Service Manual
FS 36, FS 40 and FS 44
Brushcutters

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. Microfilmed parts list are always more up to date than printed lists.

A fault on the machine may have several causes. Consult the "troubleshooting charts" when tracing faults.

Refer to the "Technical Information Bulletins" for engineering changes which have been introduced since publication of this service manual.

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

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

Always use original STIHL replacement parts.
Original STIHL parts can be identified by the STIHL part number, the STIHL® logo and the STIHL parts symbol ® The symbol may appear alone on small parts.

STIHL®

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1. SPECIFICATIONS

1.1 Engine

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

Displacement:	30.2 cm^3 (1.84 cu. in)
Bore:	34.8 mm (1.36 in)
Stroke:	31.8 mm (1.25 in)
Power output:	0.7 kW (0.95 bhp)
Max. permissible engine speed without cutting tool:	10,000 rpm
Cut-out speed without cutting tool:	9,300 rpm (± 700 rpm)
Idle speed:	3,100 rpm
Bearings:	Crankshaft supported in heavy-duty ball bearings; needle cages at big and small ends
Rewind starter:	Pawl system with automatic starter rope rewind
Remaining pull on rope rotor:	1/4 to 1 3/4 turns
Pawl/flywheel clearance:	0.05-0.4 mm (0.002-0.016 in)
Starter rope:	3.5 mm (0.14 in) dia. x 850 mm (33.5 in)
Clutch:	Centrifugal clutch without linings
Clutch engages at:	4,000 rpm (± 500 rpm)
Crankcase leakage test at gauge pressure:	0.5 bar (7.25 psi)
under vacuum:	0.4 bar (5.8 psi)
Silencing:	Intake air silencer and exhaust muffler

1.2 Fuel System

Carburetor:	All-position diaphragm carburetor with integral fuel pump
Basic setting	
High speed adjusting screw H:	Back off approx. 1 turn (only for service shop)
Low speed adjusting screw L:	Back off approx. 1 turn (Basic setting with screws initially moderately tight against their seats)
Carburetor leakage test at gauge pressure:	0.8 bar (11.6 psi)
Fuel tank capacity:	0.51 l (1 .1 US pt)
Fuel mixture:	Regular brand-name gasoline (leaded or unleaded) and STIHL two-stroke engine oil
Octane number:	min. 90 RON
Mix ratio:	50:1 with STIHL 50:1 two-stroke engine oil; 25:1 with other branded two-stroke, air-cooled engine oils
Air filter:	Foam element

1.3 Ignition System

Type:	Electronic (breakerless) magneto ignition
Air gap:	0.1-0.5 mm (0.004-0.020 in)
Ignition timing:	1.3-1.9 mm (0.05-0.07 in) B.T.D.C. at 6,000 rpm
Spark plug (suppressed):	GM AC CSR 45 or NGK BMR 6 A
Electrode gap:	0.7-0.8 mm (0.027-0.030 in)
Spark plug thread:	M14x1.25
Length of thread:	9.5 mm (0.37 in)
Heat range:	200

1.4 **Gearhead**	**FS 36**	**FS 40**	**FS 44**
Type:			Spiral-toothed bevel gears
Gear ratio:			1.33
Bearings:			Deep groove ball bearings
Lubrication:			STIHL gear lubricant 0781 120 1117

1.5 **Weights**			
without cutting tool and deflector	4.9 kg 10.8 lb	5.3 kg 11.7 lb	6.1 kg 13.4 lb

1.6 **Special Accessories**

1.6.1 **For User**

			Full harness
	STIHL multi-purpose grease (80 g tube) 0781 120 1109	STIHL multi-purpose grease (80 g tube) 0781 120 1109	STIHL multi-purpose grease (80 g tube) 0781 120 1109 STIHL gear lubricant (80 g tube) 0781 120 1117
	Safety goggles	Safety goggles	Safety goggles
			Transport guard for steel cutting tools

1.6.2 **For Service Shop**

Carburetor parts kit	4130 007 1060	4130 007 1060	4130 007 1060
Gasket kit	4130 007 1050	4130 007 1050	4130 007 1050
Gasket panel	0457 281 3803	0457 281 3803	0457 281 3803

1.7 Tightening Torques

The new "DG" screws are used in the light-alloy and fiberglass reinforced polymer components of models FS 36, 40 and 44. When screwed in for the first time, DG screws form a permanent thread in the parts concerned. They can be released and retightened as often as necessary without affecting the strength of the screwed assembly.

However, it is essential to **always use a torque wrench** to tighten the screw to the specified torques. If pneumatic or electric screwdrivers are used to fit DG screws in polymer components, always select a tightening torque below the value given in the table. Then use a torque wrench to check the tightening torque and correct it as necessary.

Fastener	Thread size	For component	Torque Nm	(lbf.ft)	Remarks
Spline screw (captive)	IS 8-32*	Clutch drum to crankshaft	2.5	(1.8)	
Clutch	3/8" 24*	Clutch to crankshaft	17.0	(12.5)	
Self-tapping screw	B3.5x9.5	Fixing screw on deflector	3.0	(2.2)	
		Support plate, diaphragm, diaphragm carrier	2.0	(1 .5)	
Self-tapping screw	B3.9x19	Control handle	2.5	(1 .8)	
Spline screw	IS-DG5x16	Loop handle	2.5	(1 .8)	
Spline screw	IS-DG5x16	Cap on clutch housing (FS 40, 44)	3.5	(2.6)	
Spline screw	IS-DG5x16	Clutch housing to fan housing	3.5	(2.6)	
Spline screw	IS-DG5x16	Fan housing to spiral housing	5.5	(4.0)	
Spline screw	IS-DG5x16	Diaphragm carrier to crankcase	5.5	(4.0)	
Spline screw	IS-DG5x24	Shroud to fan housing	3.5	(2.6)	
Spline screw	IS-DG5x60	Shroud, carburetor, diaphragm carrier	3.5	(2.6)	

Fastener	Thread size	For component	Torque Nm	(lbf.ft)	Remarks
Spline screw	IS-DG5x60	Muffler to cylinder	6.5	(4.8)	
Spline screw	IS-M4x20	Ignition module to cylinder	3.5	(2.6)	
Spline screw	IS-M5x18	Clamp on clutch housing	6.5	(4.8)	
Spline screw	IS-M5x18	Clamp on bearing housing	6.5	(4.8)	
Spline screw	IS-M5x20	Clamp screw on gearhead (FS 44)	5.5	(4.0)	
Spline screw	IS-DG6x18	Cylinder to crankcase	14.0	(10.3)	
Spline screw	IS-M6x12	Spiral housing to crankcase	14.0	(10.3)	
Spline screw	M6x50	Clamp screw in loop handle	3.5	(2.6)	
Spark plug	M14x1.25	Spark plug	19.0	(14.0)	
Special screw	P5x14	Filter cover to shroud	2.5	(1 .8)	

" inch thread

2. TROUBLESHOOTING CHARTS

2.1 Clutch

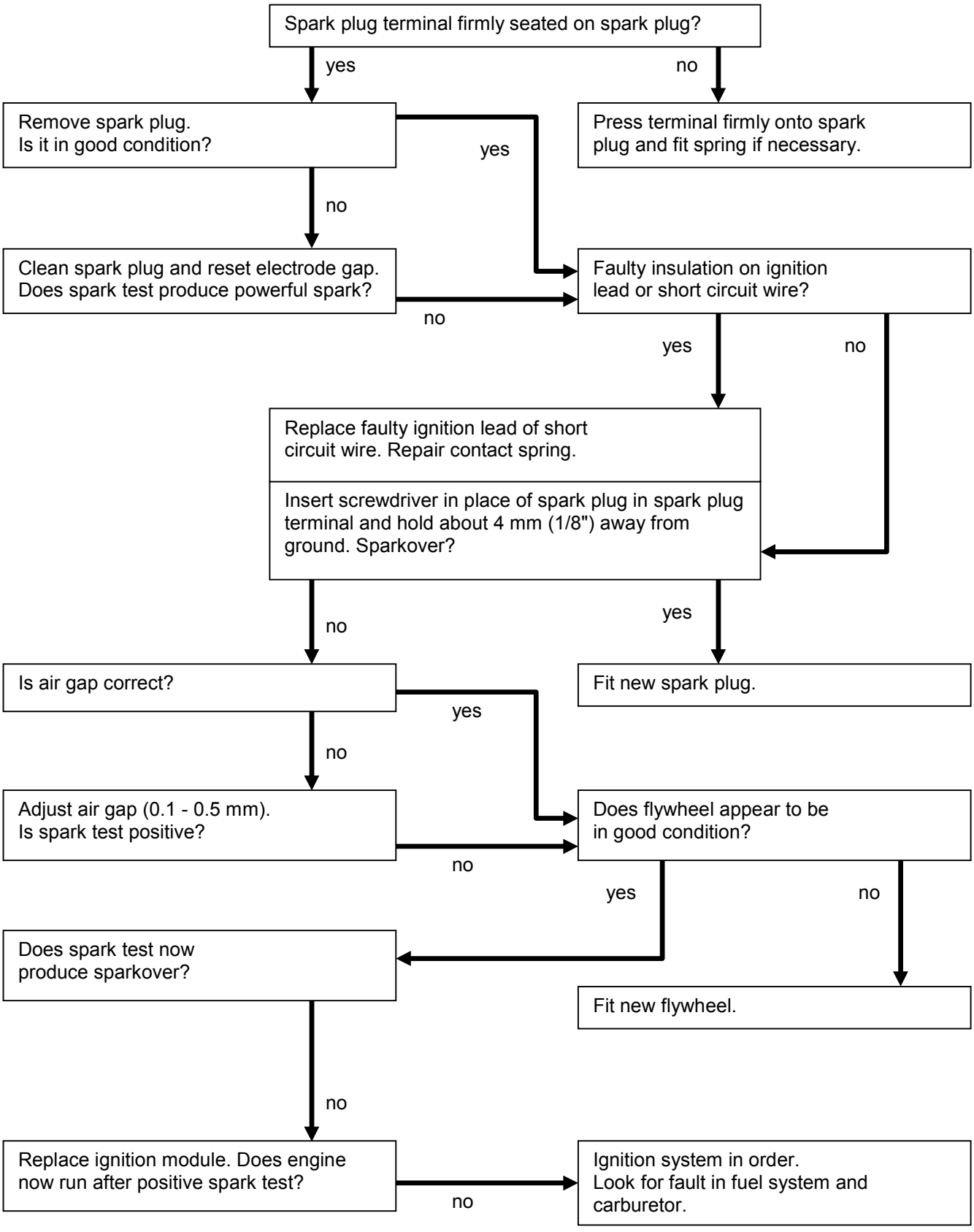
Condition	Cause	Remedy
Insufficient frictional contact - clutch slips	Clutch springs stretched or fatigued, spring hooks broken	Fit new springs
Cutting tool rotates while engine is idling	Engine idle speed too high	Correct at idle speed adjusting screw
	Clutch springs stretched or fatigued, spring hooks broken	Fit new springs

2.2 Engine

Condition	Cause	Remedy
Engine does not start easily, stalls at idle speed, but operates normally at full throttle	Oil seal in crankcase leaking	Replace oil seal
	Gaskets on diaphragm carrier leaking	Replace gaskets
	Diaphragm faulty	Replace diaphragm
	Cylinder base gasket leaking	Replace gasket
	Crankcase damaged (cracks)	Replace crankcase
	Diaphragm carrier damaged (cracks)	Replace diaphragm carrier
Engine does not deliver full power or runs erratically	Secondary air seepage through faulty gaskets on diaphragm carrier	Replace gaskets
	Piston ring leaking or broken	Fit new piston ring
	Muffler carbonized	Clean muffler (inlet and exhaust), replace spark arrestor screen
Engine overheating	Insufficient cylinder cooling. Cooling fins very dirty	Thoroughly clean cylinder fins

2.3 Ignition System

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



2.4 **Rewind Starter**

Condition	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge	Fit new starter rope
Rewind spring broken	Spring overtensioned - no reserve when rope is fully extended	Fit new rewind spring
Starter rope can be pulled out almost without resistance (crankshaft does not turn)	Pawl arm is worn	Fit new pawl
	Pawl spring fatigued or broken	Fit pawl spring
Starter rope is difficult to pull and rewinds very slowly	Starter mechanism is very dirty	Thoroughly clean complete starter mechanism
	Lubricating oil on rewind spring becomes viscous at very low outside temperatures (spring windings stick together)	Apply a few drops of kerosine (paraffin) to spring, then pull rope carefully several times until normal action is restored

2.5 **Fuel System**

Condition	Cause	Remedy
Carburetor floods; engine stalls	Inlet needle not sealing. Foreign matter in valve seat or cone damaged.	Remove and clean or replace inlet needle, clean fuel tank, pickup body and fuel line if necessary
	Inlet control lever sticking on spindle	Free off inlet control lever
	Helical spring not located on nipple of inlet control lever	Remove inlet control lever and refit correctly
	Perforated disc on diaphragm is deformed and presses constantly against inlet control lever	Fit new metering diaphragm
	Inlet control lever is too high (relative to design position)	Set inlet control lever flush with top of metering chamber face
Poor acceleration	Idle jet "too lean"	Back off low speed adjusting screw slightly (see carburetor adjustment)
	Main jet "too lean"	Back off high speed adjusting screw slightly (see carburetor adjustment)
	Inlet control lever is too low (relative to design position)	Set inlet control lever flush with top of metering chamber face
	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Connecting bore to atmosphere blocked	Clean bore
	Diaphragm gasket leaking	Fit new diaphragm gasket
	Metering diaphragm damaged or shrunk	Fit new metering diaphragm

Condition	Cause	Remedy
Engine will not idle, idle speed too high	Throttle valve opened too far by idle speed adjusting screw	Reset idle speed adjusting screw correctly
Engine stalls at idle speed	Idle jet bores or ports blocked	Clean jet bores and ports and blow out with compressed air
	Idle jet "too rich"	Screw in low speed adjusting screw slightly (see carburetor adjustment)
	Setting of idle speed adjusting screw incorrect - throttle shutter completely closed	Set idle speed adjusting screw correctly
	Small plastic plate in valve jet does not close	Clean or renew valve jet
Engine speed drops quickly under load - low power	Air filter plugged	Clean air filter
	Tank vent faulty	Clean tank vent or replace if necessary
	Leak in fuel line between tank and fuel pump	Seal connections or replace fuel line
	Pump diaphragm damaged or fatigued	Fit new pump diaphragm
	Main jet bores or ports blocked	Clean bores and ports
	Fuel pickup body dirty	Fit new pickup body
	Fuel strainer dirty	Clean fuel strainer

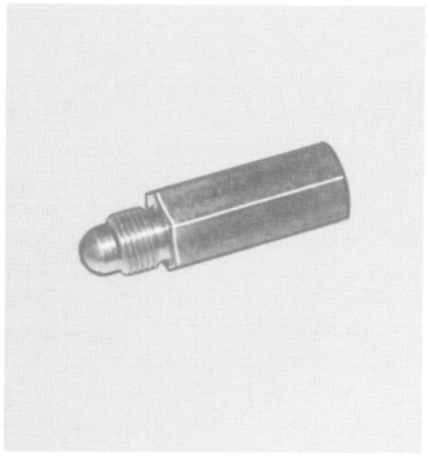
See also 2.2

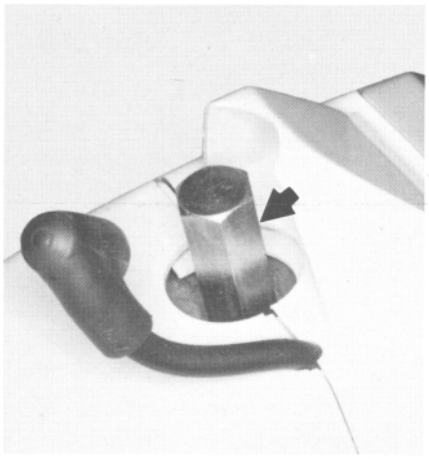
3. CLUTCH

3.1 Disassembly

Top:
Locking screw 4112 893 1200

Bottom:
Locking screw fitted in cylinder



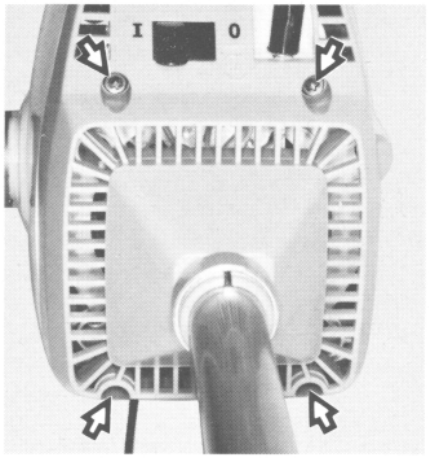


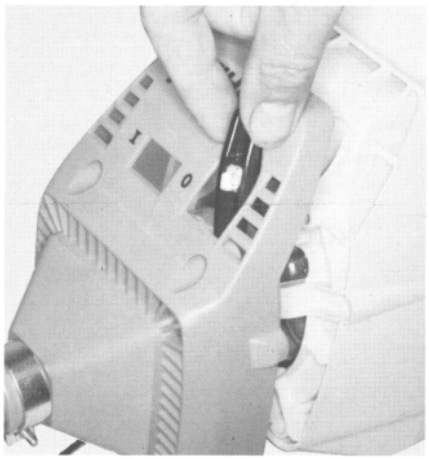
Troubleshooting chart - see 2.1.

- Pull off the spark plug terminal. Unscrew the spark plug and fit the locking screw in the spark plug hole. Screw down locking screw by hand as far as stop.

Top:
Clutch housing mounting screws

Bottom:
Removing starter grip from clutch housing





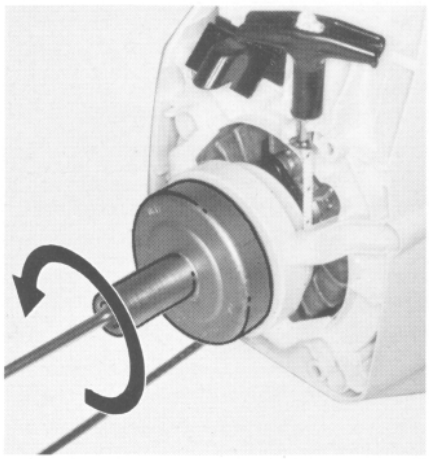
- Pull the handle hose off the handle support - see 7.5.

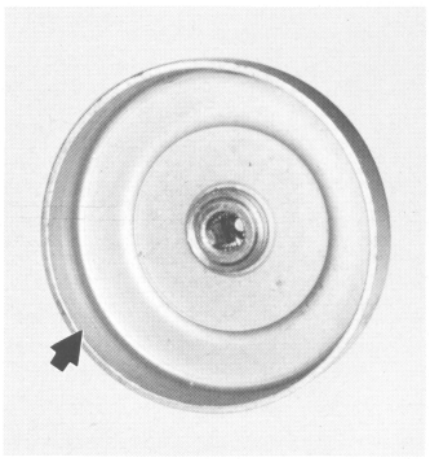
- Takeout the clutch housing mounting screws.

- Carefully pull the clutch housing with drive tube off the fan housing and take the starter grip out of the opening in the clutch housing at the same time.

Top:
Removing clutch drum mounting screw

Bottom:
Clutch drum friction surface



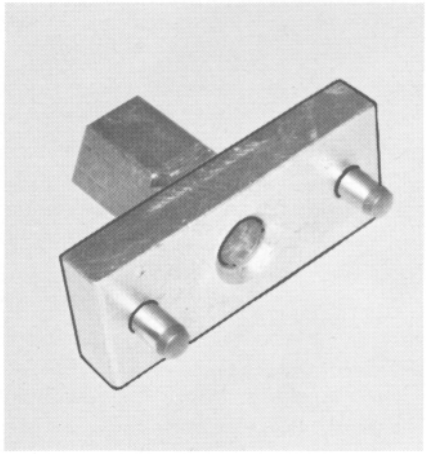


- Unscrew the clutch drum mounting screw and lift away the clutch drum.

- Examine clutch drum: There should be no scores or signs of excessive wear. Fit a new clutch drum if necessary.

Top:
Wrench 4130 890 3600

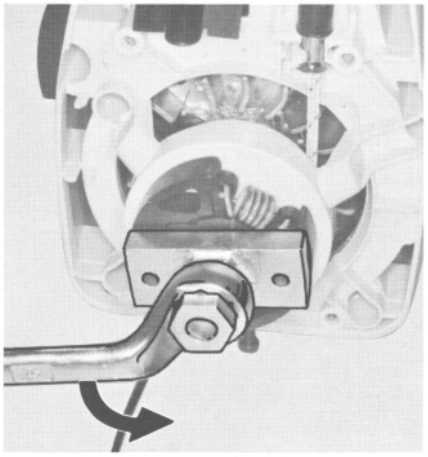
Bottom:
Wrench fitted on clutch

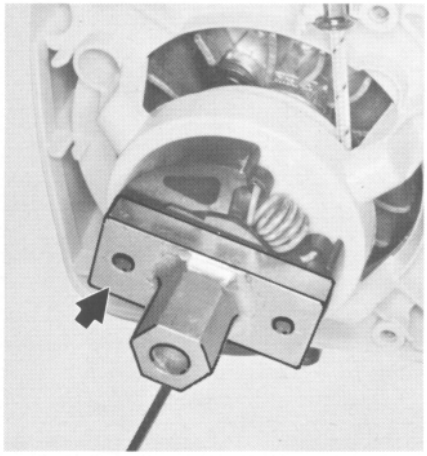


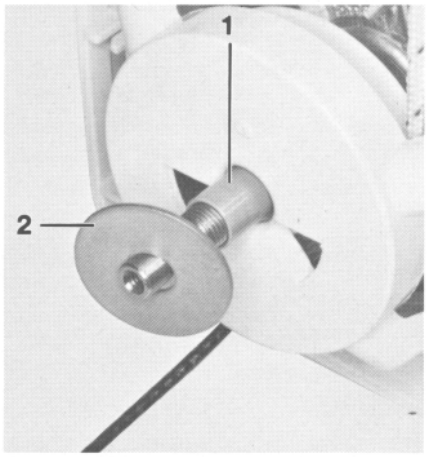
- Position wrench against clutch so that its pins engage the semicircular recesses.

Top:
Unscrewing the clutch

Bottom:
1 =Spacer sleeve
2 = Washer



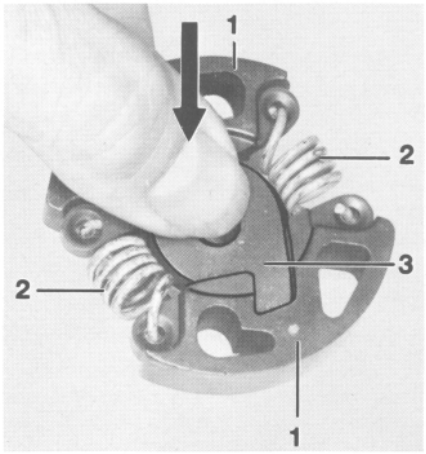




- Unscrew the clutch from the crankshaft stub.

- If necessary, pull the washer and spacer sleeve off the crankshaft stub.

1 = Clutch shoes
2 = Springs
3 = Carrier



- Push the carrier out of the clutch shoes. Detach the springs from the clutch shoes.

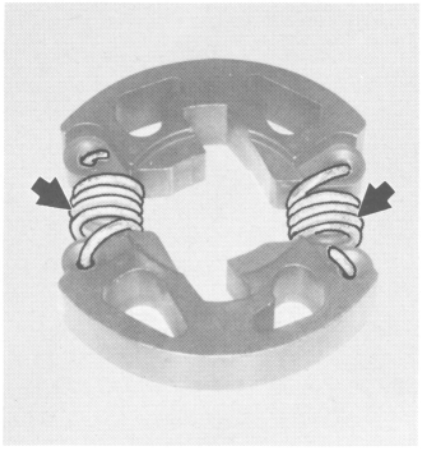
Note: Clutch shoes, carrier and springs are supplied as a complete clutch assembly.

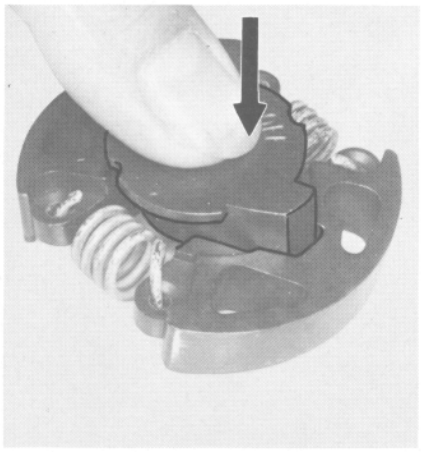
Always replace clutch springs in pairs.

3.2 **Assembly**

Top:
Correctly positioned clutch springs

Bottom:
Pressing carrier into clutch shoes



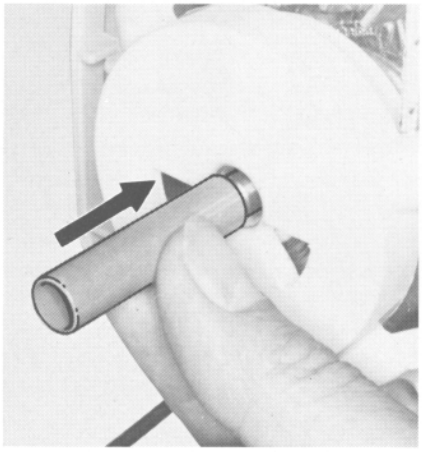


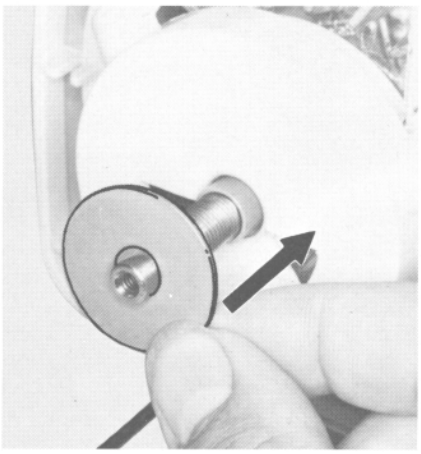
- Attach the springs so that they are exactly positioned under the clutch shoes.

- Apply the carrier at an angle, pull the clutch shoes slightly apart and press home the carrier as far as stop.

Top:
Fitting the spacer sleeve

Bottom:
Fitting the washer





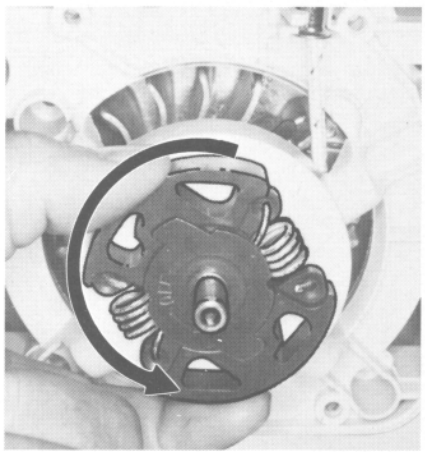
- Slide the spacer sleeve (if removed) on to the crankshaft stub as far as stop.

- Slip the washer over the crankshaft stub and up to the spacer sleeve.

- Fit the clutch with the arrow and "OFF" pointing outward.

Top:
Fitting the clutch

Bottom:
Rotating clutch until knocking sound is heard

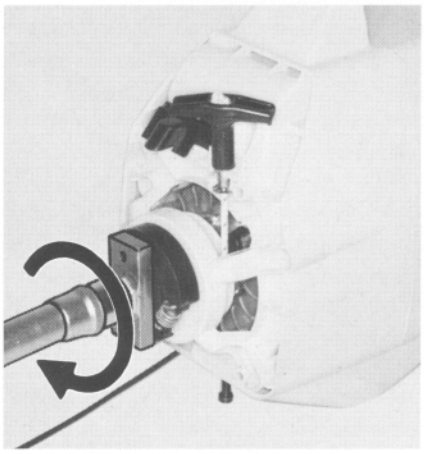


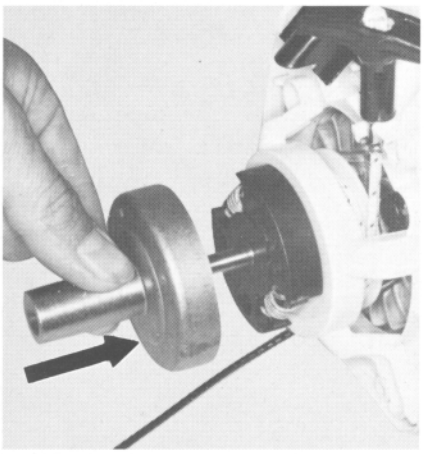
Caution: Perform the following operation before tightening the clutch. It ensures that excessive force cannot be transmitted to the rope rotor.

- Back off the locking screw from the cylinder far enough to allow the clutch to be rotated counterclockwise until a knocking sound is heard.

Top:
Tightening the clutch

Bottom:
Fitting the clutch drum

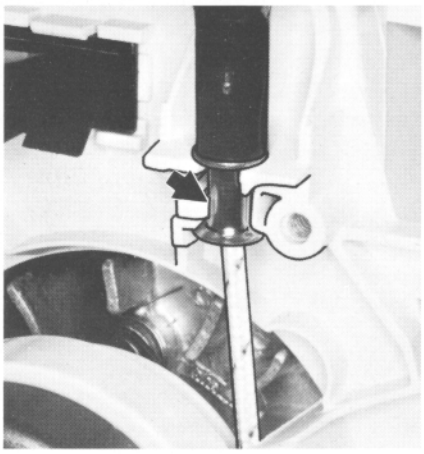


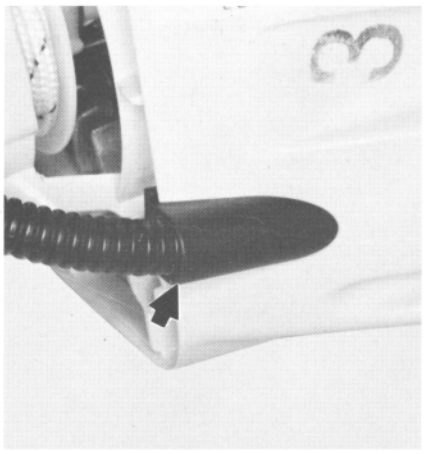


- Screw the locking screw back into the cylinder as far as it will go (this causes the clutch to move slightly counterclockwise).
- Now fit wrench and tighten the clutch to 17 Nm (12.5 lbf.ft).
- Fit the clutch drum and tighten the inner screw to 2.5 Nm (1.8 lbf.ft).

Top:
Correct position of starter rope guide bush

Bottom:
Retainer for short circuit wire

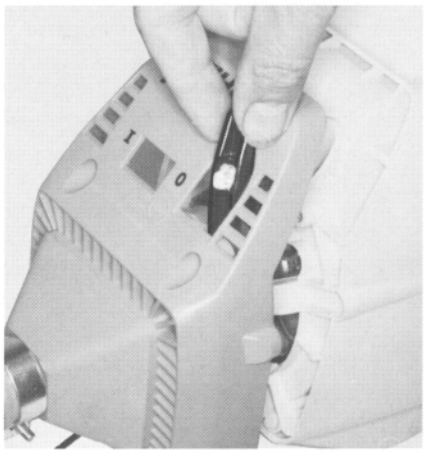


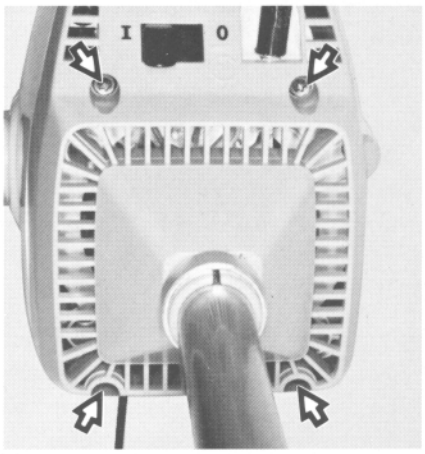


- Check to see that starter rope guide bush is properly seated in its retainer in the fan housing - correct as necessary.
- On FS 44: Check that retainer is properly seated in fan housing.
- Position the clutch housing with drive tube against the fan housing and pass the starter grip through the opening at the same time.

Top:
Clutch housing against fan housing

Bottom:
Clutch housing mounting screws





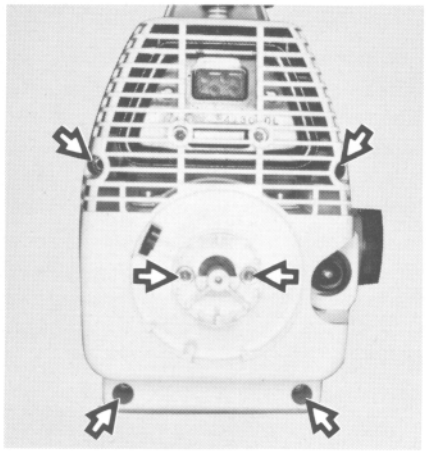
- Tighten down the clutch housing mounting screws to 3.5 Nm (2.6 lbf.ft).
- Remove the locking screw from the cylinder.
- Fit the spark plug, tighten it to 19 Nm (14 lbf.ft) and refit the spark plug terminal.
- Push the handle hose over the handle support - see 7.5.

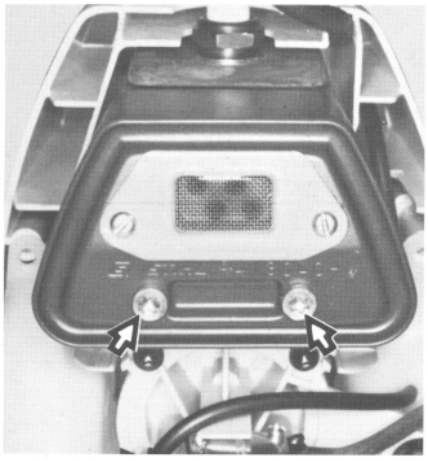
4. ENGINE

4.1 Removing and Refitting Exhaust Muffler

Top:
Shroud mounting screws

Bottom:
Muffler mounting screws





- Troubleshooting chart - see 2.2.

