

Makita[®]

DOLMAR[®]

REPAIR MANUAL

DCS460

DCS510

DCS5121

EA5000P53G

PS-460

PS-510

PS-5105

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TECHNICAL DATA

		DCS460/ DCS461	DCS500 DCS501	DCS4600	DCS5000 DCS5001	DCS510 US
Stroke volume	cm ³	45.6	49.9	45.6	49.9	3.1 cu. in
Bore	mm	43	45	43	45	1.77 inch
Stroke	mm	31.4				1.24 inch
Max. power at speed ³⁾	kW / 1/min	2.2 / 10,000	2.4 / 10,000	2.6 / 10,000	2.8 / 10,000	3.3 / 10,000
Max. torque at speed ³⁾	Nm / 1/min	2.7 / 7,000	2.9 / 7,000	2.8 / 7,000	3.1 / 7,000	2.9 / 7,000
Idling speed / max. engine speed with bar and chain	1/min	2,500 / 13,500		2,500 / 14,500	2,500 / 13,500	
Clutch engagement speed	1/min	3.900				
Sound pressure level at the workplace L _{PA,av} per ISO/CD 22868 ¹⁾	dB (A)	102.1	102.4	101.2	101	-
Sound power level L _{WA,av} per ISO/CD 22868 ¹⁾	dB (A)	108.3	108.8	109.1	108.6	-
Sound Pressure Level at the operator's ear at full load according to ANSI B 175.1	dB (A)	-				103.9
Sound Pressure Level at the bystander's position (50 ft/15 m distance) according to ANSI B 175.1	dB (A)	-				76.2
Vibration acceleration a _{h,w,eq} per ISO 22867 ¹⁾						
- Tubular handle	m/s ²	4.1	5.2	4.1	5.2	-
- Rear handle	m/s ²	3.6	3.7	3.6	3.7	-
Carburetor (diaphragm, choke flap carburetor)	Typ	membrane carburetor		ZAMA	membrane carburetor	
Ignition system	Typ	condenser ignition system		electronic	condenser ignition system	
Spark plug	Typ	NGK BPMR 7A				
Electrode gap	mm	0.5				
or spark plug	Typ	BOSCH WSR 6F				
Fuel consumption at max. load per ISO 7293 ³⁾	kg/h	1.1	1.2		1.3	1.2
Specific consumption at max. load per ISO 7293 ³⁾	g/kWh	500		450		480
Fuel tank capacity	l	0.47			15.9 floz	
Chain oil tank capacity	l	0.27			9.1 floz	
Mixture ratio (fuel/two-stroke oil)						
- when using DOLMAR oil		50 : 1 / 100 : 1 (HP-100)		50 : 1	50 : 1	50 : 1 / 100 : 1 (HP-100)
- when using Aspen Alkalyt		50 : 1 (2%)		-		50 : 1 (2%)
- when using other oils		40 : 1 (JASO FC or ISO EGD)		40 : 1	40 : 1	40 : 1 (JASO FC or ISO EGD)
Chain brake		engages manually or in case of kickback				
Chain speed ²⁾	m/s	19.3 / 22.2				-
Sprocket pitch	inch	.325 oder 3/8				
Number of teeth	Z	7				
Chain type		see the Extract from the spare-parts list				
Pitch / gauge	inch	.325 / 0.050, 0.058 oder 3/8 / 0.058				.325 / 0.050 oder 3/8 / 0.050
Guide bar, length of a cut	cm	33 / 38 / 45 / 53				16 / 18 inch
Guide-bar type		see the Extract from the spare-parts list				
Weight (fuel tank empty, without chain, guide bar and accessories)	kg	5.5		5.1		12.1 lbs

¹⁾ Figures derived in equal part from idling, full-load and racing speed.

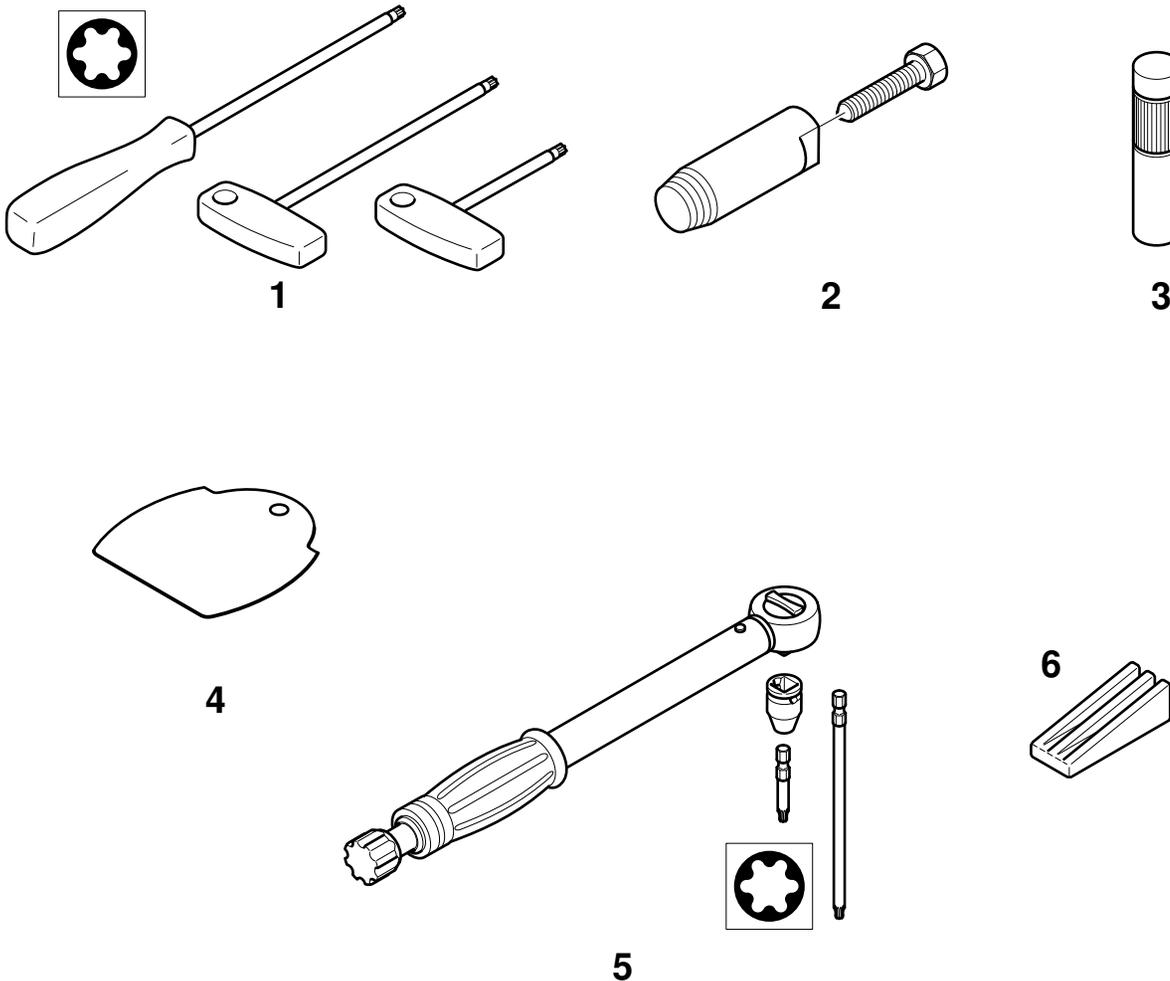
²⁾ At max. power

³⁾ For models without starting valve

TROUBLESHOOTING

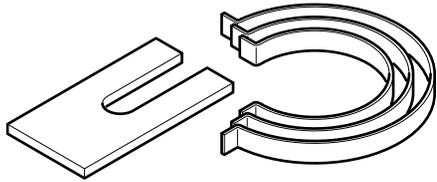
Malfunction	System	Observation	Cause
Chain does not run	Chain brake	Engine runs	Chain brake actuated, Chain too tight
Engine does not start or only with difficulty	Ignition system	Ignition spark	<p>Malfunction in fuel supply system, pressure system, mechanical malfunction.</p> <p>Switch on STOP, fault or short-circuit in the wiring, plug cap or spark plug defective, gap between ignition module and flywheel uneven or too wide</p> <p>Combination switch in Choke position, carburetor defective, suction head dirty, fuel line bent, leaky or interrupted.</p> <p>Cylinder base packing ring defective, radial shaft packings defective, cylinder or piston rings defective</p> <p>Spark plug does not seal.</p> <p>Spring in starter broken, broken parts inside the engine.</p>
	Fuel supply	No ignition spark	
	Compression	Fuel tank is filled	
	Mechanical malfunction	Inside system Outside Starter does not engage	
Engine speed gets "stuck"	Multiple systems	Engine speed about 4500 - 6000 rpm	<p>Carburetor too lean</p> <p>Bleed air at cylinder and/or rubber induction piece</p> <p>Fuel line bent. Bowden cable sticking</p>
Warm engine won't start	Carburetor	Fuel tank is filled Ignition spark	<p>Wrong carburetor adjustment</p> <p>Flooded from choke use</p>
Engine starts, but dies immediately	Fuel supply	Fuel tank is filled	<p>Wrong idling adjustment, suction head or carburetor dirty, tank venting defective, fuel line interrupted, cable defective, Choke flap closed, decompression valve dirty</p>
Insufficient power	Several systems may be involved simultaneously	Engine is idling	<p>Air filter dirty, wrong carburetor adjustment, muffler clogged, exhaust channel in cylinder clogged, spark arrester screen clogged.</p>
No chain lubrication	Oil tank/pump	No oil on the chain	<p>Oil tank empty</p> <p>Oil guide groove dirty, Oil suction head dirty</p> <p>Oil pump adjusting screw incorrectly adjusted</p> <p>Oil pump worm drive gear defective</p>

00 SPECIAL TOOLS



- | | | |
|----------|--|---------------|
| 1 | Torx screwdriver | |
| | Grip | (944.500.860) |
| | T-grip 200 mm | (944.500.862) |
| | T-grip 100 mm | (944.500.861) |
| 2 | Radial ring puller | |
| | 13 mm radial ring puller | (944.500.871) |
| | Spindle | (950.203.020) |
| 3 | Mandrel | |
| | Disassembly mandrel for tapping out the flywheel without damage to the crankshaft thread | (944.500.880) |
| 4 | Setting gauge | |
| | Gauge for measuring the gap between flywheel and armature | (944.500.891) |
| 5 | Torque wrench | |
| | 3/8" Drive socket | (944.500.864) |
| | Bit, 152 mm | (944.500.865) |
| | Bit, 49 mm | (944.500.866) |
| | Torque wrench 3/8" Drive | (950.230.000) |
| 6 | Piston stop wedge | |
| | Wedge for blocking the engine through the exhaust port | (944.602.000) |

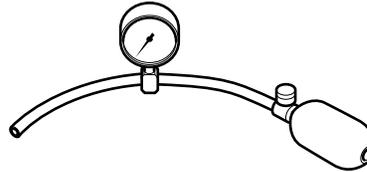
00 SPECIAL TOOLS



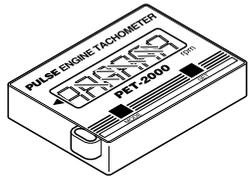
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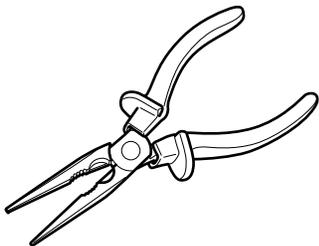
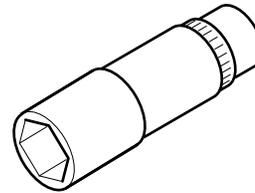
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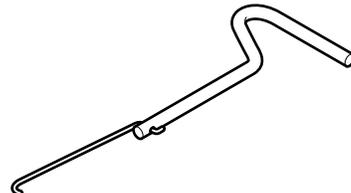
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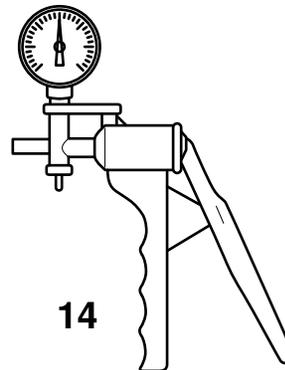
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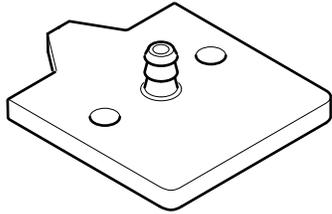
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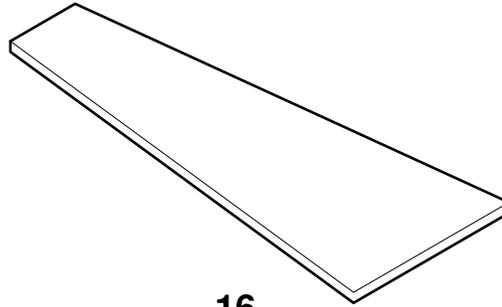
14

- 7 Piston ring tensioner**
Piston ring band and assembly tool for cylinders (944.600.001)
- 8 Assembly and disassembly wrench**
Wrench for disassembling and assembling the centrifugal clutch (944.500.590)
- 9 Pressure gauge**
Pressure gauge for checking the carburetor fuel valve (956.004.000)
- 10 Tachometer**
Electronic tachometer for measuring the engine speed of 2- and 4-stroke engines (950.233.220)
- 11 3/8" socket**
Installation/removal of Spark plug, clutch (944.500.864)
- 12 Needle-nose pliers**
Various assembly/disassembly tasks (944.603.400)
- 13 Disassembly hook**
Removal/installation Brake band spring (950.237.000)
- 14 Over/underpressure pump**
For checking sealing of radial rings and gaskets

