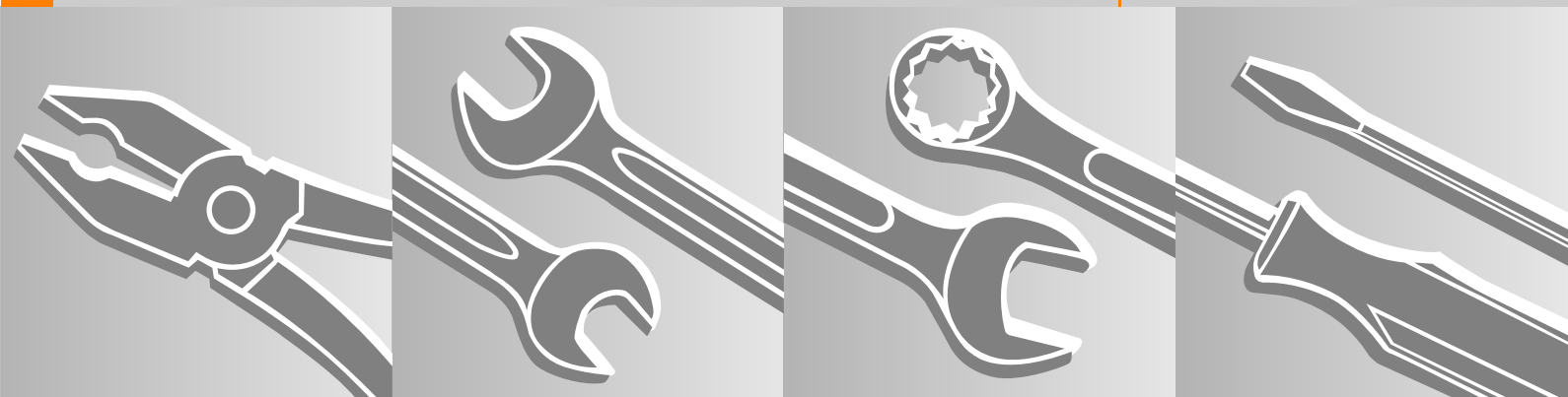


STIHL MS 661, 661 C-M

2013-07



Contents

1. Introduction and Safety Precautions	3	6.6 Crankshaft	31	8. M-Tronic	60
1.1 Introduction	3	6.6.1 Bearings / Crankcase	35	8.1 Calibrating the Control Unit	60
1.2 Safety Precautions	4	6.7 Piston	36	8.2 Testing with STIHL MDG 1	61
2. Specifications	5	6.8 Piston Rings	38	8.3 Testing	61
2.1 Engine	5	6.9 Decompression Valve	38	8.3.1 Preparations	61
2.2 Fuel System	5	7. Ignition System	39	8.3.2 Connecting Test Cables	62
2.3 Ignition System	5	7.1 Ignition Timing on All Models	39	8.3.3 Testing Screw and Plug Connections and Switch Contact	62
2.4 Chain Lubrication	5	7.2 Ignition Module / Control Unit	39	8.3.4 Checking the Solenoid Valve	63
2.5 Tightening Torquese	6	7.3 Removing and Installing	39	8.3.5 Checking Detection of Start Conditions	64
3. Troubleshooting	8	7.4 Testing the Ignition Module	41	8.3.6 Testing the Wiring Harness	65
3.1 Clutch	8	7.4.1 Testing Ignition Module with MDG 1 Engine Analyzer	41	8.4 Wiring Harness	66
3.2 Chain Drive, Chain Brake, Chain Tensioner	9	7.5 Spark Test	42	8.5 Switch Unit	66
3.3 Chain Lubrication	10	7.6 Spark Plug Boot / Ignition Lead	43	8.6 Solenoid Valve	68
3.4 Rewind Starter	11	7.7 Flywheel	44	8.7 M-Tronic Troubleshooting Chart	69
3.5 Ignition System	12	7.8 Testing Wiring Harness	45	8.7.1 Circuit Diagram	69
3.6 Carburetor	13	7.8.1 Testing Wiring Harness without M-Tronic	45	8.7.2 Engine does not start	70
3.7 Engine	17	7.8.2 Testing Wiring Harness with M-Tronic	46	8.7.3 Engine does not start in position ▲	71
4. Clutch	18	7.8.3 Testing Ground Wire	46	8.7.4 Engine speed drops under load – engine down on power	72
4.1 Clutch Drum	18	7.9 Short Circuit Wire / without M-Tronic Removing and Installing	46	8.7.5 Ignition – no spark	73
4.2 Clutch	18	7.10 Short Circuit Wire / with M-Tronic Removing and Installing	48	8.7.6 Engine stops suddenly	74
5. Chain Brake	19	7.11 Short Circuit Wire / with M-Tronic and Heating Removing and Installing	50	8.7.7 Cut-off engine speed is not reached	75
5.1 Checking Operation	19	7.12 Contact Spring	54	9. Rewind Starter	76
5.2 Brake Band	19	7.13 Ignition System Troubleshooting	57	9.1 General	76
5.3 Brake Lever	20			9.2 Rewind Starter Removing and Installing	76
5.4 Cam Lever	21			9.3 Pawls	76
5.5 Pins	21			9.4 Rope Rotor	77
5.6 Chain Tensioner	22			9.5 Starter Rope / Grip	77
5.7 Bar Mounting Studs	23			9.6 Tensioning the Rewind Spring	78
5.8 Collar Nuts for Sprocket Cover	23			9.7 Replacing the Rewind Spring	78
6. Engine	24			9.8 Segment	79
6.1 Muffler	24				
6.2 Leakage Test	25				
6.2.1 Preparations	25				
6.2.2 Vacuum Test	26				
6.2.3 Pressure Test	26				
6.3 Oil Seals	26				
6.3.1 Ignition Side	26				
6.3.2 Clutch Side	27				
6.4 Shroud	28				
6.5 Cylinder	28				

STIHL®

© ANDREAS STIHL AG & Co. KG, 2013

Contents

10. AV Elements	80	13. Fuel System	97	14. Heating System	118
10.1 Stop Buffer at Clutch Side	80	13.1 Air filter	97	14.1 Carburetor Heating	118
10.2 Antivibration Element on Oil tank / Tank Housing	80	13.2 Baffle	97	14.1.1 Testing the Complete System	118
10.3 AV Element on Fuel Tank	81	13.3 Filter Base	97	14.1.2 Testing the Heating Element	118
10.4 AV Element on Handlebar	83	13.4 Carburetor	98	14.1.3 Thermostatic Switch	119
10.4.1 Stop Buffer at Ignition Side	83	13.4.1 Leakage Test	101	14.2 Carburetor Heating System Troubleshooting Chart	120
10.5 Handlebar	83	13.5 Servicing the Carburetor	101	14.3 Handle and Carburetor Heating System	121
10.5.1 Handlebar / Wrap Around Handlebar with Heating	85	13.5.1 Disassembling and Cleaning the Carburetor	101	14.3.1 Troubleshooting	121
11. Control Levers	88	13.5.2 Assembling the Carburetor	102	14.4 Heater Switch	122
11.1 Switch Shaft	88	13.5.3 Metering Diaphragm	102	14.5 Heating Element in Rear Handle	123
11.1.1 Removing and Installing	88	13.5.4 Inlet Needle	103	14.6 Heating Element in Handlebar	124
11.2 Throttle Trigger / Lockout Lever	90	13.5.5 Pump Diaphragm	104	14.7 Generator	124
11.3 Throttle Rod	91	13.5.6 Lever on Throttle Shaft	105	14.7.1 Handle Heating and Generator Trouble-shooting Chart	126
11.3.1 Choke Rod Models without M-Tronic	93	13.5.7 Lever on Choke Shaft	106	14.7.2 Test Connections and Test Values	128
12. Chain Lubrication	94	13.5.8 Lever on Choke Shaft / Models with M-Tronic	106	14.8 Heating Element Connecting Wires	130
12.1 Pickup Body	94	13.6 Adjusting the Carburetor, Models with M-Tronic	107	14.8.1 Connecting Wire between Rear Handle and Handlebar	130
12.2 Oil Suction Hose	94	13.7 Adjusting the Carburetor, Models without M-Tronic	107	14.8.2 Connecting Wire between Rear Handle and Generator	131
12.3 Oil Pump	94	13.7.1 Adjusting Screws	107	15. Special Servicing Tools	134
12.3.1 Adjusting Uprated Oil Pumps	96	13.8 Adjusting the Carburetor	109	16. Servicing Aids	136
12.4 Valve	96	13.8.1 Basic Setting	109		
		13.8.2 Setting	109		
		13.8.3 Standard Setting	110		
		13.9 Manifold	111		
		13.9.1 Impulse Hose	112		
		13.10 Tank Vent	113		
		13.10.1 Testing	113		
		13.10.2 Removing and Installing	113		
		13.11 Fuel Intake	114		
		13.11.1 Pickup Body	114		
		13.11.2 Fuel Suction Hose in Tank Housing	114		
		13.11.3 Fuel Suction Hose on Carburetor	115		
		13.11.4 Tank Housing	115		

1. Introduction and Safety Precautions

1.1 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 malfunction on the machine may have several causes. To help locate the problem, 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 "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 that is shown in the illustration (above the text)
- = Action to be taken that is not shown in the illustration (above the text)

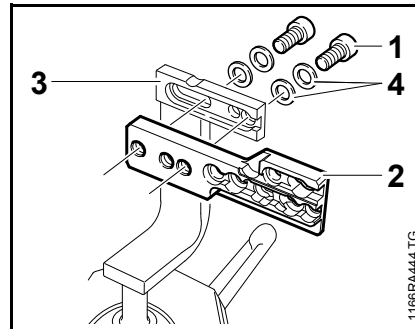
In the illustrations:

➔ Pointer (short arrow)

➡ 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.



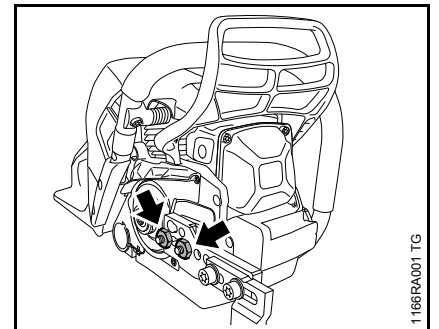
Servicing and repairs are made considerably easier if the machine is mounted to assembly stand (3) 5910 890 3100. To do this, secure the mounting plate (2) 5910 850 1651 to the assembly stand with two screws (1) and washers.

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

The screws must not project since they may, depending on the machine, damage housings when the machine is clamped in position, pack with washers (4) if necessary.

Preparations for servicing

The chain sprocket, saw chain and guide bar must be removed to mount the machine on the assembly stand for servicing.



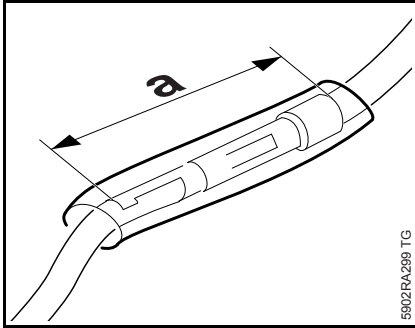
Engage the bar mounting studs in the lower holes in the mounting plate and secure the machine in position with the M 8 nuts (arrows).

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 fuels

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

Connectors in electrical wires



The insulating tube must be centered on the connector and completely cover it – there is otherwise a risk of a short circuit.

The connector is properly assembled when its overall length is $a =$ no more than 30 mm.

Positioning wires

Always use punch down tool 5910 890 4000 to press electrical wires fully into their guides.

1.2 Safety Precautions

If the machine 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.

Fuel is extremely flammable and can be explosive in certain conditions.

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.

Avoid direct skin contact with fuel and avoid breathing in fuel vapor.

Always perform leakage test after working on the fuel system and the engine.

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.

The ignition is switched on again automatically after the engine stops. The engine can start at any time if the rewind starter is operated.

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.

Always replace damaged parts. Check disassembled parts for wear or damage before re-installing – replace as necessary.

Run the machine only with the rewind starter and shroud mounted in position – there is otherwise a risk of injury from the flywheel and a risk of engine damage due to overheating.

Remove the spiked bumper to reduce the risk of injury from contact with the sharp tips.


The chapter on tightening torques lists all machine components that have to be tightened to a specific torque or coated with threadlocking adhesive. The specifications must be maintained when tightening down screws, nuts and other fasteners in all the procedures described in this service manual.

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 can be overstretched during removal.

Install new fuel hoses either dry or with the aid of STIHL press fluid – coat the ends of hoses and the connectors,  16.

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

2. Specifications

2.1 Engine

MS 661, MS 661 C-M

Displacement:	91.1 cc
Bore:	56.0 mm
Stroke:	37.0 mm
Engine power to ISO 7293:	5.4 kW (7.4 bhp) at 9,500 rpm
Max. permissible speed (with cutting attachment): ¹⁾	13,500 rpm ¹⁾
Idle speed:	2,800 rpm
Clutch:	Centrifugal clutch without linings
Clutch engages at:	4,080 rpm
Crankcase leakage test at gauge pressure:	0.5 bar
under vacuum:	0.5 bar

2.2 Fuel System

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

2.3 Ignition System

Air gap between ignition module and fanwheel:	0.30 (+ 0.05 / - 0.10) mm
Spark plug (resistor type):	NGK BPMR 7 A BOSCH WSR 6 F
Electrode gap:	0.5 mm

2.4 Chain Lubrication

Speed-controlled oil pump with reciprocating piston and manual flow control

Settings for oil delivery rate:

Standard / Uprated	min.: 7.0 (+/- 2.8) cc/min at 7,000 rpm
Standard	max.: 14.3 (+/- 2.5) cc/min at 7,000 rpm
Uprated (with pin driven home)	max.: 18.9 (+/- 2.5) cc/min at 7,000 rpm

¹⁾ The engine reaches its maximum RPM and maximum power after the break-in period (5 to 10 tank fillings) – do not make any changes to the high speed screw (H) during the break-in period.

2.5 Tightening Torque

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**.

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

Insert the screw in the hole and rotate it counterclockwise until it drops down slightly and engages in the existing thread. 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.

Micro-encapsulated screws and screws coated with threadlocking adhesive:

Before re-installing, clean both threads (screw tap into female thread by hand and then blow out with compressed air; clean male thread with brush), coat micro-encapsulated screws with medium-strength Loctite 242 or 243, and screws previously coated with threadlocking adhesive with Loctite (see list of screws below).

Power screwdriver setting for polymer: P and DG 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.

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	M 4x8	Chain tensioner cover plate / crankcase	2.0	4)
Screw	P 6x40	Cover / handlebar / handle housing	6.0	
	M 8	Starter post / fan housing	12.0	5)
Screw	M 4x12	Brake band / crankcase	3.0	4), 5)
Collar screw	M 8	Collar screw / crankcase, for bar	23.0	2)
Screw	M 4x12	Cover, chain brake / crankcase	3.0	4), 6)
	M 10x1	Decompression valve	14.0	
Screw	M 4x10	Flange / crankcase	2.5	5)
Nut	M 12x0.75	Housing / heater switch	2.0	V, W
Screw	M 4x12	Generator / crankcase	3.0	V, W, 5)
Collar screw	M 6x26	Handlebar / PA6 bushing	6.0	
Screw	P 6x40	Handlebar holder / handlebar / handle housing	6.0	
Screw	M 5x40x25	Hand guard / fan housing / crankcase	7.0	4), 6)
Nut	M 5	Shroud / stud, cylinder	3.0	
Nut	M 6	Spiked bumper (chain catcher)	6.0	
Locknut	M 5	Spiked bumper / chain sprocket cover	6.0	
Screw	M 5x12	Spiked bumper / chain sprocket cover / nut	6.0	
Screw	M 5x12	Spiked bumper / crankcase, top	8.0	4), 6)
Locknut	M 5	Spiked bumper / crankcase, top / nut	8.0	

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	M 5x20	Spiked bumper / crankcase, bottom	8.0	5)
Collar screw	M 6x50	Spiked bumper / nut (chain catcher)	6.0	5)
Screw	M 5x20	Crankcase, sprocket side/fan side	10.0	4), 6)
Screw	P 5x16	Bearing plug AS1 / crankcase	4.0	
Screw	M 5x16	Bearing plug AS2 / handlebar	6.0	4), 5)
Screw	M 5x16	Bearing plug AS2 / cylinder	10.0	4), 5)
Screw	P 5x16	Bearing plug ZS3 / crankcase	4.0	
Screw	M 5x20	Fan housing / crankcase	7.0	4), 6)
Screw	M 4x12	Fan housing / winter cover plate	2.0	5)
Carrier	M 13x1 L	Carrier / crankshaft	70.0	
Screw	M 4x12	Oil pump / crankcase	3.0	4), 5)
Screw	M 4x10	Ground wire cable lug / crankcase	2.5	4), 5)
Screw	P 4x10	M-Tronic cable lug / handle housing	1.5	
Screw	P 4x10	Heater cable lug / handle housing	1.5	V, W
Screw	M 5x20	Muffler / crankcase	10.0	4), 5), 6)
Screw	M 5x30	Muffler / cylinder	10.0	3), 4), 6)
Screw	M 5x6	Muffler casing, top	6.0	4), 5)
Screw	M 4x12	Switch unit / carburetor	2.0	5)
Screw	P 4x10	Guard / handle housing	1.5	
Nut	M 10x1	Flywheel / crankshaft	45.0	7)
Screw	M 4x8	Side plate / crankcase	2.0	4)
Screw	M 3x20	Manifold clamp / cylinder	0.5	
Screw	M 4x20	Ignition module / control unit / crankcase	4.0	5)
Stud	M 5	Stud / cylinder	8.0	5)
Screw	6-32 UNCx11.5	Thermostatic switch / carburetor cover	1.1	V
Screw	M 3x4.5	Solenoid valve / carburetor	0.7	
Collar nut	M 5	Carburetor	3.5	
Screw	P 6x40	Elbow connector / handle housing	6.0	
Screw	M 5x16	Elbow connector / handlebar	7.0	4), 6)
	M 14x1.25	Spark plug	25.0	
Screw	M 6x30	Cylinder / crankcase	15.0	4), 6)

Remarks:

- 1) Loctite 242 or 243, medium strength
- 2) Loctite 270, high strength
- 3) Loctite 272, high strength up to 250°C
- 4) Screws with binding head
- 5) Micro-encapsulated screws
- 6) Waxed screws
- 7) Degrease crankshaft / flywheel and mount oil-free
- W) Heated handles
- V) Carburetor heating

3. Troubleshooting

3.1 Clutch

Condition	Cause	Remedy
Saw chain stops under full load	Clutch shoes badly worn	Install new clutch
	Clutch drum badly worn	Install new clutch drum
Saw chain runs while engine is idling	Engine idle speed too high	Depending on model: Readjust idle speed screw LA or check M-Tronic
	Clutch springs stretched	Replace the clutch springs or install new clutch
	Clutch springs broken	Replace the clutch springs
Loud noises	Clutch springs stretched	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

3.2 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
Saw chain stops under full load	Brake band blocked	Check freedom of movement and operation of brake band
Saw chain does not stop immediately when brake is activated	Chain brake spring stretched / broken	Fit new brake spring
	Brake band stretched / worn / broken	Fit new brake band
	Clutch drum worn	Install new clutch drum

3.3 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 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
	Teeth on worm worn	Install new worm
	Oil pump damaged or worn	Install new oil pump
Machine losing chain oil	Oil pump damaged or worn	Install new oil pump
	Oil suction hose connection damaged	Install new oil suction hose
	Gasket between two halves of crankcase faulty or crankcase cracked	Install new gasket, inspect both halves of crankcase and replace if necessary
Oil pump delivers insufficient oil	Oil pump damaged or worn	Install new oil pump
	Oil pump delivery rate set too low	Adjust oil pump
	Worm driver is loose	Install new worm
	Sealing ring between oil pump and crankcase damaged	Replace the sealing ring

3.4 Rewind Starter

Condition	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge, i.e. not vertically	Install new starter rope
	Normal wear	Install 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	Install 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	Replace pawls
	Spring clip on pawl fatigued	Fit new spring clip
	Spring clip not installed properly	Install spring clip correctly
Starter rope is difficult to pull or rewinds very slowly	Starter mechanism is very dirty	Thoroughly clean complete starter mechanism
	At very low outside temperatures: Lubricating oil on rewind spring becomes viscous (spring windings stick together) or moisture has got onto the rewind spring (spring windings frozen 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

3.5 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, fit new spring and spark plug boot 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	Install new ignition lead
	Fuel/oil mixture – too much oil	Use correct mixture of fuel and oil
	Incorrect air gap between ignition module / control unit 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 has sheared off or slot in flywheel is worn	Install new flywheel or key
	Weak magnetization in flywheel	Install new flywheel
	Irregular spark	Check operation of switch shaft/contact spring and ignition module or control unit. Damaged insulation or break in ignition lead or short circuit wire – check ignition lead / ignition module / control unit, replace if necessary. Check operation of spark plug, clean the spark plug, replace if necessary, check M-Tronic with aid of troubleshooting chart,  8.7.



The carburetor or engine may also be the cause of poor engine running behavior

3.6 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 needle worn	Fit new inlet needle
	Inlet control lever sticking on spindle	Check the inlet control lever and 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 new metering diaphragm
	Metered diaphragm deformed	Fit new metering diaphragm
Poor acceleration	Low speed screw L and / or high speed screw H too lean	Check basic carburetor setting, correct if necessary
	Models with M-Tronic, carburetor setting too lean	Check M-Tronic with STIHL MDG 1 and troubleshooting chart,  8.7, adjust or calibrate control unit,  8.1
	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Metering diaphragm or gasket damaged	Fit a new metering diaphragm and gasket
	Tank vent faulty	Fit new tank vent
	Leak in fuel hose between pickup body and carburetor	Seal connections or install new fuel hose

Condition	Cause	Remedy
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	Readjust idle speed screw LA (clockwise)
	Models with M-Tronic, carburetor setting too rich or too lean	Check M-Tronic with STIHL MDG 1 and troubleshooting chart,  8.7, adjust or calibrate control unit,  8.1 (setting of idle speed screw must not be changed)
	Tank vent faulty	Fit new tank vent
Engine will not idle, idle speed too high	Leak in fuel hose between pickup body and carburetor	Seal connections or install new fuel hose
	Setting of idle speed screw LA incorrect – throttle shutter opened too wide	Readjust idle speed screw LA (counterclockwise)
	Models with M-Tronic, idle speed too high	Check M-Tronic with STIHL MDG 1 and troubleshooting chart,  8.7, adjust or calibrate control unit,  8.1 (setting of idle speed screw must not be changed)
	Oil seals / crankcase leaking	Seal oil seals / crankcase, replace if necessary
	Throttle shutter does not close	Install new carburetor

Condition	Cause	Remedy
Saw chain runs while engine is idling	Engine idle speed too high	Readjust idle speed screw LA (counterclockwise)
	Models with M-Tronic, idle speed too high	Check M-Tronic with STIHL MDG 1 and troubleshooting chart,  8.7, adjust or calibrate control unit,  8.1 (setting of idle speed screw must not be changed)
Engine speed drops quickly under load – low power	Air filter dirty	Clean air filter or replace if necessary
	Throttle shutter not opened fully	Check rod
	Tank vent faulty	Fit new tank vent
	Fuel pickup body dirty	Fit new pickup body
	Fuel strainer dirty	Clean fuel strainer in carburetor, replace if necessary
	Leak in fuel hose between pickup body and carburetor	Seal connections or install new fuel hose
	Setting of high speed screw (H) too rich	Check basic carburetor setting, correct if necessary
	Models with M-Tronic, carburetor setting too rich	Check M-Tronic with STIHL MDG 1 and troubleshooting chart,  8.7, adjust or calibrate control unit,  8.1
	Main jet bores or ports blocked	Clean the carburetor
	Pump diaphragm damaged or fatigued	Fit new pump diaphragm
	Ignition timing wrong, flywheel out of adjustment – key has sheared off or slot in flywheel is worn	Install new flywheel or key

Condition	Cause	Remedy
Engine running extremely rich, has no power and a very low maximum speed	Choke shutter does not open fully	Check carburetor and choke shaft, service or replace if necessary
	Models with M-Tronic, carburetor setting too rich	Check M-Tronic with STIHL MDG 1 and troubleshooting chart,  8.7, adjust or calibrate control unit,  8.1

3.7 Engine


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

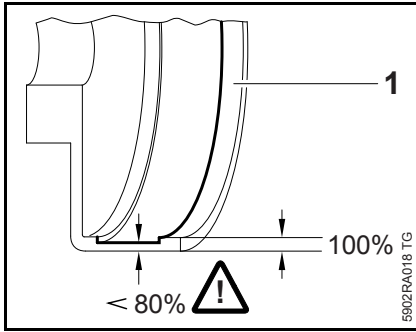
- Air filter, fuel system
- Carburetor, ignition system
- Check M-Tronic with STIHL MDG 1 and troubleshooting chart

Condition	Cause	Remedy
Engine does not start easily, stalls at idle speed, but operates normally at full throttle	Oil seals in crankcase damaged	Install new 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	Install 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	Clean or replace air filter
	Fuel hose kinked or torn	Fit new hose or position it free from kinks
	Decompression valve is not closed	Close and check decompression valve, replace 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
	Air inlet in fan housing dirty	Clean air inlet on fan housing

4. Clutch

4.1 Clutch Drum

- Remove and install the clutch drum, see instruction manual.
- Clean needle cage and crankshaft stub and lubricate with STIHL grease,  16




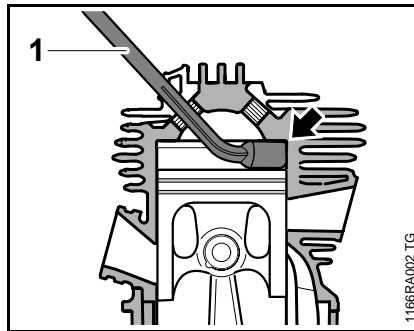
- Inspect the clutch drum (1) for signs of wear.

If there are signs of serious wear on the inside diameter of the clutch drum (1), check the remaining wall thickness. If it is less than about 80% of the original thickness, install a new clutch drum.

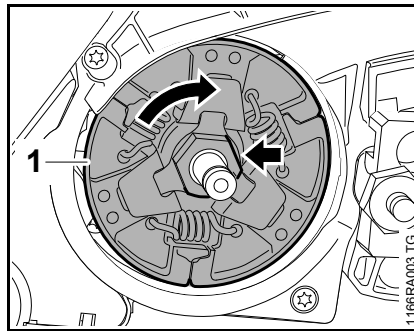
- Install the clutch drum.

4.2 Clutch

- Troubleshooting,  3
- Remove the filter cover
- Pull off the boot and unscrew the spark plug.
- Remove the rim sprocket and clutch drum.



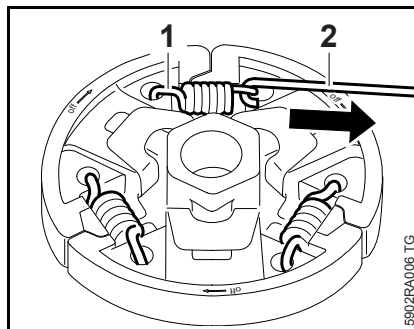
- Push the locking strip (1) 0000 893 5903 into the spark plug hole ("OBEN-TOP" must face up) until it locates against the cylinder wall (arrow)
 - as shown in the illustration.



- Apply wrench to hexagon (arrow) and unscrew the clutch (1).

Note that the clutch has a left-hand thread.

Disassembling



- Use hook (2) 5910 890 2800 to remove the clutch springs (1).

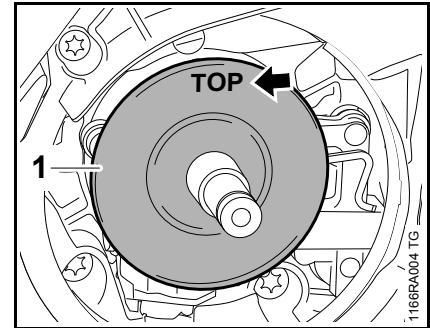
If clutch is seriously worn, install new set of 3 clutch shoes.

Assembling

- Fit the retainers and push the clutch shoes onto the arms of the clutch carrier.

Attach the springs at the side with the raised hexagon.

- Use hook 5910 890 2800 to attach the springs.
- Check the clutch – all springs must be properly attached.



The cover washer (1) must be in place and the word "TOP" (arrow) must face outwards.

- Screw the clutch onto the crankshaft stub so that the raised hexagon faces outwards, tighten it down firmly
 - left-hand thread.
- Remove the locking strip from the cylinder.
- Reassemble all other parts in the reverse sequence.

5. Chain Brake


5.1 Checking Operation

The chain brake is one of the most important safety devices on the chain saw. Its efficiency is measured in terms of the chain braking time, i.e. the time that elapses between activating the brake and the saw chain coming to a complete standstill.



Contamination (with chain oil, chips, fine particles of abrasion, etc.) and smoothing of the friction surfaces of the brake band and clutch drum impair the coefficient of friction, which prolongs the braking time. A fatigued or stretched brake spring has the same negative effect.

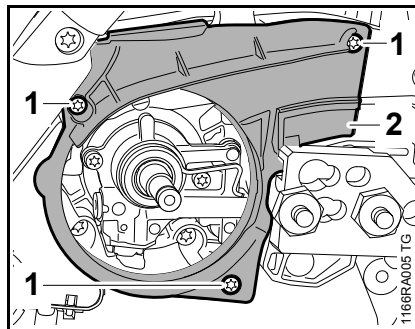
- Start the engine.
- With the chain brake activated (locked), open the throttle wide for a brief period (max. 3 seconds) – the chain must not rotate.
- With the chain brake released, open the throttle wide and activate the brake manually – the chain must come to an abrupt stop.

The braking time is in order if deceleration of the saw chain is imperceptible to the eye (a fraction of a second).

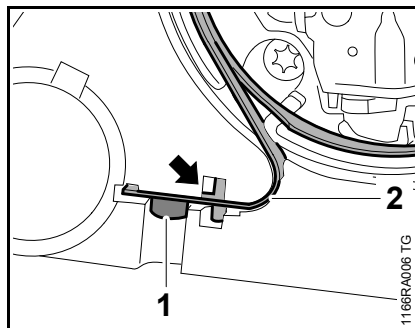
If the chain brake does not operate properly, refer to troubleshooting,  3.2.

5.2 Brake Band

- Troubleshooting,  3.2
- Remove the clutch drum,
- Remove the clutch,  4.2
- Take out the screw and remove the side plate.



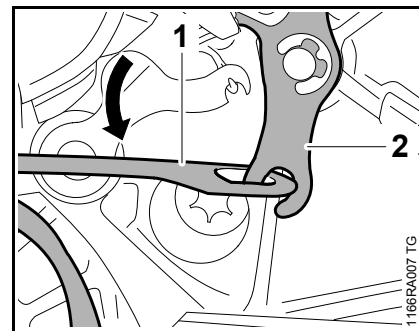
- Take out the screws (1) and remove the cover (2).



- Engage the chain brake
– Brake band no longer tensioned in its seat.
- Take out the screw (1) and pry the brake band (2) out of its seat (arrow).

Do not overstretch the brake band.

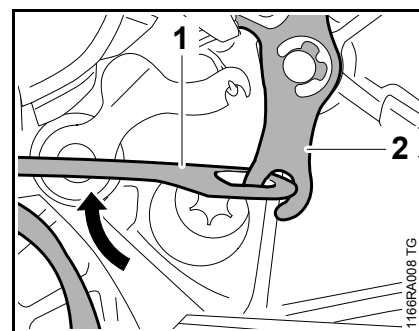
- Disengage the chain brake.



- Turn the brake band (1) to one side and disconnect it from the brake lever (2).

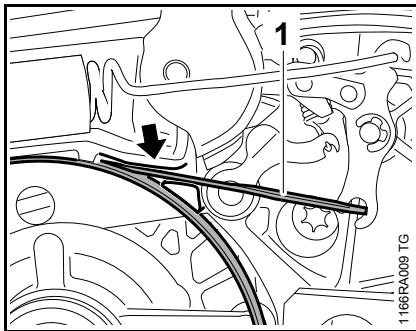
Install a new brake band if there are noticeable signs of wear (large areas on inside diameter and/or parts of outside diameter – arrows) and its remaining thickness is less than 0.6 mm.

Installing



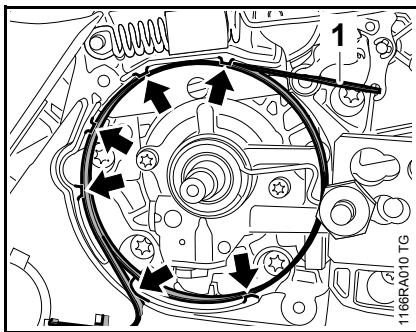
The chain brake must be disengaged.

- Hold the brake band (1) sideways, attach it to the brake lever (2) and then swing it in the direction of its seat.



- Position the brake band (1) in the guide (arrow).

- Engage the chain brake



- Push the brake band (1) into its seat (arrows) as far as stop.

- Insert and tighten down the screw on the underside.

- Fit cover, insert and tighten down the screws firmly.

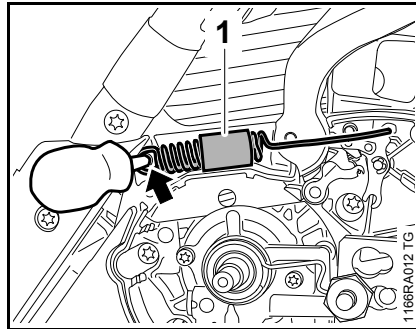
- Install the clutch drum, 4.1

- Check operation, 5.1

- Reassemble all other parts in the reverse sequence.

5.3 Brake Lever

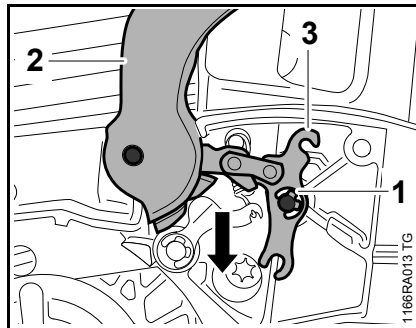
- Troubleshooting, 3.2
- Remove the brake band, 5.2



- Engage the chain brake
– this relieves spring tension.

- Use the assembly tool 1117 890 0900 to disconnect the brake spring (1) from the anchor pin (arrow) and the brake lever.

- Remove the rewind starter, 9.2



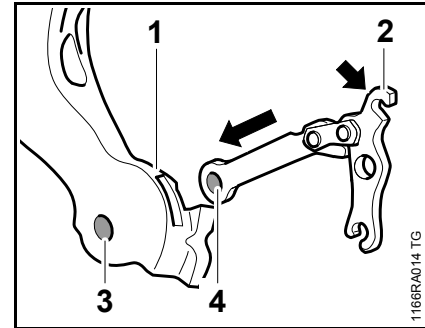
- Remove the E-clip (1), then pull the hand guard (2) and brake lever (3) off the pivot pins together.

- Check the pivot pins, replace if necessary, 5.5

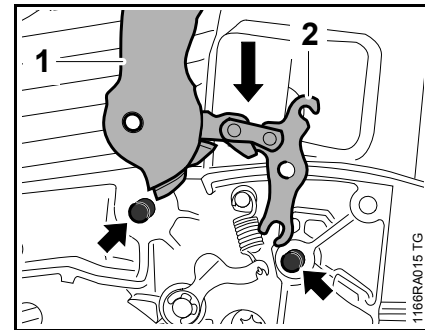
- Inspect the cam lever and replace if necessary, 5.4

Installing

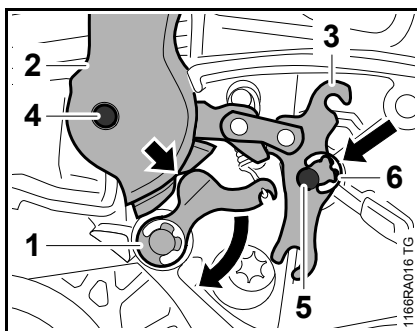
- Clean pins and disassembled parts and lubricate with STIHL grease, 16




- Push the brake lever, hook (2) for spring facing up, into the recess in the hand guard (1) and line up the holes (3, 4).



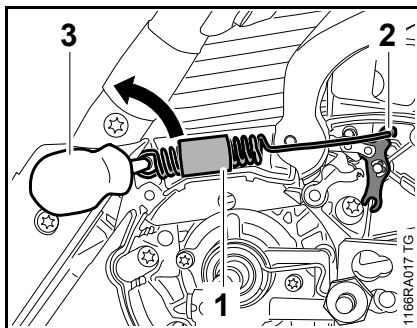
- Push the hand guard (1) with brake lever (2) over the machine until they are positioned against the pivot pins (arrows).



- Lubricate the brake lever, cam lever and hand guard slot with STIHL grease,  16
- Turn cam lever (1) to one side until the cam of the hand guard (arrow) slips past it, then push the hand guard (2) and brake lever (3) onto the pivot pins (4, 5).
- Fit the E-clip (6).

The turns of the brake spring must be tightly against one another in the relaxed condition. If this is not the case, replace the brake spring.

- Center the protective tube on the brake spring.

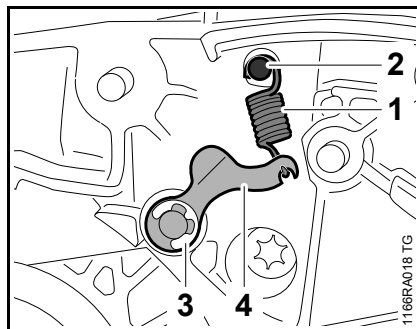



- Hook the brake spring (1) to the brake lever (2) and use the assembly tool (3) 1117 890 0900 to attach it to the anchor pin.
- Reassemble all other parts in the reverse sequence.

5.4 Cam Lever


The cam lever defines the locked position of the hand guard.

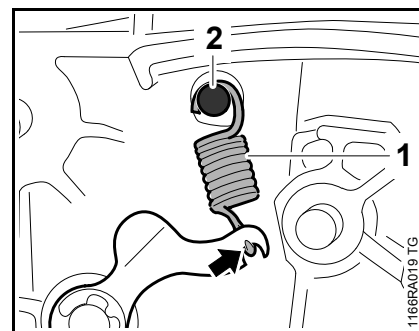
- Remove the brake lever,  5.3



- Disconnect the spring (1) from the anchor pin (2) and cam lever (4).
- Remove the E-clip (3) and pull off the cam lever (4).
- Check the cam lever, spring and cam running face on the hand guard, and replace as necessary.
- Inspect all pivot pins and replace if necessary,  5.5


Installing

- Lubricate the pivot pins with STIHL grease,  16
- Install the cam lever so that the lobe points in the direction of the carburetor.
- Fit the E-clip-



- Attach the spring (1) to the cam lever so that the open side of the spring hook (arrow) faces outwards.
- Attach the spring (1) to the anchor pin (2).

The cam lever is not yet under tension – the spring may become detached.



- Lubricate the cam lever with STIHL grease,  16
- Reassemble all other parts in the reverse sequence.

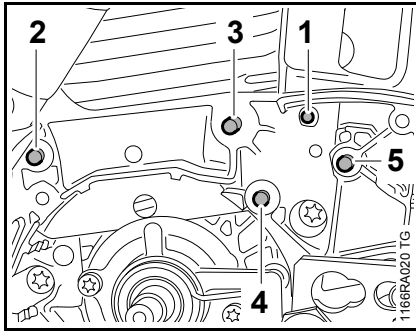
5.5 Pins

The anchor and pivot pins secure the springs. Worn pins must be replaced.

- The springs may otherwise become detached and pop out.

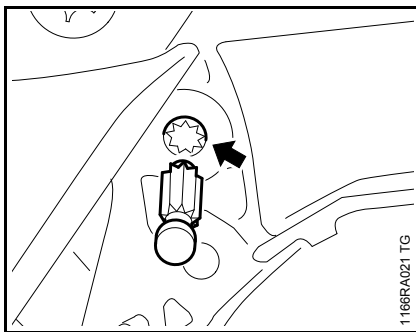
The pins must be driven home squarely.

- Remove the brake lever,  5.3
- Remove the cam lever,  5.4



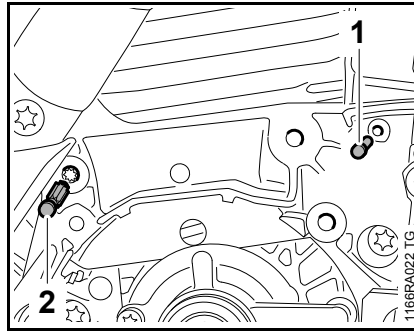
- Remove the pins (1) to (5).

Installing

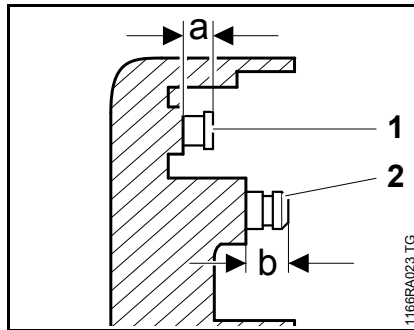


- Before installing the new pin, coat its knurled shank with threadlocking adhesive, 16
- Position the new pin in the bore (arrow) so that the knurling on the pin meshes with the existing knurling in the bore.

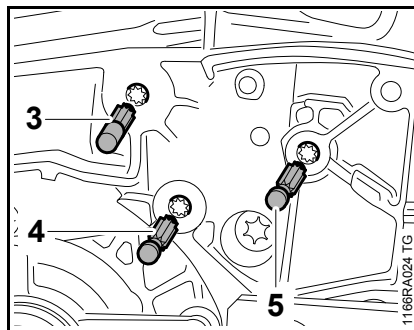
The pins must be driven home squarely.



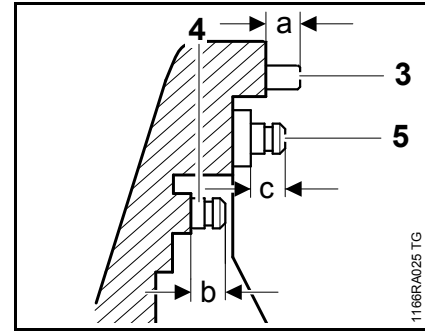
- Drive home the pins (1 and 2) as specified below.



- Pin (1) a = about 2.9 - 3.3 mm
Pin (2) b = about 4.3 - 4.7 mm



- Drive home the pins 3, 4 and 5) as specified below.

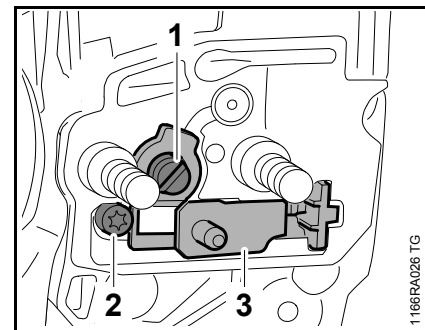


- Pin (3) a = about 9.9 - 10.1 mm
Pin (4) b = about 4.6 - 4.8 mm
Pin (5) c = about 5.1 - 5.3 mm

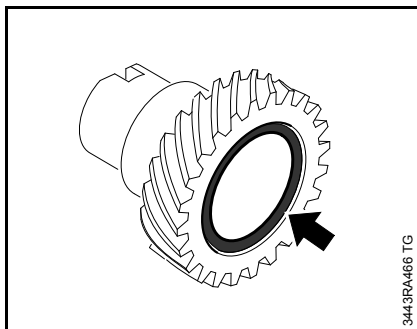
- Lubricate the brake lever and cam lever with STIHL grease, 16
- Reassemble all other parts in the reverse sequence.

5.6 Chain Tensioner

- Troubleshooting, 3.2
- Remove the side plate, 5.2



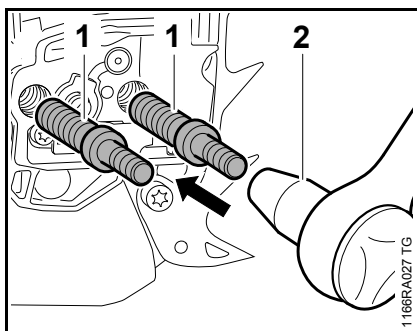
- Rotate the spur gear (1) clockwise until the screw (2) is visible.
- Take out the screw (2) and pull out the tensioner (3).
- Remove the O-ring.
- Check individual parts of the chain tensioner, replace if necessary



- Fit the O-ring in the spur gear recess (arrow).
- Clean all disassembled parts, 16
- Lubricate the threads, gears and O-ring with STIHL grease, 16
- Reassemble in the reverse sequence.

5.7 Bar Mounting Studs

- Remove the side plate, 5.2
- Use stud puller 5910 893 0501 to unscrew collar studs from crankcase.

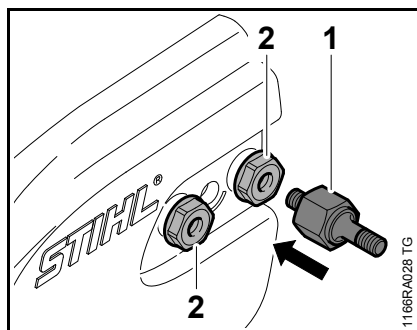


- Before installing, coat the threads (1) of the collar studs with threadlocking adhesive, 16
- Use stud puller (2) 5910 890 0501 to fit and tighten down the collar studs (1).

- Reassemble all other parts in the reverse sequence.

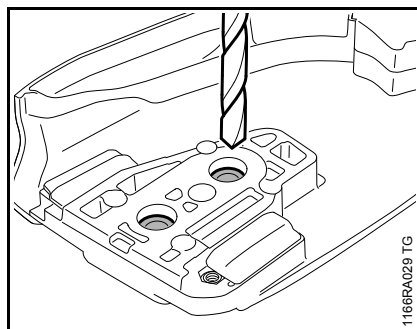
5.8 Collar Nuts for Sprocket Cover

Use special tool 5910 893 9601 to replace the nuts.



- Remove the chain sprocket cover.

- Screw the short stud (marked "S") of special tool (1) 5910 893 9601 into the collar nut (2) as far as stop.

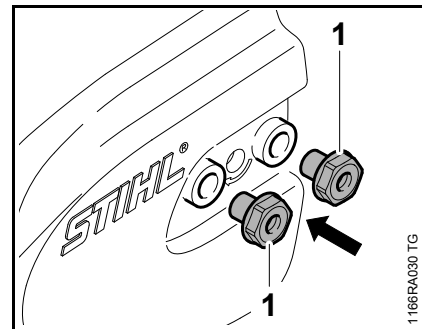


- Turn the sprocket cover over and clamp the special tool's hexagon in a vise.

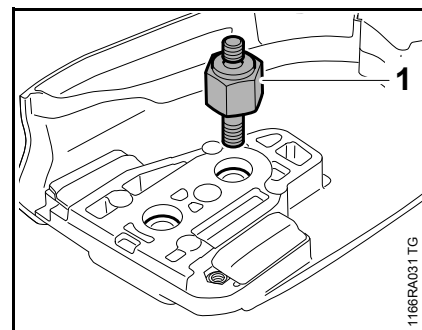
- Use an 11mm drill to drill away the flange of the captive nuts – the shoulder in the sprocket cover must not be drilled out.

- Remove the collar nuts.
- Unscrew the special tool from the collar nuts.

Installing



- Push the new collar nuts (1) into position.



- Hold hexagon of collar nuts steady.
- Screw the long stud (marked "L") of special installing tool (1) 5910 893 9601 into the collar nuts from the other side as far as stop.

This flares the ends of the new collar nuts and secures them in the sprocket cover.

- Reassemble all other parts in the reverse sequence.

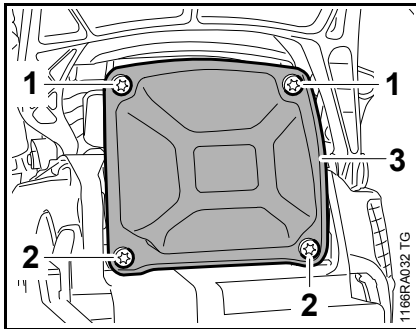
6. Engine

6.1 Muffler

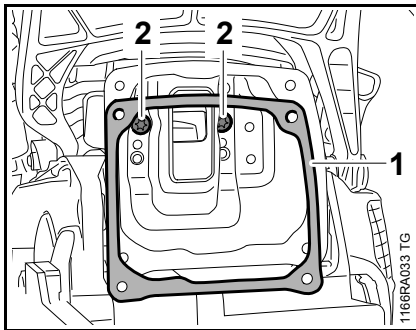
Always check and, if necessary, repair the fuel system, carburetor, air filter and ignition system before looking for faults on the engine.

- Check M-Tronic models with STIHL MDG 1 using troubleshooting chart, 8.7
- Troubleshooting, 3

To ensure that no dirt particles enter the cylinder, set the piston to top dead center before removing the muffler – top dead center is reached when the magnet poles ("N / S") on the flywheel face upwards.

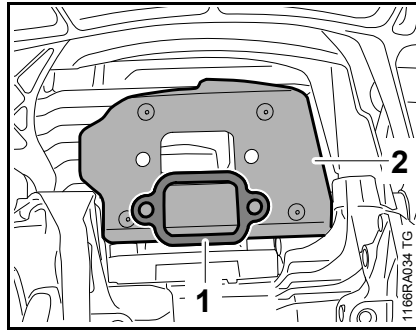


- Take out the screws (1, 2).
- Remove the top casing (3), check it and replace if necessary.



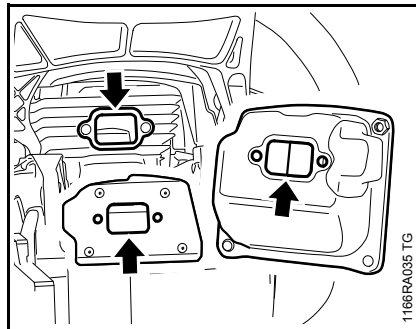
- Remove the gasket (1) and take out the screws (2) – always install a new gasket.

- Remove and inspect the muffler and replace it if necessary.



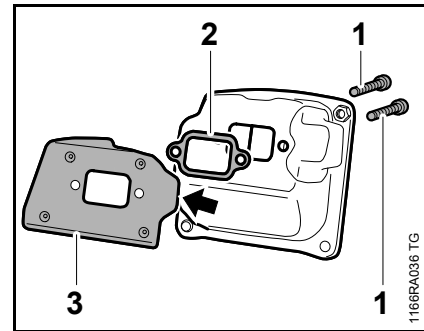
- Remove oil muffer gasket (1) and heat shield (2) – always install a new gasket.
- Remove and install the spark arresting screen – see instruction manual.

Installing

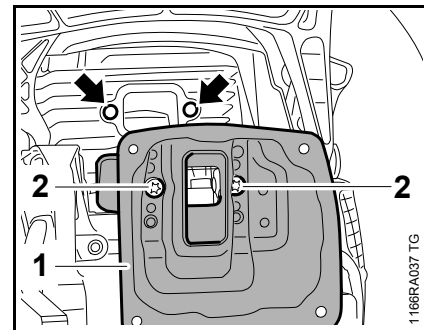


- Clean away any dirt from the cylinder and exhaust port.
- Check and clean the sealing faces (arrows) on exhaust port, heat shield and muffler, remove any gasket residue – make sure there is no gasket residue or dirt particles in the exhaust port.

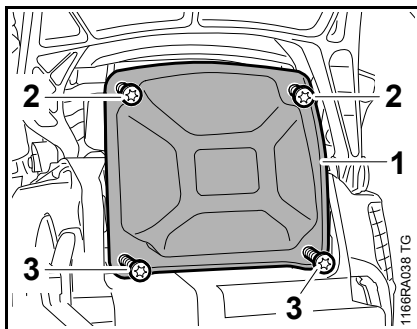
Always replace components with damaged sealing faces.



- Insert screws (1) through the muffler and fit the muffler gasket (2).
- Hold the heat shield (3) with the pegs facing the muffler so that the contour (arrow) is next to the muffler outlet and then push it into position.



- Coat screw holes (arrows) and screws (2) with threadlocking adhesive – only coat threads in screw holes (arrows), not the pilot holes, 16
- Carefully place muffler (1) with gasket and heat shield in position and insert the screws (2).
- Check position of muffler gasket and heat shield.
- Insert and tighten down the screws (2) firmly.



- Clean the sealing face.
- Fit a new gasket between the muffler and exhaust casing.
- Fit the exhaust casing (1), insert the screws (2, 3) and tighten them down firmly.

6.2 Leakage Test

Defective oil seals and gaskets or cracks in castings are the usual causes of leaks. Such faults allow supplementary air to enter the engine and upset the fuel-air mixture.

This may affect the idle speed in particular.

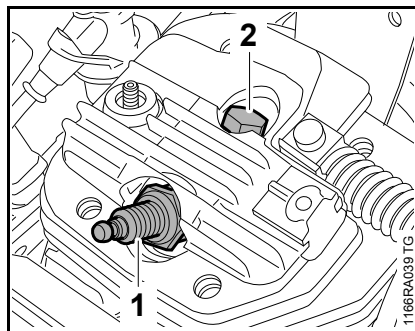
Moreover, the transition from idle speed to part or full throttle may not be smooth.

Always perform the vacuum test first and then the pressure test.

The engine can be checked thoroughly for leaks with the pump 0000 850 1300.

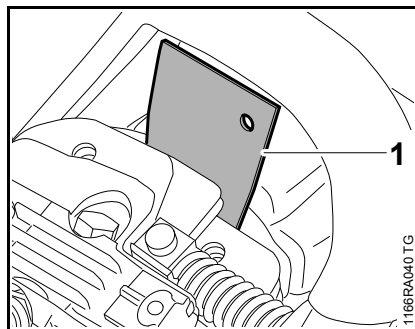
6.2.1 Preparations

- Remove the filter cover
- Remove the shroud, 1166RA039 TG



The spark plug (1) must be tightened down firmly.

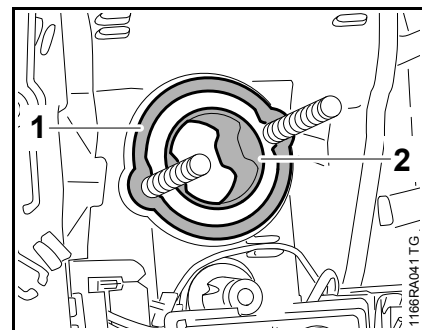
- Remove the decompression valve, 1166RA040 TG
- Fit the plug (2) 1122 025 2200 and tighten it down firmly.
- Remove the exhaust casing and loosen the muffler screws, 1166RA041 TG



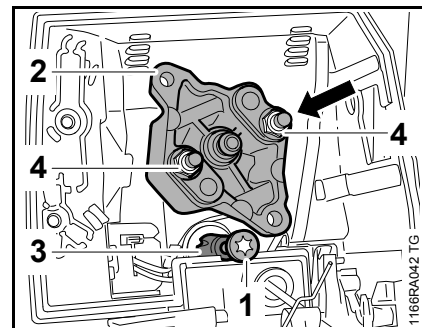
- Fit the sealing plate (1) 0000 855 8106 on the exhaust port – between the gasket / heat shield and cylinder.
- Tighten the screws moderately.

The sealing plate must completely fill the space between the two screws.

- Remove the carburetor, 1166RA042 TG

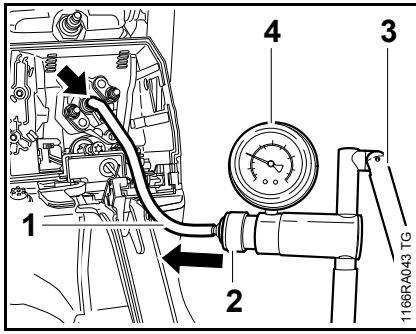


- Washer (1) and sleeve (2) must be in place.



