New STIHL MS 251 Chain saw – Series 1143

Contents
1. Technical Description
2. Specifications
3. Servicing Accessories and Special Tools
4. Repairs
The new MS 251 features an innovative engine concept and filter system that provides high power and good fuel efficiency. It is ideal for cutting firewood, felling and tending stands as well as woodworking projects. This saw is the perfect tool for farmers, horticulturists, landscapers, craftsmen and occasional users.

The strengths:
- modern, reduced emission two-cycle engine with less fuel consumption – complies with EPA III emission standard
- high torque over a broad rpm range
- air filter system with pre-separation for longer life
- good control and good straight-line stability, low vibration level
- service friendly with one-piece shroud secured by three screws and air filter with bayonet lock

The following version is available in addition to the standard MS 251:
- MS 251C-BE with quick chain adjuster, Easy2Start™ and manual fuel primer pump.

1. Technical Description

1.1 Two-cycle engine

The STIHL two-cycle reduced emission engine technology has been implemented in the new saws without an additional clean air port, without an air valve and without a double manifold.

Method of Operation

The baffle divides the intake air into two streams. In the carburetor there are partitions (1) between the choke and throttle shutters and in the direction of the manifold which separate the fresh mixture and air paths at full throttle.

The space required by the carburetor and intake manifold is almost the same as for a conventional two-cycle engine without stratified scavenging.
1.2 Air filter system with pre-separation

The intake air is rotated, causing larger and heavier airborne particles (black arrows) to be separated outwards. Pre-cleaned air (gray arrows) flows via the pre-separator channel to the air filter.

The air filter system can be adapted to suit different operating conditions by installing different filter elements. Changing a filter is accomplished quickly and easily.

1.2.1 Fleece filter (standard equipment)
For normal operating conditions and dry work areas.

1.2.2 HD2 filter (option)
For extreme wintry conditions (e.g. powder or drifting snow) or very dusty work areas.

This oil and water repellent professional HD2 fine dust filter retains its properties even after a large number of cleaning cycles.

1.2.3 Cleaning the air filter
- Remove the shroud and clean away loose dirt from around the filter.
- Lightly knock out the filter. Do not use compressed air to clean the standard fleece air filter. The optional HD2 air filter can be cleaned using compressed air blowing from the inside outwards.
- In case of stubborn dirt or sticky filter fabric:
  - Wash the filter in a clean, non-flammable solution (e.g. warm soapy water). Rinse the filter from the inside outwards under a jet of water – do not use a pressure washer.
  - Dry all parts of the filter – do not use extreme heat or compressed air.

- Place the air filter in position.
- Push the air filter in the direction of the filter housing and turn it clockwise at the same time until it engages – the filter is correctly installed when the name "STIHL" is in a horizontal position.
- Install the shroud.
1.3 Antivibration system

The new antivibration system consists of special springs (1) and stop buffers (2).

1.4 Shroud

One-piece shroud (2) secured with three screws (1) for quick and easy access to the air filter and cylinder – very service and user friendly.

2. Specifications

2.1 Engine

STIHL single cylinder two-cycle engine

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement:</td>
<td>2.78 cu.in (45.6 cm³)</td>
</tr>
<tr>
<td>Bore:</td>
<td>1.7 in (44 mm)</td>
</tr>
<tr>
<td>Stroke:</td>
<td>1.18 in (30 mm)</td>
</tr>
<tr>
<td>Engine power to ISO 7293:</td>
<td>2.9 bhp (2.2 kW) at 9,500 rpm</td>
</tr>
<tr>
<td>Torque:</td>
<td>1.84 lbf. ft (2.5 Nm) at 6,500 rpm</td>
</tr>
<tr>
<td>Idle speed:</td>
<td>2,800 rpm</td>
</tr>
<tr>
<td>Max. permissible engine speed with bar and chain:</td>
<td>13,000 rpm</td>
</tr>
</tbody>
</table>

2.2 Weight

Weight (dry, without bar and chain):

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight (dry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS 251</td>
<td>10.8 lbs (4.9 kg)</td>
</tr>
<tr>
<td>MS 251 C-BE</td>
<td>11.4 lbs (5.2 kg)</td>
</tr>
</tbody>
</table>

2.3 Ignition System

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignition module:</td>
<td>Electronically controlled with ignition timing</td>
</tr>
<tr>
<td>Spark plug (resistor type):</td>
<td>NGK CMR6H</td>
</tr>
<tr>
<td>Electrode gap:</td>
<td>0.020 in (0.5 mm)</td>
</tr>
</tbody>
</table>
2.4 Fuel System
Carburetor
All position diaphragm carburetor with integral fuel pump

