

1. Safety Precautions	1
2. Introduction	2
3. Specifications	3
3.1 Engine	3
3.2 Fuel System	3
3.3 Ignition System	4
3.4 Cutting Attachment	4
3.5 Special Accessories	4
3.5.1 For User	4
3.5.2 For Service	4
3.6 Tightening Torques	5
4. Clutch, Chain Drive, Chain Brake and Chain Tensioner	6
4.1 Clutch Drum/Chain Sprocket	6
4.2 Chain Catcher	7
4.3 Clutch	7
4.4 Chain Brake	8
4.4.1 Checking Function	8
4.4.2 Disassembly	8
4.4.3 Assembly	10
4.5 Front Chain Tensioner	12
4.6 Side Chain Tensioner	12
5. Engine	13
5.1 Exhaust Muffler/Spark Arresting Screen	13
5.2 Leaking Test	14
5.2.1 Preparations	14
5.2.2 Pressure Test	15
5.2.3 Vacuum Test	15
5.3 Oil Seals	16
5.4 Removing and Installing	18
5.5 Cylinder	18
5.6 Piston	20
5.7 Piston Rings	22
5.8 Crankshaft	22
5.9 Connecting Rod (021 up to Serial No. X 34 944 402)	23
5.10 Decompression Valve	24
6. Ignition System	24
6.1 Spark Plug Boot	24
6.2 Ignition Lead	25
6.3 Ignition Module	25
6.3.1 Ignition Timing	26
6.3.2 Removing and Installing	26
6.4 Flywheel	27

7. Rewind Starter	28
7.1 Routine Maintenance	28
7.2 Rewind Spring	28
7.2.1 Replacing	28
7.2.2 Tensioning	29
8. AV Handle System/Handle Housing	30
8.1 Annular Buffers	30
8.2 Front Handle	31
8.3 Handle Housing	31
8.4 Switch Shaft	33
8.5 Contact Spring	34
8.6 Throttle Trigger/Interlock Lever	34
9. Chain Lubrication	36
9.1 PickupBody36	
9.2 Connector/Suction Hose	36
9.3 Vent Valve	37
9.4 Worm	38
9.5 Oil Pump	38
10. Fuel System	39
10.1 Air Filter	39
10.2 Carburetor	41
10.2.1 Leakage Test	41
10.2.2 Removing and Installing	42
10.2.3 Adjustment (except 023 L and USA)	43
10.2.4 Adjustment (023 L and USA)	44
10.3 Tank Vent	45
10.4 Pickup Body	46
10.5 Suction Hose	46
10.6 Manual Fuel Pump	47
10.6.1 Fuel Hoses	47
10.7 Fuel Tank	48
11. Special Servicing Tools and Aids	50
11.1 Special Servicing Tools	50
11.2 Servicing Aids	52

1. SAFETY PRECAUTIONS

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

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

Improper handling may result in burns or other serious injuries.

Warning! Do not smoke or bring any fire or flame near the fuel. All work with fuel must be performed outdoors only. Spilled fuel must be wiped away immediately.

Wash hands thoroughly after every contact with waste oil.

Do not pour waste oil down the drain or allow it to soak into the ground.

Collect waste oil and take it to an official disposal site for environment-friendly disposal.

STIHL®

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2. INTRODUCTION

This service manual contains detailed descriptions of all the repair and servicing procedures specific to this power tool series. There are separate handbooks for servicing procedures for standardized parts and assemblies that are installed in several STIHL power tool models. Reference is made to these handbooks in the appropriate chapters in this manual.

As the design concept of model 021, 023 and 025 chainsaws is almost identical, the descriptions and servicing procedures in this manual generally apply to all three models. Differences are described in detail.

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

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

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

A fault on the machine may have several causes. To help locate the fault, 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:

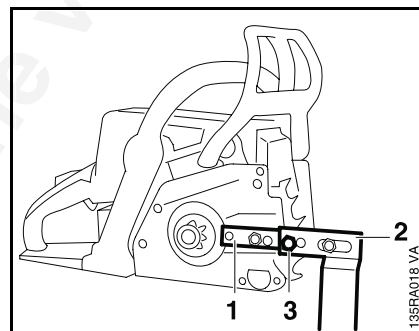
In the descriptions:

- = 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:

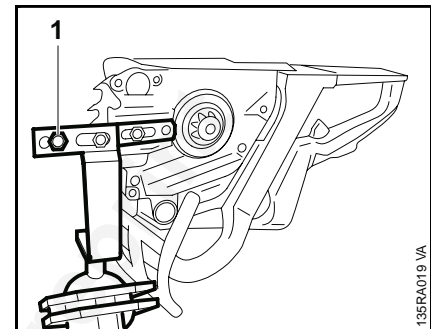
- ➔ = Pointer
- ➡ = Direction of movement

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 clamp (1) 5910 890 2000 is used to mount the machine on assembly stand (2) 5910 890 3100 so that one clamp screw engages the

outer 10 mm bore (3) in the assembly stand.



To service the underside of the machine (e.g. remove the oil pump), turn the machine through 180 degrees and mount it so that one clamp screw engages the inner 10 mm bore (1) in the assembly stand.


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

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

Always use original STIHL replacement parts.

They can be identified by the STIHL part number, the **STIHL** logo

and the

STIHL parts symbol 

The symbol may appear alone on small parts.

3. SPECIFICATIONS

3.1 Engine

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

	021	023 L	023	025
Displacement:	35.2 cm ³ 2.15 cu.in	40.2 cm ³ 2.45 cu.in	40.2 cm ³ 2.45 cu.in	45.4 cm ³ 1.8 cu.in
Bore: 40 mm	40 mm 1.57 in	40 mm 1.57 in	42 mm 1.57 in	42,5 mm 1.7 in
Stroke: 28 mm	32 mm 1.10 in	32 mm 1.26 in	32 mm 1.26 in	32 mm 1.26 in
Power output to ISO 7293:	1.5 kW (2.0 bhp) at 9,000 rpm	1.1 kW (1.5 bhp) at 6,500 rpm	1.9 kW (2.6 bhp) at 9,500 rpm	2.2 kW (3.0 bhp) at 10,000 rpm
Max. permissible engine speed (with bar and chain):	11,500 rpm	1) 12,500 rpm	12,500 rpm	13,000 rpm
Idle speed:	2,800 rpm			
Bearings:	Crankshaft supported in heavy-duty ball bearings, needle cages on small and big ends Cylindrical rollers on big end ²⁾			
Piston pin diameter:	10 mm (0.39 in)			
Rewind starter:	Pawl engagement			
Pawls:	Single pawl system			
Reserve pull on rope rotor:	min. 1/2 turn			
Starter rope:	3.0 mm (0.12 in) dia.			
Clutch:	Centrifugal clutch without linings			
Clutch engages at:	3,600 rpm	4,100 rpm	3,500 rpm	3,500 rpm
Crankcase leakage test				
at gauge pressure:	0.5 bar (7.25 psi)			
under vacuum:	0.5 bar (7.25 psi)			

3.2 Fuel System

Carburetor:	Diaphragm carburetor
Standard setting on carburetors with three adjusting screws	
High speed screw H:	Open approx. 1 turn
Low speed screw L:	Open approx. 1 turn
Carburetor leakage test	
at gauge pressure:	0.8 bar (11.6 psi)
Function of tank vent	
at gauge pressure:	≤ 0.3 bar (4.35 psi)
under vacuum:	≤ 0.05 bar (0.725 psi)
Fuel tank capacity:	0.47 l (1 US pt)
Octane rating:	min. 90 RON (US/CAN; pump octane min. 87)
Fuel mixture:	Regular brand name gasoline and two-stroke engine oil
Mix ratio:	50:1 with STIHL two-stroke engine oil 25:1 with other brand name two-stroke, air-cooled engine oils
Air filter:	Box filter, fabric or fleece filter

1) Not adjustable

2) 021 only up to serial number X 34 944 402

3.3	Ignition System	Type:	Electronic magneto ignition (breakerless) with integral trigger unit
		Air gap:	0.2 - 0.4 mm (0.008 - 0.016 in)
		Spark plug (suppressed):	Bosch WSR 6F, NGK BPMR 7 A, Champion RCJ 6Y or Autolite 2984
		Electrode gap:	0.5 mm (0.020 in)
<hr/>			
3.4	Cutting Attachment	Chain lubrication:	Fully automatic speed-controlled oil pump with rotary piston
		Oil delivery rate:	approx. 7.5 cm ³ /min (0.25 fl.oz/min) at 10,000 rpm
		Oil tank capacity:	0.20 l (0.4 US pt)
<hr/>			
3.5	Special Accessories		
3.5.1	For User	STIHL repair kit	1123 900 5000
		3/8" P, 8-tooth rim sprocket kit	1123 007 1001
		.325", 7-tooth rim sprocket kit	1123 007 1003
		.325", 8-tooth rim sprocket kit	1123 007 1002
		1/4", 8-tooth spur sprocket	1123 640 2010
		3/8" P, 7-tooth spur sprocket	1123 640 2000
		.325", 7-tooth spur sprocket	1123 640 2015
		.325", 8-tooth spur sprocket	1123 640 2020
		Side chain tensioner kit	1123 007 1000
3.5.2	For Service	Carburetor parts kit	1123 007 1061

3.6 Tightening Torques

DG screws are used in the polymer and light-alloy 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	For component size	Torque		Remarks
			Nm	lbf.ft	
Spline screw	IS-DG4x15	Chain brake cover	2.0	1.5	
Spline screw	IS-DG4x15	Handle molding	1.6	1.2	
Spline screw	IS-DG4x15	Connector (engine/oil pump)	2.5	1.8	
Spline screw	IS-DG4x15	Ground wire (to cylinder)	3.5	2.6	
Spline screw	IS-DG5x24	Handle housing/ front handle	3.5	2.6	
Spline screw	IS-DG5x24	Hand guard	3.5	2.6	
Spline screw	IS-DG5x24	Hand guard	3.7	2.8	1)
Spline screw	IS-DG5x24	Fan housing	3.5	2.6	
Spline screw	IS-DG5x24	Buffer (to front handle)	3.5	2.6	
Spline screw	IS-DG5x24	Buffer (to engine)	3.5	2.6	
Spline screw	IS-DG5x24	Ignition module (to engine housing)	4.0	3.0	
Spline screw	IS-DG5.3x40	Cylinder (to engine housing)	9.5	7.0	
Collar screw	DG8x18	Guide bar mounting	16.0	11.8	
Collar screw (rear)	DG8x18	Guide bar mounting	8.0	5.9	3)
	M12x1L	Carrier (clutch)	50.0	37.0	
	M14x1.25	Spark plug	25.0	18.5	
Hexagon nut	M5	Muffler	7.0	5.2	
Hexagon nut	M5	Filter housing/carburetor	2.7	2.0	
Collar nut	M8x1	Flywheel to crankshaft	28.0	21.0	
	M12x1.5	Decompression valve	14.0	10.3	2)
Slotted nut	M5	Filter base/carburetor	2.0	1.5	1)
Spline screw	IS-DG5x16	Spiked bumper	3.7	2.8	

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

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

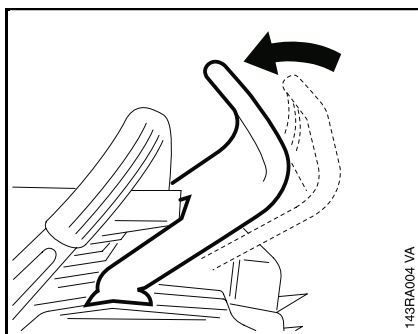
This procedure ensures that the screw engages properly in the existing thread and does not form a new thread, which would weaken the assembly.

- 1) 023 L
- 2) On easy start version only
- 3) With quick chain adjuster

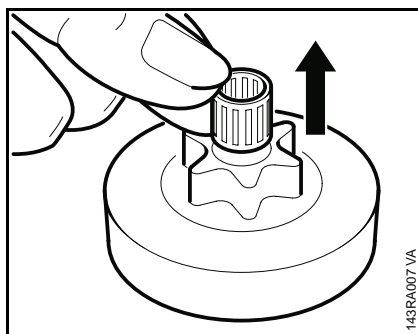
Note: Power screwdriver speed settings for polymer: Plastoform screws max. 600 rpm
DG screws max. 500 rpm

4. CLUTCH, CHAIN DRIVE, CHAIN BRAKE, CHAIN TENSIONER

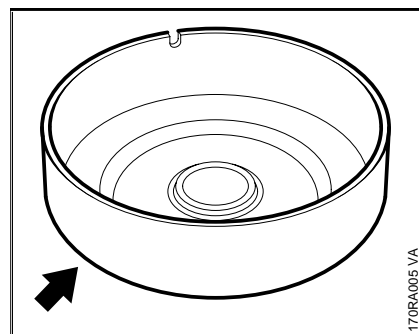
4.1 Clutch Drum/Chain Sprocket



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

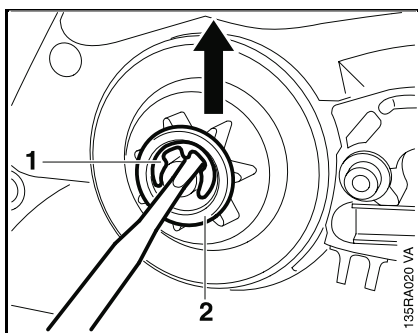


- Take the needle cage out of the sprocket.
- Clean and inspect the clutch drum/chain sprocket.

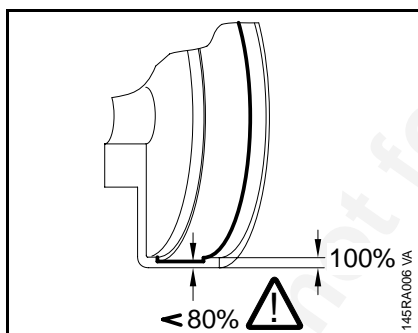


- If the clutch drum/chain sprocket is still serviceable, use No. 120 emery paper or emery cloth (grain size approx. 120µm) to clean and roughen its friction surface.

Reassemble in the reverse sequence.

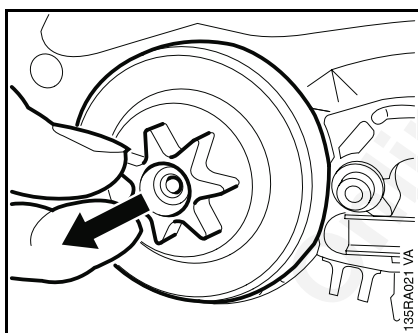


- Remove the E-clip (1).
- Remove the washer (2).



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.

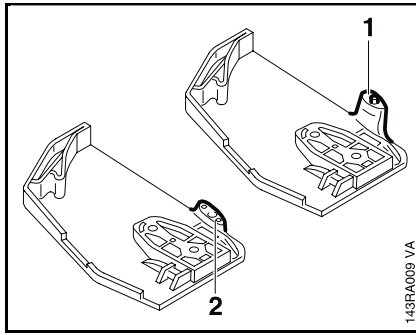
Note: If the clutch drum has to be replaced, also check the brake band - [see 4.4.2](#).



- Remove the rim sprocket, if fitted.
- Pull off the clutch drum/chain sprocket.

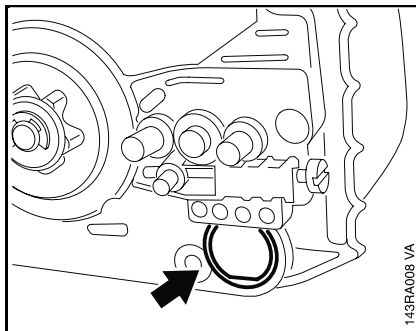
- Clean stub of crankshaft. Wash needle cage in clean white spirit and lubricate with grease - [see 11.2](#).
- Replace damaged needle cage.
- Rotate clutch drum/chain sprocket and apply slight pressure at the same time until oil pump drive spring engages properly.
- If rim sprocket was fitted, re-install it with the cavities facing outward.

4.2 Chain Catcher

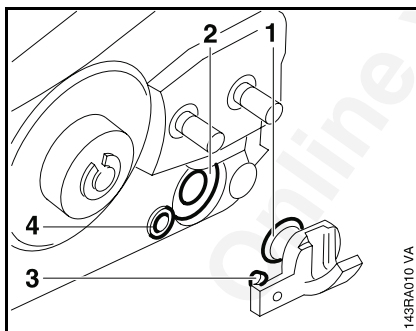


Sprocket cover with integrally molded chain catcher (1).

If the chain catcher has broken off (2), repair as follows:



- Pry the plug out of the front right-hand AV element.



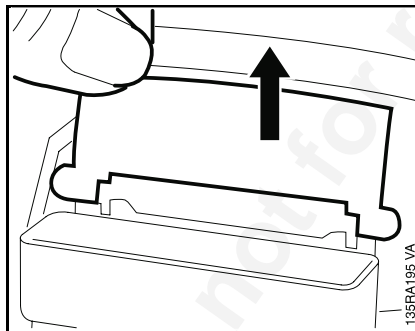
- Oil the cylindrical part (1) of the replacement chain catcher.
- Push the chain catcher into the AV element (2) and engage the peg (3) in the housing bore (4) at the same time.

021, 023, 025

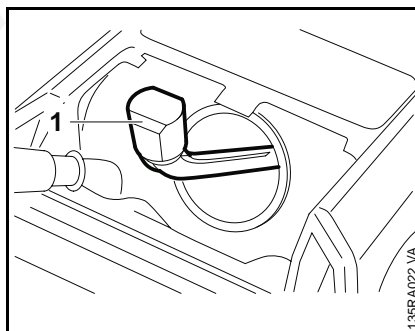
4.3 Clutch

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

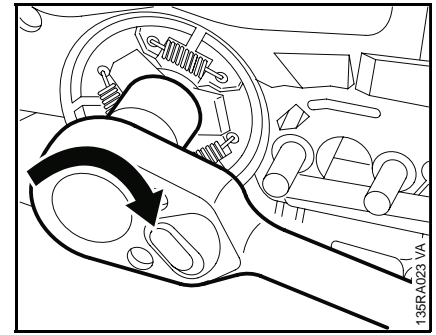
- Remove the clutch drum/chain sprocket - [see 4.1](#).
- Remove the air filter - [see 10.1](#).
- On 023 L, remove the filter base - [see 10.2.2](#).



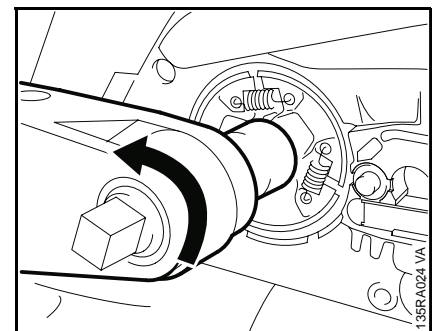
- Take out the shutter.
- Pull boot off the spark plug and then unscrew the spark plug.



- Close the decompression valve, if fitted.
- Push the locking strip (1) 0000 893 5903 into the cylinder.



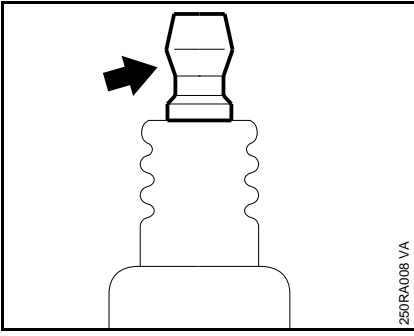
- Unscrew clutch from the crankshaft clockwise (left-hand thread).
- Service the clutch - see "Standard Repairs, Troubleshooting" handbook.



- Screw on the clutch and tighten down to 50 Nm (37 lbf.ft).
- Install the clutch drum/chain sprocket - [see 4.1](#).

4.4 Chain Brake

4.4.1 Checking Function



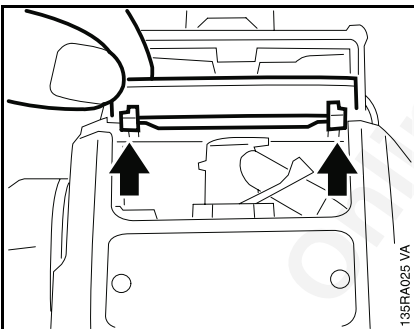
- Remove locking strip from cylinder.
- Insert spark plug and tighten down to 25 Nm (18.5 lbf.ft).
- If spark plug has a separate terminal nut, make sure it is properly tightened down.
- Fit boot on the spark plug.

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

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

- Start the engine.
- With the chain brake activated (locked), open throttle wide for a 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.