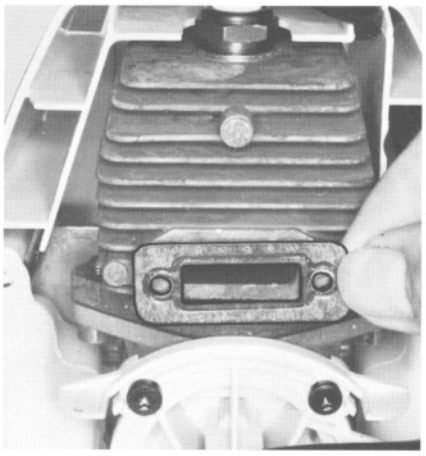
  Remove the air filter - see 8.1.

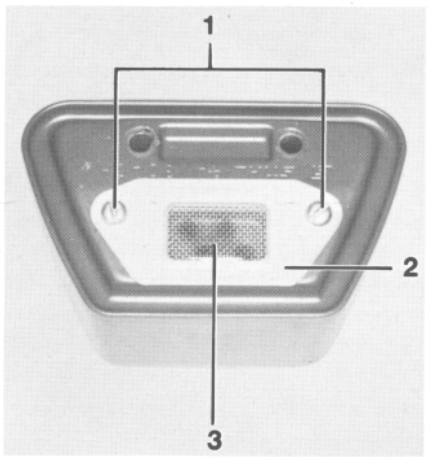
- Remove shroud mounting screws and lift away the shroud.

- Remove the muffler mounting screws and take off the muffler.

Top:
Removing gasket

Bottom:
1 = Fastening screws
2 = Screen frame
3 = Spark arrestor screen

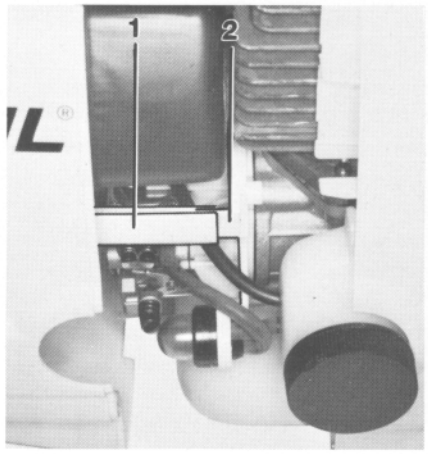




- Remove muffler gasket.

- Inspect the spark arrestor screen (if fitted). If it is dirty, take out the fastening screws, remove the screen frame and clean the spark arrestor screen or fit a new one if necessary.

1 = Angle molding
2 = Tab



Install the muffler in the reverse sequence.

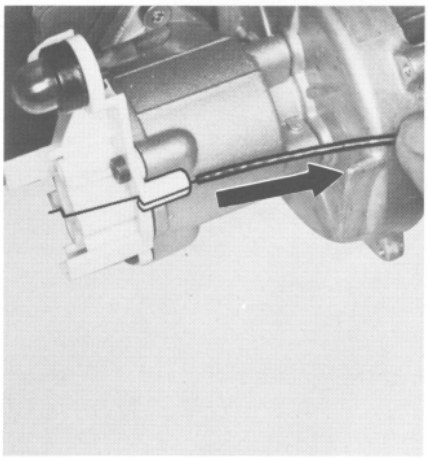
Note: Tighten the muffler mounting screws to a torque of 6.5 Nm (4.8 lbf.ft).

Slide the shroud into position so that the angle moldings on the shroud locate under the tabs on the diaphragm carrier.

Tighten the mounting screws to 3.5 Nm (2.6 lbf.ft).

4.2 Exposing the Cylinder

Withdrawing throttle cable



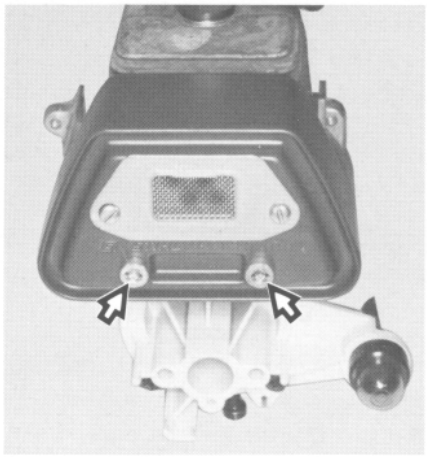
Always check and, if necessary, repair the fuel system, carburetor, air filter and ignition system before looking for faults on the engine.

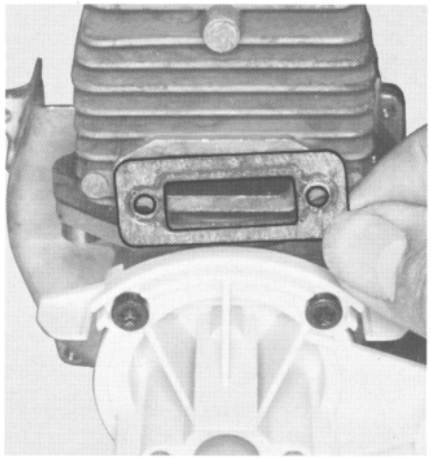
Troubleshooting chart - see 2.2

- Remove the fuel tank - see 8.8.
- Remove the carburetor - see 8.3.
- Pull the throttle cable out of its seat on the diaphragm carrier.

Top:
Muffler mounting screws

Bottom:
Removing gasket

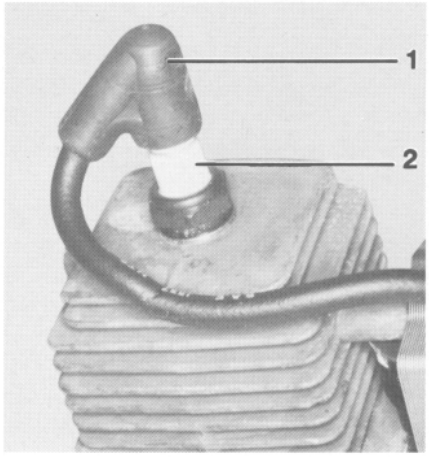


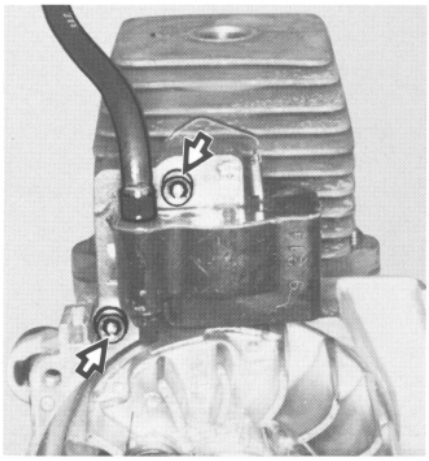


- Remove the muffler mounting screws and take off the muffler.
- Remove muffler gasket.

Top:
1 = Spark plug terminal
2 = Spark plug

Bottom:
Ignition module mounting screws





- Pull terminal off the spark plug and unscrew spark plug from the cylinder.
- Take out the ignition module mounting screws. Lift the module away.

Assembly is a reversal of the disassembly sequence.

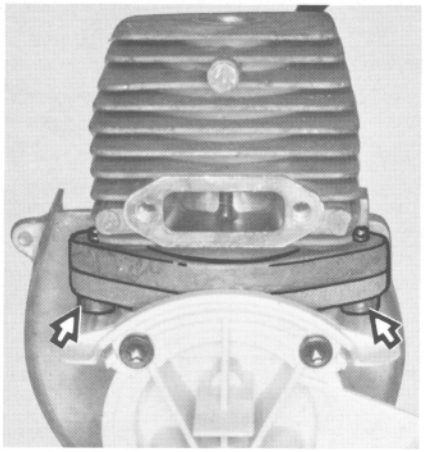
Note: Set air gap between ignition module and flywheel - see 5.1.2.

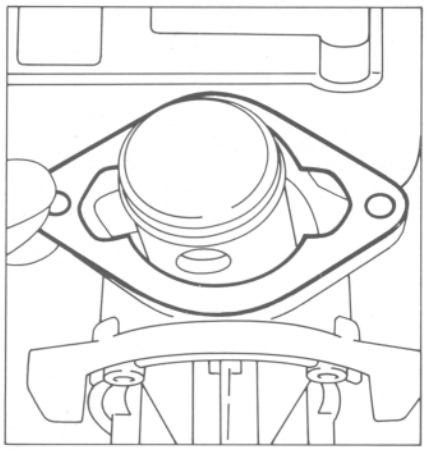
4.3 Cylinder and Piston

4.3.1 Removal

Top:
Cylinder base screws

Bottom:
Removing cylinder gasket





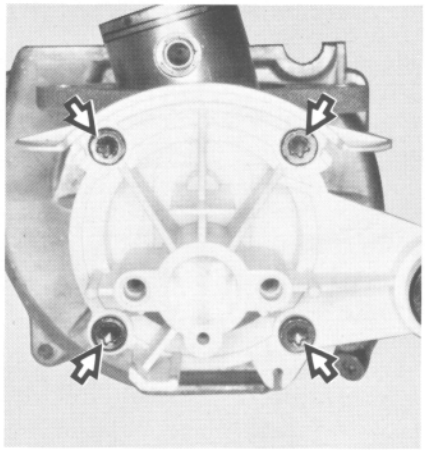
For preparations see 4.2.

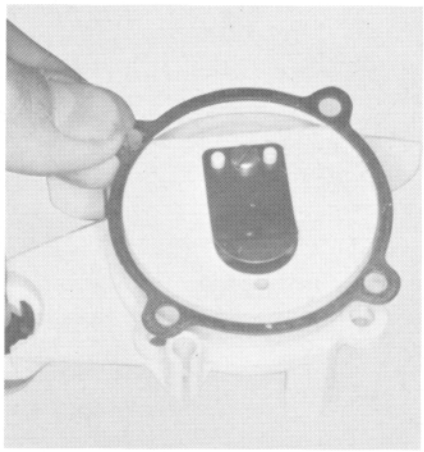
- Unscrew the cylinder base screws and pull the cylinder off the piston.
- Remove cylinder gasket.
- Inspect the cylinder and replace it if necessary.

Note: If a new cylinder has to be installed, always fit the matching piston. Replacement cylinders are only supplied complete with piston for this reason.

Top:
Diaphragm carrier mounting screws

Bottom:
Removing gasket

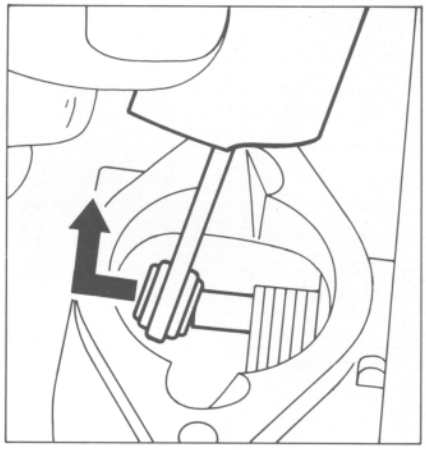


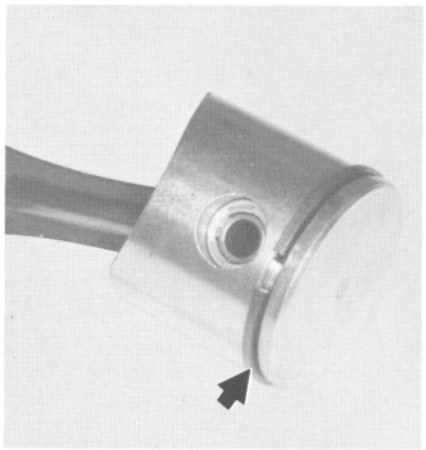


- Remove mounting screws from diaphragm carrier. Pull diaphragm carrier off the crankcase.
- Remove gasket from diaphragm carrier.

Top:
Removing connecting rod from crankshaft

Bottom:
Piston ring





- Pull the connecting rod off the crankshaft and remove it, with the piston, from the crankcase.

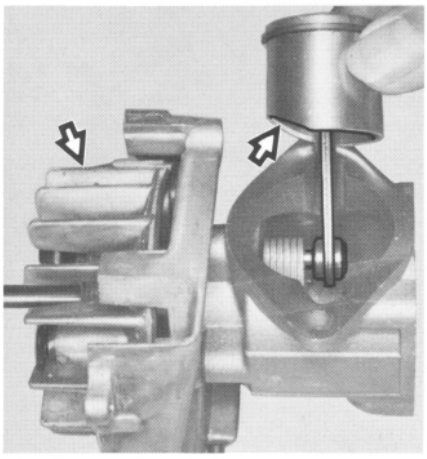
Note: Piston and connecting rod form an assembly and can only be replaced as such.

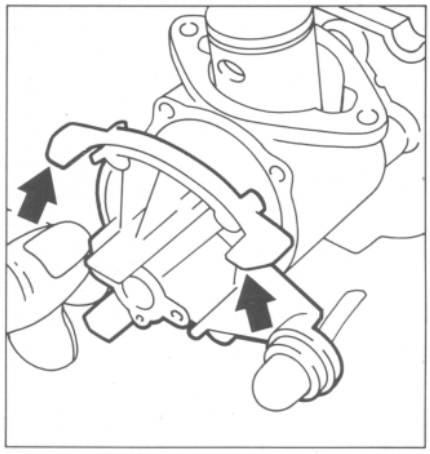
- Inspect the piston ring and replace it if necessary.

4.3.2 **Installation**

Top:
Correct position of piston

Bottom:
Tabs on diaphragm carrier

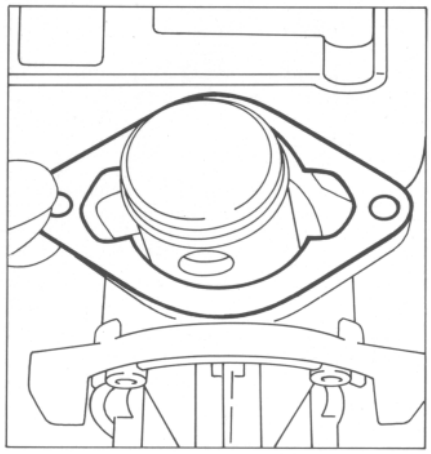


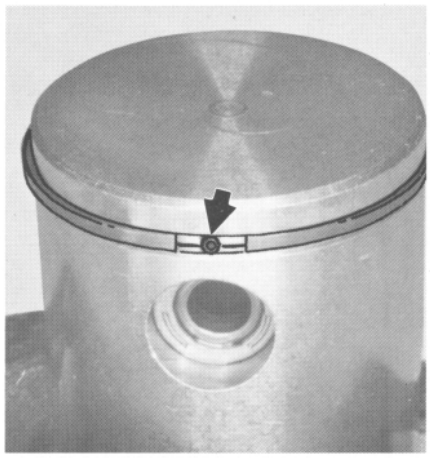


- Thoroughly clean the seating face for the cylinder gasket.
- Slip the connecting rod on to the crankshaft so that the chamfered side of the piston points toward the flywheel.
- Fit a new gasket on the diaphragm carrier. Position the diaphragm carrier in the crankcase so that its tabs face the piston.

Top:
Fitting cylinder gasket

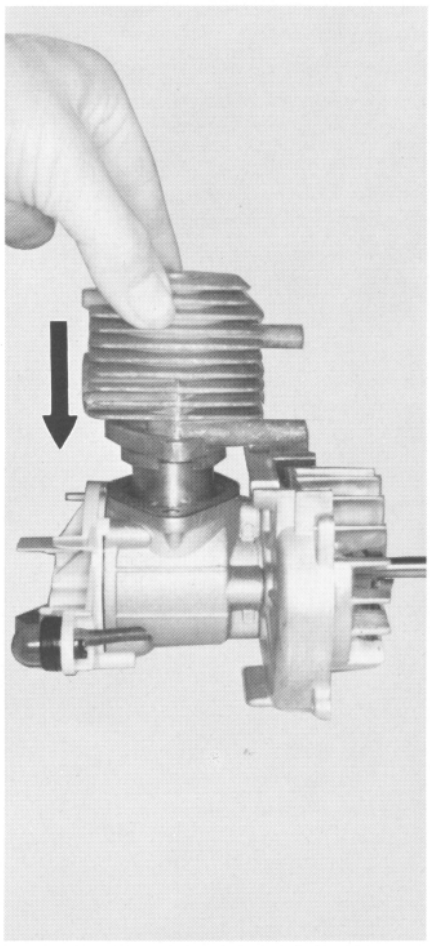
Bottom:
Piston ring correctly positioned





- Insert screws in diaphragm carrier and tighten to a torque of 5.5 Nm (4 lbf.ft).
- Fit a new cylinder gasket.
- Lubricate piston and piston ring with oil.
- Position the piston ring so that its ends meet at the fixing pin.

Pushing aligned cylinder on to piston

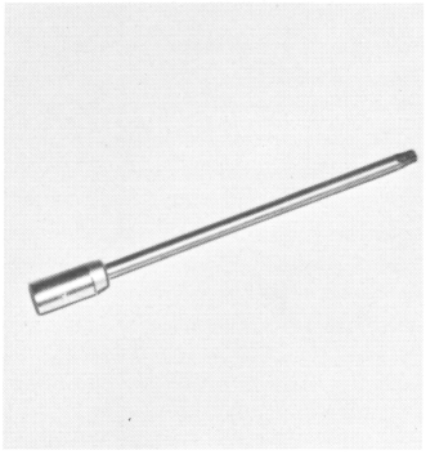


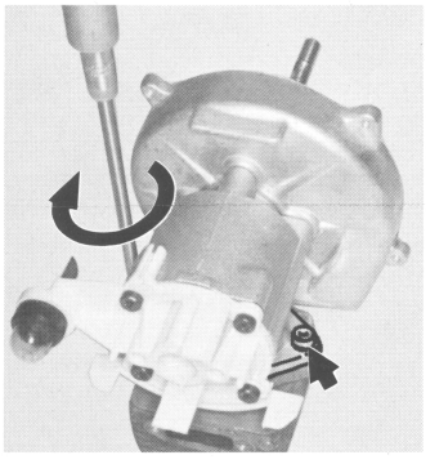
- Lubricate the cylinder with oil, line it up as shown in the illustration and then push it over the piston.

Note: The piston ring is compressed automatically by the inner taper of the cylinder as the piston enters the cylinder.

Top:
Spline screwdriver bit 0812 542 2104

Bottom:
Tightening cylinder base screws





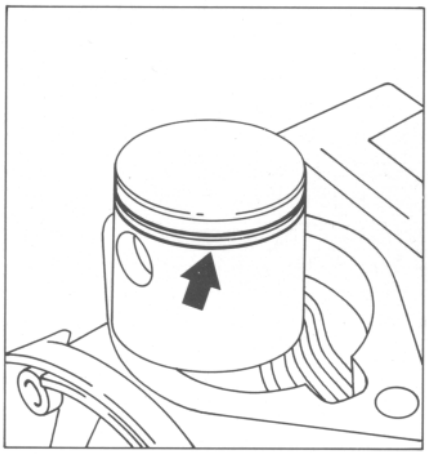
- Fit cylinder base screws and tighten to 14 Nm (10.3 lbf.ft).

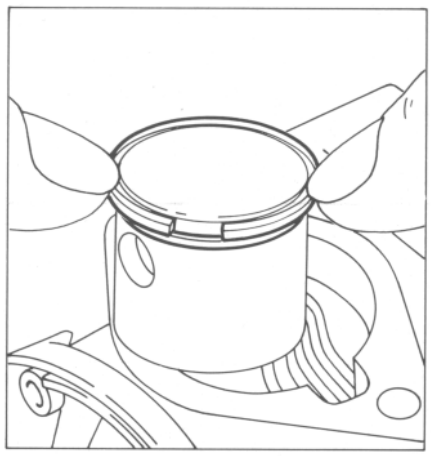
Assembly of all other parts is a reversal of the disassembly sequence described in chapter 4.2.

4.4 Piston Ring

Top:
Piston ring groove

Bottom:
Fitting piston ring





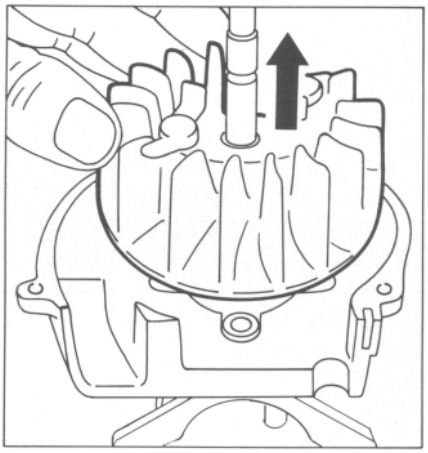
- Remove the cylinder - see 4.3.1.
- Remove the ring from the piston.
- Use a piece of an old piston ring to scrape the groove clean.
- Install the new piston ring in the groove.
- Install the cylinder - see 4.3.2.

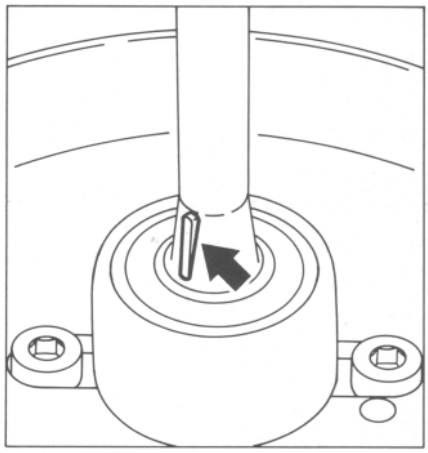
4.5 Crankcase

4.5.1 Removing and Installing the Crankshaft

Top:
Removing the flywheel

Bottom:
Woodruff key



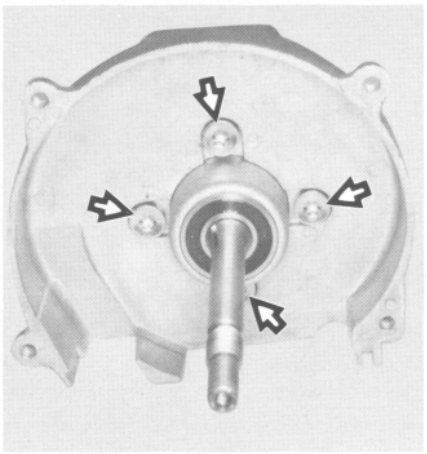


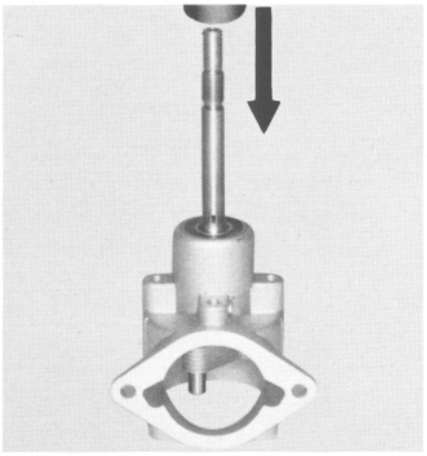
- Remove the connecting rod and piston - see 4.3.1.
- Hold the flywheel steady and release it by tapping the end of the crankshaft **lightly** with a plastic mallet. Remove the flywheel.
- Take the key out of the crankshaft slot.

4.5.2 Ball Bearings and Oil Seal

Top:
Spiral housing mounting screws

Bottom:
Pressing out crankshaft



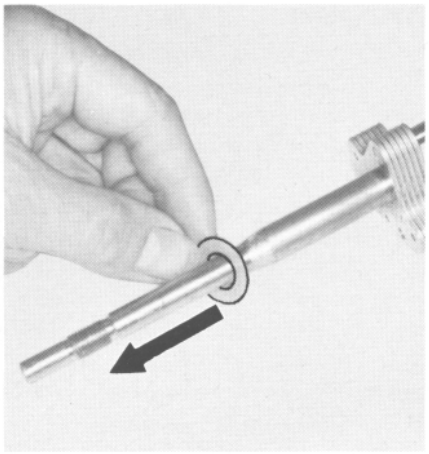


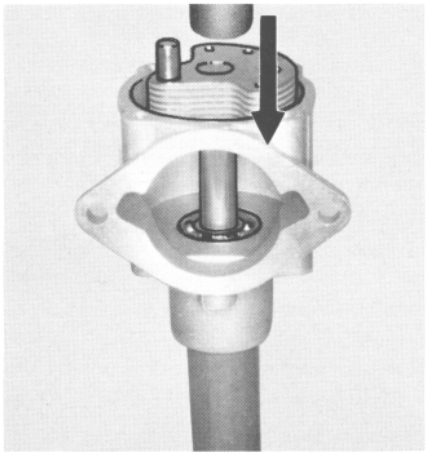
- Remove the spiral housing mounting screws. Lift spiral housing away.

- Press the crankshaft out of the crankcase.

Top:
Removing washer

Bottom:
Pressing in crankshaft





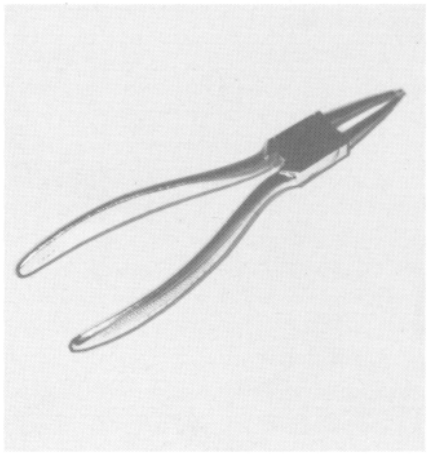
- Remove the washer from the crankshaft

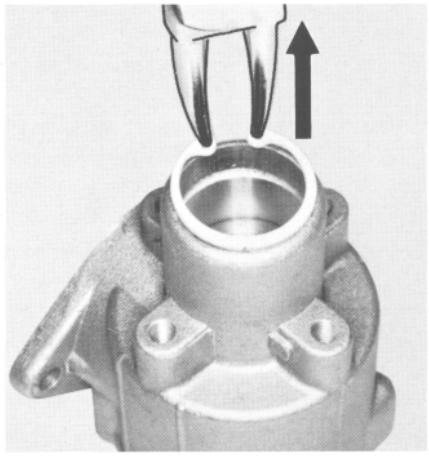
Installation is a reversal of the removal sequence.

Note: Place the crankcase on a piece of pipe (outside dia. 28 mm/ 1.1 " and about 150 mm/6" long) and press the crankshaft fully home. Tighten down spiral housing mounting screws to 14 Nm (10.3 bf.ft).

Top:
Circlip pliers 0811 641 8380

Bottom:
Removing circlip





Removal:

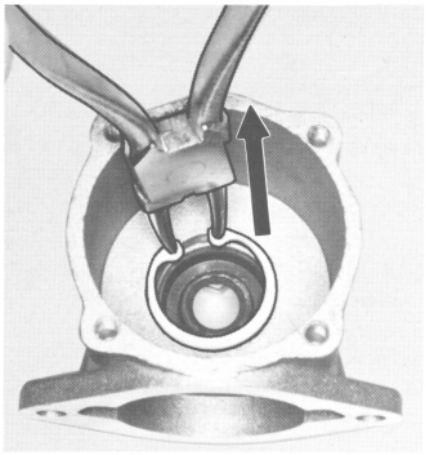
- Remove the crankshaft - see 4.5.1.

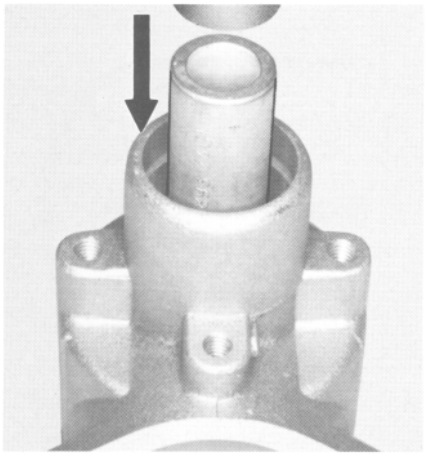
- Heat crankcase to approx. 100 °C (210 °F) and knock it against a wooden base to remove both ball bearings.

- Remove the circlip at the flywheel end.

Top:
Removing circlip

Bottom:
Removing oil seal with press sleeve
4112 893 2401



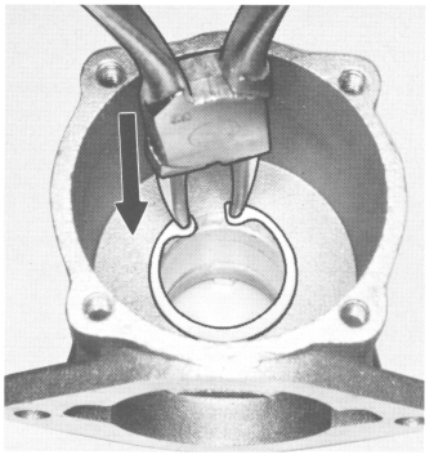


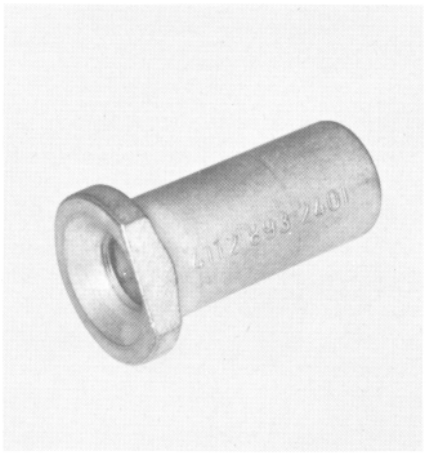
- Remove the circlip at the diaphragm carrier end of the crankcase.

- Use press sleeve to press the oil seal out of the crankcase.

Top:
Installing circlip

Bottom:
Press sleeve 4112 893 2401



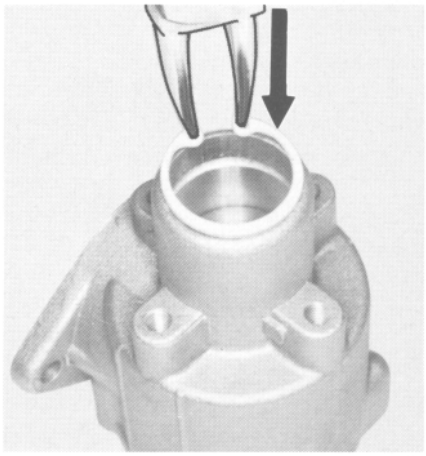


Installation:

- Install the circlip in the groove at the diaphragm carrier end of the crankcase.

Top:
Positioning oil seal

Bottom:
Fitting circlip



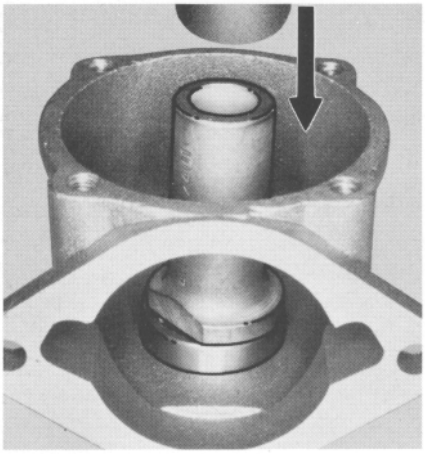
- Position the oil seal, sealing lip downward, on the flywheel end of the crankcase and use the press sleeve to press it in until it butts against the circlip.

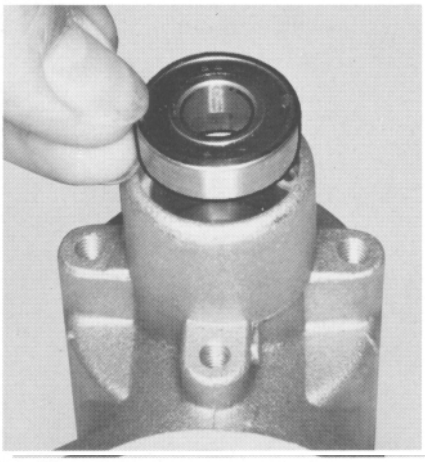
- Fit circlip in the groove at the flywheel end of the crankcase.

4.6 Leakage Testing the Crankcase

Top:
Pressing in ball bearing

Bottom:
Positioning ball bearing





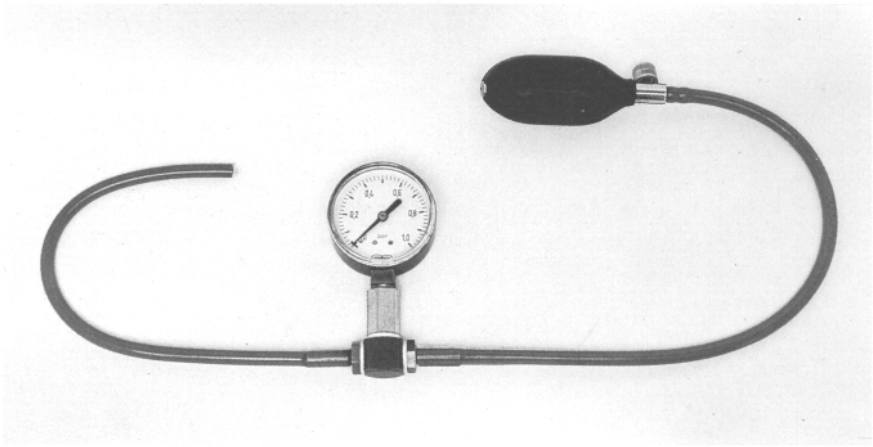
- Press in the open ball bearing at the diaphragm carrier end of the crankcase until it butts against the circlip.

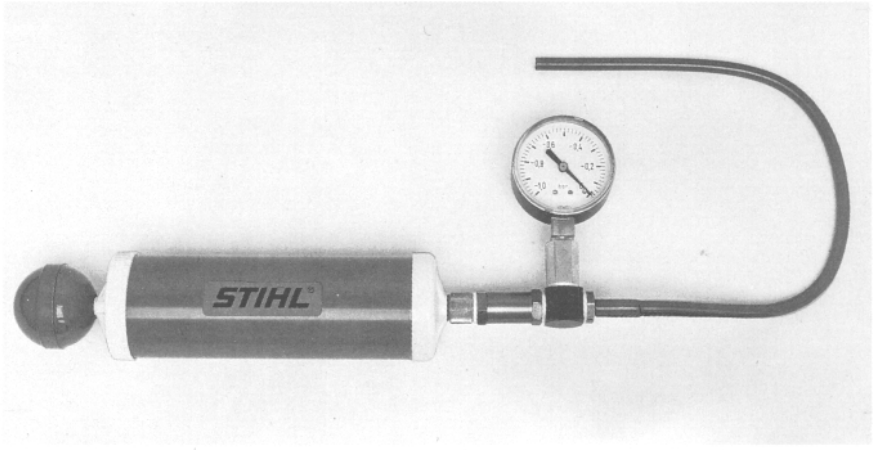
- Place ball bearing in position at flywheel end of crankcase, closed side of bearing must face outward, and press it home until it butts against the circlip.

