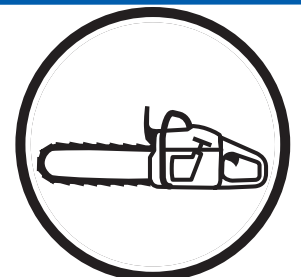


Workshop manual
455 Rancher



English

Workshop manual

Husqvarna 455 Rancher

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Introduction

Arrangement of the manual

This workshop manual can be used in two different ways.

- To repair a specific sub-assembly on a chainsaw.
- To dismantle and reassemble a complete chainsaw.

Repairing a specific sub-assembly

If a specific sub-assembly on the chainsaw needs to be repaired:

1. Look up the page referring to the relevant sub-assembly.
2. Follow the instructions under the headings:
 - Removal/Dismantling
 - Cleaning and inspection
 - Refitting/Reassembly

Dismantling and reassembling the entire chainsaw

If the entire chainsaw is to be dismantled, follow the instructions under the heading "Removal/Dismantling".

Work through the manual and follow the instructions given in each section under the heading "Removal/Dismantling".

Then follow all the "Cleaning and inspection" instructions in each section.

Working from the back of the manual, follow all the instructions under the headings "Refitting/Reassembly" in reverse order.

Each of the sections covering removal/dismantling and refitting/reassembly include the relevant lubrication instructions and bolt torques for each stage of repair.

Construction and function

This chapter gives a simple description of the chainsaw carburettor and its various parts.

Troubleshooting

These pages describe the most common faults that affect a chainsaw. They are divided into four different groups with the most likely faults described first.

Repair instructions

The section that describes how to repair the chainsaw consists of detailed, step-by-step instructions. It explains in detail the special tools, lubricants and bolt torques that are needed when working on each component.

This workshop manual covers the following chainsaw models: 455

Safety regulations

General instructions

This workshop manual gives detailed instructions on how to troubleshoot, repair and test a chainsaw. This section also describes the various safety precautions that should be taken when carrying out repairs.

The workshop manual has been written for personnel who are assumed to have general experience of repairing and servicing chainsaws.

Workshops where chainsaws are repaired must be equipped with safety equipment that meets local regulations.

No-one should carry out repairs on a chainsaw until they have read and understood the contents of this workshop manual.

Chainsaws are type-approved to meet the relevant safety legislation, but this only applies when the saw is fitted with the cutting equipment specified in the user's manual. The fitting of any other equipment, or of accessories or parts that are not approved by Jonsered, could mean that the saw no longer meets these safety requirements and the person who carried out the work may be held responsible for its non-conformance.

In this workshop manual the following boxes indicate where caution should be taken.



WARNING!
The warning text warns of the risk of personal injury if the instructions are not followed.

NOTE!

The warning text warns of the risk of material damage if the instructions are not followed.

Special instructions

The fuel that is used in a chainsaw poses the following hazards:

- The fuel and its fumes are toxic.
- May cause irritation to skin or eyes.
- May cause breathing difficulties.
- Highly flammable.

When using compressed air the air jet should never be pointed at the body. Air can be forced into the bloodstream and cause fatal injury.

Wear ear protection when testing saws.

After testing a saw do not touch the silencer until it has cooled down. The silencer gets very hot and you may burn yourself. Wear protective gloves when working on the silencer.

The guide bar, chain and clutch cover (chain brake) must be fitted before the saw is started. If not, the clutch may come loose and cause injury.

Poor chain lubrication can result in failure of the chain, which could cause serious or fatal injury.

Take care to ensure that the spring inside the starter assembly does not fly out and cause injury. Wear eye protection. If the spring is under compression when the pulley is removed it could fly out and cause injury.

Before removing the tensioning spring from the chain brake, ensure that the brake is in the on position, otherwise the spring may fly out and cause injury.

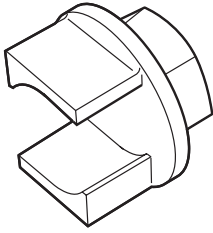
After completing the repair the chain brake must be tested, see "Chain brake – reassembly \ Operating test".

Always consider the fire risk. A chainsaw can produce sparks that could start a fire.

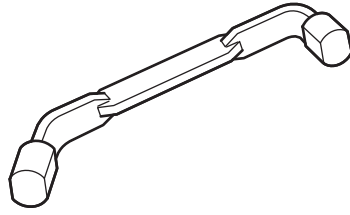
Inspect the chain catcher and replace it if it is damaged.

Special tools

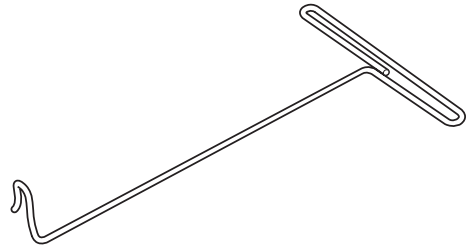
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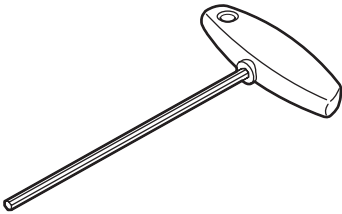
2



3



4



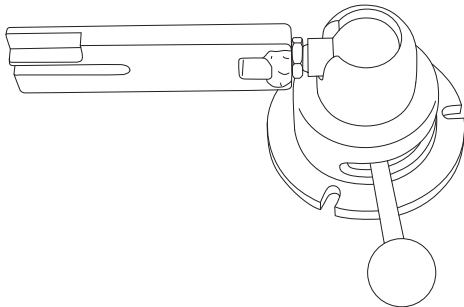
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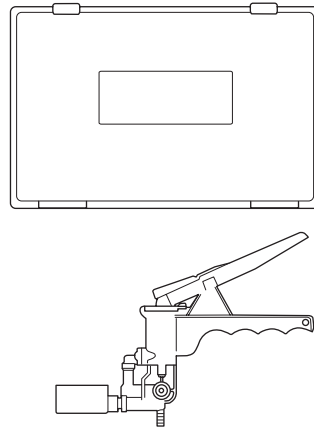
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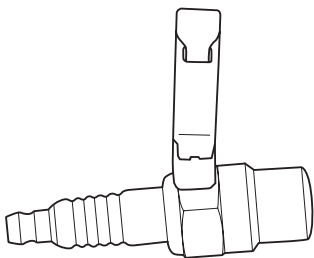
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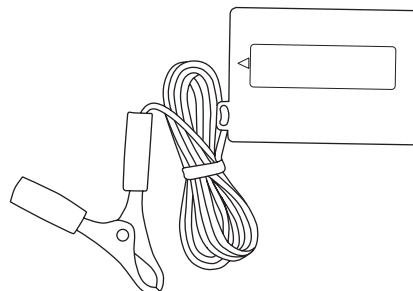
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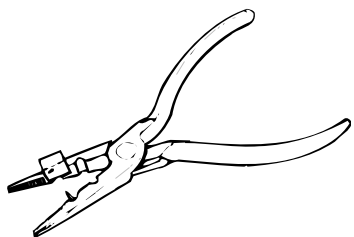
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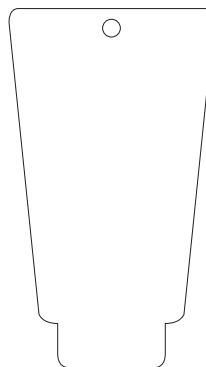
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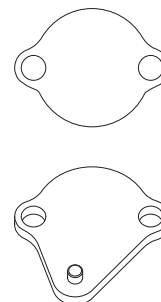
11



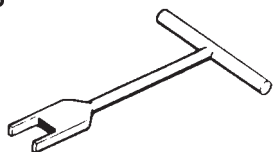
12a



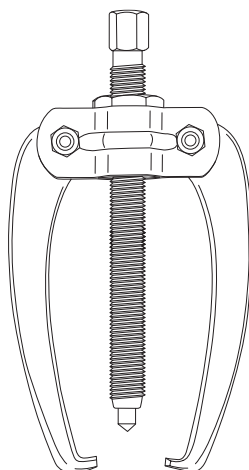
12b



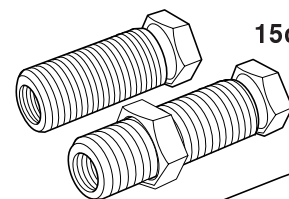
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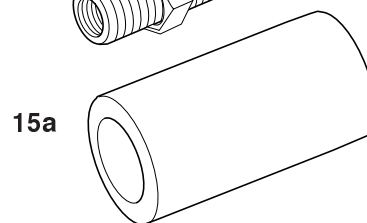
14



15b

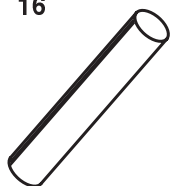


15c



15a

16



Item	Description	Used for	Order no.
1	Clutch tool	Centrifugal clutch	502 52 22-01
2	Piston stop	Locking the crankshaft	504 91 06-05
3	Fuel filter hook	Withdrawing the fuel filter	502 50 83-01
4	Allen key	For M5 bolts	502 50 18-01
5	Pressure tester	Pressure testing cylinder	502 84 40-02
6	Feeler gauge	Adjusting ignition module	502 51 34-02
7	Assembly fixture	Assembling chain saw	502 51 02-01
8	Pressure gauge	Pressurisation during testing	531 03 06-23
9	Test spark plug	Checking the ignition module	502 71 13-01
10	Rev counter	Adjusting carburettor	502 71 14-01
11	Assembly pliers	Fitting spark plug guard	502 50 06-01
12a	Cover plate, exhaust	Sealing the exhaust port	502 54 11-02
12b	Cover plates, inlet	Sealing the intake manifold	502 52 48-01
13	Assembly tool	Assembling spring, chain brake	502 50 67-01
14	Puller	Pulling bearing of crankshaft	504 90 90-01
15a	Sleeve	Fitting crankshaft	502 50 30-18
15b	Shaft extension	Flywheel side	502 50 30-18
15c	Shaft extension	Clutch side	502 50 30-18
16	Punch	Dismantling the flywheel	502 51 94-01

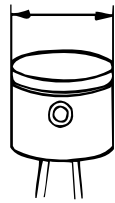
Technical data



Displacement
cm³/cubic inches

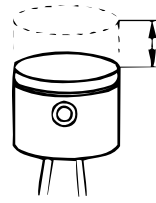
455:

55,5 / 3,38



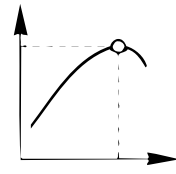
Cylinder bore
Ø mm/Ø inches

47 / 1,85"



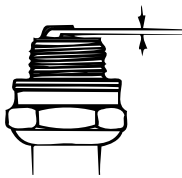
Stroke
mm/inches

32 / 1,28"



Max power/speed
kW/hp/rpm

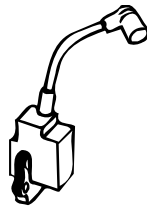
2,5 / 3,4 / 9 000



Spark plug gap
mm/inches

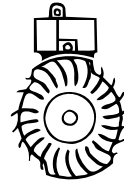
455:

0,5 / 0,02"



Ignition system

SEM CD



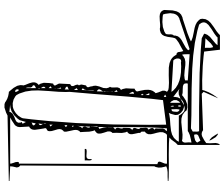
Air gap
mm/inches

0,3 / 0,012"



Carburettor type

Walbro WTA 29



Effective cutting length
cm/inches

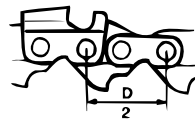
455:

31-50 / 13"-20"



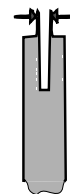
Chain speed at
max power – revs
m/s – rpm

17,3 / 9 000



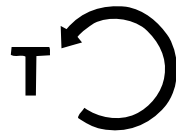
Chain pitch
mm/inches

9,52 / 3/8
8,25 / 0,325"



Drive link
mm/inches

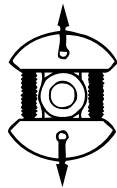
1,3 / 0,050" - 1,5 / 0,058"



Idling speed
rpm

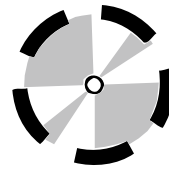
455:

2 700



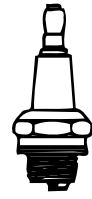
Engagement speed
rpm

3 800



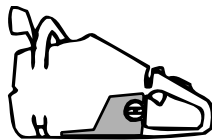
Max. speed
rpm

13 500



Spark plug

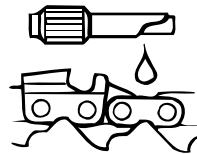
NGK BPMR 7A
Champion RCJ 7Y



Fuel tank capacity
Litres/US pints

455:

0,44 / 0,93



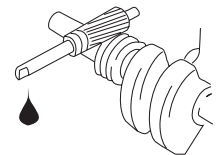
Oil pump capacity at
8,500 rpm,
ml/min

9



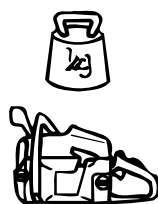
Oil tank capacity
Litres/US pints

0,32 / 0,68



Automatic oil pump

Yes



Weight without
bar and chain
kg / lbs

455:

5,8 / 12,8



Weight with
bar and chain
kg / lbs

6,2 / 13,6

Carburettor

Carburettor



WARNING!

The fuel used in the chainsaw has the following hazardous properties:

1. The fluid and its fumes are poisonous.
2. Can cause skin irritation.
3. Is highly inflammable.

Description

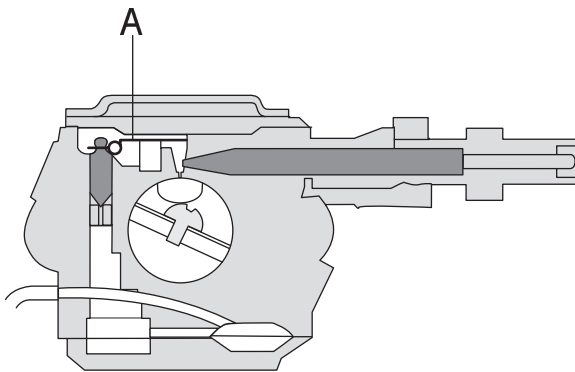
The drawings accompanying this description do not correspond with the carburettor on the chainsaw. They only show the principle for the design and function.

Design

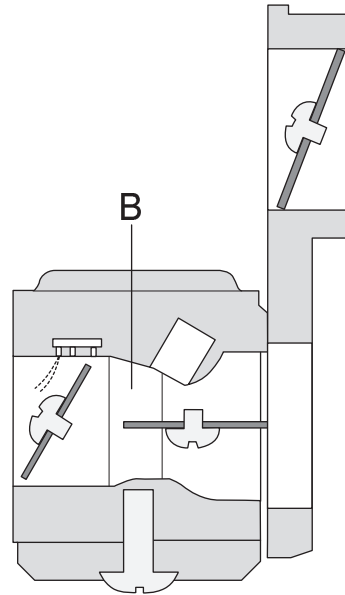
The carburettor is based on three sub-systems:

- The metering unit, A.
- The mixing venturi, B.
- The pump unit, C.

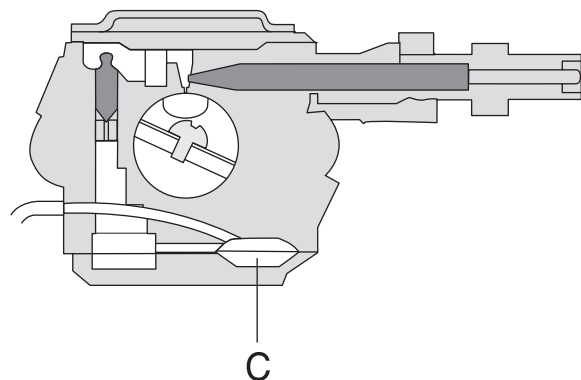
The jets and the fuel's control functions are located in the metering unit (A). Here the correct quantity of fuel is adjusted for the actual speed and power output.



The mixing venturi (B) houses the choke, throttle valve and diffuser jets. Here air is mixed with the fuel to give a fuel/air mixture that can be ignited by the ignition spark.



In the pump unit (C), fuel is pumped from the fuel tank to the metering unit. One side of the pump diaphragm is connected to the crankcase and pulses in time with the pressure changes in the crankcase. The other side of the diaphragm pumps the fuel.

