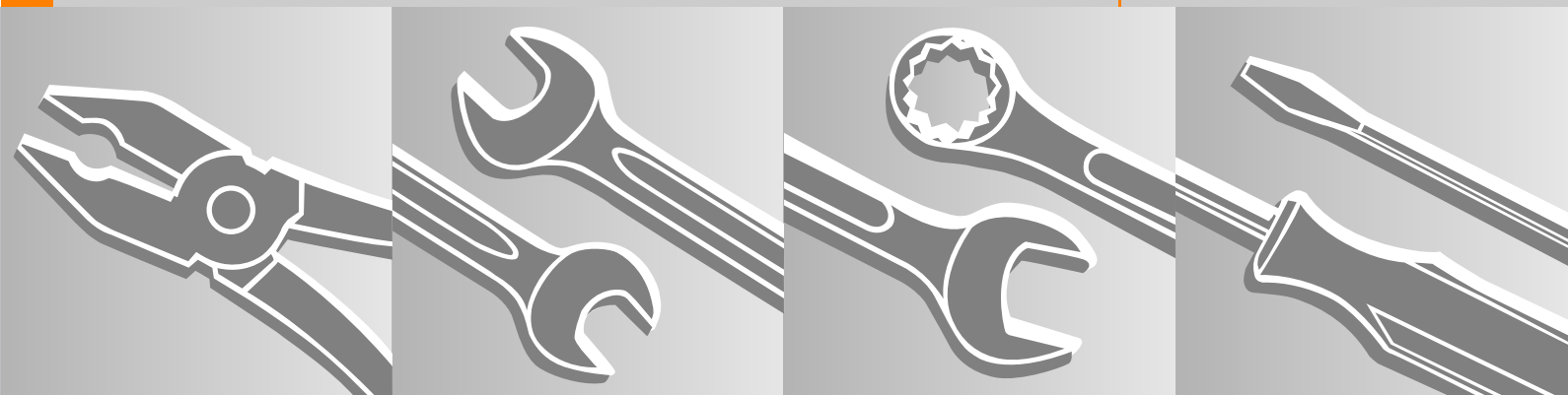


**STIHL TS 410, 420**

2007-09



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## 1. Introduction

This service manual contains detailed descriptions of all the typical repair and servicing procedures for this power tool.

Refer to the illustrated spare parts lists during all repair work. These lists show the installation position and order in which the individual parts and modules should be assembled.

Refer to the latest edition of the relevant parts list to check the part numbers of any replacement parts required.

A fault on the machine may be due to several causes. To help locate the fault, consult the chapter on "Troubleshooting" and the "STIHL Service Training System" for all function groups.

Refer to the "Technical Information" bulletins for engineering changes which have been introduced since publication of this service manual. Technical information bulletins also supplement the parts list and service manual until an updated edition is issued.

The special tools mentioned in the descriptions are listed in the chapter "Special Servicing Tools" of this manual. Use the part numbers to identify the tools in the STIHL Special Tools manual. It lists all the special servicing tools currently available from STIHL.

Symbols are included in the text and pictures for greater clarity. The meanings are as follows:

In the text:

● = Action to be taken as shown in the illustration above the text

– = Action to be taken but not shown in the illustration above the text

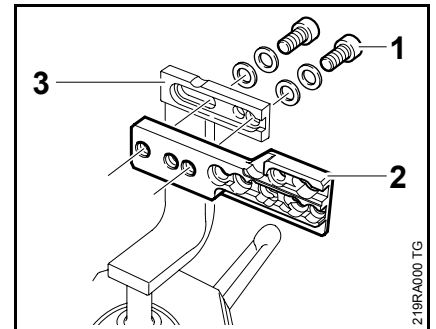
In the illustrations:

➔ Item pointer (short arrow)

➔ Direction of movement (long arrow)

📖 4.2 = Reference to another chapter, i.e. to chapter 4.2 in this case

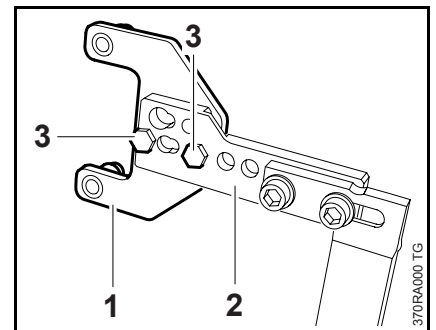
Service manuals and technical information bulletins are intended exclusively for the use of properly equipped repair shops. They must not be passed on to third parties.