- Install the crankshaft - see 4.3.2.

Top:
Carburetor and crankcase tester
1106 850 2905

Bottom:
Vacuum pump 0000 850 3500





A defective oil seal, a faulty diaphragm and gaskets or cracks in castings or the diaphragm carrier are the usual causes of leaks. Such faults allow supplementary air to enter the engine and thus upset the fuel-air mixture.

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

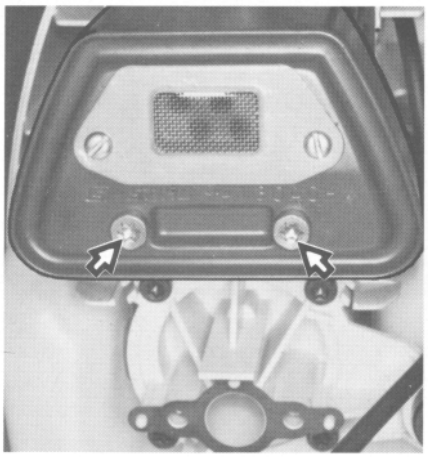
Moreover, the transition from idle speed to part or full throttle is not smooth.

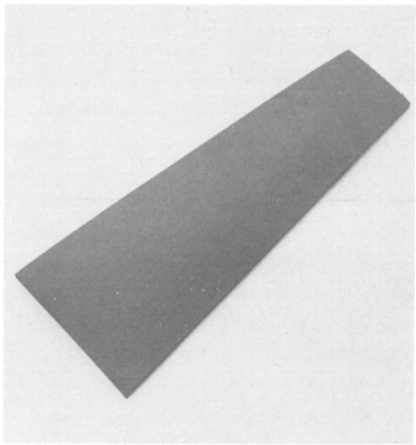
The crankcase can be checked accurately for leaks with the carburetor/crankcase tester and the vacuum pump.

4.6.1 **Preparations**

Top:
Muffler mounting screws

Bottom:
Sealing plate 0000 855 8105



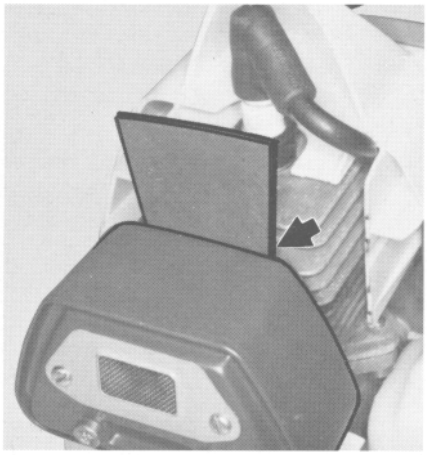


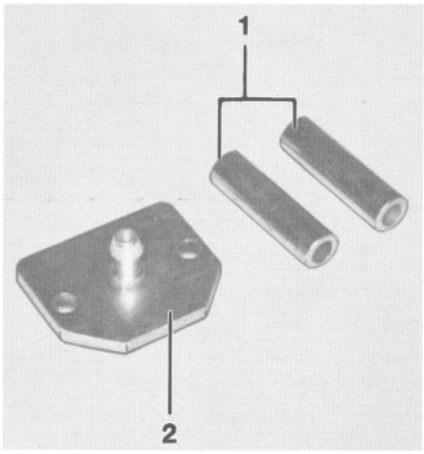
- Remove the carburetor - see 8.3.

- Slacken off the muffler mounting screws half way.

Top:
Sealing plate fitted in position

Bottom:
1 = Sleeves 0000 963 1008
2 = Flange 1119 850 4201



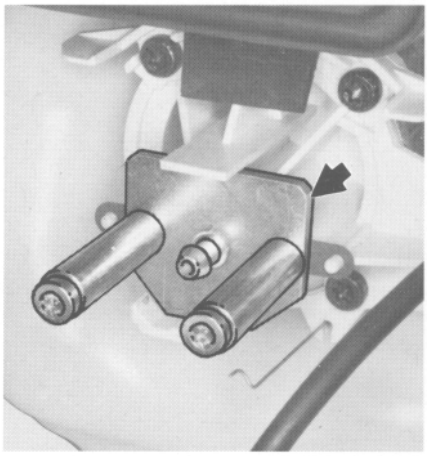


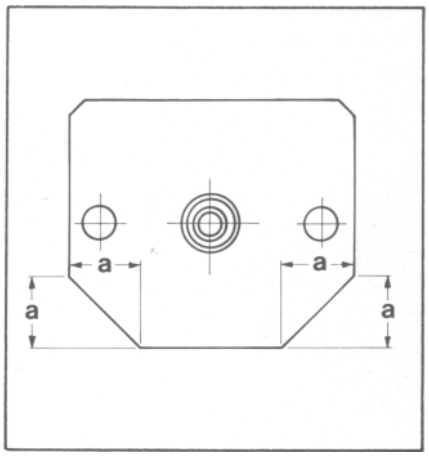
- Slide the sealing plate between the muffler and the cylinder exhaust port. Retighten the muffler mounting screws moderately.

- Set the piston to top dead center (T.D.C.). This can be checked through the inlet port.

Top:
Test flange fitted in position

Bottom:
Modified flange 1119 850 4200
a = 10 mm (13/32")





- Fit the test flange 1119 850 4201 with sleeves in place of the carburetor.

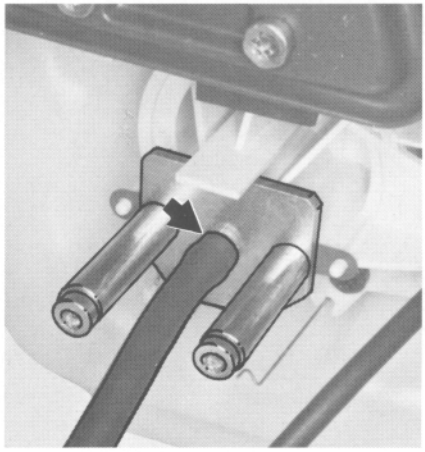
In order to use flange 1119 850 4200 for this purpose it is necessary to modify it as shown in the illustration.

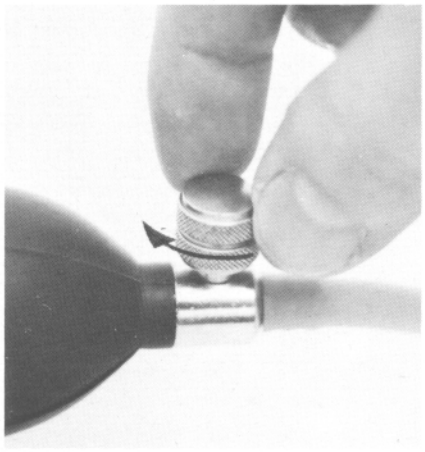
Important: A new carburetor gasket must be fitted between the test flange and diaphragm carrier.

4.6.2 **Pressure Test**

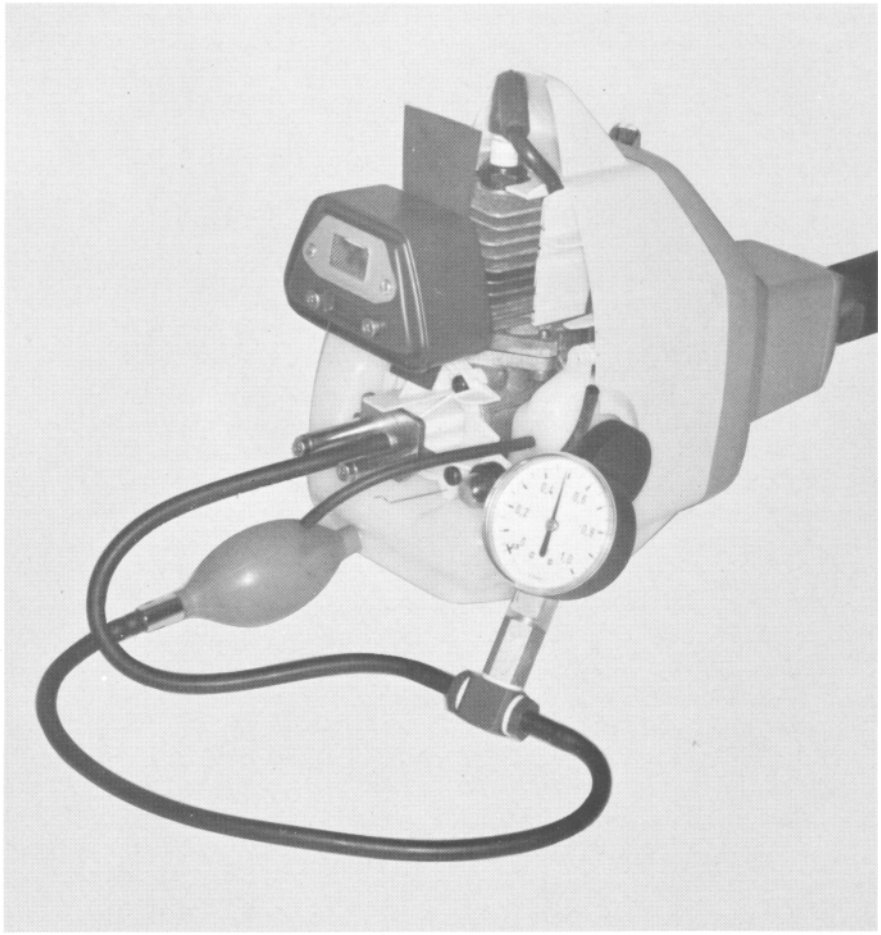
Top:
Tester's pressure hose fitted on test flange nipple

Bottom:
Closing the vent screw





Pressure-testing the crankcase



- Connect tester's pressure hose to nipple on test flange.

- Make sure the spark plug is properly tightened down before starting the test.

- Close the vent screw on the rubber bulb.

- Pump air into the crankcase until the gauge indicates a pressure of 0.5 bar (7.25 psi). If this pressure remains constant for at least 20 seconds, the crankcase is airtight.

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

Note: Coat the suspect area with oil and pressurize the crankcase again. If bubbles appear in the oiled area, replace the faulty part.

- Now carry out the vacuum test – see 4.6.3 and 4.6.4.

- After finishing the test, open the vent screw and disconnect the hose.

- Remove the test flange.

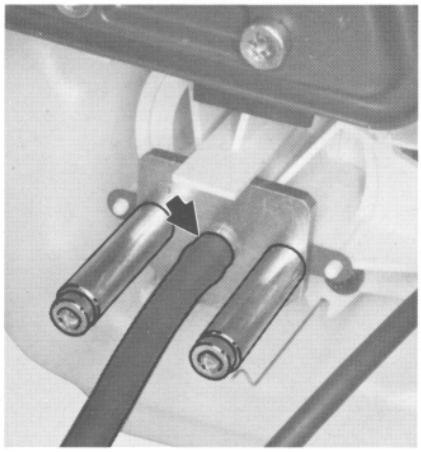
- Slacken off the muffler mounting screws.

- Remove the sealing plate from between the muffler and cylinder and tighten the screws to 6.5 Nm (4.8 lbf.ft).

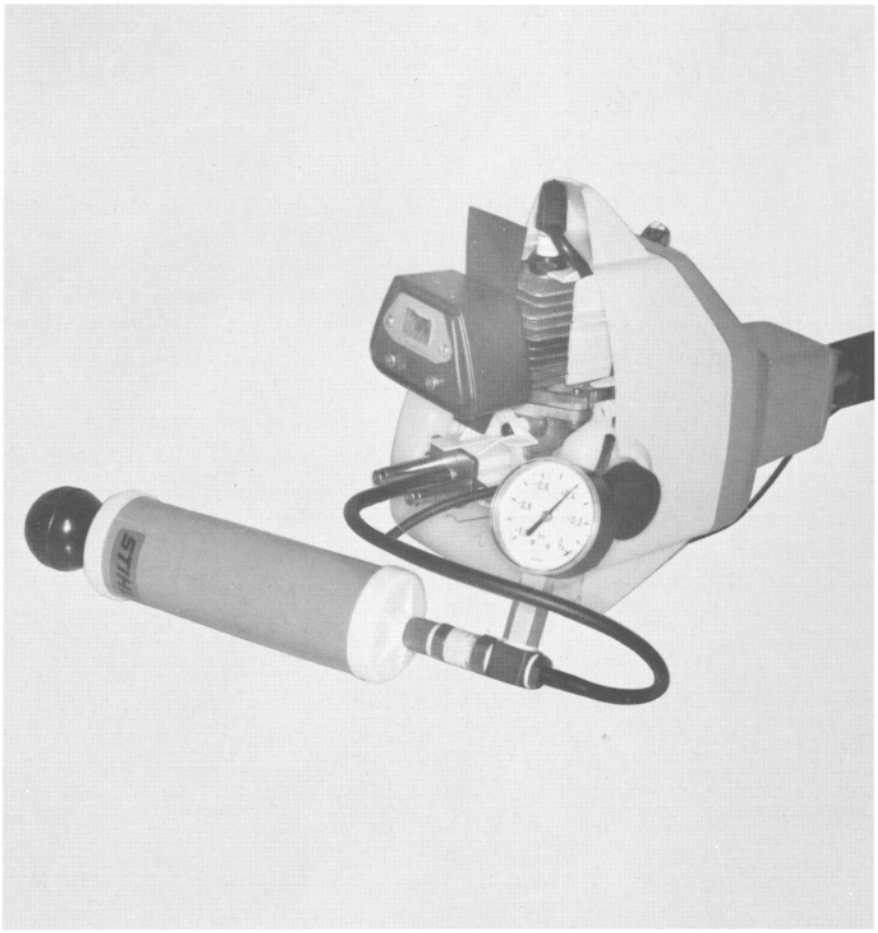
- Install the carburetor - see 8.3.

4.6.3 Vacuum Test (for Diaphragm)

Tester's suction hose fitted on test flange nipple



Diaphragm leakage test with vacuum pump



On these machines the fuel-air mixture is drawn into the crankcase via a diaphragm which closes to prevent any backflow.

If the seating surface on the diaphragm carrier is dirty or the diaphragm fatigued or damaged, mixture will flow back and cause the engine to run roughly.

An additional test can be carried out with the vacuum pump to detect this kind of fault. The preparations for this test are the same as for the pressure test - see 4.6.1.

- Connect the vacuum pump's suction hose to test flange nipple.

- Pull out the pump piston until the gauge indicates a vacuum of 0.4 bar (5.8 psi).

Note: When you release the pump piston the non-return valve automatically seals the suction hose.

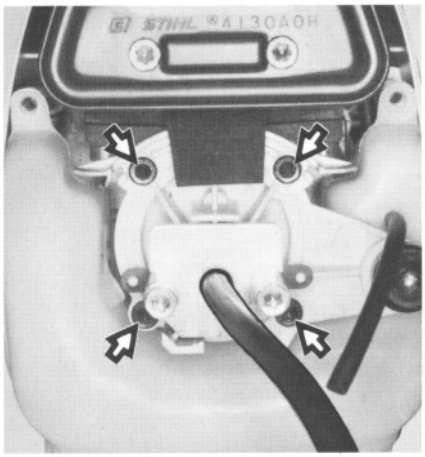
If the vacuum reading remains constant, or rises to no more than 0.2 bar (3 psi) within 20 seconds, it can be assumed that the diaphragm and diaphragm carrier are in good condition.

However, if the pressure continues to rise (reduced vacuum in diaphragm carrier), the diaphragm carrier or diaphragm must be replaced.

Now carry out vacuum test for oil seal.

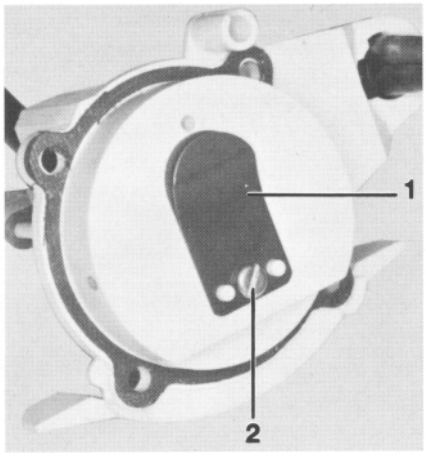
4.6.4 Vacuum Test (for Oil Seal)

Diaphragm carrier mounting screws

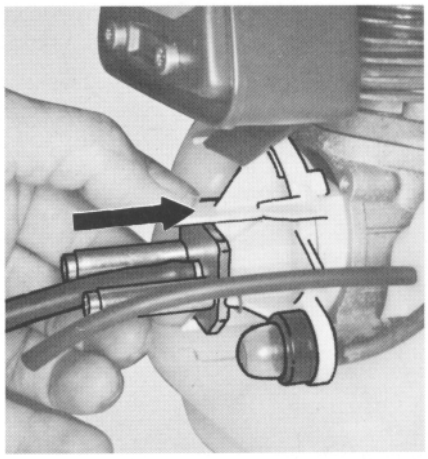


Top:
1 = Support plate
2 = Fastening screw

Bottom:
Removing the diaphragm



Fitting the diaphragm carrier

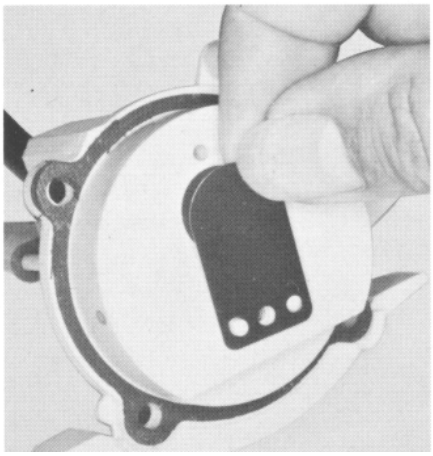


The oil seal tends to fail when subjected to a vacuum , i.e. the sealing lip lifts away from the crankshaft during the piston's induction stroke because there is no internal counterpressure.

An additional test can be carried out with the vacuum pump to detect this kind of fault. The set up for this test is the same as for the pressure test - see 4.6.1.

Preparations:

- Unscrew the diaphragm carrier mounting screws.
- Pull the diaphragm carrier off the crankcase.
- Take out the support plate fastening screw. Remove the support plate.



- Remove the diaphragm from the carrier.
- Refit the diaphragm carrier on the crankcase.

Important: Refit the gasket between the diaphragm carrier and crankcase.

Test procedure:

Pull out the pump piston several times until the gauge indicates a vacuum of 0.4 bar (5.8 psi).

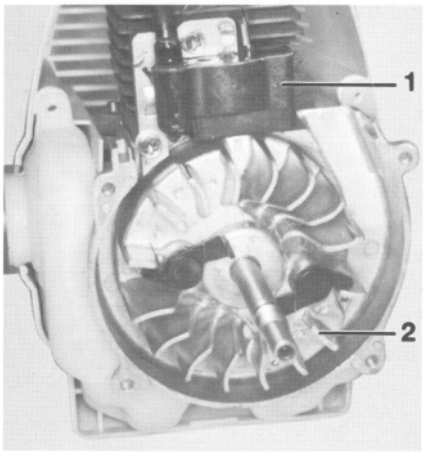
Note: The non-return valve automatically seals the suction hose when you release the pump piston. If the vacuum reading remains constant, or rises to no more than 0.3 bar (4.25 psi) within 20 seconds, it can be assumed that the oil seal is in good condition.
However, if the pressure continues to rise (reduced vacuum in engine housing), the oil seal must be replaced, even if no leaks were detected in the pressure test.

- Remove the test flange.
- Refit the diaphragm. Tighten the support plate fastening screw to 2.0 Nm (1 .5 lbf.ft) and the diaphragm carrier mounting screws to 5.5 Nm (4 lbf.ft).
- Remove sealing plate from muffler.
- Install the carburetor - see 8.3.

5. IGNITION SYSTEM

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

1 = Ignition module
2 = Flywheel



STIHL FS 36, FS 40 and FS 44 brushcutters saws are equipped with a transistor-controlled (breaker-less) magneto ignition system which requires no outside power source (battery or dynamo).

The system consists basically of an ignition module and flywheel.

5.1 Repairing Component Parts

5.1.1 Spark Plug

Troubleshooting on the ignition system should always begin at the spark plug.

In the event of starting difficulties, low engine power, misfiring, etc., unscrew the spark plug and check that it is the approved type. Only the spark plugs listed in the specifications may be used. Other makes of spark plug are unsuitable because they have long-reach electrodes.

Sooted or carbonized spark plug:

- Use brass wire brush to clean the spark plug and then blow it clear with compressed air.

Note: Never use a steel wire brush for this job.

Spark plug is smeared with oil:

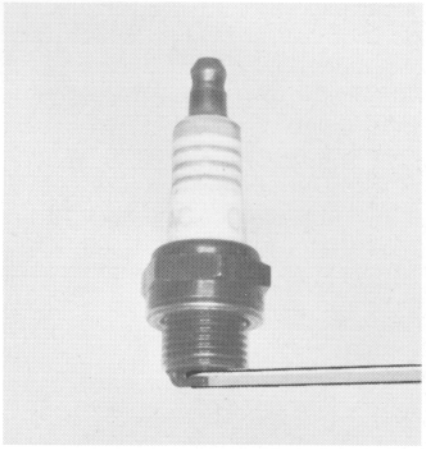
- Wash the insulator nose with a grease solvent and blow it clear with compressed air.

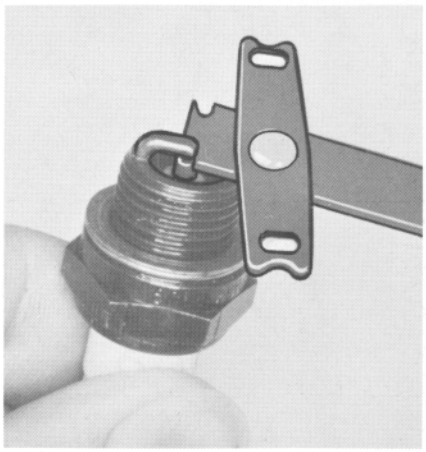
Electrode gap:

Electrode gap becomes wider as a result of normal erosion.

Top:
Checking electrode gap with feeler gauge

Bottom:
Resetting electrode gap with Bosch spark plug gauge





- Check the gap at regular intervals with a feeler gauge. It should be 0.7-0.8 mm (0.030").

- Bend the ground electrode as necessary.

Important: Always fit a new spark plug if the electrodes are badly eroded.

Checking the spark plug:

Accurate checking of the spark plug is only possible with a special spark plug tester.

A provisional check can be carried out by fitting a clean spark plug in the spark plug terminal and holding it against ground. There should be a powerful sparkover at the electrodes when the engine is cranked by pulling the starter rope.

Warning: Do not touch any live parts - contact with high voltage can cause serious or fatal accidents!

Note: It is recommended that a new spark plug be fitted in all cases of doubt.

If there is no sparkover although the spark plug is in good condition, first check the lead connections.

Note: Chafed insulation on the ignition lead or short circuit wire will cause a short-circuit to ground. In this case the engine with either not start or only run erratically.

To install the spark plug:

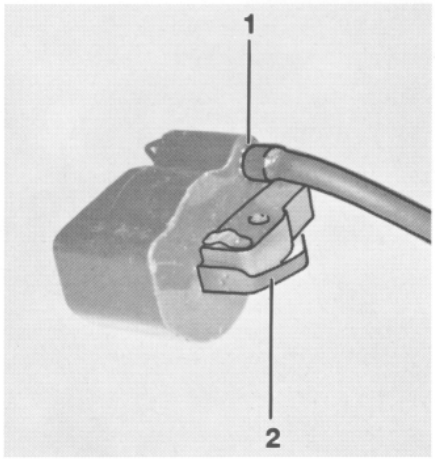
- Clean the spark plug seat and inspect the sealing ring to make sure it is in good condition.
- Fit the spark plug and tighten it down to a torque of 19 Nm (14 lbf.ft).

The appearance of the spark plug's insulator nose gives valuable information with regard to the effects of various operating conditions:

Condition of Insulator Nose	Appearance	Meaning
Normal:	Grayish yellow-to-brown, dry	Engine in order, correct spark plug (heat range as specified)
Sooted:	Velvet-like, dull black coating of soot	Mixture too rich, lack of air (dirty air filter, choke shutter partly closed), electrode gap too wide, wrong spark plug (heat range too high)
Smeared with oil:	Coating of damp oil carbon and soot	Too much oil in fuel mix
Overheated:	Welding beads on insulator nose, eroded electrodes	Mixture too lean, spark plug loose, wrong spark spark plug (heat range too low)

5.1.2 Ignition Module

1 = High voltage output
2 = Contact spring (not FS 44)



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

1. high voltage output

2. contact spring.

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

5.1.2.1 Ignition Timing

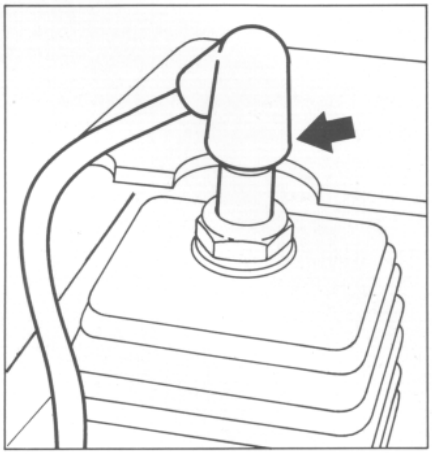
Ignition timing is fixed at 1.6 mm (0.063") B.T.D.C. at 6,000 rpm and is not adjustable. However, in view of the permissible tolerances in the electronic circuit, it may vary between 1.3 and 1.9 mm (0.05" and 0.07") B.T.D.C. at 6,000 rpm.

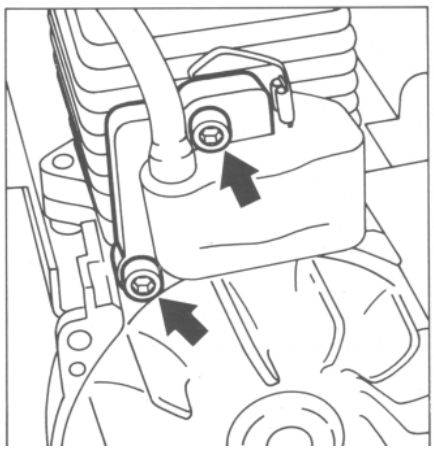
Since there is no mechanical wear in these systems, ignition timing cannot get out of adjustment. However, an internal fault in the circuit can alter the switching point in such a way that a spark test will still show the system to be in order although timing is outside the permissible tolerance. This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

5.1.2.2 Removing and Installing

Top:
Spark plug terminal

Bottom:
Ignition module mounting screws





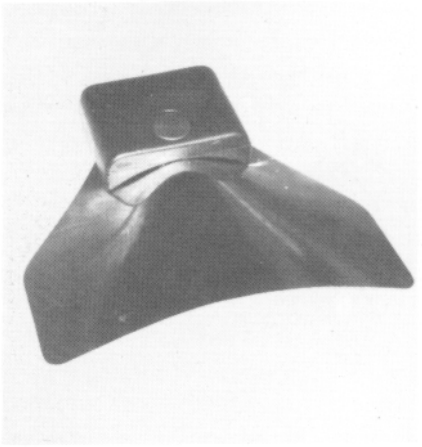
- Remove the fan housing - see 6.4.1.
- Pull the terminal off the spark plug.
- Take out ignition module mounting screws and remove the module.
- If necessary, remove the spark plug terminal - see 5.1.5.
- Place the ignition module in position, fit screws but do not tighten them down yet.

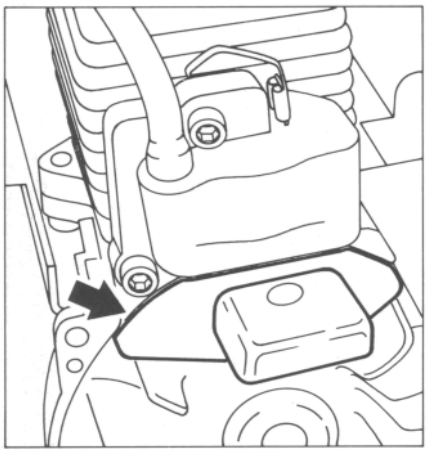
Note: On FS 44: Secure terminal sleeve with the upper screw.

5.1.3 Contact Spring (FS 36 and FS 40)

Top:
Setting gauge 1111 890 6400

Bottom:
Setting gauge fitted between flywheel and ignition module

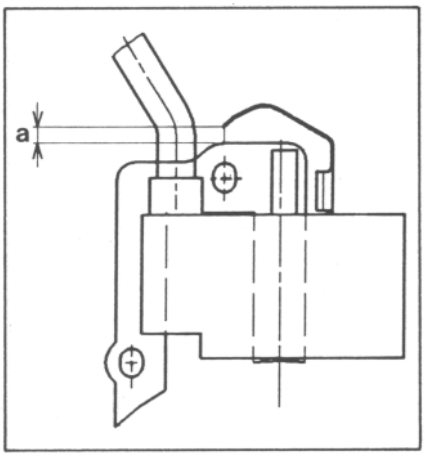




- Secure the flywheel in position with sleeve, washer and clutch. The setting will be inaccurate if the flywheel is loose.
- Slide the setting gauge between the arms of the ignition module and the flywheel magnets.
- Press the ignition module against the setting gauge. Tighten down the mounting screws to a torque of 3.5 Nm (2.6 lbf.ft) and withdraw the setting gauge.

Top:
Contact spring

Bottom:
Correct contact spring gap
"a" = 3-4 mm (0.12-0.16")



- Remove the fan housing - see 6.4.1.
- Pull contact spring off the tag on the ignition module.

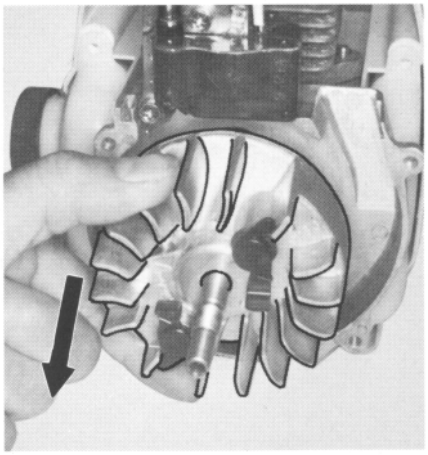
Important: Gap "a" must be 3-4 mm (0.12-0.16").

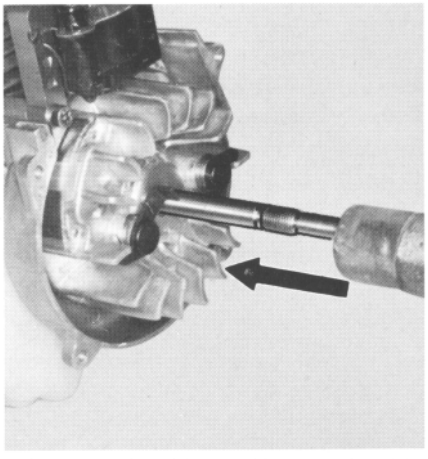
- Refit the fan housing - see 6.4.2.

5.1.4 Flywheel

Top:
Removing the flywheel

Bottom:
Releasing the flywheel





To remove the flywheel:

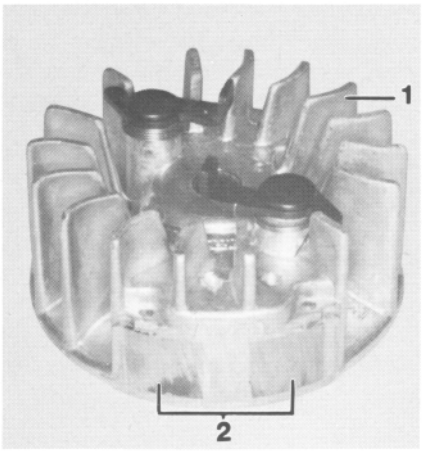
- Remove the fan housing - see 6.4.1.
- Pull the flywheel off the crankshaft.

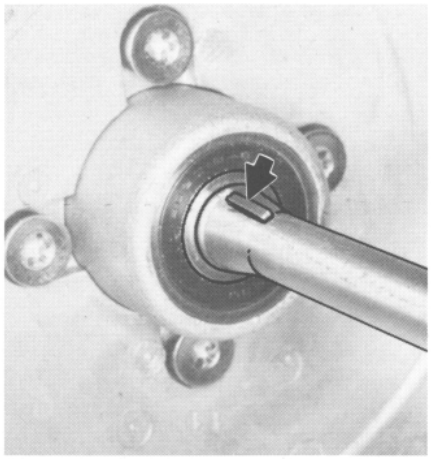
Note: Release the flywheel by tapping the end of the crankshaft **lightly** with a plastic mallet.

5.1.5 **Spark Plug Terminal**

Top:
1 = Flywheel
2 = Magnet poles

Bottom:
Woodruff key for flywheel





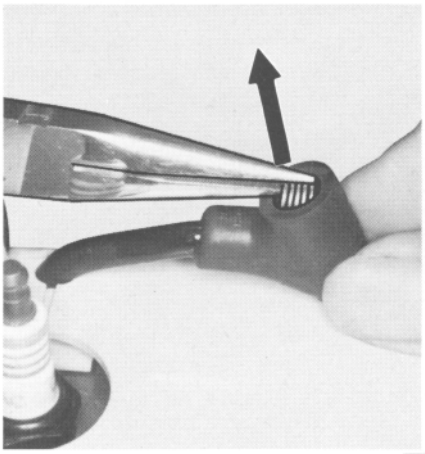
- Inspect the flywheel and magnet poles for any signs of cracks or other damage. Fit anew flywheel if you find any damage.

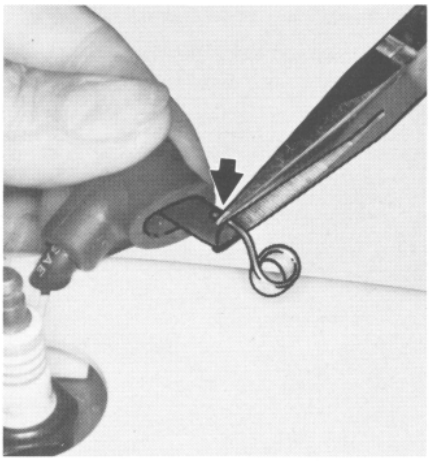
To install the flywheel:
- Check that Woodruff key is properly seated.

Important: Clean the stub of the crankshaft and the flywheel hub bore with a suitable standard commercial, solvent-based degreasant free from CFCs. Fit the flywheel in position.

