

WORKSHOP MANUAL

Chainsaws

**137 – 937 – 141 – 941 – MT3700 – GS370 –
MT4100 – GS410 – MT440 – GS44 – MT4400 – GS440**





137 - 937 - 141 - 941 - MT3700 - GS370 -
MT4100 - GS410 - MT440 - GS44 - MT4400 - GS440 chainsaws

Suggested tools

- I. **Emak tool kit**
- II. **Compression tester:** to check thermal group
- III. **Electronic tachometer:** for 2 and 4 stroke engines

I.



p/n 3055125

II.



p/n 001000392A

III.



p/n 001000785

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1) Performance

- a) Compression test
- b) Decompressor inspection
- c) Cylinder and piston inspection
- d) Cooling system cleaning
- e) Muffler inspection



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- b) Fuel system test
- c) Tank breather inspection
- d) Engine seal test
- e) Manifold inspection
- f) Impulse hole



3) Ignition system

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- b) Spark plug inspection
- c) Spark arrester test
- d) Flywheel-coil air gap inspection
- e) Flywheel key way inspection



4) Oil pump, bar and shock absorber

- a) Oil tank breather inspection
- b) Oil filter inspection
- c) Oil pump inspection
- d) Sprocket inspection
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- f) Shock absorber replacement
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6) Tightening torques



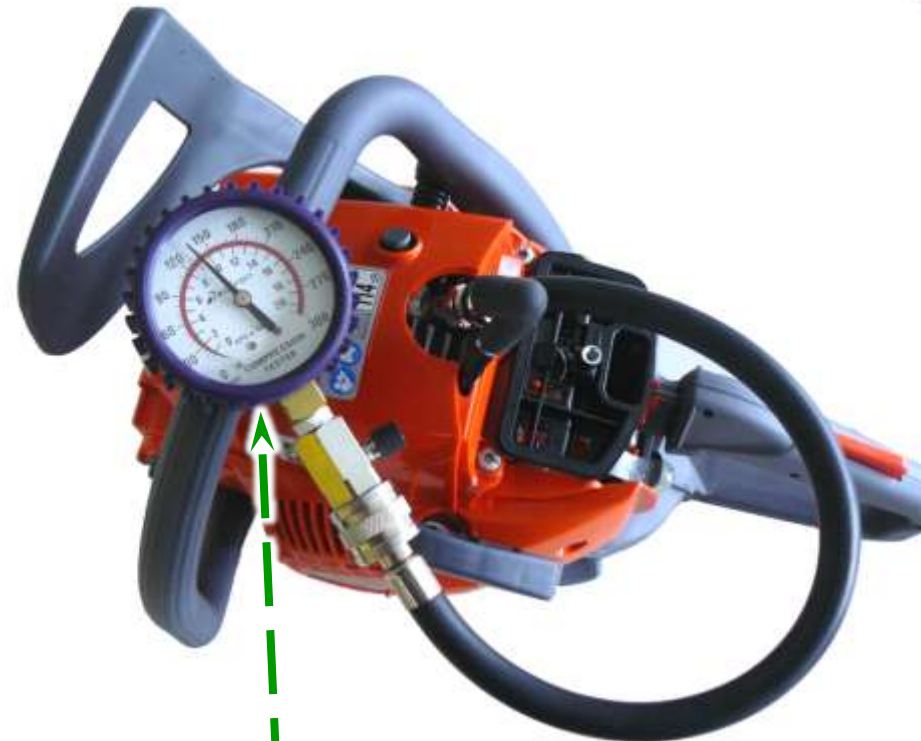
7) Trouble shooting

- a) The engine does not start
- b) Low performance
- c) Additional problems

1) Performance

- a) **Compression test**
- b) **Decompressor inspection**
- c) **Cylinder and piston inspection**
- d) **Cooling system cleaning**
- e) **Muffler inspection**

- a) **Compression test**
 - Apply the Emak compression tester (**I**) on cylinder. Pull energetically the rope 10 times
 - Verify that the compression value is not less than **8 bar – 120 psi**
 - If the value is higher than 8 bar – 120 psi, start inspection **d**), if not, carry on with inspections **b**) (for machines equipped with the decompressor) and **c**)



I
p/n 001000392A

b) Decompressor inspection (for machines equipped with the decompressor)

Verify that the decompressor and the decompression hole on the cylinder is not closed to carbon deposits.
Clean and/or replace if necessary.



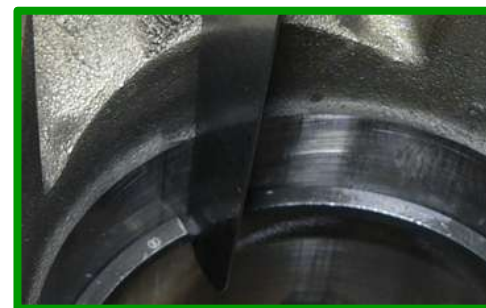
c) **Cylinder and piston inspection**

- Verify the diamond scoring on piston and the nickel lining on cylinder
- Verify the piston rings wear using feeler gauge (gap max 0.6 mm)

Tightening torque cylinder - screws
0,6 Kgm (52,08 in lb) + Loctite 243



Warning: during assembly
make sure the circlip has
the feet pointing up



Warning:
The arrow on the top of the
cylinder points towards the
exhaust port.



d) Cooling system cleaning

Blow, with compressed air, cylinder fins, starter case and flywheel

Important:

- Clean **weekly** the cooling system. For heavy duty work, clean it **every day**
- Use Loctite 243 to tighten plastic component

Tightening torque cover-basement
0,35 kgm (30,38 in lb) + Loctite 243



Tightening torque cover
0,3 kgm (26,02 in lb) + Loctite 243



e) Muffler inspection

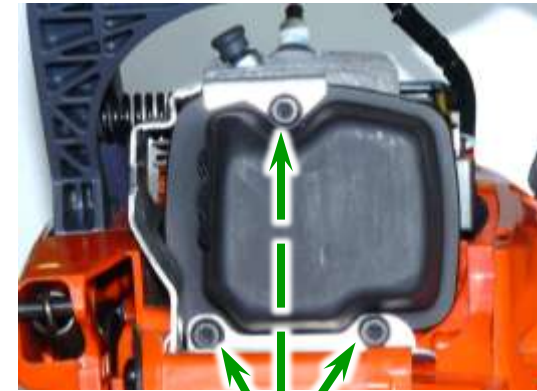
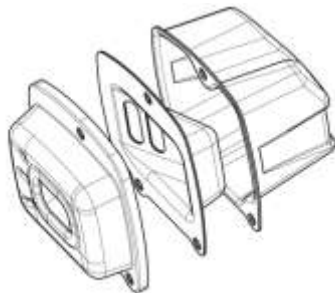
Catalytic muffler

