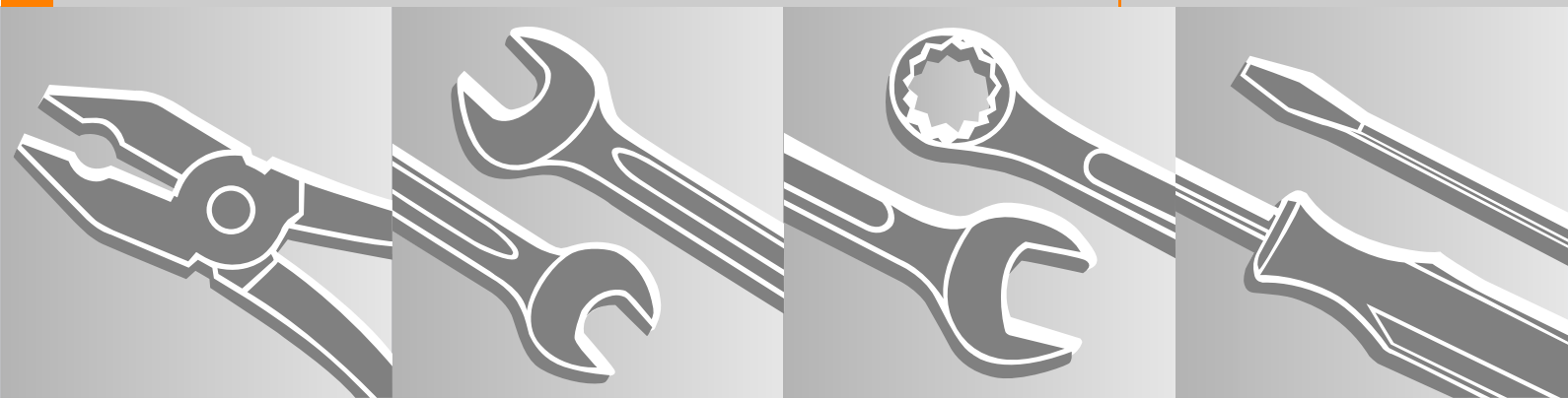


**STIHL FS 240, 260, 360, 410, 460**

2011-09



## Contents

<b>1.</b>	<b>Introduction and safety precautions</b>	<b>3</b>	<b>6.</b>	<b>Ignition system</b>	<b>39</b>	<b>7.</b>	<b>M-Tronic</b>	<b>58</b>
1.1	Introduction	3	6.1	Ignition timing	39	7.1	Calibrating the control unit	58
1.2	Safety precautions	4	6.2	Ignition module	39	7.2	Resetting the control unit to factory defaults	58
			6.2.1	Control unit (ignition module) M-Tronic	41	7.3	Testing	58
<b>2.</b>	<b>Specifications</b>	<b>5</b>	6.3	Testing the ignition module	42	7.3.1	Test preparations	58
2.1	Engine	5	6.4	Spark plug boot / ignition lead	43	7.3.2	Connect the test lead	58
2.2	Fuel system	5	6.5	Flywheel	45	7.3.3	Check screwed and plug connections as well as switch	59
2.3	Ignition system	5	6.6	Short circuit wire	45	7.3.4	Checking the solenoid valve	59
2.4	Gearbox	5	6.6.1	Testing	45	7.3.5	Checking the start detection function	60
2.5	Tightening torques	6	6.6.2	Short circuit wire on engine, removal and installation	46	7.3.6	Checking the wiring harness	60
<b>3.</b>	<b>Troubleshooting</b>	<b>8</b>	6.6.3	Short circuit wire with M-Tronic on engine, removal and installation	48	7.4	Removal and installation	62
3.1	Clutch	8	6.6.4	Short circuit wire on control handle for loop handle, removal and installation	51	7.5	Troubleshooting, M-Tronic	65
3.2	Gearbox	9	6.6.5	Short circuit wire on control handle for bike handle, removal and installation	52	7.5.1	Engine does not start	65
3.3	Drive tube assembly	10	6.6.6	Ground wire	54	7.5.2	Engine does not start in position ▲	66
3.4	Starter	11	6.6.7	Contact spring versions with control handle for bike handle	54	7.5.3	Engine speed drops under load – low power	67
3.5	Ignition system	13				7.5.4	Ignition – no ignition spark	68
3.6	Carburetor	14				7.5.5	Engine stops suddenly	69
3.7	Engine	18				7.5.6	Cut-off speed not reached	70
<b>4.</b>	<b>Clutch</b>	<b>19</b>	<b>6.7</b>	<b>Troubleshooting, Ignition System</b>	<b>55</b>	<b>8.</b>	<b>Rewind starter</b>	<b>71</b>
4.1	Clutch drum	19				8.1	General	71
4.1.1	Ball bearing	22				8.2	Starter	71
4.2	Clutch	23				8.3	Pawls	71
<b>5.</b>	<b>Engine</b>	<b>25</b>				8.4	ErgoStart/rope rotor	72
5.1	Muffler	25				8.5	Starter rope / starter grip	73
5.2	Leak testing	26				8.6	Tensioning the rewind spring	75
5.2.1	Preparations	26				8.7	Replacing the rewind spring	75
5.2.2	Vacuum test	27						
5.2.3	Pressure test	27						
5.3	Oil seals	28						
5.4	Shroud	29						
5.5	Cylinder	30						
5.6	Crankshaft	32						
5.6.1	Ball bearing / crankcase	35						
5.7	Piston	36						
5.8	Piston rings	38						