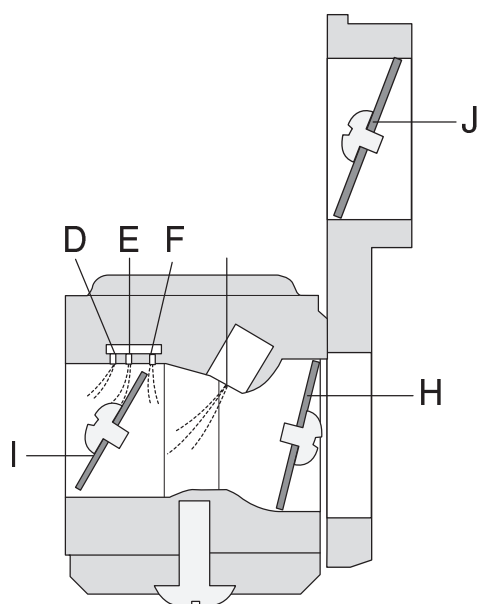


Function

The carburettor operates differently in the following modes:

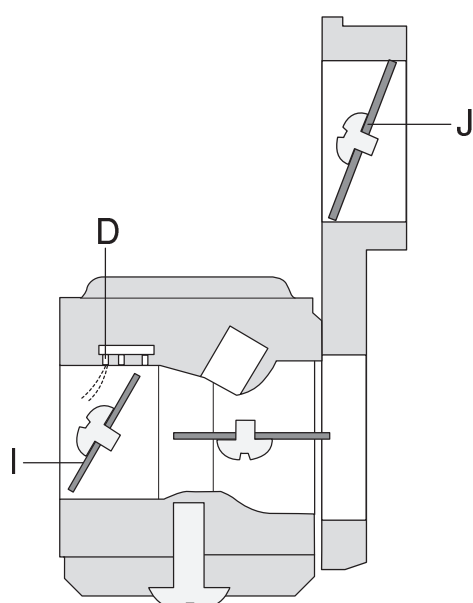
- Cold start mode
- Idling mode
- Part throttle mode
- Full throttle mode

In the cold start mode (see figure below) the choke valve (H) is fully closed. This increases the vacuum in the carburettor so that fuel is sucked more easily from all the diffuser jets (D, E and F). The throttle valve (I) is partly open. Extra air inlet (J) is closed.

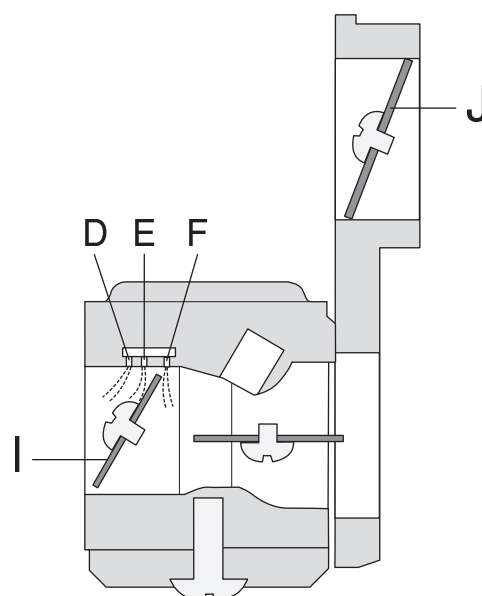


In the idling mode the throttle valve (I and J) is closed.

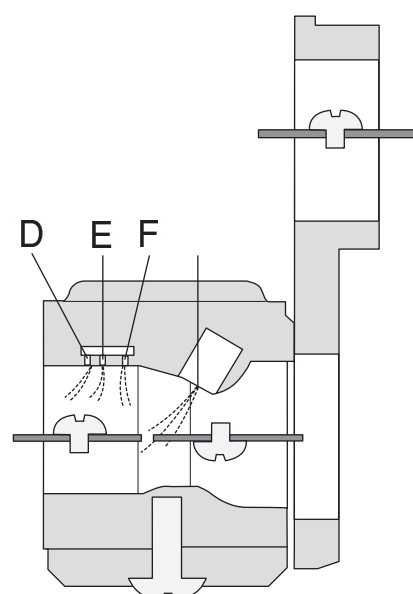
Air is sucked in through an aperture in the throttle valve and a small amount of fuel is supplied through the diffuser jet (D).



In the part throttle mode the throttle valve (I) is partially open. Fuel is supplied through the diffuser jets (D and E).

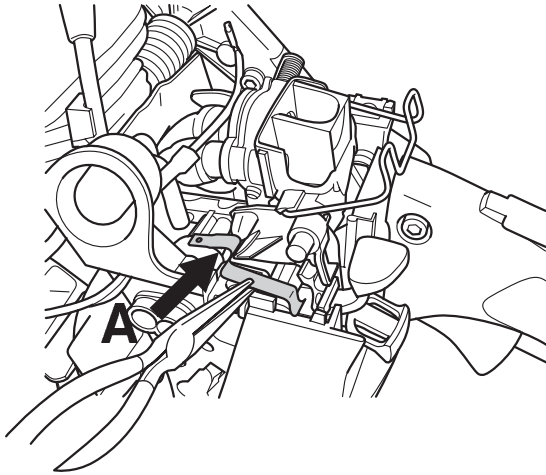


In full throttle mode all valves are open and fuel is supplied through all diffuser jets (D, E, F and G). Extra air inlet (J) is also fully opened.



Carburettor – removal

1

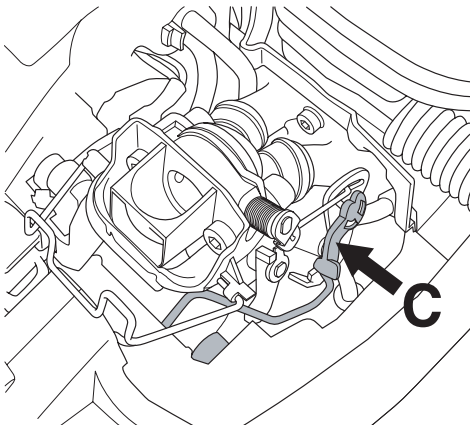


NOTE!

Do not use knurled pliers to disconnect or reconnect the fuel hose. This could damage the hose and lead to leakage or fracture.

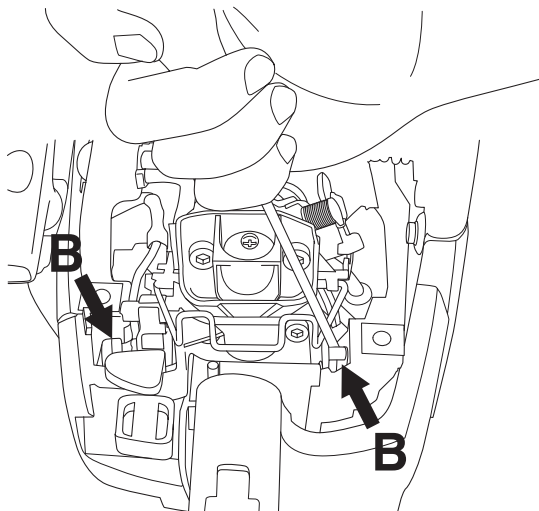
Remove the cylinder cover and air filter. Disconnect the leads from the stop switch and the fuel hoses from the carburettor. Pull out and lift up the strip (A), see figure.

2



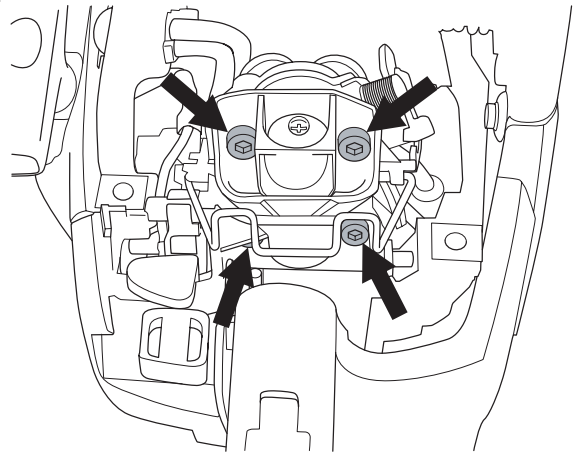
Dismantle the throttle actuator rod by pulling out and lifting up C from its seating. First remove the throttle actuator rod from the lever and then from the handle.

3



Loosen the carburettor's rubber mounting (B).

4



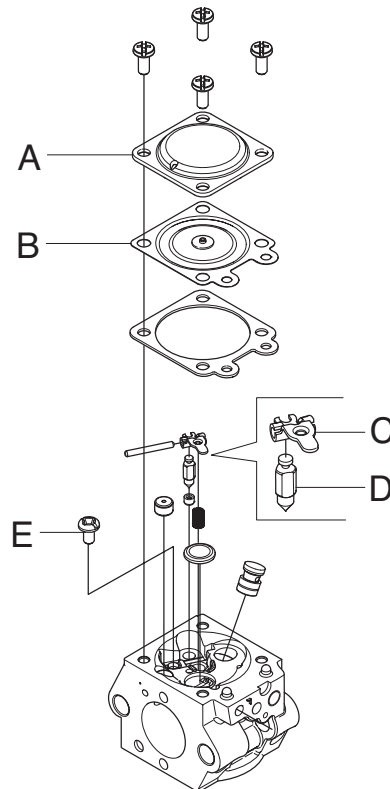
Loosen the screws (4) on the carburettor. Lift the carburettor out of the carburettor compartment.

5

Remove the cover (A) over the metering unit and carefully remove the metering diaphragm (B) and gasket. See figure below.

6

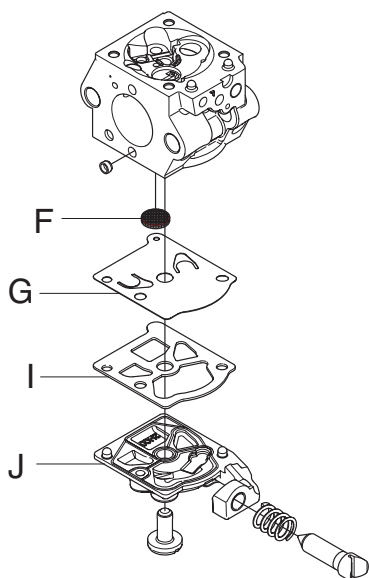
Remove the screw (E) and take out the needle valve (D) with lever (C), spindle and spring. See figure below.



7

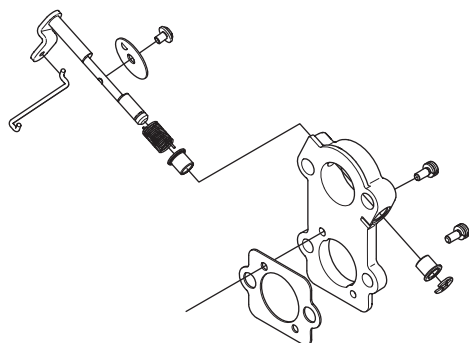
Remove the cover (J) over the pump unit and carefully remove the gasket (I) and pump diaphragm (G). See figure below.

8
Use a needle or the like to carefully remove the fuel filter (F). See figure below.





9
Remove caps with the high and low speed screws. See figure below.

10
If necessary, remove the throttle and choke valves and remove the spindles together with levers and springs. See figure below.



Cleaning and inspection

	<p>WARNING! Fuel has the following hazardous properties:</p> <ol style="list-style-type: none"> 1. The fluid and its fumes are poisonous. 2. Can cause skin irritation. 3. Is highly inflammable.
---	---

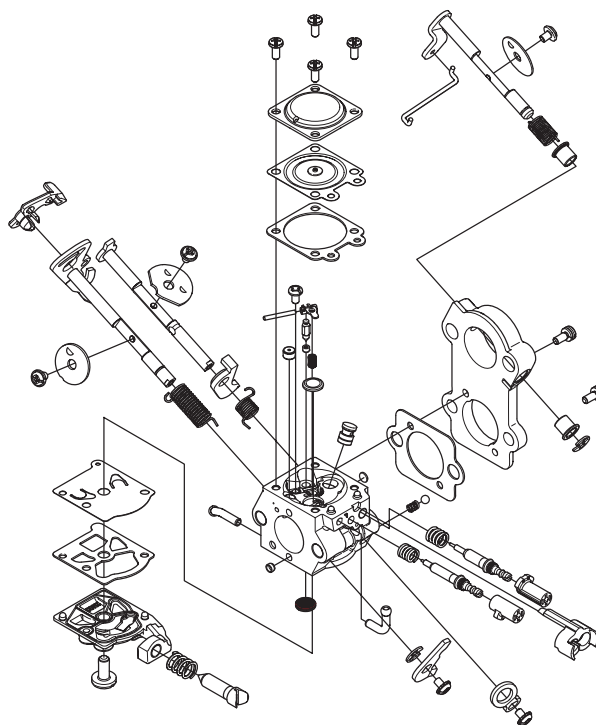
	<p>WARNING! Never direct the compressed air jet towards the body. Air can penetrate into the blood circulation, which means mortal danger.</p>
---	---

Clean all units in clean petrol.

Use compressed air to dry the petrol on the components. Direct the air through all channels in the carburettor housing and make sure that they are not blocked.

See figures on previous page and check the following:

- 1**
That gaskets, pump and control diaphragms are undamaged.
- 2**
That there is no play on the throttle and choke valve shafts.
- 3**
The needle valves and lever are not worn at C and D in figure on previous page.
- 4**
The fuel filter is undamaged.
- 5**
The tips of the high and low speed screws are not damaged.



6
The intake manifold is undamaged.

7
The carburettor has an extra air shutter connected in parallel with the ordinary throttle valve. The valve housing with axle is secured in the carburettor using two screws.

Assembly

Where no figure is referred to, see figure on the previous page.

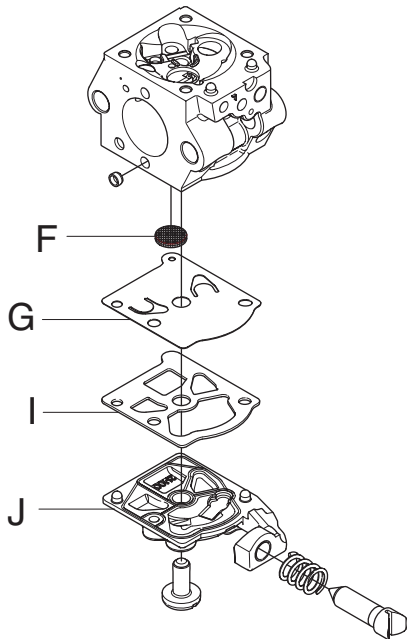
Maintain a high level of cleanliness when assembling the carburettor. The slightest contamination can result in running problems.

1
If the throttle and choke valves, together with levers and springs were removed, they should be refitted. Lubricate the spindle bearings with light oil.

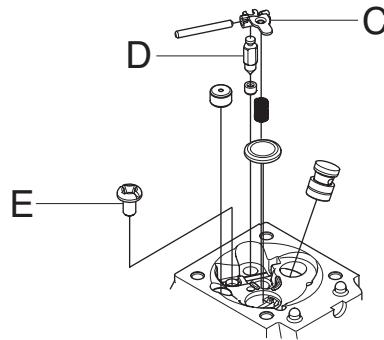
2
Fit the high and low speed screws and springs. Note! Do not fully tighten the screws. This will damage the seats and needle tips.

3
Fit the fuel filter (F) by using the handle of a small screwdriver. See figure below.

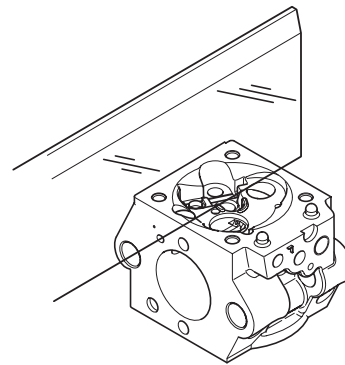
4
Fit the pump diaphragms (G and H), gasket (I) and cover (J) on the pump unit. See figure below.



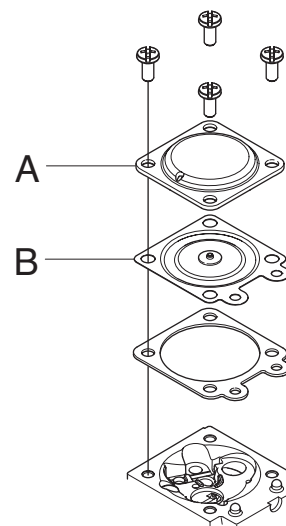
5
Fit the needle valve (D) with lever (C), spindle and spring and tighten the screw (E). Fit welch plug (K). See figure below.



6
Check with a ruler or the like that the lever is level 1.65 mm below plane. See figure below. If necessary, the lever can be bent slightly.

