Workshop manual

Superlite 4528
Ergolite 6028

English

Workshop Manual
Hedge trimmer
Model Superlite 4528, Ergolite 6028

Contents

McCULLOCH®

General recommendations

The workshop used to carry out repairs must be equipped with safety devices in accordance with local directives.

No one may carry out repairs without first having read and understood the contents of this Workshop Manual.

The boxes below can be found in appropriate parts of this manual.

WARNING!

The warning box warns of the risk for personal injury if the instructions are not followed.

NOTE!

This box warns of damage to material if the instructions are not followed.

The machine is type approved for safety in accordance with applicable legislative demands with the equipment specified in the Operator's Manual. The fitting of other attachments or non-approved accessories or spare parts may result in these safety requirements not being met and the party installing such attachments, accessories or spare parts shall be liable in this respect.

Bear in mind:

Do not start the machine without making sure the cutting attachment and all the safety features are fitted and working properly.

Do not touch hot components, e.g. the muffler and clutch before they have cooled sufficiently to avoid burns.

Avoid getting fuel or oil on your skin or in your mouth.

Use a barrier cream on your hands. This reduces the risk of infection and makes dirt easier to wash away.

Long term contact with engine oil can represent a health hazard.

Never start the engine indoors. Exhaust fumes are poisonous! They contain carbon monoxide, an odourless, poisonous and highly dangerous gas.

Wipe up oil spills from the floor immediately to avoid slipping.

Do not use tools that are worn or fit badly, for example on nuts and bolts.

+ Always work on a clean bench.
+ Always work logically to ensure all parts are fitted correctly and that nuts and bolts are tightened.
+ Use the special tools where recommended to be able to carry out the work correctly and efficiently.

Fire risk

Handle fuel with respect as it is extremely inflammable.

Never refuel while the engine is running.

Do not smoke and ensure there are no open flames or sparks in the vicinity.

Never start the engine if the machine is leaking fuel or if there has been a spillage when refuelling. Allow the remaining fuel to evaporate first.

Make sure there is a working fire extinguisher close at hand.

Do not try to extinguish a petrol fire with water.

Poisonous fumes

When using cleaning agents read the instructions carefully.

Ensure there is good ventilation when handling petrol and other volatile fluids.

The engine's exhaust fumes are poisonous. Test run the engine outdoors.

Special tools

Some of the work described in the Workshop Manual requires special tools. In each section where this is necessary there is a picture of the tool and an order number.

We recommend the use of special tools in order to avoid expensive damage to parts in question and personal injury and to provide an efficient repair procedure.

Contact faces and gaskets

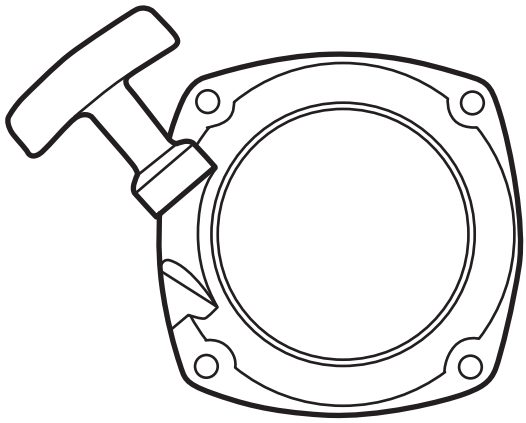
Ensure all surfaces are clean and free from gasket residue, etc. When cleaning use a tool that will not damage the contact face. Any scratches or unevenness should be removed using a flat fine cut file.

Sealing rings

Always replace a sealing ring that has been dismantled. The sensitive sealing lip can easily be damaged resulting in inferior sealing capacity. Surfaces which the seal shall seal against must also be completely undamaged. Lubricate the sealing lip with grease before it is fitted and ensure that it is not damaged e.g. by shoulders and splines on a shaft. Use tape or a conical sleeve as protection. It is important that the sealing ring faces in the right direction for it to act as it is intended.

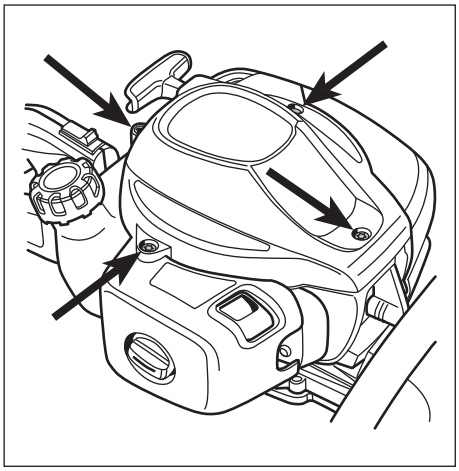
Starter

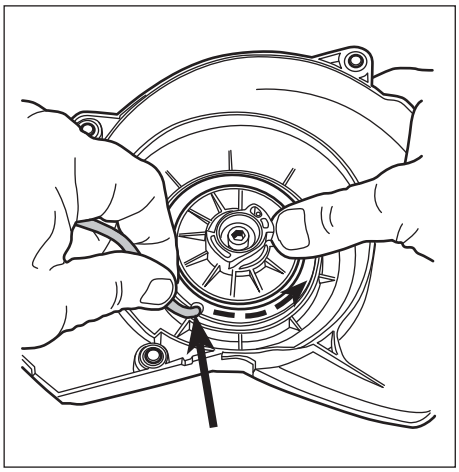
1

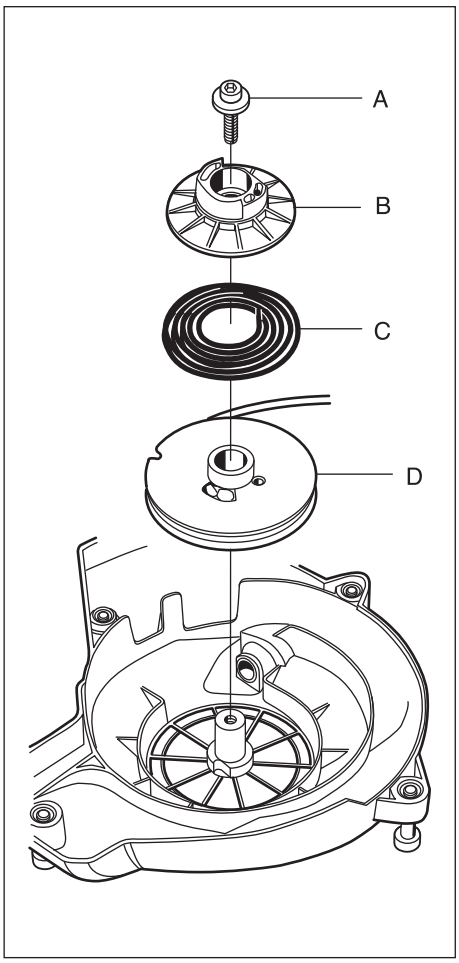


Contents

1 Starter





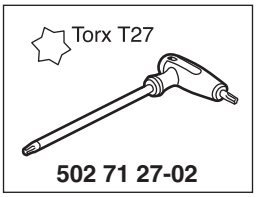


WARNING!

Protective glasses should be worn when working on the starter to avoid injury to the eyes if, for some reason, the return spring should fly out.

Dismantling

Remove the 4 bolts and lift off the starter.



502 71 27-02

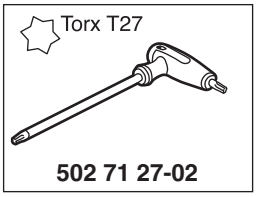
Loosen the spring tension.

Lift up the starter cord on the starter pulley and allow it to rotate backwards until the spring tension ceases

Remove the screw (A) and lift off the drive disc (B).

Remove the pressure equalisation spring (C).

Carefully remove the starter pulley (D) together with the recoil spring.



502 71 27-02

Dismantling

Loosen the four screws and remove the starter.

The screws are the so-called captive type which means that they remain in place when the starter is removed.

Loosen the spring tension.

Pull out the starter cord about 30 cm.

Slow the starter pulley with your thumb.

Lift the starter cord up out of the cut-out on the starter pulley.

Let the starter pulley rotate backwards until the spring tension ceases.

WARNING!

Be careful not to injure your thumb when the starter pulley rotates in reverse.

Dismantle the screw (A) in the centre of the starter pulley.

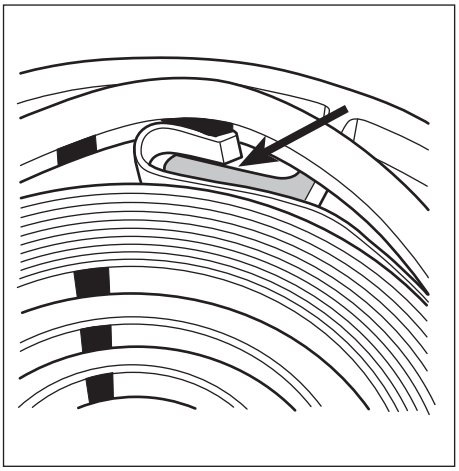
Remove the drive disc (B).

Remove the pressure equalisation spring (C) and note that it is turned with the long extension spring facing upward.

Carefully remove the starter pulley (D) together with the recoil spring.

WARNING!

Wear protective glasses. The return spring lies tensioned in the starter housing and can fly out and cause personal injury with careless handling.



Assembly

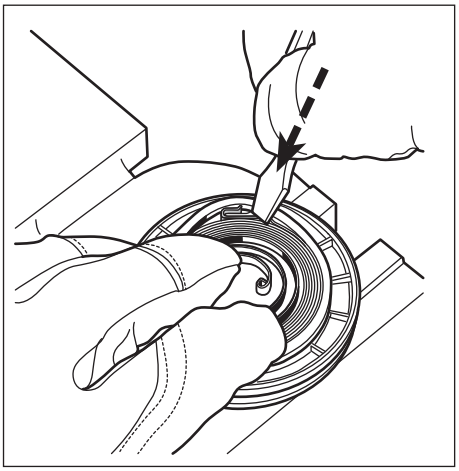
Fit the recoil spring in the starter pulley.

Place the extension spring exactly above the groove in the starter pulley.

Assembly

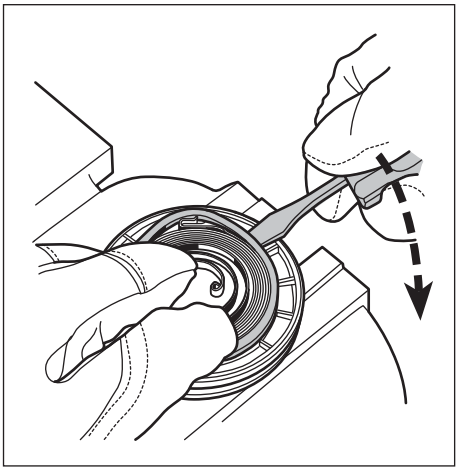
If the return spring has, despite all the precautions, flown out or if you intend to fit a new spring proceed as follows:

1. The spring, tensioned with a sturdy plastic strap, is available as a spare part.
2. The spring, tensioned with a sturdy plastic strap, is available as a spare part.



Press the extension spring into the starter pulley.

3. Hold two fingers in one hand above the recoil spring.
4. Press with the other hand and use a screwdriver to push the extension spring into the starter pulley.



Press down hard on the recoil spring and carefully prise off the plastic strap.

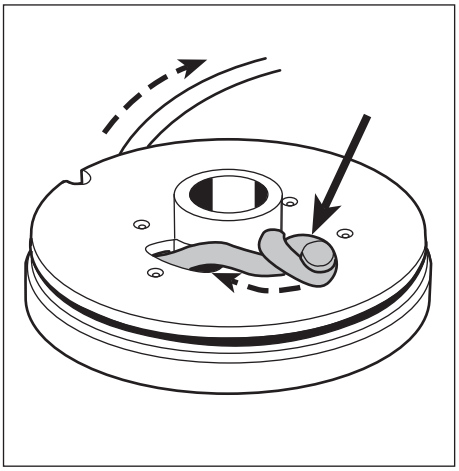
5. Press down hard with one hand's fingers over the recoil spring.
6. Carefully prise off the plastic strap with a screwdriver.

NOTE!

It is very important in step 6 above to press down hard on the spring in the starter pulley so it does not fly off.

If the spring, despite being careful, flies off, it can be fitted to the starter pulley by twisting it in place using your thumbs.

Wear assembly gloves and protective goggles.

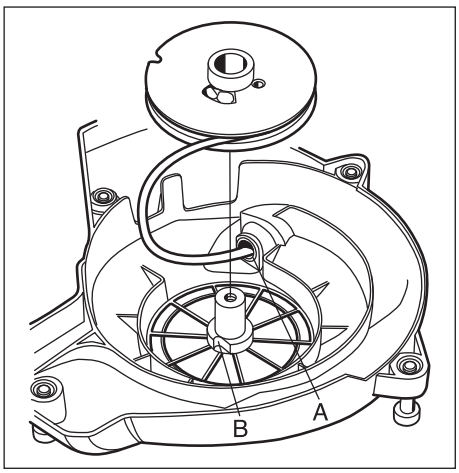


Attach the new starter cord.

Attach the new starter cord.

Make sure the knot is as small as possible and fits into the notch in the pulley.

Pulley diameter: Ø 3,3 mm.



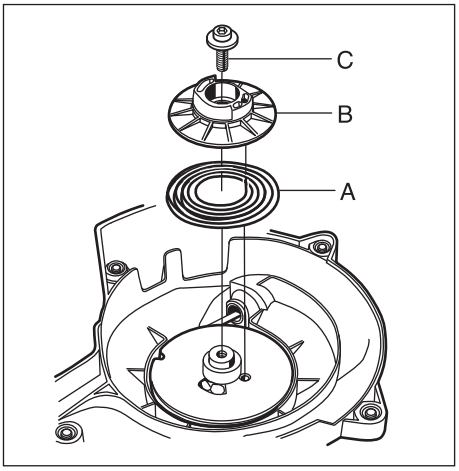
Lubricate the recoil spring and the starter pulley's stub axle with cold resistant grease or thin oil.

Insert the starter pulley in position.

Lubricate the return spring and the starter pulley's stub axle with cold resistant grease or thin oil.

Move the starter cord through the guide in the starter housing (A).

Guide the free end of the return spring in towards the spring attachment on the hub of the starter pulley (B) and slide the starter pulley down into the starter housing.

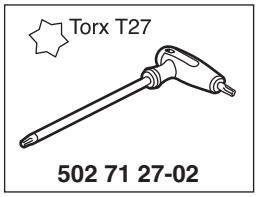


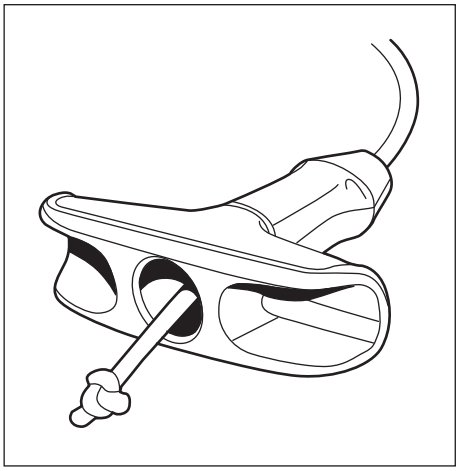
Fit the pressure equalisation spring, the drive disc and the screw with the underlying washer.

Lubricate the pressure equalisation spring (A) with a little grease.

Place the pressure equalisation spring on the starter pulley with the long extension spring turned up towards the drive disc (B).

Tighten the screw with the underlying washer (C).



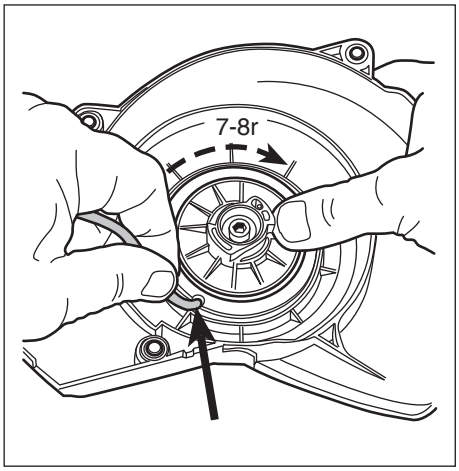


Fit the starter handle.

Fit the starter handle on the cord.

Tie a double on the cord and fold under the free end.

Pull the knot fully into the handle.



Tighten the return spring.

Check the spring tension.

Tighten the return spring.

Pull out the starter cord completely and check that the recoil spring is entirely loose.

Lift the starter cord up out of the cut-out on starter pulley.

Then turn the starter pulley **clockwise** 7 to 8 times.

Check the spring tension. With the cord completely pulled out the cord pulley should be able to be turned at **least another half revolution.**

Replacing the drive dogs

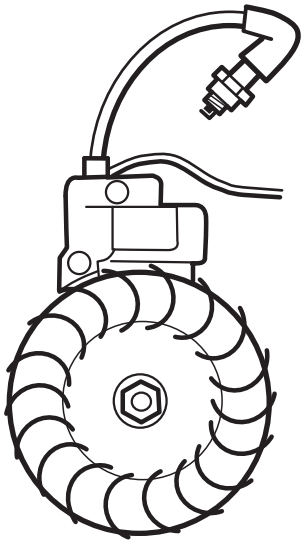
See the Electrical System chapter.

Replacing the drive dogs

See the Electrical System chapter.

Electrial system

2

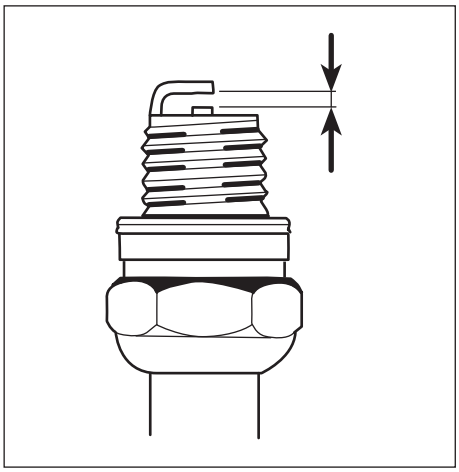


Contents

2 Electrical system

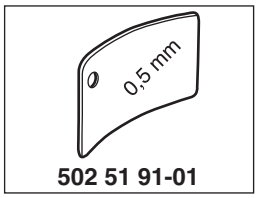
The engine is equipped with an electronic ignition system completely without moving parts. Consequently, a faulty component cannot be repaired, but must be replaced by a new component.

The spark in an electronic ignition system has a very short burn time and can therefore be interpreted as weak and can be difficult to see while troubleshooting.



Checking the ignition spark

Clean the electrodes and check the electrode gap.



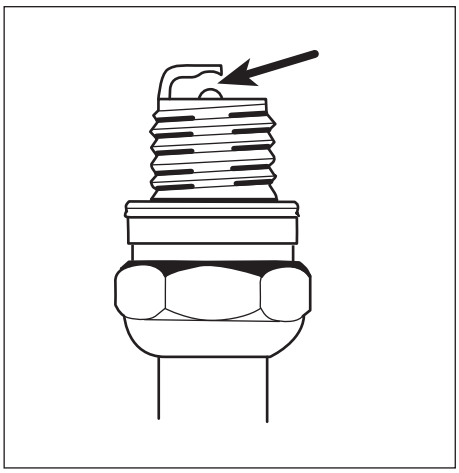
502 51 91-01

Checking the ignition spark

Remove the spark plug and clean it from soot deposits with the help of a steel brush.