00 SPECIAL TOOLS



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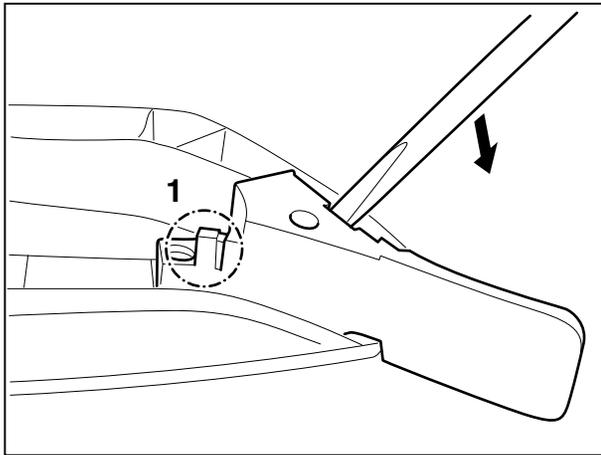


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15 Sealing plate
For sealing intake side (944.603.170)

16 Sealing plate
For sealing exhaust side (944.603.170)

01 SPROCKET GUARD / CHAIN TENSIONING SYSTEM



Chip deflector in the sprocket guard

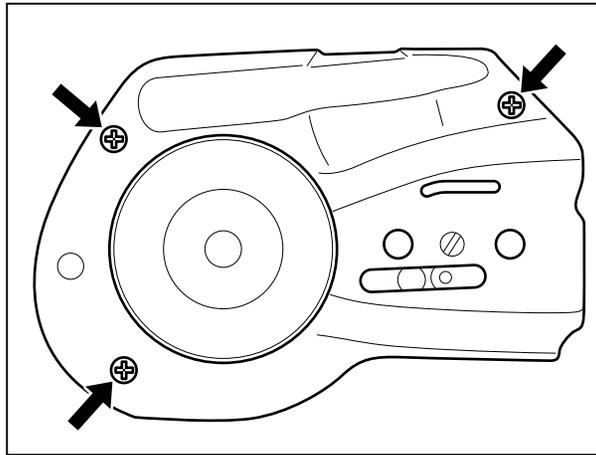
CAUTION: To prevent cuts, wear protective gloves!

Remove the sprocket guard, bar, and chain.

Use the combination wrench to disengage the chip deflector, and remove it.

Note for changing the type of chain: If using a 3/8" saw chain, be sure to first cut out the the marked portion of the chip deflector 1!

Before converting to a .325" chain it will be necessary to install a new chip deflector (957.213.220).



CAUTION: Before removing the cover plate, first set off the chain brake!

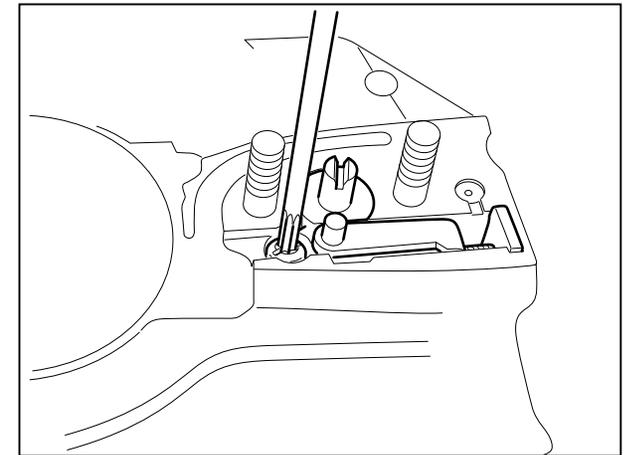
Chain tensioner

Unscrew 3 bolts and remove the cover.

Chain tensioner function

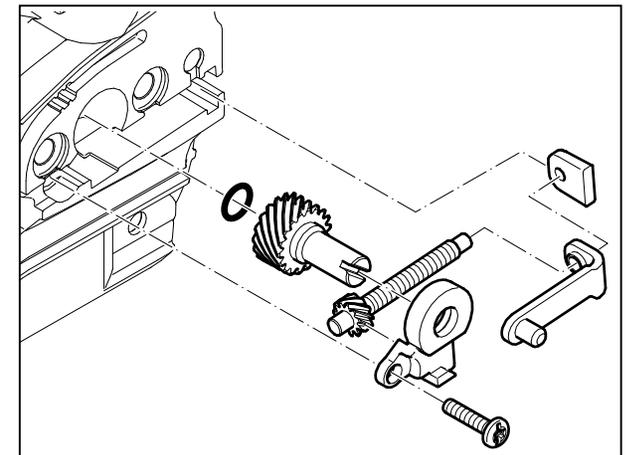
An angled worm drive converts the turns of the adjustment screw to forward or backward motion of the tensioning pin.

Grease the spindle and worm gear with multi-purpose grease (944.360.000).

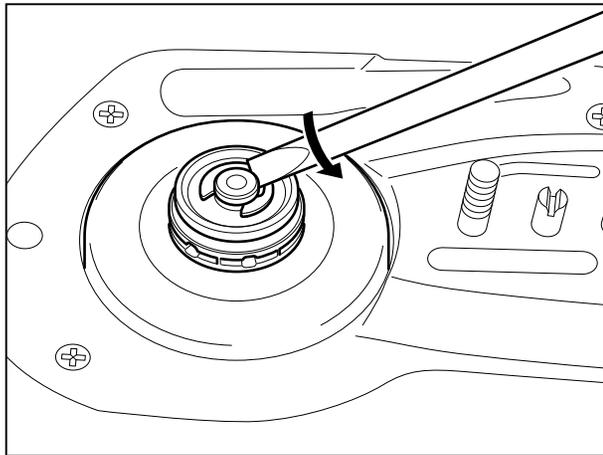


Unscrew screw and pull chain tensioner up and out.

Assembly



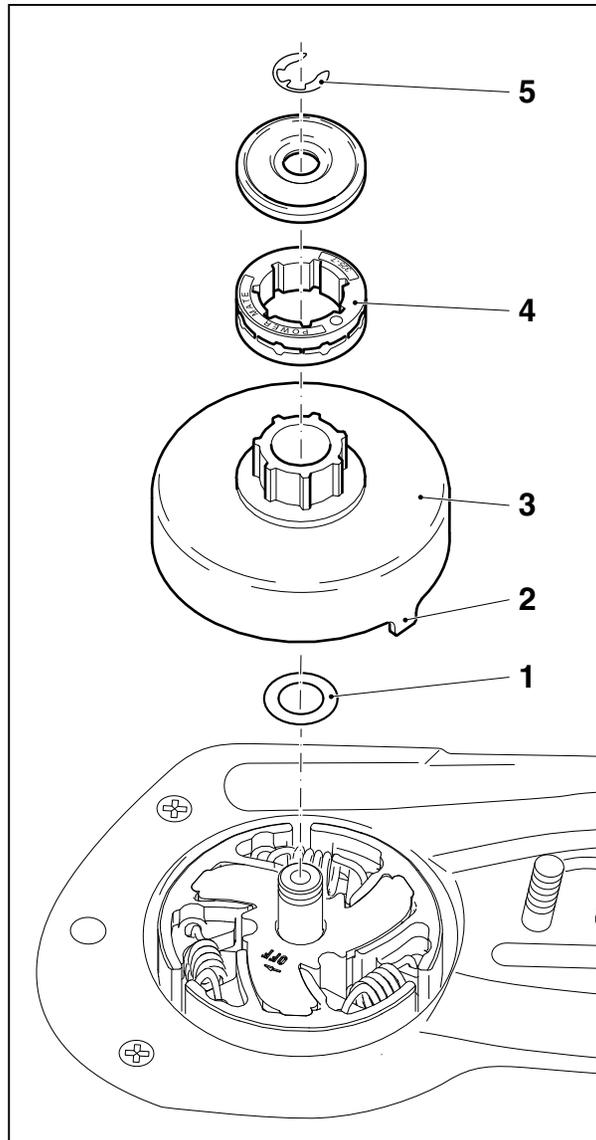
02 CLUTCH DRUM / RIM SPROCKET



Remove the sprocket guard, bar, and chain.

Remove the circlip **5** with the universal wrench.

Pull the handguard towards the front handle to release the chain brake if necessary.



Chain sprocket and clutch drum with needle bearing

Check the chain sprocket **4** for damage and wear.

Important customer information:

Before installing a new saw chain, always check the condition of the chain sprocket. A worn chain sprocket will damage a new saw chain, and must be replaced.

Check the clutch drum needle bearing for wear and damage.

Assemble the bearing with multi-purpose high-performance grease (944.360.000).

Check the inside of the clutch drum **3** for damage and wear.

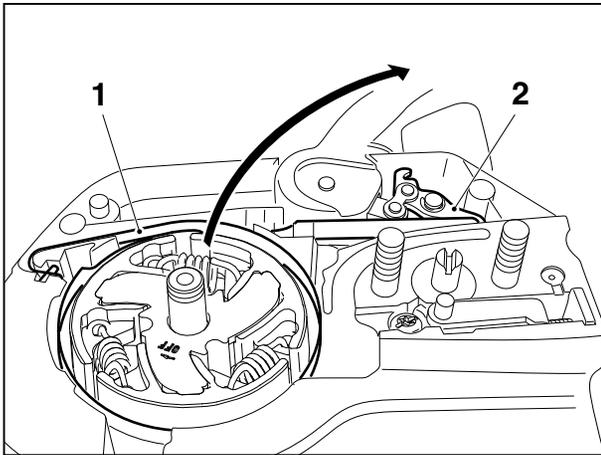
Replace the clutch drum if damaged or worn.

Important: Always replace the washer disc **1!**

Note: Always use a new circlip **5 (927.408.000)!**

When assembling the clutch drum, make sure that the lug of the clutch drum **2 is not positioned on the oil pump drive. When inserting, turn the clutch drum slightly.**

03 CHAIN BRAKE / GUIDE BAR BOLT



Removing the brake band

CAUTION: To prevent cuts, wear protective gloves and remove the spike bar (2 bolts)!

Remove the sprocket guard, bar, and chain.

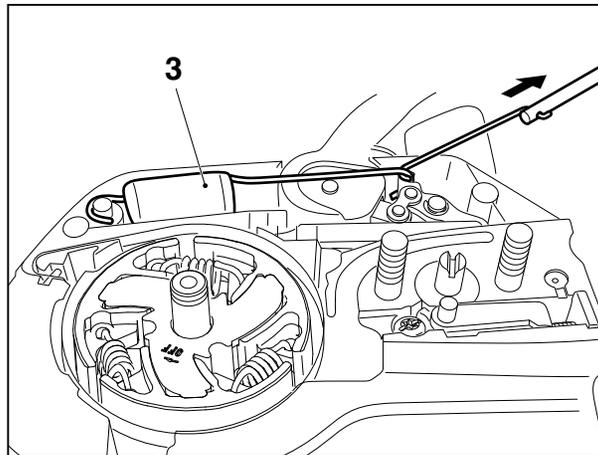
Pull the handguard towards the front handle to release the chain brake.

Remove the clutch drum, see Chapter 02.

Push the hand guard forward to engage the chain brake. This tensions the brake band spring.

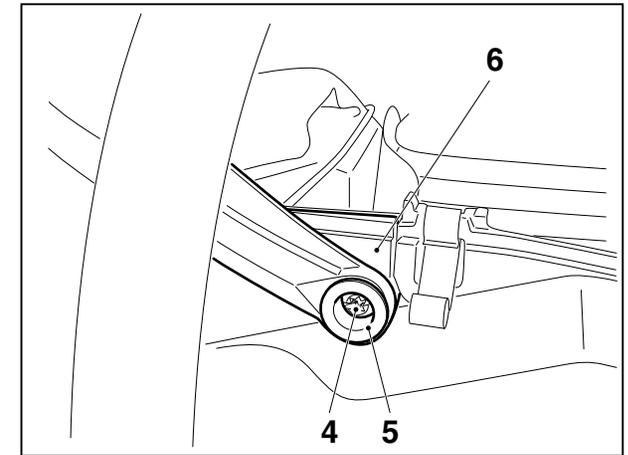
Remove the cover plate, see Chapter 01.

Fold the brake band **1** upward and turn it out of the disengagement mechanism **2**.



Secure the chain saw from slipping (vise).

Using the disassembly hook (Chap. 00, Pos. 14), disengage the brake band spring **3**.



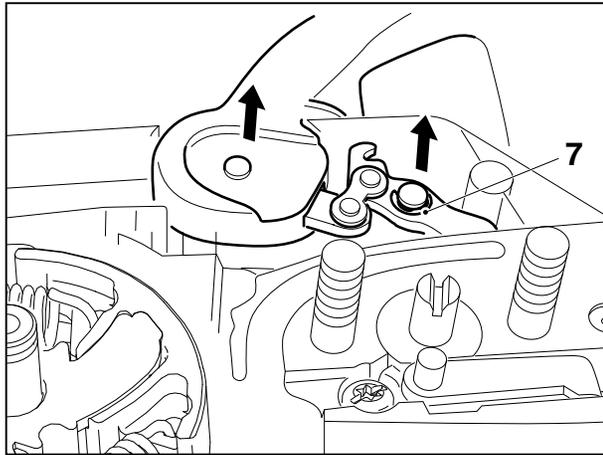
Remove the handguard and disengagement mechanism

Remove the hood.

Unscrew bolt **4** and pull out the sleeve **5**.

Remove the black spacer **6**.