- Coat screw (1) or inside of impulse hose with STIHL press fluid, 1166RA043 TG
- Take screw (1) out of flange (2) and insert it in the impulse hose (3).
- Push the flange (2) 5910 850 4200 over the collar screws as far as stop.
- Fit the nuts (4) and tighten them down firmly.

6.2.2 Vacuum Test



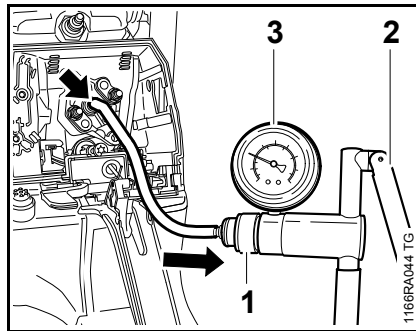
- Connect hose (1) of pump 0000 850 1300 to the nipple (arrow).
- Push ring (2) to the left – vacuum test.
- Operate the lever (3) until the pressure gauge (4) indicates a vacuum of 0.5 bar.

If the vacuum reading remains constant, or rises to no more than 0.3 bar within 20 seconds, it can be assumed that the oil seals are in good condition. However, if the pressure continues to rise (reduced vacuum in the engine), the oil seals must be replaced, 6.3.

- After finishing the test, push the ring to the right to vent the pump.
- Continue with pressure test, 6.2.3

6.2.3 Pressure Test

Carry out the same preparations as for the vacuum test, 6.2.2



- Connect hose of pump 0000 850 1300 to the nipple (arrow).
- Push ring (1) to the right – pressure test.
- Operate the lever (2) until the pressure gauge (3) indicates a pressure of 0.5 bar. If this pressure remains constant for at least 20 seconds, the crankcase is airtight.
- If the pressure drops, the leak must be located and the faulty part replaced.

To find the leak, coat the suspect area with oil and pressurize the crankcase again. Bubbles will appear if a leak exists.

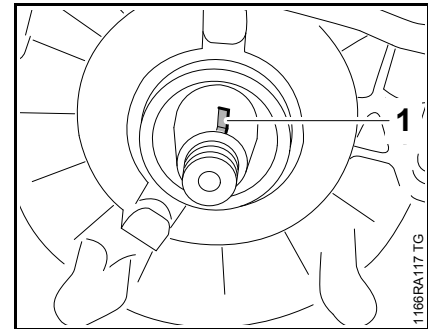
- After finishing the test, push the ring to the left to vent the pump – disconnect the hose.
- Remove the flange 5910 850 4200.
- Loosen the muffler screws and remove the sealing plate 0000 855 8106.
- Replenish threadlocking adhesive and install the muffler, 6.1
- Install the carburetor, 13.4
- Reassemble all other parts in the reverse sequence.

6.3 Oil Seals

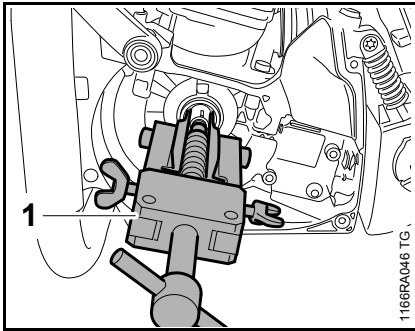
It is not necessary to disassemble the engine to replace the oil seals.

6.3.1 Ignition Side

- Remove the rewind starter, 9.2
- Remove the flywheel, 7.7
- On machines with a heating system, remove the screws and put the generator to one side, 14.7



- Remove the key (1) from the crankshaft stub.



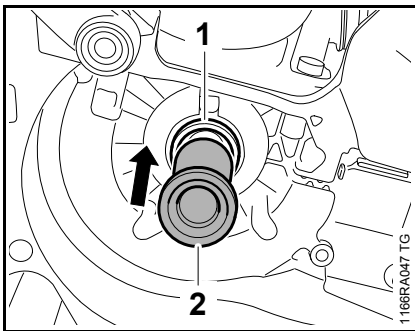
Take care not to damage the crankshaft stub.

- Free off the oil seal in its seat by tapping it with a suitable tube or a punch.

- Apply puller (1) 5910 890 4400 with No. 3.1 jaws 0000 893 3706, clamp the puller arms and pull out the oil seal.

Installing

- Clean the sealing face, 16
- Lubricate sealing lips of new oil seal with STIHL grease, 16



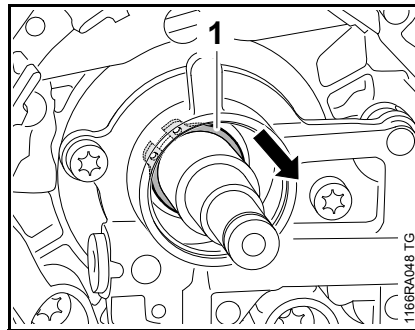
- Fit the new oil seal (1) with the sealing lip facing the crankcase.
- Use press sleeve (2) 1144 893 2400 to install the oil seal (1).

The seating face must be flat and free from burrs.

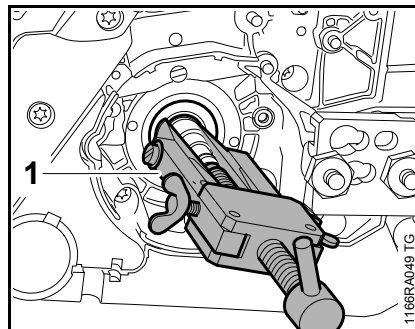
- Fit key in crankshaft stub.
- Clean the crankshaft stub
– the crankshaft taper must be free from grease, 16
- Reassemble all other parts in the reverse sequence.

6.3.2 Clutch Side

- Remove the clutch, 4.2



- Remove the retaining ring (1).
- Remove the oil pump, 12.3



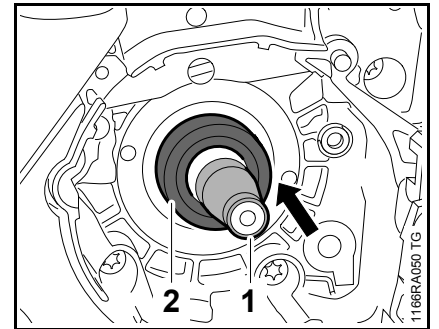
Take care not to damage the crankshaft stub.

- Free off the oil seal in its seat by tapping it with a suitable tube or a punch.

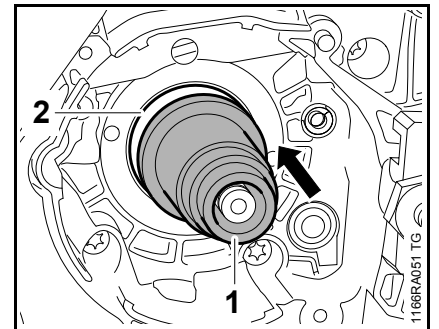
- Apply puller (1) 5910 890 4400 with No. 3.1 jaws 0000 893 3706, clamp the puller arms and pull out the oil seal.

Installing

- Clean the sealing face.
- Lubricate sealing lips of new oil seal with STIHL grease, 16



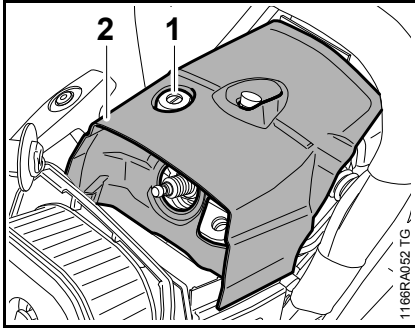
- Fit the installing sleeve (1) 1144 893 4600 on the crankshaft stub and slip the oil seal (2), sealing lip facing the crankcase, over the installing sleeve.
- Remove the installing sleeve (1).



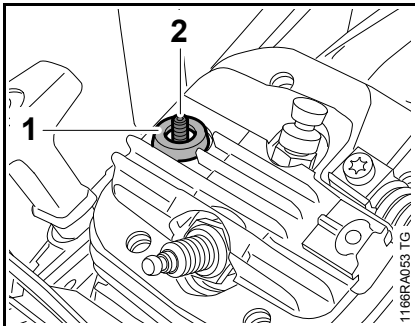
- Use press sleeve (1) 1144 893 2400 to install the oil seal (2) and then fit the retaining ring.
- Reassemble all other parts in the reverse sequence.

6.4 Shroud

- Remove the filter cover and pull off the spark plug boot.



- Unscrew the slotted nut (1) and remove the shroud (2).

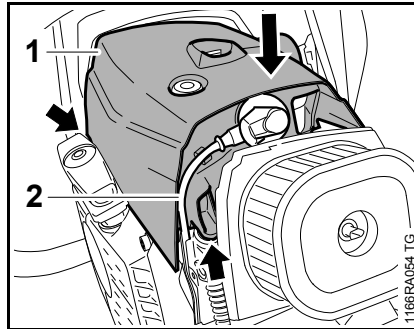


- Check the grommet (1) and stud (2), replace if necessary.

Installing

If the stud has been removed:

- Use two locked nuts to screw home the stud and tighten it down firmly.
- Coat grommet with STIHL press fluid and fit its small diameter over the stud's washer, 16



- Position the shroud (1) so that the ignition lead (2) locates in the guide and the pegs (arrows) engage the holes.
- Fit the slotted nut and tighten it down firmly.
- Reassemble all other parts in the reverse sequence.

6.5 Cylinder

Before removing the cylinder, decide whether or not the crankshaft has to be removed as well.

Cylinder installed

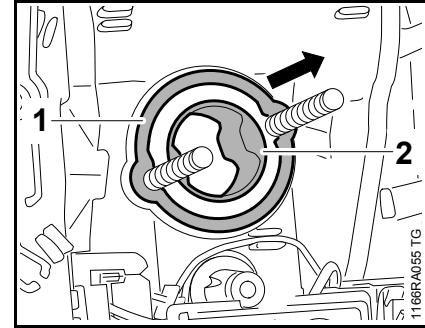
To remove the flywheel and clutch, the crankshaft has to be blocked by inserting the locking strip in the spark plug hole, 4.2.

Cylinder removed

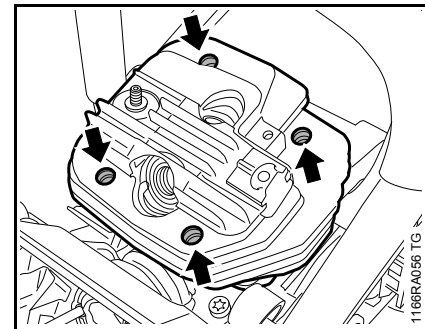
To remove the flywheel and clutch, the crankshaft has to be blocked by resting the piston on the piston support (special tool).

- Remove the shroud, 6.4
- Remove the rewind starter, 9.2
- Remove the filter base, 13.3
- Remove the carburetor, 13.4
- Remove the muffler, 6.1
- Remove the decompression valve, 6.9

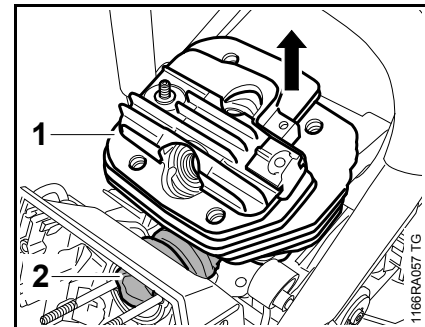
- Remove AV element from handlebar, 10.4



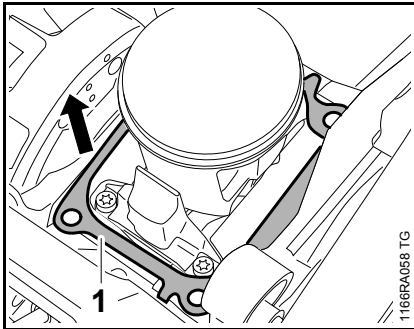
- Remove the washer (1) and sleeve (2).
- Push out the manifold flange in the direction of the cylinder.



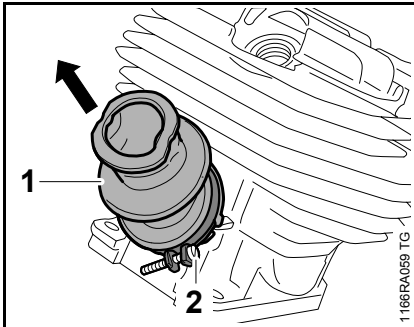
- Take out the cylinder base screws through the holes (arrows).



- Carefully lift the cylinder (1) away, guiding the manifold flange (2) past the tank housing at the same time.

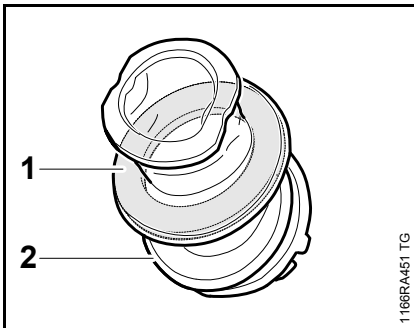


- Remove the cylinder gasket (1).



- Inspect the manifold (1) and replace it if necessary – even very minor damage can result in engine running problems, 3.7
- Loosen the screw (2) and remove the manifold (1).

A new manifold comes with the washer already installed.



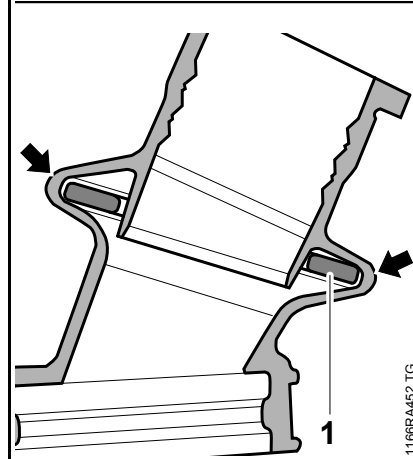
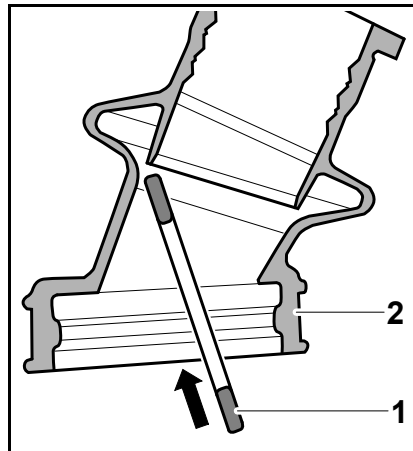
- Inspect the washer (1) in the manifold (2), remove and replace if necessary – a damaged washer must be replaced.

– Clean the sealing faces, 16

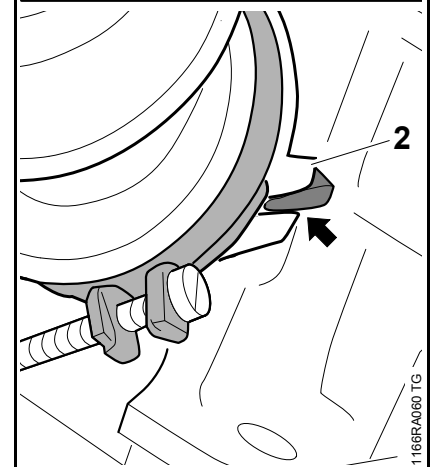
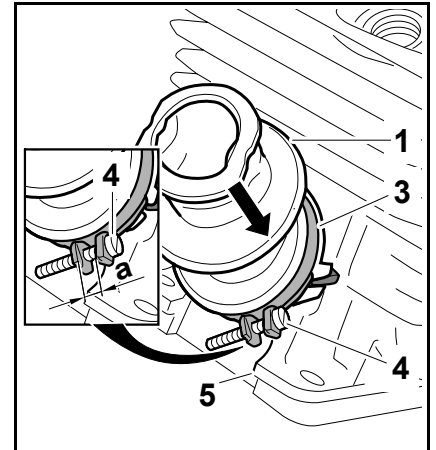
All sealing faces must be in perfect condition. Always replace components with damaged sealing faces.

Always use a new cylinder gasket when re-installing the cylinder.

Installing



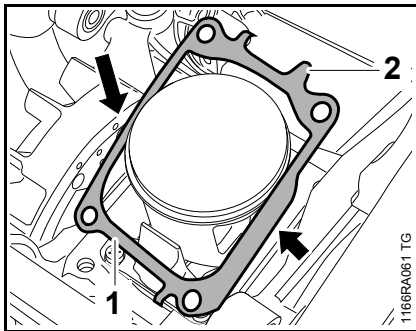
- Coat the inside of the manifold with STIHL press fluid, 16
- Insert new washer (1) through larger diameter of manifold (2) as shown.
- Position the washer (1) so that it is properly seated (arrows).



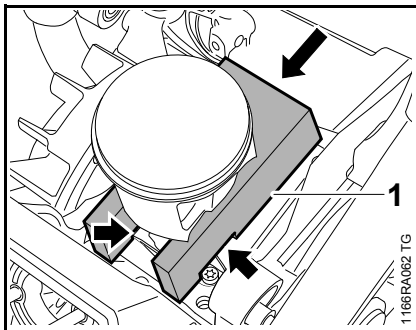
- Coat the inside of the manifold flange with STIHL press fluid, 16

Washer must be installed in manifold.

- Push the manifold (1) onto the intake port so that the tab (2) engages the web (arrow) – take care not to displace or damage the washer in the manifold.
- Fit the hose clamp (3) – the screw (4) must be next to the rib (5).
- Tighten down screw (4) until distance 'a' is about 4 - 5 mm – do not tighten as far as stop.

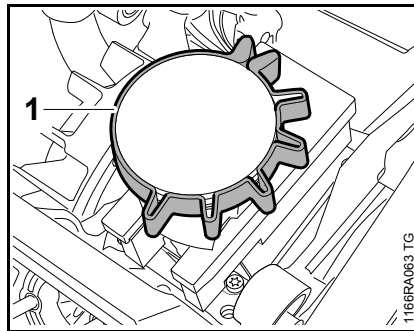


- Fit the new cylinder gasket (1) over the piston and position it so that the contour (arrow) and tab (2) are at the clutch side.



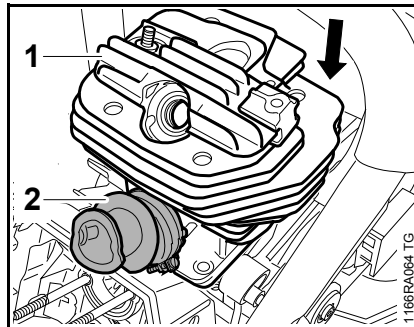
- Hold the piston support (1) 5910 893 5300 so that the recesses (arrows) engage the flange and then push it between the piston and crankcase.

Take care not to damage the cylinder gasket.



- Lubricate the piston, piston rings and cylinder wall with oil, 16
- Check correct installed position of rings, 6.8
- Use the clamping strap (1) 0000 893 2600 to compress the rings around the piston.

Apply the clamping strap (1) so that the piston rings do not project beyond the cylinder wall.

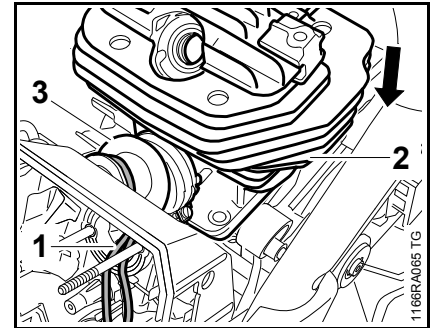


- Position the cylinder (1) so that the manifold (2) points towards the tank housing.

While sliding the cylinder over the piston, hold the clamping strap tightly around the piston so that the rings do not project – they might otherwise break.

- Slide the cylinder over the piston, the clamping strap moves downwards at the same time.

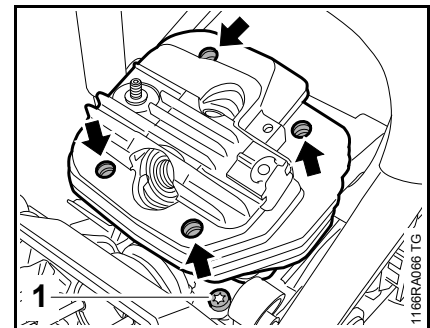
- Remove the clamping strap and piston support.



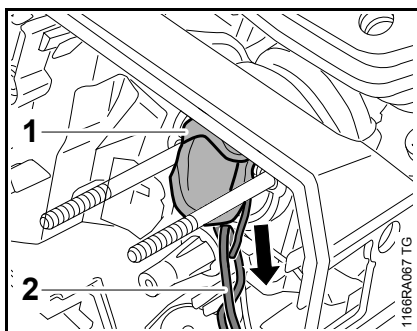
- Wind a piece of string (1) around the manifold flange and pass the ends of the string through the opening in the tank housing.

Make sure the cylinder gasket is properly seated.

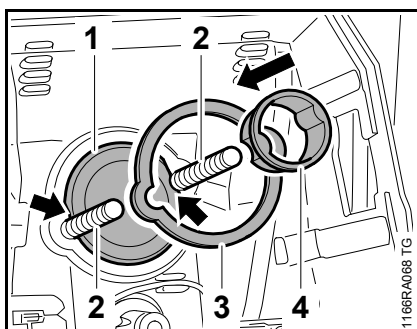
- Push home the cylinder (2) as far as stop and position the manifold flange (3) against the tank housing – take care not to displace or damage the washer in the manifold.



- Insert the screws (1) to hold the cylinder and gasket in position.
- Tighten down the screws (1) through the holes (arrows) in the cylinder in a crosswise pattern.



- Coat the outside of the manifold flange with STIHL press fluid, 16
- Hold the tank housing steady and pull the ends of the string (2) with manifold flange (1) through the opening – take care not to displace or damage the washer in the manifold.
- Remove the string.



- Position the manifold flange (1) – its recesses (arrows) must locate against the studs (2).
- Fit the washer (3) and push the sleeve (4) into the manifold flange (1).
- Reassemble all other parts in the reverse sequence.

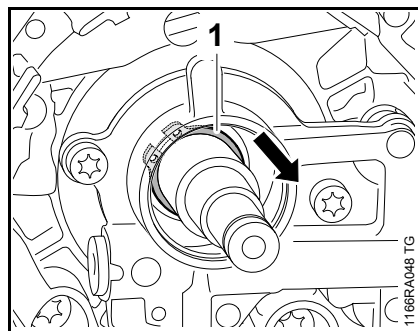
6.6 Crankshaft

- Drain the fuel and oil tanks, 1.1
- Remove the brake band, 5.2
- Remove the brake lever, 5.3
- Remove the handlebar, 10.5
Version with heating, 10.5.1
- Remove the flywheel, 7.7
- Machines with handle heating
Remove the generator, 14.7
- Remove wiring harness at ignition side, 7.9,
models with M-Tronic / heating, 7.10
- Remove the cylinder, 6.5
- Remove the piston, 6.7
- Remove the tank housing, 13.11.4

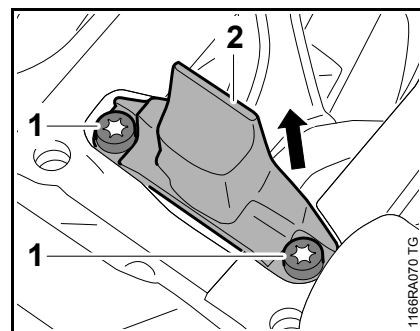
Always install new bearings and oil seals after removing the crankshaft, 6.6.1 and 6.3.

Clutch side of crankcase

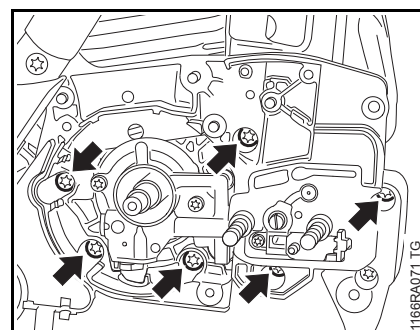
The oil pump must be left in position when the crankshaft is removed. It serves as a stop for the ball bearing.



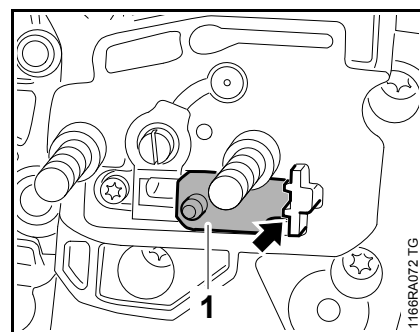
- Remove the retaining ring (1).



- Take out the screws (1) and remove the flange (2).

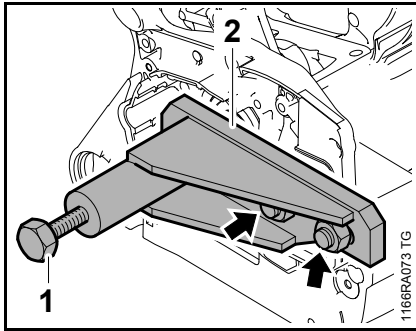


- Take out the screws (arrows).



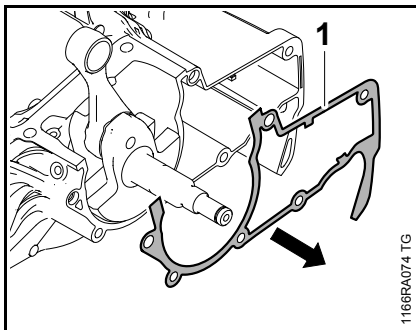
- The tensioner slide (1) must butt against the thrust pad (arrow).

Use the tools in the service tool set 5910 007 2222 to remove and install the clutch side of the crankcase

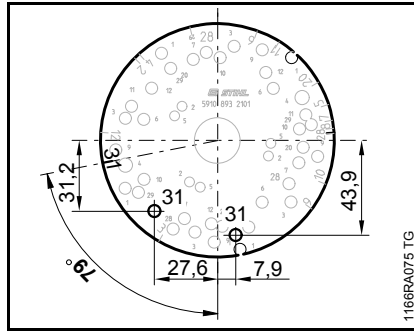


- Back off the spindle (1) in the puller until it is clear of the crankshaft stub.
- Slip the service tool (2), from set 5910 007 2222, over the collar studs (arrows), fit the nuts and tighten them down firmly.
- Turn the spindle (1) clockwise until the crankshaft stub is pushed out of the ball bearing.
- Install new ball bearings and oil seals, 6.6.1 and 6.3

Ignition side of crankcase



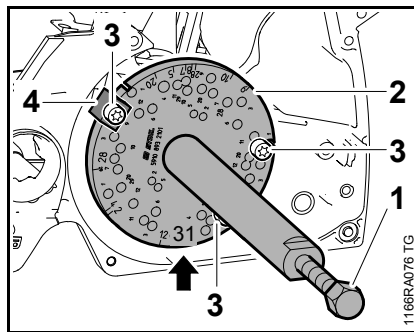
- Remove the gasket (1).



Drilled plate 5910 893 2101 without holes marked "31" can be updated with 5.5 mm holes as shown in the illustration.

Dimensions are in millimeters.

The illustration shows the front of the drilled plate.



Use the tools in the service tool set 5910 007 2201 for removing and installing – use drilled plate 5910 893 2101 and thrust piece 5910 893 8700.

- Unscrew the spindle (1) until the drilled plate (2) butts against the crankcase
– left-hand thread.
- Fit the plate (2) 5910 893 2101 against the ignition side of the crankcase so that the number "31" (arrow) is at the bottom.

- Insert two M5x72 screws (3) in the holes marked "31" and tighten them down until they butt against the crankcase.
- Fit thrust piece (4) on the third hole, insert M5 x 72 screw (3) and tighten it down.
- Turn the spindle (1) counterclockwise until the crankshaft is pushed out of the ignition side of the crankcase.

The crankshaft, connecting rod and needle bearing form an inseparable unit. Always replace as a complete unit.

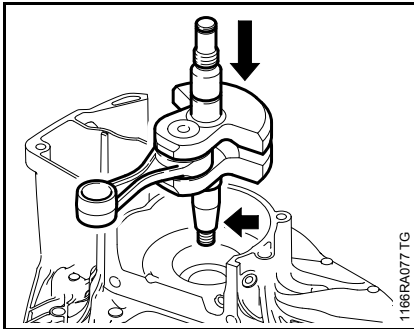
- Check the two halves of the crankcase and ball bearings and replace if necessary, 6.6.1
- Before installing, clean the crankshaft, 16

Installing

Inspect and clean the sealing faces on both halves of the crankcase (including the cylinder sealing face)
– the sealing faces must not be damaged in any way.

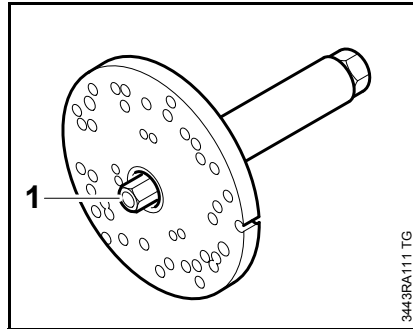
Ignition side of crankcase

Take care not to damage the crankshaft stub.



- Heat the inner bearing race to about 160°C (320°F).
- Position the tapered stub of the crankshaft (arrow) above the ball bearing at the ignition side and push it home.

This operation must be carried out very quickly because heat is absorbed by the crankshaft, and the inner bearing race shrinks.

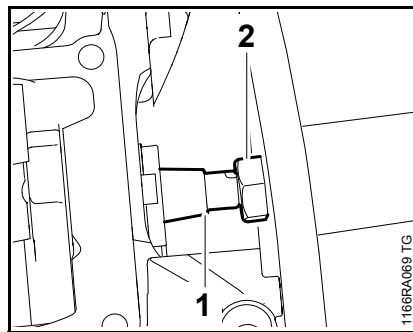


If it is not possible to heat the inner bearing race, use service tool 5910 007 2101 to install the crankshaft – use plate 5910 893 2101.

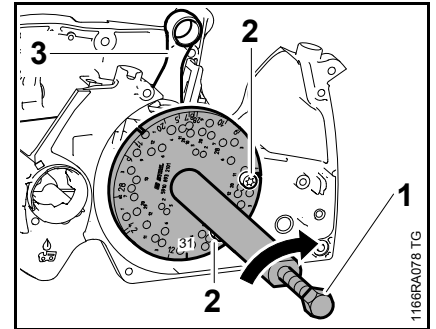
- Screw the threaded sleeve (1) 5910 893 2421 onto the spindle as far as stop.

Coat tapered stub of crankshaft with oil.

- Position the tapered stub of the crankshaft above the ball bearing at the ignition side and push it home.



- Position the screw sleeve (2) 5910 893 2421 on the crankshaft thread (1) and screw it into place.



- Turn the spindle (1) to position the drilled plate 5910 893 2101 against the ignition side of the crankcase and line it up so that the number "31" is at the bottom.

- Insert two M5x72 screws (2) in the holes marked "31" and the crankcase and tighten them down.

- Turn the spindle (1) clockwise.

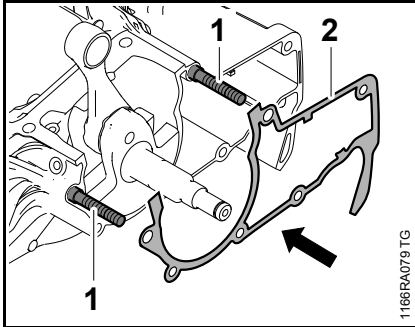
- Install the ignition side of the crankcase as far as stop.

The crankshaft turns when it is being pulled into place with the service tool. Therefore, make sure the small end (3) of the connecting rod always points upward to the cylinder.

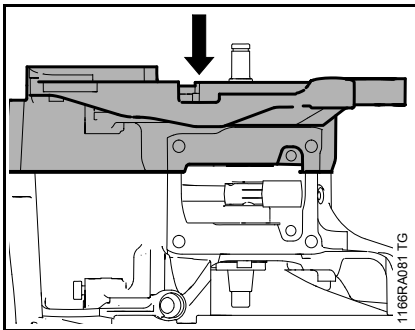
- Remove the installing tool.

Clutch side of crankcase

Take care not to damage the crankshaft stub.



- Fit two M5x72 screws (1) in the holes at the ignition side – to act as guides and prevent twisting.
- Fit a new gasket (2) and locate it on the sleeves.
- Coat the straight stub of the crankshaft with oil.

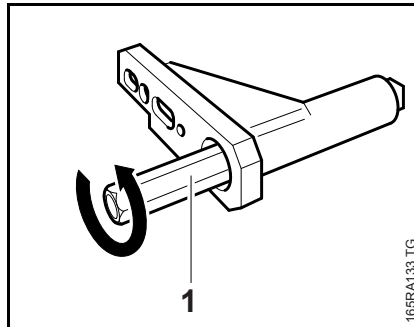


- Heat the inner bearing race to about 160°C (320°F).
- Position the clutch side of the crankcase on the straight crankshaft stub and the screws and push it on as far as stop.

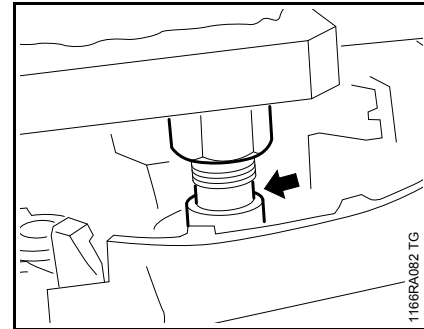
This operation must be carried out very quickly because heat is absorbed by the crankshaft, and the inner bearing race shrinks.

If it is not possible to heat the inner bearing ring, use the service tool from set 5910 007 2222 to install the crankcase. Do not remove the oil pump for this purpose.

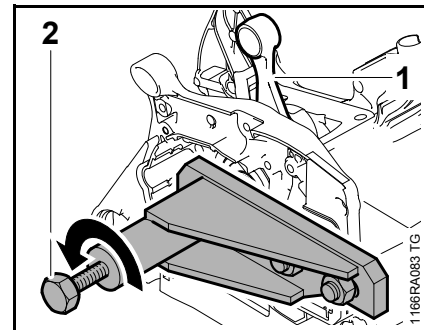
- Coat the straight stub of the crankshaft with oil.
- Position the clutch side of the crankcase on the straight crankshaft stub and the two screws.



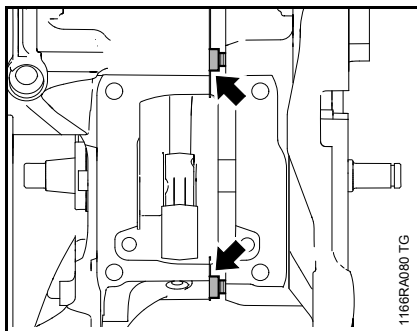
- Screw the spindle fully into the service tool.
- Screw the threaded sleeve (1) 5910 893 2202 onto the spindle as far as stop – left-hand thread.



- Apply the screw sleeve to the crankshaft stub (arrow) and push the service tool over the bar studs.

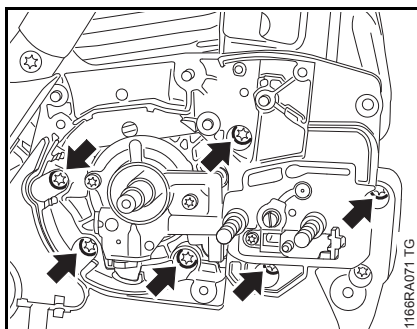


- Hold the crankshaft (1) steady and rotate the spindle (2) to screw the screw sleeve onto the crankshaft stub.
- Release the crankshaft (1). Hold the service tool steady and continue turning the spindle (2) until the tool butts against the crankcase.
- Fit the nuts on the collar studs and screw them down finger-tight.
- Turn the spindle (2) counterclockwise until the crankcase locates against the guide sleeves.



Make sure the sleeves (arrows) engage the holes and the gasket is not pinched or twisted.

- Continue turning the service tool's spindle until the gap between the two halves of the crankcase is closed.
- Remove the installing tool.
- Take out the M5x72 screws.



- Insert the screws (arrows) and tighten them down firmly in a crosswise pattern.
- Install the oil seals, 6.3
- Fit the retaining ring at the clutch side.
- Check and install the piston, 6.7

- Check and install the cylinder, 6.5
- Reassemble all other parts in the reverse sequence.

6.6.1 Bearings / Crankcase

Each half of the crankcase can be replaced separately if it is damaged.

Inspect and clean the sealing faces on both halves of the crankcase (including the cylinder sealing face) – the sealing faces must not be damaged in any way.

New crankcase halves are supplied with the main parts preassembled – see the parts list.

Parts not supplied with the new crankcase must be transferred from the original crankcase – check the parts and replace if necessary.

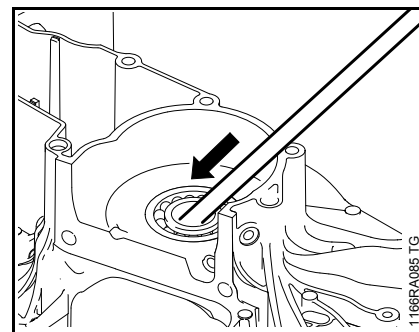
If a new crankcase is installed, the machine's serial number must be stamped on it with 2.5 mm figure stamps.

If the original crankcase is used again, replace the oil seals and ball bearings.

Examine both halves of the crankcase for cracks. Clean all sealing faces (remove any gasket residue) and check them for damage – all sealing faces must be in good condition and clean.

- See also Troubleshooting, 3.7
- Remove the crankshaft, 6.6

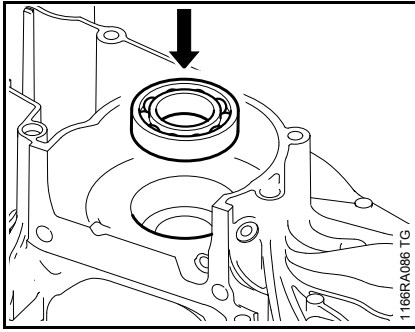
Ignition side of crankcase



- Use a punch to carefully drive out the oil seal.
- Check and clean the crankcase or replace if necessary.
- If this half of the crankcase is in order, install a new ball bearing.
- Heat area of bearing seat to about 160°C (320°F).

The bearing drops out as soon as this temperature is reached.

Installing

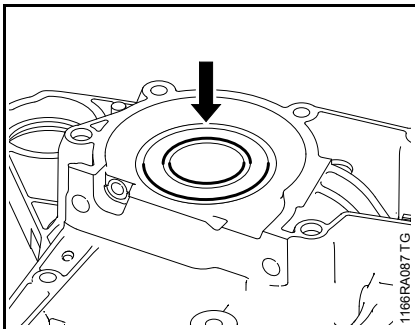


- Heat area of bearing seat to about 160°C (320°F).
- Position the ball bearing so that its open side (balls visible) faces the inside of the crankcase and then press it home as far as stop.

This operation must be carried out quickly because the bearing absorbs heat and begins to expand.

- Check that the bearing is properly seated. If necessary, use press arbor 1120 893 7200 to press the bearing fully home.

Clutch side of crankcase



The oil seal is seated in the ball bearing and does not need to be removed separately.

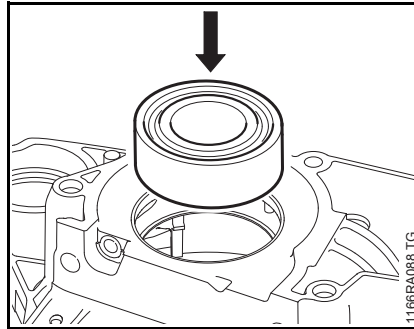
- Check and clean the crankcase or replace if necessary.

- If this half of the crankcase is in order, install a new ball bearing.
- Heat area of bearing seat to about 160°C (320°F).

When this temperature is reached, the ball bearing drops out together with the oil seal – if necessary, use press sleeve 1129 893 2400 to press out the ball bearing through the oil pump.

Installing

As the clutch side of the crankcase has no stop in its bearing seat, the mounted oil pump is used as a stop.

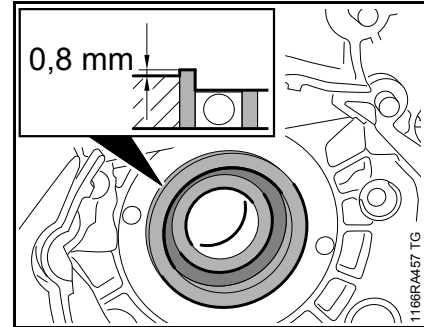


- Heat area of bearing seat to about 160°C (320°F).
- Position the ball bearing so that the oil seal's seat faces the oil pump and then press home the ball bearing until it butts against the oil pump.

This operation must be carried out quickly because the bearing absorbs heat and begins to expand.

- Check that ball bearing is properly seated. If necessary, use press arbor 1144 893 2400 to carefully press the bearing fully home until it butts against the oil pump

If the oil has been removed for any reason, carefully press home the ball bearing with the press arbor until its outer race projects 0.8 mm from the bearing seat at the clutch side.



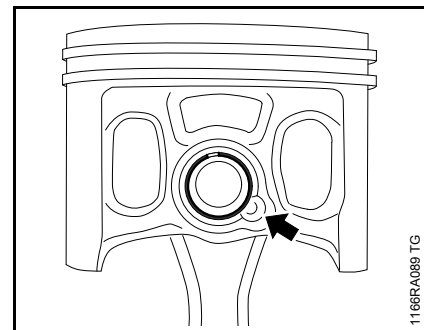
- Remove the oil pump, 12.3
- Install the crankshaft, 6.6
- Install the oil seals, 6.3
- Reassemble all other parts in the reverse sequence.

6.7 Piston

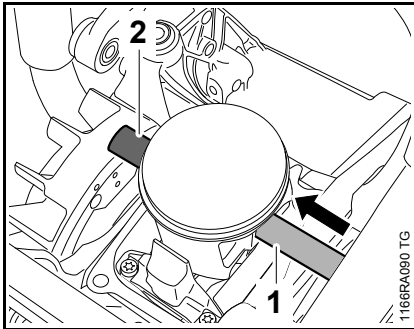
Before removing the cylinder, decide whether or not the crankshaft has to be removed as well, 6.6

- Remove the cylinder, 6.5

It is not necessary to remove the snap ring at the clutch side.



- Pry hookless snap ring out of boss at ignition side – apply tool to recess (arrow).

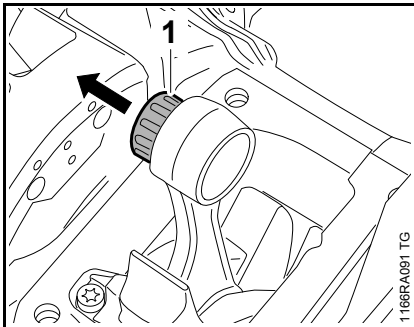


- Slide the assembly drift (1) 1108 893 4700 through the installed snap ring and push the piston pin (2) out of the piston.

If the piston pin is stuck, release it by tapping the end of the drift lightly with a hammer.

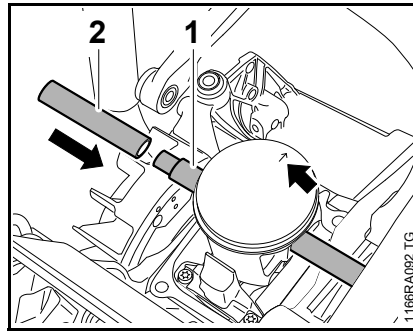
Hold the piston steady during this process to ensure that no jolts are transmitted to the connecting rod.

- Remove the piston.
- Inspect the piston rings and replace if necessary, 6.8



- Pull out the needle cage (1), inspect and clean it, replace if necessary.

Installing

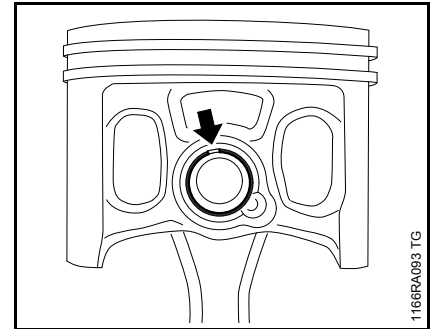


- Lubricate the needle cage with oil and push it into the connecting rod.

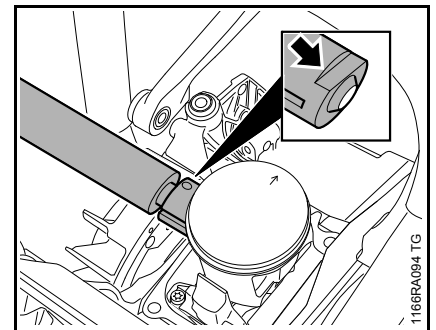
- Line up the piston so that the arrow (arrow) on the piston crown points towards the exhaust port.

The assembly drift (1) can be pushed through the installed snap ring.

- Place the piston on the connecting rod.
- Slide the assembly drift (1) 1108 893 4700, small diameter first, through the piston and small end (needle cage) and line up the piston.
- Lubricate the piston pin (2) with oil.
- Fit the piston pin (2) on the assembly drift (1) and slide it into the piston.
- Prepare snap ring for installation with installing tool 5910 890 2212.



Fit the snap ring so that its gap (arrow) points up.




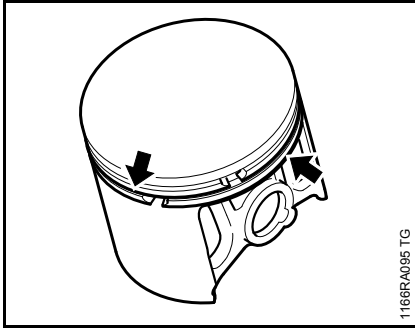
- Fit installing tool 5910 890 2212 with the sleeve's taper (flat facing up) against the piston boss, hold the piston steady, center the tool shank exactly and press home until the snap ring slips into the groove.

Make sure the tool is held square on the piston pin axis.

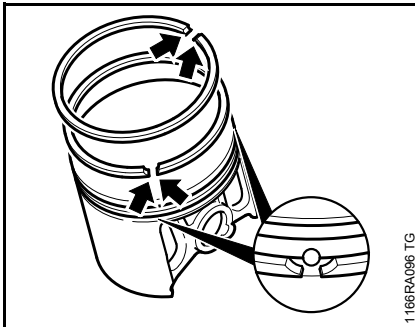
- Check that piston rings are properly seated and correct if necessary, 6.8
- Install the cylinder, 6.5
- Reassemble all other parts in the reverse sequence.


6.8 Piston Rings

- Remove the piston,  6.7
- Remove the piston rings from the piston.




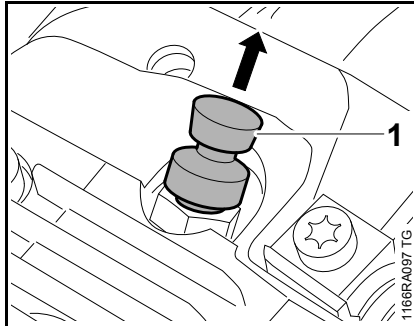
- Use a piece of old piston ring to scrape the grooves (arrows) clean.



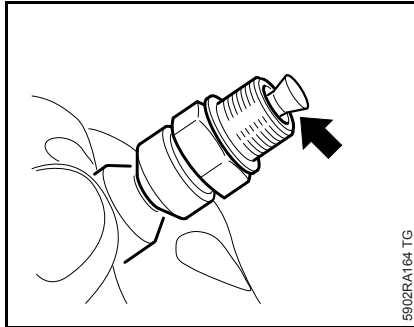
- Install the new piston rings in the grooves so that the radii face upward (arrows).
- Carefully fit the piston rings over the piston so that the radii at the ring gap meet at the fixing pins in the piston grooves
 - they might otherwise break.
- Install the piston,  6.7
- Reassemble all other parts in the reverse sequence.

6.9 Decompression Valve

- Remove the shroud,  6.4



- Unscrew the decompression valve (1).





- Check the sealing cone (arrow) on the decompression valve for damage.
- If the sealing cone does not close completely or shows signs of damage, install a new decompression valve.
- Fit the decompression valve and screw it home by hand.
- Tighten down the decompression valve firmly.
- Reassemble all other parts in the reverse sequence.

7. Ignition System

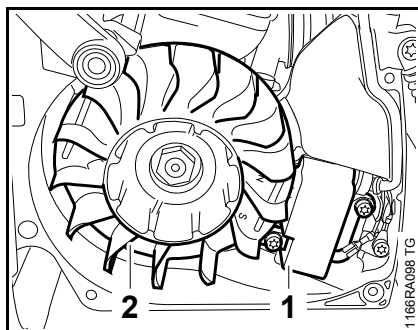
Exercise extreme caution when troubleshooting and carrying out maintenance or repair work on the ignition system. The high voltages which occur can cause serious or fatal accidents.

Do not turn the engine over with the rewind starter when the spark plug boot or the spark plug is removed – there is otherwise a risk of fire due to sparking outside the cylinder.

Troubleshooting on the ignition system should always begin at the spark plug,  3.5


- Remove the rewind starter,  9.2

Models without M-Tronic



The electronic (breakerless) ignition system basically consists of an ignition module (1) and flywheel (2).

Models with M-Tronic

For operation and description see chapter on M-Tronic,  8.

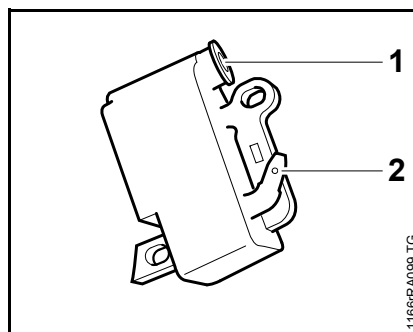
7.1 Ignition Timing on All Models

Ignition timing is fixed and cannot be adjusted during repair work.

Since there is no mechanical wear in these systems, ignition timing cannot get out of adjustment during operation.

7.2 Ignition Module / Control Unit

Ignition module

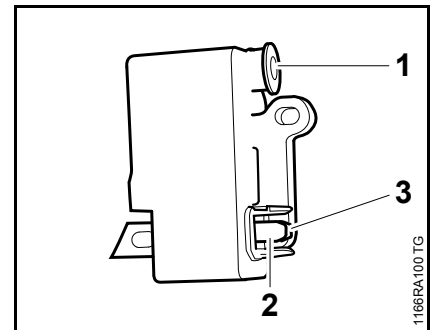


The ignition module accommodates all the components required to control ignition timing. There are two electrical connections on the coil body:

- the high voltage output (1) for the ignition lead
- the connector tag (2) for the short circuit wire


Testing in the workshop is limited to a spark test. A new ignition module must be installed if no ignition spark is obtained (after checking that wiring and stop switch are in good condition).

Control Unit




The control unit accommodates all the components required to control ignition timing and fuel feed. There are three electrical connections on the control unit:

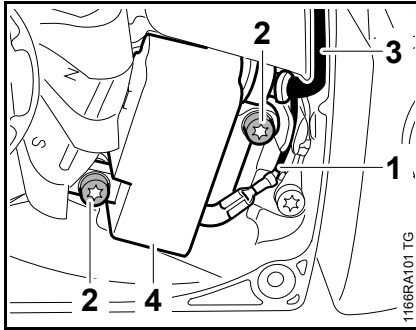
- the high voltage output (1) for the ignition lead
- Connector tag (2) for the black wire – short circuit wire
- Connector tag (3) for the read wire
 - M-Tronic

Testing the control unit is not limited to the spark test alone. If the ignition spark or another function fails, the system must be checked with the aid of the troubleshooting chart and the control unit of M-Tronic wiring harness replaced if necessary,  8.7

7.3 Removing and Installing

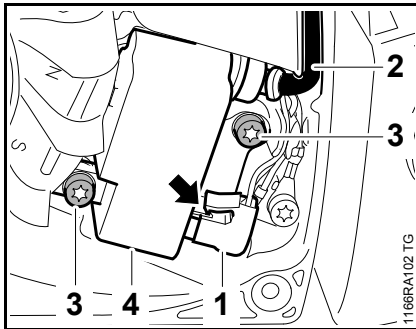
- Remove the rewind starter,  9.2
- Remove the filter cover and pull off the spark plug boot.

Models without M-Tronic (ignition module)



- Pull the short circuit wire (1) out of the guide and disconnect the terminal.
- Take out the screws (2), pull the ignition lead (3) out of the guide and remove the ignition module (4).

Models with M-Tronic (control unit)



- Lift locking tab (arrow) and pull off the flag terminal (1).
- Take out the screws (3), pull the ignition lead (2) out of the guide and remove the control unit (4).

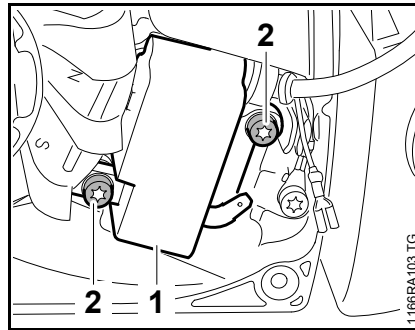
All versions

A new ignition module / control unit is supplied with cover, grommet, ignition lead and spark plug boot.

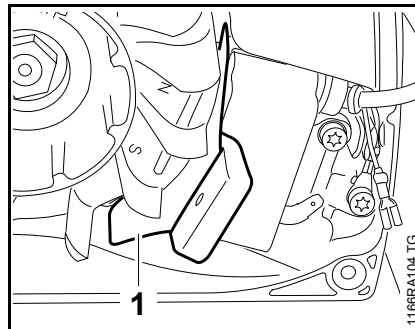
- Check the spark plug boot and ignition lead, and replace if necessary, 7.6

Installing

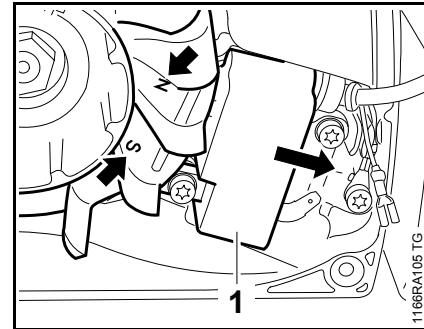
- Install the ignition lead if necessary, 7.6



- Fit the ignition module / control unit (1) and insert the screws (2) – do not tighten down yet.

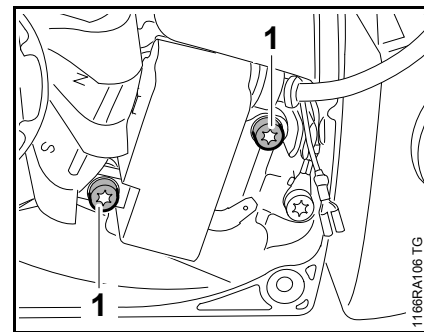


- Push the ignition module / control unit back and slide the setting gauge (1) 1111 890 6400 between the arms of the ignition module and the flywheel magnet.



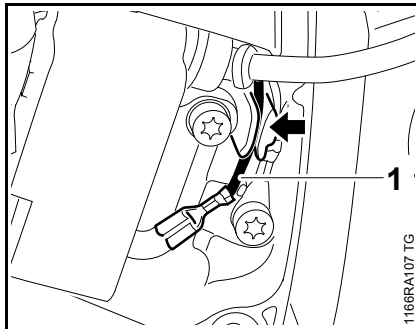
The setting gauge is not shown in the illustration.

- Push the ignition module / control unit (1) back and hold it there.
 - The flywheel must turn freely.
- Rotate the flywheel until the N / S magnet poles (arrows) are next to the ignition module / control unit (1).
 - Setting gauge remains in place during this process.
- Press the ignition module / control unit (1) against the setting gauge and hold it there.