Check the electrode gap. It should be 0.6 mm.

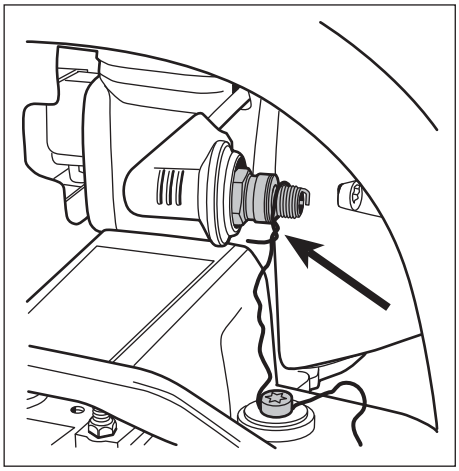
Adjust the gap as needed to the correct value with the side electrode.



If the electrodes are worn more than 50% the spark plug should be changed.

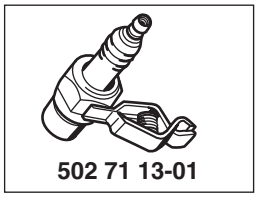
If the electrodes are worn more than 50% the spark plug should be changed.

Too large a spark gap entails a great deal of stress on the ignition module and risk for short-circuiting.



Check if a spark occurs when attempting to start.

Test with test spark plug no. 502 71 13-01 if no spark is seen.



502 71 13-01

Earth the spark plug by attaching it to the cutting unit with a steel wire as shown in the illustration.

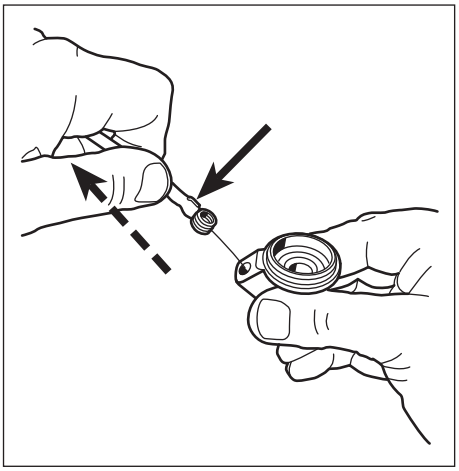
Earth the spark plug on the cutting deck and pull sharply on the starter handle.

A spark should be seen between the electrodes.

If no spark is seen test with test spark plug no. 502 71 13-01.

If a spark then occurs, the spark plug is faulty.

Try a new spark plug.



Still no spark?

Check the ignition cable's connection to the spark plug cover.

Pull the ignition cable off the spark plug guard.

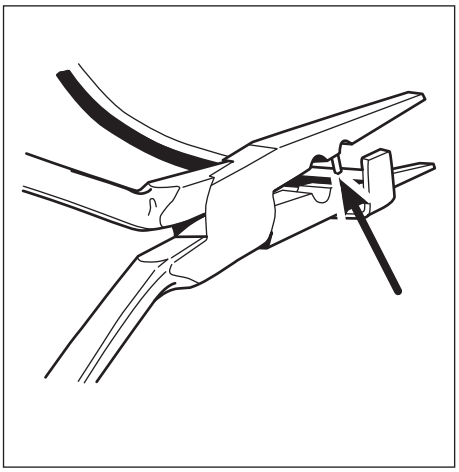
Still no spark?

Check the ignition cable's connection with the spark plug guard.

1. Pull the ignition cable off the spark plug guard by rotating it.

TIP!

Lubricate the ignition cable with a few drops of oil or silicone spray to make it easier to remove the spark plug cover.

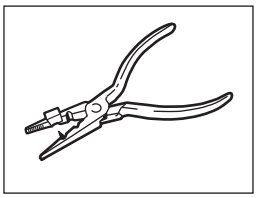


Check that the connection between the ignition cable and the ignition coil is not burnt.

Cut out the damaged section in this case.

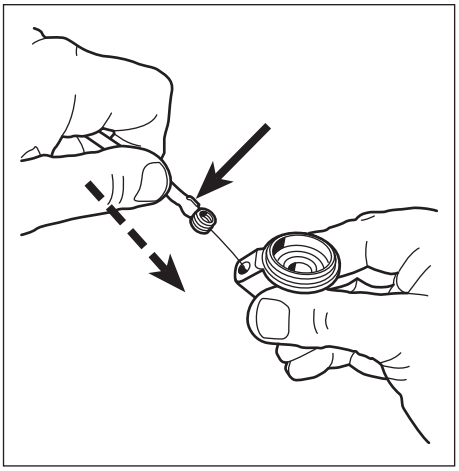
Use pliers no 502 50 06-01 to make a hole in the ignition cable.

2. Check the connection between the ignition cable and the ignition coil. Remove a segment of the ignition cable if required to make sufficient contact.



NOTE!

It is important that the tip of the ignition coil hits the centre of the ignition cable to prevent sparking.



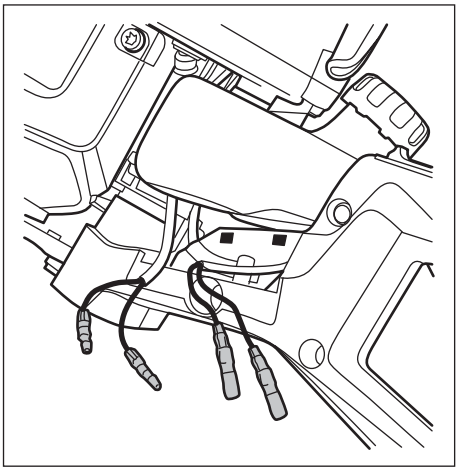
Attach the ignition coil to the ignition cable.

Attach the ignition coil to the ignition cable and ensure that the wire is folded along the cable.

Slide the contact coil into the spark plug cover.

TIP!

Lubricate the hole in the spark plug cover so that it is easier to slide in the contact coil.



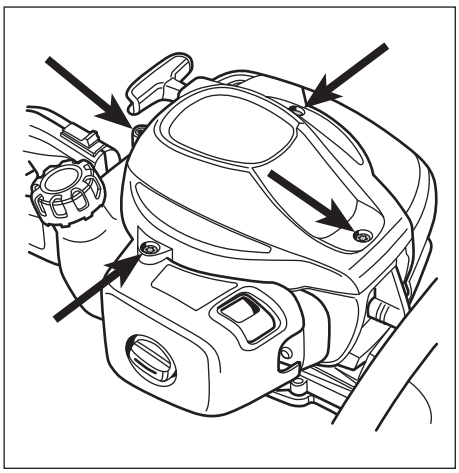
If a spark is still not obtained, the fault is in the ignition switch, shortcircuit cable or ignition module.

Replace the contact if necessary.

If there is still no spark, separate both short-circuit cables located behind the cover under the fuel tank on the left side.

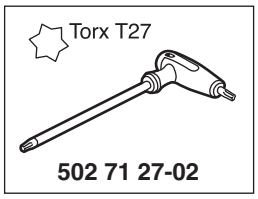
If the plug now sparks, the fault is either in the stop switch or the short-circuit cable in the handle.

Change the switch as needed and check to see if the cable insulation is damaged (see "Fuel System").



Still no spark?

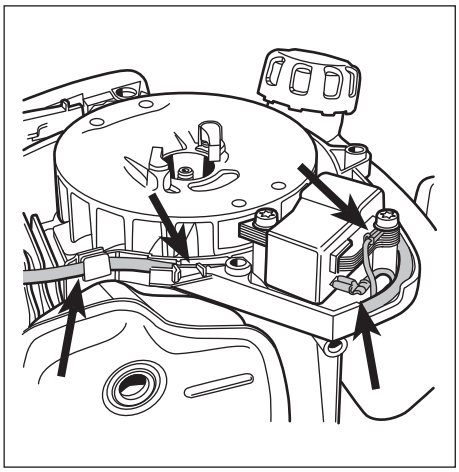
Dismantle the cylinder cover and guard over the muffler.



502 71 27-02

Still no spark?

Dismantle the cylinder cover and guard over the muffler.



Check other cables and connections.

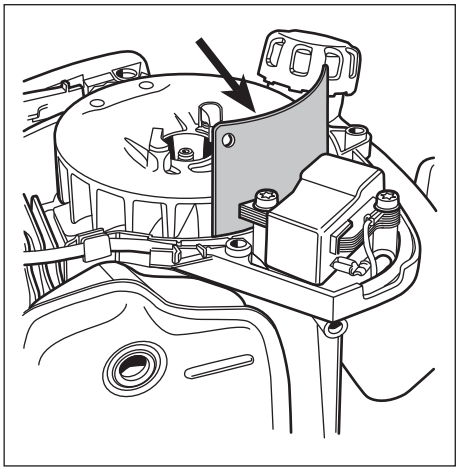
Check other cables and connections for poor contacts (dirt, corrosion, cable breakage and damaged insulation).

Make sure that the cables are correctly drawn.

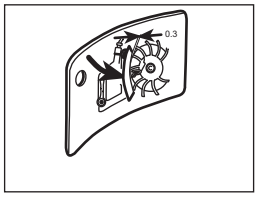
See the “Fuel system” chapter.

TIP!

Use an Ohmmeter in order to easily check if cable breakage has occurred, due to pinching, for example.



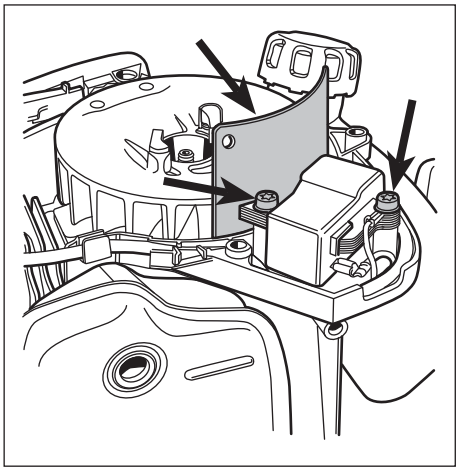
Still no spark?
Check the air gap.



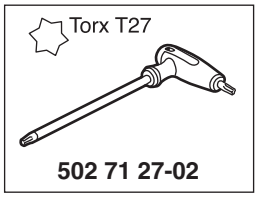
Still no spark?
Check the air gap between the fly wheel magnet and the ignition module.

The gap should be 0.3 mm.

Use air gap gauge 502 51 34-02.



Justera luft Adjust the air gap.

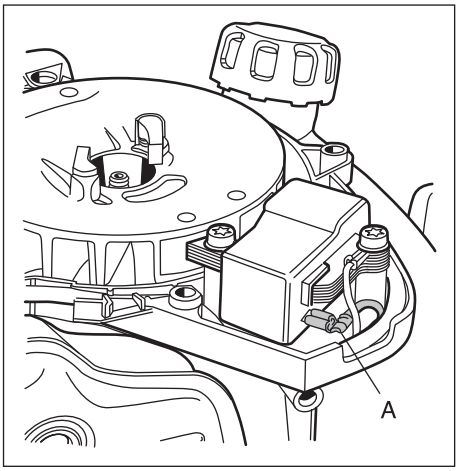


502 71 27-02

Adjust the air gap to the right measurement.

- Loosen the screws.
- Insert the feeler gauge and press the ignition module against the flywheel.
- Tighten the screws and check the air gap once again.

If there is still no spark, the ignition system should be replaced.



Dismantling

First dismantle the following:

The starter cover, the spark plug and the protective cover over the muffler.

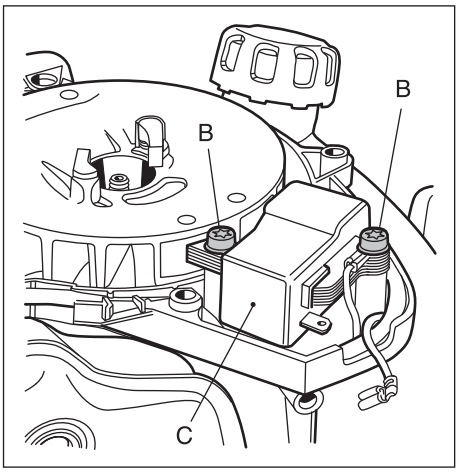
Prise off the cable (A) from the ignition module.

Dismantling

Dismantle the following parts to access the ignition system:

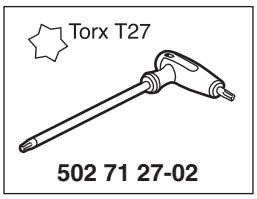
The starter cover, the spark plug and the protective cover over the muffler.

Prise off the cable (A) from the ignition module.

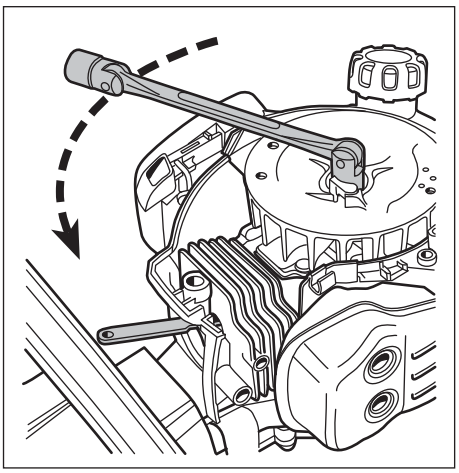


Remove the screws and lift off the ignition module.

Remove the screws (B) and then remove the ignition module (C).



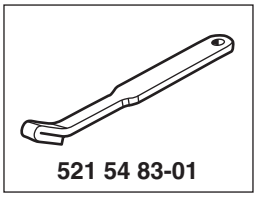
502 71 27-02



Remove the flywheel.

Remove the flywheel nut.

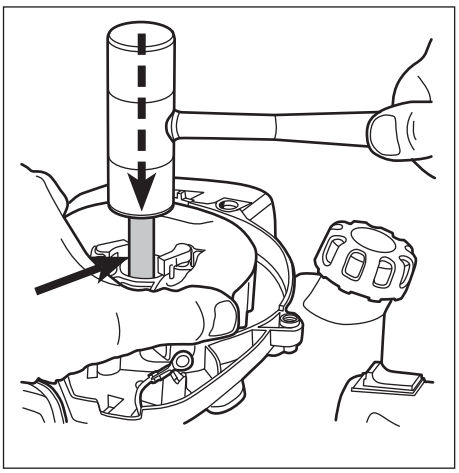
Fit the piston stop no. 521 54 83-01 in the spark plug hole and remove the nut holding the flywheel.



521 54 83-01

NOTE!

Place the piston stop so that it is trapped between the piston stop and the combustion chamber. It must not stick out into the exhaust port.

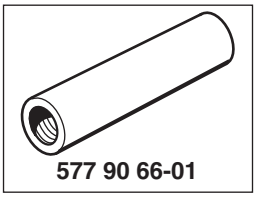


Remove the flywheel from the crankshaft.

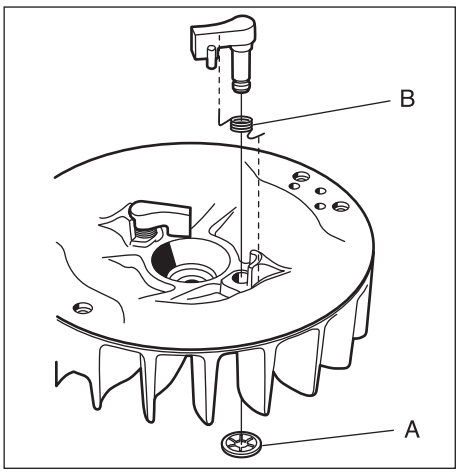
Remove the flywheel from the crankshaft using punch no. 577 90 66-01.

Leave a gap of approx. 2 mm between the punch and the flywheel.

Gently knock the punch with a hammer while lifting up the flywheel with your other hand.



577 90 66-01



Drive dogs

Dismantle the lock washer (A) with the help of a screwdriver.

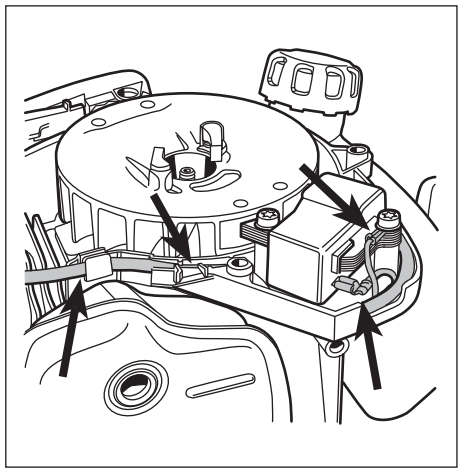
This deforms the washer and must be replaced with a new one when assembling.

Drive dogs

The flywheel must first be dismantled from the crankshaft to replace the drive dogs.

Remove the locking washer (A) using a screwdriver. This deforms the washer and must be replaced with a new one when assembling to obtain proper locking.

Note the position of the recoil spring (B).



Assembly

Check that the key in the flywheel and keyway in the crankshaft are undamaged.

Assemble the flywheel.

Fit the ignition module.

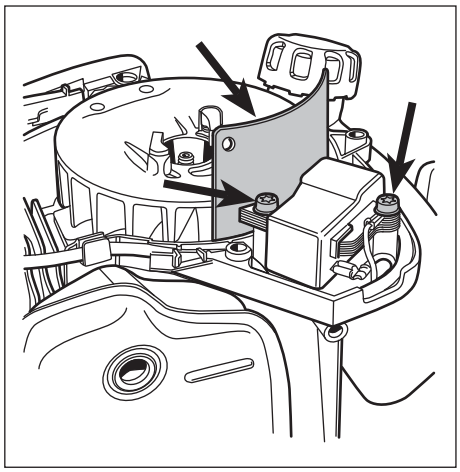
Assembly

Check that the key in the flywheel and keyway in the crankshaft are undamaged.

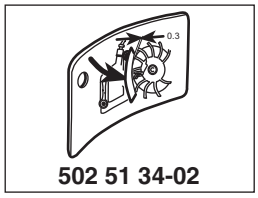
Assemble the flywheel.

Fit the ignition module.

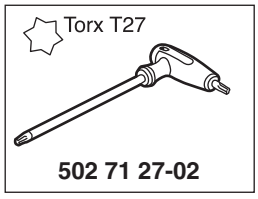
Take care that the electrical wires are positioned correctly so that they are not crushed.



Adjust the air gap to 0.3 mm.



502 51 34-02



502 71 27-02

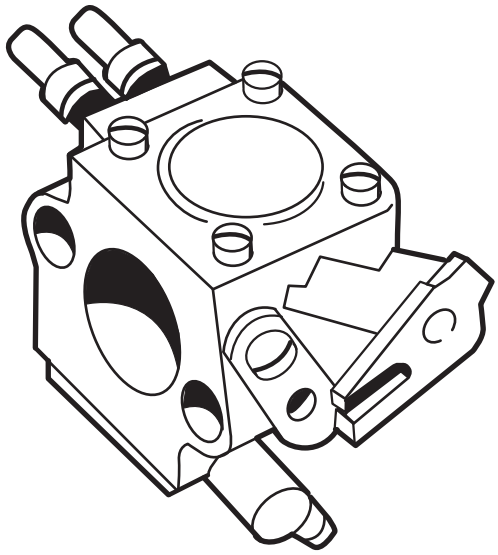
Adjust the air gap. There should be 0.3 mm between the permanent magnets in the flywheel and the ignition module.