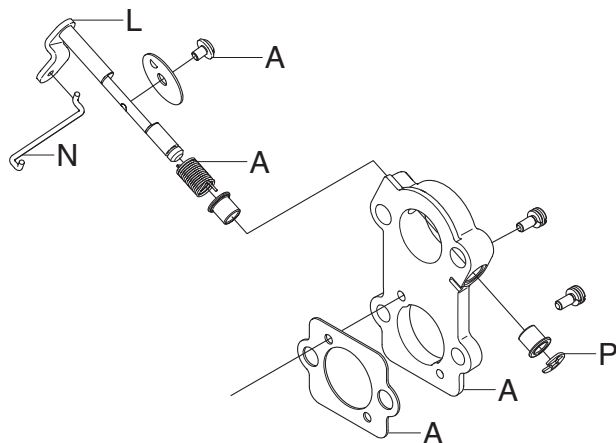


7
Fit the control diaphragm (B) with gasket and cover (A) on the metering unit. See figure below.



8
Fit the axle on the air shutter (L) and connect the throttle actuator rod (N) in parallel with the ordinary throttle valve. The valve housing (P) is secured in the carburettor using two screws.

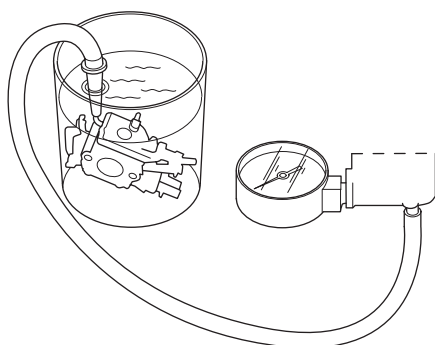
- 9
Carry out a pressure test.



Pressure testing

Pressure testing should be carried out with the carburettor fully assembled. Testing should always be carried out after the carburettor has been repaired, but it can also be carried out as trouble shooting before dismantling the carburettor.

See figure below and carry out the test as follows:



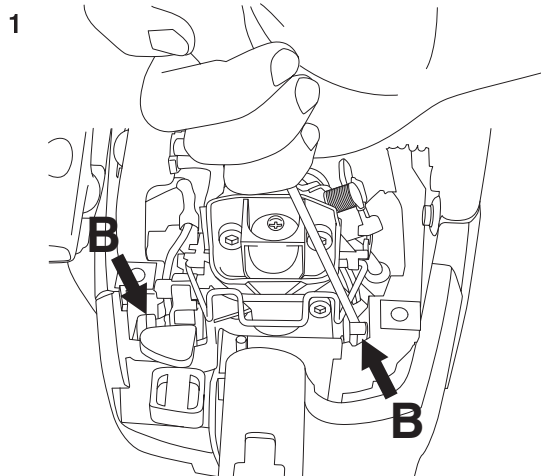
- 1
Unscrew the high and low speed screws one turn from closed position.
- 2
Connect pressure tester to the carburettor's fuel intake.
- 3
Lower the carburettor into a beaker of water.
- 4
Pump up the pressure to 50 kPa (0.5 bar).
- 5
No leakage is permitted. If a leakage occurs refer to the table below.

Leakage at	Fault with
Diffuser jets	Needle valve
Leakage in impulse tube	Pump diaphragm
Ventilation hole on metering unit.	Control diaphragm

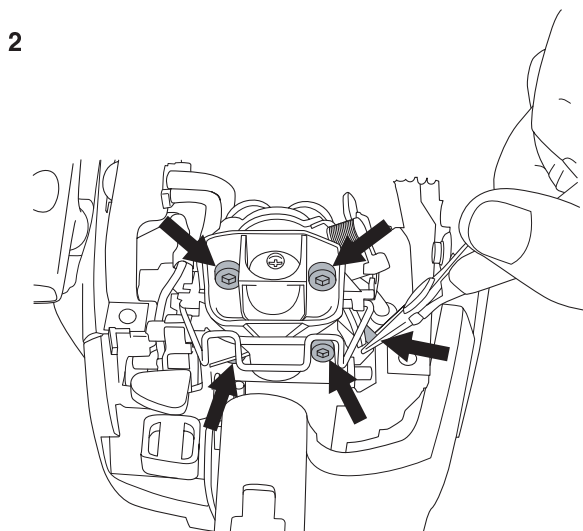
Carburettor – refitting

NOTE!

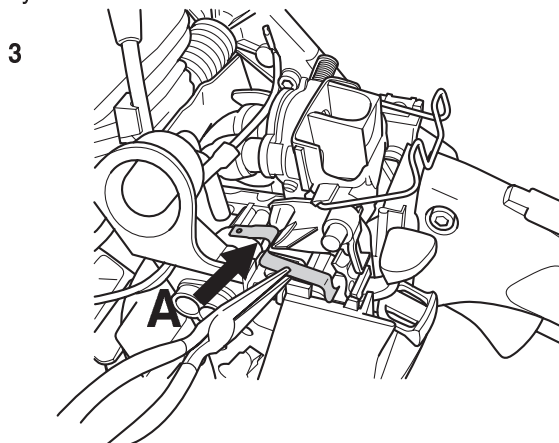
Cleanliness is very important when reassembling the carburettor. Tiny particles of dirt can cause operating problems.



1
Position the carburettor in the carburettor compartment. Fit the carburettor in the rubber mountings.



2
Tighten the carburettor screws (4) with a torque of 1-1.5 Nm. Fit the fuel hoses (2) Fit the throttle actuator rod and press down its lock. Secure the cables on the stop switch and fit the air filter and cylinder cover.



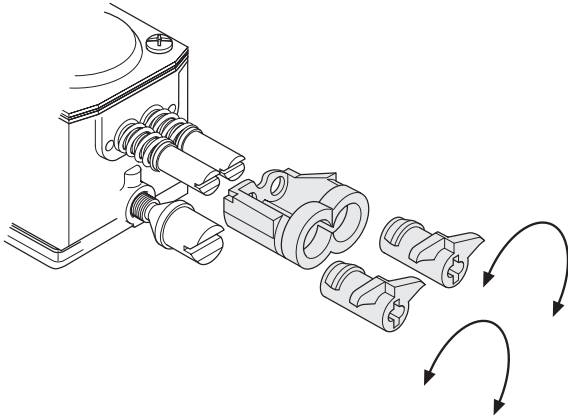
3
Connect the leads to the stop switch.

Basic adjustment for EPA II saws with capped carburetors

Model 455 is equipped with a capped carburettor. A slightly different adjustment procedure is necessary when replacing the carburettor or needles.

Capped carburettor

This means that this chain saw is equipped with movement limiters on the carburettor's adjuster screws. These limit the adjustment range to a maximum of 1/2 turn.



After replacing the carburettor or high speed and/or low speed needle on an EPA (The US Environmental Protection Agency) certified product, a basic adjustment must be carried out as described below in order to meet the EPA-requirements. This to achieve as low emissions as possible. This instruction is made for EPA certified products only.

On EPA carburetors both the H- and L-needles are fitted with caps to prevent the chain saw operator from changing the adjustment above EPA standard. The caps can be removed to achieve richer or leaner adjustments. To set the needles correctly an adjustment sleeve is fitted from the factory over the caps to lock them in maximum allowed settings.

When correctly set the caps must be fixed on the needles. The adjustment sleeve then can be removed. Over the caps on complete sparepart carburettor, there is a plastic sleeve which is intended to lock the caps at the richest position (anticlockwise towards stop) during the time that the needles are adjusted. When the adjustment is complete and the caps have been fixed on the needles, the sleeve is no longer of any function and can be removed.

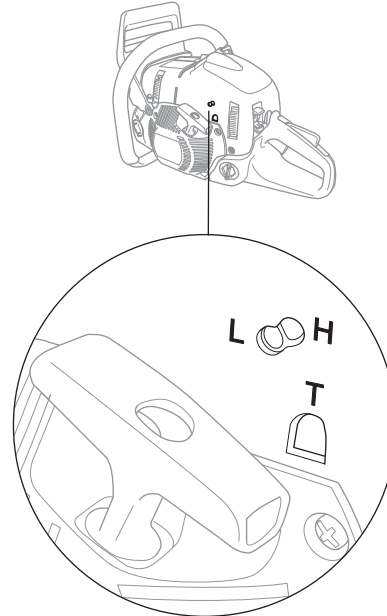
Conditions

- The air filter should be clean and the cylinder cover fitted when adjustments are made. Adjusting the carburettor with a dirty air filter will give a too lean fuel mixture the next time the air filter is cleaned. This can result in serious damage to the engine.

- Mount, for this model, approved bar and chain combination (see Technical data in the Operator's Manual).

455 16"

- The chain should not be tensioned more than that it remains ~ 0,2 inches to the bar.



Replacement of the H-needle or complete carburettor

1. Carefully screw the new H-needle to the bottom and turn it anticlockwise "A" turns.

455 A = 2 1/2

2. Check that:

The H-cap is adjusted to its richest setting (turned counterclockwise to stop). The cap is not fixed to the needle, it should rotate independently. Adjust the L-cap to a center position (1/4 turn counterclockwise = minimum, 1/4 turn clockwise = maximum).

3. Start the engine. If necessary, adjust the idling speed with the T-screw until the chain stops.

4. Adjust the H-needle to give a top speed of "B" rpm. Use a tachometer.

455 B = 12 500

Use a narrow blade screwdriver (ref.no. 531 00 48-63) and insert it through the hole in the cap (max. blade width 2 mm/0,08 inch).

5. Let the engine run at "B" rpm ~ 1 minute, until warm.
 6. Close the H-needle to a top speed of "C" rpm.
455 C = 13 500
 7. Check that the H-cap is still adjusted to its richest setting (turned counterclockwise to stop).
Note! The H-needle must not rotate!
 8. Gently knock the H-cap into position. Use a 5 mm/0,2 inch mandrel (for example the locking pin for the bevel gear ref. no. 502 02 61-03). This is a basic carburettor adjustment. Further fine adjustments, within the limits the caps allow, may be necessary to achieve optimum performance. See the Operator's Manual.
- Replacement of the L-needle**
1. Take off the cap from the L-needle using a pair of cutting pliers and unscrew the needle.
 2. Screw the new L-needle to the bottom and then turn it counterclockwise "D" turns.
455 D = 1 1/2
 3. Press a new L-cap on the L-needle to the first stop, which means that the cap is not fixed to the needle, it should rotate independently.
 4. Adjust the L-cap to the richest position (turned counterclockwise to stop) without turning the needle.
 5. Let the engine run at ~ "E" app. 1 minute until warm and then let it run on idle.
455 E = 12 500
 6. Adjust the idle speed to "F" rpm.
455 F = 2700
 7. Adjust the L-needle until the highest possible idling speed is achieved and then turn the L-needle 1/2 turn counterclockwise. Use a narrow blade screwdriver (ref.no. 531 00 48-63) and insert through the hole in the cap (max. blade width 2 mm/0,08 inch). Note! If the chain rotates, turn the idling speed screw (T) counterclockwise until the chain stops.
 8. Check that the L-cap is still adjusted to its richest position (turned counterclockwise to stop).
Note! The L-needle must not rotate!
 9. Gently knock the L-cap into position. Use a 5 mm/0,2 inch mandrel (for example the locking pin for the bevel gear ref.no. 502 02 61-03). This is a basic carburettor adjustment. Further fine adjustments, within the limits the caps allow, may be necessary to achieve optimum performance. See the Operator's Manual.

Troubleshooting

The various faults that can affect a chainsaw are divided into four groups. In each group the likely symptoms are given on the left and possible causes are listed on the right. The most likely faults are given first, and so on.

Starting

Difficulty starting	Adjust L screw Air filter blocked Choke not working Worn choke pivot Worn choke valve Fuel filter blocked Fuel line blocked Piston ring seized Blocked impulse channel
Carburettor leaking fuel	Loose or faulty fuel pipe Hole in diaphragm Worn needle valve Needle valve assembly sticking Needle valve set too high Leak in metering system (air or fuel) Loose cover on carburettor pump side
Flooding when engine not running	Worn needle valve Needle valve set too high Needle valve assembly sticking

Idling (low rpm)

Will not idle	Adjust L screw Leaking air intake hose (rubber) Loose carburettor mounting bolts Loose or faulty fuel hose Fuel filter blocked Fuel line blocked Fuel tank vent blocked Throttle valve pivot stiff Throttle pushrod sticking Defective throttle return spring Bent throttle stop Faulty diffuser jet
Idling too rich	Adjust L screw Worn needle valve Needle valve set too high Worn needle valve lever Leaking control diaphragm/cover plate Needle valve assembly sticking

Idling (low rpm) (cont.)

Idles when L screw closed	Worn needle valve Leaking control diaphragm/cover plate Needle valve assembly sticking Worn needle valve lever Faulty diffuser jet
Idling uneven	Fuel filter blocked Fuel line blocked Leaking air intake hose (rubber) Loose carburettor mounting bolts Worn throttle valve pivot Loose throttle valve screw Worn throttle valve Needle valve assembly sticking Leak in metering system (air or fuel) Metering system centre knob is worn Hole in diaphragm Leaking control diaphragm/cover plate Crankcase leaking
L screw requires constant adjustment	Fuel line blocked Needle valve set too high Needle valve assembly sticking Leak in metering system (air or fuel) Leaking control diaphragm/cover plate Faulty diffuser jets Crankcase leaking
Too much fuel at idling	Needle valve set too high Needle valve assembly sticking Metering system damaged Worn needle valve Leaking control diaphragm/cover plate Metering system incorrectly assembled

High rpm

Will not run at full throttle	Adjust H screw Blocked air filter Blocked fuel tank vent Blocked fuel filter Fuel line blocked Loose or damaged fuel hose Impulse channel leaking Impulse channel blocked Loose cover on carburettor pump side Faulty pump diaphragm Leaking air intake hose (rubber) Loose carburettor mounting bolts Needle valve set too low Metering system damaged Metering system incorrectly assembled Leaking control diaphragm/cover plate Needle valve assembly sticking Blocked silencer
Low power	Adjust H screw Blocked fuel tank vent Blocked fuel filter Impulse channel leaking Impulse channel blocked Loose cover on carburettor pump side Faulty pump diaphragm Blocked air filter Needle valve assembly sticking Leak in metering system (air or fuel) Metering system incorrectly assembled Loose diaphragm rivet Hole in diaphragm Leaking control diaphragm/cover plate
Will not "four-stroke"	Blocked fuel tank vent Blocked fuel filter Fuel line blocked Loose or damaged fuel hose Impulse channel leaking Impulse channel blocked Loose cover on carburettor pump side Faulty pump diaphragm Leaking air intake hose (rubber) Loose carburettor mounting bolts Needle valve set too low Leak in metering system (air or fuel) Metering unit incorrectly assembled Loose diaphragm rivet Hole in diaphragm Leaking control diaphragm/cover plate

Acceleration and retardation

Does not accelerate	Adjust L screw Adjust H screw Blocked air filter Blocked fuel tank vent Blocked fuel filter Fuel line blocked Loose or damaged fuel hose Impulse channel blocked Loose cover on carburettor pump side Faulty pump diaphragm Leaking air intake hose (rubber) Loose carburettor mounting bolts Needle valve set too low Metering system incorrectly assembled Needle valve assembly sticking Faulty diffuser jets Blocked silencer
Engine stalls when throttle released	Adjust L screw Adjust H screw Faulty pump diaphragm Needle valve set too high Needle valve assembly sticking Faulty diffuser jets
Over rich acceleration	Adjust L screw Adjust H screw Blocked air filter Faulty pump diaphragm Faulty diffuser jets

Troubleshooting methods

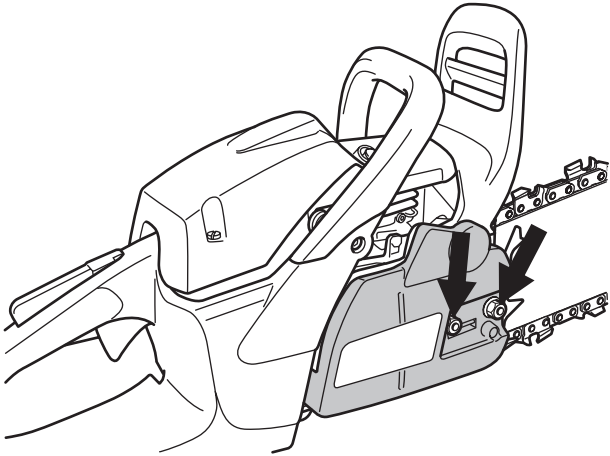
In addition to the faults described in the above table, trouble shooting can be carried out on specific components or sub-systems of the chainsaw. The various procedures are described in the relevant chapters, see the contents page, as follows:

- Checking the operation of the chain brake
- Measuring the resistance of the stop plate
- Pressure testing the carburettor
- Pressure testing the decompression valve
- Pressure testing the cylinder

Repair instructions

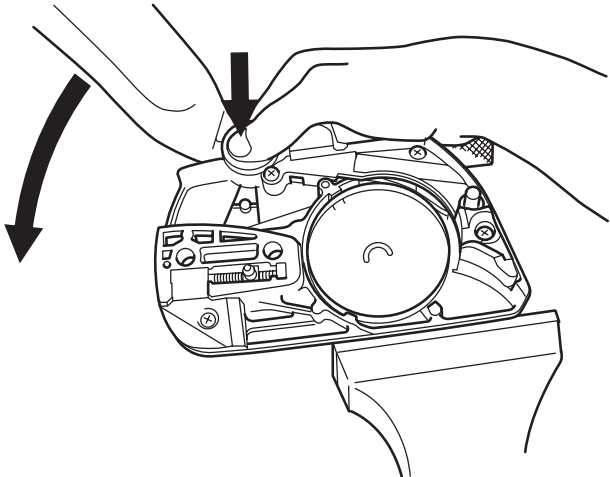
Chain brake – dismantling

1



Disengage the brake by pushing the kickback guard backwards. Unscrew the guide bar bolts and remove the clutch cover, chain and guide bar.