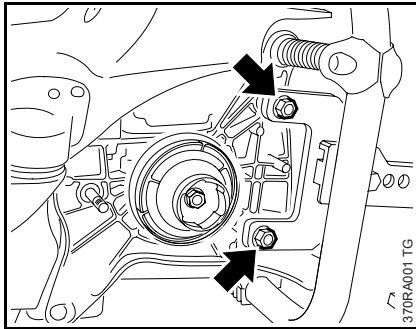
Servicing and repairs are made considerably easier by mounting the machine on the assembly stand (3) 5910 890 3100. For this purpose, secure the support (2) 5910 850 1650 to the assembly stand with two screws (1) and washers.

The screws must not protrude, as they may damage the housing when the machine is clamped, depending on model.

This step is not necessary when using the new assembly stand 5910 890 3101, as the support is already mounted on it.



The clamping plate (1) 4238 890 2100 is secured to the support (2) with two M8x20 screws (3) and washers.



The machine is secured to the clamping plate by means of the two front studs on the crankcase.

Guide the studs on the machine through the bushings on the clamping plate and secure them with the nuts (arrows).

The cast arm with guard must be removed first.

Always use original STIHL replacement parts.

They can be identified by the STIHL part number, the **STIHL** logo and the parts symbol **G**.

The symbol may appear alone on small parts.

#### **Storage and disposal of oil and fuel**

Lubricating oil and fuel must be collected in a clean container and disposed of in accordance with the regulations and without harming the environment.

## 2. Safety precautions

Specific national safety regulations and the safety instructions in the instruction manual must be observed if the machine has to be started up during maintenance or repair work.

Gasoline is highly flammable and can also be explosive under certain conditions.

Protective gloves must be worn when components have to be heated for assembly/removal purposes.

Improper handling may result in burns and other serious injuries.

Do not bring any fire, flame, spark or other source of heat near the fuel. All work with fuel must be performed outdoors only. Spilled fuel must be wiped away immediately.

Always test for leaks after working on the fuel system and shortblock.

### 3. Specifications

#### 3.1 Shortblock

##### TS 410

##### TS 420

Displacement:	66.7 cm <sup>3</sup>	66.7 cm <sup>3</sup>
Bore:	50 mm	50 mm
Stroke:	34 mm	34 mm
Engine power to ISO 7293:	3.2 kW (4.4 HP) at 9000 rpm	3.2 kW (4.4 HP) at 9000 rpm
Permissible maximum speed:	10300 rpm	10300 rpm
Idle speed:	2500 rpm	2500 rpm
Clutch:	Centrifugal clutch without linings	
Clutch engages at:	3800 rpm	3800 rpm
Crankcase leakage test at gauge pressure: under vacuum	$p_{\bar{u}} = 0.5 \text{ bar}$ $p_u = 0.5 \text{ bar}$	

---

#### 3.2 Fuel system

Carburetor leakage test at gauge pressure:	$p_{\bar{u}} = 0.8 \text{ bar}$
Operation of tank vent at gauge pressure:	$p_{\bar{u}} = 0.3 \text{ bar}$
Fuel:	as specified in instruction manual

---

#### 3.3 Ignition system

Air gap between ignition module and flywheel:	0.15...0.35 mm
Spark plug (suppressed):	Bosch WSR6F
Electrode gap:	0.5 mm

---

#### 3.4 Cutting wheels

##### TS 410

Composite and diamond cutting wheels	Diameter	300 mm
	Cutting depth	approx. 100 mm

##### TS 420

Composite and diamond cutting wheels	Diameter	350 mm
	Cutting depth	approx. 125 mm

---

### 3.5 Tightening torques

DG and P screws are fitted in plastic and light alloy metal parts. These screws form a permanent thread when they are installed for the first time. The material is permanently deformed. Screws can be removed and installed as often as necessary without impairing the strength of the screwed assembly, provided that the specified tightening torque is observed.