Tighten the screws that hold the ignition module in place and check the air gap once again.

Assemble other parts in the reverse order as set out for dismantling.

Fuel system

3



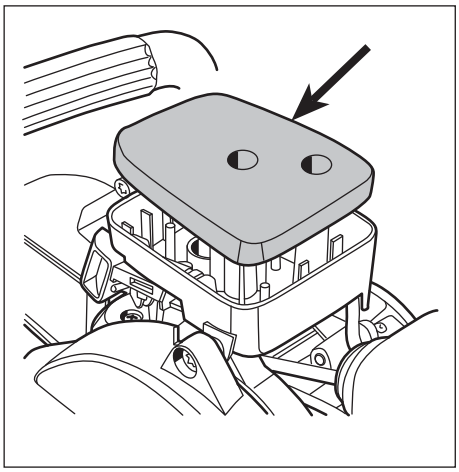
Contents

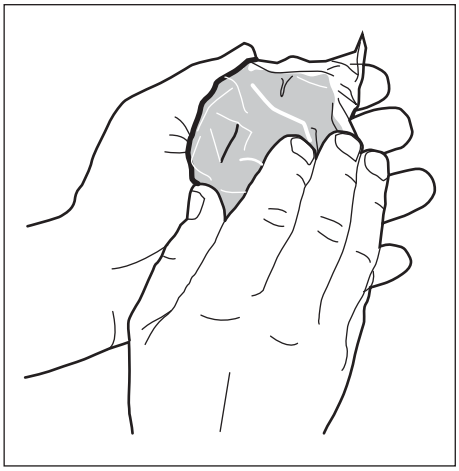
3 Fuel system

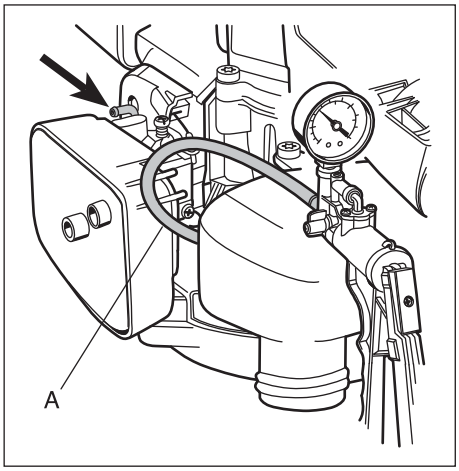
In addition to the fuel tank and carburettor, the fuel system consists of the air filter, fuel filter and tank venting.

All these components interact so that the engine receives the optimal mixture of fuel and air to make it as efficient as possible. Very small deviations in the carburettor setting or a blocked air filter have a large effect on the running and efficiency of the engine.

The carburettor can come from several different manufacturers on our models, but the function and repair methods are essentially the same.





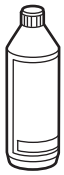


Air filter

Loosen the wing screw and lift off the cover above the air filter.

Remove the air filter and clean it with lukewarm soapy water.

Replace damaged filters with a new one.



505 69 85-70

Impregnate the filter with air filter oil.

Air filter

Loosen the wing screw and lift off the cover above the air filter.

Remove the air filter.

The filter is made of foamed plastic and must be cleaned with lukewarm soapy water.

Replace damaged filters with a new one.

WARNING!

Do not clean not the filter with petrol. Hazardous!

TIP!

Use cleaning fluid Active Cleaning no. 505 69 85-70.

Impregnate the filter with air filter oil.

NOTE!

Make sure that the air filter is free of cleaning agent before it is impregnated with air filter oil.

531 00 60-76

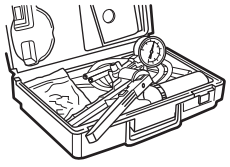
TIP!

Place the filter in a plastic bag and pour about a tablespoon of air filter oil no. 531 00 60-76 into the bag.

Massage the oil into the air filter.

Tank venting

Check that the tank venting valve works correctly.

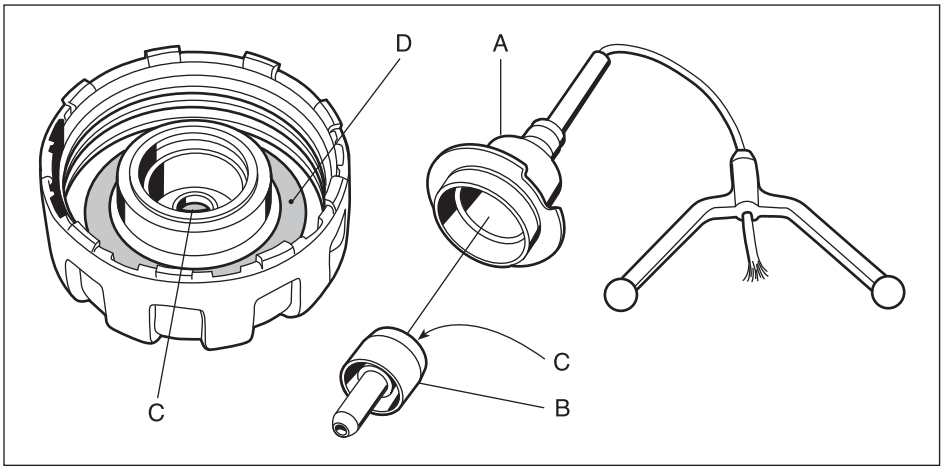


531 03 06-23

Tank venting

Tank venting takes place through the fuel cap and needs to be functional for the engine to work.

- Empty the fuel tank and turn the hedge trimmer upside down.
- Remove the air filter cover.
- Remove the transparent fuel hose (A), the return pipe, from the carburettor and connect it to the pressure tester, no. nr 531 03 06-23.
- Make sure the hose bushings in the tank are leak tight.
- Pump up a negative pressure in the tank. No or significantly low negative pressure must be noted.



The fuel cap can be taken apart for cleaning.

Use a screwdriver and prise off the housing (A).

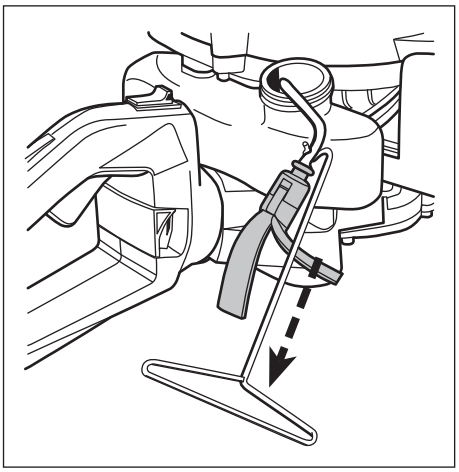
Remove the nipple (B) using a small flat nosed pliers.

Blow the bleeding opening in the house (A) clean with compressed air.

Blow clean both sintered filters (C) with compressed air.

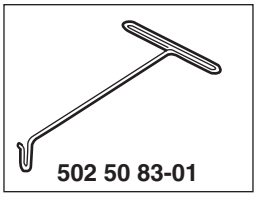
Assemble the fuel cap in reverse order as set out for dismantling.

Make sure the seal (D) is not damaged.



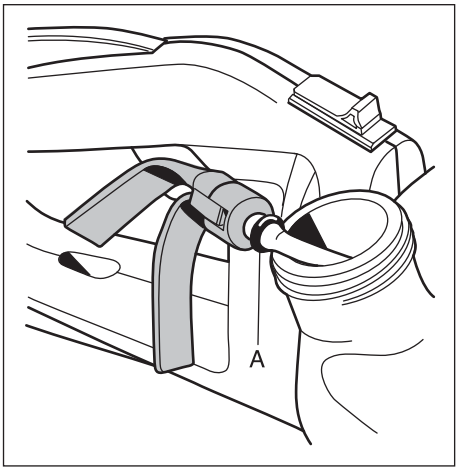
Fuel filter

The fuel filter can be removed through the tank's fill hole.



Fuel filter

The fuel hose in the tank contains a fuel filter. It is accessible through the fill hole. Pull out the filter using tool 502 50 83-01.



Clean the filter externally if it is not too dirty.

Replace the filter if required.

If the filter is not too dirty, its surface can be cleaned with a brush.

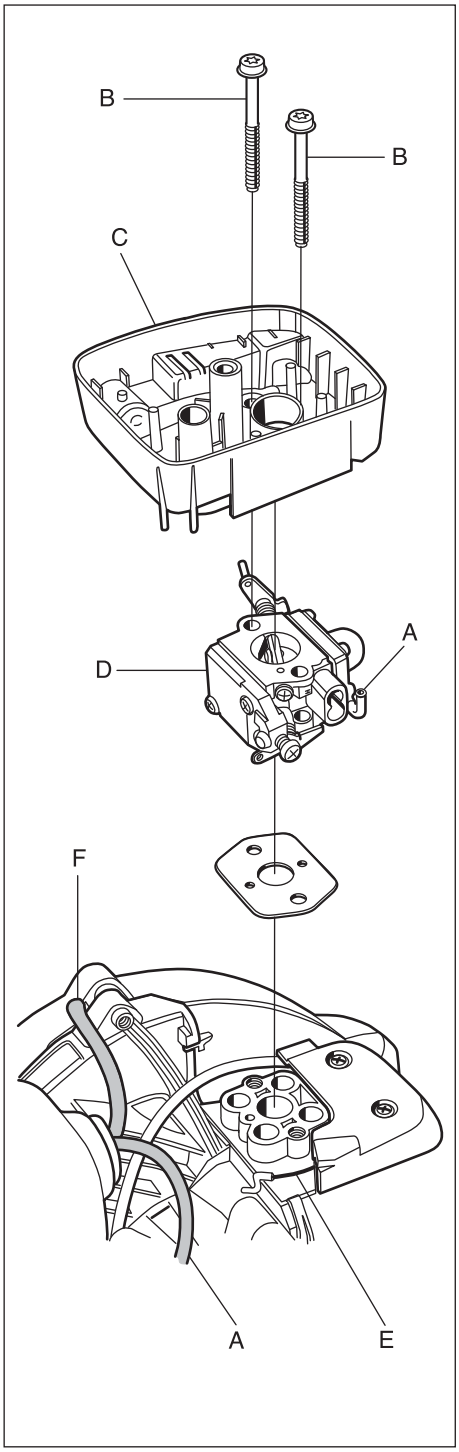
Otherwise it must be replaced.

Check the fuel hose for cracks and leaks.

Make sure that the filter's connection neck is inserted as far as possible into the fuel hose.

Check O-ring (A).

Exchange for a new one if it is not in working order.



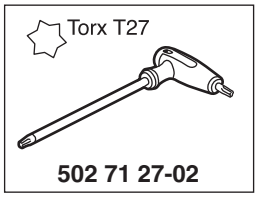
Carburettor

Dismantling

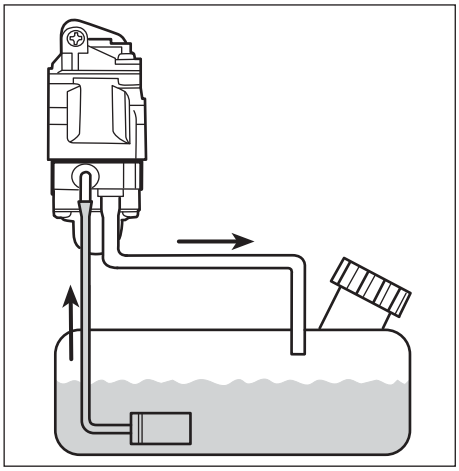
Remove the air filter cover and the air filter as well as the return fuel hose from the carburettor.

Remove the screws (B) and the air filter holder.

Unhook the throttle cable and remove the fuel hose (F).



502 71 27-02



Dismantling

With the help of the fuel pump's bellows press fuel through the carburettor and fill all ducts with fuel.

Carburettor

Dismantling

1. Remove the air filter cover and the air filter.
2. Remove the return fuel hose (A).
3. Loosen teh screw holding together the apparatus cover and air filter holder.
4. Remove the fan housing screws that hold the air filter holder in place between the fan housing cover and the crankcase.
5. Remove the screws (B) holding both the air filter holder (C) and the carburettor (D).
6. Lift off the air filter holder.
7. Remove the throttle cable (E) and the fuel hose (F) from the carburettor. Prise off the hose from the connecting nipple using a screwdriver.
7. Remove the carburettor.

Dismantling the carburettor

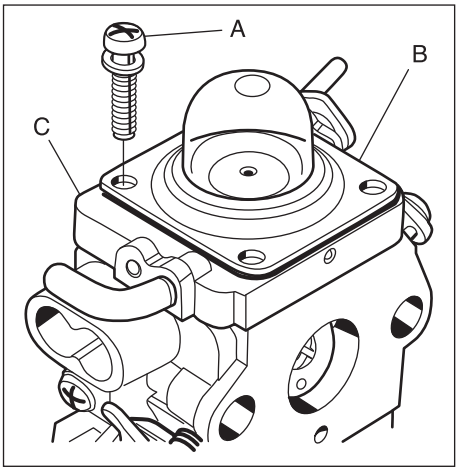
NOTE!

Carburettor spare parts cannot be ordered separately. In the event of wear or other damage the whole carburettor must be replaced.

With the help of the fuel pump's bellows press fuel through the carburettor and fill all ducts with fuel.

Any vapour bubbles that block the ducts are pushed out.

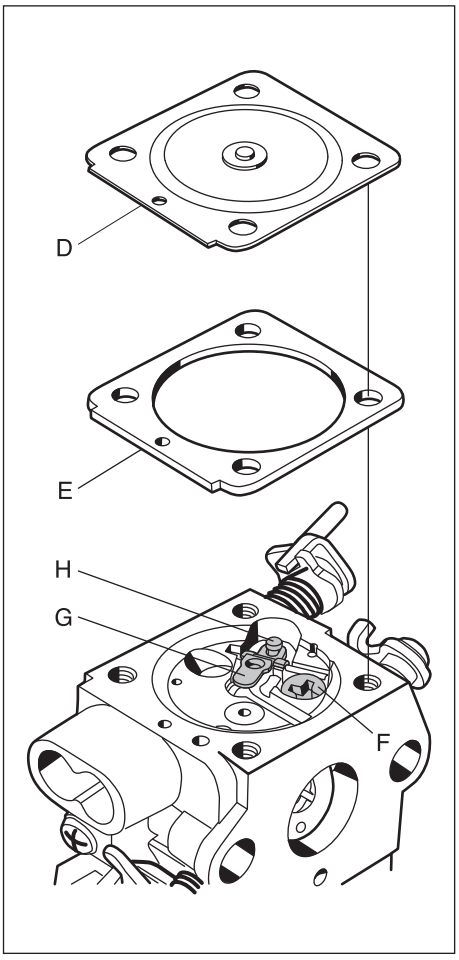
In doing so helps to start the engine.



Dismantle the fuel pump's diaphragm and the valve housing.

Remove the 4 screws (A).

Now lift off the fuel pump's diaphragm (B) and the valve housing (C).



Remove the control diaphragm and check for any damage.

Remove the gasket.

Remove the lever arm and the needle valve.

Remove the control diaphragm (D) and check for material damage and wear on the contact point with the lever arm.

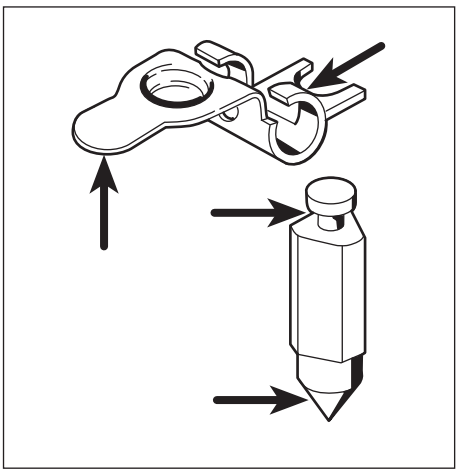
Replace the carburettor if it is damaged.

Remove the gasket (E).

Remove the screw (F) and carefully remove the lever arm (G) and the needle valve (H).

Make sure not to lose the spring.

If one or more parts are worn, the carburettor must be replaced with a new one.

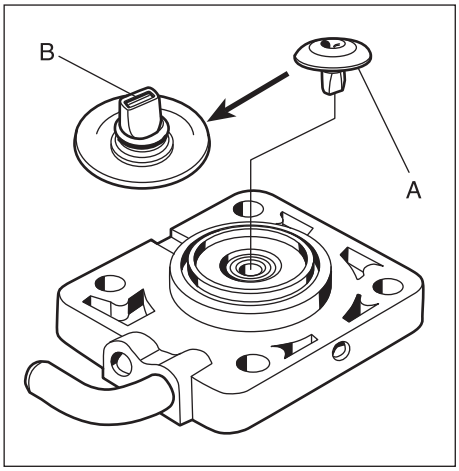


Check the lever arm and needle valve for wear.

Check the wear to the lever arm partly by the contact points against the control diaphragm and partly by the cut-outs for the needle valve.

Also check wear to the tip of the needle valve and the groove for the lever arm.

If any of the parts are damaged, the carburettor must be replaced with a new one.



Lift up the non-return valve (C) and check that the seals are intact.

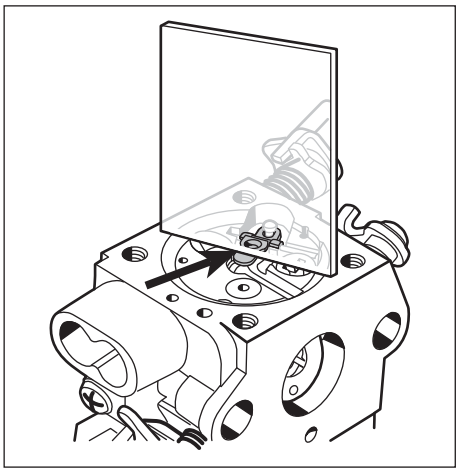
Clean the valve housing.

Carefully lift up non-return valve (A) using your nails.

Clean the valve housing and check that the channels are open.

Check that the non return valve's seals (B) are undamaged by carefully squeezing the short sides together.

If the non-return valve is damaged, the carburettor must be replaced with a new one.



Assembling the carburettor

Clean all parts and assemble the carburettor in the reverse order as set out for dismantling.

Check the position of the lever arm.

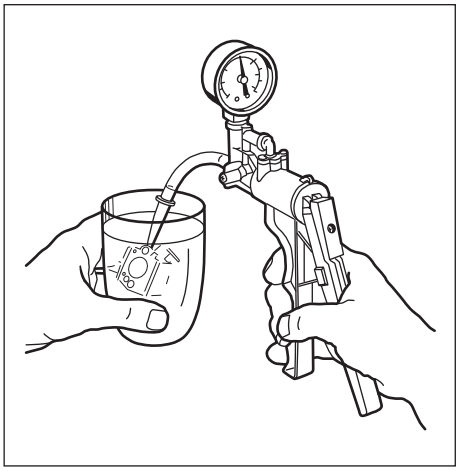
Assembling the carburettor

Carefully clean all parts before assembling the carburettor in reverse order as set out for dismantling. If any parts are damaged, the entire carburettor must be replaced with a new one.

