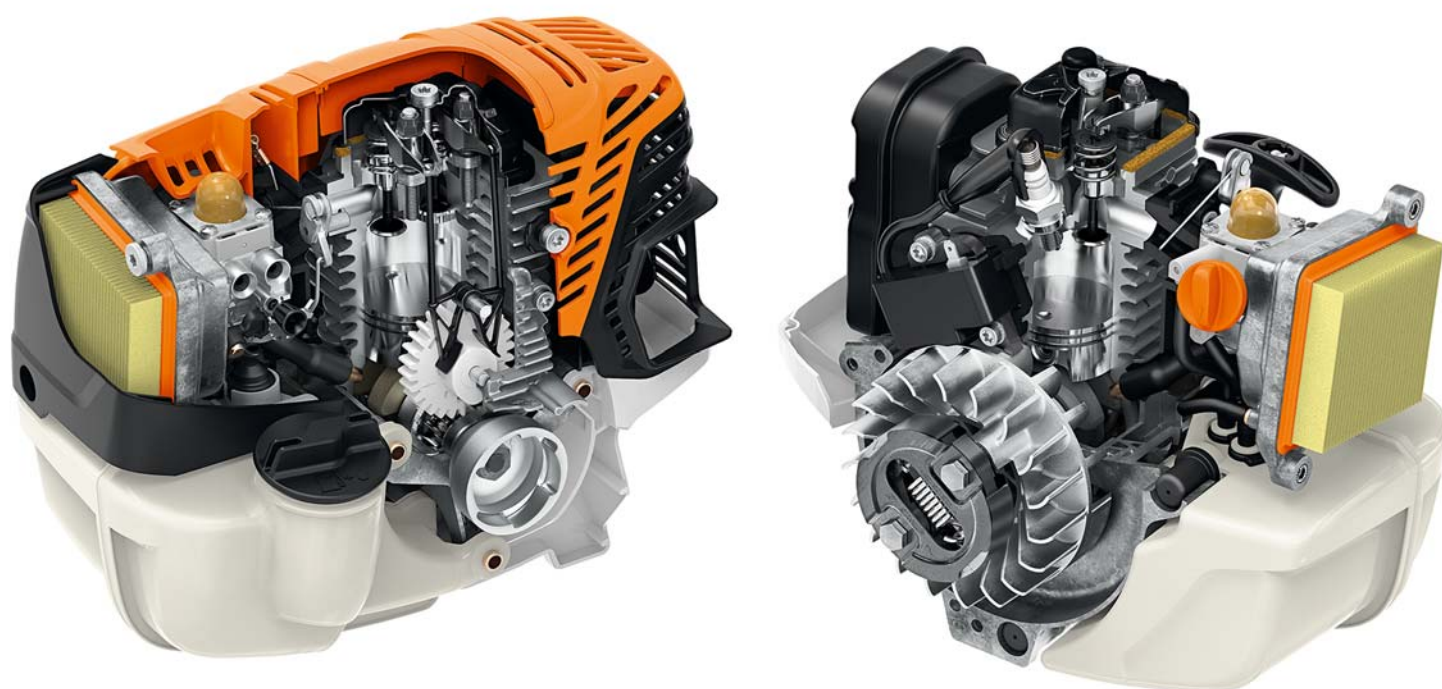


# STIHL Series 4180 Powerhead

Service Manual  
2020-07





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# 1 Safe diagnosis and repairs

## Guide to Using this Service Manual

This service manual contains the necessary safety information, exploded drawings and instructions for diagnosis and repairs. The graphic elements used in this manual have the following meanings:

- Action to be taken
-  Reference to another chapter, i.e. chapter 3 in this example
-  Interactive video tutorial available for this chapter
- 3 Nm** Tighten screw to torque specified, i.e. 3 Nm in this example
- 5 Nm** Tighten screw to torque specified, i.e. 5 Nm in this example; then back it off 1 turn counterclockwise 

## Supplements to this service manual

Technical information bulletins supplement the service manual until a revised edition is issued.

- Always refer to the latest edition of the relevant parts list for the part numbers of any replacement parts.
- Use the part numbers to identify the tools in the "STIHL Special Tools" manual.
- None of these documents may be passed to third parties.

## Interactive video tutorial

Interactive video tutorials may be used for repair procedures. They can be opened from the service manual.

Your computer must meet the following requirements:

- Active internet connection
- HTML5 compatible internet browser

# 2 Safety Precautions

## 2.1 Protective gloves

Sharp or hot components can cut or burn people.

- If sharp or hot components must be touched during repair: Wear protective gloves.

## 2.2 Safety goggles

Objects can be hurled up at high speed during repair. Objects thrown up can cause injury to the eyes.

- If components can be thrown up during repair: Wear safety glasses.

## 2.3 Spare parts

If spare parts which have not been approved by STIHL are installed, the functions of components can no longer be performed or safety devices can be deactivated. People can be seriously injured or killed.

- STIHL recommends the use of genuine STIHL spare parts.

## 2.4 Screws

### Thread forming screws



Screws with the designation P or DG press a permanent thread into the material when screwed in. If the screw does not engage in the existing thread when re-installed, the safety of the screw connection can no longer be guaranteed.

- If screws with the designation P or DG are screwed into an existing thread:
  - Insert the screw into the hole.
  - Turn the screw counterclockwise until the screw slightly sinks into the hole. The screw engages in the existing thread.
  - Tighten the screw clockwise to the specified torque.

### Micro-encapsulated screws:



The micro-encapsulated pre-coating is only effective when the screw is first screwed in. If a microencapsulated screw is reused, the screw connection may come loose during operation.

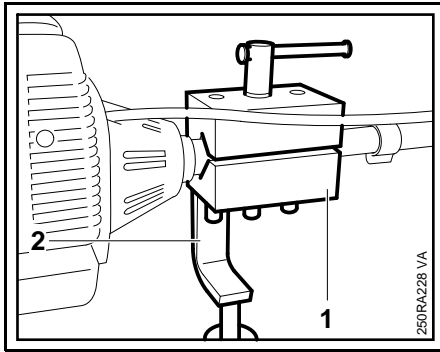
- Replace micro-encapsulated screw.
- If a micro-encapsulated screw is reused, perform the following steps:
  - Clean threaded hole and screw thread.
  - Coat thread of screw with thread-locking adhesive.
  - Tighten the screw to the specified torque.

### Aluminum screws

- Do not reuse screws.
- Screw in the screws crosswise up to the head rest.
- Tighten the screws crosswise.
- Turn the screws crosswise by 90°.

## 2.5 Preparations for Repair

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- Screw the vise 5910 890 8800 (1) to the assembly stand 5910 890 3101 (2).
- Place power tool's drive tube in the vise 5910 890 8800 (1) and clamp it in position.

## 3 Troubleshooting

### 3.1 Clutch

Condition	Cause	Remedy
Tool stops at full throttle under load	Clutch shoes worn	Fit new clutch shoes or clutch
	Clutch drum worn	Install new clutch drum
	Blade warped	Replace blade
Tool runs while engine is idling	Engine idle speed too high	Adjust idle speed screw (LA) (counterclockwise)
	Clutch springs stretched / fatigued or broken	Replace the clutch springs

### 3.2 Rewind Starter

Condition	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge	Fit new starter rope
	Normal wear	Replace starter rope and, if necessary, rope guide bushing
Starter rope does not rewind	Rewind spring broken	Install new rewind spring
	Insufficient spring tension	Check rewind spring and increase tension
	Rewind spring dirty/corroded	Spray rewind spring with Multispray or fit new spring
Starter rope cannot be pulled out far enough	Rewind spring overtensioned	Check rewind spring and reduce tension
Starter rope can be pulled out almost without resistance (crankshaft does not turn)	Guide peg on pawl or pawl itself worn	Fit new pawl
	Spring on starter post fatigued or broken	Fit new spring
	Starter cup broken / worn	Fit new starter cup
Starter rope is difficult to pull or rewinds very slowly	Starter mechanism is dirty	Clean starter mechanism

### 3.3 Ignition System

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

Condition	Cause	Remedy
Engine runs roughly, misfires, temporary loss of power	Spark plug boot is loose	Press boot firmly onto spark plug, check leg spring, replace if necessary
	Spark plug sooted, smeared with oil	Clean the spark plug or replace if necessary
	Wrong electrode gap	Check electrode gap, adjust if necessary
	Incorrect air gap between ignition module and flywheel	Set air gap correctly
	Flywheel cracked or has other damage, pole shoes have turned blue	Replace flywheel
	Ignition timing incorrect: Flywheel out of adjustment, flywheel key sheared	Replace flywheel
	Weak magnetization in flywheel pole shoes	Replace flywheel
	Intermittent or weak ignition spark	Check operation of switch / contact springs / ignition module (with ZAT 3 or ZAT 4), replace if necessary Clean the spark plug or replace it if necessary



### 3.4 Carburetor

Condition	Cause	Remedy
Carburetor floods; engine stalls	Inlet needle not sealing. Foreign matter in valve seat or cone damaged	Remove and clean the inlet needle, clean the carburetor
	Inlet control lever sticking on spindle	Free off inlet control lever
	Helical spring not located on nipple of inlet control lever	Remove the inlet control lever and refit it correctly
	Inlet control lever too high (relative to correct installed position)	Fit new inlet control lever
Poor acceleration	Idling or full load setting too lean	Adjusting the Carburetor
	Inlet control lever too low (relative to correct installed position)	Fit new inlet control lever
	Inlet needle sticking to valve seat	Remove inlet needle and clean valve seat
	Diaphragm gasket damaged	Fit new diaphragm gasket
	Metering diaphragm damaged / shrunk / hardened	Fit new metering diaphragm
Engine will not idle, idle speed too high	Throttle shutter opened too wide by idle speed screw (LA)	Reset idle speed screw (LA) correctly
	Throttle shutter is not closed properly even when idle speed screw (LA) is backed off all the way	Check throttle cable
	Engine leaking	Testing engine for leaks
Engine stops while idling	Idle jet bores or ports blocked	Clean the carburetor
	Setting of low speed screw (L) too rich or too lean	Reset low speed screw (L) correctly
	Setting of idle speed screw (LA) incorrect – throttle shutter completely closed	Reset idle speed screw (LA) correctly
Engine speed drops quickly under load – low power	Air filter dirty	Clean or replace air filter
	Exhaust port / muffler carbonized	Clean exhaust port / muffler, fit new muffler if necessary
	Throttle shutter is not opened fully	Check throttle cable
	Tank vent faulty	Test the tank vent, replace if necessary
	Fuel pickup body (filter) dirty	Clean the pickup body, replace if necessary
	Leak in a fuel hose	Check fuel hoses and replace if necessary
	Fuel strainer in carburetor dirty	Clean fuel strainer in carburetor, replace if necessary
	Setting of high speed screw (H) too rich	Readjust the carburetor
	Pump diaphragm damaged / shrunk / hardened	Fit new pump diaphragm

### 3.5 Engine

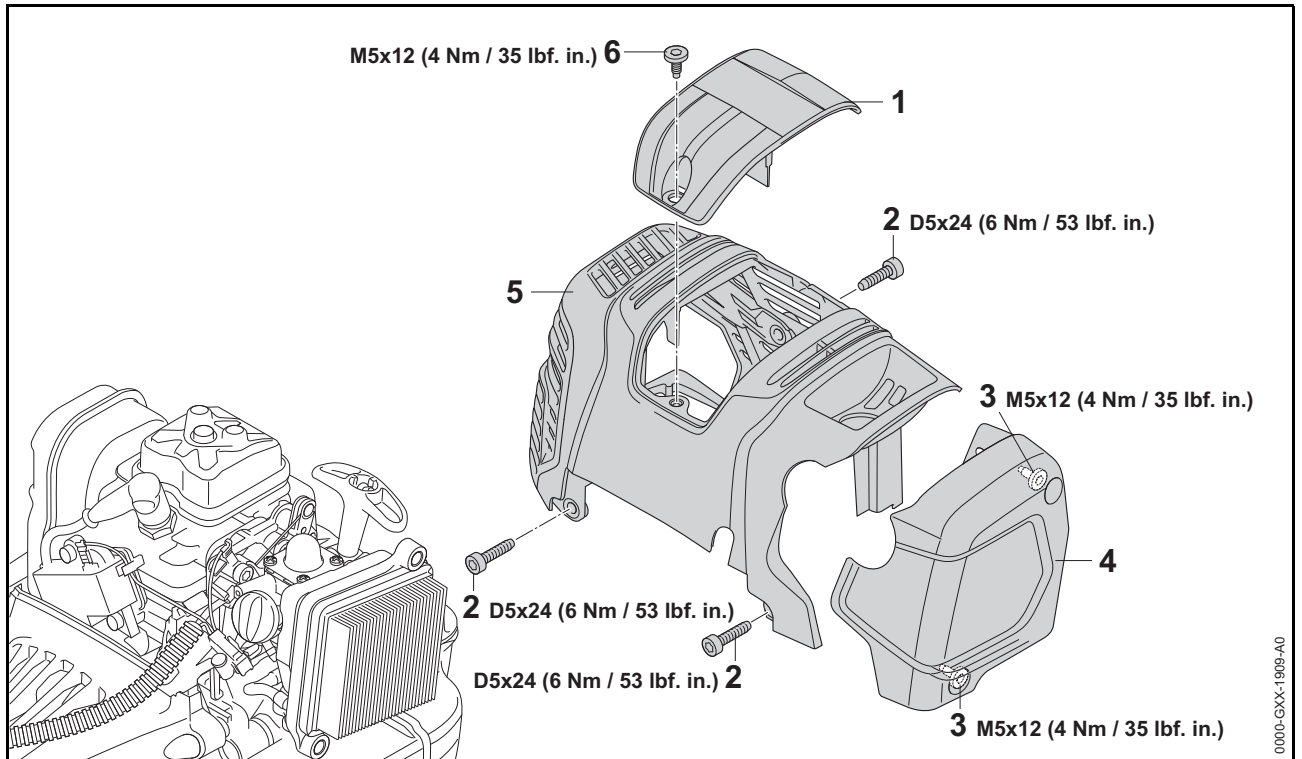
- Carburetor
- Ignition system

Always check and, if necessary, repair the following parts before looking for faults on the engine:

- Air Filter
- Fuel system

Condition	Cause	Remedy
Engine does not start easily, stalls at idle speed, but operates normally at full throttle	Low compression pressure	Check compression with pressure loss or compression tester, or check valve clearance and readjust if necessary, remove combustion residue
	Oil seals in engine damaged	Check for leaks and replace oil seals if necessary
	Engine pan is leaking	Check for leaks and re-seal engine pan if necessary
	Gasket on spacer flange leaking	Install new gasket
	Valve lifter on cam gear defective	Install new cam gear
	Engine pan is damaged	Replace engine pan
Engine does not deliver full power or runs erratically	Air filter dirty	Clean the air filter, replace if necessary
	Gasket on spacer flange leaking	Install new gasket
	Cylinder or piston worn	Install new cylinder or piston
	Muffler / spark arresting screen carbonized	Clean muffler (inlet and outlet), replace if necessary, clean or replace spark arresting screen as necessary
	Fuel hose blocked / kinked / damaged	Check fuel hose and replace if necessary
	Impulse hose or pump diaphragm dirty	Clean impulse hose or pump diaphragm
Engine overheating	Valve lifter on cam gear defective	Install new cam gear
	Insufficient cylinder cooling. Air inlets in fan housing blocked or cylinder cooling fins very dirty	Thoroughly clean all cooling air openings and the cylinder fins

## 4 Shroud



### 4.1 Tools, Servicing Aids

- Socket, T27x125 – 0812 542 2104
- Torque wrench – 5910 890 0302
- Screwdriver, T27x200 – 5910 890 2415

### 4.2 Removing the Shroud

- Unscrew the screws (3) and remove them with the air filter cover (4).
- Unscrew the screws (2) and remove them with the shroud (5).

### 4.3 Removing the Cover

- Loosen the screw (6) and remove it with the cover (1).

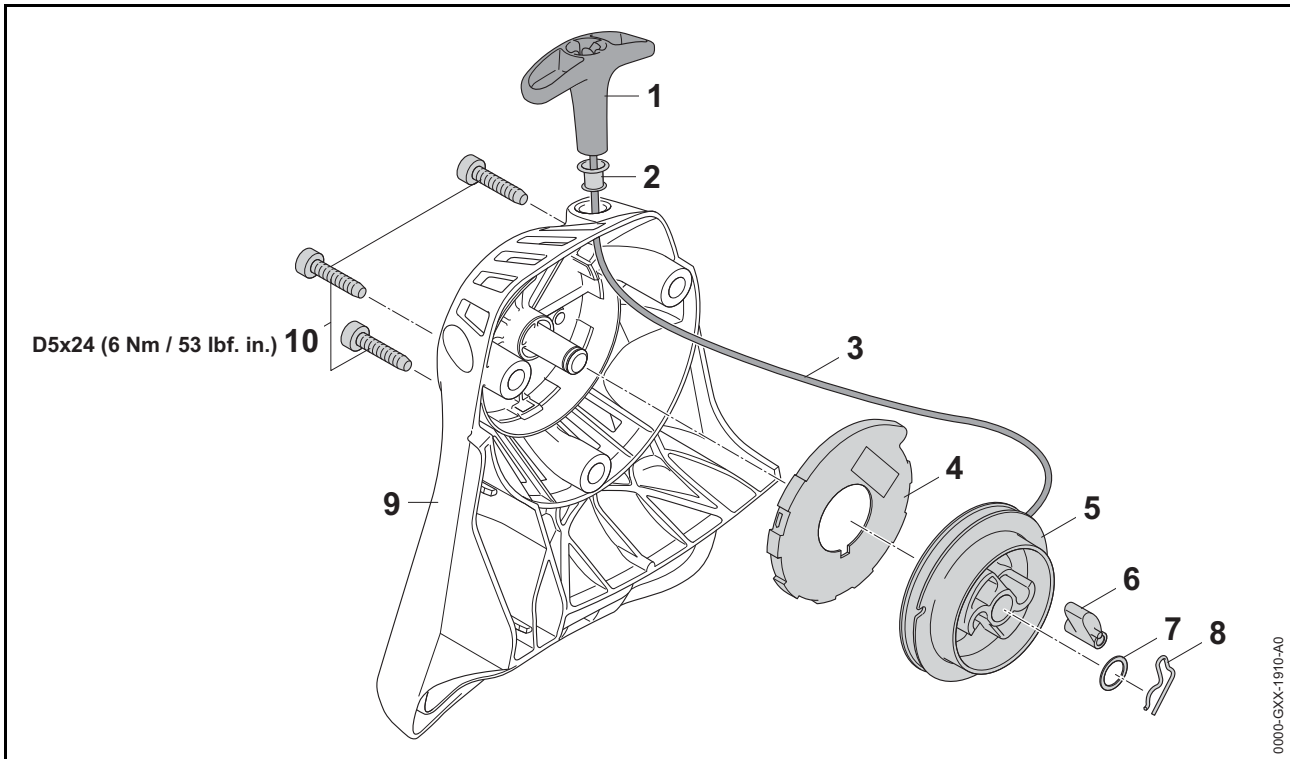
### 4.4 Mounting the Cover

- Fit the cover (1) in position.
- Insert and tighten down the screw (6).

### 4.5 Installing the Shroud

- Place the shroud (5) in position.
- Insert and tighten down the screws (2).
- Fit the air filter cover (4) in position.
- Insert and tighten down the screws (3).

## 5 Rewind Starter



### 5.1 Special Servicing Tools, Servicing Aids

- Socket, T27 – 0812 542 2104
- Torque wrench – 5910 890 0302
- Installing tool – 5910 890 2204
- Screwdriver, T27x200 – 5910 890 2415

### 5.2 Removing the Rewind Starter

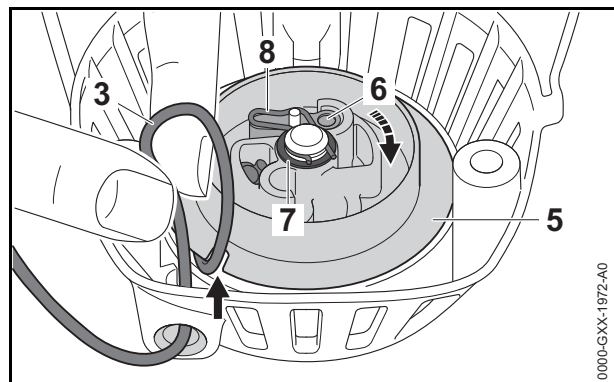
- Take out the screws (10).
- Lift away the rewind starter.

### 5.3 Disassembling the Rewind Starter

Warning! Spring is under tension. Risk of serious eye and face injuries. Wear a face shield and work gloves.

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

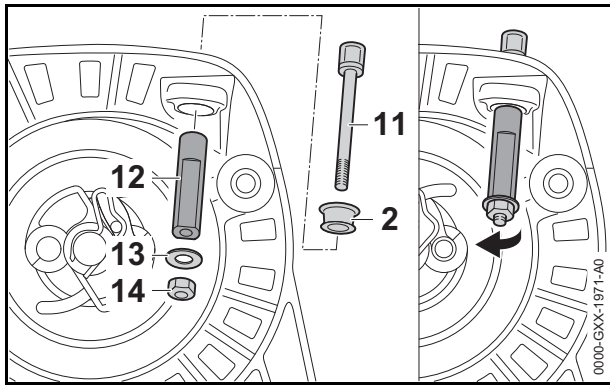
- Pull out the rope (3) with the starter grip (1) about 20 cm and hold the rope rotor (5) steady.



- Engage the rope (3) in the notch (arrow) in the rotor and make a loop in the rope.
- Use the rope to turn the rotor (5) clockwise until spring tension is relieved.
- Take out the screw (8) and remove it along with washer (7) and pawl (6).
- Remove the rope rotor (5).
- Remove the broken/worn starter rope (3) from the rope rotor (4).
- Remove the rewind spring (4).

### 5.4 Replacing the Rope Guide Bushing

- Remove the worn rope guide bushing (2) from the fan housing (9).

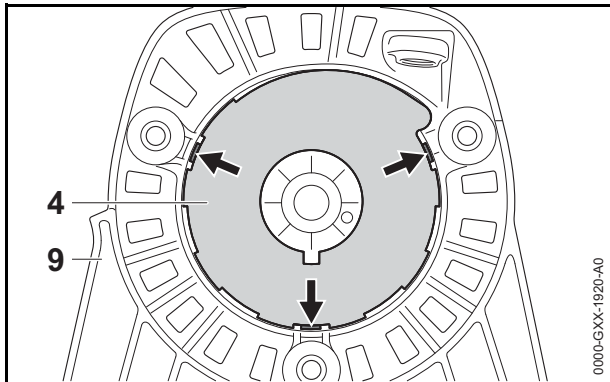


- Fit the new rope guide bushing (2) in the hole in the fan housing (3).
- Insert the screw spindle (11) of the installing tool 5910 890 2204 through the rope guide bushing (2).
- Fit the thrust sleeve (13), washer and hex nut (14).
- Tighten down the hex nut (14) and hold the screw spindle (11) steady until the rope bushing is firmly seated.

The lower end of the rope bushing (4) is flared in this process.