2

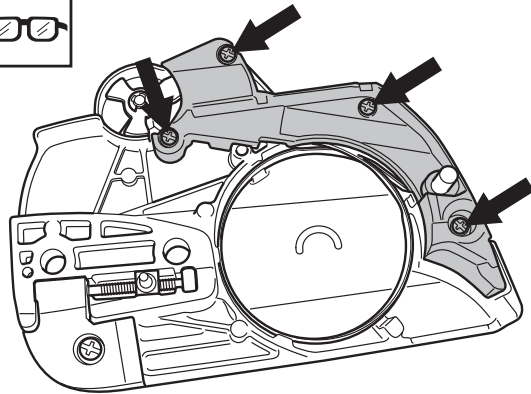


Grip the clutch cover carefully in a vice. Release the brake spring by using the kickback guard from the saw as a tool. Engage it with the brake mechanism and turn anticlockwise to activate the brake.

3

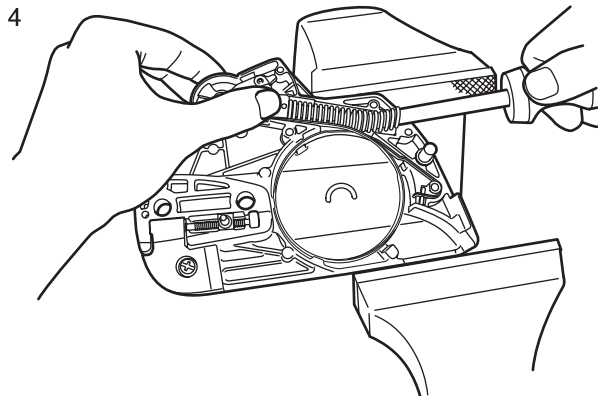


WARNING!
Make sure the spring does not fly out and cause injury. Wear eye protection.



Remove the screws and carefully remove the cover from the chain brake spring.

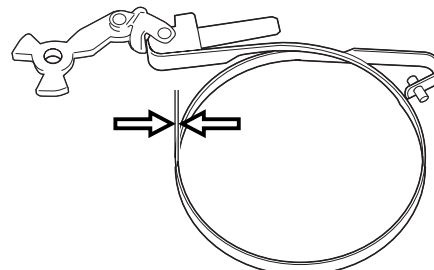
4



Place one hand over the spring and insert a small screwdriver between the bottom end of the spring and the clutch cover. Carefully prise the spring upwards so that it slides onto the screwdriver shaft.

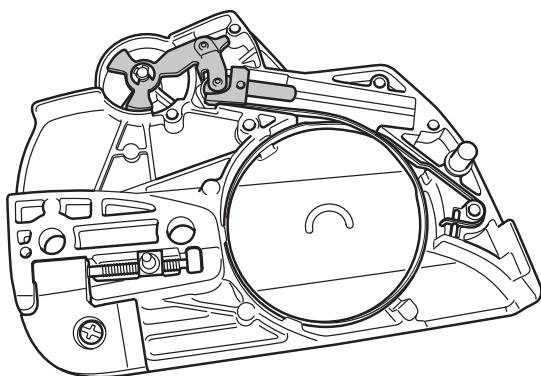
Cleaning and inspection

- Clean and inspect all parts carefully. If there are any cracks or other defects replace the damaged parts with new ones. Always use original parts.
- Measure the thickness of the chain brake band. It must be no less than 0.6 mm at any point.
- Lubricate the elbow joint with grease.



Chain brake – reassembly

1



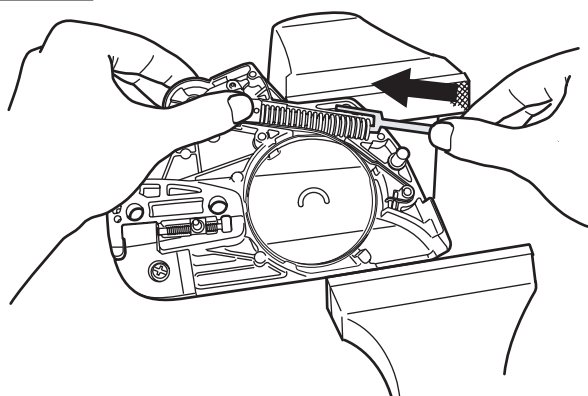
Bolt the elbow joint to the brake band and tighten to a torque of 1–1.5 Nm.

Locate the elbow joint and connected brake band in their recesses in the clutch cover. Lubricate the recess for the spring with grease.

2

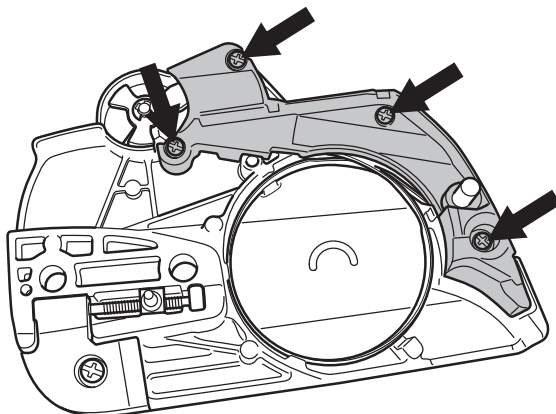


WARNING!
Make sure the spring does not fly out and cause injury. Wear eye protection.



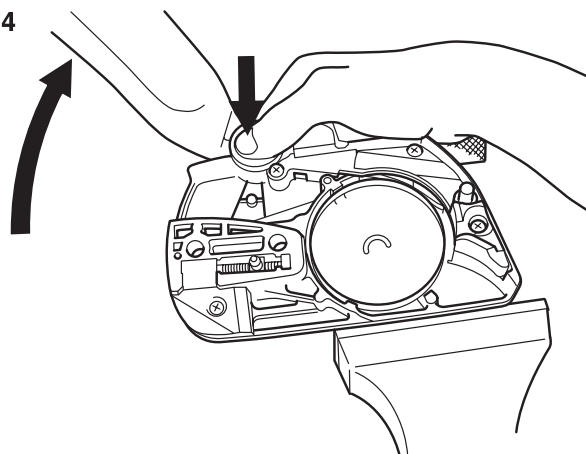
Grip the clutch cover in a vice. Compress the spring with special tool 502 50 67-01 and push it down with your thumb.

3



Fit the cover over the chain brake spring, tightening the screws to a torque of 1–1.5 Nm.

4



Tension the brake spring by using the kickback guard from the saw as a tool. Engage it with the brake mechanism and turn clockwise to release the brake.

5

Turn the chain tensioner anticlockwise as far as it will go.

Refit:

- guide bar
- chain
- clutch cover

NOTE!

After completing the repair the chain brake must be tested as described below.

Operating test:

The engine must not be running during the test.

Guide bar length	Height
38cm/15"	50 cm/20"

- Hold the chainsaw over a firm surface. The height of the guide bar above the surface is given in the table above.
- Let go of the front handle and let the chainsaw fall towards the surface.
- When the guide bar hits the surface the chain brake must engage.

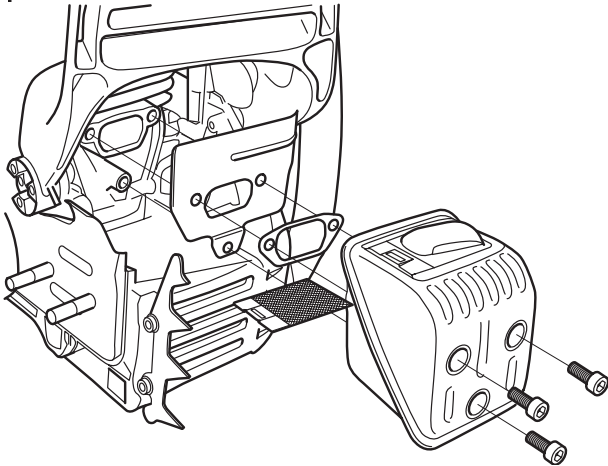


Silencer – removal



WARNING!
Do not touch the silencer until it has cooled down, otherwise you may burn yourself.

1



Remove the cylinder cover, silencer, gasket and cooling plate.

2

If the saw is fitted with a spark arrestor mesh this must also be removed.

Cleaning and inspection

Clean and inspect all parts carefully. If there are any cracks or other defects replace the damaged parts with new ones.

The spark arrestor mesh is best cleaned with a wire brush. If the mesh is damaged it must be replaced.

If the mesh is blocked the saw will overheat and this will cause damage to cylinder and piston.

Never use the saw with a silencer that is in poor condition. Always use original parts.

Silencer – refitting

1

If the saw is equipped with a spark arrestor mesh this should be fitted first.

2

Refit

- cooling plate
- gasket
- silencer, tighten bolts to a torque of 8–10 Nm.
- cylinder cover

3

Run the saw for at least 1 minute, then retighten the silencer bolts to 8–10 Nm.

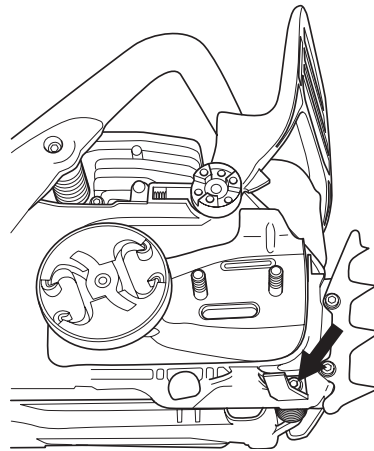
Chain catcher – replacement

If the chain catcher is worn it must be replaced with a new one.

1

Release the brake by pushing the kickback guard backwards. Undo the guide bar bolts and remove the clutch cover, chain and guide bar.

2



Remove the chain catcher and replace it with a new one. Check that the vibration damping spring locates correctly against the crankcase when you bolt the new chain catcher in position.

3

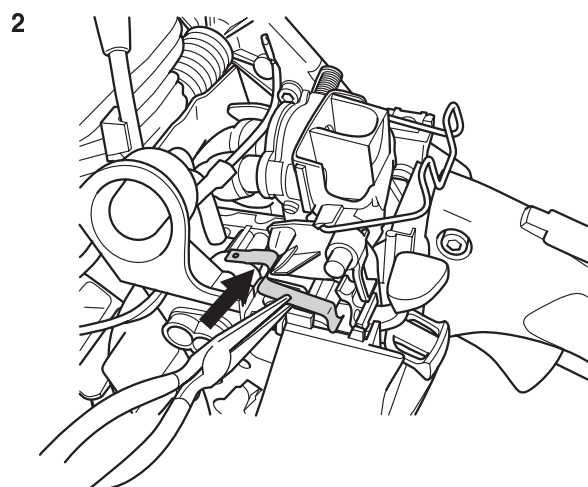
Turn the chain tensioner anticlockwise as far as it will go.

Refit:

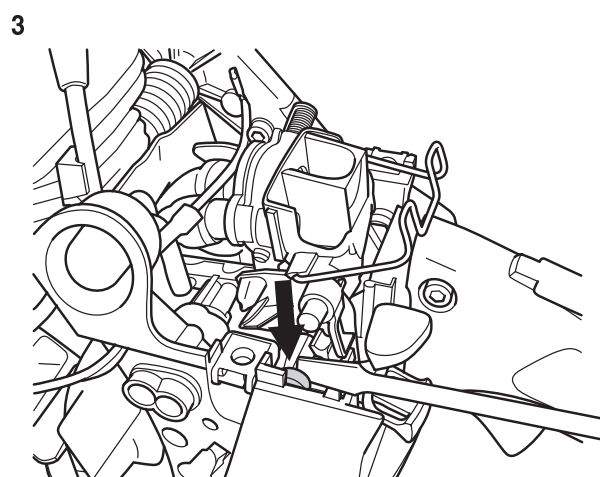
- guide bar
- chain
- clutch cover

Stop switch – removal

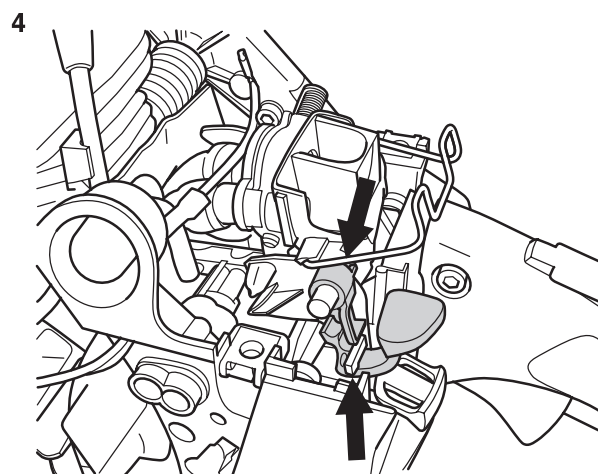
1
Remove the cylinder cover and air filter.



Disconnect both leads from the stop plate and stop switch. Remove the stop plate by carefully sliding it over the lug on the front mounting.



Carefully prise the carburettor assembly off the left-hand rubber mounting using a small screwdriver.



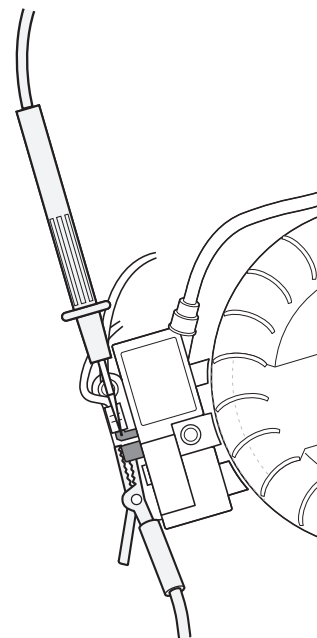
Carefully loosen the stop switch's tab from the air filter holder at the same time as moving the switch straight out.

Cleaning and inspection

Clean and inspect all parts carefully. If there are any cracks or other defects replace the damaged parts with new ones. Always use original parts.

Stop switch – resistance measurement

Clean the mating surfaces and check the resistance as follows:

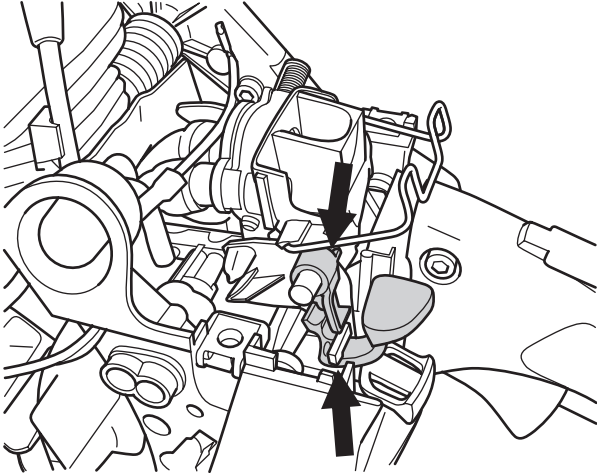


Measure the resistance by connecting a multimeter to the ignition coil. NOTE! The switch must be in the "on" position to give the correct reading.

The resistance must not be higher than 0.5Ω when the switch is in the on position.

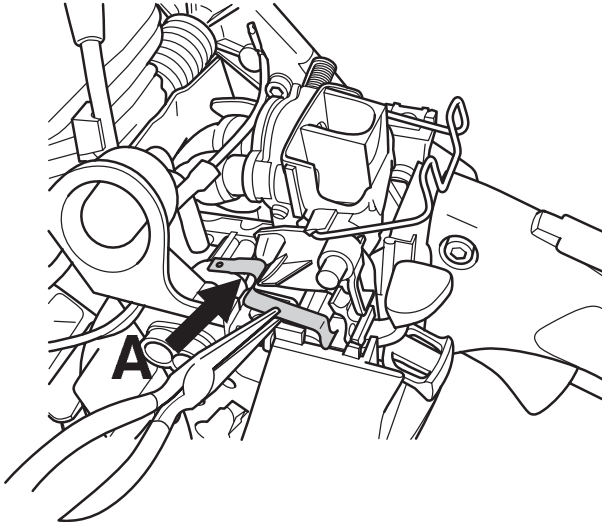
Stop switch – refitting

1



Carefully press the new stop switch into place. Check that the switch's upper mounting clips over the air filter holder.

