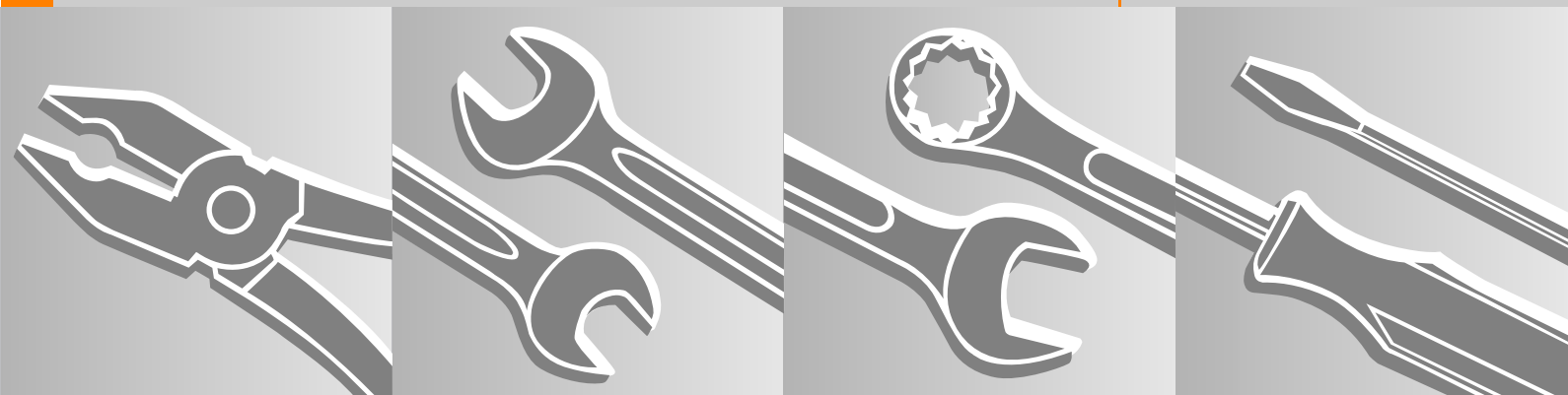


STIHL MS 780, 880

2009-08



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1. Introduction

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

You should make use of the illustrated parts lists while carrying out repair work. They show the installed positions of the individual components and assemblies.

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

A fault on the machine may have several causes. To help locate the fault, consult the chapter on "Troubleshooting" and the "STIHL Service Training System" for all assemblies.

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 until a revised edition is issued.

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

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

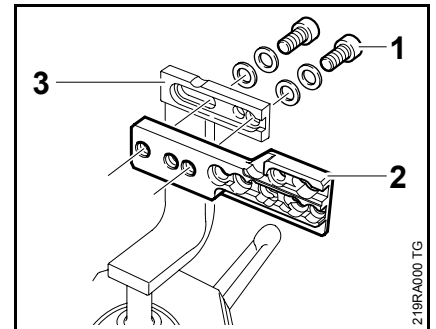
In the descriptions:

- = Action to be taken as shown in the illustration (above the text)
- = Action to be taken that is not shown in the illustration (above the text)

In the illustrations:

- ➔ Pointer
- ➡ Direction of movement
- 📖 4.2 = Reference to another chapter, i.e. chapter 4.2 in this example.

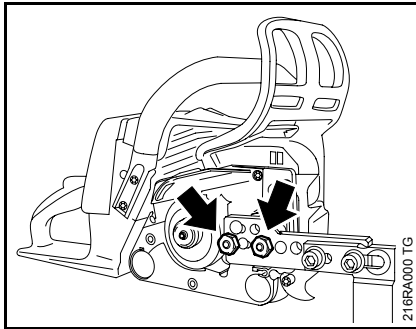
Service manuals and all technical information bulletins are intended exclusively for the use of properly equipped repair shops. They must not be passed to third parties.



Servicing and repairs are made considerably easier if the machine is mounted to assembly stand (3) 5910 890 3100. To do this, secure the mounting plate (2) 5910 850 1650 to the assembly stand with two screws (1) and washers.