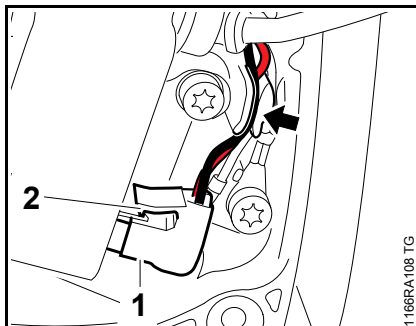
- Tighten down the screws (1) firmly and remove the setting gauge.
- Check operation
 - Rotate the flywheel and make sure it does not touch the ignition module / control unit.

Models without M-Tronic (ignition module)

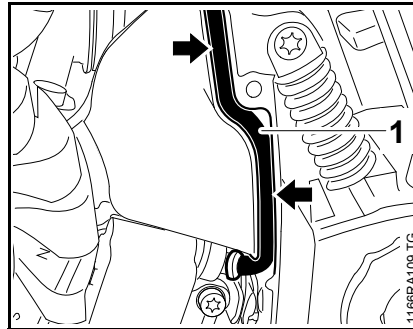


- Connect terminal of short circuit wire (1) with its crimped side facing outwards.
- Push the short circuit wire (1) fully into the guide (arrow).

Models with M-Tronic (control unit)



- Push flag terminal (1) home until locking tab (2) engages.
- Push the red and black wires into the guide (arrow) – the red wire must be under the black wire.



- Push the ignition lead (1) fully into the guide (arrows).
- Reassemble all other parts in the reverse sequence.

7.4 Testing the Ignition Module

Install a new spark plug before starting the test.

The engine may start and accelerate during the test.

- To test the ignition module, use either the ZAT 4 ignition system tester 5910 850 4503 or the ZAT 3 ignition system tester 5910 850 4520.

If a spark is visible, the ignition system is in order.

- If no spark is visible in the window, check the ignition system with the aid of the troubleshooting chart, 7.13

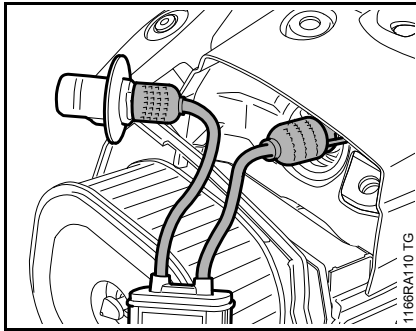
The test refers only to a spark test, not to ignition timing.

7.4.1 Testing Ignition Module with MDG 1 Engine Analyzer

The ignition module can be tested simply, reliably and quickly with the STIHL MDG 1.

The following points are checked during the test:

- Ignition voltage
- Ignition spark
- Short circuit
- Remove the filter cover
- Before starting the test, check the spark plug and replace it if necessary – use only spark plugs recommended by STIHL.



- Connect the MDG 1 between the spark plug and spark plug boot – ground clamps must engage hexagon on spark plug.
- To run diagnosis on MS 661, select "Other STIHL Products". Then start the diagnosis function and follow the steps in the diagnosis software.

To obtain an accurate result, pull the starter rope briskly.

The engine may start and accelerate during the test.

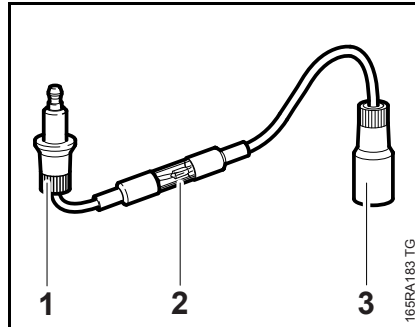
Exercise extreme caution when troubleshooting and carrying out maintenance or repair work on the ignition system. The high voltages which occur can cause serious or fatal accidents.

Troubleshooting on the ignition system should always begin at the spark plug, [11](#) 3.5

- Remove the rewind starter, [11](#) 9.2

7.5 Spark Test

Using ZAT 4 ignition system 5910 850 4503



- Before starting the test, install a new spark plug in the cylinder and tighten it down firmly.
- Connect spark plug boot to the input terminal (1). Push the tester's output terminal (3) on to the spark plug.

High voltage – risk of electric shock.

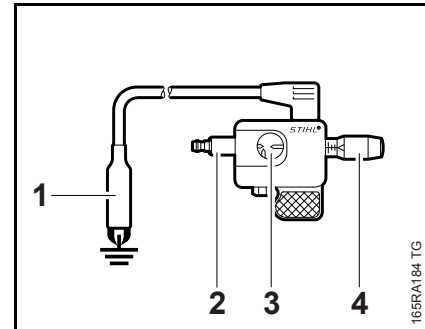
- Crank the engine quickly with the rewind starter and check spark in the tester's window (2).

The engine may start and accelerate during the test.

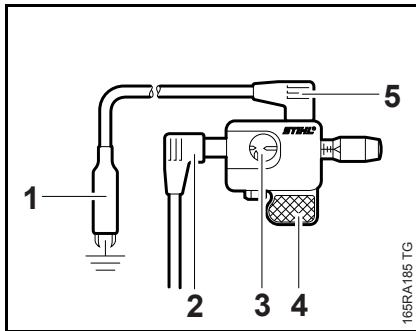
If a spark is visible, the ignition system is in order.

- If no spark is visible in the window (2), check the ignition system / M-Tronic with the aid of the troubleshooting chart, [11](#) 7.13, [11](#) 8.7

Using the ZAT 3 ignition tester 5910 850 4520



- Before starting the test, install a new spark plug in the cylinder and tighten it down firmly.
- Connect spark plug boot to the terminal (2).
- Attach the ground terminal (1) to the spark plug.
- Use adjusting knob (4) to set the spark gap to about 2 mm, see spark window (3).



While using the ZAT 3, hold it only by the handle (4) or position it in a safe place. Keep fingers or other parts of your body at least 1 cm away from the spark window (3), high voltage connection (2), ground connection (5) and the ground terminal (1).

High voltage – risk of electric shock.

- Crank the engine quickly with the rewind starter and check spark in the tester's window (3).

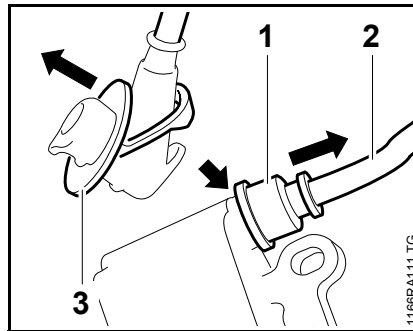
The engine may start and accelerate during the test.

If a spark is visible in the window (3), the ignition system is in order.

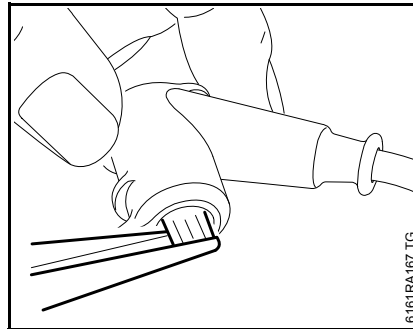
- If no spark is visible in the window (2), check the ignition system / M-Tronic with the aid of the troubleshooting chart, 7.13, 8.7

7.6 Spark Plug Boot / Ignition Lead

- Remove the ignition module / control unit, 7.3



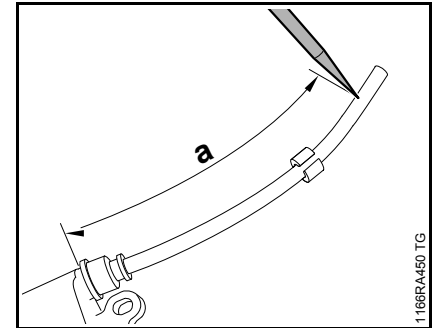
- Pull the grommet (1) off the high voltage output (arrow).
- Unscrew the ignition lead (2) from the ignition module / control unit and pull the grommet (1) off the ignition lead.
- Remove the cover (3) from the spark plug boot.



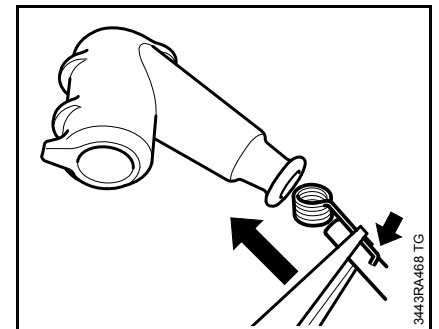
- Use suitable pliers to pull the leg spring out of the spark plug boot and unhook it from the ignition lead.
- Pull the spark plug boot and cable retainer off the ignition lead.

Installing

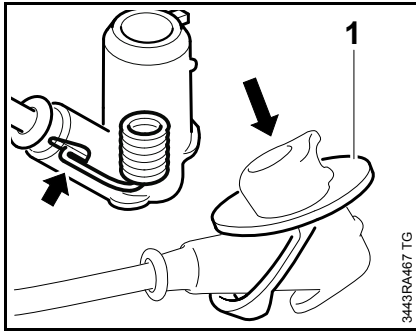
- Screw the ignition lead into the ignition module / control unit.



- Use a pointed tool to pierce the center of the ignition lead's insulation at distance 'a' from the ignition module / control unit.
- Models without M-Tronic:
a = 195 mm
- Models with M-Tronic:
a = 197 mm

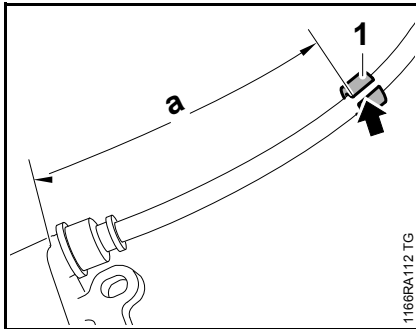


- Pinch the hook of the leg spring into the pierced hole in the center of the lead (arrow).
- Coat the inside of the spark plug boot with STIHL press fluid, 16
- Hold the ignition lead and leg spring together and push them into the spark plug boot.



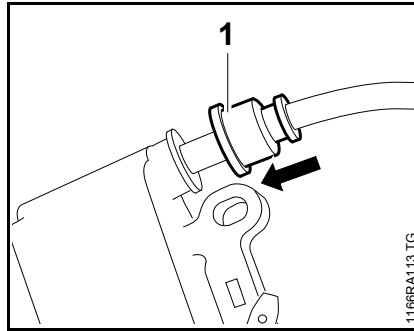
Make sure the leg spring (arrow) locates properly inside the spark plug boot.

- Fit the cover (1) over the spark plug boot.



- Fit the cable retainer (1) at distance 'a' from the ignition module / control unit so that the gap (arrow) faces away from the spark plug boot:
- Models without M-Tronic:
a = 164 mm
- Models with M-Tronic:
a = 166 mm
- Use a pointed tool to pierce the center of the other end of the ignition lead which screws into the module / control unit.
- Before installing the ignition lead, pack the high voltage output with STIHL multipurpose grease 16.

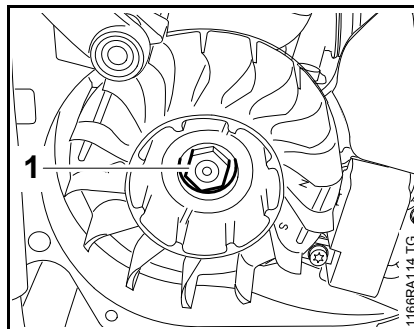
Do not use either graphite grease or silicone insulating paste.



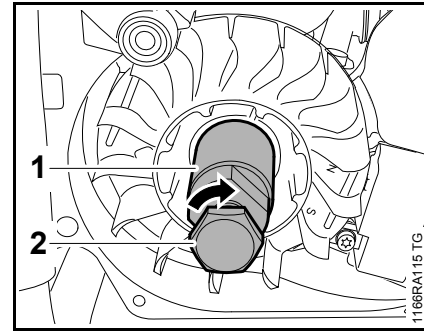
- Fit the grommet (1) on the ignition lead and screw the ignition lead into the ignition module / control unit.
- Push the grommet (1) into position.
- Install the ignition module / control unit and set the air gap, 7.3
- Reassemble all other parts in the reverse sequence.

7.7 Flywheel

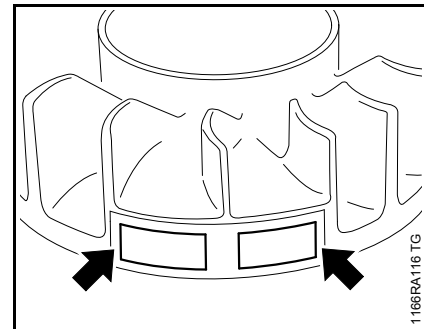
- Remove the shroud, 6.4
- Remove the rewind starter, 9.2
- Use locking strip to block the piston, 4.2



- Unscrew the flywheel nut (1).



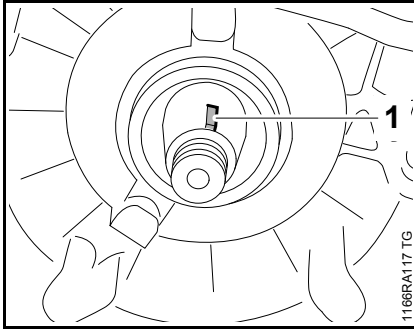
- Screw puller (1) 1106 890 4501 into flywheel as far as stop.
- Hold the puller (1) steady and screw home the thrust bolt (2) until the flywheel is released from the crankshaft.
- Remove the puller (1) 1106 890 4501 from the flywheel.



- The flywheel and magnet poles (arrows) must not be damaged or have turned blue. Replace flywheel if necessary.

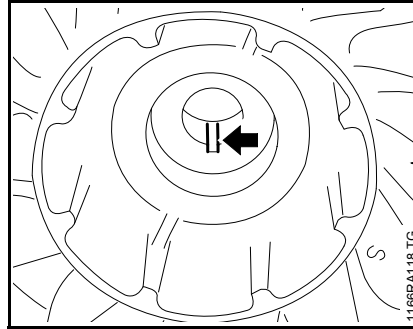
On versions with heating, also check the magnet ring for signs of damage.

- Inspect the magnet ring in the flywheel (inside) for cracks or other damage. If damage is found, replace the flywheel.



- Check the key (1) and replace if necessary.
- Check that key (1) is properly seated, readjust if necessary.

Crankshaft/flywheel joint must be free from grease and oil.



If slot (arrow) is worn, install a new flywheel.

Make sure the key engages the slot (arrow) in the flywheel.

- Set air gap between ignition module and flywheel, 7.3
- Reassemble all other parts in the reverse sequence.

7.8 Testing Wiring Harness

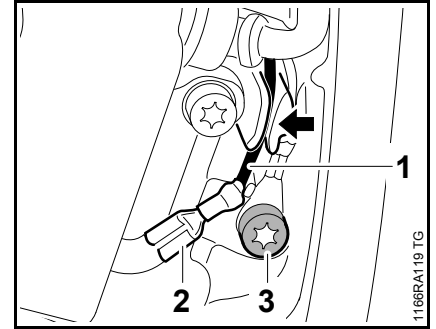
The following test distinguishes between the standard machine version (without M-Tronic) and machine versions with M-Tronic / handle heating or with M-Tronic / handle and carburetor heating.

7.8.1 Testing Wiring Harness without M-Tronic

The ground and short circuit wires are combined in a wiring harness.

If the spark plug, ignition lead and spark plug boot are in order, check the short circuit wire.

- Remove the rewind starter, 9.2



- Pull the short circuit wire (1) out of the guide (arrow) and disconnect the terminal (2).
- Connect the ohmmeter to ground (3) and the short circuit wire (1).

- Set the Master Control lever to "0".

The resistance measured must be about 0 Ω . If it is much higher, the reason is a break and the wiring harness has to be replaced, 7.8.1

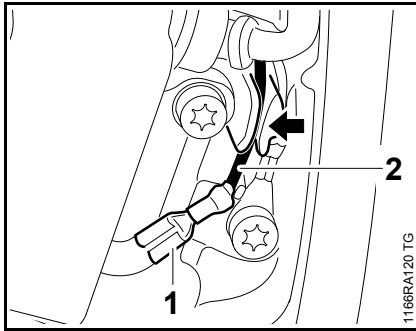
- Set the Master Control lever to "I".

The resistance measured must be infinitely high. If not, replace the wiring harness, 7.8.1

Perform the contact and continuity test on the ground wire too.

If the ground wire is damaged, the wiring harness must be replaced.

- If no fault can be found, check the ignition system with the aid of the troubleshooting chart, 7.13



- Connect terminal (1) of short circuit wire (2) with its crimped side facing outwards.
- Push the short circuit wire (2) fully into the guide (arrow).
- Reassemble in the reverse sequence.

7.8.2 Testing Wiring Harness with M-Tronic

- Test the wiring harness with the STIHL MDG 1 using the troubleshooting chart, [8.3](#), [8.7](#)
- See also Troubleshooting, [3.5](#)

7.8.3 Testing Ground Wire

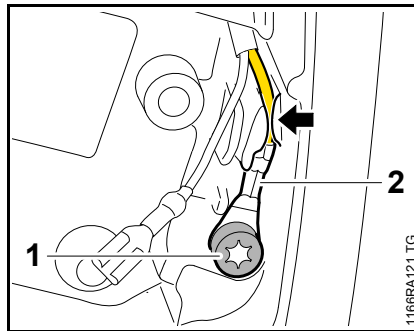
A faulty ground wire may impair or prevent operation of the short circuit wire, M-Tronic or heating.

The ground wire is combined with the short circuit wire in a wiring harness. If damaged, the complete wiring harness must be replaced [7.9](#), [7.10](#).

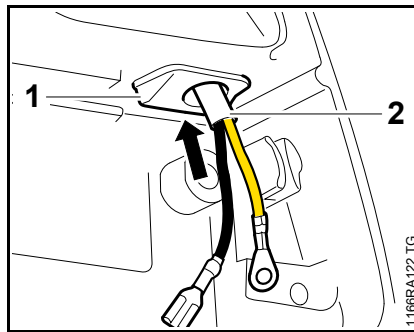
- Check ground wire for contact and continuity, replace wiring harness if necessary.

7.9 Short Circuit Wire / without M-Tronic Removing and Installing

- Remove the shroud, [6.4](#)
- Remove the rewind starter, [9.2](#)
- Remove the ignition module, [7.3](#)

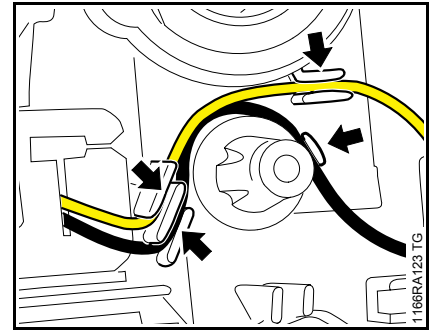


- Take out the screw (1) and pull the ground wire (2) out of the guide (arrow).

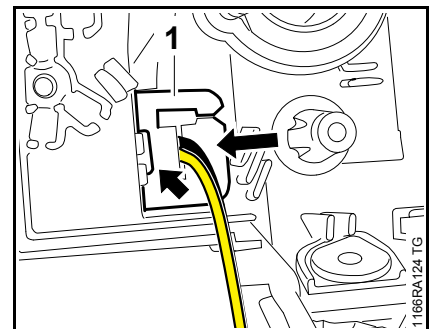


- Press out grommet (1) in direction of cylinder and pull wiring harness (2) out in direction of cylinder.
- Remove the switch shaft, [11.1.1](#)
- Remove the contact spring and retainer, [7.12](#)
- Remove the tank housing, [13.11.4](#)

- Pull the grommet off the wiring harness.

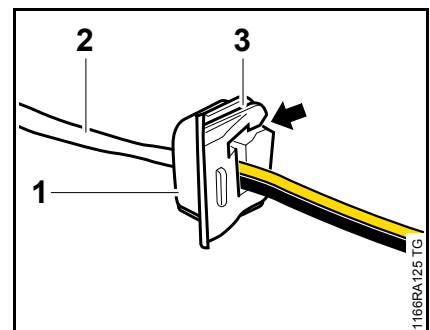


- Pull the wires out of the guides (arrows).



- Press lug (arrow) on grommet (1) in direction of cylinder and push it out sideways.
- Pull off the grommet (1), check wiring harness and replace if necessary.

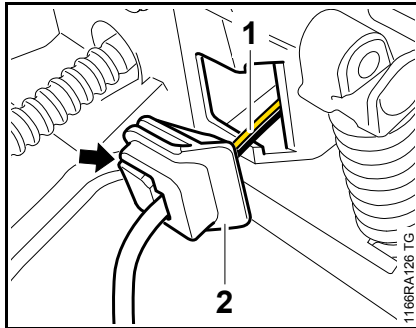
Installing



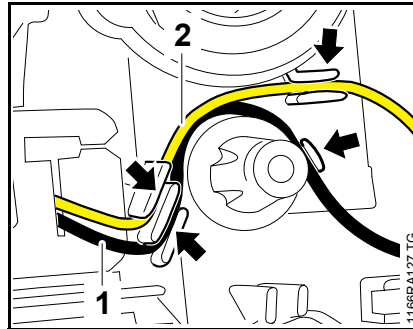
- Position the grommet (3) so that the contour (1) faces the insulation (2).

Fit the wiring harness (two wires) so that the black wire is at the bottom.

- Fit the wires through the lateral opening (arrow) in the grommet (3) so that they are behind one another
 - do not cross the wires.

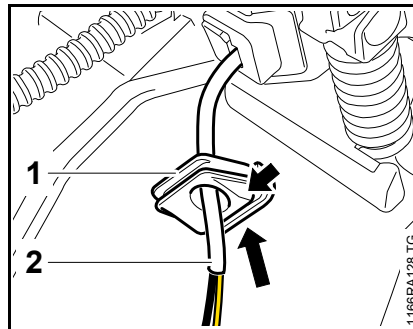


- Pass the wiring harness (1), ring terminals first, through the opening from outside (cylinder side) and into the carburetor box
- Position the grommet (2) so that the opening (arrow) is at the top, then locate its groove and slide it in sideways until the lug engages at the other side.
- Pull the wires through until the insulating tube locates in the grommet's recess.

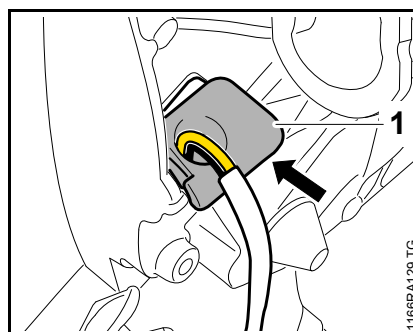


- Push the short circuit wire (1) and ground wire (2) into the guides (arrows).

Position the wires next to one another without crossing over.

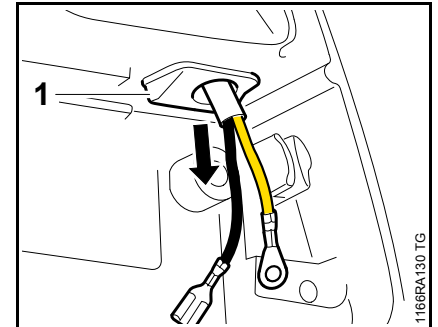


- Slip the grommet (1) over the wiring harness (2) so that slope (arrow) faces the crankcase.



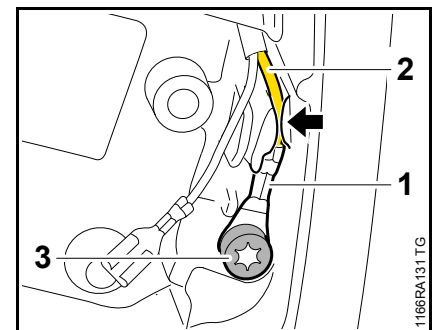
- Slide the grommet (1) into position sideways and push it home until it is properly seated in the crankcase.

- Install the tank housing, [13.11.4](#)
- Install the carburetor, [13.4](#)
- Remove the contact spring and retainer, [7.12](#)
- Install the switch shaft, [11.1.1](#)
 - check its operation, [7.12](#)



The grommet (1) must be properly seated in the opening.

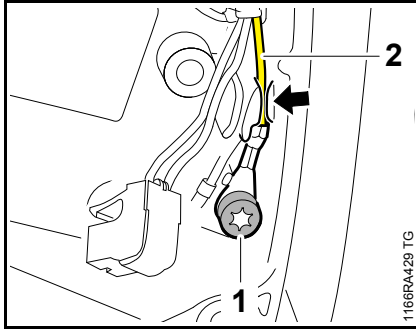
- Position the wiring harness in the crankcase without any loops.



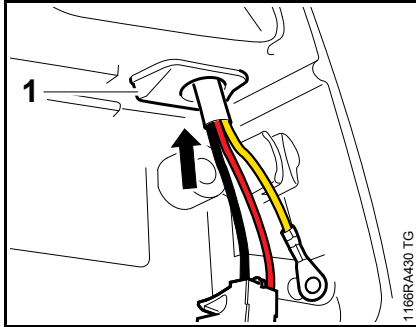
- Fit the cable lug (1) so that its crimped side faces outwards and then push the ground wire (2) into the guide (arrow).
- Insert and tighten down the screw (3) firmly.
- Install the ignition module, [7.3](#)
- Reassemble all other parts in the reverse sequence.

7.10 Short Circuit Wire / with M-Tronic Removing and Installing

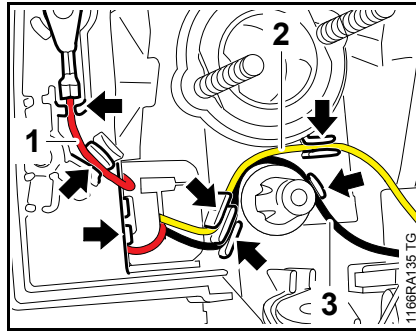
- Remove the shroud, 6.4
- Remove the rewind starter, 9.2
- Remove the control unit, 7.2



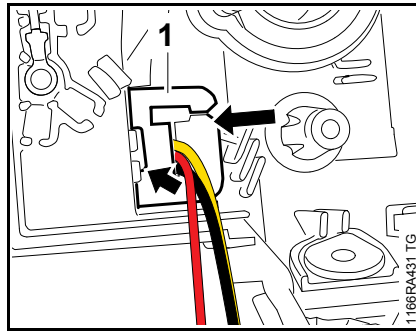
- Take out the screw (1) and pull the ground wire (2) out of the guide (arrow).



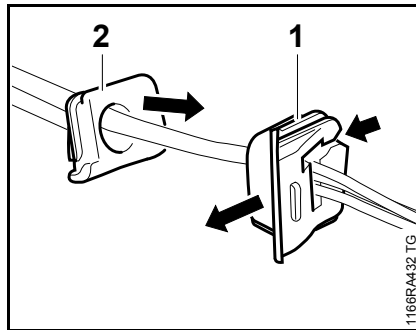
- Push grommet (1) out in direction of cylinder and pull wiring harness (2) out in direction of cylinder.
- Remove the switch shaft, 11.1.1
- Remove the contact spring and retainer, 7.12
- Remove the carburetor, 13.4
- Remove the tank housing, 13.11.4



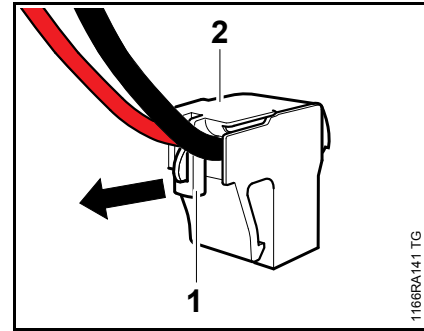
- Pull the M-Tronic wire (1), ground wire (2) and short circuit wire (3) out of the guides (arrows).



- Press lug (arrow) on grommet (1) in direction of cylinder and push it out sideways.
- Remove the wiring harness with grommets.



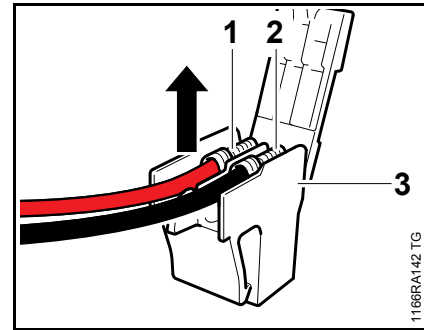
- Remove grommet (1) from the wiring harness via lateral opening (arrow) and pull off grommet (2) in direction of ring terminals.
- Check the wiring harness and replace if necessary.



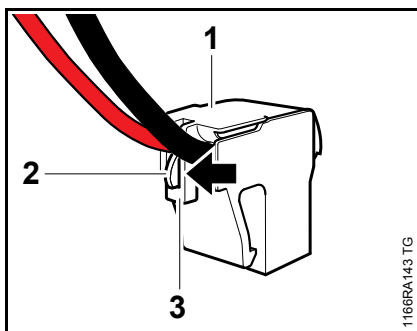
- If necessary, pull locking tab (1) towards wires, open the cover (2) and take out the wires.

A new wiring harness comes with the plug and insulated housing already fitted.

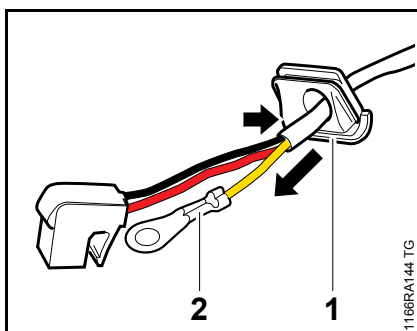
Installing



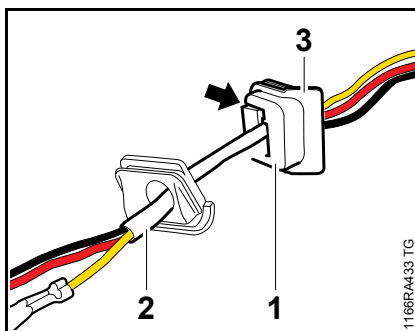
- If necessary, connect red wire's flag terminal (1) and black wire's flag terminal (2) to the insulated housing (3).



- Close the cover (1) and lock it. The lug (2) must engage the slot (arrow) in the locking tab (3) – the locking tab must fit snugly against the insulated housing.

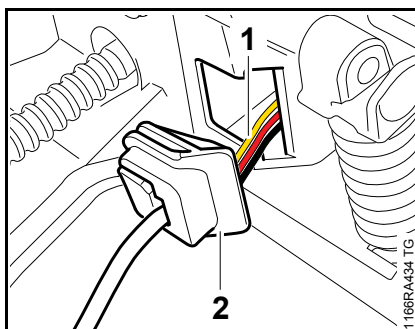


- Position grommet (1) so that the slope (arrow) faces the cable lug (2), then push it over the wiring harness at the end with the ring terminals.

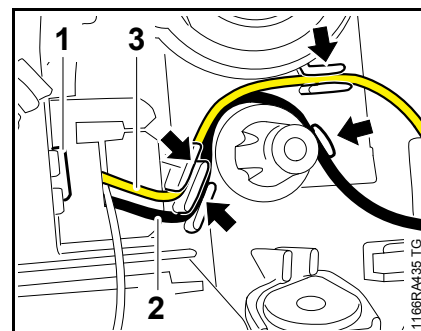


- Position the grommet (3) so that the contour (1) faces the wiring harness insulating tube (2).
- Fit the wiring harness (2) through the lateral opening (arrow) in the grommet (3) so that the black wire is at the bottom and the red and yellow wires are in the order shown.

Do not cross the wires.

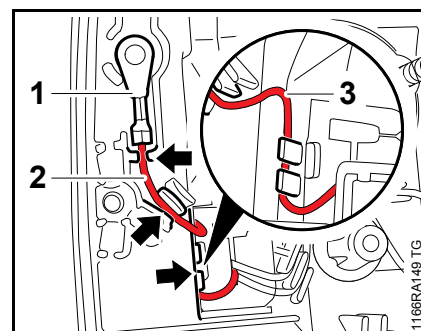


- Pass the wiring harness (1), ring terminals first, through the opening from outside (cylinder side) and into the carburetor box
- Place the grommet (2) in position, locate its groove and slide it in sideways until the lug engages at the other side.

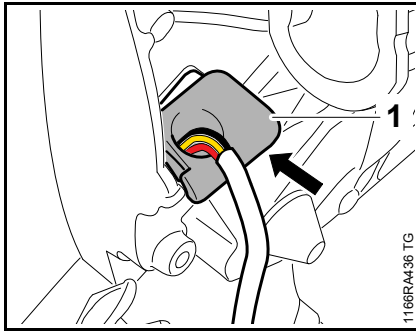


Lug (1) must be engaged.

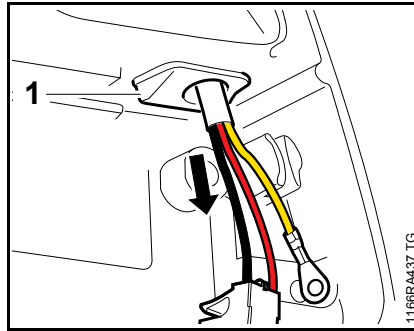
- Push the short circuit wire (2) and ground wire (3) into the guides (arrows).



- Position cable lug (1) with its crimped side facing outwards and push the M-Tronic's red wire (2) into the guides (arrows) as shown – loop (3) allows for movement.

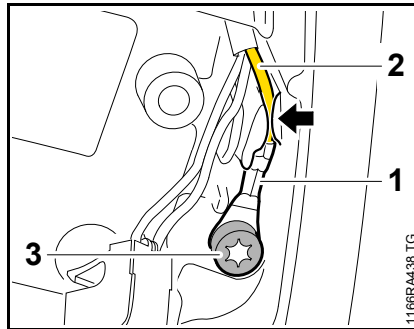


- Use STIHL press fluid to make installation easier, 16
- Fit wiring harness through opening in crankcase, push grommet (1) home sideways and press it into the opening in the crankcase until it is properly seated.
- Install the tank housing, 13.11.4
- Install the carburetor, 13.4
- Install the contact spring and retainer, 7.12
- Install the switch shaft, 11.1.1
 - check its operation, 7.12



The grommet (1) must be properly seated in the opening.

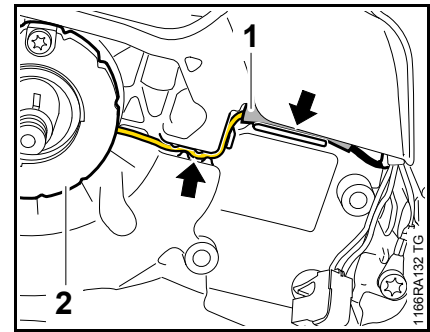
- Position the wiring harness in the crankcase without any loops.



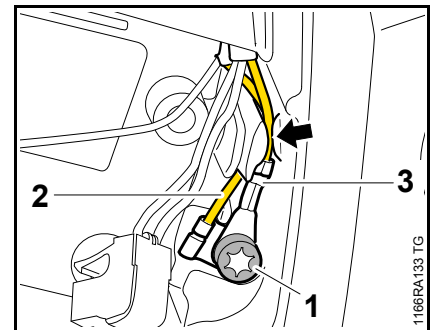
- Fit the cable lug (1) so that its crimped side faces outwards and then push the ground wire (2) into the guide (arrow).
- Insert and tighten down the screw (3) firmly.
- Install the control unit, 7.2
- Reassemble all other parts in the reverse sequence.

7.11 Short Circuit Wire / with M-Tronic and Heating Removing and Installing

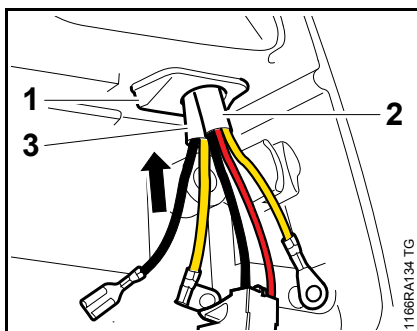
- Remove the shroud, 6.4
- Remove the rewind starter, 9.2
- Remove the control unit, 7.2
- Remove the flywheel, 7.7



- Pull the connector with insulating tube (1) and wire out of the guides (arrows).
- Push back the insulating tube (1) in the direction of generator (2) and separate the pin and socket connectors.

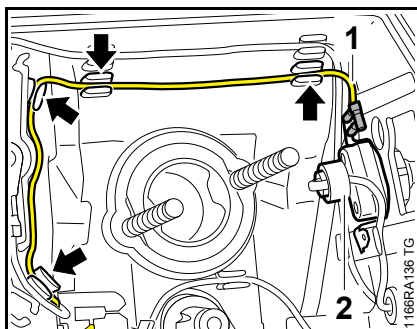


- Take out the screw (1) and pull the ground wire (2, 3) out of the guide (arrow).

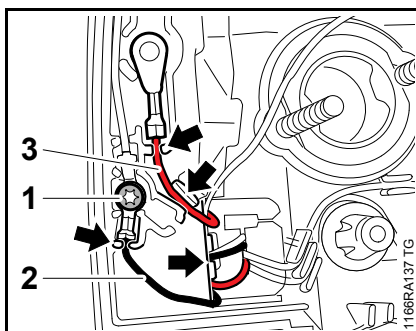


- Push grommet (1) out in direction of cylinder and pull wiring harnesses (2, 3) out in direction of cylinder.

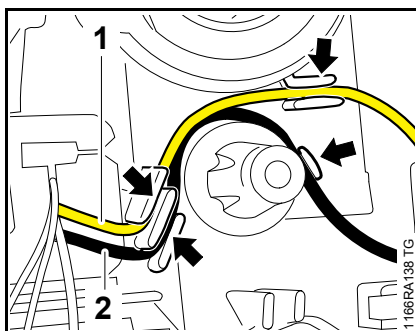
- Remove the switch shaft, 11.1.1
- Remove the contact spring and retainer, 7.12
- Remove the carburetor, 13.4
- Remove the tank housing, 13.11.4



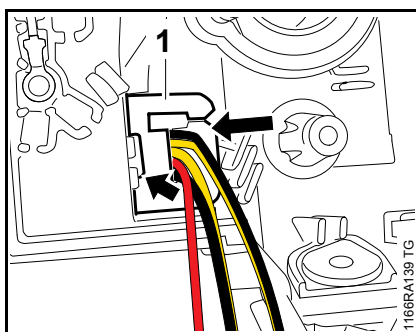
- Disconnect the ground wire (1) from the heater switch (2) and pull it out of the guides (arrows).



- Take out the screw (1), pull the black wire (2) and red wire (3) out of the guides (arrows) – screw (1) has already been removed on machines with carburetor heating.

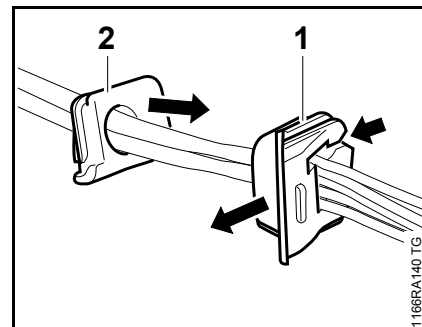


- Pull the ground wire (1) and short circuit wire (2) out of the guides (arrows).



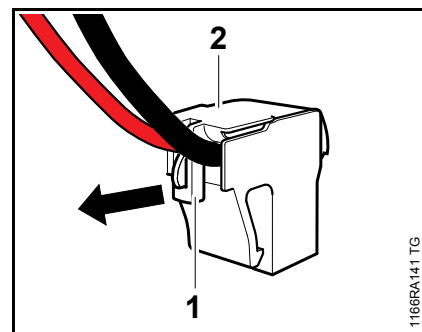
- Press lug (arrow) on grommet (1) in direction of cylinder and push it out sideways.

- Remove the wiring harnesses with grommets.



- Remove grommet (1) from the wiring harness via lateral opening (arrow) and pull off grommet (2) in direction of ring terminals.


- Check the wiring harnesses and replace if necessary.

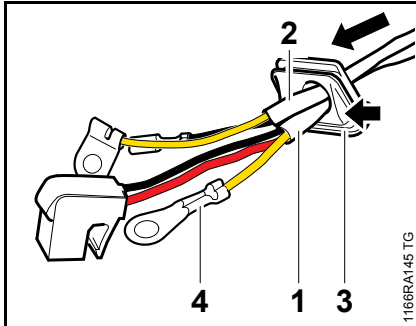


- If necessary, pull locking tab (1) towards wires, open the cover (2) and take out the wires.

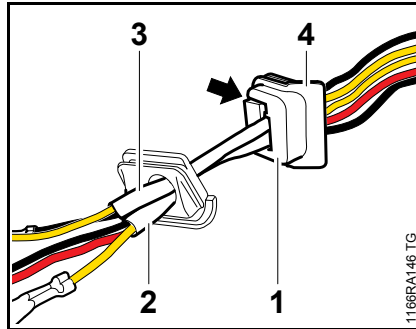
A new wiring harness comes with the plug and insulated housing already fitted.

Installing

- If necessary, install the insulated housing,  7.10

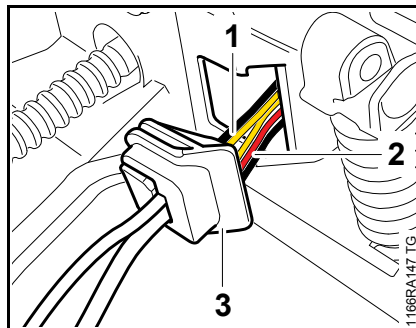


- Line up the wiring harnesses with the insulating tubes (1, 2) next to one another and hold them together.
- Position grommet (3) so that the slope (arrow) faces the cable lug (4), then push it over the wiring harnesses at the end with the ring terminals.

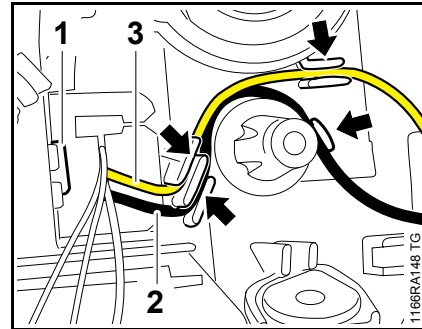


- Position the grommet (4) so that the contour (1) faces the wiring harnesses insulating tubes (2, 3).
- Fit the wiring harness (2) with the three wires through the lateral opening (arrow) in the grommet (4) so that the black wire is at the bottom and the red and yellow wires are in the order shown.
- Fit the wiring harness (3) with the two wires so that it is above wiring harness (2) and the black wire is at the top.

Do not cross the wires.

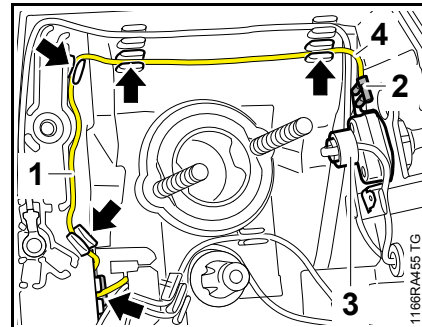


- Pass the wiring harnesses (1, 2), ring terminals first, through the opening from outside (cylinder side) and into the carburetor box.
- Place the grommet (3) in position, locate its groove and slide it in sideways until the lug engages at the other side.

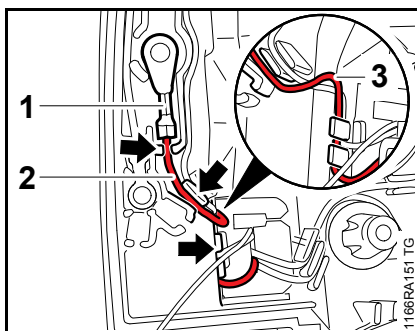


Lug (1) must be engaged.

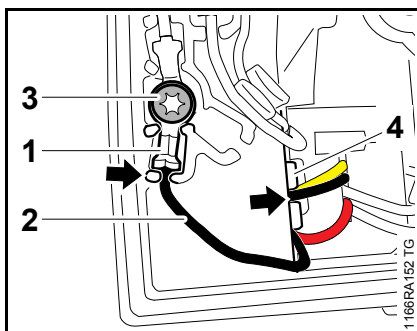
- Push the short circuit wire (2) and ground wire (3) into the guides (arrows).



- Push the ground wire (1) into the guides (arrows) as shown and connect the terminal (2) to the heater switch (3) so that its crimped side is facing the manifold.
- Lay ground wire (1) close to housing – loop (4) allows for movement.

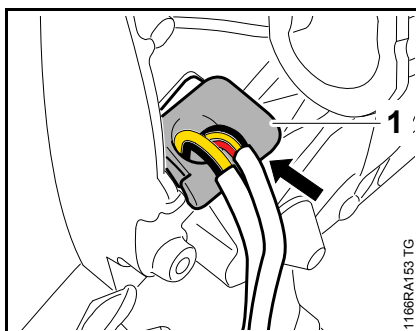


- Position cable lug (1) with its crimped side facing outwards and push the M-Tronic's red wire (2) into the guides (arrows) as shown
 - loop (3) allows for movement.

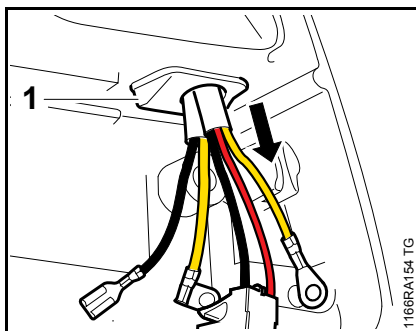


At the guide (4), the yellow and red wires must be positioned below the black wire in that order.

- Position cable lug (1) with its crimped side facing outwards and push the heating's black wire (2) into the guides (arrows).
- Insert and tighten down the screw (3) – on machines with carburetor heating, install the carburetor and carburetor heating first, then insert and tighten down the screw (3) firmly.

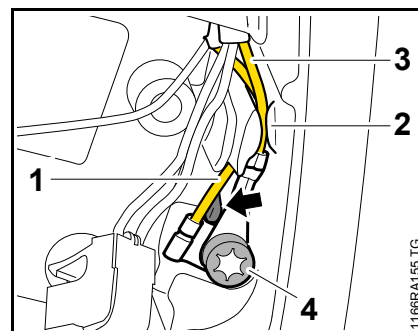


- Use STIHL press fluid to make installation easier, [16](#)
- Fit wiring harnesses through opening in crankcase, push grommet (1) home sideways and press it into the opening in the crankcase until it is properly seated.
- Install the tank housing, [13.11.4](#)
- Install the carburetor, [13.4](#)
- Install the contact spring and retainer, [7.12](#)
- Install the switch shaft, [11.1.1](#)
 - check its operation, [7.12](#)

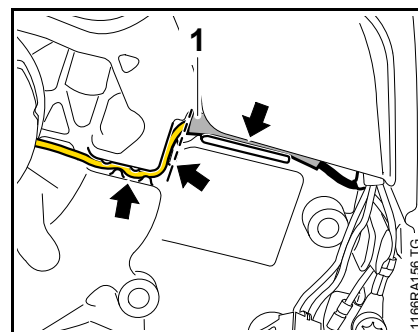


The grommet (1) must be properly seated in the opening.

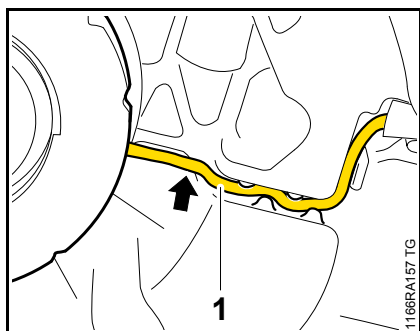
- Pull the wiring harnesses through until the insulating tubes (2, 3) project.



- Position cable lug of ground wire (1) so that the crimped side faces outwards and it butts against the rib (arrow), then push the ground wire (1) into the guide (2).
- Position cable lug of ground wire (3) so that the crimped side faces outwards and then push the ground wire (3) into the guide (2).
 - Ground wire (1) must be underneath ground wire (3).
- Insert and tighten down the screw (4) firmly.



- Reconnect the pin and socket connector and center the insulating tube (1) on the connector.
- Push the pin and socket connector with insulating tube (1) and wire into the guides (arrows).



The generator wire (1) must locate fully in the recess in the area of the expansion loop (arrow).

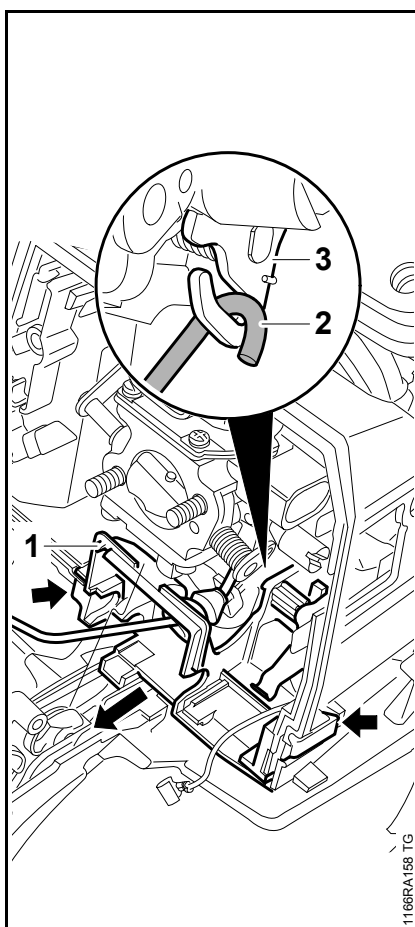
The flywheel must not touch the generator wire
– this could cause a break in power supply.

- Install the flywheel, 7.7
- Install the control unit, 7.2
- Reassemble all other parts in the reverse sequence.

7.12 Contact Spring

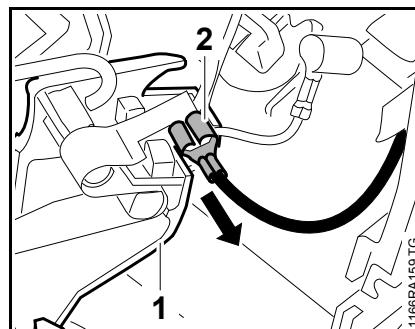
- Remove the filter base, 13.3
- Remove the switch shaft, 11.1.1

All models



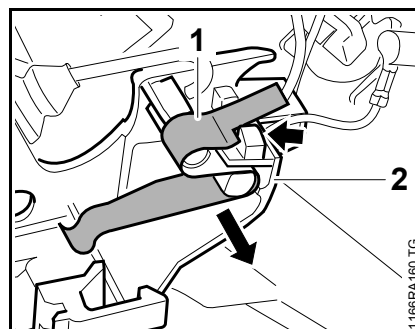
- Lift locking tabs (arrows) and pull out the retainer (1) part way, disconnect the throttle rod (2) from the carburetor (1) at the same time.

Models with M-Tronic

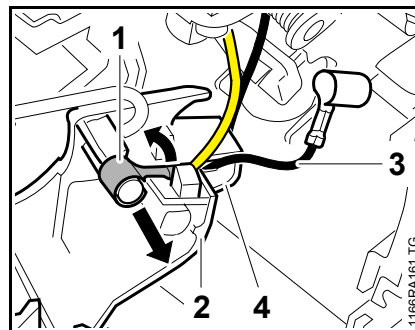


- Pull out retainer (1) part way and disconnect terminal (2).

All models

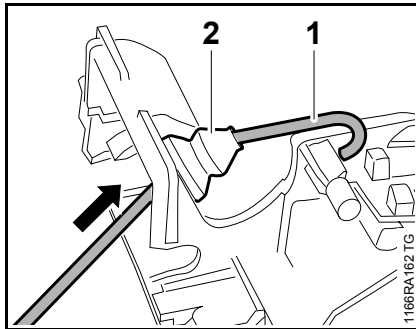


- Lift the contact spring (1) a little and ease it over the tab (arrow).
- Ease the contact spring (1) out of the guides in the retainer (2).



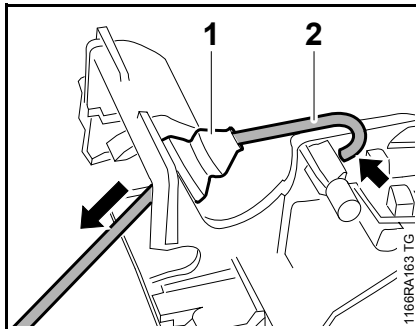
- Turn the ring terminal (1) up and pull it off the pivot pin on the retainer (2).


- Pull the short circuit wire (3) out of the ring (4) and remove the retainer.

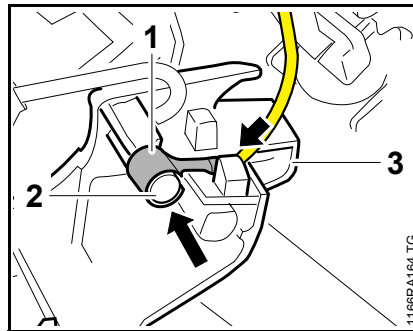


- Pull the throttle rod (1) out of the grommet (2).
- Check the grommet, throttle rod, retainer and contact spring, replace if necessary.

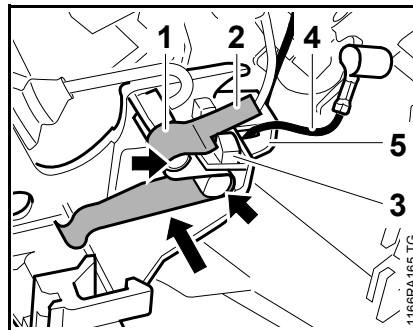
Installing



- Use STIHL press fluid to ease installation – do not lubricate grommet (1) with grease,  16
- If necessary, install the grommet (1) and push throttle rod (2) into the grommet (1) so that the end with the hook (arrow) faces the carburetor.

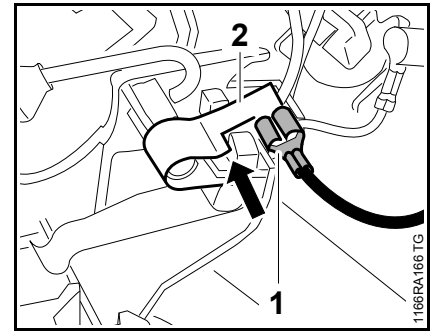


- Push ring terminal (1), crimped side facing down, onto the pivot pin (2) and position it behind the stop (arrow) on the retainer (3).



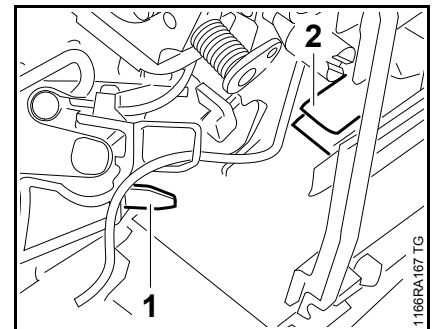
- Position the contact spring (1) against the ring terminal and guide pin (arrows).
- Lift connector tag (2) on contact spring (1) and move it over the stop (3) – take care not to overstretch the contact spring.
- Push the short circuit wire (4) through the ring (5).

Models with M-Tronic / heating

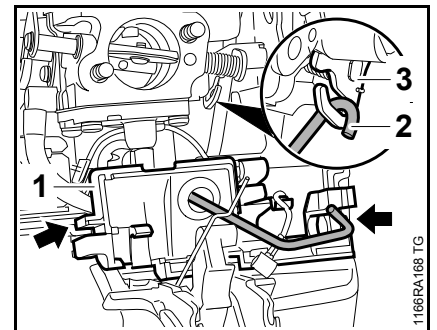


- Push terminal (1) onto the connector tag (2) so that its crimped side faces up – push the terminal on straight without bending it.

All models



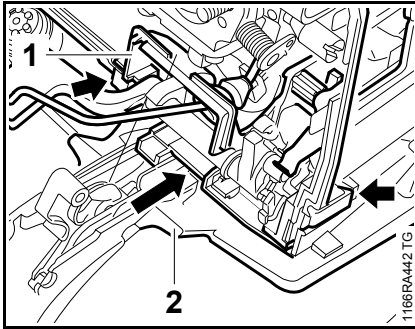
The lug (1) must engage seat (2) in tank housing.