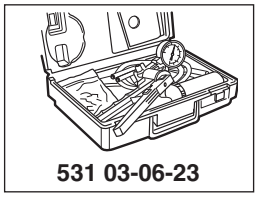
Check that the lever arm lies flush with the carburettor housing (without a gasket).

Too high setting = too much fuel.

Too low setting = too little fuel.



Check that the carburettor is sealed.



531 03-06-23

Check that the carburettor is sealed.

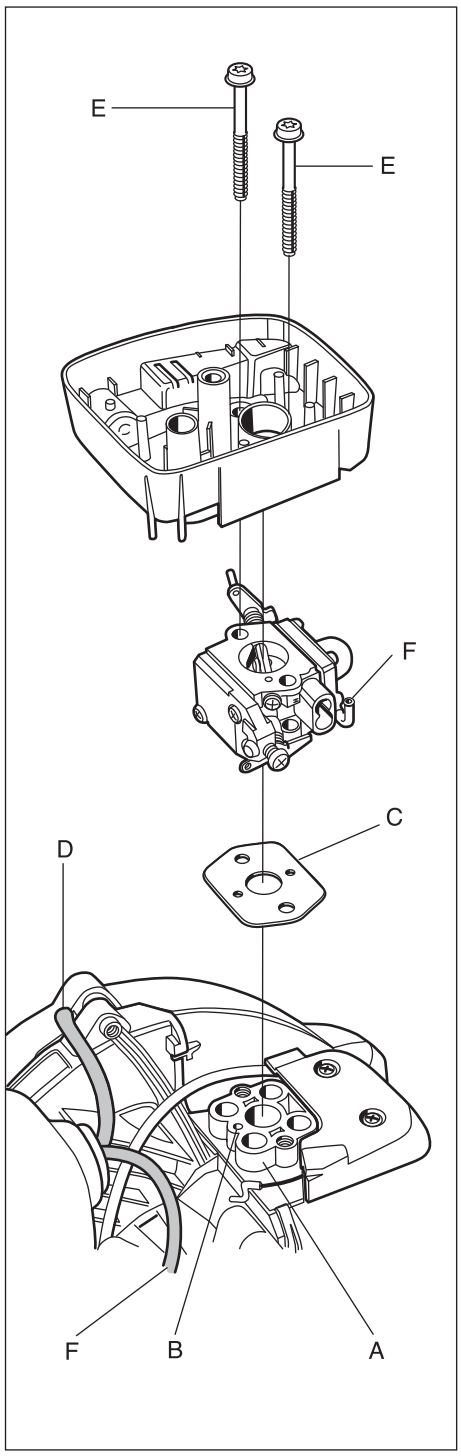
Connect the pressure tester no.

531 03 06-23 to the fuel inlet on the carburettor.

Pump up the pressure to 50 kPa.

Lower the carburettor in a vessel with petrol in order to discover any leaks more easily.

No leakage is permitted.



Assembly

Check the distance piece for cracks.

A defective distance piece must be replaced.

Make sure that the impulse channel is entirely open.

Connect the fuel hose (D) to the carburettor inlet.

Screw tight the carburettor and air filter holder.

Connect the return fuel hose.

Assembly

Inspect the distance piece (A) for cracks that can cause starting problems and negative idling. Check also that the impulse channel (B) is open and not completely or partly blocked with grease, for instance, or that the gaskets do not fit correctly. This also applies the impulse channel in the cylinder.

A defective distance piece must be replaced.

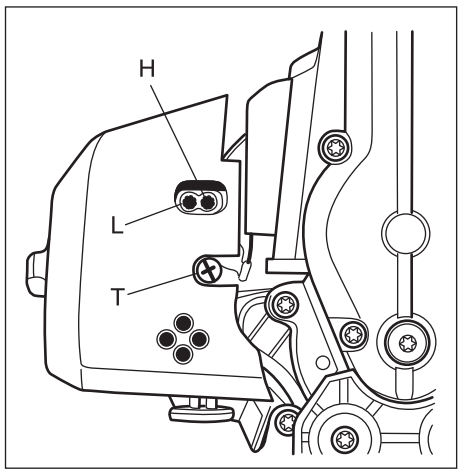
Place the carburettor gasket (C) in position and fasten it with a little grease.

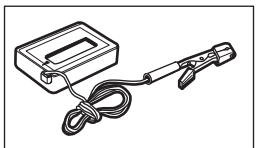
Connect the fuel hose (D) to the carburettor inlet.

Connect the throttle cable.

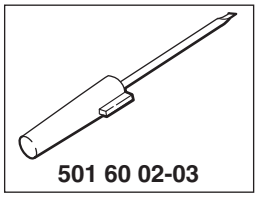
Screw tight the carburettor and air filter holder with the screws (E). Do not forget the fan housing screws.

Connect the return fuel hose (F).

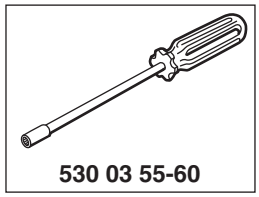




502 71 14-01



501 60 02-03



530 03 55-60

Carburettor settings

The carburettor's job is to deliver a combustible mixture of air and gasoline to the cylinder.

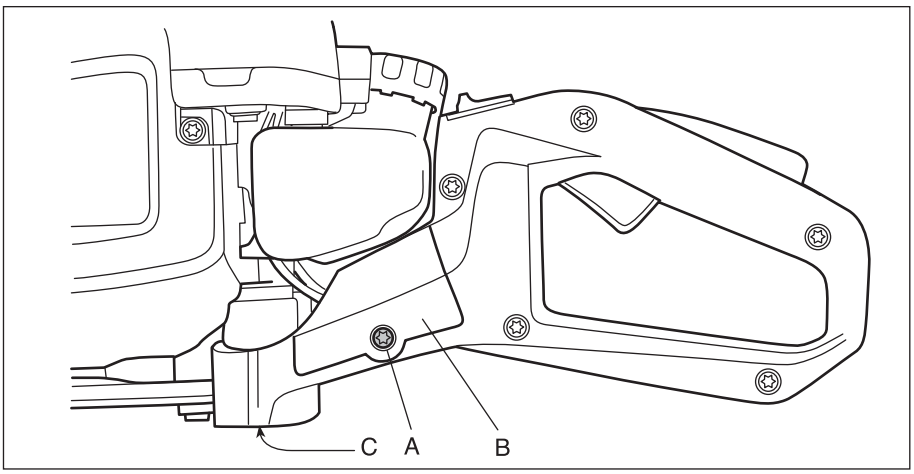
The amount of this mixture is controlled with the throttle.

The high and low speed jets in the carburettor can only be adjusted using the special tool 530 03 55-60.

Basic setting: H = 1 1/2, L = 1 1/2.

Setting idle speed:

1. Run the engine warm for about 4 minutes at 8,500–9,000 rpm.
2. If the idle speed exceeds 3,700 rpm it can be lowered by turning the idle screw (T) anticlockwise.
3. Adjust the idle speed to 2,800 – 3,100 rpm.

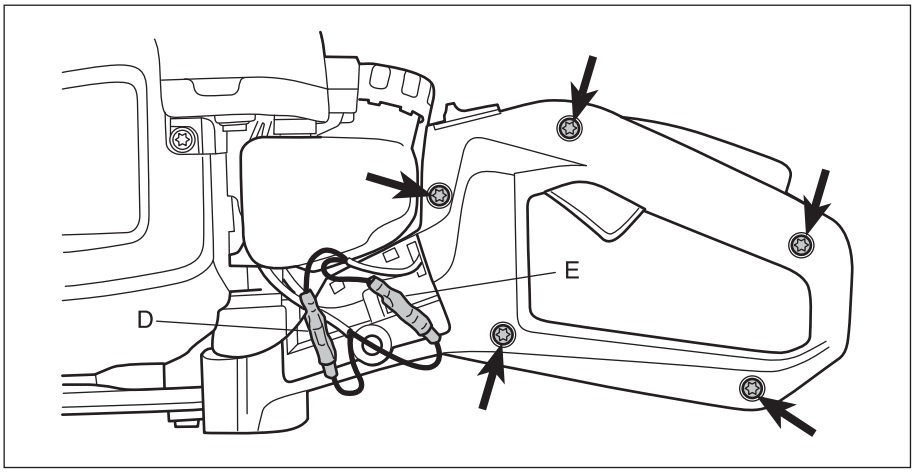


Throttle handle

Remove screw (A).

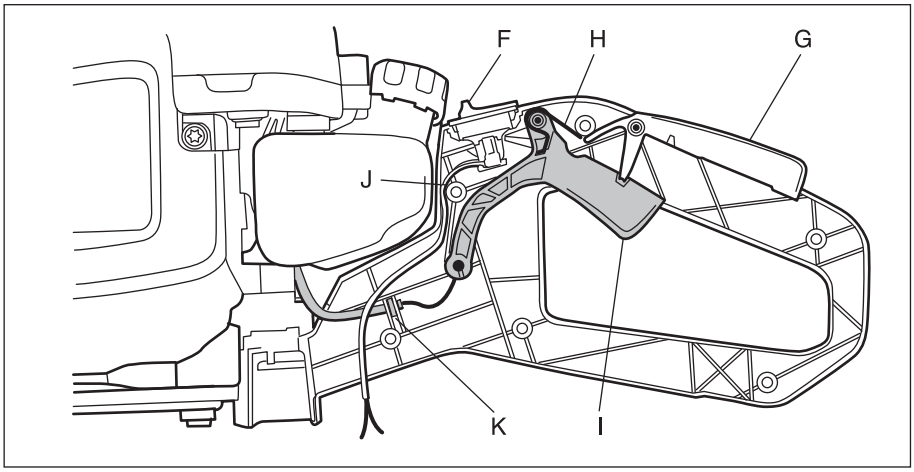
Lift off the lid (B).

Remove screw (C).



Separate short-circuit cables (D) and (E).

Remove the remaining 5 screws and carefully lift away the handle half.



Lift away the short-circuit contact (F) and replace with a new one later if necessary.

Lift off the lock preventing unintentional full trottle (G).

Note how the recoil spring (H) for the throttle is located and lift away the throttle control.

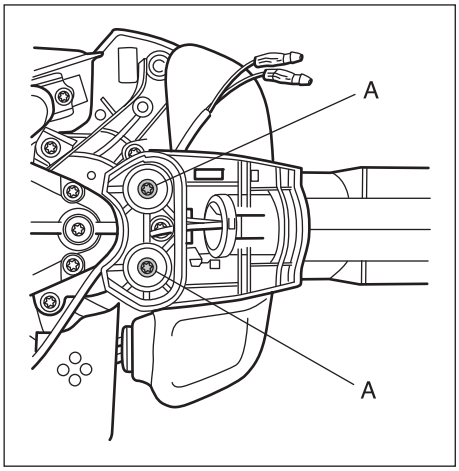
Replace damaged or worn parts and assemble the throttle handle in the reverse order as set out for dismantling.

Note the following:

Make sure that the short-circuit cables are pressed sufficiently into the handle half so they are not pinched (J). They are also to be laid above the throttle cable and then through the square hole in the left handle half.

Make sure the throttle cable is located correctly with the stop washer (K) depressed in the right handle half.

Put the left handle half in place and tighten all 6 screws.



Throttle handle, rotating

Remove the cover over the throttle cable guide by the carburettor.

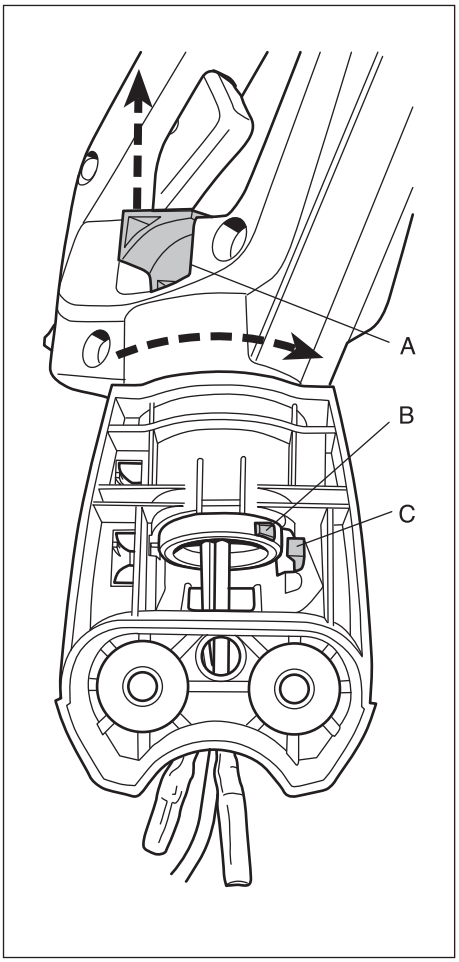
Dismantle the throttle cable.

Separate the short-circuit cables and remove the screws (A).

Pull off the handle.

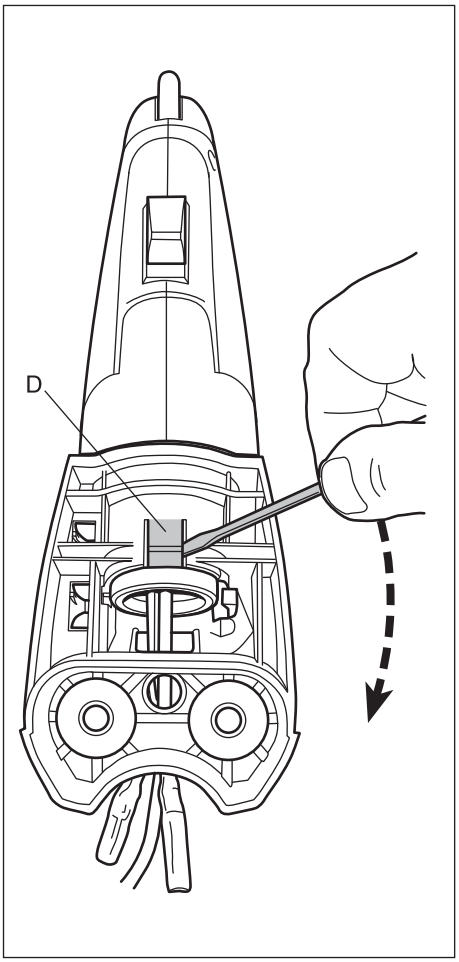
Throttle handle, rotating

1. Remove the cover over the throttle cable guide by the carburettor.
2. Dismantle the throttle cable from the carburettor.
3. Separate the short-circuit cables.
4. Remove the screws (A).
5. Remove the handle together with the throttle cable and the short-circuit cables from the engine frame.



Turn the handle until the lug (B) reaches the catch (C). The press the catch to let the lug to pass. Turn the handle a further 1/4 turn.

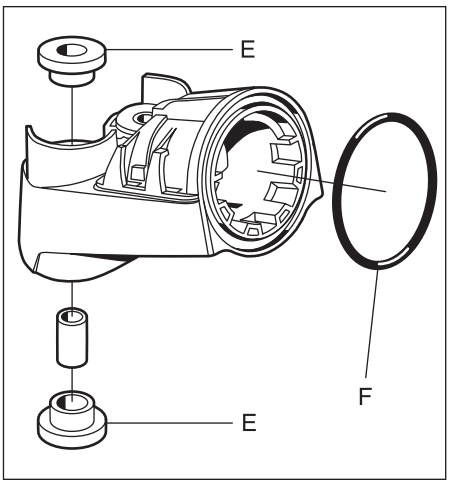
Pull the catch (A) backwards and turn the handle anticlockwise until the lug (B) reaches the catch (C). Then press out the catch (C) with a small screwdriver for instance so that the lug (B) can pass when the handle is turned a further 1/4 anti-clockwise turn.



Prise up the locking tab and pull off the handle.

Prise up the locking tab (D) using a small screwdriver.

Then pull off the twistable handle from the handle mounting.



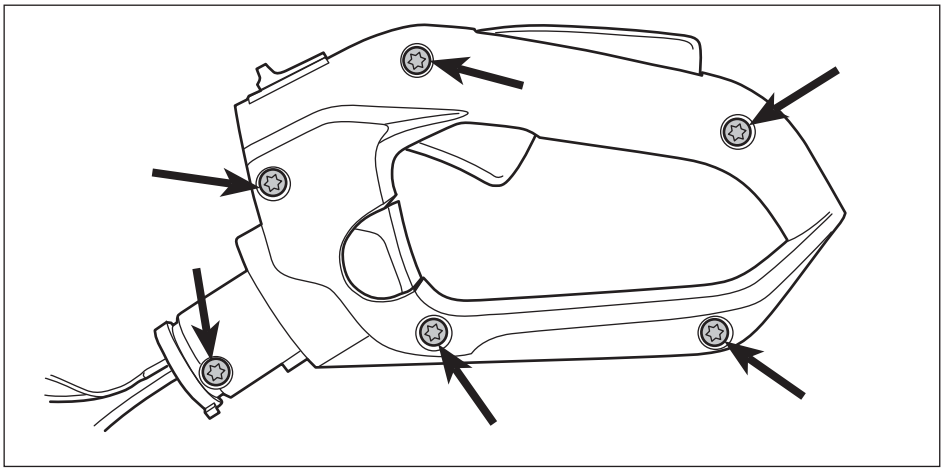
Inspect the rubber sleeves (E) and the O-ring (F) for wear and damage.

Replace any faulty parts.

Inspect the rubber sleeves (E) and the O-ring (F) for wear and damage.

Replace any faulty parts.

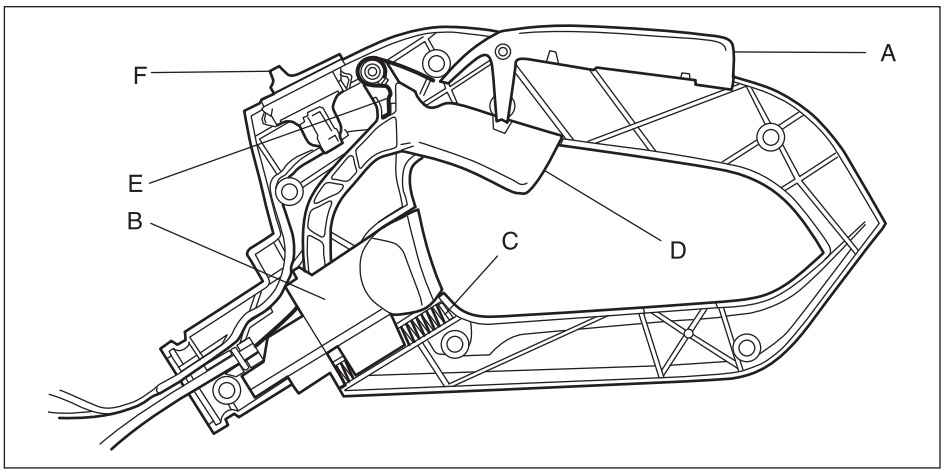
Lubricate the O-ring with a little grease when fitting it so that the handle can twist easier.



Remove the 6 screws holding the handle halves together.

Carefully lift off the left (upper) handle half.