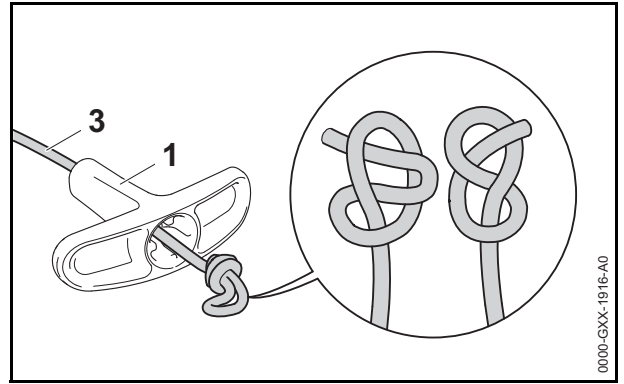
### 5.5 Installing the Rewind Spring

Warning! Spring is under tension. Risk of serious eye and face injuries. Wear a face shield and work gloves.

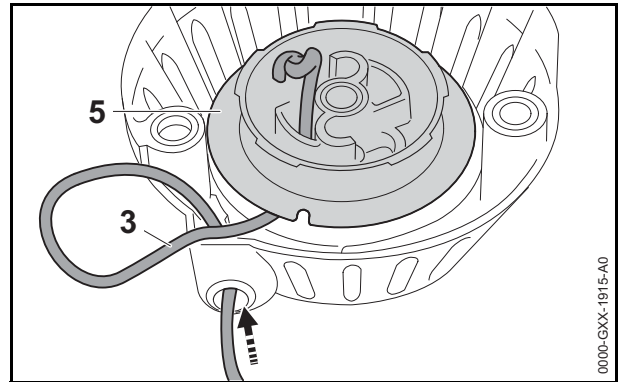


- Push the rewind spring (4) into the recesses in the fan housing.

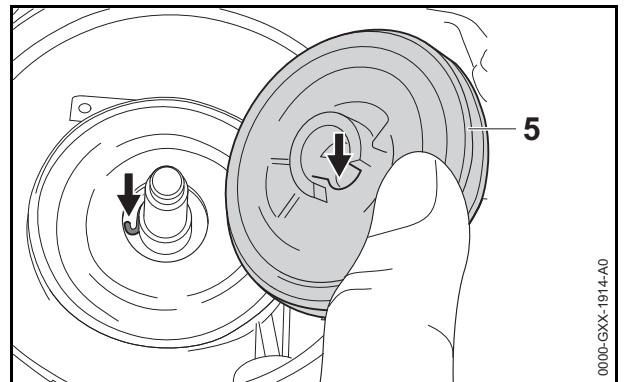
### 5.6 Assembling the Rewind Starter



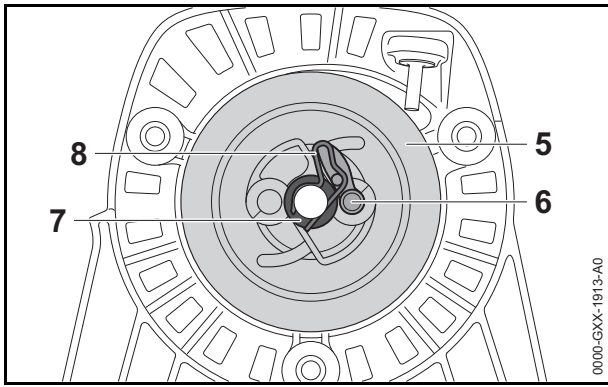
- Secure the end of the starter rope (3) on the starter grip (1) with one of the special knots shown.
- Thread the starter rope through the starter grip (1).
- Thread the other end of the rope (6) through the fan housing (9).



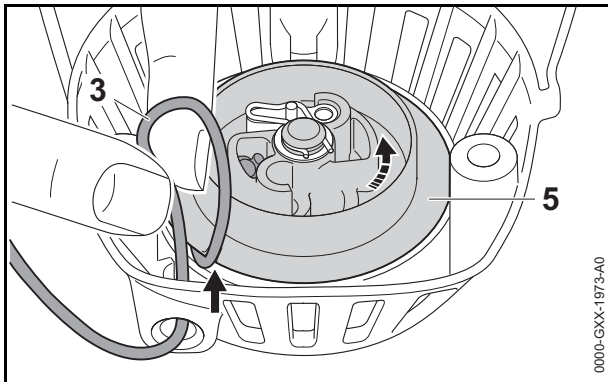
- Thread the rope (3) through the rotor (5) (arrows) and secure it with a simple overhand knot.



- Fit the rope rotor (5) on the starter post so that the driver (arrow) on the rotor engages the inner loop of the rewind spring (arrow).



- Fit pawl (6) in the rope rotor (5).
- Fit the washer (7).
- Fit the spring clip (8) so that it engages the guide peg on the pawl (6).

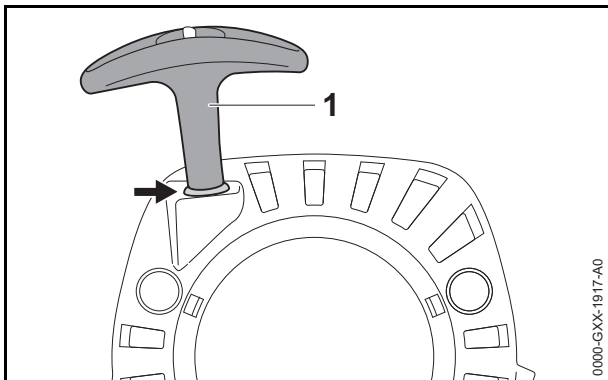


- Pull out a short length of starter rope (3) between the rope rotor (5) and fan housing (arrow).
- Engage the rope (3) in the notch (arrow) in the rotor and make a loop in the rope.
- Use the rope (3) to turn the rope rotor (5) seven times counterclockwise (arrow) and then hold the rotor (5) steady.

The rewind spring is now pre-tensioned.

Rotating the starter rope and rope rotor causes the rope to become twisted.

- Pull out the twisted rope (3) with the starter grip (1) and straighten it out.
- Let go of the rope rotor (5) and slowly release the starter rope (1) so that it can rewind properly.



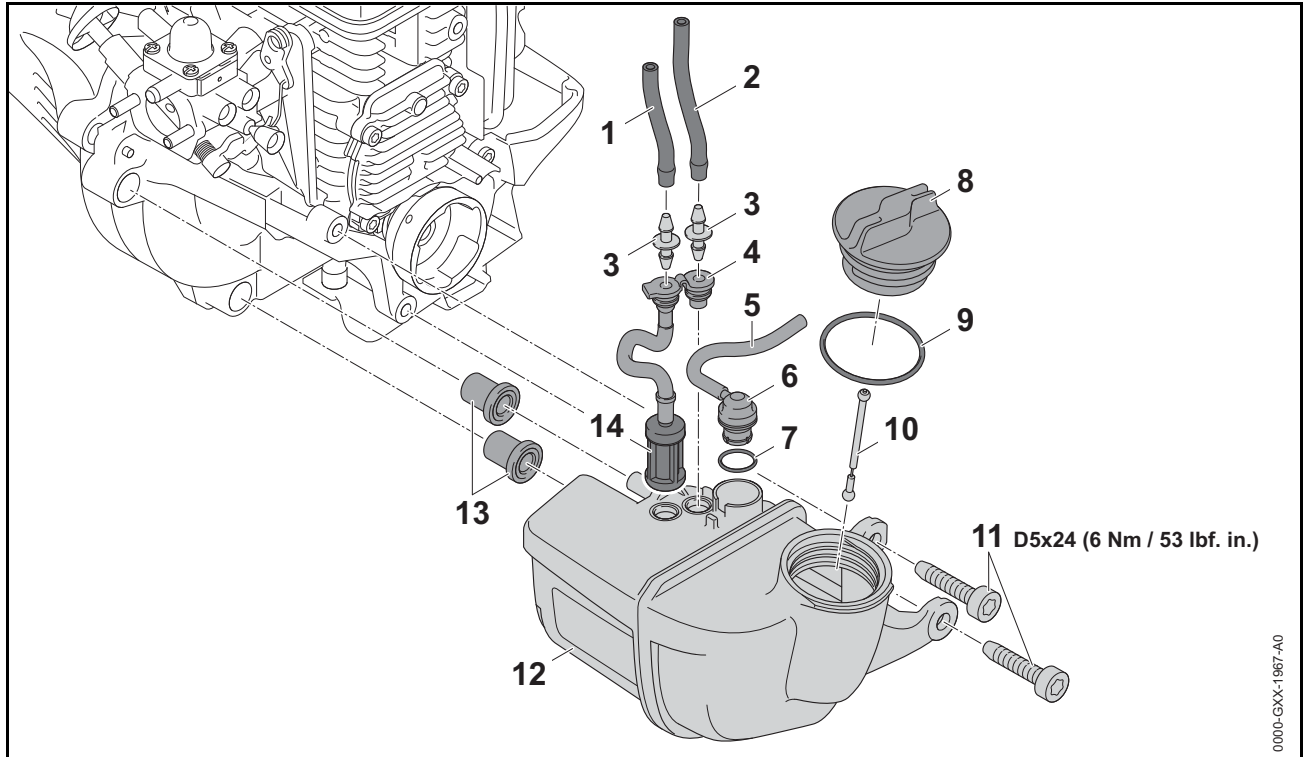
- Check that the starter grip (1) sits upright in the fan housing.

If the starter grip droops to one side, tension the rewind spring at least one additional turn.

### 5.7 Installing the Rewind Starter

- Fit the rewind starter (9) in position.
- Insert and tighten down the screws (10).

## 6 Fuel Tank



### 6.1 Special tools, aids

- Pump – 0000 850 1300
- Connector – 0000 855 9200
- Socket, T27x125 – 0812 542 2104
- Torque wrench – 5910 890 0302
- Screwdriver, T27x200 – 5910 890 2415
- Hook – 5910 893 8800
- OH 723 press fluid – 0781 957 9000

### 6.2 Checking the tank vent

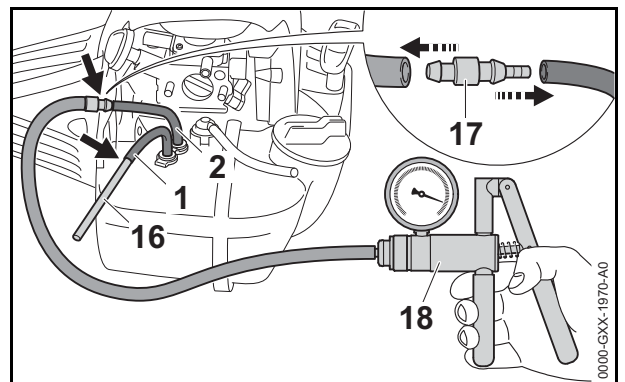


Interactive video "Testing Tank Vent"

Atmospheric pressure and internal fuel tank pressure must be equal at all times for correct operation of the carburetor. This is ensured by the tank vent.

In the case of problems with the carburetor or fuel supply system, also check and clean or replace the tank vent. Testing the fuel tank's vent is performed by applying pressure or vacuum via the fuel hose.

- Drain the fuel tank.
- Remove the shroud, [10.2](#).
- Remove filter and filter housing, [10.2](#).
- Pull hoses (1, 2) off the carburetor, [10.2](#).



- Push assembly drift 4237 893 4700 (16) into hose (1).
- Push the connector 0000 855 9200 (17) into the hose (2).
- Connect pump 0000 850 1300 (18) to the connector.
- Close the fuel cap (8).

#### Vacuum Test

- Set the pump to vacuum mode.
- Create vacuum in the fuel tank.

Equalization of pressure takes place via the tank vent. There must be no buildup of vacuum in the tank. If there is a malfunction:

- Clean the area around the tank vent.
- Replace tank vent, [6.3](#).

### Pressure test

- Set the pump to pressure mode.
- Generate gauge pressure of 0.5 bar in the fuel tank.

Pressure must remain constant for at least 20 seconds. If it drops, the leak must be found:

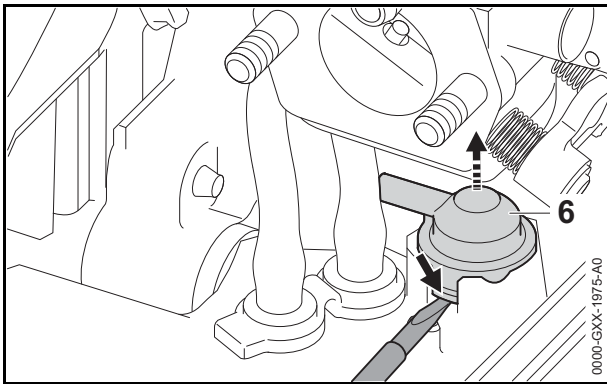
- Inspect fuel tank for damage, replace fuel tank if necessary, 6.8.
- Check the tank vent, replace if necessary, 6.3.

### After the test

- Fit the hoses (1, 2).
- Install filter and filter housing, 10.2.
- Install the shroud, 4.5.

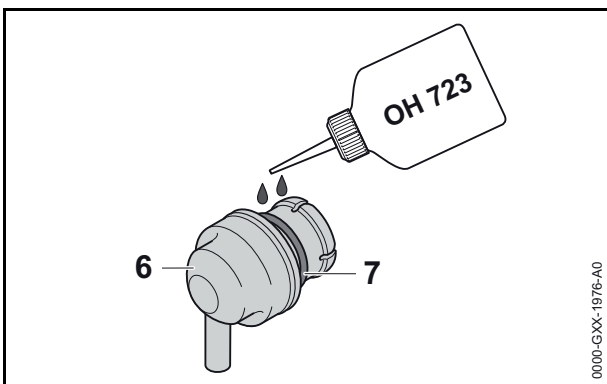
### 6.3 Removing the Tank Vent

- Remove filter and filter housing, 10.2.
- Clean the tank vent (6) and the area around it.
- Remove the hose (5).



- Use screwdriver to pry out the tank vent (6).
- Inspect the tank vent (6) and O-ring (7), replace if necessary.

### 6.4 Installing the Tank Vent



- Coat O-ring (7) and bead of new tank vent (6) with OH 723 press fluid.
- Press the tank vent (6) home as far as it will go.
- Push the hose (5) onto the tank vent (6).

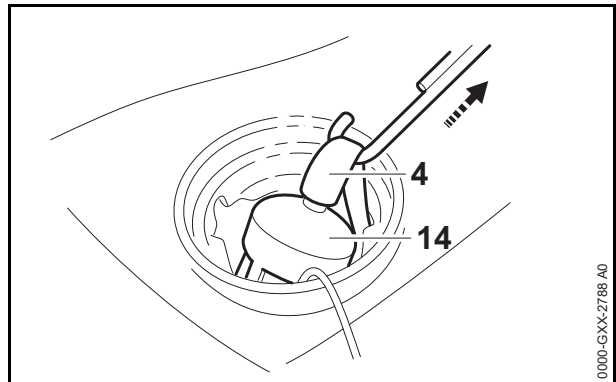
- Check the fuel tank (12) for leaks – 6.2
- Install filter and filter housing, 10.2.

### 6.5 Cleaning the fuel tank

- Open the fuel cap (8).
- Drain the fuel tank (12).
- Fill the fuel tank (12) with fresh clean gasoline.
- Close the fuel cap (8) and shake the fuel tank (12).
- Open the fuel fuel cap (8) again and drain the fuel tank (12).

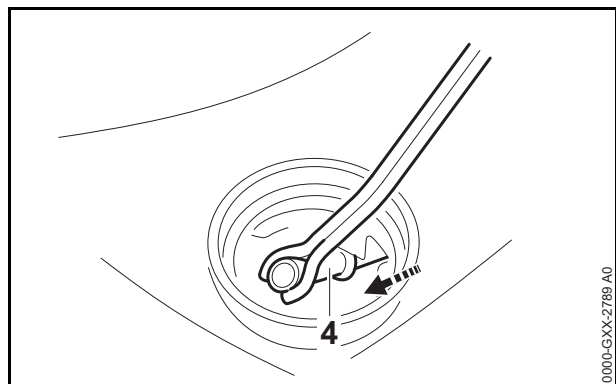
### 6.6 Removing the pickup body

- Open the fuel cap (8)



- Pull the pickup body (14) out of the fuel tank (12) by means of the assembly hook 5910 893 8800.
- Pull the pickup body (14) off the hose (4).

### 6.7 Installing the pickup body



- Pull the hose (4) out of the fuel tank by means of the assembly hook 5910 893 8800.
- Push the connector of new pickup body (14) into the hose (4).
- Push the pickup body (14) into the fuel tank (12).
- Close the fuel cap (8).



## 6.8 Removing the Fuel Tank

- Drain the fuel tank (12).
- Dispose of fuel properly in accordance with environmental requirements.
- Remove the shroud, [4.2](#).
- Remove starter, [5.2](#).
- Pull hoses (1, 2) off the carburetor, [10.2](#)
- Pull hose (5) off the tank vent (6).
- Remove and inspect the fuel tank (12), replace if necessary.
- Install new bushings (13) if necessary.

## 6.9 Installing the Fuel Tank

- Coat bushings (13) with OH 723 press fluid and push them onto the fuel tank (12).
- Fit the fuel tank (12) in the engine pan.
- Install the rewind starter, [5.7](#).
- Push the hoses (1, 2) onto the carburetor's connectors, [10.2](#).
- Push the hose (5) onto the tank vent (6).
- Assemble the intake system, [10.2](#).
- Install the shroud, [4.5](#).

## 6.10 Removing the Fuel Hoses

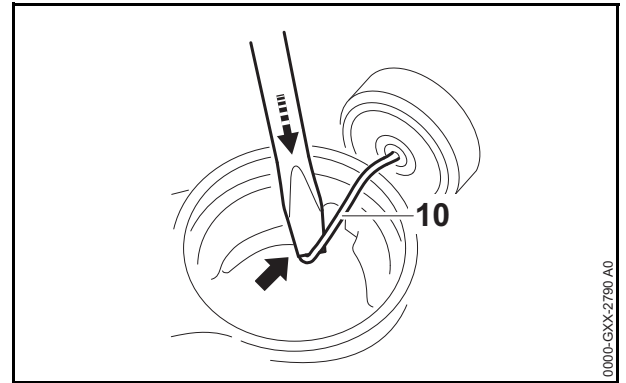
- Drain the fuel tank (12).
- Remove the shroud, [4.2](#).
- Remove filter and filter housing, [10.2](#).
- Pull hoses (1, 2) off the carburetor, [10.2](#).
- Pull hoses (1, 2) with connectors (3) out of the fuel tank (12).
- Pull connectors (3) off the hoses (1, 2).
- Remove the pickup body, [6.6](#).
- Pull hose (4) out of the fuel tank (12).

## 6.11 Installing the Fuel Hoses

- Coat grommets of hose (4) with STIHL press fluid.
- Push hose (4) into the fuel tank.
- Press grommets of hose (4) into the fuel tank.
- Install the pickup body, [6.6](#).
- Coat both ends of hoses (1, 2) with STIHL press fluid.
- Push the hoses (1, 2) onto the connectors (3).
- Push connectors (3) of both hoses (1, 2) into grommets of hose (4).
- Push the hoses (1, 2) onto the carburetor's connectors, [10.2](#).
- Install the filter housing and filter, [10.2](#).
- Install the shroud, [4.5](#).

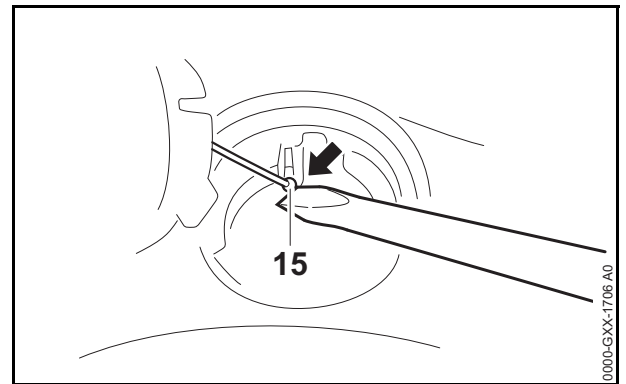
## 6.12 Removing the Fuel Cap

- Open the fuel cap (8).



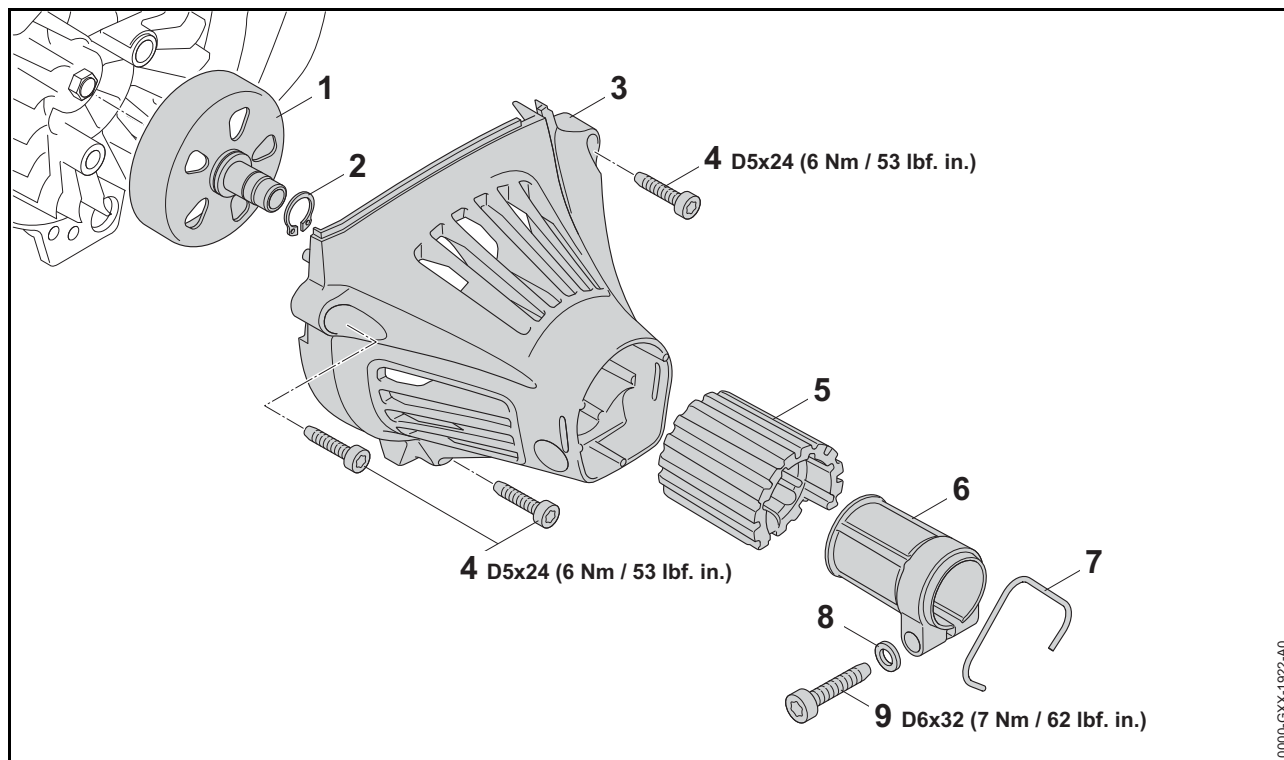
- Ease the cord (10) out of its seat (arrow).
- Inspect fuel cap (8), O-ring (9) and cord (10), replace if necessary.

## 6.13 Installing the Fuel Cap



- Use a suitable tool to push nipple (15) of cord (10) into its seat (arrow).
- Close the fuel cap (8).
- Check the fuel tank for leaks.

