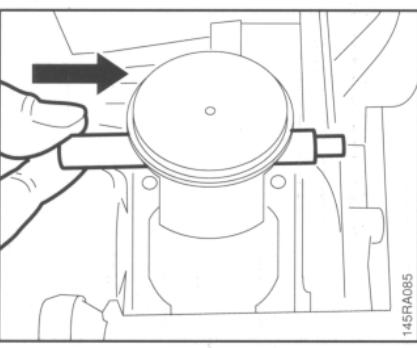
- Heat the piston on an electric heating plate to approx. 60°C (140°F) and slip it over the connecting rod.



- Apply the installing tool (1) 5910 890 2212 to the piston boss, hold the piston steady, center the tool shank exactly and press home until the snap ring slips into the groove.

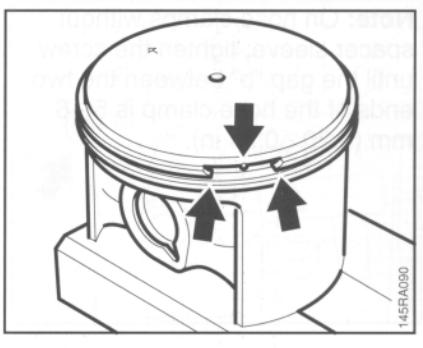


- Lubricate the piston and piston rings with oil and place the piston (1) on the wooden assembly block (2) 1108 893 4800.

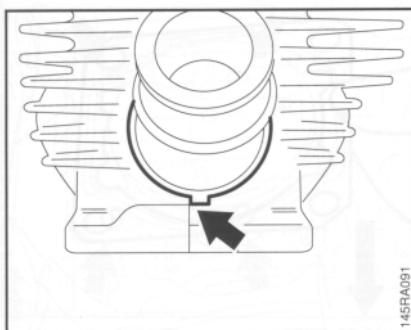


- Push the assembly drift, small diameter first, through the piston and small end (needle cage) and line up the piston.

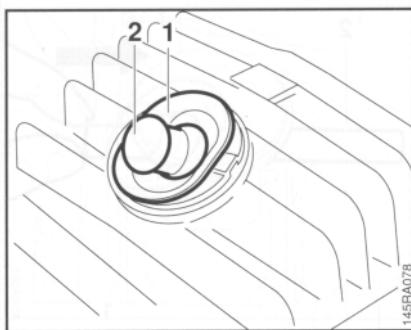
Note: For instructions on how to use installing tool, see "Standard Repairs, Troubleshooting" handbook.



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



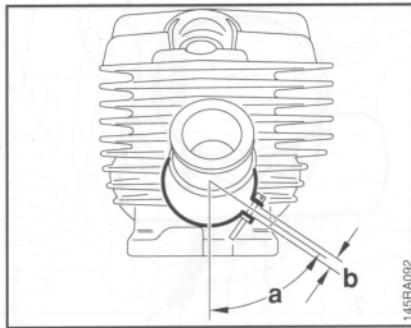
- Push the manifold onto the intake port.
- Note installed position of manifold.



- Fit decompression valve (2) and tighten down to 14 Nm (10.3 lbf.ft).
- Fit the grommet (1).

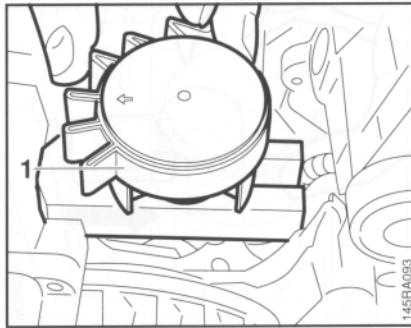


- Slide the cylinder over the piston
 - The clamping strap is pushed downward as the piston rings slip into the cylinder.
- Remove the clamping strap and wooden assembly block.

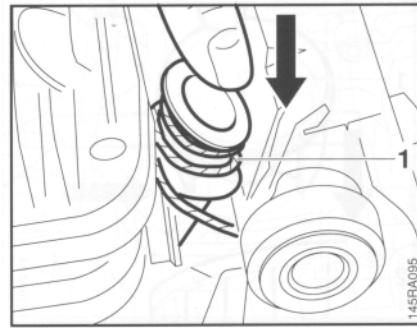


- Push the hose clamp over the manifold. The screw head must point to the right.
- Tighten the hose clamp screw against the spacer sleeve. Ends of clamp must point down to the right at angle "a" of 45.

Note: On hose clamps without spacer sleeve, tighten the screw until the gap "b" between the two ends of the hose clamp is 5 - 6 mm (0.20 - 0.24 in).

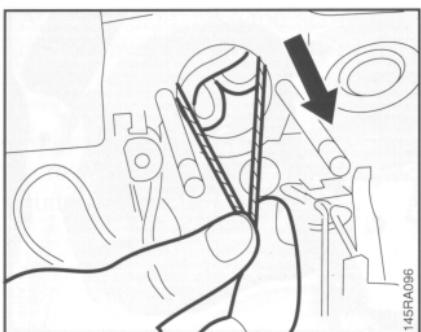


- Use the clamping strap (1) 0000 893 2600 to compress the piston rings around the piston.
 - Check that the piston rings are correctly positioned.
 - Lubricate the inside of the cylinder with oil and line it up so that it is positioned as it will be in the installed condition. It is important to observe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



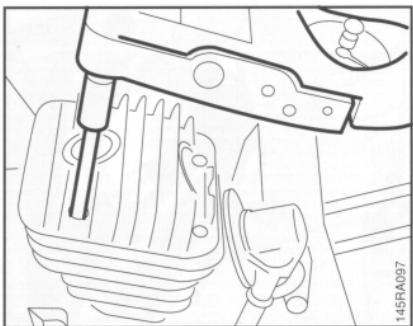
- To fit the manifold in the tank housing intake opening, wind a piece of string (about 15 cm / 6" long) around the back of the manifold flange and pass the ends of the string through the intake opening.
- Push the manifold down.

4.7 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.
- Fit cylinder base screws and torque down to 15.0 Nm (11.0 lbf.ft) in diagonal pattern.

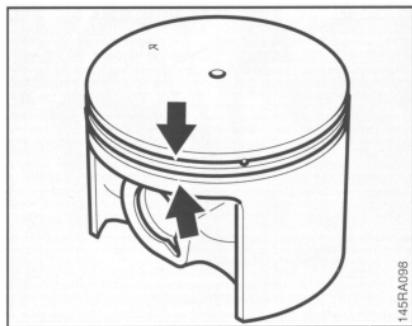
Assembly is now a reversal of the disassembly sequence.

4.8 Crankcase 4.8.1 Removing the Crankshaft

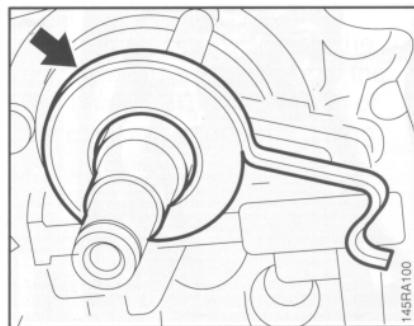
- Remove the piston - see 4.6.1.
- Remove rings from piston.

- Remove the chain brake – see 3.4.
- Remove the cylinder - see 4.6.1.
- Remove the flywheel - see 5.3.
- Drain the chain oil tank.
- Drain the fuel tank.

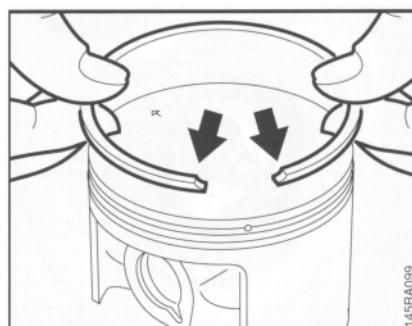
Note: Dispose of fuel at approved disposal site.



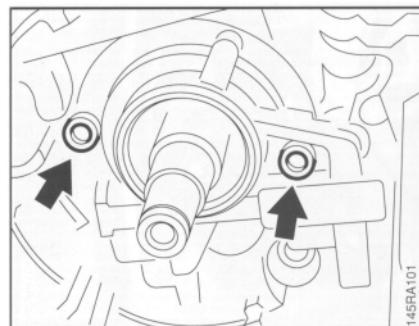
- Use a piece of old piston to scrape the grooves clean.



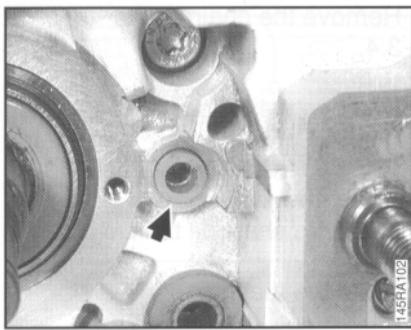
- Pull worm with drive spring out of oil pump and off the crankshaft.



- Install the new piston rings in the grooves so that the radii face upward.
- Install the piston - see 4.6.2.



- Take out the screws.
- Remove the oil pump.

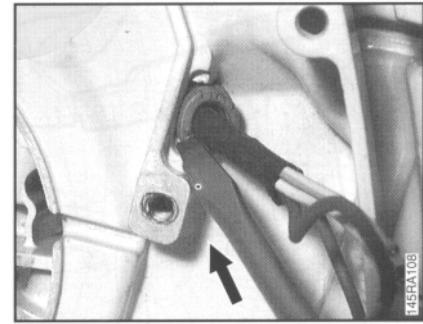
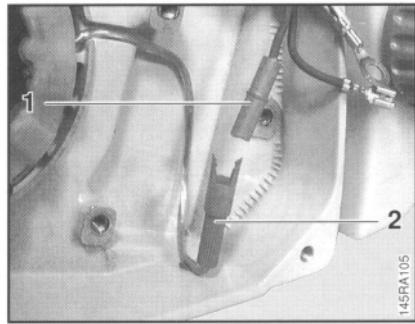
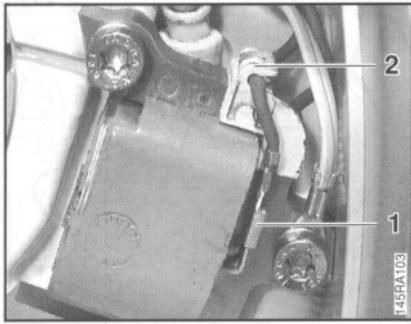


Note: On machines with heated handles, carry out the two following steps.

- Take sealing ring out of crank-case bore.



- Remove the piston – see 4.6.1

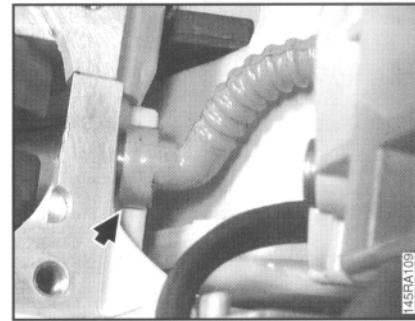
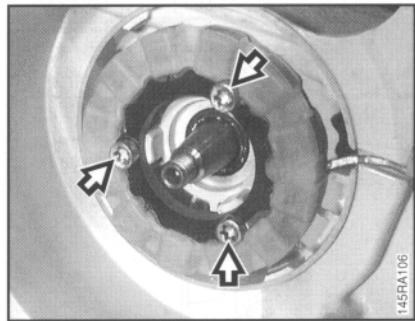
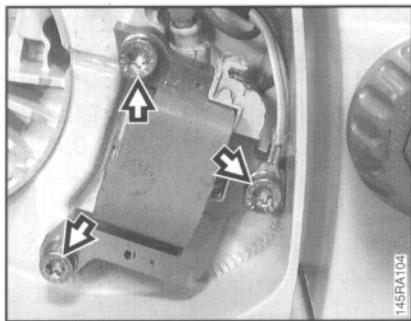


- Pull the short circuit wire (1) off the tag on the ignition module and ease it out of the retainer (2).

- Disconnect the pin (1) and socket (2) connectors.

- Push the grommet out of the housing.

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



- Take out the screws.

- Remove the ignition module.

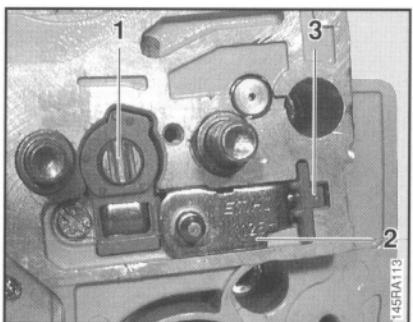
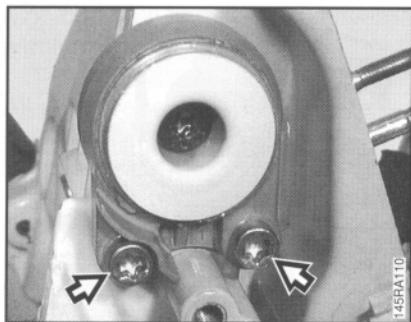
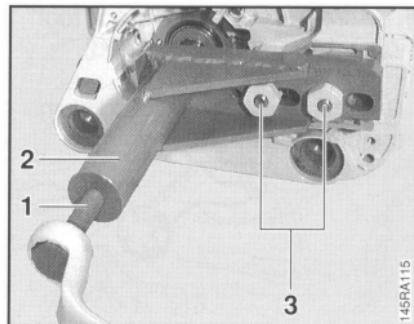
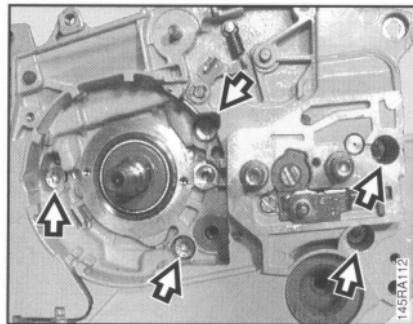
- Take out the screws.

- Remove the generator.

- Pull impulse hose off the nipple.

- At clutch side, take the screws out of the annular buffers – see 11.6.

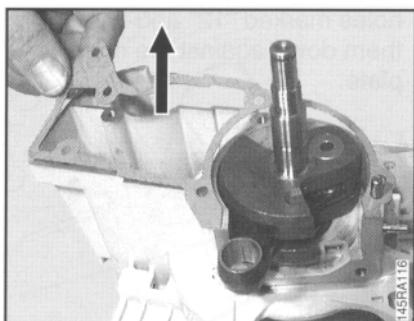
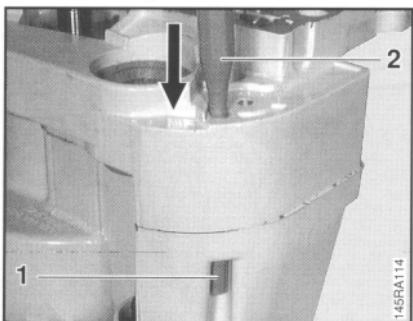
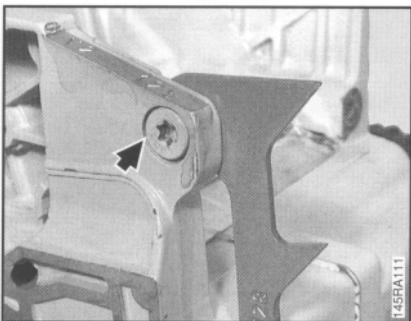
- At the starter side, take the screw out of the lower annular buffer - see 11.6.



- Remove the mounting screws from the upper annular buffer.

- Lift the crankcase away from the tank housing.

- Rotate spur gear (1) clockwise until the tensioner slide (2) butts against the thrust pad (3).



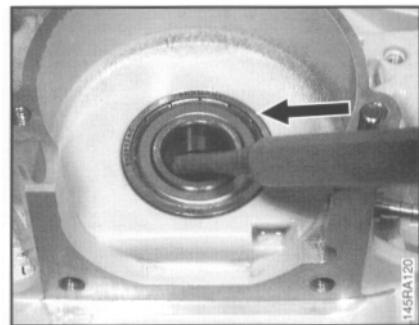
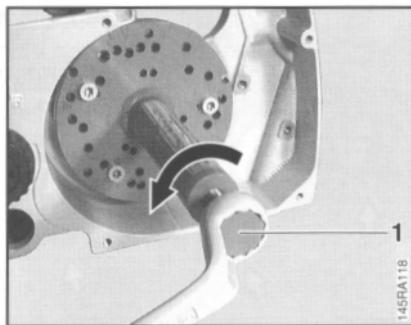
- Hold the self-locking nut steady and take out the screw.

- Remove the spiked bumper.

- At chain tensioner side of crankcase, use a 5 mm (3/16") drift (2) to drive the dowel pin (1) out of the two halves of the crankcase.

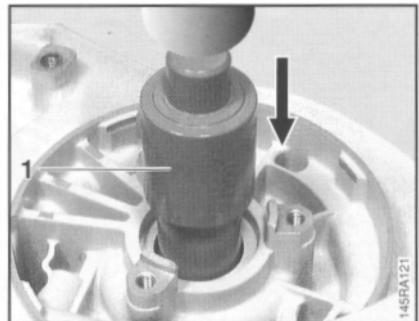
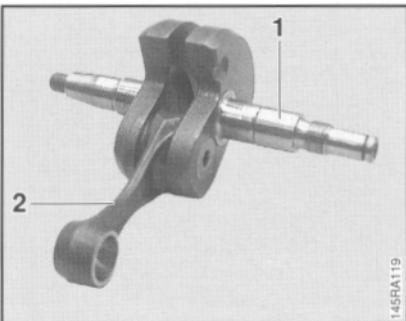
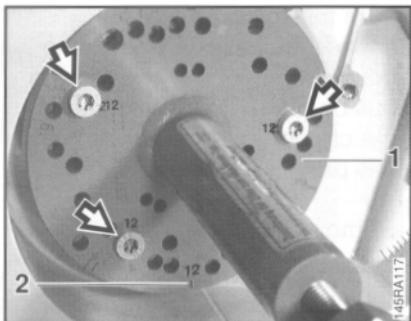
- Remove crankcase gasket.

- Unscrew spindle of service tool ZS a little (left-hand thread).
- Remove the retaining ring from the crankshaft stub.



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

- Carefully knock the oil seal out of the starter side of the crankcase.