Top:
Pulling leg spring out of spark plug terminal

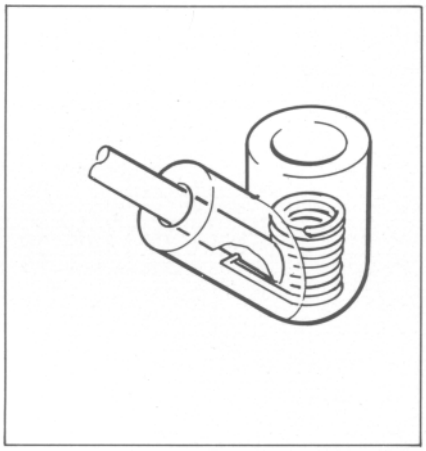
Bottom:
Attaching leg spring





- Pull the terminal off the spark plug.
- Use a suitable pair of pliers to grip the leg spring and pull it out of the spark plug terminal.
- Disconnect the leg spring from the ignition lead. Take the spark plug terminal off the ignition lead.
- Coat the end of the ignition lead with oil (about 20 mm/3/4" long).

Correct position of leg spring in spark plug terminal

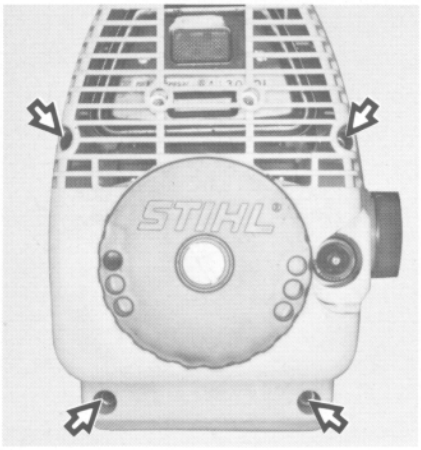


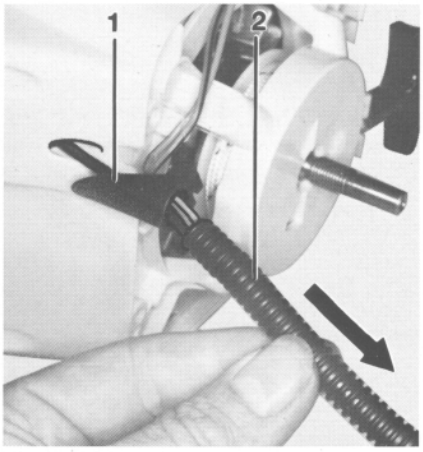
- Fit spark plug terminal over the ignition lead.
- Use a suitable pair of pliers to grip the end of the ignition lead and pull it out through the spark plug terminal.
- Pinch the hookof the leg spring into the center of the lead, about 5 mm (3/16") from the end of the lead.
- Pull the lead back into the terminal so that the leg spring locates properly inside it (see illustration).
- Fit the terminal on the spark plug.

5.1.6 Short Circuit Wire (FS 44)

Top:
Outer shroud mounting screws

Bottom:
1 = Retainer
2 = Protective hose

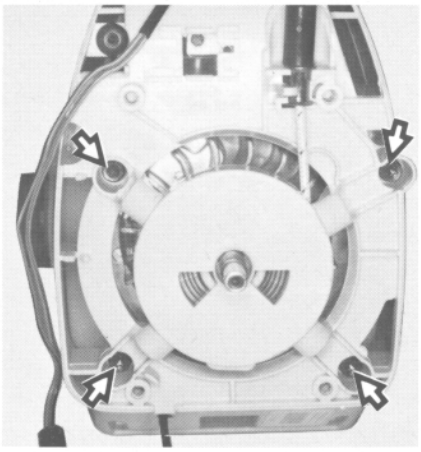


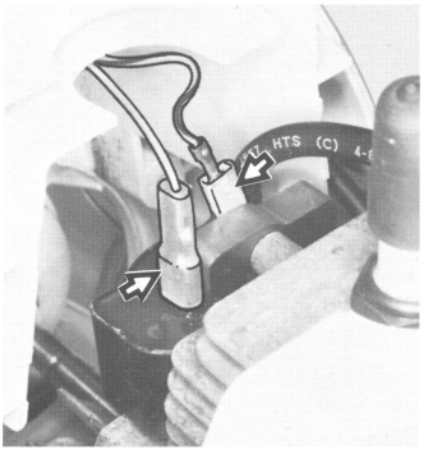


- Remove the clutch - see 3.1.
- Remove the outer shroud mounting screws.
- Pull protective hose to the rear and withdraw the throttle cable from the hose.
- Remove the retainer.

Top:
Fan housing mounting screws

Bottom:
Short circuit wire connectors

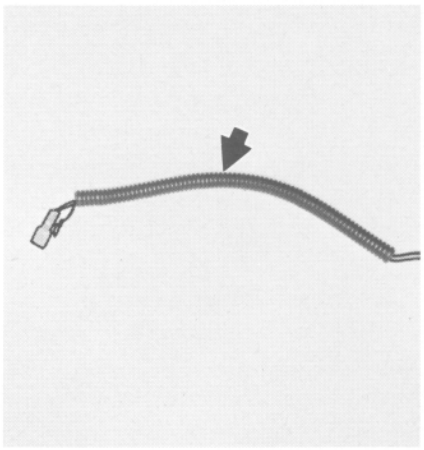


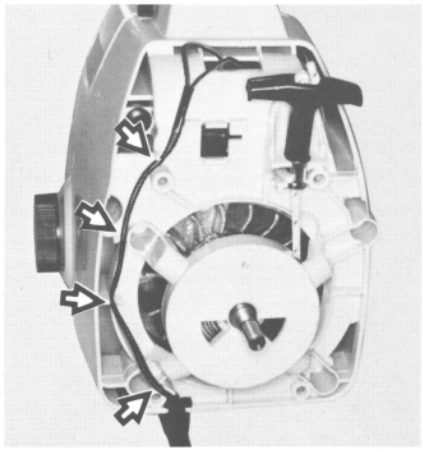


- Take out the fan housing mounting screws.
- Pull the fan housing forward far enough to disconnect the short circuit wires from the ignition module.
- Pull the short circuit wires out of the fan housing.

Top:
Protective hose

Bottom:
Correct position of short circuit wire





- If necessary, pull the protective hose off the short circuit wire.

Installation is a reversal of the removal sequence.

Note: Make sure the short circuit wire is correctly positioned in the fan housing (see illustration).

6. REWIND STARTER

6.1 Routine Maintenance

If the action of the starter rope becomes very stiff and the rope re-winds 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.

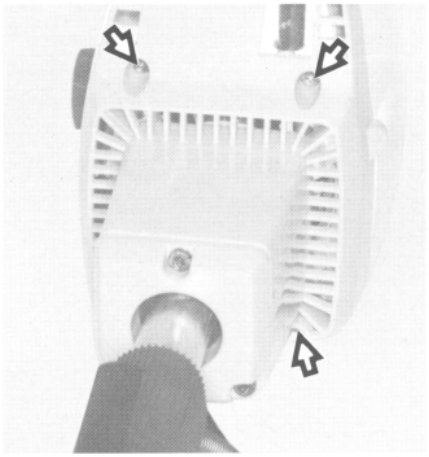
Wash all parts in paraffin (kerosine) or white spirit.

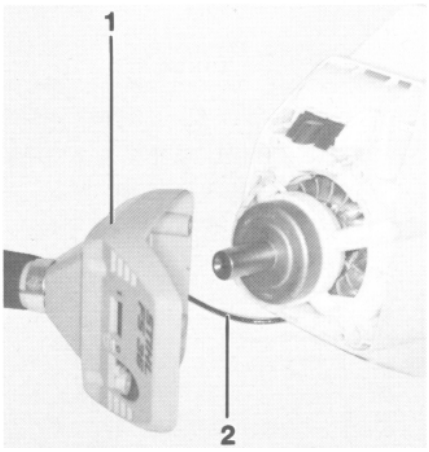
Lubricate the rewind spring and starter post with STIHL low temperature lubricant, see 11.2, before installing.

6.2 Replacing the Starter Rope (with Fan Housing Fitted)

Top:
Clutch housing mounting screws
(fourth screw hidden in this view)

Bottom:
1 = Clutch housing
2 = Throttle cable





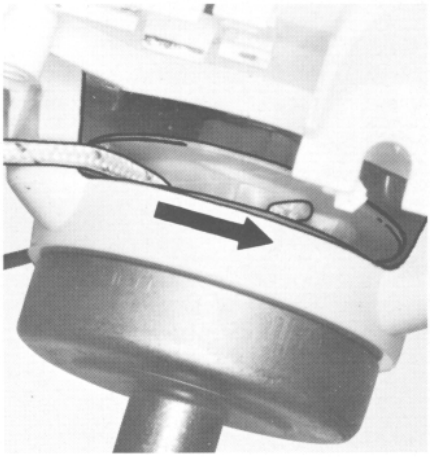
The rewind spring will not be under tension if the starter rope is broken.

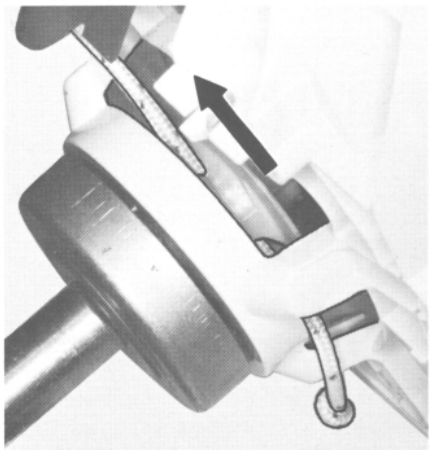
- Take out the clutch housing mounting screws.

- Carefully pull the clutch housing with drive tube away from the fan housing and put to one side without kinking the throttle cable.

Top:
Fitting starter rope

Bottom:
Pulling back starter rope





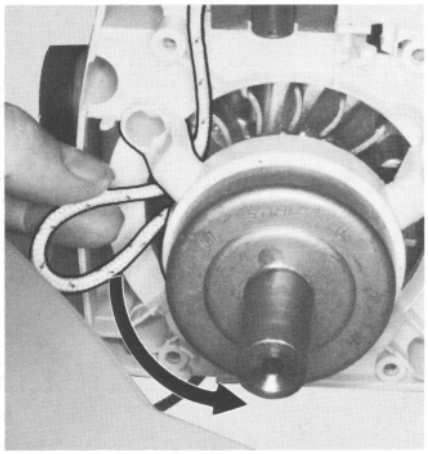
Remove the remaining rope from the rope rotor. Thread one end of a new 3.5 mm (9/64") dia. and 850 mm (351/2") long rope through the bores of the rope rotor, from the left. Pull it out of the right-hand bore and tie a simple overhand knot in the end of the rope.

- Pull the rope back so that the knot locates in the recess in the rope rotor.

- Now tension the rewind spring and fit the starter grip – see 6.3.

6.3 Tensioning the Rewind Spring (with Fan Housing Fitted)

Winding rope onto rotor



- Wind the starter rope four full turns counterclockwise onto the rotor.

Note: Pass starter rope behind the spokes of the fan housing.

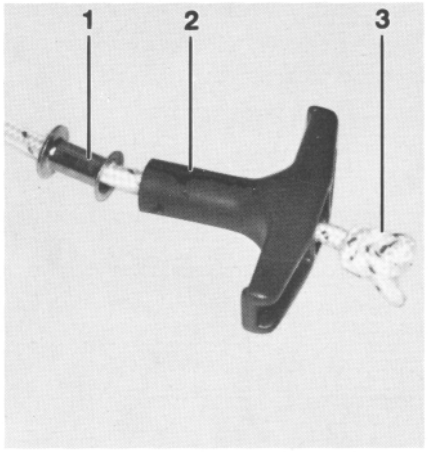
- Pull the starter rope upward so that the rope rotor turns two full revolutions.

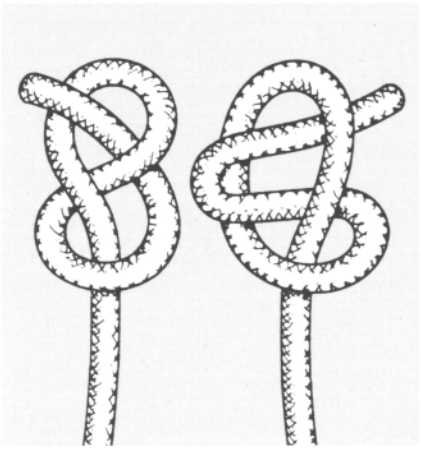
Important: Hold rope rotor steady from now on.

- Wind the starter rope a further two full turns counterclockwise onto the rotor.

Top:
1 = Rope guide bush
2 = Starter grip
3 = Special knot

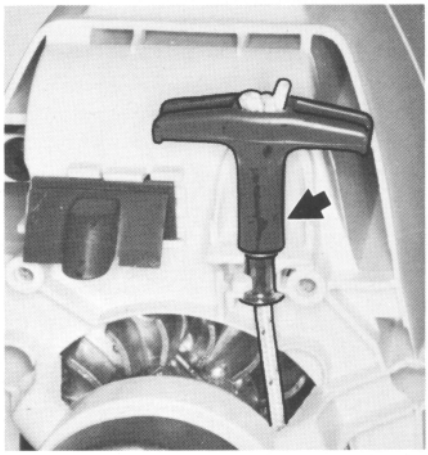
Bottom:
Special knots used





- Thread the other end of the starter rope through the guide bush and the underside of the starter grip. Secure with a special knot.

Starter grip against fan housing



- Fit the rope guide bush in its seat in the fan housing.

Note: The rewind spring is correctly tensioned when the starter grip sits firmly in the rope guide bush without drooping to one side. Spring tension has to be increased if this is not the case.

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.

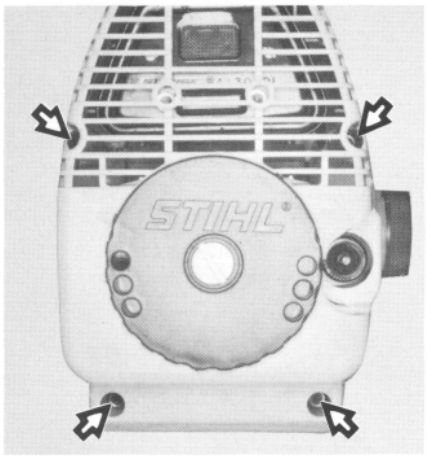
- Refit the clutch housing and tighten mounting screws to 3.5 Nm (2.6 lbf.ft).

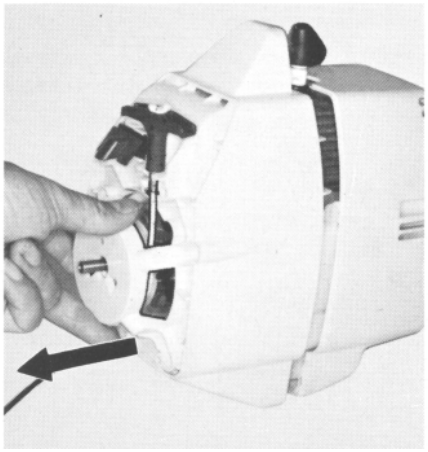
6.4 Rope Rotor

6.4.1 Removal

Top:
Outer shroud mounting screws

Bottom:
Removing fan housing





Troubleshooting chart - see 2.4.

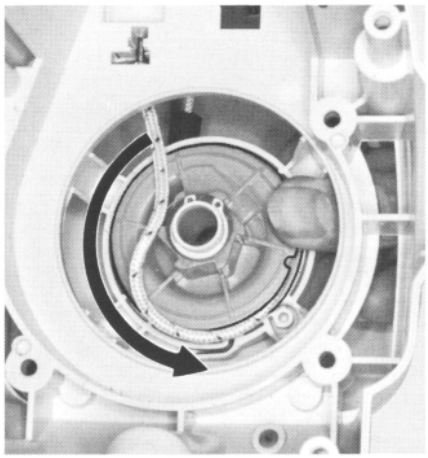
- Remove the clutch - see 3.1.

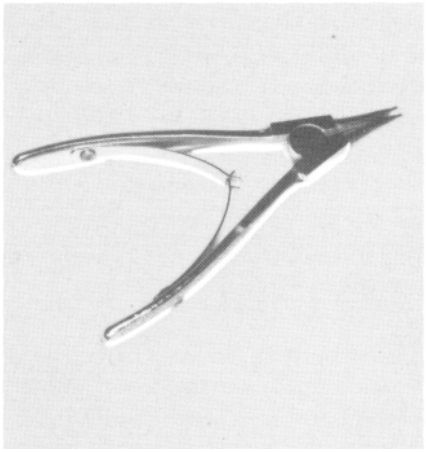
Unscrew outer shroud mounting screws.

- Unscrew the fan housing mounting screws.
- Pull off the fan housing and withdraw the throttle cable at the same time.
- On FS 44: Disconnect the short circuit wire from the ignition module.

Top:
Removing starter rope from rotor

Bottom:
Pliers 0811 611 8380



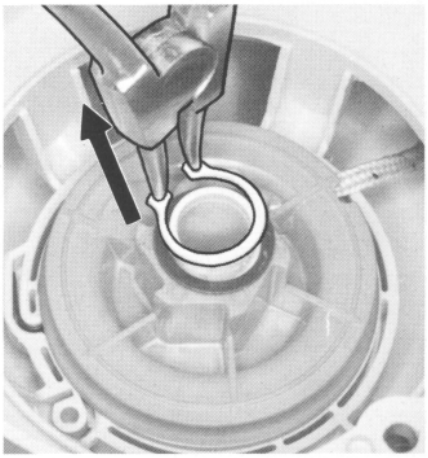


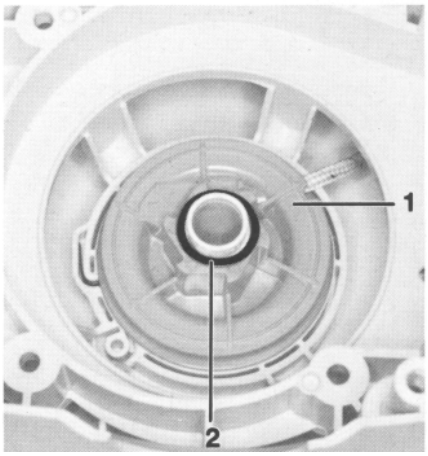
To relieve tension of rewind spring:

- Pull out the starter rope to a length of about 20 cm (8") and hold the rope rotor steady.
- Pull the starter rope inwards and take about three turns off the rotor.
- Pull out the rope with the starter grip and then release the rope rotor gradually so that the tension of the rewind spring is relieved.

Top:
Removing circlip

Bottom:
1 = Rope rotor
2 = Washer



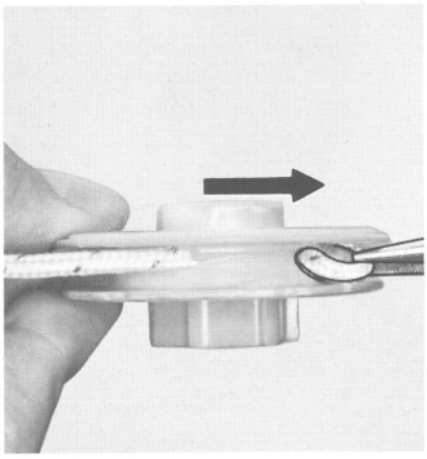


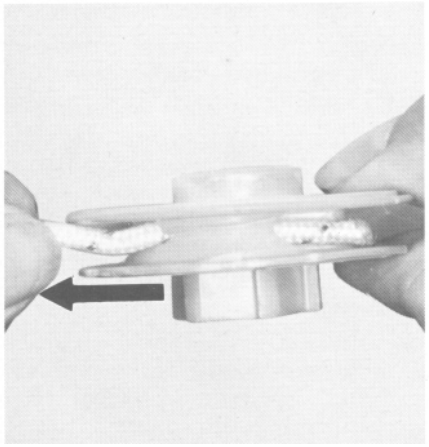
- Now unwind the starter rope from the rotor.
- Remove the circlip from the starter post.
- Pull the washer and rope rotor off the starter post.

6.4.2 **Installation**

Top:
Pulling starter rope by knot

Bottom:
Removing starter rope from rotor



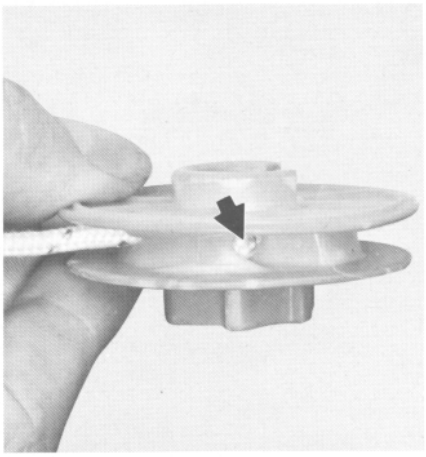


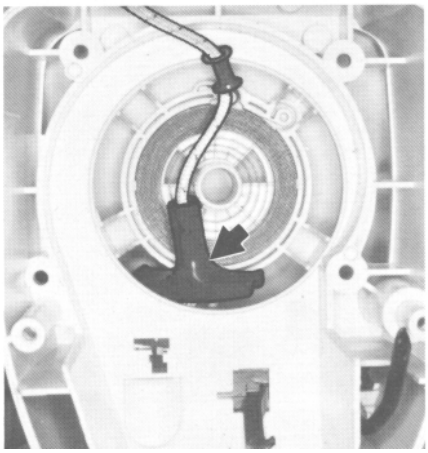
- Use a suitable pair of pliers to grip the knot in the starter rope and pull it away from the rotor.
- Undo the knot and pull the starter rope out of the rotor.

Note: Check condition of starter rope and fit new one if necessary.

Top:
Starter rope secured in rotor with knot

Bottom:
Starter grip

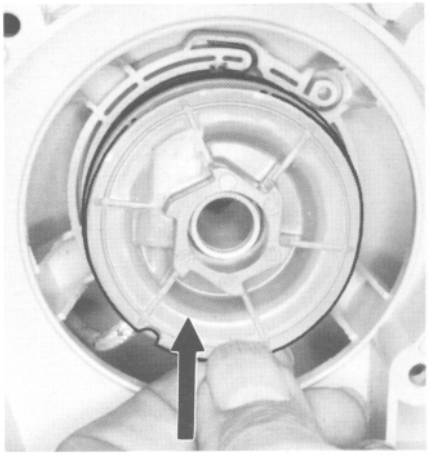


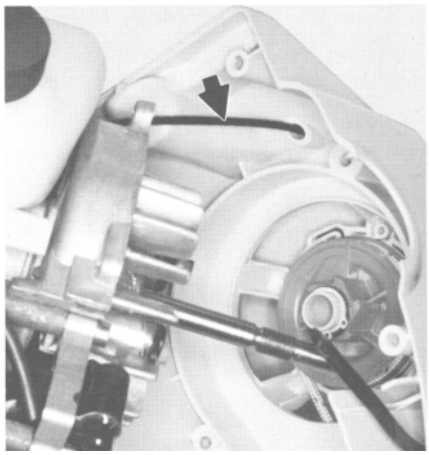


- Thread starter rope through the smaller bore, pull it out the other side and secure with a simple overhand knot.
- Pull the rope back until the knot locates in the rope rotor recess.
- Push the starter grip from inside through the upper slot the fan housing.

Top:
Fitting rope rotor

Bottom:
Throttle cable

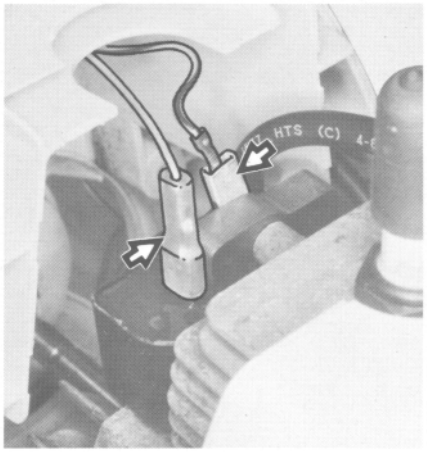


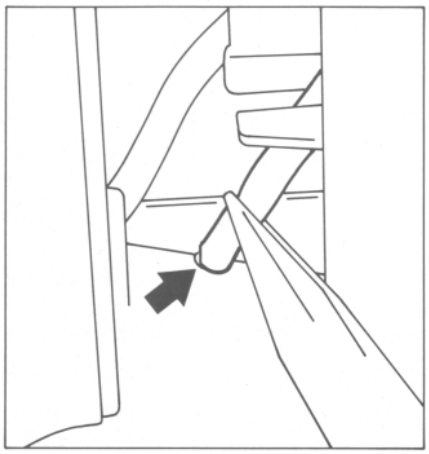


- Coat bore in rope rotor with STIHL low temperature lubricant, see 11.2, and push the rotor onto the starter post.
- Fit washer and secure rope rotor in position with circlip.
- Tension the rewind spring - see 6.4.3.
- Pass throttle cable through bore in fan housing.

Top:
Short circuit wires on ignition module

Bottom:
Fitting the vent hose



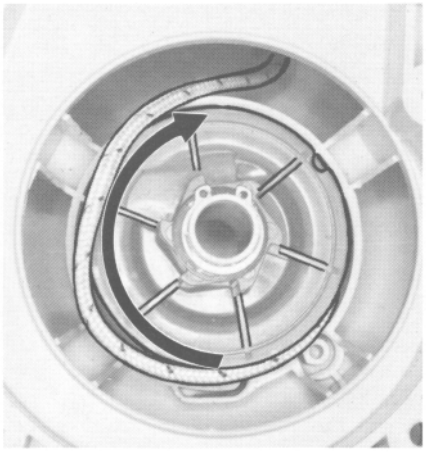


Note: On FS 44: Connect short circuit wires to ignition module.

- Place fan housing in position and fit vent hose in fuel tank at the same time.
- Tighten fan housing mounting screws to 5.5 Nm (4 lbf.ft).
- Tighten shroud mounting screws to 3.5 Nm (2.6 lbf.ft).
- Install the clutch - see 3.2.

6.4.3 Tensioning the Rewind Spring (with Fan Housing Removed)

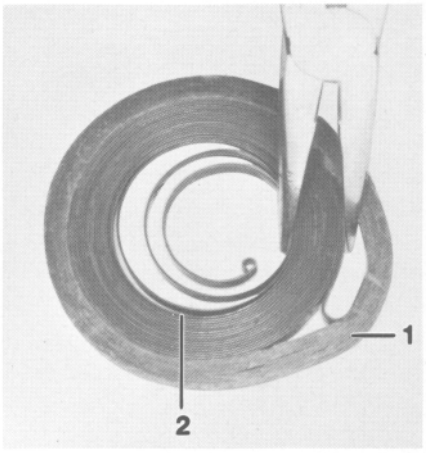
Winding starter rope onto rotor



- Wind four full turns of the rope on to the rotor in the clockwise direction.
- Pull the starter grip upward so that the rope rotor makes two full revolutions.
- Hold the rope rotor steady.
- Now wind two full turns of the rope on to the rotor in the clockwise direction.
- Fit the rope guide bush in its seat in the fan housing and check tension of rewind spring - see 6.3.

6.5 Replacing the Rewind Spring

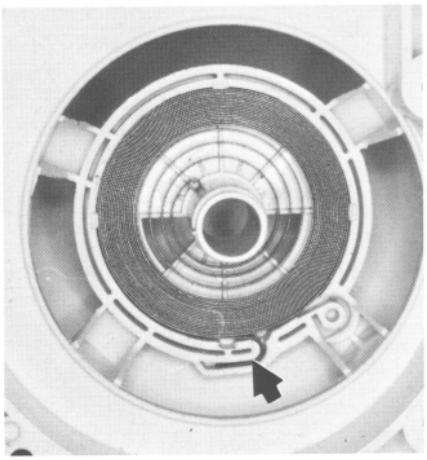
1 = Strap
2 = Rewind spring



- Remove the rope rotor, see 6.4.1, and use a pair of pliers to remove the remaining bits of the broken spring from the fan housing.
- The replacement spring is supplied ready for installation and held together by a strap. It should be lubricated with a few drops of STIHL low temperature lubricant, see 11.2, before installation.
- Use long nose pliers to hold the replacement spring compressed and the take off the strap.

6.6 Starter Pawls

Rewind spring fitted in position



- Fit the spring into the fan housing. Press the outer spring loop into the recess in the fan housing.

Caution: The rewind spring can pop out if it is not fitted carefully.

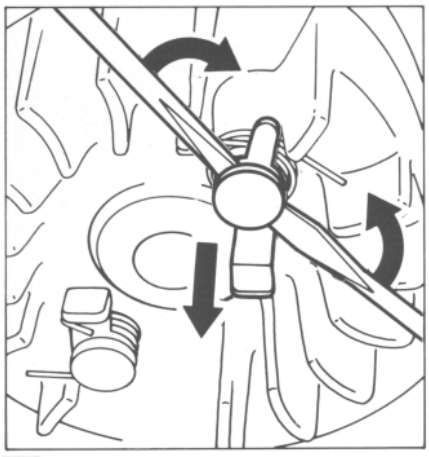
- If the spring has popped out, rewind it in your hand, starting from the outside and working inwards. Tension it to a diameter of 55 mm (approx. 2 3/16").

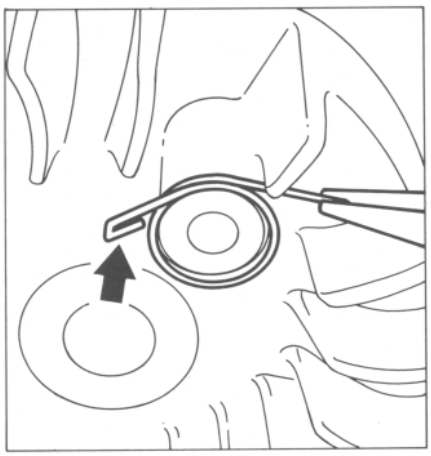
- Now use long nose pliers to grip the spring about 10 mm (3/8") from the end of the outer loop and place it in the fan housing.

- Fit the rope rotor - see 6.4.2.

Top:
Prying out pin

Bottom:
Bent end of torsion spring

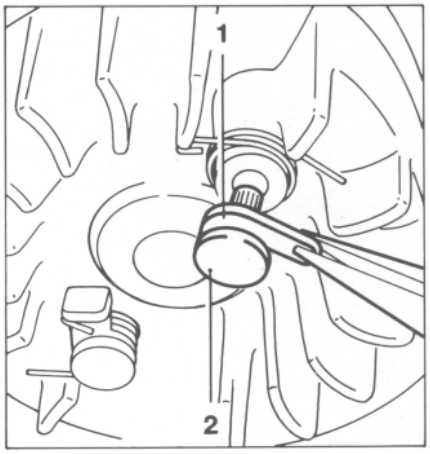


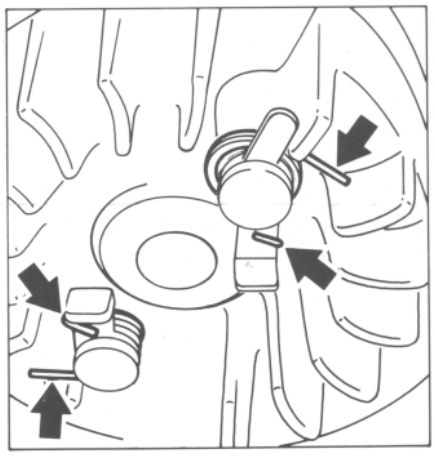


- Remove the fan housing - see 6.4.1.
- Remove the flywheel - see 5.1.4.
- Detach torsion springs from the pawls.
- Use two screwdrivers to pry the pins out of the flywheel.
- Remove pawls and torsion springs.
- Fit the torsion spring with its bent end pointing toward the flywheel hub.

Top:
1 = Pawl
2 = Pin

Bottom:
Correct position of torsion spring





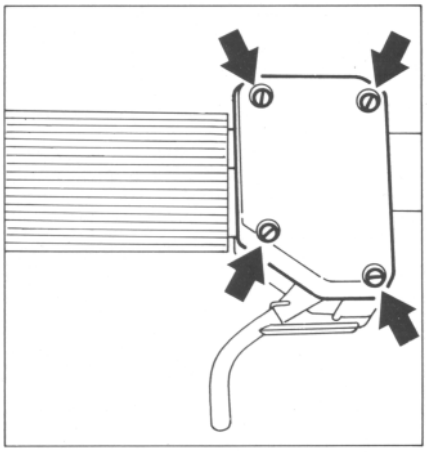
- Fit the pawl so that its bent end points toward the flywheel hub.
- Press the pin in so that the pawl still moves freely.
- Attach the torsion spring.
- Install the flywheel - see 5.1.4.
- Fit the fan housing - see 6.4.2.

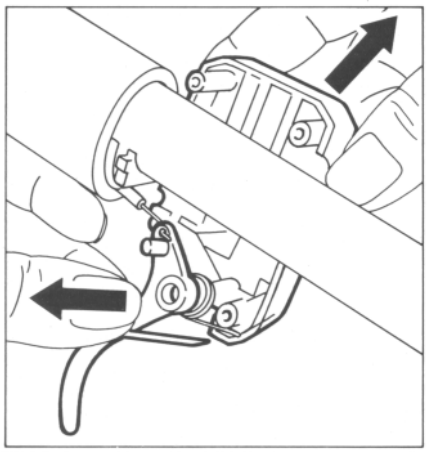
7. Throttle Control

7.1 Throttle Trigger (FS 36, FS 40)

Top:
Trigger housing fastening screws

Bottom:
Removing left half of housing

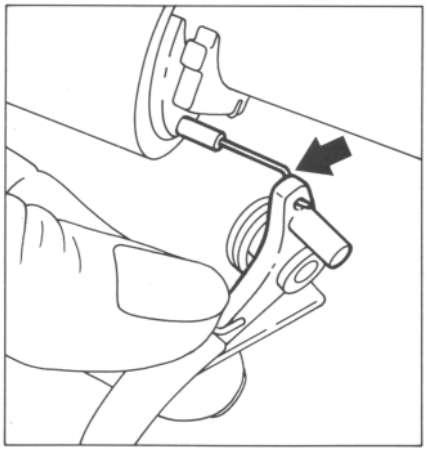


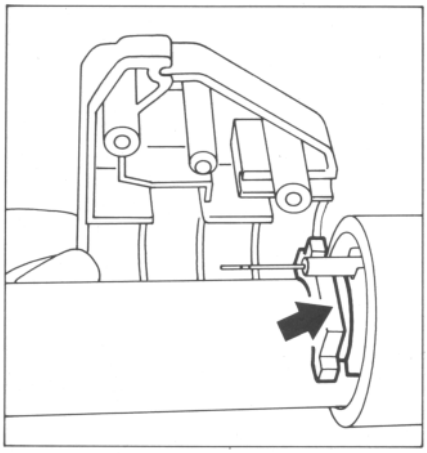


- Take out trigger housing fastening screws and pull off the right half of the housing.
- Remove the left half of the housing and ease the throttle trigger and torsion spring off the pivot pin at the same time.