## Contents

<b>9. Antivibration elements</b>	<b>77</b>	<b>11. Fuel system</b>	<b>91</b>	<b>12. Drive tube assembly</b>	<b>112</b>
9.1 Rubber insert		11.1 Air filter	91	12.1 Drive tube assembly with loop handle	112
1-point antivibration system	77	11.2 Filter housing	91	12.2 Drive tube assembly with control handle for bike handle	113
9.2 Rubber buffers/springs 4-point antivibration system	78	11.3 Carburetor	93	12.2.1 Disassembling the drive tube assembly with a diameter of 25.4 mm	114
		11.3.1 Leakage test	95	12.2.2 Disassembling the drive tube assembly with a diameter of 28 mm	116
		11.4 Repairing the carburetor	96	12.2.3 Loop handle with barrier bar	117
		11.4.1 Metering diaphragm	96	12.3 Deflector	118
		11.4.2 Inlet needle	97	12.3.1 Deflector for gearbox with 25.4 mm drive tube assembly diameter	118
		11.4.3 Pump diaphragm	98	12.3.2 Deflector for gearbox with 28 mm drive tube assembly diameter	119
		11.4.4 Throttle shaft lever	99	12.3.3 One-piece carrying ring	120
		11.4.5 Choke lever/choke knob	100	12.3.4 Support	120
		11.4.6 Adjusting screws, carburetor without M-Tronic	102	12.4 Gearbox for drive tube assembly 25.4 mm with square profile	120
		11.5 Carburetor adjustment with M-Tronic	103	12.4.1 Removal and installation	120
		11.6 Carburetor adjustment without M-Tronic	103	12.4.2 Disassembly	121
		11.6.1 Basic setting	103	12.5 Gearbox for drive tube assembly 28 mm with serration	124
		11.6.2 User adjustment	104	12.5.1 Removal and installation	124
		11.7 Spacer flange	105	12.5.2 Disassembly	124
		11.8 Tank vent	107		
		11.8.1 Testing	107	<b>13. Special tools</b>	<b>129</b>
		11.8.2 Removal and installation	108		
		11.9 Fuel intake	108	<b>14. Service accessories</b>	<b>131</b>
		11.9.1 Pickup body	108		
		11.9.2 Fuel hose	109		
		11.9.3 Fuel tank	110		

# 1. Introduction and safety precautions

## 1.1 Introduction

This Service Manual contains detailed descriptions of all the typical repair and servicing procedures for this machine.

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

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

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

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

The special tools mentioned in the descriptions are listed in the chapter "Special Servicing Tools" of this manual. The tools can be identified according to part number in the "STIHL Special Tools" manual. The manual lists all tools supplied by STIHL.

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

In the text:

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

In the illustrations:

- ➔ Item pointer (short)
- ➔ Direction of movement (long arrow)
- 📖 4.2 Reference to another chapter, in this case to Chapter 4.2

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

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

### Storage or disposal of oil and fuel

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

## 1.2 Safety precautions

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

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

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

Test for leakage after all work on the fuel system and 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.

Suitable protective gloves must be worn without fail if parts are heated for assembly/disassembly purposes. Risk of burns from hot grease. Lubricants in the parts become hot due to heating.

Improper handling may result in burns and other serious injuries.

Always replace damaged parts. Check dismantled parts for wear and damage before installation, replace if necessary.

Only use the machine with the shroud mounted – otherwise the rotating fan wheel poses a risk of injury and there is a risk of engine damage due to overheating.


The chapter "Tightening Torques" lists all components of this machine that must be tightened with the specified tightening torques or coated with thread-locking adhesive. These specifications must be observed throughout the Service Manual when tightening screws and nuts as well as other fasteners.

### Fuel system – barbed connectors


Pull or push the fuel hoses, by hand whenever possible, in the direction of the connector in order to ensure leakproofness of the fuel system.

Avoid damaging the barbed connectors  
– sharp-edged pliers, screwdrivers, etc., may not be used.  
Also, do not cut open fuel hoses with a knife or similar aids.

Do not reuse fuel hoses after disassembly, but instead always replace them with new hoses  
– fuel hoses can be overstretched when being detached.

Mount new fuel hoses dry or using STIHL press fluid,  14.

Other press fluids are not permitted and may lead to fuel hose damage.

When using STIHL press fluid, apply press fluid to the ends of the hose and the connectors and press the new hoses onto the barbed connectors,  14.

## 2. Specifications

### 2.1 Engine

	FS 240 C, FS 360 C	FS 260 C, FS 410 C	FS 460 C
Displacement:	37.7 cm <sup>3</sup>	41.6 cm <sup>3</sup>	45.6 cm <sup>3</sup>
Bore:	40.0 mm	42.0 mm	44.0 mm
Stroke:	30.0 mm	30.0 mm	30.0 mm
Engine power to ISO 8893:	1.7 kW (2.3 HP) at 8500 rpm	2.0 kW (2.7 HP) at 9000 rpm	2.2 kW (3.0 HP) at 9500 rpm
Cut-off speed (Nominal value):	12500 rpm, FS 240 RC 10500 rpm	12500 rpm, FS 260 RC 10500 rpm	12300 rpm
Idling speed (Nominal value):	2800 rpm	2800 rpm	2700 rpm
Clutch:	Centrifugal clutch without linings	Centrifugal clutch without linings	Centrifugal clutch without linings
Clutch engages at:	3600 rpm	3600 rpm	3600 rpm
Crankcase leakage test at gauge pressure:	$p_{\bar{u}} = 0.5 \text{ bar}$	$p_{\bar{u}} = 0.5 \text{ bar}$	$p_{\bar{u}} = 0.5 \text{ bar}$
under vacuum:	$p_{\underline{u}} = 0.5 \text{ bar}$	$p_{\underline{u}} = 0.5 \text{ bar}$	$p_{\underline{u}} = 0.5 \text{ bar}$