2



Refit the stop plate. Engage the stop plate in the front slot first then lift the rear edge onto the stop switch. Slide the stop plate in as far as it will go.

3

Refit:

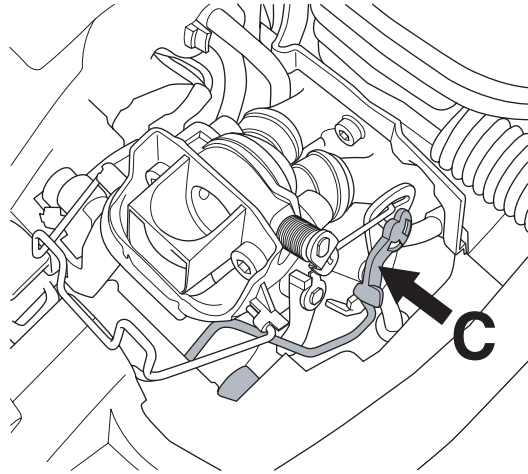
- the leads to the stop plate and stop switch
- left rubber mounting
- air filter
- cylinder

Choke control – removal

1

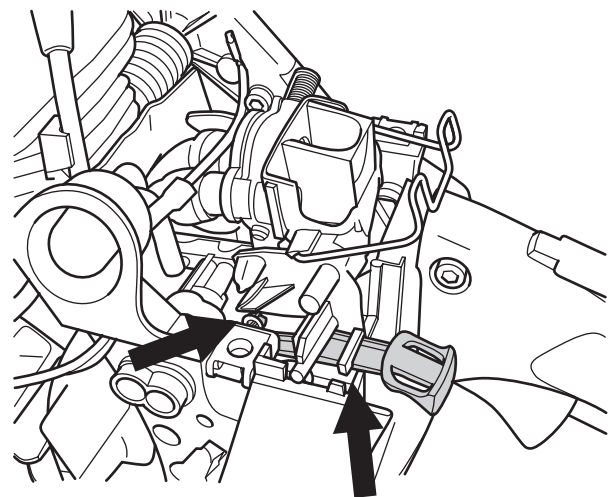
Remove the cylinder cover, air filter and stop switch.

2



Tilt the carburettor.

3



Compress the clip that holds the choke control to the carburettor while pulling it out at the same time. Disconnect the choke control from the air filter holder.

Choke control – refitting

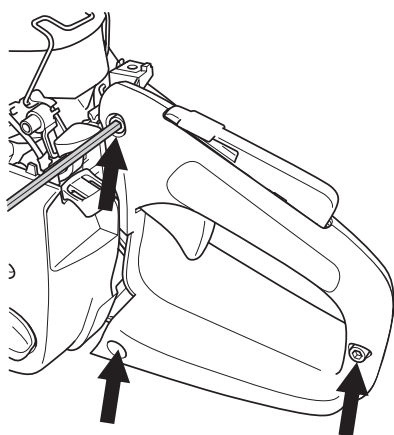
First reattach the choke control to the air filter, then press it onto the carburettor so that the clips engage.

Then refit:

- stop switch
- check that the rubber guide over the carburettor screws is seated correctly
- carburettor into its rubber mountings
- air filter and cylinder cover

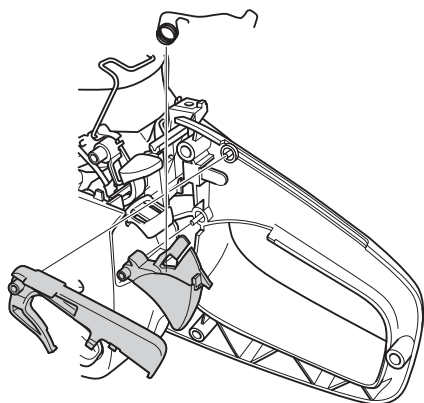
Throttle lock, throttle trigger and return spring – removal

1



Loosen the handle screws (3).

2



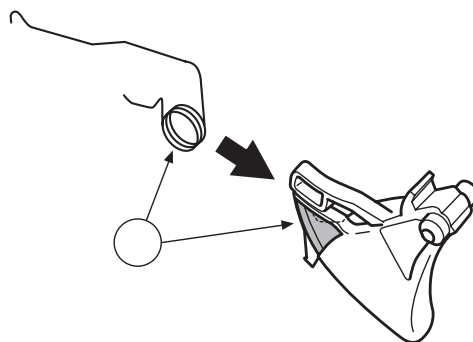
Remove the throttle lock from the handle. Remove the spring and throttle trigger.

Cleaning and inspection

- Clean and inspect all parts carefully. If there are any cracks or other defects replace the damaged parts with new ones. Always use original parts.
- Check that the spring is not broken and has not lost its tension.

Throttle lock, throttle trigger and return spring – refitting

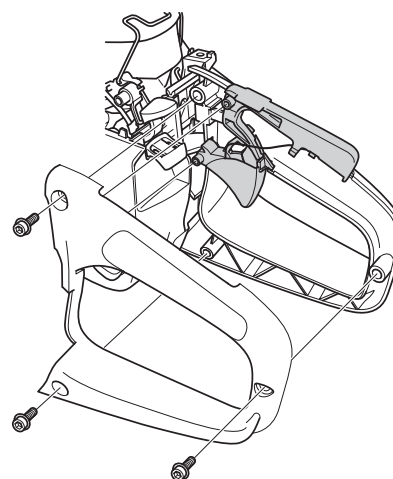
1



Refit the return spring to the throttle trigger as shown. Make sure the spring is correctly positioned by engaging one end in the slot in the throttle trigger (A).

2

Fit the front part of the throttle in the handle. **NOTE!** The spring should be seated in front of the lock.



3

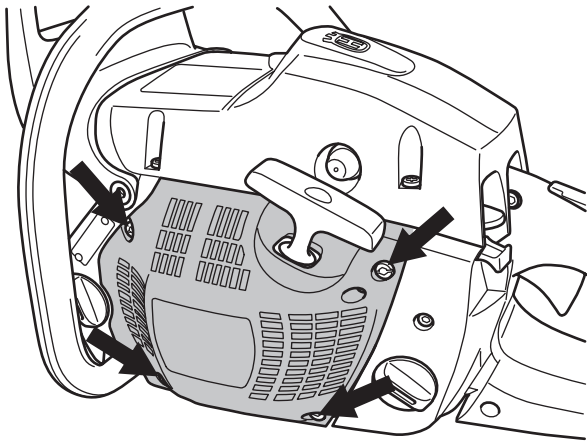
Press the return spring in the throttle lock. Fit the throttle lock in the handle and fit the cover.

4

Check the operation of the throttle lock by trying to press the throttle trigger without pressing down the throttle lock. Also check that the throttle lock and throttle trigger return freely to their original positions when released.

Starter assembly – removal

1



Undo the four bolts that fasten the starter assembly to the crankcase and lift off the starter assembly.

2

Pull out about 30 cm of the cord and fasten it in the notch in the pulley rim. Release the tension in the return spring by letting the pulley wind backwards slowly.

3



WARNING!
If the recoil spring is still under tension when the pulley is removed it can fly out and cause injury. Wear eye protection.



Remove the bolt from the centre of the pulley and lift off the pulley.

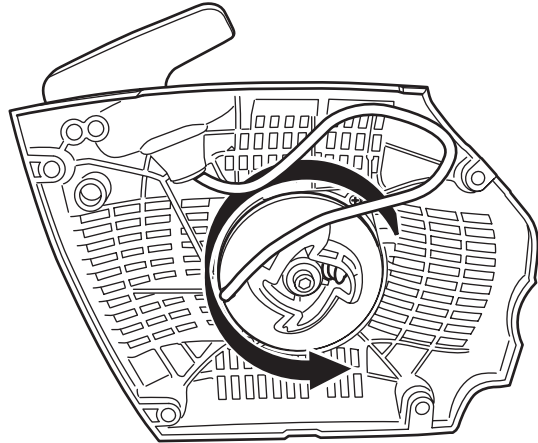
Cleaning and inspection

Clean the parts and check the following:

- The starter cord.
- That the pawls on the flywheel are undamaged, i.e. that they spring back towards the centre and move freely.
- Lubricate the return spring with light oil.

Replacing a broken or worn starter cord

1

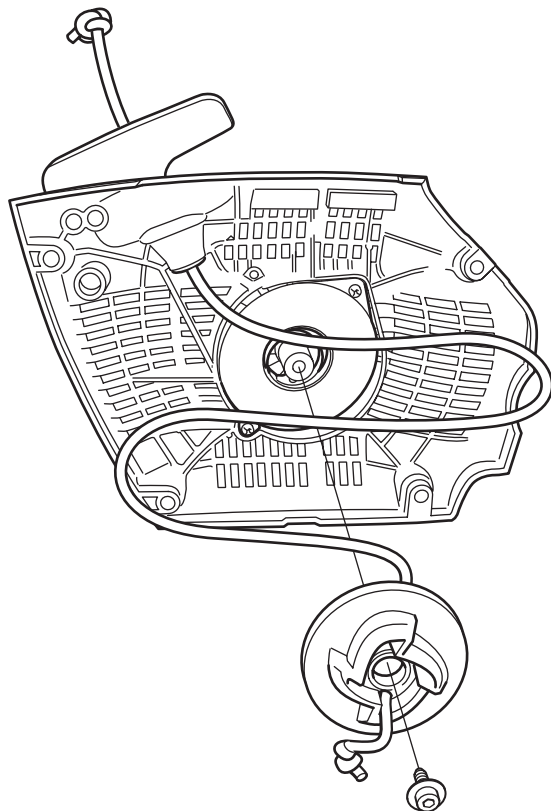


Before replacing a worn starter cord the tension in the recoil spring must be released. Pull the starter cord out through the notch in the pulley rim and wind the pulley anti-clockwise to release the tension in the spring.

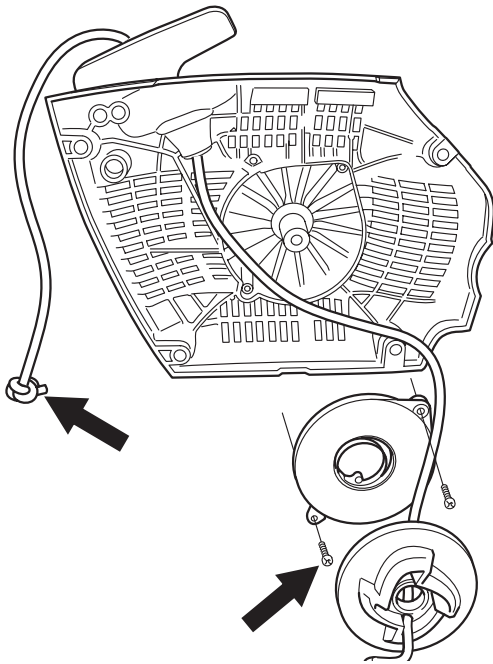
2

Remove the bolt from the centre of the pulley and lift off the pulley.

3



Fit a new cord through the hole in the pulley and tie a knot to secure it. Feed the other end of the cord through the hole in the starter housing and through the starter handle, then tie a double knot in the end. Wind about 3 turns of the starter cord onto the pulley. Fit the bolt through the centre of the pulley and tighten to a torque of 2–3 Nm.



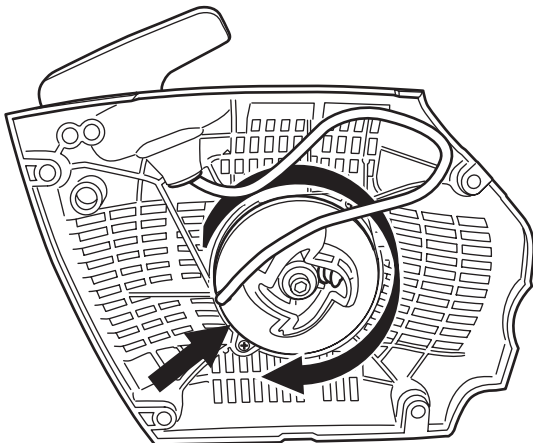
Cleaning and inspection

- Clean and inspect all parts carefully. If there are any cracks or other defects replace the damaged parts with new ones. Lubricate the return spring with a little grease.

Tensioning the recoil spring

1

Fasten the starter cord in the notch in the pulley rim and wind the pulley about 3 turns clockwise. Check that the pulley is free to rotate at least another half turn when the starter cord is fully extended.



Replacing a worn recoil spring



WARNING!
Make sure the recoil spring does not fly out and cause injury. Wear eye protection.



1

Remove the bolt from the centre of the pulley and lift off the pulley and spring cassette.

2

Replace the defective spring cassette with a new one.

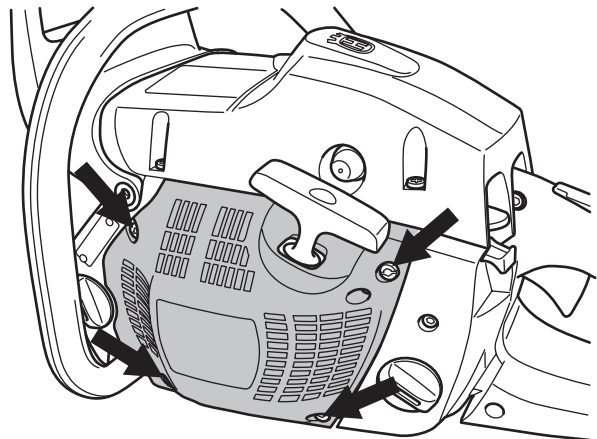
3

Fit the bolt through the centre of the pulley and tighten to a torque of 2–3 Nm.

Tension the recoil spring, see “Tensioning the recoil spring”.

Starter assembly – refitting

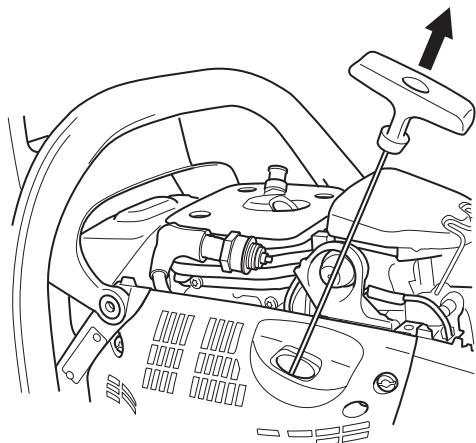
1



Position the starter assembly on the crankcase and tighten the bolts to a torque of 2.5–3.5 Nm.

Ignition module – testing

If there is a fault in the ignition system the ignition module must be tested before the ignition system is removed.

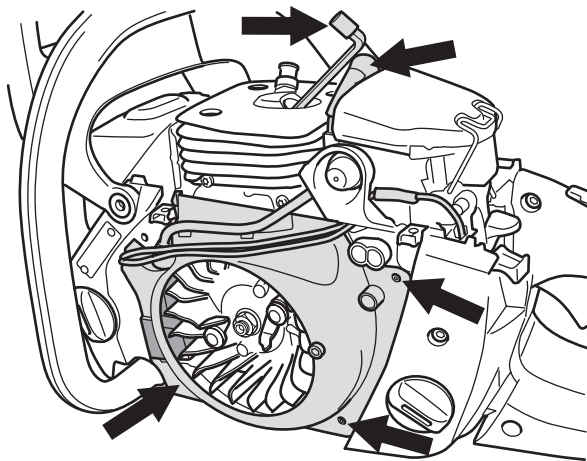


Test the ignition module as follows:

- Connect a test spark plug 502 71 13-01 to the ignition lead and clip the test spark plug onto the cylinder.
- Turn the engine over using the starter cord.
- If the test spark plug produces a spark the ignition module is OK.

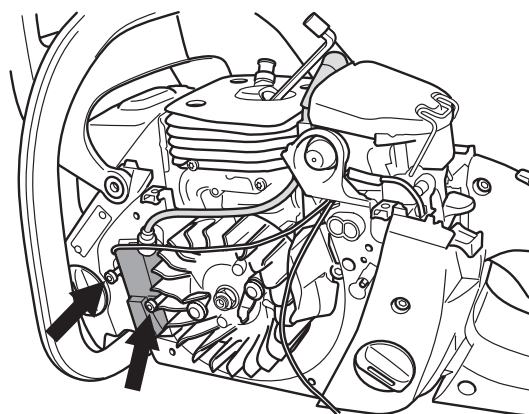
Ignition module/flywheel – removal

1



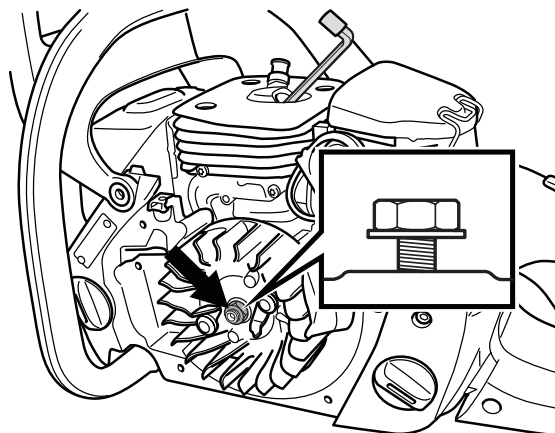
Remove the cylinder cover. Disconnect the HT lead, remove the spark plug and fit piston stop 502 54 15-01 in its place. Take off the starter assembly, release the leads from the cable guide and remove it.