The screws must not project since they, depending on the machine, may damage housings when the machine is clamped in position.


The above operation is not necessary with the new assembly stand 5910 890 3101 since the mounting plate is already fitted.



Engage the bar mounting studs in the outer bores in the mounting plate and secure the saw in position with the nuts (arrows).

Preparations for servicing

Remove the chain sprocket cover, saw chain and guide bar before carrying out repairs or mounting the machine to the assembly stand.

Always use original STIHL replacement parts. They can be identified by the STIHL part number, the **STIHL** logo and the STIHL parts symbol . This symbol may appear alone on small parts.

Storing and disposing of oils and fuels

Collect fuel or lubricating oil in a clean container and dispose of it properly in accordance with local environmental regulations.

2. Safety Precautions

If the power tool is started up in the course of repairs or maintenance work, observe all local and country-specific safety regulations as well as the safety precautions and warnings in the instruction manual.

Gasoline is an extremely flammable fuel and can be explosive in certain conditions.

Always wear suitable protective gloves for operations in which components are heated for assembly or disassembly.

Improper handling may result in burns or other serious injuries.

Do not smoke or bring any fire, flame 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 perform leakage test after working on the fuel system and the engine.


Fuel system – hose barb connectors

Pull off or push on fuel hoses in line with the connector, preferably by hand, to ensure the tightness of the fuel system.


Avoid damaging the hose barb – do not use sharp-edged pliers, screwdrivers, etc.

Do not cut open fuel hoses with a knife or similar tool.

Do not re-use fuel hoses after removal. Always install new hoses – fuel hoses may be overstretched during removal.

Install new fuel hoses either dry or with the aid of STIHL press fluid,  16.

Other press fluids are not approved and may result in damage to the fuel hoses.

Coat the ends of the hoses and the connectors with STIHL press fluid and then push the new hoses on to the hose barbs,  16.

3. Specifications

3.1 Engine

	MS 780	MS 880
Displacement:	121.6 cm ³	121.6 cm ³
Bore:	60 mm	60 mm
Stroke:	43 mm	43 mm
Engine power to ISO 7293:	5.6 kW (7.8 bhp) at 8,000 rpm	6.4 kW (8.7 bhp) at 8,500 rpm
Maximum permissible engine speed with bar and chain:	11,000 rpm	11,000 rpm
Idle speed:	2,700 rpm	2,700 rpm
Clutch:	Centrifugal, without linings	Centrifugal, without linings
Clutch engages at:	3,400 rpm	3,400 rpm
Crankcase leakage test at gauge pressure:	0.5 bar	0.5 bar
under vacuum:	0.5 bar	0.5 bar

3.2 Fuel System

Carburetor leakage test at gauge pressure:	0.8 bar
Operation of tank vent at gauge pressure:	0.5 bar
Fuel:	as in instruction manual

3.3 Ignition System

Air gap between ignition module and fanwheel:	0.20...0.30 mm
Spark plug (suppressed):	NGK BPMR 7 A
Electrode gap:	0.5 mm

3.4 Chain Lubrication

Speed-controlled oil pump with reciprocating piston and manual flow control	
Oil delivery rate:	at 10,000 rpm
Adjustable oil pump	14.0...36.0 (+/- 5.0) cm ³ /min
Ematic position	21.0 (+/- 3.0) cm ³ /min
Special accessory	
Oil delivery rate:	at 10,000 rpm
Oil pump with increased delivery rate: (oil delivery rate is not adjustable)	50.0 (+/- 5.0) cm ³ /min

3.5 Tightening Torquese

DG and P (Plastoform) screws are used in polymer and light metal components. These screws form a permanent thread when they are installed for the first time. They can be removed and installed as often as necessary without impairing the strength of the screwed assembly, providing the specified tightening torque is observed.