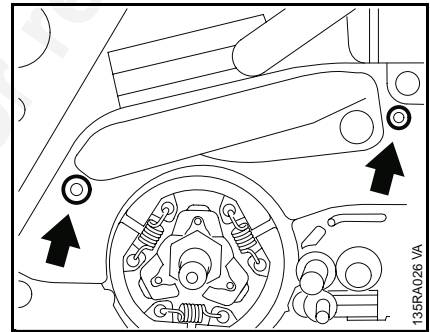
Note: The braking time is in order if deceleration of the saw chain is imperceptible to the eye.



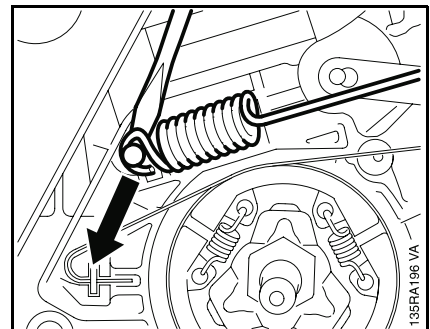
- Fit the shutter so that its lugs engage the recesses in the handle housing.
- Install the air filter - see 10.1.

4.4.2 Disassembly

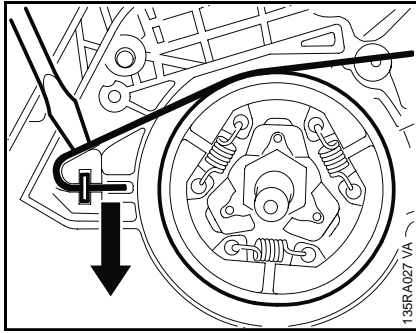
- Remove the clutch drum/chain sprocket - see 4.1.
- Release brake spring tension by pushing hand guard forward.
- Remove upper bumper strip from tensioner.



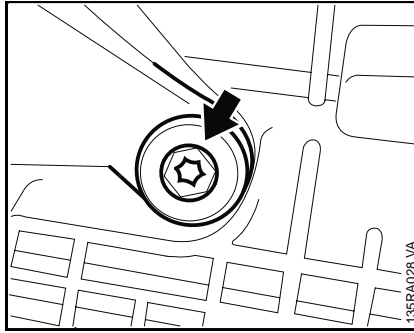
- Take out the screws.
- Remove the cover.



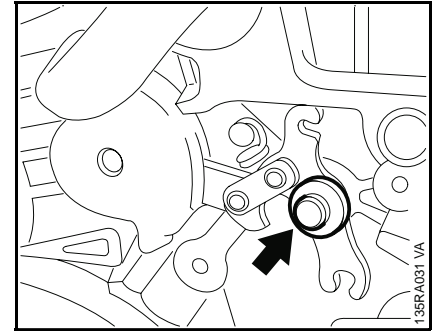
- Carefully ease the brake spring off the anchor pin and take it off the bell crank.



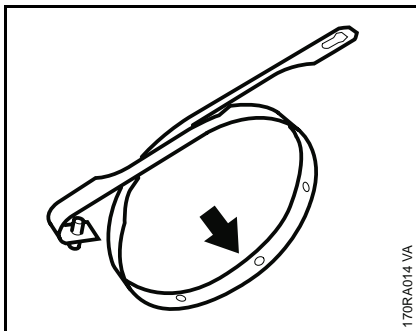
- Pry the brake band out of the engine housing.
- Disconnect brake band from bell crank.



- Take out the screw.



- Remove the washer.

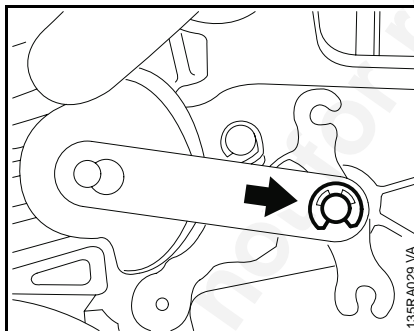


Replace the brake band if:

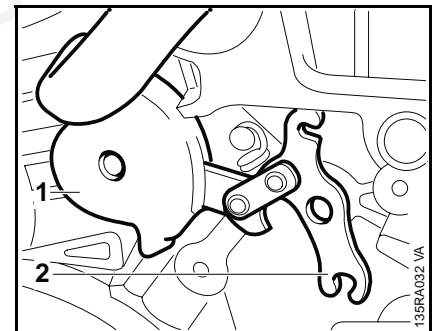
- there are noticeable signs of wear (large areas on inside diameter and/or parts of outside diameter) and
- its remaining thickness is < 0.6 mm (0.024").

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

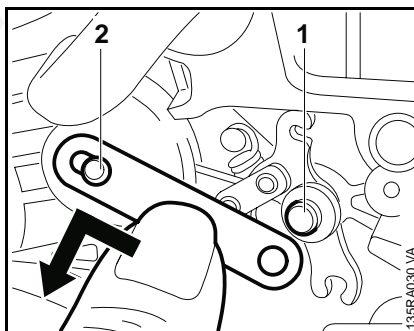
- If the brake band is still serviceable, use No. 120 emery paper or emery cloth (grain size approx. 120µm) to clean and roughen its entire friction surface (inside diameter).



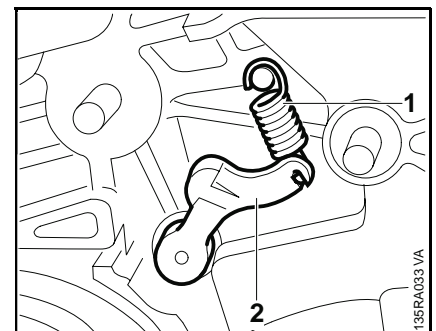
- Remove the E-clip.



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

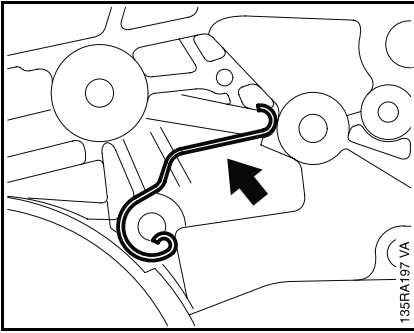


- Remove strap from bell crank pivot pin (1).
- Push the strap sideways and lift it off the hand guard pivot pin (2).



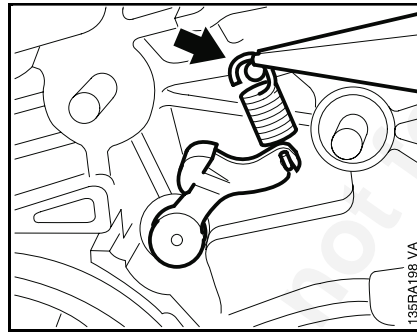
- Up to serial number X 28 310 254, remove the spring (1).
- Pull out the cam lever (2).

4.4.3 Assembly

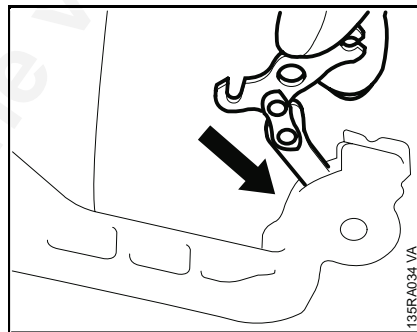


- From serial number X 28 310 255, remove the flat spring.
- Inspect parts and replace if damaged.
- Clean the entire housing recess for the chain brake.
- If the groove of the brake spring anchor pin is worn, replace the housing.

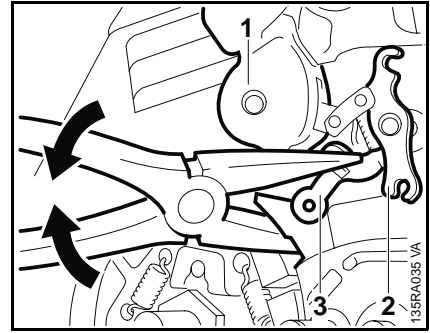
- Lubricate sliding and bearing points of chain brake with STIHL multipurpose grease or, preferably, Molykote grease - see 11.2.
- From serial number X 28 310 255, install the flat spring.



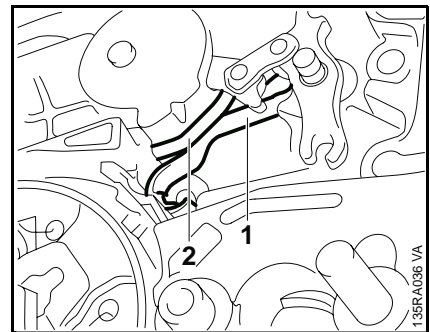
- Up to serial number X 28 310 254, fit the cam lever.
- Attach spring to cam lever (open side of spring hook facing outwards) and slip it over the pivot pin



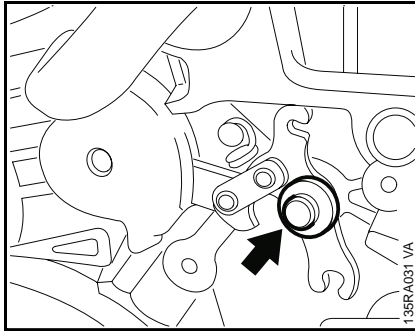
- Insert the bell crank in the side of the hand guard so that the short arm of the bell crank points to top of hand guard.



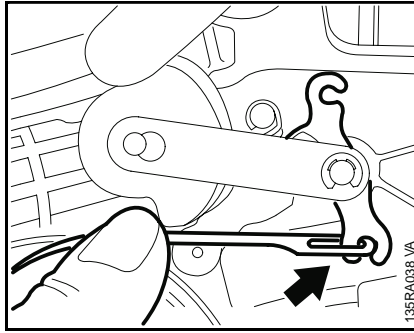
- Position the hand guard (1) against the pivot pin and fit the other side of the hand guard over the housing.
- Position the bell crank (2) against the pivot pin.
- Press the cam lever (3) slightly downward and push the hand guard and bell crank onto their pivot pins.



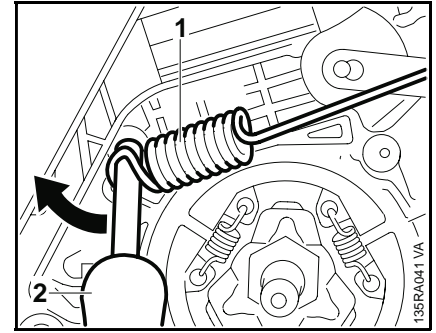
- Check that cam lever or flat spring (1) is properly located on face (2) of hand guard bearing boss.



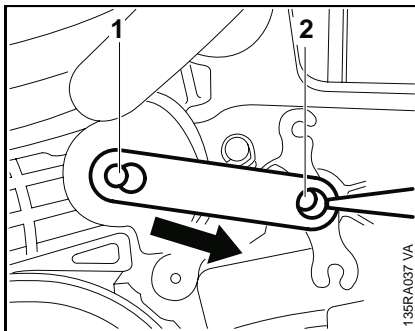
- Fit the washer on the pivot pin.



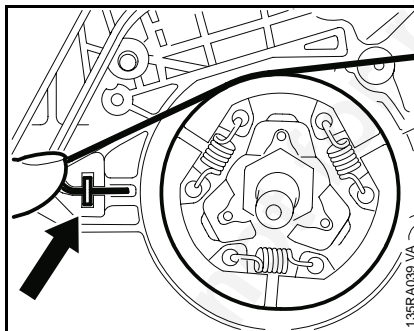
- Hook the brake spring onto the bell crank.



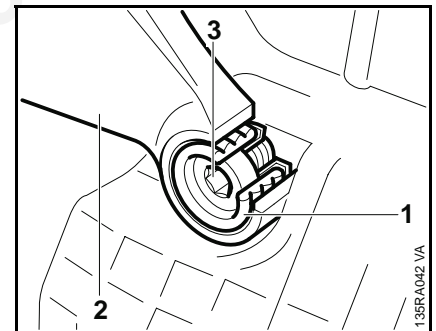
- Use the assembly (2) 1117 890 0900 to attach the brake spring (1) to the anchor pin.



- Fit strap on the pivot pin (1) and locate it in the pivot pin's groove.
 - Slip the other end of the strap over the bell crank pivot pin (2).
- Secure strap with E-clip.

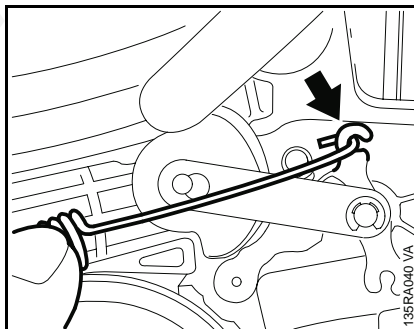


- Position the brake band around the clutch and push it into the engine housing.



- Fit the bushing in the hand guard.
- Insert M5x24 screw and tighten down to 3.5 Nm (2.6 lbf.ft).
- On 023 L, push the rubber bushing (1) into the hand guard (2).

- Coat brake band with chain oil (STIHL Bioplus), [see 11.2](#), to protect it from corrosion and help reduce "snatching" during the first few brake applications.

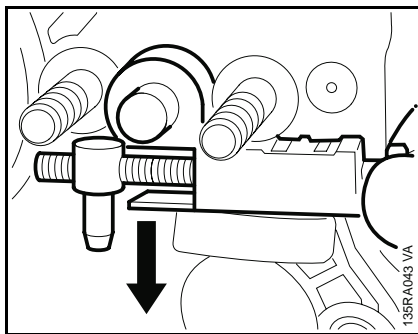


- Attach the brake spring to the bell crank.

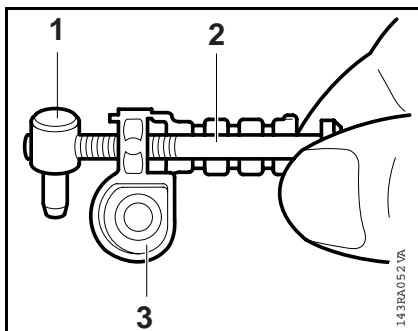
- Insert M5x32 screw (3) and tighten down to 3.7 Nm (2.8 lbf.ft).
- Fit the cover.
- Tighten screws to 2.0 Nm (1.5 lbf.ft).
- Install clutch drum/chain sprocket - [see 4.1](#).

- Check operation of chain brake - [see 4.4.1](#).

4.5 Front Chain Tensioner



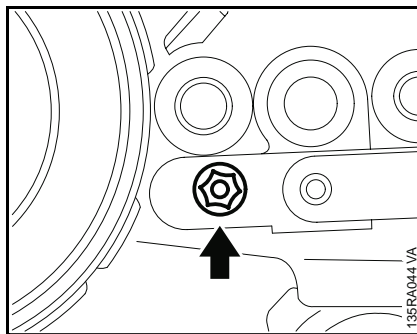
- Remove the chain sprocket cover.
- Pull the cover out of the engine housing.



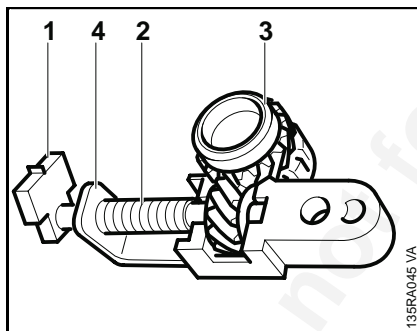
- Unscrew the nut (1) from the adjusting screw (2).
- Take the adjusting screw out of the cover (3).

Reverse the above sequence to install the chain tensioner.

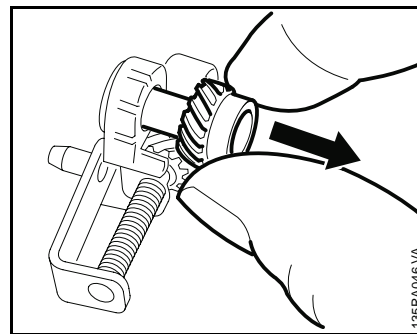
4.6 Side Chain Tensioner



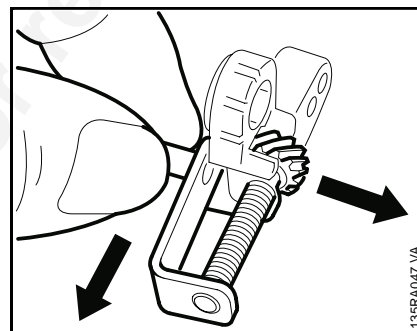
- Remove the chain sprocket cover.
- Take out the screw.
- Pull the complete tensioner assembly out of the engine housing.



- Take the thrust pad (1) off the adjusting screw (2).
- Rotate the spur gear (3) until the adjusting screw comes out of the tensioner slide (4).



- Pull the spur gear out of the cover.



- Pull the tensioner slide off the cover.
- Take the adjusting screw out of the cover.
- Inspect the teeth on the spur gear and adjusting screw. Replace both parts if necessary.

Reverse the above sequence to install the chain tensioner.

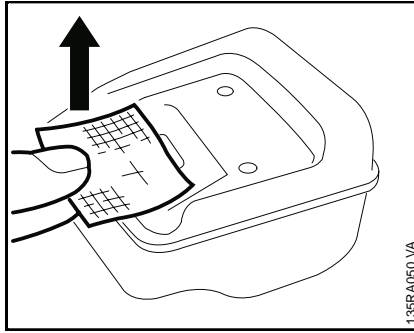
- Coat teeth of adjusting screw and spur gear with grease, [see 11.2](#), before refitting.

5. ENGINE

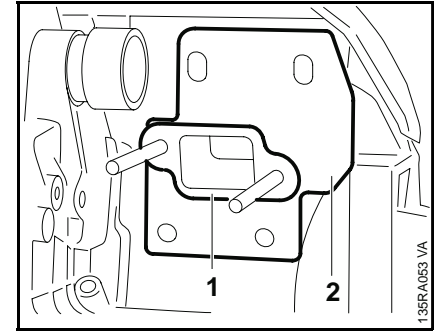
5.1 Exhaust Muffler/Spark Arresting Screen

This machine does not have a conventional crankcase. The engine consists of the cylinder, piston, crankshaft and engine pan.

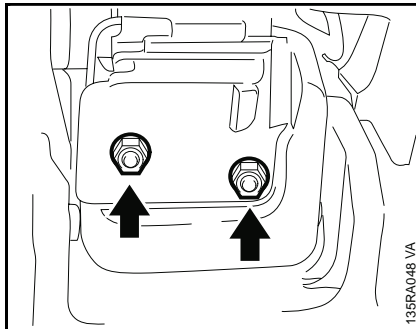
Troubleshooting - see "Standard Repairs, Troubleshooting" handbook.



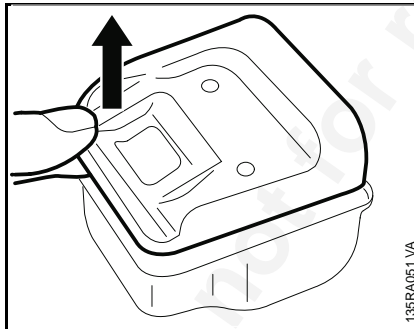
- Remove spark arresting screen, if fitted.
- Clean the spark arresting screen or fit a new one if necessary.



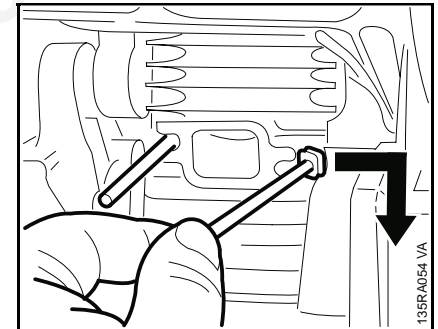
- On 023 and 025, remove gasket (1) and heat shield (2).



- Unscrew the nuts.
- Remove the muffler.



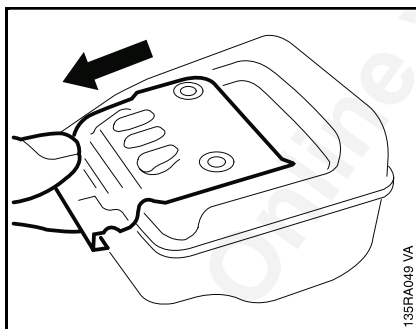
- Remove the upper casing from the lower casing (not on 023 L).



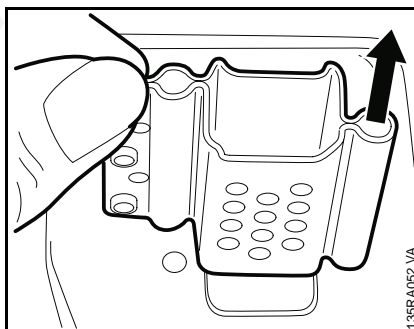
- Remove the screws from the flange.

Reassemble in the reverse sequence.

- Use a new gasket.
- Fit new locknuts and torque down to 7.0 Nm (5.2 lbf.ft).