2

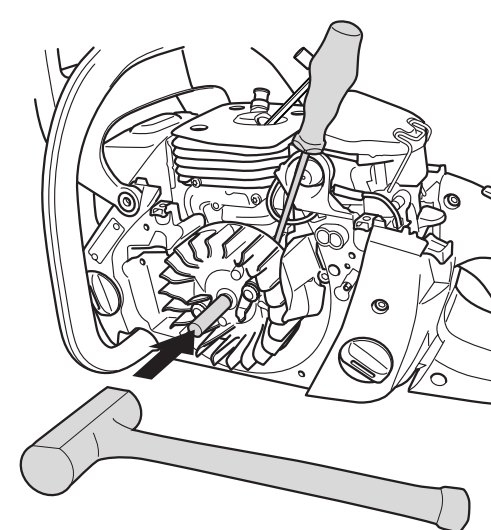


If replacing the ignition module, disconnect its leads and unscrew it. The ignition module can be left in place if you are simply removing the flywheel.

3



4



Loosen the flywheel nut using a suitable socket and unscrew it until it is flush with the end of the shaft.

5

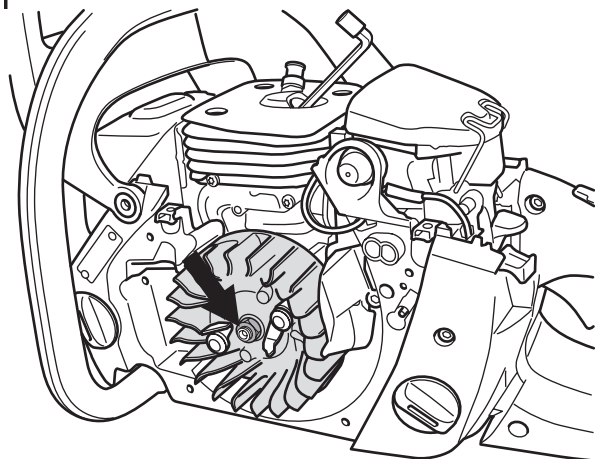
Knock on the nut using a metal mallet until the flywheel releases from the axle. Remove the nut and the flywheel.

Cleaning and inspection

- Clean all parts, especially the tapers on the flywheel and shaft.
- Check that the flywheel is not cracked or damaged in any other way.

Ignition module and flywheel – refitting

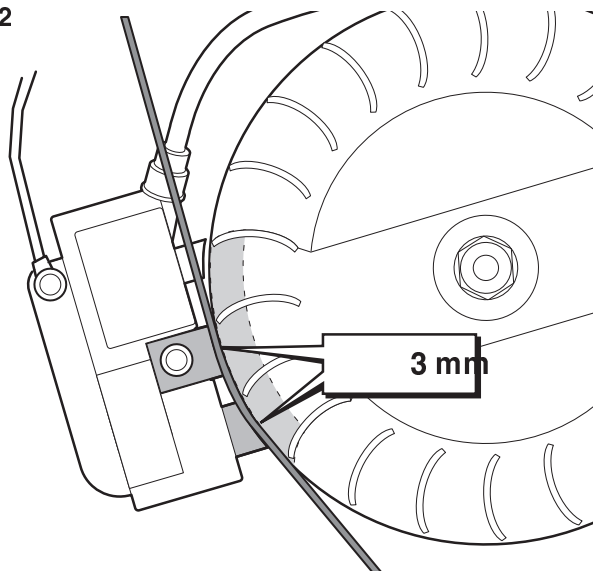
1



Place the flywheel on the crankshaft. Turn the flywheel so that the key lines up with the keyway in the shaft.

Fit the nut on the shaft and tighten to a torque of 25-30 Nm.

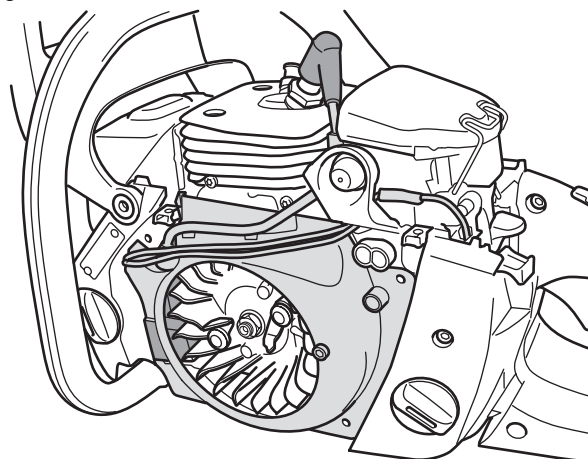
2



To refit the ignition module proceed as follows:

Turn the flywheel so that the magnets are in line with the ignition module. Fit the ignition module with the plastic feeler gauge (502 51 34-01) held in position at the same time, without tightening the bolts. Connect the black earth lead to the front screw on the ignition module. Adjust the gap between the ignition module and magnet to 0.3 +/- 0.1 mm. The gap must be measured at either of the two lowest pegs on the ignition module. Tighten the bolts to 4.5–6 Nm. Connect the blue lead to the ignition module.

3

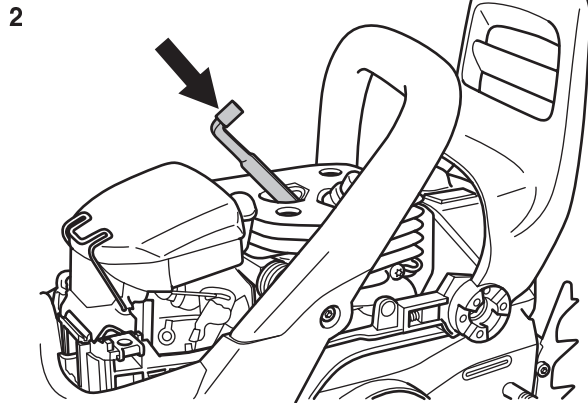


Then refit:

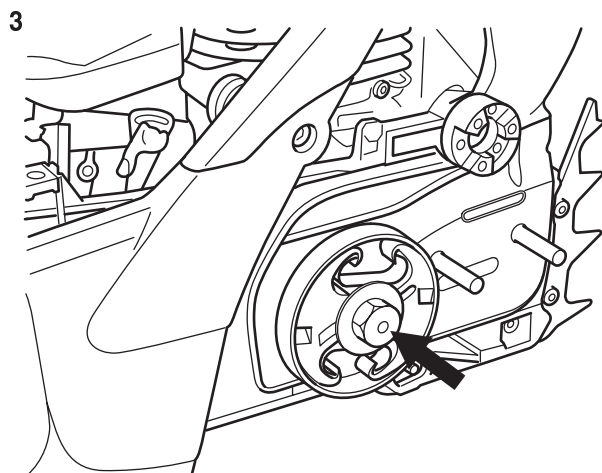
- cable guide and press the leads into position
- HT lead
- starter assembly, tighten to a torque of 2.5–3.5 Nm
- cylinder cover

Centrifugal clutch – removal

1
Remove the cylinder cover. Disengage the chain brake by pushing the kickback guard backwards. Undo the guide bar bolts and remove the clutch cover, chain and guide bar.



Disconnect the HT lead. Remove the spark plug and fit piston stop 502 54 15-01 in its place.

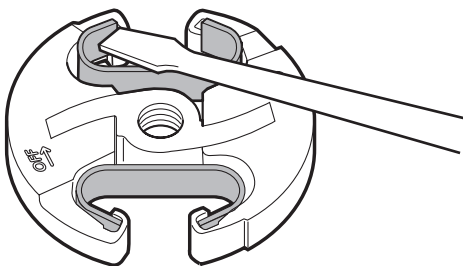


Unbolt the clutch using tool 502 54 16-01 and a suitable socket or combination spanner. Turn the nut clockwise to remove it.

4

NOTE!

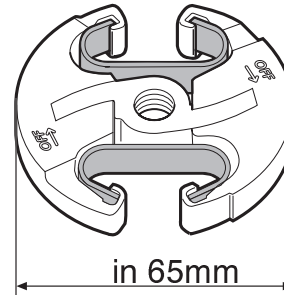
Handle the clutch springs carefully. If they are opened up too much they could damage the saw.



Carefully prise out the clutch springs with a screwdriver.

Inspection and cleaning

- Clean and inspect all parts carefully. If there are any cracks or other defects replace the damaged parts with new ones. Always use original parts.



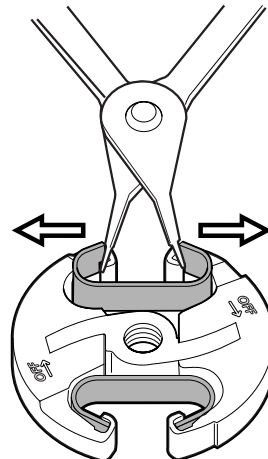
- Check the thickness of the clutch shoes by using vernier callipers to measure the diameter of the clutch. If the diameter is less than 65 mm the clutch assembly must be replaced.

Centrifugal clutch – refitting

1

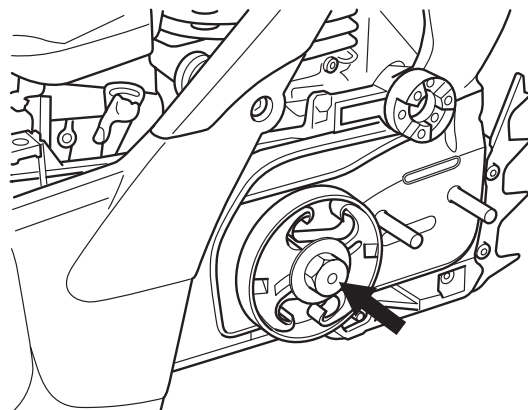
NOTE!

Handle the clutch springs carefully. If they are opened up too much they could damage the saw.



Insert the clutch springs in the shoes using circlip pliers.

2



Fit the clutch onto the crankshaft and tighten anticlockwise as far as it will go. Then tighten to a torque of at least 20 Nm using tool 502 54 16-01 and a suitable socket or combination spanner.

3

Remove the piston stop. Fit the spark plug, tightening it to a torque of 15 Nm, then connect the HT lead.

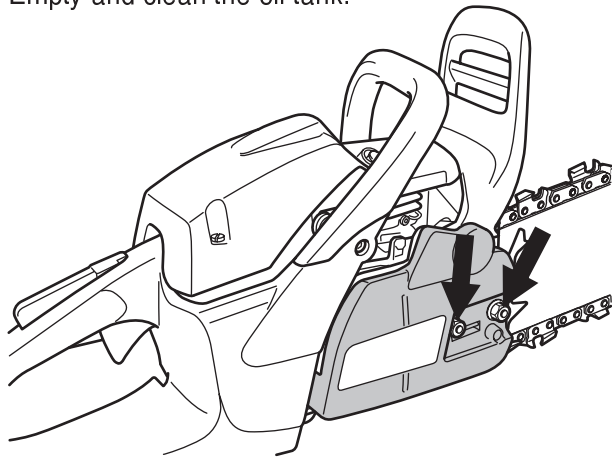
Then refit:

- cylinder cover
- guide bar
- chain
- clutch cover

Dismantling the oil pump and screen

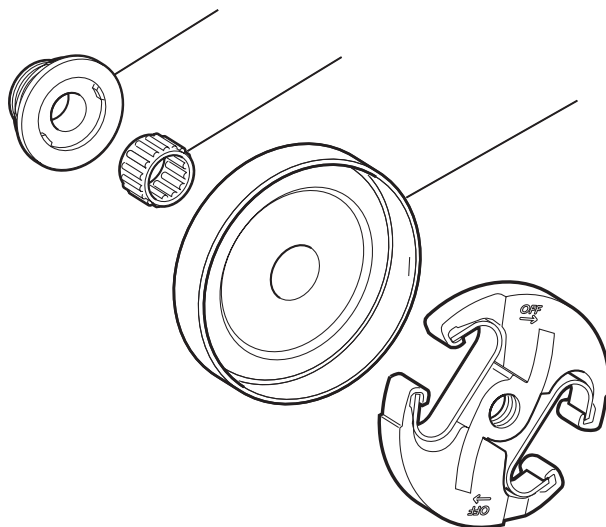
1

Empty and clean the oil tank.



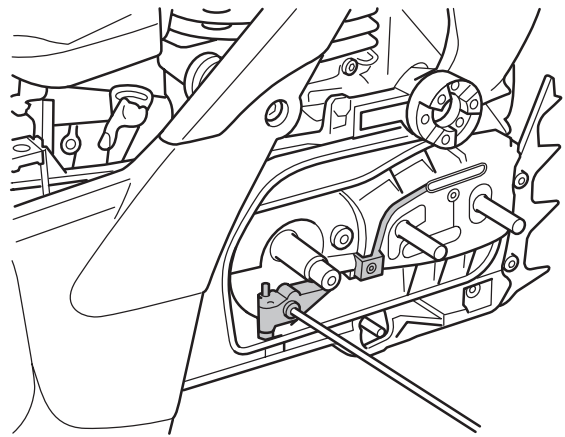
Remove the cylinder cover. Disengage the chain brake by pushing the kickback guard backwards. Undo the guide bar bolts and remove the clutch cover, chain and guide bar. Disconnect the HT lead. Remove the spark plug and fit piston stop 502 54 15-01 in its place. Unscrew the clutch (clockwise) using clutch tool 502 54 16-01 and a suitable socket spanner or combination spanner.

2



Unbolt and remove the clutch drum (A), needle bearing (C) and pump drive wheel (D).

3

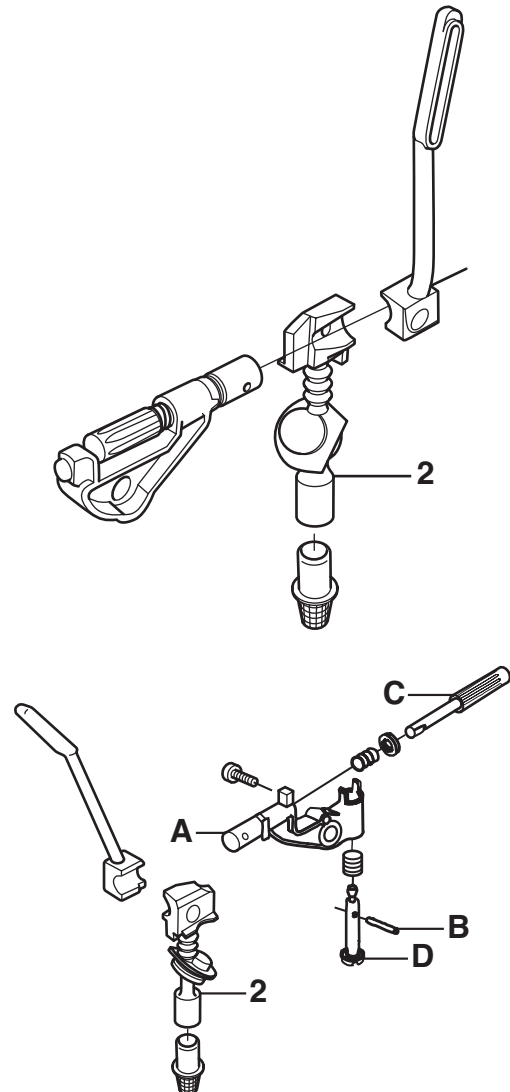


Unbolt the oil pump from the crankcase.

4

The oil pump is available in two versions:

- Top, non adjustable pump.
- Below, adjustable pump.



When dismantling the screen, remove the oil hose from its clip on the underside of the oil tank. Pull the screen loose from the hose.

Remove the pin (B) from the adjuster screw, using a small drift to press it out.