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

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	M 4x8	Chain tensioner cover plate/crankcase	3.5	
Screw	B 3.9x13	Cover plate/chain sprocket cover	2.0	
Screw	M 4x12	Exhaust cover/muffler	4.0	4)
Screw	M 4x12	Brake band/crankcase	3.0	1), 4)
Screw	M 6x30	Collar stud/crankcase, for muffler (MS 780/ new MS 880)	12.0	1)
Screw	M 10x27	Collar stud / crankcase, for bar	30.0	1)
Screw	M 4x12	Cover, chain brake/crankcase	3.5	4)
Screw	M 4x12	Cover, oil pump/crankcase	3.5	4)
Screw	M 4x12	Cover, spur gear/crankcase	3.0	4)
	M 10x1	Decompression valve	14.0	
Nut	M 5	Filter cover, twist lock	1.0	
Nut	M 5	Flange/carburetor/tank housing	5.0	
Screw	P 6x32.5	Handlebar, right, stiffener/tank housing	8.0	2)
Screw	P 6x21.5	Handlebar, bottom/tank housing	8.0	2)
Screw	M 5x35	Hand guard/fan housing/crankcase	7.0	4)
Nut	M 6	Helper's handle/front handle/screw (2-man saw)	6.0	
Screw	M 5x20	Shroud/crankcase	7.0	4)
Nut	M 5	Shroud/cylinder	3.5	
Nut	M 5	Chain catcher/spiked bumper/crankcase	6.0	
Nut	M 6	Spiked bumper/chain sprocket cover	7.5	
Screw	M 6x16	Spiked bumper/crankcase, top/locknut	7.5	4)
Screw	M 6x18	Spiked bumper/crankcase, top/locknut	7.5	4)
Screw	M 6x16	Spiked bumper/crankcase, bottom	7.5	1), 4)
Screw	M 6x18	Spiked bumper/crankcase, bottom (Z version)	7.5	1), 4)
Screw	M 5x25	Crankcase (old MS 880)	11.5	4)
Screw	M 5x28	Crankcase (MS 780/new MS 880)	10.0	4)
Screw	P 4x19	Bearing, switch shaft/tank housing	1.0	
Screw	M 5x20	Fan housing/crankcase	7.0	4)
Carrier	M 14x1 L	Carrier / crankshaft	80.0	6)
Screw	M 4x12	Oil oump/crankcase, front top	3.5	4), 7)
Screw	M 4x12	Oil pump/crankcase, front bottom and rear	3.5	4)

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	M 6x40	Annular buffer, left top/retainer/tank housing	7.0	1), 4)
Screw	P 6x19	Annular buffer, bottom/tank housing	5.5	
Screw	M 5x12	Annular buffer plate, left top/crankcase	9.0	1), 4)
Screw	M 4x12	Rewind spring, fan housing	4.0	4)
Screw	M 5	Muffler/collar stud with spring washer (MS 780/new MS 880)	10.0	
Screw	M 5x16	Muffler/cylinder (MS 780/new MS 880)	10.0	1), 4), 5)
Screw	M 5x6	Muffler casing, top (MS 780/new MS 880)	6.5	1), 4)
Crankshaft	M 10x1	Flywheel/crankshaft	45.0	6)
Screw	M 4x12	Segment/fan housing	2.0	4)
Screw	M 4x8	Side plate/crankcase	3.0	4)
Screw	M 3x20	Clamp/manifold (MS 780/new MS 880)	0.5	
Stud	M 5x8.5	Stud/cylinder	3.5	3)
Screw	M 5x16	Support/crankcase (old MS 880)	10.0	4)
Screw	M 5x16	Support/muffler (old MS 880)	10.0	4)
Screw	P 4x19	Tank housing/handle molding	1.0	
Spark plug	M 14x1.25	Spark plug	25.0	
Screw	M 5x25	Ignition module/crankcase (old MS 880)	9.0	1), 4)
Screw	M 5x20	Ignition module/crankcase	8.0	5)
Screw	M 6x30	Cylinder/crankcase	15.0	4)

Remarks:

- 1) Loctite 242 or 243, medium strength
- 2) Loctite 649, high strength
- 3) Loctite 270, high strength
- 4) Screws with binding head
- 5) Micro-encapsulated screws
- 6) Degrease joint and mount oil-free
- 7) Use Hylomar HYL sealant

Use the following procedure when refitting a DG or P screw in an existing thread:

Place the screw in the hole and rotate it counterclockwise until it drops down slightly.
Tighten the screw clockwise to the specified torque.