## 7 Fan Housing, AV System



### 7.1 Tools, Servicing Aids

- Jaws (profile No. 9) – 0000 893 3707
- Socket, T27x125 – 0812 542 2104
- Pliers A10 flat – 0816 610 1495
- Sleeve – 1120 893 2400
- Press sleeve – 4119 893 2400
- Extension – 4180 893 4400
- Torque wrench – 5910 890 0302
- Torque wrench – 5910 890 0312
- Screwdriver, T27x200 – 5910 890 2415
- Puller – 5910 890 4400
- Ring – 5910 893 7005
- OH 723 press fluid – 0781 957 9000

### 7.2 Removing the Fan Housing

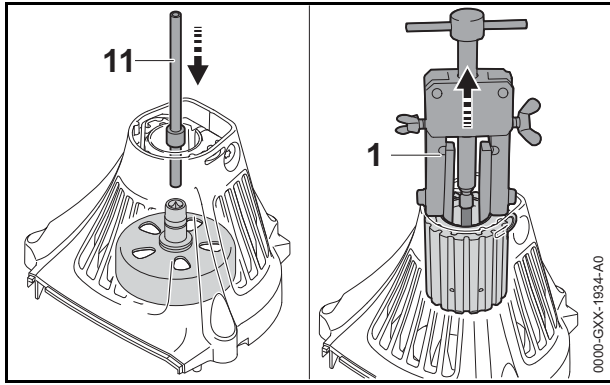
- Remove the shroud, 4.2.
- Loosen screw (9) on the clamp (6).
- Pull the drive tube out of the fan housing (3).
- Take out the screws (4) and remove the fan housing (3).

### 7.3 Installing the Fan Housing

- Fit the fan housing (3) on the clutch.
- Insert and tighten down the screws (4).
- Push the drive tube into the fan housing (3) and line it up.
- Insert and tighten down the screw (9).
- Install the shroud, 4.5

### 7.4 Removing Rubber Element

- Remove the fan housing, 7.1
- Remove the retaining ring (7).



- Insert extension 4180 893 4400 (11), small diameter first, in the square hole in the clutch drum (1).
- Apply puller 5910 890 4400 (1) with jaws (profile No. 9) so that the jaws engage the recesses in the clamp (6).
- Pull clamp (6) with rubber element (5) out of the fan housing (3).
- If necessary, replace the clamp (6) or rubber element (5).

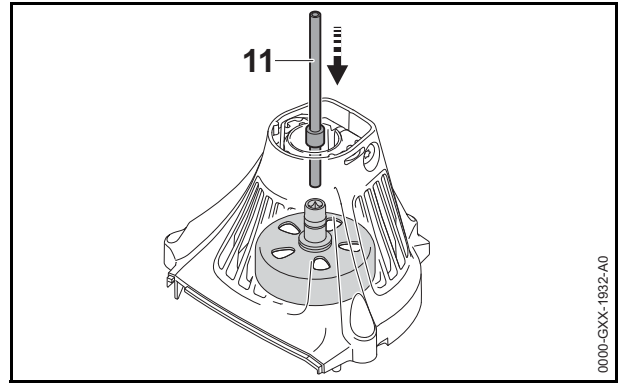
### 7.5 Installing the Rubber Element

- Coat the rubber element (5) with OH 723 press fluid.
- Push the rubber element (5) onto the clamp.
- Use installing sleeve 4119 893 2400 to press the rubber element (5) and clamp (6) into the fan housing (3) as far as stop.
- Fit the screw (9) together with the washer (8).
- Fit the retaining ring (7).
- Install the fan housing (3), 7.3

### 7.6 Removing the Clutch Drum

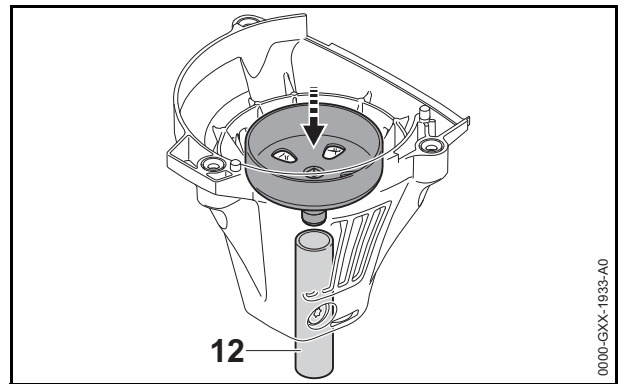
The ball bearing in the fan housing cannot be removed or replaced. If the ball bearing is worn, a new fan housing with built-in ball bearing must be installed.

- Remove the fan housing (3), 7.1.
- Remove the retaining ring (2) with A10 flat pliers – 0816 610 1495.
- Use ring 5910 893 7005 to support the fan housing (3) so that it is upright.



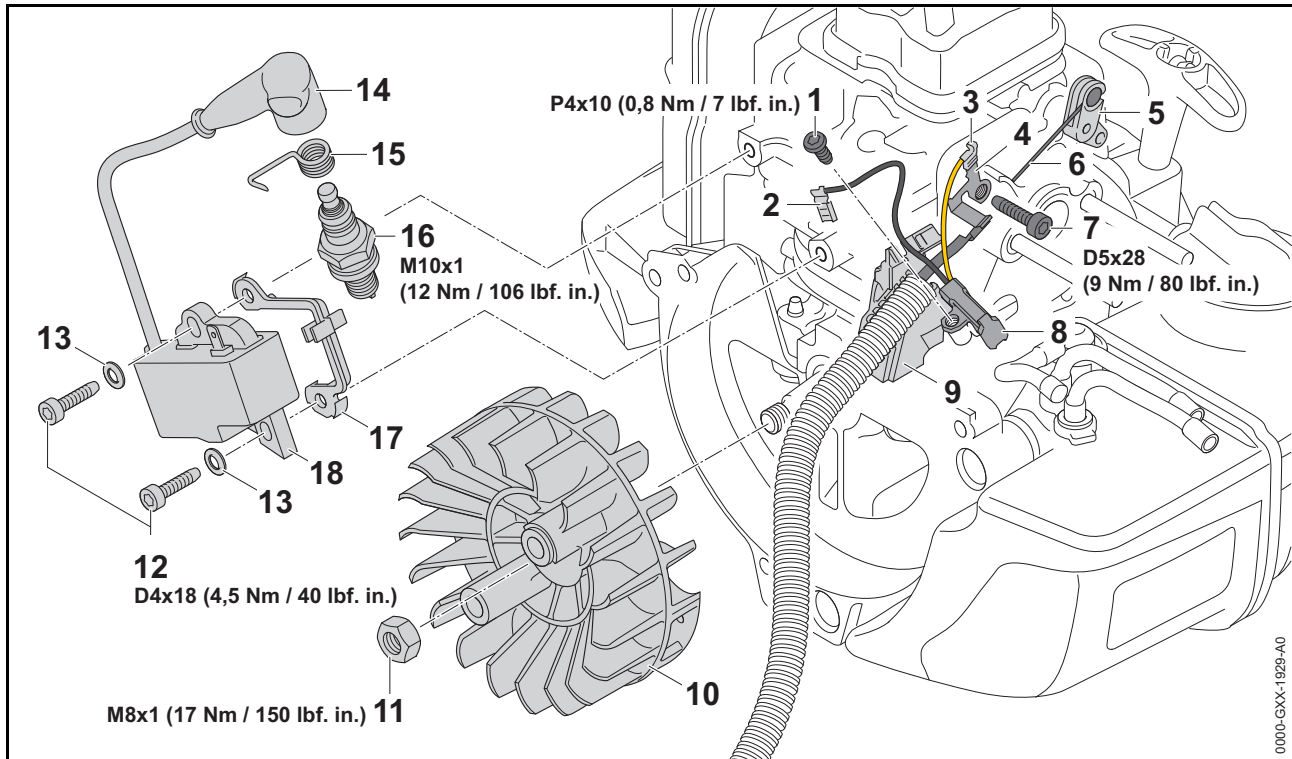
- Insert extension 4180 893 4400 (11), small diameter first, in the square hole in the clutch drum (1).
- Use press to remove the clutch drum (1).

### 7.7 Installing the Clutch Drum



- Remove rubber element, 7.1
- Use sleeve 1120 893 2400 (12) to support inner race of ball bearing in the fan housing (3).
- Heat inner race of ball bearing in fan housing (3).
- Fit the clutch drum (1) in the ball bearing.
- Press home the clutch drum (1) as far as stop.
- Install new retaining ring (2) with A10 flat pliers – 0816 610 1495.
- Install the rubber element, 7.1
- Install the fan housing (3), 7.3



## 8 Ignition System

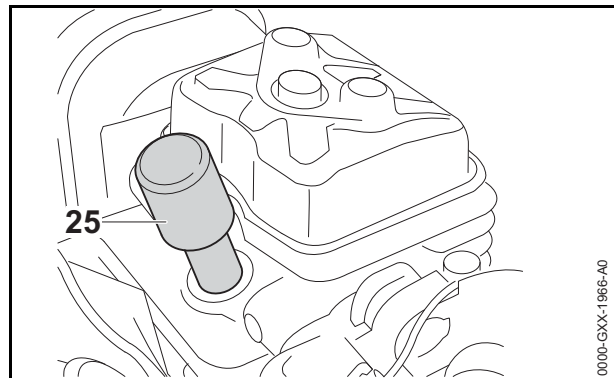



### 8.1 Tools, Servicing Aids

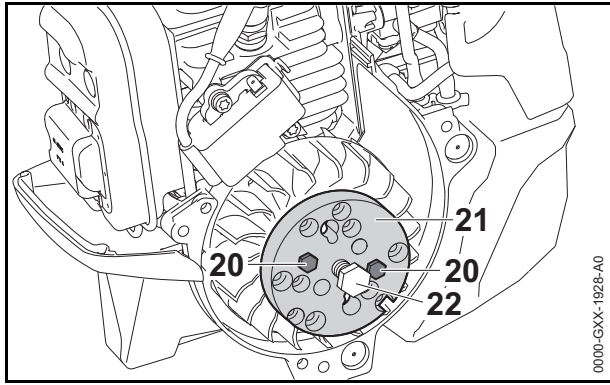
- Socket, T27x125 – 0812 542 2104
- Setting gauge – 4118 890 6401
- Locking screw – 4282 890 2700
- Puller – 4119 890 4501
- Torque wrench – 5910 890 0302
- Torque wrench – 5910 890 0312
- Screwdriver, T20 – 5910 890 2301
- Screwdriver, T27x200 – 5910 890 2415
- Socket, 13 mm, long – 5910 893 2804
- ZAT 4 ignition system tester – 5910 850 4503
- ZAT 3 ignition system tester – 5910 850 4520
- OH 723 press fluid – 0781 957 9000
- Standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons

### 8.2 Removing the Flywheel

- Remove the shroud,  4.2.
- Remove the fan housing,  7.1



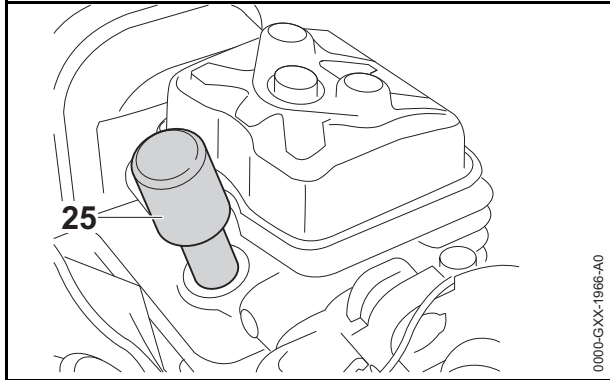
- Pull the boot (14) off the spark plug (16).
- Unscrew the spark plug (16).
- Fit the locking screw 4282 890 2700 (25).
- Remove the clutch,  9.2.
- Unscrew the nut (11).



- Mount the puller 4119 890 4501 (21) with screws (20) from clutch.
- Turn screw (22) of puller 4119 890 4501 (21) clockwise.
- Remove the flywheel (10).

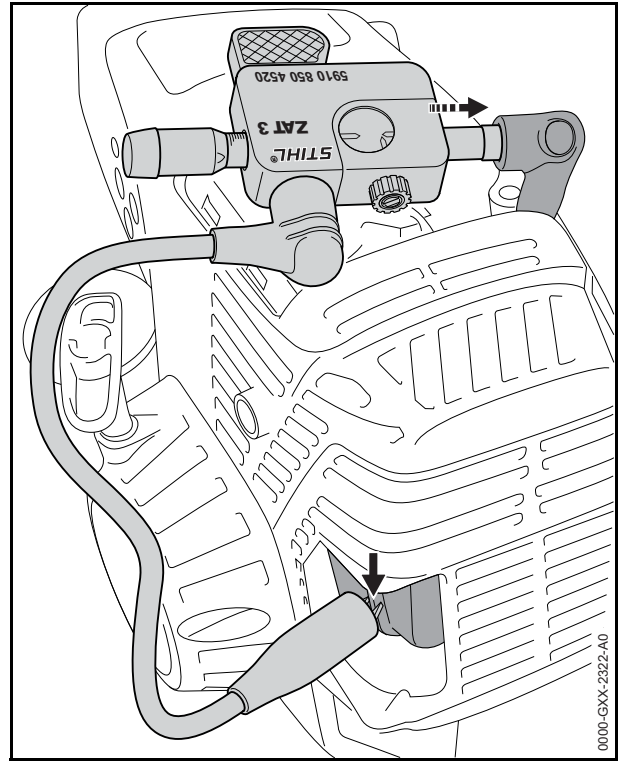
### 8.3 Installing the Flywheel

- Degrease taper on crankshaft stub and in flywheel (7) hub.



- Fit locking screw 4282 890 2700 (25).
- Place the flywheel (10) on the crankshaft taper.
- Turn the crankshaft clockwise until the piston butts against the locking screw.
- Fit the nut (11) on the crankshaft and tighten it down.
- Install the clutch, 9.5.
- Remove the locking screw 4282 890 2700.
- Insert and tighten down the spark plug (16).
- Fit the boot (14) on the spark plug (16).
- Install the fan housing, 7.3
- Install the shroud, 4.3.

### 8.4 Testing Ignition Module with ZAT 3 Tester



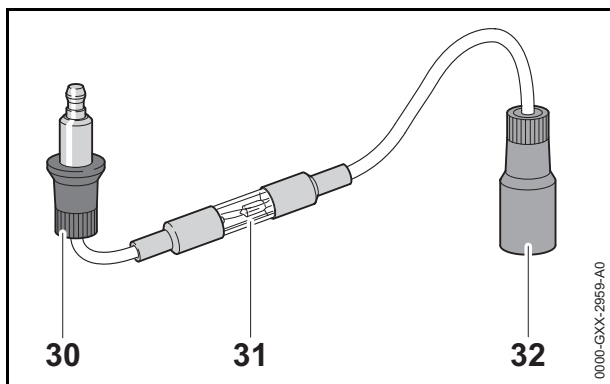
- Remove the cover, 4.3
- Pull boot (11) off the spark plug.
- Unscrew the spark plug (16).
- Connect ZAT 3 ground terminal to the muffler (arrow).
- Connect the spark plug boot (14) to the ZAT 3.
- Set spark gap on ZAT 3 to about 2 mm.
- Pull the starter several times and observe the spark window on the ZAT 3 at the same time:

If no spark is visible in the ZAT 3 window, check ignition system with the aid of the troubleshooting chart.

### 8.5 Testing Ignition Module with ZAT 4 Tester



Interactive video "Testing Ignition Module with ZAT 4 Tester"



- Remove the cover, [4.3](#).
- Pull boot (11) off the spark plug.
- Connect ZAT 4 input terminal (30) to spark plug boot (11).
- Connect ZAT 4 output terminal (32) to spark plug (16).
- Pull the starter several times and observe the spark window on the ZAT 4 at the same time:

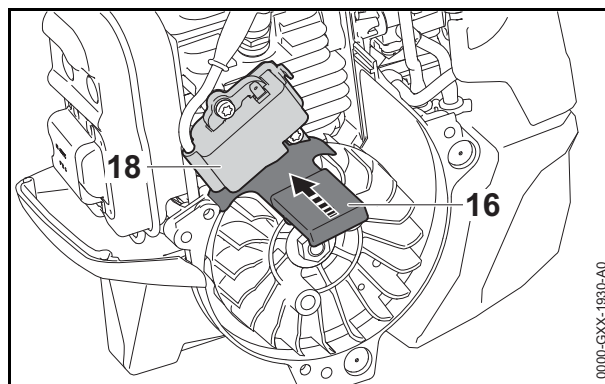
If no spark is visible in the ZAT 4 window (31), check ignition system with the aid of the troubleshooting chart.

### 8.6 Removing the Ignition Module

- Remove the shroud, [4.2](#).
- Remove the fan housing, [7.1](#)
- Pull boot (14) off the spark plug.
- Disconnect short circuit wire's flag terminal (2) from the ignition module (18).
- Take out the screws (12) and remove them together with the washers (13).
- Remove the ignition module (18) together with the insulator (17).

### 8.7 Installing the Ignition Module

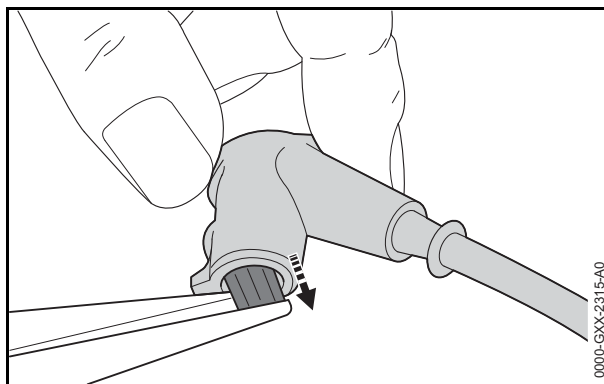
- Fit the ignition module (18) together with the insulator (17) in position.
- Insert the screws (12) together with the washers (13).



- Adjust air gap between ignition module (18) and flywheel (10) with the setting gauge 4118 890 6401 (16).
- Tighten down the screws (12).
- Connect short circuit wire's flag terminal (2) to connector tag on ignition module.
- Push the short circuit wire (2) into the recess on the insulator.
- Fit the boot (14) on the spark plug (16).
- Install the fan housing, [7.3](#)
- Install the shroud, [4.5](#).

### 8.8 Removing Spark Plug Boot and Leg Spring

- Pull the boot (14) off the spark plug (16).

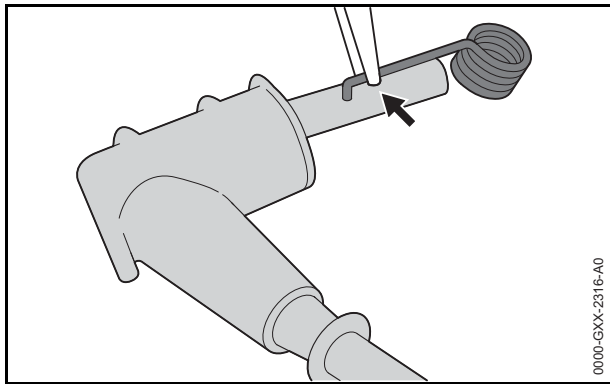


- Use suitable pliers to pull leg spring (15) out of the spark plug boot (14).
- Remove the leg spring (15) from the ignition lead.
- Pull the spark plug boot (14) off the ignition lead.

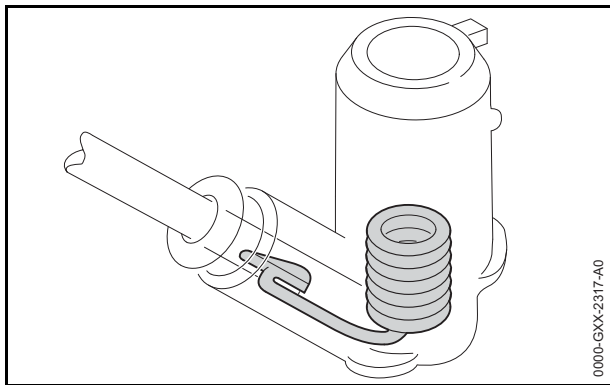
### 8.9 Installing Spark Plug Boot and Leg Spring

The ignition lead cannot be renewed because it is permanently molded to the ignition module.



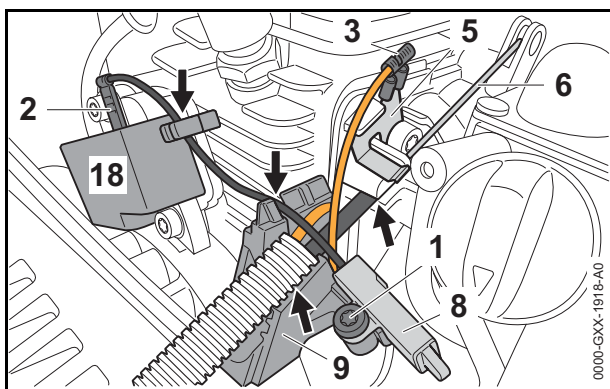


- Use a scribe to pierce the center of the ignition lead's insulation, about 15 mm (0.6 in) from the end of the lead.
- Pinch the hook of the leg spring (15) into the center of the lead (arrow).
- Coat inside of spark plug boot (14) with press fluid.



- Hold the ignition lead and leg spring (15) together and push them into the spark plug boot (14).

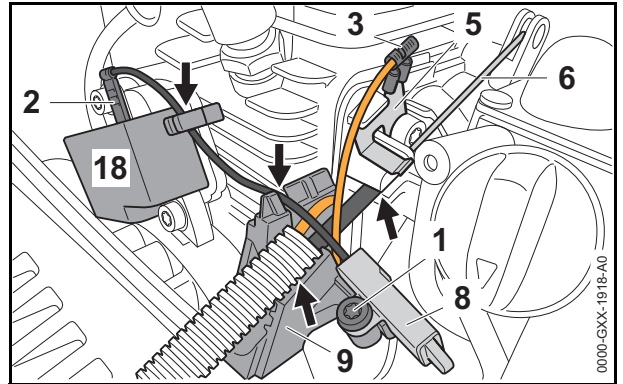
### 8.10 Removing the Short Circuit Wire, Ground Wire and Throttle Cable



- Remove the shroud, 4.2.
- Disconnect ground wire's flag terminal (3).
- Disconnect throttle cable (6) from the lever (5).
- Disconnect short circuit wire's flag terminal (2).
- Pull the short circuit wire (2) out of the guides (arrows).
- Take out the screw (1).