Make sure that the recoil spring for the catch for the twistable handle does not fly out.



Lift off the lock preventing unintentional full throttle (A).

Remove the catch (B) for the twistable handle and its spring (C).

Remove the throttle lever (D).

Note how this recoil spring (E) is tensioned.

Prise off the ignition switch (F) using a small screwdriver.

Assemble the throttle handle in the reverse order as set out for dismantling.

Note the following:

Make sure that the short-circuit cable is properly pressed into the handle half so that it is jammed in place.

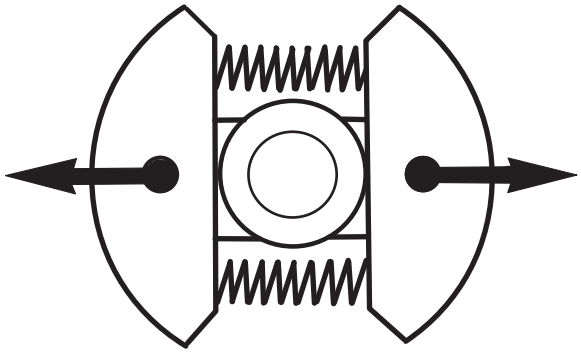
Trouble Shooting Guide

Probable causes / Symptom		Starting			Low speed				Acceleration/ Deceleration			High speed
		Difficult to start	Flooding, fuel leakage	Difficult to prime when starting	Engine does not idle	Idles too slowly	Idling does not stabilise	Stops when idling	Engine does not accelerate	Engine stops when decelerating	Poor acceleration capacity	Poor performance at high speed
Stop screw for the throttle not working		●			●		●	●				
Fuel tank/hose	Fuel filter blocked	●		●	●		●	●	●			●
	The fuel hose blocked	●		●	●		●	●	●			●
	Air in fuel ducts	●		●	●		●	●	●			●
	Incorrect/poor fuel	●					●					●
Pump diaphragm	Vacuum pulse leakage								●			●
	Vacuum pulse duct blocked								●			●
	Loose screw(s) on the pump cover		●						●			●
	Faulty pump diaphragm								●	●		●
Flow bellows	Flow bellows damaged			●								
	The needle valve faulty	●		●			●	●	●			●
Carburettor is not fitted correctly					●		●		●			●
Faulty heat insulation seal				●		●		●			●	
Needle valve's lever	Lever arm damaged	●	●			●			●			●
	Lever arm too high		●			●		●		●		
	Lever arm too low								●			
	Lever arm does not work correctly	●	●	●	●	●	●	●	●	●		●
Needle valve's spring	The spring is deformed		●					●				●
	The spring is not fitted correctly						●	●	●			●
Control diaphragm	Diaphragm is damaged	●	●	●			●		●			●
	Faulty seal	●	●	●								●
Needle valve	Valve jams	●		●					●			
	Valve worn	●	●			●	●	●		●		●
	Foreign object in the valve guide	●	●			●	●	●		●		●

3 Fuel system

Centrifugal clutch

4



Contents

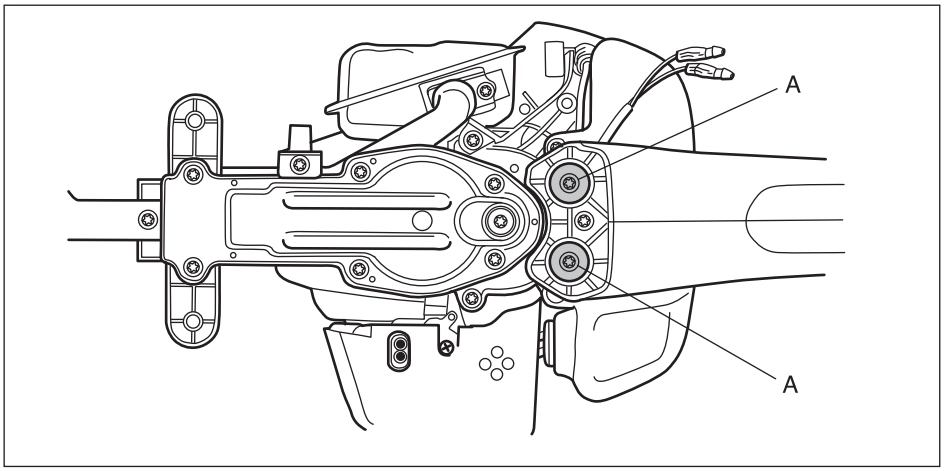
4 Centrifugal clutch

The centrifugal clutch has the task of transferring the power from the engine to the cutting equipment's drive axle. As the name implies, it works according to a centrifugal principle.

This means the clutch's friction shoes are thrown outwards towards the clutch drum at a certain engine speed. When the friction against the drum is sufficiently great it drives the drive shaft at the same speed as the engine.

Some slipping occurs between the clutch and the clutch drum when accelerating as well as in the reversed situation when the cutting equipment jams. Thereby preventing abnormal load changes on the crankshaft.

The engagement speed has been carefully tested so that the engine can idle without the cutting equipment's drive shaft rotating.



Centrifugal clutch

Dismantling

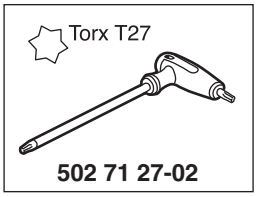
Unscrew the spark plug.

Unhook the throttle cable from the carburettor and separate the connections to the short-circuit cable (see also Chapter 3).

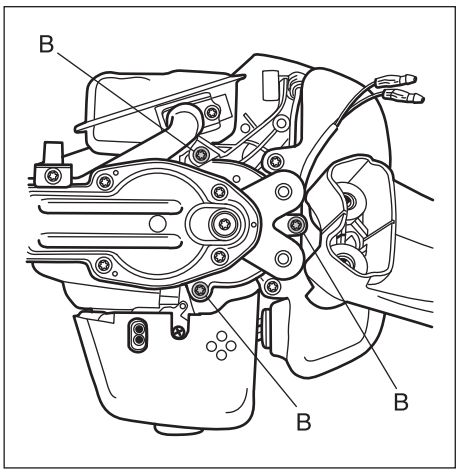
Remove the 2 screws holding the front handle and lift off the front handle.

Remove the guard over the muffler (2 screws).

Remove screws (A) and fold the rear handle to one side.



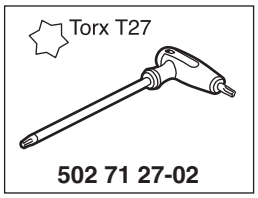
502 71 27-02



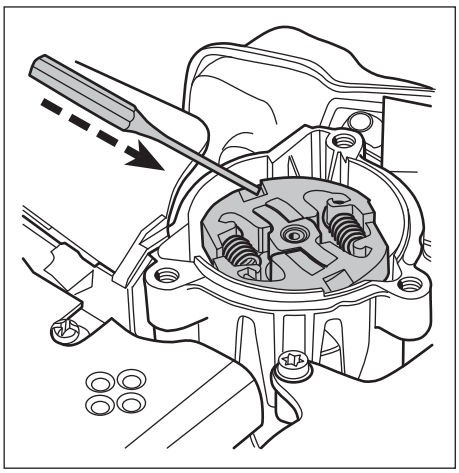
Remove the cutting deck from the engine.

Remove the three screws (B) and lift out the cutting deck from the engine.

Note that the exhaust pipe does not have to be removed.



502 71 27-02

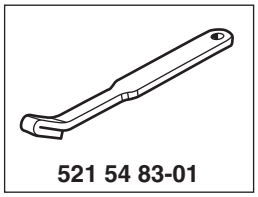


Dismantle the centrifugal clutch.

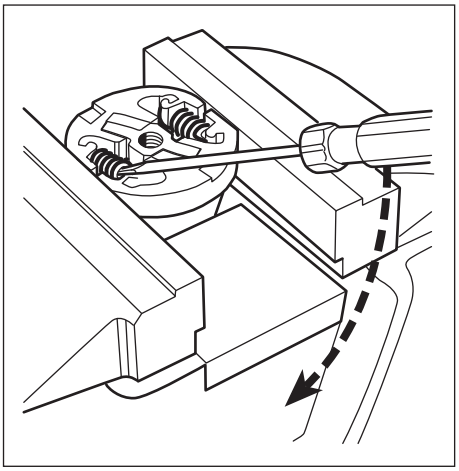
Note: left hand threads!

Position the piston stop, 521 54 83-01 in the spark plug hole so that it is situated between the piston and the top of the cylinder.

Use a mandrel and a hammer to loosen the clutch clockwise (left hand threads).



521 54 83-01



Dismantle the clutch shoes from the hub.

Assembly

Check that the clutch springs are not damaged, e.g. cracks.

Assemble the clutch in the reverse order as set out for dismantling.

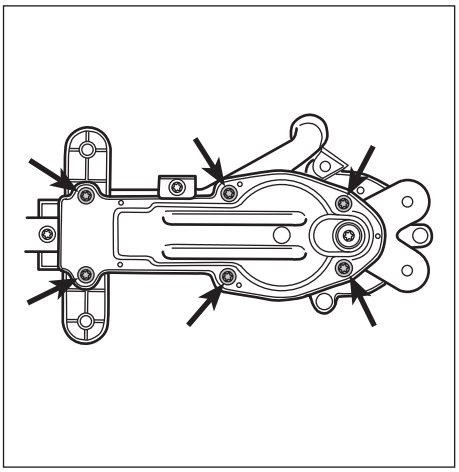
Dismantle the clutch shoes from the hub using a small screwdriver or a pointed tool by first unhooking the clutch springs.

Assembly

Check that the clutch springs are not damaged, e.g. cracks.

Assemble the clutch in the reverse order as set out for dismantling.

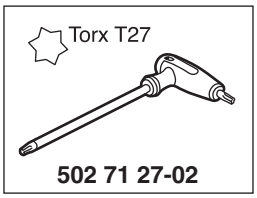
The text on the clutch shoes must face outwards.



Clutch drum

Remove the cutting deck from the engine (see above).

Remove the contents of the gear housing.



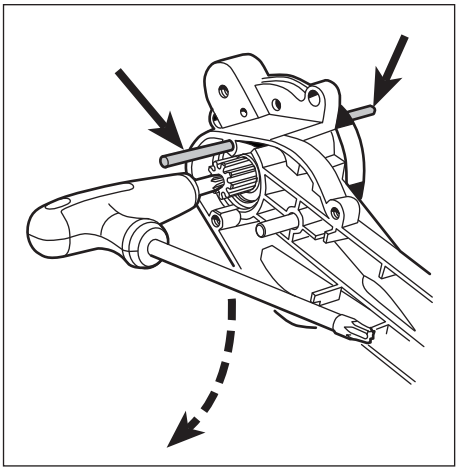
Clutch drum

Remove the cutting deck from the engine (see above).

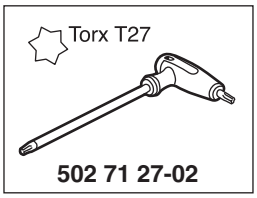
To dismantle the clutch drum, the gear housing contents must be removed first (see also the ”Cutting deck” chapter).

Remove the 6 screws and lift off the cover.

Carefully prise up if needed the back edge of the cover with a screwdriver.



Dismantle the clutch drum.

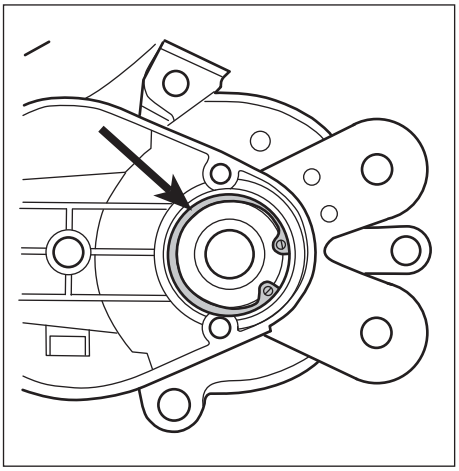


Dismantle the clutch drum.

Lock the clutch drum in place with a punch (Ø 4 mm) by inserting it in the threaded holes in the gear housing and one of the holes in the clutch drum.

Unscrew the sprocket clockwise (left-hand threads).

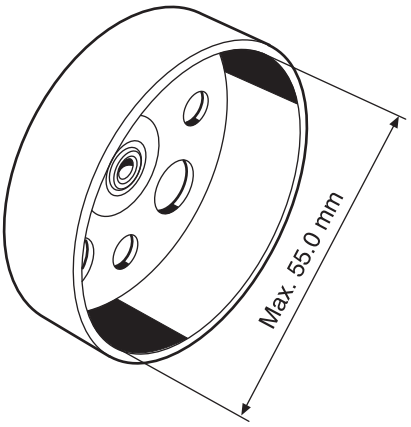
Press the clutch drum out of the ball bearing.



Remove the circlip and dismantle the ball bearings.

Remove the circlip holding the ball bearings in place in the gear housing.

Then heat the gear housing to approx. 120°C and tap the housing against a wooden block so that the ball bearing falls out of the bearing seating or use a suitable mandrel.



Check the inside diameter of the clutch drum. If it exceeds 55,0 mm it should be replaced.

Assemble the different components in the reverse order as set out for dismantling.

Heat the gear housing before the ball bearings are fitted.

531 00 92-05

Check the clutch drum for wear.

The diameter must not exceed 55,0 mm. If this is the case replace the clutch drum.

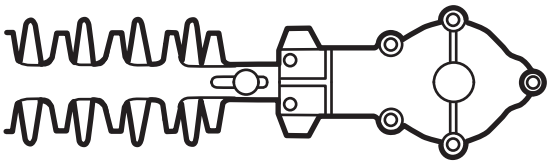
Assemble the different components in the reverse order as set out for dismantling.

Heat the gear housing before the ball bearings are fitted.

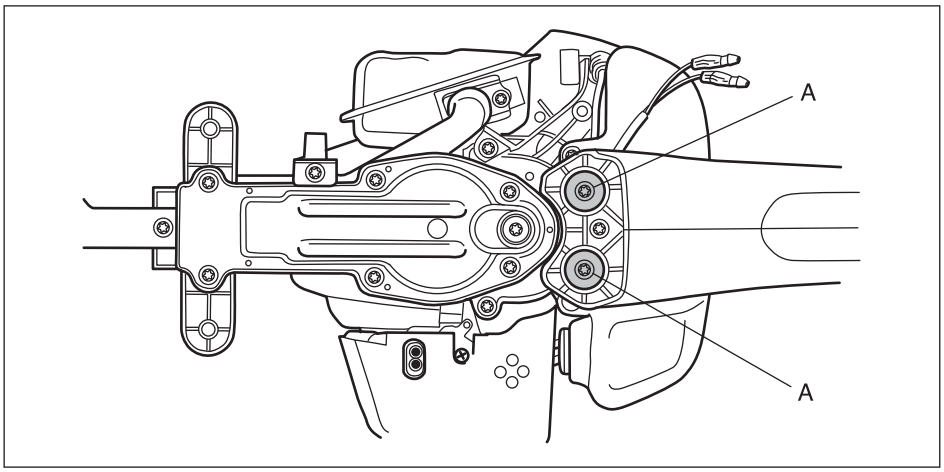
Do nor forget to fill the gear housing with grease!

Cutting deck

5



Contents



Cutting deck

Dismantling

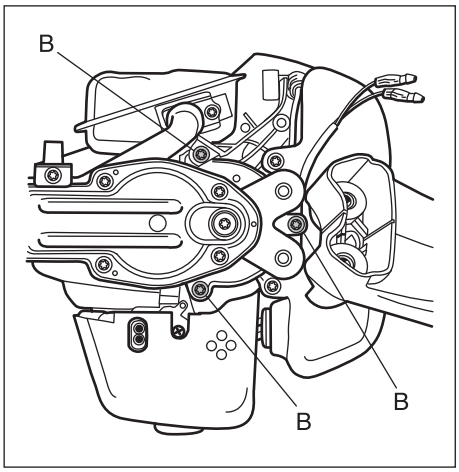
Remove the spark plug protector.

Unhook the throttle cable from the carburettor and separate the connections to the short-circuit cable (see also Chapter 3).

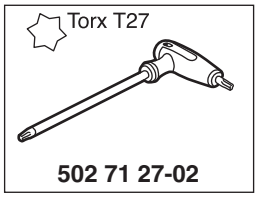
Remove the 2 screws holding the front handle and lift off the front handle.

Remove the guard over the muffler (2 screws).

Remove screws (A) and fold the rear handle to one side.



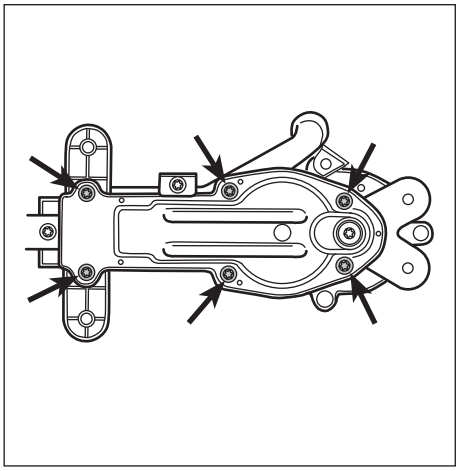
Remove the cutting deck from the engine.



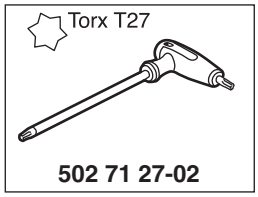
502 71 27-02

Remove the three screws (B) and lift out the cutting deck from the engine.

Note that the exhaust pipe does not have to be removed.



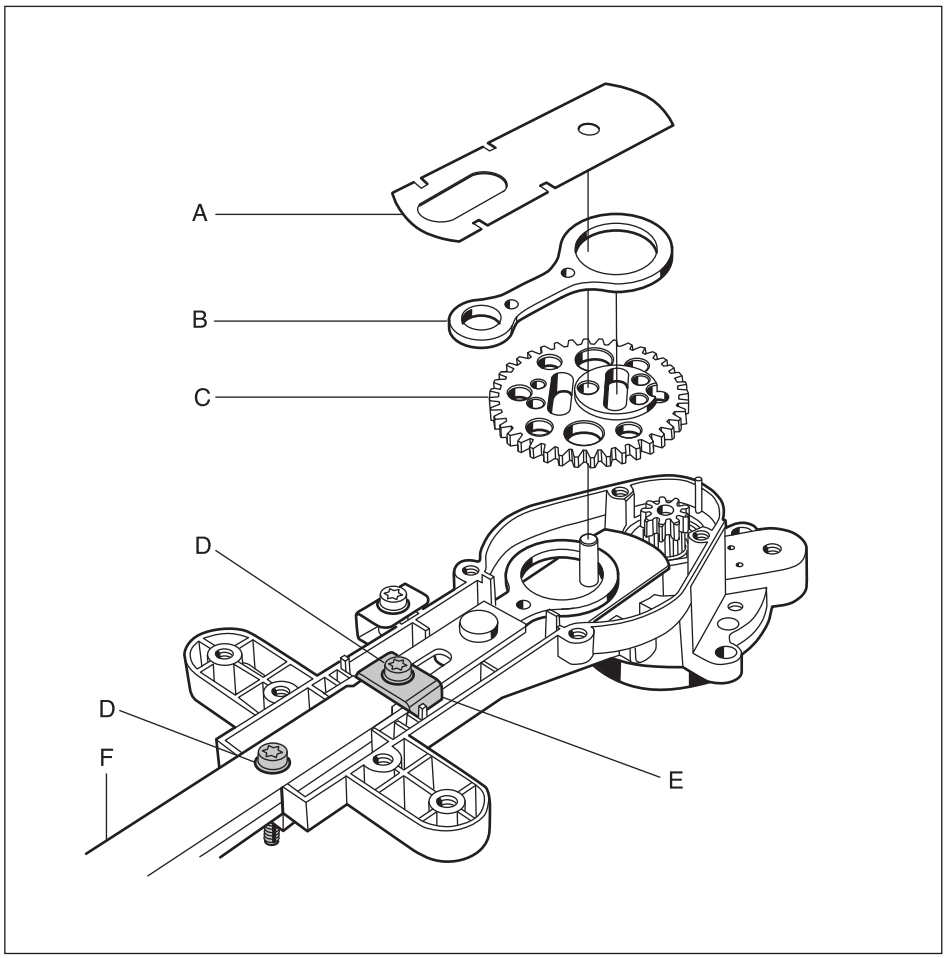
Remove the knife protector, cutting knives and the cover over the gear housing.