- Pull away the cover plate.



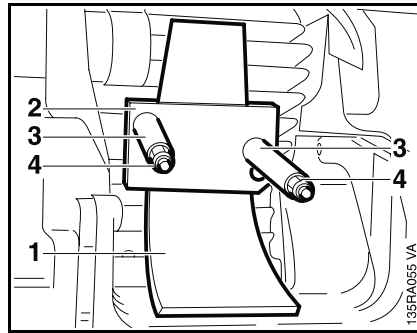
- If necessary, take the baffle out of the lower casing.

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

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

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

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

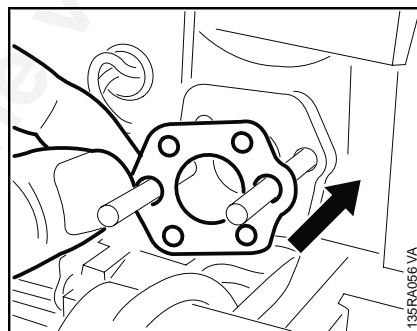


- Remove the muffler - **see 5.1.**

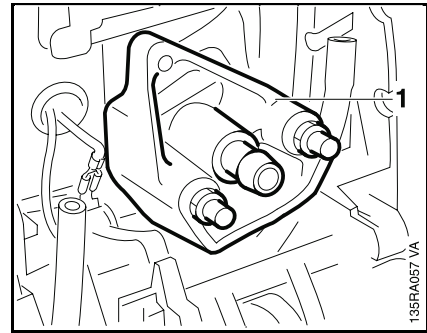
- Fit the sealing plate (1) 0000 855 8106 between the muffler and cylinder.

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

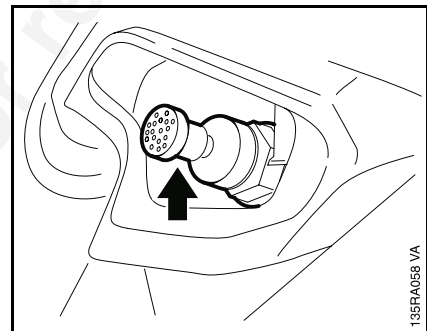
- Slip the flange (2) 1123 855 4200 over the screws.
 - Fit the sleeves (3) 1123 851 8300 on the screws.
 - Fit the nuts (4) and tighten down securely.
- Remove the carburetor - **see 10.2.2.**
- Set the piston to top dead center (T.D.C.). This can be checked through the inlet port.



- Inspect carburetor gasket and fit new one if necessary.

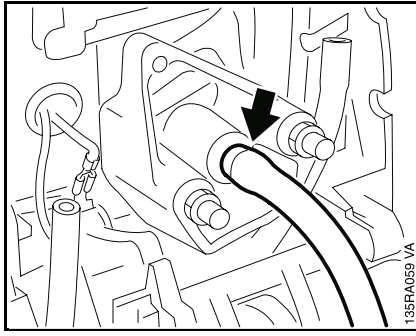


- Fit the test flange (1) 1118 850 4200 in place of the carburetor.

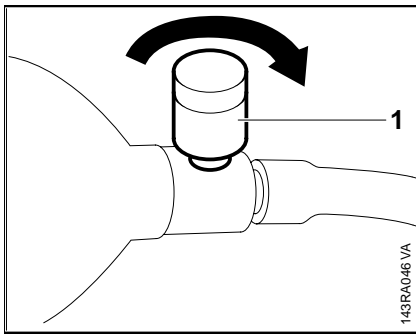


- Pull out decompression valve button, if fitted.
- Check that spark plug is properly tightened down.
- Check tester 1106 850 2905 and vacuum pump 0000 850 3501 for leaks.

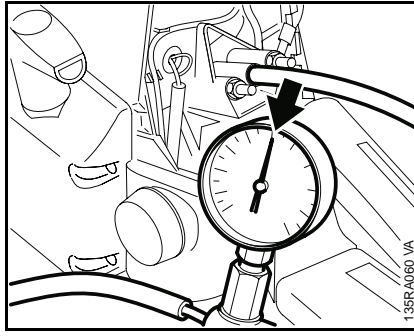
5.2.2 Pressure Test



- Carry out preparations - [see 5.2.1.](#)
- Connect pressure hose of tester 1106 850 2905 to nipple on test flange.



- Close the vent screw (1) on the rubber bulb.
- Pump air into the engine housing with the rubber bulb until the gauge indicates a pressure of 0.5 bar (7.25 psi). If this pressure remains constant for at least 20 seconds, the housing or decompression valve, if fitted, is airtight.



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

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

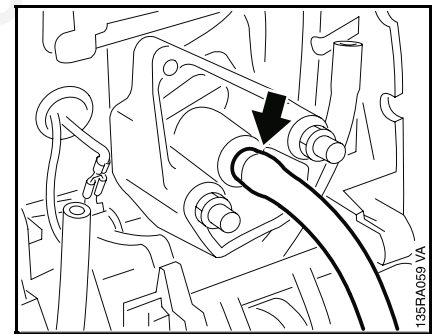
- If the decompression valve is leaking, fit a new one - [see 5.10.](#)
- Repeat the pressure test.
- Carry out the vacuum test - [see 5.2.3.](#)
- After finishing the test, open the vent screw and disconnect the hose.
- Remove the test flange.
- Install the carburetor - [see 10.2.2.](#)
- Remove the flange.
- Remove the sealing plate.
- Install the muffler - [see 5.1.](#)

5.2.3 Vacuum Test

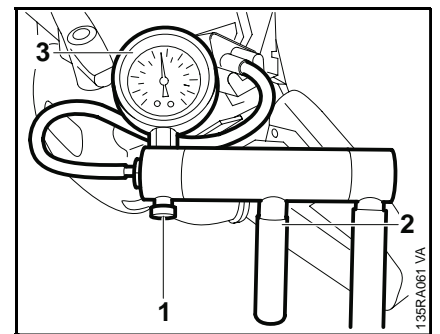
Oil seals tend to fail when subjected to a vacuum, i.e. the sealing lip lifts away from the crankshaft during the piston's induction stroke because there is no internal counterpressure.

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

- Carry out preparations - [see 5.2.1.](#)



- 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 (3) indicates a vacuum of 0.5 bar (7.25 psi).

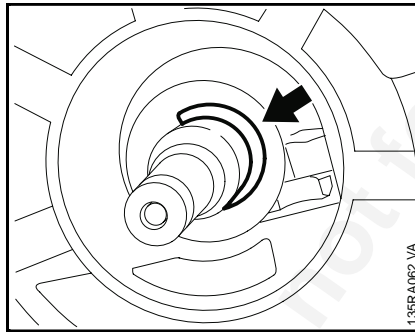
Note: If the vacuum reading remains constant, or rises to no more than 0.3 bar (4.25 psi) within 20 seconds, it can be assumed that the oil seals are in good condition. However, if the pressure continues to rise (reduced vacuum in the engine housing), the oil seals must be replaced.

- After finishing the test, open the vent screw and disconnect the hose.
- Remove the test flange.
- Install the carburetor - [see 10.2.2.](#)
- Remove the test flange.
- Remove the sealing plate.
- Install the muffler - [see 5.1.](#)

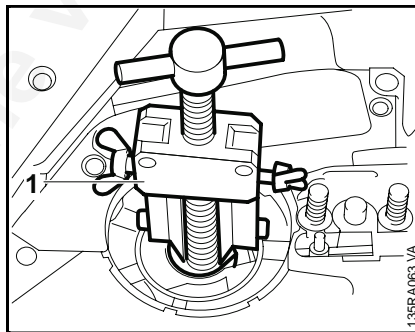
It is not necessary to disassemble the complete engine housing if only the oil seals have to be replaced.

Clutch side:

- Remove the clutch - [see 4.3.](#)
- Remove the oil pump - [see 9.5.](#)



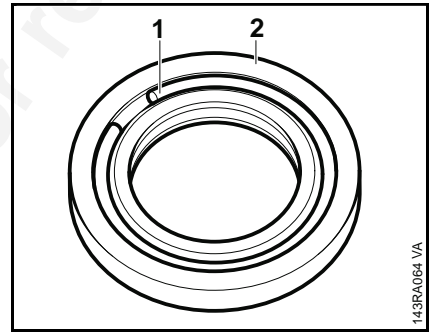
- Ease the retaining ring out of the crankshaft.



- Apply puller (1) 5910 890 4400 (jaws 0000 893 3711 with No. 6 profile).

- Clamp the puller arms.
- Pull out the oil seal.

Important: Take special care not to damage crankshaft stub.

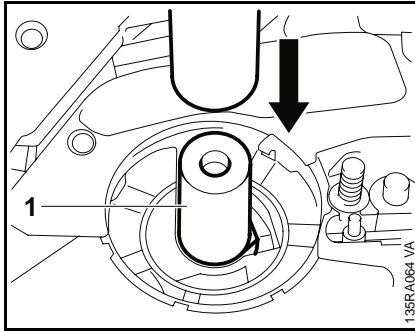


- If an oil seal with clamping ring (1) is installed, use puller and No. 3.1 jaws to remove the clamping ring. Pry the sealing ring (2) out of the housing.

- Clean sealing face on crankshaft stub with standard commercial, solvent-based degreasant containing no chlorinated or halogenated hydrocarbons - [see 11.2.](#)

Note: If the cylinder and engine pan are assembled, only oil seals 9638 003 1581 (with clamping ring) may be installed.

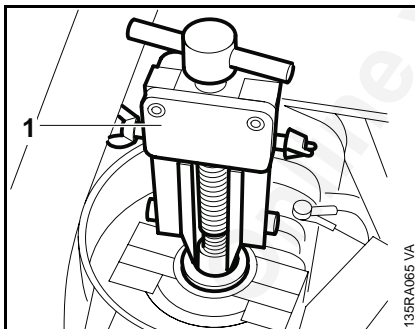
- Lubricate sealing lips of oil seal with grease - [see 11.2.](#)
- Thinly coat the outside diameter of the oil seal with sealant - [see 11.2.](#)



- Position the oil seal so that the clamping ring faces upwards.
- Use the press sleeve (1) 1123 893 2400 to install the oil seal.
- Wait about one minute, then rotate the crankshaft.
- Fit a new retaining ring.
- Install the oil pump - [see 9.5.](#)
- Install the clutch - [see 4.3.](#)

Starter side

- Remove the flywheel - [see 6.4.](#)



- Apply puller (1) 5910 890 4400 (jaws 0000 893 3711 with No. 6 profile).

- Clamp the puller arms.
- Pull out the oil seal.

Important: Take special care not to damage crankshaft stub.

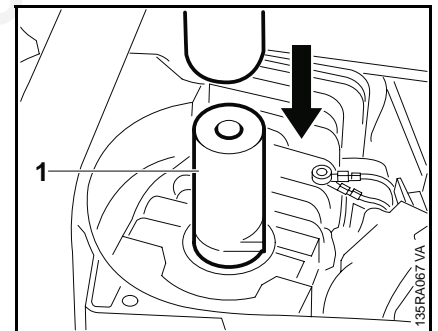
Note: Remove the oil seal with clamping ring as described for clutch side.

- Clean sealing face on crankshaft stub with standard commercial, solvent-based degreasant containing no chlorinated or halogenated hydrocarbons - [see 11.2.](#)

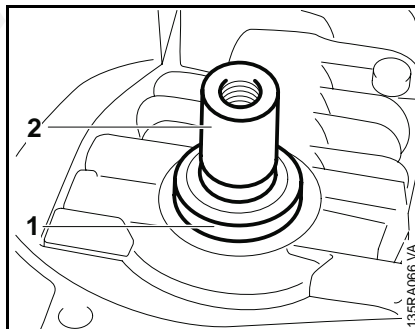
Note: If the cylinder and engine pan are assembled, only oil seals 9638 003 1581 (with clamping ring) may be installed.

- Lubricate sealing lips of oil seal with grease - [see 11.2.](#)
- Thinly coat the outside diameter of the oil seal with sealant - [see 11.2.](#)

- Screw the guide sleeve (2) 1123 894 7700 onto the crankshaft.



- Use the press sleeve (1) 1123 893 2400 to install the oil seal.
- Wait about one minute, then rotate the crankshaft.
- Install the flywheel - [see 6.4.](#)

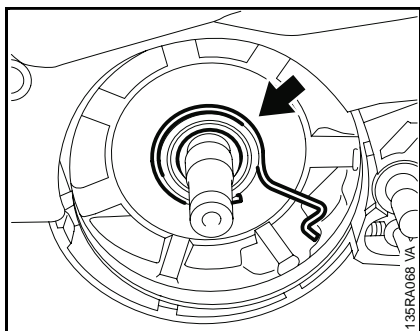


- Position the oil seal (1) so that the clamping ring faces upwards.

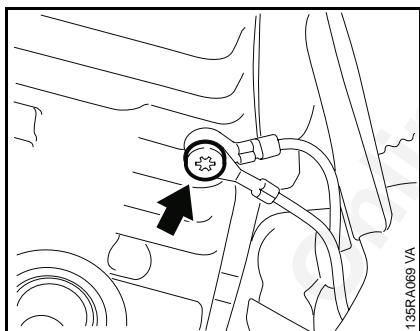
5.4 Removing and Installing

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

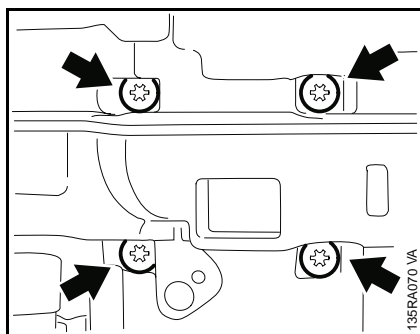
- Remove the handle housing - [see 8.3](#).
- Remove the oil pump - [see 9.5](#).



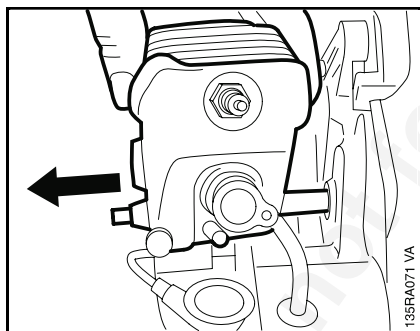
- Pull off the worm with drive spring.



- Take out ground wire fastening screw.



- Unscrew the engine pan mounting screws.

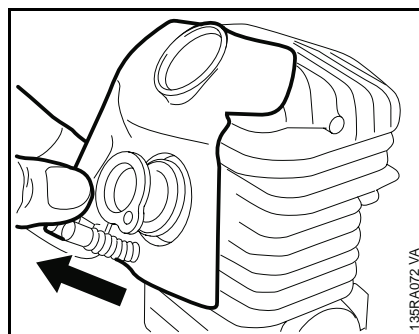


- Remove engine sideways from housing.

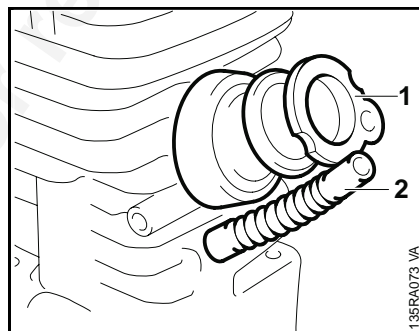
Install in the reverse sequence.

- Tighten down engine pan mounting screws to 9.5 Nm (7 lbf.ft) and ground wire fastening screw to 3.5 Nm (2.6 lbf.ft).

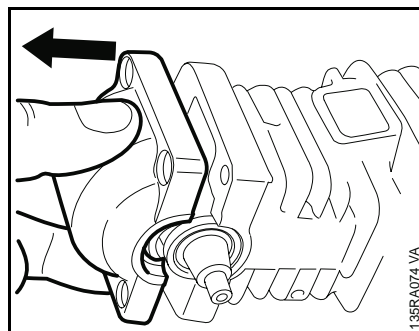
5.5 Cylinder



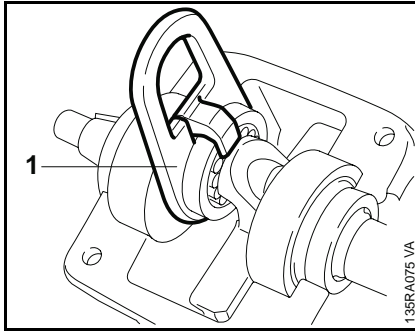
- Remove the engine - [see 5.4](#).
- Take out the spark plug.
- Remove baffle plate.



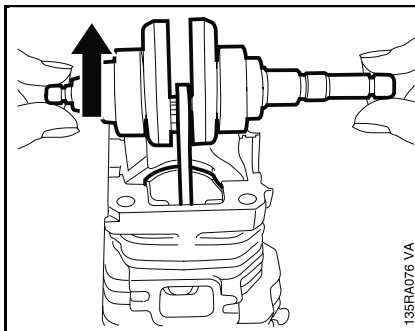
- Pull the manifold (1) off the intake port.
- Disconnect the impulse hose (2).



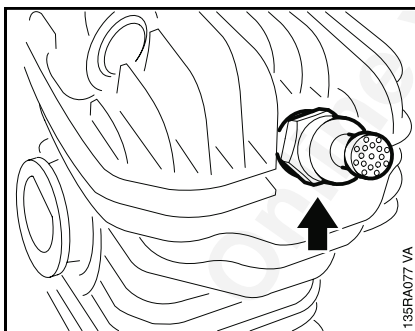
- Pull the engine pan off the cylinder.



- Fit the clamp (1) 1123 893 9100 on connecting rod of 021 up to serial number X 34 944 402 to prevent it slipping off the crankshaft.

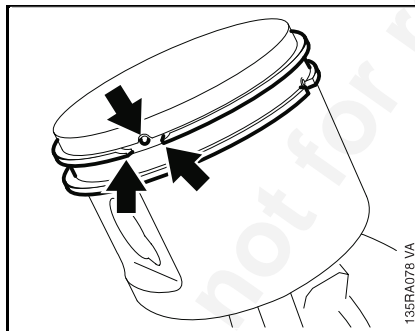


- Lift the crankshaft and pull the piston out of the cylinder.
- Inspect ball bearings and oil seals and replace if necessary - **see 5.8.**

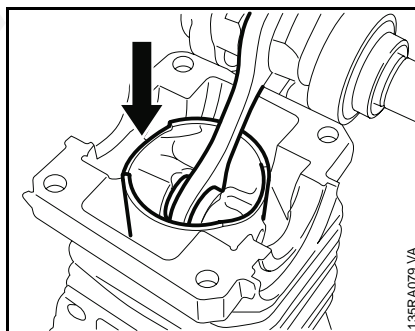


- Inspect the cylinder and replace it if necessary.
- On easy start version, unscrew the decompression valve.

- If a new cylinder has to be installed, always fit the matching piston. Replacement cylinders are only supplied complete with piston for this reason.
- Thoroughly clean all residue of sealant from the cylinder and engine pan mating faces.
- Apply a thin coating of sealant to the outer diameters of the oil seals - **see 11.2.**
- Lubricate piston and piston ring with oil.

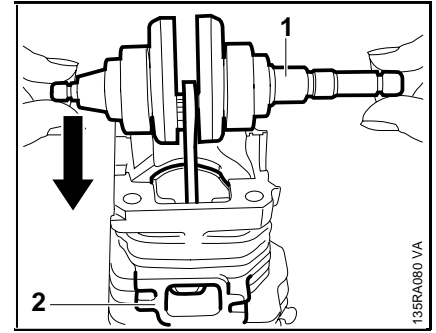


- Position the piston rings so that the radii at the ring gap meet at the fixing pin in the piston groove when the rings are compressed.

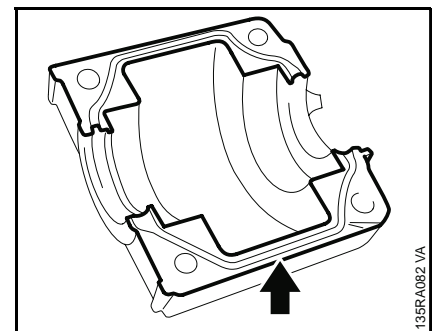


- Slide piston carefully into the cylinder.

Note: The piston rings are compressed by the inner taper of the cylinder.



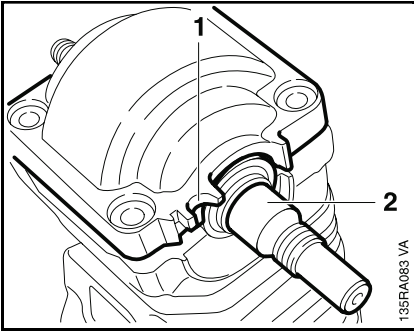
- Line up the crankshaft so that the long crankshaft stub (1) is on the same side as the exhaust port (2).
- Push piston home until ball bearings are seated.
- On 021 up to serial number X 34 944 402, remove the clamp from the connecting rod.