Verify the conditions of the muffler (dirt / oily)
change if necessary

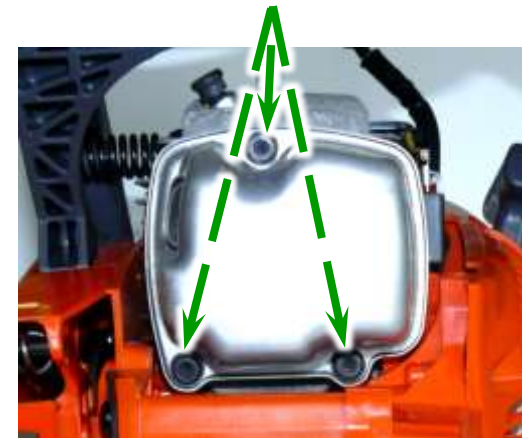


Non-catalytic muffler

If the muffler is blocked or damaged, clean or replace it



Tightening torque cover muffler-muffler
0,55 kgm (47,74 in lb) + Loctite 243



2) Fuel system

- a) **Fuel and fuel filter inspection**
- b) **Fuel system test**
- c) **Tank breather inspection**
- d) **Engine seal test**
- e) **Manifold inspection**
- f) **Impulse hole**



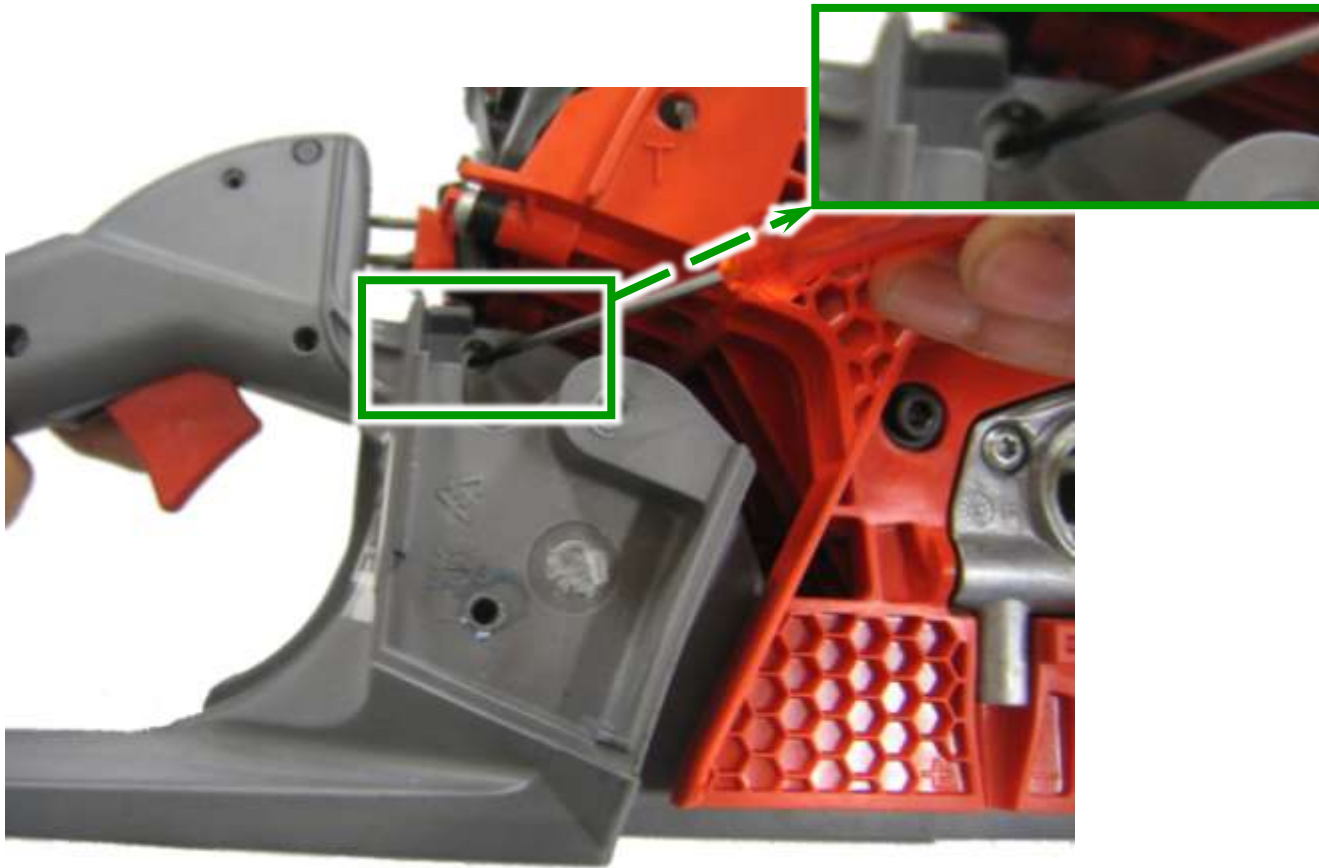
- a) **Fuel and fuel filter inspection**
 - Verify fuel quality odor
 - Dismount and check periodically the fuel filter and the sintered internal filter. In case of dirt or oxidation, replace it
- b) **Fuel system test**
 - Apply the pressure gauge at the fuel line. Check any possible leakage at 0,5 bar
 - If the pressure is not stable, it may indicate worn fuel system or loose at the carburetor parts