Standard setting with limiter caps seated on high speed and low speed screws
Low speed screw L: Open 1/4 turn
High speed screw H: Open 3/4 turn (no further than stop)

Basic setting without limiter caps seated on high speed and low speed screws (in service shop)
Low speed screw L: Open 1 full turn
High speed screw H: Open 1 1/2 turns

Fuel mixture
See instruction manual.
Fuel tank capacity: 13.2 fl.oz (0.39 L)

2.5 Chain Lubrication
Oil pump: Fully automatic, speed-controlled oil pump
Oil tank capacity: 6.7 fl.oz (0.2 L)

2.6 Cutting Attachment

2.6.1 Guide Bars
Reduced kickback STIHL guide bars (with green label)

STIHL ROLLOMATIC® E .325" guide bars
Cutting lengths: 14, 16, 18 in (35, 40, 45 cm)
Groove width: 0.063 in (1.6 mm)
Nose sprocket: 11-tooth

STIHL ROLLOMATIC® E 3/8" P guide bars
Cutting lengths: 12, 14, 16, 18 in (30, 35, 40, 45 cm)
Groove width: 0.050 in (1.3 mm)
Nose sprocket: 9-tooth

2.6.2 OILOMATIC® STIHL Saw Chain
Reduced kickback STIHL saw chains (with green label)

.325" saw chains
STIHL RAPID™ Micro™ 3 (26 RM3)
STIHL RAPID™ Duro™ 3 (26 RD3)
Pitch: .325" (8.25 mm)
Drive link gauge: 0.063 in (1.6 mm)

3/8" P chain
STIHL PICCO™ Micro™ 3 (63 PM3)
STIHL PICCO™ Super™ 3 (63 PS3)
STIHL PICCO™ Duro™ 3 (63 PD3)
Pitch: 3/8" P (9.32 mm)
Drive link gauge: 0.050 in (1.3 mm)

2.6.3 Chain sprocket
7-tooth for .325"
6-tooth for 3/8" P
3. **Servicing Accessories and Special Tools**

3.1 **Modification**

The previous flange 4224 893 2501 has been replaced by the new version 5910 855 4201.

An existing flange 4224 893 2501 without the middle hole can be updated as shown in the following drawing.

![Diagram of flange modification](image)

3.2 **Servicing Accessories**

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Part No.</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carburetor parts kit</td>
<td>1143 007 1700</td>
<td>Servicing the carburetor</td>
</tr>
<tr>
<td>Lubricating grease (225 g</td>
<td>0781 120 1111</td>
<td>Oil seals, oil pump drive, sprocket bearing, chain tensioner bearing and sliding points of throttle, brake and lockout levers</td>
</tr>
<tr>
<td>Tube)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dirko sealant</td>
<td>0783 830 2000</td>
<td>Engine pan/cylinder</td>
</tr>
</tbody>
</table>

4. Repairs

Do not run the chain saw without the shroud installed – there is otherwise a risk of injury from the fanwheel and a risk of engine damage due to overheating.

4.1 Service Manual

A service manual is available for the new STIHL MS 251 chain saw.

4.2 Spare Parts

Spare parts documentation is available for the new STIHL MS 251 chain saw.

4.3 Wiring

4.3.1 Spark Plug Boot

- Fit the spark plug boot. It must not butt against the air baffle.

4.3.2 Wiring Harness

Ground and short circuit wires

The yellow ground wire is light gray in the following illustrations. The black short circuit wire is black in the following illustrations.

- To replace the wiring harness (ground and short circuit wires), first remove the carburetor as described in the service manual.

- Position the ground wire (1) and short circuit wire (2) in the ribbed guide (3); the marks on the wires must line up with the edge of the ribbed guide.

- Push the grommet (4) into the housing recess.

- Position the wiring harness (ground and short circuit wires) in the ribbed guide (5).

The wiring harness (ground and short circuit wires) must not be moved once it has been fitted in position.
- Place the short circuit wire (2) on top of the ground wire (1) in the guide (6).

- Push the flat receptacle (7) of short circuit wire (2) into the switch shaft (8).
- Fit the short circuit wire in the guide (9).
- Install the carburetor and the filter base as described in the service manual.

- Insert the flat receptacle (10) of the ground wire (1) as far as stop.