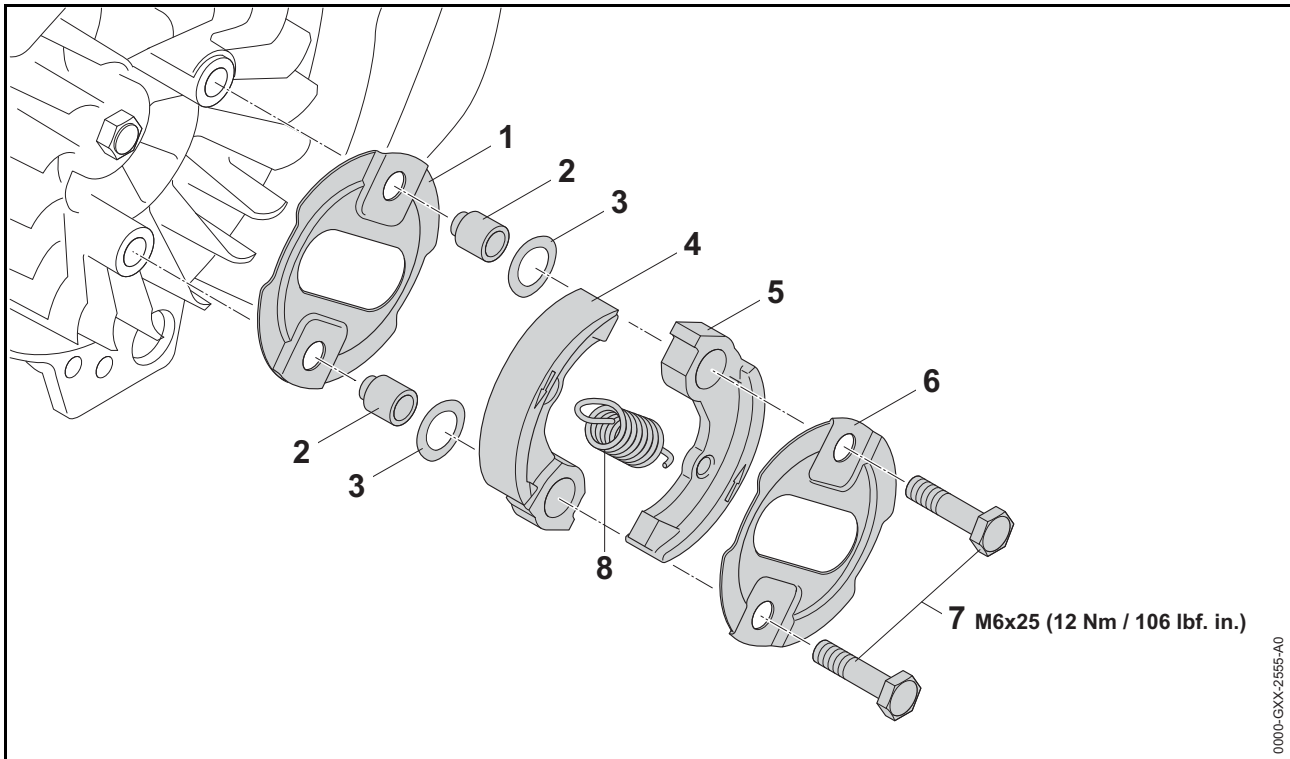
- Remove the short circuit wire, ground wire and throttle cable.
- Remove the short circuit wire, ground wire and throttle cable from the control handle, 12.4 or 13.4.

### 8.11 Installing the Short Circuit Wire, Ground Wire and Throttle Cable



- Install the short circuit wire, ground wire and throttle cable in the control handle, 12.5 or 13.5.
- Fit the throttle cable (6) in the flange's guide.
- Place hose profile of throttle cable (6) in guide on cable holder.
- Fit diagnostic socket (8) in the cable holder (9).
- Insert and tighten down the screw (1).
- Attach nipple of throttle cable (6) to lever (5).
- Connect short circuit wire's flag terminal (3) to connector tag on ground plate (4).
- Connect short circuit wire's flag terminal (2) to connector tag on ignition module.
- Fit short circuit wire (2) in recesses on cable holder (arrow) and ignition module (arrow).
- Install the shroud, 4.3.

## 9 Clutch

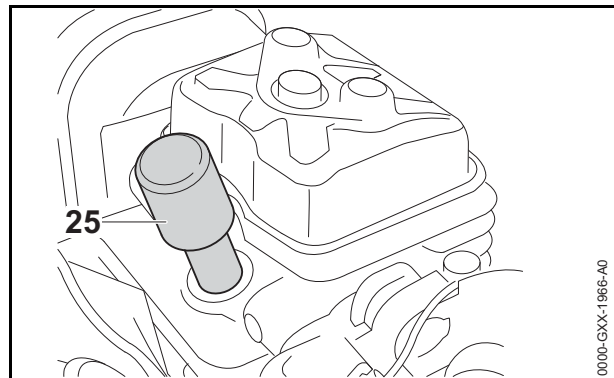


### 9.1 Tools, Servicing Aids

- Socket, T27x125 – 0812 542 2104
- Locking screw – 4282 890 2700
- Torque wrench – 5910 890 0302
- Torque wrench – 5910 890 0312
- Screwdriver, T27x200 – 5910 890 2415

### 9.2 Removing the Clutch

- Remove the shroud, [4.2](#).
- Remove the fan housing, [5.2](#)
- Unscrew the spark plug.



- Fit the locking screw 4282 890 2700 (25) in the spark plug hole.
- Turn the crankshaft counterclockwise until the piston butts against the locking screw.
- Take out the screws (7).
- Remove the cover plate (6).
- Remove the clutch shoes (4, 5) together with the spring (8) and other cover plate (1).
- If necessary, remove the washers (3) and sleeves (2).

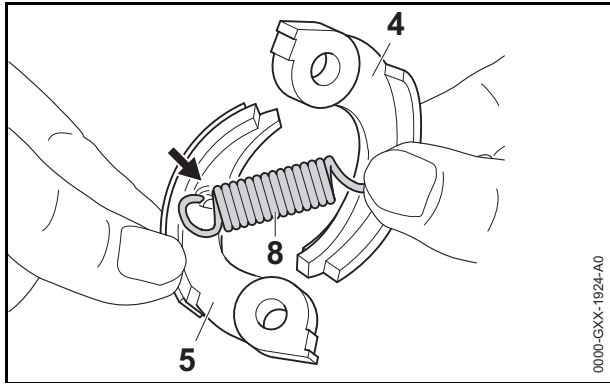
### 9.3 Disassembling the Clutch

- Inspect the clutch drum in the fan housing for scores and wear marks, and replace it if necessary.
- Twist the clutch shoes (4, 5) and unhook the spring (8).

Clutch shoes must always be replaced in pairs.

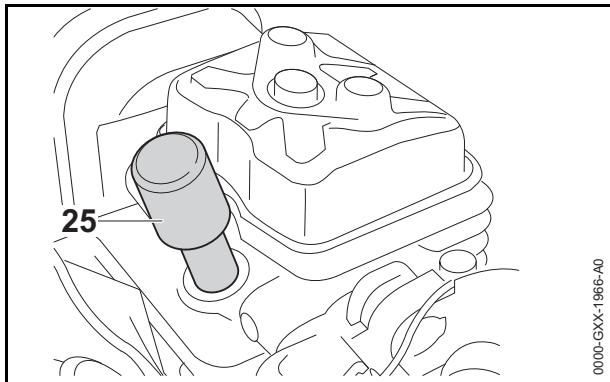


## 9.4 Assembling the Clutch

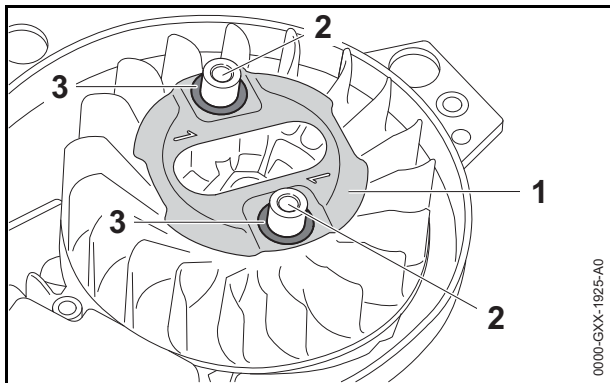


- Attach the spring (8) to the clutch shoes (4, 5) so that its hooks (arrow) are on the side with the lettering.

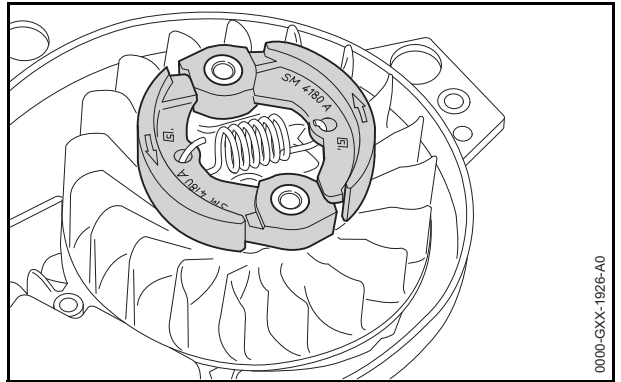
## 9.5 Installing the Clutch



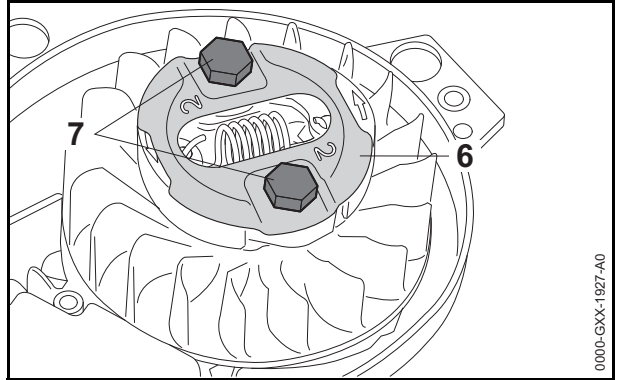
- Pull boot off the spark plug.
- Unscrew the spark plug.
- Fit the locking screw 4282 890 2700 (25) in the spark plug hole.
- Turn the crankshaft clockwise until the piston butts against the locking screw.



- Place the cover plate (1) on the flywheel so that the number "1" faces up.
- Fit the sleeves (2) on the cover plate (1) and push them into the flywheel.
- Fit the washers (3) on the sleeves (2).

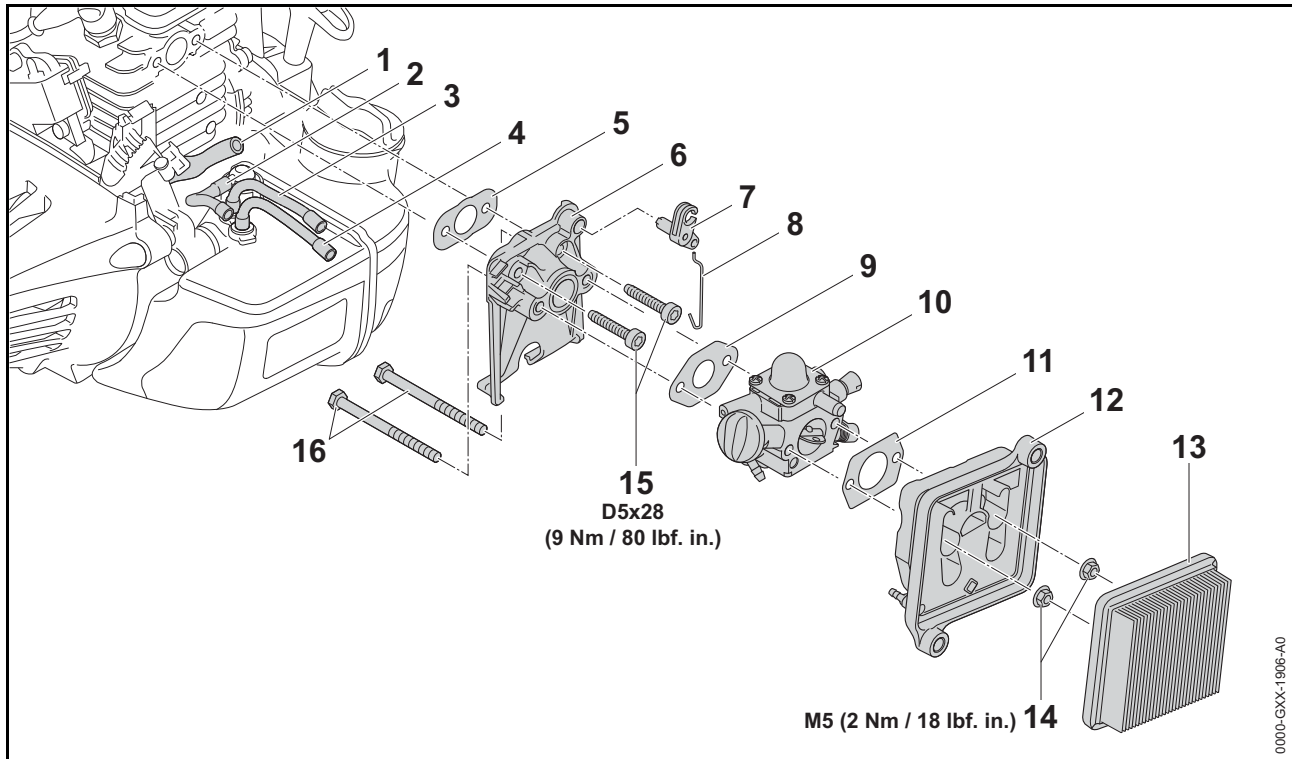


- Fit the clutch so that the lettering faces up.



- Place the cover plate (6) on the flywheel so that the number "2" faces up.
- Insert and tighten down the screws (7).
- Insert and tighten down the spark plug.
- Fit the boot on the spark plug.
- Install the fan housing, 5.7
- Install the shroud, 4.5.


## 10 Intake System

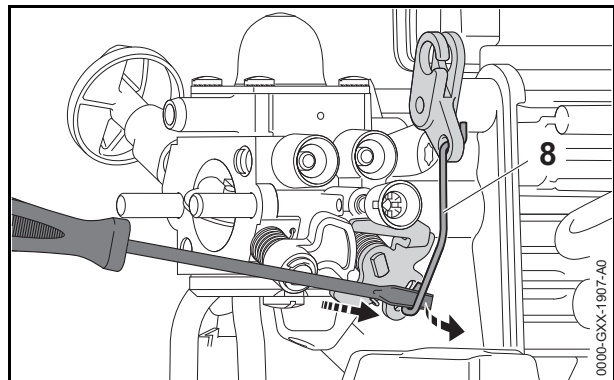


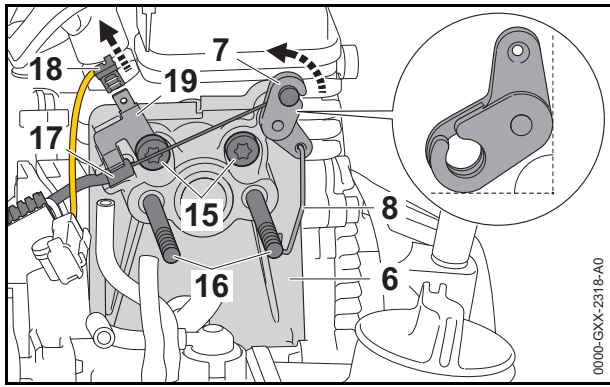
### 10.1 Tools, Servicing Aids

- Screwdriver – 0000 890 2305
- Socket, T27x125 – 0812 542 2104
- Screwdriver, T27x200 – 5910 890 2415
- Torque wrench – 5910 890 0302
- Torque wrench – 5910 890 0312
- Screwdriver, Q-SW 8x200 – 5910 890 2420

### 10.2 Disassembling the Intake System

- Remove the shroud,  4.2.
- Remove the filter element (13).
- Remove the nuts (14).
- Pull the hose (2) off the filter housing (12).
- Remove the filter housing (12).
- Remove the gasket (11).
- Use screwdriver 0000 890 2305 to unhook throttle rod (8) from carburetor's throttle lever.
- Pull hoses (3, 4) off the carburetor.
- Pull impulse hose (1) off the carburetor.
- Remove the carburetor (10).
- Remove the gasket (9).

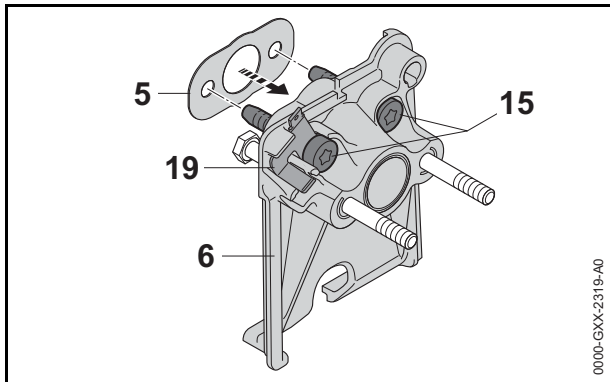




0000-GXX-2318-A0

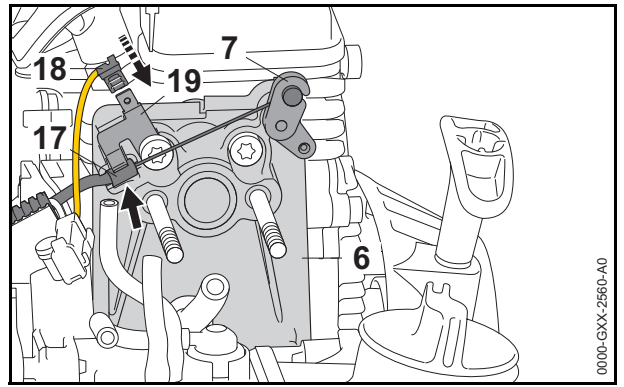
- Disconnect throttle cable (17) from the lever (7).
- Remove the throttle rod (8).
- Turn lever (7) counterclockwise and pull it off.
- Disconnect ground wire blade receptacle (18).
- Take out the screws (15).
- Remove the ground tab (19).
- Remove the spacer flange (6) together with the screws (16).
- Remove the gasket (5).
- If necessary, remove and replace impulse hose (1).

### 10.3 Assembling the Intake System



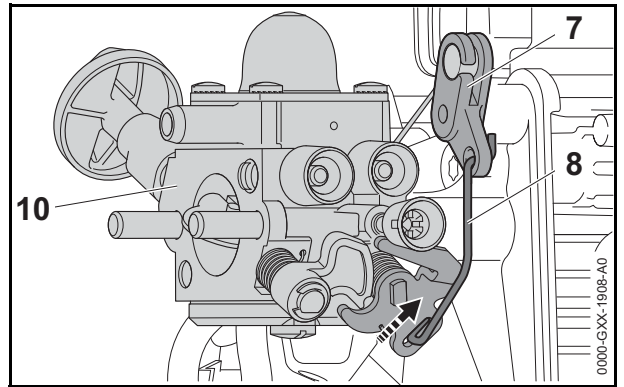
0000-GXX-2319-A0

- Push the screws (16) into the spacer flange (6).
- Fit the ground tab (19).
- Push the screws (15) into the spacer flange (6).
- Fit the gasket (5).
- Position the spacer flange (6) on the cylinder.
- Insert and tighten down the screws (15).



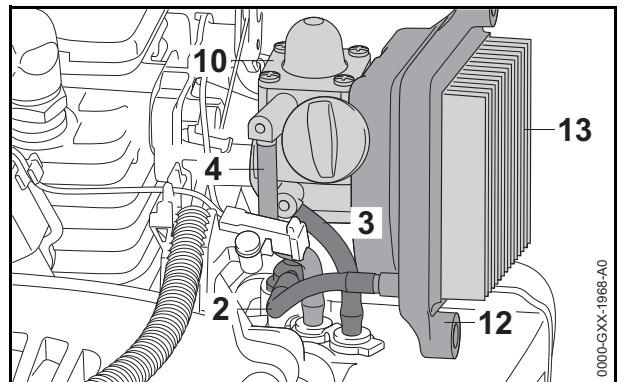
0000-GXX-2560-A0

- Fit sleeve of throttle cable (17) in recess in spacer flange (6).
- Fit blade receptacle of ground wire (18) on ground tab (19).
- Fit the lever (7).
- Attach throttle cable (17) to lever (7).




0000-GXX-1908-A0

- Attach throttle rod (8) to lever (7).
- Fit a new gasket (9).
- Push the carburetor (10) into place.
- Push the impulse hose (1) onto the carburetor's connector.
- Attach the throttle rod (8) to the throttle lever (7).

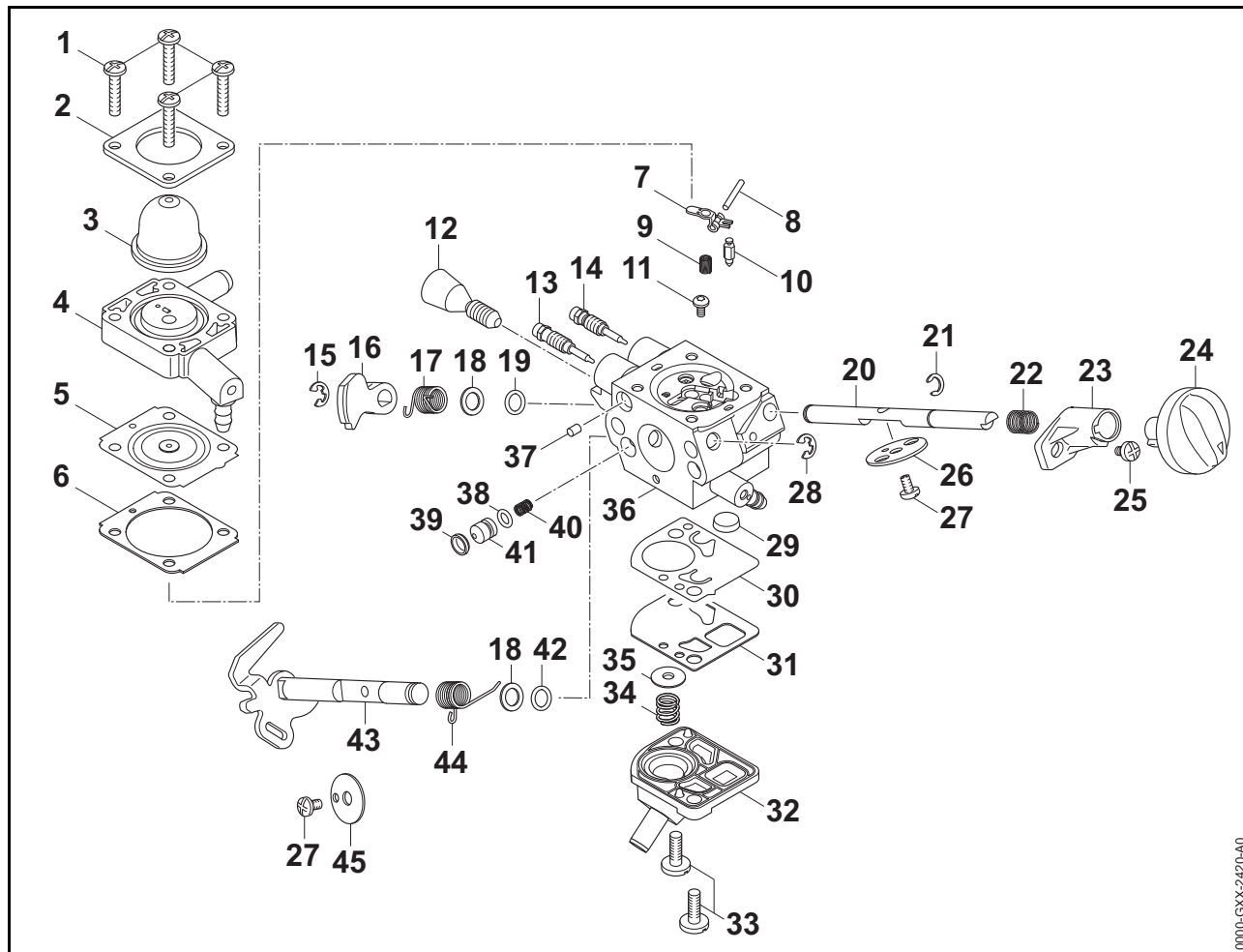


0000-GXX-1968-A0

- Push the hoses (3, 4) onto the carburetor's connectors.
- Fit the gasket (11).
- Push the hose (2) onto the connector on the filter housing (12).
- Push the filter housing (12) into position.