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 medium strength Loctite 242 or 243 before reinstalling.

Power screwdriver setting for polymer: DG and P screws max. 500 rpm
Do not use an impact wrench for releasing or tightening screws.

Do not mix up screws with and without binding heads.

4. Troubleshooting

4.1 Clutch

Condition	Cause	Remedy
Saw chain stops under load at full throttle	Clutch shoes badly worn	Install new clutch
	Clutch drum badly worn	Install new clutch drum
Saw chain rotates at idle speed	Engine idle speed too high	Check carburetor settings and readjust properly if necessary
	Clutch springs stretched or fatigued	Replace the clutch springs or install new clutch
	Clutch spring hooks broken	Replace the clutch springs
Loud noises	Clutch springs stretched or fatigued	Replace all clutch springs
	Needle cage damaged	Fit new needle cage
	Clutch shoe retainer broken	Install new retainer or clutch
	Clutch shoes and carrier worn	Install new clutch

4.2 Chain Drive, Chain Brake, Chain Tensioner

Condition	Cause	Remedy
Chain sprocket wears rapidly	Chain not properly tensioned	Tension chain as specified
	Wrong chain pitch	Fit chain of correct pitch
	Insufficient chain lubrication	Check chain lubrication
	Chain sprocket worn	Fit new chain sprocket
Saw chain stops under load at full throttle	Clutch shoes badly worn	Install new clutch
	Clutch drum badly worn	Install new clutch drum
	Brake band does not release fully or sticks	Check freedom of movement and operation of brake band
Saw chain does not stop immediately when brake is activated	Brake spring stretched or broken	Fit new brake spring
	Brake band stretched or worn	Fit new brake band
	Clutch drum worn	Install new clutch drum

4.3 Chain Lubrication

In the event of trouble with the chain lubrication system, check and rectify other sources of faults before disassembling the oil pump.

Condition	Cause	Remedy
Chain receives no oil	Oil tank empty	Fill up with oil and check setting of oil pump if necessary
	Oil inlet hole in guide bar is blocked	Clean oil inlet hole
	Intake hose or pickup body clogged or intake hose ruptured	Fit new intake hose and pickup body
	Valve in oil tank blocked	Clean or replace valve
	Spur gear broken	Fit new spur gears
	Oil pump damaged or worn	Install new oil pump
Machine losing chain oil	Oil pump body damaged	Install new oil pump
	Oil pump damaged or worn	Install new oil pump
	Oil intake hose connection leaking or damaged	Install new oil intake hose
	Sealing ring on oil pump outlet damaged or missing	Replace the sealing ring
Oil pump delivers insufficient oil	Oil pump worn	Install new oil pump
	Oil pump delivery rate set too low	Adjust oil pump (only on version with adjustable oil pump)
	Pickup body in oil tank clogged	Clean the pickup body or replace if necessary.

4.4 Rewind Starter

Condition	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge, i.e. not vertically	Fit new starter rope
	Normal wear	Fit new starter rope
Starter rope does not rewind	Rewind spring very dirty or corroded	Clean or replace rewind spring
	Insufficient spring tension	Check rewind spring and increase tension
	Rewind spring broken	Fit new rewind spring
Starter rope cannot be pulled out far enough	Spring overtensioned	Check rewind spring and reduce tension
Starter rope can be pulled out almost without resistance (crankshaft does not turn)	Guide pegs on pawls or pawls themselves are worn	Fit new pawls
	Spring clip on pawl fatigued	Fit new spring clip
	Spring clip installed wrong	Install spring clip correctly
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 small amount of standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons), then pull rope carefully several times until normal action is restored
	Decompression valve is not open	Open, check and replace decompression valve if necessary

4.5 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.