---

### 2.2 Fuel system

Carburetor leakage test at gauge pressure:	$p_{\bar{u}} = 0.8 \text{ bar}$	$p_{\bar{u}} = 0.8 \text{ bar}$	$p_{\bar{u}} = 0.8 \text{ bar}$
Operation of tank vent at gauge pressure:	$p_{\bar{u}} = 0.5 \text{ bar}$	$p_{\bar{u}} = 0.5 \text{ bar}$	$p_{\bar{u}} = 0.5 \text{ bar}$
Fuel:	as specified in instruction manual	as specified in instruction manual	as specified in instruction manual

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### 2.3 Ignition system

Air gap between ignition module and fanwheel:	0.30 (+ 0.15/- 0.20) mm	0.30 (+ 0.15/- 0.20) mm	0.30 (+ 0.05/- 0.10) mm
Spark plug (suppressed):	NGK CMR 6 H	NGK CMR 6 H	NGK CMR 6 H
Electrode gap:	0.5 mm	0.5 mm	0.5 mm

---

### 2.4 Gearbox

Quantity of gear  
lubricant:

Drive tube assembly  
diameter  
25.4 mm/28.0 mm

9.5 g,  
STIHL gear lubricant for  
brushcutters

## 2.5 Tightening torques

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

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

Fastener	Thread size	For component	Tightening torque Nm	Comment
Screw	M 5x17	Cover/ shroud	6.0	
Screw	D 5x24	Cover/ clutch housing	6.0	1), 5)
Screw	P 4x14	Cover/ starter cover	2.0	
Screw	P 6x14	Line limiting blade/ deflector	2.5	
Screw	D 5x24	Starter	6.0	1)
Screw	P 5x32	Plugs for antivibration springs/ antivibration housing	3.0	6)
Screw	M 5x48x22	Control handle/ handlebar/ locknut	2.5	
Screw	P 4x16	Control handle moldings outside/ inside	1.3	
Screw	M 5x12	Control handle clamp/ drive tube assembly	5.0	
Screw	P 4x10	Diagnostic jack/ bushing	1.5	7)
Screw	M 5x21	Filter cover	6.0	
Collar nut	M 5	Filter housing	3.5	
Screw	M 6x35	Gearbox/ drive tube assembly	10.0	1)
Screw	D 5x24	Gear housing/ drive tube assembly (1st stage)	4.0	1)
Screw	D 5x24	Gear housing/ drive tube assembly (2nd stage)	9.0	1)
Screw	M 5x10	Gear housing/ guard ring	8.0	2)
Screw	M 5x48x22	Left handle/ handlebar/ locknut	2.5	
Screw	D 5x24	Shroud	6.0	1)
Screw	P 4x14	Shroud/ slide	2.0	
Screw	P 4x10	Cable holder/ short circuit wire/ ignition module	1.5	
Screw	M 6x30	Clamp/ drive tube assembly/ supports	8.0	1)
Screw	M 5x16	Clamps handlebars	2.0	1)
Screw	D 6x35	Clamping device clutch housing	8.0	1), 6)
Screw	D 5x24	Fuel tank/ crankcase	6.0	1)
Screw	M 6x25	Clutch/ flywheel	10.0	
Screw	D 5x24	Clutch housing/ crankcase	8.0	1)
Screw	M 5x16	Crankcase fan side/ insert	6.0	2)
Screw	D 5x24	Crankcase fan side/ starter side	8.0	1)
Screw	P 3x6	Return spring/ fan housing	0.6	
Screw	M 5x16	Muffler / crankcase	9.0	2)
Screw	M 5x16	Muffler/ cylinder/ first screw (1st stage)	2.0	2)
Screw	M 5x16	Muffler/ cylinder/ second screw (2nd stage)	10.0	2)
Screw	M 5x16	Muffler/ cylinder/ first screw (3rd stage)	10.0	2)
Screw	P 4x10	Switchgear/ bushing	1.5	7)

Fastener	Thread size	For component	Tightening torque Nm	Comment
Screw	M 5x20	Clamp/ control handle for loop handle/ nut	4.5	1)
Screw	M 5x20	Cutting attachment deflector/ gear housing	4.3	1)
Screw	M 5x23	Cutting attachment deflector/ gear housing	10.0	
Screw	IS 5x14	Deflector/ antivibration housing	4.0	6)
Screw	D 5x32	Protective hip plate/ crankcase	8.0	1)
Nut	M 8x1	Flywheel/ crankshaft	28.0	
Screw	M 6x14	Clamp/ drive tube assembly harness anchor	4.5	1)
Screw	D 6x32	Clamp/ drive tube assembly with washer	12.0	1)
Screw	M 5x18	Clamp/ supports/ drive tube assembly	4.0	1), 6)
Nut	M 8x1	Starter cup / crankshaft	17.0	
Screw	P 6x19	Supports/ plugs antivibration springs	6.0	6)
Screw	M 14x1.25x7	Supports/ muffler with spark arresting screen	8.0	
Screw	P 4x14	Bushing choke/ filter housing	2.0	
Screw	P 4x10	Shim/ deflector	1.0	
Screw	M 11x10	Screw plug/ gearbox	9.5	
	M 10x1	Spark plug/ cylinder	12.0	
Screw	D 4x18	Ignition module/ cylinder	4.0	1)
Screw	M 5x20	Spacer flange/ cylinder	8.0	2)
Screw	D 5x32	Cylinder / crankcase	9.0	1)