03 CHAIN BRAKE / GUIDE BAR BOLT

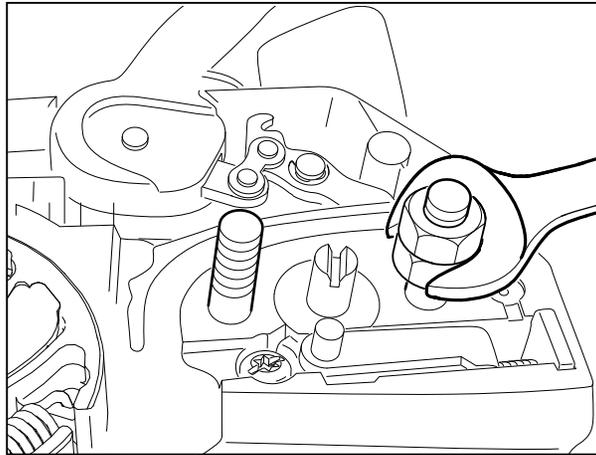


Remove the circlip 7.

Pull the handguard and disengagement mechanism up and out parallel to their axes.

When reassembling always use a new circlip 7 (927.304.000)!

Assemble the handguard and disengagement mechanism, brake band and brake band spring in reverse order.



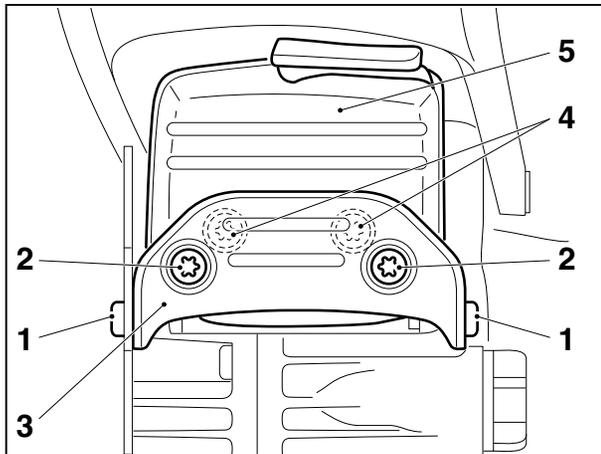
Replacing the guide bar bolt

Screw two nuts onto the bar bolt and counterlock them.

Unscrew the bar bolt.

Assembly: Screw in bar bolt to 20.5 ± 0.5 mm and secure with Loctite 243 (980.009.000).

04 CLUTCH



Disassembly

CAUTION: To prevent cuts, wear protective gloves!

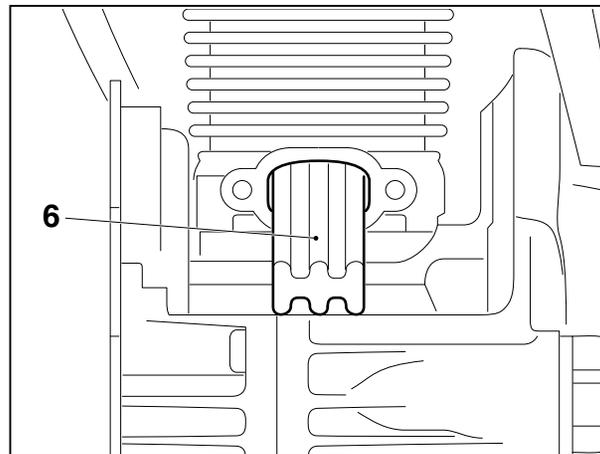
Remove the sprocket guard, bar and chain.

Pull the handguard towards the front handle to release the chain brake if necessary.

Remove the clutch drum, see Chapter 02.

Remove the muffler. To do this, unscrew 2 bolts **1** and 2 bolts **2**, and remove the protective plate **3**.

Unscrew bolts **4** and remove the muffler **5** with cover plate.

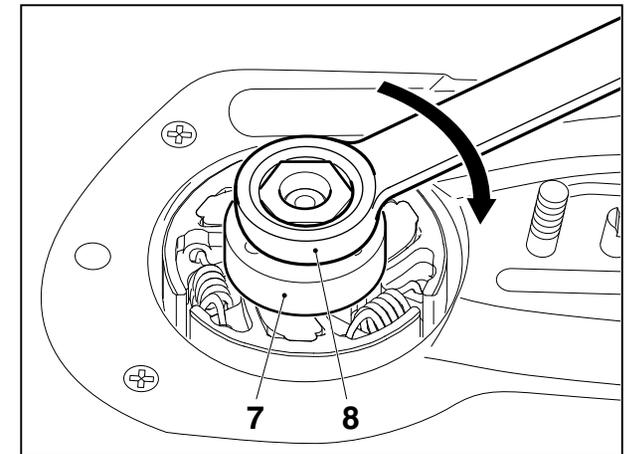


Remove the hood.

Move piston to bottom dead centre (visible through the exhaust opening).

Push the piston stop wedge **6** (944.602.000) into the exhaust opening.

Note: Before the piston stop wedge is pressed into the exhaust opening, it is necessary to remove the carbon insert in the exhaust. During assembly the gasket must always be between the muffler and the guard plate!

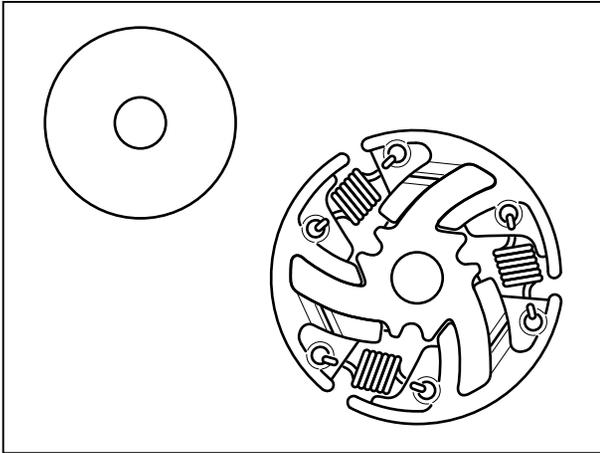


Insert wrench **7** (Chap. 00, Pos. 8) into the clutch and use a socket wrench **8** to turn in the direction of the arrow (left-hand thread) to loosen and remove the clutch.

Turn the clutch over and remove the disc.

The flyweights can now be pushed off the guide axially in one direction.

04 CLUTCH



Inserting the flyweights

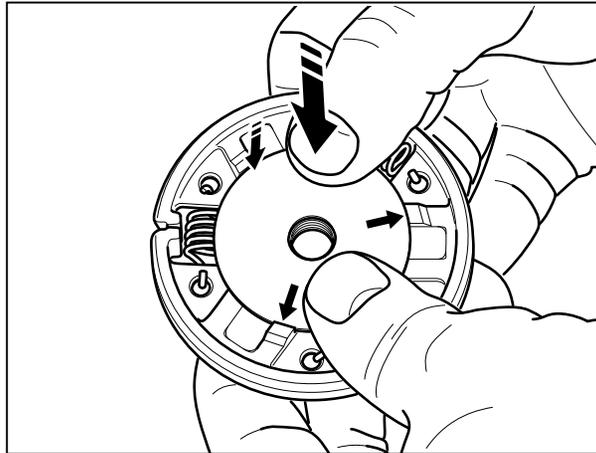
Hook the springs as shown in the illustration.

Then press the flyweights onto the guide. To do this, first push on two flyweights half-way, then put on the third flyweight by setting it on its edge.

Press the flyweights all the way onto the guide.

CAUTION: Note the position of the springs. Do not replace springs individually! If a spring breaks or is fatigued, all three springs must be replaced. The springs must not touch the cover.

The illustration shows the inside of the clutch.



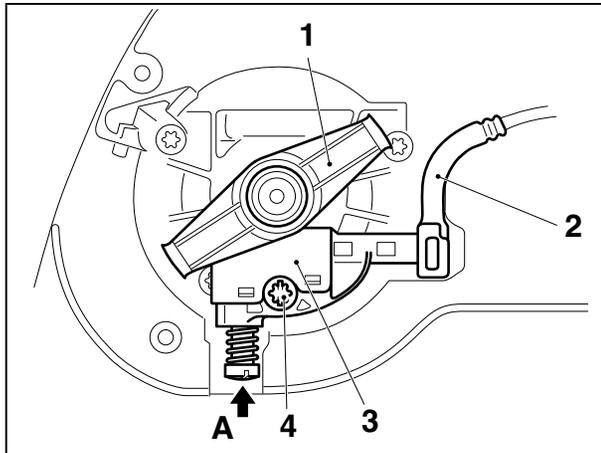
Press the disc onto the clutch. It must be flat and be engaged.

Installing the clutch

Install the clutch with the arrow marking point up.

CAUTION: Before installing the clutch, disassemble the starter in order to prevent damage to the starting catches.

05 OIL PUMP



General

The oil pump is driven by the clutch drum. Lugs on the clutch drum transfer the power to the drive arms of the oil pump drive 1.

The drive worm of the oil pump drive engages in the teeth of the oil pump 3.

This means that oil is pumped only when the chain is running.

The oil flow rate can be adjusted with adjusting screw A:

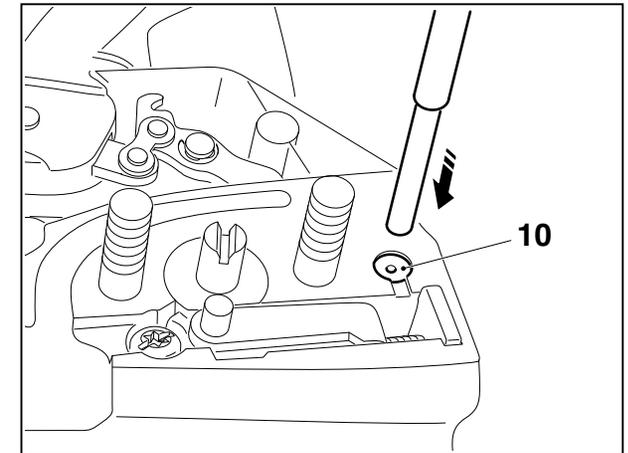
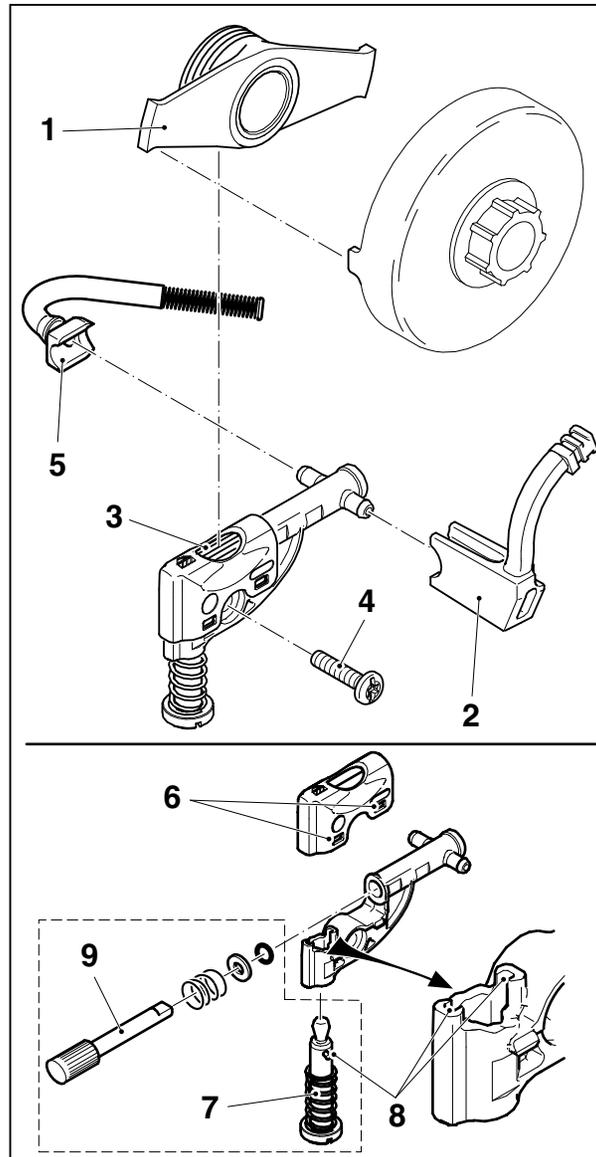
- Turn right for more oil
- Turn left for less oil

Disassembly

Remove the clutch drum and clutch, see chapter 04.

Turn the oil pump drive 1 counter-clockwise and pull it off the shaft.

Pull the oil pressure line 2 from the oil pump. Unscrew screw 4 and remove the oil pump.



The suction line 5 remains in the crankcase. It extends into the oil tank. To remove it, carefully pull on the connection to the oil pump.

Removing the oil pump

Pull the plastic housing off the oil pump by carefully spreading it apart in the area of the holes marked 6 in the illustration.

Push the adjusting screw 7 up against the spring pressure and turn it until the pin 8 goes into the assembly slit 8. If necessary press the supply piston 9 in somewhat.

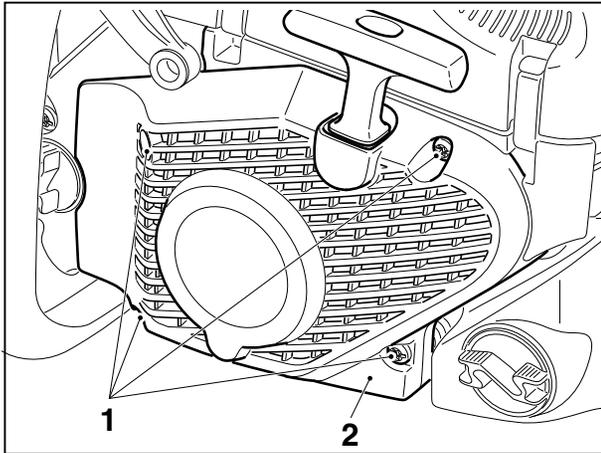
Note: For assembly put the adjusting screw in stop positions 2 or 3, not in one of the outer stops.

Oil tank ventilation

To replace, use a 4 mm mandrel to knock the valve 10 into the tank and press the new valve in from the outside with an 8 mm mandrel.

IMPORTANT: Use a mandrel with a flat face!