Condition	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. If sooting keeps recurring, check air filter
	Ignition lead loose in ignition module	Secure ignition lead properly
	Fuel/oil mixture – too much oil	Use correct mixture of fuel and oil
	Incorrect air gap between ignition module and flywheel	Set air gap correctly
	Flywheel cracked or damaged or pole shoes have turned blue	Install new flywheel
	Ignition timing wrong, flywheel out of adjustment, key in flywheel has sheared off	Fit key if necessary and secure flywheel properly or install new flywheel
	Weak magnetization in flywheel	Install new flywheel
Irregular spark		Check operation of switch shaft/contact springs and ignition module. Faulty insulation or break in ignition lead or short circuit wire. Check ignition lead/ignition module and replace ignition module if necessary. Check operation of spark plug. Clean the spark plug or replace if necessary.
	Crankcase damaged (cracks)	Install new crankcase

Condition	Cause	Remedy
No spark	Spark plug faulty	Install new spark plug
	Faulty insulation or short in short circuit wire	Check short circuit wire for short circuit to ground
	Break in ignition lead or insulation damaged	Check ignition lead and replace if necessary
	Ignition module faulty	Install new ignition module

4.6 Carburetor

Condition	Cause	Remedy
Carburetor floods; engine stalls	Inlet needle not sealing – foreign matter in valve seat or cone	Remove and clean the inlet needle, clean the carburetor
	Inlet control lever sticking on spindle	Check inlet control lever, replace if necessary
	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	Fit a new metering diaphragm
	Metered diaphragm deformed	Fit a new metering diaphragm
Poor acceleration	Air filter dirty	Clean air filter or replace if necessary
	Setting of low speed screw too lean	Check basic carburetor setting, correct if necessary
	Setting of high speed screw too lean	Check basic carburetor setting, correct if necessary
	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Diaphragm gasket leaking	Fit new diaphragm gasket
	Metering diaphragm damaged or shrunk	Fit a new metering diaphragm
	Impulse hose damaged or kinked	Install new impulse hose
	Tank vent faulty	Replace tank vent
Leak on fuel hose from tank to carburetor	Seal connections or install new fuel hose	

Condition	Cause	Remedy
Engine will not idle, idle speed too high	Throttle shutter opened too wide by idle speed screw LA	Reset idle speed screw LA correctly
	Oil seals/crankcase leaking	Seal or replace oil seals/crankcase
Engine stalls at idle speed	Idle jet bores or ports blocked	Clean the carburetor
	Low speed screw 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
	Tank vent faulty	Replace tank vent
	Leak on fuel hose from tank to carburetor	Seal connections or install new fuel hose
Saw chain rotates at idle speed	Engine idle speed too high	Reset low speed screw L correctly
	Clutch does not release even though idle speed is correct	Check the clutch

Condition	Cause	Remedy
Engine speed drops quickly under load – low power	Air filter dirty	Clean air filter or replace if necessary
	Throttle shutter not opened fully	Check throttle cable and rod
	Tank vent faulty	Replace tank vent
	Fuel pickup body dirty	Install new pickup body
	Fuel strainer dirty	Clean fuel strainer in carburetor, replace if necessary
	Leak on fuel hose from tank to carburetor	Seal connections or install new fuel hose
	Setting of high speed screw H too rich	Check basic carburetor setting, correct if necessary
	Main jet bores or ports blocked	Clean the carburetor
	Pump diaphragm damaged or fatigued	Fit new pump diaphragm
	Impulse hose damaged or kinked	Install new impulse hose
Ignition timing wrong, flywheel out of adjustment, key in flywheel has sheared off	Fit key if necessary and secure flywheel properly or install new flywheel	