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

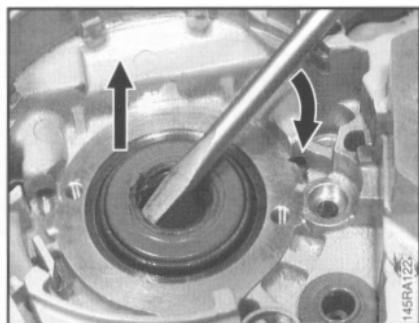
Note: Cylinder flange upright.

- Insert three M5x72 screws in the holes marked "12" and tighten them down against the drilled plate.

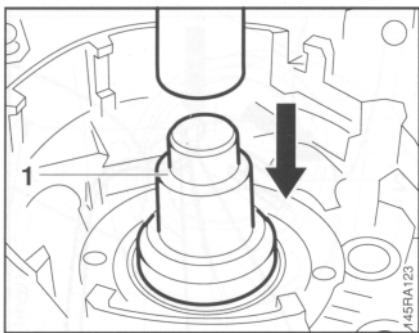
- The crankshaft (1), connecting rod (2) and needle bearing form an inseparable unit. This means that the crankshaft must always be replaced as a complete unit.

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

- Use press arbor (1) 1120 893 7200 to remove the ball bearing.



- Pry the oil seal out of the ball bearing at the clutch side.

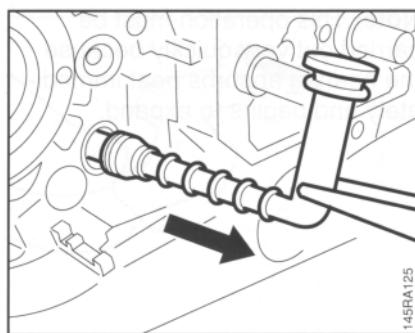


- Use press arbor (1) 1118 893 7200 to press the ball bearing out of its seat.
- Inspect both halves of the crankcase for cracks and replace if necessary.

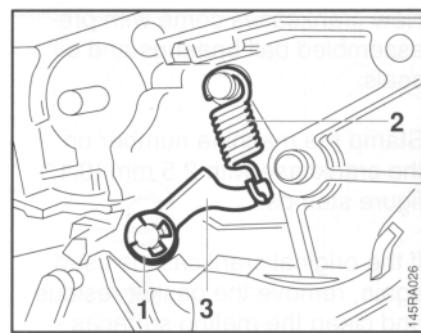
Note: The crankcase must be replaced as a complete unit even if only one half is damaged.

All other parts which are still serviceable can then be transferred to the new crankcase.

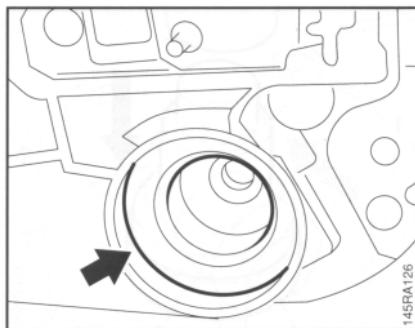
If only the ball bearings have to be replaced, remove all rubber and plastic components first, i.e. oil suction hose, stop buffer and annular buffers. Carry out the following operations for this purpose.



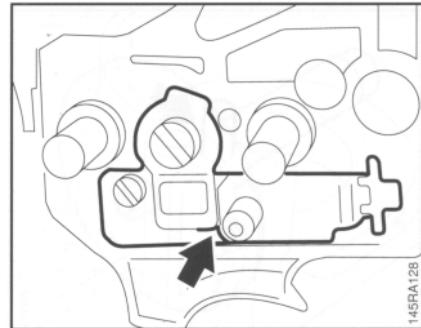
- Pull out the oil suction hose with pickup body.



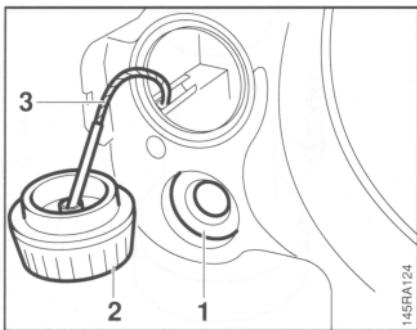
- Unhook and remove the spring (1).
- Ease the E-clip (2) off the bearing pin (3).
- Pull off the lever (3).



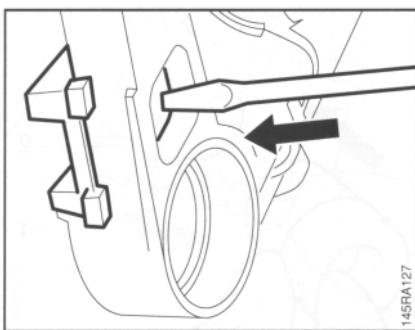
- Push the annular buffer out of the clutch side of the crankcase.



- Remove the complete chain tensioner - see 3.6.

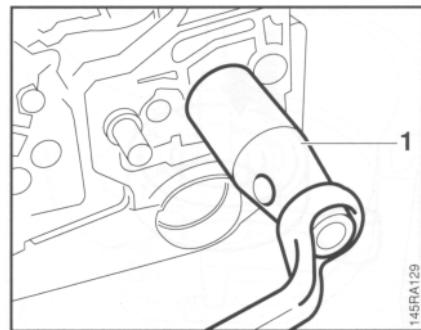


- Push the annular buffer (1) out of the starter side of the crankcase.
- Unscrew the oil tank filler cap (2).
- Remove cord (3) from the groove.



- Push the stop buffer out of its seat.

Note: To replace the crankcase, carry out the following operations.



- If necessary, use stud puller (1) 5910 893 0501 to unscrew the collar studs.

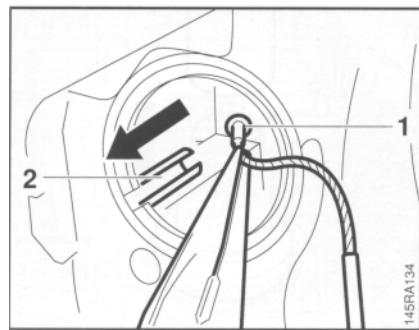
4.8.2 Installing the Crankshaft

New crankcases come with pre-assembled ball bearings and oil seals.

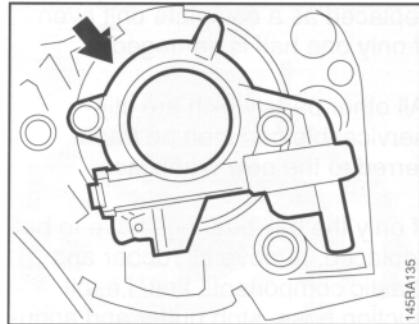
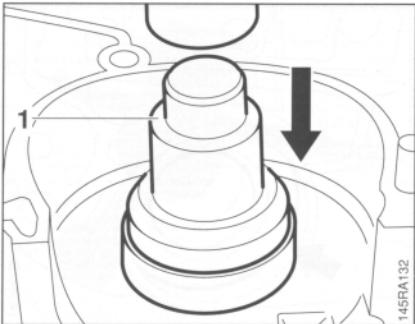
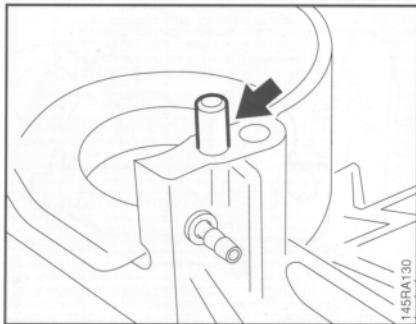
Stamp the machine number on the crankcase with 2.5 mm (0.1") figure stamps.

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.

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



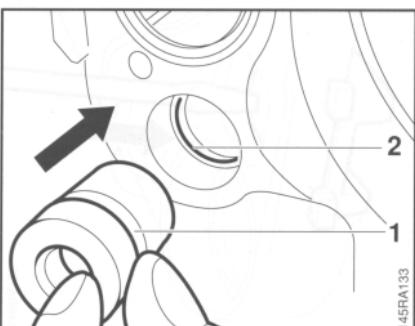
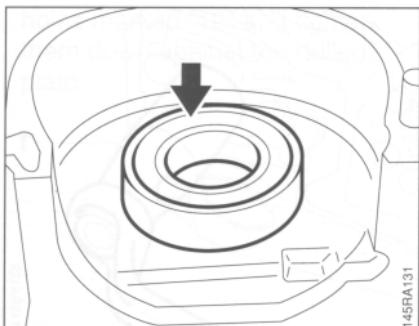
- Place filler cap's cord (1) in the groove (2) and pull it forward.



- Check that dowel pin is in position. If necessary, drive dowel pin into new crankcase.
- Heat area of bearing seat on starter side of crankcase to approx. 150°C (300°F).

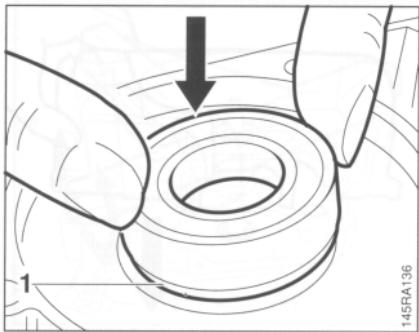
- If it is not possible to heat the crankcase, use the press arbor (1) 1118 893 7200 to press in the ball bearing as far as stop.

- Place oil pump in position.
 - Insert screws and tighten down firmly.
- Heat area of bearing seat on clutch side of crankcase to approx. 150°C (300°F).



- Place ball bearing in position (closed side up) and push it home by hand as far as stop.

- After the crankcase has cooled down, push the annular buffer into position until its annular groove (1) engages the edge of the housing (2).

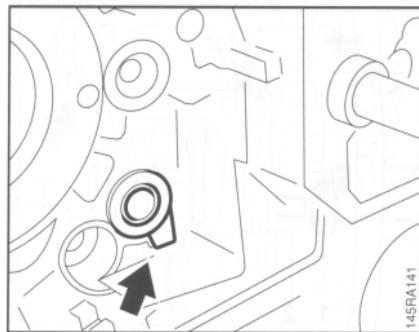


- Place ball bearing in position, with stepped edge (1) down, and push it home by hand as far as stop.

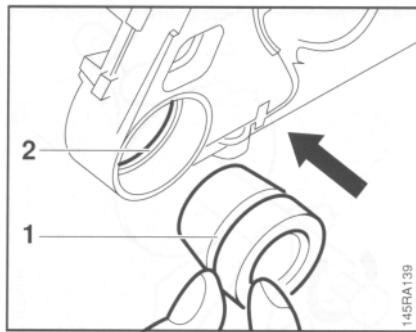
Note: This operation must be carried out very quickly because the bearing absorbs heat immediately and begins to expand.



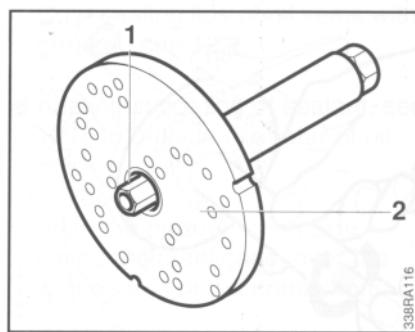
- Remove the oil pump.
- After the crankcase has cooled down, push the stop buffer into guide until its lugs are behind the edge of the housing.



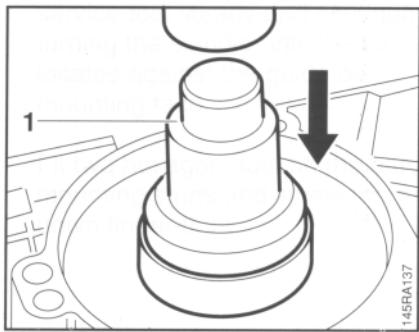
- Use a blunt tool to push the oil suction hose into the bore so that its tab locates in the recess at the bottom right.



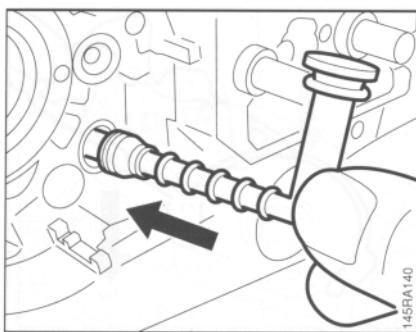
- Push the two annular buffers, tapered end first, into position until their annular grooves (1) engage the edge of the housing (2).



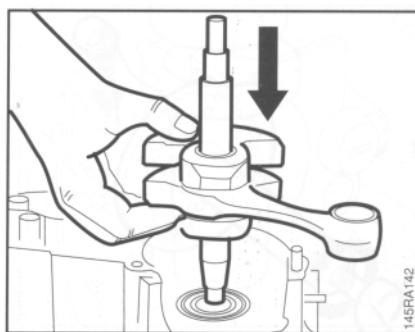
- Screw the spindle fully into service tool ZS (2) and then screw the threaded sleeve (1) 5910 893 2420 onto the spindle as far as it will go.
- Lubricate tapered crankshaft stub with oil.



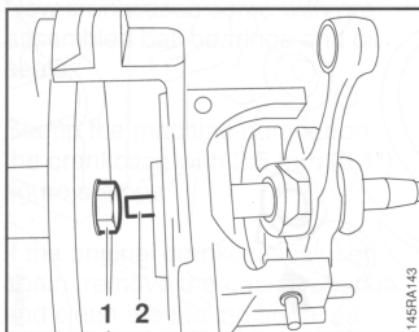
- If it is not possible to heat the crankcase, use the press arbor (1) 1118 893 7200 to press in the ball bearing as far as stop.



- Push the oil suction hose into the crankcase bore.

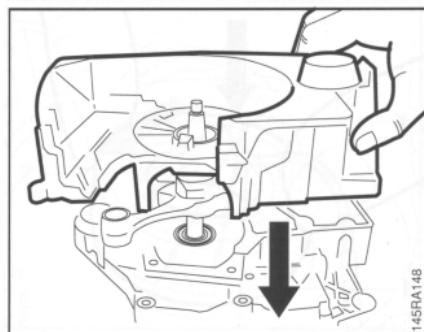


- Place tapered crankshaft stub in ball bearing at starter side of crankcase.

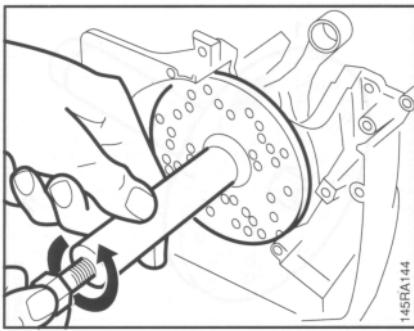


Important: The connecting rod must point toward the cylinder flange while the crankshaft is being installed.

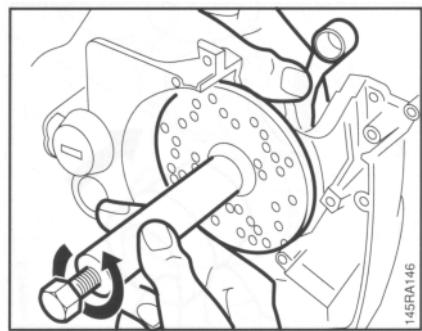
- Apply threaded sleeve (1) to thread (2) on crankshaft stub and screw it on.



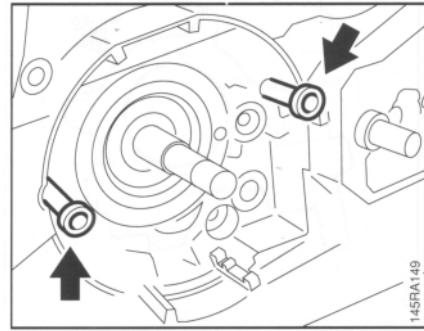
- Lubricate straight crankshaft stub with oil.
- Position crankshaft stub in ball bearing.



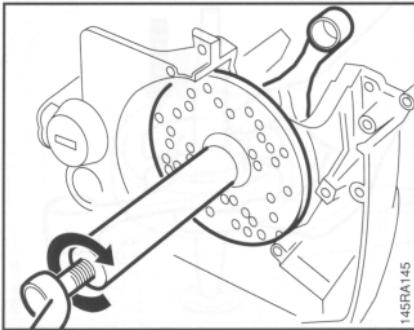
- Hold the spindle steady and turn the service tool counterclockwise until the drilled plate butts against the crankcase.



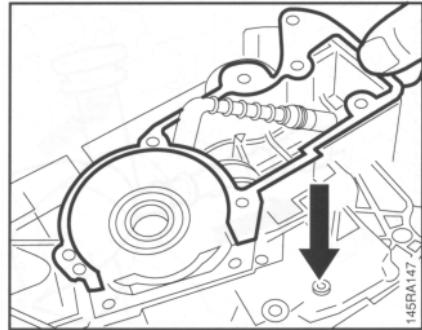
- Release the spindle by turning it counterclockwise and then hold the crankshaft steady and unscrew the service tool counterclockwise.



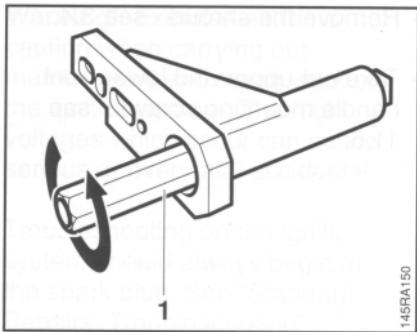
- To prevent the crankcase and gasket twisting, fit M5x72 screws (from service tool ZS) in two crankcase holes as far as stop.
- Screw the spindle fully into service tool AS by turning it clockwise.



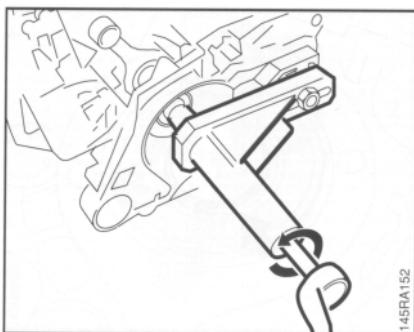
- Turn the spindle clockwise until the crankshaft locates against the ball bearing.



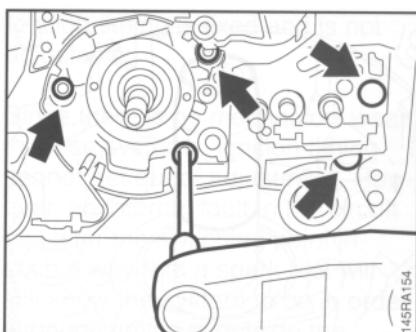
- Fit a new gasket on the clutch side of the crankcase.