502 71 27-02

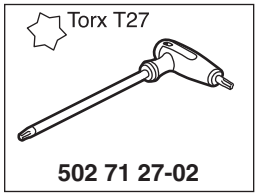
Remove the 6 screws and lift off the cover and the gasket.

Carefully prise up if needed the back edge of the cover with a screwdriver.

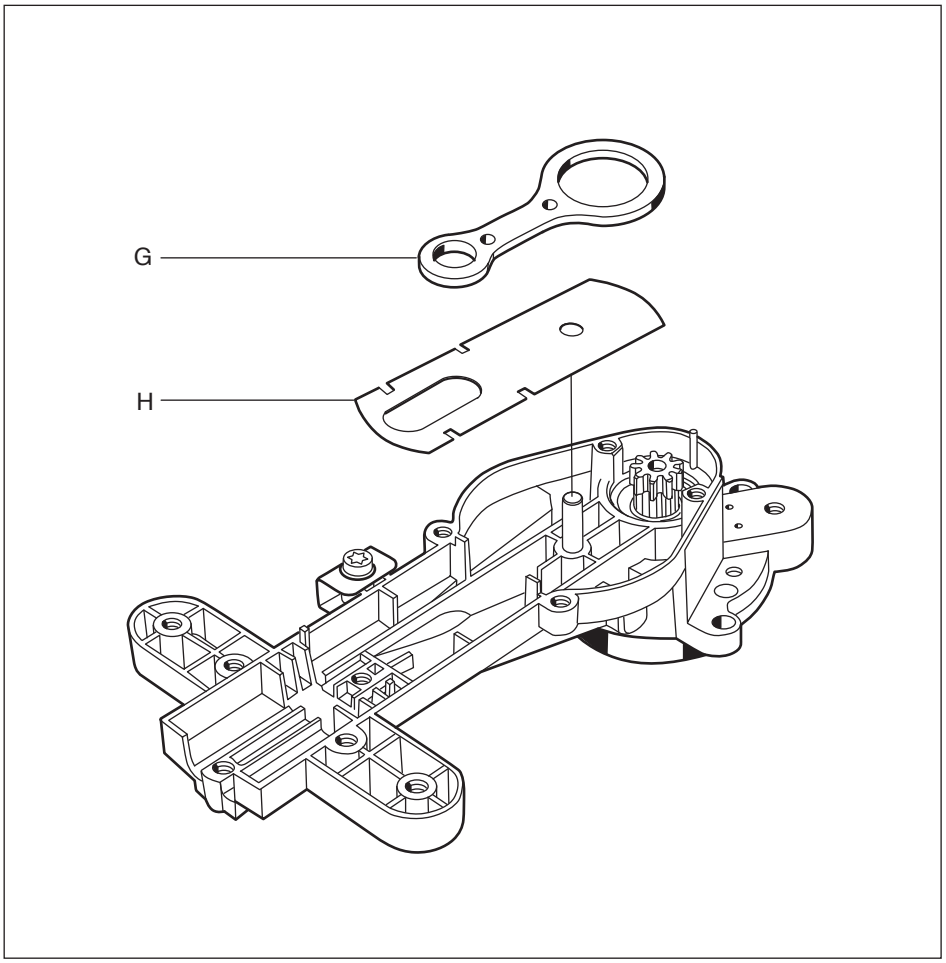


Lift off the following parts:

1. Wear plate (A).
2. Connecting rod (B).
3. Sprocket (C).
4. Screws (D).
5. Bracket (E).
6. Cutting knives (F).



502 71 27-02



Continue removing the following parts:

7. Lower connecting rod (G).
8. Lower wear plate (H).

See the “Centrifugal clutch” chapter for information on dismantling the small gear wheel.

Assembly

Clean and inspect all components for wear and damage.

Assemble in the reverse order as set out for dismantling.

Fill the gear housing with grease. no. 531 00 92-05.

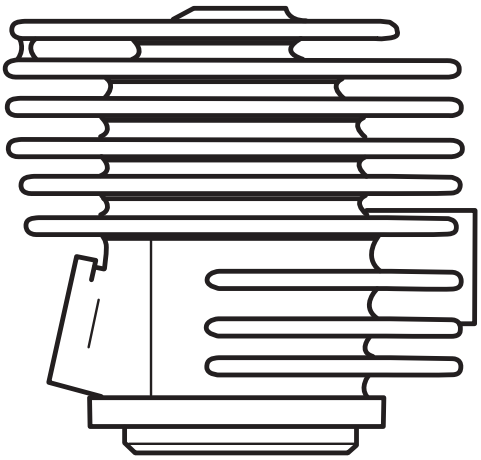
Lubricate the friction surfaces of the cutters.

531 00 92-05

5 Cutting deck

Cylinder and pisston

6

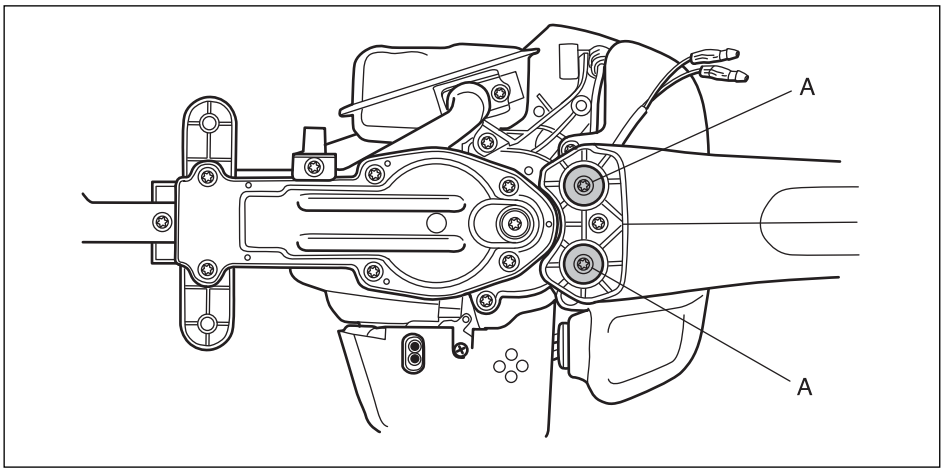


Contents

6 Cylinder and piston

The cylinder and the piston are two of the components exposed to most strain in the engine. They must withstand, for example, high speeds, large temperature swings and high pressure. Moreover, they must be resistant to wear. Despite these tough working conditions, major piston and cylinder failure is relatively uncommon. The reasons for this include new coatings in the cylinder bore, new types of oil and grease and refined manufacturing techniques.

When servicing these components, cleanliness is of the utmost importance. It is therefore recommended that the cylinder and the area around it be thoroughly cleaned before being dismantled from the crankcase



Dismantling

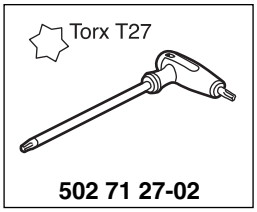
Remove the spark plug protector.

Unhook the throttle cable from the carburettor and separate the connections to the short-circuit cable (see also Chapter 3).

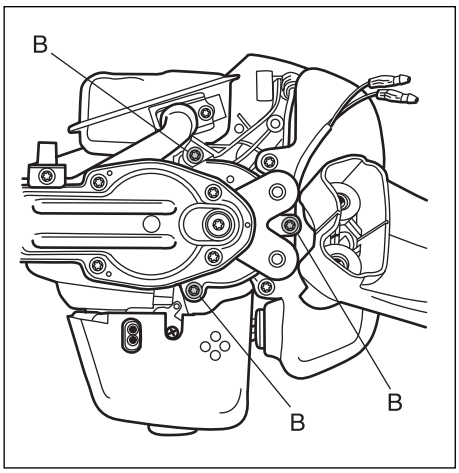
Remove the 2 screws holding the front handle and lift off the front handle.

Remove the guard over the muffler (2 screws).

Remove screws (A) and fold the rear handle to one side.



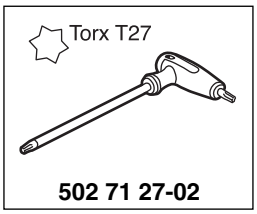
502 71 27-02



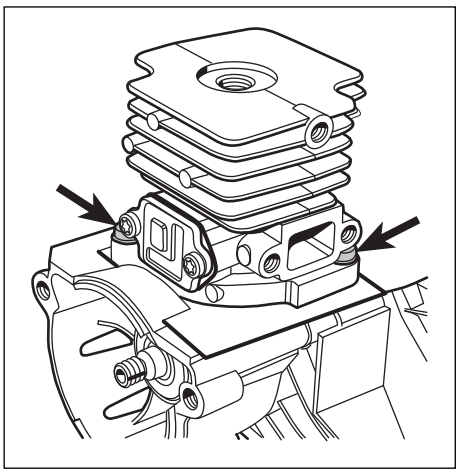
Remove the cutting deck from the engine.

Remove the 3 screws (B) and lift off the cutting deck from the engine.

Note that the exhaust pipe does not have to be removed.



502 71 27-02



Dismantle the following parts:

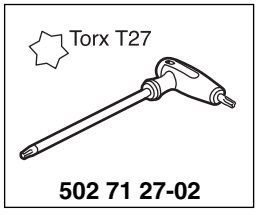
Spark plug, air filter, carburettor, muffler, heat protective plate, fan house cover, ignition module, flywheel, cylinder cover, distance piece that is fitted to the cylinder, fuel tank (do not lose the rubber bushings fitted between the tank and the crankcase).

Only the cylinder and the crankcase now remain.

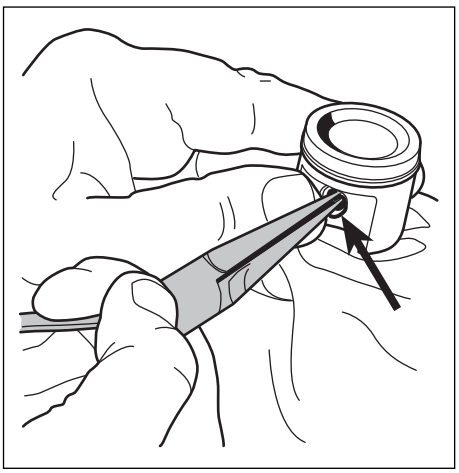
Remove both screws holding the cylinder to the crankcase.

Lift the cylinder straight up. Do not turn it as the piston ring can easily break.

Use a rag to cover the crankcase opening under the piston.



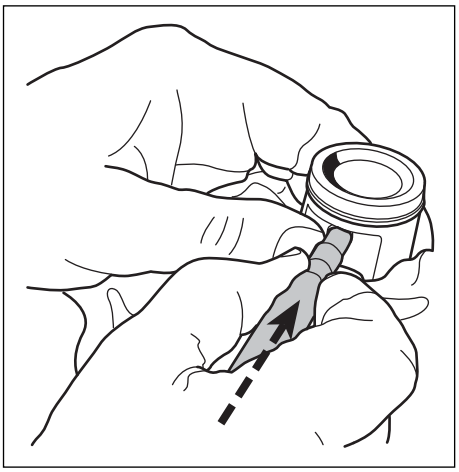
502 71 27-02



Remove the circlips from the gudgeon pin.

Remove the circlips on the gudgeon pin using a small flat nosed pliers.

Keep your thumb over the circlip to prevent it from flying out.



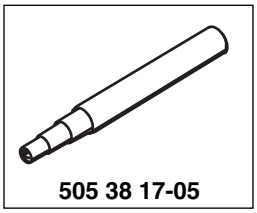
Dismantle the piston from the connecting rod.

Push the gudgeon pin from the piston using punch 505 38 17-05.

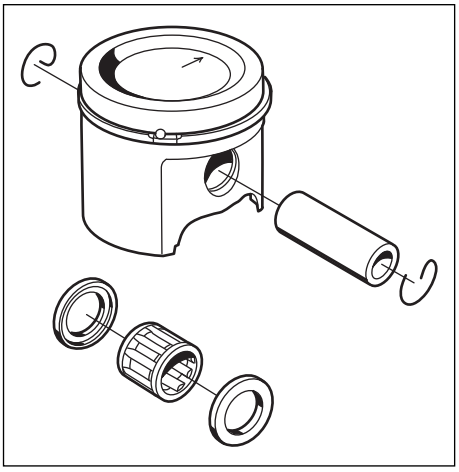
If the pin is too tight, dismantling is facilitated by carefully heating the piston using a hot air gun.

NOTE!

Do not lose the two distance rings that are placed between the piston and the gudgeon pin bearing.



505 38 17-05



Cleaning, inspection

After dismantling, clean the individual components:

1. Scrape carbon deposits from the top of the piston.
2. Scrape carbon deposits from the cylinder's combustion chamber.
3. Scrape carbon deposits from the cylinder's exhaust port.

   Deposits in the exhaust port may cause self ignition and therefore a higher fast idle speed than the electronic speed inhibitor is set to.

NOTE!

Scrape carefully with not too sharp a tool so as not to damage the soft aluminium parts.

4. Wash all the components.
5. Inspect the different components for damage and wear.

Check the piston and cylinder for seizure damage and wear.

Also see the "Analysis and actions" section.

Check the piston ring for wear and possible breakage.

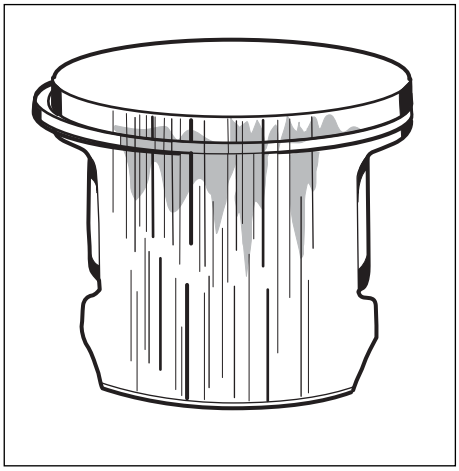
Also see the "Analysis and actions" section.

Check the gudgeon pin.

– If it has blued, it must be replaced.
– If the piston moves too easily both the piston and the gudgeon pin must be replaced.

Check the needle bearing. If it is discoloured or damaged, it must be replaced.

Check the circlips. If they exhibit cracks or are discoloured (caused by overheating), they must be replaced.



Small to medium size scores primarily in the middle of the exhaust port.

Analysis and actions

Experience tells us that piston or cylinder failure due to manufacturing errors are extremely rare.

The reason is usually due to other factors, which is evident from the following.

Note the reasons for the breakdown, repair the damage and take the actions required to prevent the same thing happening again.

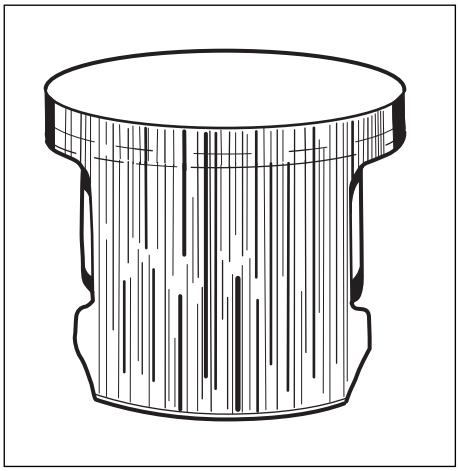
Insufficient lubrication

The piston has small to medium size score marks usually in front of the exhaust port. In extreme cases heat development can be so great that material from the piston smears along the piston skirt and even in the cylinder bore.

Generally the piston ring is undamaged and moves freely in the ring groove

There can also be scores on the inlet side of the piston.

Cause:	Action:
• Incorrect carburettor setting. Recommended max. speed exceeded.	Check and change the carburettor setting.
• Incorrect oil mixture in the fuel.	Change the fuel.
• Too low octane fuel.	



Medium to deep scores along the entire piston skirt on the exhaust side.

The piston ring starts to stick or is completely stuck in its groove and has therefore not been able to seal against the cylinder wall, which has resulted in further, intensive temperature increases in the piston

Seizure scores along the entire piston skirt on the inlet and exhaust sides.

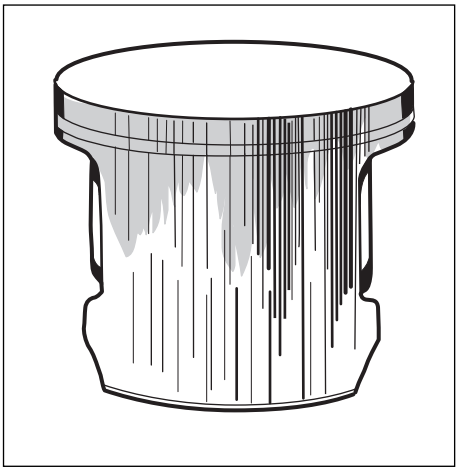
Cause:	Action:
• Incorrect oil mixture in the fuel.	Change to a fuel with the correct oil mixture.
• Too low octane fuel.	
• Air leaks. Cracked fuel hose. Leaking inlet gaskets. Cracked distance piece or inlet manifold.	Replace damaged parts.
• Air leakage in engine body. Leaking crankshaft seals. Leaking cylinder and crankcase gaskets.	Replace leaking gaskets and shaft seals.
• Poor maintenance. Dirty cooling fins on the cylinder. Blocked air intake on the starter.	Clean the cooling fins and air intake.
Blocked spark arrestor mesh in the muffler.	Clean or replace the spark arrestor mesh.

For the best results we recommend Husqvarna two-stroke oil or ready-mixed fuel that is specially developed for air-cooled two-stroke engines.

Mixing ratio: 1:50 (2%).

If Husqvarna two-stroke oil is not available another good quality two-stroke oil can be used.

Mixing ratio: 1:33 (3%) or 1:25 (4%).



Medium to deep scores on the exhaust side.

The piston ring is stuck in the groove.

Black discoloration under the piston ring due to blow-by.

Piston scoring caused by heavy carbon deposits

Too heavy carbon depositing can cause damage similar to that caused by insufficient lubrication. However, the piston skirt has a darker colour caused by the hot combustion gases that are blown past the piston.