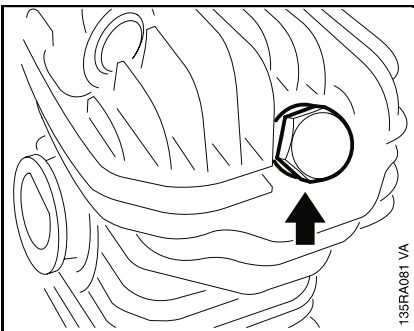
- Apply a thin bead of sealant to the engine pan mating face - **see 11.2.**

Note: Follow manufacturer's instructions for use of sealant.

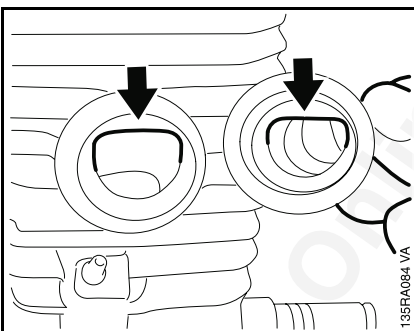
5.6 Piston



- Fit the engine pan so that the seat (1) for the oil pump is at the same side as the long crankshaft stub (2).

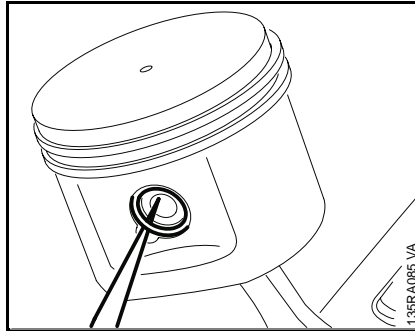


- On easy start version, unscrew the plug, screw home the decompression valve and tighten it to 14 Nm (10.3 lbf.ft).

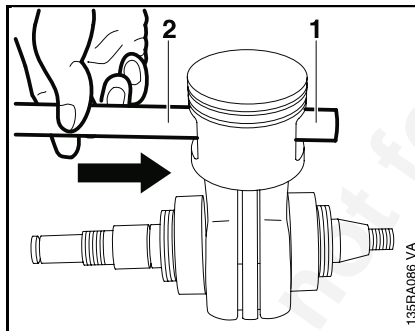


- Push the manifold on to the intake port so that the straight faces are in alignment.

Reassemble all other parts in the reverse sequence.



- Pull the piston out of the cylinder - **see 5.5.**
- Ease the hookless snap rings out of the grooves in the piston bosses.

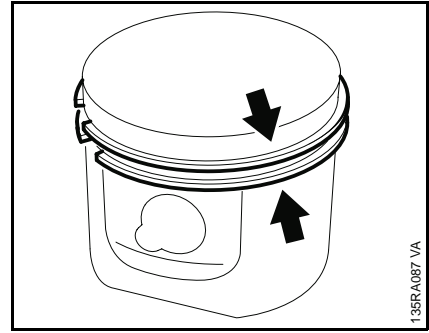


- Use the assembly drift (2) 1110 893 4700 to push the piston pin (1) out of the piston.

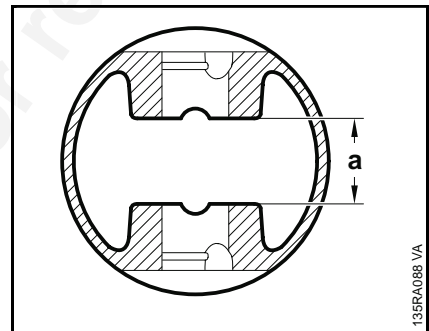
Note: If the piston pin is stuck, tap the end of the drift **lightly** with a hammer. **Important:** Hold the piston steady during this process to ensure that no jolts are transmitted to the connecting rod.

- Remove the piston from the connecting rod.
- Inspect needle cage and replace if necessary.

Note: If needle cage is press-fitted, replace the crankshaft.



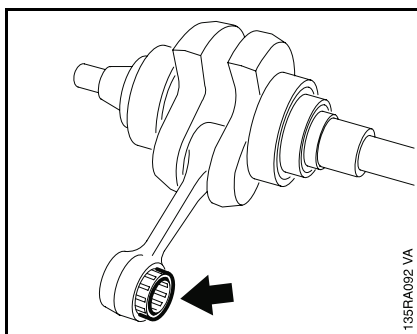
- Inspect piston rings and replace if necessary - **see 5.7.**



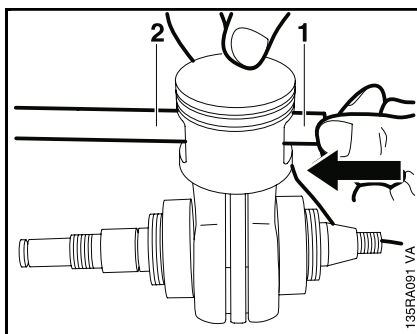
Note: On 021, install new piston on crankshaft with fixed connecting rod; installed original piston on crankshaft with loose connecting rod.

- How to identify pistons:

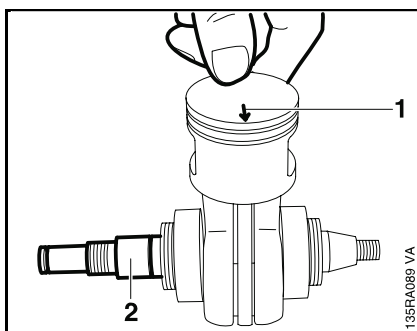
Original piston "a" = 12.7 mm
New piston "a" = 12.2 mm



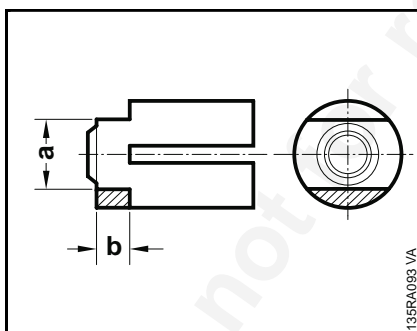
- Fit needle cage in the small end.
- Oil the needle cage.



- 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 warm).

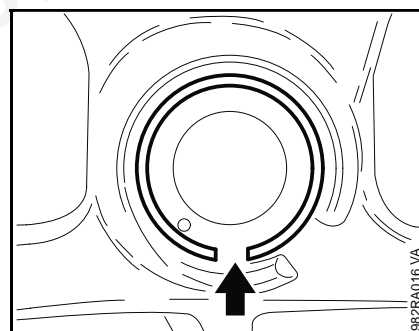


- To ease assembly, heat the piston slightly and push it over the connecting rod.
- Installed position of piston:
1 = Arrow
2 = Long stub of crankshaft



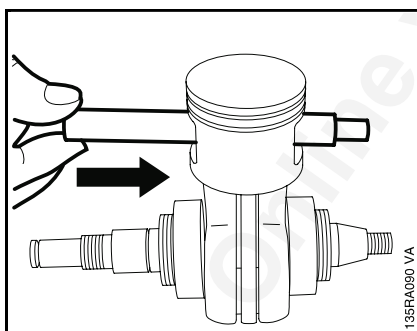
- Modify the sleeve of the installing tool 5910 890 2210 as shown.
a = 16 mm (11/16")
b = 8 mm (5/16")

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

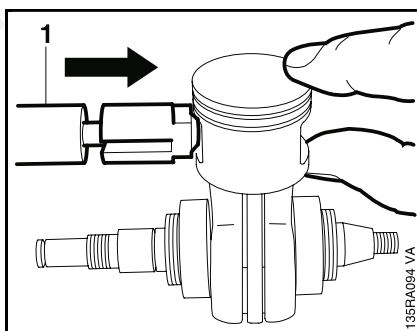


The ring gap must be on the piston's vertical axis (point either up or down).

- Install the piston - **see 5.5.**



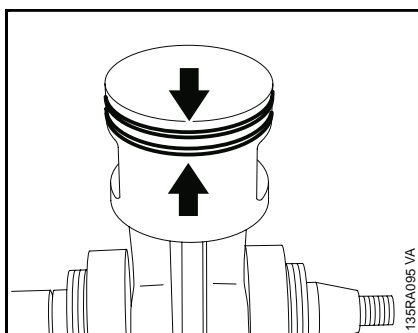
- Push the assembly drift, small diameter first, through the piston and small end (needle cage) and line up the piston.



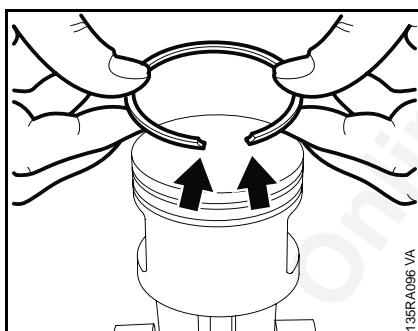
- Use installing tool (1) 5910 890 2210 to fit the hookless snap rings.

5.7 Piston Rings

- Pull the piston out of the cylinder
- **see 5.6.**
- Remove rings from piston.

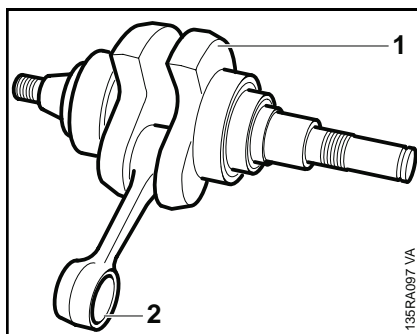


- Use a piece of old piston ring to scrape the groove clean.

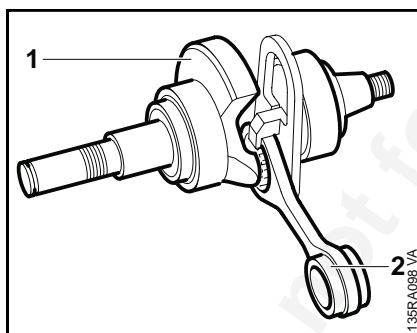


- Install the new piston rings in the grooves so that the radii face upward.
- Install the piston - **see 5.6.**

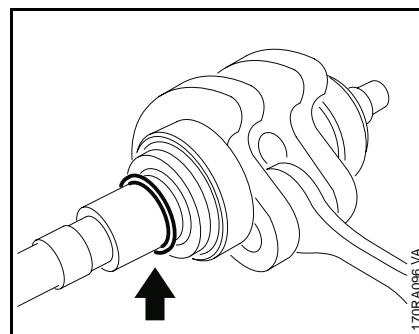
5.8 Crankshaft



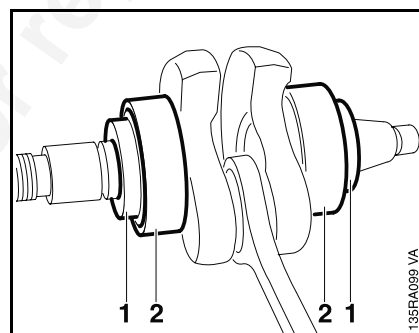
- The crankshaft (1), connecting rod (2) and needle bearing are inseparable on models 023 and 025 as well as model 021 from serial number X 34 944 403. This means the crankshaft must always be replaced as a complete unit.



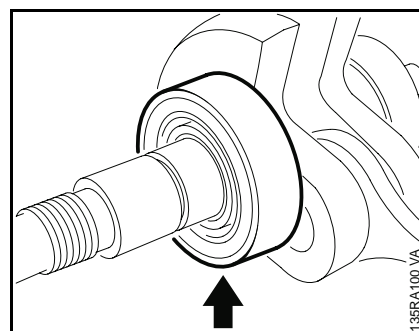
- On 021 up to serial number X 34 944 402, remove connecting rod (1) from the crankshaft (2) - **see 5.9.**
- When fitting a replacement crankshaft, always install new oil seals and ball bearings.



- Remove the piston - **see 5.6.**
- Remove the retaining ring.



- Pull off the oil seals (1) and ball bearings (2).

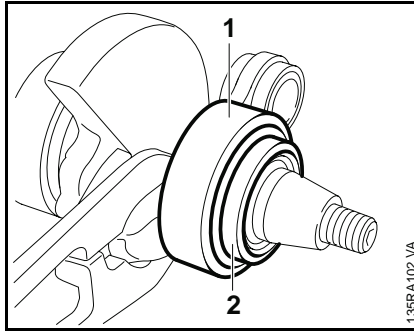


- Heat ball bearing to approx. 50°C (120°F) and, with closed side facing outwards, push it on to the crankshaft stub as far as stop.

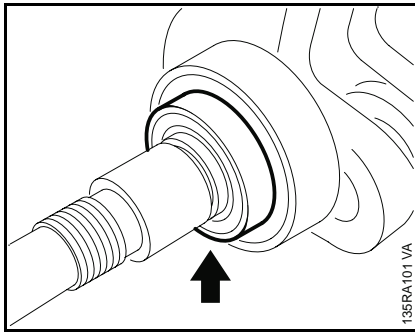
5.9 Connecting Rod (021 up to Serial No. X 34 944 402)

Note: If the crankshaft has been removed, the oil seals used in production (9639 003 1585 with rigid housing) may be installed.

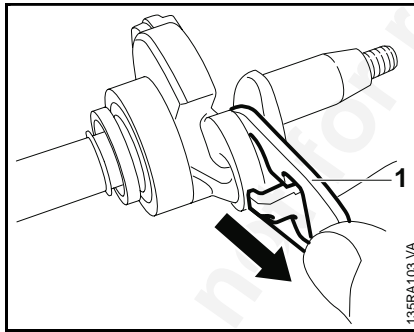
- Lubricate sealing lips of oil seals with grease - [see 11.2](#).



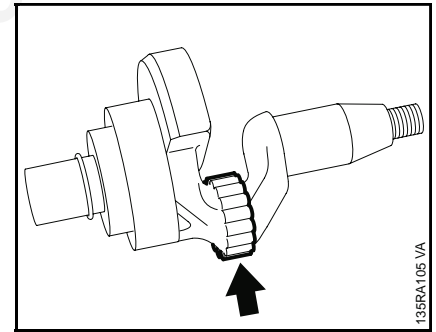
- Remove the piston - [see 5.6](#).
- Pull the oil seal (1) and ball bearing (2) off the short stub of the crankshaft.



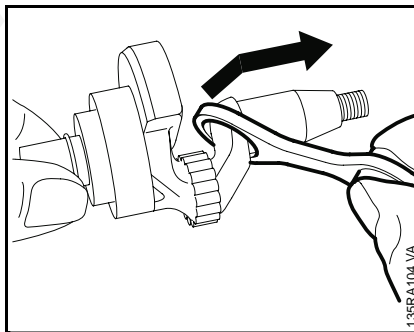
- Slide oil seals over the crankshaft stubs so that their open sides are facing the ball bearings.
- Install new retaining ring in crankshaft groove.
- Install the piston - [see 5.6](#).



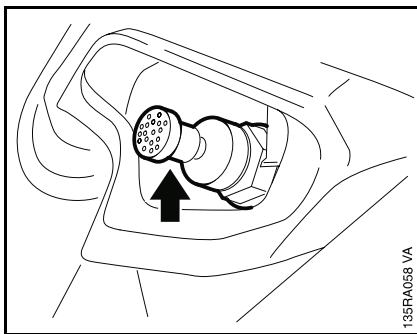
- Remove clamp (1) 1123 893 9100 from the connecting rod.



- Use grease, [see 11.2](#), to stick the cylindrical rollers to the crankshaft.
- Slide connecting rod into position and secure it with the clamp.
- Install ball bearing and oil seal - [see 5.8](#).
- Install the piston - [see 5.6](#).



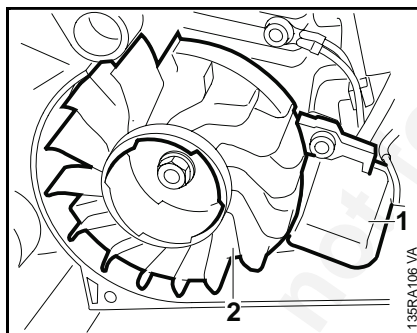
- Take the connecting rod off the crankshaft.
- Remove the cylindrical rollers from the crankshaft.



- Remove the front handle - see 8.2.
- Use standard commercial 13 mm socket to unscrew the decompression valve.
- Fit new decompression valve and torque down to 14 Nm (10.3 lbf.ft).
- Fit the front handle.

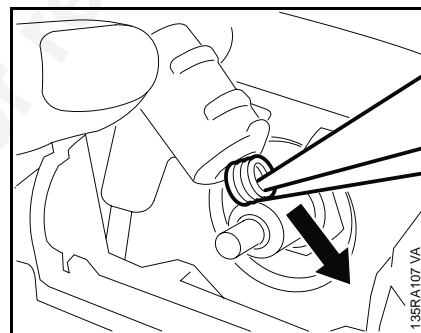
Warning! Exercise extreme caution when carrying out maintenance and repair work on the ignition system. The high voltages which occur can cause serious or even fatal accidents!

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

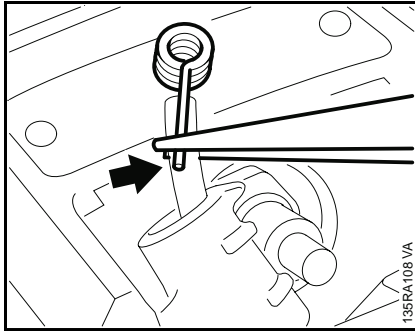


Note: The electronic (breakerless) ignition system basically consists of an ignition module (1) and flywheel (2).

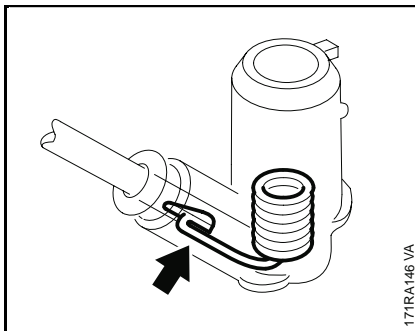
- Remove the air filter - see 10.1.
- On 023 L, remove the filter base - see 10.2.2.
- Pull out the shutter - see 4.3.
- Pull boot off the spark plug.



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



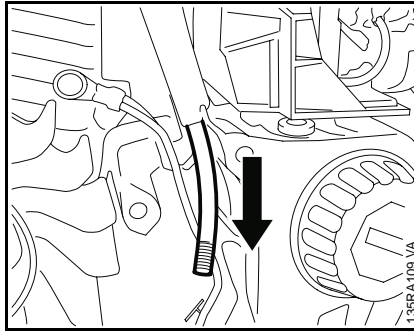
- Pinch the hook of the leg spring into the center of the lead, i.e. about 10 mm (3/8") from the end of the lead.



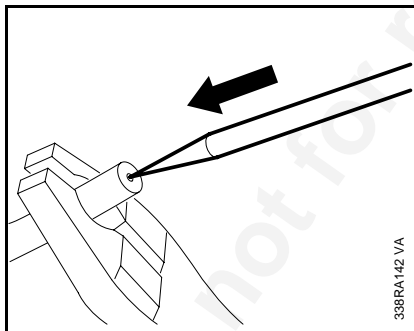
- Pull the lead back into the boot so that the leg spring locates properly inside it (as shown).

Important: If spark plug has a separate terminal nut, make sure that it is properly tightened down.

- Fit boot on spark plug.
- Fit the shutter - [see 4.3.](#)
- On 023 L, fit the filter base.
- Install the air filter - [see 10.1.](#)



- Pull the boot off the spark plug - [see 6.1.](#)
- Remove the ignition module - [see 6.3.2.](#)
- Pull ignition lead out of the guide.

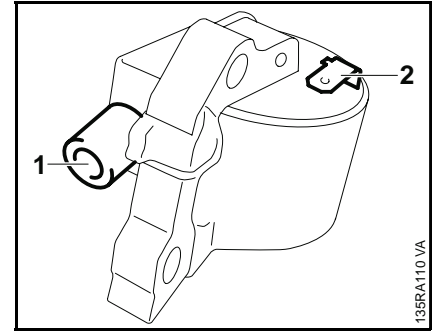


- Cut new ignition lead to length (see parts list or cut to same length as old lead).
- Use pointed tool (awl or gimlet) to pierce the center of the lead that is to be screwed into the module.

- Pack the high voltage output with STIHL multipurpose grease - [see 11.2.](#)

Important: Do not use graphite grease (Molykote) or silicone insulating paste for this job.

Reassemble all other parts in the reverse sequence.