Go to

Carburetor inspection

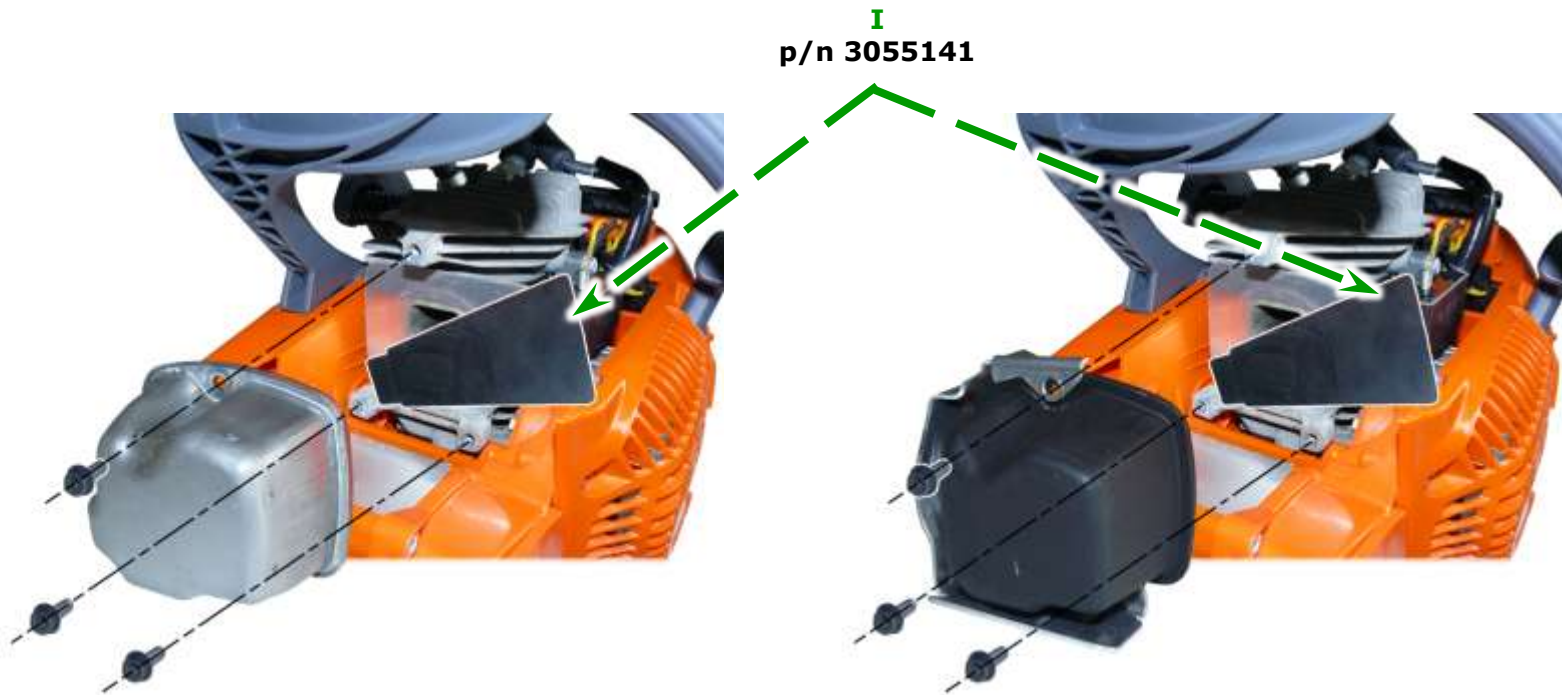


- c) **Tank breather inspection**
Dismount the breather and check the components



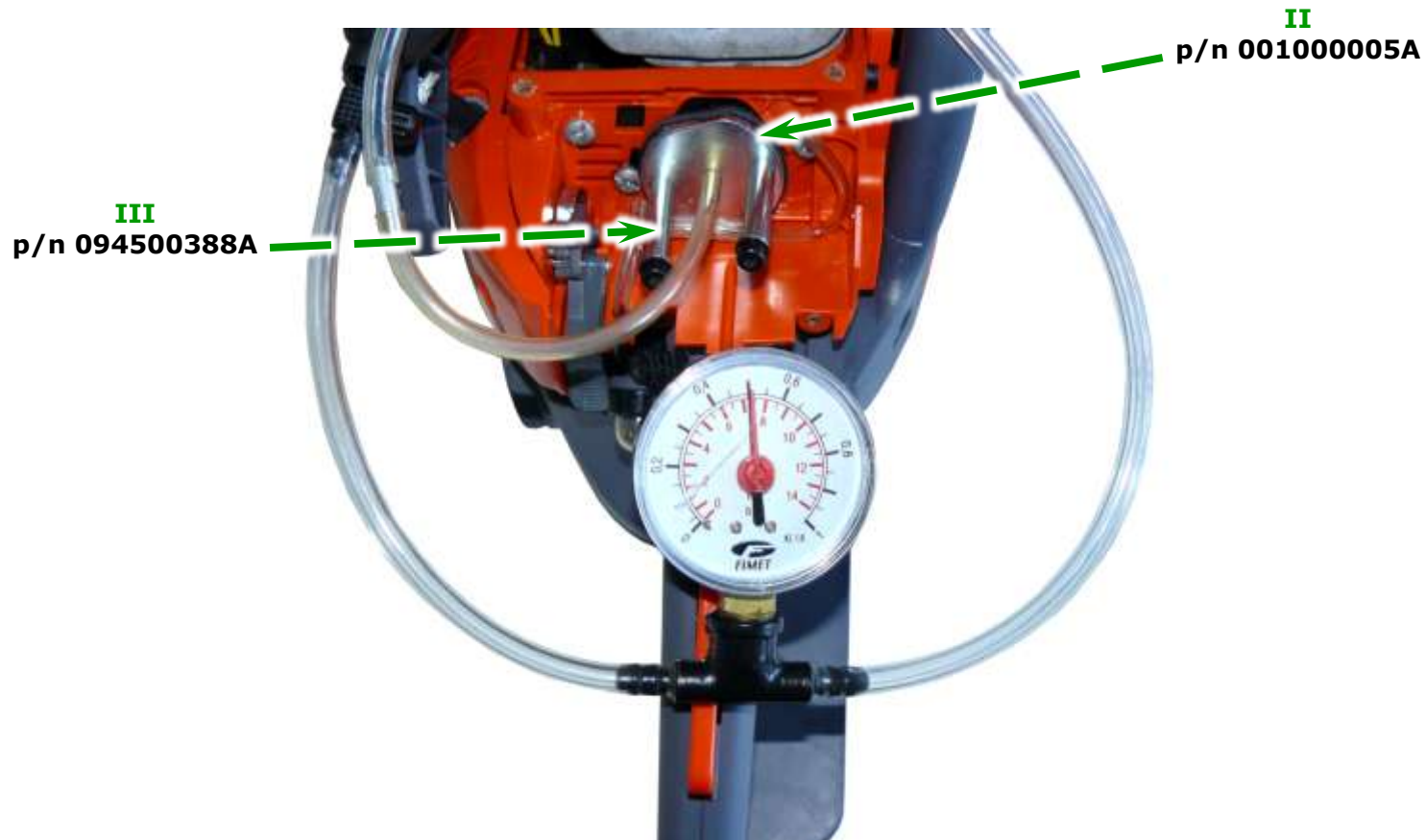
d) Engine seal test

- Loosen the muffler and insert the gasket (I) between muffler and cylinder. Once inserted the gasket tighten the screws of the muffler for closing the exhaust port.



Warning:
During the seal test use only a light
torque of 0,4 Kgm (35 in lb)

- Remove the air filter support, the carburetor and close the intake port with the flange (II) and the spacer (III).
- The pressure must remain stable at 0.5 bar. If the engine loses pressure, find the leak and repair. Retest for seal



e) Manifold inspection

Check the manifolds for wear. Verify that the manifold's rubber is not deteriorated or hardened and check that there are no cuts or holes. Replace if necessary



f) Impulse hole

Verify that the impulse hole is not blocked



Impulse hole

Warning!
Make sure the impulse path is correctly inserted into the cylinder hole.