- Position retainer (1) against the guides (arrows) and push it about 5 mm into the tank housing, attaching the throttle rod (2) to the carburetor (3) at the same time.

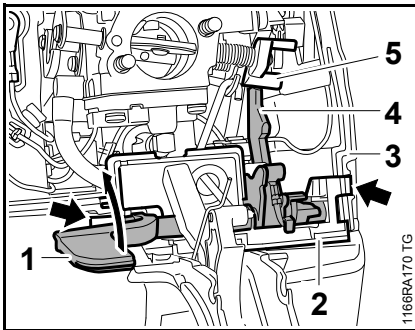
- Install the switch lever,  11.1.1

Models without M-Tronic



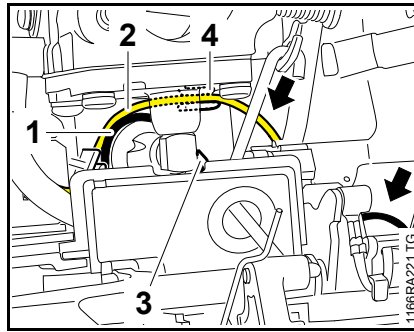
- Push the retainer (1) into the tank housing (2) until the locking tabs (arrows) engage.

Models with M-Tronic



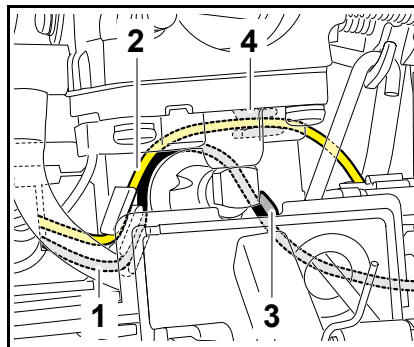
- Move the switch shaft (1) in direction of **"STOP"** and hold it there. Push the retainer (2) into the guides in the tank housing (3) until the locking tabs (arrows) engage, position lever (4) behind lever (5) on choke shaft at the same time.

Models without M-Tronic



Short circuit wire (1) and ground wire (2) must be properly located in the guides (3, 4). If necessary, push the wires fully home – the loops (arrows) allow for movement.

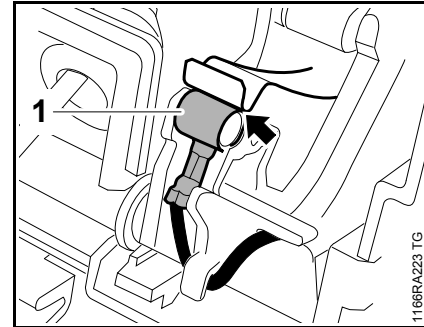
Models with M-Tronic



Short circuit wire (1) and ground wire (2) must be properly located in the guides (3, 4) – the loops (arrows) allow for movement.


The M-Tronic's black wire (5) must locate properly in the guides (6, 7) – loop (arrow) allows for movement.

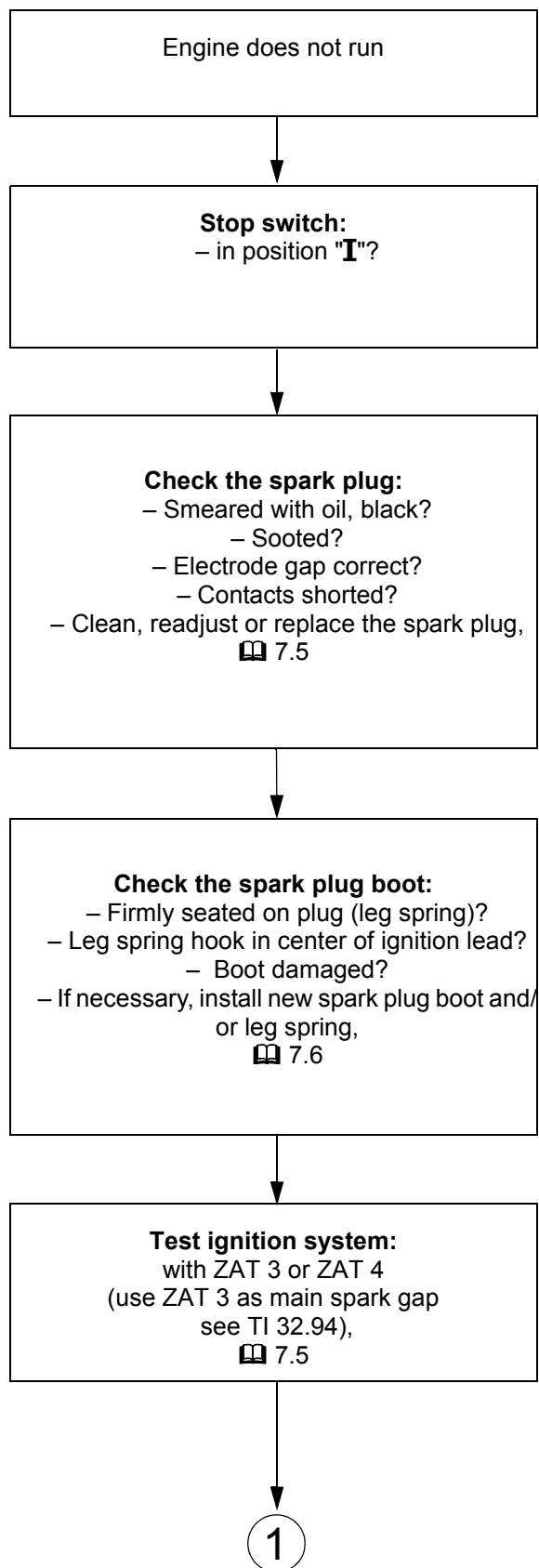
Checking operation of all models

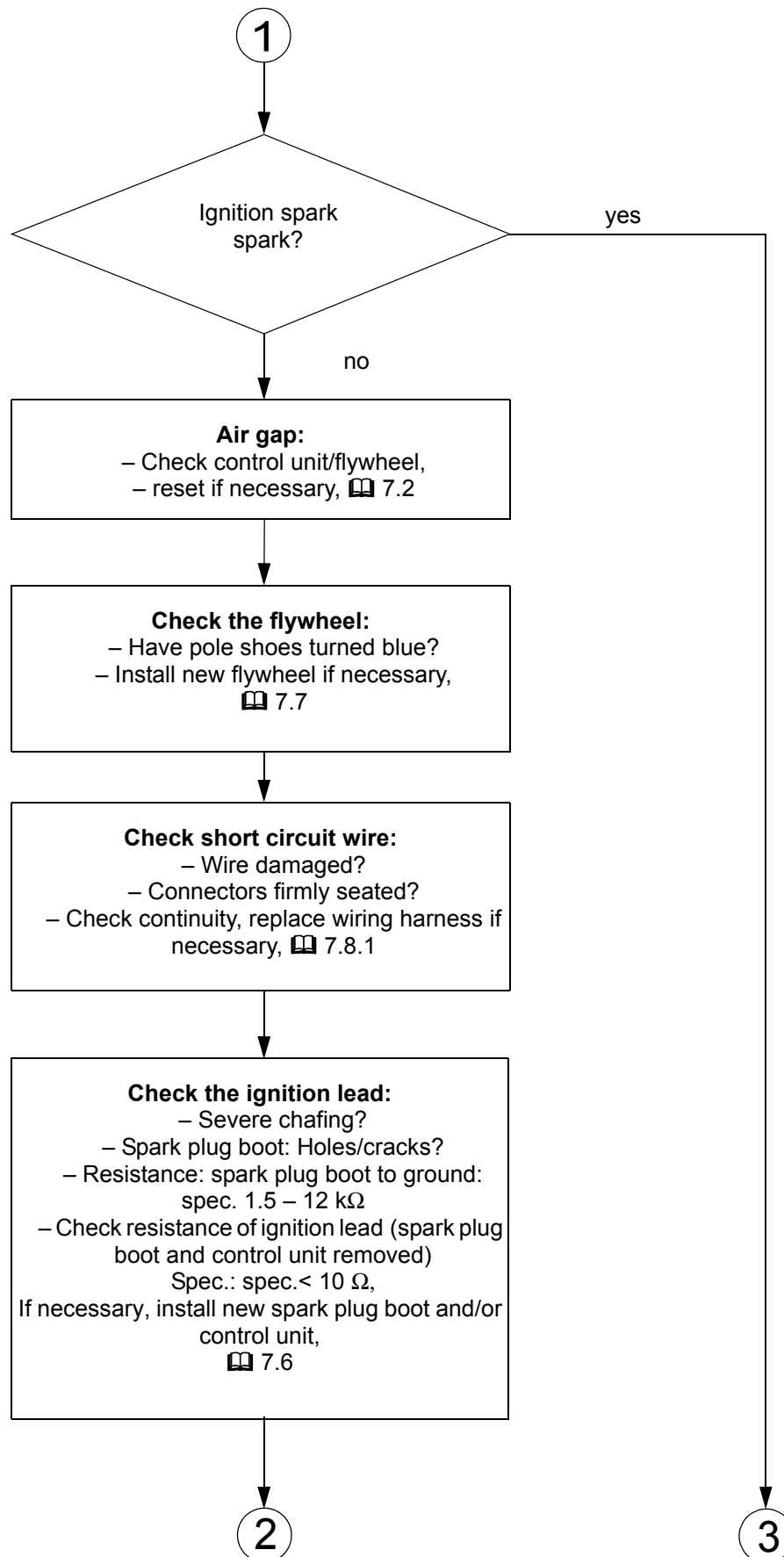


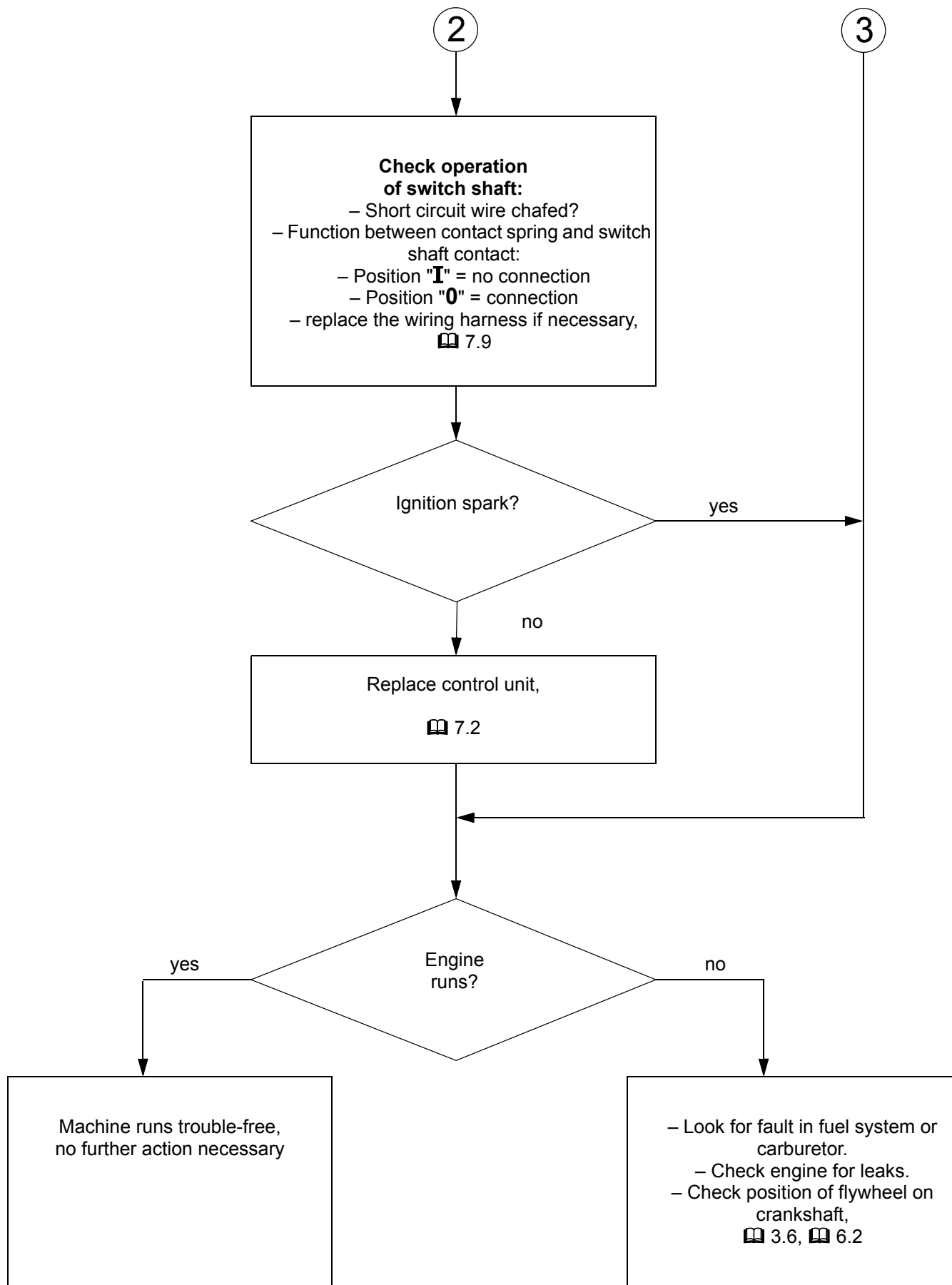
- The short circuit wire's ring terminal (1) must touch the contact spring (arrow) in position **"0"** – on M-Tronic models the switch shaft must be held in position **"0"**.

Also perform contact and continuity check on ground wire between ring terminal and contact spring and replace the wiring harness if necessary.

- If no fault can be found, check the ignition system with the aid of the troubleshooting chart,  7.13
- Reassemble all other parts in the reverse sequence.

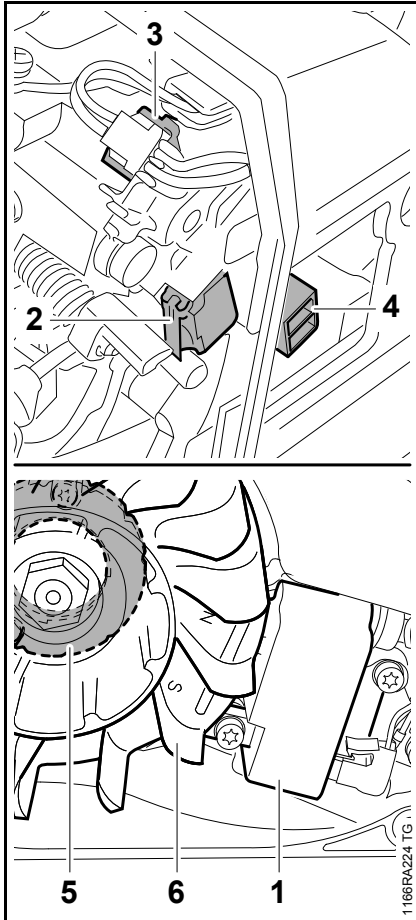






8. M-Tronic

For the sake of clarity, the components in this chapter are shown without filter cover, rewind starter and the grommet on the heater switch.



The M-Tronic basically consists of the control unit (1), switch unit (2), solenoid valve (3) diagnostic socket (4), generator (5) and flywheel (6).

The control unit (1) contains a high energy ignition module and is responsible for centralized control of all engine functions. It adjusts ignition timing and meters the exact quantity of fuel as a function of external conditions.

It is no longer necessary to carry out a basic or standard carburetor setting.

The M-Tronic controls all operating modes, such as start, idle, part and full load, in response to external conditions, e.g. operating at different altitudes and temperatures or with different fuel qualities – the carburetor has no adjusting screws.

8.1 Calibrating the Control Unit

The control unit has to be calibrated if maximum engine speed is not reached or the control unit and/or carburetor or solenoid valve have been replaced.

- Remove the saw chain and guide bar and refit the chain sprocket cover.
- Start the engine – **do not** blip the throttle trigger – move Master Control lever to start position ▲

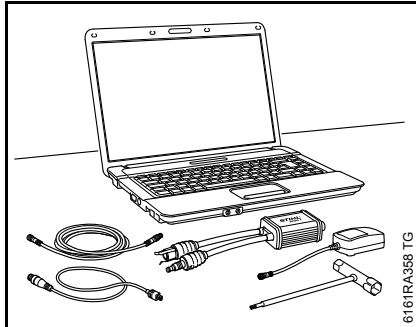
Allow engine to run for at least 60 seconds in start position ▲ and then move the Master Control lever to "**STOP**" without operating the throttle trigger – that completes calibration.

The control unit is adapted to the carburetor during the run in the start position ▲.

An immediate engine shutdown is necessary for the information to be saved to the control unit.

8.2 Testing with STIHL MDG 1

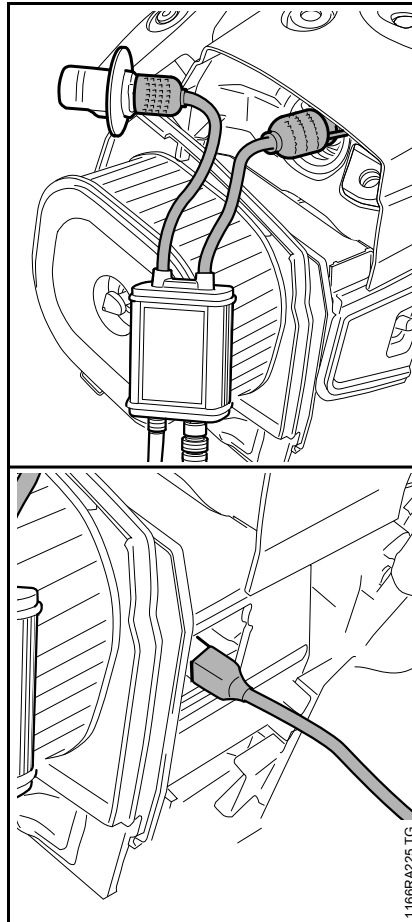
Always perform tests with the **STIHL MDG 1 engine analyzer**.



The M-Tronic system can be tested with the STIHL MDG 1 in conjunction with a computer.

The diagnostic software for the engine analyzer must be installed on the computer. A STIHL Bluetooth stick 5910 840 1500 must be plugged into the computer's USB port. The STIHL Bluetooth stick guarantees the data transfer between the STIHL MDG 1 and the computer.

The diagnostic software guides the user interactively in steps through the entire test run. Malfunctions and their sources in the STIHL M-Tronic are taken into account and displayed by the program during the test run.



The STIHL MDG 1 engine analyzer is now integrated in the ignition circuit and connected to the control unit and generator via the test cable.

The STIHL MDG 1 comes with a power supply unit which is also be connected to the MDG 1.

There is an electronic module in the STIHL MDG 1 for data transfer to the bluetooth stick on the computer. The engine analyzer is supplied from the factory together with the diagnostic program on a data carrier for the computer. The diagnostic program includes a database in which the data of different power tools is stored for the test run.

Depending on the production date of the STIHL MDG 1 and the power tool to be tested, it is possible that the database may not up to date for the power tool concerned. In such a case the latest version of the program can be downloaded from the internet.

For further and more detailed information on the STIHL MDG 1, see the STIHL MDG 1 instruction manual and Technical Information bulletin TI 28.2011 which accompanied the market launch.

- Test the control unit with the STIHL MDG 1, 8.3, 7.2, see also Troubleshooting Chart, 8.7

8.3 Testing

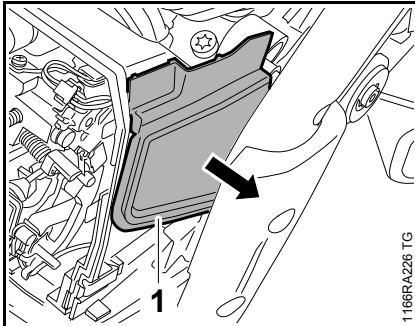
8.3.1 Preparations

Carry out the following operations before starting the tests.

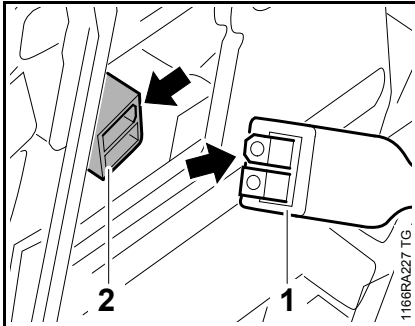
- Troubleshoot with aid of troubleshooting chart, 8.7
- Remove the shroud, 6.4
- Remove the filter base, 13.3
- Clean loose dirt from screw connections, control unit, switch unit, solenoid valve and diagnostic socket.

8.3.2 Connecting Test Cables

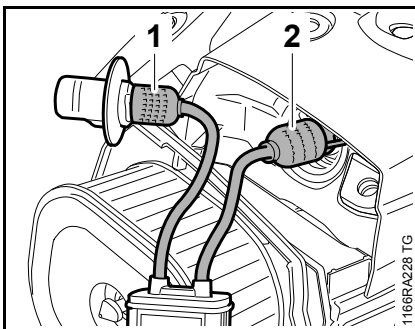
- Remove the filter base, 13.3



- Pull out the grommet (1).



- Insert plug (1) of M-Tronic diagnostic cable 5910 840 0400 into the socket (2), contours (arrows) must match – the plug (1) must snap into place.



The STIHL MDG 1 must be installed between the spark plug boot and spark plug.

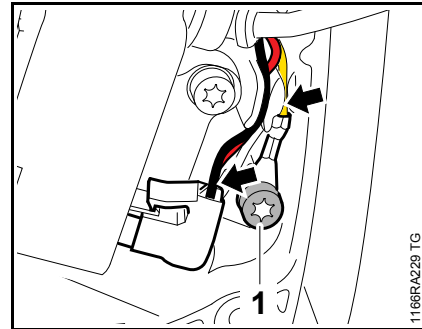
- Pull boot off the spark plug.
- Insert plug (1) in spark plug boot and fit socket (2) on spark plug.
- Perform test, wires and contacts, 8.3, test M-Tronic according to troubleshooting chart, 8.7
- After completing test, lift the lock and disconnect cable from diagnostic socket.
- Install the grommet.
- Reassemble all other parts in the reverse sequence.

8.3.3 Testing Screw and Plug Connections and Switch Contact

- Carry out preparations, 8.3.1

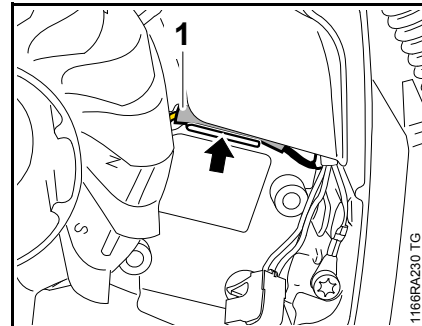
A reliable connection is required for communications between the control unit, switch unit and solenoid valve. If communications between the control unit and solenoid valve are interrupted or faulty, the control unit will not produce an ignition spark.

- In the event of interference or a missing ignition spark, first check the screw connections, switch contact and wiring harness between the control unit and solenoid valve.



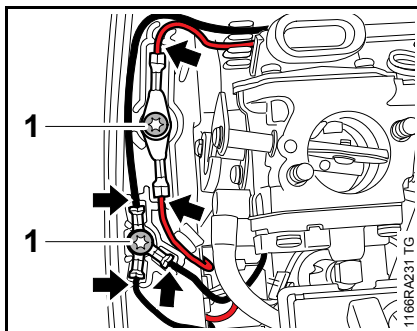
Screw (1) must be tightened down firmly.

Wires (arrows) must be firmly seated in the terminal sockets and the cable lug – the plug must engage properly.



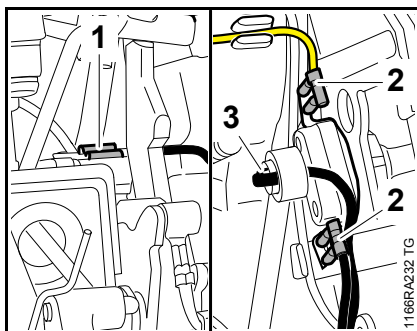
Generator pin and socket connector (1) must make full contact.

- If necessary, pull pin and socket connector (1) out of guide (arrow), disconnect and check contacts, 8.3.3

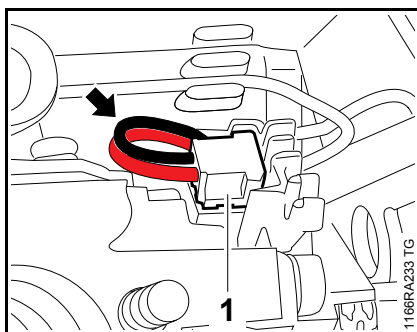


Screws (1) must be tightened down firmly.

Wires (arrows) must be properly and firmly seated in the cable lugs.



- Check terminal sockets (1, 2) and contact sleeve (3) for contact – the wires must be properly and firmly seated in the terminal sockets and the contact sleeve.

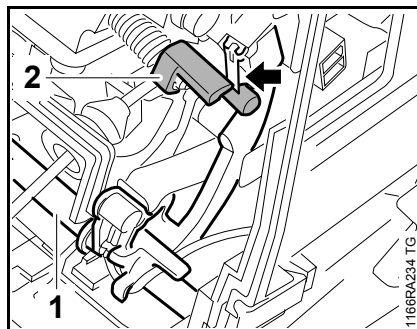


Connector (1) must be properly seated in solenoid valve.

Make sure that no dirt gets between the connector and solenoid valve. If necessary, clean area before removing the connector.

- Pull off the connector (1) and check the contacts.

When the connector is installed, check that the wires are properly seated in the switch unit's guides and the loop (arrow) is next to the connector.



- Move throttle lever in direction of full throttle and set Master Control lever (1) to ▲, the lever (2) on the choke shaft must operate the microswitch (arrow) – with an audible click.
- If the microswitch is not operated by the lever (2) on the choke shaft, fit a new lever if necessary, 13.5.7
- If the microswitch does not work when it is operated, install a new switch unit, 8.5

8.3.4 Checking the Solenoid Valve

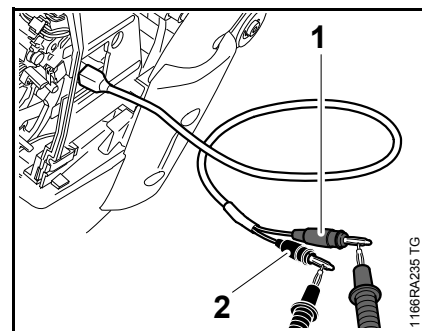
- Carry out preparations, 8.3.1
- Test screw and plug connections, 8.3.3

- Check contact and operation, 8.3.5

Master Control lever must be on "I".

- Connect test cable, 8.3.2

Measuring resistance



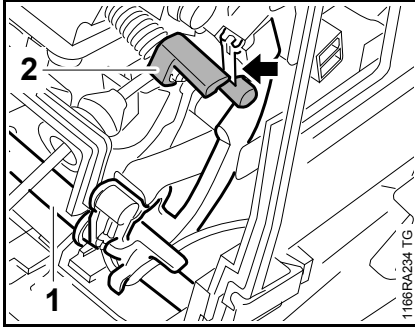
- Measure resistance between the plugs (1) and (2) of the M-Tronic test cable.

Specified value: between 28 and 42 Ω .

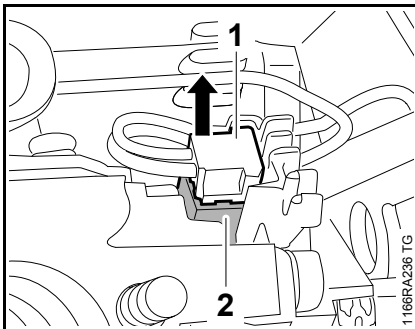
- If this value is not obtained, check wires for break, e.g. between solenoid valve and diagnostic socket, or check for lack of contact due to damaged insulation, replace solenoid valve if necessary, 8.6

8.3.5 Checking Detection of Start Conditions

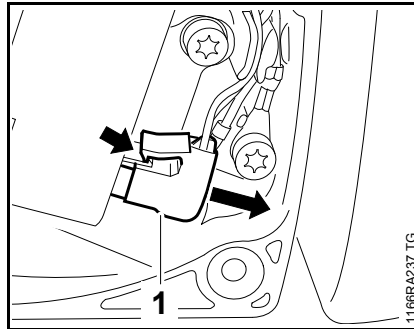
- Carry out preparations, 8.3.1
- Test screw and plug connections, 8.3.3



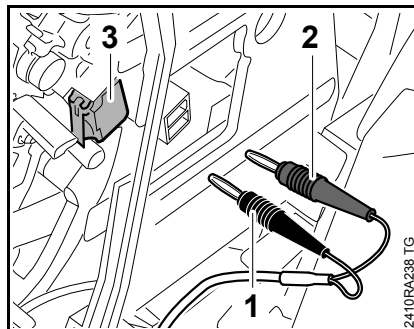
- Set the Master Control lever (1) to ▲, the lever (2) must operate the microswitch (arrow) in this process – audible click.



- Remove the connector (1) from the solenoid valve (2) – do not tug wires to remove the connector.



- Lift locking tab (arrow) and pull off the flag terminal (1).
- Check the flag terminal, disassemble and clean if necessary, 7.10
- Set the Master Control lever to ▲.
- Connect test cable, 8.3.2





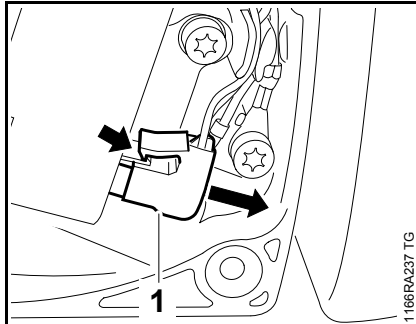
- Connect M-Tronic test cable to multimeter.
- Connect black plug (1) to "com" / "ground" socket and red plug (2) to "Volt" / "Ohm" socket.
- Set multimeter to "diode test".
- Test diode on switch unit (3) (microswitch) – follow instructions supplied with multimeter.


If the switch unit (microswitch) is in order and the Master Control lever is on ▲, the following values are obtained:

- Measurement in forward direction, specified value: 0,3 V to 0.7 V
- Set the Master Control lever to I
- Measurement in reverse direction, specified value: 1,2 V to infinity – observe display, e.g. (O.L.) or (1.)
- If specified values are not obtained, replace the switch unit and repeat the test procedure, 8.5
- If the specified values are still not obtained, replace the wiring harness, it may be possible to re-use the existing switch unit, 7.10
- Reassemble all other parts in the reverse sequence.

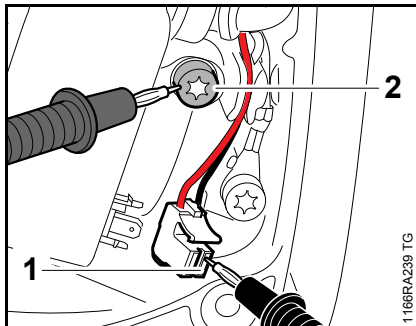
8.3.6 Testing the Wiring Harness

- Carry out preparations,  8.3.1
- Check contact and operation,  8.3.3
- Set Master Control lever to **STOP 0** and hold it there.



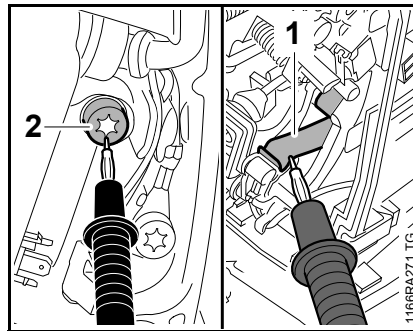
- Lift locking tab (arrow) and pull off the flag terminal (1).
- Check the flag terminal, disassemble and clean if necessary,  7.10

Testing ground connection



- Measure resistance between terminal socket (1) with black wire and screw (2) on control unit.


Specified value: < 10 Ω.



- Measure resistance between contact spring (1) and screw (2) on control unit.

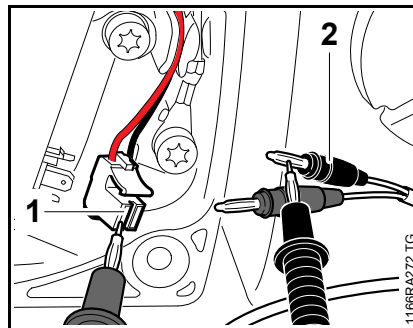
Specified value: < 10 Ω.

If the specified values are not obtained

- Check wires for break and replace wiring harness if necessary,  8.3.6

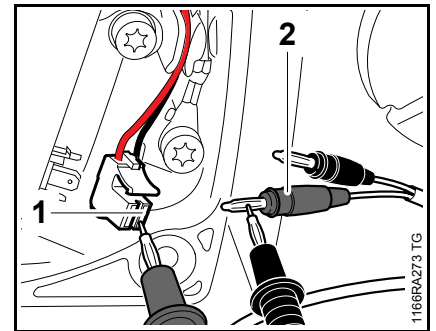
Checking wires between control unit and diagnostic socket

- Connect test cable,  16



- Measure resistance between terminal socket (1) with red wire and test cable's black plug (2).



Specified value: < 10 Ω.




- Measure resistance between terminal socket (1) with black wire and test cable's red plug (2).

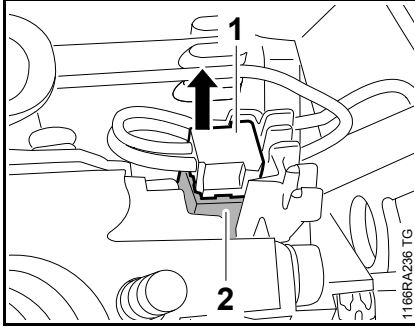
Specified value: < 10 Ω.

If the specified values are not obtained

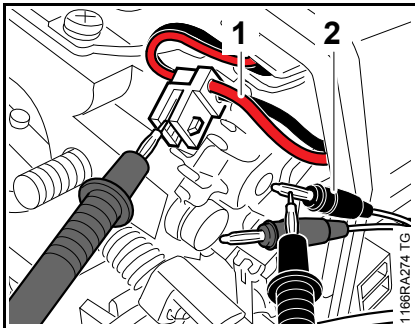
- Check contact between terminal socket on switch shaft and contact spring.
- Check continuity between wires and terminal sockets
 - terminal sockets must be firmly connected to the wires. If there are problems with contact, replace the wiring harness,  8.3.3,  8.3.6

Checking wires between solenoid valve unit and diagnostic socket

- Connect test cable,  8.3.2

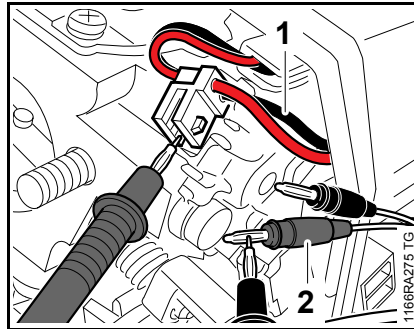


- Pull connector (1) off the solenoid valve (2).



- Measure resistance between red wire (1) on the solenoid valve's connector and test cable's black plug (2).


Specified value: < 10 Ω




- Measure resistance between black wire (1) on the solenoid valve's connector and test cable's red plug (2).

Specified value: < 10 Ω




If the specified values are not obtained

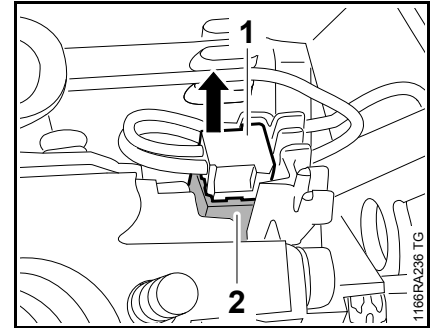
- Check contact faces on the plug and connector tag, and wires for break, or contact between cable lug / terminal socket, replace switch unit if necessary,  8.5
- Reassemble all other parts in the reverse sequence.

8.4 Wiring Harness

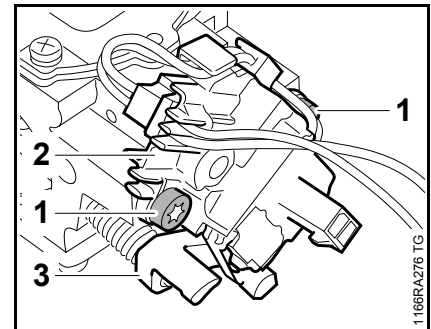
The wires of the M-Tronic and the short circuit wire are combined in a wiring harness. Removal and installation are described in the chapter on "Wiring Harness with M-Tronic / Heating, Removing and Installing,  7.10.


8.5 Switch Unit

- Remove the filter base,  13.3
- Test the switch unit,  8.3.5
- Remove the carburetor,  13.4



- Remove the connector (1) from the solenoid valve (2) – do not tug wires to remove the connector.

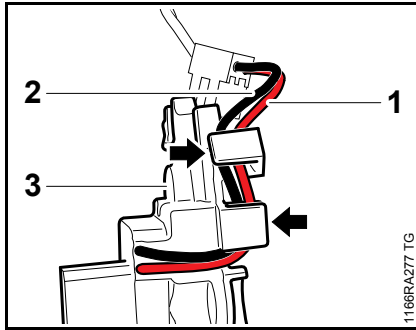


- Take out the screws (1) and remove the switch unit (2).
- Check lever on choke shaft (3), replace if necessary,  13.5.7

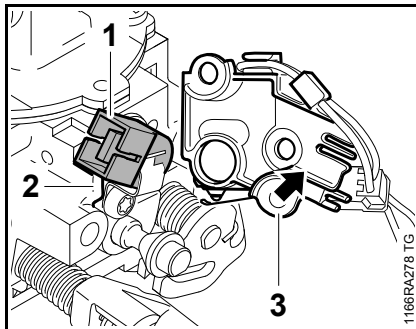
Installing

If a new switch unit is being used, first fit the wires in the switch unit's guides.

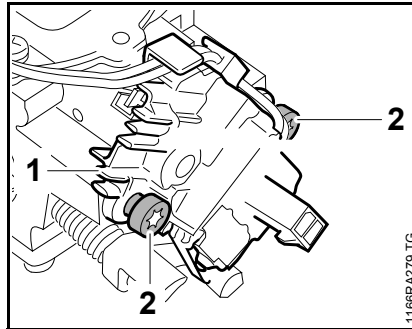
The wires and plug connections must not be damaged.



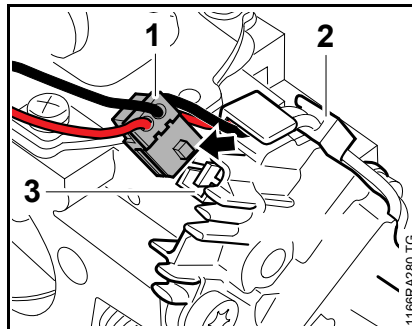
- Push the red wire (1) and black wire (2) into of the guides (arrows) in the switch unit (3)
– position the wires parallel to one another as shown.



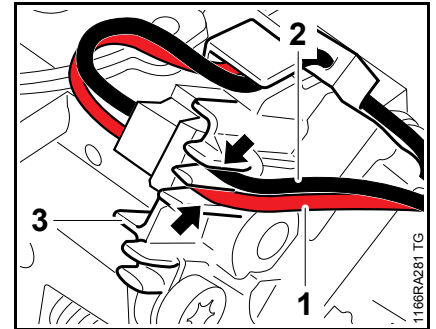
- Solenoid valve (1) must rest against the rib (2), reposition it if necessary and then test it, [1166RA278 TG](#) 8.3.4
- Position the switch unit (3) so that the solenoid valve (1) engages the recess (arrow).



- Place the solenoid valve (1) in position.
- Coat screws (2) with threadlocking adhesive, [1166RA279 TG](#) 16
- Insert and tighten down the screws (2) firmly.

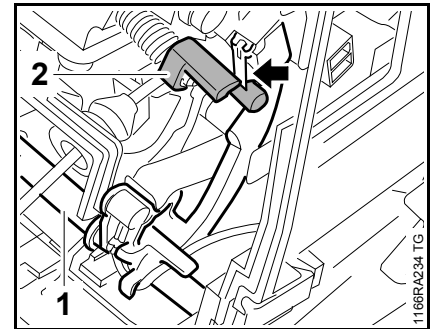


- Position the connector (1) so that guide lug (arrow) faces the switch unit (2).
- Push connector (1) into solenoid valve's socket (3) as far as stop.






- Push the red wire (1) and black wire (2) into of the guides (arrows) in the switch unit (3)
– position the wires parallel to one another as shown.

Check operation

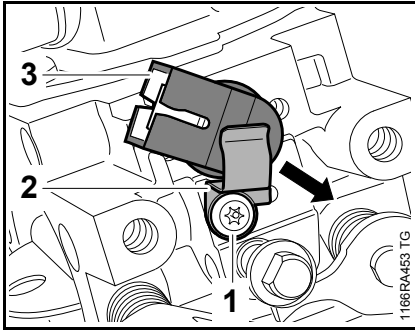


- Move the choke shaft (1) to in direction of cold start ▲, the lever (2) must operate the microswitch (arrow) in this process
– with an audible click.
- Install the carburetor – all wires must be properly seated in their guides, [1166RA234 TG](#) 13.4
- Reassemble all other parts in the reverse sequence.

8.6 Solenoid Valve

- Remove the carburetor,  13.4
- Remove the switch unit,  8.5
- Clean the carburetor,  13.5.1

Removing

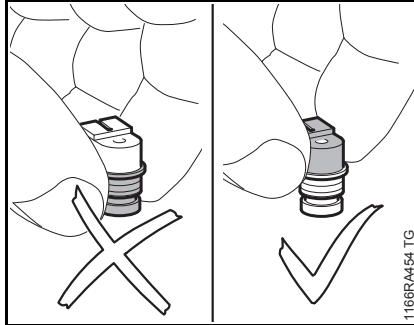


- Use screwdriver 5910 890 2313 to take out screw (1) and remove the retainer (2).
- Pull out the solenoid valve (3)
 - do not re-use the solenoid valve, always install a new one.

Make sure no dust or dirt gets into the solenoid valve's mounting bore.

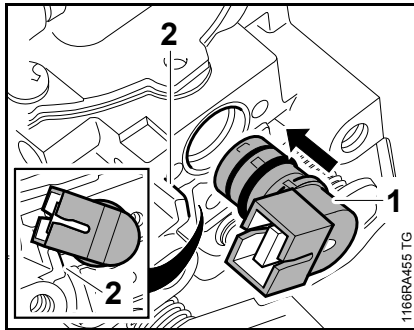
Installing

The area around the mounting bore must be completely free from dust and dirt.



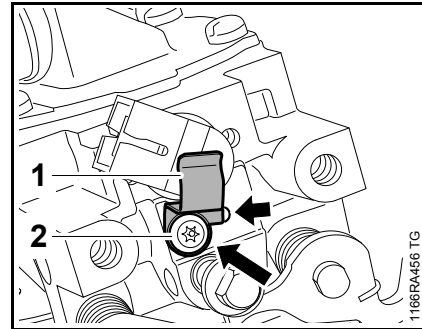
Only hold the solenoid valve above the collar




- sealing faces might otherwise be damaged.



- Position the solenoid valve (1) so that it rests against the carburetor's stop (2), then push it carefully into the mounting bore. Do not rotate the solenoid valve during this process – its sealing face must not be damaged.

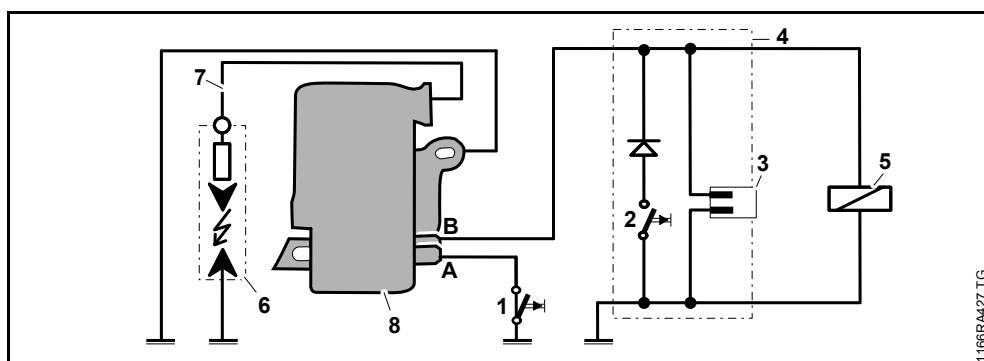
The solenoid valve (1) must be pushed squarely into the mounting bore.



- Position the retainer (1) so that the lug engages the hole (arrow)
 - the retainer is held in place.
 - Insert and tighten down the screw (2) firmly.
- Install the switch unit,  8.5
 - Install the carburetor,  13.4
 - Calibrate the control unit,  8.1
 - Reassemble all other parts in the reverse sequence.

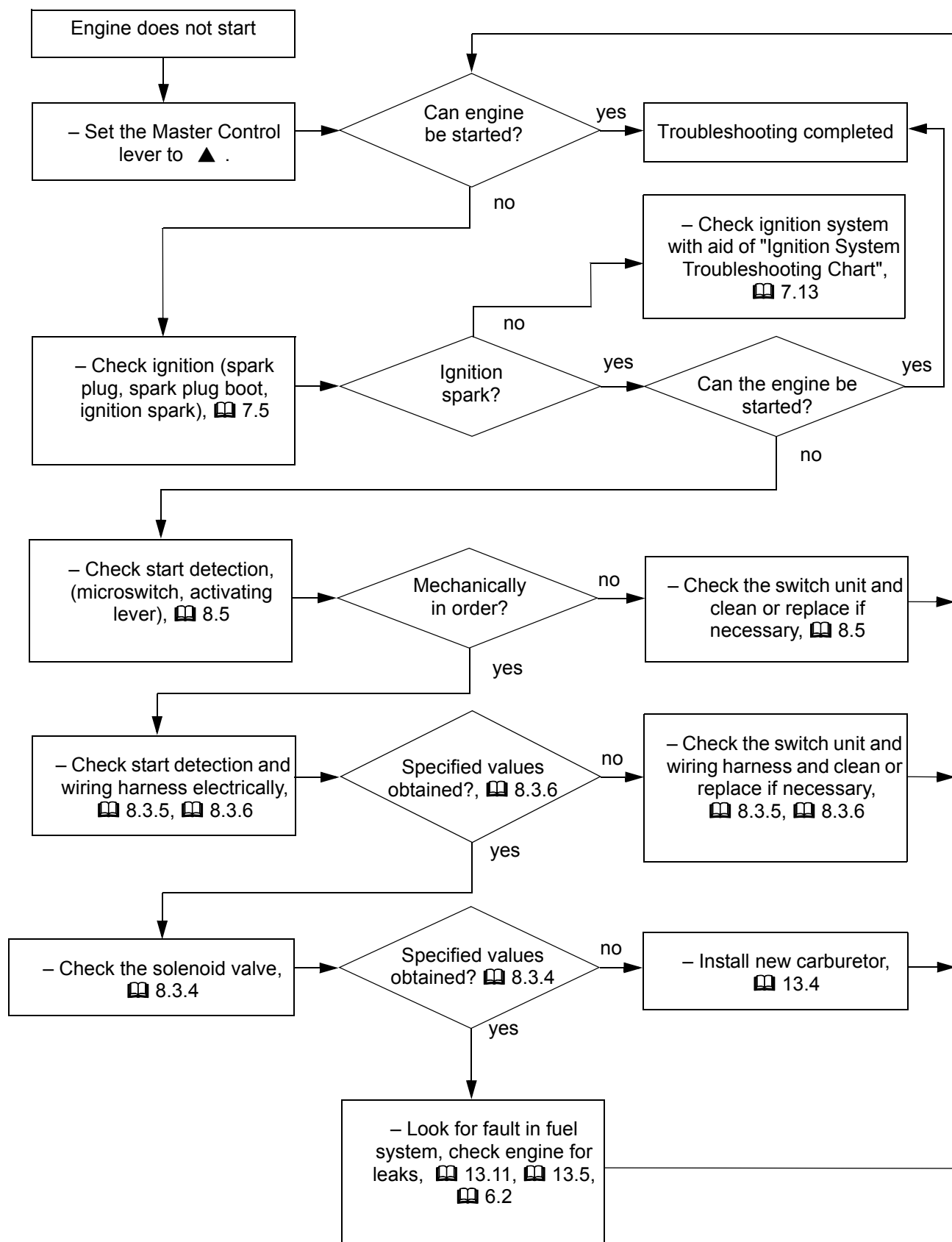
8.7 M-Tronic Troubleshooting Chart

8.7.1 Circuit Diagram

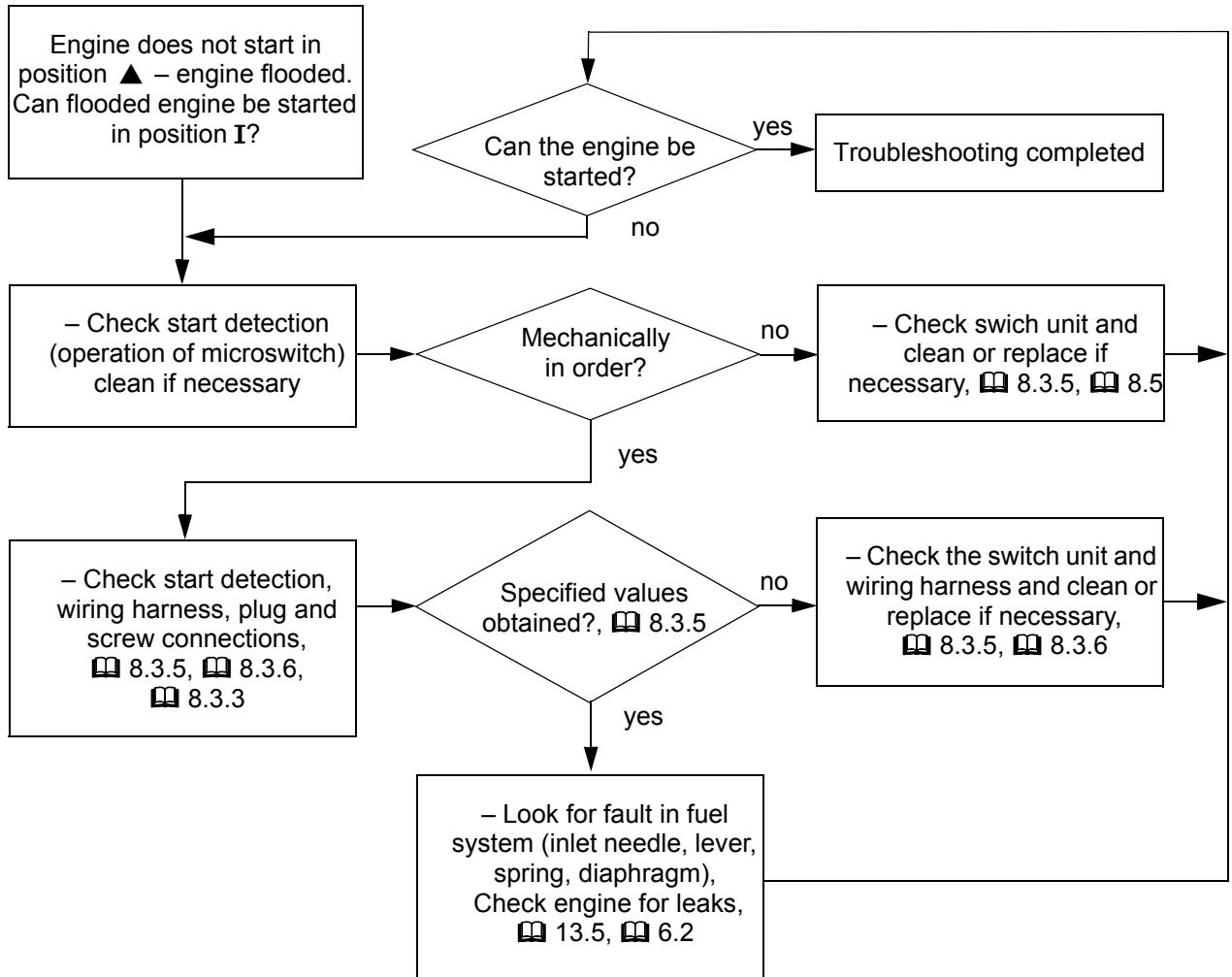


- 1 Stop switch
- 2 Choke switch
- 3 Diagnostic socket
- 4 Switch unit (choke module)
- 5 Solenoid valve (in carburetor)
- 6 Spark plug
- 7 Ignition lead
- 8 Control unit