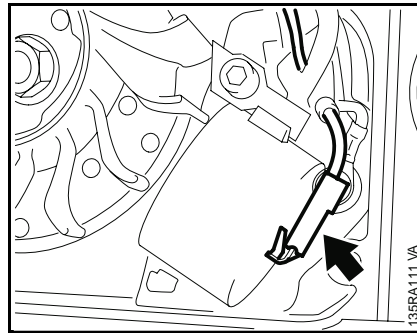
The ignition module accommodates all the components required to control ignition timing. There are two electrical connections on the coil body:

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

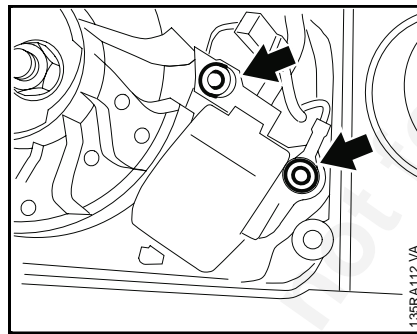
Accurate testing of the ignition module is only possible with sophisticated test equipment. For this reason it is only necessary to carry out a spark test in the workshop. A new ignition module must be installed if no ignition spark is obtained (after checking that wiring and stop switch are in good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

Ignition timing is not adjustable.

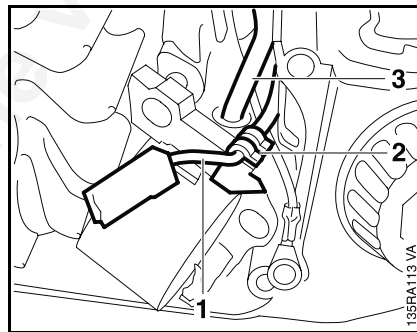
Since there is no mechanical wear in these systems, ignition timing cannot get out of adjustment. However, an internal fault in the circuit can alter the switching point in such a way that a spark test will still show the system to be in order although timing is outside the permissible tolerance. This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



- Remove the fan housing.
- Pull short circuit wire connector off tag on ignition module.



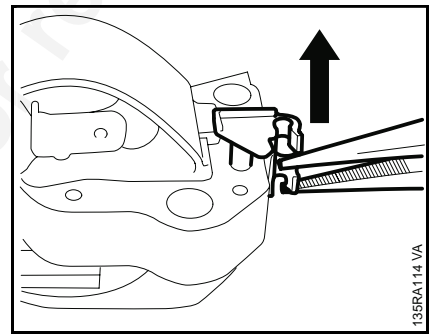
- Take out the screws.



- Pull the ignition module forward a little.
- Take the short circuit wire (1) out of the retainer (2).

- Pull the ignition module forward a little further and turn it to unscrew the ignition lead (3) from the contact pin.

- Pull the ignition lead out of the high voltage output.



- If necessary, ease peg of cable retainer out of bore.

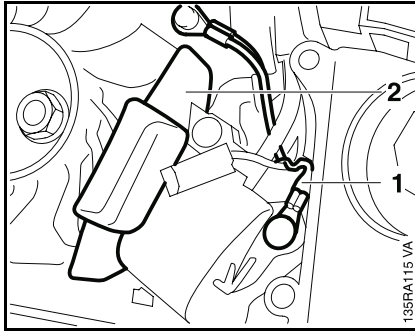
- Remove the cable retainer.

- Pack high voltage output with STIHL multipurpose grease - see 11.2.

Important: Do not use graphite grease (Molykote) or silicone insulating paste for this job.

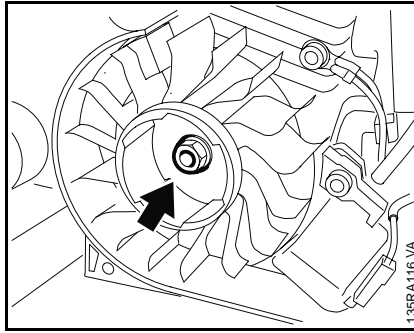
- Screw ignition lead into position.
- Fit short circuit wire in the retainer.

6.4 Flywheel



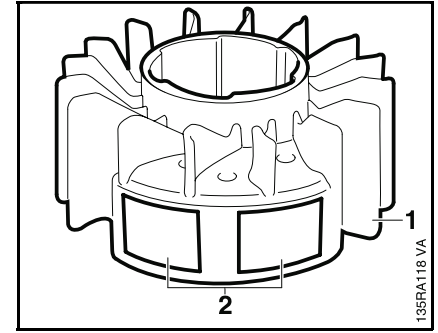
- Place the module in position, insert the screws but do not tighten them down yet.
- Secure ground wire (1) with outer screw.
- Slide the setting gauge (1) 1111 890 6400 between the arms of the ignition module and the flywheel magnet poles.
- Press the ignition module against the setting gauge and tighten down the mounting screws to 4 Nm (3 lbf.ft).

Reassemble all other parts in the reverse sequence.



Removing the flywheel:

- Fit locking strip to block the piston - **see 4.3.**
- Remove the fan housing.
- Unscrew the collar nut.
- Pull off the flywheel.



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

Installing the flywheel:

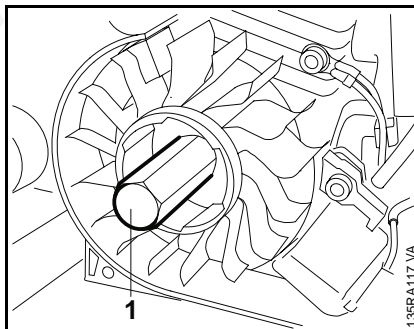
Important: Clean the stub of the crankshaft and the flywheel hub bore with a standard commercial, solvent-based degreasant which contains no chlorinated or halogenated hydrocarbons - **see 11.2.**

- Fit the flywheel.

Note: Check position of slot.

Assemble all other parts in the reverse sequence.

- Tighten flywheel nut to 28.0 Nm (20.6 lbf.ft).



Note: If the flywheel cannot be removed by hand, screw on the puller (1) 1116 893 0800 and tap its end to release the flywheel. Unscrew the puller.

7. REWIND STARTER

7.1 Routine Maintenance

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 11.2**, before installing.

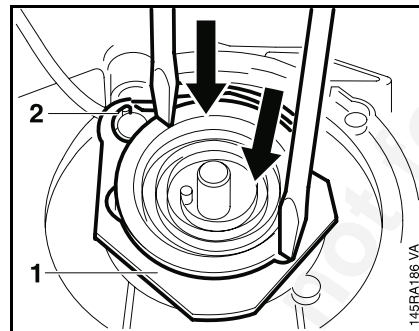
7.2 Rewind Spring

7.2.1 Replacing

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

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

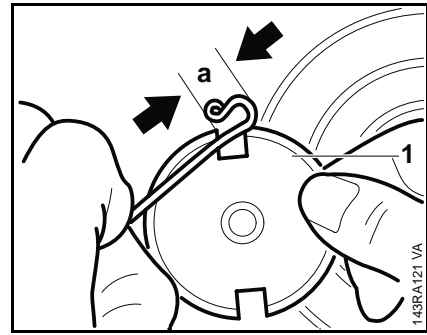
Note: The replacement spring comes ready for installation and is secured with a frame.



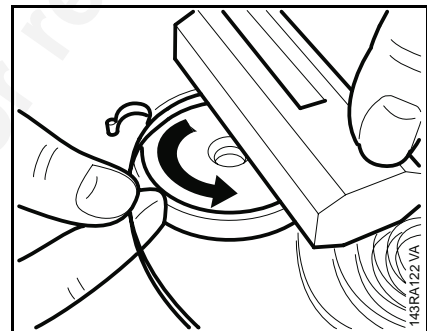
- It should be lubricated with a few drops of STIHL special lubricant before installation - **see 11.2**.
- The frame (1) slips off as the rewind spring is pushed into the fan housing. Engage the anchor loop (2) in the recess in the fan housing at the same time.

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

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

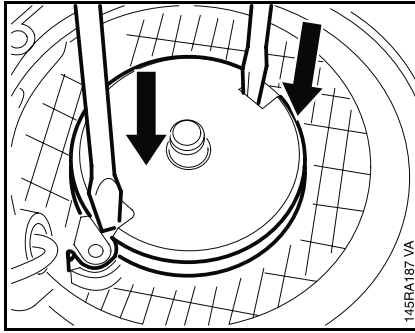


- Position the anchor loop about 20 mm (3/4") (dimension 'a') from the edge of the assembly tool (1) 1116 893 4800.

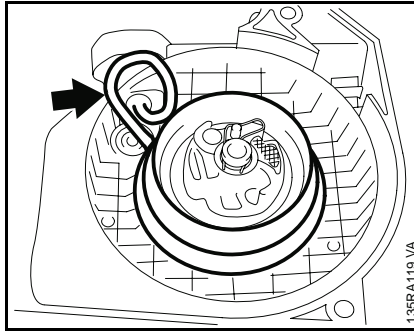


- Fit the rewind spring in the counterclockwise direction, starting from outside and working inwards.
- Place wooden assembly block 1108 893 4800 over the spring housing to simplify this operation.
- Slip the assembly tool with rewind spring over the starter post.

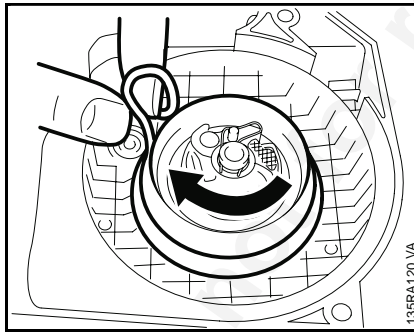
7.2.2 Tensioning



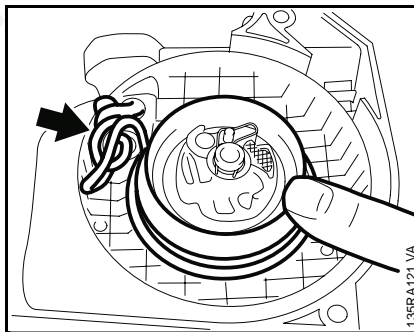
- Push the rewind spring into the fan housing and then remove the assembly tool.
- Install the rope rotor - see "Standard Repairs and Troubleshooting" handbook.
- Tension the rewind spring - see 7.2.2.



- Make a loop in the starter rope.

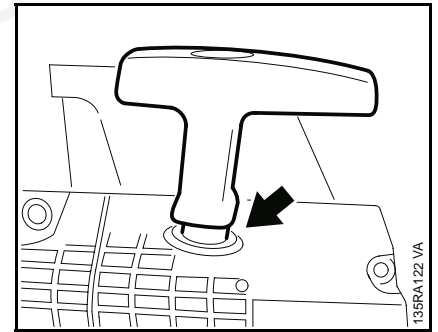


- Grip the rope close to the rotor and use it to turn the rope rotor six times clockwise.



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

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



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

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

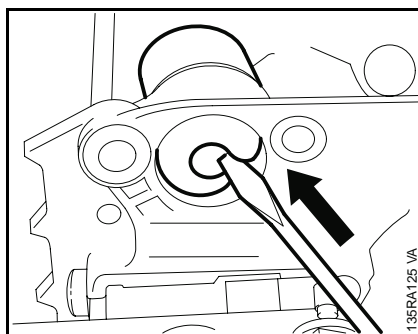
Do not overtension the rewind spring as this will cause it to break.

- Fit the fan housing.

8. AV HANDLE SYSTEM/HANDLE HOUSING

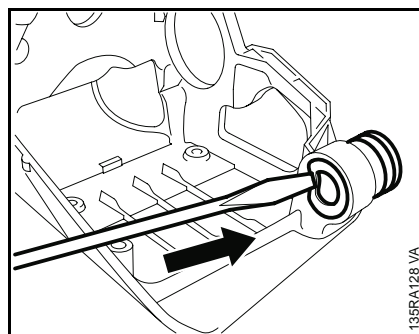
8.1 Annular Buffers

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

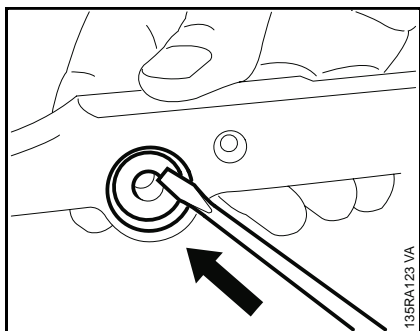


Annular buffer in engine housing

- Front handle abgebaut.
- Pry the annular buffer out of the engine housing.

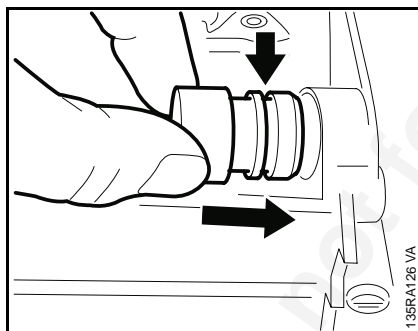


- Pry the annular buffer out of the handle housing.

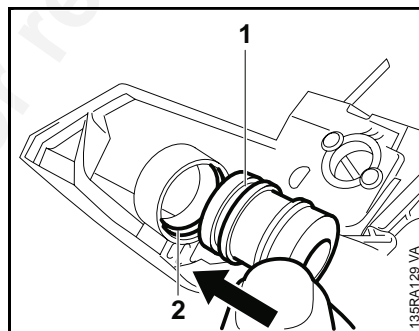


Annular buffers in front handle

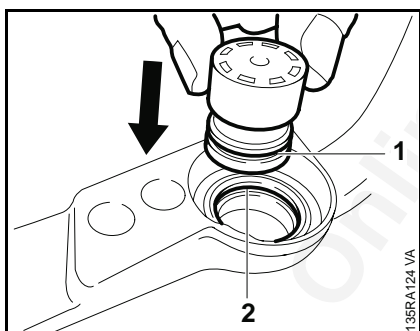
- Remove the front handle - see 8.2.
- Pry both annular buffers out of the front handle.



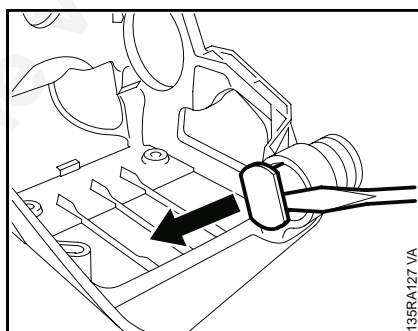
- Push annular buffer into the engine housing until its groove engages over the housing rib.
- Fit the front handle.



- Push the annular buffer into the handle housing from outside until its groove (1) engages over the edge of the housing (2).
- Install the handle housing - see 8.3.



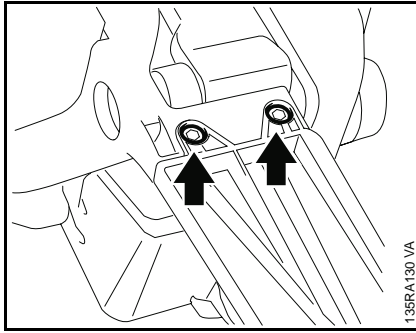
- Push home the annular buffer from the inside the front handle until its groove (1) engages over the housing rib (2).



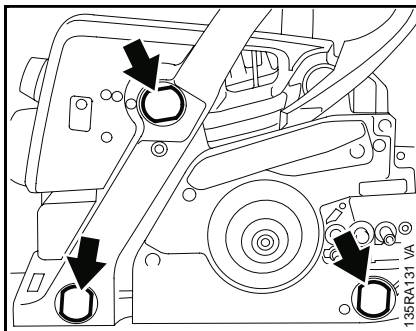
Annular buffer in handle housing

- Remove the handle housing - see 8.3.
- Ease the plug out of the buffer.

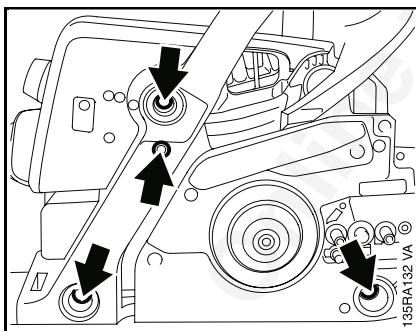
8.2 Front Handle



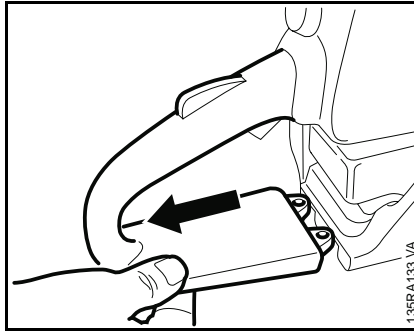
- Take the lower mounting screws out of the front handle.



- Remove lower bumper strip from the tensioner.
- Ease plugs out of the annular buffers.



- Take out the screws.



- Pull the lower part of the handle housing out of the front handle.

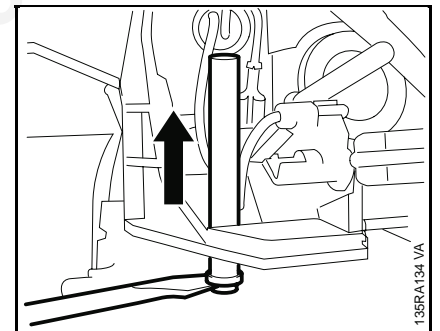
- Remove the front handle.

Reassemble in the reverse sequence.

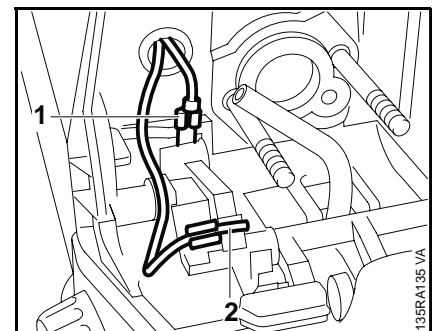
- Tighten down screws in annular buffers to 3.5 Nm (2.6 lbf.ft).

8.3 Handle Housing

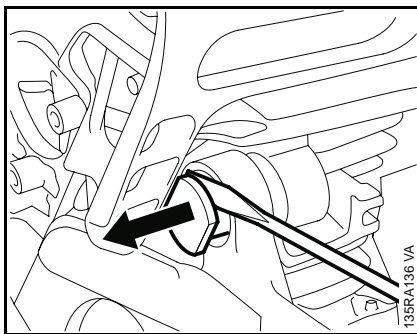
- Remove the front handle - see 8.2.
- Remove the fan housing.
- Remove the muffler - see 5.1.
- Remove the carburetor - see 10.2.2.



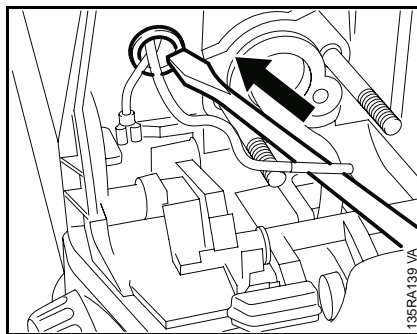
- Disconnect the tank vent from the stub.



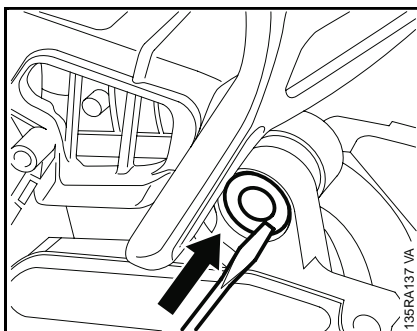
- Pull the ground wire (1) off the contact spring.
- Pull the short circuit wire's contact sleeve (2) out of the switch shaft.



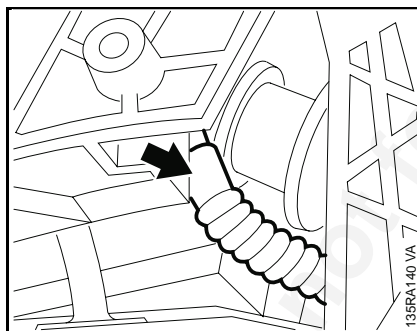
- Ease the plug out of the annular buffer.



- Push the grommet out of the handle housing.
- Pull the ground and short circuit wires out of the bore.



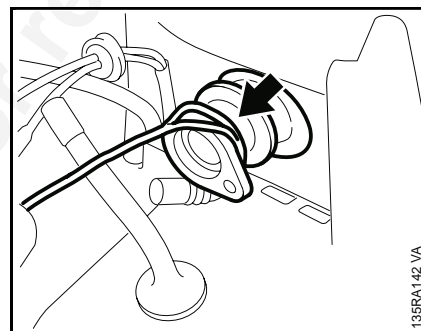
- Pry the annular buffer out of the engine housing.