- Screw threaded sleeve (1) 5910 893 2409 onto the spindle as far as it will go (left-hand thread).

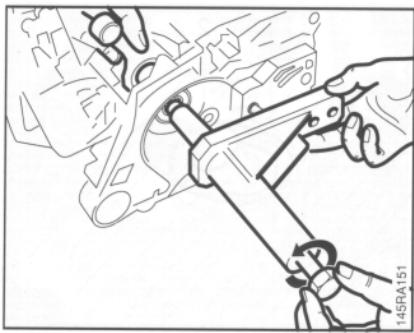


- Turn the spindle counterclockwise until the crankshaft locates against the ball bearing.
- Unscrew the hexagon nuts.
- Unscrew the spindle clockwise and take away the service tool.
- Take out the two M5x72 screws.

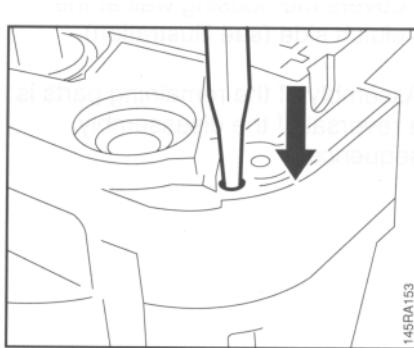


- Fit the crankcase mounting screws and tighten them down alternately in a diagonal pattern to 11.5 Nm (8.5 lbf.ft).

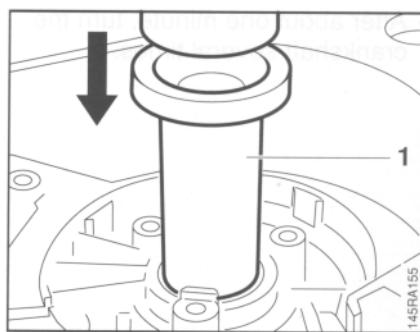
Note: Trim away any excess gasket material in the area of the cylinder mounting face.



- Push the threaded sleeve over the crankshaft stub.
- Hold the crankshaft steady, rotate the spindle counter-clockwise to screw the threaded sleeve onto the crankshaft.
- Release the crankshaft. Hold the service tool steady and continue turning the spindle until the tool locates against the guide bar mounting face.
- Fit two hexagon nuts on the bar mounting studs and screw them down finger-tight.



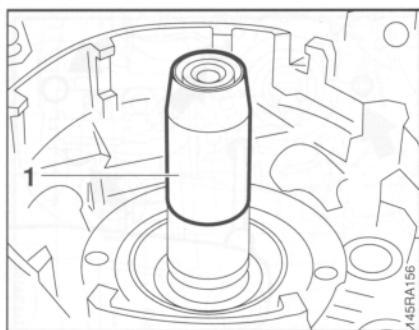
- Use a 5 mm (3/16") drift to drive the dowel pin into the two halves of the crankcase from the sprocket side.



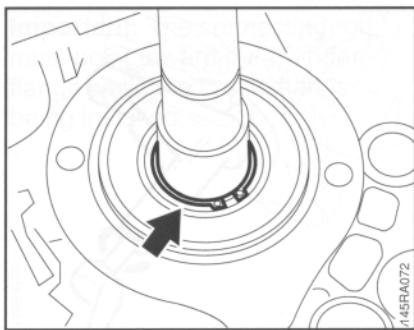
- Press it fully home with press sleeve (1) 1115 893 4600.

Note: The press surface must be flat and free from burrs.

4.9 Decompression Valve

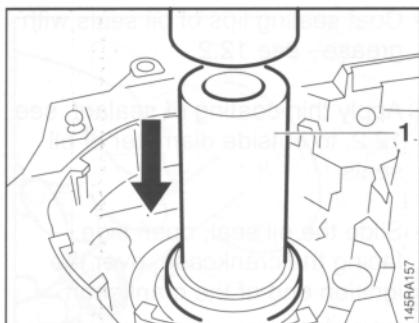


- Fit the assembly sleeve (1) 1118 893 2401 over the clutch end of the crankshaft.

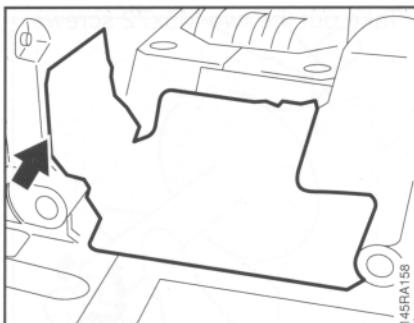


- Use pliers 0811 611 8380 to fit retaining ring in groove on crank-shaft stub.

Note: If retaining ring is fatigued, fit a new one.



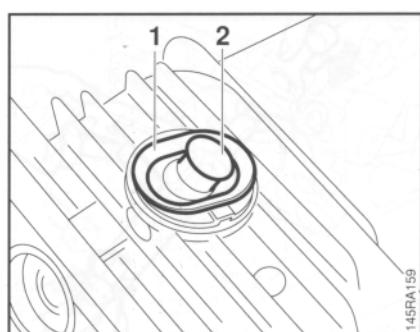
- Slide the oil seal, open side facing the crankcase, over the assembly sleeve.
- Press it home with press sleeve (1) 1118 893 4602.
- Remove the assembly sleeve.
- After about one minute, turn the crankshaft several times.



- Clean both halves of crankcase (free from grease).
- Pull the backing off the new heat reflecting foil.
- Stick heat reflecting foil in position, without creases, so that it covers the housing wall at the clutch side (see illustration).

Assembly of the remaining parts is a reversal of the disassembly sequence.

- Remove the shroud - see 3.4.
- Take out upper and lower front handle mounting screws – see 11.6.



- Remove the grommet (1).
- Unscrew the decompression valve (2).
- Fit new decompression valve and torque down to 14 Nm (10.3 lbf.ft).
- Fit the grommet.
- Fit upper and lower front handle mounting screws and tighten down to 8.0 Nm (5.9 lbf.ft)
- Fit the shroud - see 3.5.

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!

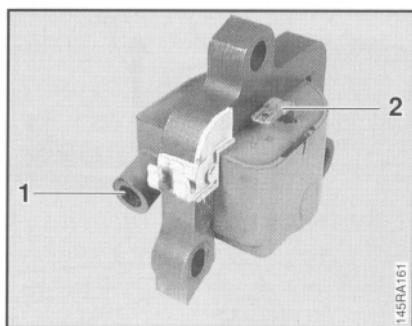
Troubleshooting on the ignition system should always begin at the spark plug. See "Standard Repairs, Troubleshooting" handbook.

5.1 Ignition Module

5.1.1 Ignition Timing

Ignition timing is fixed and is not adjustable.

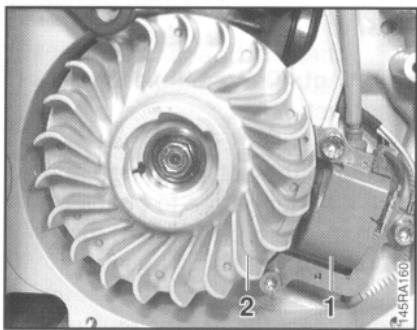
Since there is no mechanical wear in these systems, ignition timing cannot get out of adjustment. However, an internal fault in the circuit can alter the switching point in such a way that a spark test will still show the system to be in order although timing is outside the permissible tolerance. This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



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

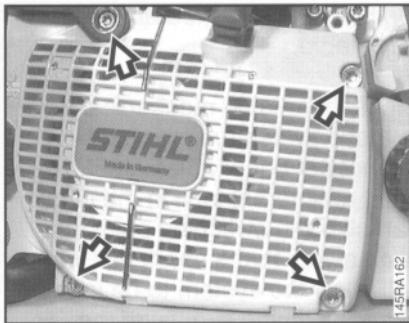
1. the high voltage output (1)
2. the connector tag (2) for the short circuit wire

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).

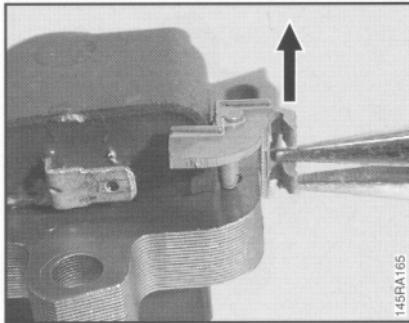


Note: The electronic (breakerless) ignition system basically consists of an ignition module (1) and flywheel (2) and is easily accessible.

5.1.2 Removing and Installing



- Remove the shroud - see 3.4.
- Take out the screws.
- Remove the fan housing.



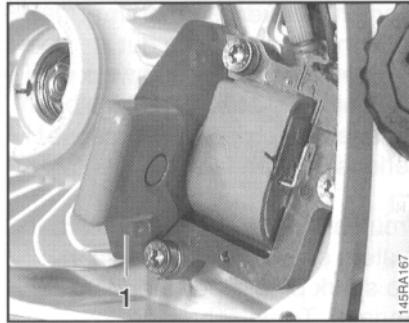
- If necessary, pry the pin of the wire retainer out of the ignition module.
- Remove wire retainer.
- Refit retainer before installing the ignition lead - see 5.2.
- Coat threads of screws with Loctite 242 - see 12.2.
- Place the module in position, insert the screws with washers but do not tighten them down yet.

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

Note: Secure the ground wire with the center mounting screw.

Machines with heated handles:

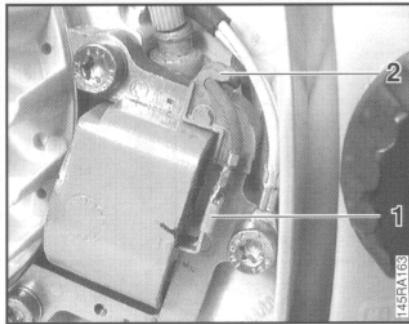
- Position the wire with connector under the ignition module.



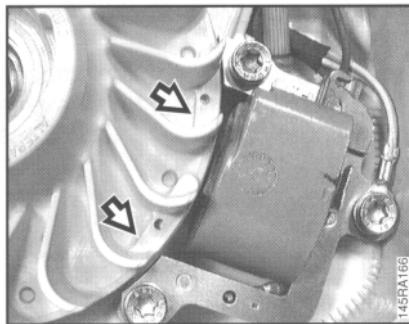
- Slide the setting gauge (1) 1111 890 6400 between the arms of the ignition module and the raised edge of the flywheel.
- Press the ignition module against the setting gauge and tighten down the mounting screws to a torque of 7.0 Nm (5.2 lbf.ft).

Important: Tighten the center screw first.

- Remove the setting gauge and use a feeler gauge to check the air gap. It should be 0.20 mm (0.008").
- Reconnect the short circuit wire.
- Fit the fan housing, tighten screws to 7.0 Nm (5.2 lbf.ft).
- Install the shroud - see 3.5.

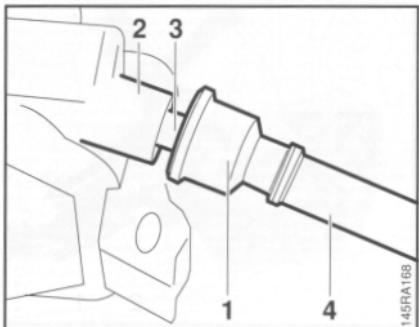


- Pull the short circuit wire off the connector tag on the ignition module and out of the retainer (2).

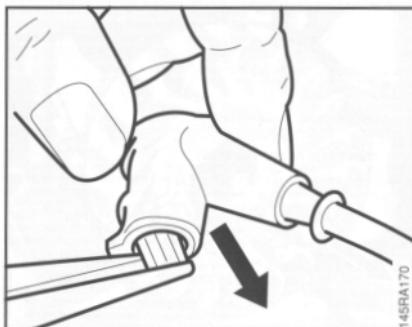


- Take out the screws.
- Remove the ignition module.
- Remove the ignition lead – see 5.2.
- Rotate the flywheel until the two raised portions line up with the ignition module.

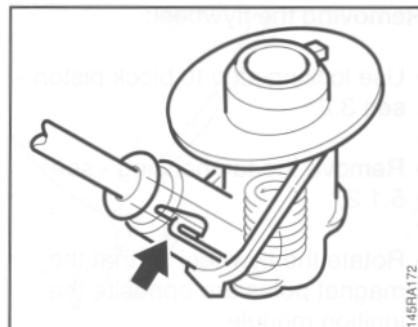
5.2 Spark Plug Connector/ Ignition Lead



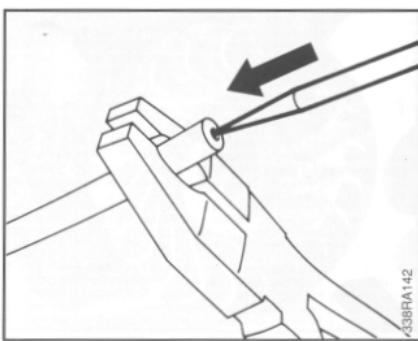
- Remove the ignition module - see 5.1.2.
- Pull the grommet (1) off the high voltage output (2).
- Unscrew the lead (3) from the contact pin and pull it out of the ignition module.
- Pull grommet and insulating hose (4) off the ignition lead.



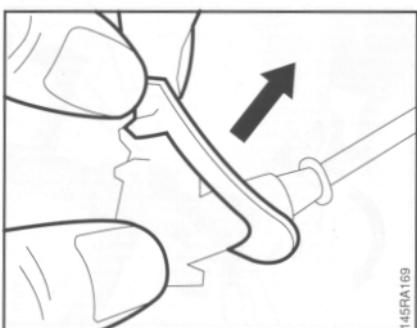
- Use suitable pliers to grip the leg spring and pull it out of the spark plug connector.
- Unhook the leg spring from the ignition lead.
- Slip the spark plug connector off the ignition lead.
- Cut new ignition lead to length (see parts list or cut to same length as old lead).
- Coat end of the ignition lead (about 20 mm/3/4") with oil.
- Fit spark plug connector over the ignition lead.
- Use suitable pliers to grip the end of the ignition lead inside the spark plug connector and pull it out.



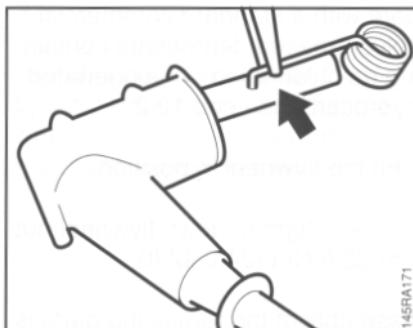
- Pull the lead back into the connector so that the leg spring locates properly inside it.
- Fit the loop and collar over the spark plug connector.



- Use a pointed tool (awl or gimlet) to pierce the center of the other end of the ignition lead which screws into the module.
 - Slip the insulating hose and grommet onto the lead.
 - Pack the high voltage output with STIHL multipurpose grease – see 12.2.
- Important:** Do not use graphite grease (Molykote) or silicone insulating paste.
- Screw home the ignition lead.
 - Slide the grommet over the high voltage output.
 - Install the ignition module – see 5.1.2.



- Pull the loop and collar off the spark plug connector.

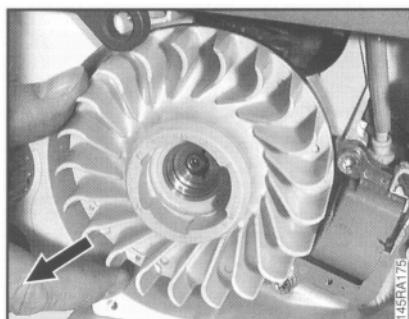


- Pinch the hook of the leg spring into the center of the lead, i.e. about 15 mm (5/8") from the end of the lead.

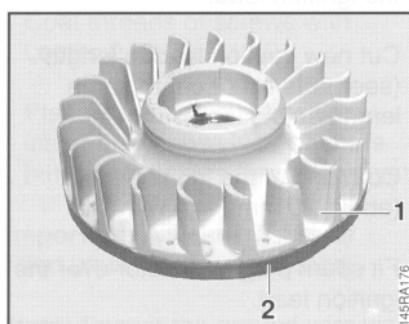
5.3 Flywheel

Removing the flywheel:

- Use locking strip to block piston – see 3.2.
- Remove the fan housing – see 5.1.2.
- Rotate the flywheel so that the magnet poles are opposite the ignition module.



- Pull off the flywheel.



- Unscrew the flywheel nut.

- Inspect flywheel (1) and magnets (2). If you find any damage (e.g. cracks, broken fan blades), fit 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 containing no chlorinated or halogenated hydrocarbons - see 12.2.

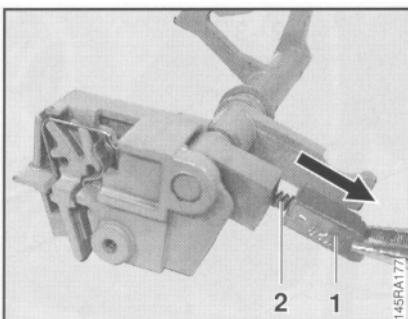
- Fit the flywheel in position.
- Fit and tighten down flywheel nut to 32.5 Nm (24.0 lbf.ft).

Assembly of the remaining parts is now a reversal of the disassembly sequence.

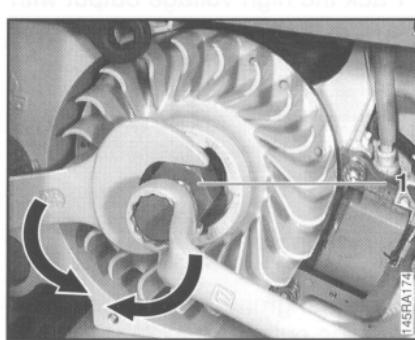
- Screw the puller (1) 1110 890 4500 into the flywheel.
- Screw home the thrust bolt until the flywheel is released.

- Carefully push the switch housing to the side and lift it away.
- When installing, the switch actuator must be pushed home until it snaps into position.