Top:
Disconnecting the throttle cable

Bottom:
Groove in handle support





- Disconnect the throttle cable from the trigger.

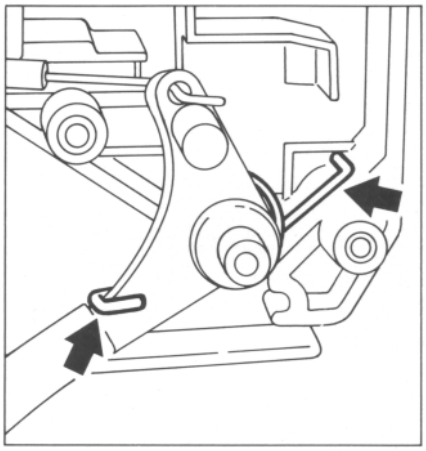
Assembly is a reversal of the disassembly sequence.

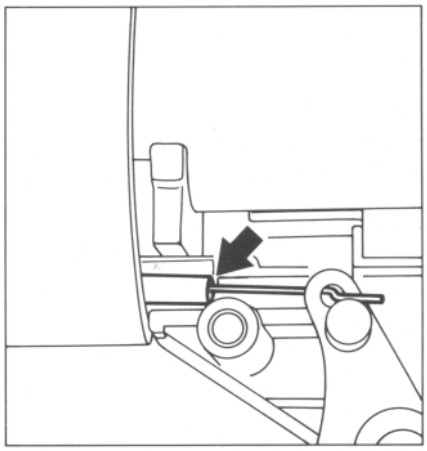
Note: Special attention must be paid to the following points:

- The two halves of the trigger housing must engage the groove in the handle support.

Top:
Correct position of torsion spring

Bottom:
Correct position of throttle cable





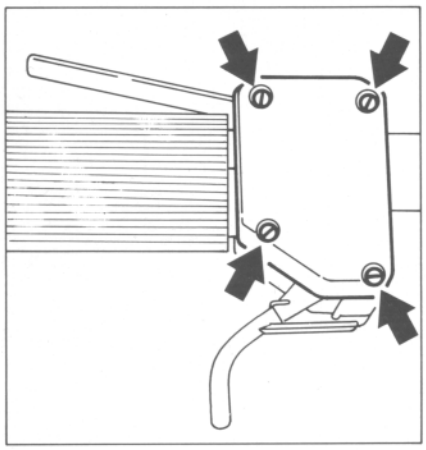
- Make sure the torsion spring is correctly positioned.
- The throttle cable must locate in its seat in the left half of the housing.
- Tighten the fastening screws to a torque of 2.5 Nm (1 .8 lbf.ft).

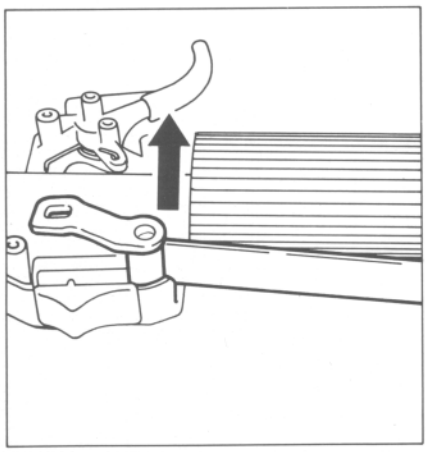
7.2 Throttle Trigger, Throttle Trigger Interlock, Stop Switch (FS 44)

7.2.1 Disassembly

Top:
Trigger housing fastening screws

Bottom:
Removing throttle trigger interlock lever

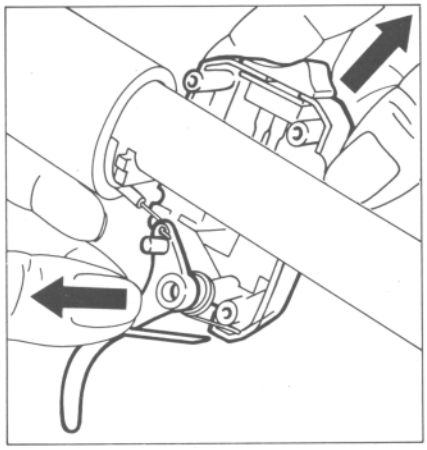




- Take out trigger housing fastening screws and pull off the right half of the housing.
- If necessary, take the lever and helical spring out of the right half of the housing.
- Pull the interlock lever off its pivot in the left half of the housing.

Top:
Removing left half of housing

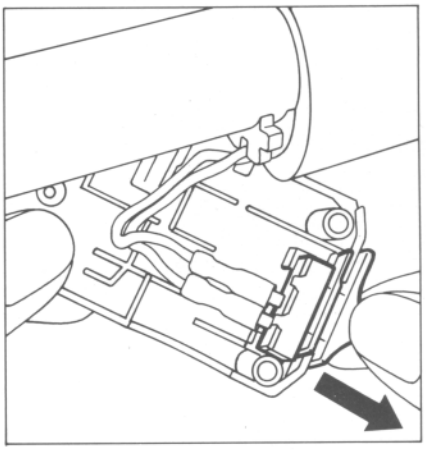
Bottom: Disconnecting the throttle cable

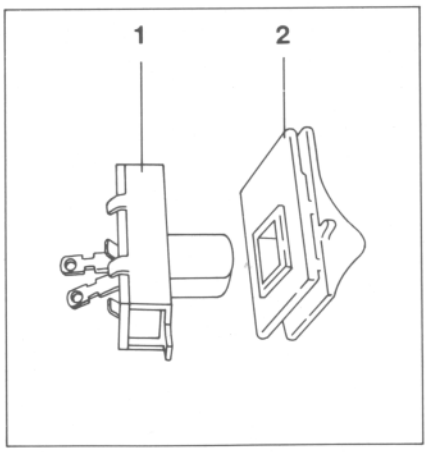


- Remove the left half of the housing and ease the throttle trigger and torsion spring off the pivot pin at the same time.
- Disconnect the throttle cable from the trigger.
- Take the torsion spring off the throttle trigger.

Top:
Withdrawing stop switch

Bottom:
1 = Stop switch
2 = Switch button



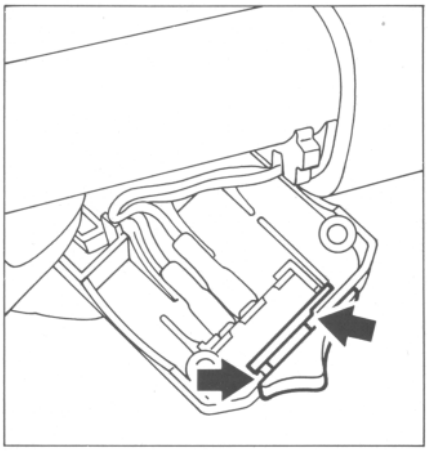


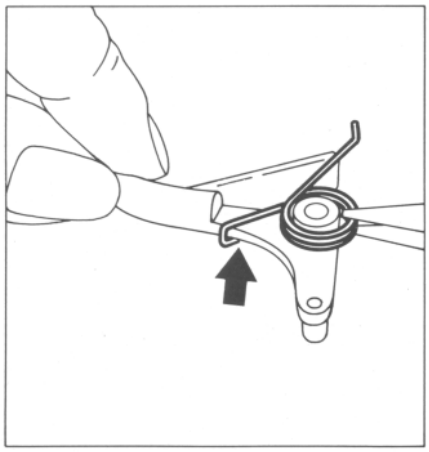
- Take the stop switch out of the left half of the housing and pull off the short circuit wires.
- Pull the button off the stop switch.

7.2.2 **Assembly**

Top:
Correct position of stop switch

Bottom:
Attaching torsion spring





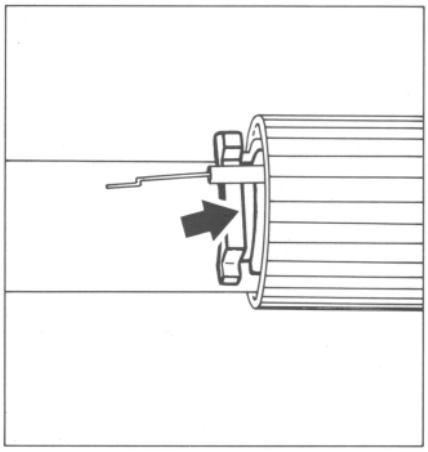
- Slip the button over the stop switch, connect up the short circuit wires and fit the stop switch in the left half of the housing so that its groove engages the edge of the housing.

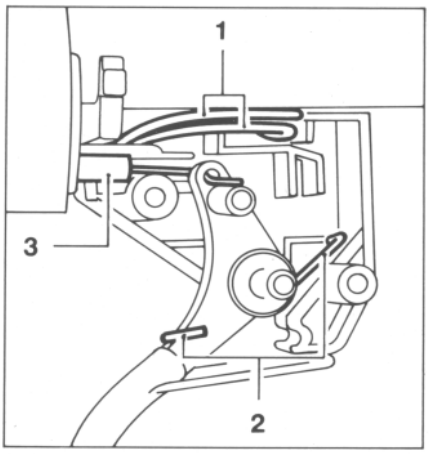
- Attach the torsion spring to the throttle trigger.

- Connect the throttle cable to the trigger. Push the trigger over the pivot pin in the left half of the housing.

Top:
Groove in handle support

Bottom:
Correct positions of
1 = Short circuit wires
2 = Torsion spring
3 = Throttle cable





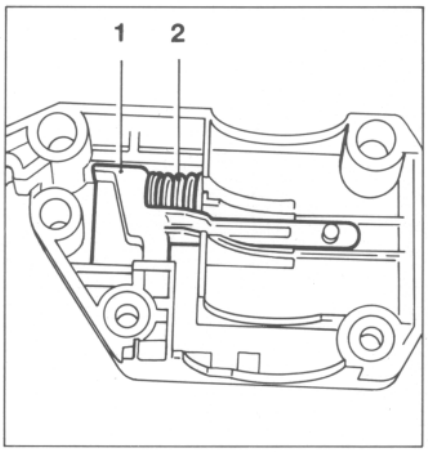
- Place the left half of the trigger housing against the drive tube.

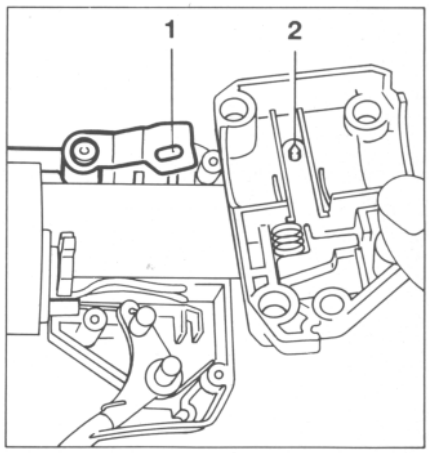
Note: The two halves of the trigger housing must engage the groove in the handle support. Check that the short circuit wires and torsion spring are correctly positioned (see illustration).

The throttle cable must locate in its seat in the left half of the housing.

Top:
1 = Lever
2 = Helical spring

Bottom:
1 = Slot in interlock lever
2 = Peg on lever





- Push interlock lever over the pivot.

- Fit the lever and helical spring in the right half of the housing.

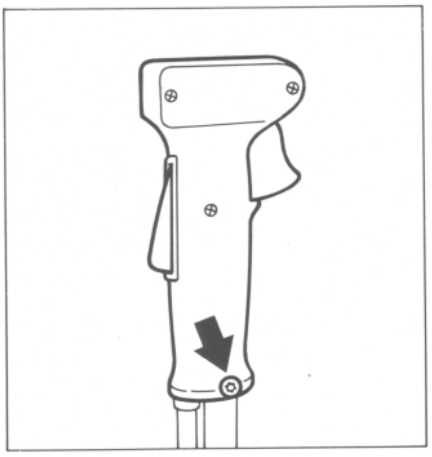
- Place right half of housing in position so that the peg on the lever engages the slot in the interlock lever.

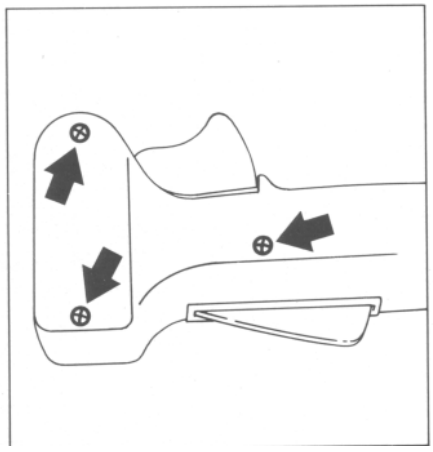
- Fit screws and tighten to a torque of 2.5 Nm (1.8 lbf.ft).

7.3 Throttle Trigger, Throttle Trigger Interlock (FS 44 with Two-Handed Handlebar)

Top:
Handle mounting screw

Bottom:
Handle molding fastening screws

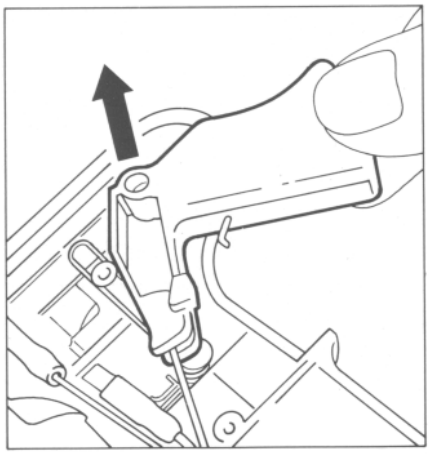


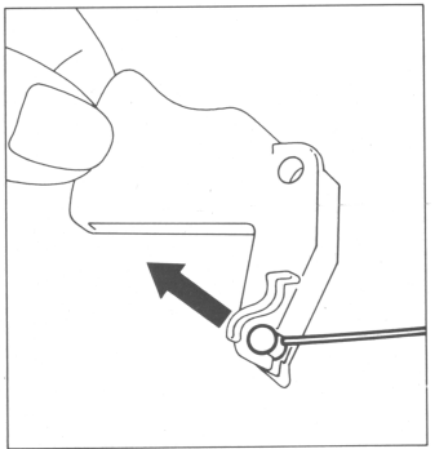


- Take out the handle mounting screw and pull the handle off the handlebar.
- Remove the handle molding fastening screws and separate the two halves.

Top:
Removing throttle trigger

Bottom:
Disconnecting throttle cable from trigger

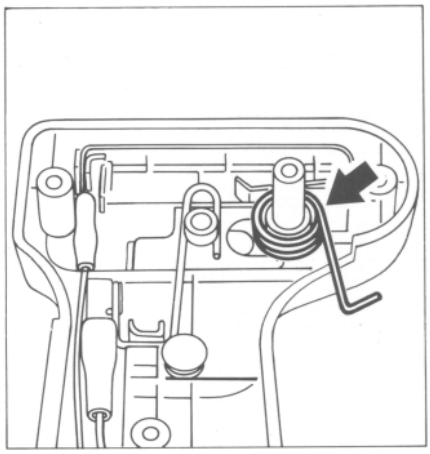


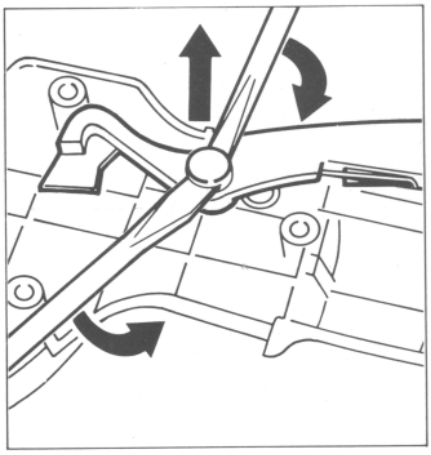


- Lift the throttle trigger slightly, turn it to one side to relieve tension on torsion spring and then take it off the pivot.
- Remove throttle cable nipple from the trigger.

Top:
Torsion spring

Bottom:
Prying out rivet



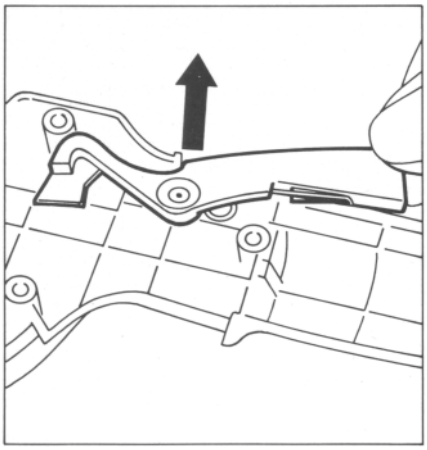


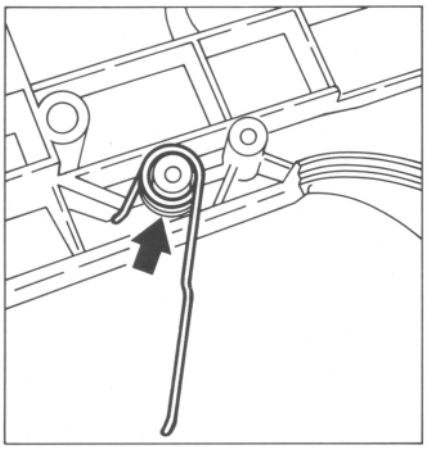
- Take the trigger's torsion spring out of the handle.
- Carefully pry the rivet out of the interlock lever in the outer handle molding.

7.4 Contact Springs in Control Handle (FS 44 with Two-Handed Handlebar)

Top:
Removing trigger interlock lever

Bottom:
Torsion spring





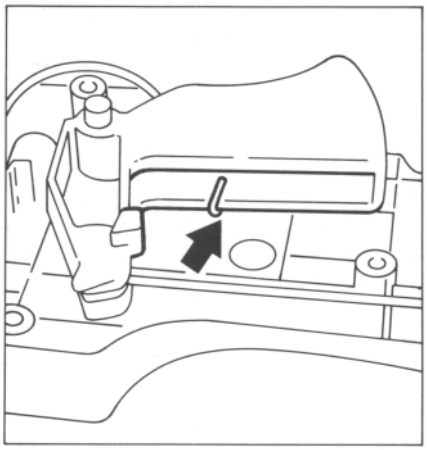
- Remove the trigger interlock lever from its pivot.
- Remove the torsion spring from its pivot.

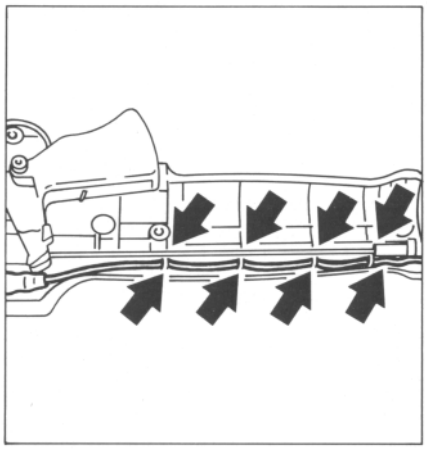
Assembly is a reversal of the disassembly sequence.

Pay special attention to the following points:

Top:
Correct position of trigger's torsion spring

Bottom:
Correct positions of throttle cable and wires

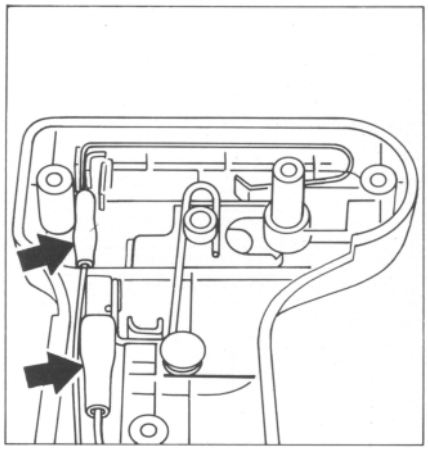


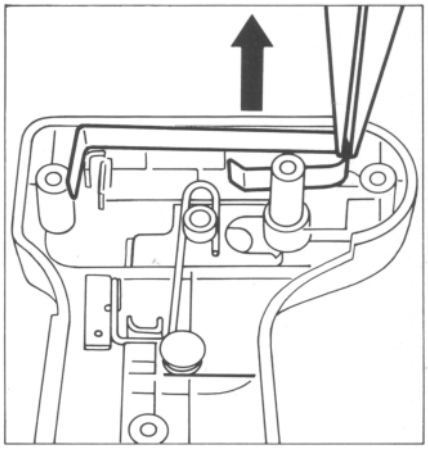


- Torsion spring must engage throttle trigger as shown in illustration.
- Stop switch wire, ground wire and throttle cable must be correctly positioned in the handle molding.

Top:
Wire connections on contact springs

Bottom:
Withdrawing the contact spring



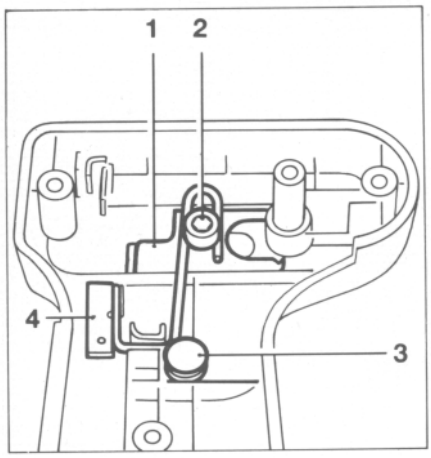


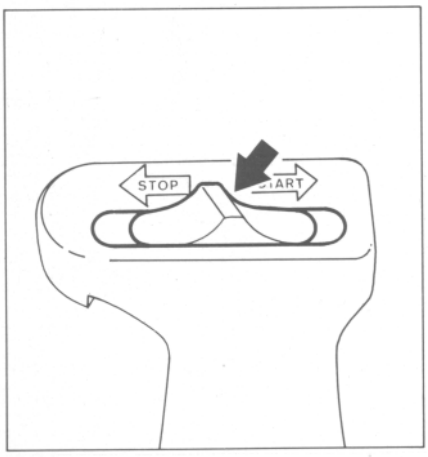
- Remove the throttle trigger - see 7.3.
- Pull the stop switch wire and ground wire off the tags on the contact springs.
- Take out the contact spring.

7.5 Handle Support

Top:
1 = Detent spring
2 = Collar screw
3 = Rivet
4 = Contact spring

Bottom:
Control slide





- Remove collar screw from the control slide. Take out the control slide and detent spring. Pull out the rivet and remove the contact spring.

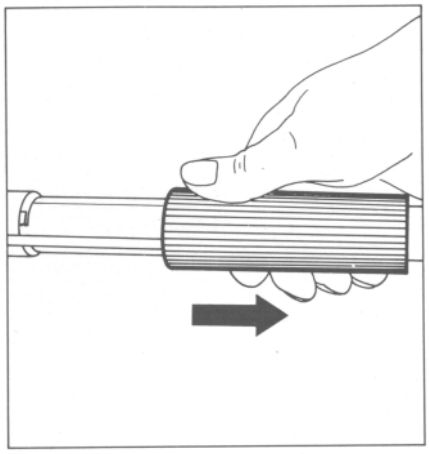
Note: The contact spring must engage groove in collar screw.

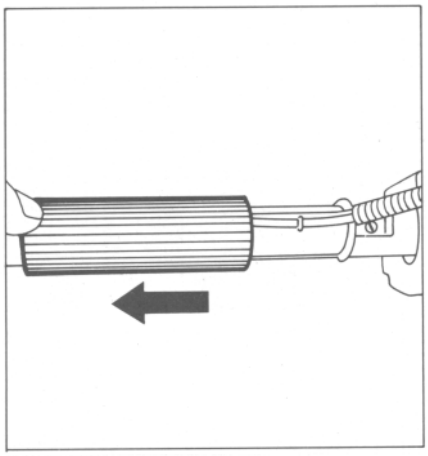
Assembly is a reversal of the disassembly sequence.

Note: Check that stop switch wire and ground wire are making good contact.

Top:
Removing handle hose (FS 40)

Bottom:
Removing handle hose (FS 44)





- Remove throttle trigger - see 7.1., 7.2 or 7.3.

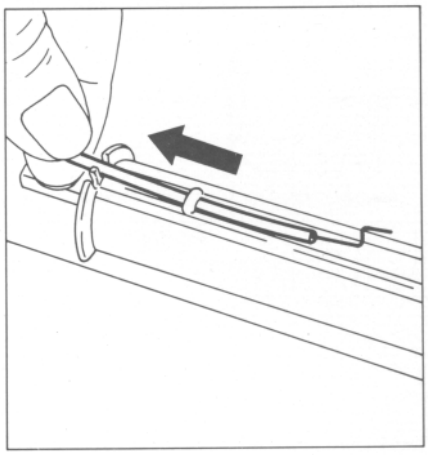
- On FS 36: Remove handle support – see 10.4.

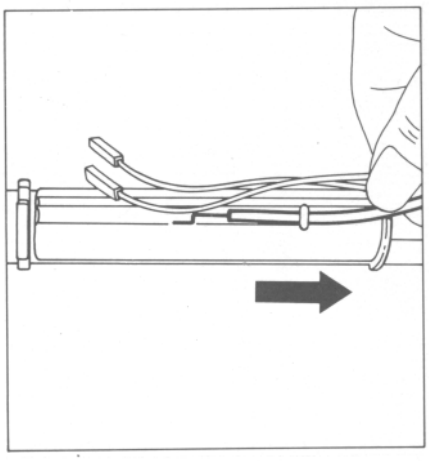
- Pull the handle hose off the handle support.

Important: While removing the handle hose, take care not to kink the bent end of the throttle cable.

Top:
Withdrawing throttle cable (FS 40)

Bottom:
Withdrawing throttle cable (FS 44)





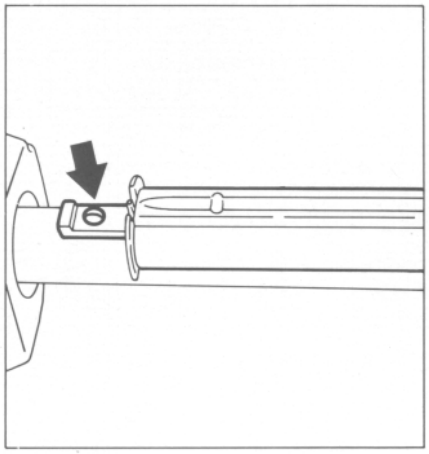
- Pull the throttle cable out of its seat in the handle support.

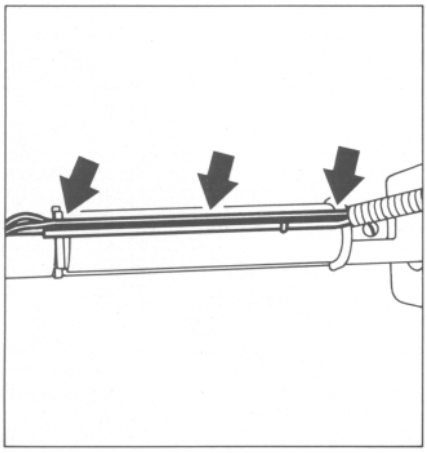
- Pull the short circuit wires out of the groove and throttle cable out of the handle support.

7.6 Throttle Cable

Top:
Handle support fastening screw

Bottom:
Short circuit wires correctly positioned (FS 44)





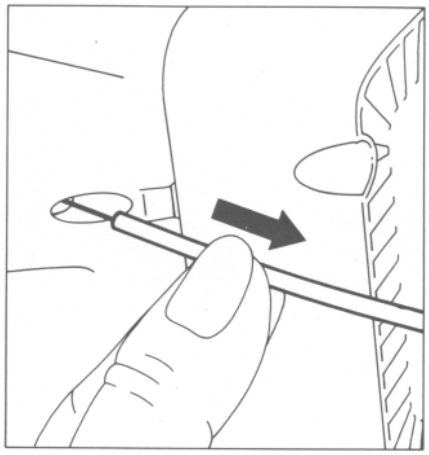
- Take out the handle support fastening screw and remove the handle support from the drive tube.

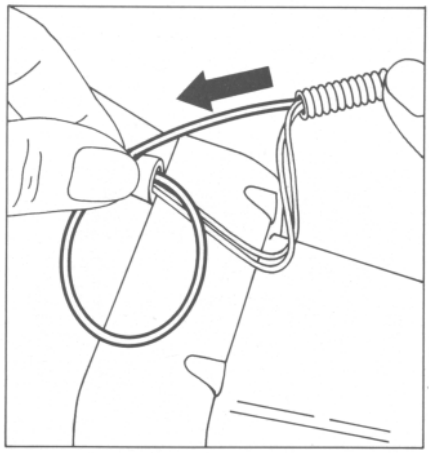
Assembly is a reversal of the disassembly sequence.

Note: Make sure the short circuit wires are correctly positioned in the handle support (see illustration).

Top:
Withdrawing throttle cable (FS 36, FS 40)

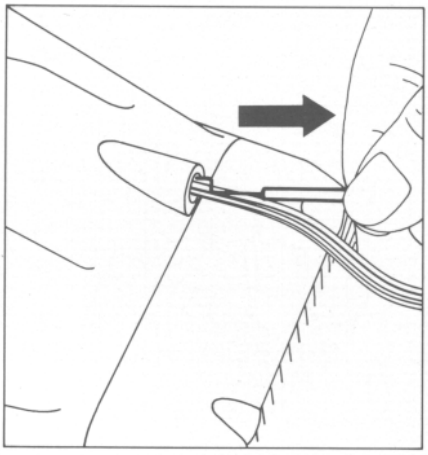
Bottom:
Withdrawing throttle cable from protective hose (FS 44)





- Pull the throttle cable out of the handle support - see 7.5.
- Remove the diaphragm carrier - see 8.6.
- Pull the throttle cable out of the hole in the fan housing.

Withdrawing throttle cable (FS 44)



- FS 44 with two-handed handlebar: Remove throttle trigger - see 7.3.
- FS 44: Pull throttle cable out of the protective hose.
- FS 44: Pull throttle cable out of the retainer.

Assembly is a reversal of the disassembly sequence.

Note: Take care not to kink the front end of the throttle cable during installation.

Caution: FS 36 throttle cable is shorter.

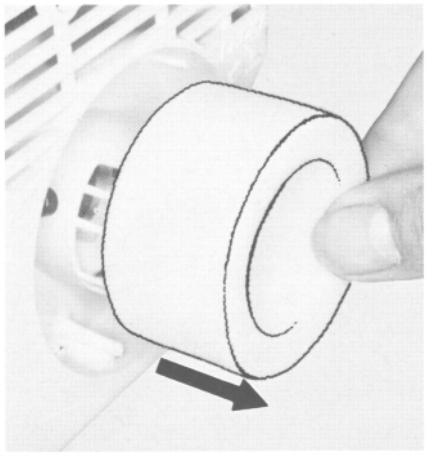
8. FUEL SYSTEM

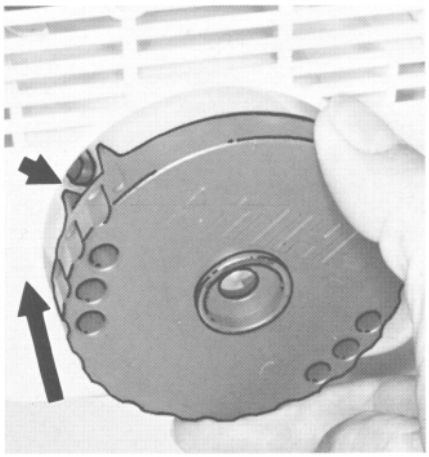
8.1 Air Filter

Filter cover mounting screw

Top:
Removing foam filter element

Bottom:
Fitting filter cover





The air filter's function is to remove dust and dirt sucked in with the combustion air and thus help reduce wear on engine components to a minimum.

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

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

- Close the choke shutter (turn filter cover to CHOKE) to prevent dirt falling into the carburetor.
- Take out the filter cover mounting screw. Remove the filter cover without rotating it.
- Pull the foam filter element out of the housing.
- Wash the element in a fresh, non-inflammable cleaning solution (e.g. warm soapy water) and dry it.
- Encrusted dirt should be loosened by immersing the filter in the cleaning solution.

Note: If the filter is extremely dirty or damaged, replace it immediately.

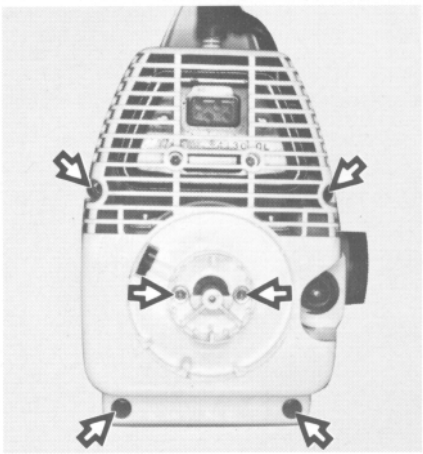
Installation is a reversal of the removal sequence.

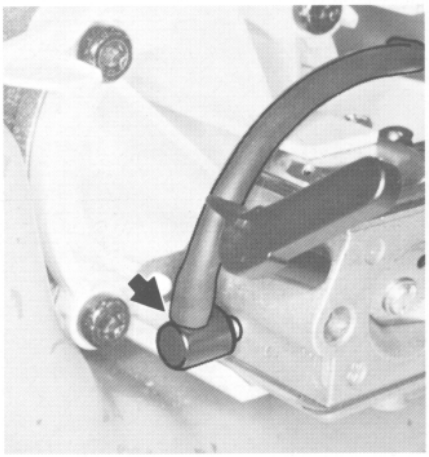
Note: Refit the filter cover so that it engages the choke lever (see illustration).