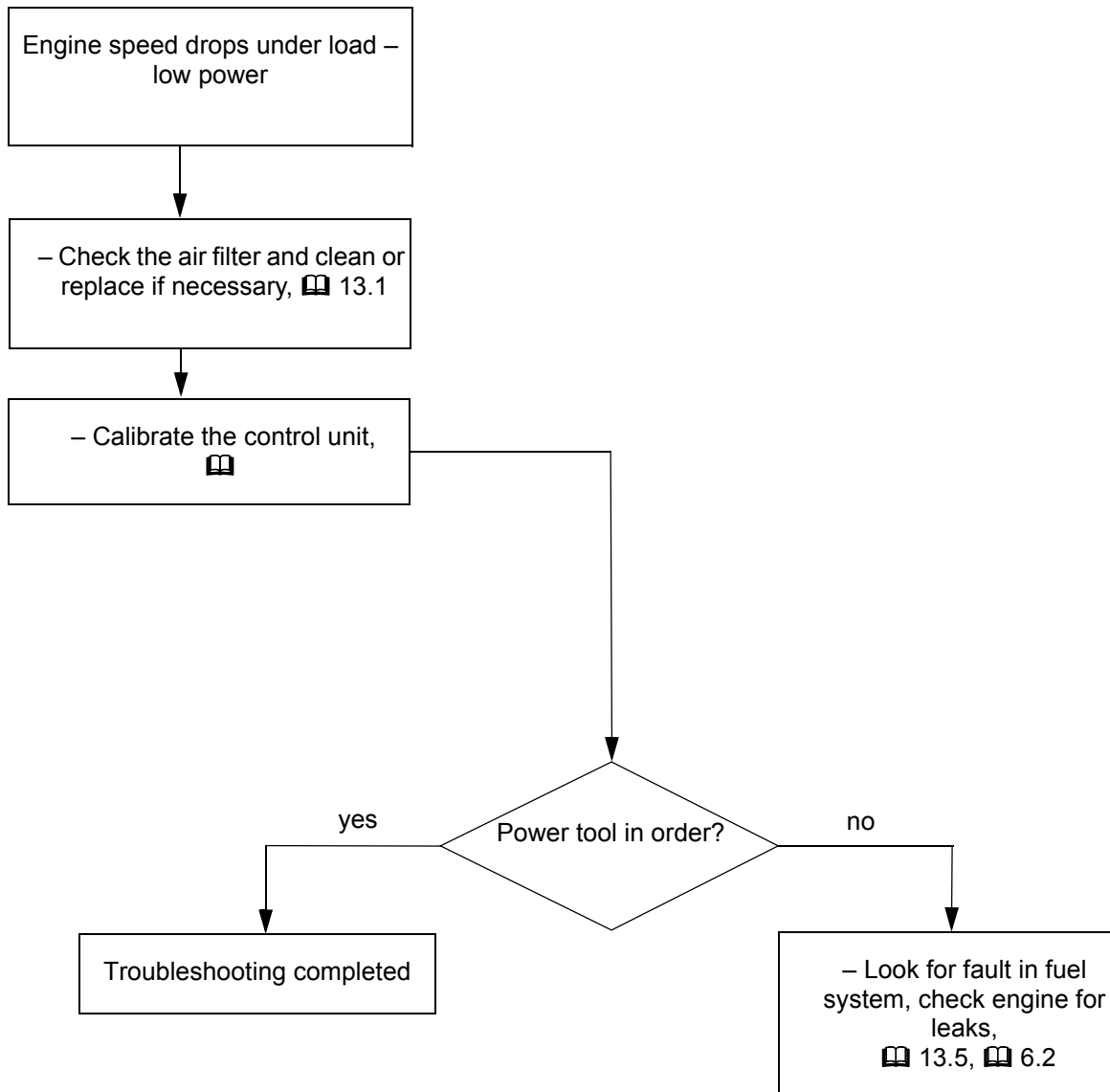
8.6.1 Engine does not start



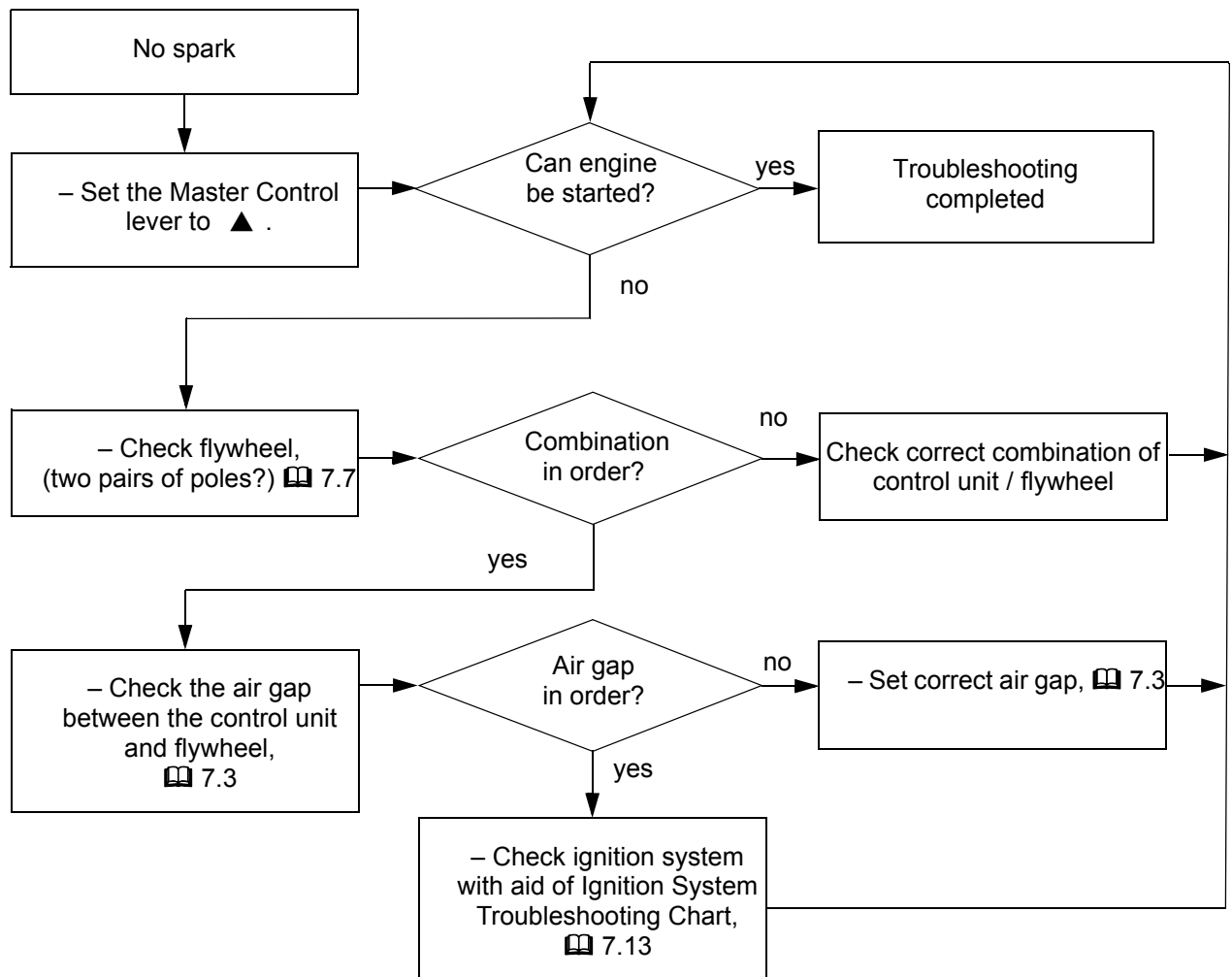
8.7.2 Engine does not start in position ▲



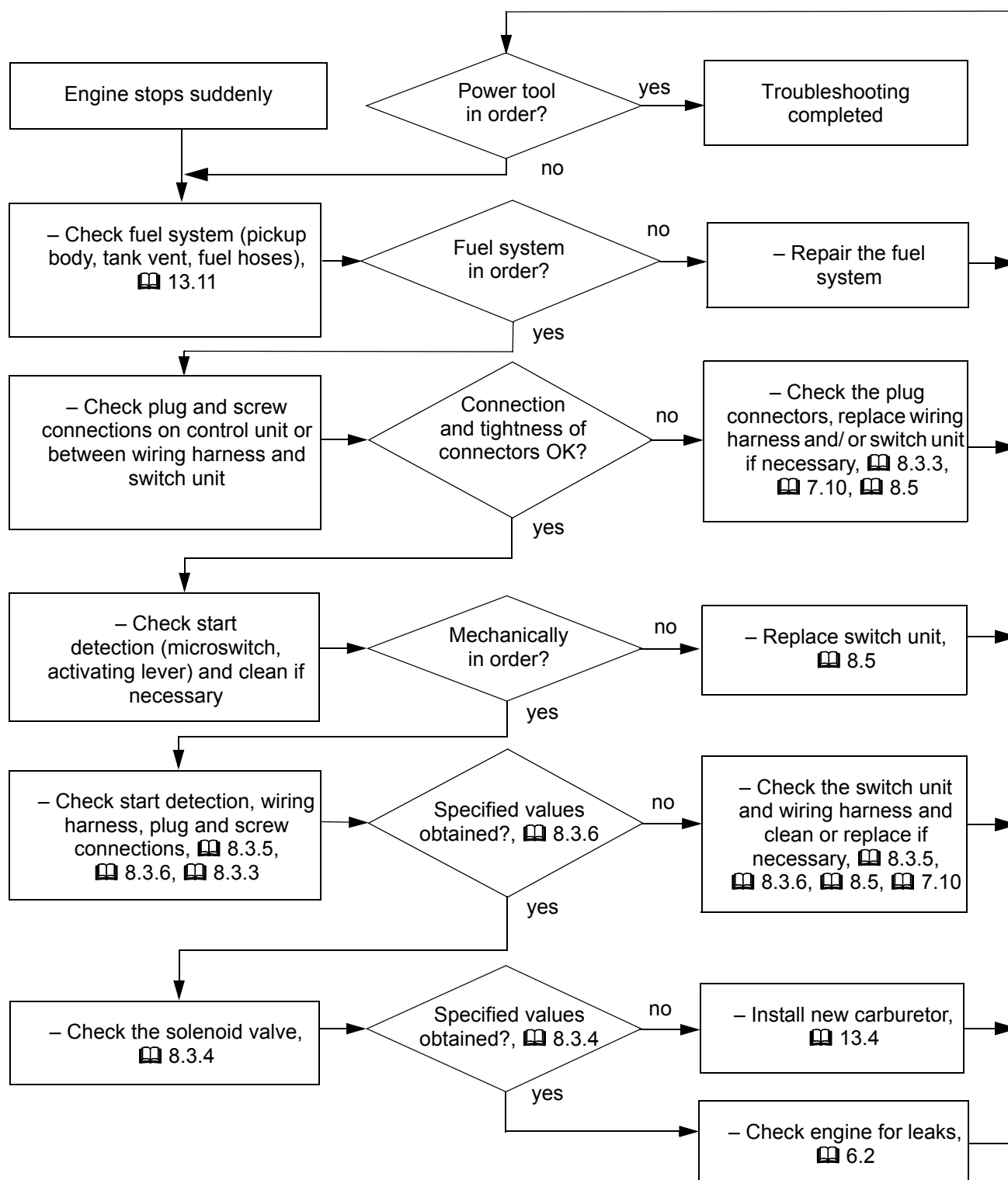
8.7.3 Engine speed drops under load – engine down on power



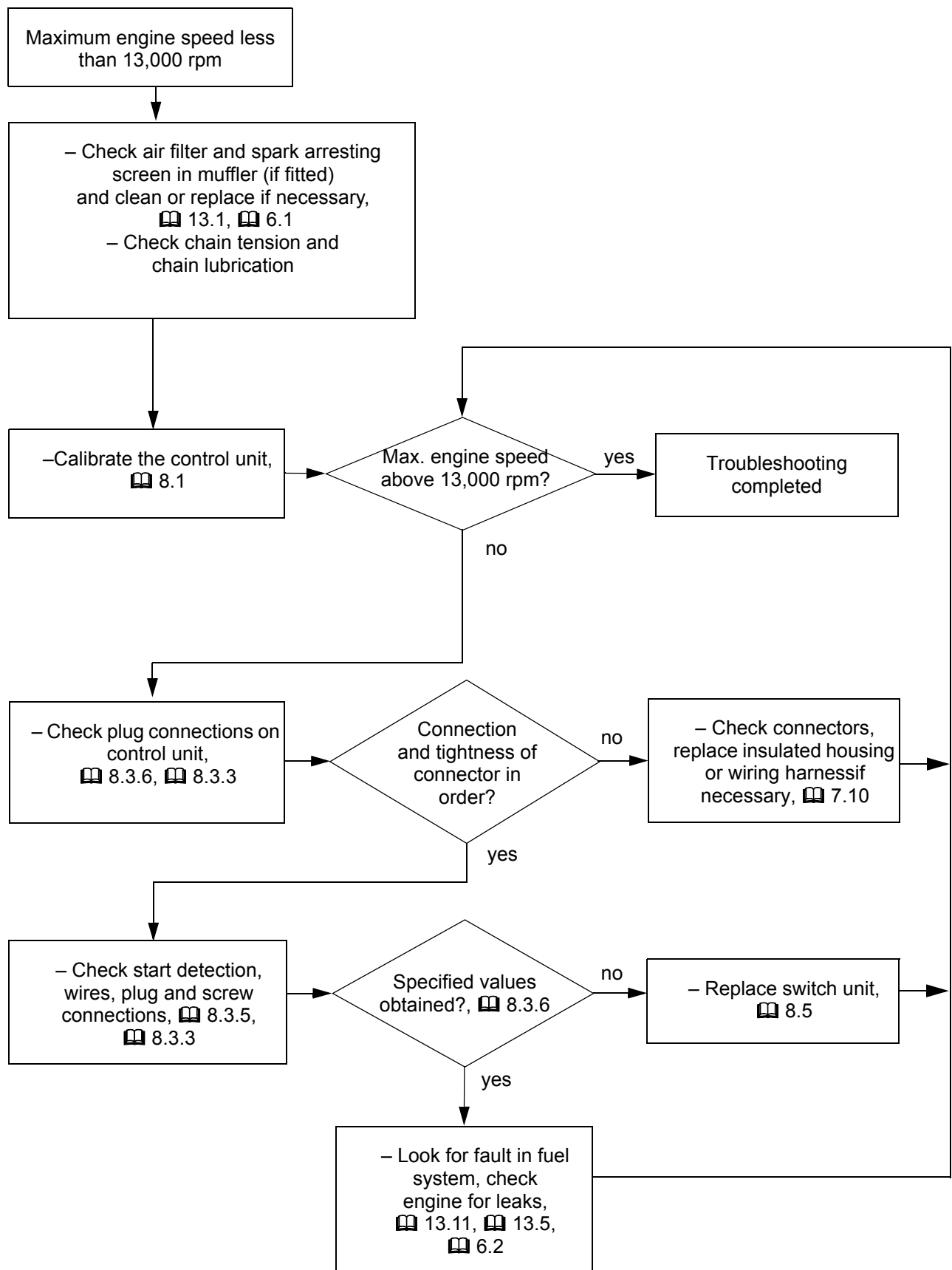
8.7.4 Ignition – no spark



8.7.5 Engine stops suddenly



8.7.6 Cut-off engine speed is not reached



9. Rewind Starter


9.1 General

If the action of the starter rope becomes very stiff and the rope rewinds very slowly or not completely, it can be assumed that the starter mechanism is in order but plugged with dirt. At very low outside temperatures the lubricating oil on the rewind spring may thicken and cause the spring windings to stick together. This has a detrimental effect on the function of the starter mechanism.

In such a case it is sufficient to apply a few drops of a standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons) to the rewind spring.

On versions with a momentary contact stop switch, push Master Control lever all the way in direction of **STOP** or **0** and hold it there before operating the starter rope.

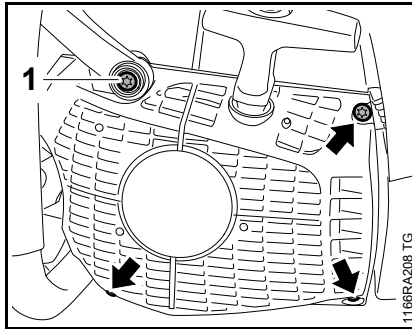
Carefully pull out the starter rope several times and allow it to rewind until its normal smooth action is restored.

Before installing, lubricate the rewind spring and starter post with STIHL special lubricant,  16.

If clogged with dirt or pitch, the entire starter mechanism, including the rewind spring, must be removed and disassembled. Take particular care when removing the rewind spring.



- Clean all components.

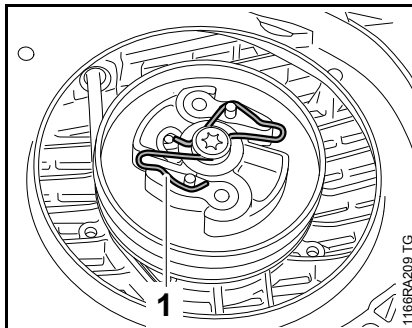
9.2 Rewind Starter Removing and Installing



- Take out the screw (1) and screws (arrows).
- Lift the hand guard a little and remove the fan housing.
- Reassemble in the reverse sequence.

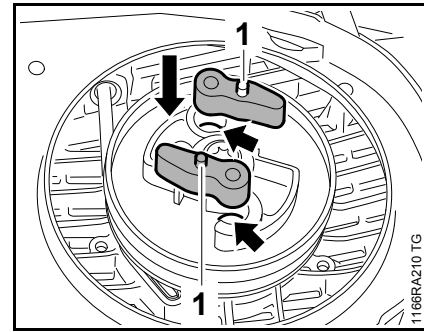
9.3 Pawls


- Remove the rewind starter,  9.2
- Relieve tension of rewind spring,  9.4

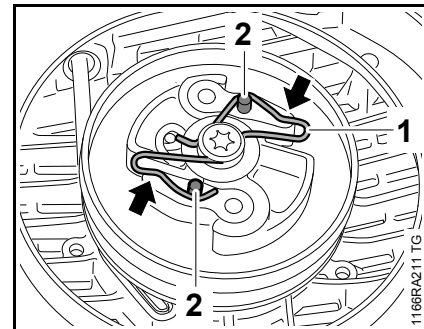


- Carefully ease the spring clip (1) off the starter post.
- Pull the pawls out of the rotor.

Installing



- Fit the new pawls in the bores (arrows) and lubricate the pegs (1) with STIHL grease,  16



- Install the spring clip (1) so that its loops (arrow) are parallel to the pawls and engage the pegs (2).


Check operation

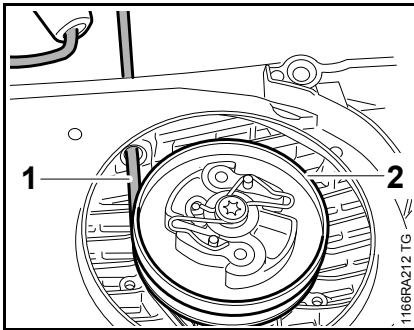
- Pull the starter rope, the rotor turns and the pegs on the pawls move in the direction of spring loops – the pawls move outwards.
- Reassemble all other parts in the reverse sequence.


9.4 Rope Rotor

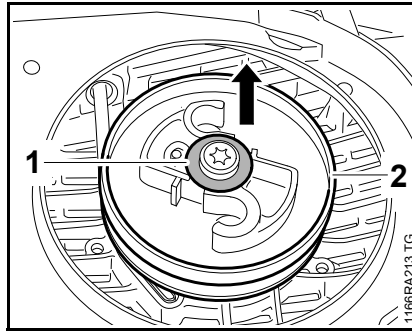
Relieving tension of rewind spring

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



- Remove the rewind starter,  9.2
- Pull out the rope a little with the starter grip and hold the rope rotor steady.





- While still holding the rope rotor (2) steady, unwind the starter rope (1).
- Pull out the twisted rope (2) in direction of starter grip and straighten it out.
- Keep the rope (2) under tension and slowly release the rope rotor.
- Remove the pawls,  9.3

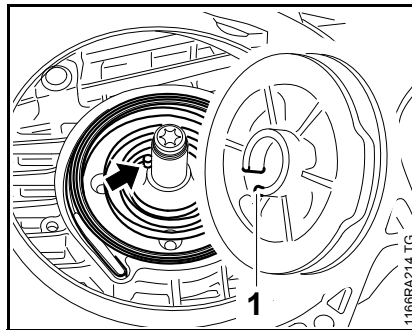


Rewind spring must be relaxed.



- Remove the washer (1) and carefully pull the rotor rope (2) off the starter post
 - the rewind spring may pop out and uncoil.
- Remove starter rope, or remaining rope, from rotor and install a new starter rope,  9.5
- Inspect the rewind spring and replace if necessary,  9.7

Installing



- Lubricate full length of starter post with STIHL special lubricant,  16
- Install starter rope in rope rotor,  9.5



- Fit the rope rotor on the starter post so that the inner spring loop (arrow) engages the recess (1).
- Fit the cover washer.

- Install the pawls and spring clip,  9.3
- Tension the rewind spring,  9.6
- Reassemble all other parts in the reverse sequence.

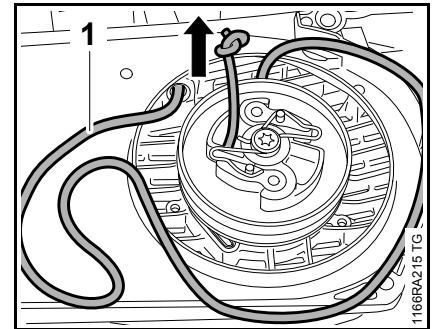
9.5 Starter Rope / Grip

- Remove the rewind starter,  9.2
- Relieve tension of rewind spring,  9.4

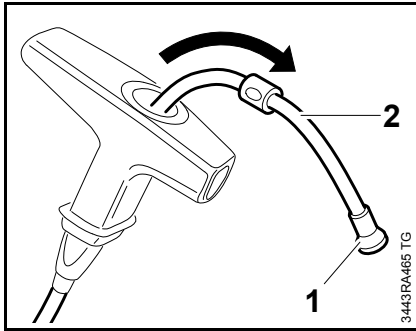
The spring will not be under tension if the starter rope is broken.

- Remove any remaining rope from the rope rotor.

Do not shorten the starter rope.



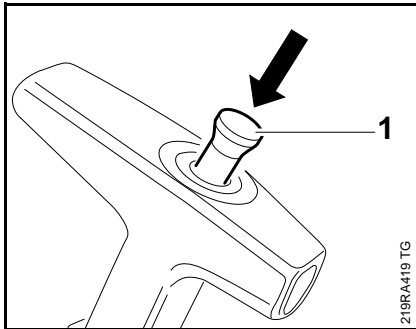
- Push the end of the starter rope (1) out a little, undo the knot and pull the rope out.



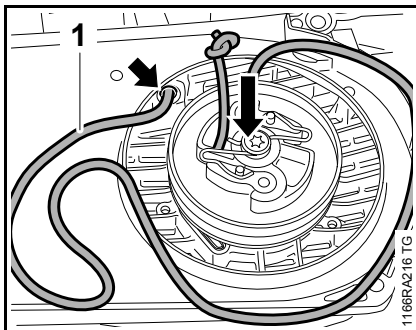
- Pry out the nipple (1) and pull starter rope (2) out of the grip.

Check the starter rope and replace if necessary.

Installing



- Thread the new starter rope through the top of the starter grip, press the nipple (1) into the grip until it snaps into place.

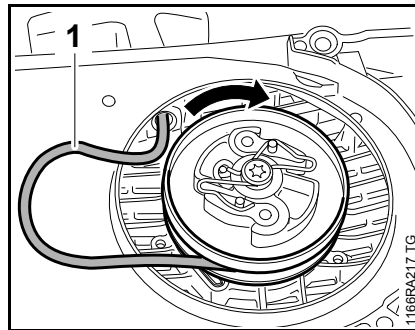


- Thread the starter rope (1) through the opening (arrow) in the rope rotor.

- Tie a simple overhand knot in the end of the new rope (1) and pull it back into the rotor.
- Tension the rewind spring, 9.6
- Reassemble all other parts in the reverse sequence.

9.6 Tensioning the Rewind Spring

- Remove the rewind starter, 9.2



- Pull out a short length of starter rope (1).
- Make a loop with the starter rope (1) and use it to rotate the rope rotor 6 turns clockwise.

Hold the rope rotor steady since it will otherwise spin back and may damage the rewind spring.

- Pull out the twisted rope (1) in direction of starter grip and straighten it out.
- Keep the rope (1) under tension and slowly release the rope rotor.

The starter grip must sit firmly in the rope guide bushing.
If it droops to one side: Tension the rewind spring by one additional turn.

When the starter rope is fully extended it must still be possible to rotate the rope rotor another 1/2 to 1 1/2 turns. If this is not the case, spring tension must be reduced – they might otherwise break.

To reduce spring tension:

Hold the rope rotor steady and take one turn off the rope.

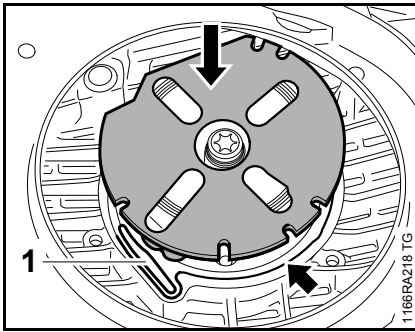
- Install the rewind starter, 9.2

9.7 Replacing the Rewind Spring

- Troubleshooting, 3.4
- Remove the rewind starter, 9.2
- Relieve tension of rewind spring if necessary and remove the rope rotor, 9.4
- Remove any remaining pieces of the old rewind spring.

Even a worn rewind spring is still pre-loaded in the installed condition.

Installing new rewind spring

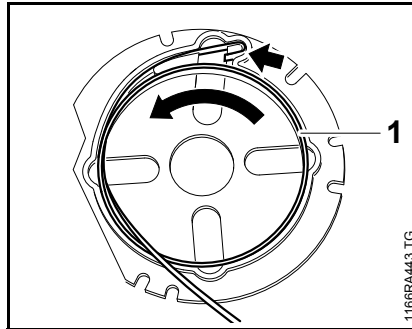


- Lubricate the replacement spring with frame with a few drops of STIHL special lubricant before installing, 16
- Position the replacement spring with frame in the fan housing and push it into its seat (arrow) – the anchor loop must be above the lug (1).
- Remove the frame – keep it if necessary.

The rewind spring must be properly seated – if necessary, push it fully into its seat and onto the lug.

Installing unwound rewind spring

If the rewind spring has popped out, refit it in the fan housing as follows:



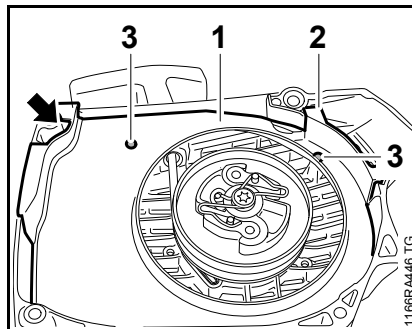
- Fit the anchor loop in its seat (arrow) in the frame.
- Fit the rewind spring (1) counterclockwise in the frame, holding the windings steady in the process.

The procedure is otherwise the same as that for installing a new rewind spring.

- Reassemble all other parts in the reverse sequence.

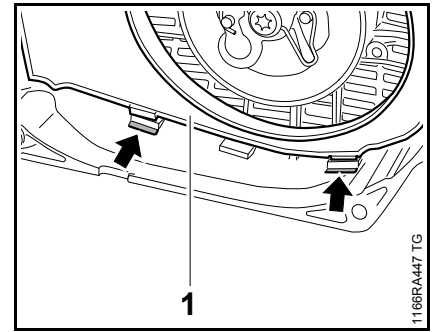
9.8 Segment

- Remove the rewind starter, 9.2

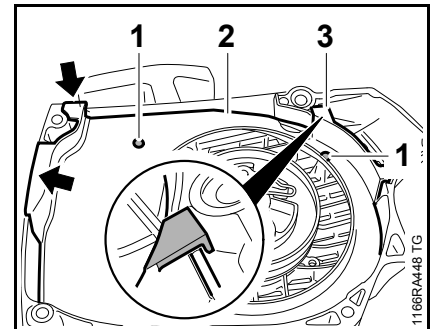


- Lift the segment (1) at the recess (arrow) and tab (2) until the pegs (3) are clear of the holes.
- Inspect the segment, replace if necessary

Installing



- Engage the segment (1) in the slots (arrows) in the fan housing first and then swing it into position.



- Press the pegs (1) of segment (2) into the holes as far as stop, making sure the tab (3) engages over the rib and the tabs (arrows) locate in their seats.
- Reassemble all other parts in the reverse sequence.

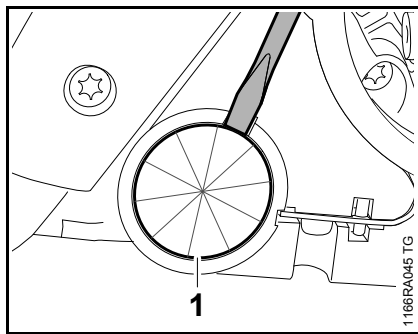
10. AV Elements

Vibration-damping springs and stop buffers are used for the connection between the handlebar, tank housing and crankcase.

Damaged springs and stop buffers must always be replaced.

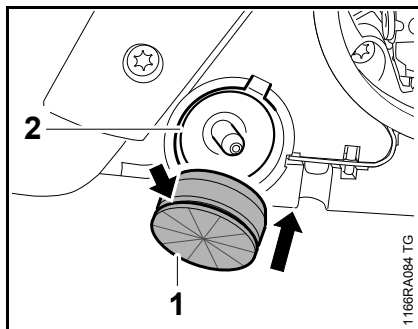
10.1 Stop Buffer at Clutch Side

- Remove the chain sprocket cover.



- Pry out the stop buffer (1), check it and replace if necessary.

Installing

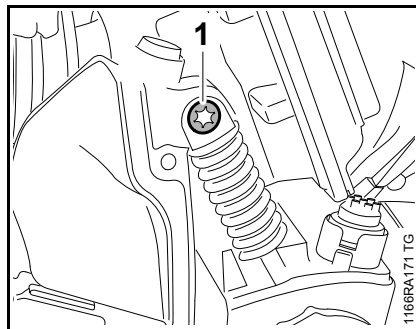


- Use STIHL press fluid to make installation easier, 16
- Push the stop buffer (1), taper first, into the bore until its groove (arrow) engages the housing rib (2).

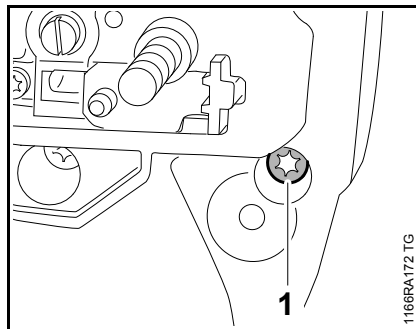
- Reassemble all other parts in the reverse sequence.

10.2 Antivibration Element on Oil tank / Tank Housing

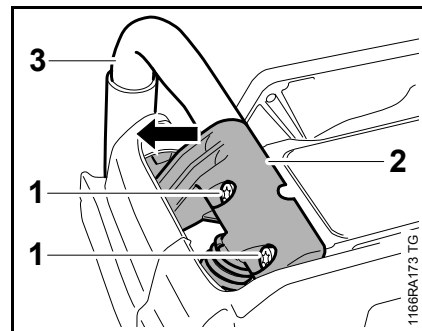
- Remove the stop buffer at the clutch side, 10.1



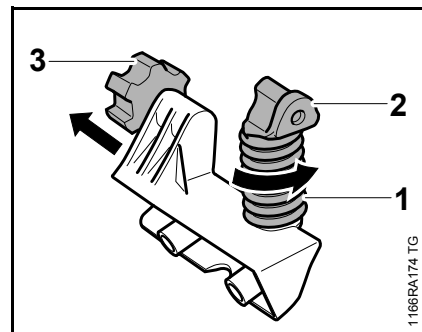
- Take out the screw (1).



- Take out the screw (1).

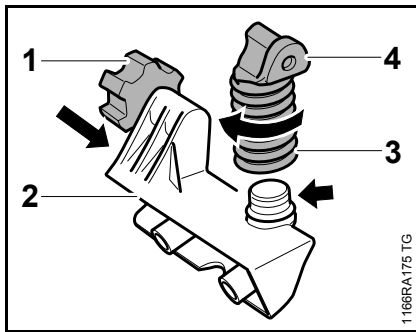


- Remove the screws (1) from the underside of the machine, pry the handlebar holder (2) out of the handlebar (3) and lift it away.

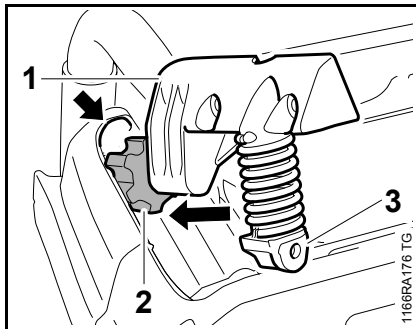


- Unscrew spring (1) with bearing plug (2) and pull off the annular buffer (3).
- Inspect the spring with plug, annular buffer and handlebar holder, replace if necessary.

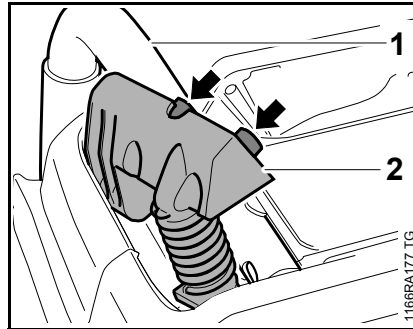
Installing



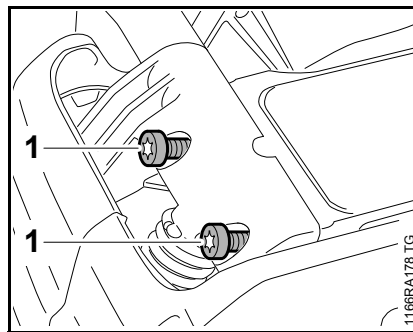
- Use STIHL press fluid to make installation easier, 16
- Push the annular buffer (1) onto the handlebar holder (2) as far as stop – the taper must be properly seated.
- Screw the AV spring (3) with bearing plug (4) onto the handlebar holder (arrow) as far as stop.



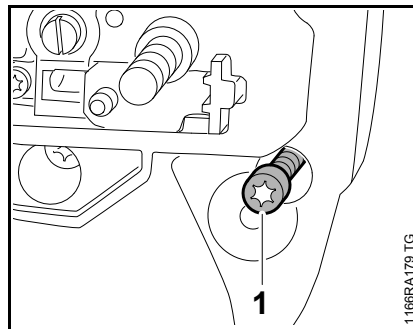
- Push the handlebar holder (1), annular buffer (2) first, into its seat (arrow) and place the bearing plug (3) in position.



- Push pegs (arrows) into handlebar (1) and fit handlebar holder (2) in position.



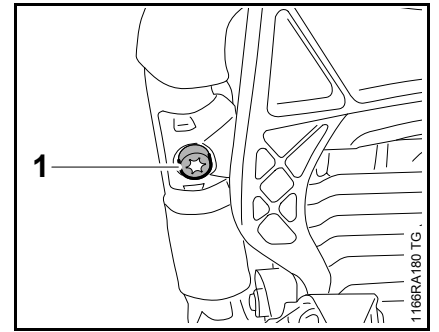
- Insert and tighten down the screws (1) firmly.



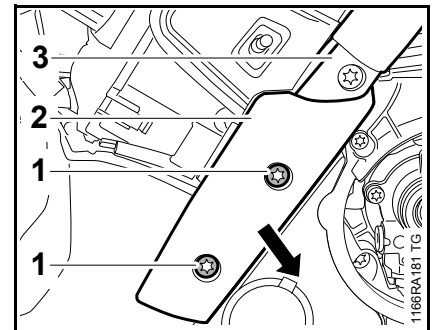
- Insert and tighten down the screw (1) firmly – bearing plug is now secure.

- Reassemble all other parts in the reverse sequence.

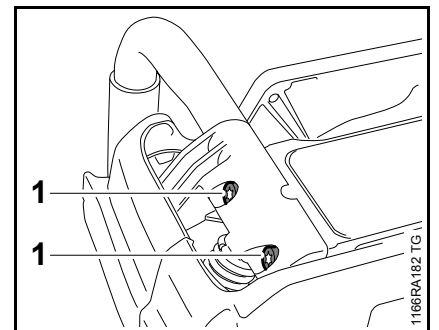
10.3 AV Element on Fuel Tank



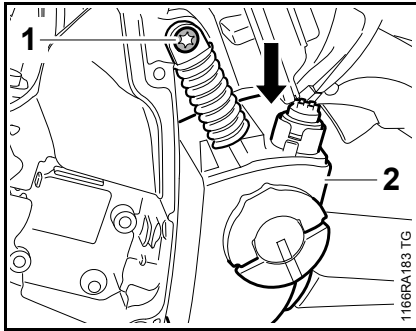
- Remove screw (1) from handlebar.



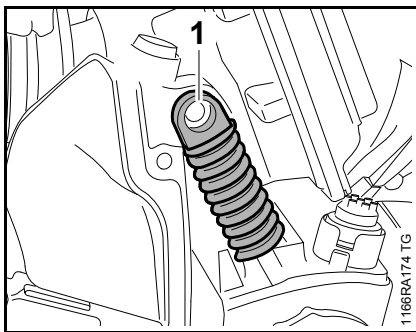
- Take out the screws (1) and remove the cover (2).
- Ease the handlebar (3) sideways and take it out of the guide.



- Remove the screws (1) from the underside of the machine.



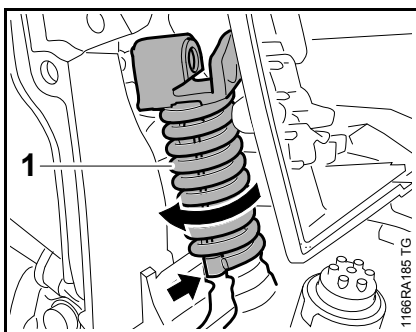
- Take out the screw (1), push the tank housing (2) down a little and hold it there.



- Unscrew the AV element (1) from the tank housing and disconnect the retainer.
- Inspect the plug, spring and retainer, replace if necessary.

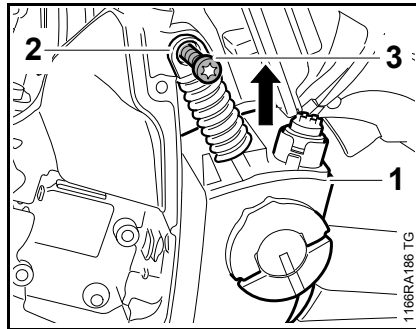
Installing

- Preassemble the plug, spring and retainer.

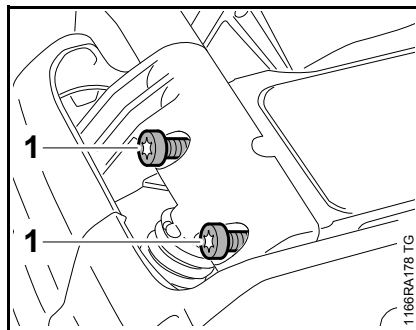


- Push the tank housing down a little and hold it there.

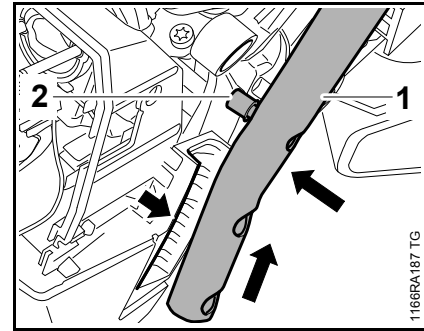
- Fit AV element (1) with retainer on tank housing stub (arrow) and screw it home as far as stop.



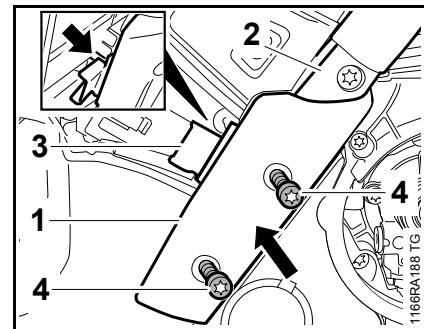
- Lift the tank housing (1) until holes in bearing plug (2) line up.
- Insert and tighten down the screw (3) firmly.



- Insert and tighten down the screws (1) on the underside of the machine.

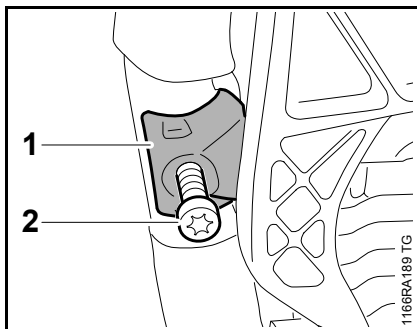


- Lift the handlebar (1) sideways and position it in the guide (arrow) so that the peg (2) engages the seat in the crankcase.



On versions with handle heating, check that wires are properly positioned.

- Position cover (1) with bosses in holes in handlebar (2), making sure the tab (3) engages the groove (arrow).
- Insert and tighten down the screws (4) firmly.

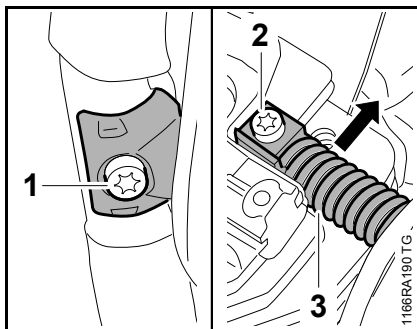


- Fit bearing plug (1) in position.
- Coat the screw (2) with threadlocking adhesive, fit it and tighten it down firmly, 16
- Reassemble all other parts in the reverse sequence.

10.4 AV Element on Handlebar

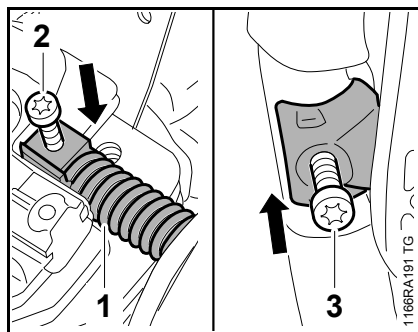
The AV element is located between the handlebar and cylinder.

- Remove the shroud, 6.4
- Remove the air filter, 13.1



- Take out the screws (1, 2) and remove the AV element (3).
- Inspect the AV element and replace if necessary.

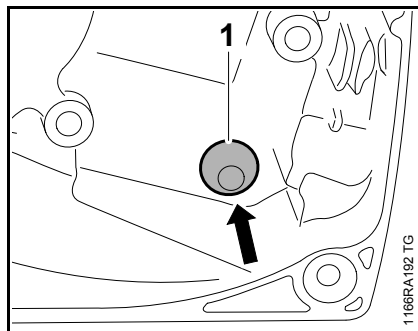
Installing



- Position the AV element (1) on the handlebar and cylinder.
- Insert and tighten down the screws (2, 3) firmly.
- Reassemble all other parts in the reverse sequence.

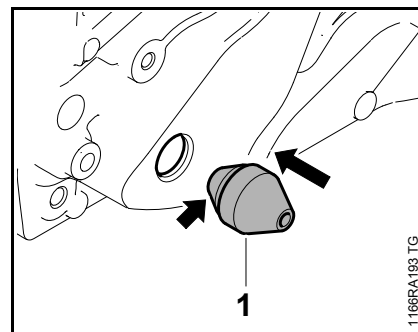
10.4.1 Stop Buffer at Ignition Side

- Remove the ignition module / control unit, 7.3
- Remove the tank housing, 13.11.4



- Ease the stop buffer (1) out of the bore.
- Inspect the stop buffer and replace if necessary.

Installing



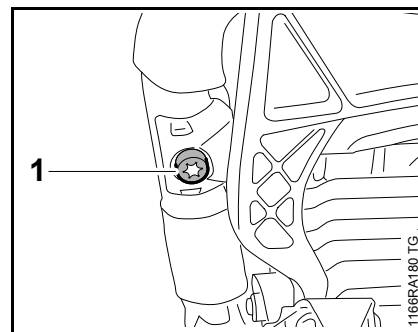
- Use STIHL press fluid to make installation easier, 16
- Position the stop buffer (1) with its small tapered end (arrow) facing the crankcase and push it into the bore while turning it slightly at the same time.

The tapered end must be properly seated in the bore at the ignition side.

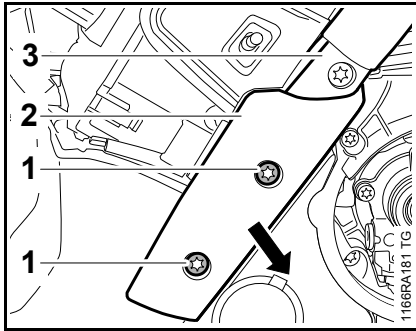
- Reassemble all other parts in the reverse sequence.

10.5 Handlebar

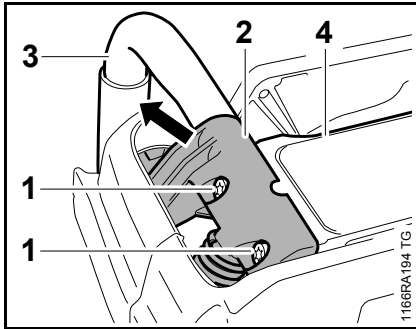
- Remove the shroud, 6.4



- Take out the screw (1).



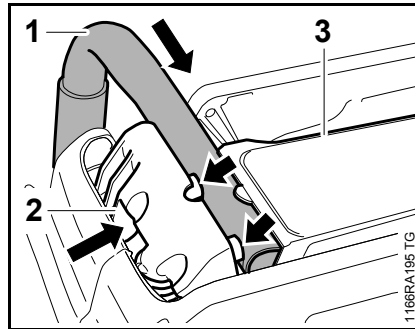
- Take out the screws (1) and remove the cover (2).
- Ease the handlebar (3) sideways and take it out of the guide.



- Remove the screws (1) from the underside of the machine, pry the handlebar holder (2) out of the handlebar (3).
- Lift the handlebar holder slightly and pull out handlebar (3) between handlebar holder (2) and tank housing (4).
- Remove the handlebar (3), check it and replace if necessary.
- Inspect handlebar holder with AV spring and annular buffer, replace if necessary, 10.4

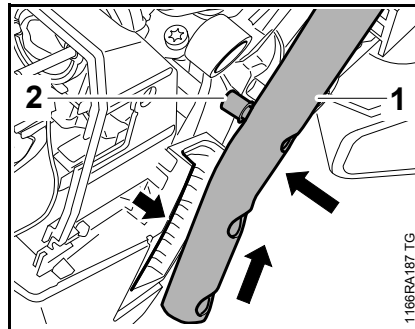
Installing

- Place the handlebar in position.

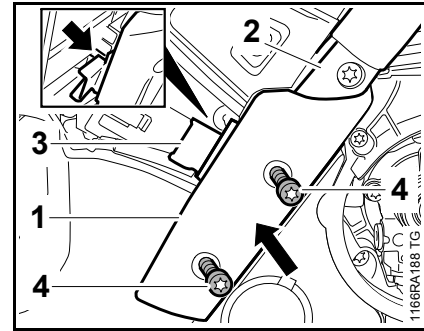


- Fit handlebar (1) between handlebar holder (2) and tank housing (3), push pegs (arrows) into handlebar (1) and place handlebar holder (2) in position.

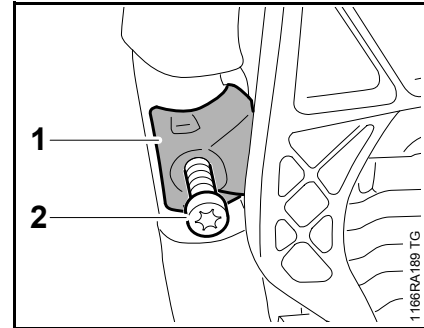
- Insert the screws and tighten them down firmly.



- Lift the handlebar (1) sideways and position it in the guide (arrow) so that the peg (2) engages the seat in the crankcase.








- Position cover (1) with bosses in holes in handlebar (2), making sure the tab (3) engages the groove (arrow).
- Insert and tighten down the screws (4) firmly.

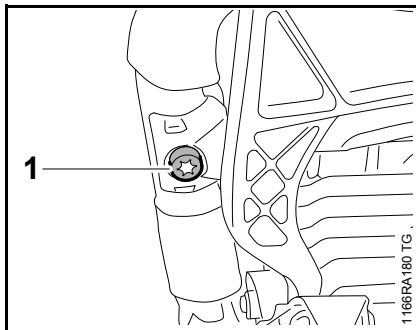


- Fit bearing plug (1) in position.
- Coat the screw (2) with threadlocking adhesive, fit it and tighten it down firmly, 16
- Reassemble all other parts in the reverse sequence.

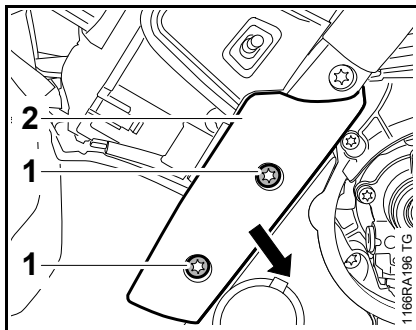
10.5.1 Handlebar / Wrap Around Handlebar with Heating

The handlebar on this version is equipped with a heating system – therefore, the electrical wires have to be disconnected as described below.

- Troubleshooting,  14.7.1
- Remove the shroud,  6.4
- Remove the handle molding and lockout lever,  11.2
- Remove the switch shaft with retainer,  11.1.1
- Remove the carburetor,  13.4

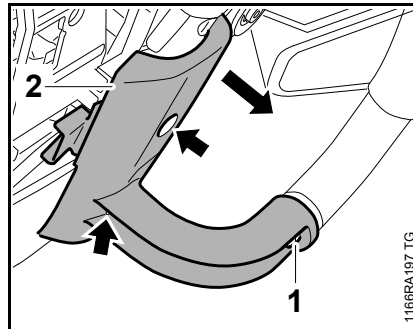


- Take out the screw (1).

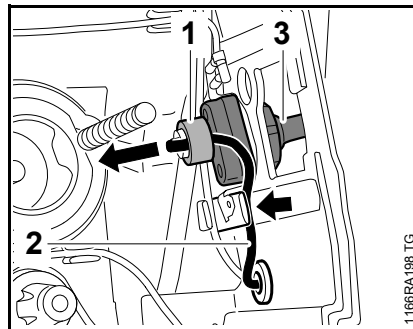


- Take out the screws (1) and remove the cover (2).

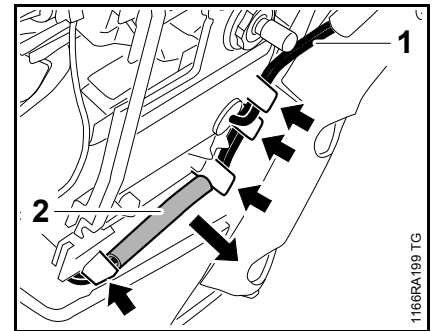
Machines with wrap around handlebar



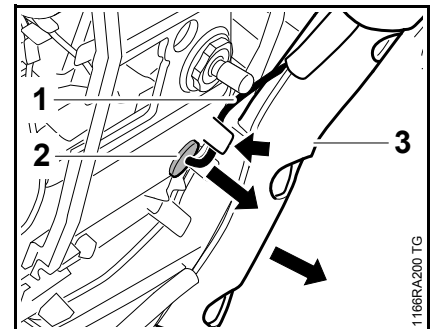
- Take out the screws (arrows) and screw (1).
- Remove the elbow (2).



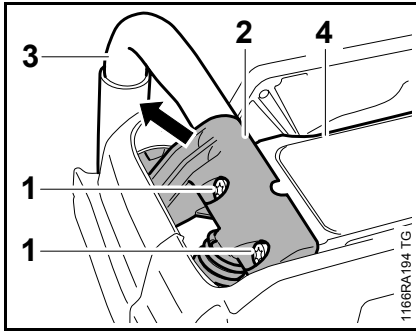
- Take off the cable retainer (1) and pull connector of wire (2) out of the heater switch (3).
- Pull the wire (2) out of the guide (arrow).



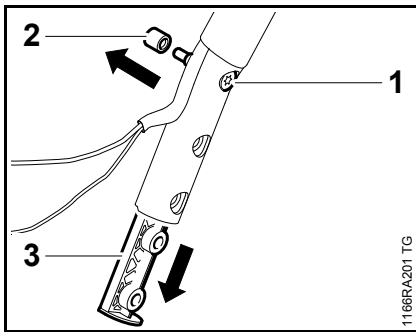
- Pull wire (1) with pin and socket connector out of guides (arrows) and push insulating tube (2) in direction of throttle trigger.
- Separate the pin and socket connector.



- Pull the thick black wire (1) out of the grommet (2) and guide (arrow).
- Ease the handlebar (3) sideways and take it out of the guide.

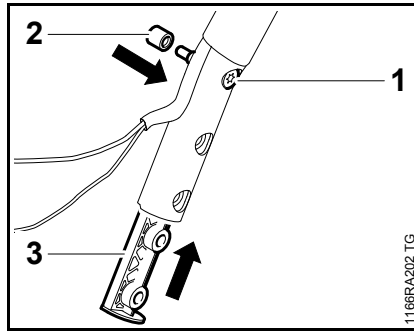


- Remove the screws (1) from the underside of the machine, pry the handlebar holder (2) out of the handlebar (3).
- Lift the handlebar holder slightly and pull out handlebar (3) between handlebar holder (2) and tank housing (4).
- Remove the handlebar (3), check it and replace if necessary.
- Inspect handlebar holder with AV spring and annular buffer, replace if necessary, 10.4

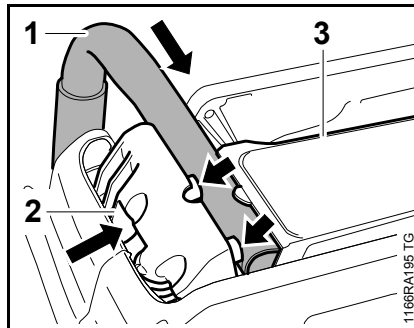


- Take out the screw (1) - the plastic sleeve (2) is pushed off in the process.
- Pull out the handlebar stiffener (3).
- Check handlebar heating and replace handlebar if necessary, 14.6

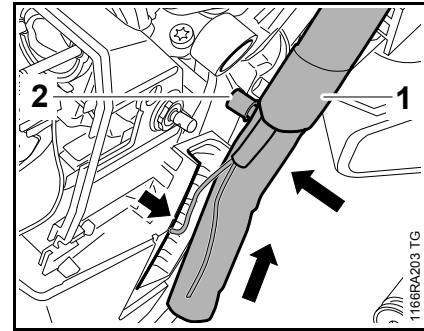
Installing



- Insert and tighten down the screw (1) firmly.
- Push on the plastic sleeve (2) until it snaps into position.
- Push home the handlebar stiffener (3) as far as stop.
- Place the handlebar in position.

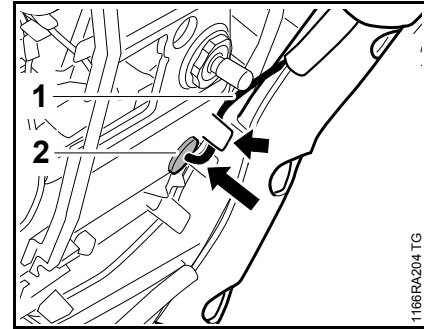


- Fit handlebar (1) between handlebar holder (2) and tank housing (3), push pegs (arrows) into handlebar (1) and place handlebar holder (2) in position.
- Insert the screws and tighten them down firmly.

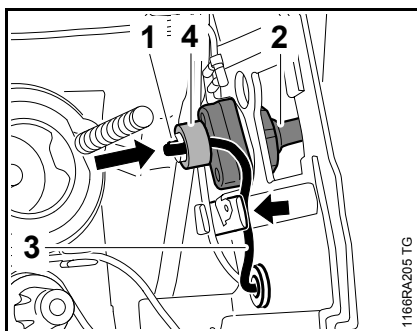


Make sure wires and connectors are not pinched.

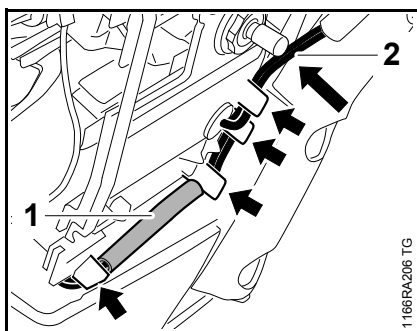
- Lift the handlebar (1) sideways and position it in the guide (arrow) so that the peg (2) engages the seat in the crankcase.



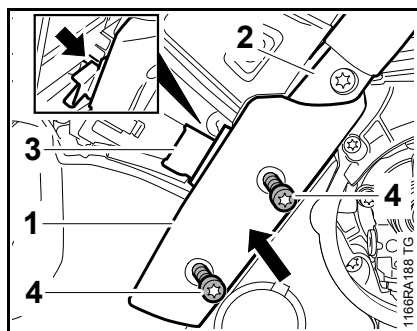
- Insert thick black wire (1) with round connector sleeve through the grommet (2) and push it into the guide (arrow) so that it fits snugly.



- Push the round connector sleeve (1) into the heater switch (2) as far as stop.
- Push the wire (3) into the guide (arrow) and push on cable retainer (4) as far as stop.



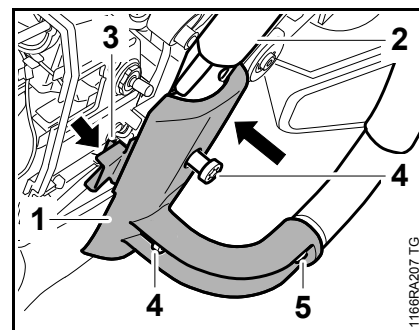
- Reconnect the pin and socket connector and center the insulating tube (1) on the connector.
- Place wire (2) with pin and socket connector in position and push it into the guides (arrows) – the thin black wire to the generator and the thick black wire to the heater switch must be below wire (2).



Wires must be properly seated in the guides.

- Position cover (1) with bosses in holes in handlebar (2), making sure the tab (3) engages the groove (arrow) – check that wires are not pinched.
- Insert and tighten down the screws (4) firmly.