**Connecting the Ignition Module**

- Fit the ground wire (1) and short circuit wire (2) in the retainer (11) – make sure the wires between the grommet (4) and retainer (11) are not under tension.

- Secure cable lug (12) of ground wire (1) with screw – the cable lug must be positioned within the area marked in the illustration.
4.4 Installing the Fuel Hoses

Fuel hose 1143 937 5000

- Short mark (A) on end of hose – connects to elbow connector on tank housing.
- Mark (B) – for positioning on grommet on air baffle.
- Long mark (C) on end of hose – connects to carburetor.

4.4.1 Models without quick chain adjuster (QCA) and Easy2Start™ (CBE)

- Remove the carburetor, carburetor carrier and tank housing as described in the service manual.

- Push fuel hose (1) 1143 937 5000, short mark (A) facing up, onto the tank housing elbow connector (2) as far as stop.

- Insert the fuel hose (1) upwards through the grommet (3) in the air baffle.
- Line up mark (B) on fuel hose with the mark (D) on the air baffle.
- Pull the fuel hose through until the long part of the mark (B) is fully visible. The black space between the long and short marks may be just visible, but not the short mark.
4.4.2 Models with quick chain adjuster (QCA) and Easy2Start™ (CBE)

Fuel hose 1143 358 7731

- Install the carburetor (4) on the carburetor carrier.
- Push fuel hose (1), long mark (C) facing up, onto the carburetor’s elbow connector (5) as far as the stop.

- Push end of fuel hose (3) 1143 358 7731 closest to mark (E), with mark facing up, onto the tank housing elbow connector (4) as far as stop.
- Push fuel hose (1) 1143 937 5000, short mark (A) facing up, onto the tank housing elbow connector (2) as far as stop.

- Insert the fuel hose (1) upwards through the grommet (5) in the air baffle.
- Line up mark (B) on fuel hose with the mark (D) on the air baffle.
- Pull the fuel hose (1) through until the long part of the mark (B) is fully visible. The black space between the long and short marks may be just visible, but not the short mark.

- Pass the fuel hose (3) upwards through the grommet (6) in the air baffle.
- Pull the fuel hose (3) through until the mark (E) is flush with the grommet. If there is no mark, pull the fuel hose (3) through so that it projects 118 mm from the grommet.
- Connect fuel hose (3) to manual fuel pump.

- Remove the carburetor, carburetor carrier and tank housing as described in the service manual.
Install the carburetor.
Push fuel hose (1), long mark (C) facing up, onto the carburetor's elbow connector (9) as far as the stop.

4.5 Carburetor
The carburetor on this saw only allows the settings of the adjusting screws within fine limits.
If the setting is too lean there is a risk of engine damage due to insufficient lubrication and overheating.

4.5.1 During break-in period
The engine reaches maximum speed and develops its maximum power after about 5 to 15 tank fillings. For this reason do not correct the maximum speed (high speed screw H) during the break-in period.

4.5.2 Removing limiter caps
The limiter caps must be removed to replace a damaged adjusting screw or to clean the carburetor.
Do not re-install used limiter caps because they are damaged during the removal process.

- Screw the puller 5910 890 4502 (special tool) about five turns counterclockwise (left-hand thread) into the limiter cap.

- Check position of the limiter cap – the limiter cap's lug must be visible through the slot in the carburetor body.
- Pull off the limiter cap.

Pre-installing the limiter caps

- Fit new limiter caps in the bores as shown in the illustration – check correct position of the lugs. Push the limiter caps onto the adjusting screws to the first detent.
- Install the carburetor and continue with "Basic setting with pre-installed limiter caps".

4.5.3 Basic setting with pre-installed limiter caps
The basic setting must be carried out on the carburetor after servicing work or replacing the adjusting screws.
- Check the air filter and clean or replace if necessary.
- Check the spark arresting screen in the muffler and clean or replace if necessary.
- Carry out basic setting on the adjusting screws. Starting with screws gently against their seats, adjust counterclockwise.

Basic setting:
Low speed screw L: Open 1 full turn
High speed screw H: Open 1 1/2 turns

- Pre-install limiter caps.
- Install the carburetor.
- Check chain tension and adjust if necessary.
Adjustment

Adjust engine speeds with the aid of a tachometer or STIHL MDG 1 engine analyzer.
The setting is carried out through the pre-installed limiter caps with screwdriver 5910 890 2306.
Unless otherwise specified, adjust engine speeds within a tolerance of ± 200 rpm.

Start the engine and warm it up at varying speeds for 1 minute – if necessary, turn the idle speed screw (LA) slowly clockwise until the engine runs smoothly – the saw chain cannot rotate.