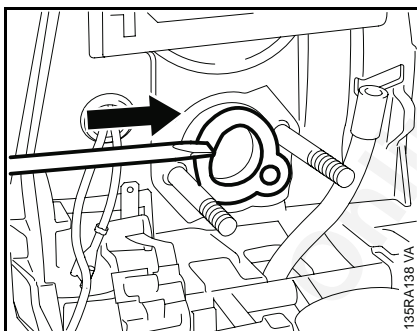
- Pull the impulse hose off the stub on the handle housing.

- Remove the handle housing.
- To replace, remove the annular buffers - [see 8.1.](#)
- Remove the switch shaft - [see 8.4.](#)
- Remove the throttle trigger - [see 8.6.](#)
- Remove the contact spring - [see 8.5.](#)
- On easy start machines, remove the manual fuel pump - [see 10.6.](#)

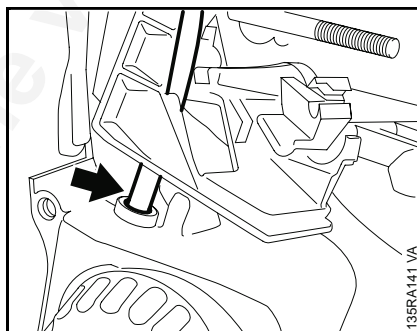
Reassemble in the reverse sequence.



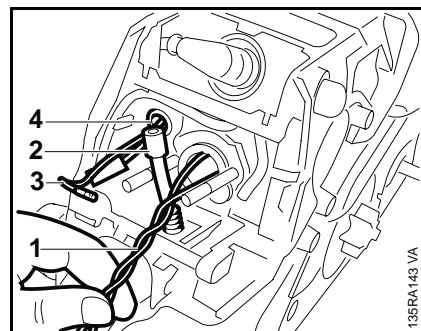
- To fit the manifold in the handle housing intake opening, wind a piece of string (about 15 cm / 6" long) around the back of the manifold flange.



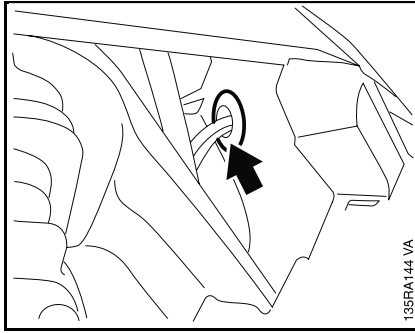
- Pull the handle housing slightly forward and push the manifold through the handle housing opening at the same time.



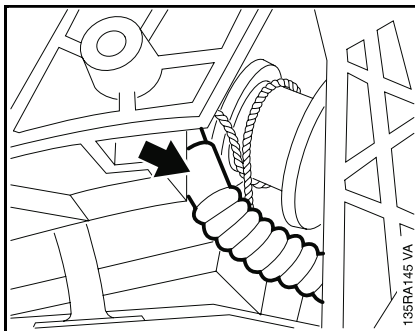
- On easy start machines, pull manual fuel pump hose out of the fuel tank.



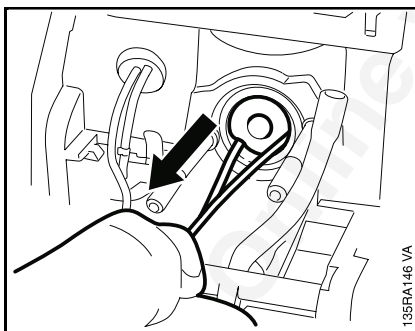
- Place the handle housing in position and thread the string (1), fuel hose (2), ground wire (3) and short circuit wire (4) through the openings.



- Push the grommet for the ground and short circuit wires into the bore from inside.

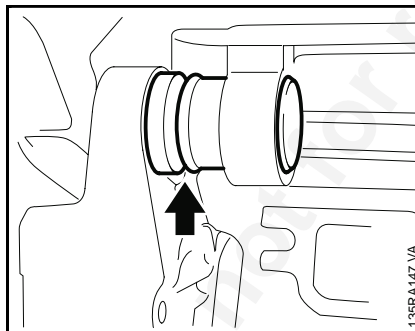


- Connect the impulse hose to the stub on the handle housing.

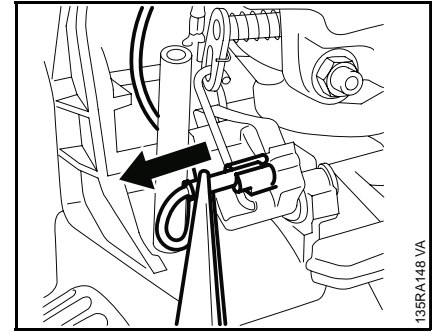


- Pull the ends of the string outward.

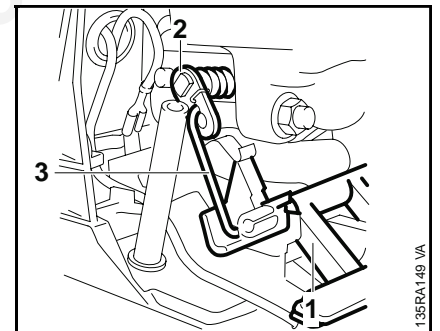
Note: The manifold flange is thus pulled through the handle housing intake opening without any damage to the manifold.



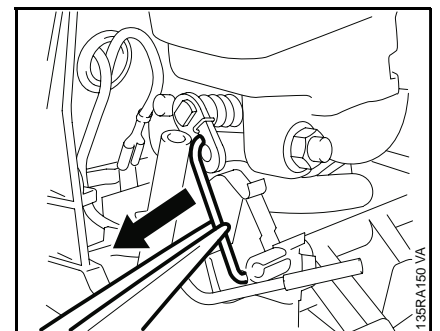
- Push the annular buffer into the engine housing until its groove engages over the housing rib.



- Remove the carburetor box cover - [see 10.1](#).
- On 023 L, remove the filter base - [see 10.2.2](#).
- Pull the contact sleeve out of the switch shaft.

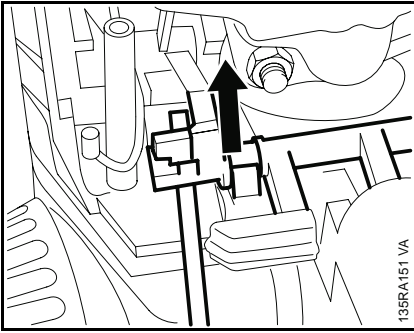


- Move the Master Control lever (1) until the slot in the choke shaft (2) and the choke rod (3) are in line.

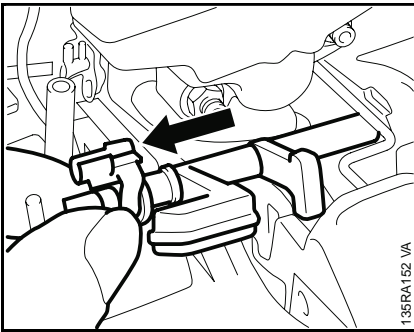


- Pull the choke rod out of the switch shaft and the choke shaft.

8.5 Contact Spring

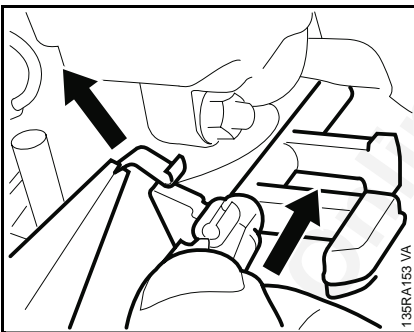


- Set the Master Control lever to the horizontal position and pry the switch shaft out of its pivot mount.

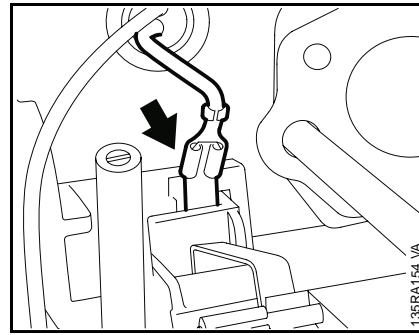


- Pull the switch shaft out of its bore.

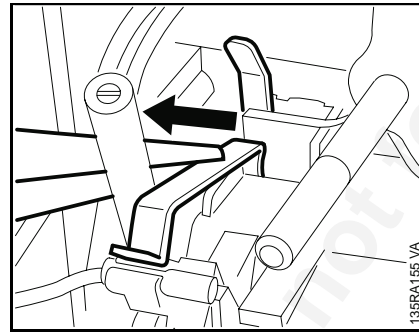
Reassemble in the reverse sequence.



- Lift the contact spring slightly to install the switch shaft.



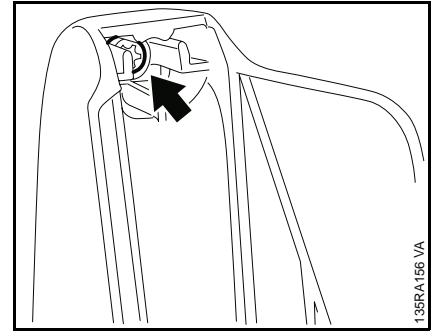
- Remove the carburetor - [see 10.2.2.](#)
- Pull the ground wire terminal off the contact spring.



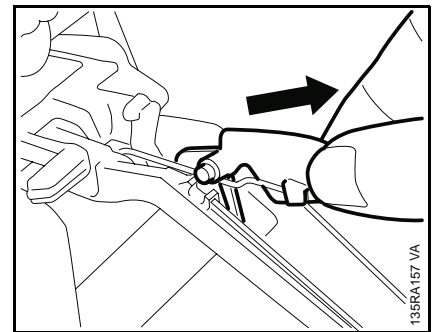
- Pull the contact spring out of its seat in the handle housing.

Reassemble in the reverse sequence.

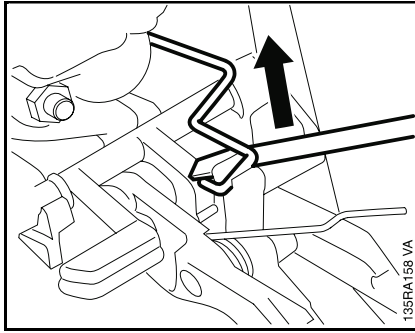
8.6 Throttle Trigger/Interlock Lever



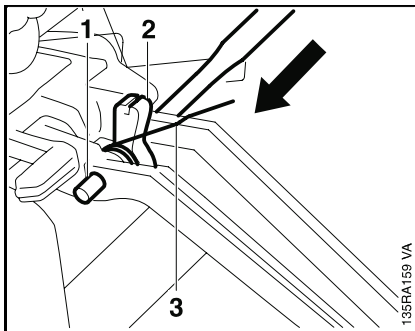
- Remove the carburetor box cover - [see 10.1.](#)
- On 023 L, remove the filter base - [see 10.2.2.](#)
- Take out the screw
- Lift away the handle molding.



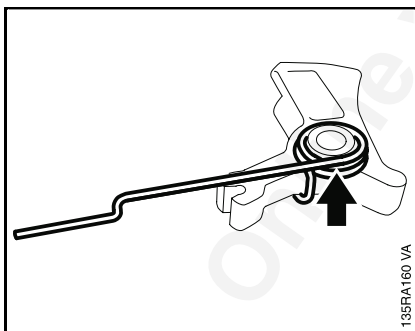
- Move Master Control lever to "RUN" position.
- Pull the throttle interlock lever out of its seat.



- Remove throttle rod from throttle trigger.

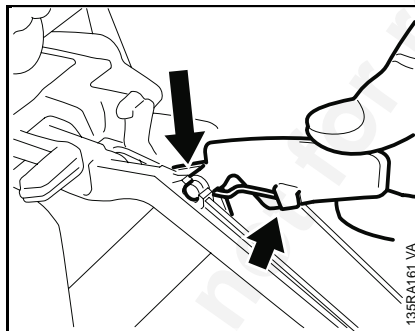


- Use a 4 mm (5/32") drift to drive out the cylindrical pin (1).
- Remove the throttle trigger (2) and torsion spring (3).

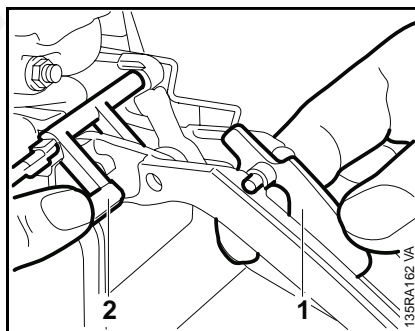


- Take the torsion spring off the throttle trigger.

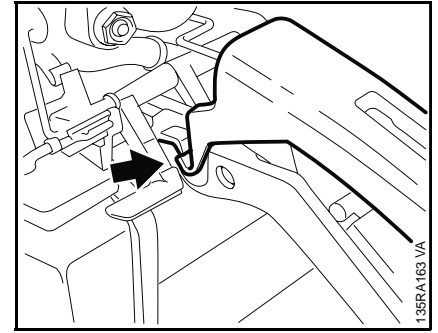
- Fit the throttle trigger so that the seat for the throttle rod points upward.
- Fit the cylindrical pin.
- Push the throttle rod into the throttle trigger.



- Press the interlock lever into the slots. The torsion spring must be under the interlock lever and engage the notch.



- Press the interlock lever (1) downward.
- Push the throttle trigger upward and move the Master Control lever (2) to the "Choke" position.



- Fit the handle molding so that it engages behind the lugs as shown.

- Insert screw and tighten down to 1.6 Nm (1.2 lbf.ft).

- On 023 L, fit the filter base - [see 10.2.2.](#)

- Fit the carburetor box cover - [see 10.1.](#)

9. CHAIN LUBRICATION

9.1 Pickup Body

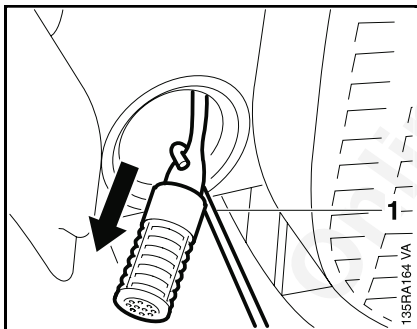
Impurities gradually clog the fine pores of the filter with minute particles of dirt. This prevents the oil pump from supplying sufficient oil to the bar and chain. In the event of problems with the oil supply system, first check the oil tank and the pickup body. Clean the oil tank if necessary.

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

- Unscrew oil filler cap and drain the oil tank.

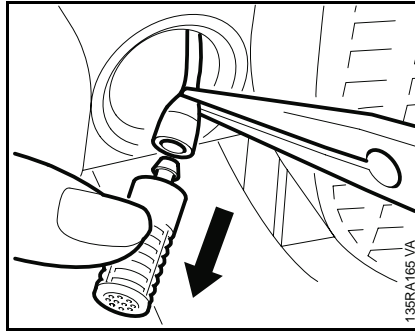
Note: Collect chain oil in a clean container or dispose of it properly at an approved disposal site.

- Observe safety precautions - see 1.



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

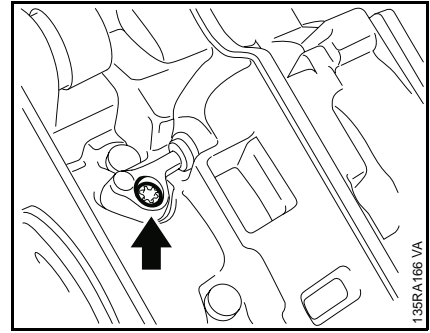
Note: Avoid stretching the oil hose.



- 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.

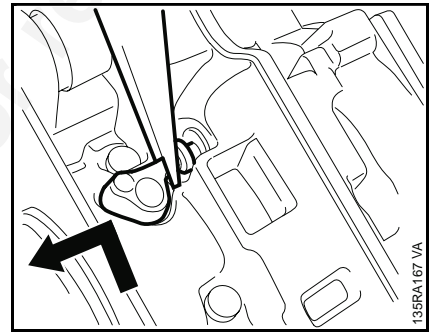
Reassemble in the reverse sequence.

9.2 Connector/Suction Hose

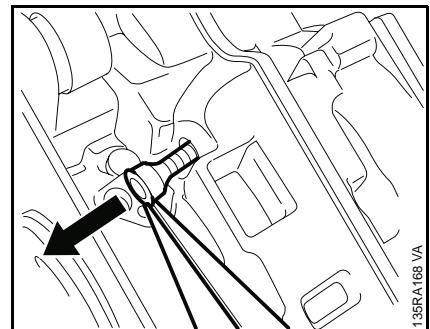


- Remove the front handle - see 8.2.

- Take out the screw.

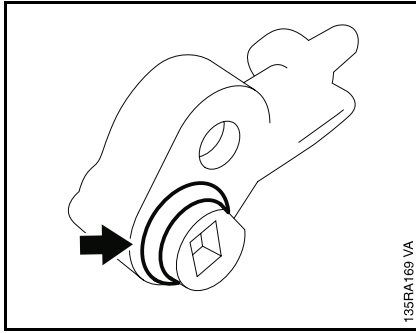


- Pull the connector out of the oil pump and suction hose.



- Pull suction hose with pickup body out of the oil tank.
- Remove the pickup body.

9.3 Vent Valve



Reassemble in the reverse sequence.

- Fit new O-ring on connector (arrow).
- Tighten down screw to 2.5 Nm (1.8 lbf.ft).

There is a vent valve in the tank wall which keeps the internal pressure in the oil tank equal to atmospheric pressure.

Cleaning the valve

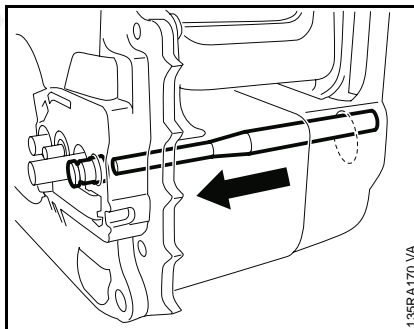
- Unscrew the oil filler cap.
- Drain the oil tank.

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

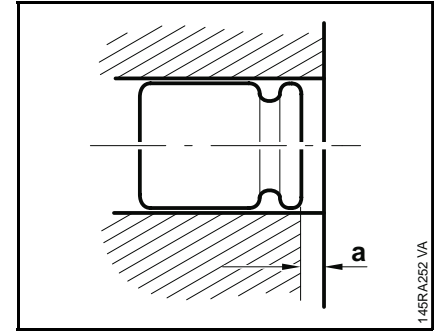
- Observe safety precautions - **see 1.**
- Use compressed air to blow valve clear from the outside inwards.
- Flush the oil tank.
- Fit the oil filler cap.

Relacing the valve

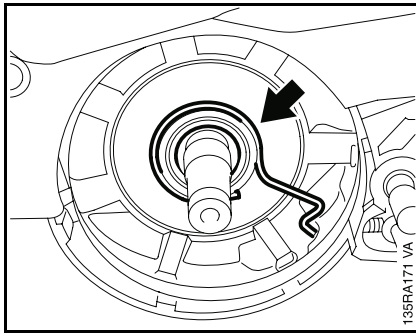
- Unscrew the oil filler cap.



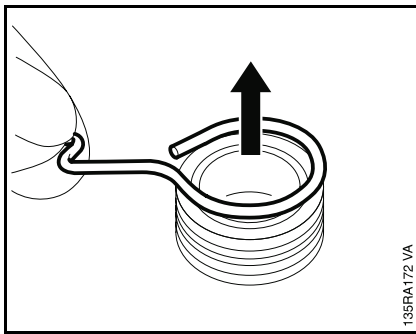
- Use a 5 mm (3/16") dia. drift to carefully drive the valve out of the housing from inside the tank.



- Use a 7 mm (9/32") dia. drift to carefully push home the new valve until dimension 'a' is about 1 mm (3/64").
- Fit the oil filler cap.

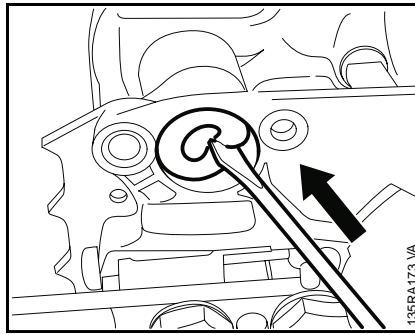


- Remove the clutch - [see 4.3.](#)
- Pull the worm and drive spring off the crankshaft stub.



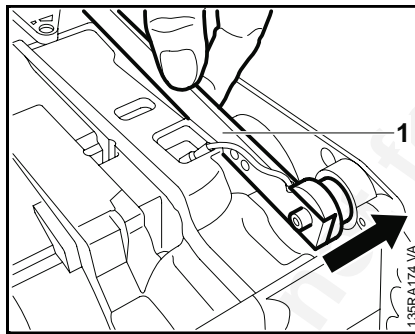
- Take the drive spring off the worm.

Reassemble in the reverse sequence.