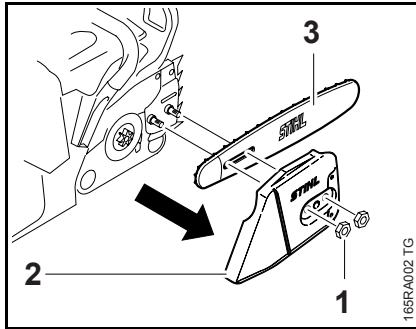
4.7 Engine

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

- Air filter
- Fuel system
- Carburetor
- Ignition system

Condition	Cause	Remedy
Engine does not start easily, stalls at idle speed, but operates normally at full throttle	Oil seals in crankcase damaged	Replace the oil seals
	Crankcase leaking or damaged (cracks)	Seal or replace the crankcase
Engine does not deliver full power or runs erratically	Piston rings worn or broken	Fit new piston rings
	Muffler / spark arresting screen carbonized	Clean the muffler (inlet and exhaust), replace spark arresting screen, replace muffler if necessary
	Air filter dirty	Replace air filter
	Fuel/impulse hose severely kinked or damaged	Fit new hoses or position them free from kinks
	Decompression valve is not closed	Close, check and replace decompression valve if necessary
Engine overheating	Insufficient cylinder cooling. Air inlets in fan housing blocked or cooling fins on cylinder very dirty	Thoroughly clean all cooling air openings and the cylinder fins

5. Saw Chain / Guide Bar



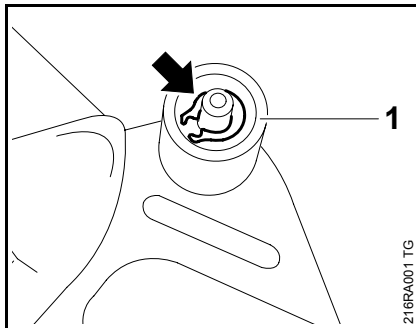
Wear work gloves to protect your hands from injury.

- Unscrew the hex nuts (1).
- Remove the chain sprocket cover (2).
- Remove the guide bar (3) with chain.
- Reassemble in the reverse sequence.

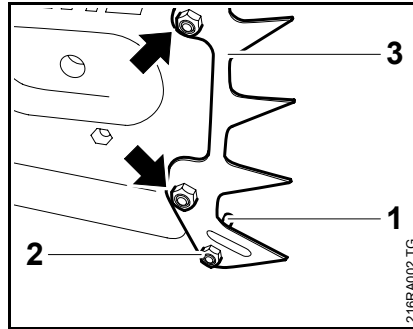
5.1 Spiked Bumper / Chain Catcher

- Remove the chain sprocket cover, 5

Chain Catcher / Spiked Bumper on Chain Sprocket Cover

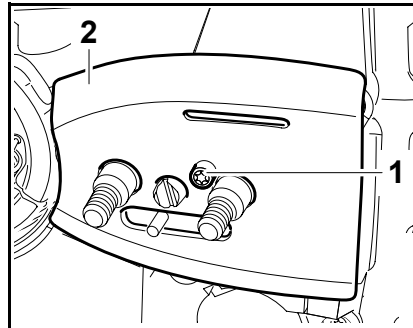


- Remove the E-clip (arrow).
- Pull off the roller (1).

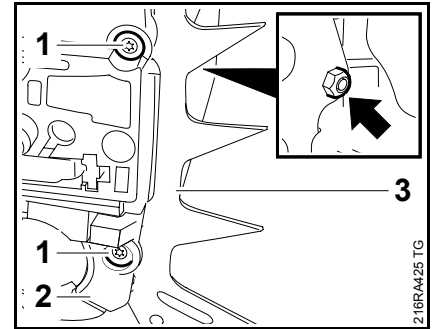


- Hold the guide lug (1) steady and unscrew the nut (2).
 - Unscrew the nuts (arrows).
 - Remove the spiked bumper (3).
- Always use new self-locking nuts.
- Reassemble in the reverse sequence.

Spiked Bumper on Crankcase



- Take out the screw (1).
- Remove the inner side plate (2).



- Hold the nut (arrow) steady and take out the screws (1).
 - Remove the deflector (2) and spiked bumper (3).
- Always use new self-locking nuts.
- Reassemble in the reverse sequence.
 - Tightening torques, 3.5

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