Remarks:

- 1) Easy-slide coating with locking serration
- 2) Microencapsulated with locking serration
- 3) Microencapsulated with washer
- 4) Connection between crankshaft and flywheel must be degreased and oil-free
- 5) 1-point antivibration system
- 6) 4-point antivibration system
- 7) M-Tronic

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

Insert the DG or P screw in the hole and turn counterclockwise until it gently drops into the hole in axial direction. Tighten the screw clockwise to the specified torque.

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

As a rule, microencapsulated screws must be replaced after removal.

Screwdriver speed when used in plastic material: max. 500 rpm for DG and P-type screws. Do not use an impact wrench to release or tighten screw connections.

Screws with and without locking serration must not be confused.



### 3. Troubleshooting

#### 3.1 Clutch

Problem	Cause	Remedy
Cutting attachment stops under load at full throttle	Clutch shoes badly worn	Install new clutch
	Clutch drum badly worn	Install new clutch drum
Cutting attachment rotates at idle speed	Idle speed too high	<b>Versions without M-Tronic:</b> Readjust idle speed screw <b>LA</b> <b>Versions with M-Tronic:</b> Carry out diagnosis
	Tension springs of the clutch shoes are stretched	Replace tension springs, replace clutch if necessary
	Tension springs of the clutch shoes are broken	Replace tension springs
Loud noises	Tension springs stretched	Replace all tension springs
	Ball bearing of the clutch drum is damaged	Replace ball bearing
	Screws of the clutch are loose	Tighten screws, replace clutch if necessary and check threaded holes on the flywheel, replace flywheel if necessary
	Clutch shoes worn	Install new clutch

### 3.2 Gearbox

Problem	Cause	Remedy
Loud noises	Ball bearings damaged or worn	Replace ball bearings on the drive side and non-drive side
	Pinion damaged or worn	Replace set of pinions on the drive side and non-drive side
	Too little or no gear lubricant in gearbox	<b>Gearbox drive tube assembly 25.4 mm:</b> Add gear lubricant <b>Gearbox drive tube assembly 28 mm:</b> Remove drive pinion and add gear lubricant
Gearbox becomes too hot	Excessive friction due to damaged or worn ball bearings	Replace ball bearings on the drive side and non-drive side
	Too little or no gear lubricant in gearbox	<b>Gearbox drive tube assembly 25.4 mm:</b> Add gear lubricant <b>Gearbox drive tube assembly 28 mm:</b> Remove drive pinion and add gear lubricant
Gearbox runs rough and stops running under load	Drive shaft does not fully engage drive pinion	Push gearbox onto drive tube assembly until the drive shaft fully engages the drive pinion
	Square profile or serration in the drive train is damaged or worn	Check drive pinion, drive shaft and clutch drum, replace if necessary
	Clutch worn	Check clutch and clutch drum, replace if necessary
Gearbox frozen	Locking pin for changing tools not removed	Remove locking pin
	Damaged or worn ball bearings jammed	Replace ball bearings on the drive and non-drive sides, also check bearing seats in the gear housing, replace gear housing if necessary
	Serration damaged or broken – fragments jammed	Replace set of pinions on the drive side and non-drive side

### 3.3 Drive tube assembly

Problem	Cause	Remedy
Drive tube assembly vibrates	Flexible liner is worn – Drive shaft is insufficiently supported and can vibrate	Replace flexible liner
	Cutting attachment out of true	Resharpener cutting attachment evenly, replace if necessary
Drive tube assembly becomes very warm	Drive shaft not sufficiently lubricated	Lubricate drive shaft along its entire length – the entire length of the flexible liner must be lubricated
Bike handle does not clamp	Clamps are greasy or oily	Clean clamps and bike handle
Bike handle can no longer be adjusted	Clamps are dirty	Clean clamps and bike handle

### 3.4 Starter

Problem	Cause	Remedy
Starter rope broken	Rope pulled out too vigorously as far as stop or over edge, i.e. not vertically	Replace starter rope
	Normal wear	Replace starter rope
Starter rope does not rewind	Heavy fouling or rust on rewind spring	Clean or replace rewind spring
	Spring insufficiently tensioned	Check rewind spring and increase tension
	Rewind spring broken	Replace rewind spring
Starter rope cannot be pulled out far enough	Rewind spring overtensioned	Check rewind spring and reduce tension
Starter rope can be pulled out almost without resistance (crankshaft does not turn)	Guide peg on pawls or pawls themselves are worn	Replace pawls
	Spring clip fatigued	Replace spring clip
	Spring clip improperly installed	Install spring clip properly
	Lugs on starter cup worn	Replace starter cup, check pawls, replace if necessary
	Anchor loop in ErgoStart spring housing not hooked onto carrier	Hook ErgoStart anchor loop to carrier