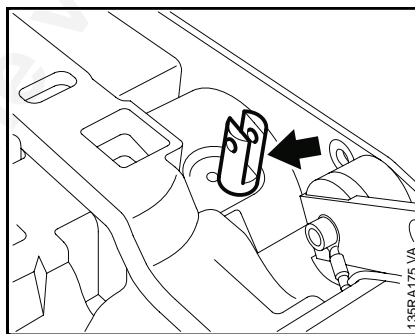


Removing

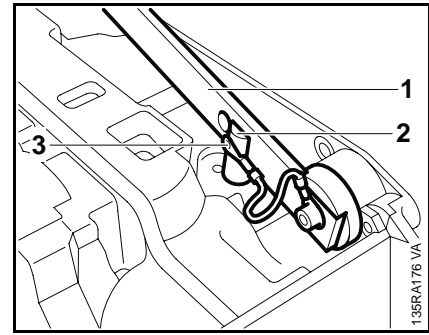
- Remove the connector - [see 9.2.](#)
- Push out the lower annular buffer.



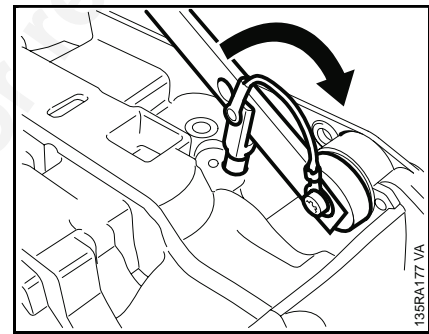
- Fit lever (1) of installing tool 1123 890 2201 in the bore for the annular buffer - from inside.



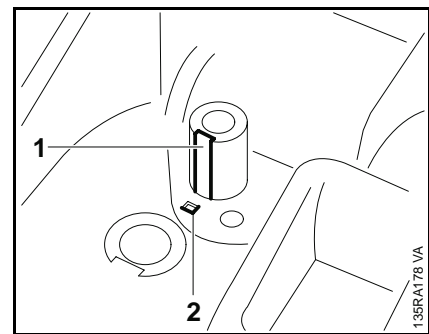
- Screw fork head (1123) with threaded stem (from installing tool) into the oil pump.



- Swing lever (1) down into fork head (2) and secure it with the connecting pin (3).



- Swing lever upward to pull the oil pump out of the housing.
- Unscrew the oil pump from the fork head.

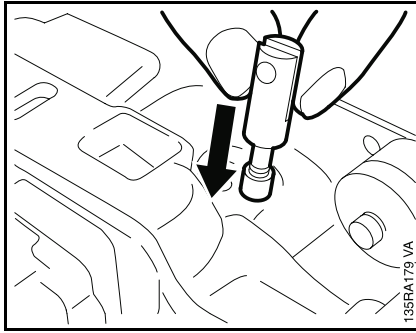


Installing

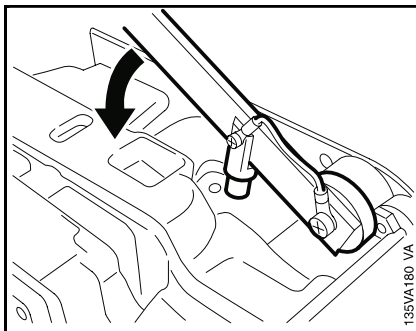
- Place the oil pump in position so that its groove (1) lines up with the square (2) on the housing.

10. FUEL SYSTEM

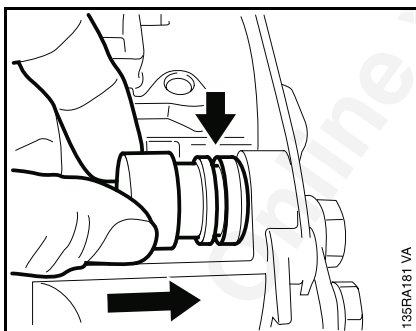
10.1 Air Filter



- Place the fork head (1123) with the straight stem (from installing tool) in the oil pump.
- Fit lever in fork head and secure in position.



- Press the lever down until the fork head butts against the engine housing. The oil pump is now installed at the right depth.
- Remove the lever.



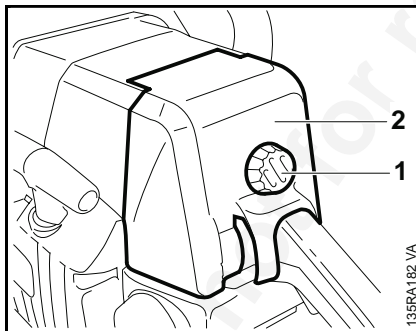
- Push the annular buffer into the housing until its groove engages over the housing rib.
- Fit the connector - see 9.2.

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

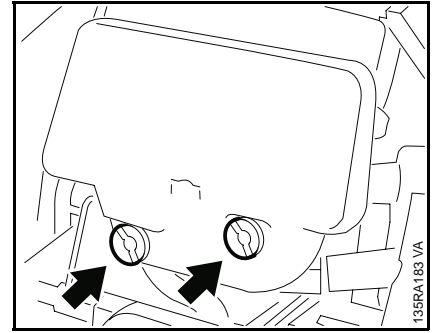
The air filter should always be cleaned when there is a noticeable loss of engine power.

- Close the choke shutter.

All models except 023 L

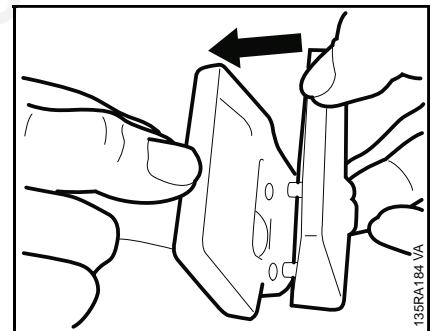


- Turn twist lock (1) 90 degrees counterclockwise.
- Lift off the carburetor box cover (2) vertically.
- Remove all loose dirt from around the filter.



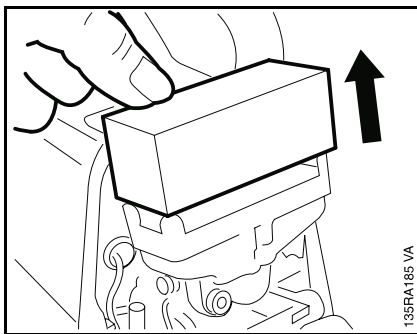
Box filter

- Unscrew the slotted nuts.
- Lift away the box filter.



- Separate the two halves of the filter.
- Wash both halves the filter in a fresh, non-flammable cleaning solution (e.g. warm soapy water) and then dry.

Note: Replace a damaged air filter immediately.



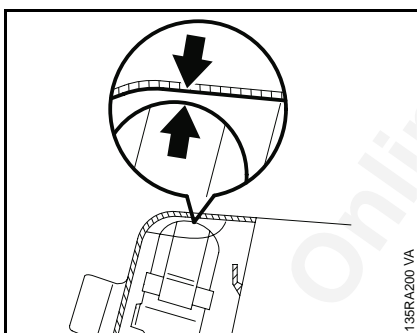
Foam filter

- Remove the foam filter from the filter housing.
- Wash the foam filter in a fresh, non-flammable cleaning solution (e.g. warm soapy water) and then dry.

Note: Replace a damaged foam filter immediately.

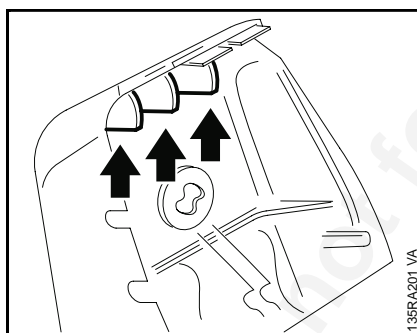
Convert machines with foam filter to fabric/fleece filter.

- Replace the filter housing - see 10.2.2.



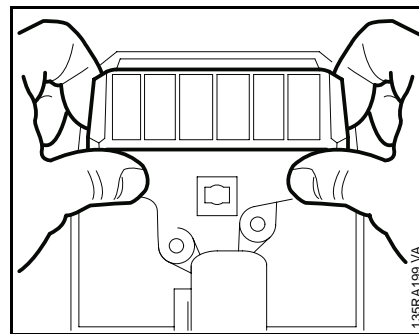
Note: The clearance between the top edge of the air filter and the carburetor box cover is only a few millimeters.

Install only carburetor box covers without ribs.



- If an original carburetor box cover with ribs has to be installed, use side cutters to remove the ribs.
- Carefully deburr the cover.

Important: Deburring is essential to avoid damaging the filter mesh.



Fabric/fleece filter

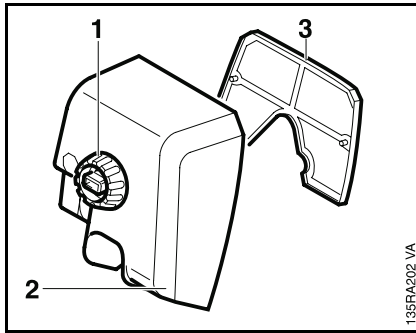
- Place fingers behind the filter, press thumbs against housing, and swing filter toward rear handle.
- Remove the filter.
- Use compressed air to blow out filter from the clean air side.
- If the mesh is caked with dirt or no compressed air is available, wash the filter in a fresh, non-flammable cleaning solution (e.g. warm soapy water) and then dry.

Note: Replace a damaged air filter immediately.

- Push air filter onto filter housing until it snaps into position.
- Carburetor box cover anbauen.

10.2 Carburetor

10.2.1 Leakage Test



023 L

- Unscrew twist lock (1) several turns counterclockwise.
- Lift off the carburetor box cover vertically.
- Grip the tab and pull the air filter (3) out of the carburetor box.
- Knock it out or blow it out with compressed air.
- If the mesh is caked with dirt, wash the filter in a fresh, non-flammable cleaning solution (e.g. warm soapy water) and then dry.

Note: Replace a damaged air filter immediately.

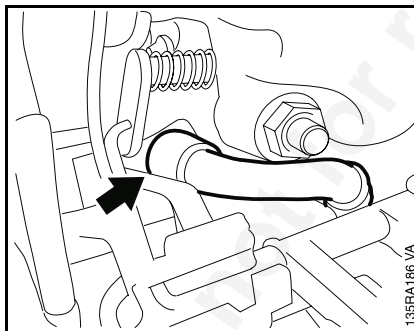
- Fit the air filter in the carburetor box cover.
- Fit the carburetor box cover.

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

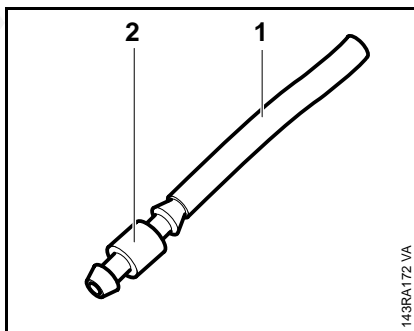
Important: If problems occur on the carburetor or the fuel supply system, always check and clean the tank vent - [see 10.3](#).

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

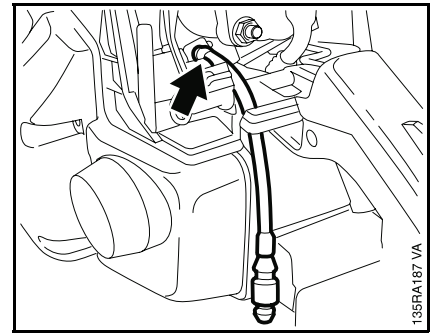
- Remove the carburetor box cover - [see 10.1](#).
- On 023 L, remove the filter base - [see 10.2.2](#).



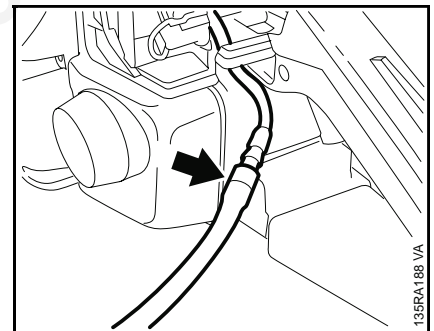
- Check tester for leaks.
- Pull fuel hose off the carburetor's elbow connector.



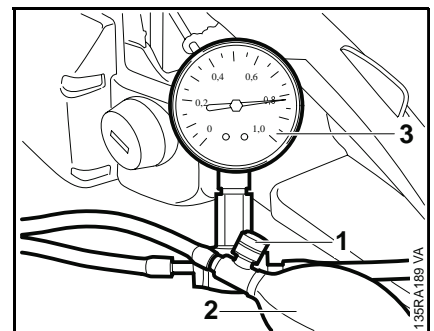
- Push the fuel line (1) 1110 141 8600 onto the nipple (2) 0000 855 9200.



- Push fuel line with nipple onto carburetor elbow connector.



- Connect the tester's pressure hose to the nipple.

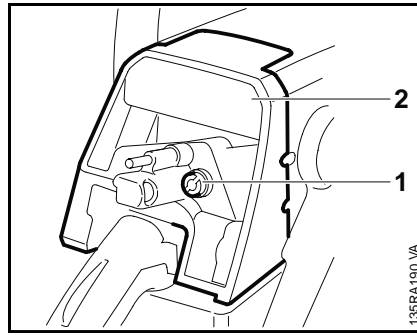


- Close the vent screw (1) on the rubber bulb (2) and pump air into the carburetor until the pressure gauge (3) shows a reading of approx. 0.8 bar (11.6 psi).

10.2.2 Removing and Installing

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

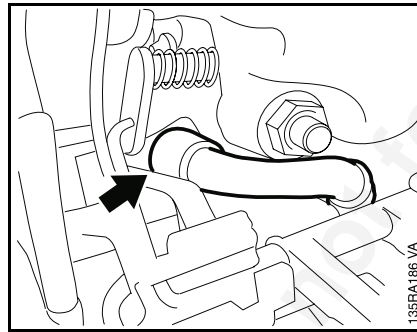
1. The inlet needle is not sealing (foreign matter in valve seat or sealing cone of inlet needle is damaged or inlet control lever sticking).
 2. The metering diaphragm is damaged.
- After completing test, open the vent screw and pull the fuel line off the elbow connector.
 - Push the fuel hose onto the elbow connector.
 - On 023 L, fit the filter base.
 - Fit the carburetor box cover.



- Remove the air filter - see 10.1.

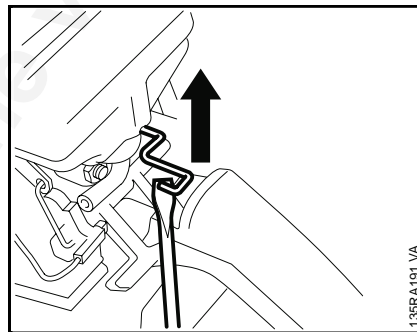
On 023 L,

- unscrew the slotted nuts (1).
- Remove the filter base (2).

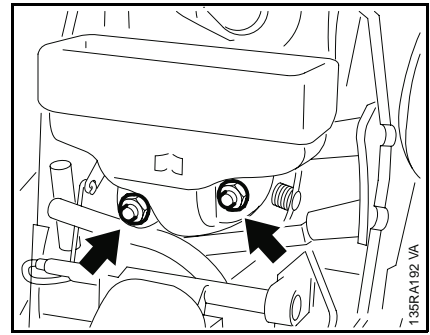


All models

- Pull fuel hose off the carburetor's elbow connector.

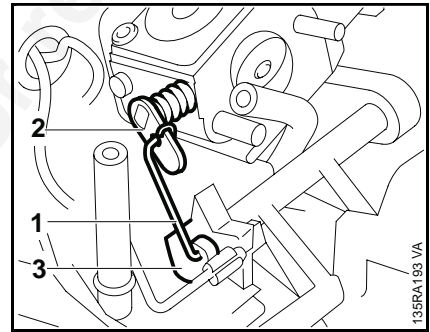


- Detach throttle rod from the throttle trigger.



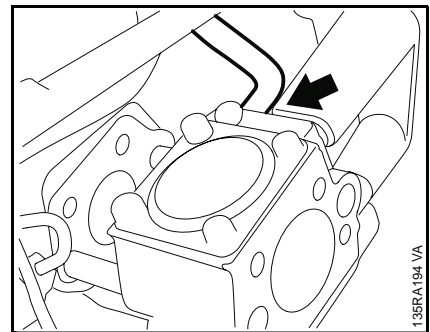
- Unscrew the filter housing locknuts.

- Lift away the filter housing.



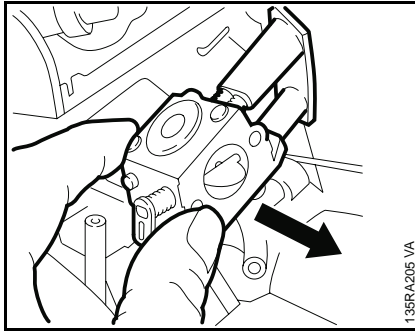
- Pull choke rod (1) out of choke shaft (2) and switch shaft (3).

- On easy start machines, ease carburetor forward a little.

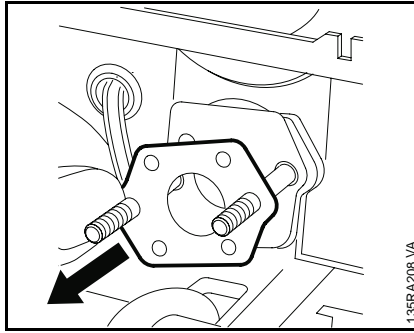


- Disconnect fuel hose from the manual fuel pump.

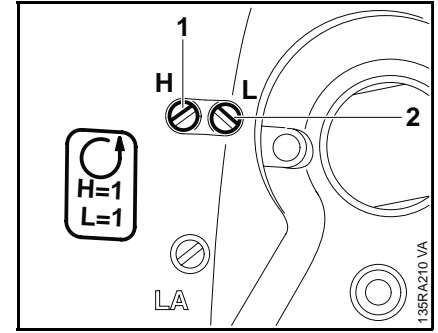
10.2.3 Adjustment (except 023 L and USA)



- Remove the carburetor.



- Slip the gasket off the studs.



Standard setting

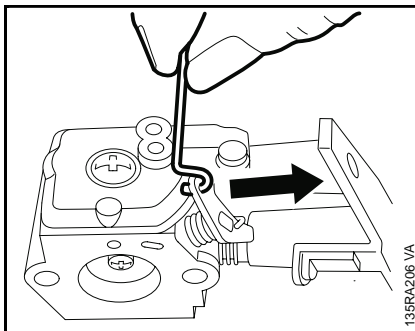
To readjust the carburetor, start with the standard setting.

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

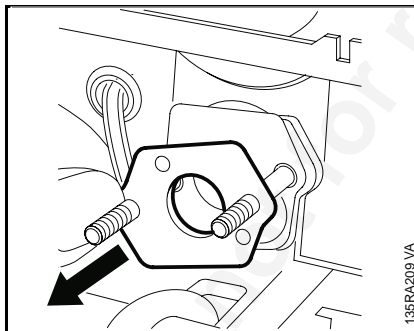
Then make the following adjustments:

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

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



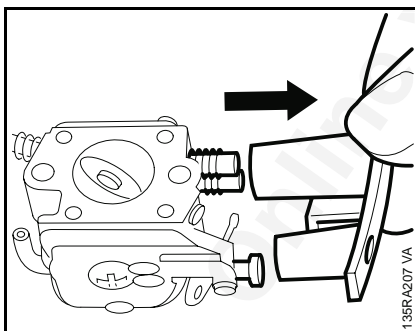
- Take the throttle rod off the throttle shaft.



- If necessary, remove the shim from the studs.

Resassemble in the reverse sequence.

- Fit the shim with its flat side facing outward.
- Install a new gasket.
- Tighten down locknuts to 2.5 Nm (1.8 lbf.ft).
- On 023 L, fit a new gasket in the filter base.
- On 023 L, tighten slotted nuts to 2 Nm (1.5 lbf.ft).



- Remove the grommet from the adjusting screws.

For corrections to high speed 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:
11,500 rpm (021)
12,500 rpm (023, 025)

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

10.2.4 Adjustment (023 L and USA)

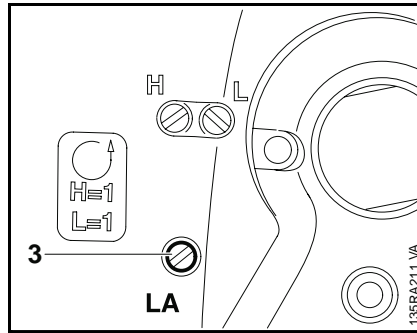
- Check chain tension.
- Check air filter and clean if necessary.
- Inspect the spark arresting screen and clean or replace if necessary.
- Start the saw - warm up the engine.
- Adjust idle speed correctly (chain must not rotate).