4.5.4 Secure the limiter caps.
- Apply a suitable punch through the holes in the grommet to push the limiter caps onto the adjusting screws to the stop.

4.6 Fuel System – Hose Barb Connectors

To ensure the tightness of the fuel system:
- To avoid damaging hose barb connectors, pull off and push on fuel hoses in line with the connector by hand where possible – do not use sharp-edged pliers, screwdrivers, etc. and do not cut open fuel hoses with a knife or similar tools.
- Do not re-use fuel hoses after removal. Always replace with new hoses – fuel hoses may be over-stretched during removal.
- Fit new fuel hoses dry or with the aid of OH 723 press fluid – 0781 957 9000. Other press fluids are not approved and may result in damage to the fuel hoses.
- Coat the ends of the hose and the connectors with OH 723 press fluid and push the new hoses onto the hose barb connectors.

Note on OH 723 press fluid

OH 723 press fluid produces a lubricating film which simplifies assembly. The lubricant evaporates after a short period – the hose is then tight.

Never use fuel, oil or grease as a lubricant for this purpose. Fuel, oil and grease do not evaporate – the hose may loosen or become detached.
4.7 Tightening Torques
The tightening torques for the MS 251 are listed in the STIHL MS 251 service manual.

4.8 Serial Number
The serial number is applied to the side of the crankcase.

4.9 Repair Times
The specified repair times assume that the work is performed by trained personnel in a properly equipped service workshop.
Repair times are quoted in minutes.

<table>
<thead>
<tr>
<th>Code</th>
<th>Type of Repair</th>
<th>MS 251 C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Replace crankcase, crankcase gasket or re-seal crankcase. Includes air leak test.</td>
<td>120</td>
</tr>
<tr>
<td>2</td>
<td>Replace engine housing or cylinder shroud.</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Replace crankshaft main bearing(s). Includes air leak test.</td>
<td>110</td>
</tr>
<tr>
<td>4</td>
<td>Replace crankshaft seal(s). Includes air leak test.</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>Replace tank filler cap.</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>Replace cylinder and/or piston. Includes air leak test and repair of components causing failure.</td>
<td>60</td>
</tr>
<tr>
<td>7</td>
<td>Replace ignition module or fly-wheel. Includes stop circuit test.</td>
<td>30</td>
</tr>
<tr>
<td>8</td>
<td>Replace fuel tank line, tank vent, or fuel pick-up body.</td>
<td>25</td>
</tr>
<tr>
<td>9</td>
<td>Replace intake manifold or intake flange, including leak test.</td>
<td>30</td>
</tr>
<tr>
<td>10</td>
<td>Repair or replace carburetor. Includes fuel system testing.</td>
<td>35</td>
</tr>
<tr>
<td>11</td>
<td>Replace fuel tank housing.</td>
<td>25</td>
</tr>
<tr>
<td>12</td>
<td>Replace oil pick-up/delivery line. Includes oil output test.</td>
<td>30</td>
</tr>
<tr>
<td>13</td>
<td>Replace oil pump and/or drive gear. Includes oil output test.</td>
<td>30</td>
</tr>
<tr>
<td>14</td>
<td>Replace rear handle frame or handle housing.</td>
<td>25</td>
</tr>
<tr>
<td>15</td>
<td>Repair or replace rewind starter.</td>
<td>20</td>
</tr>
<tr>
<td>16</td>
<td>Repair or replace clutch, clutch shoes or clutch springs.</td>
<td>20</td>
</tr>
<tr>
<td>17</td>
<td>Repair chain break, including check for proper function.</td>
<td>35</td>
</tr>
<tr>
<td>18</td>
<td>Replace muffler.</td>
<td>15</td>
</tr>
<tr>
<td>19</td>
<td>Replace air filter or filter housing.</td>
<td>15</td>
</tr>
<tr>
<td>22</td>
<td>Repair or replace stop switch. Includes circuit testing.</td>
<td>20</td>
</tr>
<tr>
<td>35</td>
<td>Engine diagnosis only to determine failures requiring unit replacement.</td>
<td>25</td>
</tr>
<tr>
<td>40</td>
<td>Miscellaneous repairs and other repairs not listed.</td>
<td>15</td>
</tr>
<tr>
<td>45</td>
<td>Handling allowance only-no labor.</td>
<td>5</td>
</tr>
<tr>
<td>50</td>
<td>No labor.</td>
<td>0</td>
</tr>
</tbody>
</table>