Problem	Cause	Remedy
Starter rope is difficult to pull or rewinds very slowly	Starter mechanism is very dirty	Thoroughly clean complete starter mechanism
	Spring in ErgoStart spring housing is fatigued	Replace ErgoStart
	At very low outside temperatures: Lubricant oil on the rewind spring becomes viscous (spring winding stick together) or moisture has penetrated the rewind spring (spring windings are frozen)	Coat rewind spring with a little standard solvent-based degreasant (containing no chlorinated or halogenated hydrocarbons), then pull rope carefully several times until normal action is restored

### 3.5 Ignition system

Problem	Cause	Remedy
Engine runs roughly, misfires, temporary loss of power	Spark plug boot is loose	Press boot firmly onto spark plug and fit new spring if necessary
	Spark plug sooted, smeared with oil	Clean the spark plug or replace if necessary In the event of repeated sooting, check air filter
	Fuel/oil mixture – contains too much oil	Use a fuel mixture with the correct mixing ratio
	Incorrect air gap between ignition module/control unit and flywheel	Set the correct air gap
	Flywheel cracked or has other damage or pole shoes have turned blue	Install new flywheel
	Incorrect ignition timing, flywheel out of adjustment – Key in flywheel has sheared off	Install new flywheel
	Weak magnetization in flywheel	Install new flywheel
	Irregular spark	Check proper functioning of lever for stop function/contact spring or slide control/microswitch and ignition module. Damaged insulation or interruption in ignition lead or short circuit wire. Check ignition lead/ignition module, replace ignition module if necessary. Check operation of spark plug, clean spark plug and replace if necessary. Versions with M-Tronic, carry out diagnosis

### 3.6 Carburetor

Problem	Cause	Remedy
Carburetor floods; engine stalls	Inlet needle not sealing – Foreign matter in valve seat or cone	Remove and clean inlet needle or clean carburetor
	Inlet needle worn	Replace inlet needle
	Inlet control lever sticking on spindle	Examine control lever, replace if necessary
	Helical spring not located on nipple of inlet control lever	Remove the inlet control lever and refit it correctly
	Perforated disc on diaphragm is deformed and presses constantly against the inlet control lever	Replace metering diaphragm
	Metering diaphragm is deformed	Replace metering diaphragm
Poor acceleration, version without M-Tronic	Low speed screw "too lean"	Check basic carburetor setting, correct if necessary
	High speed screw "too lean"	Check basic carburetor setting, correct if necessary
... All versions	Inlet needle sticking to valve seat	Remove inlet needle, clean and refit
	Diaphragm gasket leaking	Replace diaphragm gasket
	Metering diaphragm damaged or shrunk	Replace metering diaphragm
	Tank vent faulty	Replace tank vent
	Leak in fuel line between tank and carburetor	Seal connections or replace line
... Versions with M-Tronic	Parts in carburetor or M-Tronic wiring harness defective	Carry out M-Tronic diagnosis, if necessary, replace carburetor or M-Tronic wiring harness

Problem	Cause	Remedy
Power loss during acceleration, all versions	Seal or spring of accelerator pump worn or damaged	Replace carburetor
... Versions with M-Tronic	Parts in carburetor or M-Tronic wiring harness defective	Carry out M-Tronic diagnosis, if necessary, replace carburetor or M-Tronic wiring harness
Engine will not idle, idle speed too high, versions without M-Tronic	Throttle shutter opened too wide by idle speed screw <b>LA</b>	Set idle speed screw <b>LA</b> correctly
... All versions	Oil seals / crankcase leaking	Seal oil seals / crankcase, replace if necessary
	Throttle shutter does not close	Replace carburetor
... Versions with M-Tronic	Parts in carburetor or M-Tronic wiring harness defective	Carry out M-Tronic diagnosis, if necessary, replace carburetor or M-Tronic wiring harness
Engine stops when idling, versions without M-Tronic	Idle speed screw "too rich" or "too lean"	Correct setting of low speed screw <b>L</b>
	Idle speed screw <b>LA</b> setting incorrect – throttle shutter completely closed	Set idle speed screw <b>LA</b> correctly
... All versions	Idle jet bores or ports blocked	Clean the carburetor
	Tank vent faulty	Replace tank vent
	Leak in fuel line between tank and carburetor	Seal connections or replace line
... Versions with M-Tronic	Parts in carburetor or M-Tronic wiring harness defective	Carry out M-Tronic diagnosis, if necessary, replace carburetor or M-Tronic wiring harness



Problem	Cause	Remedy
Cutting attachment stops when idling, versions without M-Tronic	Idle speed too high	Readjust with idle speed screw <b>LA</b> (counterclockwise)
... All versions	Clutch springs stretched or fatigued	Replace tension springs, replace clutch if necessary
	Clutch spring hooks broken	Replace tension springs
... Versions with M-Tronic	Parts in carburetor or M-Tronic wiring harness defective	Carry out M-Tronic diagnosis, if necessary, replace carburetor or M-Tronic wiring harness
Engine speed drops quickly under load – low power, all versions	Air filter dirty	Clean air filter, replace if necessary
	Throttle shutter not opened fully	Check throttle cable and rod
	Tank vent faulty	Replace tank vent
	Fuel pick-up body dirty	Replace pickup body
	Fuel strainer dirty	Clean fuel strainer in carburetor, replace if necessary
	Leak in fuel line between tank and carburetor	Seal connections or replace line
	Main jet bores or ports blocked	Clean the carburetor
	Pump diaphragm damaged or fatigued	Replace pump diaphragm
	Incorrect ignition timing, flywheel out of adjustment – Key in flywheel has sheared off	Install new flywheel
... Versions without M-Tronic	High speed screw <b>H</b> "too rich"	Check basic carburetor setting, correct if necessary