8.2 Leakage Testing the Carburetor

Top:
Shroud mounting screws

Bottom:
Fuel hose on elbow connector





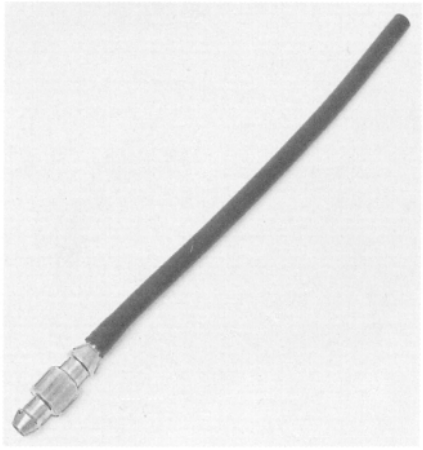
Troubleshooting chart - see 2.5.

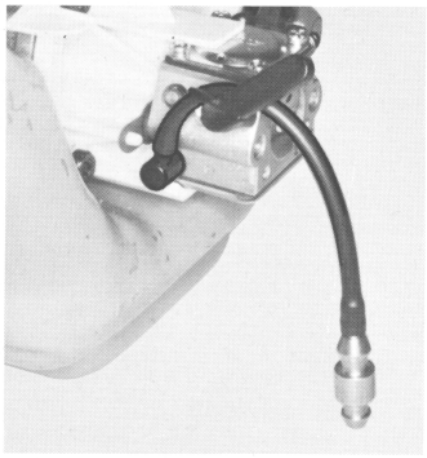
The carburetor can be tested for leaks with the carburetor and crankcase tester.

- Remove the air filter - see 8.1.
- Take out the shroud mounting screws and pull off the shroud.
- Pull the fuel hose off the carburetor's elbow connector.

Top:
Fuel line 1110 141 8600 fitted on nipple 0000 855 9200

Bottom:
Fuel line fitted on elbow connector

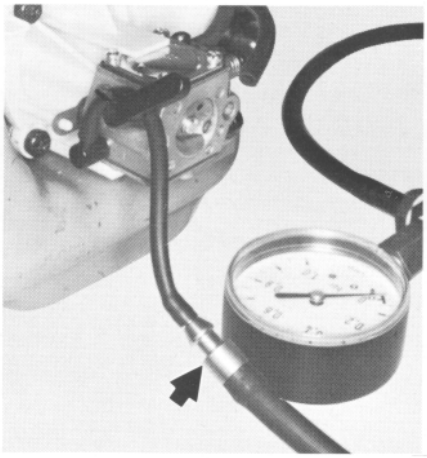


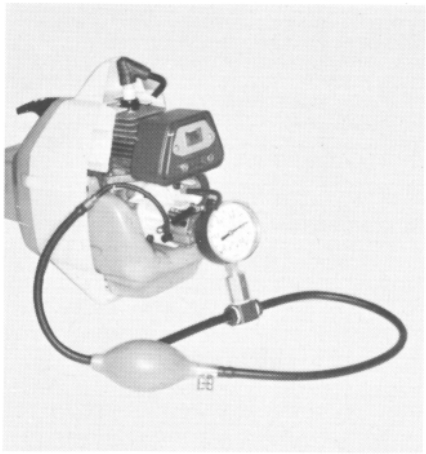


- Use a separate nipple and a length of fuel line as an adapter. Push the fuel line on to the carburetor's elbow connector.

Top:
Tester's pressure hose connected to nipple

Bottom:
Pressure testing carburetor with carburetor/crankcase tester 1106 850 2905

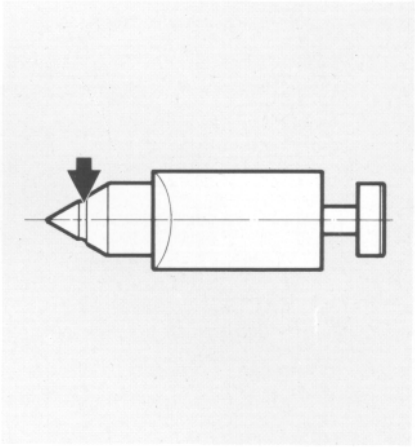




- Connect tester's pressure hose to the nipple.

- Close the vent screw on the rubber bulb and pump air into the carburetor until the pressure gauge shows a reading of approx. 0.8 bar (12 psi).

Damaged inlet needle



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

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

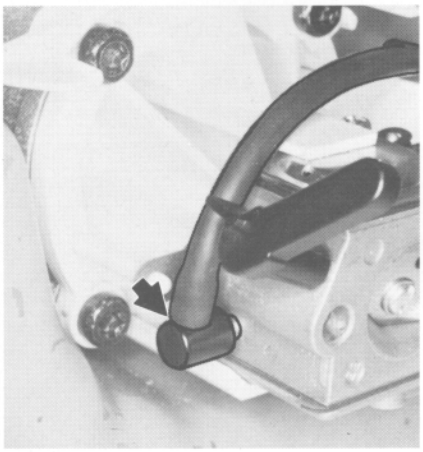
2. The metering diaphragm is damaged.

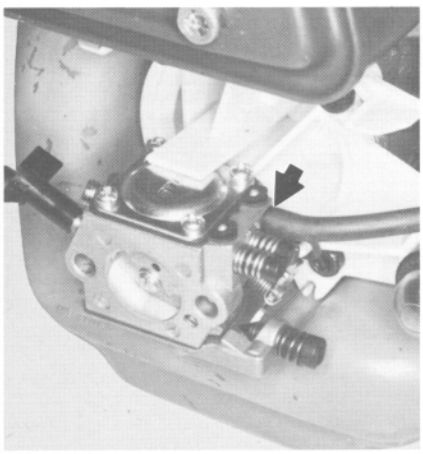
In either of these cases the carburetor must be removed and serviced.

8.3 Removing the Carburetor

Top:
Fuel hose on elbow connector

Bottom:
Fuel hose on nipple



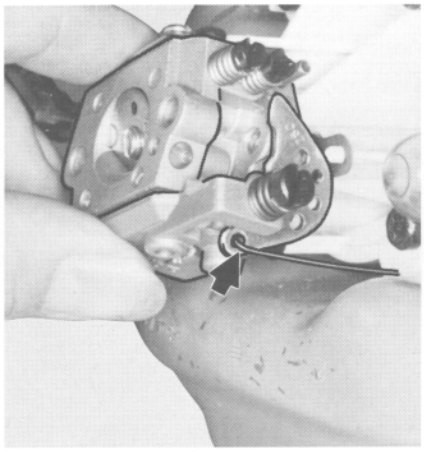


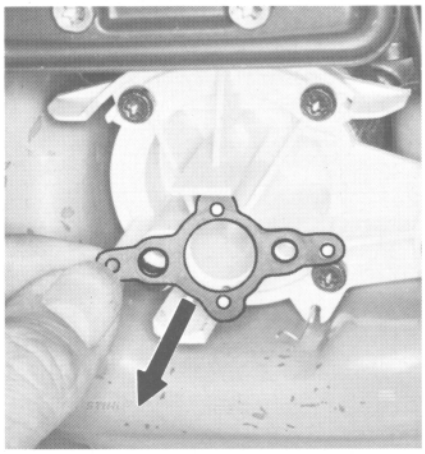
The all-position diaphragm carburetor consists of a fuel pump and the actual carburetor. Although the fuel pump shares a common housing with the carburetor, it operates as a completely separate and independent unit.
A built-in control valve limits maximum engine speed to 9,300 ± 700 rpm (without cutting tool).

- Remove the shroud - see 8.2.

Top:
Disconnecting throttle cable

Bottom:
Removing gasket





- Pull the fuel hose off the carburetor elbow connector.

- Pull the fuel hose off the nipple.

- Pull the carburetor forward and disconnect the throttle cable from the throttle lever.

- Remove the gasket from the diaphragm carrier.

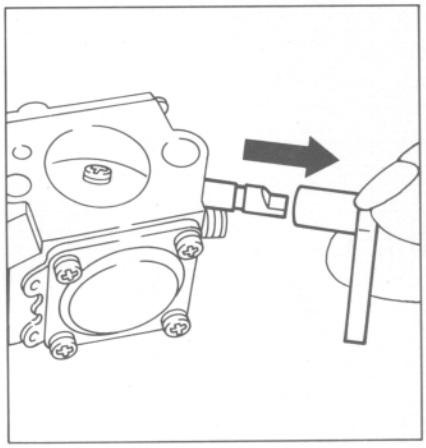
Installation is a reversal of the removal sequence.

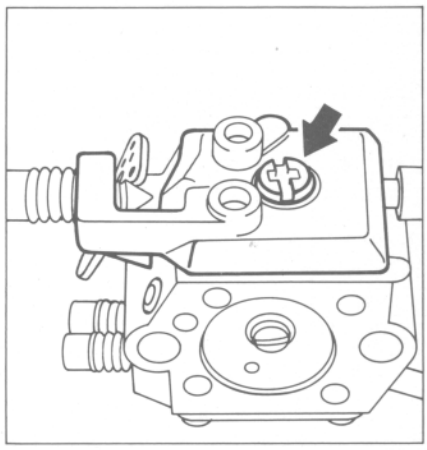
Note: Fit a new gasket.

8.4 Servicing the Carburetor

Top:
Removing choke lever

Bottom:
Pump end cover fastening screw





It is advisable to check the serviceability of the fuel pump whenever the carburetor is removed for repair.

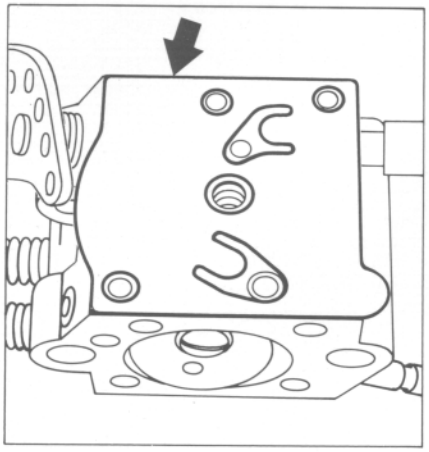
- Remove the carburetor - see 8.3.

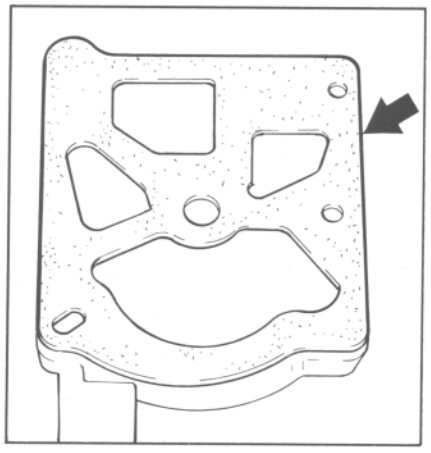
- Pull the choke lever off the shaft.

- Unscrew and remove the pump end cover.

Top:
Pump diaphragm on carburetor body

Bottom:
Fuel pump end cover with gasket





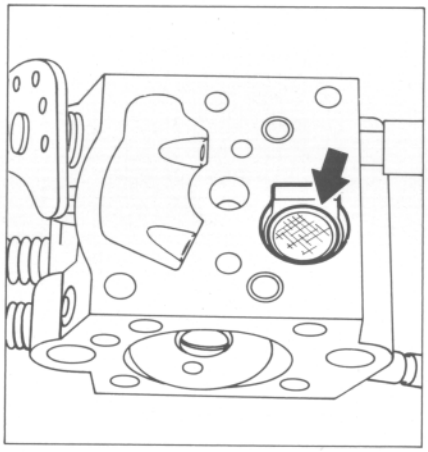
- Remove the gasket and pump diaphragm.

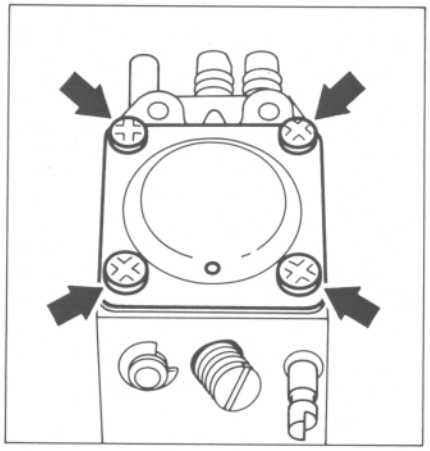
Note: The diaphragm and gasket often stick to the cover or carburetor body. If this is the case, take particular care when separating them.

- If the fuel strainer in the pump side of the carburetor body is dirty, use a scriber to pry it out and then clean it.

Top:
Fuel strainer in carburetor body

Bottom:
Fastening screws on metering diaphragm end cover





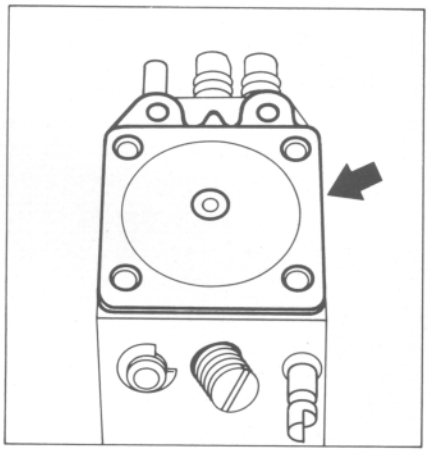
Important: If the fuel strainer is damaged, always fit a new one.

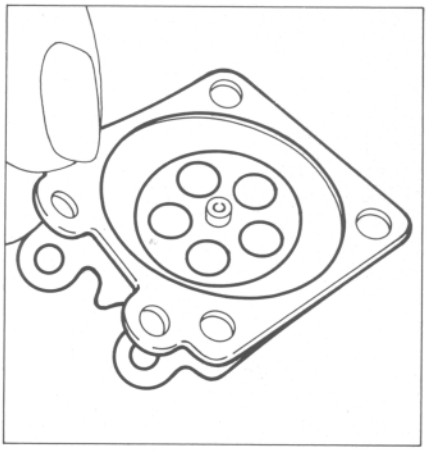
In such a case the fuel pickup head should also be inspected and replaced if necessary - see 8.7.

- To disassemble the carburetor, unscrew the metering chamber end cover and lift it away.

Top:
Metering diaphragm and gasket on carburetor body

Bottom:
Separating gasket and diaphragm





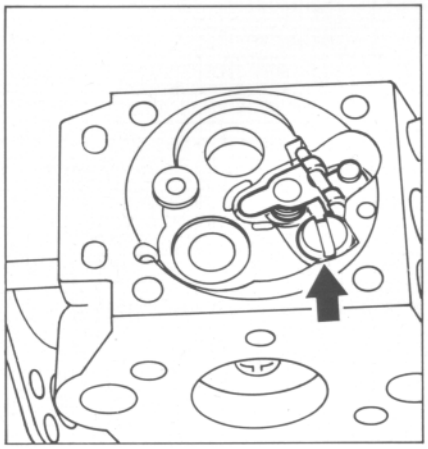
- Remove the metering diaphragm and gasket from the carburetor body and cover.

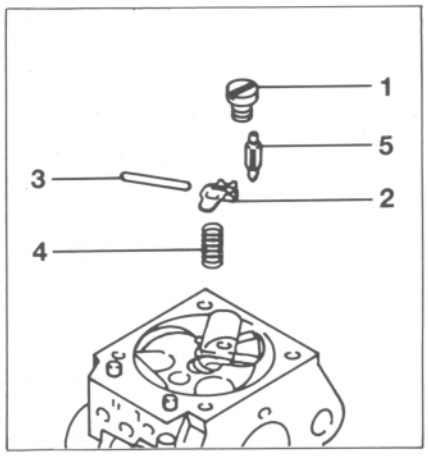
- Carefully separate the diaphragm and gasket.

Note: The diaphragms are the most delicate parts of the carburetor. They are subjected to continuous alternating stresses and the material eventually shows signs of fatigue, i.e. the diaphragms distort and swell. They have to be replaced when this stage is reached.

Top:
Round head screw holds control lever spindle

Bottom:
1 = Round head screw
2 = Inlet control lever
3 = Spindle
4 = Helical spring
5 = Inlet needle



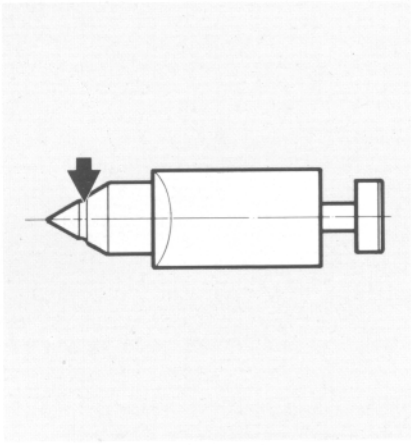


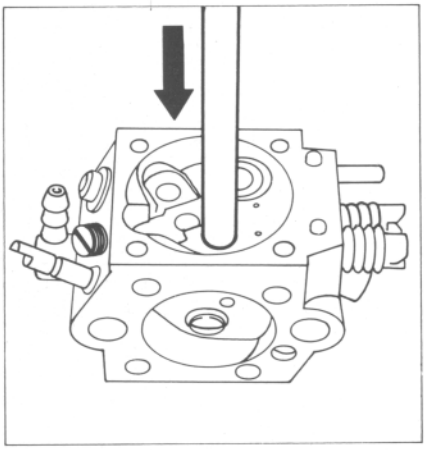
- The inlet control valve is located in a recess in the metering diaphragm chamber. Take out the round head retaining screw.

- Remove the inlet control lever with spindle, helical spring and inlet needle. If there is an annular indentation on the sealing cone of the inlet needle, it will be necessary to replace the inlet needle because it will no longer seal properly. This is indicated by constant flooding of the carburetor even though the needle is clean.

Top:
Damaged inlet needle

Bottom:
Pressing out valve jet

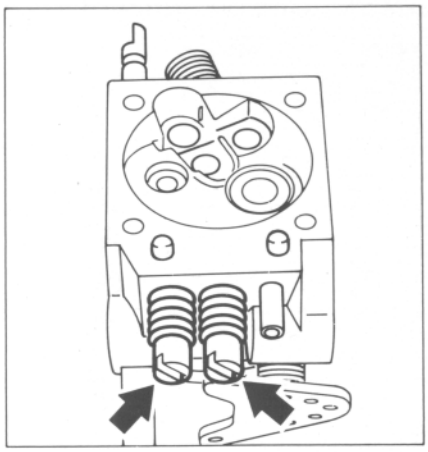


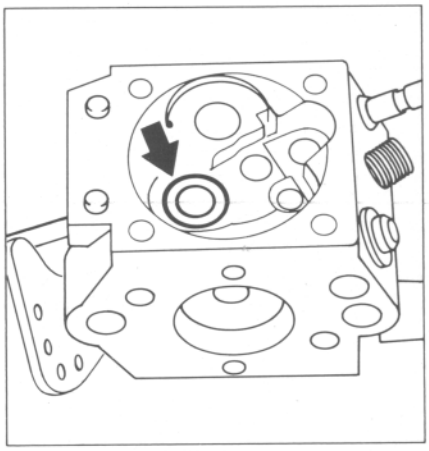


- If the small plastic plate in the valve jet (main jet) no longer moves freely, use a 4.5 mm (approx. 3/16") dia. drift from outside to press the valve jet out of its seat in the direction of the venturi and wash it in white spirit.

Top:
Carburetor adjusting screws

Bottom:
Sealing plug





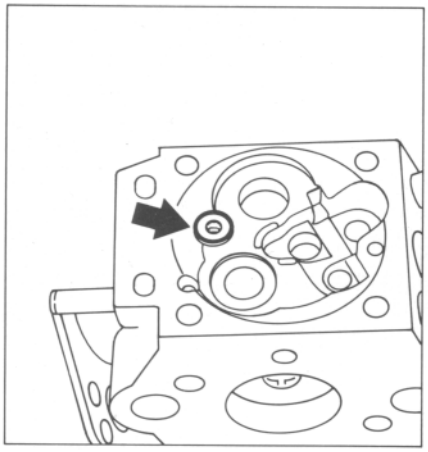
- Remove the carburetor adjusting screws.

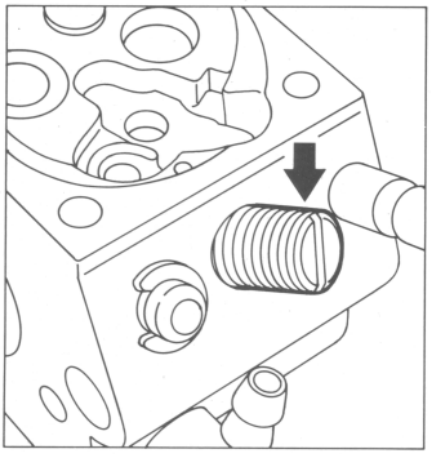
- Pry the sealing plug out of the metering chamber.

Caution: The sealing plug is destroyed during removal. Remove it only if a replacement is available. After fitting, secure the sealing plug with Loctite, see 11.2 (fill gap between carburetor body and sealing plug with Loctite).

Top:
Non-return valve

Bottom:
Control valve



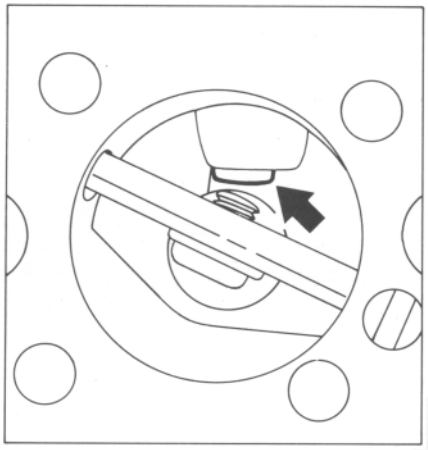


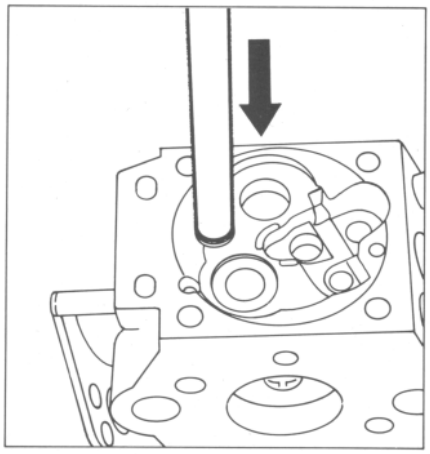
- Screw a 2.5x13 mm self-tapping screw into the non-return valve bore and use it to pull out the non-return valve.

- Unscrew the control valve and take the washer out of the bore in the carburetor body.

Top:
Valve jet fitted - lower edge of jet flush with venturi wall

Bottom:
Pressing in non-return valve



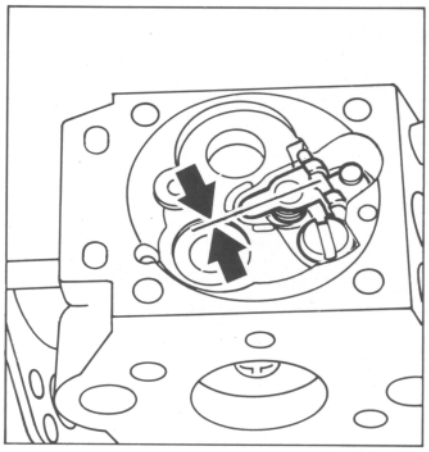


Wash the carburetor body and all serviceable parts in fresh white spirit and blow clear with compressed air, paying special attention to the bores and ports.

- When inserting the valve jet, make sure that it is exactly vertical in the bore. Press home jet until its lower edge is flush with the venturi wall.

- Use a 4 mm (5/32") drift to press the non-return valve into the metering chamber bore as far as stop.

Correct position of inlet control lever



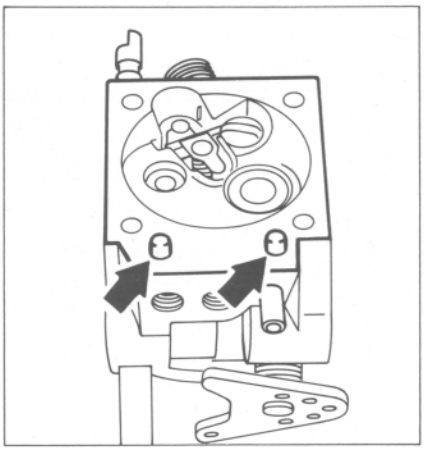
- Fit the inlet needle and the helical spring in their respective bores. Insert spindle in the inlet control ever, engage clevis in annular groove on the head of the inlet needle and tighten down the round head screw. Make sure that the helical spring locates on the control lever's nipple.

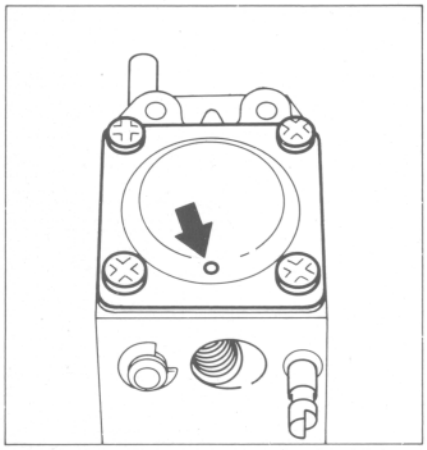
- Check easy action of the inlet control lever.

Important: The top edge of the inlet control lever must be level with the metering diaphragm seating face. If necessary, use suitable pliers to carefully bend the inlet control lever into position.

Top:
Locating pegs on carburetor body

Bottom:
Hole in end cover





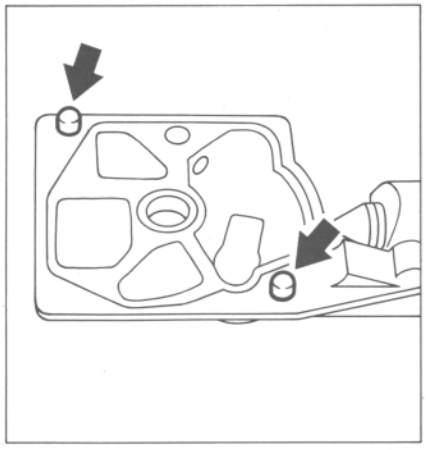
- Fit the gasket and metering diaphragm. They are held in position by the integrally cast pegs on the body.

- Fit the end cover. The hole in the end cover must be at the same side as the tapped bore for the control valve.

- Fit screws and tighten down firmly.

Top:
1 = Gasket
2 = Pump diaphragm

Bottom:
Locating pegs on pump end cover



Insert the fuel strainer at the pump side.

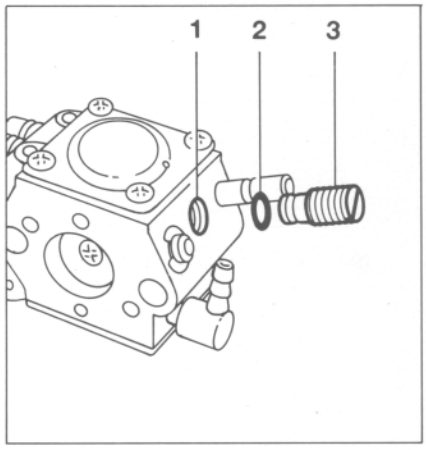
- Fit the pump diaphragm, gasket and end cover and tighten down securely. The pump diaphragm and gasket are held in position by the integrally cast pegs on the end cover.

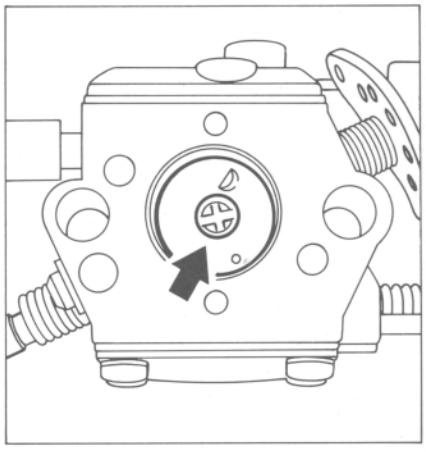
- Refit the carburetor adjusting screws.

- Fit a new copper washer in the control valve bore.

Top:
1 = Bore
2 = Copper washer
3 = Control valve

Bottom:
Throttle shutter fastening screw





- Screw in control valve about 2 turns.

- Now coat thread projecting from carburetor body with Loctite, see 11.2.

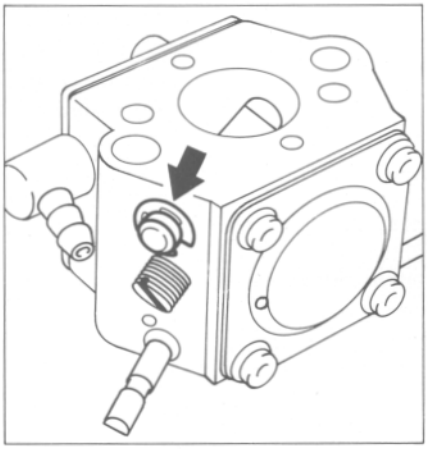
- Carefully screw control valve home and tighten it to a torque of 4 Nm (3 lbf.ft).

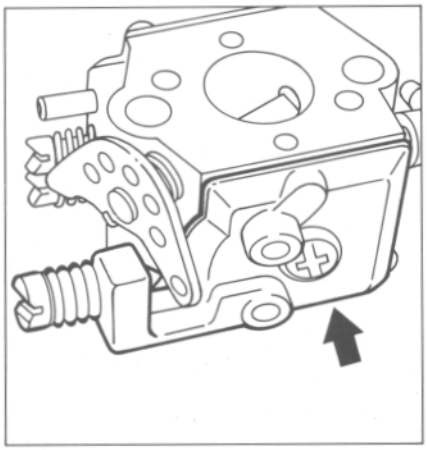
Removing the throttle shaft

- Remove the throttle shutter fastening screw.

Top:
E-clip

Bottom:
Fuel pump end cover



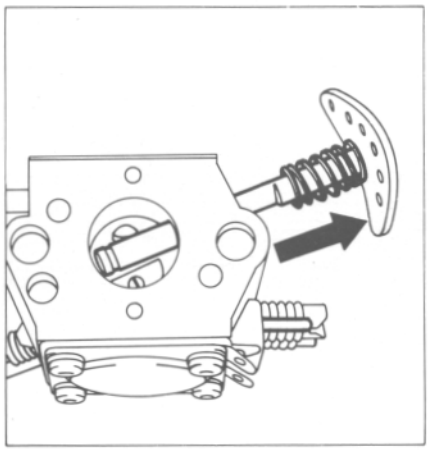


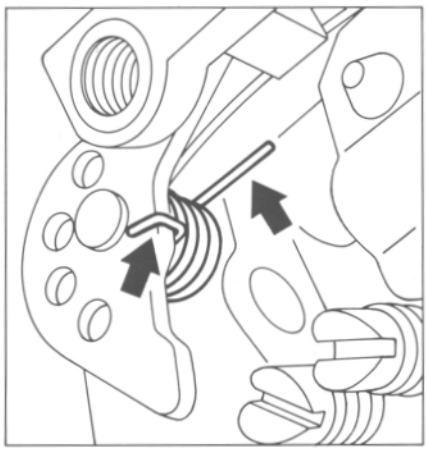
- Take the throttle shutter out of the carburetor.
- Pry the E-clip off the throttle shaft.
- Remove the pump end cover.

Note: Carefully remove pump diaphragm and gasket.

Top:
Withdrawing throttle shaft

Bottom:
Correctly positioned torsion spring

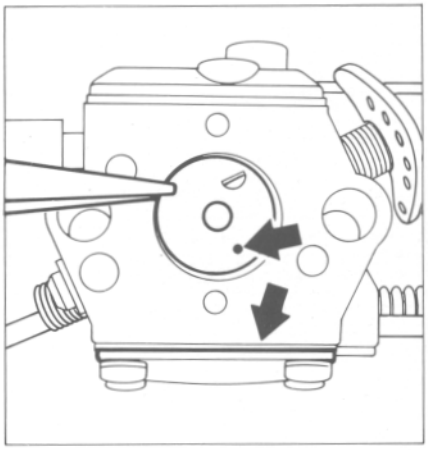


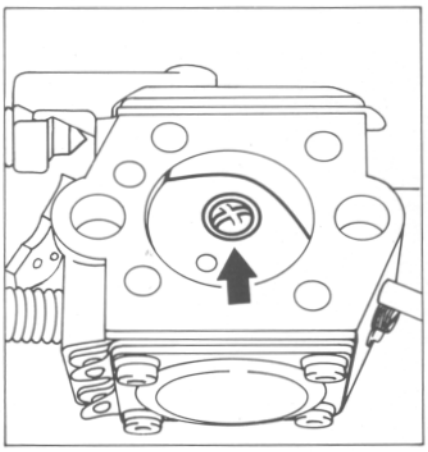


- Carefully pull the throttle shaft out of the carburetor.
- Remove the torsion spring.
- Slide the throttle shaft into the carburetor, fit the end cover with pump diaphragm and check that the torsion spring is correctly positioned.

Top:
Fitting the throttle shutter

Bottom:
Choke shutter fastening screw





- Fit the throttle shutter so that the hole points toward the metering chamber end cover. The indentation in the shutter must face upward.
- Coat fastening screw with Loctite, see 11.2, and tighten it down securely.

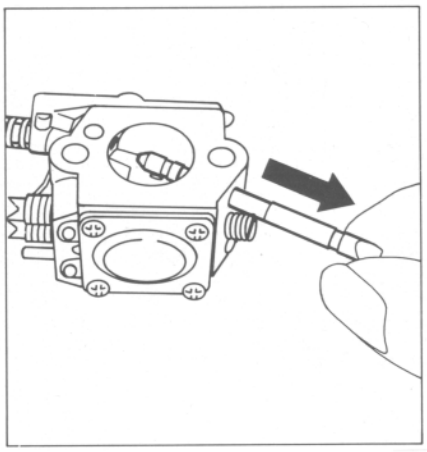
Removing the choke shaft

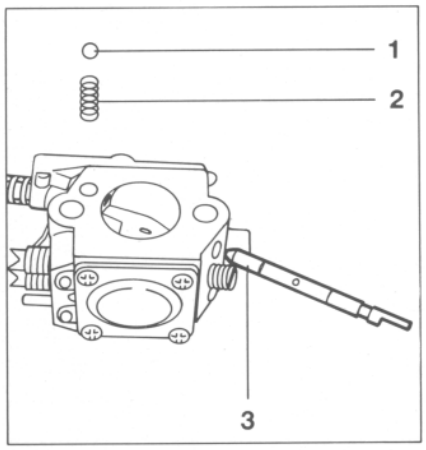
- Take out the choke shutter fastening screw and remove the choke shutter.