- Fit and tighten down the nuts (14).
- Fit the filter element (13).
- Install the shroud,  4.5.

## 11 Carburetor



### 11.1 Special tools, aids

- Pump – 0000 850 1300
- Connector – 0000 855 9201
- Screwdriver – 0000 890 2300
- Hose 135 mm – 1110 141 8600
- Screwdriver – 5910 890 2307
- Screwdriver, T10 – 5910 890 2308
- Screwdriver T8 – 5910 890 2310
- STIHL press fluid OH 723 – 0781 957 9000

### 11.2 Setting the carburetor

#### 11.2.1 Making the basic setting

- Check the air filter and clean or replace as necessary.
- Check the spark arresting screen (installation depends on the country) in the muffler – clean or replace it if necessary, 14.2
- Screw the high speed screw (H) (14) and the low speed screw (L) (13) in clockwise until tight.

#### Carburetor "4180/15x" (models with displacement of 28.4 and 31.4 cc)

- Turn the high speed screw (H) (14) 3 1/2 turns counterclockwise.
- Turn the low speed screw (L) (13) 1 3/4 turns counterclockwise.

#### Carburetor "4180/14x" (series with 36.3 cm<sup>3</sup> displacement)

- Turn the high speed screw (H) (14) 3 1/2 turns counterclockwise.
- Turn the low speed screw (L) (13) 1 1/4 turns counterclockwise.

#### Adjust idle speed

Idle speed: \_\_\_\_\_ | 2800 rpm

Adjust engine speeds with the aid of a tachometer or the STIHL MDG 1 analyzer.

For speeds with range information, set the speed in a tolerance range of  $\pm 100$  rpm.

- Start the engine and warm it up for 1 minute with load changes – if necessary, slowly turn the idle speed adjusting screw (LA) (12) slowly clockwise until the engine runs evenly when idling – the attachment must not move.
- Turn the low speed screw (L) (13) clockwise or counterclockwise when the engine is idling until the highest speed is reached.

The highest speed should be between 3100 and 3300 rpm.

- If applicable, use the idle speed adjusting screw (LA) (12) to set the idle speed to 3200 rpm.
- Turn the low speed screw (L) (13) counterclockwise when the engine is idling and set the speed to 2800 rpm.

### 11.2.2 Adjust idle speed


#### The engine stops at idling speed

- Start the engine and run until it is warm.
- Turn the slow speed screw (LA) (12) clockwise until the engine runs evenly – the attachment must not move.


#### Attachment runs while engine is idling

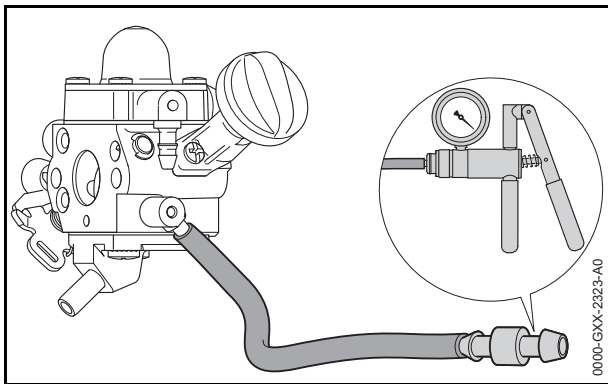
- Turn the slow speed screw (LA) (12) counterclockwise until the attachment stops. Then, continue to turn 1/2 to 3/4 of a turn in the same direction.

### 11.3 Testing carburetor for leaks

In the case of problems with the carburetor or fuel supply system, also check and clean or replace the tank vent,  6.1.

You do not have to remove the carburetor for the leak test.

- Pull the fuel hoses off at the carburetor,  10.2




- Push the 135 mm hose 1110 141 8600 onto the fuel flow connector of the carburetor.
- Fit the connector 0000 855 9201 in the 135 mm hose 1110 141 8600.
- Connect the hose from pump 0000 850 1300 to connector 0000 855 9201.
- Push the ring of pump 0000 850 1300 to the right (overpressure).
- Actuate pump 0000 850 1300 and generate 0.8 bar (11.6 psi) overpressure.

If the indicated underpressure does not fall beyond 0.5 bar (7.25 psi) within 20 seconds, the carburetor is leak-tight. If it drops, there are three possible causes:

- The inlet needle is not sealing (foreign matter in valve seat, sealing cone of inlet needle is damaged or inlet control lever is sticking); remove for cleaning.
- Metering diaphragm (5) damaged, replace if necessary.
- Pump diaphragm damaged, replace if necessary.

After the test:

- Pull off the 135 mm hose 1110 141 8600 from the elbow fitting of the carburetor.
- Install the carburetor,  10.1.

### 11.4 Choke knob

#### Removal


- Unscrew the screw (25) and remove it together with choke knob (24) and guide piece (23).
- Take the spring (22) off the choke shaft (20).
- Pull the choke knob (24) off the guide piece (23).

#### Installation

- Place the spring (22) on the choke shaft (20).
- Insert the choke knob (24) into the guide piece (23) and turn it counterclockwise until the choke knob (24) is fastened in the groove.
- Push the choke knob (24) together with the guide piece (23) onto the choke shaft (20) as far as it will go.
- Insert and tighten down the screw (25) firmly.

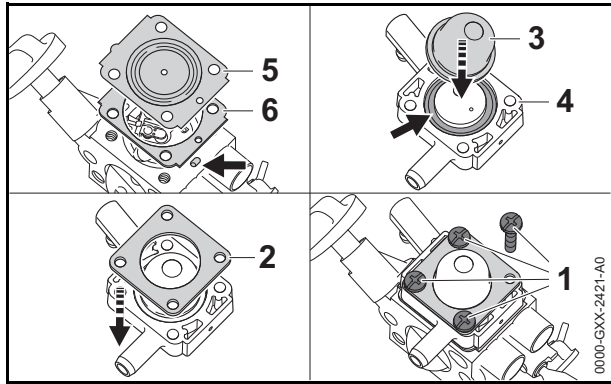
### 11.5 Metering Diaphragm and Manual Fuel Pump

#### Removal

- Remove the carburetor,  10.2.
- Unscrew the screws (1).
- Remove the cap (3), cover lid (2) and flange (4).
- Check the cap (3) and replace if necessary.
- Remove the metering diaphragm (5).
- Remove the gasket (6)
- Check the metering diaphragm (5) for damage and wear, replace if necessary. If the metering diaphragm (5) bulges or is convex, it must be replaced.



## Installation

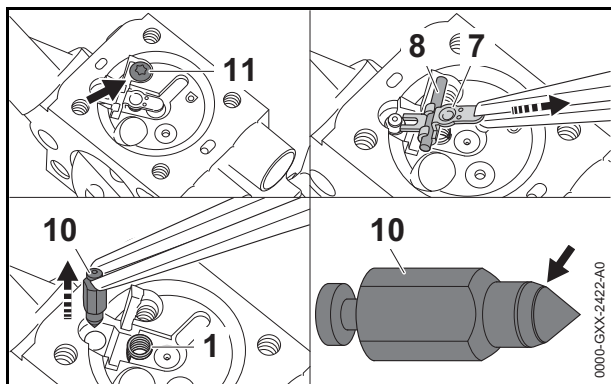


- Insert a new gasket (6) and metering diaphragm (5) - the small bore (arrow) on the gasket and metering diaphragm (5) is on the side of the setting screws.
- Insert the cap (3) in the ring groove (arrow) at the flange (4).
- Fit the cover lid (2).
- Align the flange (4) so that both fuel connectors (arrows) are opposite the setting screws.
- Position two screws (1) and fasten the gasket (6) with the metering diaphragm (5).
- Insert further screws (1).
- Tighten the screws (1) down in a crosswise pattern.
- Install the carburetor, 10.2.
- Check for correct functioning.

## 11.6 Inlet needle

### Removal

- Remove the metering diaphragm (5).



- Remove the screw (11) with screwdriver T8 5910 890 2310.
- Pull the inlet control lever (7) with starter post (8) out of the groove of the inlet needle (10) - the spring (9) under the inlet control lever (7) may jump out.
- Remove the spring (9) and check it, replace if necessary.
- Pull out the inlet needle (10) and check it, replace if necessary.

If a ring-shaped impression (arrow) is visible at the sealing cone of the inlet needle (10), replace the needle.

## Installation

- Insert the inlet needle (10) so that the tip points into the carburetor.
- Insert spring (9).
- First position the inlet control lever (7) with starter post (8) with the seat at the spring (9), then push the fork of the inlet control lever (7) into the groove of the inlet needle (10).

The spring (9) must rest in the spherical seat of the inlet control lever (7).

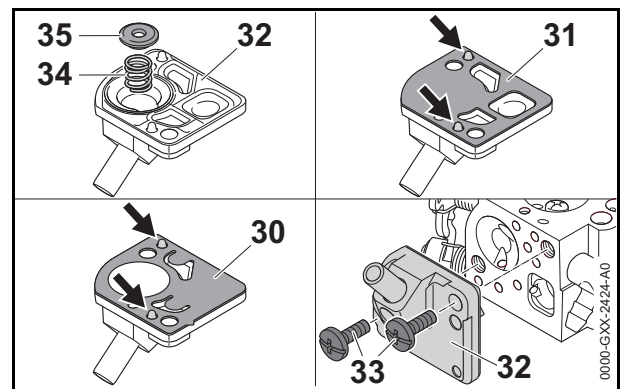
- Push the inlet control lever (7) down and secure it with screw (11).
- Check the inlet control lever (7) for smooth running.
- Insert the metering diaphragm (5).

## 11.7 Pump Diaphragm


### Removal

- Remove the carburetor, 10.2.
- Unscrew the screws (33).
- Remove the cover lids (32) - the spring (34) and the washer (35) may fall out.
- Carefully remove the gasket (31) with the pump diaphragm (30) from the pegs at the cover lid (32).
- Carefully remove the pump diaphragm (30) from the gasket (31).
- Check the pump diaphragm (30) for damage and wear, replace if necessary. If the pump diaphragm (30) bulges or is convex, it must be replaced.
- Clean the sieve (29) - if damaged, possibly pull it out of the carburetor housing by means of a scriber.
- Replace the gasket (31).

### Installation



- Push the sieve (29) into the sieve in the carburetor housing. The convex side of the sieve (29) faces inwards.
- Place the spring (34) and the washer (35) on the closing lid (32).
- Place the gasket (31) on the closing lid (32) and fix it with the pegs (arrows).
- Place the pump diaphragm (30) on the gasket (31) and fix it with the pegs (arrows).

- Position the closing lid (32) with gasket (31) and pump diaphragm (30) facing up at the carburetor housing – make sure that the gasket (31) and the pump diaphragm (30) remain fixed on the cover lid (32).
- Move the closing lid (32) slightly to and fro until the pegs of the cover lid line up in the bores of the carburetor housing.
- Insert and tighten down the screws (33).
- Install the carburetor,  10.2.


### 11.8 Adjusting screws

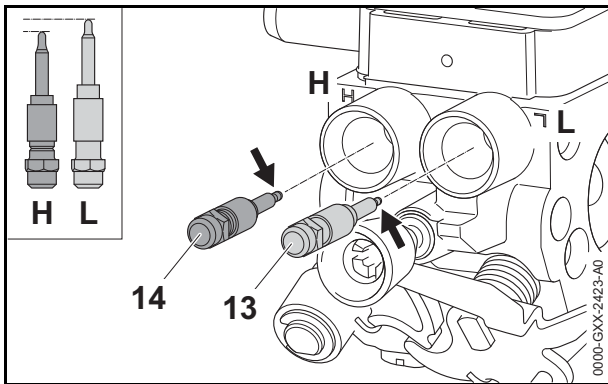
There are three setting screws at the carburetor:

- High speed screw **H** (14)
- Low speed screw **L** (13)
- Idle speed screw **LA** (12)

If the carburetor setting can no longer be adjusted, this may also be due to the adjusting screws.


#### Removal

- Remove the carburetor,  10.2
- Unscrew the high speed screw (H) (14) and low speed screw (L) (13).



- Check the tips (arrows) of the high speed screw **H** (14) and the low speed screw **L** (13) for damage or wear; if necessary, replace high speed screw (14) and low speed screw (13).
- Unscrew and check the idle speed screw (12), replace if necessary.

#### Installation

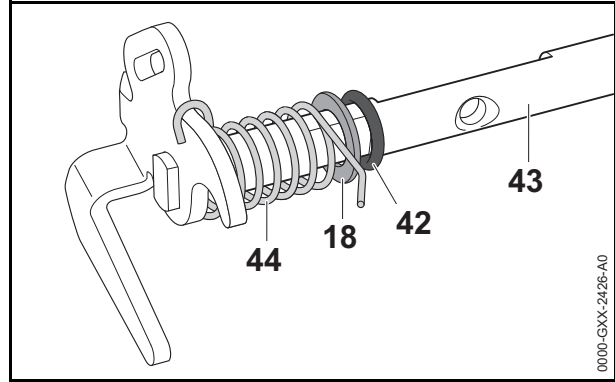
- Screw in the setting screws (12, 13, 14) and do the basic setting,  11.2.

### 11.9 Throttle shaft with lever

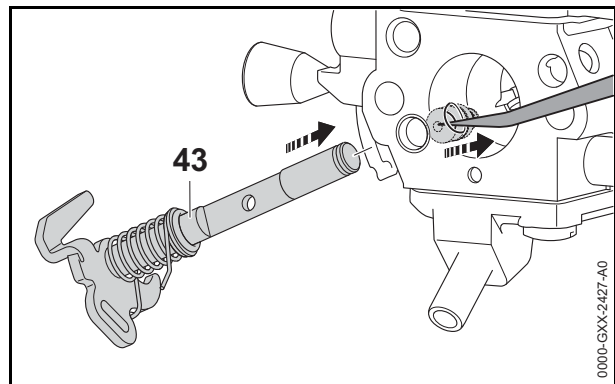
#### Removal

- Unscrew the screw (27) at the throttle shutter (45) and remove the throttle shutter (45).
- Remove E-clip (28).
- Pull out the throttle shaft (43).
- Pull off the sealing ring (42), washer (18) and spring (44) from the throttle shaft (43).

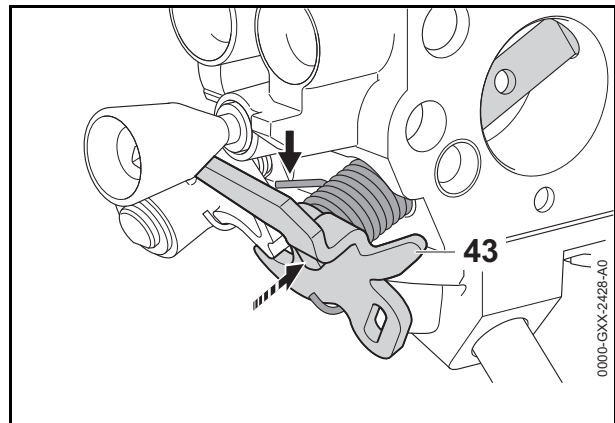
#### Installation



- Push the spring (44) onto the throttle shaft (43) so that the spring (44) touches the notch at the lever.
- Push the washer (18) and sealing ring (42) up to the spring (44) onto the throttle shaft (43).

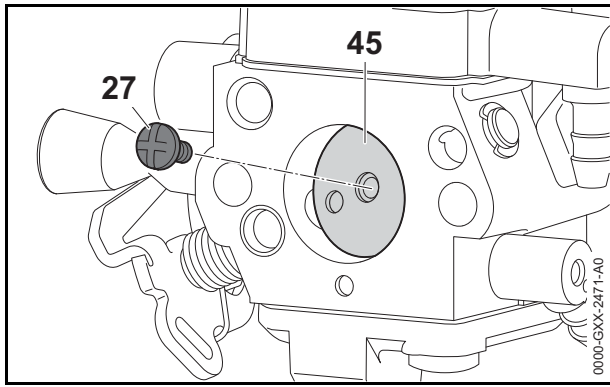


- Push the pump piston back by means of a scribe and at the same time push the throttle shaft (43) into the carburetor.



- Push the throttle shaft (43) so far back into the carburetor that the long leg of the spring (44) butts against the recess at the carburetor (arrow).
- Fit the lock washer (28).





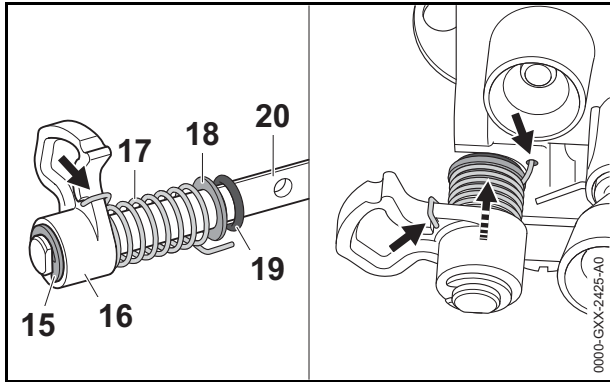
- Turn the throttle shaft (43) and insert the throttle shutter (45). The bore in the throttle shutter (45) faces the setting screws.
- Insert and tighten down the screw (27) firmly.

### 11.10 Start Choke with Lever

#### Removal

- Unscrew the screw (27) and the carburetor choke (26) and remove the carburetor choke (26).
- Remove the choke knob (24), 11.4
- Remove the retaining ring (21).
- Pull out the choke shaft (13).
- Remove the sealing ring (19), washer (18) and spring (17).
- Remove the retaining ring (15).
- Pull off the lever (16).

#### Installation

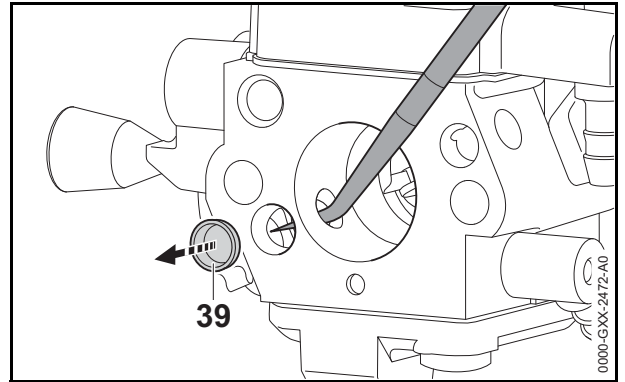


- Place the lever (16) on the choke shaft (20) and fit the retaining ring (15).
- Push the spring (17) onto the choke shaft (20) so that the spring (17) is hooked in at the lever (16) (arrow).
- Push the washer (18) and sealing ring (19) onto the choke shaft (20) up to the spring (17).
- Fit the choke shaft (20) in the carburetor so that the spring (17) engages the hole in the carburetor body (arrow) and the lever (arrow).
- Install the retaining ring (21).

- Position the choke shutter (26) on the choke shaft (20) in such a way that the number on the choke shutter is visible and located on the side of the choke knob (24).
- Insert and tighten down the screw (27) firmly.
- Install the choke knob (24), 11.4.

### 11.11 Accelerator pump

#### Removal

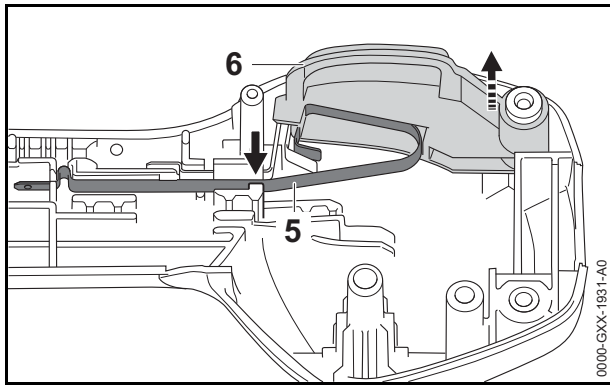


- Remove the throttle shaft (43).
- Use a right-angle scriber to push out the lid (39).
- Remove the pump piston (41) with sealing ring (38) and spring (40) and check for damage, replace if necessary.

#### Installation

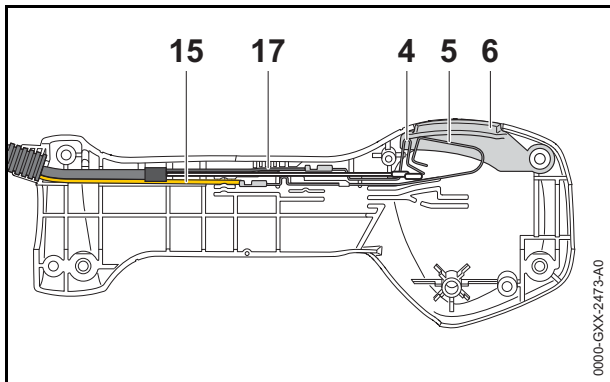
- Fit the spring (40) and pump piston (41) with a new sealing ring (38) in the bore.
- Push a new lid (39) into the bore.



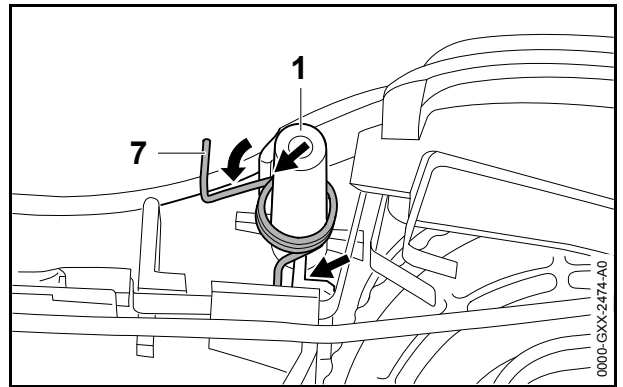


- Lift the lever (6) slightly, pull the contact spring (5) out of the guide (arrow) and push it to one side.
- Remove the lever (6).
- Remove the yellow ground wire (15) together with the contact spring (5).
- Pull the contact spring (5) off the yellow ground wire (17).
- Remove the black short-circuit wire (17) together with the contact spring (4).
- Pull the contact spring (4) off the black short-circuit wire (17).
- Remove short-circuit wire, ground wire and throttle cable from the engine, 8.8.

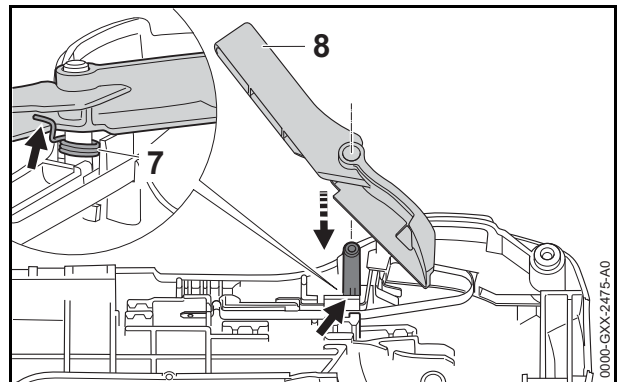
## 12.5 Assembling the Control Handle



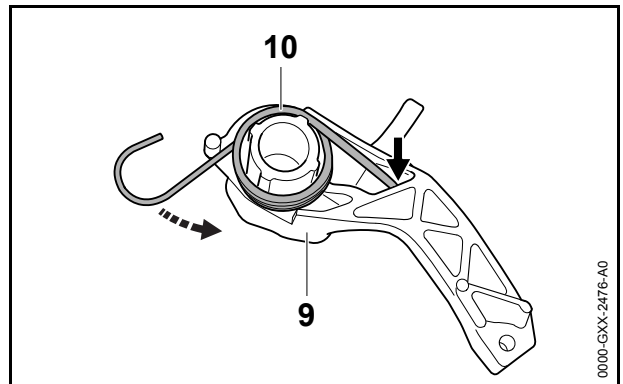
- Push blade receptacle of black short-circuit wire (17) onto the contact spring (4) so that its open side faces the throttle trigger (11).
- Fit the black short-circuit wire (17) together with the contact spring (4) in the guides in the handle housing.
- Fit the lever (6).
- Push blade receptacle of yellow ground wire (15) onto the contact spring (5) so that its open side faces the throttle trigger (11).
- Push the yellow ground wire (15) with contact spring (5) in the guides in the handle housing, and fit the contact spring (5) in the recesses in the lever (5).
- Depress lever (6) and check that the contact springs (4, 5) make contact.