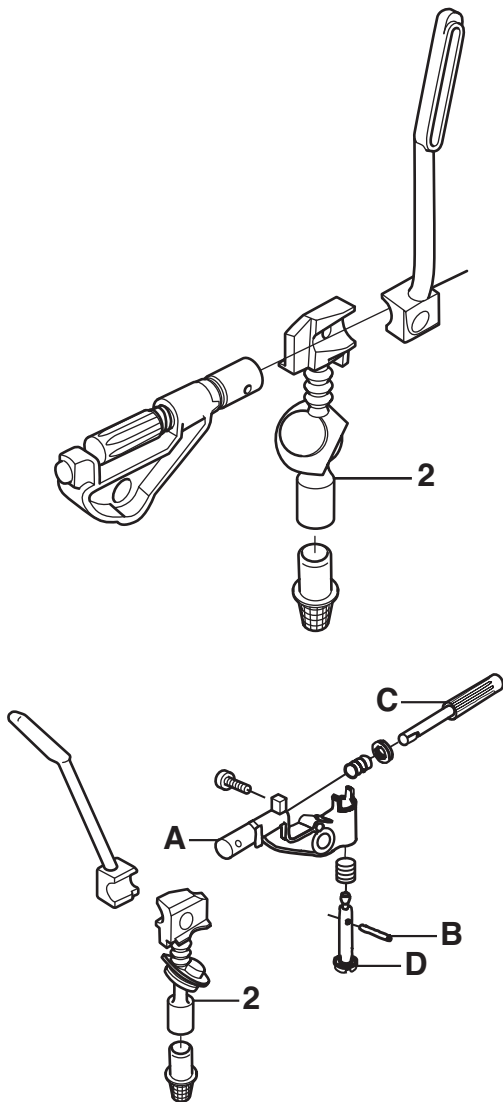
Press in the pump piston (C) so that the adjuster screw (D) can be removed. Remove the pump piston.

Cleaning and inspection

- Clean and inspect all parts carefully. If there are any cracks or other defects replace the damaged parts with new ones. Always use original parts.
- Lubricate all moving parts with chain oil.

Assembling the oil pump and screen

1



Lubricate the pump piston (C) with chain oil and fit the pump piston and washers.

2

Press down the pump piston (C). Fit the adjuster screw and spring so that the pin (B) can be pressed into position.

3

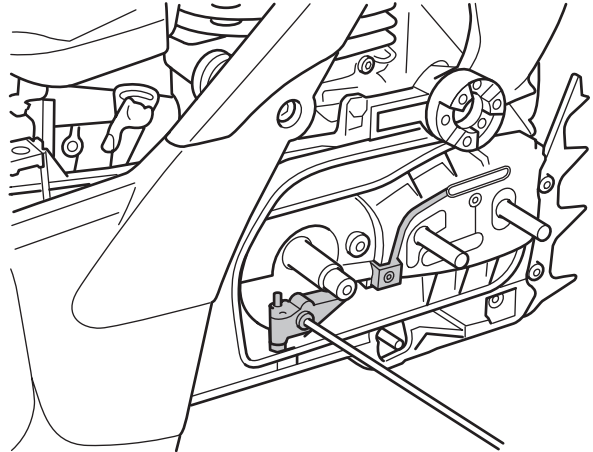
Fit the oil suction hose (2) with screen.



WARNING!

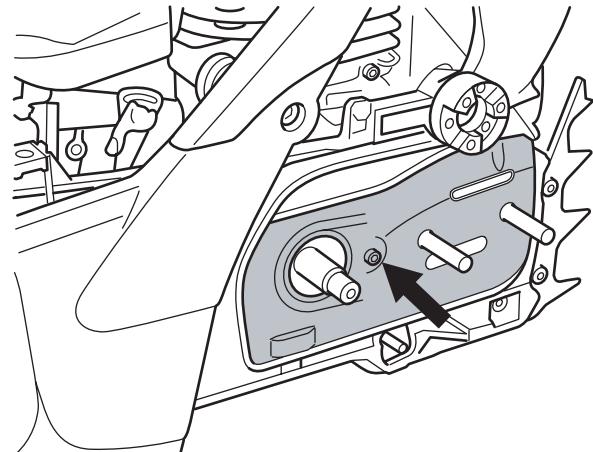
Poor chain lubrication can result in failure of the chain, which could cause serious or fatal injury.

4



Bolt the oil pump to the crankcase. It must be bolted to torque of 2–3 Nm.

5



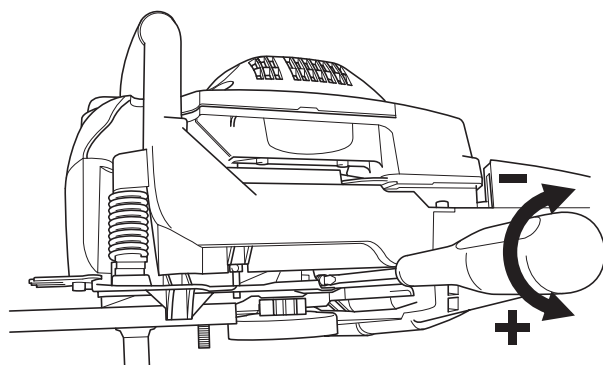
Fit the chain guard plate, tightening the bolts to a torque of 2–3 Nm.

Fit the pump gear, needle bearing, clutch drum and clutch.

Fit the chain, bar and clutch cover.

Adjustable oil pump – adjustment

Use a screwdriver or adjustable spanner to turn the adjuster screw on the pump. Turning the screw clockwise decreases the oil flow and turning it anti-clockwise increases the oil flow.



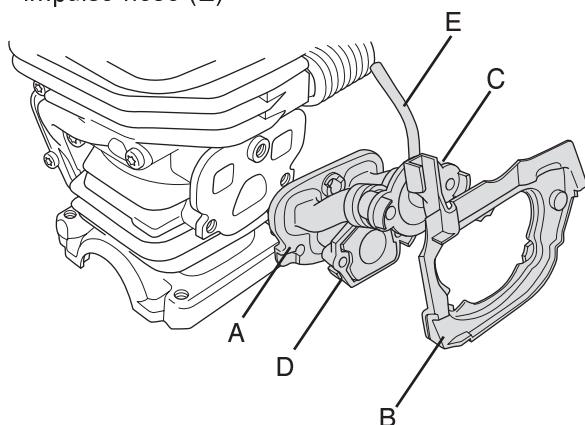
Recommended setting:

13–15" bar	Min. setting
15–18" bar	Midway setting
18–20" bar	Max. setting

Air intake system – removal

The air intake system comprises:

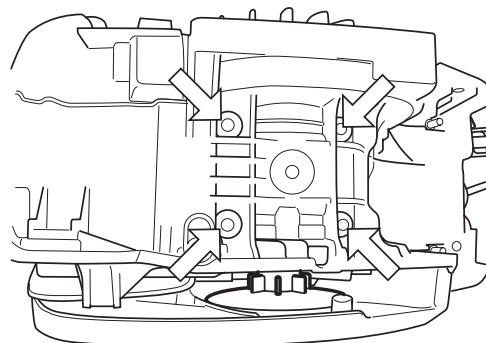
- intake manifold (A)
- insulating plate (B)
- air flange (C)
- carburettor flange (D)
- impulse hose (E)



1

Remove:

- cylinder cover
- air filter
- carburettor
- vibration element on the cylinder (F)
- cylinder screws (4)



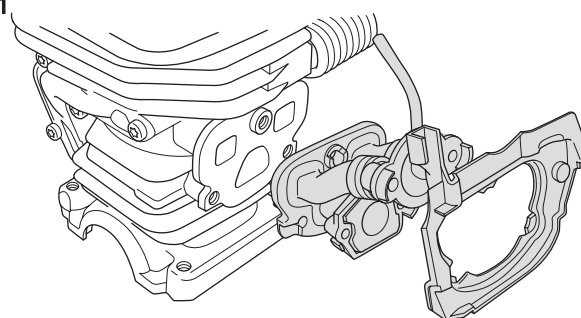
- handle system (3 screws)
- hand guard

2

Carefully remove the cylinder. Knock on the crankshaft and/or flywheel using a plastic mallet. Loosen the impulse hose and the screws (3) holding the intake manifold on the cylinder. Lift out the sealing collar.

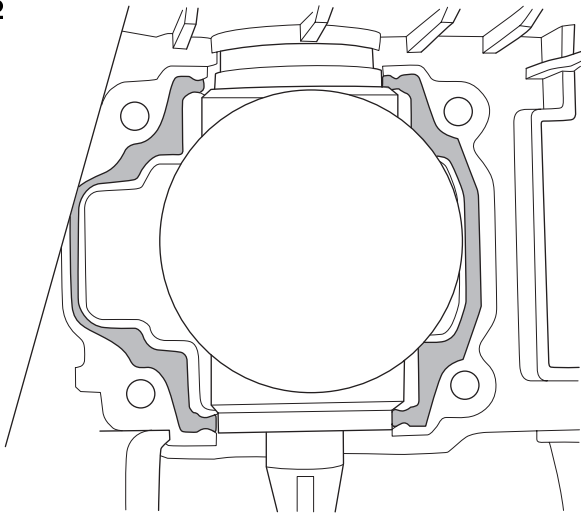
Air intake system – refitting

1



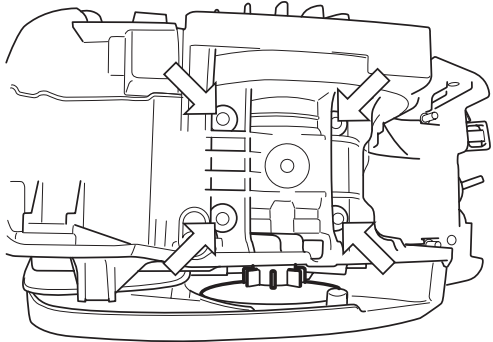
Fit the carburettor flange and the air flange on the intake manifold and the impulse hose, intake manifold and sealing collar on the cylinder.

2



Place the new cylinder base gaskets on the crankcase. Fit the cylinder on the crankcase by pressing the cylinder down onto the crankcase and then carefully turn the saw so that the cylinder base gasket does not slide out of position.

3



Tighten the cylinder base screws (4) with a torque of 13 Nm. Fit the vibration element on the cylinder. Now assemble the spark plug cap, carburettor, air filter, handle system and the cylinder cover.

Cleaning and inspection

Clean and inspect all parts carefully. If there are any cracks or other defects replace the damaged parts with new ones. Always use original parts.

NOTE! When replacing the impulse hose it must not be lubricated with oil or grease.

Replacing the fuel filter

NOTE!

Do not use knurled pliers to disconnect or reconnect the fuel hose. This could damage the hose and lead to leakage or fracture.

1

First remove the old fuel filter from the tank unit using special tool 502 50 83-01.

2

Pull the fuel hose out of the tank and pull off the filter.

3

Fit the new fuel filter and feed the fuel hose back into position.

Replacing the fuel hose

NOTE!

Do not use knurled pliers to disconnect or reconnect the fuel hose. This could damage the hose.

1

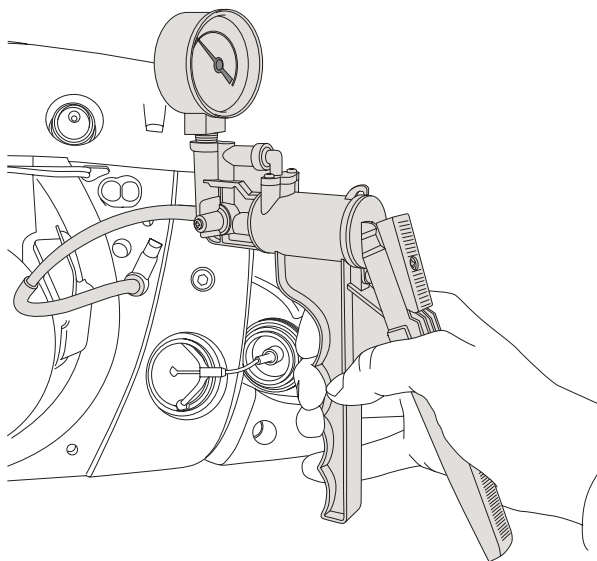
Loosen the hose from the carburettor and pull the hose up through the fuel cap opening.

2

Insert tool 502 50 83-01 in the hose bushing in the bottom of the carburettor compartment and out through the tank opening. Secure the new hose on the end of the tool and, by using the tool, pull the hose through the hose bushing. Cut off the angled parts of the hose at both ends and then fit the hose on the carburettor and fuel filter.

Tank vent – testing

1



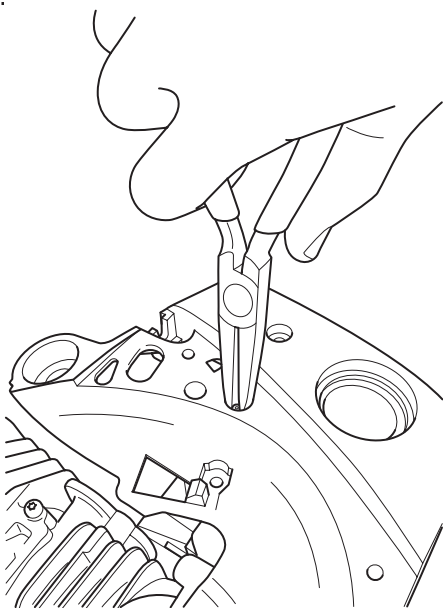
Connect pressure gauge 531 03 06-23 to the fuel hose. Pump the pressure up to 7 kPa (0.07 bar).

The two-way valve has the following properties:

- Has a controlled opening pressure outwards and inwards that prevents overpressure and underpressure arising in the fuel tank, which can affect the engine. This also impedes fuel leakage.
- Opening pressure outwards 100-450 mbar.
- Opening pressure inwards (vacuum) max. 70 mbar.

Tank vent removal

Pull out the tank vent with a pair of knurled flat pliers.



Push the new tank vent into place without damaging the tank vent.

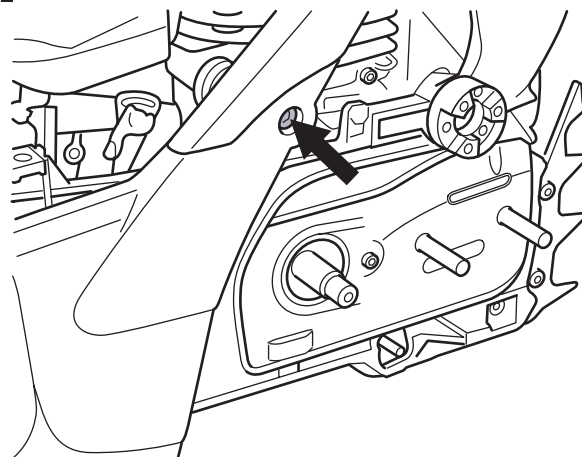
Piston and cylinder – removal

1

Remove:

- cylinder cover
- carburettor (see “Carburettor – removal”)
- silencer
- spark plug
- hand guard (2 screws)

2



Unbolt the vibration damping spring from the hand grip.

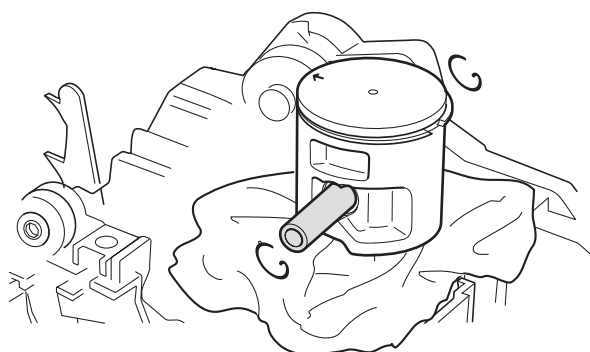
3

Undo the four cylinder bolts from the underside and lift the cylinder off carefully.

4

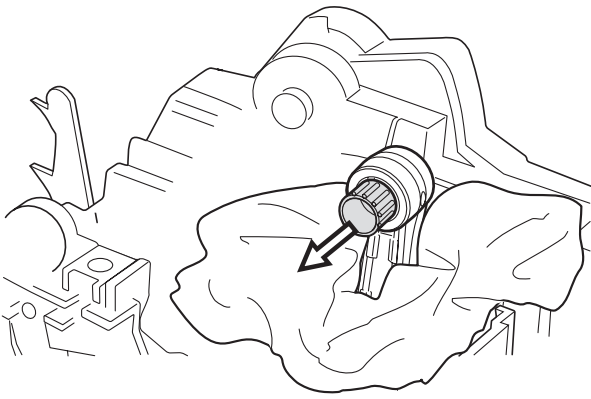
Cover the opening in the crankcase.

5



Remove the circlips from the ends of the gudgeon pin and press it out. Then lift off the piston.

6



Remove the bearing from the little end of the connecting rod.

If replacing the cylinder:

Remove the intake manifold, see “Air intake system – removal”.