For this reason, it is **essential to use a torque wrench**.

Fastener	Thread size	For component	Tightening torque	Remarks
			Nm	
Bolt	M 6x28	Cast arm/flange	8.0	
Nut	M 8	Cast arm/starter cover/stud	20.0	
	M 10x1	Decompression valve	14.0	
Bolt	M 5x20	Filter cover/tank housing	6.0	
Bolt	P 5x16	Handle molding/shroud	4.0	
Bolt	D 5x20	Rubber buffer/support	6.0	
Bolt	P 5x16	Holder/switch/shroud	3.0	
Bolt	P 6x19	Holder/water attachment/tank housing	6.0	
Bolt	P 6x19	Shroud/tank housing	6.0	
Bolt	M 5x17	Cap, spark plug cover/shroud	3.5	
Nut	M 10x1 L	Poly V-belt pulley, front	38.0	
Bolt	P 6x40	Clamp/handlebar/tank housing	6.0	
Bolt	P 6x26	Clamp/tank housing	6.0	
Bolt	D 5x45	Clamp (AV system)/handlebar support	4.0	
Bolt	P 6x19	Crankcase/bearing plug (AV system)	6.0	
Bolt	M 5x32	Crankcase/cylinder	9.0	
Bolt	M 5x25	Crankcase fan side/drive side	10.0	
	M 12x1 L	Driver	40.0	
Bolt	M 5x6	Bearing/rubber buffer	4.0	1)
Bolt	P 5x16	Bearing plug AV system/tank housing	4.0	
Bolt	M 5x20	Fan cover/crankcase	6.0	
Bolt	P 6x19	Air baffle/tank housing	6.0	
Bolt	M 5x20	Air guide shroud/crankcase	3.0	
Bolt	M 5x20	Muffler/crankcase	10.0	
Bolt	M 5x20	Muffler/cylinder	10.0	
Bolt	M 5x30	Belt guard/cast arm	6.0	
Nut	M 8x1	Flywheel/crankshaft	33.0	2)
Bolt	D 5x24	Clamping lever/cast arm	4.0	
Bolt	M 3x20	Hose clamp, manifold/cylinder	0.5	
Nut	M 8x1	Starter cup/crankshaft	33.0	
Bolt	M 8x53	Stud/crankcase	21.0	
Bolt	P 6x50	Support/clamp/handlebar/tank housing	6.0	



Bolt	P 6x19	Support/bearing plug AV system	6.0
Bolt	P 6x40	Support/tank housing	6.0
Bolt	M 5x48x22	Tank housing/flange	3.5
Bolt	M 10x18	Abrasive wheel	30.0
Bolt	M 5x30	Adjusting lever/guard	6.0
Bolt	M 8x24	Adjusting lever/guard/square nut, drive side	3.0
Bolt	M 8x17	Adjusting lever/guard/square nut, fan side	3.0
	M 14x1.25	Spark plug	28.0
Bolt	M 5x20	Ignition module/crankcase	8.0
Bolt	M 4x8	Pan head screw/banjo bolt	3.0

---

Remarks:

- 1) Loctite 243 medium strength
- 2) Connection between crankshaft and flywheel must be degreased and oil-free

---

When inserting DG and P screws into an existing screw thread:

Insert the DG or P screw in the hole and turn counterclockwise until it gently drops into the hole in axial direction.

Tighten the screw clockwise to the specified torque.

DG screws must always be tightened with a torque wrench.