Problem	Cause	Remedy
Engine speed drops quickly under load – low power, versions with M-Tronic	Parts in carburetor or M-Tronic wiring harness defective	Carry out M-Tronic diagnosis, if necessary, replace carburetor or M-Tronic wiring harness
Engine runs extremely richly, lacks power and has very low final speed	Choke shutter does not open	Check carburetor and choke shaft, if necessary, repair lever at the choke shaft (choke lever) or replace carburetor
Engine does not start	No spark	Replace spark plug, check ignition module/control unit, replace if necessary
	Starter grip not pulled forcefully enough – Fuel/air mixture too rich (flooded)	Remove and dry the spark plug, crank the engine several times with the starter to clear the combustion chamber, reinsert and tighten spark plug, repeat starting procedure

### 3.7 Engine




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

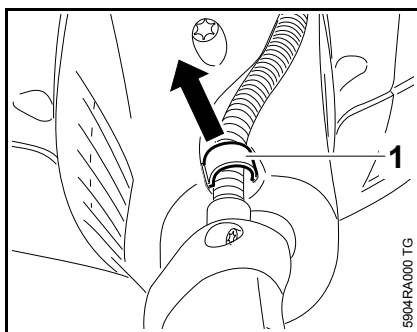
- Air filter
- Fuel supply
- Carburetor
- Ignition system/ M-Tronic

Problem	Cause	Remedy
Engine does not start easily, stalls at idle speed but operates normally at full throttle	Oil seals in engine defective	Replace oil seals
	Crankcase leaking or damaged (cracks)	Reseal crankcase, replace if necessary
Engine does not deliver full power or runs erratically	Piston rings worn or broken	Replace piston rings
	Muffler / spark arresting screen carbonized	Clean muffler (inlet and outlet openings), replace spark arresting screen, replace muffler if necessary
	Air filter dirty	Clean or replace air filter
	Fuel line kinked or cracked	Fit new lines and ensure they are installed without kinking
Engine is overheated	Insufficient cylinder cooling. Air inlet openings in clutch housing or air slits in shroud, cover or antivibration housing are clogged. Cooling fins on cylinder are severely fouled.	Thoroughly clean all cooling air openings and the cylinder fins
	Starter air intake fouled	Clean starter air intake

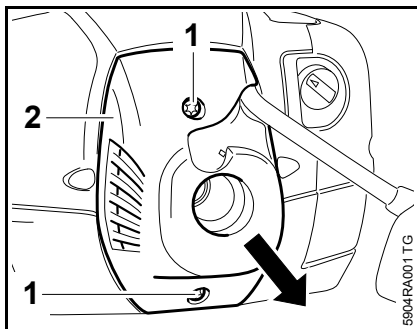
## 4. Clutch




### 4.1 Clutch drum

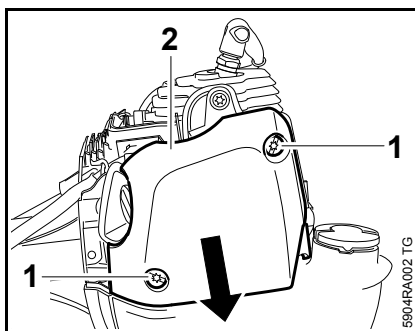
- Troubleshooting,  3.1
- Remove drive tube assembly, 1-point antivibration system,  12.1, 4-point antivibration system,  12.2



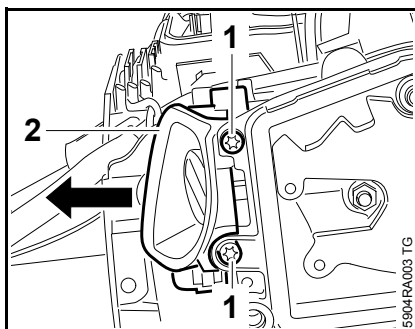
- Pry out cable holder (1) on one side
- Remove cable holder (1)
- Lay aside protective tube with control handle
  - Do not kink protective tube




- Remove screws (1)
- Remove cover (2)
- Remove starter,  8.2
- Remove shroud,  5.4
- Remove protective hip plate,  11.9.3

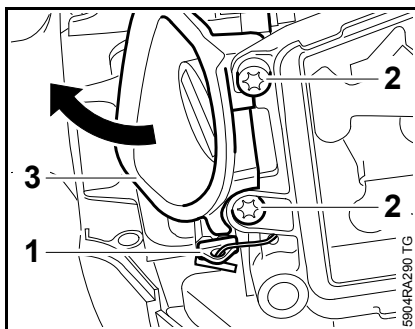


- Remove screws (1)
- Remove filter cover (2) with screws




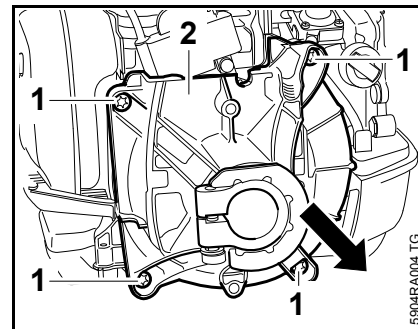
- Remove screws (1)
- Remove bushing (2)
- Detach short circuit wire and cable holder from engine,  6.6.2