3) Ignition system

- a) Starter housing inspection
- b) Spark plug inspection
- c) Spark arrester test
- d) Flywheel-coil air gap inspection
- e) Flywheel key way inspection

a) **Starter housing inspection**

Remove housing. Inspect parts for wear. If necessary clean or replace

Counterclockwise
turn to release
the spring



Important: grease moving parts

Clockwise turn
to wind the
spring

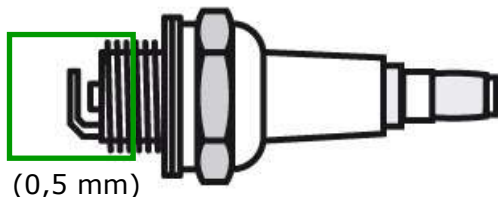
Wind the spring 7 times.
Ø 3,0 x 960 mm



Important: make
sure the spring does
not wind fully with
the rope fully out

b) Spark plug inspection

Remove the spark plug and check the gap between the electrodes (0.5 mm)



RCJ-7Y (35,2 cm³ - 39,0 cm³)
CMR7A (42,9 cm³)



c) Spark arrester test

- Fit the spark tester (**I**) between spark plug and spark plug cap. Pull the rope and verify the current
- Replace the spark plug if necessary
- Check the two wires, ignition coil and switch

I
p/n 001000515R



d) Flywheel - coil air gap inspection

- Check the air gap using the shim (**II**-0.3 mm)
- Otherwise proceed with the adjustment

Tightening torque coil-screws
0,45 Kgm (39,05 in lb) + Loctite 243 **II**
p/n 001000004



Tightening torque flywheel-nut
1,9 kgm (168,2 in lb)

e) Flywheel key way inspection

- Remove flywheel with correct tool (**III**)
- Inspect the condition and the position of the key way. If necessary, exchange or adjust

III
p/n 001000782



4) Oil pump, bar and shock absorber

- a) Oil tank breather inspection
- b) Oil filter inspection
- c) Oil pump inspection
- d) Sprocket inspection
- e) Chain brake inspection
- f) Shock absorber replacement
- g) Lubrication and bar maintenance

- a) **Oil tank breather inspection**
 - Clean with compressed air
 - Verify the quality of the bar and chain oil

- b) **Oil filter inspection**
Check the oil filter. If it is dirty, clean it. Apply liquid gasket before reassemble

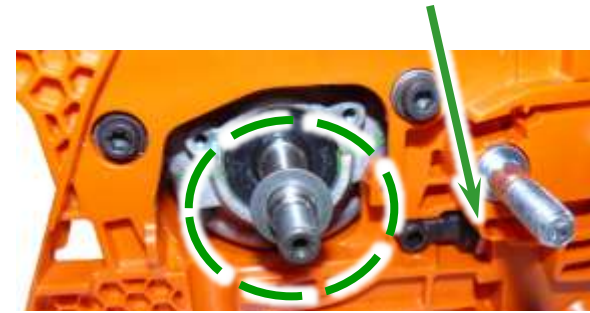
Tightening torque crankcase-screws
0,7 Kgm (60,75 in lb)
+ Loctite 243



c) Oil pump inspection

- Insert the piston stop (I) from the sparkplug hole and remove the clutch
- Remove the oil pump, check the pump and worm gear
- Be sure to put the washer on crankshaft before reassembling the pump

Warning!
Use a liquid gasket to seal in the hose to the saw body



- 35,2 cm³ - 39,0 cm³ : p/n 001000684
- 42,9 cm³ : p/n 3055127



Tightening torque clutch
2,2 kgm (190,95 in lb)
+ Loctite 243



Important: If the gear inside the pump is hard to turn, disassemble all components and clean them using Emak detergent

d) Sprocket inspection

Check the sprocket wear periodically. Replacement is suggested every 100 hrs. or before

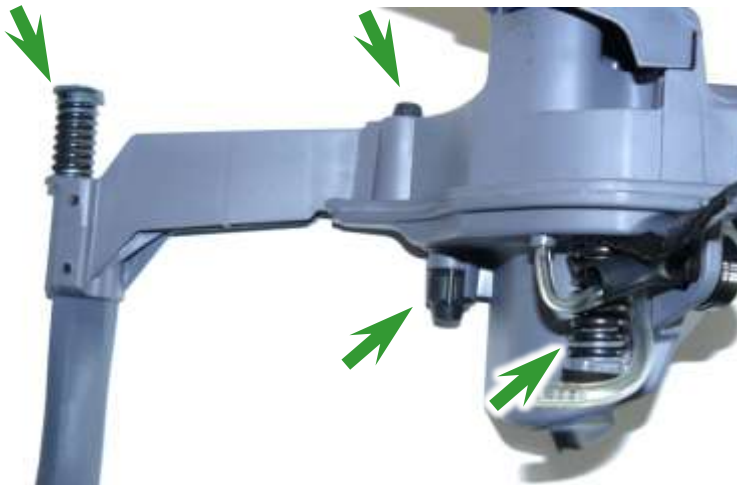


e) Chain brake inspection

Check the break band for wear. This must be changed if the wear limit is less than 0.6 mm

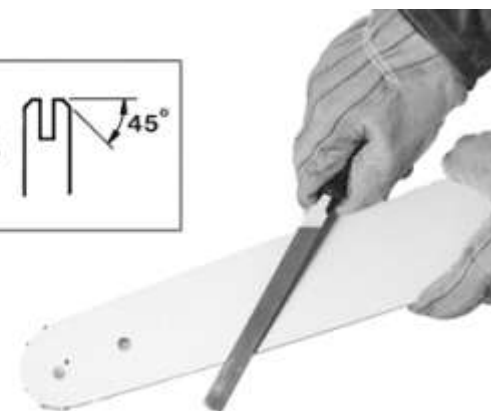
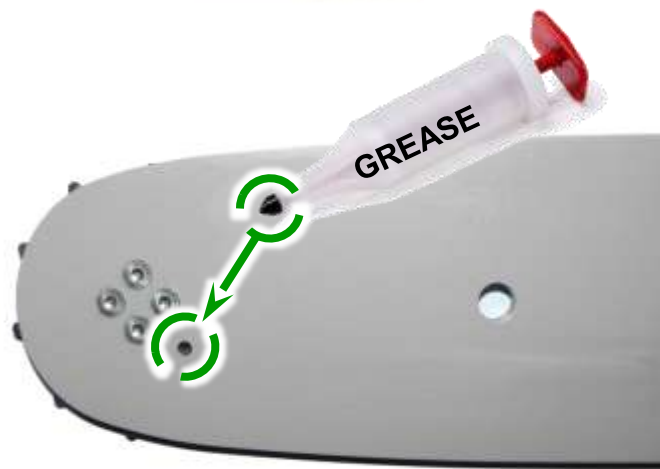
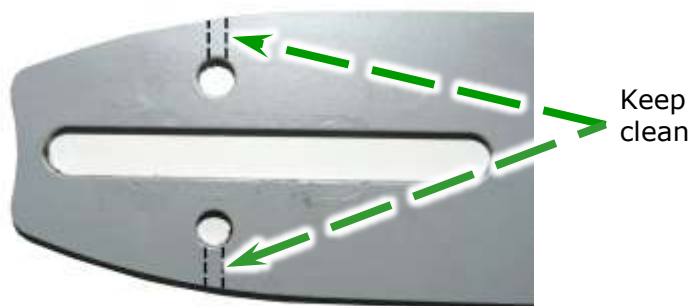