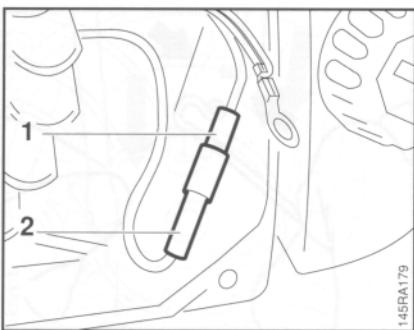
5.4 Stop Switch



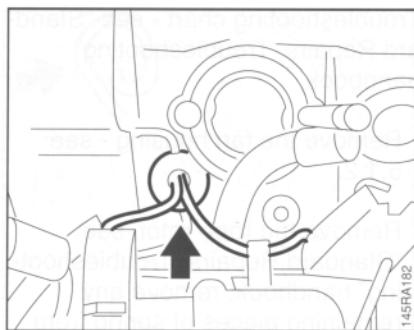
- Remove the switch shaft – see 8.1.
- Rotate the switch housing until the switch actuator is exposed.
- Use pliers to pull out the switch actuator (1) and spring (2).



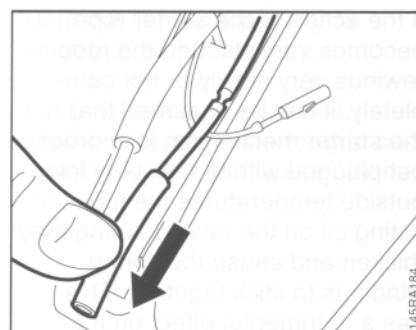
5.5 Wiring Harness



- Remove the ignition module – see 5.1.2.



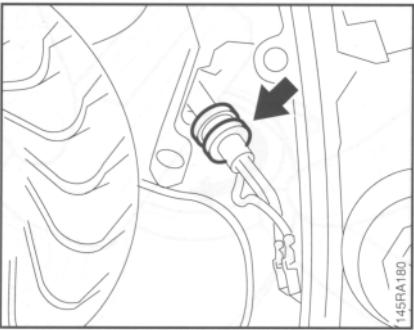
- Pull grommet and wires out of tank housing.



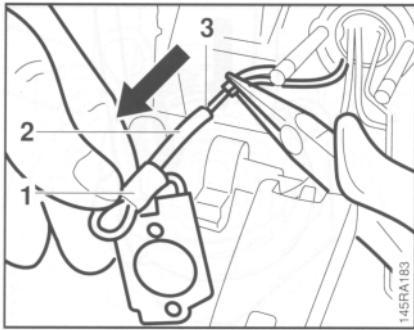
- Separate pin and socket connectors of both wires and pull off the insulating tube.
- Pull the wire out of the grommet.

Machines with heated handles:

- Pull pin connector (1) out of socket (2).

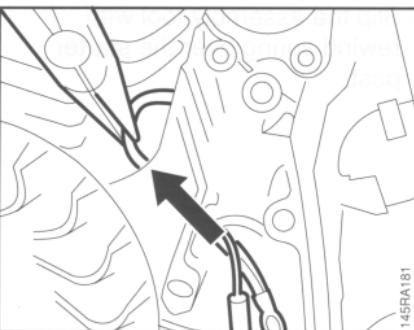


- Pull grommet out of tank housing and off the wires.

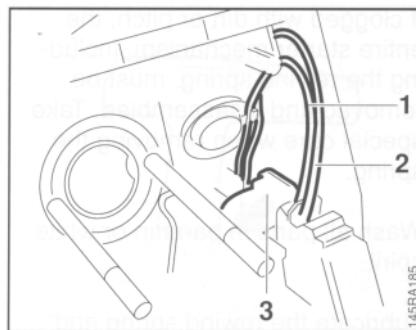


Machines with carburetor heating:

- Pull off the tube (1) and push back insulating tube (2) to expose connector.
- Disconnect the pin and socket connector (3).
- Remove the interlock lever – see 8.2.
- Pull off the insulating tube from pin and socket connector on the wire between the generator and rear handle heating element.



- Pull the wires sideways out of the tank housing.
- Remove the carburetor – see 11.2.1.



- Pull short circuit wire (1) and ground wire (2) off the contact springs.

Machines with heated handles:

- Remove the heater switch (3) – see 9.2.
 - Remove the wiring harness.
- Reassemble in the reverse sequence.
- After fitting the wiring harness, press the wires into their retainers.
 - Fit the grommets properly in the openings in the tank housing.

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.

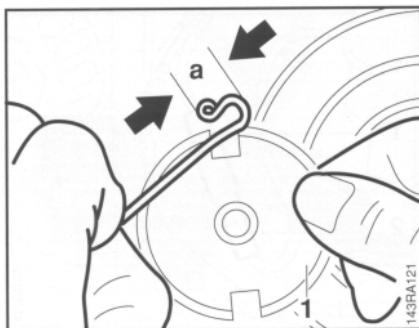
Lubricate the rewind spring and starter post with STIHL special lubricant, see 12.2, before installing.

6.2 Rewind Spring 6.2.1 Replacing

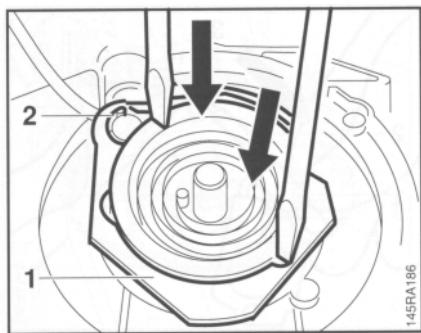
Troubleshooting chart - see "Standard Repairs, Troubleshooting" handbook.

- Remove the fan housing – see 5.1.2.
- Remove the rope rotor, see "Standard Repairs, Troubleshooting" handbook, remove any remaining pieces of spring from the fan housing.

Note: The replacement spring comes ready for installation and is held by a retainer. It should be lubricated with a few drops of STIHL special lubricant before installation - see 12.2.



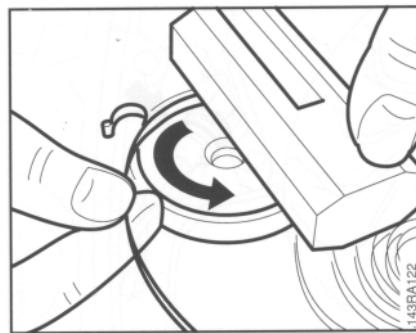
- Position anchor loop about 11 mm (0.4") (dimension 'a') from the edge of the assembly tool (1) 1116 893 4800.



- The retainer (1) slips off as the rewind spring is pressed into the fan housing. Engage the anchor loop (2) in the recess in the fan housing.

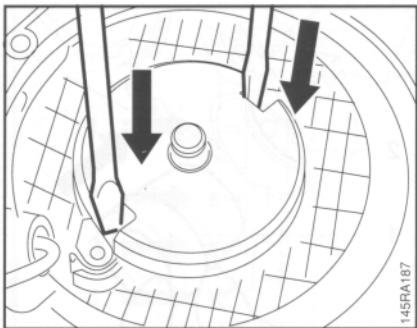
Caution: The rewind spring may pop out and uncoil during installation.

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



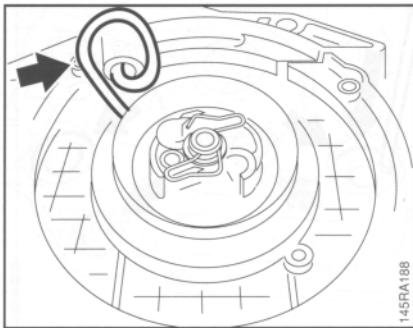
- Fit the rewind spring in the assembly tool in the counter-clockwise direction, starting outside and working inwards.
- The wooden assembly block can be placed over the assembly tool to simplify this operation.
- Slip the assembly tool with rewind spring over the starter post.

6.2.2 Tensioning



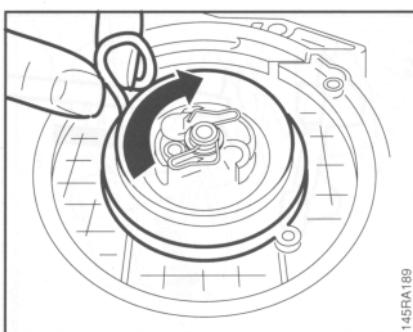
- Push the rewind spring into the fan housing and then remove the assembly tool.

- Install the rope rotor – see "Standard Repairs, Troubleshooting" handbook.
- Tension the rewind spring – see 6.2.2.

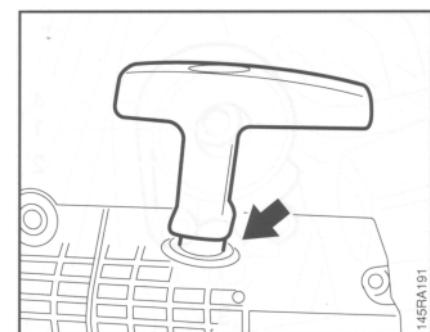


- Make a loop in the starter rope.

- Hold the starter grip firmly to keep the rope tensioned.
- Let go of the rope rotor and slowly release the starter grip so that the rope winds itself onto the rotor.



- Grip the rope **close** to the rotor and use it to turn the rope rotor six full turns clockwise.

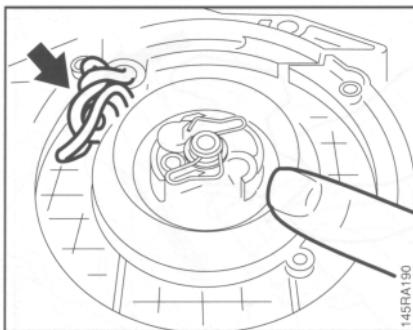


Note: The rewind spring is correctly tensioned when the starter grip sits firmly in the rope guide bush without drooping to one side. If this is not the case, tension the spring by one additional turn.

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 - it might break.

- Refit the fan housing - see 5.1.2.

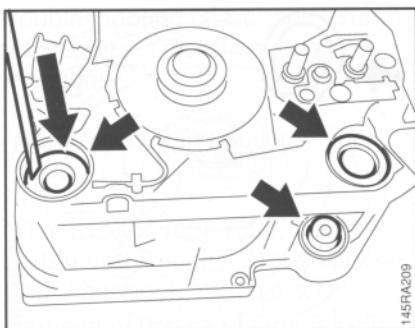


- Hold the rope rotor steady.
- Pull out the rope with the starter grip and straighten it out.

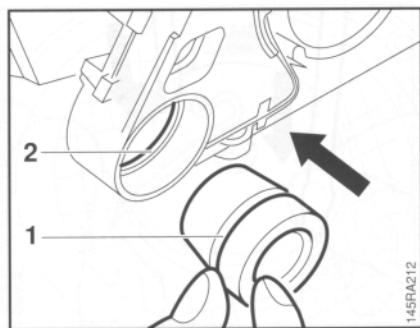
7. AV HANDLE SYSTEM

Rubber anti-vibration buffers are installed between the engine housing and handle frame. Damaged rubber buffers (annular buffers) must always be replaced in sets.

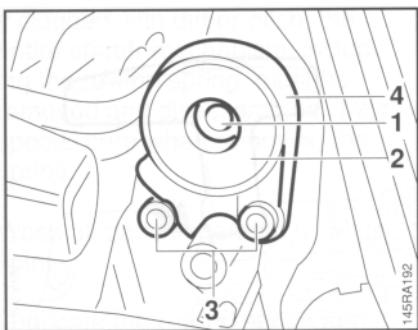
- Remove the air baffle.
- Remove the shroud.



- Pry the annular buffers out of the crankcase.

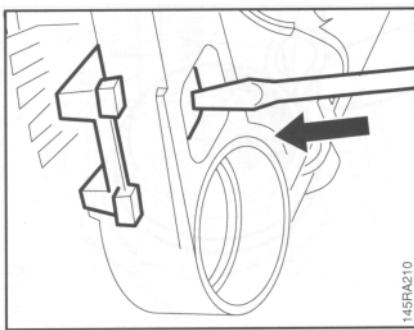


- At clutch side, push annular buffer home from outside until its groove (1) engages the housing rib (2).

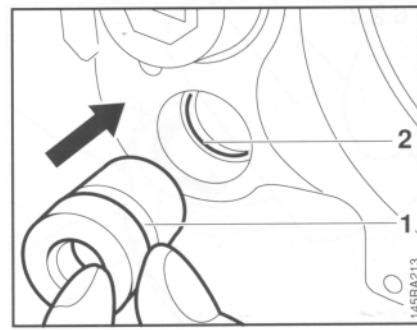


- Take out the center screw (1).
- Remove the sleeve (2).
- Take out the screws (3).
- Remove the annular buffer (4).

Note: Remove the tank housing, see 11.6, for access to the other annular buffers.

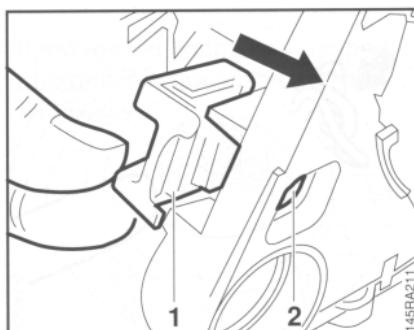


- Push the stop buffer out of its seat and take it away.



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

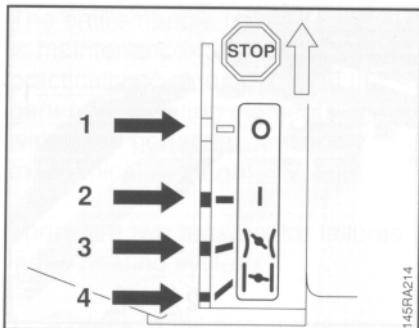
Assembly is now a reversal of the disassembly sequence.



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

8. MASTER CONTROLHANDLE SYSTEM

8.1 Switch Shaft

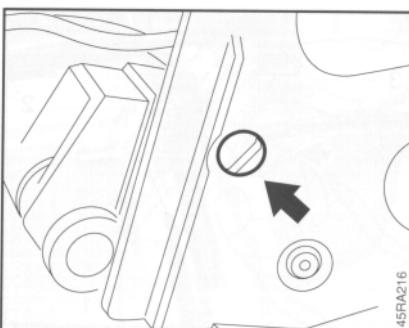


The thumb-operated Master Control lever moves the switch shaft to select the required function.

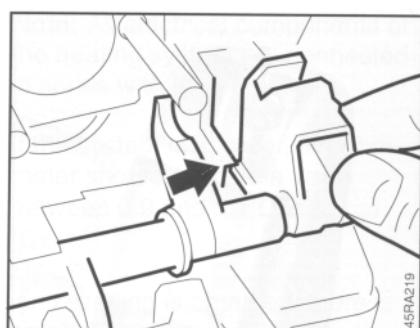
The following positions can be selected with the Master Control lever:

- STOP (1) (closes short circuit contact and interrupts ignition)
- RUN (2) (normal operating position)
- START (3) (warm start – starting throttle/choke shutter open)
- CHOKE (4) (cold start – starting throttle/choke shutter closed)

- Remove throttle rod from carburetor - see 11.2.1.

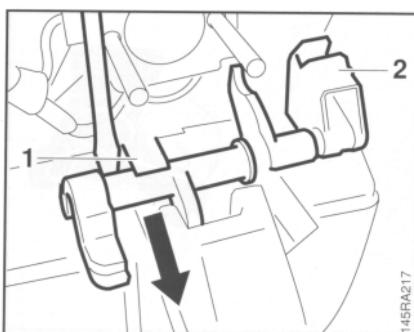


- Take out switch shaft fastening screw.

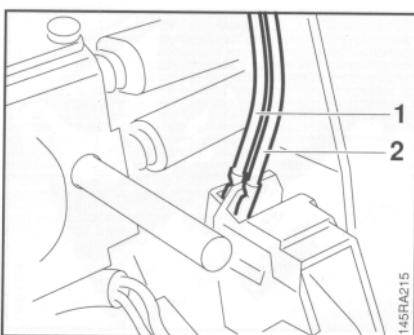


Reassemble in the reverse sequence.

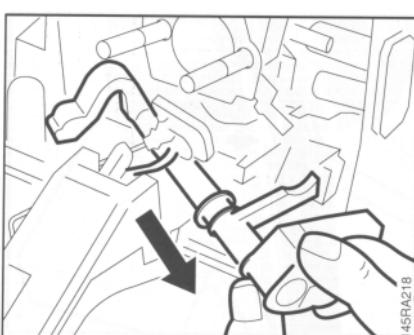
- Slide the switch housing into its guide before fitting the switch shaft in its pivot mount.



- Ease the switch shaft out of its left-hand pivot mount (1) and pull switch housing (2) out of the right-hand guide.

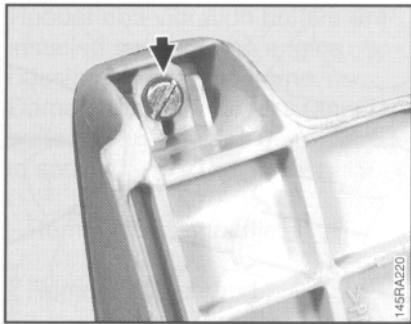


- Pull short circuit wire (1) and ground wire (2) off the contact springs.

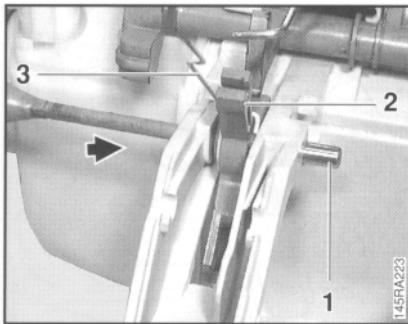


- On machines with heated handles:**
- Remove the switch shaft from under the wires to the rear handle heating element.

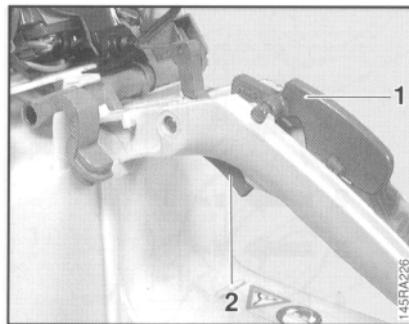
8.2 Throttle Trigger/Interlock Lever



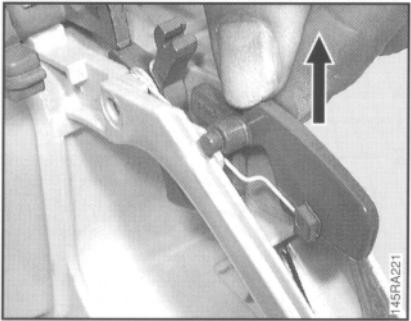
- Remove the filter base - see 11.1.
- Take out the screw.
- Remove the handle molding.