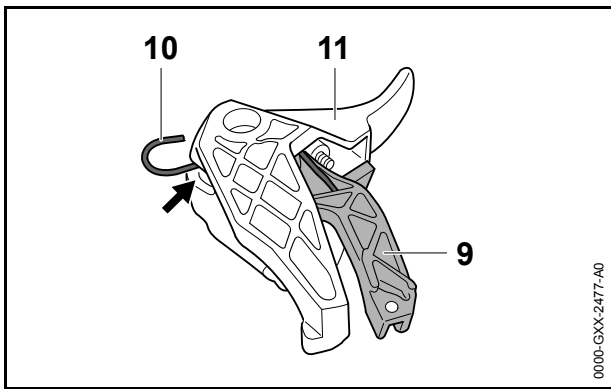
- Fit the torsion spring (7) on the pivot pin so that its downward angled leg locates against the rib (arrow).
- Turn the upper leg (arrow) of the torsion spring counterclockwise and locate it against the housing (arrow)



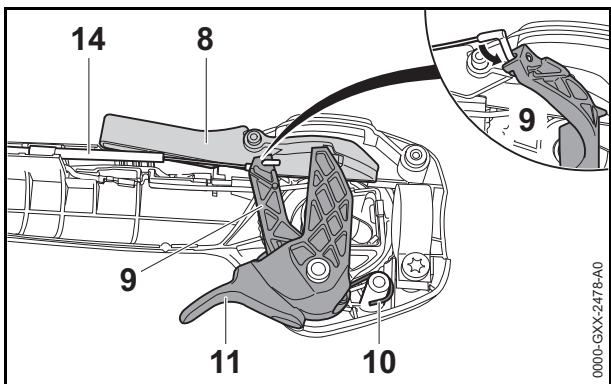
- Push the lockout lever (8) onto the pivot pin (arrow) so that it fits past the upper leg of the torsion spring (7).
- Hook the torsion spring (7) (arrow) to the lockout lever (8) and fit the lockout lever (8) in position.



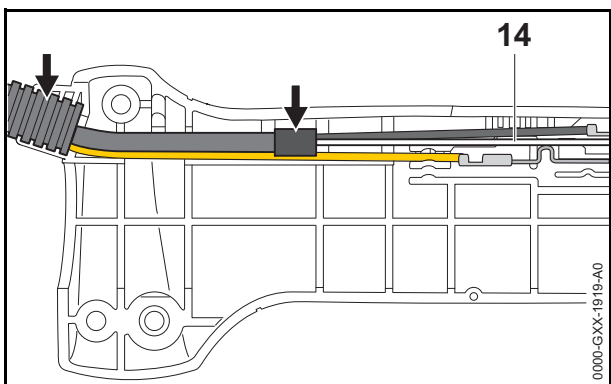
- Push the straight leg of torsion spring (10) into the opening (arrow).
- Tension the hooked leg (10) counterclockwise and fit it behind the stop.



- Push lever (9) into the throttle trigger (11) as far as stop so that the hooked end of the torsion spring (10) projects from the opening (arrow).

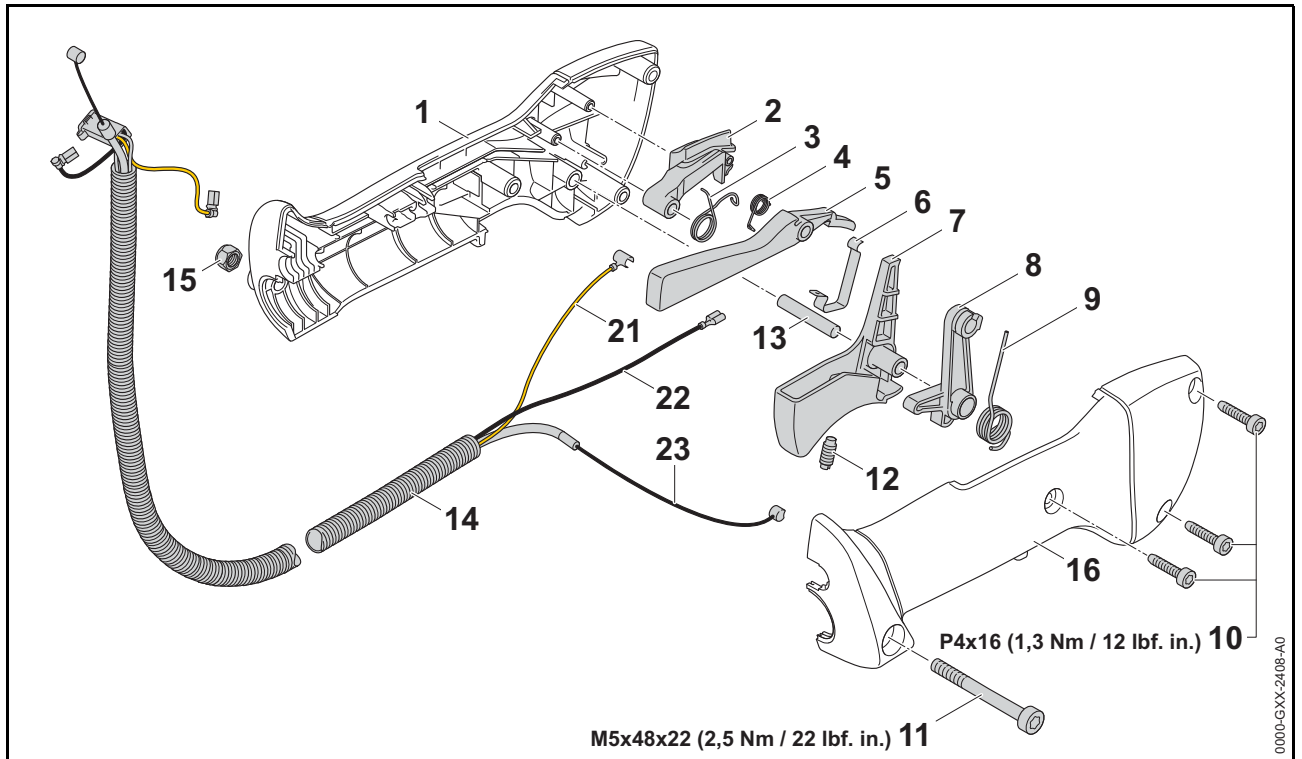


- Attach the throttle cable (14).
- Fit the throttle trigger (11) with lever (9) in position so that the hooked leg of the torsion spring (10) engages the pivot.
- Depress the lockout lever (8) and fit the throttle trigger (11) so that it engages the lockout lever (8).



- Press sleeve of throttle cable (14) into the guide (arrow).
- Press protective hose of throttle cable (14) into the guide (arrow).
- Fit the 'outer handle molding' (18).
- Insert and tighten down the screws (12).
- Fit short-circuit wire, ground wire and throttle cable on the engine, [8.11](#).
- Install the control handle, [12.2](#).

## 13 Control Handle – Bicycle Handle



### 13.1 Special Servicing Tools, Servicing Aids

- Socket, T27 – 0812 542 2104
- Torque wrench – 5910 890 0302
- Screwdriver, T20 – 5910 890 2301
- Screwdriver, T27x200 – 5910 890 2415
- Punch-down tool – 5910 890 4000

### 13.2 Removing the Control Handle

- Unscrew the screw (1) and remove it with the nut (15).
- Pull the control handle off the bike handle.
- Pull the hose off the retainers.

### 13.3 Fitting the Control Handle

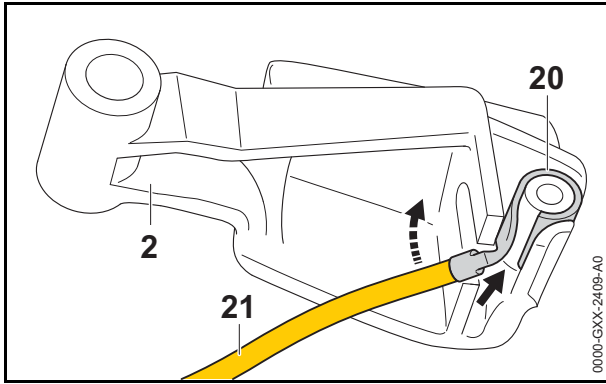
- Push the control handle onto the bike handle so that the throttle trigger faces the gearbox.
- Insert the screw (1) with nut (15) and tighten it down firmly.
- Push the protective hose into the retainer so that it remains straight.

### 13.4 Disassembling the Control Handle

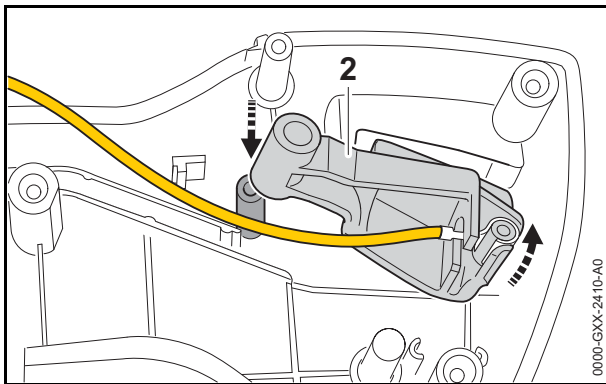
- Remove the control handle, 13.2.
- Take out the screws (10).

- Remove 'outer handle molding' (16).
- Remove the torsion spring (9).
- Take out the throttle trigger (7) together with the lever (8).
- Unhook the throttle cable (23).
- Remove the lockout lever (5) and torsion spring (4).
- Remove the torsion spring (4).
- Pull out the lever (2).
- Disconnect ground wire (23) and pull ground wire out of the 'inner handle molding' (1).
- Pull the contact spring (6) together with the short circuit wire out of the 'inner handle molding' (1).
- Pull the contact spring (6) off the short circuit wire.
- Remove short circuit wire, ground wire and throttle cable from the engine, 8.8.

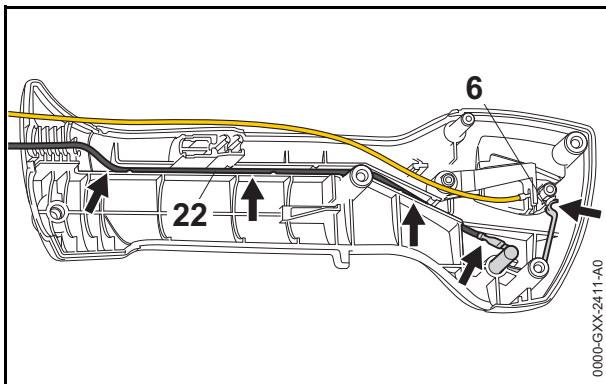
### 13.5 Assembling the Control Handle



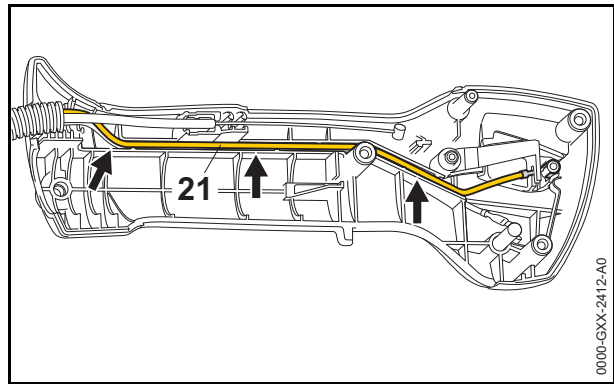
- Push the ground wire (21) terminal (21) onto the pivot of lever (2) and then rotate the ground wire (21) into the slot as far as stop.



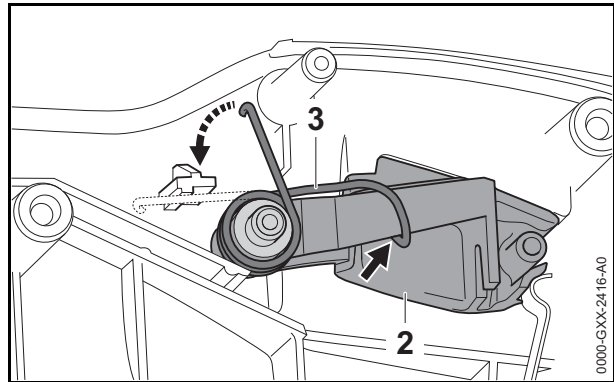
- Fit lever (2) on the pivot pin and rotate it into the recess.



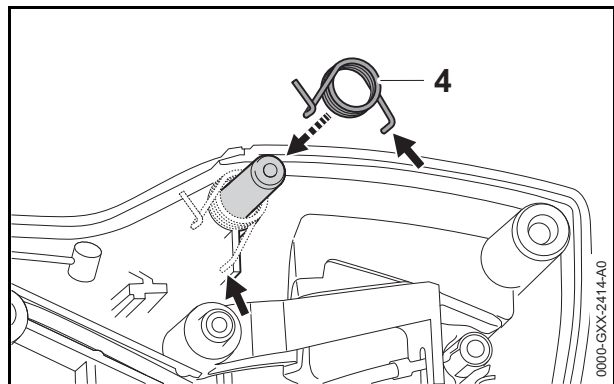
- Fit blade receptacle (1) of short circuit wire (22) on contact spring (6).
- Push the contact spring (6) in its guides.
- Starting at the contact spring, fit the short circuit wire in the guides (arrows).



- Starting at lever (2), press the ground wire (21) into its guides (arrows).

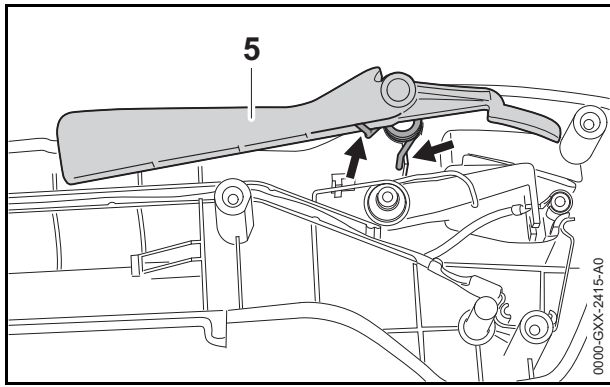


- Push the torsion spring (3) onto the pivot pin of lever (2) so that its hooked end engages the lever (arrow).
- Pre-tension the straight leg of torsion spring (3) and attach it to the stop (arrow).

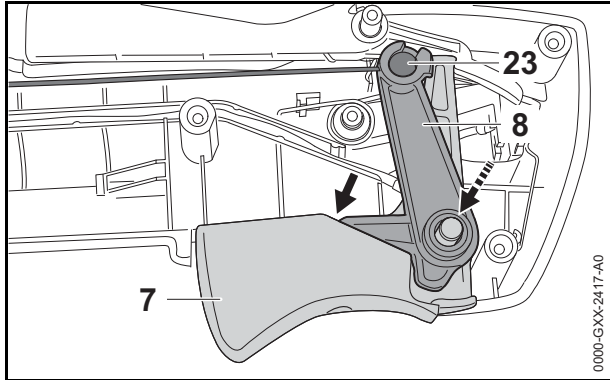


- Fit the torsion spring (4).

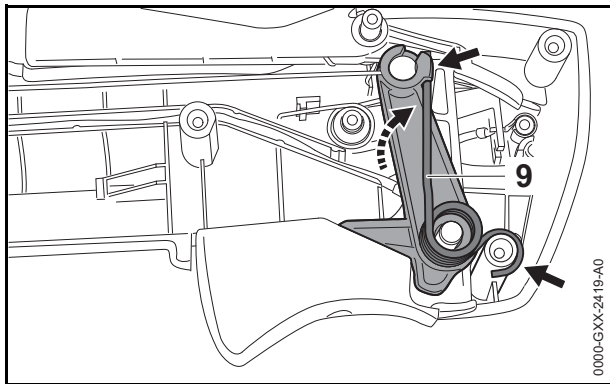




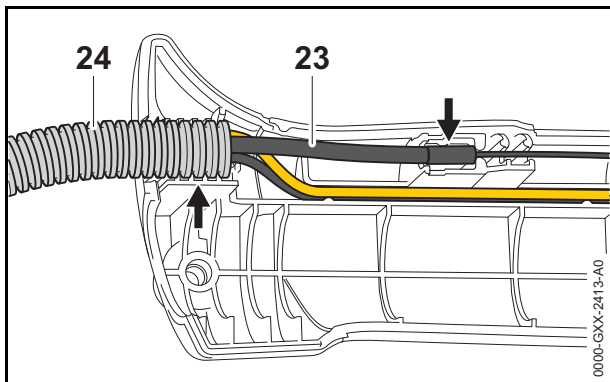
- Push lockout lever (5) into place and hook torsion spring (4) (arrow) to the lockout lever.



- Fit the lever (8) in the throttle trigger (7).
- Attach throttle cable (23) to lever (8).
- Depress the lockout lever (5) and push throttle trigger (7) with lever (8) onto the pin (13).



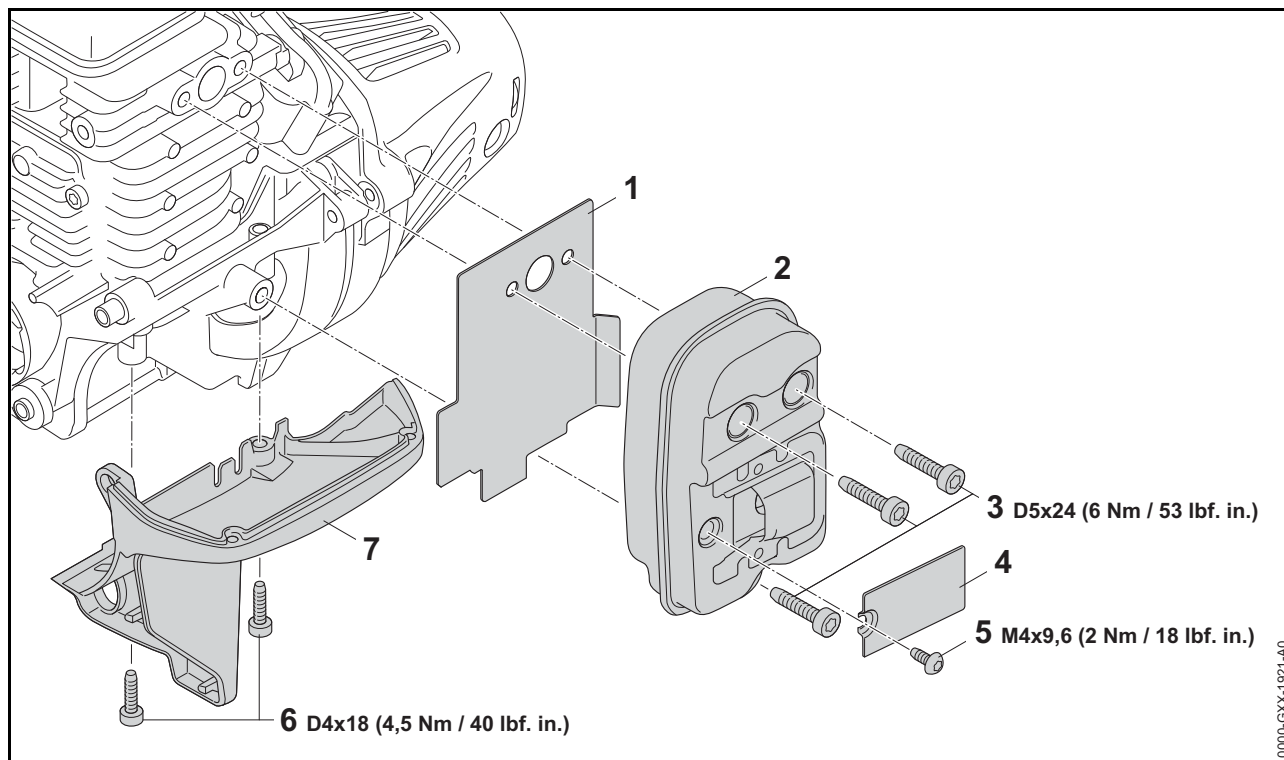
- Fit the torsion spring (9).



- Fit throttle cable (23) and hose (24) in the guides.

- Fit the 'outer handle molding' (16).
- Insert and tighten down the screws (10).
- Fit short circuit wire, ground wire and throttle cable on the engine, 8.11.
- Install the control handle, 13.3.

## 14 Muffler



### 14.1 Tools, Servicing Aids

- Socket, T20x125 – 0812 542 2041
- Socket, T27x125 – 0812 542 2104
- Torque wrench – 5910 890 0302
- Torque wrench – 5910 890 0312
- Screwdriver, T20 – 5910 890 2301
- Screwdriver, T27x200 – 5910 890 2415

### 14.2 Removing the Muffler

- Remove the shroud, 4.2.
- Remove the rewind starter, 5.1.
- Take out the screws (6) and remove the cover (7).
- Take out the screws (3) and remove the muffler (2).
- Remove the gasket (1).

### 14.3 Installing the Muffler

- Push the screws (3) into the muffler.
- Fit the gasket (1) on the screws (3).
- Position the muffler (2) with gasket (1) against the cylinder.
- Insert and tighten down the screws (3).
- Fit the cover (7) in position.
- Insert and tighten down the screws (6).

- Install the rewind starter, 5.7.
- Install the shroud, 4.5.