Machines with wrap around handlebar



- Position elbow (1) with bosses in holes in handlebar (2), making sure the tab (3) engages the groove (arrow) – check that wires are not pinched.
- Fit screws (4) and screw (5).
 - Install the carburetor – all wires must be properly seated in their guides, [13.4](#)
 - Install switch shaft with retainer, [11.1.1](#)
 - Reassemble all other parts in the reverse sequence.

11. Control Levers

11.1 Switch Shaft

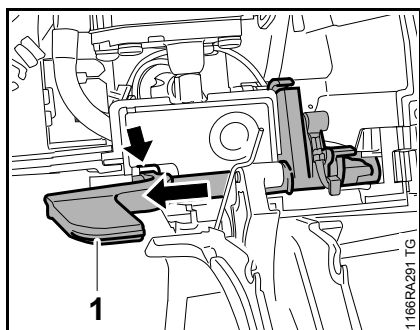
The positions of the switch shaft are described in the instruction manual.

11.1.1 Removing and Installing

- Remove the air filter, 13.1
- Remove the filter base, 13.3
- Remove the handle molding and disconnect throttle rod from throttle trigger, 11.3

Models without M-Tronic

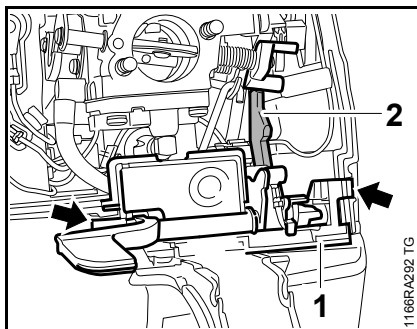
- Remove the choke rod, 11.3.1



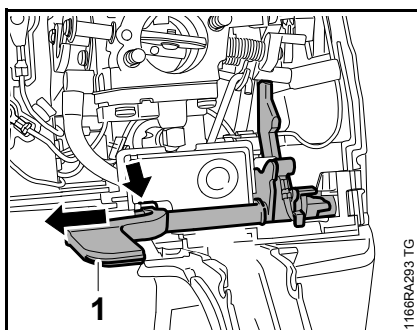
- Pry switch shaft (1) out of pivot mount (arrow) and pull it out of the lateral pivot mount – take care not to damage the short circuit wire.

Models with M-Tronic

- Remove the throttle trigger, 11.2

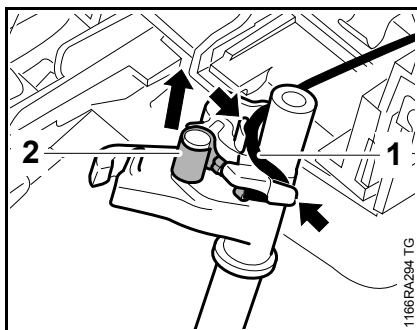


- Lift locking tabs (arrows) and pull out the retainer (1) part way, slip lever (2) below the choke shaft's lever at the same time.



- Pry switch shaft (1) out of pivot mount (arrow) and pull it out of the lateral pivot mount – take care not to damage the short circuit wire.

All models

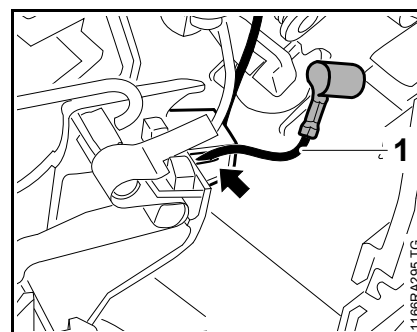


- Pull the short circuit wire (1) out of the guides (arrows) and push the ring terminal (2) out sideways.

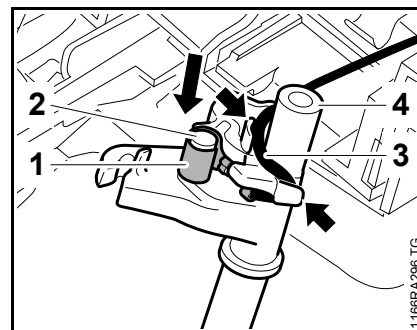
- Inspect the switch shaft and replace if necessary.
- Inspect the contact spring and retainer, replace if necessary, 7.12
- Check the short circuit wire and replace if necessary, 7.9, 7.10

Installing

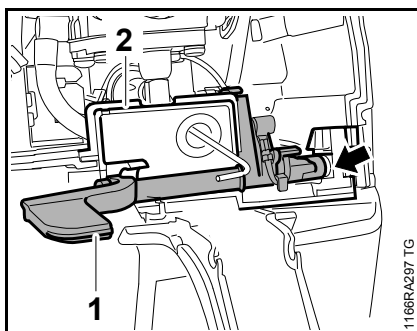
All models



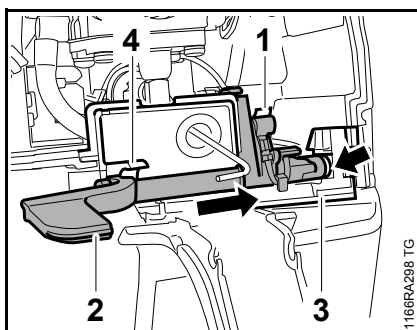
Thread the short circuit wire (1) through the opening (arrow).



- Push the ring terminal (1) onto the pivot pin (2) so that its crimped side is visible.
- Fit the short circuit wire (3) tightly around the switch shaft (4) and push it into or hook it onto the guides (arrows) – the short circuit wire (3) must be a snug fit on the switch shaft (4).

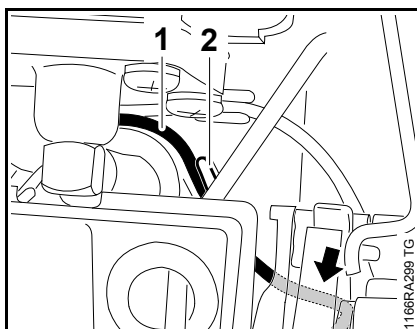


- Fit the switch shaft (1) under the throttle rod and against the retainer (2) and lateral pivot mount (arrow).



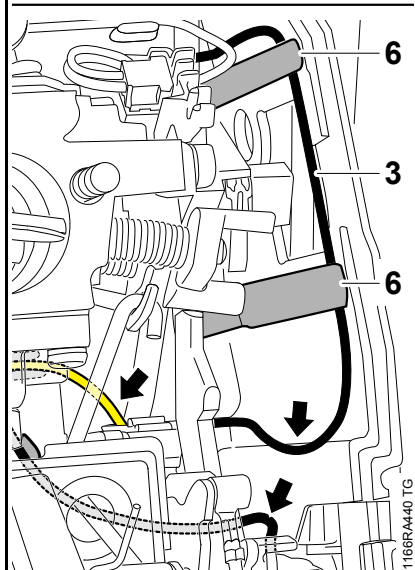
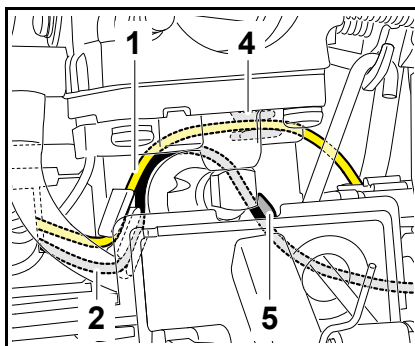
- Lift the contact spring (1) a little and push pivot pin of switch shaft (2) into the hole (arrow) in the retainer (3), then press the switch shaft (2) into the pivot mount (4) so that it snaps into position.

Models without M-Tronic

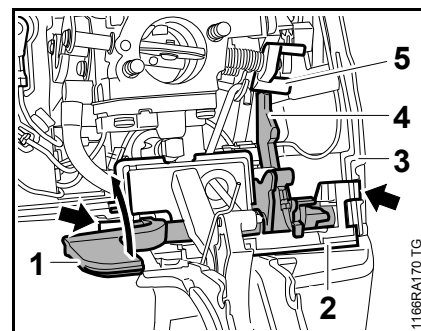


- Short circuit wire (1) must be seated in the guide (2) – loop (arrow) allows for movement.

Models with M-Tronic



- Ground wire (1), short circuit wire (2) and M-Tronic wire (3) must be seated in the guides (4, 5, 6), push them into the guides if necessary – loops (arrows) allow for movement.



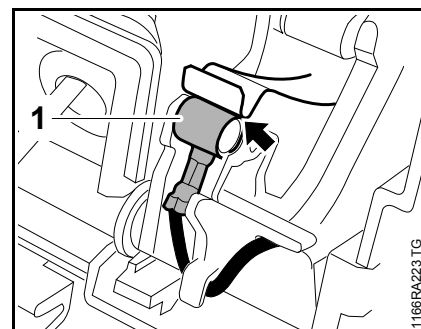
- Move the switch shaft (1) in direction of "STOP" and hold it there. Push the retainer (2) into the guides in the tank housing (3) until the locking tabs (arrows) engage, position lever (4) behind lever (5) on choke shaft at the same time.

– Install the throttle trigger, 11.2

All models

– Attach throttle rod to throttle trigger and install handle molding, 11.3.1

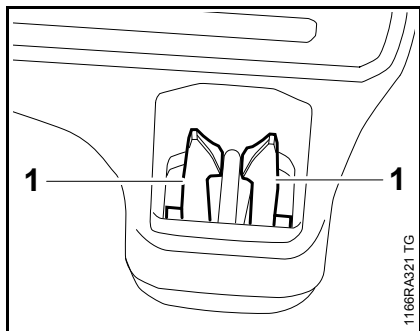
Check operation



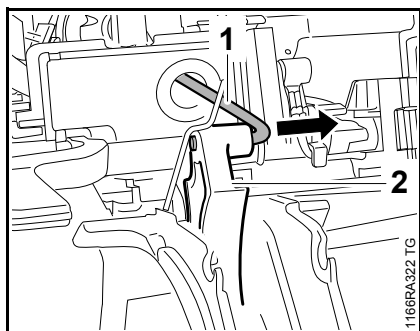
- Short circuit wire's ring terminal (1) must touch the contact spring (arrow) in position "0".
- Reassemble all other parts in the reverse sequence.

11.2 Throttle Trigger / Lockout Lever

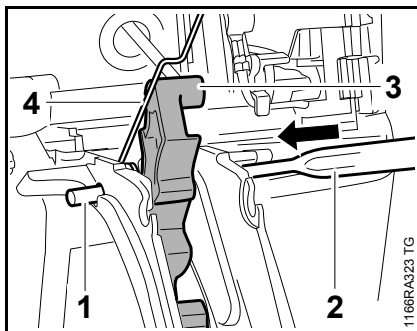
All models



- Use STIHL combination wrench to ease the lugs (1) on the underside apart and push them through the rear hand guard.
- Remove the handle molding and pull the lockout lever out of the pivot mounts – the lockout lever may pop out.



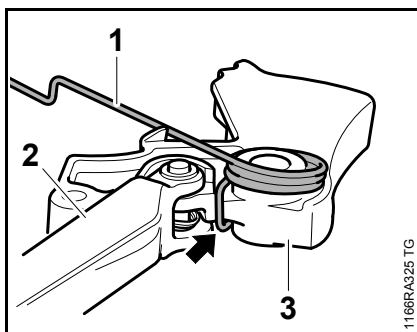
- Disconnect the throttle rod (1) from the throttle trigger (2).



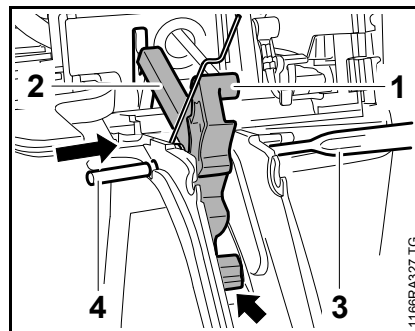
- Use a punch (2) to drive out the pin (1) and remove the throttle trigger (3) with torsion spring (4).
- Inspect the lockout lever, throttle trigger and torsion spring, replace as necessary.

Installing


Models with M-Tronic



- Attach the torsion spring (1) between lever (2) and throttle trigger (3) – note installed position (arrow).

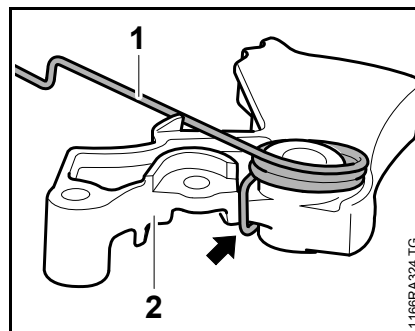


- Fit the throttle trigger (1) in the rear handle so that lever (2) engages over the switch lever's cam and the tongue (arrow) is within the rear handle – the holes must be in alignment.
- Use a punch (3) to center the throttle trigger (1).

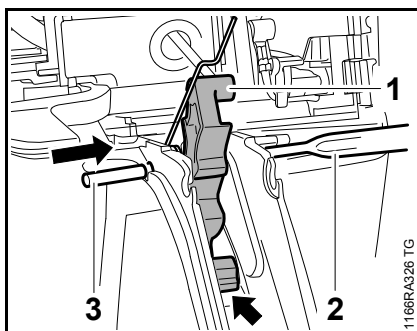
On versions with heating, make sure the connecting wires are properly seated in the guide and do not protrude
– risk of pinching the wires,  14.8.

- Drive home the pin (4) until it is recessed by the same amount at both sides.

Models without M-Tronic

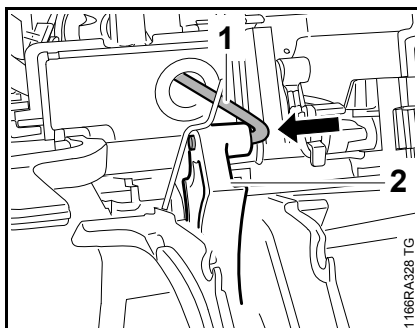


- Attach the torsion spring (1) to the trigger (2)
– note the installed position (arrow).

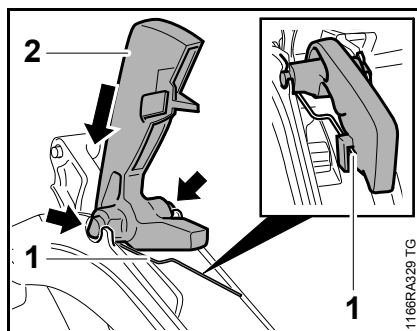


- Place the throttle trigger (1) in the rear handle so that the tongue (arrow) is within the handle and the holes in the throttle trigger and handle are in alignment.
- Use a punch (2) to center the throttle trigger (1).
- Drive home the pin (3) until it is recessed by the same amount at both sides.

All models



- Attach the throttle rod (1) to the throttle trigger (2).



- Fit the leg (1) of torsion spring under the lockout lever (2) and engage lockout lever (2) in the pivot mounts (arrows).

Note flat on lockout lever's shaft.

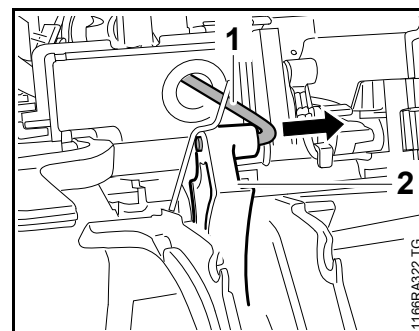
- Turn the lockout lever (2) downwards and attach leg (1) of torsion spring.
- Fit the handle molding and push it down until it snaps into position – lockout lever (2) may pop out.

Check operation

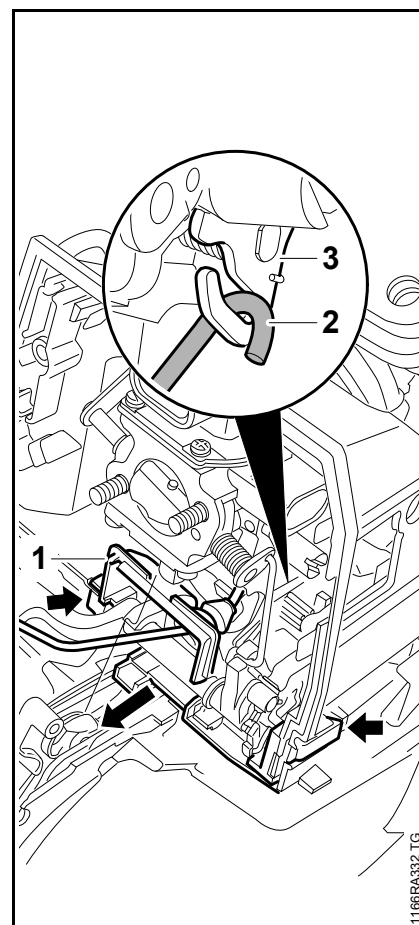
- Squeeze trigger all the way, the throttle lever on the carburetor must then be in the full throttle position. It should not be possible to move it any further in the open direction.
- Reassemble all other parts in the reverse sequence.

11.3 Throttle Rod

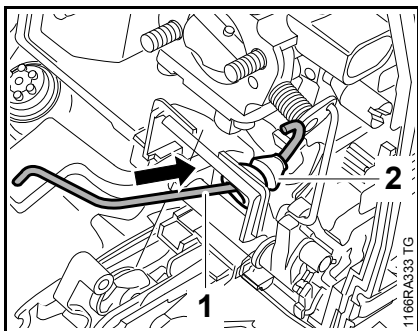
- Remove the handle molding and lockout lever, 11.2
- Remove the filter base, 13.3
- On versions without M-Tronic, remove the choke rod, 11.3.1



- Disconnect the throttle rod (1) from the throttle trigger (2).

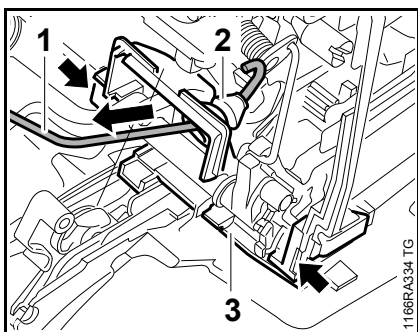


- Lift locking tabs (arrows) and pull the retainer (1) out part way.
- Disconnect the throttle rod (2) from the lever (3).



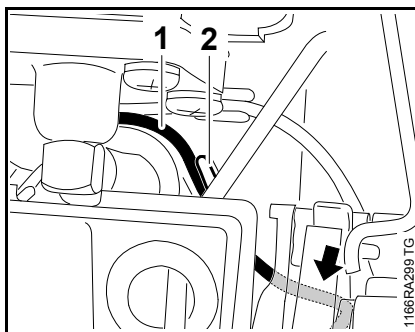
- Pull throttle rod (1) out through the grommet (2) in direction of carburetor.
- Inspect throttle rod and grommet, replace if necessary.
- Inspect the retainer and replace if necessary, 7.12

Installing



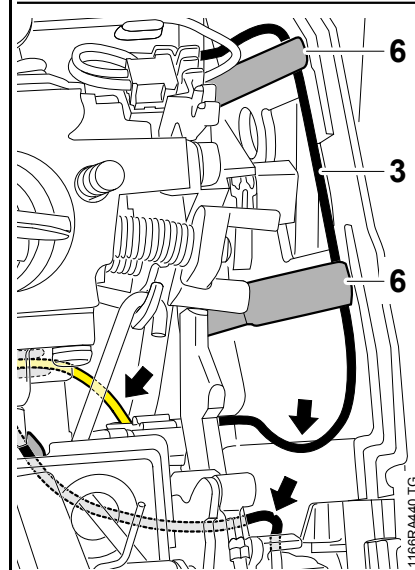
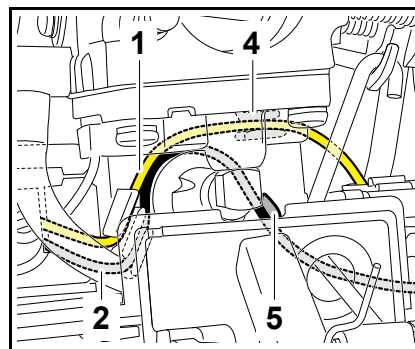
- Use STIHL press fluid to ease installation – do not lubricate grommet (2) with grease, 16
- If necessary, install the grommet (2) and push throttle rod (1) into the grommet (2) so that the end with the hook (arrow) faces the carburetor, then position retainer (3) against guides (arrows).

Models without M-Tronic

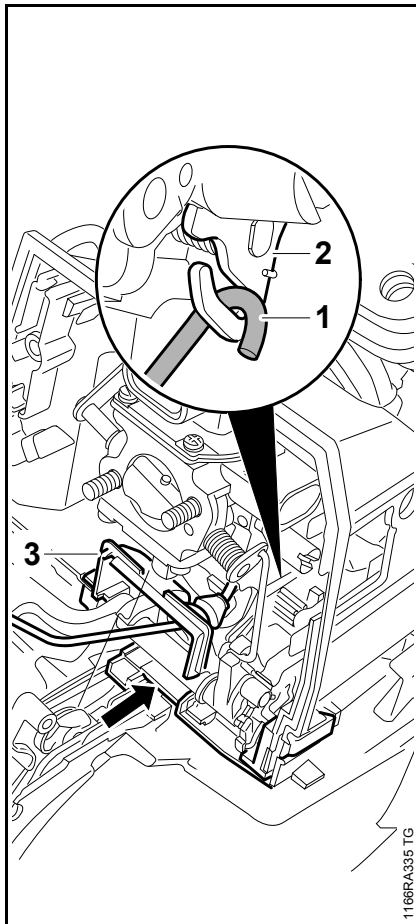


- Short circuit wire (1) must be seated in the guide (2) – loop (arrow) allows for movement.

Models with M-Tronic

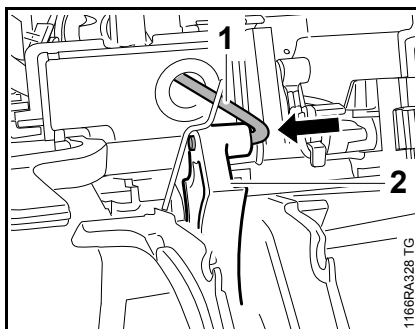


- Ground wire (1), short circuit wire (2) and M-Tronic wire (3) must be seated in the guides (4, 5, 6), push them into the guides if necessary – loops (arrows) allow for movement.



- Attach throttle rod (1) to lever (2) and push retainer (3) into the tank housing until locking tabs engage at both sides.

- On versions with M-Tronic, install throttle trigger, 11.2



- Attach the throttle rod (1) to the trigger (2).

- On versions without M-Tronic, install the choke rod, 11.3.1

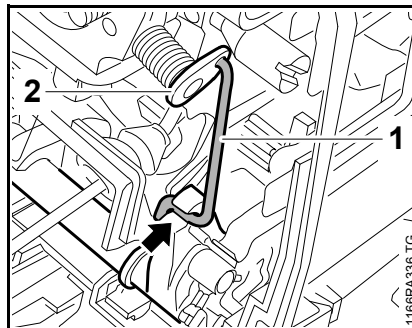
- Install the switch shaft and handle molding, 11.2

Check operation

- Squeeze trigger all the way, the lever on the carburetor must then be in the full throttle position. It should not be possible to move it any further in the open direction.
- Reassemble all other parts in the reverse sequence.

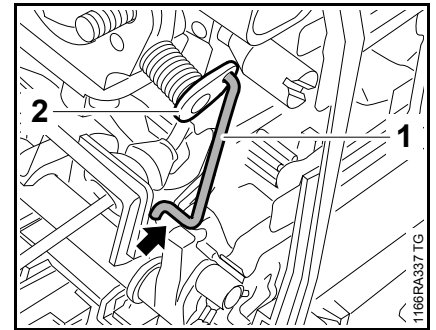
11.3.1 Choke Rod Models without M-Tronic

- Remove the filter base, 13.3

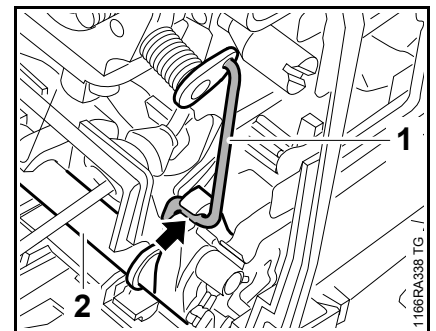


- Pry the choke rod (1) out of the switch shaft (arrow) and disconnect it from lever on choke shaft (2).
- Inspect the choke rod and replace if necessary.

Installing



- Attach choke rod (1) to lever (2) on choke shaft so that its bent end (arrow) faces the ignition side.



- Place the choke rod (1) in its seat (arrow), hold lever on switch shaft (2) steady and push choke rod (1) into its seat (arrow) – the choke rod must be fully engaged.





Check operation

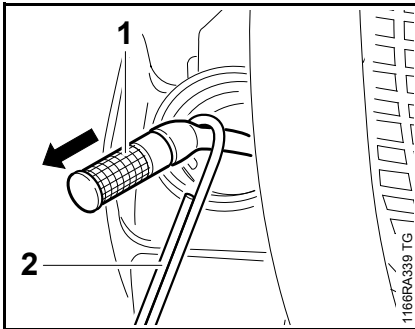
- Set switch shaft to cold start, the choke shutter must be closed in this position.
- Reassemble all other parts in the reverse sequence.

12. Chain Lubrication

12.1 Pickup Body

Impurities gradually clog the fine pores of the filter with minute particles of dirt. This prevents the oil pump from supplying sufficient oil. In the event of problems with the oil supply system, first check the oil tank and the pickup body.

- Troubleshooting,  3.3
- Open the oil tank cap and drain the oil tank  1.1.
- Collect the oil in a clean container,  1.1
- Clean the oil tank if necessary,  16







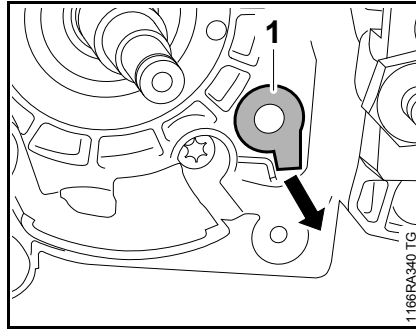
- Use hook (2) 5910 893 8800 to remove the pickup body (1) from the oil tank.


Do not overstretch the suction hose.

- Pull off the pickup body (1), check it and replace if necessary.
- Reassemble in the reverse sequence.

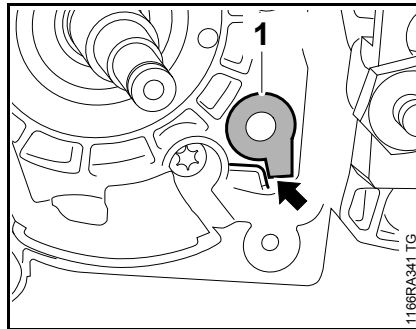
12.2 Oil Suction Hose


- Open the oil tank cap and drain the oil tank  1.1.
- Remove the clutch,  4.2
- Remove the brake band,  5.2
- Remove the oil pump,  12.3




- Remove the oil suction hose (1) together with the pickup body.
- Check the oil suction hose and pickup body and replace if necessary.
- Fit the pickup body,  12.1




Installing

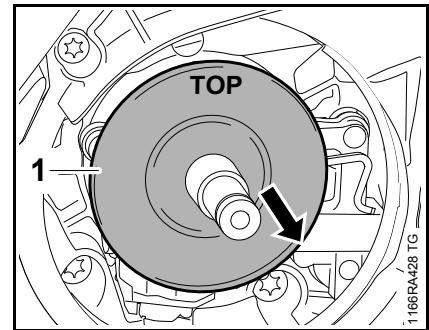


- Coat groove in fuel suction hose with STIHL press fluid,  16
- Push the oil suction hose (1), pickup body first, through the housing bore (arrow).

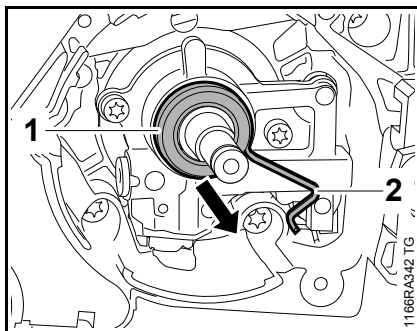
- Position the oil suction hose (1) so that the tab (arrow) locates against the rib.
- Push home the oil suction hose (1) until its groove is properly seated in the crankcase bore.
- Check position of the pickup body and, if necessary, use the hook 5910 893 8800 correct its position in the oil tank.
- Install the oil pump,  12.3
- Reassemble all other parts in the reverse sequence.

12.3 Oil Pump

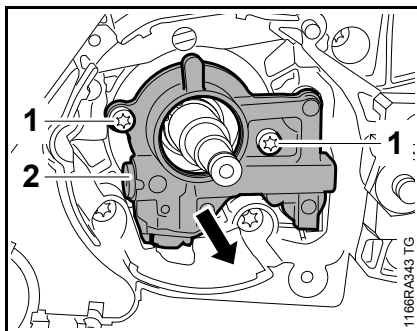
- Troubleshooting,  3.3
- Remove the clutch,  4.2
- Remove the brake band,  5.2



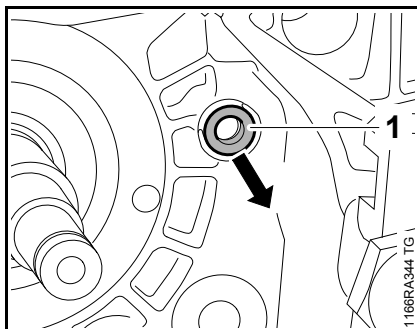
- Remove the washer (1).



- Pull the worm (1) with drive spring (2) out of the oil pump.
- Check the spring and worm and replace if necessary.

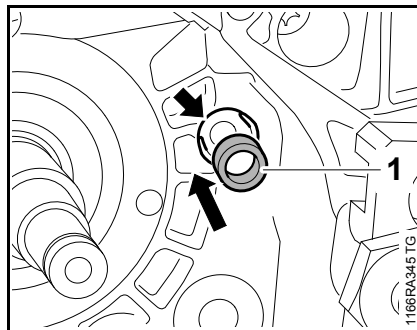


- Take out the screws (1) and remove the oil pump (2).

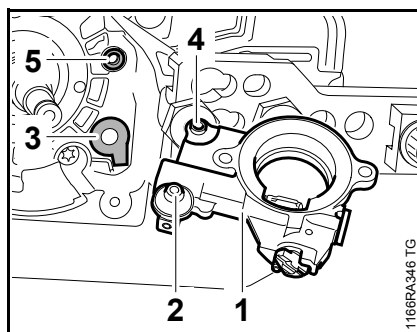



- Remove the sealing ring (1).
- Check the oil pump and replace it if necessary

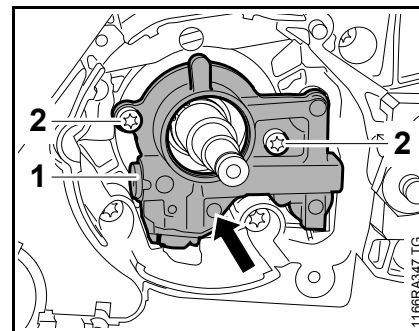
Installing



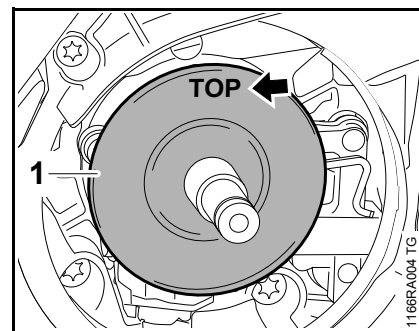
- Fit a new sealing ring (1) in the bore (arrow).



- Line up the oil pump (1) so that the stub (2) engages the oil suction hose (3) and stub (4) slips into the sealing ring (5).
- Coat stubs and sealing ring with STIHL press fluid,  16



- Push oil pump (1) into position as far as stop.
- Fit the screws (2) and tighten them down firmly.
- Push the worm fully home.



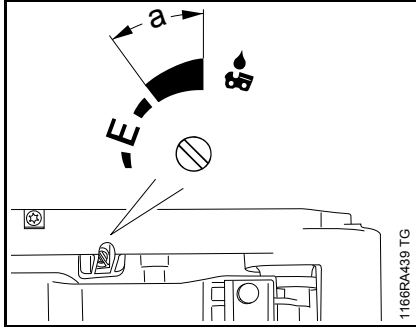
- Push the cover washer (1) into position.

Installed position is correct when "TOP" (arrow) faces outwards.

- Reassemble all other parts in the reverse sequence.

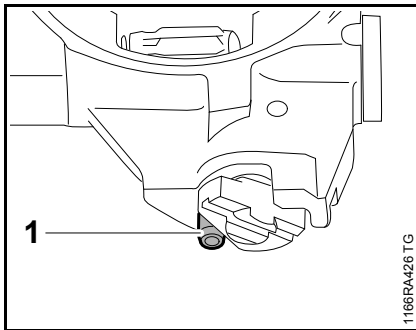
12.3.1 Adjusting Upgraded Oil Pumps

See owner's manual for most suitable settings for different uses.



When oil pumps with an increased oil flow rate are set within range "a", note that the oil tank may run dry before the fuel tank and the saw chain may then have insufficient lubrication.

Therefore, if pump is set to range "a", fill fuel tank to half full mark only or refill oil tank when fuel tank is half empty.



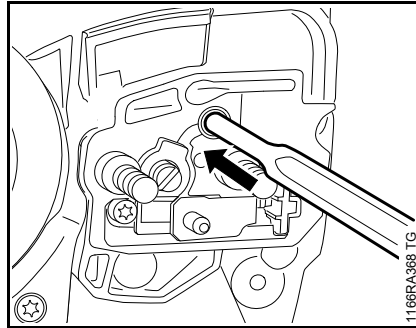
An oil pump with an increased oil flow rate can be identified by the limit stop pin (1).

If the limit stop pin (1) is driven fully home (recessed in the housing), the adjusting screw can be set to maximum oil flow.

12.4 Valve

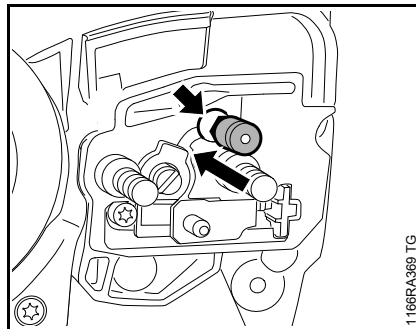
A valve is installed in the housing wall to keep internal tank pressure equal to atmospheric pressure. The valve must be replaced if it is faulty.

- Open the oil tank cap and drain the oil tank 1.1.



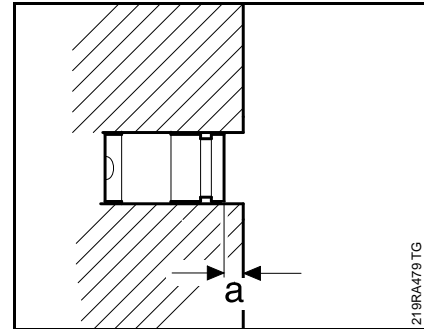
- Use a 6 mm drift to carefully drive the valve out of its seat in the housing and into the oil tank.
- Remove the old valve from the oil tank.

Installing



Check correct installed position.

- Insert the valve in the crankcase bore (arrow).
- Use a 6 mm drift to carefully drive in the new valve from outside – note installed depth.





- Drive the new valve into the bore to a depth of 1 +/- 0.2 mm (a).
- Reassemble all other parts in the reverse sequence.


13. Fuel System

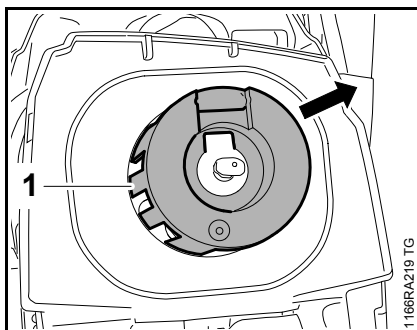
13.1 Air filter

Dirty air filters reduce engine power, increase fuel consumption and make starting more difficult. The air filter should be checked when there is a noticeable loss of engine power.

- See also Troubleshooting,  3.6,  3.7
- Remove the filter cover
- Remove the air filter.
- Check the air filter and clean or replace if necessary – see owner's manual.
- Reassemble in the reverse sequence.

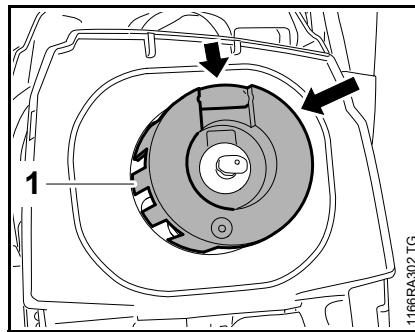
13.2 Baffle

- Remove the air filter,  13.1




- Remove the baffle (1).
- Check the baffle and replace if necessary.

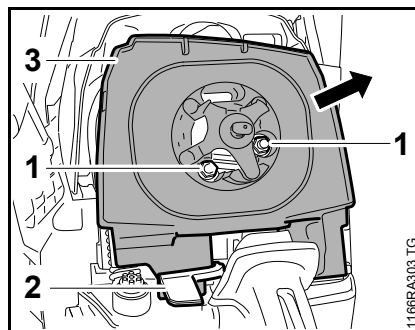
Installing



- Push the baffle (1) into position so that the stub (arrow) engages the opening in the filter base and the locking tab (1) snaps into place.
- Reassemble all other parts in the reverse sequence.

13.3 Filter Base

- Remove the baffle,  13.2

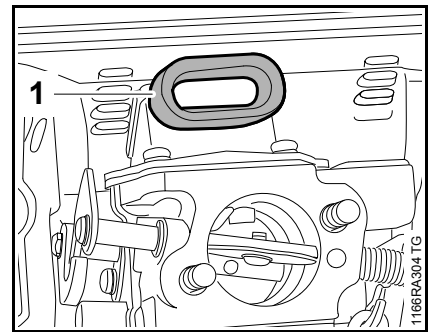


- Unscrew the nuts (1).

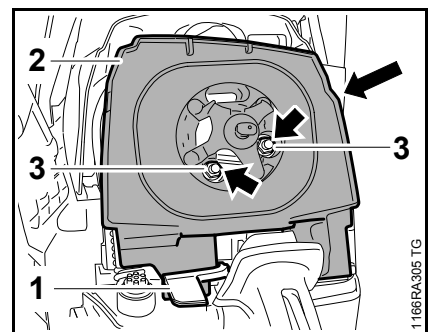
To reduce the risk of dirt particles getting into the intake port, set switch shaft (2) to cold start – set it to ▲ on M-Tronic machines.


- Remove the filter base (3) from the studs.

Installing



Make sure the sleeve (1) is in place.



- Set the switch lever (1) to cold start.
- Use STIHL press fluid to make installation easier,  16
- Fit filter base (2) over the studs (arrows) and push it home until it is seated in the carburetor's sleeve.
- Fit the nuts (3) and tighten them down firmly.
- Reassemble all other parts in the reverse sequence.

13.4 Carburetor

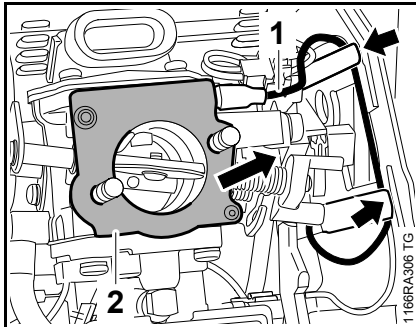
- Open the fuel tank cap and drain the fuel tank, 1.1.
- Collect the fuel in a clean container, 1.1
- Remove the filter base, 13.3
- Remove the shroud, 6.4
- Disconnect the throttle rod from the trigger and carburetor, 11.3

Disconnect the fuel hose only when the tank cap is open.

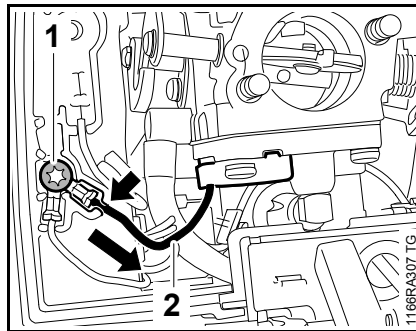
Models without M-Tronic

- Remove the choke rod, 11.3.1

Versions with carburetor heating

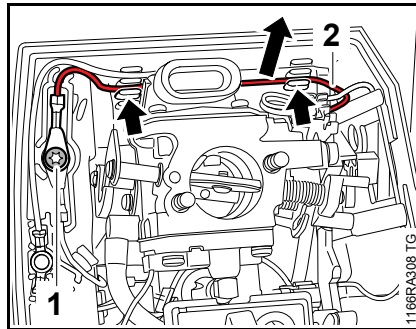


- Pull the wire (1) out of the guides (arrows), remove the heating element (2) and put it to one side.

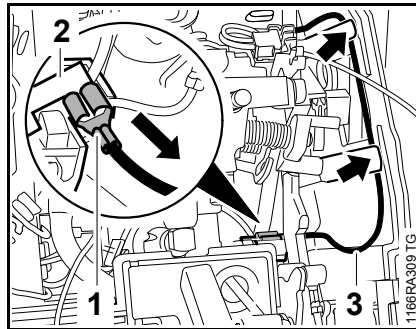


- Take out the screw (1) and pull the thermocouple's wire (2) out of the guide (arrow).

Models with M-Tronic

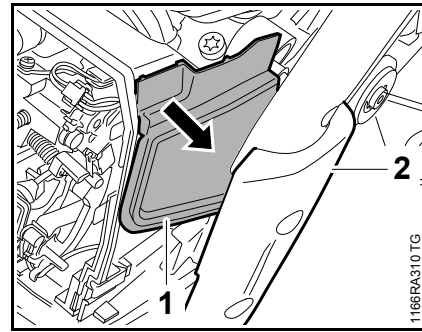


- Take out the screw (1) and pull the M-Tronic's red wire (2) out of the guides (arrows).

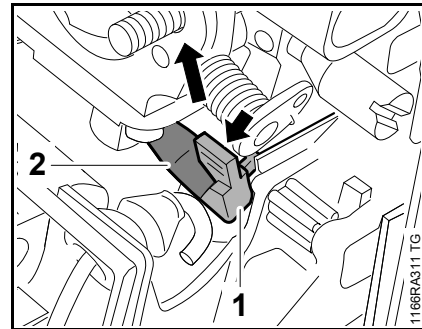


- Disconnect spade terminal (1) from the contact spring (2) and pull the M-Tronic's black wire (2) out of the guides (arrows).

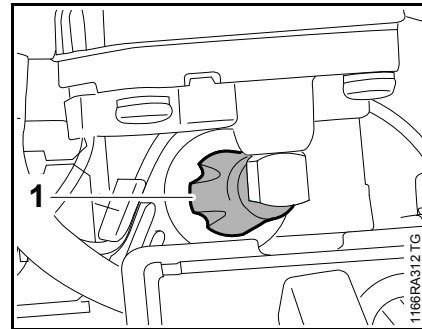
All models



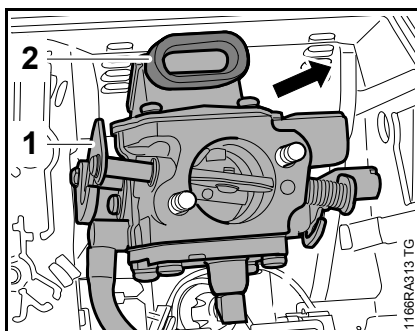
- Push out the grommet (1) and then pull it out between the tank housing and cover (2).



- Use the tab (arrow) to pull out the elbow connector (1) with fuel suction hose (2).

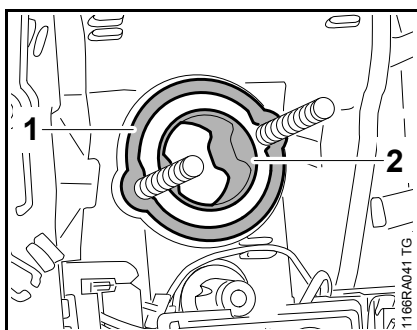


- Disconnect impulse hose (1).



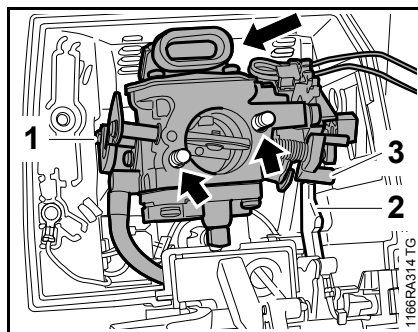
- Remove the carburetor (1).
- Check the carburetor and service or replace it if necessary.
- Check the sleeve (2), remove and replace it if necessary.

Installing



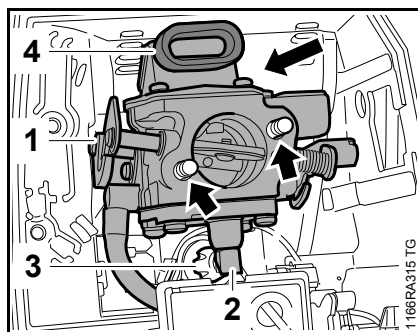
Check that the washer (1) and sleeve (2) are in place.

Models with M-Tronic

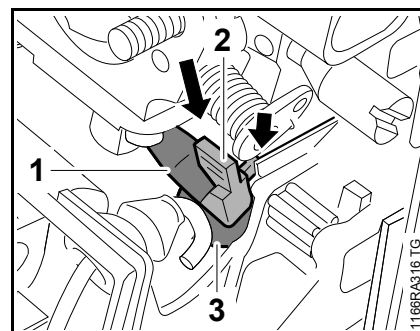


- Fit the carburetor (1) over the studs (arrows) so that the lever (2) on the switch shaft is behind the lever (3) on the choke shaft.

All models

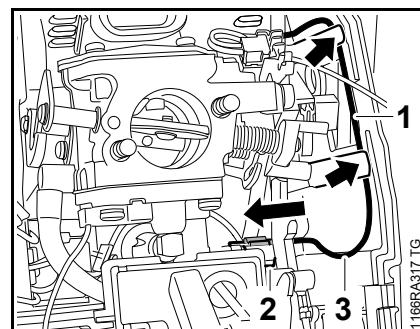


- Use STIHL press fluid to make installation easier, 16
- Fit the carburetor (1) over the studs (arrows), and push the stub (2) into the impulse hose (3) at the same time.
 - Make sure the sleeve (4) is in place.

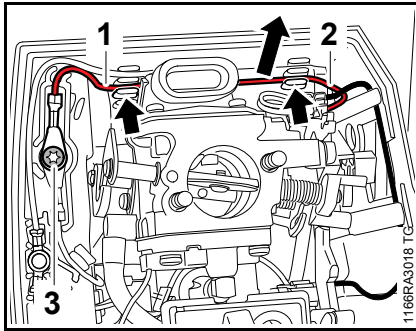


- Use STIHL press fluid to make installation easier, 16
- Grip tab (2) on elbow connector with fuel suction hose (1) to push it into fuel suction hose (3) so that the guide lug engages between the ribs (arrow)
 - the fuel suction hose is fixed in position.

Models with M-Tronic



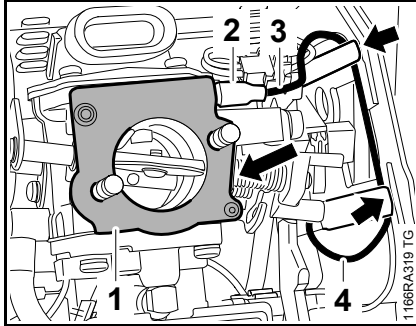
- Push spade terminal of black M-Tronic wire (1) onto contact spring's tag (2) so that its crimped side faces up, then push black M-Tronic wire (1) into the guides (arrows) – loop (3) allows for movement.



Position red M-Tronic wire (1) on switch unit below the black M-Tronic wire.

- Place the cable lug of the red M-Tronic wire (1) in its seat so that the crimped side faces up, then push the red M-Tronic wire (1) into the guides (arrows) – loop (2) allows for movement.
- Insert and tighten down the screw (3) firmly.

Versions with carburetor heating

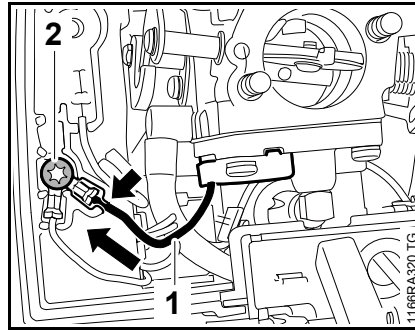


The flag terminal of the heating element (1) is connected to the heater switch.

- Fit the heating element (1) over the studs so that the wire (2) is at the top right.

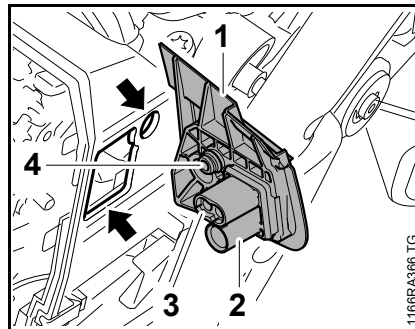
The black M-Tronic wire must be underneath the heating element's black wire (3) in the guides.


- Push black wire (3) of heating element (1) into the guides (arrows) – loop (4) allows for movement.



- Push the cable lug of the black wire (1) to the thermocouple into its seat so that the crimped side faces up and the wire locates in the guide (arrow).
- Insert and tighten down the screw (2) firmly.


Models without M-Tronic:




- Use STIHL press fluid to make installation easier,  16

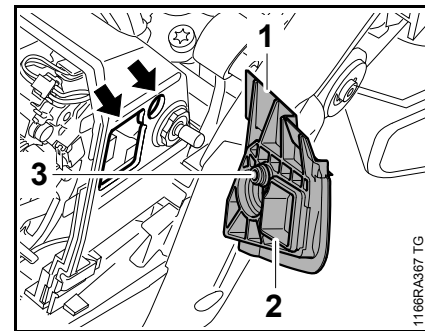
- Hold the grommet (1) so that the extensions (2, 3) and the peg (4) match the openings (arrows) in the tank housing.


- Slide the grommet (1) between the handlebar cover and tank housing, then push it into the openings (arrows) as far as stop.

- Attach the throttle rod to the carburetor and throttle trigger,  11.3

- Install the choke rod,  11.3.1


Models with M-Tronic



- Use STIHL press fluid to make installation easier,  16

- Hold the grommet (1) so that the frame (2) and the peg (4) match the openings (arrows) in the tank housing.


- Slide the grommet (1) between the handlebar cover and tank housing, then push it over the heater switch and into the openings (arrows) as far as stop.


- Attach the throttle rod to the carburetor and throttle trigger,  11.3

All models



- Check operation
- Reassemble all other parts in the reverse sequence.

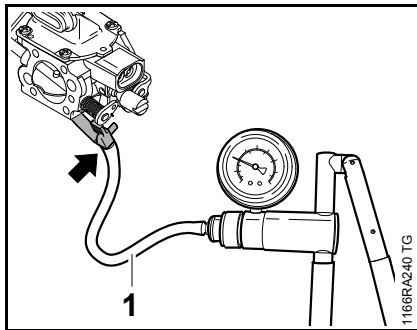
13.4.1 Leakage Test

In the case of problems with the carburetor or fuel supply system, also check and clean or replace the tank vent,  13.10

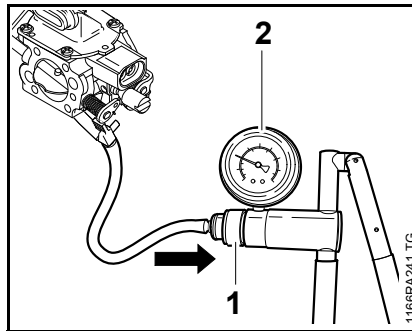
On versions with M-Tronic the switch unit / solenoid valve on the carburetor may also be the cause of a malfunction,  8.3.

The carburetor can be tested for leaks with the pump 0000 850 1300.

- Remove filter base with wiring harness still attached and put it to one side,  13.3
- Remove the carburetor,  13.4








- Connect fuel hose (1) from pump 0000 850 1300 to the elbow connector (arrow).



- Push the ring (1) to the right and pump air into the carburetor until the pressure gauge (2) indicates a pressure of about 0.8 bar (80 kPa).

If this pressure remains constant, the carburetor is airtight. However, if it drops, there are three possible causes:

1. Metering diaphragm or gasket damaged, replace as necessary,  13.5.3
 2. 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 to clean,  13.5.4
 3. Pump diaphragm or gasket damaged, replace if necessary,  13.5.5
- Test the tank vent if necessary,  13.10.1
 - After completing the test, push the ring (1) to the left to vent the system and then pull the fuel hose off the carburetor.
 - Install the carburetor,  13.4
 - Reassemble all other parts in the reverse sequence.

13.5 Servicing the Carburetor

13.5.1 Disassembling and Cleaning the Carburetor

Cleaning the carburetor in an ultrasonic bath is not recommended.

The carburetor may be opened only if its exterior is absolutely clean.

Do not allow dirt to enter the bores or ports.

Do not store open and cleaned carburetors for long periods unprotected.


Perform the following steps to remove dirt and deposits:

- Use compressed air to remove loose dirt, then, if necessary, clean with a brush and a standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons.
- Remove the metering chamber cover and pump cover, diaphragm and gaskets.
- Pull off the limiter caps and remove the low speed and high speed screws (without M-Tronic), inlet needle and fuel strainer.
- Do not remove the following parts: Press-fitted or bonded parts such as cover of idle chamber, idle jet, part load jet, main jet and idle speed screw (LA).
- Only remove the choke shaft, throttle shaft and throttle shutter if they are stiff, clean the shaft and bearing bore.



- Clean all disassembled parts with a brush and a standard solvent-based degreasant containing no chlorinated or halogenated hydrocarbons.
- Blow out loose dirt in metering and pump chambers with compressed air or remove with a brush.

13.5.2 Assembling the Carburetor

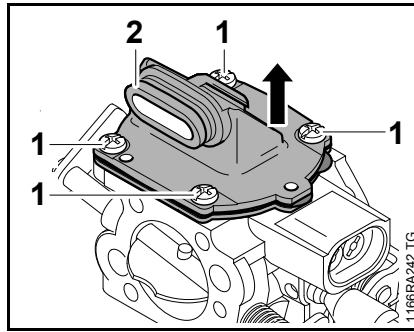
Perform the following steps on a clean base (cloth, paper):

- Inspect fuel strainer. If there are hard deposits or the surface is damaged or misshapen, install a new strainer.
- Check shape and tip of inlet needle – replace needle if damaged or worn,  13.5.4
- Install new diaphragm and gaskets.
- After installing and adjusting the carburetor, use new limiter caps.

13.5.3 Metering Diaphragm

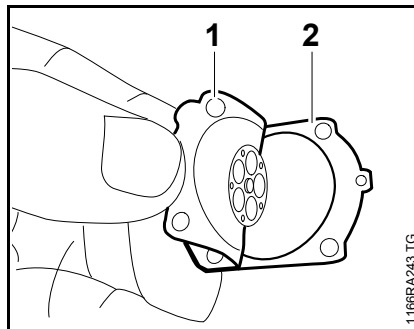
- Troubleshooting,  3.6
- Remove the carburetor,  13.4
- Check the sleeve, remove and replace it if necessary.

All models



- Take out the screws (1) and remove the end cover (2).

If the gasket and metering diaphragm are stuck to the carburetor, remove them very carefully.

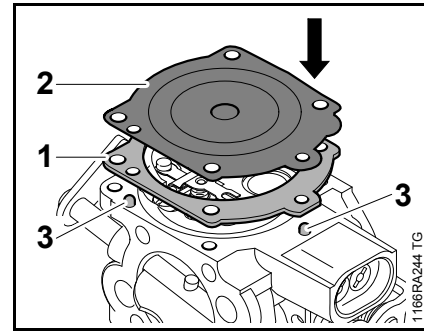


- Carefully separate the metering diaphragm (1) and gasket (2).