- f) **Shock absorber replacement**
In case of wear or breakage replace the parts



g) Lubrication and bar maintenance

- Lubricate the sprocket nose
- Keep the rail and the lubrication hole cleaned
- Check the parallelism of the guide bar and for sharp metal edges
- Turn the bar every 8 hrs. to allow for uniform wear



5) Tuning

- a) **Air filter inspection**
- b) **Needle valve inspection**
- c) **Carburetor inspection**
- d) **Suggested tools**
- e) **Carburetion setting**

Tightening torque carburetor-screws
0,4 Kgm (34,72 in lb)



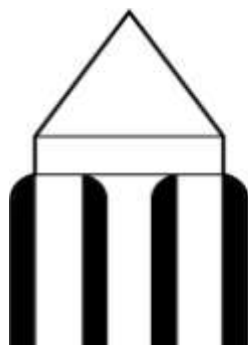
- a) **Air filter inspection**
 - Clean with Emak detergent, rinse with water and blow with compressed air in the opposite direction of the normal air flow
 - Replace the filter when damaged

b) Needle valve inspection

Check the right position of the valve using a caliper. Adjust if necessary



WALBRO



OK

needle



replace

c) Carburetor inspection

Check and clean all components (diaphragm, needle, filter). Use the repairing kit to replace worn components. If the carburetor is oxidized, it must be replaced



WALBRO

d) Suggested tools

- I. **Special screwdriver for caps-lock:** to unblock the two caps-lock before tuning the saw
- II. **Special screwdriver to adjust the jets with caps-lock:** pass through the caps-lock to turn the jets



Screw anti-clock wise and pull out the caps (5 mm)

I
p/n 001001342



To set carburetion use the special screwdriver

II
p/n 001001070R

e) Carburetion setting

Correct tuning of the **EURO 1** (direttiva 97/68/CE + 2002/88/CE) and **EURO 2** (direttiva 97/68/CE + 2002/88/CE + 2004/26/CE).

Carburetor's jet regulation:

The jets L & H are factory set by Emak to comply with Euro 1 Regulations, these are then restricted by the "Caps Lock". With the caps lock fitted the jets L & H have only $\frac{1}{4}$ turn of adjustment

The jets have the following factory registration: $L=2+\frac{1}{2}\pm\frac{1}{4}$; $H=3+\frac{1}{4}\pm\frac{1}{4}$

When, following a repair or engine overhaul, you are obliged to re-tune the carburetor to its' original setting.

Follow, step by step, this procedure:

Idling adjustment (L)

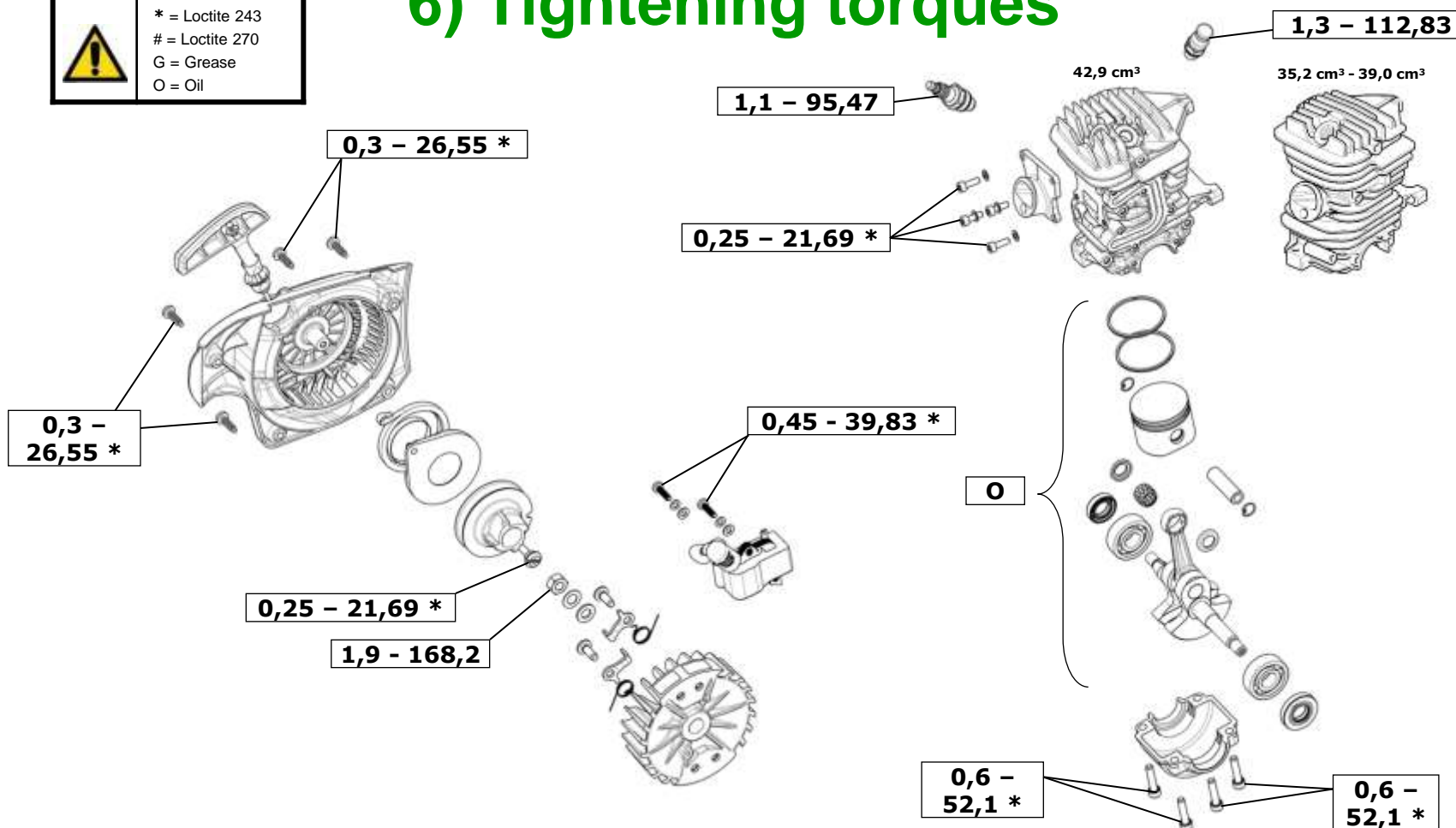
1. Remove the caps locks from the carburetor jets;
2. Start the unit and warm up for 180 seconds, accelerating and decelerating (**do not take the unit to full throttle no load**);
3. Close the L jet until the maximum number of rpm is reached (stop rotating the jet before the rpms drop or the unit stalls);
4. Adjust the T screw until the unit reaches an idle rpm between **3900/4400**;
5. Open the jet L until rpm drops to between **2700/3100 rpm**;