### 14.4 Removing the Spark Arresting Screen

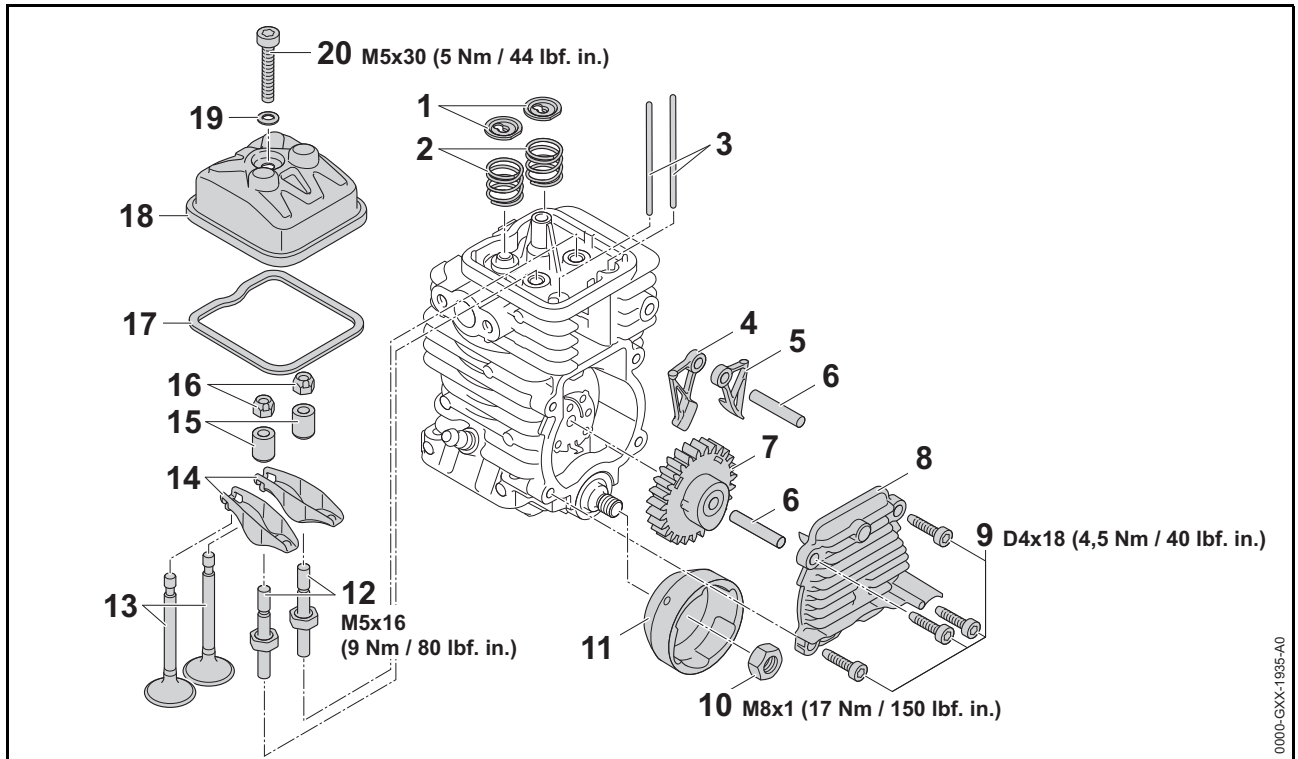
- Remove the shroud, 4.2.
- Take out the screw (5).
- Pull out the spark arresting screen (4).
- Clean the spark arresting screen (4) or replace it if damaged.

### 14.5 Installing the Spark Arresting Screen

- Push the spark arresting screen (4) into position.
- Insert and tighten down the screw (5).
- Install the shroud, 4.5.



## 15 Valve Gear



### 15.1 Tools, Servicing Aids

- Socket, T27x125 – 0812 542 2104
- Setting gauge – 4180 893 6400
- Locking screw – 4282 890 2700
- Torque wrench – 5910 890 0302
- Torque wrench – 5910 890 0312
- Screwdriver, T27x200 – 5910 890 2415
- Screwdriver, Q-SW 8x200 – 5910 890 2420
- Socket, 13 mm, long – 5910 893 2804
- Dirko HT red sealant – 0783 830 2000

### 15.2 Disassembling / Assembling Valve Gear

#### Removing rocker arm, pushrod

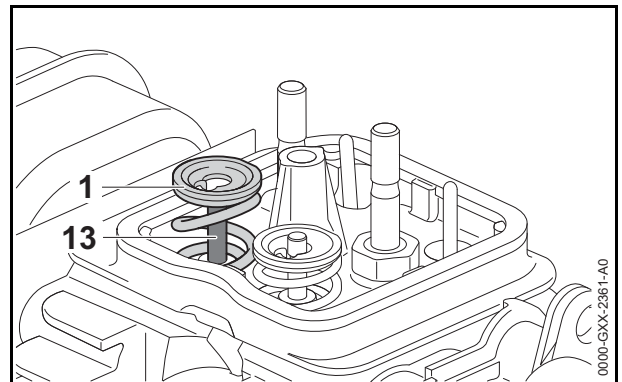
- Remove the shroud, [15.2](#).
- Clean area around valve cover (18).
- Take out the screw (20) and remove together with sealing ring (19), valve cover (18) and gasket (17).
- Unscrew and remove the nut (16).
- Remove the sleeve (15).
- Remove the rocker arm (14).
- Take out the pushrod (3).

#### Installing rocker arm, pushrod

- Fit the pushrod (3).
- Fit the rocker arm (14).

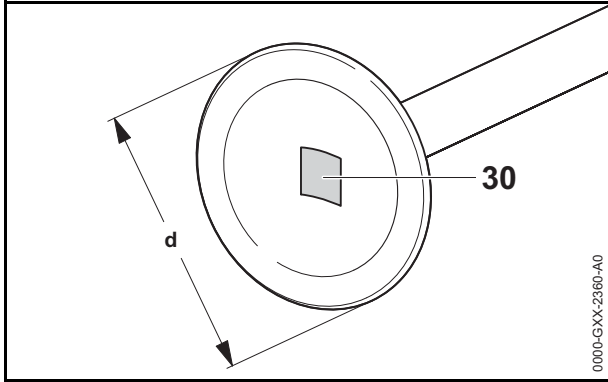
- Fit the sleeve (15).
- Screw nut (16) onto the collar screw (12).
- Adjust valve clearance, [15.3](#).
- Fit gasket (17) in the valve cover (18).
- Place valve cover (18) in position, fit screw (2) with new sealing ring (19) and tighten down.

#### Removing the valves



- Remove rocker arm and pushrod, [15.2](#).
- Remove the crankshaft, [16.9](#).
- Press the valve spring retainer (1) down and move it sideways until the valve stem is in the large hole.
- Remove the spring retainer (1) and valve spring (2).
- Pull the valve (13) out of the cylinder.

## Installing the valves



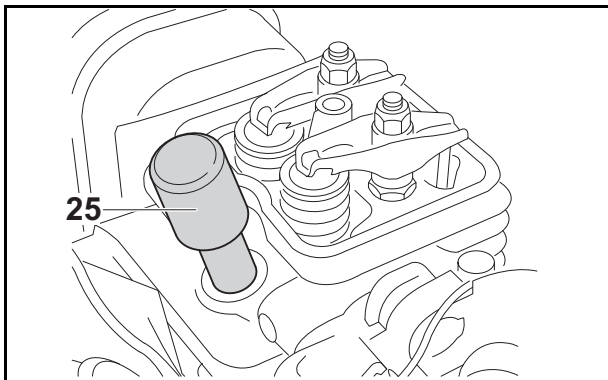
The inlet and exhaust valves are distinguished by the mark (30) on the valve head and the head diameter.

Factory installed inlet and exhaust valves are different. If a used valve is being installed, check whether it is an inlet or an exhaust valve. Only the exhaust valve is available as a replacement part – it can be used as either an inlet or exhaust valve.

- Marking Valve diameter 38 mm, 40 mm  
Standard part: Inlet "G", Exhaust "H"  
Replacement part: "H"
- Marking Valve diameter 43 mm  
Standard part: Inlet "L", Exhaust "M"  
Replacement part: "M"
- Insert valve (13) in bore in cylinder and hold it in position.
- Fit the spring retainer (1) and valve spring (2) on the valve stem, press the spring retainer down and move it sideways until the valve stem is in the small hole.
- Install the crankshaft, [16.9](#)
- Install rocker arm and pushrod, [15.2](#).

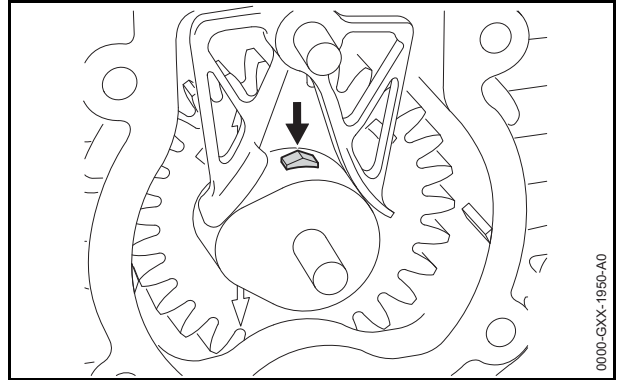
### Removing cam followers, cam gear

- Remove the shroud, [4.2](#).
- Remove the rewind starter, [5.2](#).
- Removing rocker arm, pushrod, [15.2](#).
- Pull boot off the spark plug.
- Unscrew the spark plug.



- Fit the locking screw 4282 890 2700 (25) in the spark plug hole.
- Turn the crankshaft counterclockwise until the piston butts against the locking screw (25).

- Unscrew the nut (10) and remove it together with the starter cup (11).
- Take out the screws (9).
- Pry off the cover (8) at the recesses.
- Pull out the pin (6).
- Remove the cam followers (4, 5).
- Remove the cam gear (7).

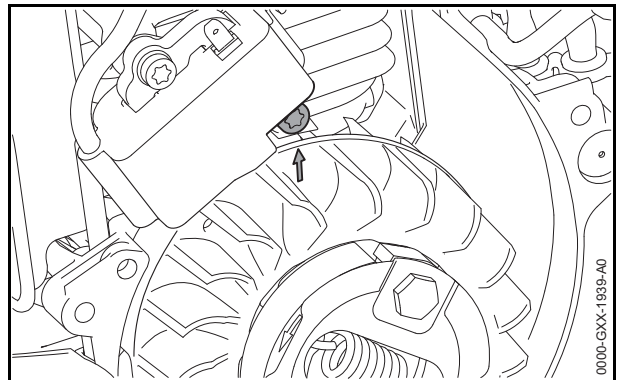


- Checking decompression system valve lifter:  
Valve lifter (arrow) must project about 2 mm from the cam.  
When the valve lifter is pressed counterclockwise, it must move freely and retract fully.

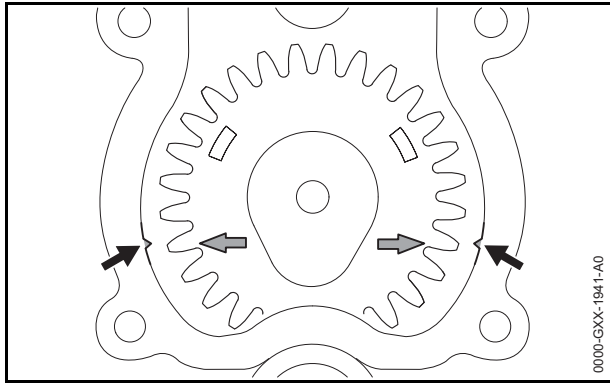
### Installing cam followers, cam gear, adjusting valve timing



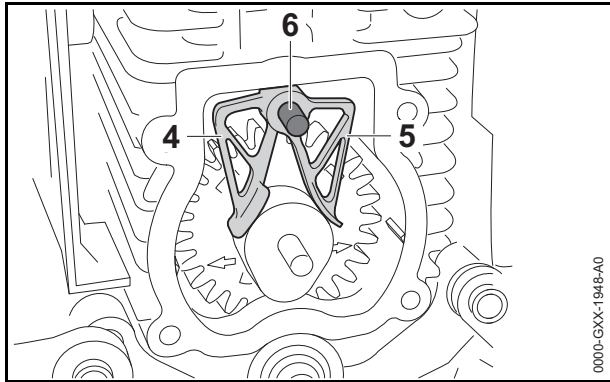
Interactive video "Assembling the Valve Gear"



- Rotate the crankshaft until the arrow on the front of the flywheel is in line with the right-hand screw on the ignition module (top dead center).



- Fit the cam gear (7) so that the arrows on it line up with the marks (arrows) in the cylinder.
- Fit the pin (6) in the cam gear's bore.



- Fit the pin (6).
- Fit the left cam follower (4) first, then the right cam follower (5).
- Apply Dirko sealant to groove in cover (8).
- Fit the cover (8).
- Insert and tighten down the screws (9).
- Install rocker arm, pushrod, 15.2.
- Fit the starter cup (11) and tighten down the nut (10).

### 15.3 Checking / Adjusting Valve Clearance



Interactive video "Adjusting Valve Clearance"

If engine is low on power or cranking effort is very high, check valve clearance.

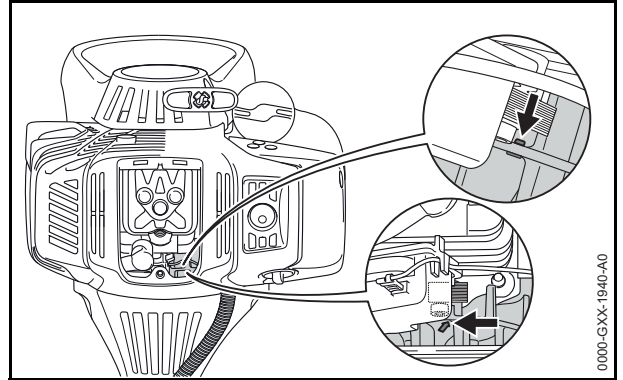
#### Setting engine to top dead center on power stroke

When the mark on the flywheel is in line with the right-hand screw on the ignition module, the setting is either TDC on power stroke or TDC on valve overlap.

The engine must be set to TDC on power stroke to check and adjust valve clearance.

Check or adjust valve clearance only when the engine is cold.

- Remove the cover, 4.2.
- Take out the screw (20) and remove together with sealing ring (19), valve cover (18) and gasket (17).
- Pull boot off the spark plug.
- Unscrew the spark plug.

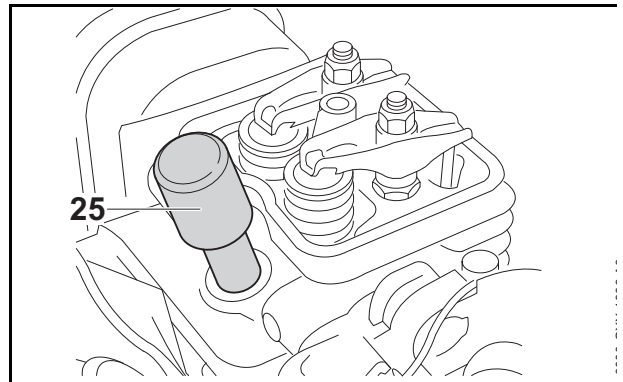


- Rotate the crankshaft until the mark (arrow) on the flywheel or the mark on the front of the flywheel (arrow) is in line with the right-hand screw on the ignition module (top dead center).

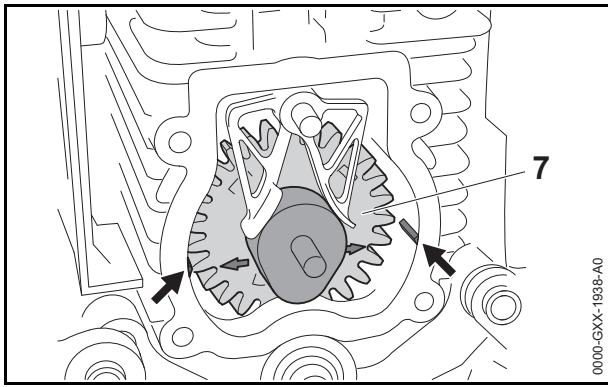
Observe the two rocker arms while rotating the flywheel up to the mark. The valves must not be operated, the rocker arms must move freely (TDC on power stroke).

If the valves are operated and the rocker arms cannot be moved, carry out the following steps to obtain TDC on the power stroke:

- Remove the shroud, 4.2.
- Remove the rewind starter, 5.1.



- Fit the locking screw 4282 890 2700 (25).
- Turn the crankshaft counterclockwise until the piston butts against the locking screw (25).
- Unscrew the nut (10) and remove it together with the starter cup (11).
- Remove the locking screw 4282 890 2700 (25).
- Take out the screws (9).
- Pry off the cover (8) at the recesses.

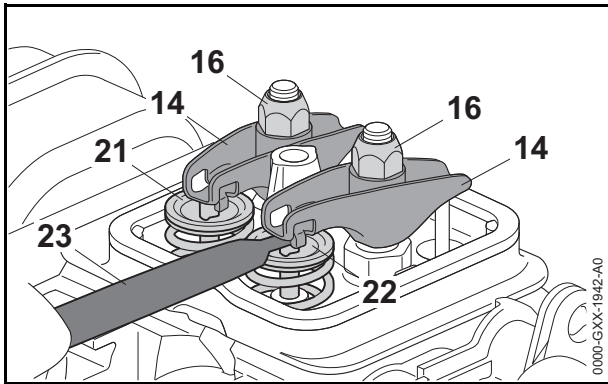


- Rotate the crankshaft clockwise until the cam lobe points downwards.
- Check that mark on flywheel lines up with the right-hand screw on the ignition module.

The two arrows on the cam gear (8) must line up with the two notches in the cylinder.

- Fit the cover (8) before adjusting the valves.

### Checking, adjusting valve clearance



- Insert feeler gauge 4180 893 6400 (23) between rocker arm (14) and valve stem (21).

The feeler gauge must slip through with a certain resistance.


- Adjust valve clearance with the two nuts (16):

Inlet valve = 0.10 +/- 0.02 mm

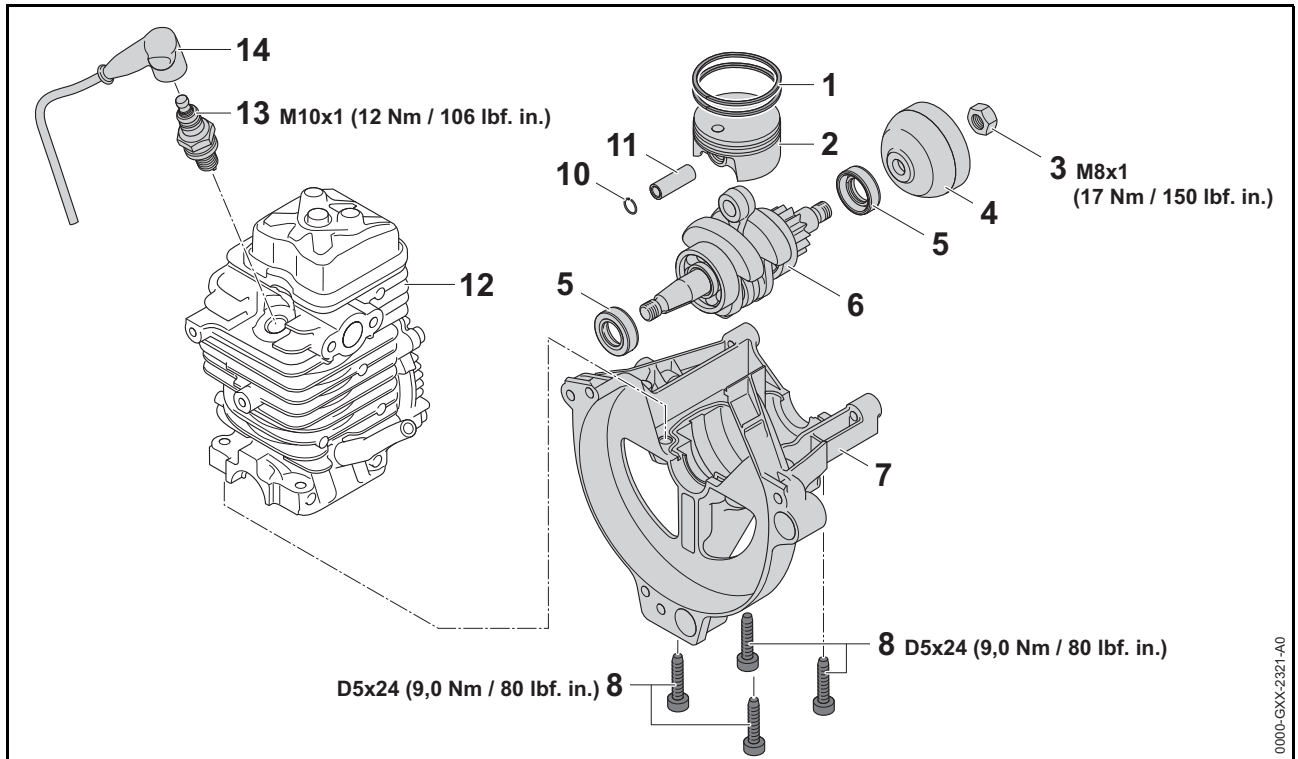
Exhaust valve = 0.10 +/- 0.02 mm

To increase valve clearance: Turn nut counterclockwise.

To reduce valve clearance: Turn nut clockwise.

- Rotate crankshaft several times and then check valve clearance again.
- Apply Dirko sealant to groove in cover (8).
- Fit the cover (8).
- Insert and tighten down the screws (9).
- Fit gasket (17) in the valve cover (18).
- Place valve cover (18) in position, fit screw (20) with new sealing ring (19) and tighten down.
- Fit the starter cup (11) and tighten down the nut (10).
- Insert and tighten down the spark plug.
- Fit the spark plug boot.
- Install the shroud,  4.3.

## 16 Powerhead



### 16.1 Special Servicing Tools, Servicing Aids

- Pump – 0000 850 1300
- Sealing plate – 0000 855 8106
- Jaws (profile No. 3.1) – 0000 893 3706
- Socket, T27x125 – 0812 542 2104
- Assembly drift – 1108 893 4700
- Assembly drift – 1110 893 4700
- Assembly drift – 1114 893 4700
- Press sleeve – 4112 893 2401
- Retainer – 4180 890 8600
- Locking screw – 4282 890 2700
- Leakage tester – 5910 850 0300
- Compression tester – 5910 850 2000
- Flange – 5910 850 4200
- Torque wrench – 5910 890 0302
- Installing tool 8 – 5910 890 2208
- Installing tool 9 – 5910 890 2209
- Screwdriver, T27x200 – 5910 890 2415
- Puller – 5910 890 4400
- STIHL multipurpose grease – 0781 120 1110
- Dirko HT red sealant – 0783 830 2000
- Standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons

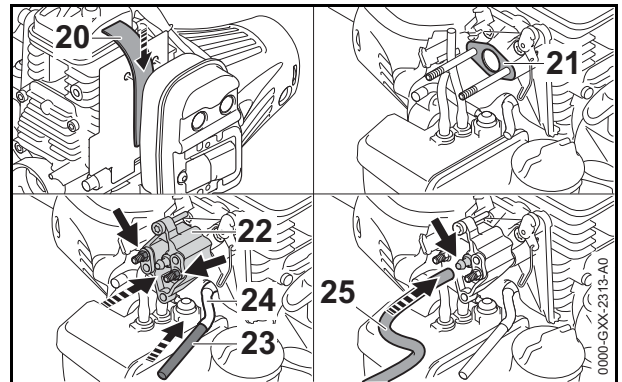
### 16.2 Testing Engine for Leaks



Interactive video "Engine Leakage Test"

#### Preparations

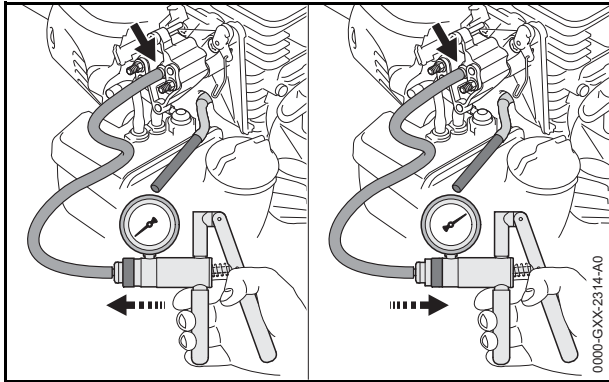
- Remove the shroud, 4.2.
- Remove filter housing and carburetor, 10.2.