06 STARTER



Disassembly

Unscrew four screws **1**.

Remove fan housing **2**.

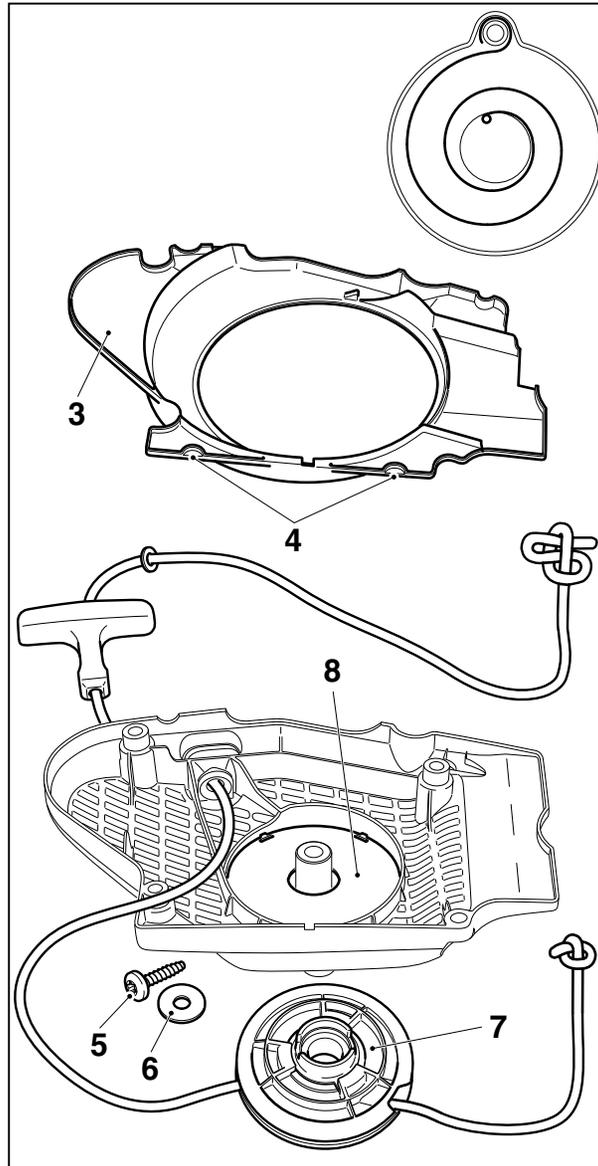
Remove air guide **3** from fan housing.

Detension the return spring.

Injury hazard! Unscrew screw **5 only after detensioning the return spring!**

Unscrew screw **5** and remove the washer **6**.

Pull off the cable drum **7**.



Knock the fan housing against a tabletop with the entire contact surface of the hollow side, so that the return spring cassette **8** pops out of the fan housing.

Caution! The return spring can jump out of the plastic cassette! Always wear protective goggles and gloves!

If the spring pops out, put it back into the plastic housing as shown in the schematic.

Assembly

Note: If installing a new return spring cassette, grease it on the spring side.

Carefully insert the new return spring cassette **8** and press down until it engages. Lightly grease the surface of the spring and spring cassette with multipurpose grease (944.360.000).

Thread in a new starter cable (dia 3.5 mm / 1/8", length 980 mm / 38.5") as shown in the illustration, tie a knot (as shown in the illustration) in both ends, and tighten both knots.

Put on the cable drum **7** and turn it slightly until the return spring engages.

Screw in the screw with washer.

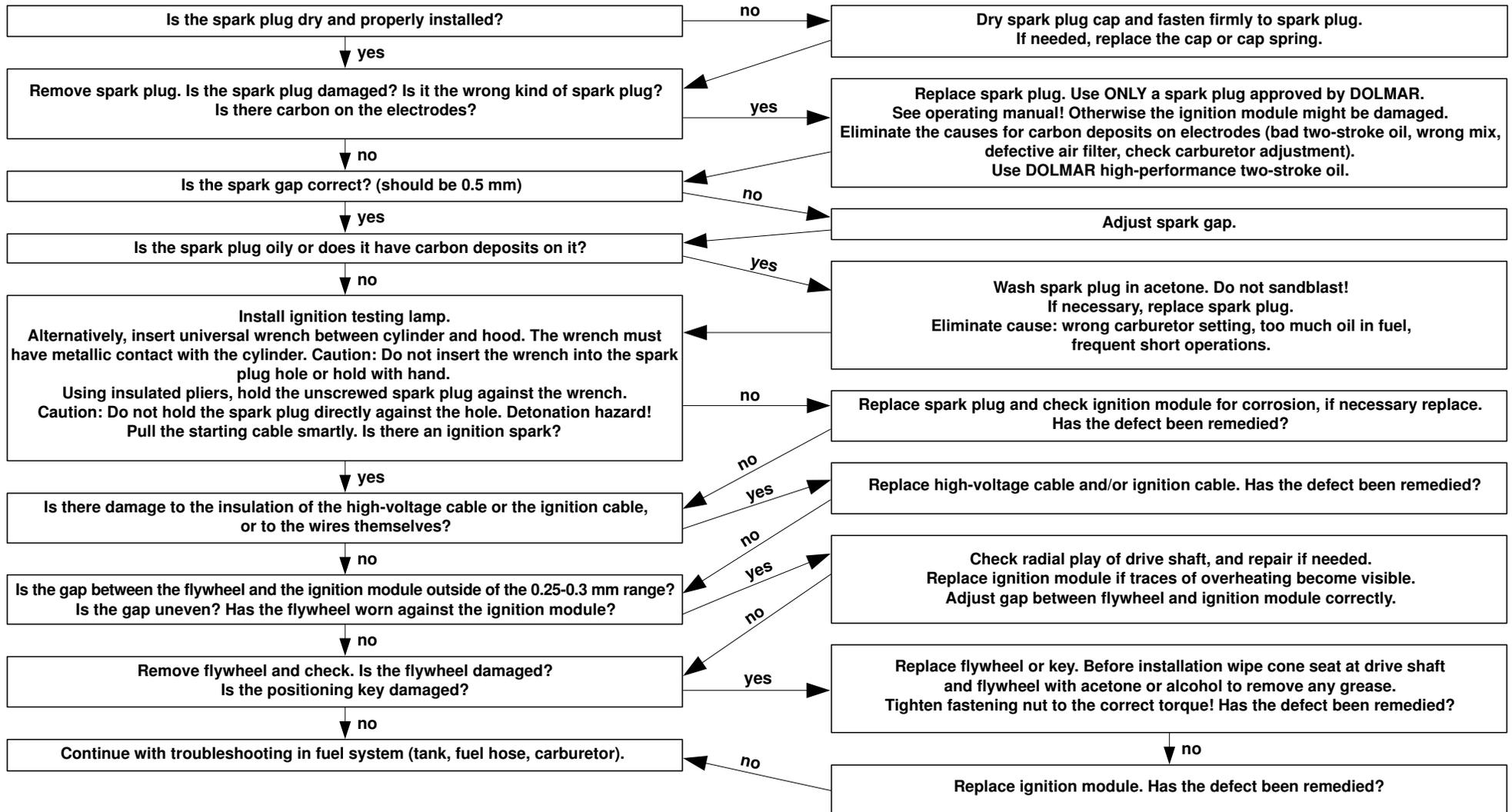
Tension the return spring clockwise about 8 1/2 turns.

Place the air guide **3** in the fan housing and make sure the two recesses **4** engage.

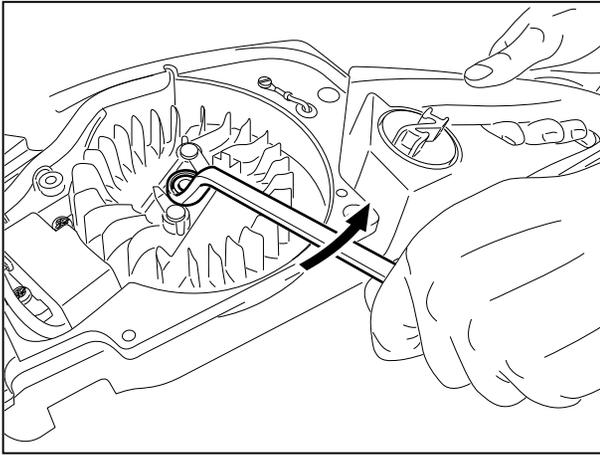
Position the fan housing **2** correctly on the saw, press against it slightly, and pull the starter handle until the starter catches.

Tighten screws **1**.

07 IGNITION SYSTEM (TROUBLE-SHOOTING)



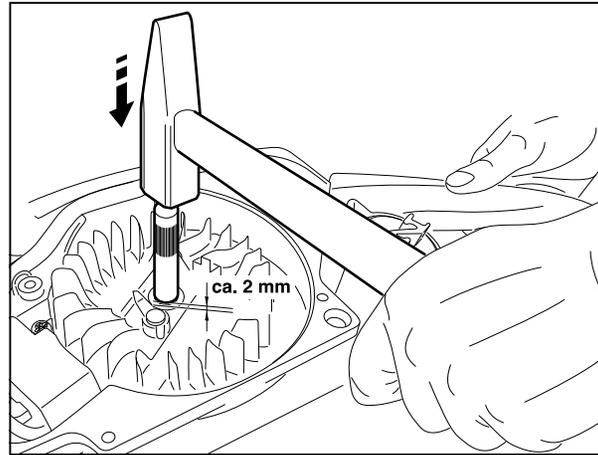
07 IGNITION SYSTEM



Removing the flywheel

Block the piston. To do this, see **04 CLUTCH**.

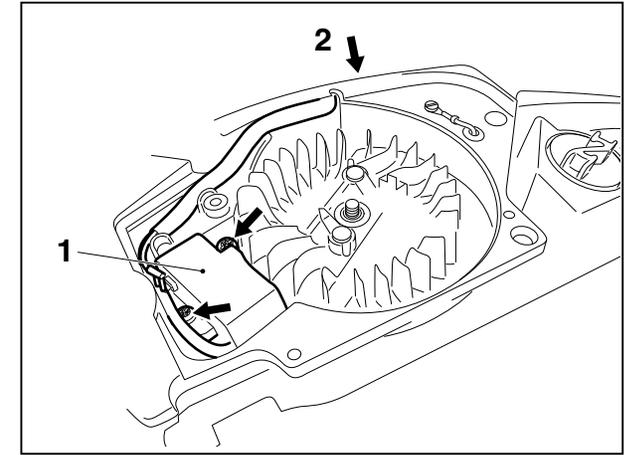
Loosen the nut in the direction of the arrow and remove it along with the washer.



Screw the disassembly mandrel (944.500.880) onto the threaded end of the shaft.

Do not screw the mandrel all the way down. Leave about 2 mm between the mandrel and the flywheel.

Hold the machine in one hand or place on a soft surface, and knock the flywheel loose with a tap on the mandrel.



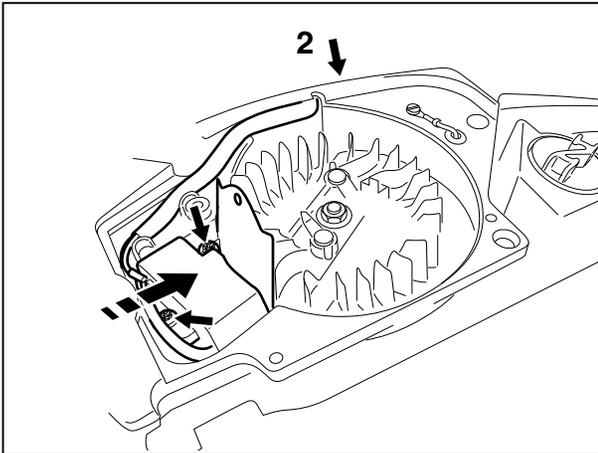
Removing the ignition armature

Unscrew 2 screws on ignition armature **1**.

Unscrew ignition cable screw **2**.

Remove armature **1** and wire.

07 IGNITION SYSTEM



Installing the ignition armature

NOTE: The high-voltage cable is moulded onto the ignition system and cannot be replaced separately.

Insert the armature and turn the screws in almost all the way.

Lay the high-voltage cable with the ignition cable as show.

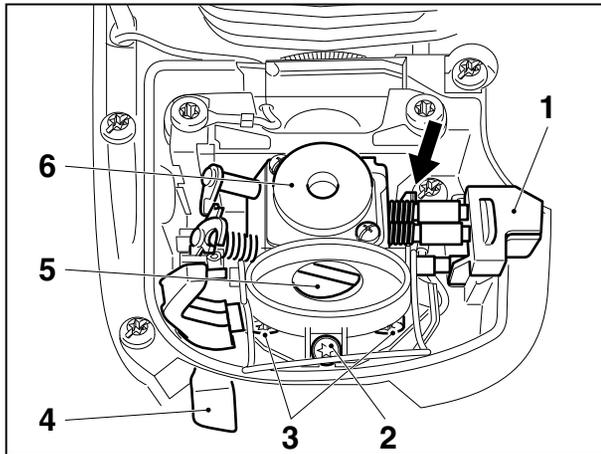
Fasten the ignition cable with screws **2**.

Insert the setting gauge (944.500.891) between the ignition armature and the flywheel.

Position the flywheel so that the magnet is against the armature (gap 0.25 – 0.3 mm).

Press the armature against the gauge towards the flywheel and tighten the armature screws.

08 CARBURETOR



Removing the carburetor

CAUTION: Empty the fuel tank before disassembling the carburetor!

Remove the hood and air filter.

Move combination switch **4** to **STOP drücken**.

Shut the choke valve **5**.