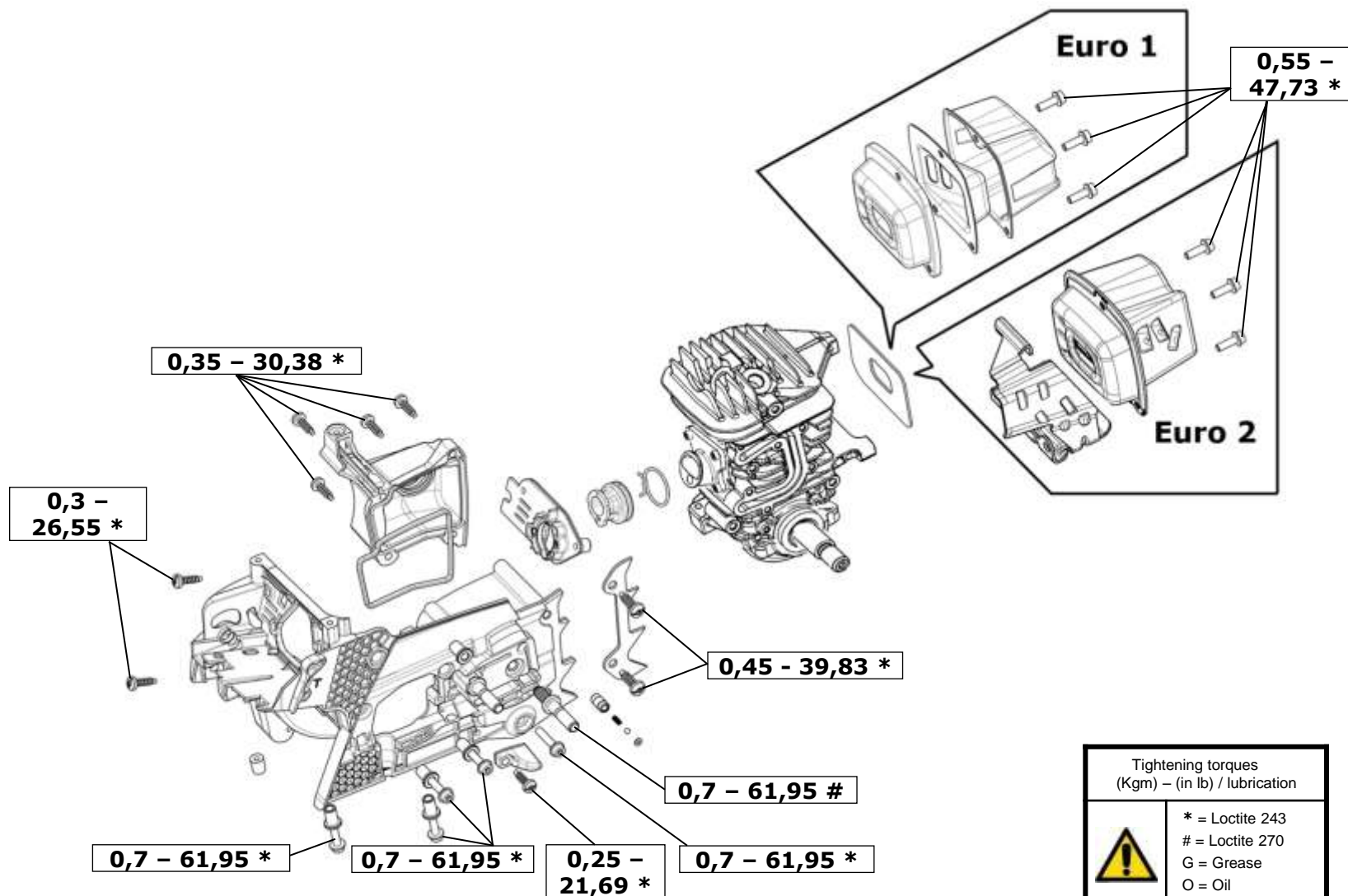
Maximum adjustment (H)


6. Adjustment of the jet H for wide open throttle operation fitted with bar and chain (standard 16" - 41 cm):
35,2 cm³ - 39,0 cm³: 11000/11500 RPM new engine; **12100/12500 RPM** with run-in engine;
42,9 cm³: 11000/11500 RPM new engine; **12500/13000 RPM** with run-in engine;
7. Block the L & H jets with new caps.