This type of piston damage starts at the exhaust port where carbon deposits can become loose and get trapped between the piston and the cylinder wall.

Typical for this type of piston damage is brown or black discoloration of the piston skirt.

Cause:	**Action:**
• Wrong type of two-stroke oil or petrol.	Change the fuel.
• Incorrect oil mixture in the petrol.	Change to a fuel with the correct oil mixture.
• Incorrect carburettor setting.	Correct the carburettor setting

Exhaust side damaged by a broken piston ring. The piston ring parts damage the top section and cause score marks.

Piston damage caused by a too high engine speed.

Typical damage from too high engine speed is ruptured piston ring/piston rings, broken circlip on the gudgeon pin, faulty bearings or that the guide pin for the piston ring has become loose.

Piston ring breakage

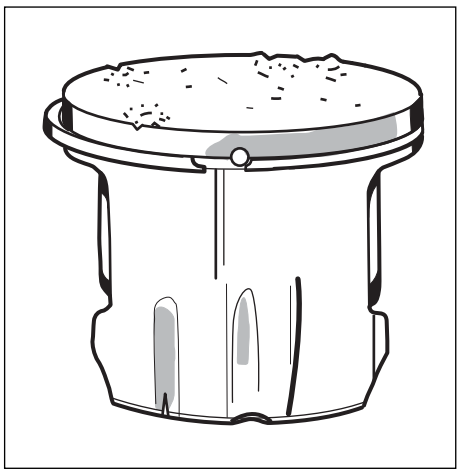
A too “lean” carburettor setting results in a too high speed and a high piston temperature. If the piston temperature rises above the normal working temperature the piston ring can seize in its groove, consequently it will not sit deep enough in its groove. The edges of the piston ring can then hit the top edge of the exhaust port and be smashed and also cause piston damage.

A too high engine speed can also cause rapid wear to the piston ring and play in the piston ring groove primarily in front of the exhaust port. The ring is weakened by the wear and can be caught in the port causing serious piston damage.

The guide pin for the piston ring has been pushed up through the top of piston.

Piston ring guide pin vibrated loose

A too high engine speed can cause the ends of the piston ring to hammer against the guide pin when the piston ring moves in its groove. The intensive hammering can drive out the pin through the top of the piston causing serious damage also to the cylinder.



Deep, irregular grooves caused by a loose circlip. Shown here on the piston's inlet side.

Damage caused by gudgeon pin circlips

A too high engine speed can cause the gudgeon pin circlips to vibrate. The circlips are drawn out of their grooves due to the vibrations, which in turn reduces the circlips' tensioning power. The rings can then become loose and damage the piston.

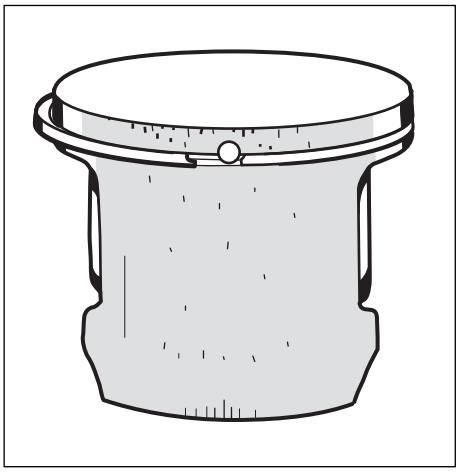
Irregular grooves on the piston's inlet side caused by a broken roller retainer.

Bearing failure

Failure of the crankshaft bearing or on the connecting rod bearing is usually caused by a too high engine speed, resulting in the bearing being overloaded or overheating. This in turn can cause the bearing rollers or ball to glide instead of rotate, which can cause the roller or ball retainer to break.

The broken debris can be trapped between the piston and cylinder wall, damaging the piston skirt.

Debris can also pass up through the cylinder's transfer channels and cause damage to the top and sides of the piston as well as to the cylinder's combustion chamber.



Small score marks and a matt, grey surface on the piston's inlet side caused by fine dust particles.

Foreign objects

Everything other than clean air and pure fuel that enters the engine's inlet port causes some type of abnormal wear or damage to the cylinder and piston.

This type of increased wear shows on the piston's inlet side starting at the lower edge of the piston skirt.

The damage is caused by badly filtered air that passes through the carburettor and into the engine.

Inlet side.

Particles of dust and dirt from carbon-like deposits on the top of the piston and in the piston ring groove. The piston ring sits firmly in the groove. Piston material has been worn away.

The lower part of the piston skirt is thinner on the inlet side than on the exhaust side.

Cause:

- Faulty air filter. Small dust particles pass through the filter.
- The filter is worn out due to too much cleaning, whereby small holes have appeared in the material.
- Unsuitable filter maintenance, such as wrong method or wrong cleaning agent. Flock material becomes loose and holes appear.
- Air filter incorrectly fitted.
- Air filter damaged or missing.

Action:

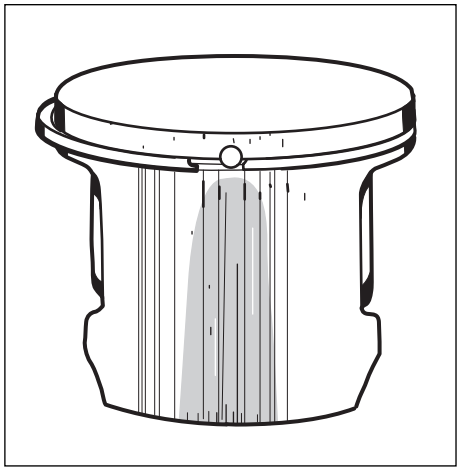
Fit a finer grade filter.

Check the filter carefully for holes and damage after cleaning. Replace the filter if necessary.

Clean more carefully and use the right cleaning agent (such as tepid soapy water). Change the filter.

Fit the filter correctly.

Fit a new air filter.



The piston scored and worn from the piston ring down on the inlet side.

Larger, softer particles that penetrate into the engine cause damage to the piston skirt under the piston ring as the illustration shows.

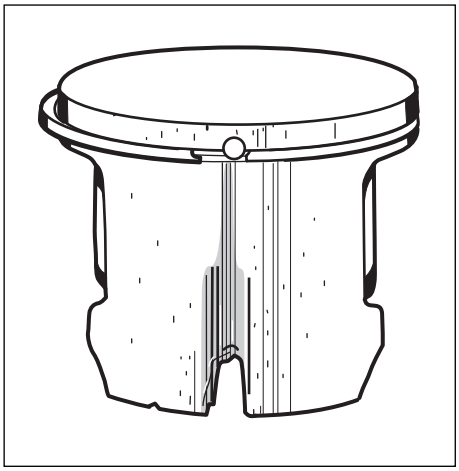
Cause:

- Air filter incorrectly fitted.
- Air filter damaged or missing.

Action:

Fit the air filter correctly.

Fit a new air filter.



Extensive damage to the lower part of the piston's inlet side.

Larger, harder particles that enter the engine cause serious damage to the underside of the piston skirt.

Cause:

- Air filter damaged or missing.
- Parts from the carburettor or intake system have come loose and entered the engine.

Action:

Fit a new air filter.

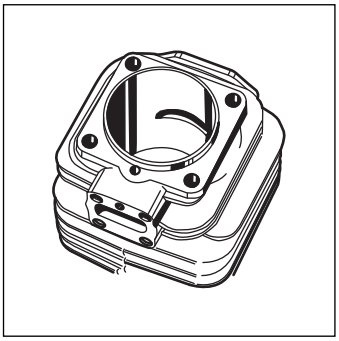
Regular service and inspection.

Service tips

Defect:	Action:
Broken cooling fins, damaged threads or sheared bolts by the exhaust port.	In severe cases – replace the cylinder. Repair the threads using Heli-Coil.
Seizure marks in the cylinder bore (especially by the exhaust port).	Polish the damaged area using a fine grade emery cloth so that the coating of aluminium disappears. With deep seizure score marks the piston and cylinder should be replaced.
Surface coating in the cylinder bore worn out (primarily at the top of the cylinder).	Replace the cylinder and piston.
The piston shows signs of seizure score marks.	Carefully polish the damaged area using a fine file of fine grade emery cloth. Before the piston is refitted the cylinder should be polished as above. With deep score marks the piston and cylinder should be replaced.
Piston ring burnt in its groove.	Carefully loosen the piston rings and clean the groove well before refitting. Carbon deposits in the groove impair the important heat transfer between the piston and cylinder. **NOTE!** **Be careful with the lower edge of the piston ring groove. If this is damaged, or if carbon deposits remain, the compression pressure can leak through.** Check the wear on the piston ring by placing it in the lower part of the cylinder bore.
Bolts much too tight in the aluminium material.	Position a suitable punch on the bolt head and give a few sharp knocks with a hammer. If the bolt still does not loosen, repeat the procedure.

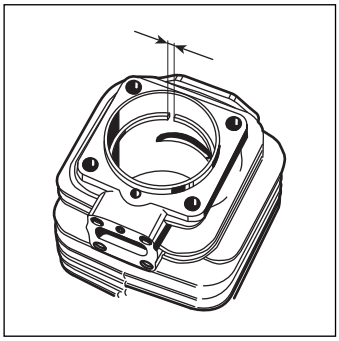
Wear tolerances

Cylinder bore



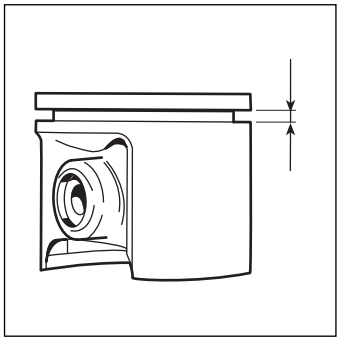
When the surface coating is worn and aluminium appears.

Piston ring gap



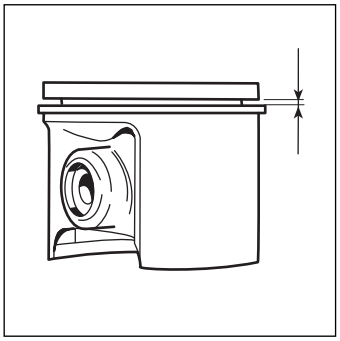
Max. 1.0 mm with the piston ring inserted in the lower part of the cylinder.

Piston ring groove

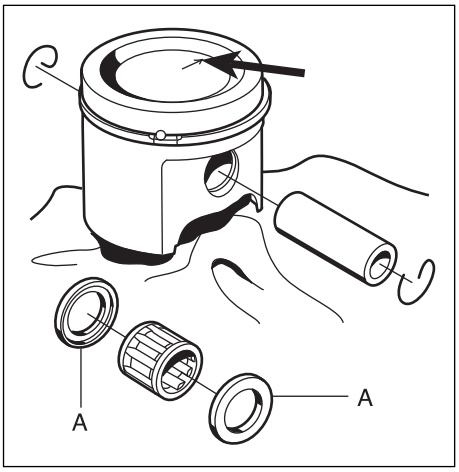


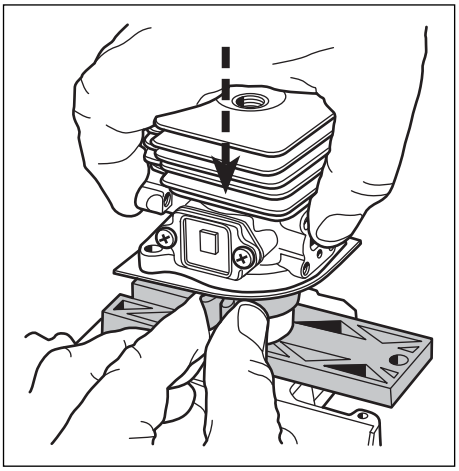
Max. 1.6 mm. Clean the groove before checking the measurement.

Piston ring play



Max. 0.15 mm. Clean the groove before checking the measurement.



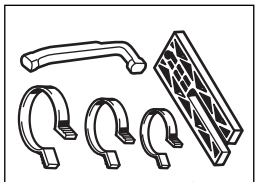


Assembly

Lubricate the gudgeon pin's needle bearing with a few drops of engine oil.

Check that the pulse channel in the cylinder is open.

Assemble the cylinder with the help of assembly set 502 50 70-01.



502 50 70-01

Assembly

Lubricate the gudgeon pin's needle bearing with a few drops of engine oil.

Stick the spacer washers (A) in place with a little grease on each side of the needle bearing in the gudgeon pin.

Direct the arrow on the top of the piston towards the exhaust port.

Press in the gudgeon pin and fit the circlips.

NOTE!

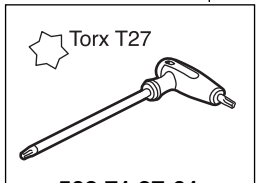
Place a rag in the crankcase opening to prevent the retaining rings from falling into the crankcase.

Check that the retaining rings are correctly fitted into the grooves by turning them with flat nosed pliers.

Check that the pulse channel in the cylinder is open.

Place a new cylinder base gasket on the cylinder or the crankcase. Lubricate the piston and the crank bearing with a few drops of engine oil.

Assemble the cylinder with the help of the piston ring compressor in the assembly set 502 50 70-01.



502 71 27-01

NOTE!

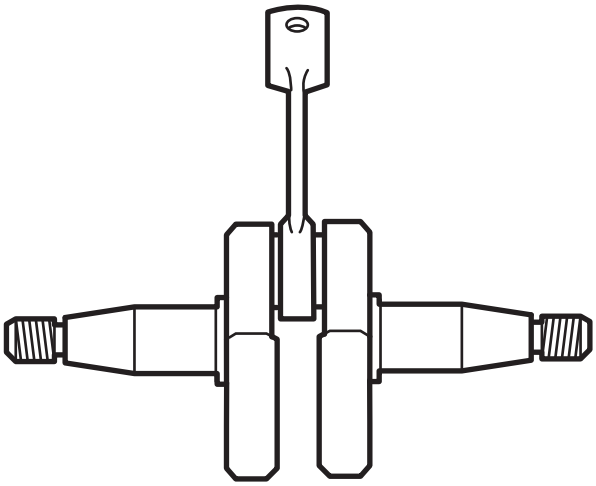
Do not turn the cylinder, as the piston ring can easily break.

Tighten the 2 screws diagonally crosswise.

6 Cylinder and piston

Crankshaft and crankcase

7



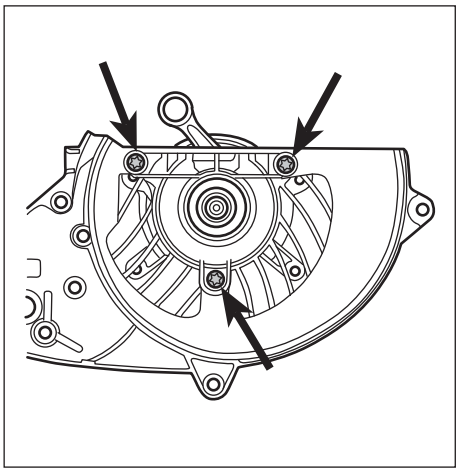
Contents

7 Crankshaft and crankcase

The task of the crankshaft is to transform the reciprocating motion of the piston to rotation. This requires a stable design withstanding immense pressure and rotational and bending strain, as well as high rotational speed. In addition the connecting rod is exposed to large acceleration and retardation forces as it moves between the top and bottom dead centres. This puts special demands on the bearings that must withstand quick changes in load. Moreover, the bearing's roller retainer must also cope with high temperatures and friction. It is therefore extremely important when servicing to check the roller retainer for cracks, wear and discolouration caused by overheating.

The crankshaft is journalled in the crankcase on heavy-duty ball bearings. In addition to the journalling point for the crankshaft, the crankcase acts as a scavenging pump for the fuel/air mixture when this is "sucked" from the carburettor and is forced into the cylinder's combustion chamber. The crankcase must be perfectly sealed so as not to affect this pump function. There cannot be any leakage from the crankshaft, between the crankcase halves or between the crankcase and the cylinder.

Always replace the sealing rings and gaskets when servicing the crankcase.

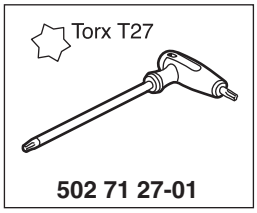


Dismantling

Dismantle all components so that only the crankcase and crankshaft remain.

Remove the 3 screws holding both crankcase halves together.

Separate the crankcase halves.



502 71 27-01

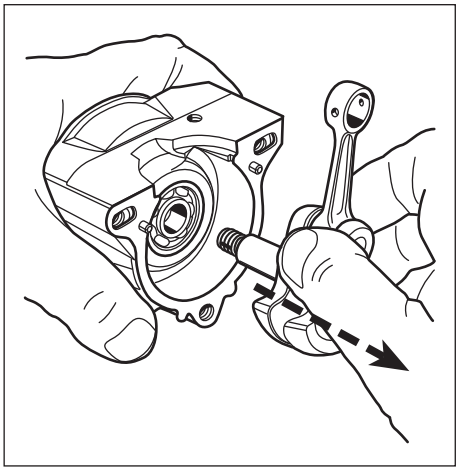
Dismantling

Dismantle all components so that only the crankcase and crankshaft remain.

See the respective sections for detailed information if necessary.

Remove the 3 screws holding both crankcase halves together.

Separate the crankcase halves. A special tool is not required.



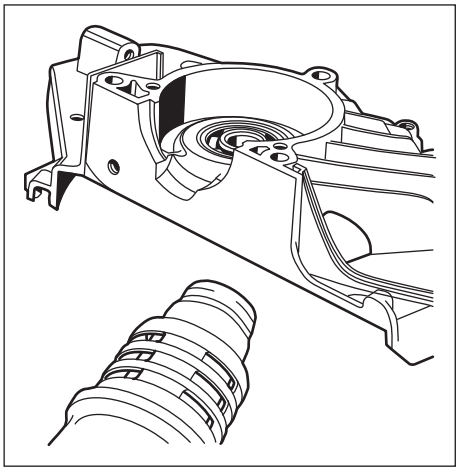
Lift out the crankshaft.

Clean any gasket remains from the sealing surfaces.

Lift the crankshaft out of the crankcase half on the starter side (a special tool is not required).

The crankshaft has a snug fit in the crankshaft bearing.

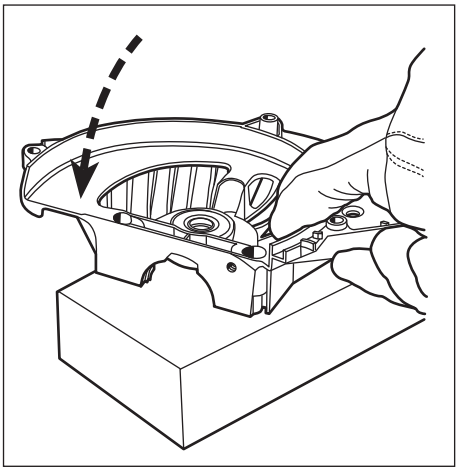
Clean any gasket remains from the sealing surfaces.



Dismantle the ball-bearings from the crankcase halves.

Dismantle the ball-bearings from the crankcase halves.