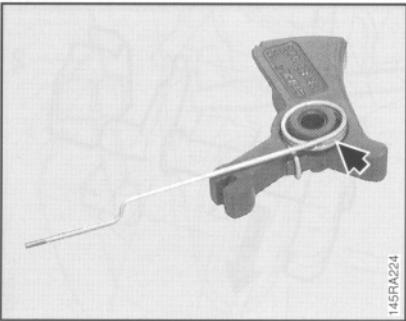
- Use a 5 mm (3/16") drift to drive out the dowel pin (1).
- Take out the throttle trigger (2) with torsion spring (3).



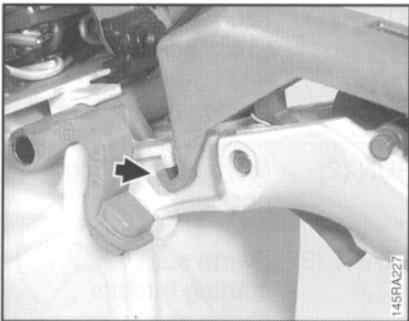
- Press the interlock lever (1) down.
- Pull the throttle trigger (2) up and move the Master Control lever (3) to "Choke".



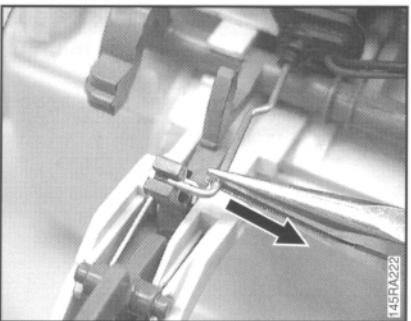
- Move Master Control lever to "Run" position.
- Take out the interlock lever.



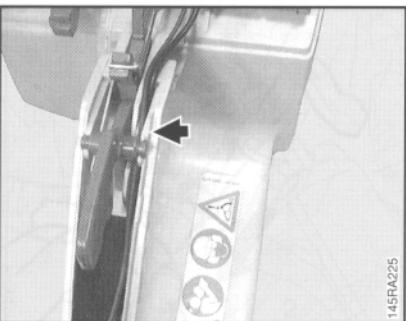
- Remove the torsion spring from the throttle trigger.
- The torsion spring must fitted under the interlock lever and locate in the notch.



- Fit the handle molding and make sure it engages properly.



- Pull the throttle rod out of the throttle trigger.



- Machines with heated handles:**
- The wires from the heating element must be under the interlock lever and locate in the channel.



- Machines with heated handles:**
- Wires must locate in slot in handle molding.
 - Fit the filter base - see 11.1.

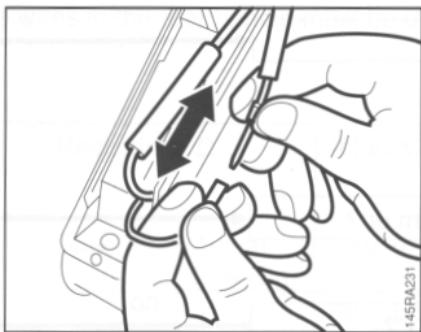
9. ELECTRIC HANDLE HEATING SYSTEM

9.1 Troubleshooting

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

There are two reasons for failures in the heating system:

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



- Separate the pin and socket connector.

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

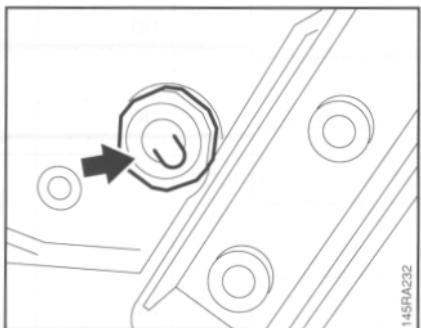
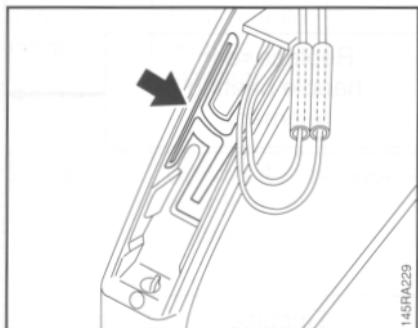
If the system is in order, the ohmmeter should indicate a value between 0.9 and 1.1 Ω in range " $\Omega \times 1$ ".

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

If the ohmmeter shows a value of less than 0.9 Ω , there is a short circuit in one of the components.

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

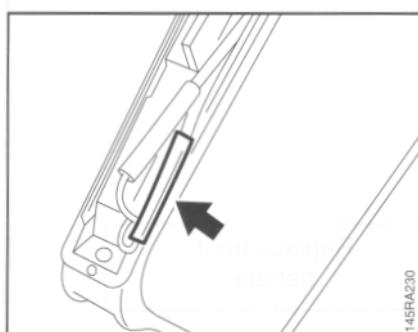
- After completing the test, reconnect the wires and slide the insulating tube over the pin and socket connector.
- Fit the interlock lever and handle molding - see 8.2.



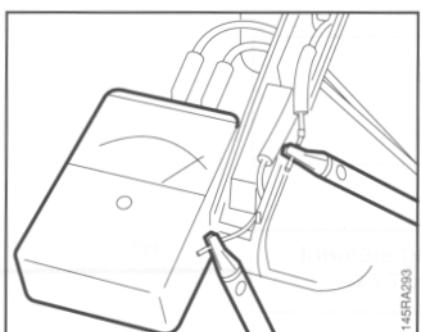
- Set the heater switch to "I".
- Set the ohmmeter to " $\Omega \times 1$ ".

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

To trace the cause of a fault:

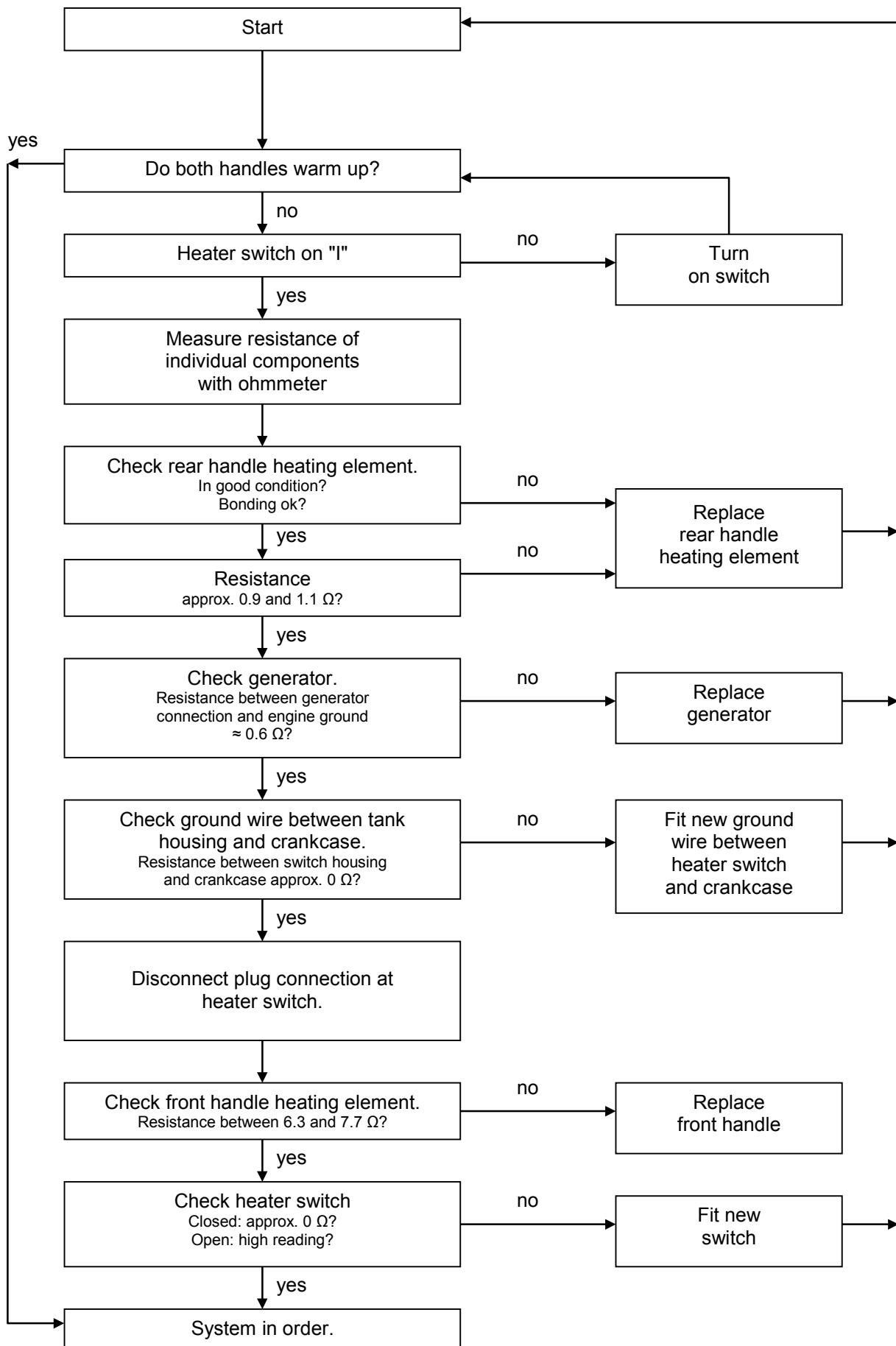


- Remove interlock lever - see 8.2.
- Slide back the insulating tube from pin and socket connector on the wire between the generator and rear handle heating element.



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

9.1.1 Troubleshooting Chart



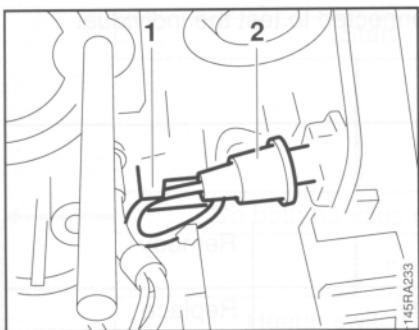
9.1.2 Test Connections and Test Values

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

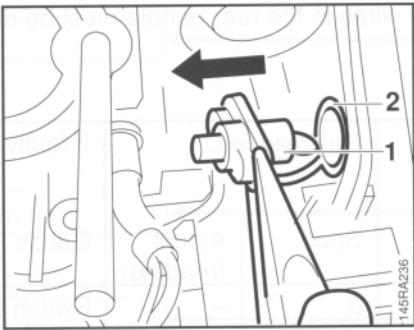
Com- ponent	Ohmmeter connection (use either test lead)		Resistance Ω		If faulty	
	Lead 1	Lead 2	Spec.	Actual (reading)	Cause	Remedy
Switch	Switch terminal ¹⁾	Ground	0	-	Switch faulty	Replace switch
Heating element in rear handle	Connector on wire from rear handle heating element	Connector on wire from rear handle heating element	0.9...1.1	approx. 0.9 - 0	Heating element OK Break in wire, heating element damaged Short circuit - damaged insulation	Replace heating element Repair insulation
Heating element in front handle	Connector on wire from front handle heating element	Ground	6.3...7.7	approx. 6.3 - 0	Heating element OK Break in wire, heating element damaged Short circuit - damaged insulation	Replace front handle Repair insulation
Generator	Connector on wire from generator	Ground	1.2	approx. 1.2 - 0	Generator OK Break in wire, generator damaged Short circuit - damaged insulation	Replace generator Repair insulation

¹⁾ Pull off wire to make connection

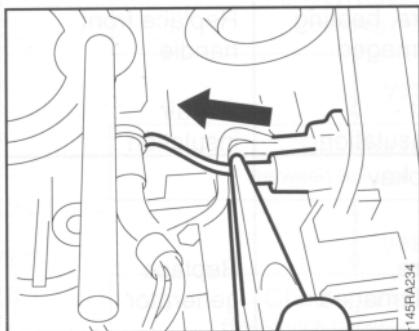
9.2 Heater Switch



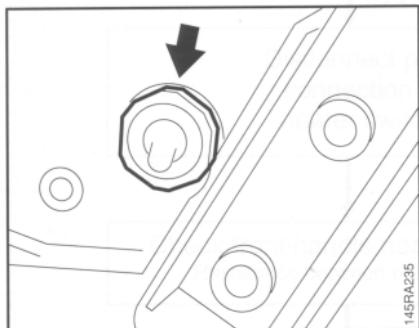
- Remove carburetor - see 11.2.1.
- Pull wire out of retainer (1).
- Push back the rubber grommet (2) a little.



- Remove heater switch (1) from inside housing.
- Fit new heater switch in ground wire's cable lug (2).
- Position heater switch in housing bore.

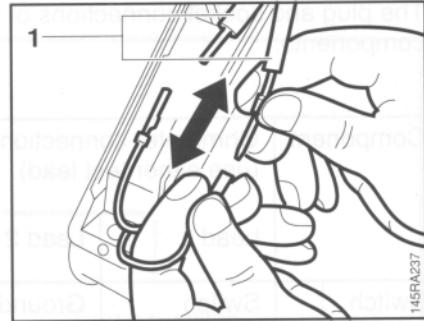


- Pull the connector sleeve out of the heater switch.
- Fit the washer.
- Fit the nut and tighten down firmly.
- Plug the connector sleeve into the switch.
- Slide the rubber grommet over the switch.
- Push the wire into the retainer.
- Install the carburetor - see 11.2.1.

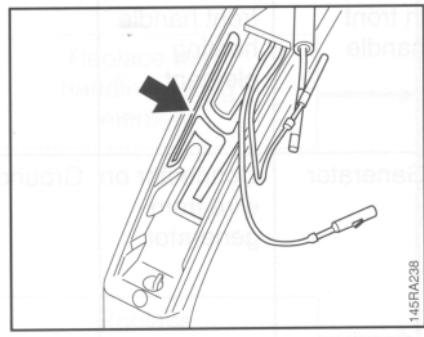


- Unscrew the nut from the switch.
- Remove the washer.

9.3 Heating Element in Rear Handle



- Remove the interlock lever – see 8.2.
- Slide the two insulating tubes (1) off the pin and socket connectors.
- Separate the connectors of the handle heating system.



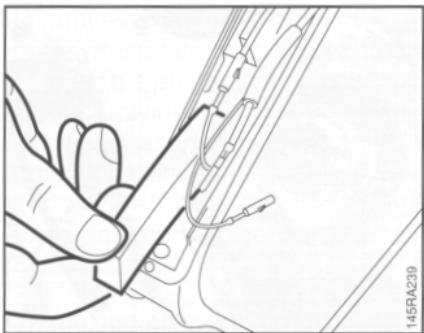
- Take the pressure pad and heating element out of the handle recess.

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

- Remove the backing from the new heating element.
- Press the heating element firmly and uniformly into position, taking special care at the corners and along the edges.

Important: Avoid creases. If the heating element is not fitted perfectly flat, heat transfer will be interrupted and the element may fail as a result of overheating. The ambient temperature during installation should not be less than 15°C (60°F).

9.4 Heating Element in Front handle



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

- Remove carburetor - see 11.2.1.
- Remove the interlock lever - see 8.2.
- Slide the insulating tube off the pin and socket connector of the wire between the front handle heating element and the rear handle heating element.

- Pull the connecting wire out of the heater switch - see 9.2.

- Remove the front handle – see 11.6.

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

- Reconnect the two wires.

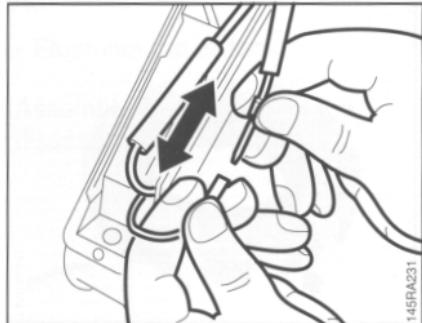
- Slide the insulating tubes over the pin and socket connectors.

- Fit the interlock lever - see 8.2.

Check operation of heating element:

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

Note: The heat generated during this process also helps the element's adhesive set faster.



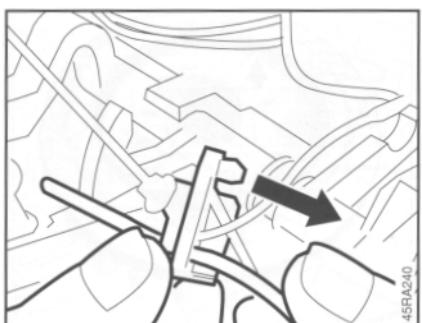
- Separate the pin and socket connector in the rear handle.



- Pull the wires out of the bore.

Installation is a reversal of the removal sequence.

- Position connecting wires in the recess (1) when installing the front handle.

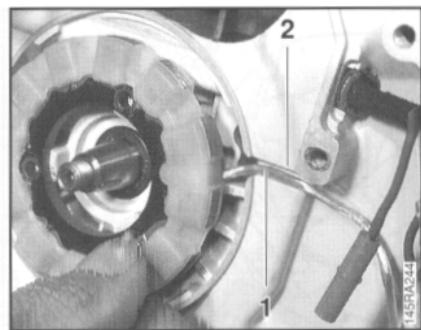


- Pull the wires out of the rubber grommet.

9.5 Generator

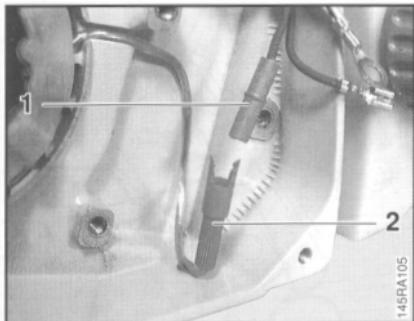
- Remove the ignition module – see 5.1.2.
- Remove the flywheel - see 5.3.

Remove the generator.