#### Versions with M-Tronic



- Remove the plug (1)


- Remove screws (2) and tilt bushing (3) to the side
- Detach short circuit wire and cable holder from engine,  6.6.3



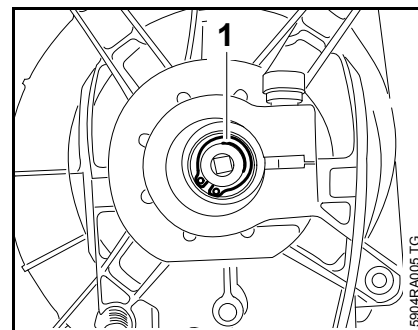
- Remove screws (1)
- Remove clutch housing (2)

#### Versions with 4-point antivibration system

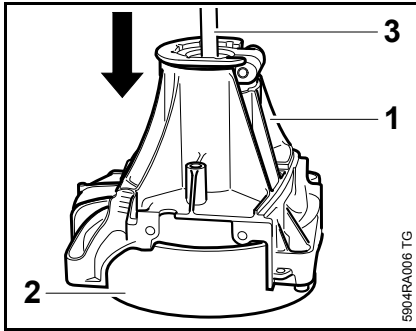
Removal and installation of the clutch housing are the same as for 1-point antivibration systems.

- Examine the rubber buffers, replace if necessary,  9.2

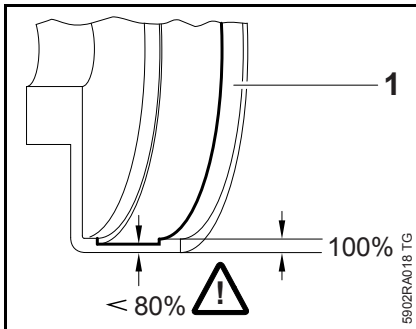
#### All versions



- Remove the circlip (1)



- To protect the guide sleeves, set clutch housing (1) on ring (2) 5910 893 7005
- Orient ring (2) so that the clutch housing rests evenly on it
- Press out clutch drum using a suitable punch (3)

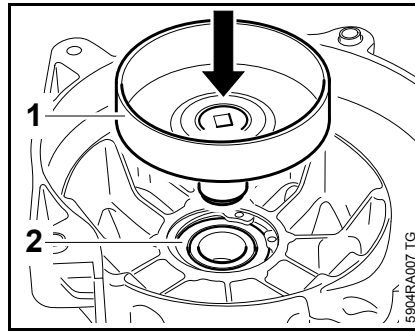


- Examine the clutch drum (1) for signs of wear

The remaining thickness must be measured if there are distinct signs of wear on the inside diameter of the clutch drum (1). The clutch drum must be replaced if the remaining thickness is less than approx. 80 % of the original thickness.

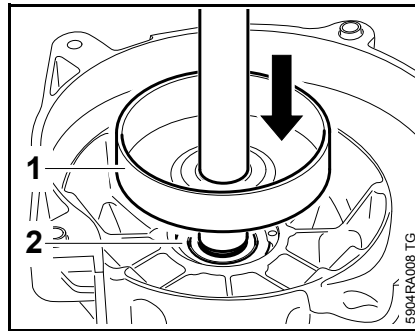
If the square socket is worn or the pin is damaged, the clutch drum must be replaced.

## Installation



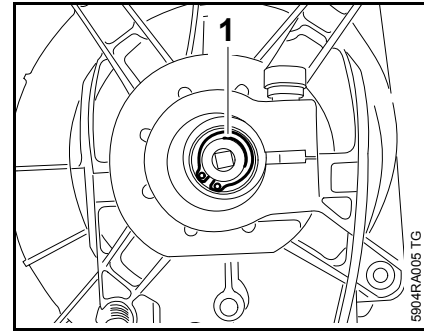
- Heat the inner race of the ball bearing to approx. 120 °C (250 °F)
- Position clutch drum (1) on ball bearing (2) and push it on as far as it will go

This must be done quickly, as the clutch drum absorbs heat and begins to expand.

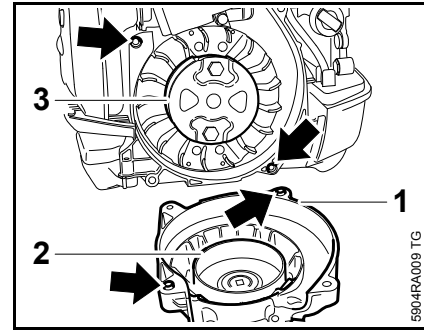


If it is impossible to heat the inner race, the clutch drum must be pressed on cold.