8.5 Carburetor Adjustment

Top:
Withdrawing choke shaft

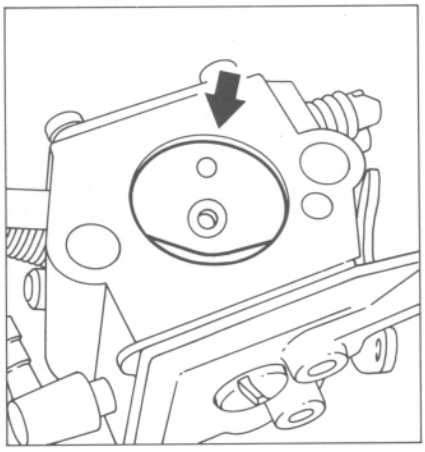
Bottom:
1 = Ball
2 = Spring
3 = Groove in choke shaft





- Carefully withdraw the choke shaft from the carburetor to ensure that ball does not pop out and be lost.
- Take the ball and spring out of the carburetor.

Correct position of choke shutter



- Fit the spring and ball and then push in the choke shaft until the ball engages the groove in the shaft.
- Place the choke shutter in position so that it is about 1 mm (3/64") below the face of the carburetor body.
- Coat fastening screw with Loctite, see 11.2, and tighten it down securely.
- Install the carburetor - see 8.3.
- Carry out carburetor leakage test - see 8.2.

When the engine is tested at the factory the carburetor is set to obtain a slightly richer mixture to provide the cylinder bore and bearings with additional lubricant during the break-in period. This setting should be left as it is for the first three tank fillings. The high speed adjusting screw may then be turned up to 1/4 turn clockwise to obtain a leaner mixture.

Caution: Engine's maximum permissible speed must not be exceeded.

If the unit is used at high altitudes (mountains) or near sea level, it may be necessary to alter the carburetor setting slightly. This correction is made at the two adjusting screws (H and L) as follows: Turn clockwise for a leaner mixture (at high altitudes) or counterclockwise for a richer mixture (at sea level).

Note that even very slight variations at the adjusting screws produce a noticeable change in engine running behavior. Always make sure that the engine is warm and the air filter clean before carrying out carburetor adjustments.

Caution: The setting of the high speed adjusting screw not only affects the engine's performance but also its maximum off-load speed. If the setting is too lean (adjusting screw turned too far clockwise), the engine's maximum permissible speed will be exceeded. There is then a risk of engine damage due to insufficient lubrication and overheating.

Corrections to the high speed adjusting screw may only be carried out if the maximum **permissible** speed of 10,000 rpm (without cutting tool) can be checked with an accurate tachometer.

Important: This engine speed applies only when the engine is at normal operating temperature. Warm up the engine by running it for at 3 minutes at full throttle. If the carburetor is adjusted while the engine is cold, the maximum attainable engine speed may be far in excess of the maximum permissible rpm.

When the carburetor is tuned for optimum performance the maximum **achievable** rpm or cut-off rpm may be considerably lower than the maximum **permissible** rpm. This is due to the tolerances in the control valve.

Basic setting

If the carburetor has to be adjusted from scratch, first carry out the basic setting to obtain a starting point for fine tuning:

- Place the screwdriver guide in position.

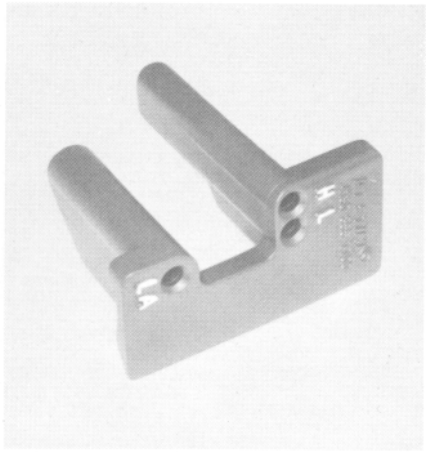
- Carefully screw both adjusting screws clockwise down onto their seats.

Then make the following adjustments:

High speed adjusting screw H:
back off 1 full turn

Low speed adjusting screw L:
back off 1 full turn

Screwdriver guide 4130 855 7700



If an accurate tachometer is not available to check maximum permissible engine rpm, do not turn the high speed adjusting screw beyond this basic setting to obtain a leaner mixture.

Notes for adjustment of idle speed

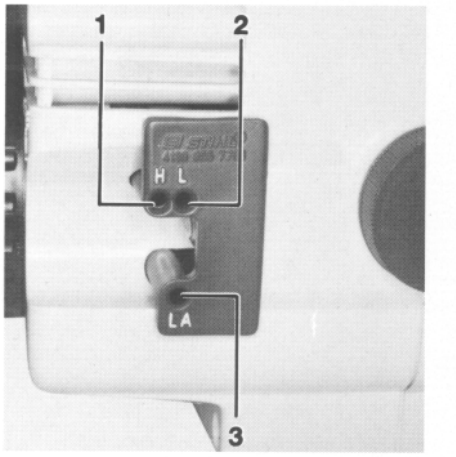
Engine stops while idling

Turn idle speed adjusting screw clockwise until cutting tool begin to rotate and then turn it back one half turn. The cutting tool must not rotate.

Cutting tool rotates while engine is idling

- Turn idle speed adjusting screw counterclockwise until the cutting tool remains stationary and then turn it about another one half turn in the same direction.

Screwdriver guide fitted in position
1 = Bore for high speed adjusting screw
2 = Bore for low speed adjusting screw
3 = Bore for idle speed adjusting screw



Erratic idling behavior, poor acceleration

Idle setting too lean:

- Turn the low speed adjusting screw counterclockwise until the engine runs and accelerates smoothly.

Exhaust smokes at idle speed

Idle setting too rich:

- Turn the low speed adjusting screw clockwise until the engine speed drops.

- Turn screw back one quarter turn.

- Check that the engine accelerates smoothly when the throttle is opened.

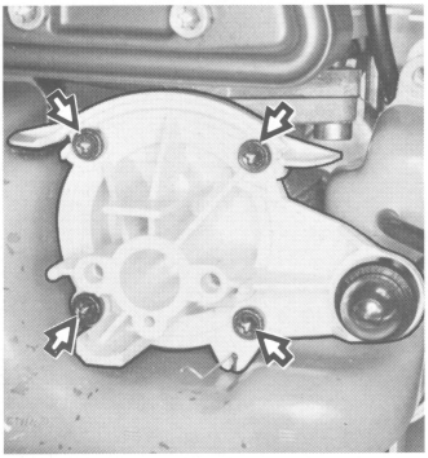
Note: It is usually necessary to correct the setting of the idle speed adjusting screw after making changes at the low speed adjusting screw.

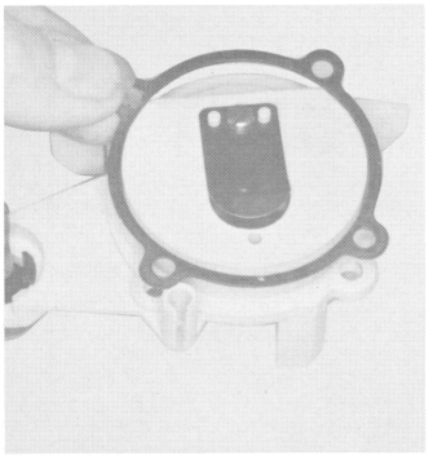
- Remove screwdriver guide after completing the adjustment.

8.6 Diaphragm Carrier, Diaphragm

Top:
Diaphragm carrier mounting screws

Bottom:
Removing gasket



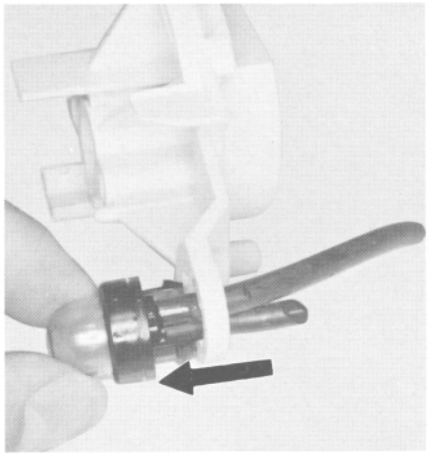


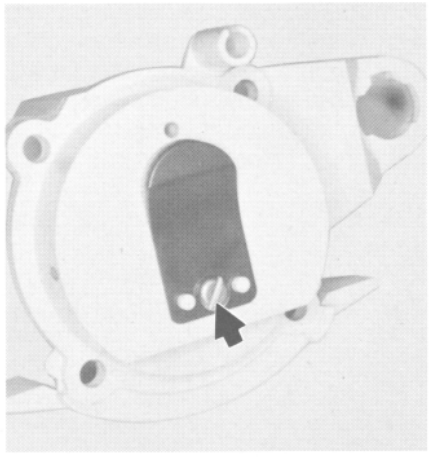
There is a diaphragm or flap valve on the diaphragm carrier. It prevents gas flowing back in the direction of the carburetor.

- Remove the carburetor - see 8.3.
- Take out the diaphragm carrier mounting screws. Pull the diaphragm carrier off the crankcase.
- Remove the gasket from the diaphragm carrier.

Top:
Withdrawing the fuel pump

Bottom:
Support plate fastening screw

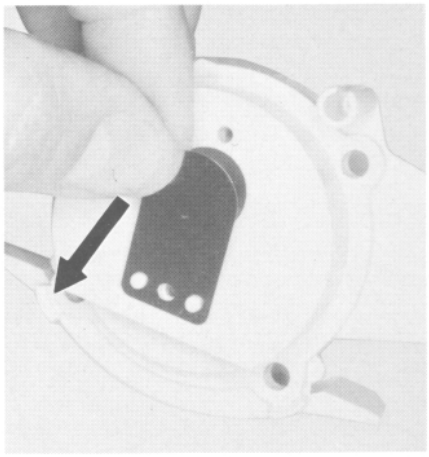


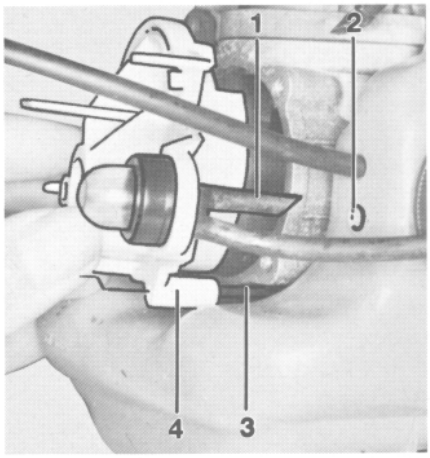


- Push back the retaining lugs and pull the fuel pump out of its seat.
- Take out the support plate fastening screw. Remove the support plate.
- Remove the diaphragm.

Top:
Removing diaphragm

Bottom:
1 = Short hose
2 = Bore
3 = Throttle cable
4 = Guide





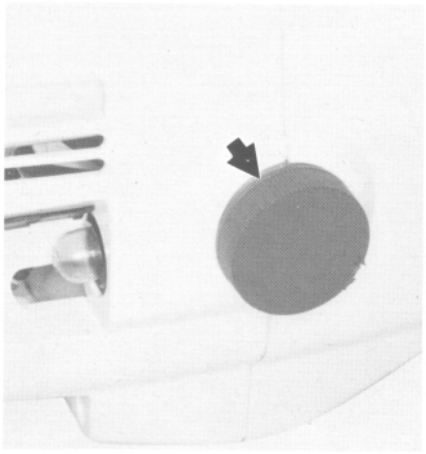
Installation is a reversal of the removal sequence.

Note: When reassembling, fit the throttle cable in its guide and the short hose in the fuel tank bore.

Tighten support plate fastening screw to 2 Nm (1.5 lbf.ft) and the diaphragm mounting screws to 5.5 Nm (4 lbf.ft).

8.7 Pickup Body and Fuel Hose

Fuel filler cap



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

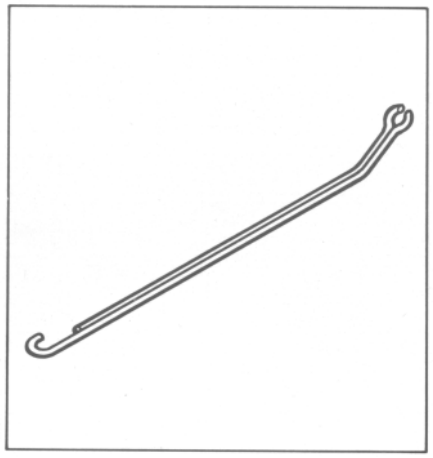
Important: In the event of trouble with the fuel supply system, always check the fuel tank and the pickup body first. Clean the fuel tank if necessary.

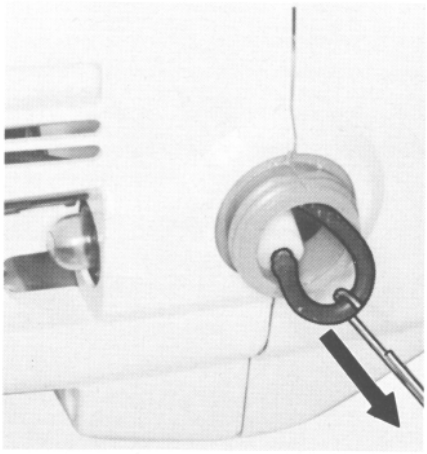
Cleaning the fuel tank:

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

Top:
Assembly hook 5910 893 8800

Bottom:
Withdrawing pickup body



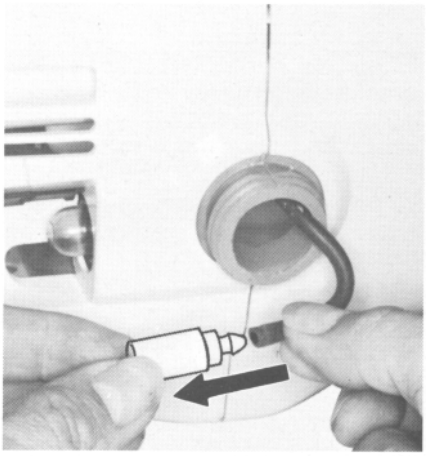


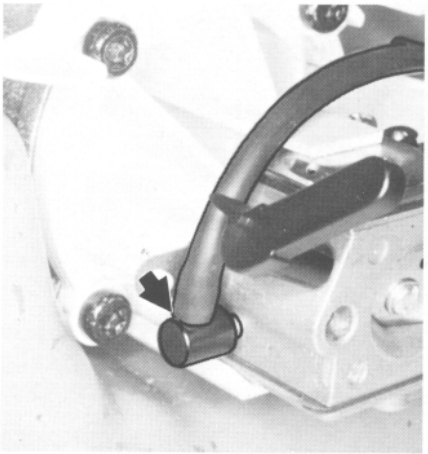
Removing and installing pickup body:

- Use the special assembly hook to pull the pickup body and fuel hose out of the fuel tank's filler neck.

Top:
Disconnecting the pickup body

Bottom:
Fuel hose on elbow connector





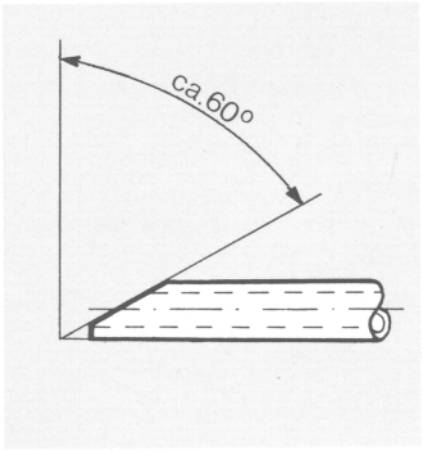
- Pull the pickup body off the fuel hose.

Note: It is not advisable to clean the pickup body - always fit a new one.

- Remove the shroud - see 8.2.
- Pull the fuel hose off the carburetor elbow connector.

8.8 Fuel Tank

Fuel hose cut at angle



- Withdraw the fuel hose from the tank housing.

Note: The new fuel hose is fitted from outside the tank.

Fitting is easier if the end of fuel hose is cut to an angle of approx. 60°.

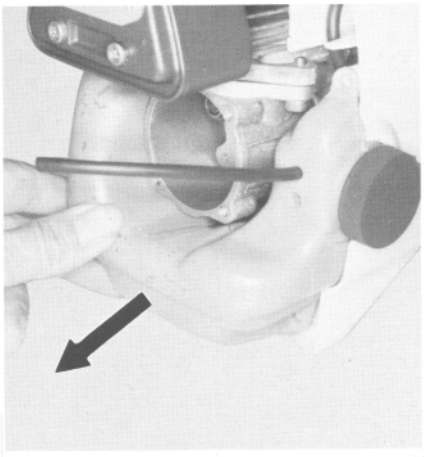
Insert fuel hose until about 11 cm (4 1 /2") is left.

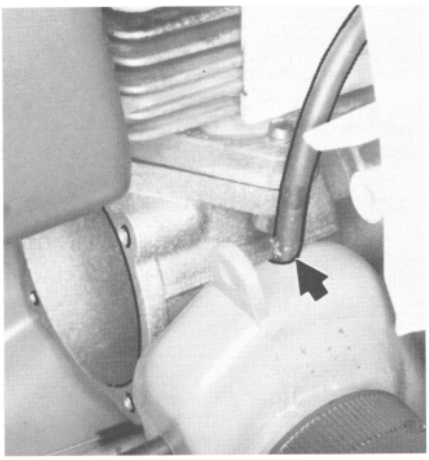
The angled end of the hose must be cut off square before it is pushed onto the carburetor's elbow connector.

- Examine gasket in fuel filler cap and fit a new one if necessary. Replace filler caps that have no gaskets with ones that have gaskets.

Top:
Removing fuel tank

Bottom:
Vent hose





- Remove diaphragm carrier – see 8.6.

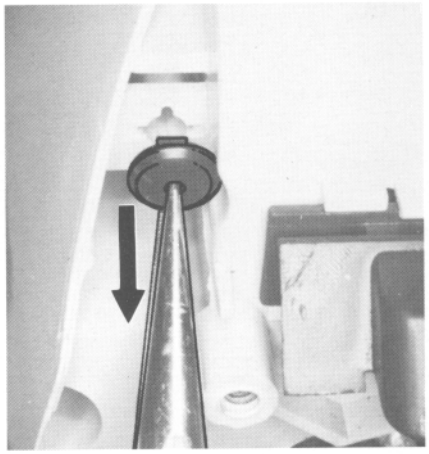
- Remove the fuel tank.

Installation is a reversal of the removal sequence.

Note: Push vent hose into bore before fitting the fuel tank.

8.9 Tank Vent

Removing vent valve



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

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

Equalization of tank pressure in both directions takes place via the valve in the vent connector.

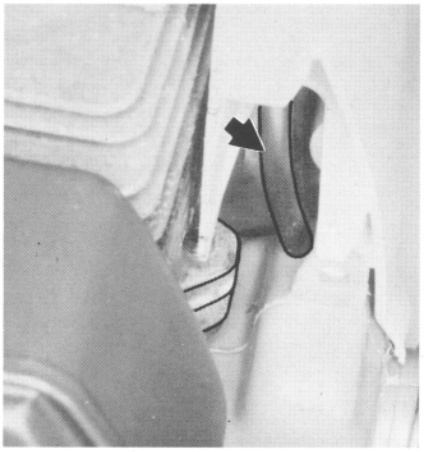
- Remove the clutch housing - see 3.1.

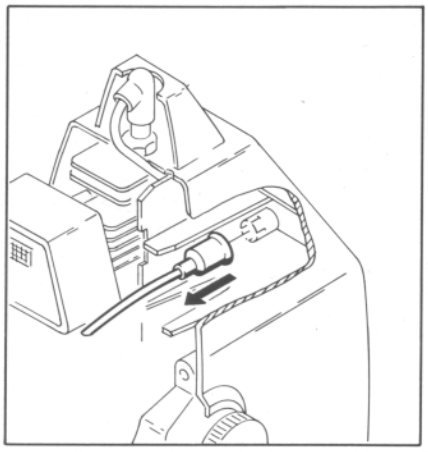
- Remove the valve from the bore in the vent connector.

8.10 **Fuel Pump**

Top:
Vent hose

Bottom:
Vent connector



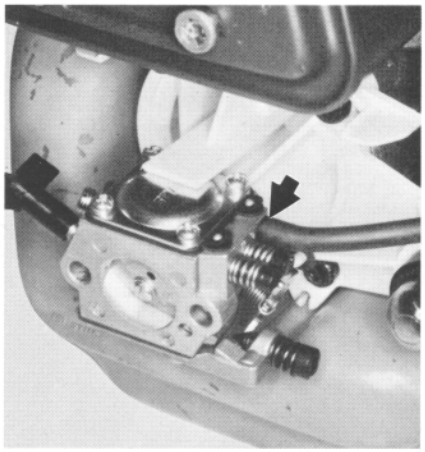


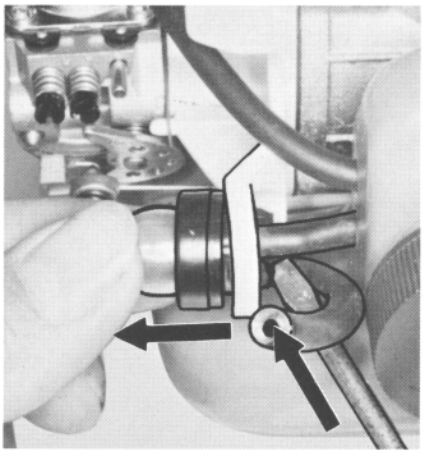
- Remove the shroud - see 8.2.
- Pull the vent hose out of the bore in the fuel tank.
- Pull the vent connector off the fan housing.

Installation is a reversal of the removal sequence.

Top:
Fuel hose on nipple

Bottom:
Withdrawing fuel pump

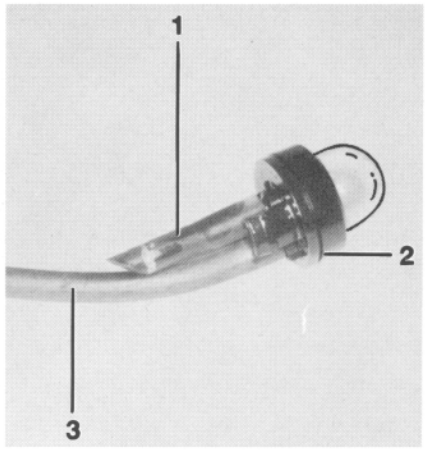


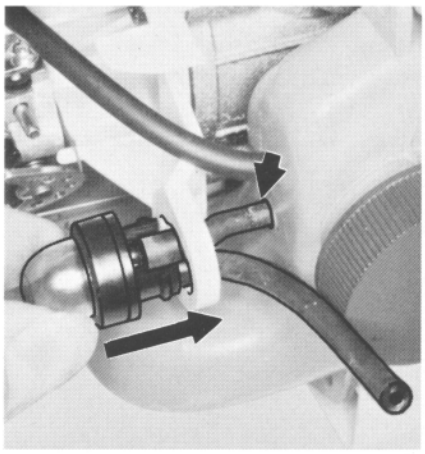


- Remove the shroud - see 8.2.
- Pull the fuel hose off the nipple on the carburetor.
- Carefully push back the retaining lugs and pull the fuel pump out of its seat in the diaphragm carrier.

Top:
1 = Short hose
2 = Fuel pump
3 = Long hose

Bottom:
Fitting the fuel pump





- Pull the short and long hoses off the stubs on the fuel pump.

Installation is a reversal of the removal sequence.

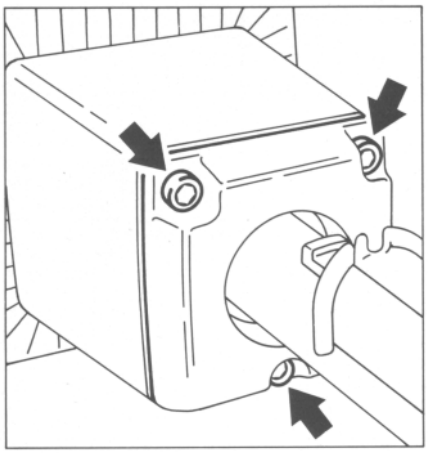
Note: When reassembling, fit the short hose at the top of the pump and push it into the lower bore in the fuel tank.

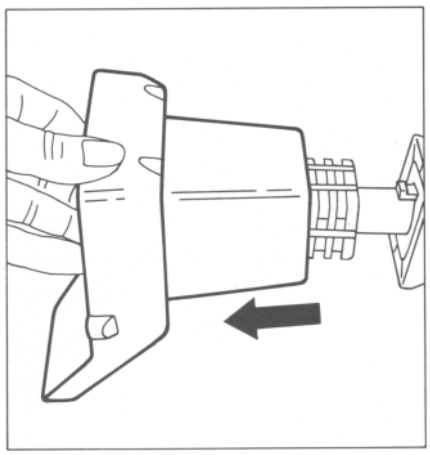
9. AV SYSTEM (FS 40 and FS 44)

9.1 Repair

Top:
Mounting screws on cap

Bottom:
Removing clutch housing



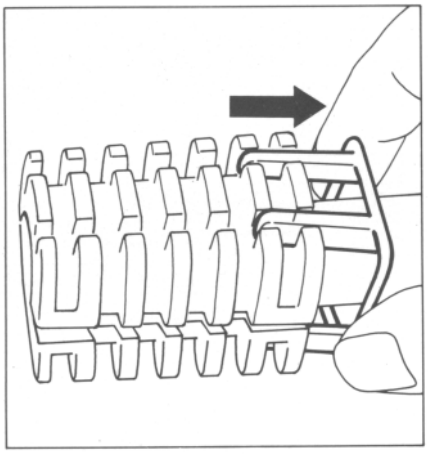


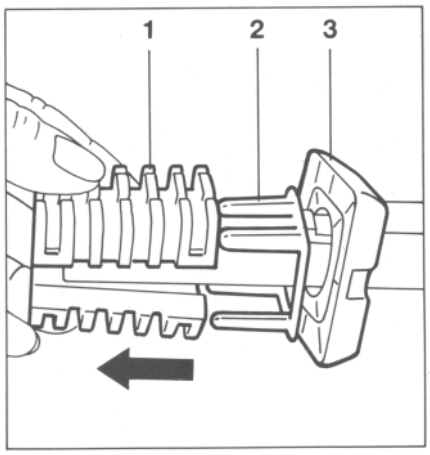
The vibration-damping connection between the engine and drive tube is effected by a rubber element (AV system) installed in the clutch housing.

- Remove the clutch housing - see 3.1.
- Take out the cap mounting screws.
- Pull the clutch housing off the rubber element.

Top:
Withdrawing the clip

Bottom:
1 = Rubber element
2 = Clip
3=Cap





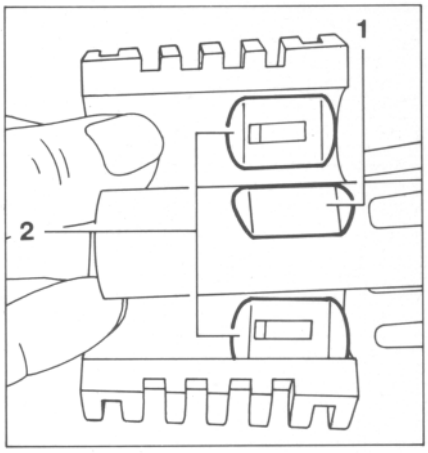
- Pull the clip out of the rubber element
- Remove the rubber element. Slip the clip and cap off the shaft

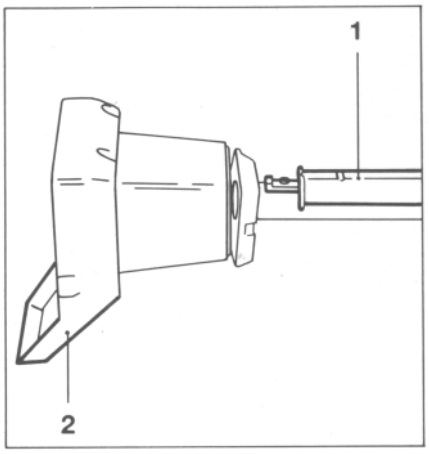
Installation is a reversal of the removal sequence

Note: Pay special attention to the following points:

Top:
1 = Flat on drive tube
2 = Pads on rubber element

Bottom:
1 = Handle support
2 = Long side of clutch housing





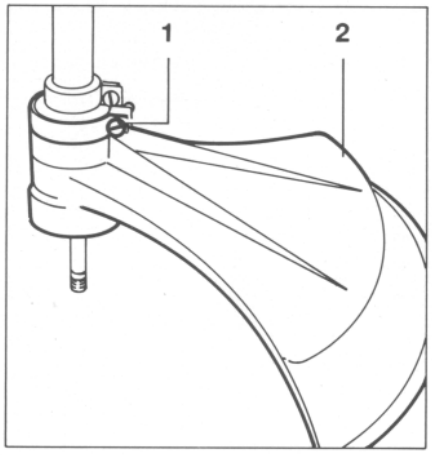
- The pads on the inside of the rubber element must locate on the flats of the drive tube.
- Do not use any lubricant to fit the rubber element.
- Slide the clutch housing into position so that its long side is pointing away from the handle support.
- Tighten mounting screws on cap to a torque of 3.5 Nm (2.8 lbf.ft).

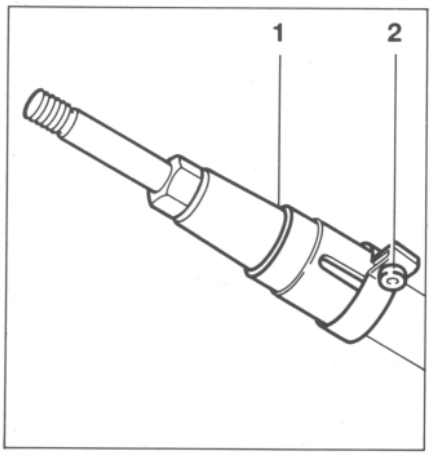
10. CUTTING TOOL DRIVE

10.1 Bearing Housing (FS 36, FS 40)

Top:
1 = Clamp
2 = Deflector shield

Bottom:
1 = Bearing housing
2 = Clamp

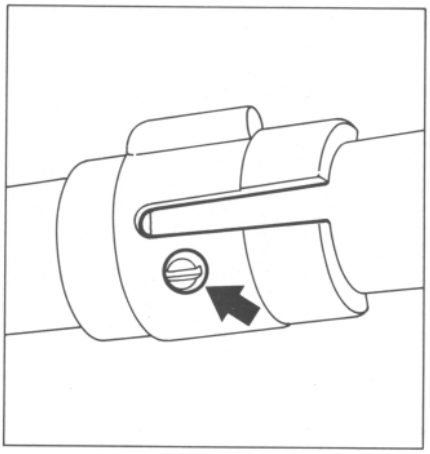


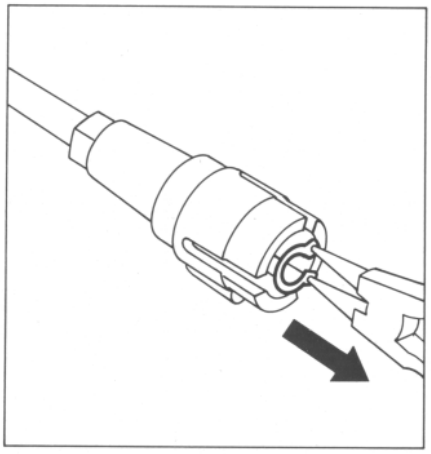


- Release the screw on the clamp and pull the deflector shield off the bearing housing.
- Release the screw on the bearing housing clamp and pull the clamp off the bearing housing.

Top:
Setscrew

Bottom:
Removing circlip with pliers
0811 611 8200

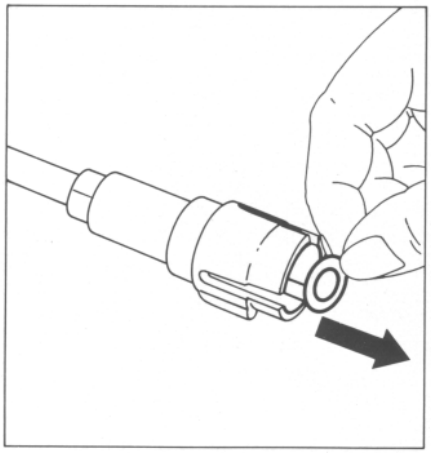


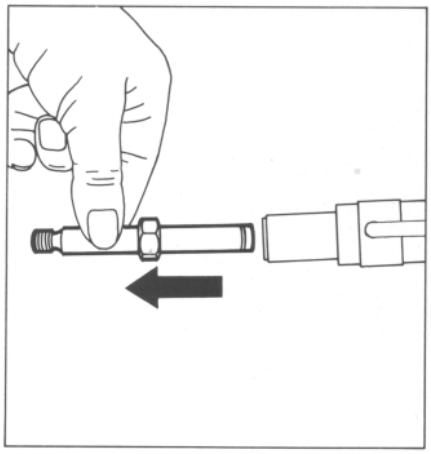


- Take the setscrew out of the bearing housing. Pull the bearing housing off the drive tube.
- Remove the circlip from the output shaft.

Top:
Removing washer

Bottom:
Withdrawing output shaft

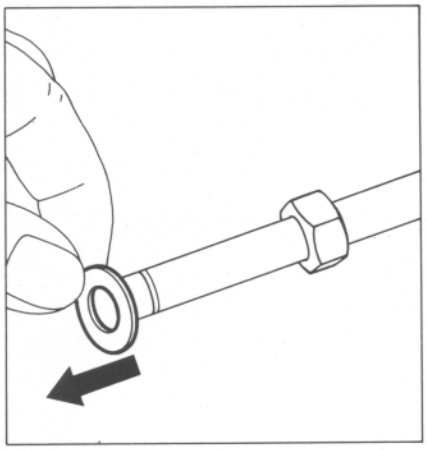


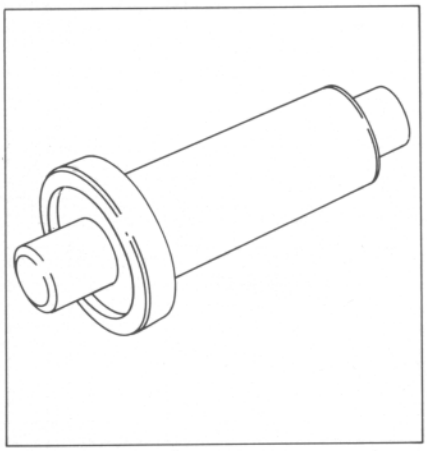


- Remove the washer from the output shaft.
- Pull the output shaft out of the bearing housing.