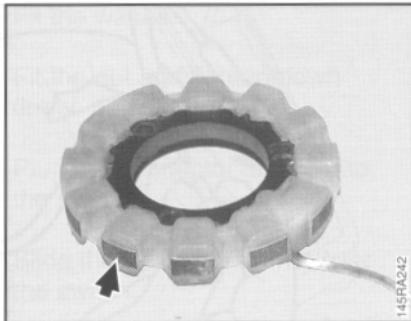


Reassemble in the reverse sequence.

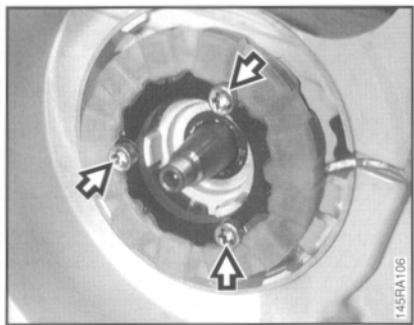
- Place the generator in position with the connecting wire (1) against the crankcase.
- Connecting wire must locate in crankcase recess (2).
- Coat screw threads with Loctite, - see 12.2, and tighten down to 3.5 Nm (2.6 lbf.ft).



- Pull the pin (1) out of the socket (2).

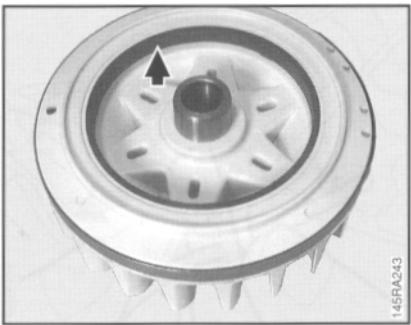


- Inspect generator and poles for cracks or other damage. If damage is found, replace the generator.



- Take out the screws.

Note: The screws are secured with Loctite and may be difficult to remove.



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

10. CHAIN LUBRICATION

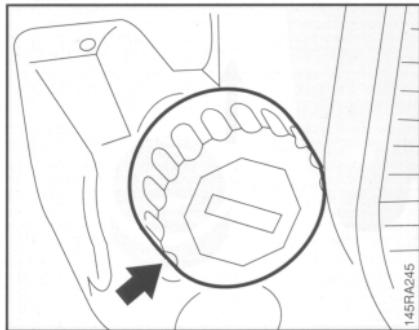
10.1 Pickup Body/Suction Hose

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

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

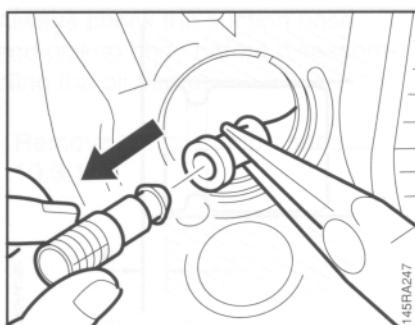
Pickup body

- Remove the oil filler cap.



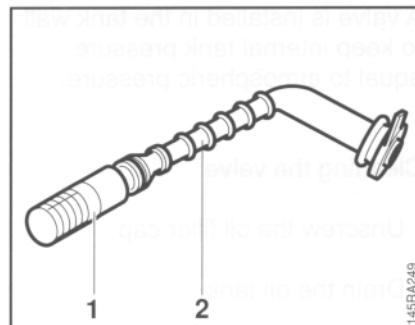
- Unscrew oil filler cap and drain the oil tank.

Note: Collect chain oil in a clean container or dispose of properly.



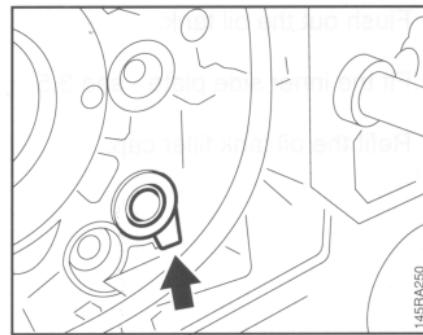
- Pull the pickup body out of the oil suction hose.
- Wash the pickup body in white spirit and, if possible, blow out with compressed air.
- Always replace a damaged pickup body.
- Flush out the oil tank.

Assembly is a reversal of the disassembly sequence.



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

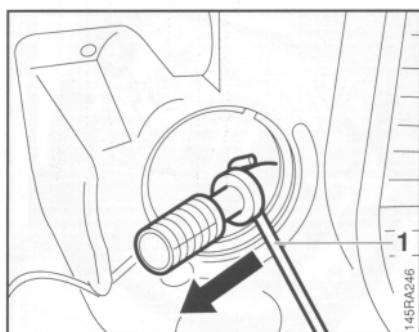
Reassemble in the reverse sequence.



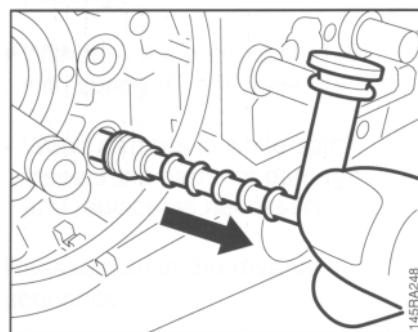
Suction hose

- Remove the oil pump - see 10.3.
- Use pliers to grip the tab of the oil hose and pull it out of the bore.

- Insert suction hose in bore.
- Use a blunt tool to push the end of the suction hose into the crankcase so that the tab locates at its seat at the bottom right.
- This operation is easier if the bead of the hose is lubricated with a little oil.



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



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

Note: Avoid stretching the oil hose.

10.2 Valve

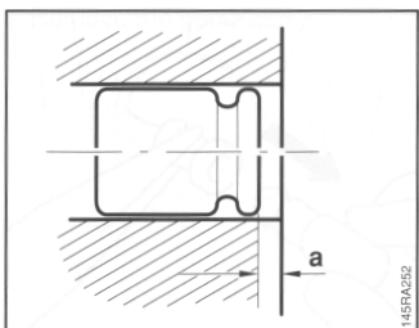
A valve is installed in the tank wall to keep internal tank pressure equal to atmospheric pressure.

Cleaning the valve

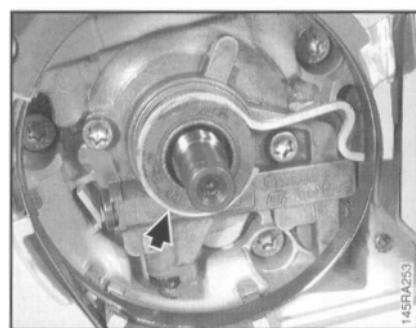
- Unscrew the oil filler cap.
- Drain the oil tank.

Note: Collect chain oil in a clean container or dispose of properly.

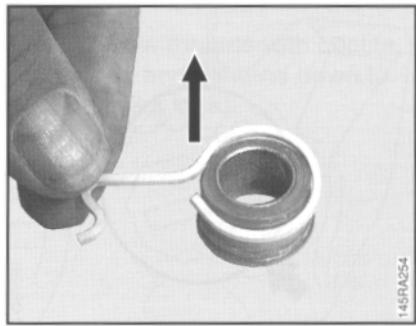
- Remove the inner side plate – see 3.4.
- Blow valve clear with compressed air - from outside to inside of tank.
- Flush out the oil tank.
- Fit the inner side plate - see 3.5.
- Refit the oil tank filler cap.



10.3 Oil Pump 10.3.1 Removal and Installation

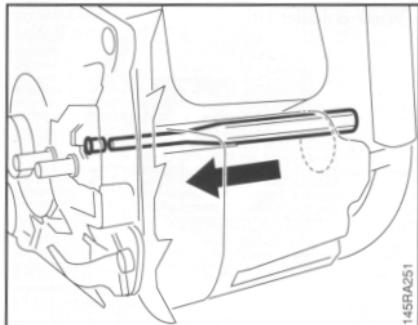


- Remove the clutch - see 3.2.
- Pull the worm with drive spring out of the oil pump and off the crankshaft stub.



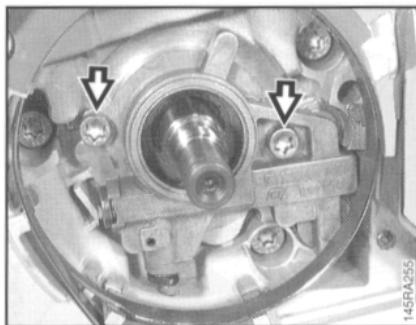
Replacing the valve

- Unscrew the oil filler cap.
- Remove the inner side plate – see 3.4.



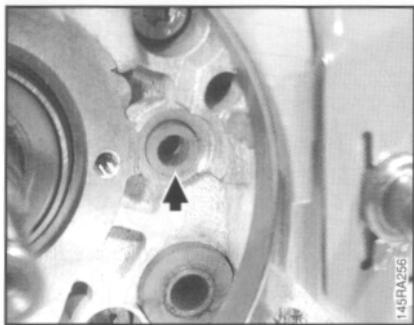
- Use a 5 mm (3/16") drift to carefully drive the vent valve out of the crankcase from inside the oil tank.

- If necessary, remove the drive spring from the worm.



- Take out the screws.
- Remove the oil pump.

10.3.2 Servicing



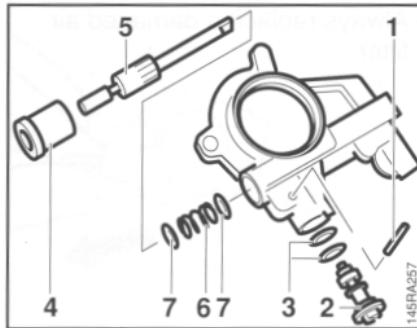
Always check the suction hose and pickup body before disassembling the oil pump.

- Remove the oil pump – see 10.3.1.

- Take the sealing ring out of the crankcase bore.

Reassemble in the reverse sequence.

- Lubricate the worm gear with grease before installing – see 12.2.



- Use a 2 mm (5/64") drift to drive out the spring pin (1).
- Pull out the control bolt (2).
- Remove the O-rings (3).
- Pry the plug (4) out of the housing.
- Withdraw the pump piston (5) with spring (6) and washers (7).

- Wash all parts in white spirit. Inspect the parts for damage and replace as necessary.

Reassemble in the reverse sequence.

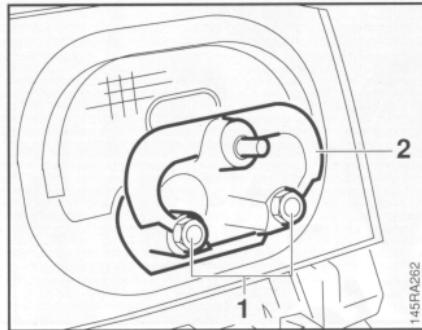
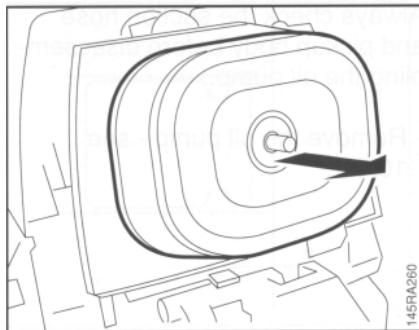
- Always install new O-rings.
- Coat pump piston and worm with grease, see 12.2, before installing.

11. FUEL SYSTEM

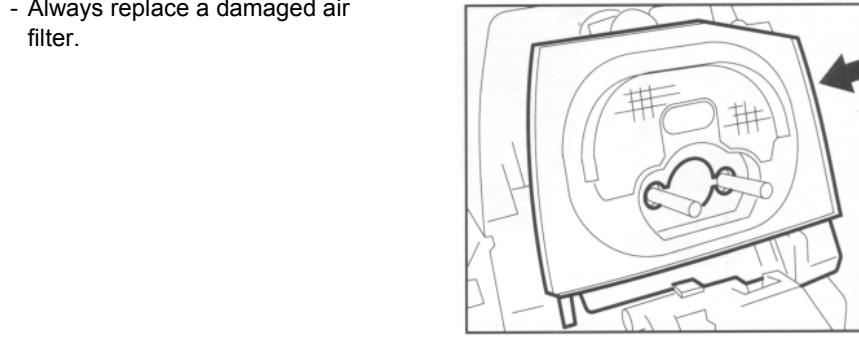
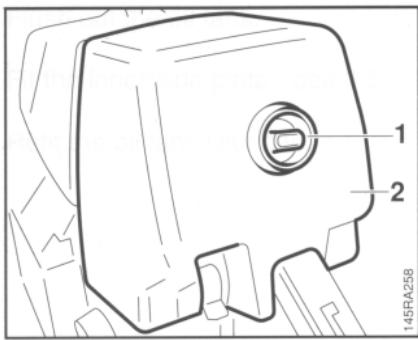
11.1 Air Filter

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

The air filter should always be cleaned when engine power begins to drop off.



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

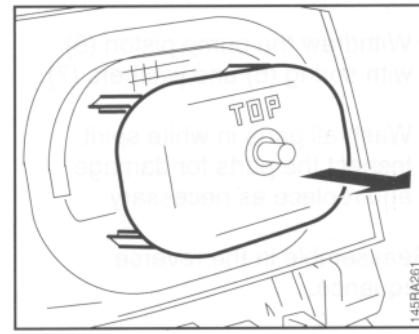
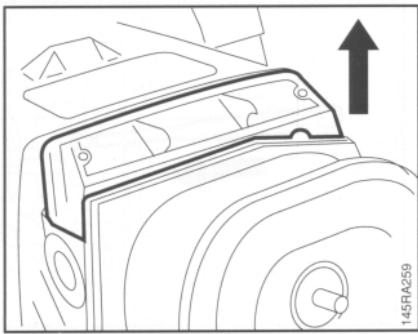


- Unscrew the twist lock (1).
- Remove the carburetor box cover (2).

- Remove the filter base.
- Wash filter mesh in a fresh, non-flammable cleaning solution (e.g. warm soapy water) and, if possible, blow out with compressed air. Soften encrusted dirt by soaking parts in cleaning solution.

Note: If filter mesh is damaged, replace filter base.

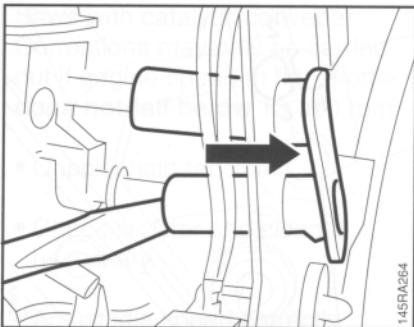
Reassemble in the reverse sequence.



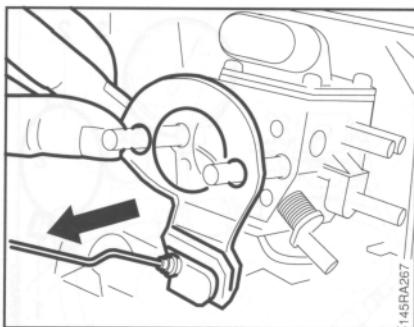
- Pull off the air baffle upward.
- Pull off the baffle in the direction of arrow. Baffle is clipped to the flange.

11.2 Carburetor

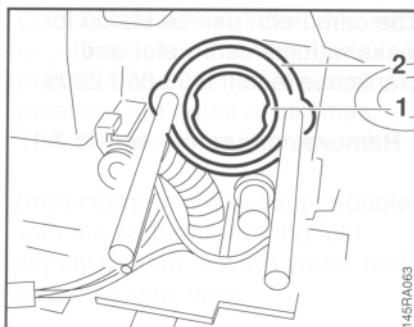
11.2.1 Removal and Installation



- Remove the filter base - see 11.1.
- Pull the grommet off the adjusting screws and out of the housing.

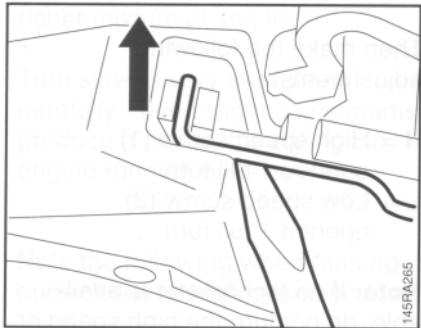


- Remove the baffle plate with grommet and throttle rod.

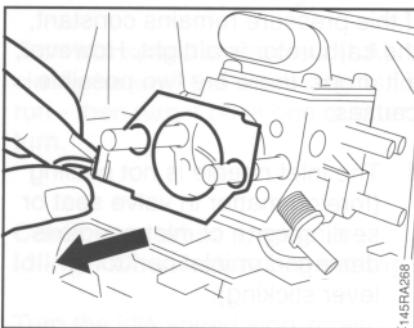


Reassemble in the reverse sequence.

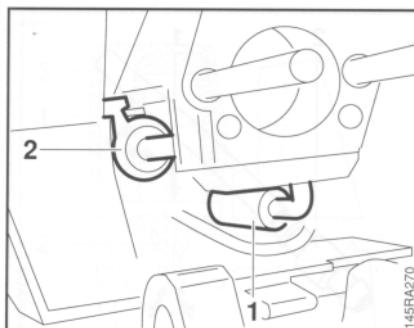
- Before installing the carburetor, check that sleeve (1) and washer (2) are in position.



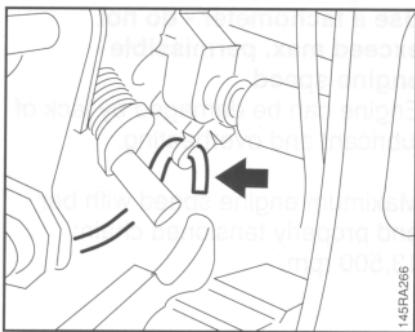
- Pry the throttle rod off the throttle trigger.



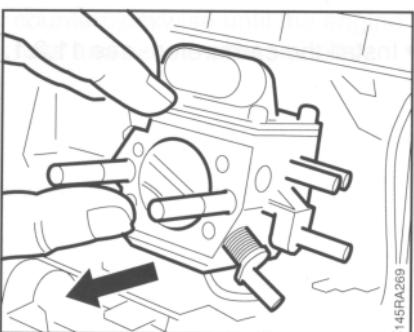
- Machines with carburetor heating:**
- Pull the heating element off the studs.



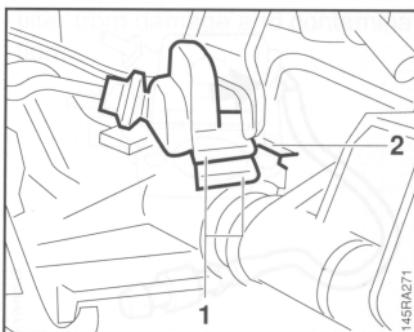
- After pushing carburetor into position, check that elbow connectors are properly seated in impulse hose (1) and fuel hose (2).