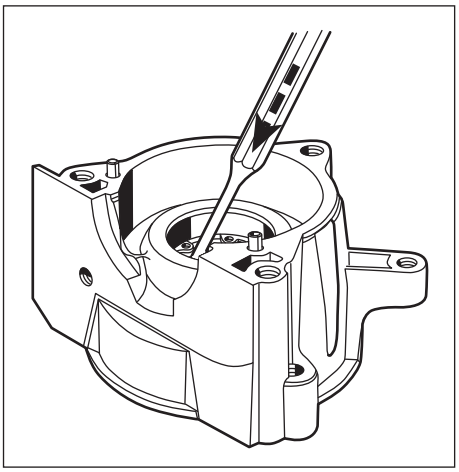
Heat the crankcase halves to 120°C using a hot air gun.

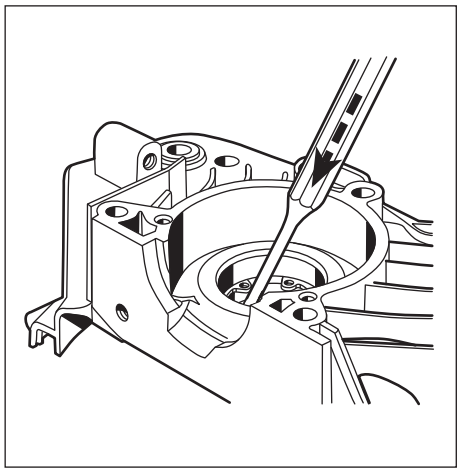


Knock the crankcase half against a wooden block so that the ball-bearing falls out.

Knock the crankcase half against a wooden block so that the ball-bearing falls out.

Use a suitable punch and hammer if required.





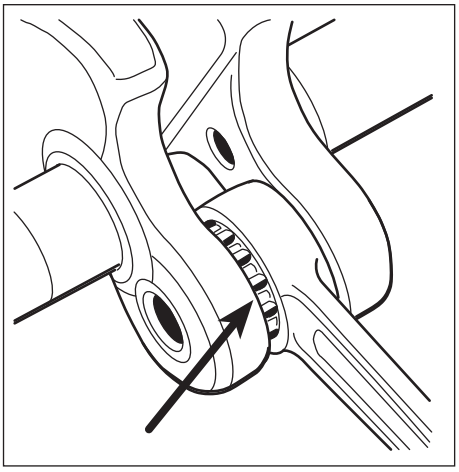
Dismantle the sealing rings from the crankcase halves.

Use a suitable punch or sleeve and knock out the sealing rings with the help of a hammer. Do this while the crankcase half is still warm if possible.

NOTE!

The bearing seating in both crankcase halves is divided by a circlip.

Now clean the crankcase halves and crankshaft.



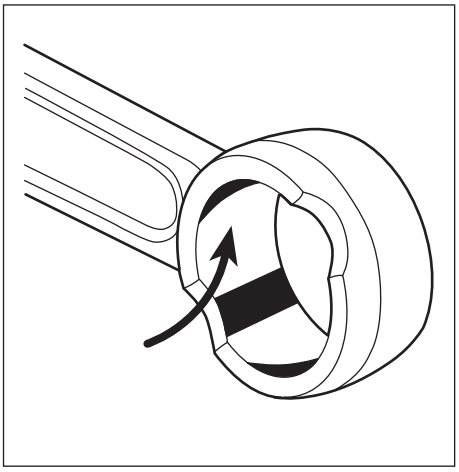
Inspecting the crankshaft

Inspect the large end of the connecting rod.

Inspecting the crankshaft

The crankshaft cannot be reconditioned but must be replaced if it is worn or damaged.

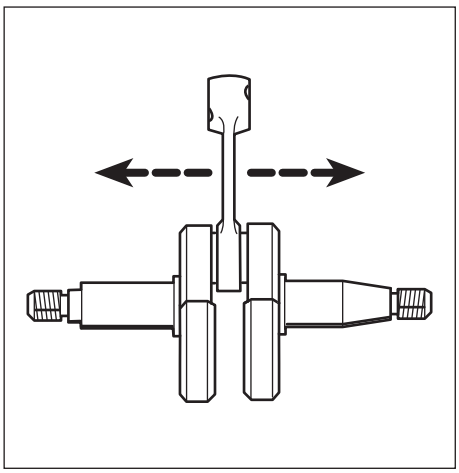
Inspect the large end of the connecting rod. If seizure marks, discolouration on the sides or damaged needle holders are found the crankshaft must be replaced.



Inspect the small end of the connecting rod.

Inspect the small end of the connecting rod.

If seizure marks or discolouration are found in the bearing track the crankshaft must be replaced.

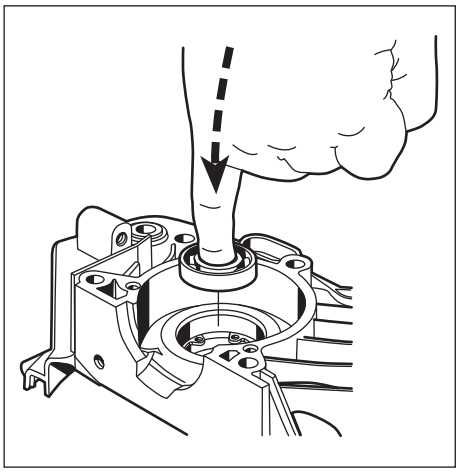


Check the crank bearing.

Check the crank bearing. The connecting rod shall not have any radial play (up and down).

It should, however, have axial play, in order to ensure good lubrication of the crank bearing among other things.

Assembly



Mount the bearings in the crankcase halves.

Fit the sealing rings in the crankcase halves.

Assembly

Mount the bearings in the crankcase halves.

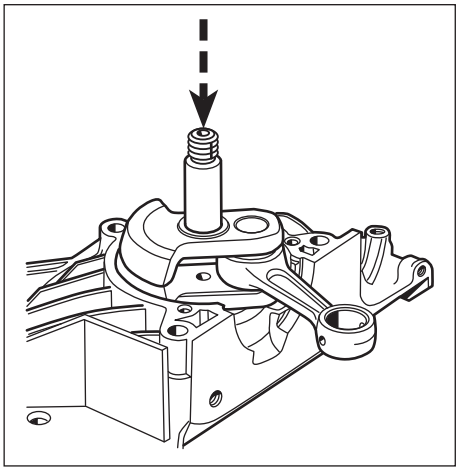
Heat the crankcase halves to approx. 120°C using a hot air gun. Put the ball-bearings in position.

Use a suitable punch and hammer, if needed.

Make sure the ball bearings rest against the circlip.

Fit the sealing ring in the crankcase half on the flywheel side with the help of a suitable punch.

Turn the sealing ring so the abraded edge faces inwards.



Fit the crankshaft in the crankcase half of the flywheel side.

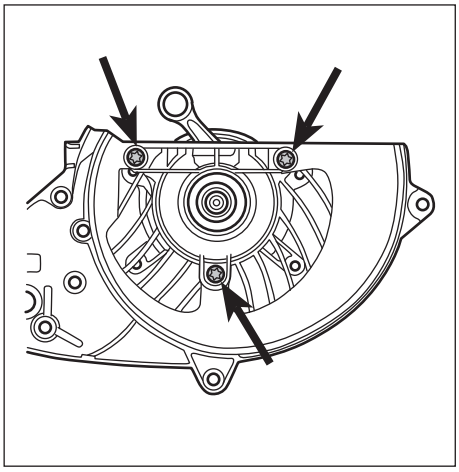
Fit the gasket to the clutch-side of the crankcase half.

Slide the crankcase half into place over the crankshaft.

Fit the crankshaft in the crankcase half on the flywheel side. Lubricate the stub axle with a few drops of oil and carefully slide the crankshaft into the bearing.

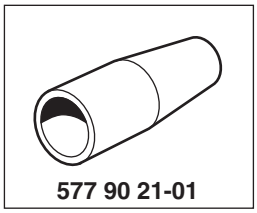
Fit the gasket to the clutch-side of the crankcase half.

Lubricate the crankshaft pin with a few drops of oil and slide the crankcase half on the clutch side into position.



Pull out the 3 crankcase screws.

Fit the sealing ring and protect it with the 577 90 21-01 assembly sleeve placed on the shaft pin.



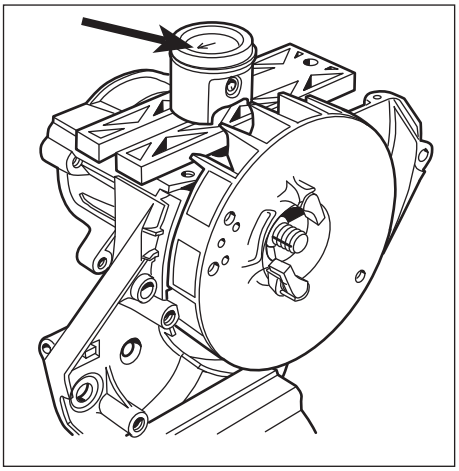
577 90 21-01

Tighten the 3 crankcase screws in turns a little at a time.

Check that the crankshaft can rotate easily.

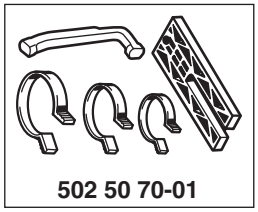
Place the assembly sleeve (577 90 21-01) on the shaft pin on the clutch side to protect the sealing ring when it is fitted.

Lubricate the shaft pin with oil and fit the sealing ring using a suitable punch. The metal cover must face outwards.

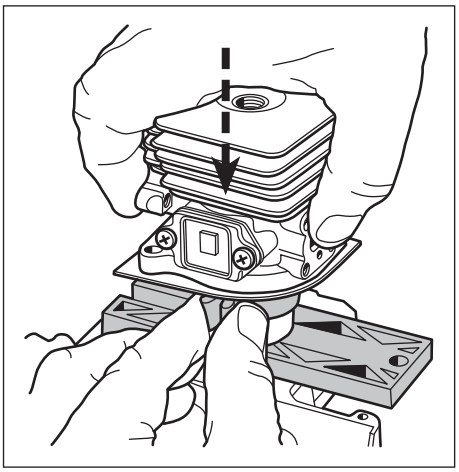


Assemble the piston.

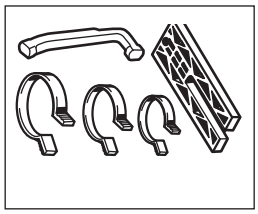
Put the flywheel in place but do not tighten the nur yet.

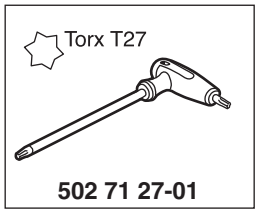


502 50 70-01

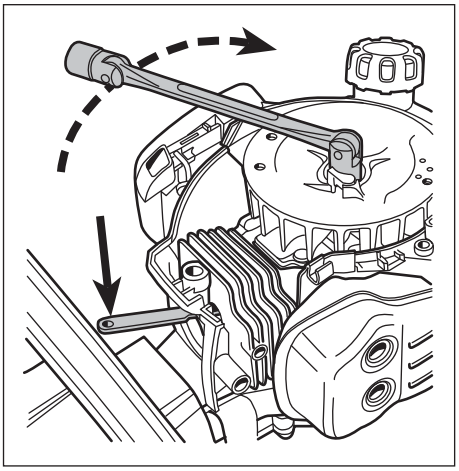


Fit the cylinder on the crankcase.

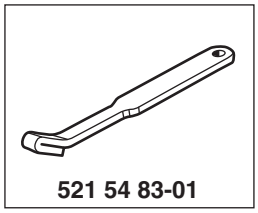




502 71 27-01



Screw on the flywheel nut.



521 54 83-01

Put the cylinder base gasket in place either in the crankcase or cylinder base.

Assemble the piston on the connecting rod.

Tip!

Fit both spacer washers between the piston and the needle bearing with a little grease to facilitate assembling.

Check that the piston is turned so the arrow points towards the exhaust port.

Make sure that the gudgeon pin retaining rings are fitted correctly in the slots by twisting them with a flat nosed pliers.

Put the flywheel in place but do not tighten the nut yet.

Lubricate the piston and piston rings with a few drops of oil.

Fit the cylinder on the crankcase.

Use the piston ring compressor and carefully slide the cylinder into position.

Tighten the 2 screws.

Fit the piston stop no 521 54 83-01 in the spark plug hole and screw on the nut holding the flywheel.

Assemble the remaining components in the reverse order as set out for dismantling.

See relevant sections in the manual.

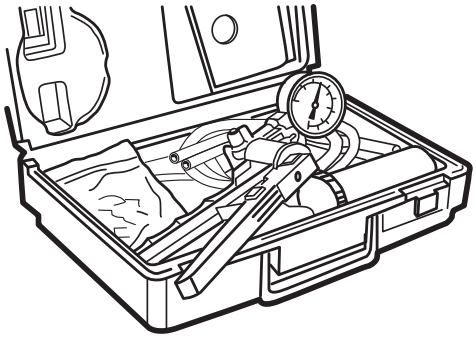
NOTE!

Place the piston stop so that it is trapped between the piston stop and the combustion chamber. It must not stick out into the exhaust port.

7 Crankshaft and crankcase

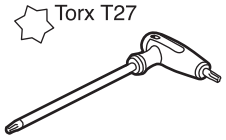
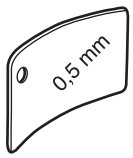
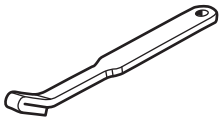
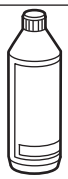
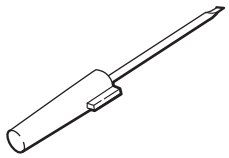
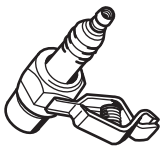
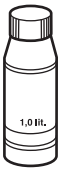
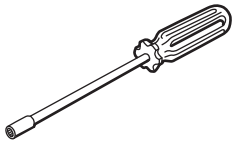
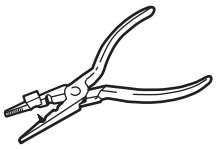
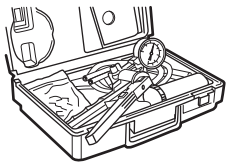
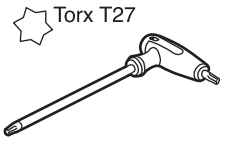
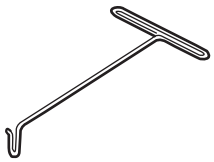
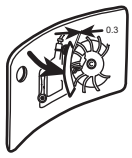
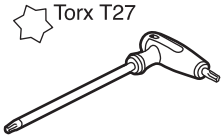
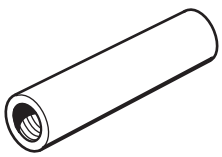
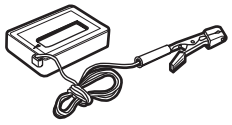
Tools

8

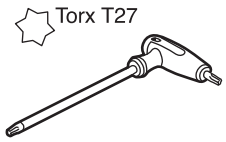
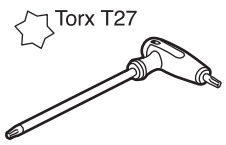
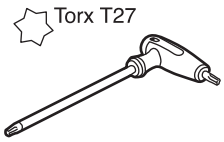
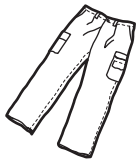
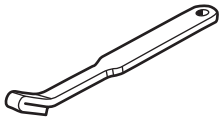
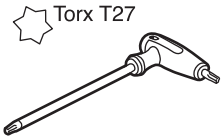
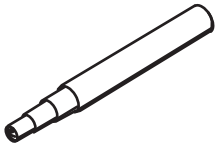
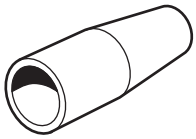
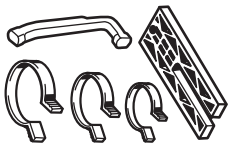
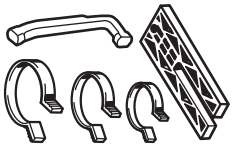
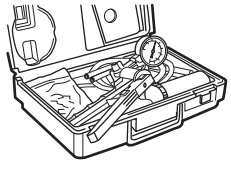
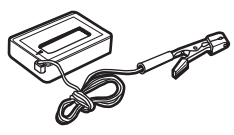


Contents

8 List of tools

Starter	Electrical system	Electrical system	Fuel system	Fuel system
 502 71 27-02	 502 51 91-01	 521 54 83-01	 505 69 85-70	 501 60 02-03
	 502 71 13-01		 531 00 60-76	 530 03 55-60
	 502 50 06-01		 531 03 06-23	
	 502 71 27-02		 502 50 83-01	
	 502 51 34-02		 502 71 27-02	
	 577 90 66-01		 502 71 14-01	

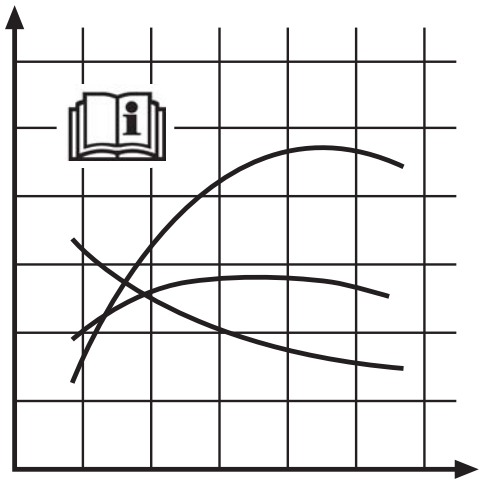
List of tools

Centrifugal clutch	Cutting deck	Cylinder and piston	Crankshaft and crankcase	Workshop equipment
 502 71 27-02	 531 00 92-05	 502 71 27-02	 502 71 27-02	 544 13 05-01
 521 54 83-01	 502 71 27-02	 505 38 17-05	 577 90 21-01	 544 13 08-01
		 502 50 70-01	 502 50 70-01	 544 13 09-01
				 544 13 10-01
				 544 34 87-01
				 531 03 06-23
				 502 71 14-01

8 List of tools

Technical data

9



Contents

9. Technicel data

Engine	Superlite 4528	Ergolite 6028
Displacement, cm^3	21.7	21.7
Cylinder bore, mm	32.0	32.0
Stroke, mm	27.0	27.0
Engine output, kW / speed, rpm	0.6/6000	0.6/6000
Catalytic converter muffler	Ja	Ja
Ignition system		
Spark plug	NGK BPMR 6Y	NGK BPMR 6Y
Electrode distance, mm	0.5	0.5
Electronic speed limitation	9500	9500
Carburettor		
Manufacturer	Ruixing	Ruixing
Idle speed, rpm	2700	2700
Max speed, rpm	8900 – 9500	8900 – 9500
Clutch		
2-shoe clutch. Diameter, mm	52.0	52.0
Engage speed, rpm	4000	4000
Cutting equipment		
Cutters	Double-sided	Double-sided
Blade length, mm	450	600
Cutting frequency, cuts/min	4050	4050
Cutting diameter, mm	Max. 20.0	Max. 20.0
Dimensions		
Fuel tank volume, litre	0.30	0.30
Weight, empty, kg	4.8	5.0

www.McCulloch.com

115 59 15-26

2013W12