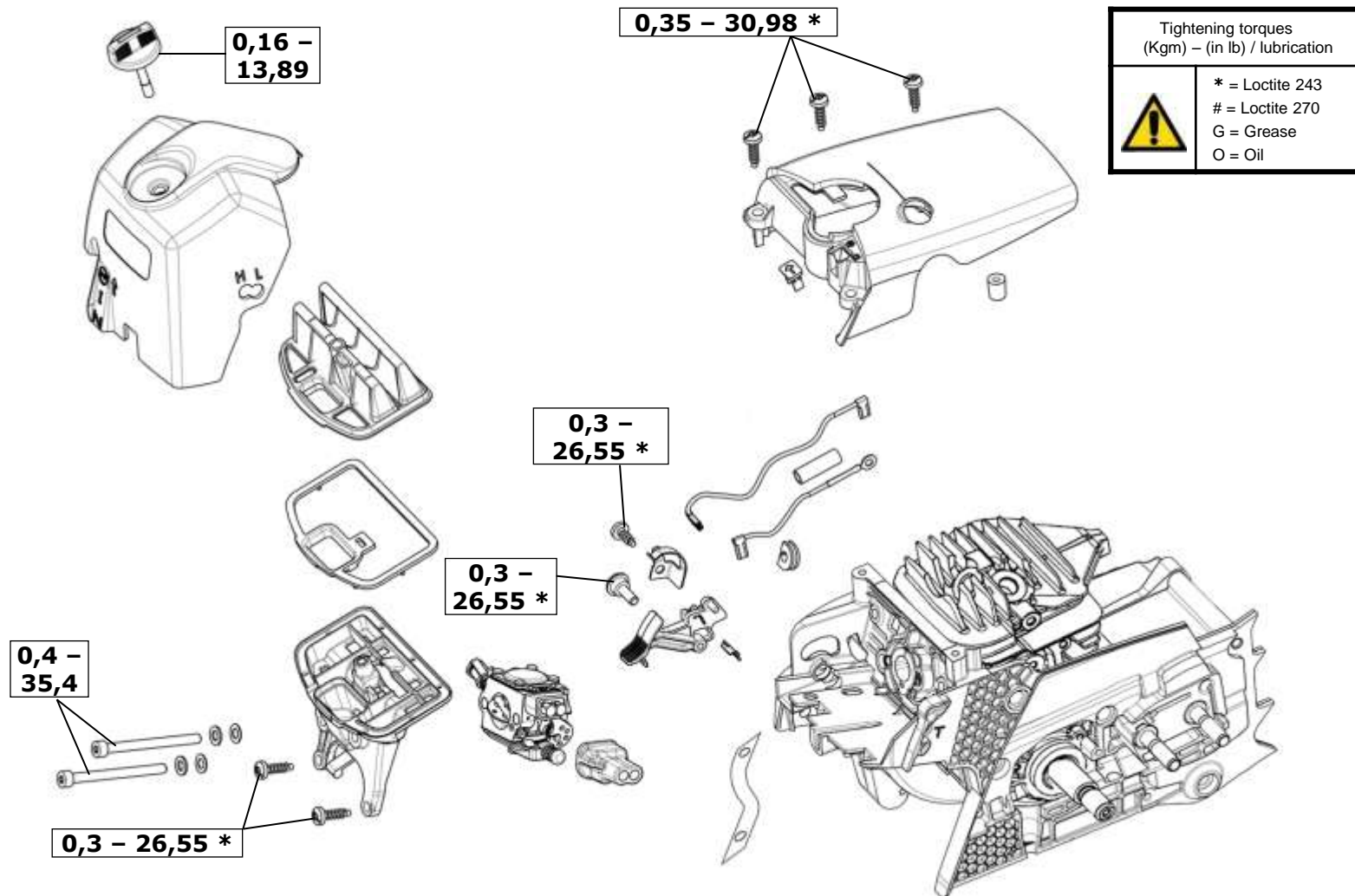
6) Tightening torques

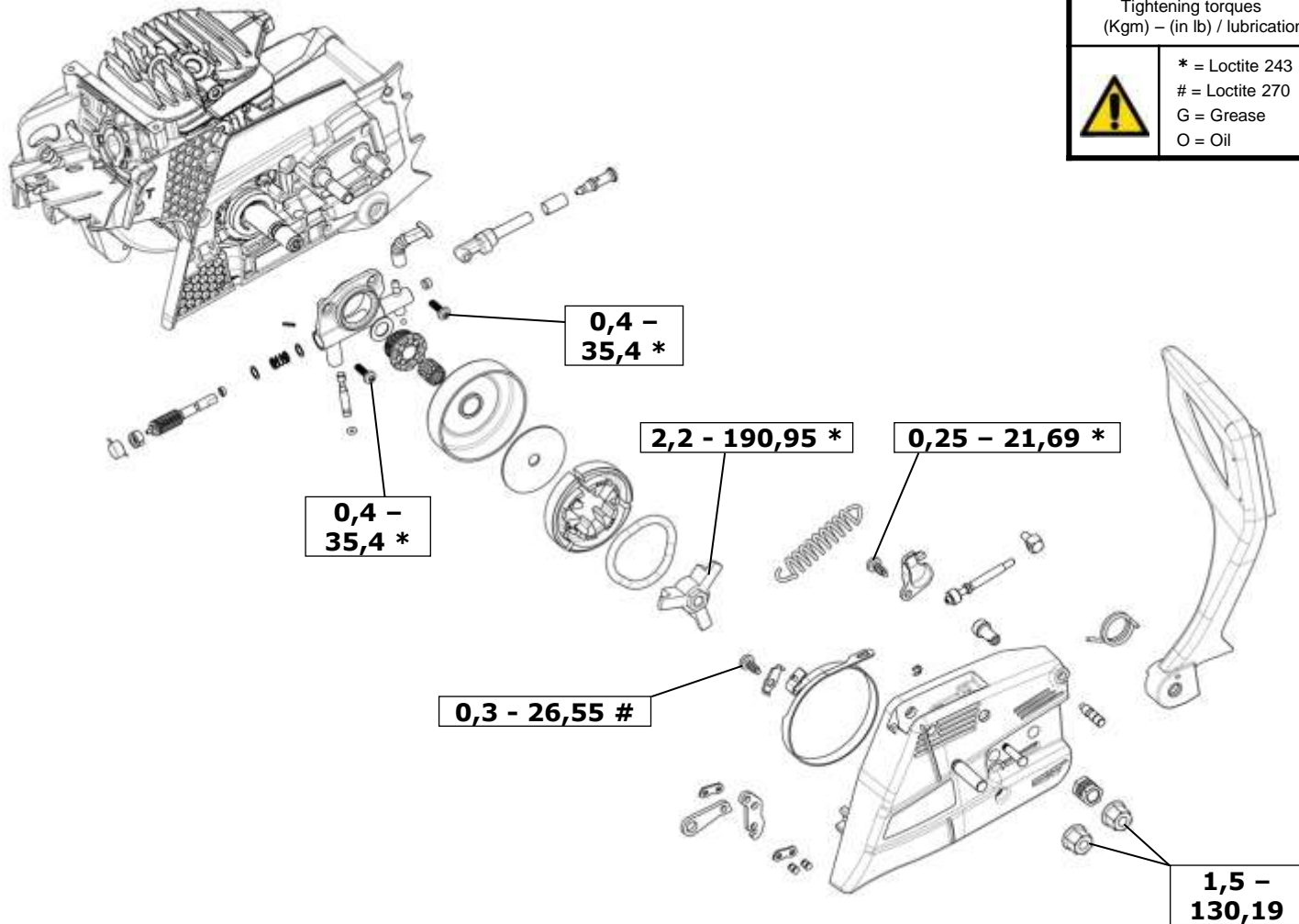
Tightening torques (Kgm) – (in lb) / lubrication	
	* = Loctite 243
	# = Loctite 270
	G = Grease
	O = Oil