This procedure ensures that the screw engages properly in the existing thread and does not form a new thread and weaken the assembly.

Coat micro-encapsulated screws with Loctite 243 medium strength before refitting them.

Screwdriver speed when used in plastic material: DG and P screws max. 500 rpm.

Do not use an impact wrench to release or tighten screw connections.

Screws with and without locking serration must not be confused.

## 4.2 Cast arm with guard

Problem	Cause	Remedy
Cutting wheel does not run smoothly or vibrates	Axial or radial runout	Set axial or radial true running, replace cutting wheel if necessary
	Ribbed poly V-belt is loose	Check and tension ribbed poly V-belt, replace ribbed poly V-belt or tensioner if necessary
	Grooved ball bearing of the front poly V-belt pulley is worn	Replace grooved ball bearing
Cutting wheel stops under load at full throttle	Clutch shoes badly worn	Install new clutch
	Clutch drum badly worn	Install new clutch drum
	Ribbed poly V-belt not properly tensioned	Tension ribbed poly V-belt, replace if necessary
Cutting wheel rotates at idle speed	Idle speed too high	Readjust with idle speed screw <b>LA</b> (counterclockwise)
	Clutch springs stretched or fatigued	Replace tension springs, replace clutch if necessary
	Clutch spring hooks broken	Replace tension springs
Cutting wheel runs dry although shutoff cock is open	Shut-off cock or connector for hose is clogged	Check and clean shut-off cock/connector, replace if necessary
	Nozzles are clogged	Clean nozzles, replace if necessary

### 4.3 Rewind starter

Problem	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge, i.e. not vertically	Replace starter rope
	Normal wear	Replace starter rope
Starter rope does not rewind	Very dirty or corroded	Clean or replace rewind spring
	Spring insufficiently tensioned	Check rewind spring and increase tension
	Rewind spring broken	Replace rewind 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 pawls or pawls themselves are worn	Replace pawls
	Spring clip fatigued	Replace spring clip
	Loose starter cup	Tighten starter cup, replace if necessary
Starter rope is difficult to pull or rewinds very slowly	Starter mechanism is very dirty	Thoroughly clean complete starter mechanism
	Lubricating oil on rewind spring becomes viscous at very low outside temperatures (spring windings stick together)	Coat rewind spring with a little standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons), then pull rope carefully several times until normal action is restored

## 4.4 Ignition system

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.

Problem	Cause	Remedy
Engine runs roughly, misfires, temporary loss of power	Spark plug boot is loose	Press boot firmly onto spark plug and fit new spring if necessary
	Spark plug sooted, smeared with oil	Clean the spark plug or replace if necessary
	Ignition lead loose in ignition module	Secure ignition lead
	Fuel/oil mixture contains too much oil	Use a fuel mixture with the correct mixing ratio
	Incorrect air gap between ignition module and flywheel	Set the correct air gap
	Flywheel cracked or has other damage or pole shoes have turned blue	Install new flywheel
	Ignition timing wrong, flywheel out of adjustment, key in flywheel has sheared off	Install new flywheel
	Weak magnetization in flywheel – pole shoes have turned blue	Install new flywheel
Irregular spark	Check operation of switch shaft/ contact spring, switch and ignition module Insulation damaged or break in ignition lead or short circuit wire, check ignition lead/ignition module, replace if necessary Check operation of spark plug Clean the spark plug or replace if necessary	

If the engine runs roughly, this may also be due to problems in the carburetor or shortblock.