- Disconnect throttle rod from the throttle shaft.



- Remove carburetor from mounting studs.
- Separate pin and socket connector for thermostatic switch – see 11.9.

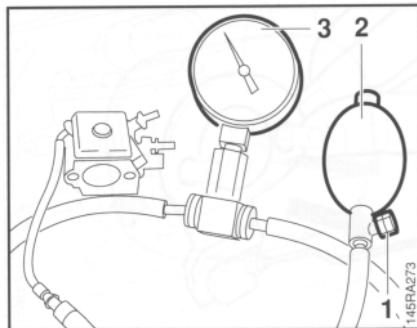


- Fit the grommet so that the rubber tabs (1) are on the housing rib (2).

11.2.2 Leakage Test

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

- Remove carburetor - see 11.2.1.



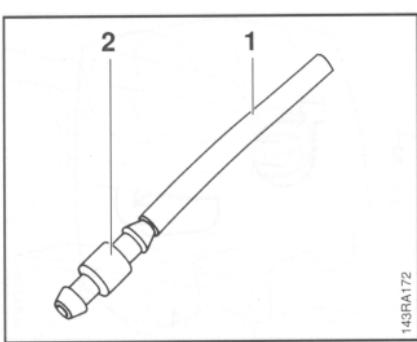
- Push the nipple into the tester's pressure hose.
- Close the vent screw (1) on the rubber bulb (2) and pump air into the carburetor until the pressure gauge (3) shows a reading of approx. 0.4 bar (5.8 psi).

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

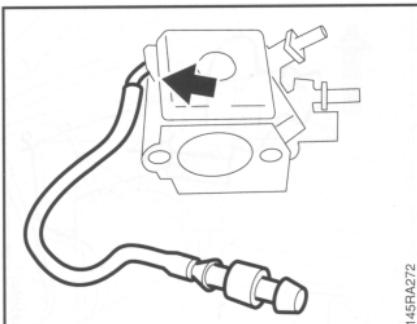
1. The inlet needle is not sealing (foreign matter in valve seat or sealing cone of inlet needle is damaged or inlet control lever sticking).
2. The metering diaphragm is damaged.

In either of these cases the carburetor must be removed and serviced.

- After completing the test, open the vent screw and pull the fuel line off the elbow connector.
- Install the carburetor - see 11.2.1.

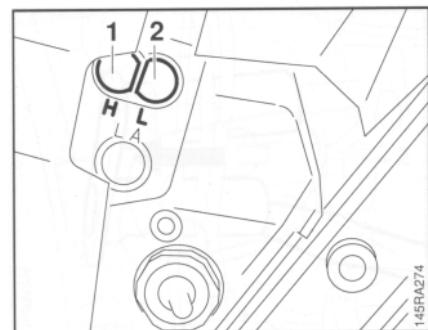


- Push the fuel line (1) 1110 141 8600 onto the nipple (2) 0000 855 8600.



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

11.2.3 Adjustment



Standard setting

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

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

Then make the following adjustments:

H = High speed screw (1)
opened 1 full turn

L = Low speed screw (2)
opened 1 full turn

Note: If no tachometer is available, do not turn the high speed or low speed screws beyond the standard setting to make the mixture leaner.

If the saw is used at high altitudes (mountains) or near sea level:

For corrections to high speed adjusting screw (**H**):

Use a tachometer - do not exceed max. permissible engine speed.

Engine can be damaged by lack of lubricant and overheating.

Maximum engine speed with bar and properly tensioned chain:
13,500 rpm.

11.3 Tank Vent

Saws with catalytic converter:
Corrections may only be carried
out if engine speed at full throttle
does not fall below 13,000 rpm.

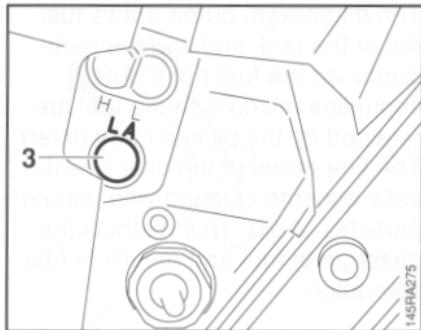
- Check chain tension.
- Check air filter and clean if necessary.
- Adjust idle speed correctly (chain must not rotate).
- Start the saw – warm up the engine.

Turn high speed screw (**H**) and low speed screw (**L**) clockwise for leaner mixture at high altitudes or counterclockwise for richer mixture at sea level.

Turn screws very slowly and carefully - even slight adjustments produce a noticeable change in engine running behavior.

Note the following when making corrections to high speed screw:

The setting of the high speed screw (**H**) affects the maximum off-load engine speed.
If the setting is too lean, the maximum permissible engine speed will be exceeded and increase the risk of engine damage.



Adjusting idle speed

A correction at the low speed screw (**L**) usually necessitates a change in the setting of the idle speed screw (**LA**).

Engine stops while idling – Check standard setting

Turn idle speed stop screw (**LA**) clockwise until the chain begins to run - then turn it back one quarter turn.

Chain runs while engine is idling - Check standard setting

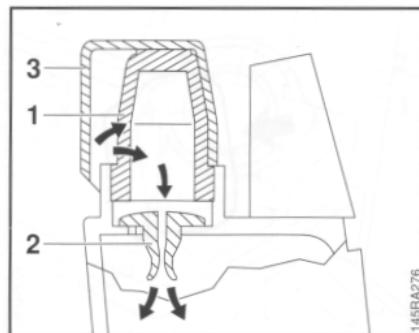
Turn the idle speed stop screw (**LA**) counterclockwise until the chain stops running - and then turn it about another quarter turn in the same direction.

Erratic idling behavior, poor acceleration

Idle setting too lean. Turn the low speed screw (**L**) counterclockwise until the engine runs and accelerates smoothly.

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



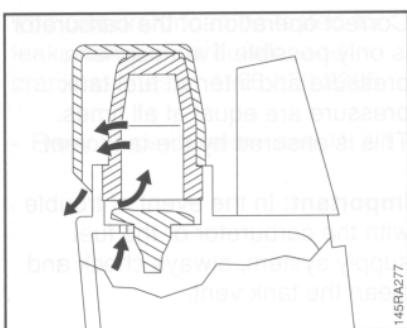
Equalization of pressure from the outside inwards takes place via the sintered filter (1) and the valve (2).

Note: The sintered filter helps prevent dirt entering the valve or the tank.

The cap (3) protects the sintered filter from damage and contamination.

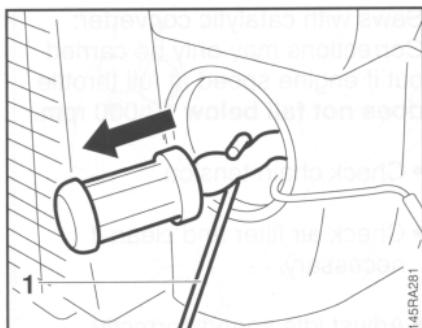
11.4 Pickup Body

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.



Equalization of pressure from the inside outwards takes place via the bore in the tank, the valve and sintered filter.

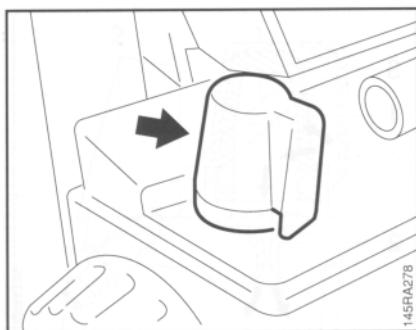
Important: In the event of trouble with the fuel supply system, always check the fuel tank and the pickup body first. Clean the fuel tank if necessary.



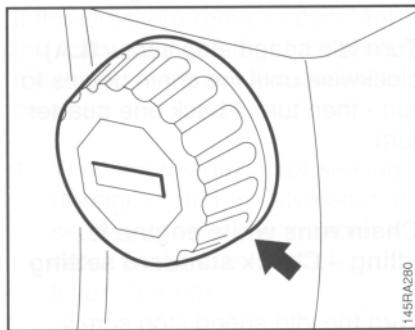
Pickup body

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

Note: Do not stretch the fuel hose while removing it.



- Pull off the cap (1).



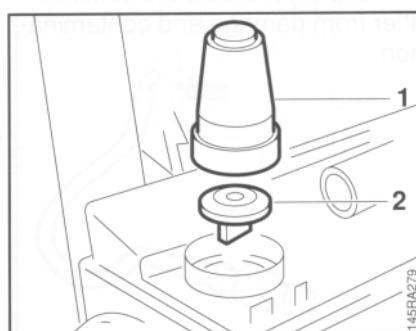
Cleaning the fuel tank

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

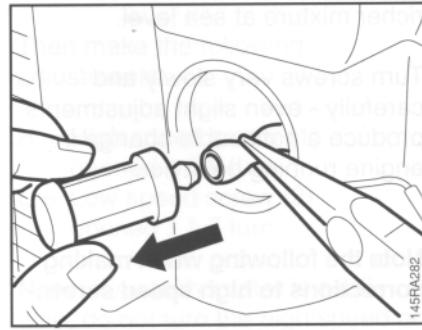
- Pull the pickup body off the fuel hose.

- Fit a new pickup body.

Reassemble in the reverse sequence.

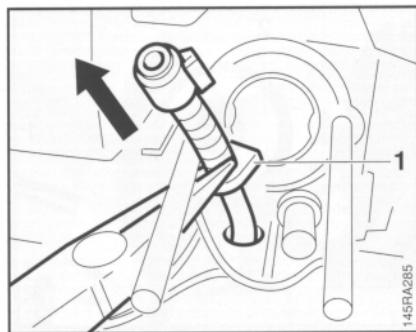


- Pull the sintered filter (1) and valve (2) out of the tank.



11.5 Fuel Hose

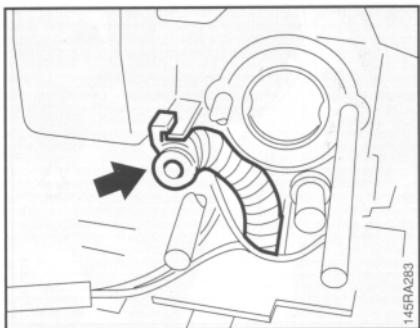
- Remove carburetor - see 11.2.1.
- Pull off the pickup body – see 11.4.



- Remove the fuel hose.

Reassemble in the reverse sequence.

- Coat the flange of the fuel hose with a little oil.
- Straight side (1) of flange must locate against tank housing.



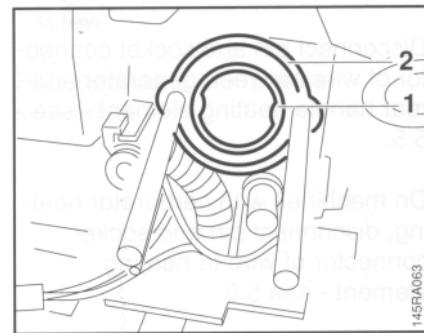
- Pull the fuel tank off the retainer on the tank housing.

11.6 Tank Housing

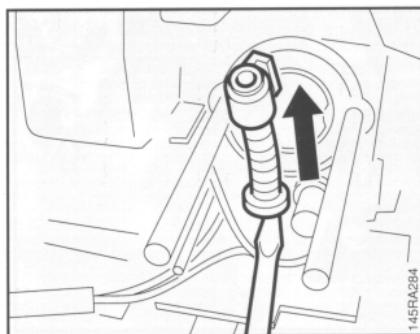
- Drain the tank housing.

Note: Collect fuel in a clean container or dispose of at approved disposal site.

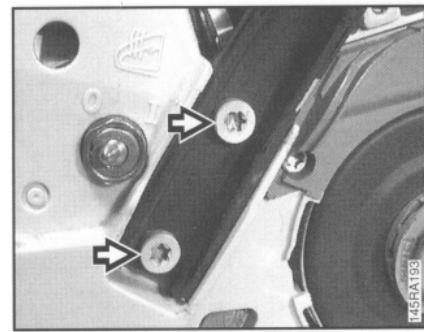
- Remove carburetor - see 11.2.1.



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

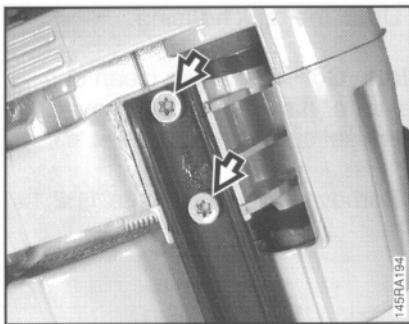


- Pry the flange of the fuel hose out of the fuel tank.



Important: Heat the screwed joints. Do not overheat polymer.

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

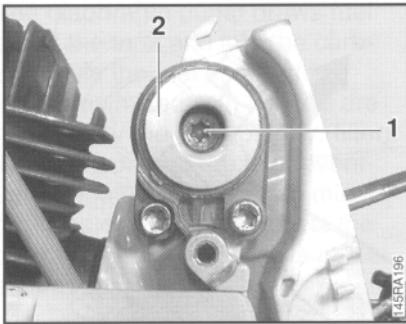


- Take out the front handle mounting screws on the underside of the machine.
- Remove the front handle.

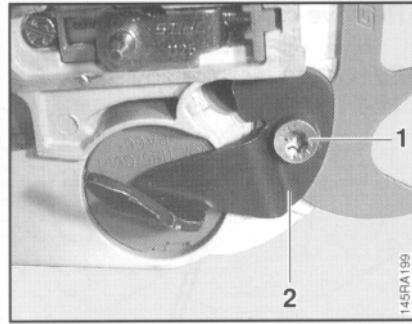
Note: On machines with heated handles, remove the front handle – see 9.4.

Disconnect pin and socket connector of wire between generator and rear handle heating element – see 5.5.

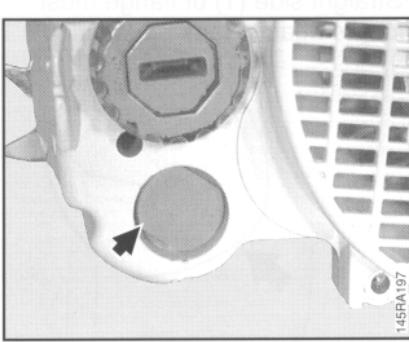
On machines with carburetor heating, disconnect pin and socket connector of wire to heating element - see 5.5.



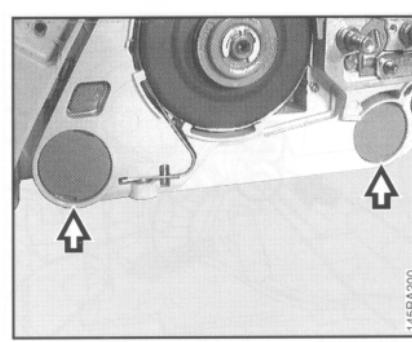
- Unscrew the center screw (1) from the upper annular buffer.
- Remove the sleeve (2).



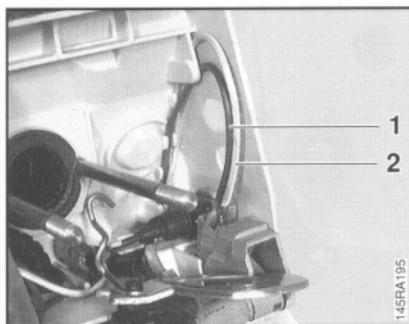
- Remove the inner side plate – see 3.4.
- Take out the screw (1).
- Remove the chain catcher (2).



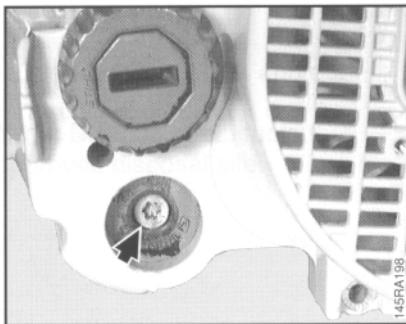
- Pry the plug out of the annular buffer at the starter side.



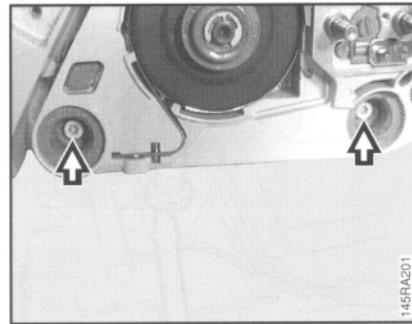
- Pry the plugs out of the annular buffers at the clutch side.



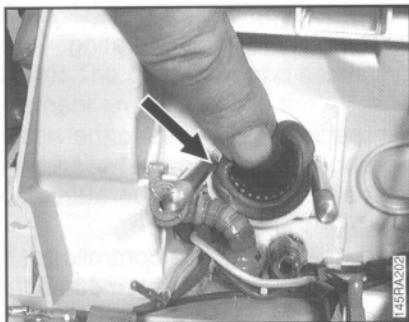
- Pull short circuit wire (1) and ground wire (2) off the contact springs.



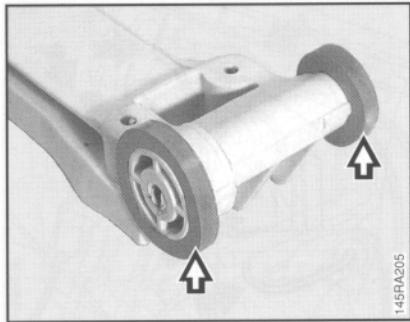
- Take the screw out of the buffer.



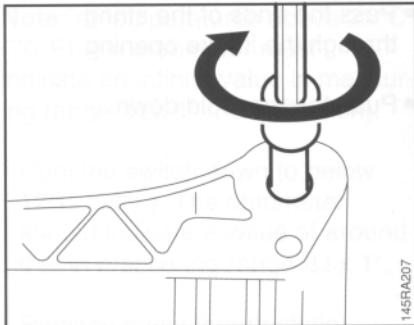
- Take out the annular buffer mounting screws.