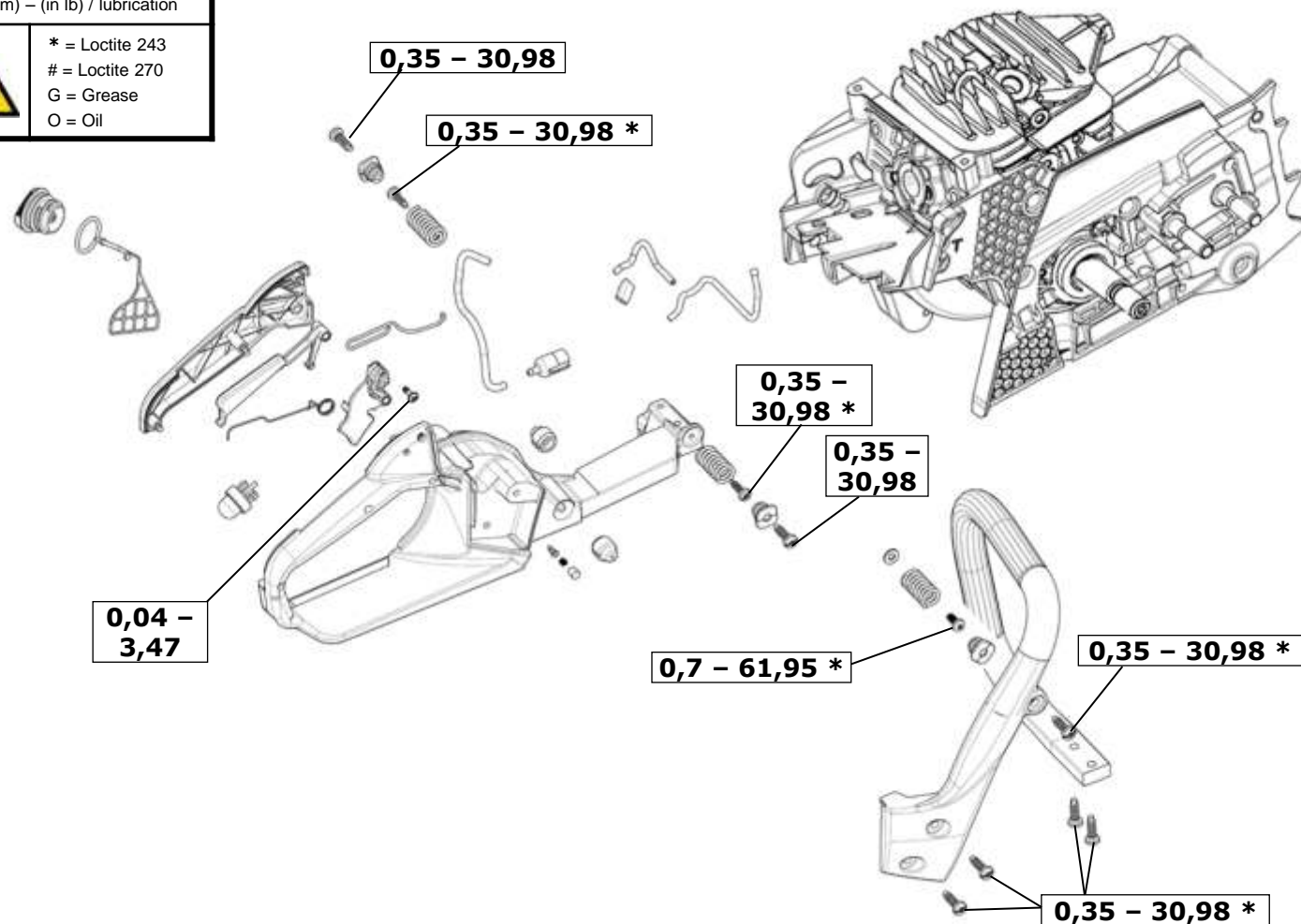
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Tightening torques (Kgm) – (in lb) / lubrication	
	* = Loctite 243
	# = Loctite 270
	G = Grease
	O = Oil





7) Trouble shooting: ENGINE DOES NOT START

Symptoms	Causes	Remedies	Go to
1. The engine does not turn over	<p>1.a Starter assy defect or broken starter rope</p> <p>1.b Internal damage</p>	<p>1.a Check starter assy or starter rope replacement</p> <p>1.b Check thermal group and replace worn components</p>	<p>Ch. 3</p> <p>Ch. 1</p>
2. There is no compression	<p>2.a Spark plug looses</p> <p>2.b Piston ring, cylinder and piston worn</p> <p>2.c Carbon deposit on decompressor or decompressor damage</p>	<p>2.a Tighten spark plug. Compression test</p> <p>2.b Replace worn or damaged parts. Compression test</p> <p>2.c Clean or replace</p>	<p>Ch. 1</p> <p>Ch. 1</p> <p>Ch. 1</p>
3. No spark	<p>3.a Ignition switch is in "OFF" position</p> <p>3.b Ignition system defected</p> <p>3.c Broken spark plug or wrong type</p>	<p>3.a Switch "ON" and restart</p> <p>3.b Inspect and/or replace</p> <p>3.c Replace the spark plug</p>	<p>Ch. 3</p> <p>Ch. 3</p>
4. Fuel does not reach the carburetor, the machine stops after 5 minutes	<p>4.a Fuel filter or breather blocked</p> <p>4.b Fuel system is leaking air</p> <p>4.c Wet spark plug, flooded cylinder</p>	<p>4.a Clean or replace</p> <p>4.b Tightness test on fuel system</p> <p>4.c Carburetor inspection (point 5.c). Take off spark plug, rotate the engine, blow inside cylinder passing through spark plug hole, dry the spark plug and restart</p>	<p>Ch. 2</p> <p>Ch. 2</p> <p>Ch. 5</p>
5. Wrong carburetion setting or erratic throttle response	<p>5.a Air filter dirty</p> <p>5.b Wrong L and H setting</p> <p>5.c Carburetor problems</p> <p>5.d Manifold problems</p>	<p>5.a Clean or replace</p> <p>5.b Adjust the carburetion according the above</p> <p>5.c Carburetor inspection</p> <p>5.d Manifold tightness</p>	<p>Ch. 5</p> <p>Ch. 5</p> <p>Ch. 5</p> <p>Ch. 2</p>

Trouble shooting: LOW PERFORMANCE

Symptoms	Causes	Remedies	Go to
1. Engine overheating	1.a Carburetor mixture too lean	1.a Set the carburetor	Ch. 5
	1.b Air leaking in the engine or in fuel system	1.b Find air leaking and eliminate it	Ch. 1
	1.c Wrong oil-fuel ratio	1.c Replace with fresh fuel and right oil ratio	Ch. 2
	1.d Fan, starter housing, cylinder fins dirty or damage	1.d Clean or replace it	Ch. 1
	1.e Carbon deposit on piston	1.e Eliminate deposit	Ch. 1
2. Engine performance is not stable	2.a Dirty air filter	2.a Clean or replace	Ch. 5
	2.b Loose spark plug or damaged	2.b Tighten or replace	Ch. 3
	2.c Water in the fuel	2.c Clean the carburetor and replace fuel	Ch. 5
	2.d Seizure	2.d Replace the components	Ch. 1
	2.e Faulty carburetor or diaphragm	2.e Check and replace	Ch. 5
	2.f Carbon deposit on decompressor or decompressor damage	2.f Clean or replace	Ch. 1

Trouble shooting: ADDITIONAL PROBLEMS

Symptoms	Causes	Remedies	Go to
1. The chain does not work correctly or does not rotate	1.a Bended or worn bar	1.a Replace or maintain	Ch. 4
	1.b Lubrication system blocked	1.b Clean or replace	Ch. 4
	1.c Worn sprocket	1.c Replace sprocket	Ch. 4
	1.d The chain is not sharp	1.d Sharpen the chain	 Owner's manual
	1.e Chain too tight	1.e Correct tension/assembly bar and chain	 Owner's manual