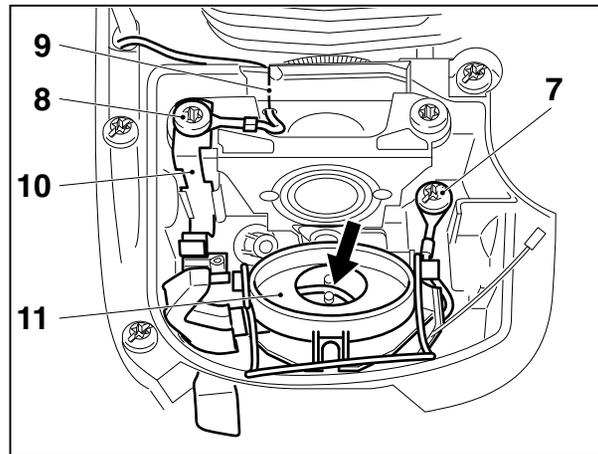
Remove carburetor adjusting guide **1**.

Disengage Bowden cable (arrow).

Unscrew screws **2** and **3** and pull them out.

CAUTION: There is fuel in the line. Briefly open the tank cap to reduce pressure in the fuel system.

Remove the carburetor **6**, and **carefully** pull off the fuel line.



Removing the intake manifold

Unscrew screws **7**.

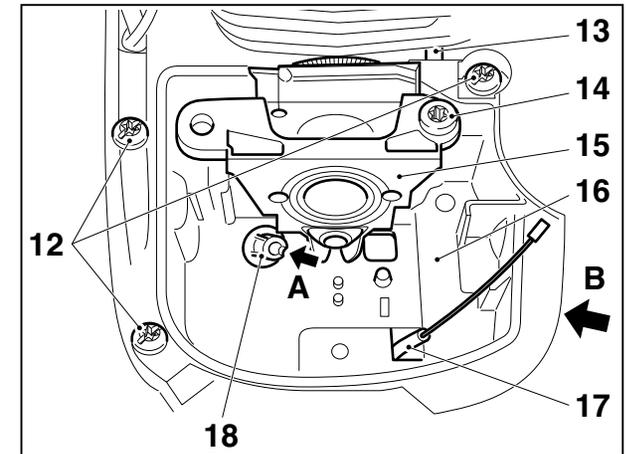
Unscrew screws **8**.

Pull ignition cable out through slot **9**.

Note: When assembling, make sure that the ignition cable is pulled as far as possible through the carburetor flange towards the carburetor, in order to prevent the cable from coming into contact with the cylinder.

Pull contact spring **10** up and out.

The intake manifold **11** can now be removed along with the combination switch. When doing so, disengage the contact wire (arrow) from the carburetor bottom.



Removing the carburetor bottom

Unscrew 3 screws **12**.

The carburetor bottom **16** and flange **15** can now be removed. When doing so, press out the fuel line **18** and pull off the low-pressure hose **13**.

To separate the carburetor flange **15** from the carburetor bottom **16**, unscrew screw **14**.

Assembly is in reverse order. When putting on the carburetor bottom, guide the Bowden cable through the opening **17**. When installing the fuel hose **18**, guide the collar through then opening very carefully.

Note: Do **not** twist the fuel line during assembly. The recess **A** in the fuel line must point towards the carburetor.

Visually check between the carburetor bottom and the crankcase **B** to ascertain that the fuel line did not get pinched.

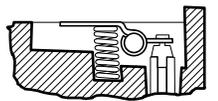
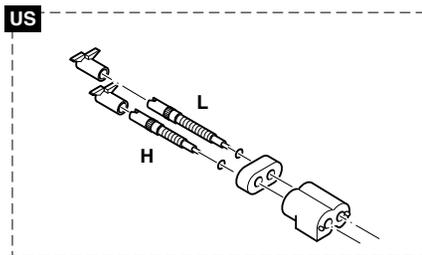
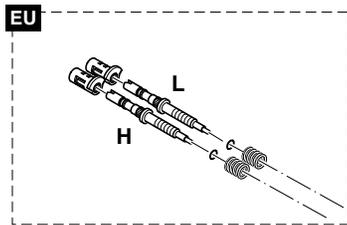
08 CARBURETOR

Base Setting (without Limiter Caps)

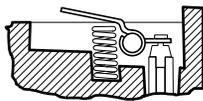
L= 1 1/2

H= 1 1/2

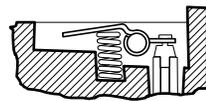
NOTE: Adjust the carburetor only using a tachometer.



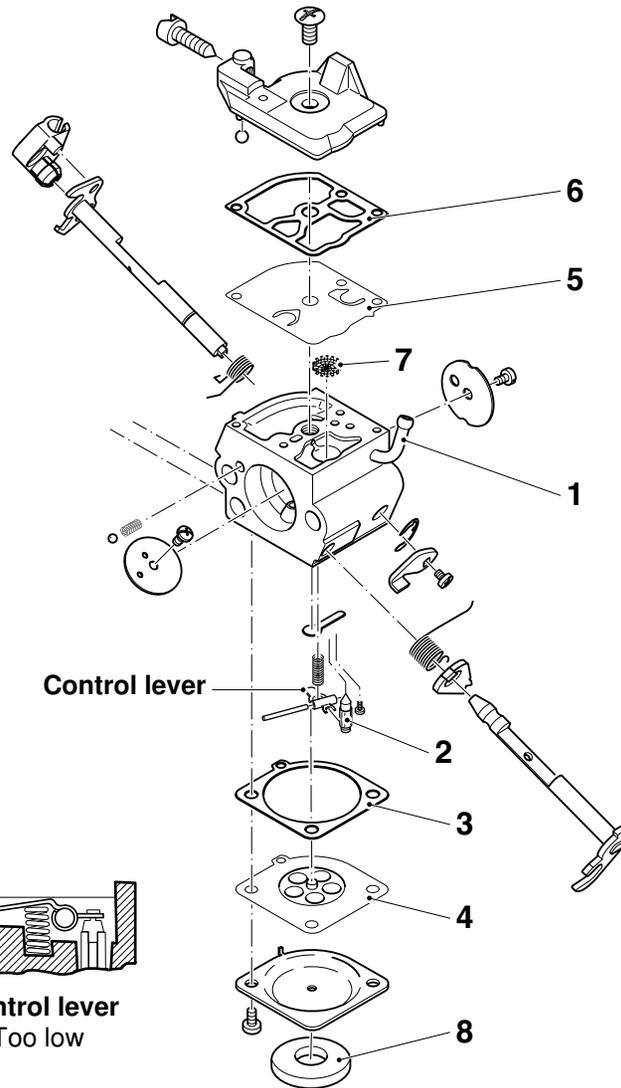
Control lever
Correctly installed



Control lever
Too high



Control lever
Too low



Pressure test

Connect the pressure gauge (956.004.000) to the carburetor fuel connection **1**.

Set up a pressure of max. 0.5 bar.

If the pressure drops off, check the inlet needle **2** for damage or foreign objects. If necessary, replace control parts.

If the inlet needle is OK, replace the gasket **3** and diaphragm **4**.

If the pump diaphragm **5** is obviously dented, it needs to be replaced along with the gasket **6**.

Check:

- Screen **7** for contamination
- Pulse hole for contamination
- Foam sealing ring **8** for correct positioning. The seal ring must be centred on the cover of the control side, and glued on the whole surface.

Check control parts

(control lever/inlet needle):

Check the tip of the inlet needle for wear. Check control lever for correct installation, see illustration to the right.

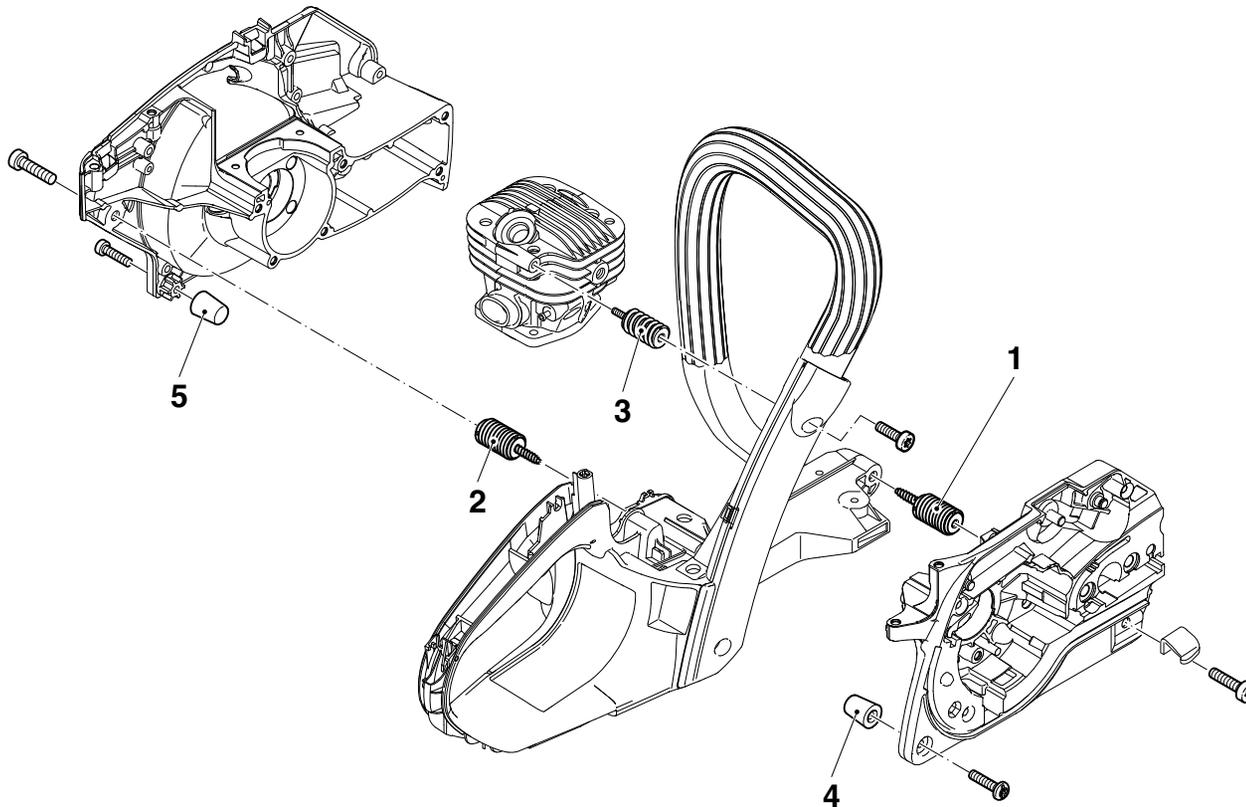
If the control lever is too low:

- Insufficient fuel
- Poor acceleration
- No max. speed

If the control lever is too high:

- Carburetor flooding
- Starting problems
- Poor idling
- Poor transition

09 VIBRATION DAMPER



Disassembly

Spring 1

Unscrew screw on chain catcher.

Loosen spring with Torx screwdriver (944.500.862) and remove.

Spring 2

NOTE: To facilitate removal of the spring, unscrew the screw of spring 3.

Remove fan housing.

Unscrew screw.

Loosen spring with offset screwdriver (940.827.000) and remove.

Spring 3

Remove hood.

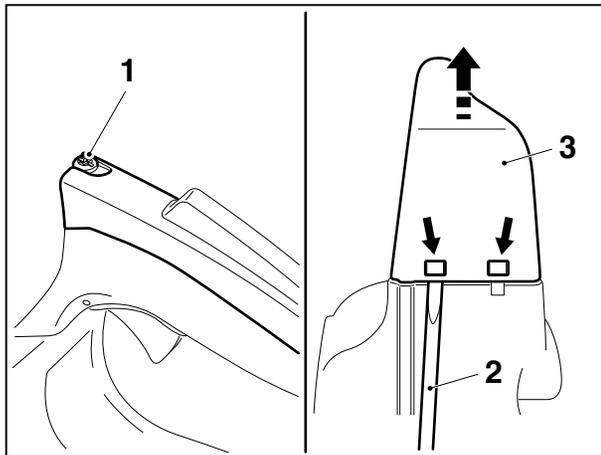
Unscrew screw.

Loosen spring with offset screwdriver (940.827.000) and remove.

Impact dampers 4 and 5

Loosen screws and remove dampers.

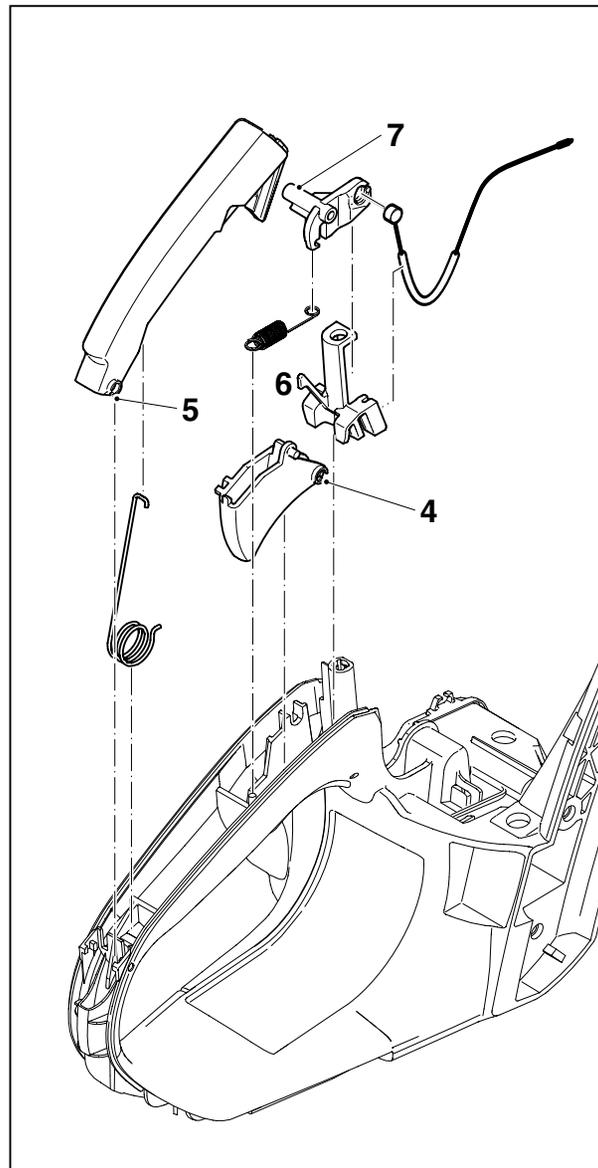
10 TANK



Grip mechanism

Unscrew screw 1.