- Loosen the muffer screws, 14.2
- Slide the sealing plate 0000 855 8106 (20) between the exhaust port and muffler so that it completely fills the space between the two upper screws on the muffler.
- Tighten down the muffer screws.
- Push the gasket (21) onto the spacer flange.



- Insert assembly drift 1108 893 4700 (23) in the impulse hose (24).
- Push on the test flange 5910 850 4200 (22) and secure it with the filter housing mounting nuts.
- Connect hose of pump 0000 850 1300 (24) to the nipple on the test flange.



### Vacuum Test

- Push the ring on pump 0000 850 1300 (23) to the left (vacuum).
- Operate the pump 0000 850 1300 until gauge indicates a vacuum of 0.5 bar (7.25 psi).

If the pressure reading does not drop any further than 0.3 bar (4.35 psi) within 20 seconds, the oil seals (5) are in good condition.

### Pressure Test

- Push the ring on pump (25) 0000 850 1300 to the right (over-pressure).
- Operate the pump (25) 0000 850 1300 until pressure of 0.5 bar (7.25 psi) is indicated.

If the pressure reading does not drop any further than 0.3 bar (4.35 psi) within 20 seconds, the engine is airtight.

To find a leak, coat the suspect area with soapy water and repeat the pressure test. Bubbles will appear to show the position of the leak.

After finishing the test:

- Disconnect hose of pump 0000 850 1300 from the test flange 5910 850 4200.
- Unscrew the nuts and remove the test flange 5910 850 4200.
- Loosen the screws on the muffler and pull out the sealing plate 0000 855 8106 (20).
- Tighten down the muffler screws.
- Install the carburetor, filter housing, air filter and filter cover, 10.2.
- Install the shroud, 4.5.

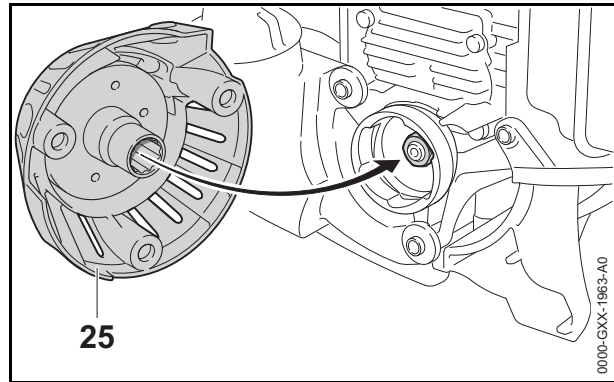
## 16.3 Performing Pressure Loss Test



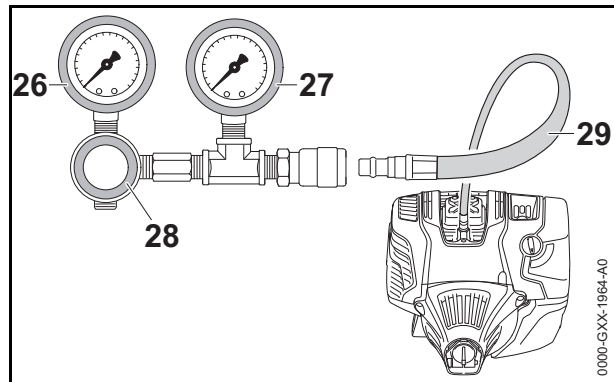
Interactive video "Pressure Loss Test"

If there is a loss of engine power, the cause may be carbon deposits or combustion residue. They accumulate primarily on valve seats and valve heads. The combustion chamber is cannot be sealed properly in such a case. The combustion chamber has to be decoked.

The piston must be set to top dead center on the power stroke for the pressure loss test. Only in this position are the inlet and exhaust valves both closed, and no pressure can be lost if the engine is in order.



- Remove the cover, 4.3.
- Remove the rewind starter, 5.2.
- Set the piston to top dead center on the power stroke, 15.3.
- To block the crankshaft, fit the retainer (25).
- Pull boot off the spark plug.
- Unscrew the spark plug.



- Screw hose (29) of leakage tester 5910 850 0300 into spark plug hole.
- Close valve (28) on leakage tester (rotate counterclockwise as far as stop). This prevents the engine from being suddenly pressurized.
- Connect leakage tester to compressed air supply (6-8 bar).
- Slowly open the leakage tester's valve (28) clockwise until the needle of the left-hand pressure gauge (26) is in the red range (vertical). The needle on the right-hand pressure gauge (27) must be on zero.
- Connect the hose (29) to the leakage tester.

If the right-hand pressure gauge (27) shows a value greater than 10%, the combustion chamber is leaking.

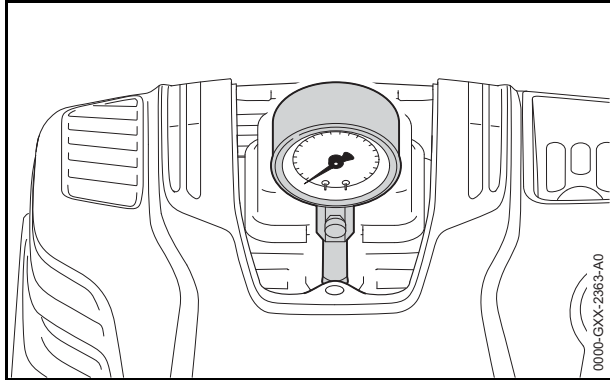
If air is escaping at the cylinder inlet/exhaust ports or around the pushrods, the cause may be:

- Carbon deposits on inlet/exhaust valve
- Worn piston rings
- Seized piston

## 16.4 Testing Compression Pressure



Interactive video "Testing Compression Pressure"



- Remove the cover, [4.3](#).
- Pull boot (14) off the spark plug.
- Unscrew the spark plug (13).
- Screw the compression tester 5910 850 2000 (25) into the spark plug hole.
- Pull rewind starter firmly and quickly several times.
- Read compression pressure on pressure gauge.

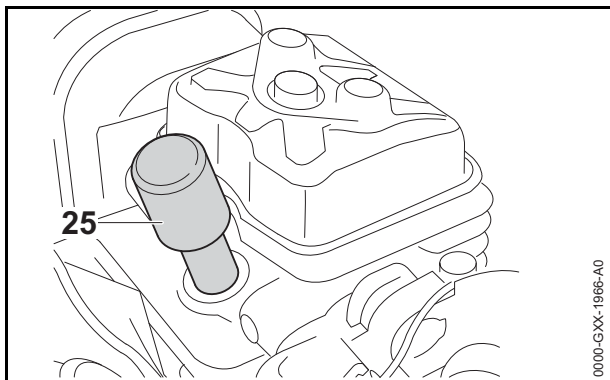
Specification: 6 – 7 bar

If compression pressure is less than 6 bar, check valve clearance, [15.3](#).

If valve clearance is correct, check cylinder, piston and piston rings for scores and damage.

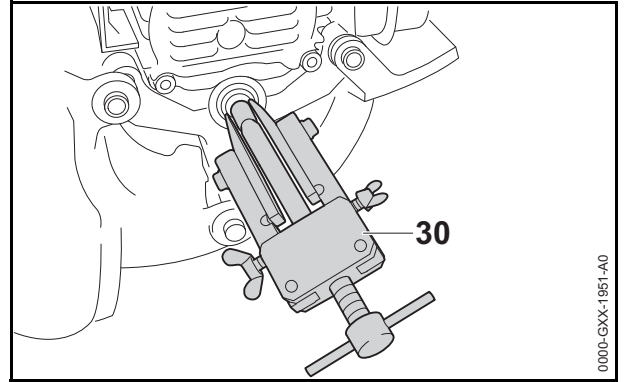
## 16.5 Installing New Oil Seals at Starter Side

- Remove the shroud, [4.2](#).
- Remove the rewind starter, [5.2](#).

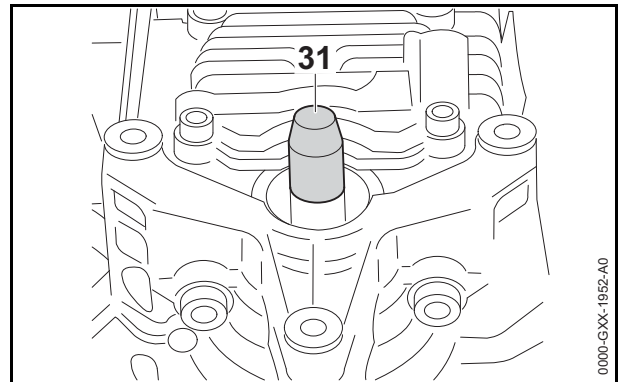


- Fit the locking screw 4282 890 2700 (25).

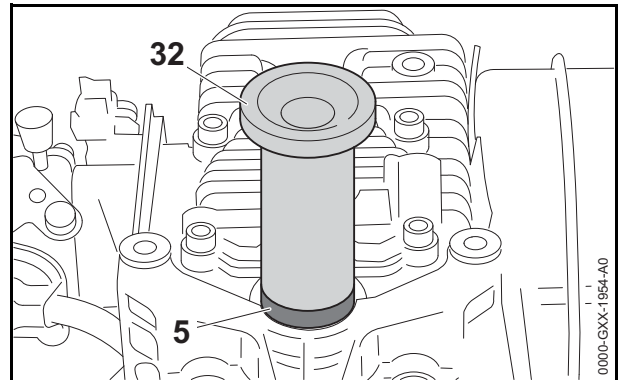
- Turn the crankshaft counterclockwise until the piston butts against the locking screw.
- Unscrew the nut (3) and remove the starter cup (4).



- Apply puller 5910 890 4400 (1) with No. 3.1 jaws to oil seal (5) and clamp the arms.
- Pull out the oil seal (5).



- Push the installing sleeve 4112 893 2400 onto the crankshaft.



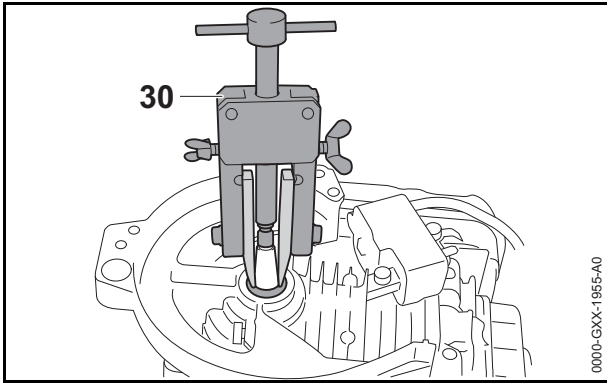
- Lubricate lips of oil seal (5) with multipurpose grease.
- Push on the oil seal (5) with its open side facing the crankcase.
- Use press sleeve 1115 893 4600 (32) to install the oil seal (5).

## 16.6 Installing New Oil Seals at Flywheel Side

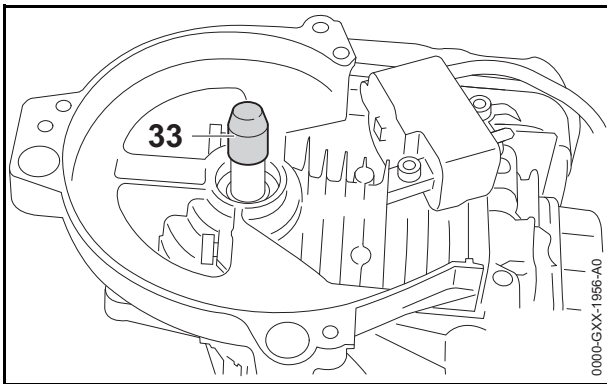
- Remove the shroud, [4.2](#).
- Remove the fan housing, [7.1](#).



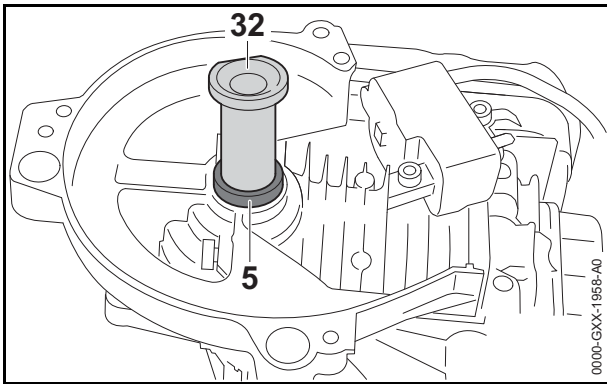
- Remove the clutch, 9.2.
- Remove the flywheel, 8.2.



- Apply puller 5910 890 4400 (1) with No. 3.1 jaws to oil seal (5) and clamp the arms.
- Pull out the oil seal (5).



- Push the installing sleeve 4112 893 2400 (33) onto the crankshaft.



- Lubricate lips of oil seal (5) with multipurpose grease.
- Push on the oil seal (5) with its open side facing the crankcase.
- Use press sleeve 4112 893 2401 (32) to install the oil seal (5).

### 16.7 Removing the Engine

- Remove the shroud, 4.2.
- Remove the rewind starter, 5.2.
- Remove the muffler, 14.2.
- Remove the intake system, 10.2.

- Remove the fan housing, 7.1.
- Remove ground wire, short-circuit wire and throttle cable from the engine, 8.8.
- Remove the fuel tank, 6.8
- Remove the clutch, 9.2.
- Remove the flywheel, 8.2.
- Remove the ignition module, 8.6
- Remove the starter cup (4).
- Disassemble the engine if necessary, 16.9.

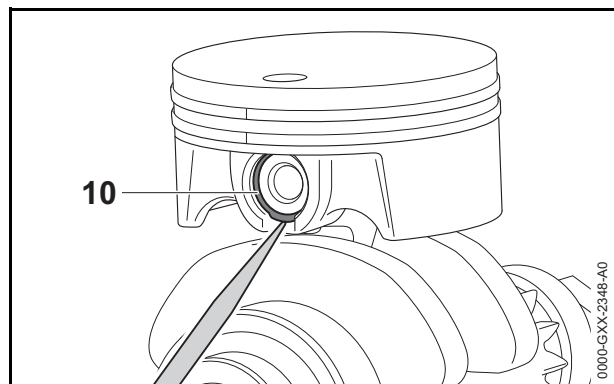
### 16.8 Installing the Engine

- Assemble the engine, 16.9.
- Install the muffler, 14.2.
- Install the starter cup (4).
- Install the fuel tank, 14.2.
- Install the flywheel, 8.3.
- Install the ignition module, 8.7
- Adjust valve timing, 15.2
- Install the clutch, 9.5.
- Assemble the intake system, 10.2.
- Fit ground wire, short-circuit wire and throttle cable on the engine, 8.11.
- Install the fan housing, 7.3
- Install the shroud, 4.5.

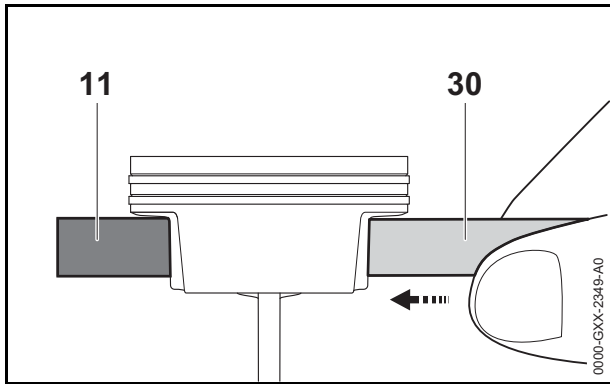
### 16.9 Disassembling the Engine

Valve timing gets out of adjustment when the crankshaft is removed, 15.2.

- Unscrew the screws (8) and remove them together with the engine pan (7).
- Pull out the crankshaft (6) together with the piston (2).
- Remove the oil seals (5).

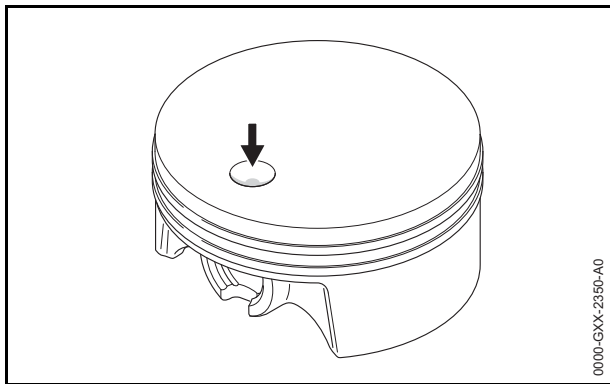


- Ease snap ring (10) out of groove at recess.

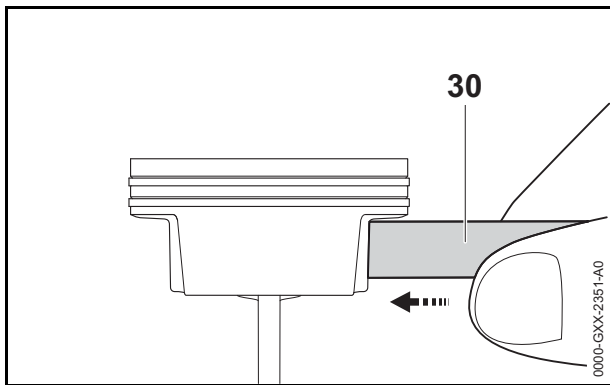


- Apply assembly drift 1110 893 4700 to other side of piston (1) and push out the piston pin (11).
- Lift away the piston (2).

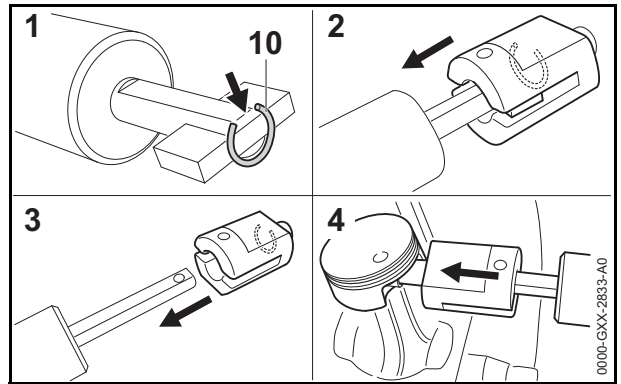
### 16.10 Assembling the Engine



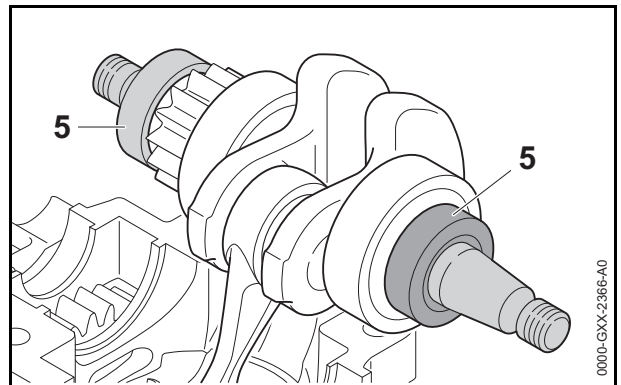
- Fit piston rings (1) on piston (2) so that their gaps are offset 120 degrees.
- Coat plain bearing in connecting rod with oil.
- Fit piston (2) on the connecting rod so that the indentation (arrow) in the piston crown faces the spark plug.



- Insert the assembly drift 1114 893 4700 (30), small diameter first, in the piston boss and align the piston (2).
- Fit the piston pin (11) on the assembly drift 1114 893 4700 (30). Slide the assembly drift 1114 893 4700 (30) with the piston pin into the piston (2).



- Use installing tool 8 – 5910 890 2208 (8mm piston pin) or installing tool 9 – 5910 890 2209 (9mm piston pin) to fit the snap ring (10) in the piston (2). The gap in the snap ring (10) must face either up or down.



- Push the oil seals (5) onto the crankshaft (6), making sure that their closed sides face outwards.
- Coat piston (2), piston ring (1) and inside of cylinder (12) with oil.
- Fit the piston (2) with crankshaft (6) in the cylinder so that the indentation in the piston crown faces the spark plug.
- Coat sealing face on engine pan (7) with Dirko sealant.
- Place the engine pan (7) on the cylinder (12).
- Insert and tighten down the screws (8) alternately in crosswise pattern.
- Install the powerhead, 16.7.

## 17 Tools, Servicing Aids

### 17.1 Tools

Part No.	Part Name	Application
0000 850 1300	Pump	Testing crankcase and tank vent for leaks
0000 855 8106	Sealing plate	Sealing exhaust port
0000 855 9200	Nipple	For pump
0000 890 2305	Screwdriver	Disconnecting throttle rod
0000 893 3706	Jaws (No. 3.1)	Removing oil seals
0000 893 3707	Jaws (No. 9)	Removing AV rubber element
0812 542 2104	Socket bit, T27x125	Removing and installing spline socket screws with electric or pneumatic screwdrivers; tightening down screws with torque wrench
0816 610 1495	Pliers, A10 flat	Removing and installing retaining ring
1108 893 4700	Assembly drift	Sealing impulse hose for engine leakage test
1110 141 8600	Hose, 135 mm	Testing carburetor for leaks
1110 893 4700	Assembly drift	Removing piston pin
1114 893 4700	Assembly drift	Installing piston pin
1120 893 2400	Sleeve	Removing clutch drum
4112 893 2401	Press sleeve	Installing oil seal
4118 890 6401	Setting gauge	Setting air gap for ignition
4119 890 4501	Puller	Removing the Flywheel
4119 893 2400	Press sleeve	Installing clamp and rubber element
4180 890 8600	Retainer	Blocking crankshaft for leakage test
4180 893 4400	Extension	Removing and installing clutch drum
4180 893 6400	Setting gauge	Adjusting valve clearance
4282 890 2700	Locking screw	Blocking the crankshaft
5910 850 0300	Leakage tester	Testing pressure loss
5910 850 2000	Compression tester	Testing valves and piston rings for leaks
5910 850 4200	Flange	Testing engine for leaks
5910 850 4503	Ignition system tester, ZAT 4	Testing the ignition system
5910 850 4520	Ignition system tester, ZAT 3	Testing the ignition system
5910 890 0302	Torque wrench with optical/acoustic signal	1 to 18 Nm
5910 890 0312	Torque wrench with optical/acoustic signal	10 to 80 Nm
5910 890 2204	Installing tool	Installing rope guide bushing
5910 890 2208	Installing tool 8	Snap ring, 8 mm diameter piston pin
5910 890 2209	Installing tool 9	Snap ring, 9 mm diameter piston pin
5910 890 2301	Screwdriver, T20	Star socket screws, installing and removing
5910 890 2307	Screwdriver	Disassembling the carburetor
5910 890 2308	Screwdriver, T10	Star socket screws, installing and removing
5910 890 2310	Screwdriver, T8	Star socket screws, installing and removing
5910 890 2415	Screwdriver, T27x200	Star socket screws, installing and removing
5910 890 2420	Screwdriver, Q-SW 8-200	Removing filter housing
5910 890 3101	Assembly stand	Holding powerhead
5910 890 4000	Punch-down tool	Installing short circuit and ground wires
5910 890 4400	Puller	Removing oil seals and AV rubber element
5910 893 2804	Socket, 13 mm, long	Removing and installing flywheel and starter cup
5910 893 7005	Ring	Removing clutch drum
5910 893 8800	Hook	Removing and installing pickup body
0781 120 1110	STIHL multipurpose grease, 225 g tube	Lubricating contact springs in loop handle
0781 957 9000	STIHL OH 723 press fluid, 50 ml bottle	Installing hoses and AV rubber element
0783 830 2000	Dirko HT red sealant, 70 ml tube	Sealing engine pan



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