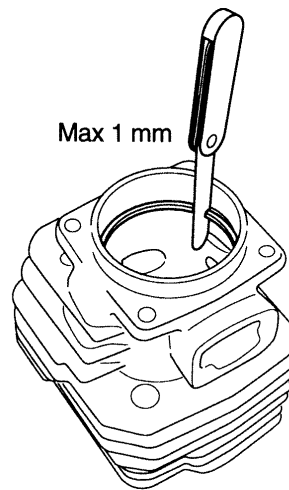
Cleaning and inspection

Clean all the components, scraping off all traces of old gasket and carbon from the following places:

- Piston crown
- Top of the cylinder bore
- Cylinder exhaust port
- Decompression valve channel
- Cylinder base and/or crankcase

Check the following:

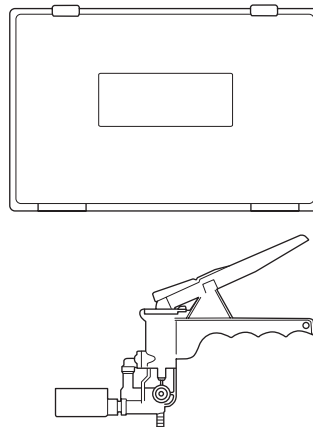
- The surface coating of the cylinder is not worn through, especially in the upper part of the cylinder.
- The cylinder is free from score marks and areas of wear.
- The piston is free from score marks. Small scratches can be polished out with fine emery paper.
- The piston ring is not burnt into its groove.



- Measure piston ring wear. This should not exceed 1 mm. Use the piston to push down the piston ring.
- The needle roller bearing is undamaged.
- The intake manifold is undamaged.
- That the air hoses and impulse hose are undamaged.
- Pressure test the decompression valve.

Decompression valve – pressure testing

1



Connect tool 531 03 06-23 to the decompression valve.

2

Pump up the pressure to 80 kPa (0.8 bar).

3

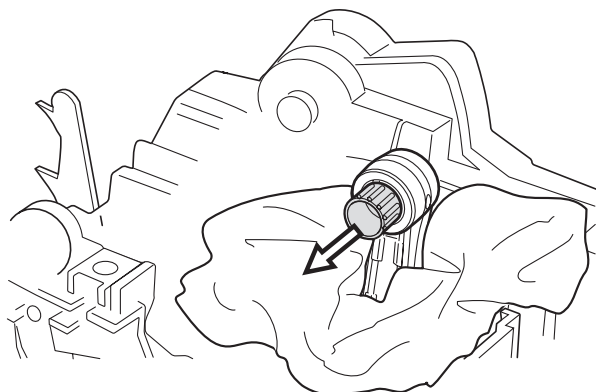
Wait 30 seconds.

4

The pressure should not be less than 60 kPa (0.6 bar).

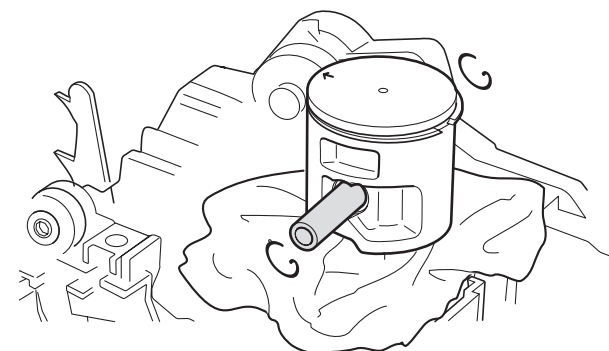
Piston and cylinder – refitting

1



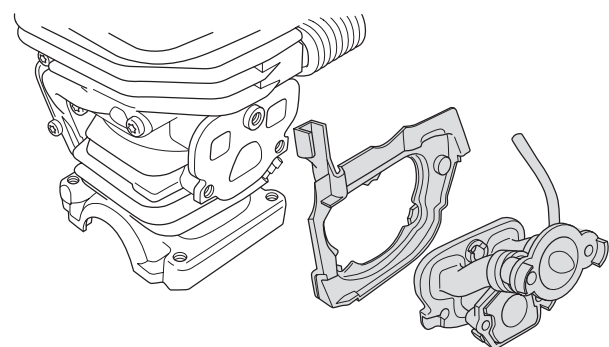
Lubricate the little end bearing with two-stroke oil and insert it in the connecting rod.

2



Fit the piston with the arrow pointing towards the exhaust port. Push in the gudgeon pin and fit the circlips. If replacing the cylinder, fit the decompression valve, tightening to a torque of 12–14 Nm.

3



Fit the intake manifold on the cylinder, with partition (3 screws).

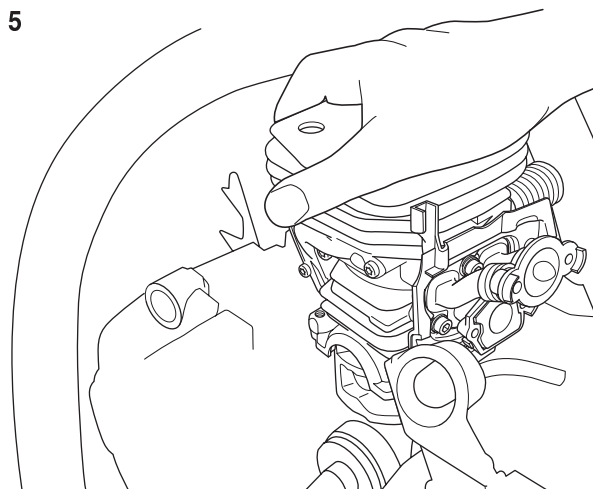
NOTE!

It is very important that there are no leaks in the inlet system, otherwise the engine may seize.

4

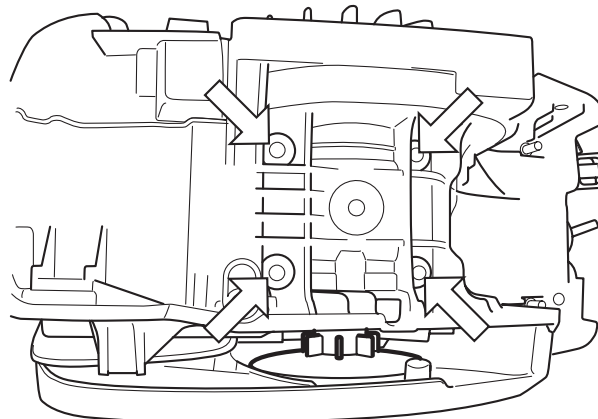
Lubricate the piston ring and piston with two-stroke oil.

5



Fit a new cylinder base gasket. Lower the cylinder over the piston carefully.

6



Fit the cylinder bolts, tightening them in diagonal pairs to a torque of 13–15 Nm.

7

Pressure test the cylinder.

8

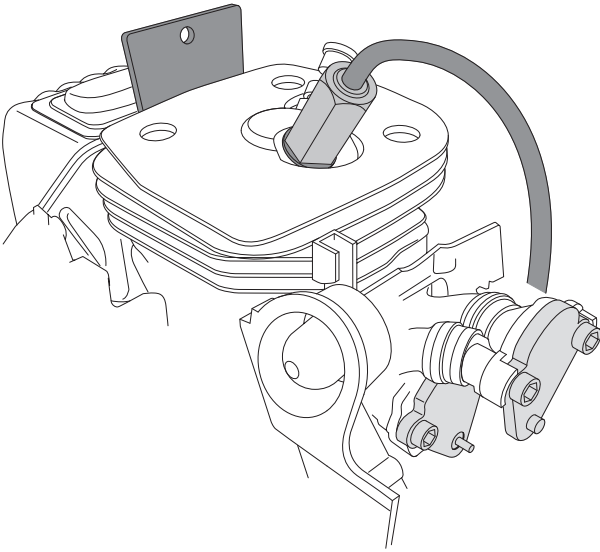
Refit:

- spark plug, tighten to a torque of 15 Nm
- carburettor, see “Carburettor – refitting”,
- silencer, tighten to a torque of 12–14 Nm
- cylinder cover

NOTE!

If a new piston or cylinder has been fitted the saw must be run for the first 3–4 hours with carburettor adjusted to the factory settings.

Cylinder – pressure testing



1

Remove:

- cylinder cover
- carburettor
- spark plug

2

Loosen the screws on the muffler and press the rubber sheet 502 54 05-01 between the muffler and cylinder. Tighten the top two muffler screws.

3

Screw on both the pressure testing covers. See the figure.

4

Fit the pressure testing spark plug 503 84 40-02 and connect the pressure testing tool 502 50 38-01.

5

Pump up the pressure to 80 kPa (0.8 bar). Wait 30 seconds. The pressure should not be less than 60 kPa (0.6 bar). Remove the cover plates from the silencer and carburettor, tighten the bolts to the specified torque. Remove the pressure test nipple 503 84 40-02 and refit the spark plug.



WARNING!

After pressure testing the cylinder, check that the inlet manifold is seated correctly, otherwise the saw may be damaged.

Crankshaft complete - dismantling

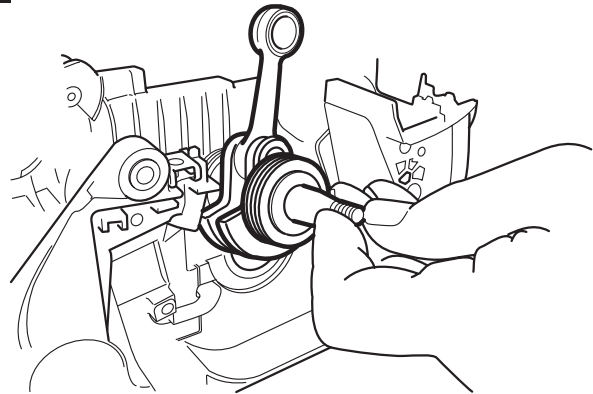
1

Remove the following:

- chain and bar
- clutch cover
- cylinder cover
- starter assembly*
- centrifugal clutch*
- throttle pushrod
- carburettor*
- silencer*
- handle system
- hand guard
- piston and cylinder*

* See special instructions.

2

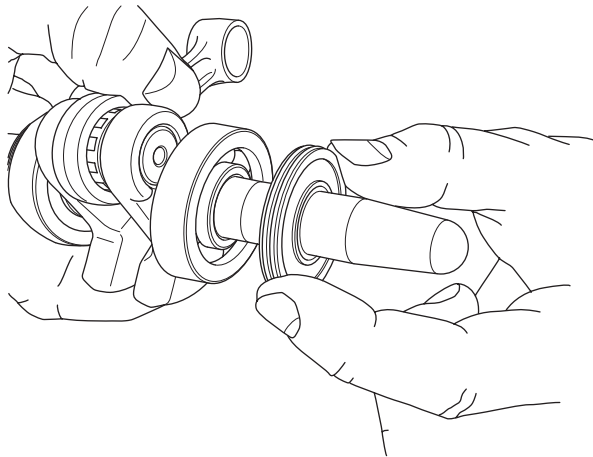


Lift the crankshaft completely out of the crankcase.

Crankshaft bearings – replacement

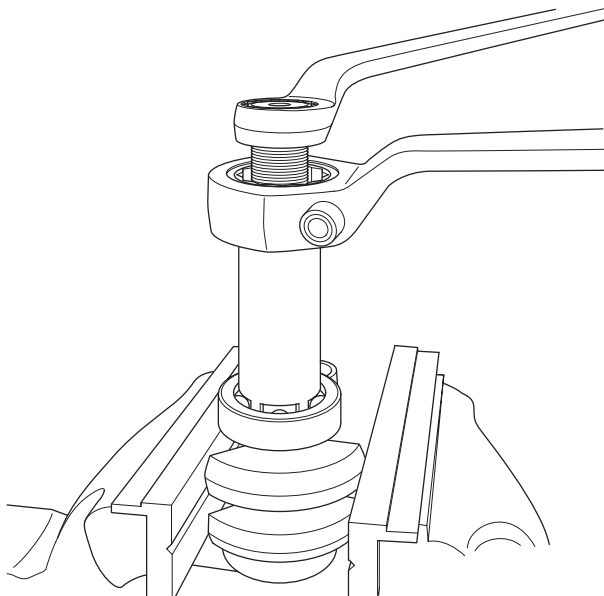
Remove:

- The crankshaft complete from the crankcase.

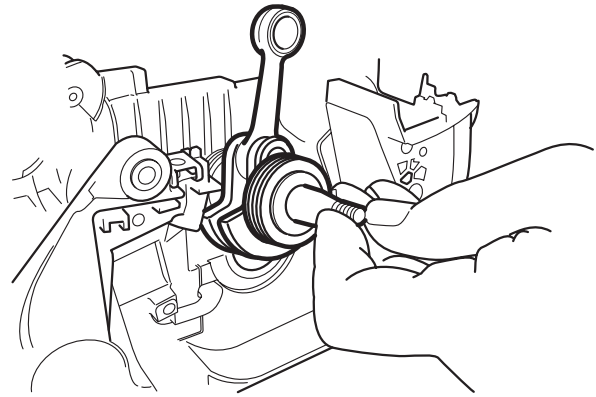


1
Pull the crankshaft bearing off of the crankshaft using a bearing puller.

2
Place a new bearing on the shaft and push into position using tool 502 50 30-18. See figure.



Crankshaft complete – reassembly



1
Fit the crankshaft complete in the crankcase.

Refit the following parts:

- piston and cylinder*
- handle system
- hand guard
- silencer*
- carburettor*
- throttle pushrod
- centrifugal clutch*
- starter assembly*
- cylinder cover
- clutch cover
- chain and bar

* See special instructions.

Thread insert

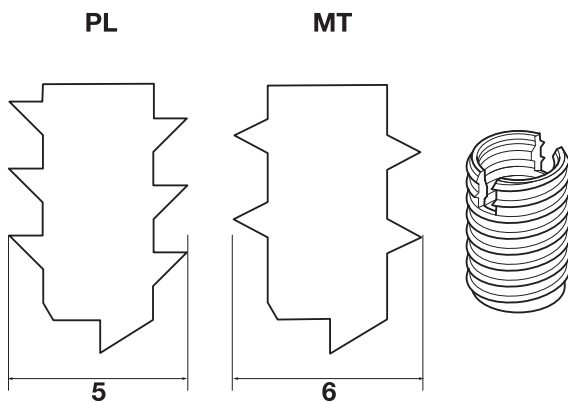
A damaged thread can be repaired using a thread insert. The slotted part of the thread insert is screwed in first, as this is the cutting part.

To repair a thread that was originally designed for a PL5 screw: first drill out with a 6.1 mm diameter drill bit, then screw in the thread insert using a suitable screw and spanner.

To repair a thread that was originally designed for a MT6 screw: first drill out with a 7.1 mm diameter drill bit, then screw in the thread insert using a suitable screw and spanner.

This type of thread insert is best suited for use in plastic and magnesium, but not for repairing threads in aluminium. In that case use a helicoil insert with metric screw.

New part no.	Description
503 27 39-01	PL5
503 27 40-01	MT6



Repairing damaged threads

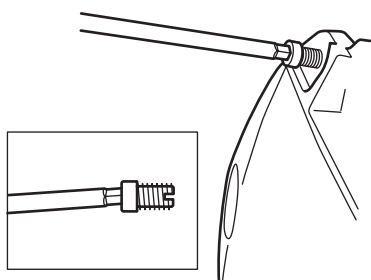
A repair kit, 503 27 33-01, is available for repairing damaged threads.

First drill out the hole using:

6.1 mm drill bit for magnesium crankcase

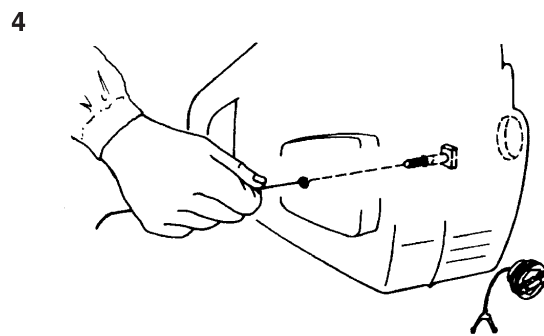
6.0 mm drill bit for plastic crankcase

Then screw in the thread insert using a suitable bolt and spanner.



Changing the front bar bolt

- 1 Drain the oil tank.
- 2 Knock through the old guide bar bolt so that it falls into the oil tank.
- 3 Remove the bolt from the oil tank.



Fasten a steel wire to the thread of the new bolt, feed the steel wire into the oil tank and out through the bolt hole in the crankcase.

- 5 Pull the steel wire until the bolt comes out through its hole.
- 6 Pull through the bolt with its nut. Place a spacer between the nut and crankcase.
- 7 Check that the square shoulder of the bolt is correctly seated in the recess in the crankcase.

- 8 Refill with chain oil.

Changing the rear bar bolt

- 1 Dismantle the cylinder cover, hand guard and muffler.
- 2 Knock in the bar bolt.
- 3 Press in a new bar bolt.
- 4 Check that the square shoulder of the bolt is correctly seated in the recess in the crankcase.



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