Disengage the two snap closures on the upper grip half 3 with the universal wrench 2 and pull off the top grip half towards the rear. Keep the throttle lock pressed down during this procedure.



The throttle and throttle lock have slots 4 and 5 at their pivot points.

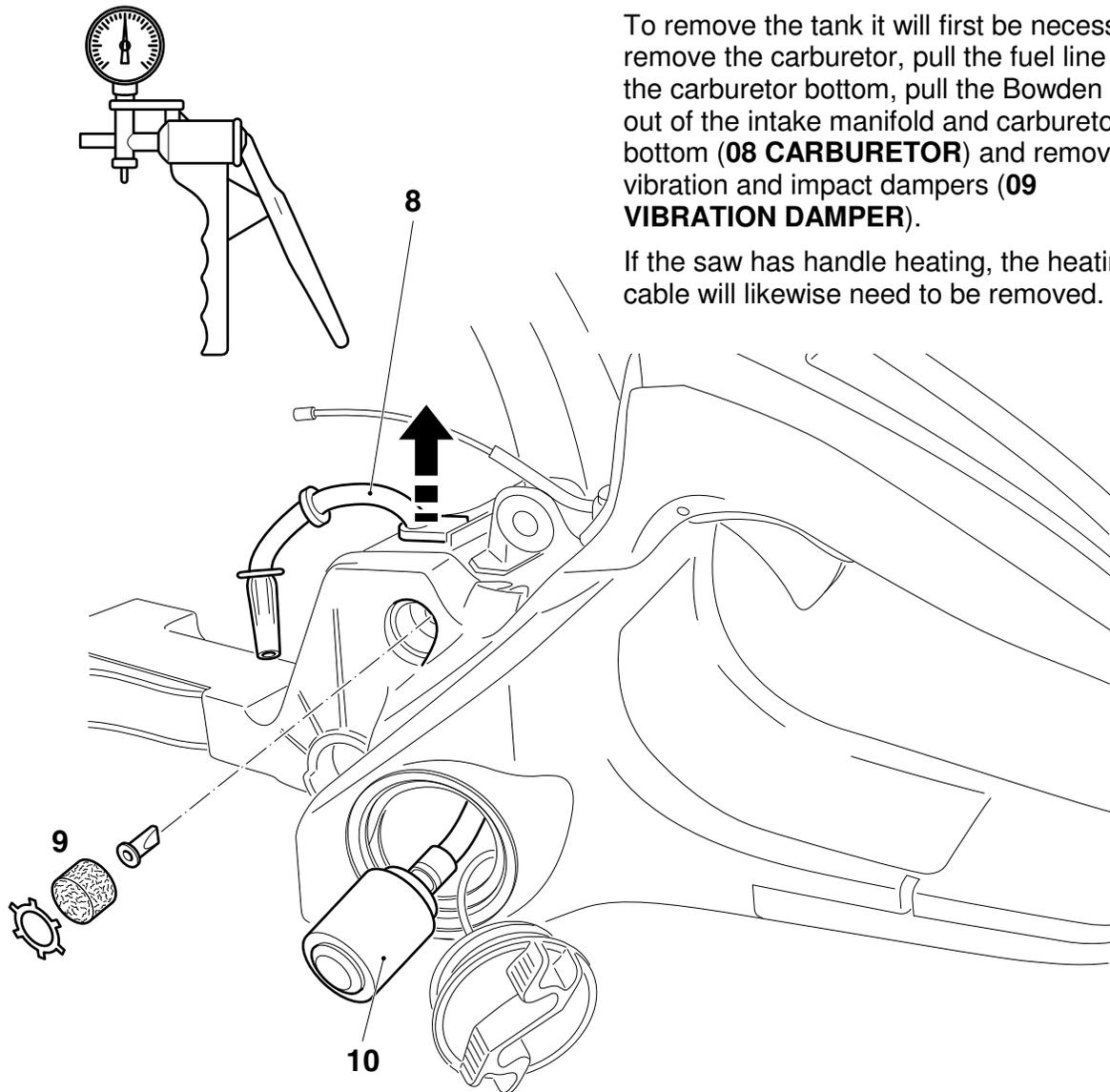
When assembling the throttle and throttle lock, first press them onto the pivot axle by the slot. For this, the slot must point downwards when inserted.

The Bowden clip 6 goes in after the throttle.

The lever is then attached to the Bowden clip. Guide the pivot axle 7 under the hook on the Bowden clip 6.

Before installing the throttle, engage the spring in the throttle. When installing the throttle lock, engage the spring in the throttle lock.

10 TANK



Disassembly

To remove the tank it will first be necessary to remove the carburetor, pull the fuel line out of the carburetor bottom, pull the Bowden cable out of the intake manifold and carburetor bottom (**08 CARBURETOR**) and remove the vibration and impact dampers (**09 VIBRATION DAMPER**).

If the saw has handle heating, the heating cable will likewise need to be removed.

Pressure test

Connect the over/underpressure pump to the fuel line **8**.

Set up a pressure of max. 0.3 bar.

If the pressure drops off, check the following:

- Air valve
- Fuel line at tank entry
- Tank cap seal
- Check tank for holes

Vacuum test of air valve 9

Connect the over/underpressure pump to the fuel line **8**.

Close off the installation opening of the air valve with your thumb (dampen it slightly).

Set up a negative pressure of max 0.025 bar.

This negative pressure must not change as long as the opening is sealed. When you take your thumb off the air valve, the negative pressure must quickly return to normal.

Parts

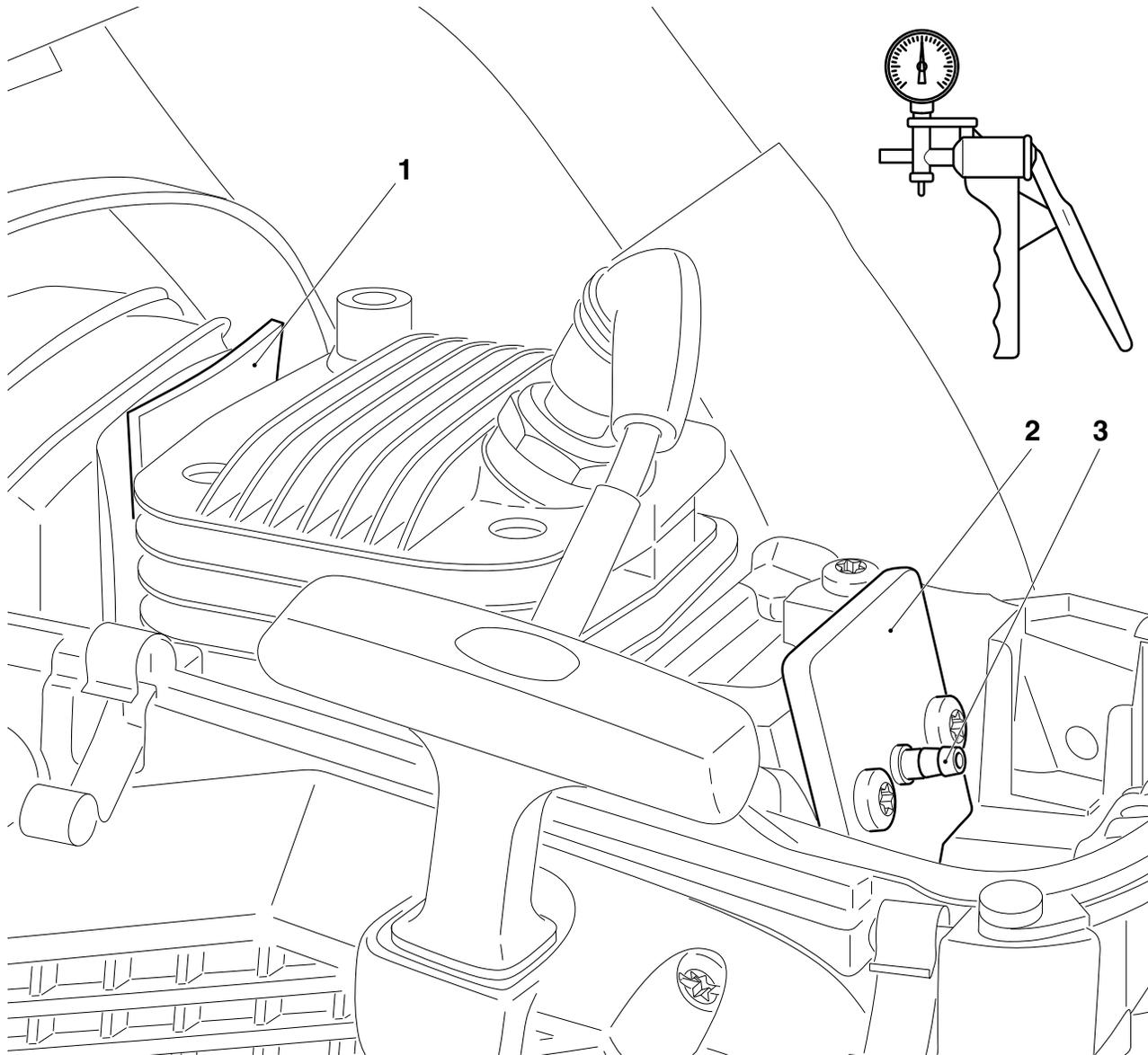
To remove the suction head **10** pull it through the tank opening with a hooked wire.

Note: Do not use pliers, as this may damage the line.

Then carefully pull out the fuel line **8** (hold briefly).

To pull out the air valve **9** lever out the toothed washer with a small screwdriver.

11 CYLINDER / PISTON



Pressure test

If it is not possible to adjust the carburetor properly, it will be necessary to check the sealing of the Drive.

To seal off the exhaust side, insert the sealing plate **1** (944.603.160) between the cover plate and cylinder. To do this it will be necessary to loosen the muffler (see under **04 CLUTCH**, page 12, left side of page).

To seal off the intake side, install the sealing plate **2** (944.603.170) in the place of the carburetor. To do this it will be necessary to remove the carburetor (see under **08 CARBURETOR**, page 19, left and middle of page).

Connect the over/underpressure pump to the connection on the sealing plate **3**.

Move the piston to top dead centre.

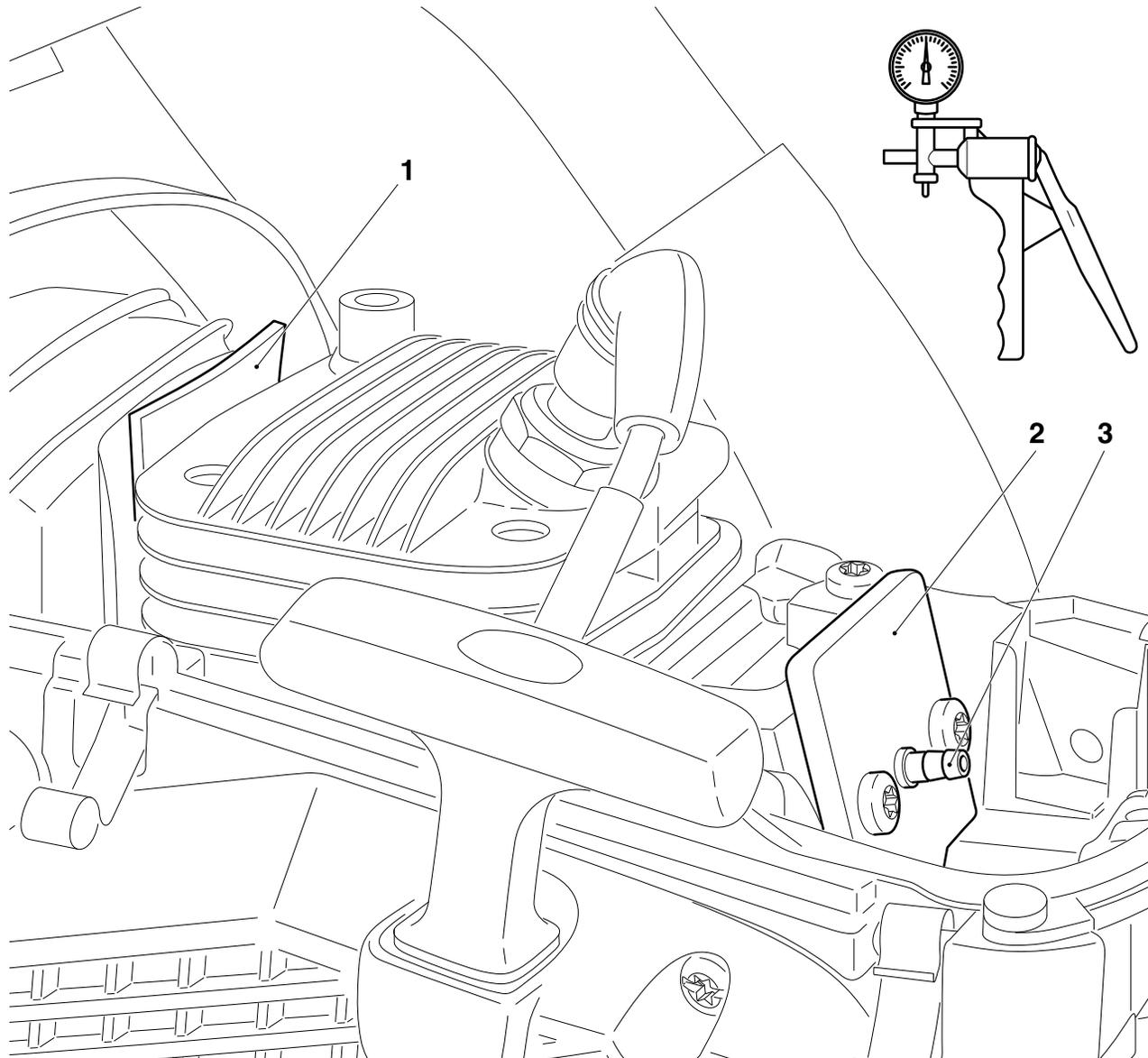
Set up a pressure of max. 0.3 bar (4,35 psi).