---

Problem	Cause	Remedy
No spark	Spark plug defective	Replace spark plug
	Faulty insulation or short circuit in short circuit wire or short circuit switch	Check short circuit wire and switch, replace switch if necessary
	Break or damaged insulation in ignition lead	Check ignition lead, replace if necessary
	Ignition module defective	Replace ignition module

---

## 4.5 Carburetor

Problem	Cause	Remedy
Carburetor floods; engine stalls	Inlet needle not sealing. Foreign matter in valve seat or cone	Remove and clean inlet needle or clean carburetor
	Inlet control lever sticking on spindle	Restore easy movement of inlet control lever
	Helical spring not located on nipple of inlet control lever	Remove the inlet control lever and refit it correctly
	Perforated disc on diaphragm is deformed and presses constantly against the inlet control lever	Replace metering diaphragm
Poor acceleration	Low speed adjusting screw "too lean"	Check basic setting of carburetor, correct if necessary
	High speed adjusting screw "too lean"	Check basic setting of carburetor, correct if necessary
	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Diaphragm gasket leaking	Replace diaphragm gasket
	Metering diaphragm damaged or shrunk	Replace metering diaphragm
	Manifold damaged	Replace manifold
	Impulse hose damaged or kinked	Straighten or replace impulse hose

Problem	Cause	Remedy
Engine will not idle, idle speed too high	Throttle shutter opened too wide by idle speed screw <b>LA</b>	Set idle speed screw <b>LA</b> correctly
	Oil seals/crankcase leaking	Seal oil seals/crankcase, replace if necessary
	Air valve soiled – air valve does not close	Clean air valve, replace if necessary
	Air valve moves stiffly	Check air valve, replace if necessary
	Throttle rod moves stiffly – throttle shutter does not close	Restore easy movement of throttle rod
Engine stops when idling	Idle jet bores or ports blocked	Clean the carburetor
	Low speed adjusting screw "too rich" or "too lean"	Correct setting of low speed adjusting screw <b>L</b>
	Setting of idle speed screw incorrect – throttle shutter completely closed	Correct setting of idle speed screw <b>LA</b>

Problem	Cause	Remedy
Engine speed drops quickly under load – low power	Air filter dirty	Replace air filter
	Throttle shutter not opened fully	Check linkage
	Tank vent faulty	Replace tank vent
	Pickup body soiled	Replace pickup body
	Fuel strainer dirty	Clean fuel strainer in carburetor, replace if necessary
	Leak in fuel line between tank and fuel pump	Seal connections or replace line
	High speed adjusting screw <b>H</b> "too rich"	Check basic setting of carburetor, correct if necessary
	Main jet bores or ports blocked	Clean the carburetor
	Pump diaphragm damaged or fatigued	Replace pump diaphragm
	Impulse hose damaged or kinked	Straighten or replace impulse hose
Engine runs extremely richly, lacks power and has very low final speed	Air valve does not open	Check lever and rod on air valve, adjust or replace if necessary
Engine runs too richly, loses power, final speed is too low	Air valve does not open completely at full throttle	Lever on air valve has been fitted incorrectly – the stamped number must not be visible
		Check lever, rod and air valve, adjust, clean or replace if necessary
Engine idles erratically – too lean	Air valve does not close completely	Check lever, rod and air valve, adjust, clean or replace if necessary



## 4.6 Engine

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

- Air filter
- Fuel supply
- Carburetor
- Ignition system

Problem	Cause	Remedy
Engine does not start easily, stalls at idle speed but operates normally at full throttle	Oil seals in crankgear damaged	Replace oil seals
	Crankcase leaking or damaged (cracks)	Seal/replace crankcase
Engine does not deliver full power or runs erratically	Piston rings worn or broken	Replace piston rings
	Muffler/spark arresting screen carbonized	Clean muffler (inlet and outlet openings), replace spark arresting screen, replace muffler if necessary
	Air filter dirty	Replace air filter
	Fuel/impulse hose severely bent, kinked or damaged	Fit new lines and ensure they are installed without kinking
	Tank vent faulty	Check tank vent and replace if necessary
	Air valve does not open	Check air valve, adjust or replace if necessary
	Decompression valve does not close	Replace decompression valve
Engine overheating	Insufficient cylinder cooling. Air inlet openings in fan cover clogged or cooling fins on cylinder severely fouled.	Thoroughly clean all cooling air openings and the cylinder fins.



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