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

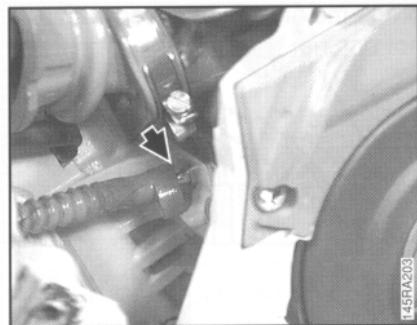


- Remove the rings from the tank housing.
- To replace the impulse hose, remove the fuel hose, switch shaft, throttle lever and tank vent.



- Fit an M6x10 screw with washer in the thread insert.
- Screw the thread insert into the tank housing.
- An M6x18 pan head screw must then be used in place of the original special self-threading screw.

Reassemble in the reverse sequence.

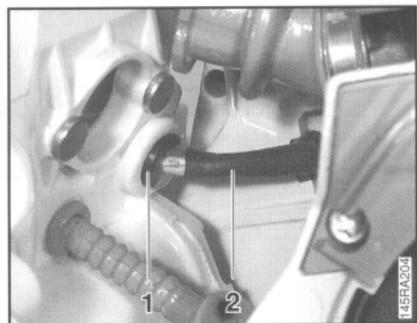


- Pull the impulse hose off the nipple.

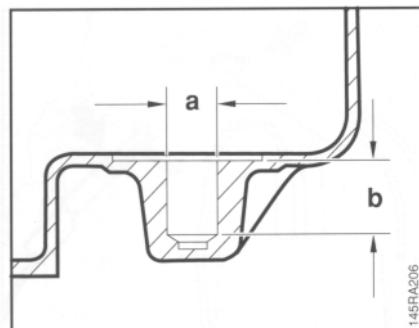
On machines with heated handles:

- Remove the heater switch.

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

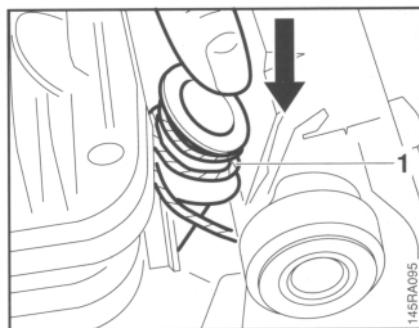


- Turn the tank housing to one side.
- Pry the grommet (1) out of the housing and withdraw the wiring harness (2).



- The stripped thread must be drilled out to a diameter of 'a' = 8.5 mm and a depth of 'b' = 15 mm (approx. 9/16").

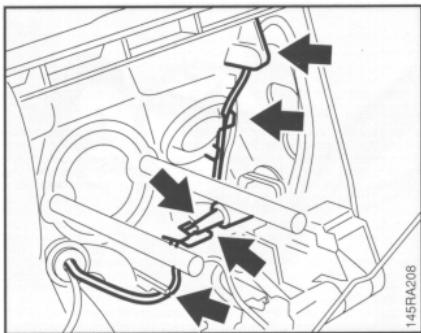
Caution: Do not exceed the specified hole depth of 15 mm.



- Fit the manifold in the tank housing intake opening as follows: Wind a piece of string (approx. 15 cm / 6" long) around the back of the manifold flange.

11.7 Carburetor Heating System

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



- All wires must be properly located in their retainers.
- Coat threads of front handle mounting screws with Loctite, see 12.2, and torque down to 8.0 Nm (5.9 lbf.ft).

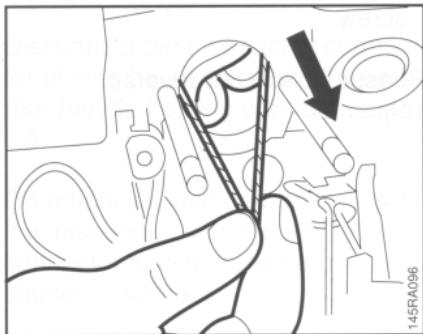
Power is supplied by the generator for the electric handle heating system.

Current is fed via wires to the heating element fitted between the baffle plate and carburetor.

Carburetor heating is controlled automatically via the thermostatic switch on the carburetor.

The carburetor heating system should be checked if running problems occur when the cold engine is idling or running at part load, particularly at freezing temperatures.

A fault in the carburetor heating system is also possible if running problems are experienced with a hot engine.



- Pull the ends of the string outward.

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

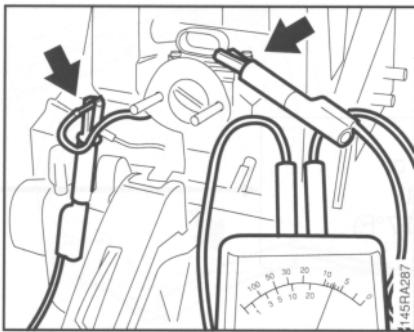
11.7.1 Testing

Complete system:

Note: The generator and heating element are checked in the following test which should be performed at an ambient temperature of at least 25°C (77°F).

If the temperature is lower than 11 °C (52°F), the thermostatic switch may close and produce false readings.

Test the thermostatic switch separately.

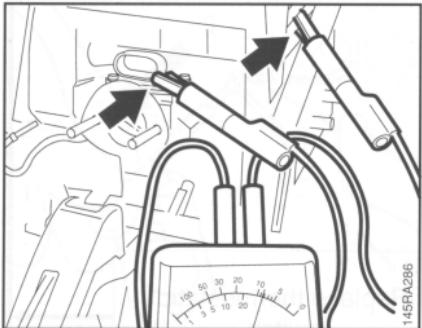


Note: at temperatures above 21 °C (70°F), the ohmmeter must indicate an infinite value in measuring range "Ω x 1 " (no deflection).

- Cool the switch down to below 12°C (54°F). The ohmmeter should indicate a value of around 0 Ω in measuring range "Ω x 1 ".
- Replace faulty thermostatic switch.

Heating element:

- Disconnect pin and socket connector to heating element.
- Hold one of the two test leads against the carburetor body and the other against the heating element's pin and socket connector.
- If the heating element is in good condition the ohmmeter will show a reading of approx. 8 Ω in measuring range "Ω x 1 ".

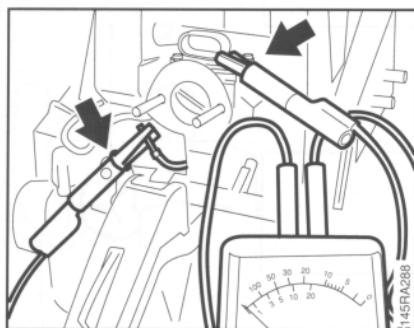


- Remove the filter base - see 11.1.
- Set ohmmeter to "Ω x 1 ".
- Clip one of the two test leads to the carburetor body and the other to a cylinder fin.
- If the system is in good condition the ohmmeter will indicate 8 Ω in measuring range "Ω x 1 ".

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

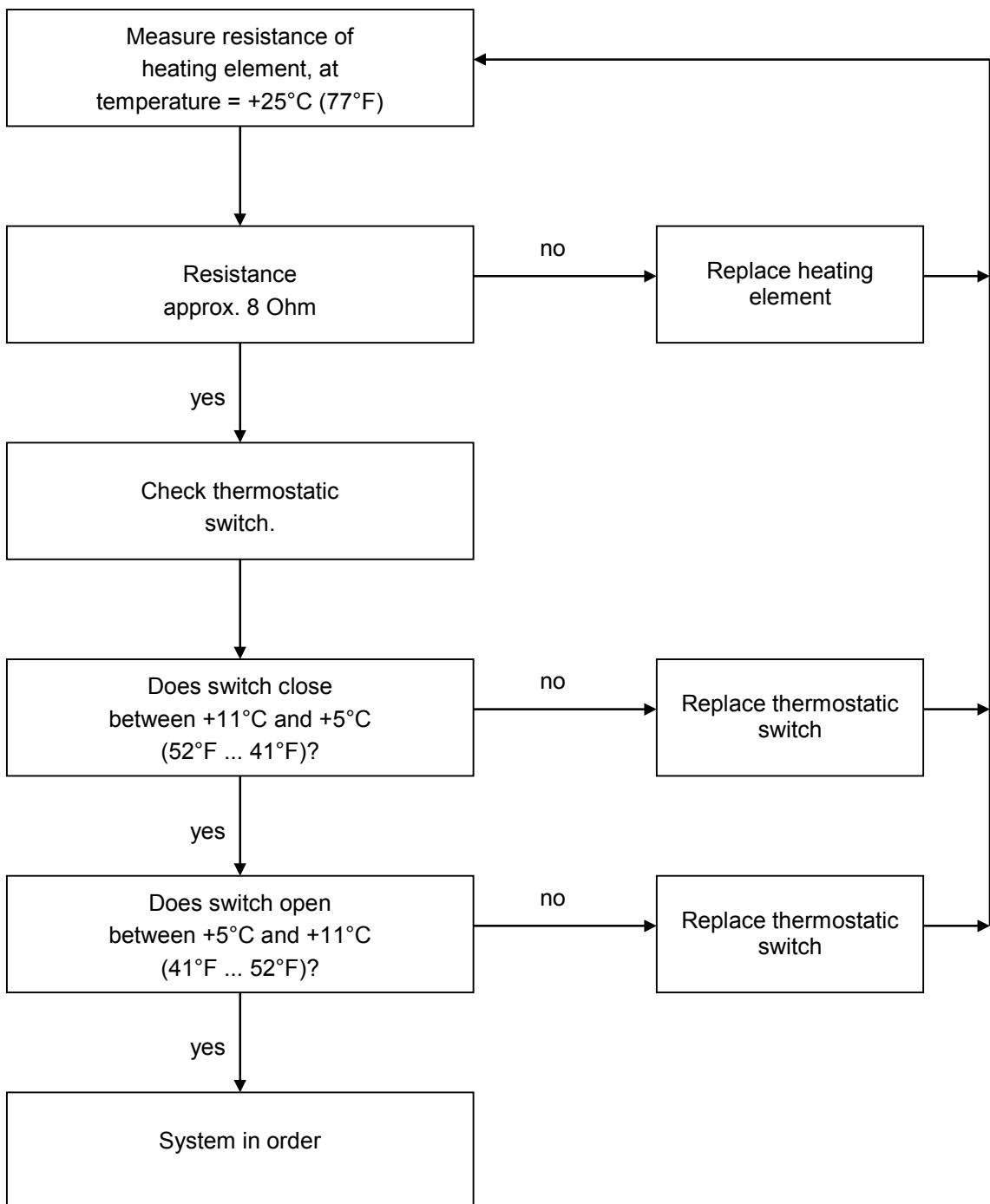
Thermostatic switch:

- Disconnect pin and socket connector to thermostatic switch.

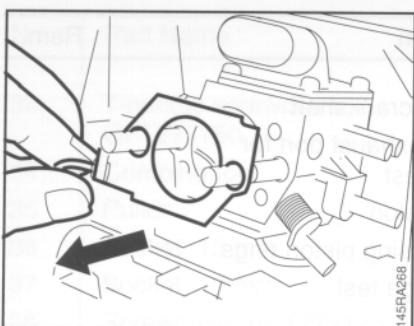


- Clip one of the two test leads to the carburetor body and the other to the pin and socket connector to the thermostatic switch.

11.7.2 Troubleshooting Chart

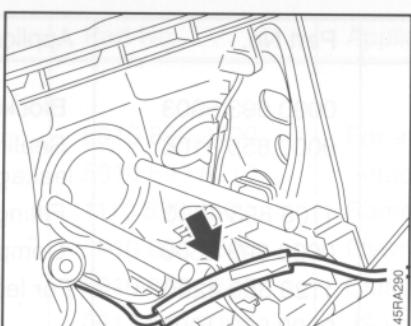


11.8 Heating Element



- Pull the baffle plate off the carburetor - see 11.2.1.
- Remove the heating element.

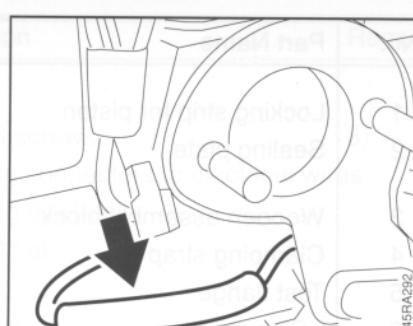
11.9 Thermostatic Switch



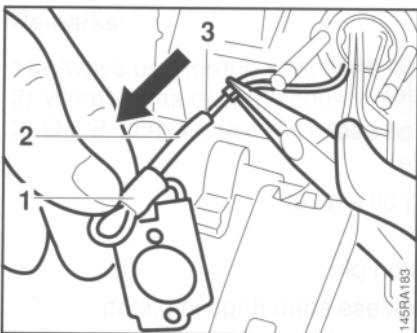
- Pull the carburetor off the mounting studs - see 11.2.1.
- Slip the insulating tube off the pin and socket connector.

Note: Do not bend or twist the pin and socket connector during removal or installation.

- Disconnect the pin and socket connector.

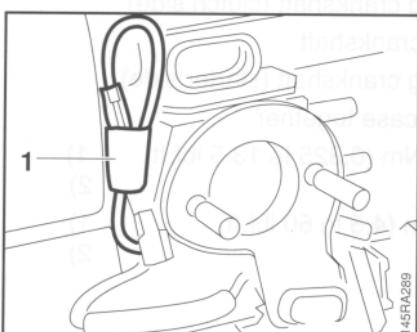


- Reassemble in the reverse sequence.
- After fitting the baffle plate, position the pin and socket connector so that it is straight.

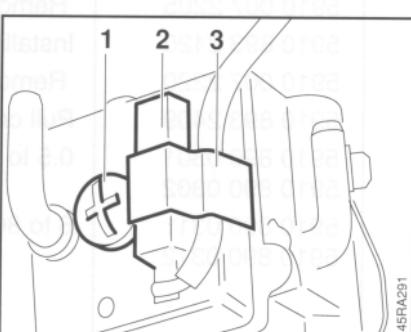


- Pull off tube (1) and push back tube (2) to expose connector.
- Disconnect the pin and socket connector (3).

Reassemble in the reverse sequence.



- After fitting the baffle plate, make a loop in the wire, push on the tube (1) and place it next to the carburetor..



- Release the screw (1).
- Pull out the thermostatic switch (2) from behind the retainer (3).

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	Sealing plate	0000 855 8106	Sealing exhaust port for leakage test	
3	Wooden assembly block	1108 893 4800	Fitting piston	
4	Clamping strap	0000 893 2600	Compressing piston rings	
5	Test flange	1128 850 4200	For leakage test	
6	- Sleeves	0000 963 1008		
7	Carburetor and crankcase tester	1106 850 2905	Testing carburetor and crankcase for leaks	
8	Vacuum pump	0000 850 3501	Testing crankcase for leaks	
9	- Nipple	0000 855 9200		
10	- Fuel line	1110 141 8600		
11	- Plug	1122 025 2200		
12	Puller	0000 890 4400	Removing oil seals	
13	- Jaws (No. 3.1)	0000 893 3706		
14	- Jaws (No. 6)	0000 893 3711		
15	Press sleeve	1115 893 4600	Installing oil seal (starter side)	
16	Press sleeve	1118 893 4602	Installing oil seal (clutch side)	
17	Assembly sleeve	1118 893 2401	Protecting oil seal at clutch side	
18	Assembly drift	1111 893 4700	Fitting piston pin	
19	Installing tool 12	5910 890 2212	Fitting hookless snap rings in piston	
20	Stud puller M8	5910 893 0501	Removing bar mounting studs	
21	Assembly tool	1116 893 4800	Installing rewind spring	
22	Setting gauge	1111 890 6400	Setting air gap between ignition module and flywheel	
23	Assembly hook	5910 893 8800	Removing pickup bodies	
24	Assembly stand	5910 890 3100	Holding saw for repairs	
25	- Clamping bar	5910 890 2005		
26	Assembly tube	1117 890 0900	Attaching the brake spring	
27	Service tool AS	5910 007 2205	Removing crankshaft (clutch side)	
28	- Screw sleeve	5910 893 2420	Installing crankshaft	
29	Service tool ZS	5910 007 2220	Removing crankshaft (starter side)	
30	- Screw sleeve	5910 893 2409	Pull crankcase together	
31	Torque wrench	5910 890 0301	0.5 to 18 Nm (0.325 to 13.5 lbf.ft)	1)
		5910 890 0302		2)
32	Torque wrench	5910 890 0311	6 to 80 Nm (4.5 to 60 lbf.ft)	1)
		5910 890 0312		2)

No.	Part Name	Part No.	Application	Rem.
33	T-handle screwdriver QI-T27x150	5910 890 2400	For all IS screws	3)
34	Crimping tool	5910 890 8210	Attaching connectors to electrical wires	
35	Puller	1110 893 4500	Removing flywheel	
36	Socket, 13 mm	5910 893 5608	Flywheel nut	
37	Socket, 19 mm	5910 893 5613	Clutch	
38	Screwdriver bit T27x125	0812 542 2104	IS screws	
39	Press arbor	1118 893 7200	Removing and installing ball bearing (clutch side)	
40	Press arbor	1120 893 7200	Removing and installing ball bearing (starter side)	
41	Circlip pliers A 19 DIN 5254	0811 611 8380	Removing retaining ring on crankshaft	

Remarks:

- 1) Always use torque wrench to tighten 'P' screws.
- 2) Wrench has optical/acoustic signal.
- 3) On 'P' screws, use for releasing only.

12.2 Servicing Aids

No.	Part Name	Part No.	Application
1	Lubricating grease	0781 120 1111	Oil seals, oil pump drive, chain sprocket bearing
2	Standard commercial, solvent-based degreasant without chlorinated or halogenated hydrocarbons		Cleaning crankshaft stub
3	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in starter cover
4	Ignition lead HTR (10 m/33')	0000 930 2251	
5	Electrician's repair kit	0000 007 1013	
6	Graphite grease		Peg on starter pawl
7	Dirko sealant (100 g/3.5 oz)	0783 830 2120	Outside diameter of oil seals
8	STIHL multipurpose grease	0781 120 1109	High voltage output on ignition module
9	Medium-strength threadlocking (Loctite 242)	0786 111 1101	Securing screws, see 2.6
10	High-strength threadlocking (Loctite 270)	0786 111 1109	Securing screw, see 2.6
11	High-strength threadlocking (Loctite 649)	0786 110 0126	Securing screws, see 2.6