The diaphragm material is subjected to continuous alternating stresses and eventually shows signs of fatigue, i.e. the diaphragm distorts and swells and has to be replaced.

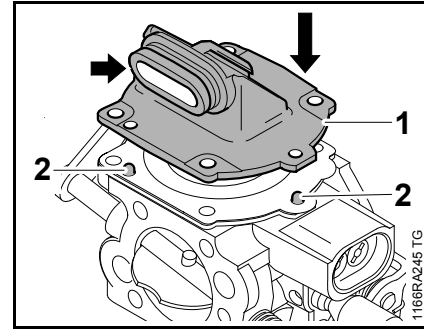
- Check the metering diaphragm for signs of damage and wear. Install a new gasket.

Installing

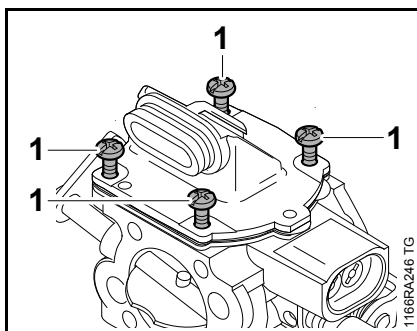


Note installed positions of gasket (1) and metering diaphragm (2).

- Position the gasket (1) and metering diaphragm (2) so that the pegs (3) engage the holes.



- Position the end cover (1) so that the stub (arrow) points in the direction of the choke shutter.
- Line up the end cover (1) so that the holes engage the pegs (2).

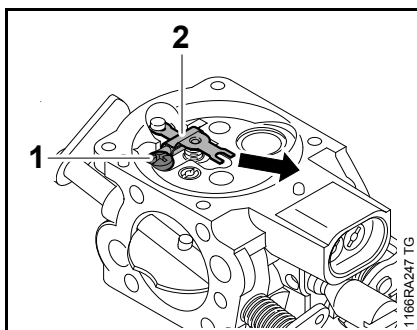


- Fit the screws (1).
- Check position of metering diaphragm and gasket, then tighten down the screws firmly in a crosswise pattern.
- Push the sleeve onto the stub.
- Reassemble all other parts in the reverse sequence.

13.5.4 Inlet Needle

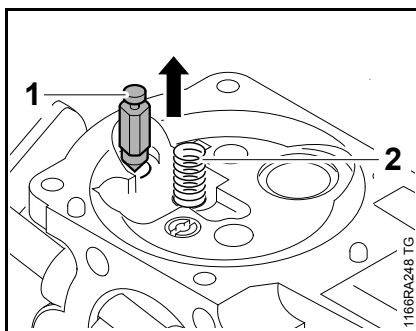
- Remove the metering diaphragm, 13.5.3

All models

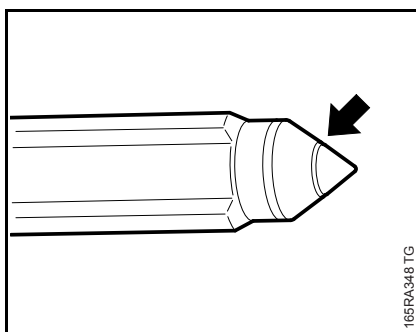


- Take out the screw (1).
- Take the inlet control lever (2) with spindle out of the inlet needle's groove.

The small spring under the inlet control lever may pop out.

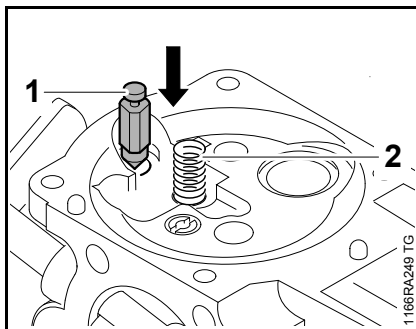


- Pull out the inlet needle (1) and spring (2), check and replace if necessary.

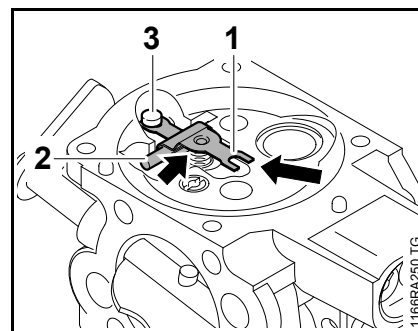


If there is an annular indentation (arrow) on the sealing cone of the inlet needle, fit a new inlet needle.

Installing



- Fit the inlet needle (1).
- Fit the spring (2) in the bore.





- Position the inlet control lever (1) with spindle (2) on the spring (arrow) first, then slide the inlet control lever's clevis into the groove in the inlet needle (3).

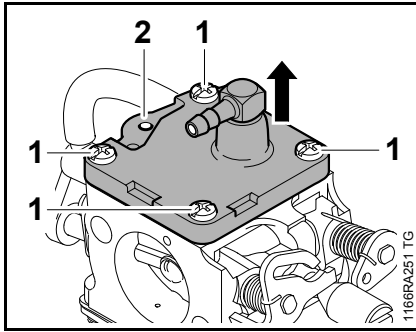
Make sure the spring locates on the control lever's nipple.

- Press the inlet control lever down and secure it with the screw.
- Check that the inlet control lever moves freely.
- Install the metering diaphragm, 13.5.3

13.5.5 Pump Diaphragm

- Troubleshooting,  3.6
- Remove the carburetor,  13.4

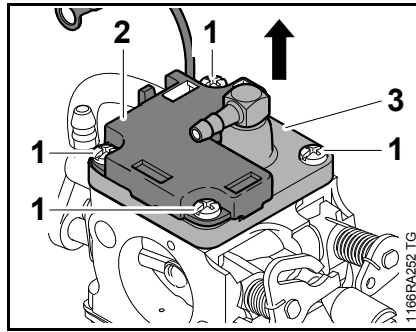
Versions without carburetor heating



- Take out the screws (1).
- Remove the end cover (2).

If the gasket and pump diaphragm are stuck to the carburetor, remove them very carefully.

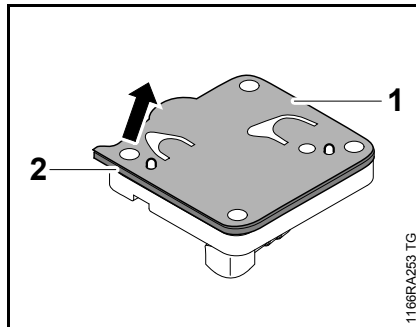
Versions with carburetor heating



- Take out the screws (1) and remove the thermostatic switch (2) and end cover (3).

All models

If the gasket and pump diaphragm are stuck to the carburetor, remove them very carefully.

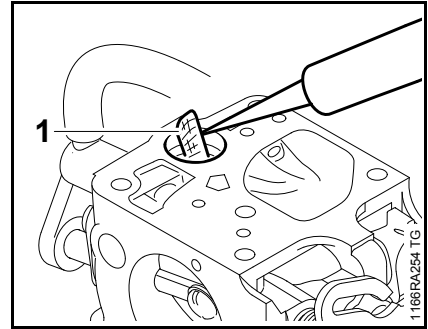


- Carefully separate the pump diaphragm (1) and gasket (2)
- Inspect the end cover and replace if necessary.

The diaphragm material is subjected to continuous alternating stresses and eventually shows signs of fatigue, i.e. the diaphragm distorts and swells and has to be replaced.

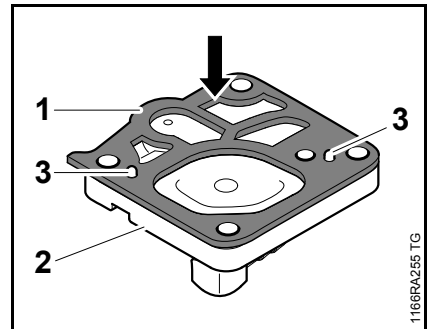
- Check the pump diaphragm for signs of damage and wear. Install a new gasket.

- Check fuel strainer for contamination and damage. Clean or replace if necessary.

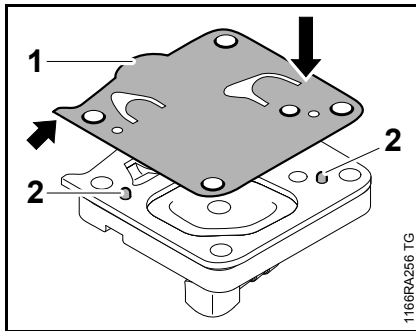


- Use a needle to remove the fuel strainer (1) from the carburetor body. Clean or replace the fuel strainer.
- Reassemble in the reverse sequence.

Installing

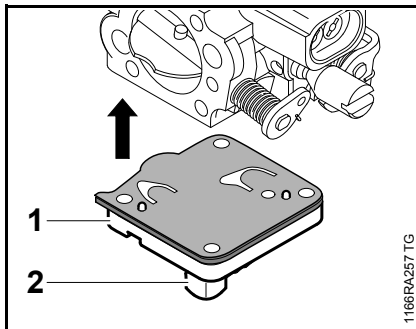


- Fit the new gasket (1) so that its contours match the end cover (2) and its holes engage the pegs (3).

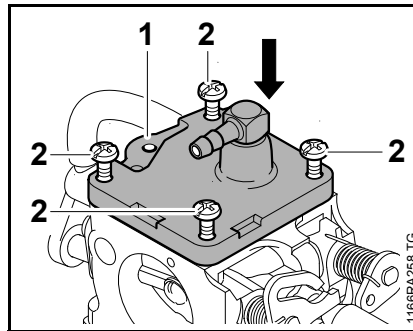


- Fit the pump diaphragm (1) on the gasket so that their tabs (arrow) are in alignment and its holes engage the pegs (2).

Gasket and pump diaphragm are now held in position.

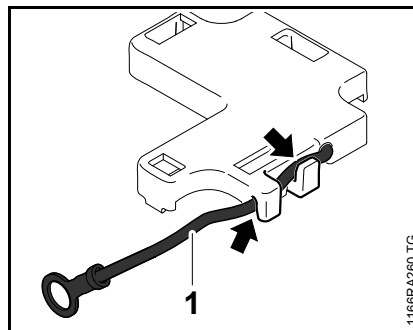


- Fit the end cover (1) from below so that the pump diaphragm and gasket remain in position.
- Align the end cover (1) so that the stub (2) faces the throttle shutter.

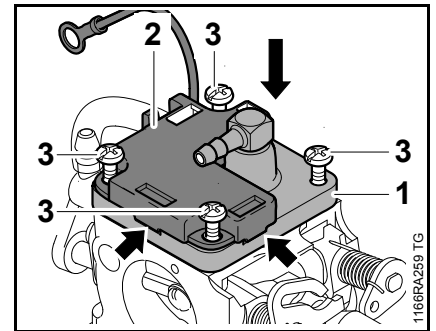


- Move the end cover (1) back and forth until its pegs engage the holes in the carburetor body.
- Check that the pump diaphragm and gasket are properly seated.
- Insert and tighten down the screws (2) firmly.

Versions with carburetor heating



- Push the wire (1) into the guides (arrows).



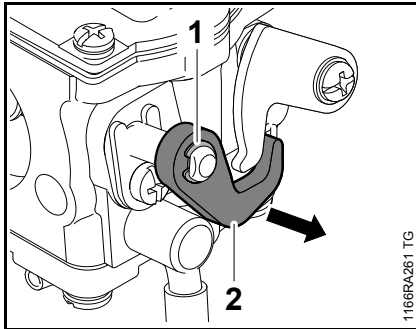
- Move the end cover (1) back and forth until its pegs engage the holes in the carburetor body.
- Fit the thermostatic switch (2) so that it engages the recesses (arrows).
- Check that the pump diaphragm and gasket are properly seated.
- Insert and tighten down the screws (3) firmly.

All models

- Reassemble all other parts in the reverse sequence.

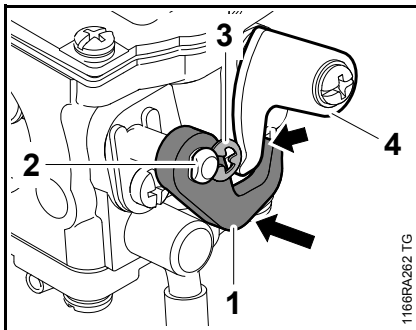
13.5.6 Lever on Throttle Shaft

- Remove the carburetor, 13.4
- Carburetor troubleshooting, 3.6



- Remove the E-clip (1) and pull off the lever (2).

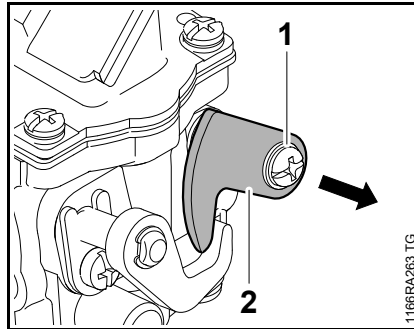
Installing



- Position the lever (1) so that its hook engages the lever on the choke shaft (arrow).
- Push the lever (1) onto the throttle shaft (2) so that it engages the flats on the end of the shaft.
- Fit the E-clip (3).
 - lever (1) must engage lever (4) (arrow).
- Reassemble all other parts in the reverse sequence.

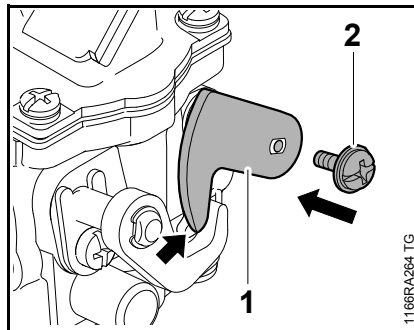
13.5.7 Lever on Choke Shaft

- Remove the carburetor, 13.4
- Carburetor troubleshooting, 3.6



- Take out the screw (1) and pull off the lever (2).

Installing

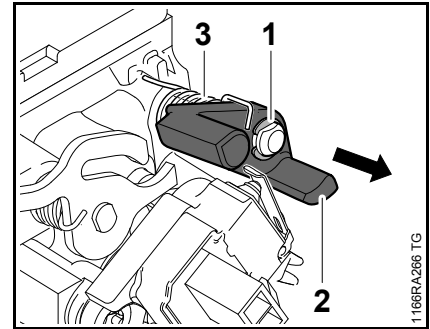


- Position the lever (1) so that it points in the direction of the throttle shaft – on models without M-Tronic, fit lever with lobe on its tip (arrow).
- Push the lever (1) onto the choke shaft so that it engages the flats on the end of the shaft.
- Insert and tighten down the screw (2) firmly.
- Reassemble all other parts in the reverse sequence.

13.5.8 Lever on Choke Shaft / Switch Unit, Models with M-Tronic

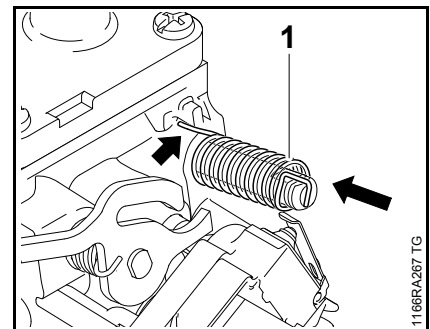
- Remove the carburetor, 13.4
- Troubleshooting, 8.3

Carburetor is shown from below for greater clarity.

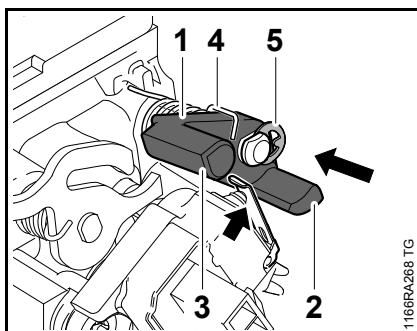


- Remove the E-clip (1) and pull off the lever (2) with torsion spring (3).
- Inspect lever and torsion spring, replace if necessary.
- Inspect the switch unit, replace if necessary, 8.3.3, 8.5
- Check the solenoid valve, replace if necessary, 8.3.4, 8.6

Installing



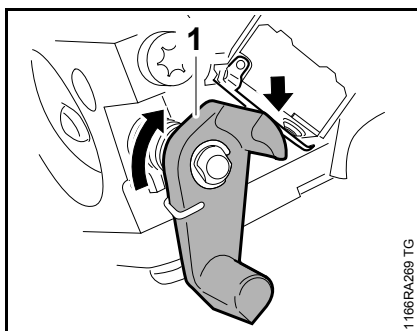
- Fit the torsion spring (1) so that its leg (arrow) rests against the rib on the carburetor.



- Position the lever (1) so that the microswitch's spring (arrow) is between the lugs (2, 3).
- Rotate leg (4) of torsion spring a 3/4 turn clockwise and attach it to the lever (1).
- Push the lever (1) onto the choke shaft so that it engages the flats on the end of the shaft.
- Fit the E-clip (5).

Leg of torsion spring must be preloaded and locate against the carburetor's rib.

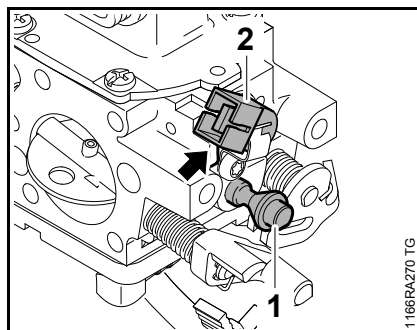
Check operation



- Move the choke shaft in direction of cold start ▲, the lever (1) must operate the microswitch (arrow) – with an audible click.
- Reassemble all other parts in the reverse sequence.

13.6 Adjusting the Carburetor, Models with M-Tronic

The M-Tronic adjusts the carburetor. Therefore, no manual adjustments are necessary or possible.



Shown without switch unit for greater clarity.

Position of special screw (1) must not be changed
– changing the factory setting will cause engine running problems.

- If solenoid valve (2) has been turned out of position, turn it back counterclockwise as far as stop (arrow), then test the solenoid valve (2), 8.3.4
- In the event of problems, test the M-Tronic, 8.3

13.7 Adjusting the Carburetor, Models without M-Tronic

13.7.1 Adjusting Screws

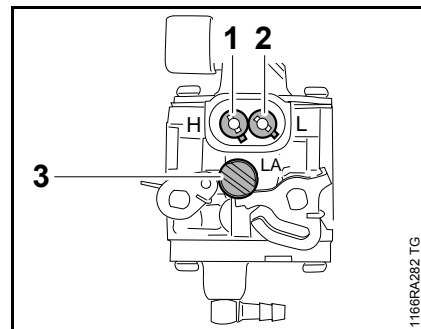


Illustration with limiter caps.

There are three adjusting screws on the carburetor:

– Adjusting screws (1) and (2) with limiter caps

H = high speed screw (1)

L = low speed screw (2)

LA = idle speed screw (3)

If the carburetor cannot be adjusted properly, the problem may be the adjusting screws.

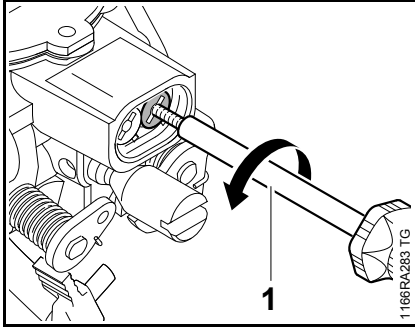
The high speed screw **H** and low speed screw **L** have limiter caps, which have to be removed before the screws are removed.

Always install new limiter caps.

– Remove the carburetor, 13.4

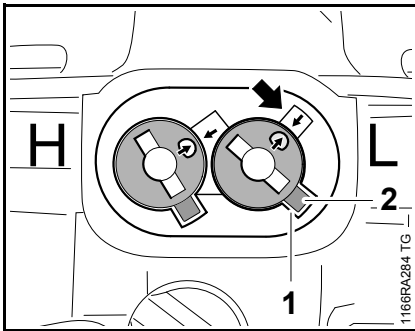
– See also carburetor troubleshooting, 3.6

Low speed screw



- Screw the puller (1) 5910 890 4500 about 5 turns counterclockwise into the limiter cap
 - left-hand thread.

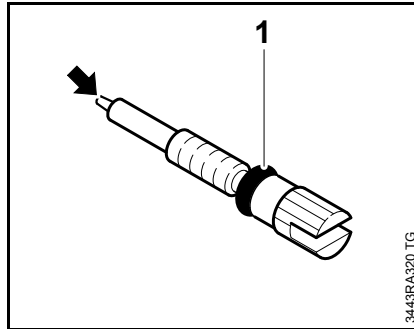
Do not turn the puller (1) any further
 – the low speed screw (L) may otherwise be damaged.



- Use the puller to turn the limiter cap clockwise until the lug (2) or screw slot is in line with slot (1).

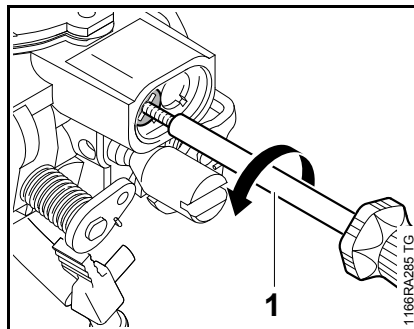
The dot on the limiter cap must line up with the mark (arrow).

- Pull out the limiter cap.
- Remove the low speed screw (L).



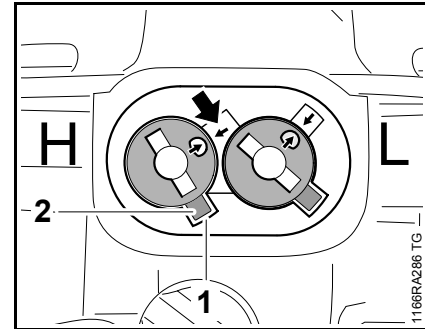
- Inspect the tip (arrow) and O-ring (1) for damage or wear and replace the low speed screw (L) if necessary.
- Screw down the low speed screw (L) as far as stop.
- Continue with the high speed screw (H).

High speed screw



- Screw the puller (1) 5910 890 4500 about 5 turns counterclockwise into the limiter cap
 - left-hand thread.

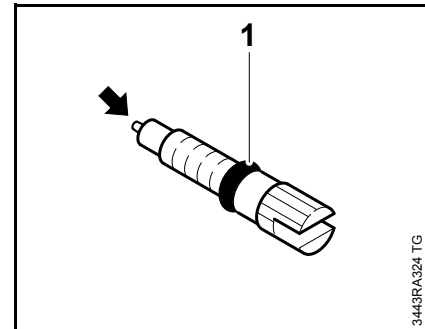
Do not turn the puller (1) any further
 – the high speed screw (H) may otherwise be damaged.



- Check position of limiter cap. If necessary, use the puller to turn the limiter cap counterclockwise until the lug (2) or screw slot is in line with slot (1).

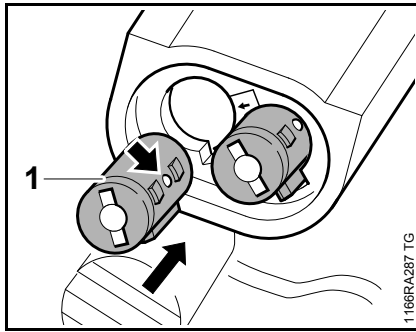
The dot on the limiter cap must line up with the mark (arrow).

- Pull out the limiter cap.
- Take out the high speed screw (H).



- Inspect the tip (arrow) and O-ring (1) for damage or wear and replace the high speed screw (H) if necessary.
- Screw down the high speed screw (H) as far as stop.
- Continue with "Pre-installing limiter cap".

Pre-installing limiter caps



- Push the new limiter caps (1) onto the high speed screws as far as the first detent (arrow) – do not push them fully home.
- Carry out the basic setting, 13.8.1

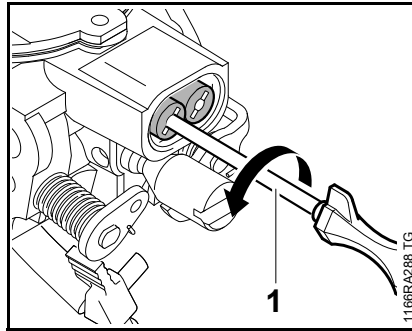
13.8 Adjusting the Carburetor

13.8.1 Basic Setting

The basic setting is necessary only if the high speed screw (H) or low speed screw (L) has to be replaced or after cleaning and adjusting the carburetor from scratch.

It is necessary to carry out the basic setting after removing the limiter caps.

- Install the carburetor and air filter
– adjusting screws must be preset and the new limiter caps pre-installed.
- Check chain tension and adjust if necessary.
- Inspect the spark arresting screen (if fitted) and clean or replace if necessary, 3.7 or 6.1
- Check the air filter and clean or replace if necessary, 13.1



For the sake of clarity the adjusting screws are shown on the exposed carburetor.

- Insert the screwdriver (1) 5910 890 2304 through the pre-installed limiter caps of high speed screw (H) and low speed screw (L).
- Starting with the high speed screw (H) against its seat, open it **1 1/2 turns** counterclockwise
- Starting with the low speed screw (L) against its seat, open it **1 full turn**.
- Go to "Setting", 13.8.2

13.8.2 Setting

- Insert screwdriver 5910 890 2304 through the grommet and the pre-installed limiter caps of high speed screw (H) and low speed screw (L).

Adjust engine speeds with tachometer or STIHL MDG 1 engine analyzer (select "Other STIHL Products" / "Tachometer"). Adjust specified engine speeds within a tolerance of ± 200 rpm.

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

Adjusting idle speed

1. Turn the low speed screw **L** counterclockwise or clockwise to obtain the highest engine idle speed.

If this speed is **between** 3,300 rpm and 3,500 rpm, continue with **step 3**.

If this speed is **outside the range between** 3,300 rpm and 3,500 rpm, continue with **step 2**.

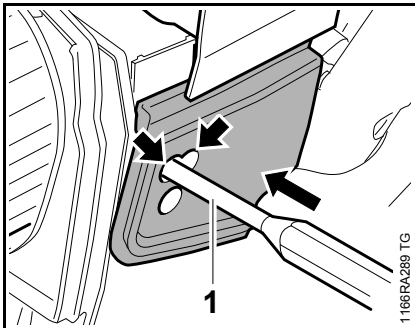
2. Use the idle speed screw **LA** to set engine speed to 3,400 rpm and repeat **step 1**.

3. Use the low speed screw **L** to set engine speed to 2,800 rpm.
4. Use the high speed screw **H** to set engine speed to 13,000 rpm.
5. Remove tachometer after obtaining engine speed of 13,000 rpm.
Turn high speed screw **H** another **1/8 turn clockwise** (leaner), a maximum engine speed of 13,500 rpm is obtained – making the setting any leaner increases the risk of engine damage.

The ignition module limits maximum engine speed to 13,500 rpm. For this reason the maximum permissible engine speed cannot be adjusted with a tachometer.

- Continue with "Securing the limiter caps".

Securing the limiter caps

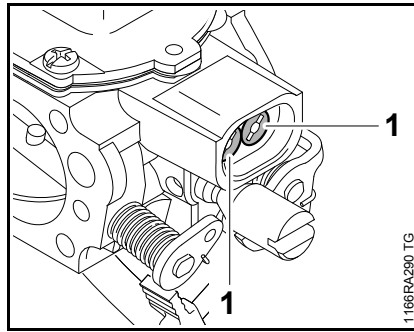


- Insert a suitable punch through the holes (arrows) in the grommet and push the limiter caps home as far as stop.

This completes the basic setting of the high speed screw (**H**) and the low speed screw (**L**).

Version without limiter caps: The high speed screw (**H**) and the low speed screw (**L**) are now set.

13.8.3 Standard Setting



The limiter caps (1) must not be removed for the standard setting.

Always perform the following steps before carrying out any adjustments:

- Troubleshooting, 3.6
- Check chain tension and adjust if necessary.
- Inspect the spark arresting screen (if fitted) and clean or replace if necessary, 3.7 or 6.1
- Check the air filter and clean or replace if necessary, 13.1

Standard setting with limiter caps

- Shut off the engine.
- Turn the high speed screw (**H**) slowly counterclockwise as far as stop, but not more than **3/4 of a turn**.
- Turn the low speed screw (**L**) slowly clockwise as far as stop, but not more than a **3/4 turn**, then turn it back a **1/4 turn**.

Check running behavior:
The engine must accelerate smoothly when the throttle is opened and run uniformly at idle speed.

Standing setting without limiter caps

- Shut off the engine.
- Starting with the high speed screw (**H**) and low speed screw (**L**) against their seats, open them **1 full turn**.

Check running behavior:
The engine must accelerate smoothly when the throttle is opened and run uniformly at idle speed.

Adjusting idle speed

- Carry out "Setting".

Engine stops while idling

- Turn the idle speed screw **LA** clockwise until the chain begins to run, then turn it back **1 1/2 turns**.

Saw chain runs while engine is idling

- Turn the idle speed screw (**LA**) counterclockwise until the chain stops running, then turn it back **1 1/2 turns**.

Erratic idling behavior, poor acceleration

(although low speed screw = 1/4)

Idle setting too lean.

- Warm up the engine.
- Turn the low speed screw (**L**) counterclockwise until the engine runs and accelerates smoothly.

It is usually necessary to change the setting of the idle speed screw (**L**) after every correction to the low speed screw (**LA**).

Fine tuning for operation at high altitude

A minor correction may be necessary if engine power is not satisfactory when operating at high altitude.

- Check "Setting".
- Warm up the engine.
- Turn the high speed screw (**H**) slightly clockwise (leaner) – no further than stop on versions with limiter caps.

Turn the adjusting screws only very slightly. Even minor adjustments can noticeably affect engine running behavior.

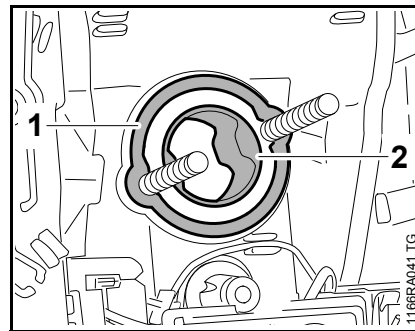
If the setting is made too lean there is a risk of engine damage as a result of lack of lubrication and overheating.

Readjust carburetor to "Standard Setting" after returning from high altitude.

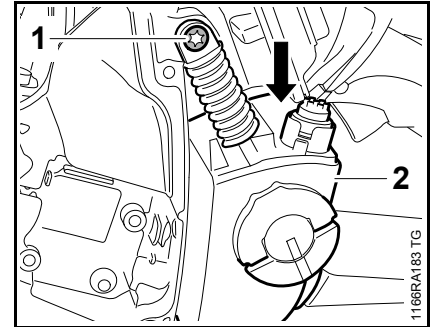
13.9 Manifold

A damaged intake manifold can cause engine running problems, 3.7

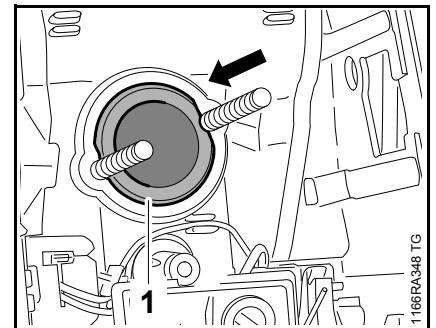
- Troubleshooting, 3.6 or 3.7
- Remove the shroud, 6.4
- Remove the stop buffer at the clutch side, 10.1
- Remove the carburetor, 13.4



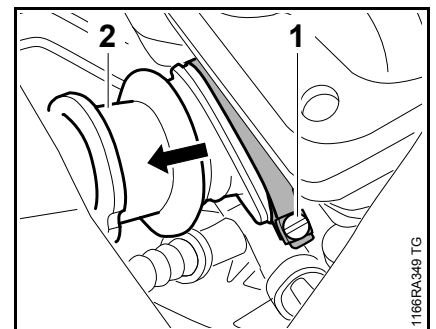
- Remove the washer (1) and sleeve (2).



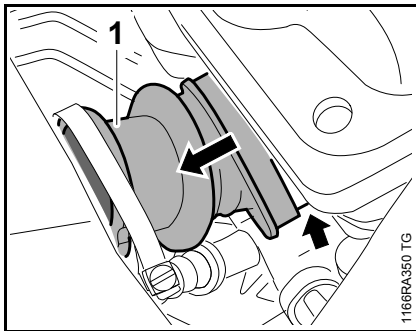
- Take out the screw (1), push the tank housing (2) down a little and hold it there.



- Push the manifold flange (1) out of the tank housing in the direction of the cylinder.
- Pull the tank housing out part way – do not over-tension wiring harness and do not pull the impulse hose off the stub.



- Loosen the screw (1) and slip the hose clamp (2) over the manifold (2) in the direction of the tank housing.



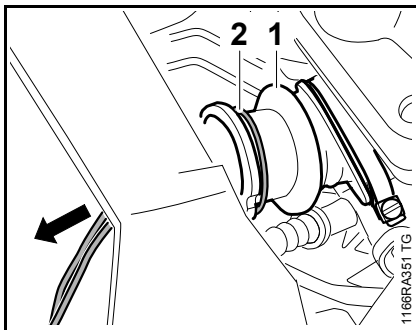
- Pull the manifold (1) off the intake stub (arrow).

- Inspect the intake manifold and replace it if necessary – even very minor damage can cause engine running problems, 3.7

The sealing faces must be in perfect condition. Always replace components with damaged sealing faces.

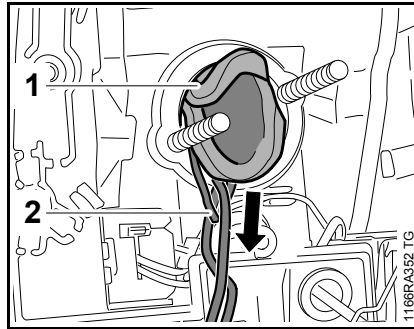
Installing

- Install manifold on cylinder, 6.5

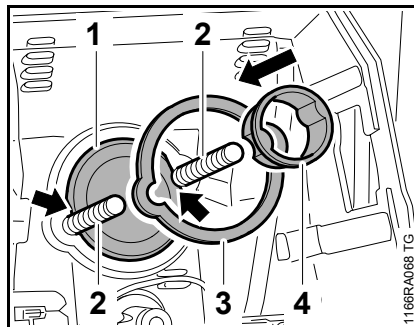


- Coat the outside of the manifold flange with STIHL press fluid, 16
- To pull the manifold flange (1) through the intake opening, wind a piece of string (2) (about 15 cm long) around the flange and pass the ends of the string through the intake opening.

Take care to ensure that the washer in the manifold is not damaged or displaced.



- Press the tank housing against the manifold and hold it there.
- Grip the ends of the string (2) and pull the manifold flange (1) through the opening.
- Remove the string.

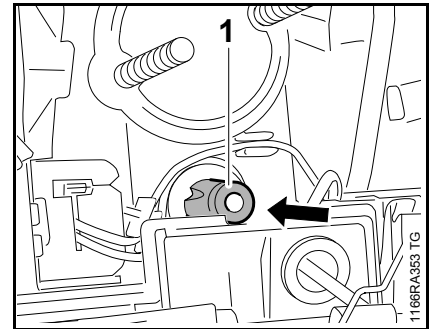


- Position the manifold flange (1) – its recesses (arrows) must locate against the studs (2).
- Fit the washer (3) and push the sleeve (4) into the manifold flange (1).
- Install the carburetor, 13.4
- Reassemble all other parts in the reverse sequence.

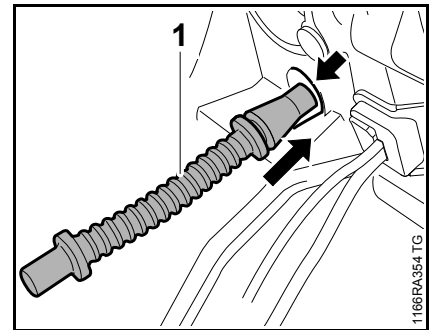
13.9.1 Impulse Hose

A damaged impulse hose can cause engine running problems.

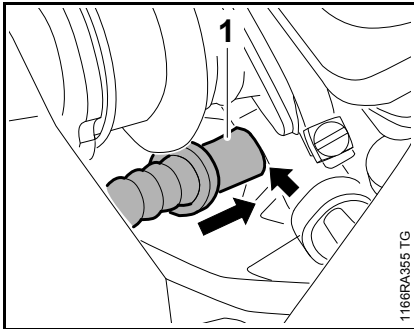
- Remove the carburetor, 13.4
- Remove the tank housing, 13.11.4



- Pull the impulse hose (1) out of the tank housing in the direction of the cylinder.
- Check the impulse hose and replace if necessary.



- Coat tapered outside of new impulse hose with STIHL press fluid, 16
- Push tapered end of impulse hose (1) through the hole (arrow) and push it home until it is properly seated.



- Install the tank housing, pushing the impulse hose (1) onto the stub (arrow) at the same time, 13.11.4
- Install the carburetor, 13.4
- Reassemble all other parts in the reverse sequence.

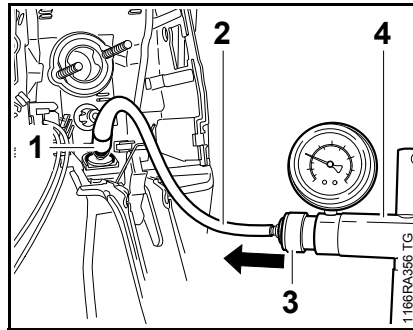
13.10 Tank Vent

13.10.1 Testing

If problems occur on the carburetor or the fuel supply system, also check and clean the tank vent and replace it if necessary. Check function by performing pressure and vacuum tests on the tank via the fuel suction hose.

- Open the fuel tank cap and drain the fuel tank, 1.1.
- Close the tank cap.
- Remove the carburetor, 13.4
- Remove the retainer with switch shaft and put it to one side, 11.1.1

Vacuum test

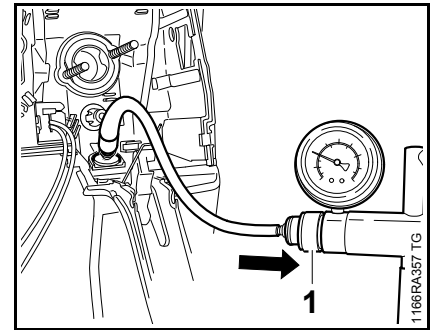


- Push nipple (1) 0000 855 9200 with hose (2) into the fuel suction hose.
- Push the ring (3) to the left and connect the pump (4) 0000 850 1300 to the hose (2) – create a vacuum in the fuel tank.

Equalization of pressure takes place via the tank vent. There must be no buildup of vacuum in the tank.

- Clean the area around the tank vent.
- If necessary, install a new tank vent or tank housing, 13.10 or 13.11.4

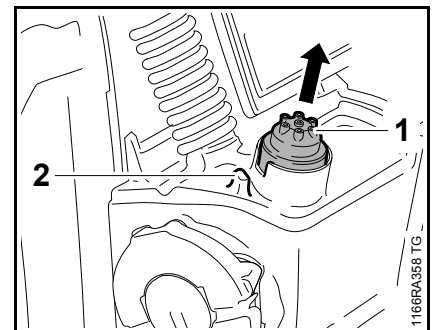
Pressure test



- Push ring (1) to the right – pressurize the fuel tank.
- Operate the pump until the pressure gauge indicates a pressure of 0.5 bar. If this pressure remains constant for at least 20 seconds, the tank, including the tank vent, is airtight. If the pressure drops, the leak must be located and the faulty part replaced.
- Remove the nipple and pump.
- Reassemble in the reverse sequence.


13.10.2 Removing and Installing

- Remove the filter cover



- Pry the tank vent (1) out of its seat using the rib (2) for leverage. – Always install a new tank vent.

Installing



- Coat sealing ring of new tank vent with STIHL press fluid,  16
- Push home the tank vent by hand until it snaps into position.
- Reassemble all other parts in the reverse sequence.

13.11 Fuel Intake




13.11.1 Pickup Body

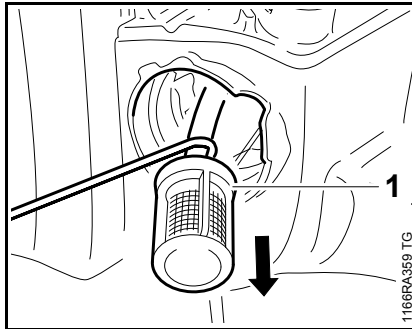
The fine pores of the filter become clogged with minute particles of dirt. This restricts the passage of fuel and results in fuel starvation.

In the event of problems with the fuel supply system, always check the fuel tank and the pickup body first.

- Troubleshooting,  3.6 or  3.7

Clean the fuel tank if necessary.

- Open the tank cap and drain the tank,  1.1
- Pour a small amount of clean gasoline into the tank. Close the tank and shake the saw vigorously.
- Open the tank again and drain it,  1.1
- Dispose of fuel properly in accordance with environmental requirements,  1.1
- Open the tank cap.





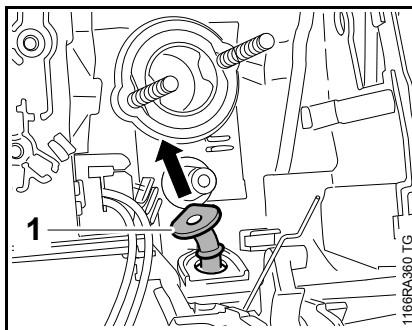
- Use hook 5910 893 8800 to remove the pickup body (1) from the fuel tank.

Do not overstretch the fuel hose.

- Pull off the pickup body (1), check it and replace if necessary.
- Reassemble in the reverse sequence.

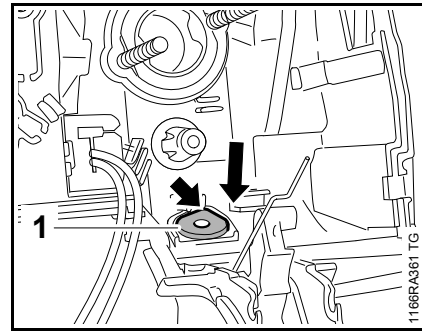
13.11.2 Fuel Suction Hose in Tank Housing


- Open the tank cap.
- Remove the carburetor,  13.4
- Remove the pickup body,  13.11.1



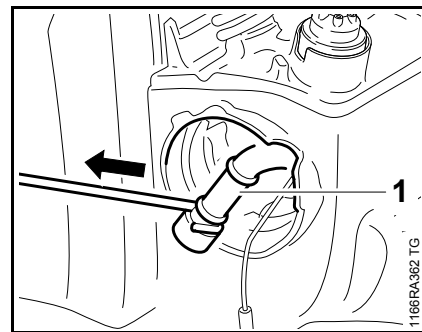
- Pry fuel suction hose (1) out of bore and pull it out of the tank.
- Check the fuel suction hose and replace if necessary.

Installing




- Use STIHL press fluid to make installation easier,  16

- Insert the fuel suction hose (1) in the bore in the fuel tank and position it so that the flange matches the contour (arrow) on the tank housing, then push it fully home.



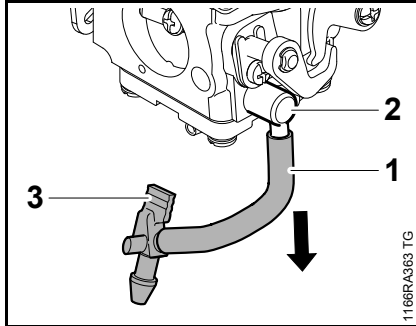
- Use hook 5910 893 8800 to pull the end of the fuel suction hose (1) out of the fuel tank.

Do not overstretch the fuel suction hose.

- Fit the pickup body,  13.11.1
- Close the tank cap.
- Reassemble all other parts in the reverse sequence.

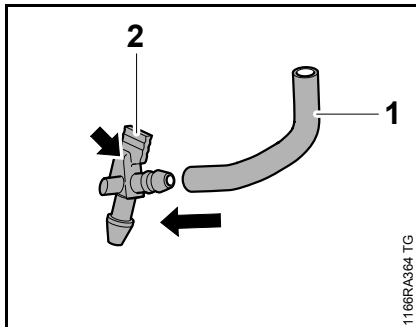
13.11.3 Fuel Suction Hose on Carburetor

- Remove the carburetor, 13.4

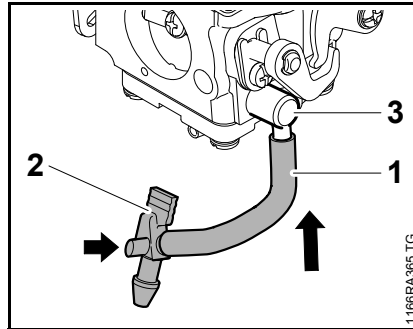


- Pull the fuel suction hose (1) off the nipple (2).
- Pull the elbow connector (3) off the fuel suction hose (1).
- Replace the fuel suction hose, inspect the elbow connector and replace if necessary.

Installing



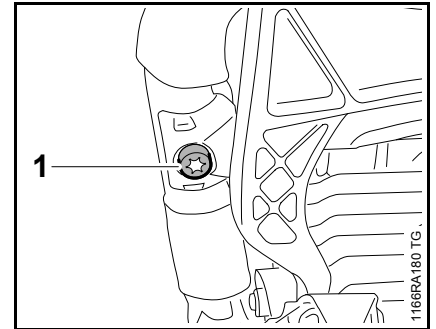
- Use STIHL press fluid to make installation easier, 16
- Connect new fuel suction hose (1) to angled nipple (arrow) on elbow connector (2).



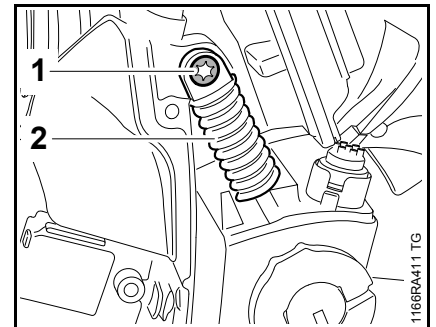
- Use STIHL press fluid to make installation easier, 16
- Fit fuel hose (1) with elbow connector (2) on the nipple (3) so that lug (arrow) faces to the rear in the direction of the throttle shutter.
- Install the carburetor, 13.4
- Reassemble all other parts in the reverse sequence.

13.11.4 Tank Housing

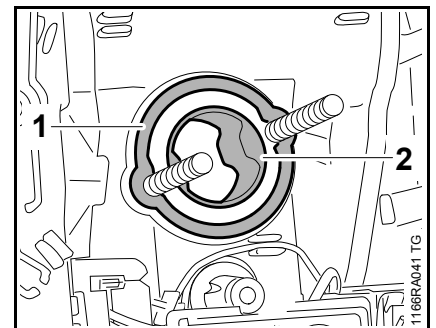
- Drain the fuel tank, 1.1
- Remove the carburetor, 13.4
- Remove the handle molding and lockout lever, 11.2
- Remove the stop buffer at the clutch side, 10.1
- Remove the ignition module / control unit, 7.3
- Remove wiring harness at ignition side and push it out through the opening in the crankcase in direction of cylinder, 7.9, M-Tronic / heating, 7.10



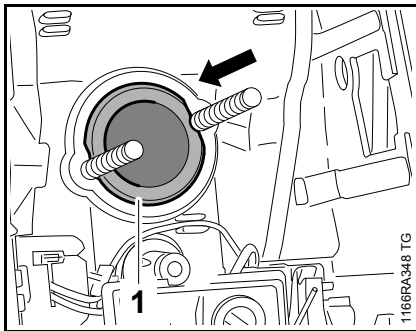
- Remove screw (1) from AV element on handlebar.



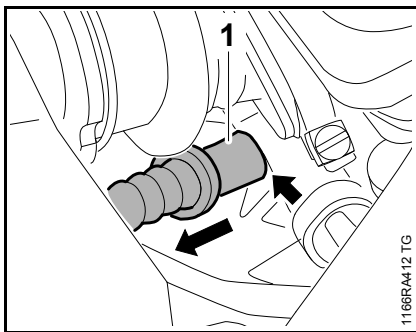
- Remove screw (1) from AV spring (2).



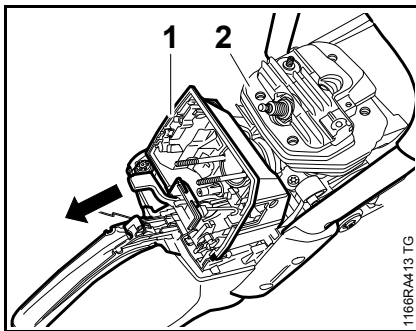
- Remove the washer (1) and sleeve (2).



- Push the manifold flange (1) out of the tank housing in the direction of the cylinder.



- Pull out tank housing about 30 mm and disconnect impulse hose (1) from stub (arrow).



- Pull the tank housing (1) out of the crankcase (2).
- Inspect the tank housing and replace if necessary.

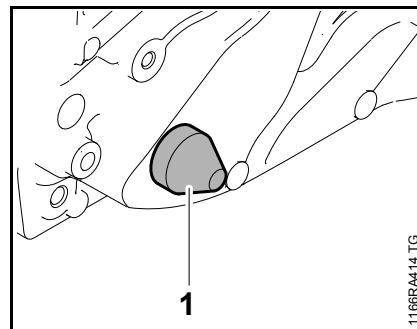
Only transfer those parts from the old tank housing that are not damaged or not included with the replacement – see parts list.

- Transfer the switch shaft, 11.1
- Transfer the wiring harness, 7.9, M-Tronic / heating, 7.10
- Transfer the lockout lever and throttle trigger, 11.2
- Transfer the handlebar, 10.5
Models with heating, 10.5.1

Versions with handle and carburetor heating

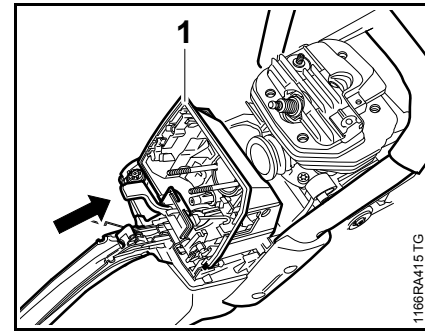
- Transfer heating element in rear handle, 14.5
- Transfer the heater switch, 14.4
- Transfer heating element wiring, 14.8

All models

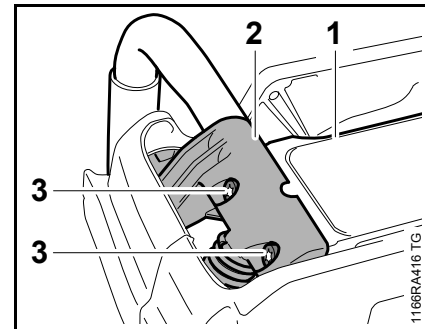


- Check the stop buffer (1) at the ignition side and replace if necessary, 10.4.1

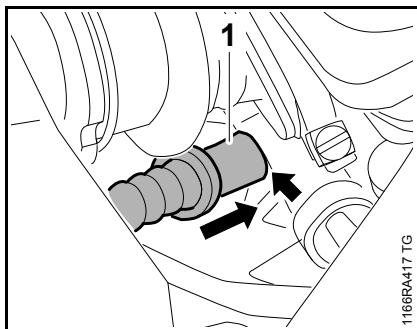
Installing



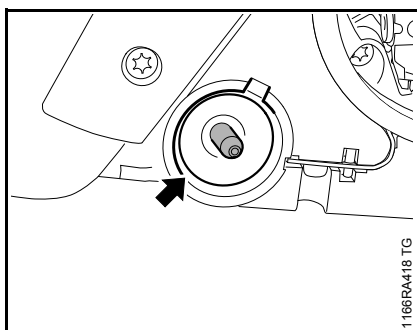
- Push the tank housing (1) with handlebar between the two halves of the crankcase until it locates against the manifold.



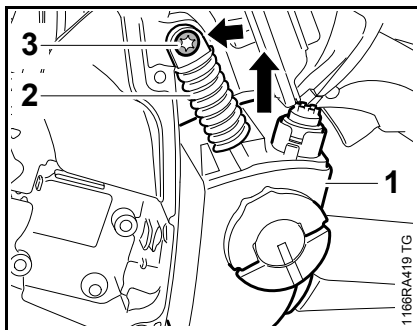
- Push tank housing (1) with handlebar onto pegs on handlebar holder (2).
- Insert and tighten down the screws (3) firmly.
- Hold the tank housing with handlebar steady and thread the wiring harness at the ignition side through the opening in the crankcase towards ignition module / control unit and install the grommet, 7.9, M-Tronic / heating, 7.10



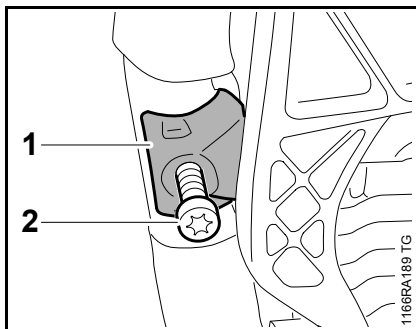
- Hold the tank housing with handlebar steady and push impulse hose (1) onto stub (arrow) as far as stop.



- Lift the tank housing with handlebar and engage tank housing's peg in stop buffer's bore (arrow).
- Pull the manifold into the tank housing, [13.9](#)



- Lift the tank housing (1) until holes (arrow) in AV spring (2) line up.
- Insert and tighten down the screw (3) firmly.



- Fit bearing plug (1) in position.
- Coat the screw (2) with threadlocking adhesive, fit it and tighten it down firmly, [16](#)
- Install the stop buffer at the clutch side, [10.1](#)
- Install the ignition module / control unit, [7.3](#)
- Fit wiring harness at ignition side, [7.9](#), M-Tronic / heating, [7.10](#)
- Install the carburetor, [13.4](#)
- Install the handle molding and lockout lever, [11.2](#)
- Reassemble all other parts in the reverse sequence.

14. Heating System

14.1 Carburetor Heating

The heating element is installed between the filter base and the carburetor. Current is supplied via a wire to the heating element.



The heating element is controlled by a thermostatic switch on the underside of the carburetor.

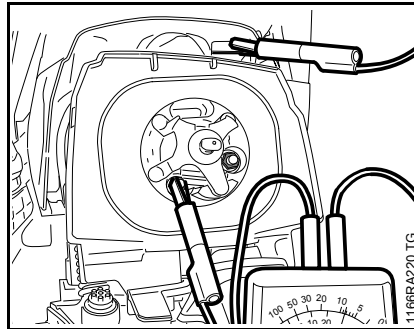
The heating element and thermostatic switch should be checked if running problems occur when the cold engine is idling or running at part load, particularly at temperatures below freezing.

Idling problems with a hot engine are also an indication of a fault in the heating element or thermostatic switch.

14.1.1 Testing the Complete System

The generator and heating element are checked in the following test which should be performed at an ambient temperature of at least + 20°C (68°F).

- Test the heating system as specified in the carburetor heating troubleshooting chart,  14.2
- Remove the air filter,  13.1
- Set the ohmmeter to measuring range "Ω".



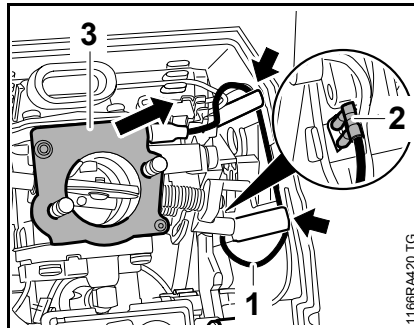
- Clip one of the two test leads to a nut on the filter base and the other to a cylinder fin.

If the system is in good condition the ohmmeter will indicate a value of about 10 Ω in measuring range "Ω".