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 movements 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 engine 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.

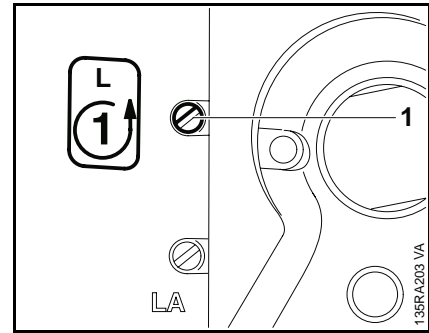
Turn idle speed screw **(LA)** clockwise until the chain begins to run - then turn it back one quarter turn.

Chain runs while engine is idling: Check standard setting.

Turn the idle speed 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.



This carburetor has a fixed jet in place of the high speed adjusting screw (H screw).

Maximum engine speed is preset and no longer adjustable. It is only possible to correct idling speed within certain limits.

The carburetor guarantees an optimum fuel-air mixture in all operating conditions.

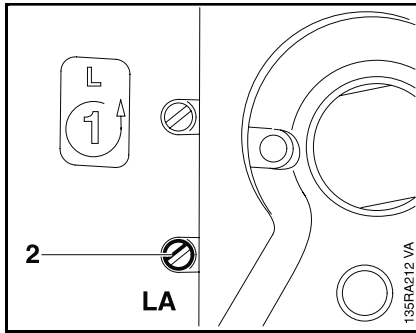
Standard setting

To readjust the carburetor, start with the standard setting.

Carefully screw down the low speed screw **(L)** clockwise until it is hard against its seat. Then open it one full turn.

- Check chain tension.
- Check air filter and clean if necessary.
- Inspect the spark arresting screen and clean or replace if necessary.
- Start the saw - warm up the engine.
- Adjust idle speed correctly (chain must not rotate).

10.3 Tank Vent



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

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

**Engine stops while idling:
Check standard setting.**

Turn idle speed 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 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 - even though low speed screw in one turn open
Idle setting too lean.

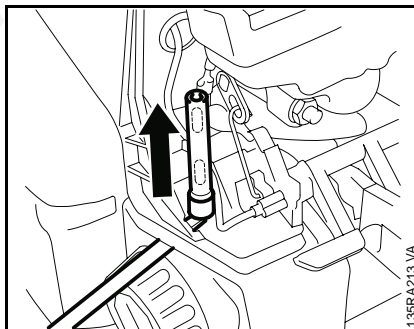
Turn the low speed screw **(L)** counterclockwise until the engine runs and accelerates smoothly.

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.

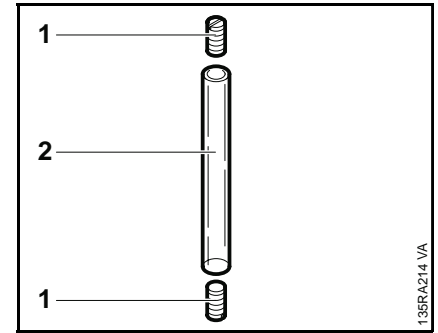
Important: If problems occur on the carburetor or the fuel supply system, always check and clean the tank vent.

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

- Remove the carburetor box cover - **see 10.1.**
- On 023 L, remove the filter base - **see 10.2.2.**



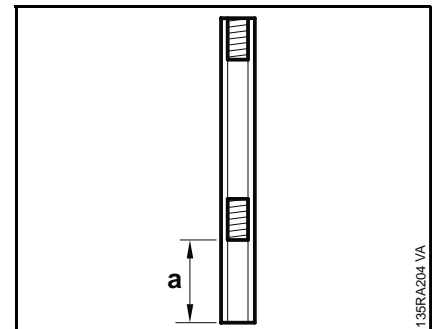
- Remove the vent from the stub on the fuel tank.



- Use a 3 mm (1/8") dia. drift to push the grub screws (1) out of the hose (2).

- Wash all parts in fresh white spirit and blow clear with compressed air.

Reassemble in reverse sequence.



- Use a drift to position the grub screws as shown in the illustration.
a = approx. 20 mm (3/4")

10.4 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.

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

Cleaning the fuel tank:

- Unscrew the filler cap and drain the tank.

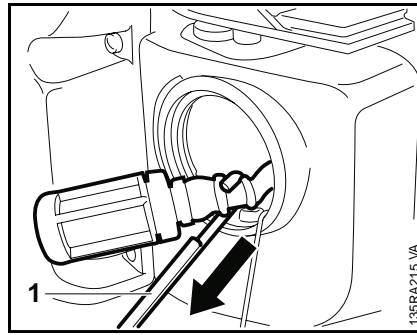
Note: Observe safety precautions - [see 1](#).

- 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.

Note: Dispose of fuel properly.

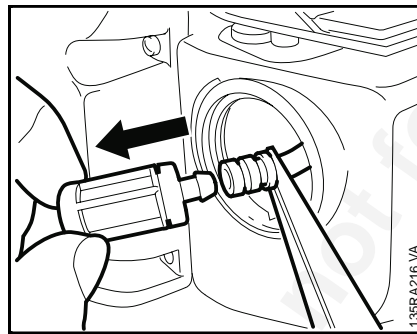
Pickup body

- Unscrew the fuel filler cap and remove it together with the cap retainer, if fitted.



- Use hook (1) 5910 893 8800 to pull the pickup body out through the filler opening.

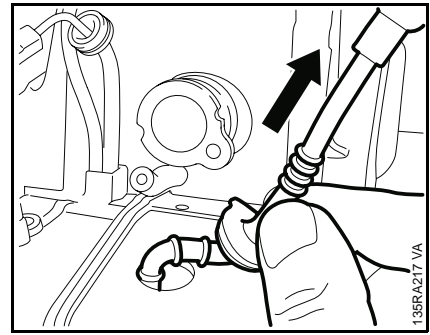
Note: Do not stretch the suction hose.



- Pull the pickup body off the fuel hose.
- Replace the pickup body.

Reassemble in the reverse sequence.

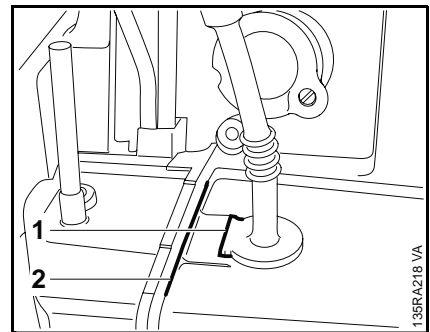
10.5 Suction Hose



- Remove the handle housing - [see 8.3](#).
- Remove the pickup body - [see 10.4](#).
- Pry suction hose flange out of the fuel tank.
- Pull the suction hose out of the tank.

Reassemble in the reverse sequence.

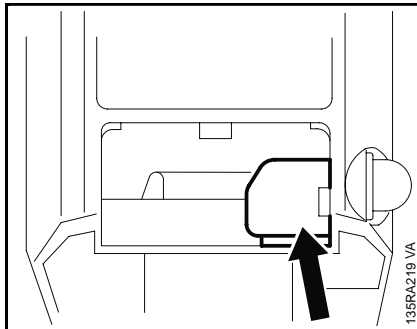
- Coat the hose flange with a little oil to simplify installation.



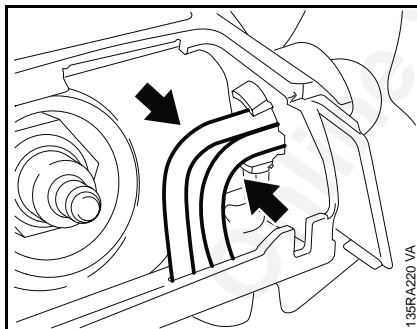
- Straight side (1) of hose flange must be parallel to tank joint (2).

Easy start machines only

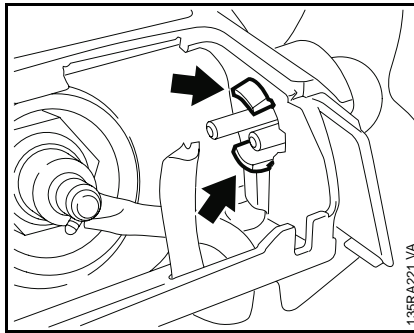
- Remove the air filter - [see 10.1.](#)
- Take out the shutter - [see 4.3.](#)
- Pull boot off the spark plug.



- Carefully push cover, if fitted, with thumb in direction of arrow until it is released from its seat.
- Remove the cover.



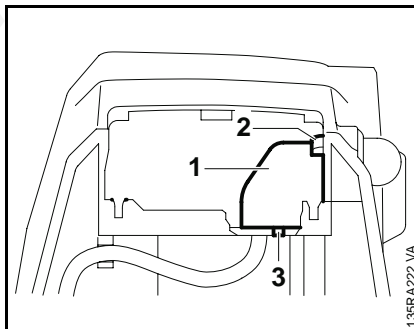
- Disconnect hoses from the connectors.



- Carefully squeeze the retaining tabs.
- Pull the fuel pump out of its seat in the handle housing.

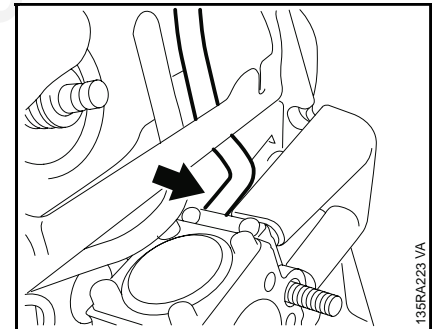
Reassemble in the reverse sequence.

- Push home the fuel pump (short intake stub facing the air filter) until retaining tabs snap into position.
- Connect carburetor suction hose to the short stub.



- Slide the cover (1) under the top retaining tab (2) and fit the pin (3) in the bore in the handle housing.

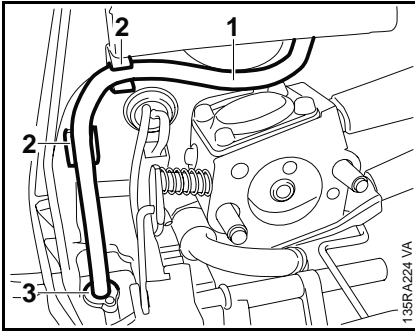
- Disconnect the hoses from the fuel pump - [see 10.6.](#)
- Remove the filter housing - [see 10.2.2.](#)
- Pull off the tank vent - [see 10.3.](#)



- Pull the suction hose off the carburetor stub.
- Pull the suction hose out of the bore in the handle housing.
- If necessary, pull the helical spring out of the suction hose.

Note: The helical spring **must** be fitted to prevent the hose bend kinking and restricting its cross section.

10.7 Fuel Tank



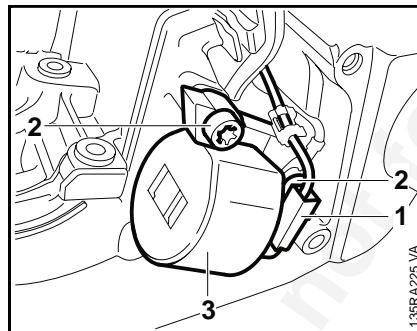
- Pull the return hose (1) out of the retainers (2).
- Pull the return hose out of the grommet (3) and the bore in the handle housing.
- Check grommet and replace if necessary.

Note: Grommet is essential to provide an effective seal.

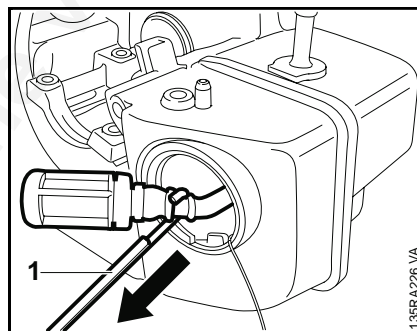
Reassemble in the reverse sequence.

Fuel tank and engine housing are a single unit.

- Remove the engine - [see 5.4](#).
- Remove the chain tensioner - [see 4.5 and 4.6](#).
- Remove the chain brake - [see 4.4.2](#).



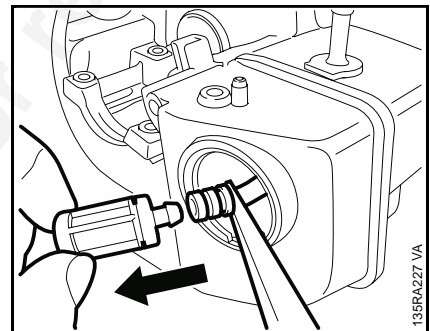
- Disconnect the short circuit wire (1).
- Take out the screws (2).
- Remove the ignition module (3).



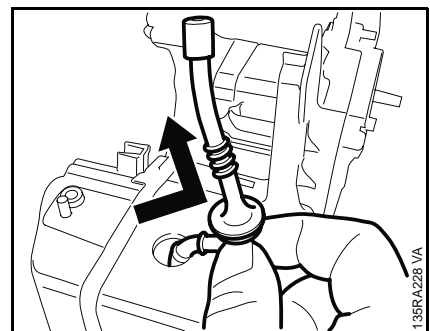
- Unscrew the fuel filler cap and remove with cap retainer, if fitted.

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

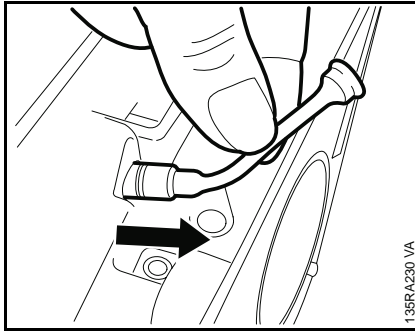
Note: Do not stretch the suction hose.



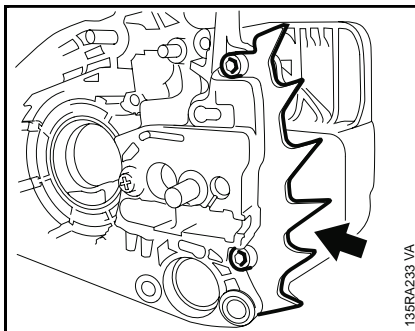
- Disconnect pickup body from the suction hose.



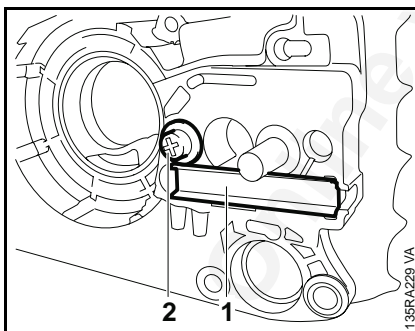
- Pry the suction hose flange out of the fuel tank.
- Pull out the suction hose.



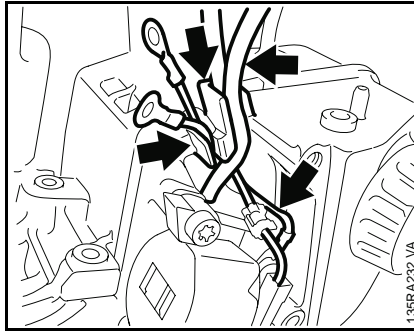
- Pull out the oil pump suction hose with pickup body.



- Remove the spiked bumper, if fitted.

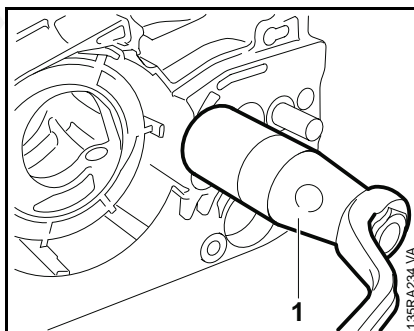


- On machines with quick chain tensioner, remove the stiffener (1) and take out the rear collar screw (2).



Reassemble in the reverse sequence.

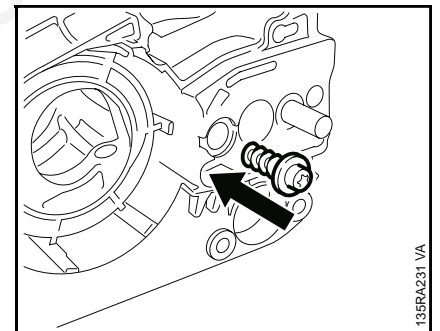
- Position ground wires, short circuit wire and ignition lead in the housing slots.
- After assembling, set distance between ignition module and flywheel - [see 6.3.2.](#)
- Coat the fuel hose flange with a little oil to simplify installation.
- Straight side of hose flange must be parallel to tank joint.



Note: Replacement engine housings are supplied with two collar screws of the same length.

- To install engine housing in a machine with a quick chain tensioner, use stud puller (1) 5910 893 0501 to slowly unscrew the rear collar screw.

Note: Thread in engine housing can be damaged if stud puller is turned too fast.



- Apply a little oil to the thread of the new or original collar screw.
- Insert collar screw in the bore of the replacement engine housing and turn it counterclockwise until it engages the thread.
- Then screw it home clockwise and torque down to approx. 8.0 Nm (5.9 lbf.ft).
- Tighten down mounting screws on spiked bumper to 3.7 Nm (2.8 lbf.ft).

11. Special Servicing Tools and Aids
11.1 Special Servicing Tools

No.	Part Name	Part No.	Application	Rem.
1	Locking strip	0000 893 5903	Blocking crankshaft	
2	Press sleeve	1123 893 2400	Fitting oil seal	
3	- Guide sleeve	1123 894 7700	- (ignition side only)	
4	Puller	5910 890 4400	Removing oil seals	1)
5	- Jaws (No. 6)	0000 893 3711		
6	Puller	1116 893 0800	Removing flywheel	
7	Crimping tool	5910 890 8210	Attaching connectors to electrical wires	
8	Assembly drift	1110 893 4700	Removing and fitting piston pin	
9	Carburetor and crankcase tester	1106 850 2905	Testing carburetor and engine for leaks	
10	- Nipple	0000 855 9200		
11	- Fuel hose	1110 141 8600		
12	Vacuum pump	0000 850 3501	Testing engine for leaks	
13	Sealing plate	0000 855 8106	Sealing exhaust port for leakage test	
14	- Flange	1123 855 4200		
15	- Sleeves	1123 851 8300		
16	Test flange	1118 850 4200	Leakage test	
17	Setting gauge	1111 890 6400	Setting air gap between ignition module and flywheel	
18	Socket, 13 mm	5910 893 5608	Flywheel nut	
19	Socket, 19 mm	5910 893 5612	Clutch	
20	Torque wrench	5910 890 0301	0.5 - 18 Nm (0.4 - 13.5 lbf.ft)	2)
		5910 890 0302		3)
21	Torque wrench	5910 890 0311	6 bis 80 Nm (4.4 - 60 lbf.ft)	2)
		5910 890 0312		3)
22	Spline screw socket T27x125	0812 542 2104	IS screws	
23	Hook	5910 893 8800	Removing pickup bodies	
24	Installing tool	5910 890 2210	Installing hookless snap rings in piston	
25	Assembly tube	1117 890 0900	Attaching brake spring	
26	T-handle screwdriver QI-T27x150	5910 890 2400	For all IS screws	4)
27	Stud puller M8	5910 893 0501	Removing guide bar mounting studs	

No.	Part Name	Part No.	Application	Rem.
28	Clamp	1123 893 9100	Holding conrod bearing	5)
29	Installing tool	1123 890 2201	Removing/installing oil pump	
30	Installing tool	1116 893 4800	Refitting rewind spring	
31	Assembly stand	5910 890 3100	Holds chainsaw for repairs	
32	- Clamping bar	5910 890 2000		

Remarks:

- 1) Equivalent to puller 0000 890 4400, but with longer spindle 5910 890 8400.
- 2) DG screws must always be tightened with a torque wrench
- 3) Wrench has optical/acoustic signal
- 4) Only use for releasing DG screws
- 5) 021 up to serial No. X 34 944 402 only

11.2 Servicing Aids

No.	Part Name	Part No.	Application
1	Lubricating grease (370 g/13 oz tube)	0781 120 1111	Oil seals, oil pump drive, chain sprocket bearing, chain tensioner, cylindrical rollers
2	Standard commercial, solvent-based degresant containing no chlorinated or halogenated hydrocarbons		Cleaning crankshaft stub and flywheel taper
3	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in fan housing
4	Ignition lead HTR, 10 m (33')	0000 930 2251	
5	Dirko sealant, (100 g/3 1/2 oz tube)	0783 830 2120	Engine pan, oil seals (outside dia.)
6	Graphite grease		Peg on pawl
7	Molykote grease		Sliding and bearing points on brake band
8	STIHL Bioplus (1 l/34 fl.oz bottle)	0781 516 3331	Protects brake band against corrosion