If the pressure drops within 20 seconds, it can have one of these causes:

- Radial ring (flywheel side) leaking
- Combination bearing (clutch side) leaking
- Cylinder base gasket leaking
- Crankcase gasket leaking
- Crack in crankcase
- Crack in cylinder
- Starting valve (if present) leaking
- Spark plug leaking
- Rubber intake on cylinder leaking
- Defective pulse line

Note: Detergent can be used to localise leaks.

11 CYLINDER / PISTON



NOTE: If there is a leak into the oil tank, it will not be possible to fully identify the leak. If pressure remains steady in the crankcase after shutting off the oil line hole, for example with a rubber stopper (see **05 OIL PUMP**), it is an indication that there is a defect in the crankcase gasket to the oil tank.

Vacuum test

Since the radial gasket ring can also fail at negative pressure, a vacuum must be established in the crankcase to test the radial ring.

Seal off the intake and exhaust sides as described above.

Connect the over/underpressure pump to the connection on the sealing plate **3**.

Move the piston to top dead centre.

Set up a negative pressure of max. 0.3 bar (4,35 psi).

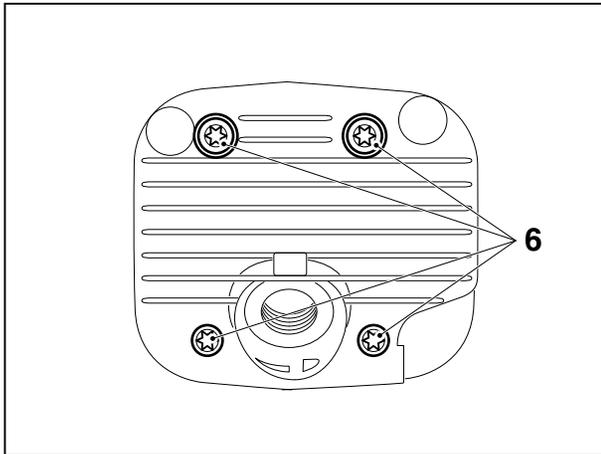
If the pressure does not rise to more than 0.3 bar (4,35 psi) within 20 seconds, the radial ring is OK. If the pressure continues to rise, the radial ring will have to be replaced.

Remove the flywheel and if necessary the generator.

Place the 13 mm radial ring puller (944.500.871) over the shaft and turn it firmly into the radial ring. When screwing in the spindle it is supported against the shaft and pulls the radial ring out.

Note: The radial ring of the combination bearing is available as a single part (962.900.065)

11 CYLINDER / PISTON



Removing the cylinder and piston

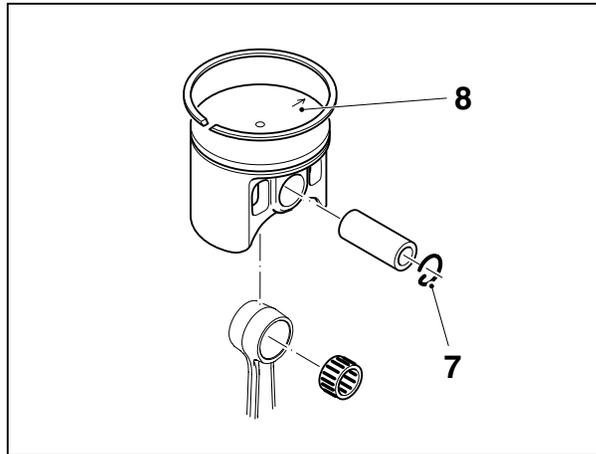
Disconnect the intake and exhaust sides.

Unscrew the spark plug.

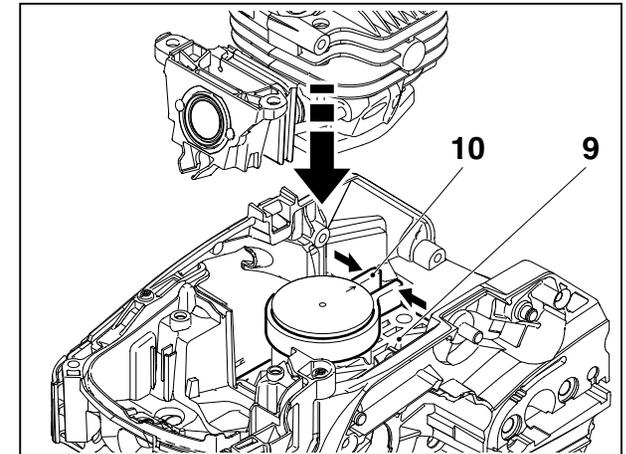
Unscrew 4 screws **6** and pull the cylinder up and off.

Note: After pulling off the cylinder, support the piston with the assembly tool (944.600.001).

Note:, The cylinder comes without thread as a spare part, because the muffler screws are self forming screws



Remove spring ring **7** with needle-nose pliers.



Assembling the cylinder and piston

Use a new gasket!

Before assembly, lightly oil the cylinder race and piston!

Push the assembly tool **9** under the piston.

Position the opening on the piston ring towards the piston ring lock.

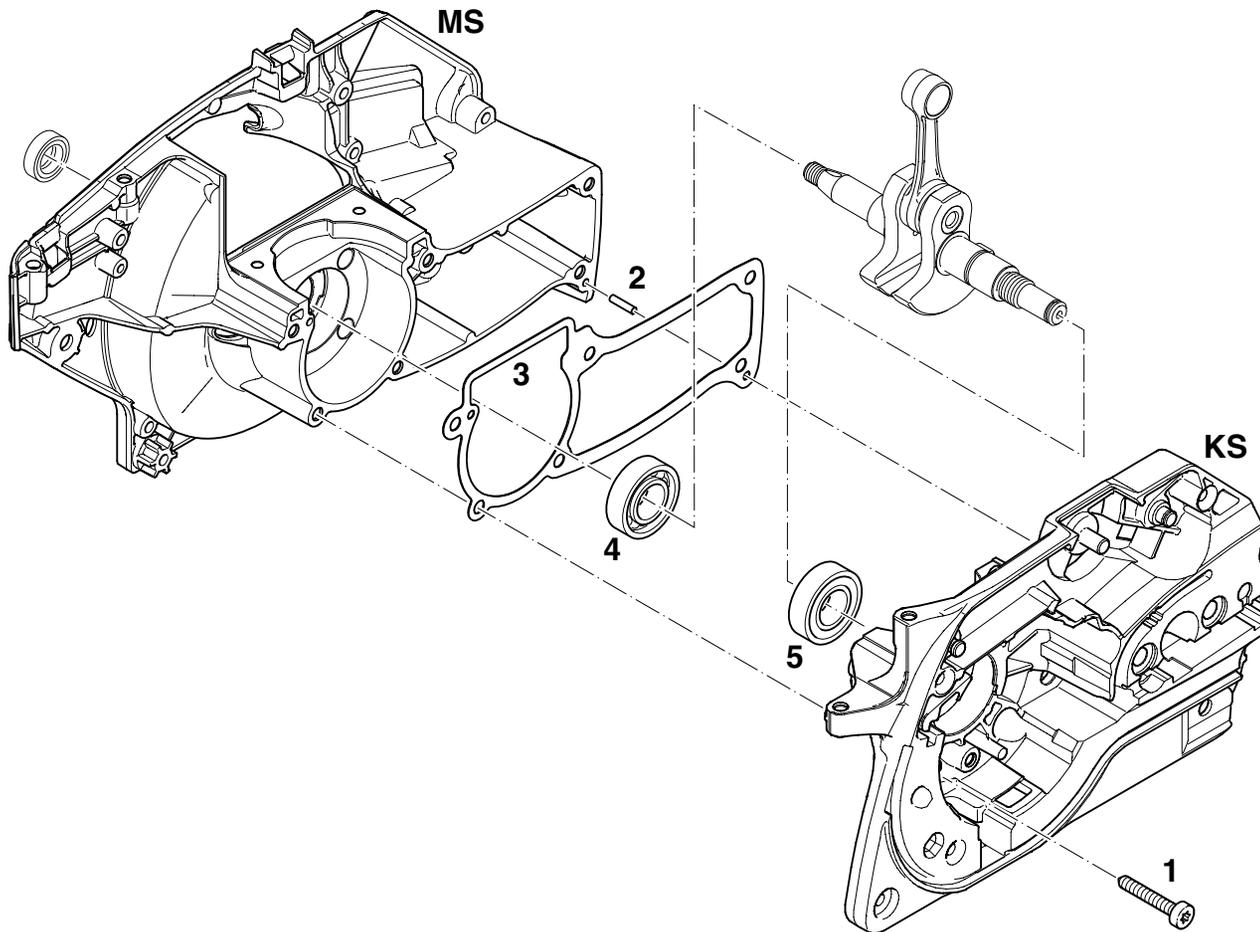
Use the piston ring tensioner **10** to press the piston ring together.

Push the cylinder onto the piston. Let the piston ring tensioner slide down with it.

Remove the assembly tool and piston ring tensioner and press the cylinder all the way down.

Hand-tighten the screws **6** lightly crosswise, and then tighten to the correct torque, again crosswise.

12 CRANKCASE / CRANKSHAFT



The crankcase magnet side and cylinder side are held together with six screws **1**.

Two pins **2** ensure proper fitting.

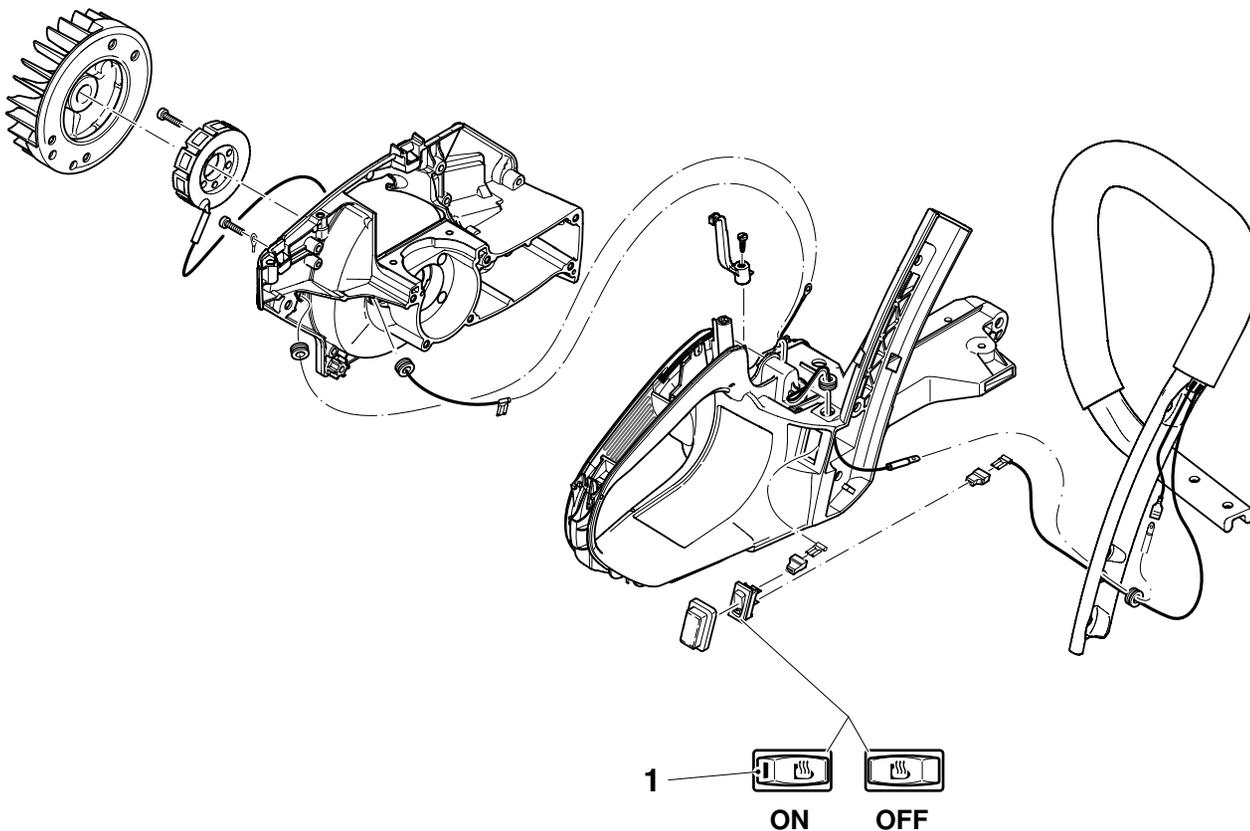
To assemble the ball bearings please note the following repair instructions

- Press a ball bearing onto the crankshaft clutch-side by using an assembling bush. Press only on the internal ring of the bearing.
Note: Put a wedge between the crankwebs.
- Heat the crankcase clutch-side up to 150 - 160° Celsius (302-320° Fahrenheit), evenly coat the external ring of the ball bearing with Loctite 601 and slide it together with the crankshaft in the warm crankcase without any effort.
Note: Degrease both ball bearings before coating the external ring with Loctite 601.
- Heat the crankcase magneto-side up to 150 - 160° Celsius (302-320° Fahrenheit), evenly coat the external ring of the ball bearing with Loctite 601 and slide it in the warm crankcase without any effort.
- Assemble the crankcase halves. Put a wedge between the crankwebs

Always use a new gasket. After bolting the crankcase sides together, cut off the flash **3**.