Top:
Removing washer (FS 40)

Bottom:
Press arbor 4119 893 7200





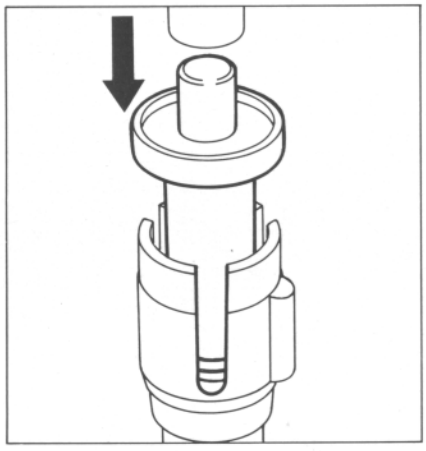
- FS 40: Remove washer from the output shaft.
- Carefully drive the two flanged plain bearings of the FS 36 or the two needle bearings of the FS 40 out of the bearing housing.

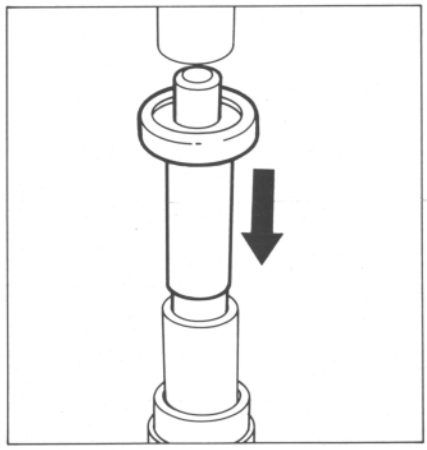
Assembly is a reversal of the disassembly sequence.

Note: Pay special attention to the following points:

Top:
Pressing in flanged plain bearing

Bottom:
Pressing in needle bearing

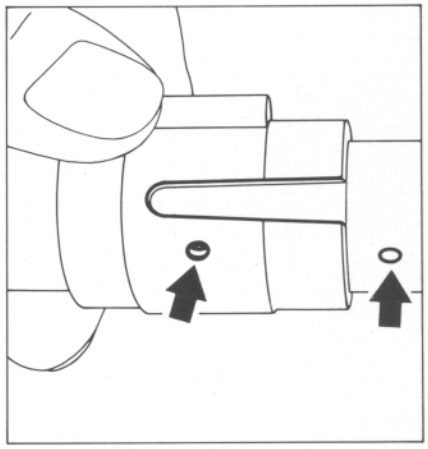


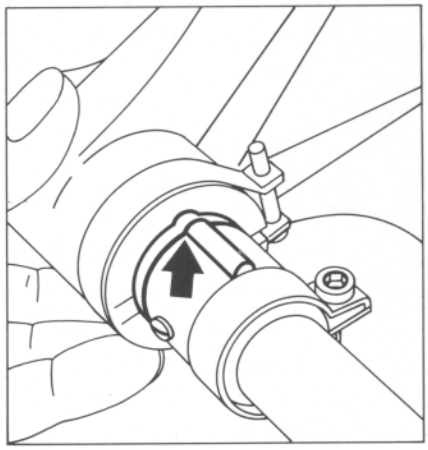


- FS 36: Use press arbor to press in the two flanged plain bearings until they butt against the shoulder on the bearing housing.
- FS 40: Use press arbor to press in the two needle bearings until the press arbor butts against the bearing housing.

Top:
Alignment of holes in bearing housing and drive tube

Bottom:
Correct position of deflector shield on bearing housing





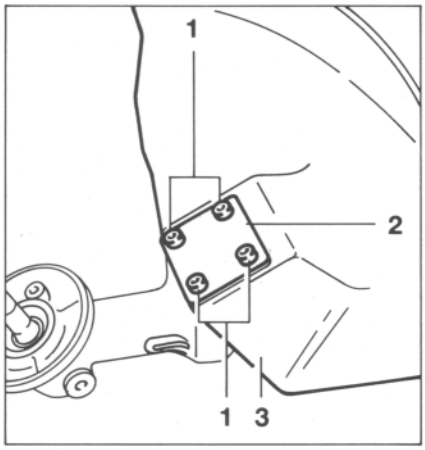
- Slide the bearing housing onto the drive tube so that the holes are in alignment.
- Fit the setscrew and tighten it to 3 Nm (2.2 lbf.ft).
- Line up the recess in the neck of the deflector shield with the rib on the bearing housing. Push the deflector shield onto the bearing housing as far as stop.
- Tighten screw on bearing housing clamp to 6.5 Nm (4.8 lbf.ft).

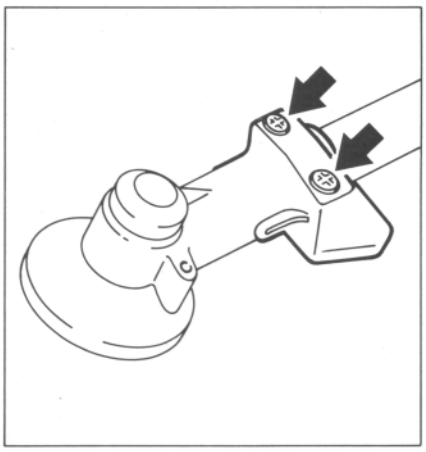
10.2 **Gearhead (FS 44)**

10.2.1 **Disassembly**

Top:
1 = Screws
2 = Back plate
3 = Deflector shield

Bottom:
Gearhead clamp screws



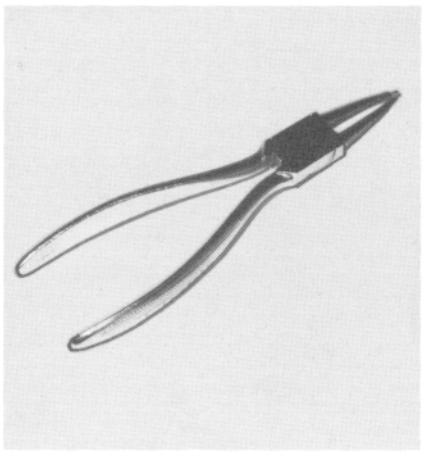


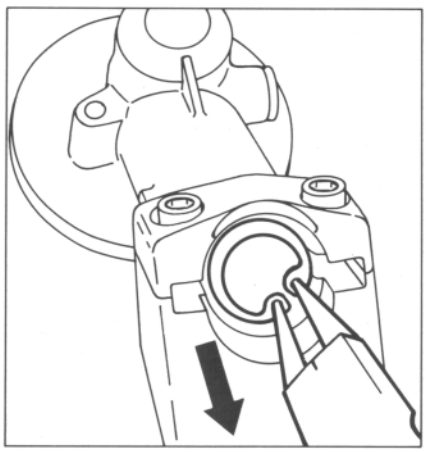
- Take out the deflector shield mounting screws. Remove the back plate and deflector shield from the gearhead.

Release the gearhead clamp screws and pull the gearhead off the drive tube.

Top:
Circlip pliers 0811 641 8380

Bottom:
Removing circlip (input end)

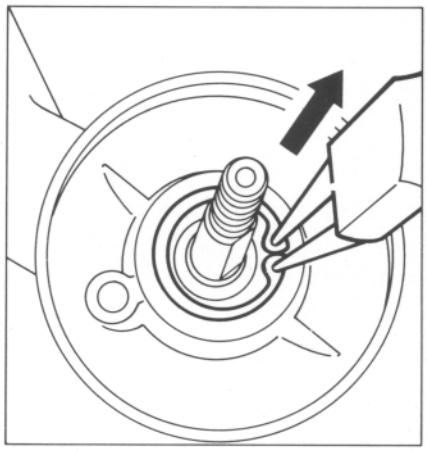


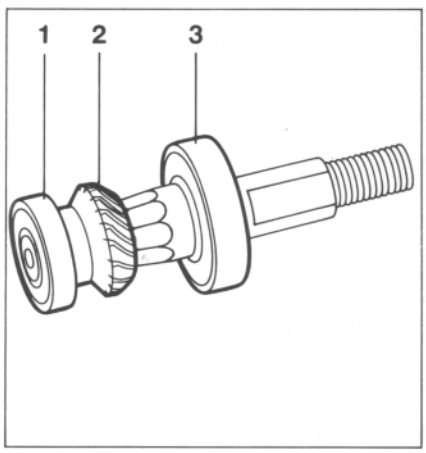


- Remove the circlip from the groove in the input end of the gearhead.

Top:
Removing circlip (output end)

Bottom:
1 = Ball bearing
2 = Bevel gear
3 = Ball bearing





- Remove the circlip from the groove in the output end of the gearhead.

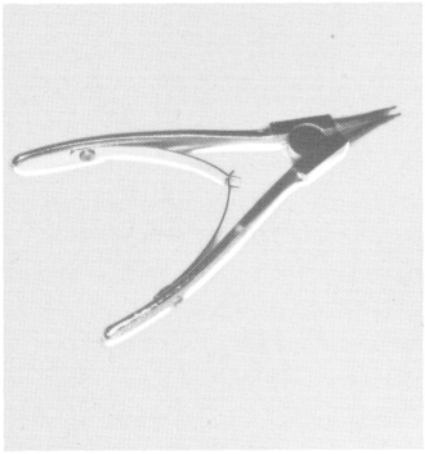
- Heat the gearhead to approx. 110-140 °C (230-280 °F) and knock it on a wooden base to remove the drive components - from the input end first and then the output end.

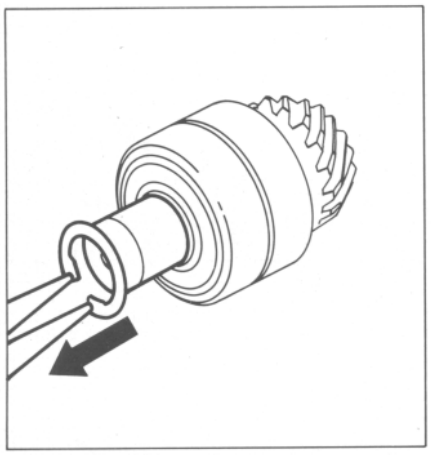
- Pull the ball bearing and bevel gear off the output shaft.

10.2.2 **Assembly**

Top:
Circlip pliers 0811 611 8200

Bottom:
Removing circlip from drive pinion

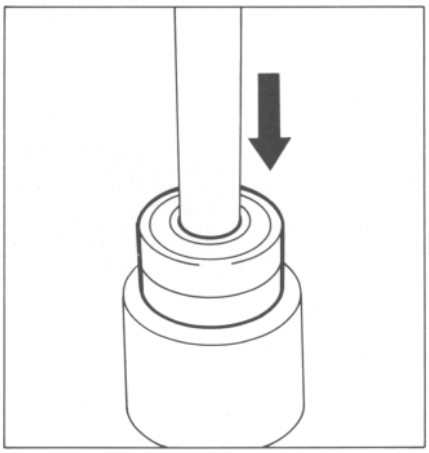


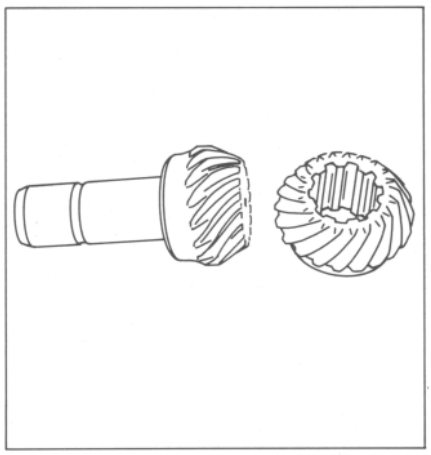


- Remove the circlip from the drive pinion.

Top:
Pressing drive pinion out of ball bearings

Bottom:
Pinion set



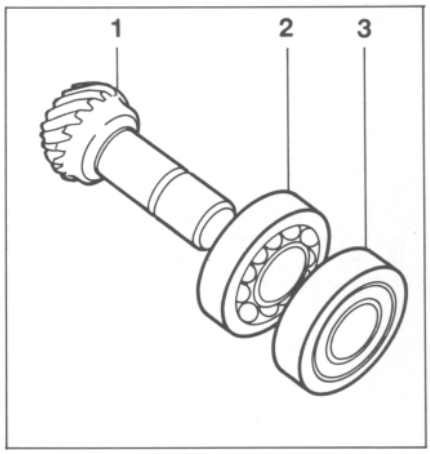


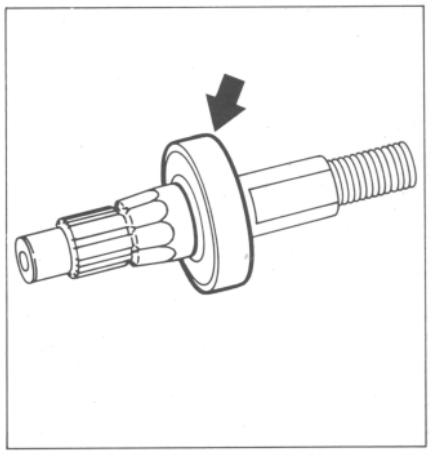
- Press the drive pinion out of the ball bearings.
- Clean all parts and inspect them for signs of damage or wear.

Note: The drive pinion and bevel gear are only available as a matched pinion set.

Top:
1 = Drive pinion
2 = Open ball bearing
3 = Ball bearing, closed at one side

Bottom:
Ball bearing on output shaft





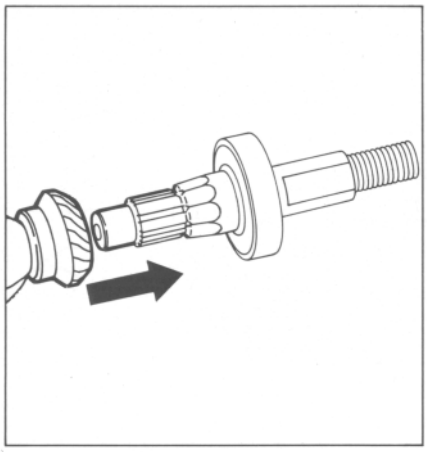
- Heat input end ball bearings to about 50 °C (120 °F) and push them onto the drive pinion so that the open bearing locates against the pinion.

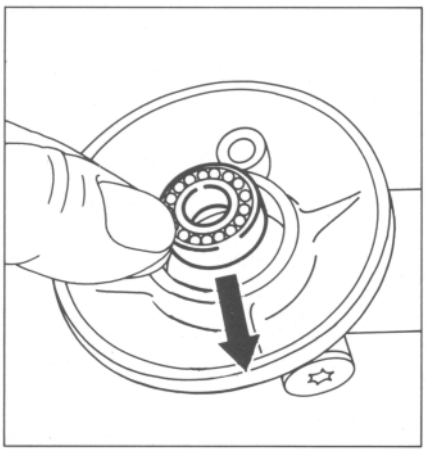
Note: Closed side of ball bearing must face the circlip.

- Fit circlip in the groove.
- Heat output end ball bearing to about 50 °C (120 °F) and push it – closed side facing thread - onto the output shaft as far as stop.

Top:
Pushing bevel gear onto output shaft

Bottom:
Fitting the ball bearing in the gearhead housing





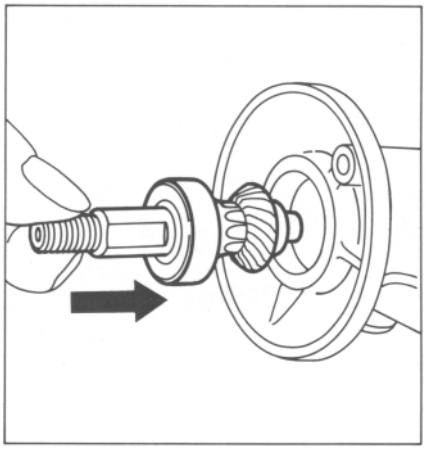
- Push the bevel gear (teeth first) onto the output shaft.

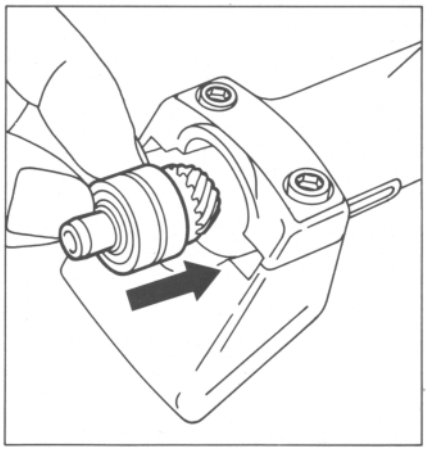
- To install the bearing and pinion set, heat the gearhead to about 140 °C (285 °F), e.g. on a heating plate or with a hot air blower.

- Press the ball bearing into the gearhead housing as far as stop.

Top:
Fitting the output shaft

Bottom:
Fitting the drive pinion





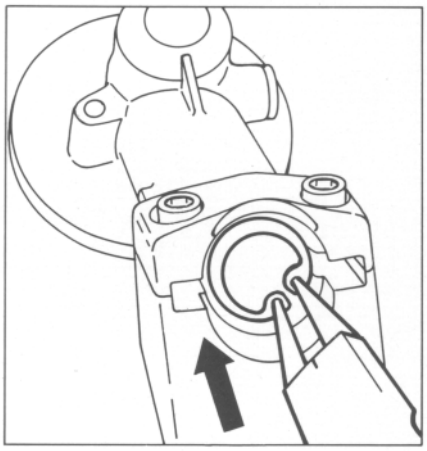
- Fit the preassembled output shaft and press it home as far as stop.

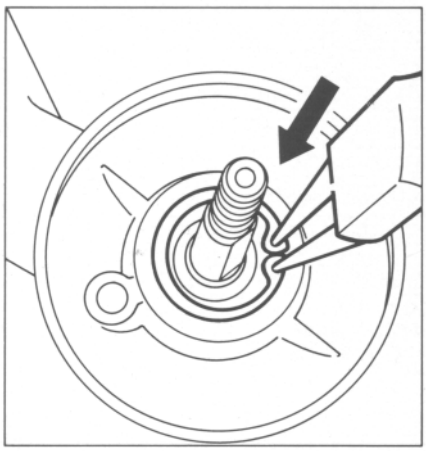
- Fit the preassembled drive pinion and press it home as far as stop.

Note: Make sure the teeth of the drive pinion and bevel gear engage properly during assembly.

Top:
Fitting circlip (input end)

Bottom:
Fitting circlip (output end)



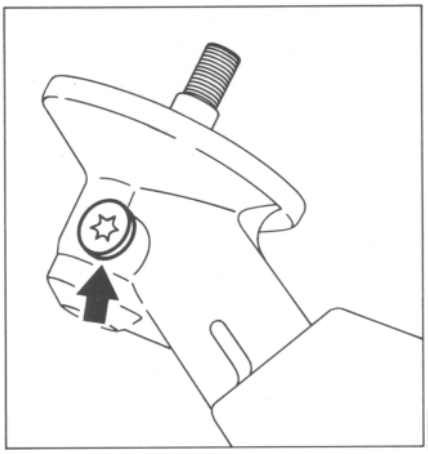


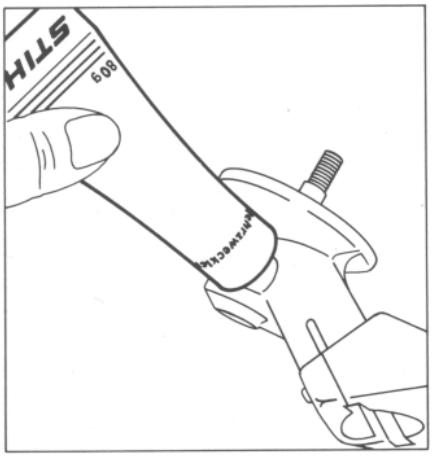
- Fit the circlips in their respective grooves at the input and output ends of the gearhead housing.

10.3 **Drive Shaft**

Top:
Filler plug for lubricant

Bottom:
Tube of grease applied to filler hole



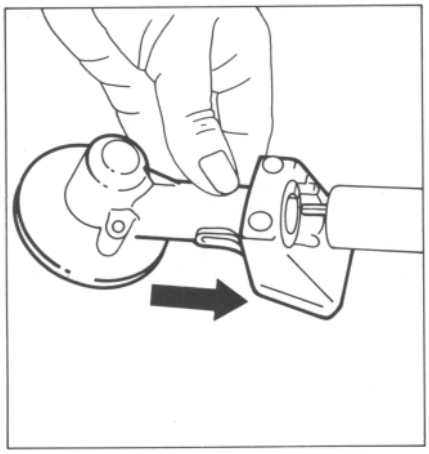


- Remove the filler plug and pack the gearhead with grease.

Note: Use STIHL gear lubricant, see 11.2, for lubrication of the bevel gears.

Important: Fill the gearhead with approx. 20 g (3/4 oz) of grease.

Fitting gearhead on drive tube



Service note:
When carrying out maintenance work, top up grease level in gearhead (max. 5 - 10 g/ 1 /4 - 3/8oz) only if no grease is visible on the inside of the filler plug.

- Unscrew the tube of grease, refit the filler plug and tighten down firmly.

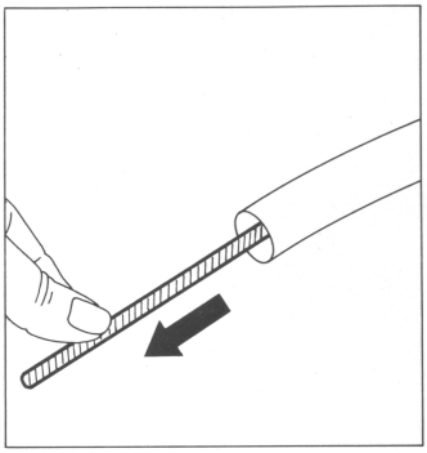
- Slide the gearhead onto the drive tube and turn the output shaft back and forth at the same time so that the square end of the flexible drive shaft engages the square recess in the input shaft.

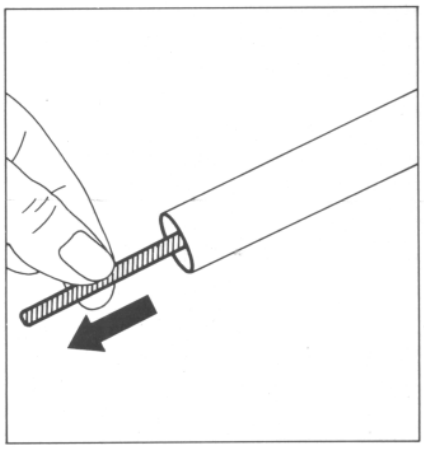
- Push the gearhead on as far as stop, line it up and tighten down the clamp screws uniformly.

- Refit the deflector shield.

Top:
Withdrawing drive shaft
(FS 36 and FS 40)

Bottom:
Withdrawing drive shaft (FS 44)





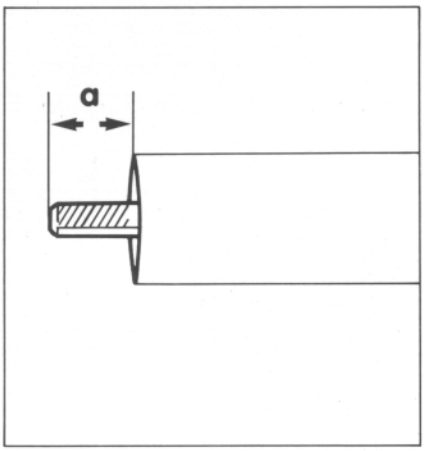
The shaft is supported in the drive tube in a flexible liner. The liner cannot be replaced. In the event of a fault, replace the whole drive tube.

- Remove bearing housing on FS 36 and FS 40 or gearhead on FS 44 - see 10.1 or 10.2.

- Withdraw the drive shaft from the drive tube.

10.4 **Drive Tube**

Drive shaft projection
a = 15 mm/0.6" (FS 44)



- Before installing, coat flexible drive shaft with STIHL multi-purpose grease, see 11.2.

Important: Apply grease uniformly and sparingly. Do not pump it directly into the drive tube.

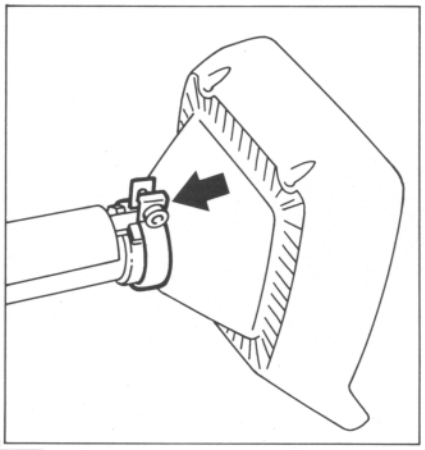
- Push the drive shaft into the drive tube.

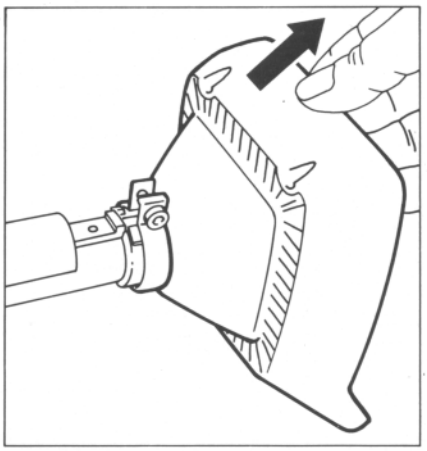
Note: On the FS 44, push the shaft into the drive tube so that it projects by dimension "a". If necessary, rotate the shaft slowly and apply light pressure until it can be pushed in to the specified dimension.

- Fit the bearing housing or gearhead.

Top:
Clamp

Bottom:
Removing clutch housing





- Remove clutch housing with drive tube - see 3.1.

- FS 40 and FS 44: Remove AV system - see 9.1.

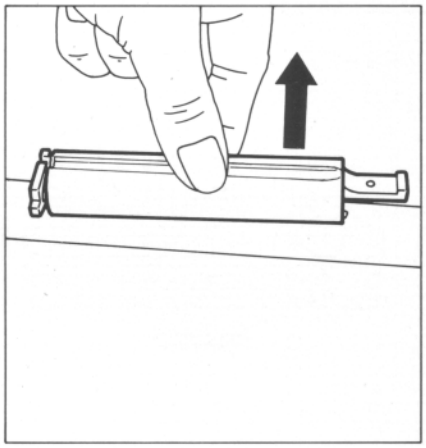
- Remove the input shaft - see 10.3.

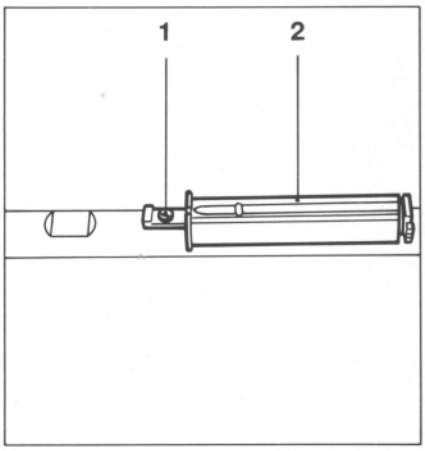
- Release clamp screw on FS 36 clutch housing and bend clamp open a little.

- Pull the clutch housing and clamp off the drive tube.

Top:
Removing handle support

Bottom:
1 = Fastening screw
2 = Handle support



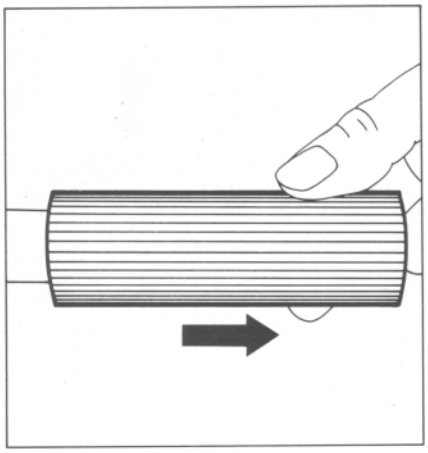


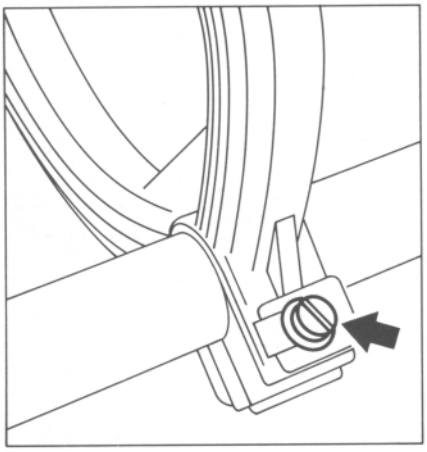
- Remove the handle support from the drive tube.

- FS 40 and FS 44: Take out fastening screw and remove handle support from the drive tube.

Top:
Removing handle hose

Bottom:
Clamp screw on loop handle

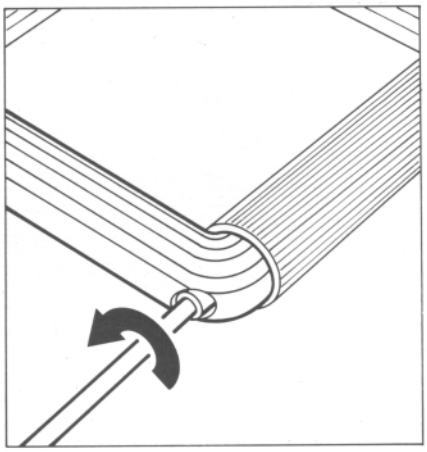


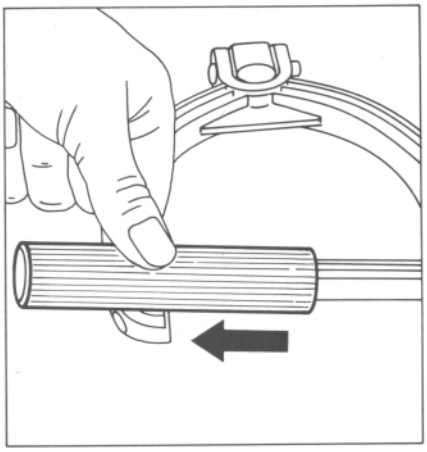


- Pull the handle hose off the drive tube.
- FS 36 and FS 40: Release the clamp screw and pull the loop handle off the drive tube.

Top:
Removing mounting screw

Bottom:
Removing handle hose

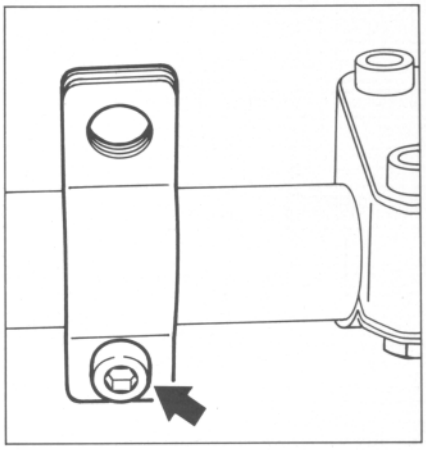


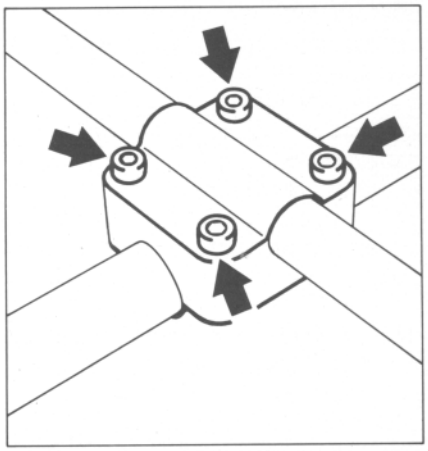


- To replace the handle hose on the loop handle, take out the mounting screw.
- Turn the crosspiece of the loop handle to one side and pull off the handle hose.
- FS 44: Release the clamp screw on the carrying loop and pull the carrying loop off the drive tube.

Top:
Clamp screw on carrying loop

Bottom:
Screws on clamping block





- Release the screws on the clamping block for "J" handle and two-handed handlebar.

Assembly is a reversal of the disassembly sequence.

Note: Tighten clamp screw on clutch housing to 6.5 Nm (4.8 lbf.ft) and clamp screw on loop handle to 3.5 Nm (2.6 lbf.ft).

11. Special Servicing Tools and Aids

11.1 Special Servicing Tools

No.	Part Name	Part No.	Application
1	Locking screw	4112 893 1200	Blocking crankshaft
2	Press sleeve	4112 893 2401	Installing ball bearing and oil seal [1]
3	Crimping tool	5910 890 8210	Attaching connectors to electric wires
4	Press arbor	4119 893 7200	Installing flanged plain bearings or needle bearings in bearing housing
5	Carburetor and crankcase tester	1106 850 2905	Testing carburetor and crankcase for leaks
6	Vacuum pump	0000 850 3500	Testing crankcase for leaks
7	Sealing plate	0000 855 8105	Sealing exhaust port for leakage test
8	Test flange	1119 850 4201	For leakage test
9	- Sleeves	0000 963 1008	
10	Setting gauge	1111 890 6400	Setting air gap between ignition module and flywheel
11	Nipple	0000 855 9200	Carburetor leakage test
12	- Fuel line	1110 141 8600	
13	Pliers A 10	0811 611 8200	External circlip on bearing housing
14	Pliers A 9	0811 611 8380	External circlip on rope rotor [2]
15	Pliers C 19	0811 641 8380	Internal circlips in crankcase and gearhead (FS 44)
16	Screwdriver bit I-5x150x6.3	0812 542 2104	Tightening spline screws
17	Assembly hook	5910 893 8800	Removing pickup body
18	T-handle screwdriver QI-5 x 150	5910 890 2400	IS screws
19	Screwdriver guide	4130 855 7700	Carburetor adjustment
20	Wrench	4130 890 3600	Removing/fitting clutch

[1] Press sleeve 1114 893 4601 can be used as an alternative

[2] Pliers A 10 0811 611 8200 can be used as an alternative

11.2 Servicing Aids

No.	Part Name	Part No.	Application
1	Medium-strength threadlocking adhesive (Loctite 242)	0786 111 1101	Throttle and choke shutter fastening screws, thread of control valve
2	Standard commercial, solvent-based degreasant containing no CFCs		Cleaning crankshaft stub
3	Resin-free oil		Bearing bore in rope rotor
4	STIHL low temperature lubricant	0781 417 1315	Rewind spring in starter
5	STIHL gear lubricant	0781 120 1117	Lubricating gearhead
6	STIHL multipurpose grease	0781 120 1109	Lubricating drive shaft