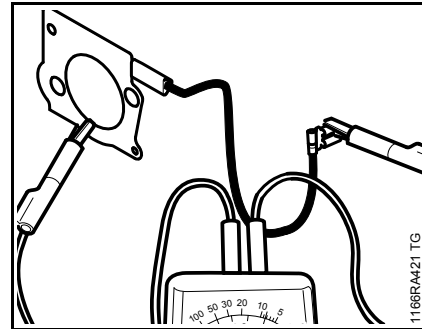
If the reading obtained is outside this tolerance, test each component separately.

14.1.2 Testing the Heating Element

- Remove the filter base,  13.3



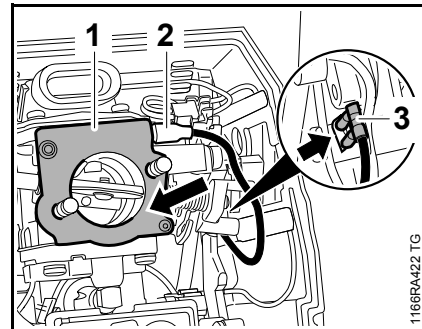
- Pull the wire (1) out of the guides and disconnect the flag terminal (2).
- Take the heating element (3) off the studs.



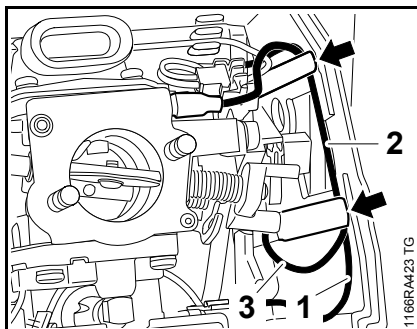
- Clip one test lead to the heating element and the other to the spade terminal.

If the heating element is in good condition the ohmmeter will indicate a value of about 8 Ω in measuring range "Ω".

Installing



- Fit the heating element (1) over the studs so that the wire (2) is at the top right.
- Hold the flag terminal (3) with the crimped side facing the carburetor and push it fully onto the connector tag (arrow).



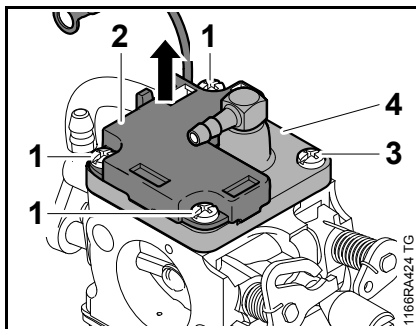
The black M-Tronic wire (1) must be underneath the heating element's black wire (2) in the guides.

- Push the heating element's black wire (2) into the guides (arrows) – loop (3) allows for movement.
- Reassemble all other parts in the reverse sequence.

14.1.3 Thermostatic Switch

The thermostatic switch is an electronic component that cannot be tested directly. Check operation of thermostatic switch with the aid of the "Troubleshooting Chart", 14.2.

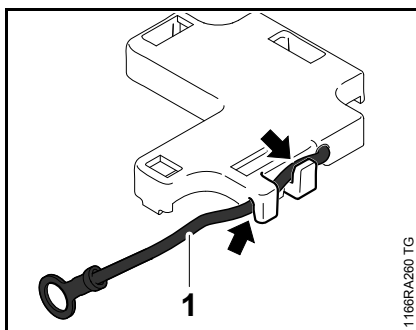
- Remove the carburetor, 13.4



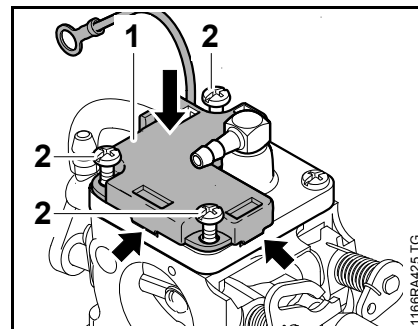
- Take out the screws (1) and remove the thermostatic switch (2).

Do not loosen the fourth screw (3) – end cover (4), pump diaphragm and gasket remain fixed in position.

Installing

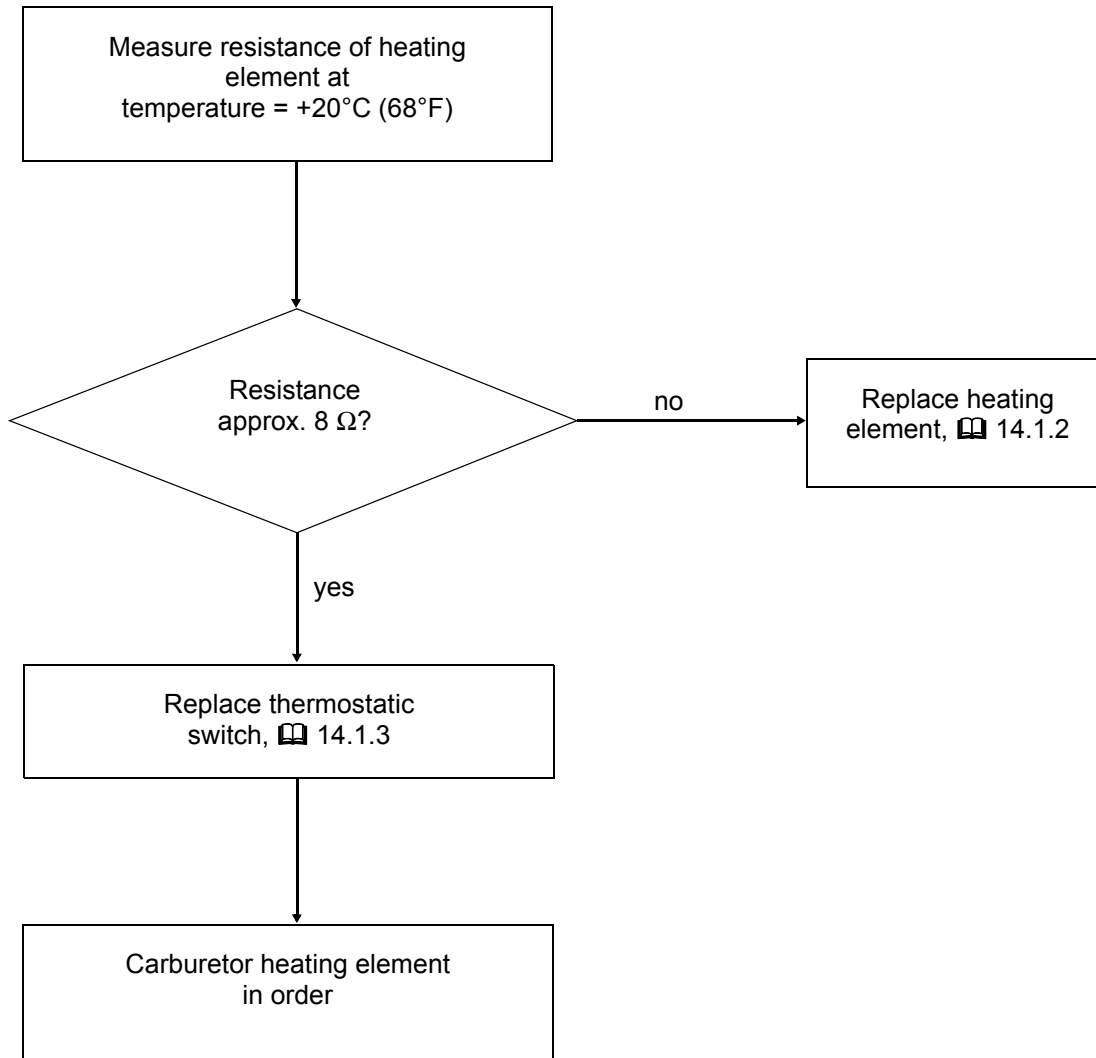


- Push the wire (1) into the guides (arrows).

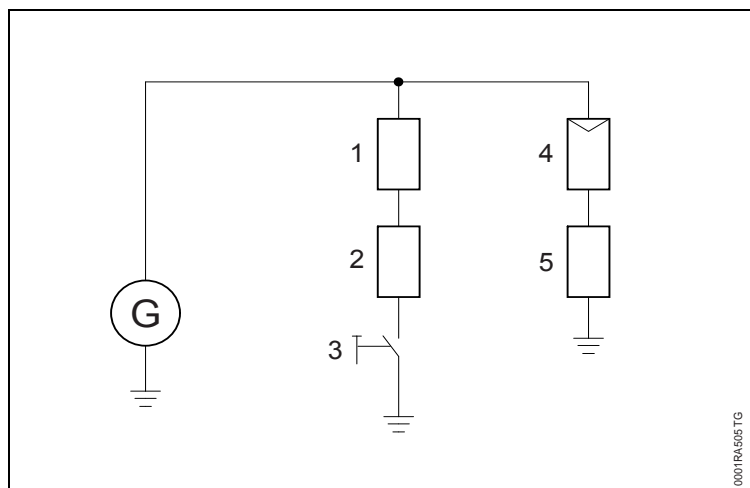


- Fit the thermostatic switch (1) so that it engages the recesses (arrows).
- Insert and tighten down the screws (2) firmly.
- Install the carburetor, 13.4
- Check operation with "Troubleshooting Chart", 14.2
- Reassemble all other parts in the reverse sequence.

14.2 Carburetor Heating System Troubleshooting Chart



Circuit Diagram




- G = Generator
- 1 = Rear handle
- 2 = Handlebar
- 3 = Heater switch
- 4 = Thermostatic switch
- 5 = Heating element (carburetor)

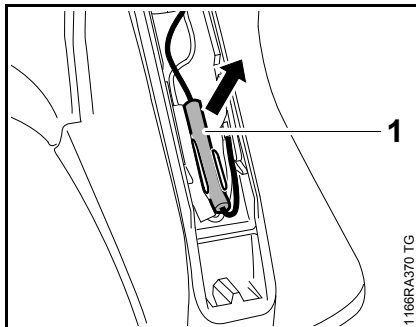
14.3 Handle and Carburetor Heating System

14.3.1 Troubleshooting

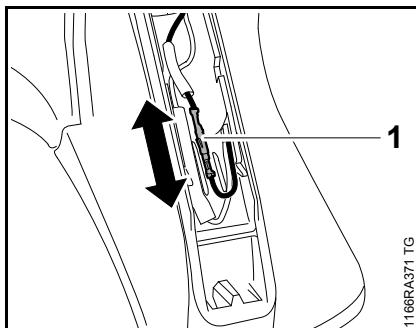
The entire handle heating system is maintenance-free and subject to practically no wear. Faults in the generator, heating elements and wiring are generally caused by mechanical damage.

There are two reasons for failures in the heating system:

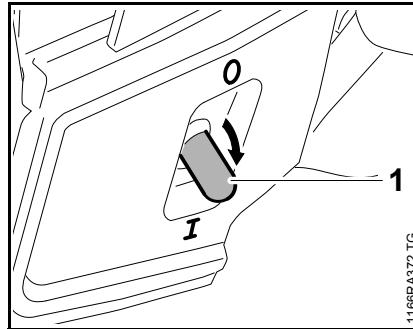
1. A break in the circuit due to a faulty wire or component.
 2. A short circuit resulting from damage to the insulation.
- Remove the handle molding and lockout lever,  11.2



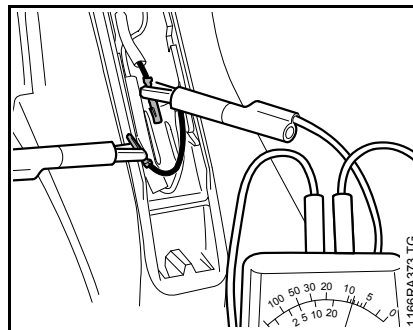
- Pull one of the connectors out of the guide and push the insulating tube (1) in the direction of the wiring harness.



- Separate the pin and socket connector (1).




- Set the heater switch (1) to "I".
- Set the ohmmeter to "Ω".



- Set Master Control lever to "STOP" and hold it there.
- Clip the test leads to the connecting wire and the rear handle heating element wire.

Carburetor heating

- Take out the screw and remove the thermostatic switch wire, then refit the screw and tighten it down firmly,  13.4

All electrical components of the handle heating system are connected in series with the ohmmeter.




If the system is in order, the ohmmeter will indicate a value of about 10 Ω in measuring range "Ω".

If no reading is obtained, there is a break in the circuit.

If the ohmmeter shows a very low value, there is a short circuit in one of the components.

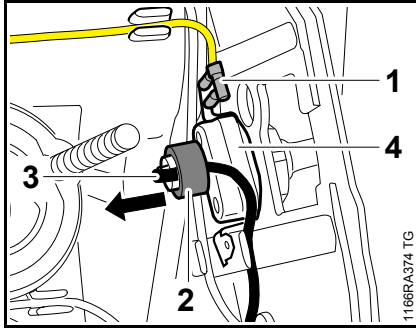
In either case it is necessary to check each component separately.

The thermostatic switch remains disconnected.

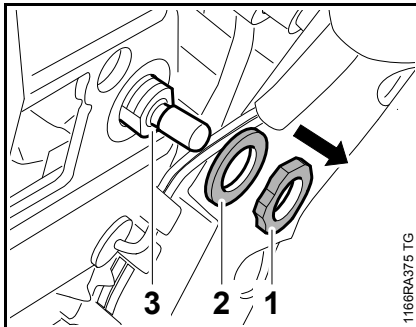
- Use handle heating and generator troubleshooting chart to check the system,  14.7.1
- Check resistance on handlebar,  14.6
- Check resistance on rear handle,  14.5
- After completing the test, reconnect the wires and push the insulating tube over the pin and socket connector.
- Reassemble in the reverse sequence.

14.4 Heater Switch

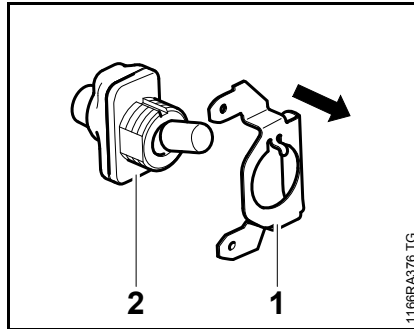
- Remove the filter base, 13.3
- Push out the grommet and remove the carburetor, 13.4



- Disconnect ground wire flag terminal (1).
- Take off the cable retainer (2) and pull connector of wire (3) out of the heater switch (4).

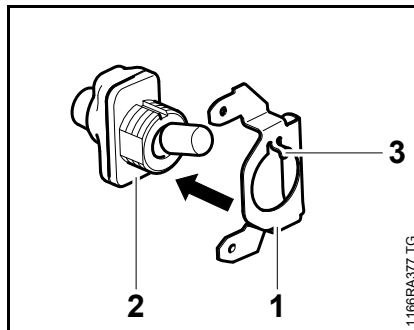


- Remove the nut (1) and washer (2).
- Push heater switch (3) with multiple tab inwards and out.

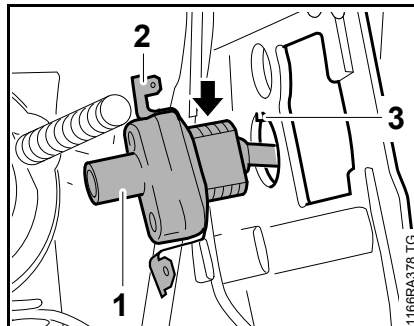


- Remove the multiple tab (1) from the heater switch (2), inspect components and replace if necessary.
- Check the ground wire, replace if necessary

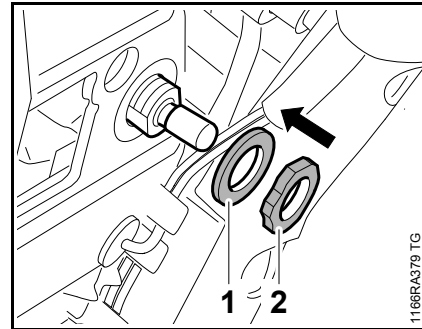
Installing



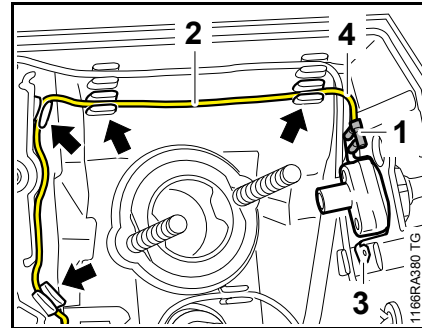
- Slide the multiple tab (1) onto the heater switch (2) so that the nib (3) engages the slot.



- To ensure the switch position is correct, slide the heater switch (1) with multiple tab (2) into the tank housing bore so that the nib (3) engages the recess (arrow).




- Fit the washer (1), screw on the nut (2) and tighten it down firmly.

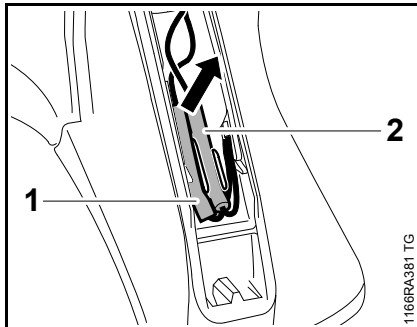


- Connect the flag terminal (1) of ground wire (2) to multiple tab (3) – crimped side facing manifold.
- Push the ground wire (2) into the guides (arrows) – loop (4) allows for movement.

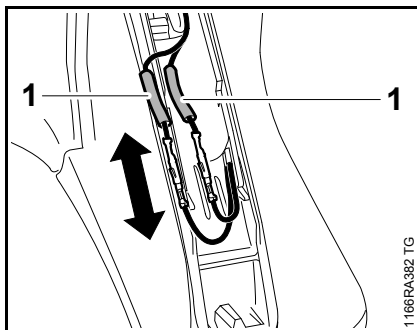
- Check operation
- Install carburetor and press grommet into openings, 13.4
- Reassemble all other parts in the reverse sequence.

14.5 Heating Element in Rear Handle

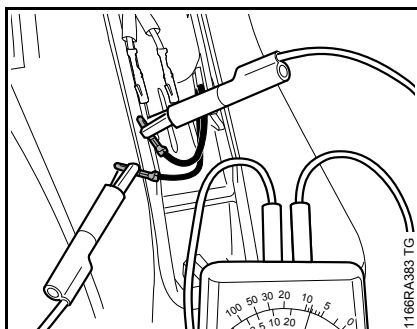
- Remove the handle molding and lockout lever,  11.2



- Pull the insulating tubes (1, 2) with pin and socket connectors out of the guides.



- Push back the insulating tubes (1) in the direction of the connecting wires and separate the pin and socket connectors.






- Test the heating element, replace it if necessary.

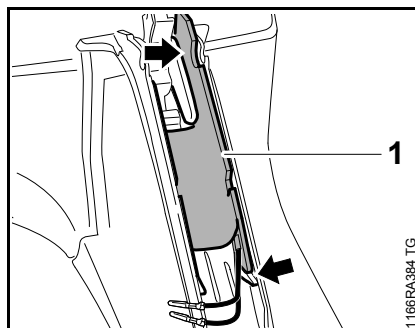
If the heating elements are in good condition the ohmmeter will indicate a value of about 1.6 Ω (measured value 1.5 – 2.0 Ω) in measuring range " Ω ".

If the reading is outside this range, install a new heating element.

Heating element does not operate even though resistance measurement is ok?

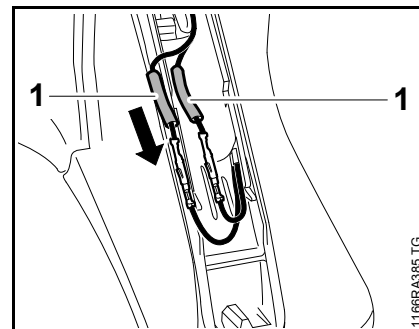
- Test the generator and heater switch,  14.7,  14.4
- Check connecting wires to handlebar heating and replace if necessary,  14.8

Installing



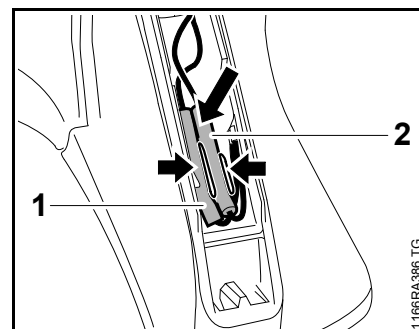
- Position the new heating element (1) so that it butts against the angled edge (arrow) and locates in rear handle's slot (arrow) – make sure it is completely flat.

If the heating element is not fitted perfectly flat, heat transfer to the handle will be interrupted and the element may fail as a result of overheating.

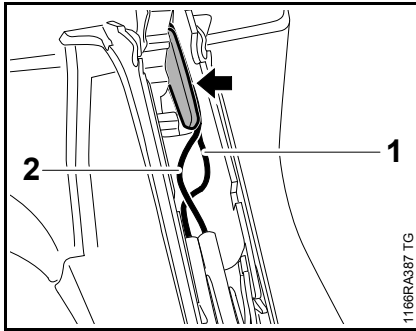


The connecting wires must not be twisted.

- Connect the pins and sockets and center the insulating tubes (1) on the connectors.



- Push the insulating tubes (1, 2) with connectors into the guides (arrows).



- Push connecting wire (1) to the handlebar between the rib and handle heating element (arrow) first, and then the connecting wire (2) to the generator.
- Reassemble all other parts in the reverse sequence.

14.6 Heating Element in Handlebar

The heating element in the handlebar (front handle) is not replaceable. A new handlebar must be fitted if the heating element is faulty.

Testing the heating element

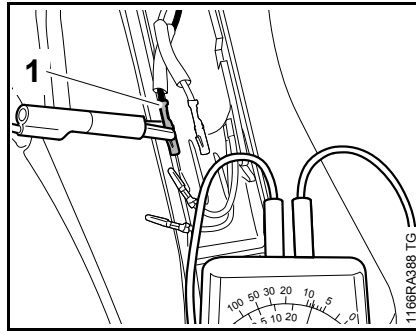
- Remove the handle molding, 11.2

Use the following test procedure to test the function of the handlebar heating element.

- Separate the connectors of the heating element on the rear handle.

Carry out measurement between the two connector pins and the heater switch contact sleeve.

- Set the heater switch to **I**.

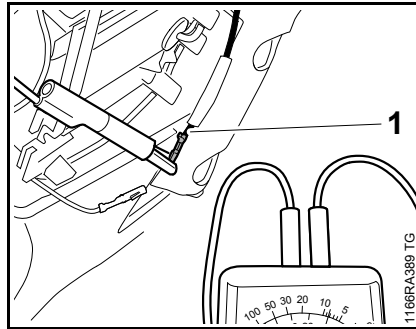


- Clip one test lead to the connector pin (1) and the second to the heater switch contact sleeve.

If the heating elements are in good condition the ohmmeter will indicate a value of about 6.4 Ω (measured value 6.0 – 8.0 Ω) in measuring range " Ω ".

If the reading is outside this range, test the handlebar (handlebar heating element) directly on the connecting wires.

- Separate pin and socket connector on handlebar, 10.5.1



- Clip one test lead to the connector pin of wire (1) and the other test lead to the heater switch contact sleeve.

If the heating elements are in good condition the ohmmeter will indicate a value of about 6.4 Ω (measured value 6.0 – 8.0 Ω) in measuring range " Ω ".

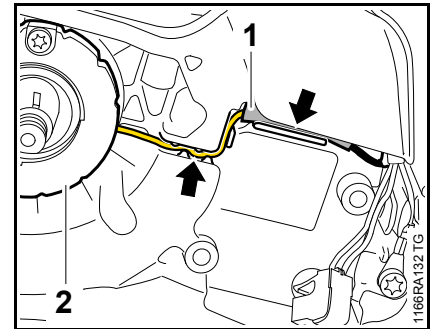
If the reading is outside this range, install a new handlebar with heating element, 10.5.1

Heating element does not operate even though resistance measurement is ok?

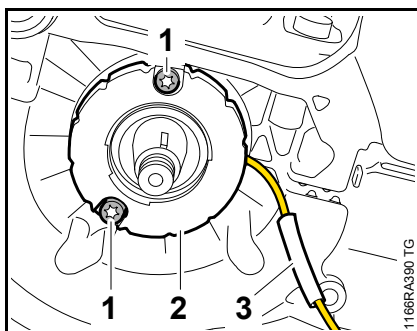
- Test connecting wire to rear handle heating element, replace if necessary, 14.8
- Test connecting wire to generator, replace if necessary, 14.3, 14.8
- Test the generator and heater switch, replace if necessary, 14.7, 14.4
- Reassemble in the reverse sequence.

14.7 Generator

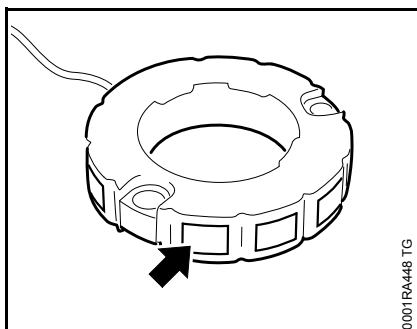
- Remove the control unit, 7.2
- Remove the flywheel, 7.7



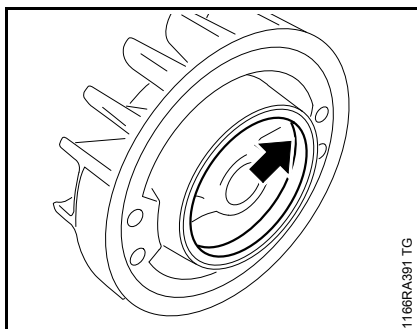
- Pull the insulating tube (1) with connector and generator wire out of the guides (arrows).
- Push back the insulating tube (1) in the direction of generator (2) and separate the pin and socket connector.



- Take out the screws (1) and remove the generator (2).
- Pull off the insulating tube (3).

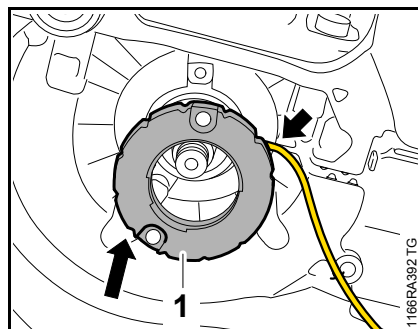


- Inspect the generator and poles (arrow) for cracks or other damage. If damage is found, replace the generator.

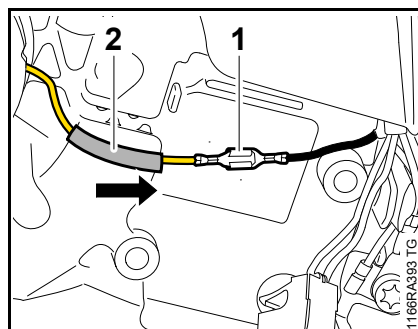


- Inspect the magnet ring (arrow) in the flywheel for cracks or other damage, replace if necessary.

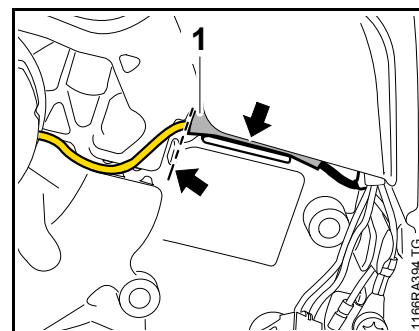
Installing



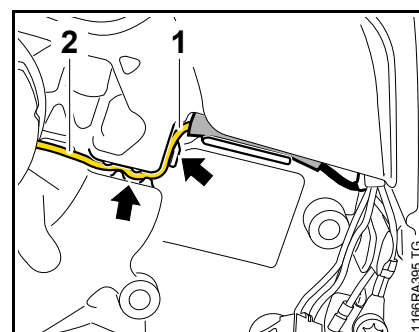
- Position the generator (1) with the wire (arrow) facing the crankcase.
- Check that the generator is properly seated.
- Fit the screws and tighten them down firmly.
- Push insulating tube onto generator wire.



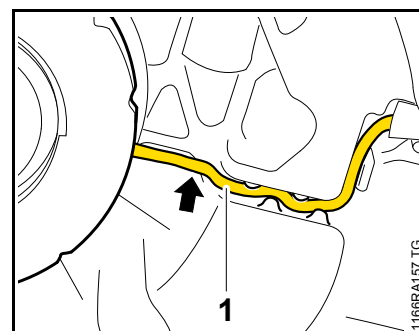
- Reconnect the pin and socket connector (1) and center the insulating tube (2) on the connector (1).



- Push the insulating tube (1) with pin and socket connector into the guide (arrow).



- Push the generator wire (1) into the guides (arrows)
 - loop (2) allows for movement.

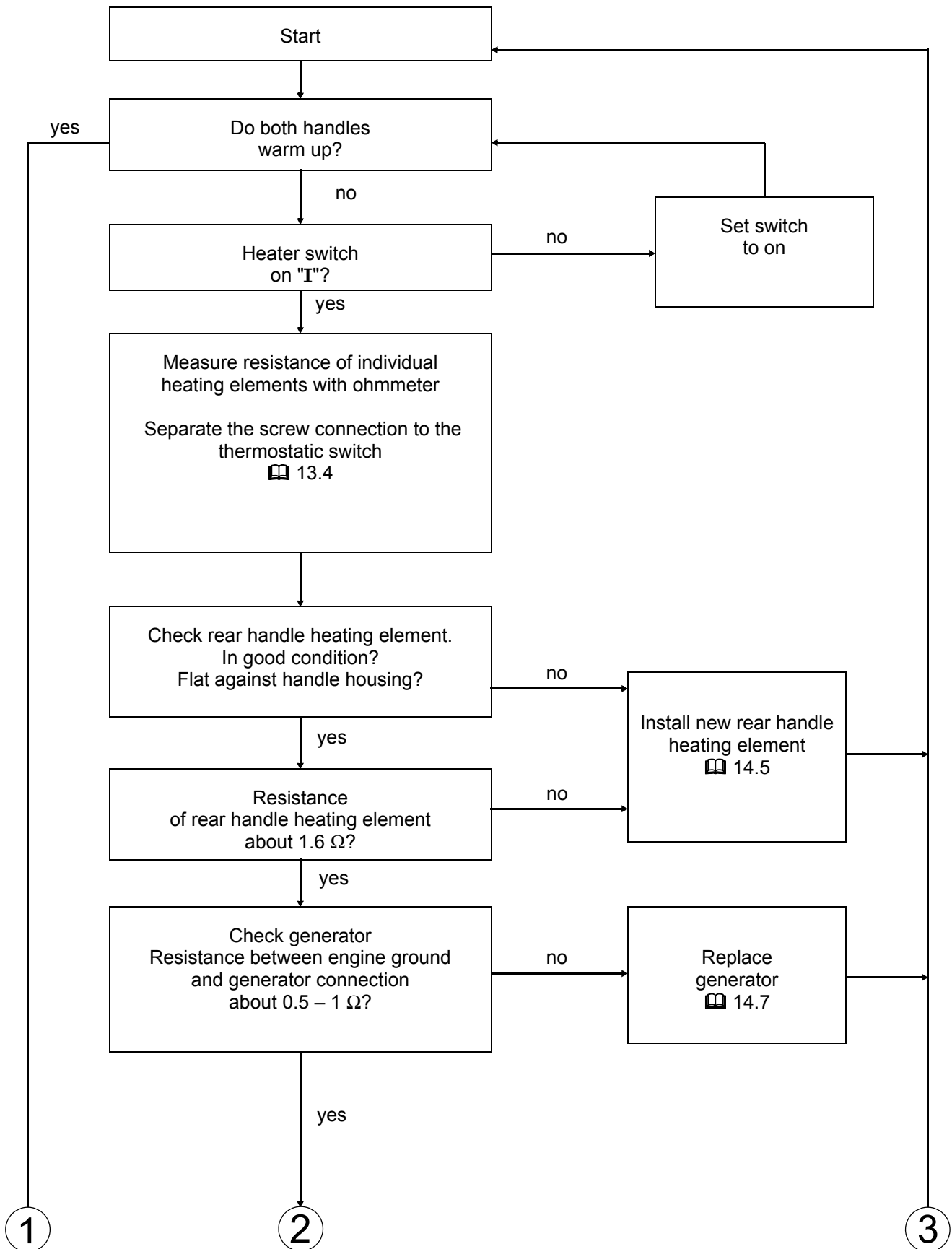


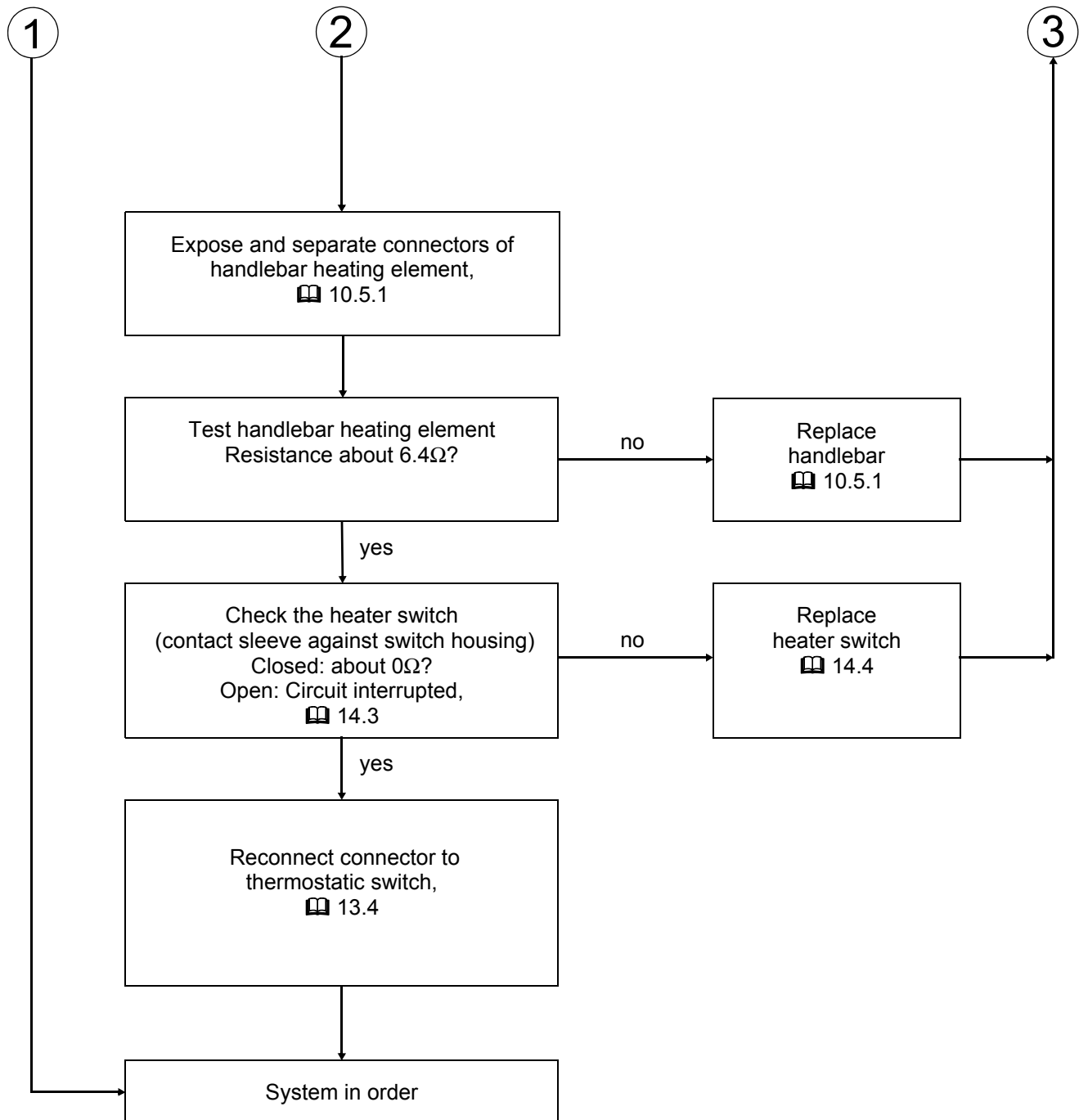
The compensating length of wire (1) must be properly seated in the recess (arrow).

The flywheel must not touch the generator wire
 – this could cause a break in power supply.

- Reassemble all other parts in the reverse sequence.

14.7.1 Handle Heating and Generator Troubleshooting Chart





14.7.2 Test Connections and Test Values

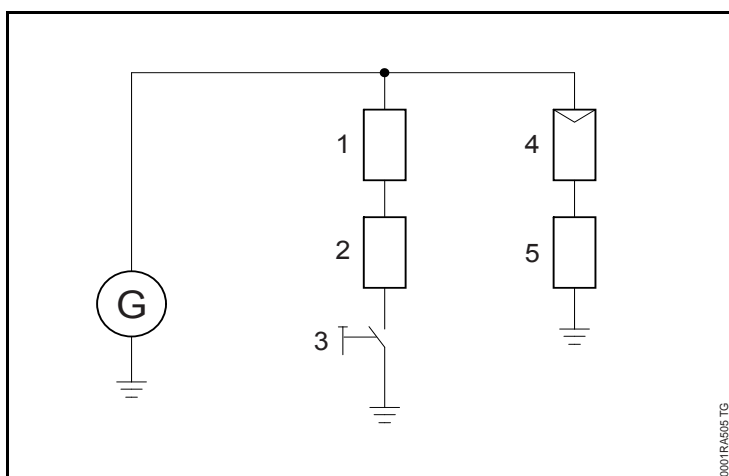
- The pin and socket connections of the wires in the rear handle must be disconnected to test the individual components.

Component	Ohmmeter connection (use either test lead)		Resistance Ω		If faulty	
	Lead 1	Lead 2	Spec.	Actual	Cause	Remedy
Switch	Switch terminal ¹⁾	Switch housing	< 0.5	-	Switch faulty	Replace switch
Heating element in rear handle	Connector on wire from heating element	Connector on wire from heating element	1.6	1.5 - 2.0	Heating element OK	Replace heating element or repair insulation
				-	Break in wire, heating element damaged	
				0	Short circuit – damaged insulation	
Heating element in handlebar	Connector on wire from handlebar heating element	Connector on wire from handlebar heating element	6.4	6.0...8.0	Heating element OK	Install new handlebar
				-	Break in wire, heating element damaged	
				0	Short circuit – damaged insulation	

¹⁾ Pull out wire for this purpose

Component	Ohmmeter connection (use either test lead)		Resistance Ω		If faulty	
	Lead 1	Lead 2	Spec.	Actual	Cause	Remedy
Generator	Connector on generator wire	Ground	0.6	0.5 - 1	Generator OK	
				-	Break in wire, generator damaged	Install new generator
				0	Short circuit – damaged insulation	repair insulation

Circuit Diagram




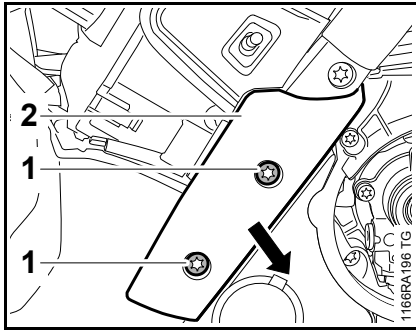
- G = Generator
- 1 = Rear handle
- 2 = Handlebar
- 3 = Heater switch
- 4 = Thermostatic switch
- 5 = Heating element (carburetor)

14.8 Heating Element Connecting Wires

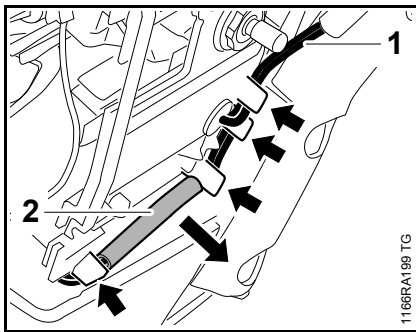
If there is no defect in the heating elements, generator or heater switch, the problem may be a damaged connecting wire between the rear handle and handlebar heating elements.

14.8.1 Connecting Wire between Rear Handle and Handlebar

- Remove the filter cover
- Remove the handle molding and lockout lever,  11.2

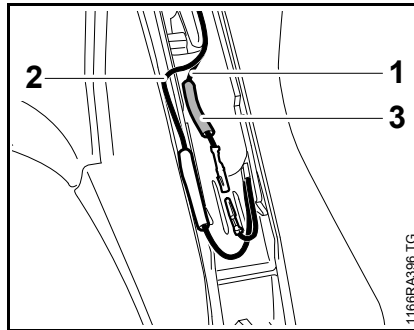


- Take out the screws (1) and remove the cover (2).



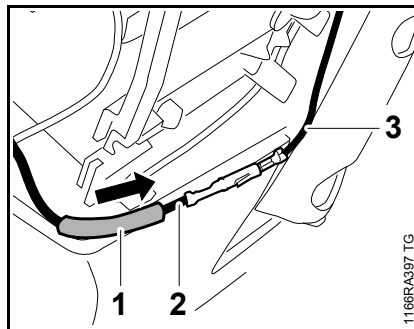
- Pull connecting wire (1) with pin and socket connector out of guides (arrows) and push insulating tube (2) in direction of throttle trigger.

- Separate the pin and socket connector.

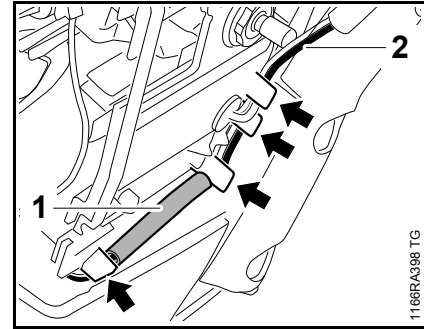


- Pull the connecting wires (1, 2) with pin and socket connectors out of the guides
 - connecting wire (1) goes to the handlebar and is underneath the connecting wire (2) on the rear handle.
- Push back the insulating tube (3) in the direction of connecting wire and separate the pin and socket connector.
- Remove and inspect the connecting wire, replace it if necessary.

Installing

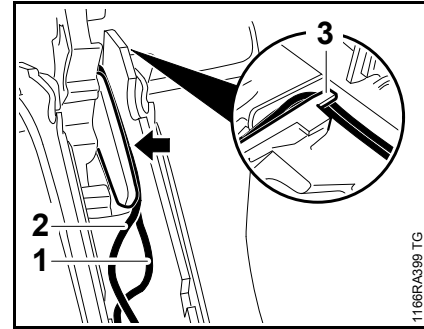


- Fit the insulating tube (1) on the connecting wire (2).
- Reconnect pin and socket of wire (3) and handlebar connecting wire (2) – push them firmly together.
- Push the insulating tube (1) over the pin and socket connector.

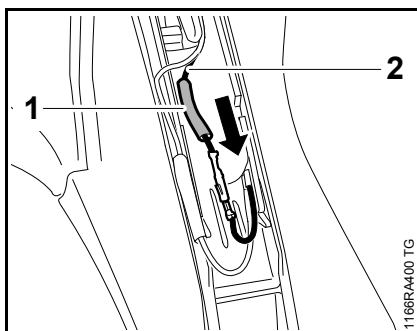


The wire to the generator must be seated in the guides.

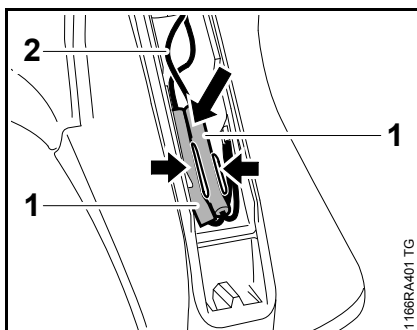
- Position insulating tube (1) with pin and socket connector on tank housing and push wire (2) into the guides (arrows).



- Hook handlebar connecting wire (1) to tab (3) first, then the generator connecting wire (2) and push them into the gap between the rib / handle heating (arrow).



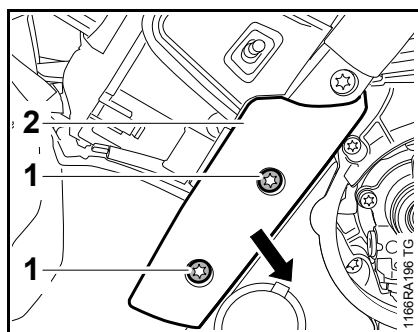
- Fit the insulating tube (1) on the generator connecting wire (2).
- Push the pin and socket together until they lock.
- Slide the insulating tube (1) over the pin and socket connector.
- Push the wires into the guide between the rib and handle heating so that the connecting wire to the handlebar is underneath the connecting wire to the generator.



- Push the insulating tubes (1) with connectors into the guides (arrows).
- Reassemble all other parts in the reverse sequence.

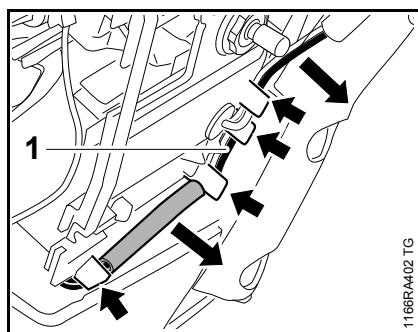
14.8.2 Connecting Wire between Rear Handle and Generator

- Remove the filter cover
- Remove the handle molding and lockout lever, 11.2
- Remove the carburetor, 13.4
- Pull the retainer with switch shaft out of the guide and put it to one side, 11.1.1



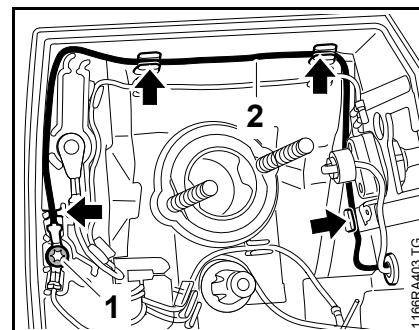
- Take out the screws (1) and remove the cover (2).

Connecting Wire between Rear Handle Heating Element and Handlebar

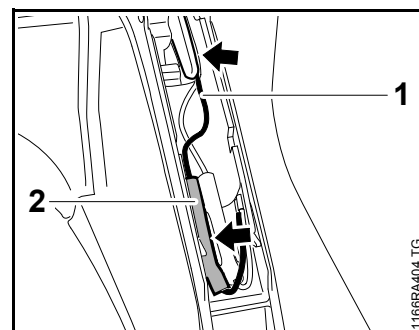


- Pull connecting wire (1) with pin and socket connector out of the guides (arrows) and put it to one side.

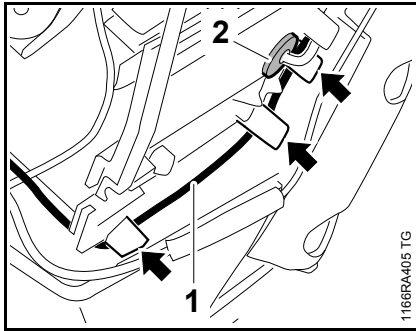
Connecting Wire between Rear Handle Heating Element and Generator



- Take out the screw (1), pull the connecting wire (2) out of the guides (arrows) – screw (1) has already been removed on machines with carburetor heating.

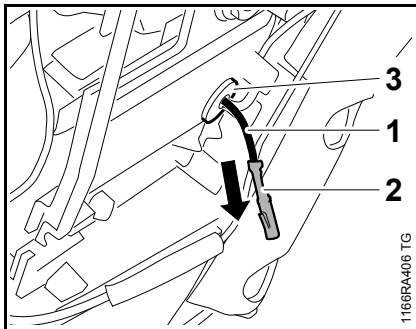


- Pull the connecting wire (1) and insulating tube (2) with pin and socket connector out of the guides (arrows).
- Push back the insulating tube (2) in the direction of connecting wire and separate the pin and socket connector.
- Pull the insulating tube off the connecting wire.

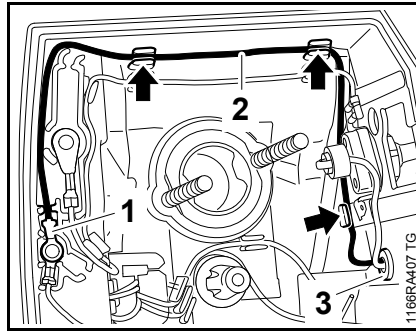


- Pull the connecting wire (1) out of the guides (arrows) and out of the grommet (2) in direction of manifold.
- Check the connecting wire and replace if necessary
- Inspect the grommet, if necessary pull out wire on heater switch and replace the grommet – remove the grommet outwards.

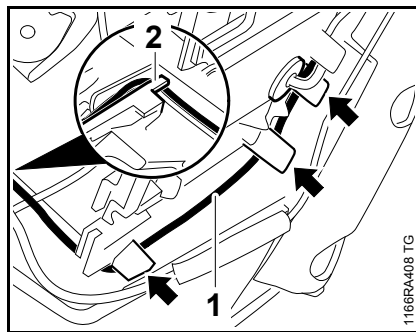
Installing



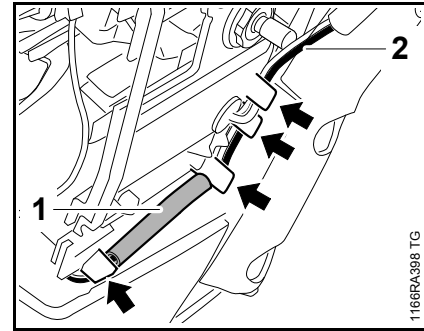
- Push the connecting wire (1), connector (2) first, through the grommet (3) from inside.



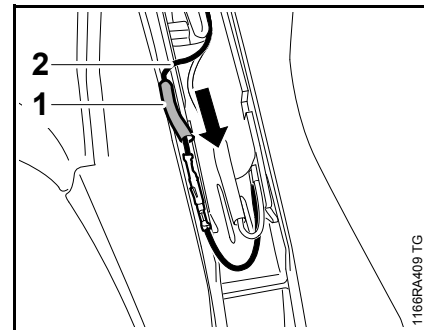
- Position cable lug (1) with its crimped side facing outwards and route the connecting wire (2) behind the heater switch, and push it into the guides (arrows).
- Pull the connecting wire (2) out through the grommet (3) in direction of handlebar until there are no more loops – the wire must not be under tension.



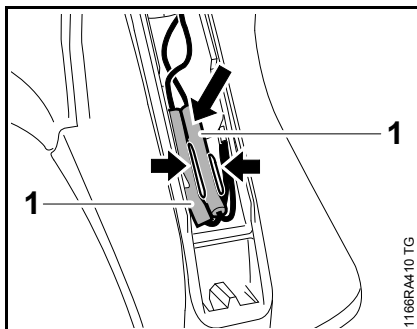
- Push the generator connecting wire (1) into the guides (arrows) and then hook it tightly around the lug (2) – connecting wire to handlebar and must be hooked in place and underneath the generator wire.



- Position insulating tube (1) with pin and socket connector on tank housing and push wire (2) into the guides (arrows).



- Fit the insulating tube (1) on the generator connecting wire (2).
- Push the pin and socket together until they lock.
- Slide the insulating tube (1) over the pin and socket connector.



- Push the insulating tubes (1) with connectors into the guides (arrows).
- Push the wires into the guide between the rib and handle heating so that the connecting wire to the handlebar is underneath the generator connecting wire.
- Reassemble all other parts in the reverse sequence.

15. Special Servicing Tools

New Special Tools

No.	Part Name	Part No.	Application
1	Screwdriver	5910 890 2313	Special screw on solenoid valve
2	Press sleeve	1144 893 2400	Installing oil seal (ignition side / clutch side)
3	Installing sleeve	1144 893 4600	Protecting the oil seal (ignition side)
4	Screw sleeve for service tool AS (set) 5910 007 2222	5910 893 2202	Pulling two halves of crankcase together
5	Thrust piece	5910 893 8700	Addition (third hole) for drilled plate 5910 893 2101

Existing Special Tools

No.	Part Name	Part No.	Application
1	Carburetor and engine tester	0000 850 1300	Testing engine and carburetor for leaks
	- Nipple	0000 855 9200	Testing carburetor for leaks
	- Hose for leakage test	1110 141 8600	Testing carburetor for leaks
	- Plug for leakage test	1122 025 2200	Leakage testing decompression valve
2	Sealing plate	0000 855 8106	Testing engine for leaks
3	Installing tool	0000 890 2201	Installing rope guide bushing
4	Clamping strap	0000 893 2600	Compressing the piston rings
5	Locking strip	0000 893 5903	Blocking the crankshaft
6	Screwdriver bit, T 27 x 125	0812 542 2104	Removing and installing spline socket screws with electric or pneumatic screwdrivers; tightening down screws with torque wrench
7	Puller	1106 890 4501	Removing flywheel
8	Assembly drift	1108 893 4700	Removing and installing piston pin
9	Setting gauge	1111 890 6400	Adjusting air gap between the control unit and flywheel
10	Installing tool	1116 893 4800	Installing rewind spring
11	Assembly tube	1117 890 0900	Attaching springs
12	Press arbor	1118 893 7200	Installing ball bearing (clutch side of crankcase)
13	Press arbor	1120 893 7200	Installing ball bearing (ignition side of crankcase)
14	Combination wrench	1129 890 3401	Spark plug

No.	Part Name	Part No.	Application
15	Service tool ZS (set)	5910 007 2201	Removing and installing crankshaft (ignition side)
	- Drilled plate	5910 893 2101	Removing and installing crankshaft (ignition side)
	- Screw sleeve	5910 893 2421	Installing crankshaft
16	Service tool AS (set)	5910 007 2222	Removing and installing crankshaft (clutch side)
17	Test cable	5910 840 0400	Diagnosing and testing M-Tronic
18	Bluetooth USB stick	5910 840 1500	Data transfer between MDG 1 and PC
19	Clamping strap for assembly stand	5910 850 1651	Clamping machine to assembly stand
20	Flange	5910 850 4200	Leakage Test
21	Ignition system tester, ZAT 4	5910 850 4503	Testing ignition system
22	Ignition system tester, ZAT 3	5910 850 4520	Testing ignition system
23	Torque wrench	5910 890 0302	0.5 to 18 Nm
24	Torque wrench	5910 890 0312	6 to 80 Nm
25	Installing tool 12	5910 890 2212	Installing hookless snap rings in piston
26	Screwdriver	5910 890 2304	Adjusting carburetor through limiter caps
27	Screwdriver bit, T 27 x 150	5910 890 2400	IS-P screws
28	Hook	5910 890 2800	Detaching springs on clutch shoes
29	Punch-down tool	5910 890 4000	Fitting electrical wires in guides
30	Assembly stand	5910 890 3101	Holding saw for repairs
31	Puller	5910 890 4400	Removing oil seals
	- Jaws (No. 3.1)	0000 893 3706	Removing oil seals
32	Puller	5910 890 4500	Pulling out limiter caps
33	Stud puller M8	5910 893 0501	Removing bar mounting stud
34	Stud puller M8	5910 890 3001	Installing and tightening bar mounting stud
35	Piston support	5910 893 5300	Supporting the piston
36	Hook	5910 893 8800	Removing pickup body
37	Installing tool	5910 893 9601	Removing and installing collar nut in sprocket cover

16. Servicing Aids

No.	Part Name	Part No.	Application
1	STIHL multipurpose grease	0781 120 1109	
2	Lubricating grease (225 g tube)	0781 120 1111	Oil seals, sliding and bearing points
3	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in fan housing
4	STIHL press fluid OH 723	0781 957 9000	Rubber components, AV buffers
5	Medium-strength threadlocking adhesive (Loctite 242)	0786 111 2101	
6	High-strength threadlocking adhesive (Loctite 270)	0786 111 2101	
7	High-strength threadlocking adhesive up to 250°C (Loctite 272)	0786 111 2101	
8	Standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons		Cleaning sealing faces and carburetor, crankshaft stubs and flywheel taper