Makita is providing crankcases as a spare part where the ball bearings are already glued into the crankcase

13 HANDLE HEATING



Diagnosis/Cause

The handle heating is switched on when the red mark **1** on the switch is visible.

Diagnosis: Heating in both rear and front handles not working.

Cause: Generator defective, interruption of current.

Diagnosis: Heating in rear or front handle not working.

Cause: Short-circuit in the affected handle.

Diagnosis: Both handles are heated constantly or intermittently, although the heating switch is on **OFF**.

Cause: Short-circuit at or in switch, insulation cap is damaged or missing.

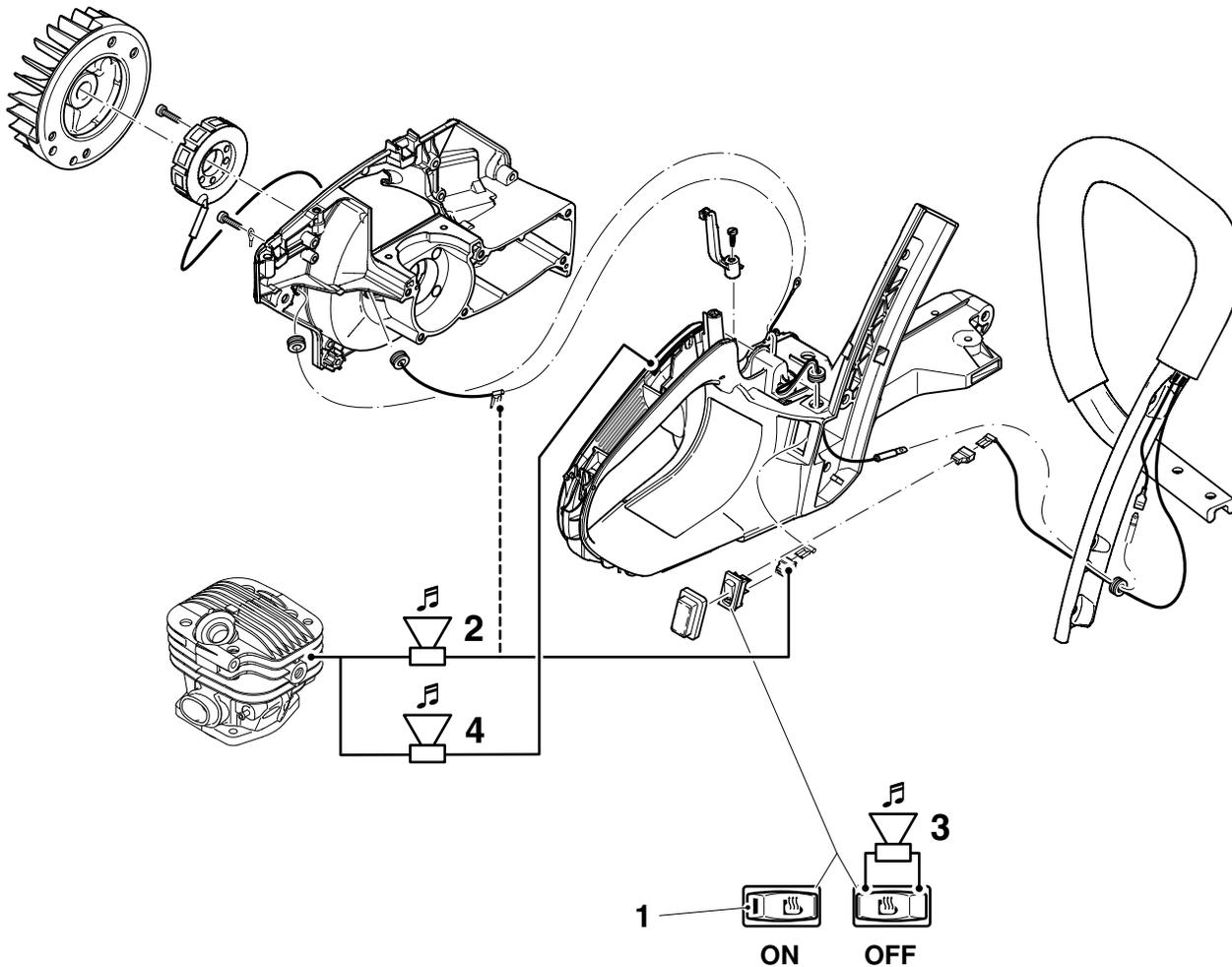
Expose wire for testing

Carefully lever the handle heating switch out of the tank with a small screwdriver.

Remove the side cover (two screws).

Disassemble fan housing.

13 HANDLE HEATING



Current testing

Generator test 2

Switch off the handle heating.

Check current between the plug located at the middle of the switch and the cylinder (ground).

No current – Check wire and generator (181 148 060) for damage, replace if necessary.

Handle heating switch 3

Both handles are constantly or intermittently heated, although the heating switch is turned off:

Check the insulation cap (038 146 030) on the middle contact for damage, replace if necessary.

Switch off switch and pull the plug in the middle. Check current between the two connections.

Current – Replace switch (975.001.230).

Switch on the handle heating and check for current.

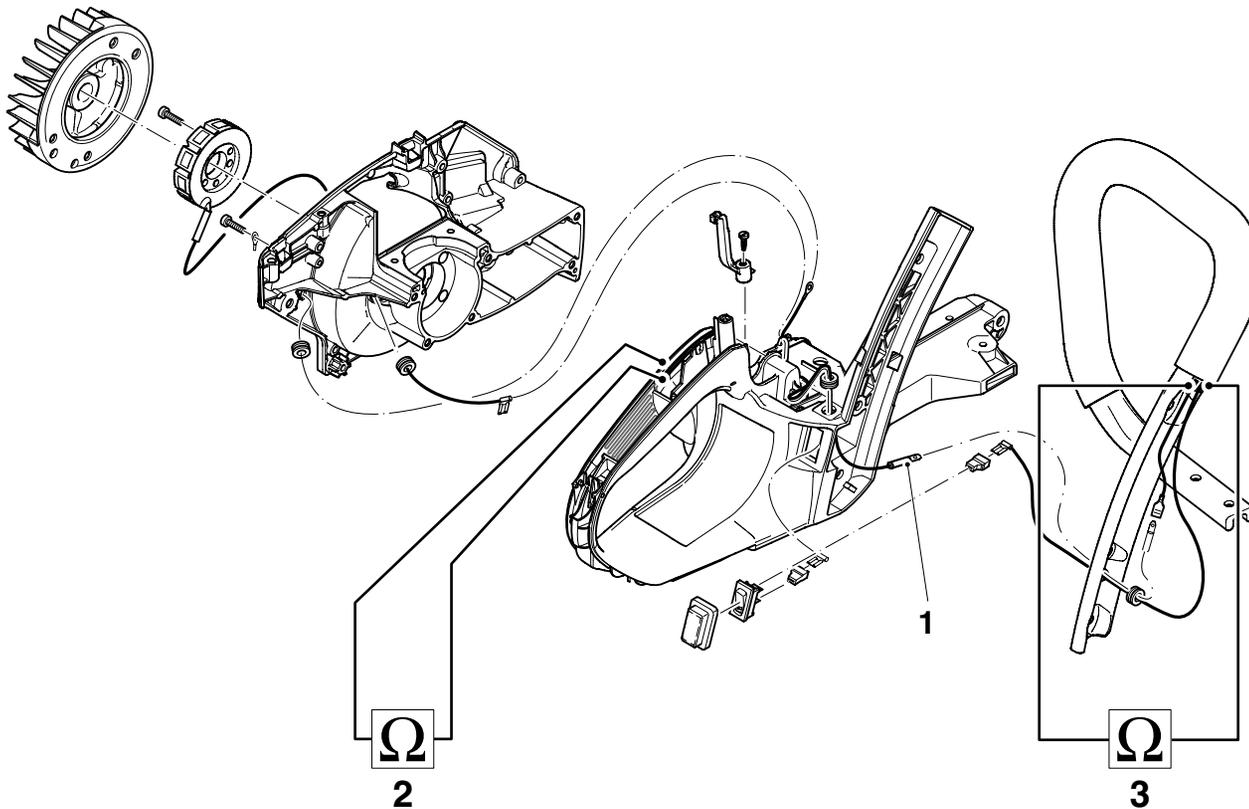
No current - Replace switch (975.001.230).

Ground wire 4

Check current between the upper solder point on the heating film in the handle and the cylinder (ground).

No current – Ground system. If necessary replace tank.

13 HANDLE HEATING



Resistance testing

Heating film in rear handle 2

Unplug plug 1 in the front handle.

Test resistance between the two solder points on the heating film in the handle.

Resistance should be approx. **0.9 Ohm** ($\pm 10\%$ at approx. 20°C / 68°F)

If the resistance is not correct, the tank (181 114 170) must be replaced.

Heating film in front handle 3

Measure resistance between the two solder points on the heating film in the front handle.

Resistance should be approx. **5.1 Ohm** ($\pm 10\%$ at approx. 20°C / 68°F)

If the resistance is not correct, the front handle (181 310 150) must be replaced.

14 TORQUES

Fastener	Part No.	Size	Qty.	Torque
Crankcase sides	908.905.205	M 5 x 20 Torx		9.5 -0.5
Cylinder on crankcase	908.405.205	M 5 x 20 Torx with lock teeth	6 x	12 +/-0.5
Carburetor bottom on crankcase	908.905.205	M 5 x 20 Torx	4 x	5 +/-0.5
Muffler on cylinder	908.905.205	M 5 x 20 Torx	4 x	9.5 +/-0.5
Sheet-metal plate mounting on muffler	908.005.095	M 5 x 9 Torx with lock teeth	2 x	7 +/-0.5
Sheet-metal plate mounting on crankcase magnet side	908.905.165	M 5 x 16 Torx	2 x	7 +/-0.5
			1 x	
Carburetor / intake manifold in carburetor flange	908.505.555	M 5 x 55 Torx with lock teeth	2 x	2.5 +/- 0.25
Intake manifold on carburetor bottom	913.455.164	M 5.5 x 16 Torx	1 x	4 +/-0.5 (with spring washer)
Carburetor flange on carburetor bottom	928.405.000	M 5.5 x 16 Torx	2 x	4 +/-0.5
Oil pump mounting on crankcase	913.455.164	M 5 x16 Torx	1 x	5 +/-0.5
Clutch to crankshaft	908.905.165	M 12 x 1 L with assembly wrench for centrifugal clutch	1 x	35 +/-2.5
Transmission cover on crankcase	---	M 5 x16 Torx	1 x	5 +/-0.5
Mounting bolt in bar flange	908.905.165	M 8, screw in to dimension 20.5 +/-0.5	2 x	-
Sprocket guard mounting	905.808.205	M 8, A/F 13, 6KT nut with flange	2 x	1.5 +/-0.5
Chain brake cover	923.208.004	M 5 x 15 Torx	3 x	5 +/-0.5
Ignition mounting in crankcase	913.850.155	M 5 x 20 Torx	2 x	8 +/-0.5
Flywheel nut fastening	908.905.205	M 8 x 1 / A/F 13	1 x	25 +/-1
Impact protection mounting, cylinder side	920.308.024	M 5 x 20 Torx	1 x	5 +/-0.5
Impact protection mounting, magnet side	908.905.205	M 5 x 20 Torx	1 x	5 +/-0.5
Cable drum fastening in starter housing	908.905.205	M 5.5 x 20 Torx	1 x	4.5 +/-0.5
Starter housing to crankcase	913.455.204	M 5 x 20 Torx	4 x	6.5 +/-0.5
Handguard bearing on magnet side	908.905.205	M 5 x 20 Torx	1 x	6.5 +/-0.5
Grip shell / rear handle on tank	908.905.205	M 5.5 x 20 Torx	1 x	3.5 -0.5
Front handle on tank, side	913.455.204	M 5.5 x 20 Torx	1 x	5 -0.5
Front handle on tank, bottom	913.455.204	M 5.5 x 16 Torx	2 x	5 -0.5
Front handle side cover on tank	913.455.164	M 5.5 x 20 Torx	1 x	5 -0.5
Damping spring fastening on cylinder	913.455.204	M 5 x 20 Torx, included in damping spring	1 x	5 +0.5
Damping spring / tank, mag. side rear	908.005.205	M 5.5 x 25 Torx, part of spring	1 x	5 -0.5
Damping spring / tank, cyl. side front	913.455.254	M 5.5 x 25 Torx, part of spring	1 x	5 -0.5
Damping spring cylinder / handle side cover	913.455.254	M 6 x 20 Torx with lock teeth	1 x	5 +/-0.5
Damping spring / crankcase, mag. side	908.006.205	M 6 x 20 Torx with lock teeth	1 x	5 +/-0.5
Damping spring / crankcase, cyl. side	908.006.205	M 6 x 20 Torx with lock teeth	1 x	5 +/-0.5
Spike bar mounting on crankcase	908.006.205	M 5 x 16 Torx	2 x	7 +/-0.5
Decomp. valve on cylinder (where present)	908.905.165	M 10 x 1 / A/F 13	1 x	8 +0.5
Spark plug	001.131.150	M 14 x 1.25 / A/F 19	1 x	25 +/-5
Handle heating generator mounting	965.603.021	M 4 x 12	3 x	2.5 +/-0.25
Handle heating short-circuit wire	901.504.127	M 4 x 12	1 x	2.5 +/-0.25
Kabelführung / Kraftstofftank	901.504.127	3.5 x 9.5	1 x	0.7 +/-0.1