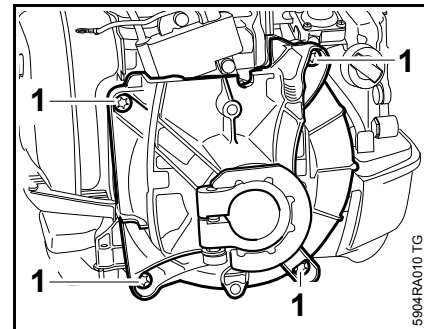
- Support the clutch housing on the opposite side with a suitable pipe on the inner race of the ball bearing
- Position clutch drum (1) on ball bearing (2) and press it on as far as it will go



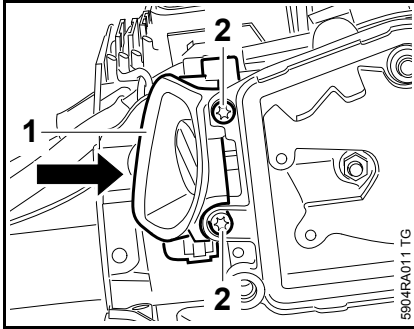
- Install circlip (1) on the opposite side



- Guide clutch housing (1) with the clutch drum (2) over the clutch (3) and fasten with the sleeves in the holes (arrows) of the clutch housing



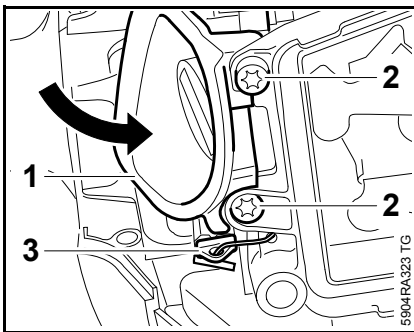
- Insert and tighten down the screws (1)
- Attach cable holder and short circuit wire to engine, 6.6.2



- Position bushing (1)
- Insert and tighten down the screws (2)

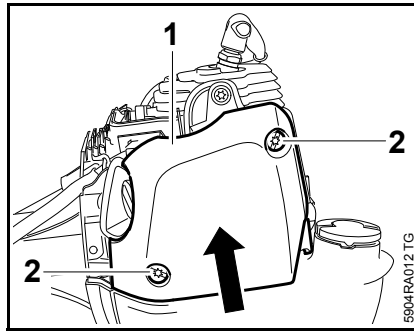
#### Versions with M-Tronic

- Attach cable holder and short circuit wire to engine, [6.6.3](#)



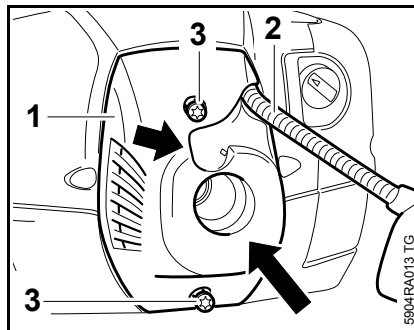
- Position bushing (1)
- Insert and tighten down the screws (2)
- Insert plug (3)

#### All versions

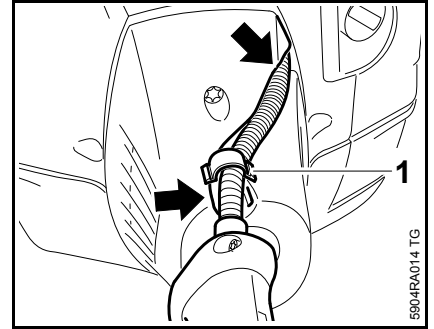


- Position filter cover (1) with screws
- Insert and tighten down the screws (2)
- Attach protective hip plate, [11.9.3](#)
- Refit the shroud, [5.4](#)
- Install starter, [8.2](#)

#### Versions with 1-point antivibration system



- Orient cover (1) so that the guide groove (arrow) faces the protective tube (2)
- Position cover (1)
- Insert and tighten down the screws (3)



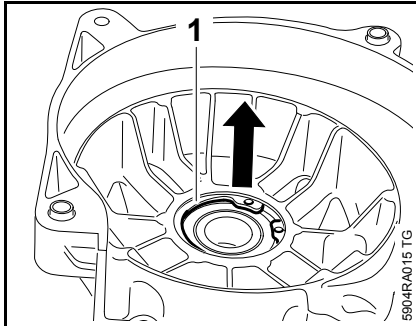
- Insert protective tube with control handle in the guide groove (arrows)
- Position cable holder (1) and slide it into the slits on the side
- Install drive tube assembly, 1-point antivibration system, [12.1](#)


#### Versions with 4-point antivibration system

- Press on rubber buffers, [9.2](#)
- Install drive tube assembly, 4-point antivibration system, [12.2](#)

### 4.1.1 Ball bearing

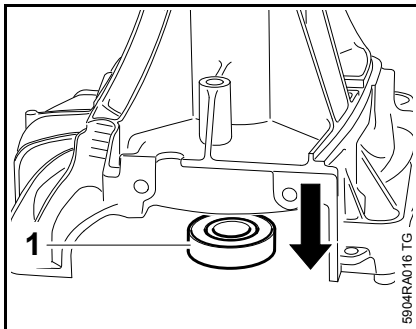
- Remove the clutch drum,  4.1



- Remove the circlip (1)
- Remove rubber insert,  9.1

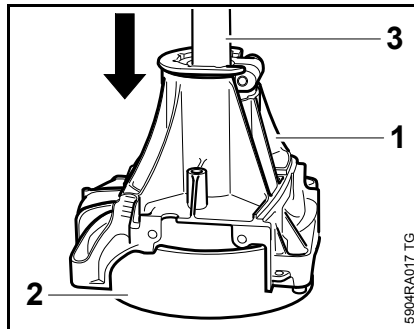
#### 4 -point antivibration system


- Remove both rubber buffers





- Heat the area around the bearing seat to approx. 120 °C (250 °F)
- The bearing (1) drops out on its own when this temperature is reached

If it is impossible to heat the clutch housing, the ball bearing must be pressed out cold.



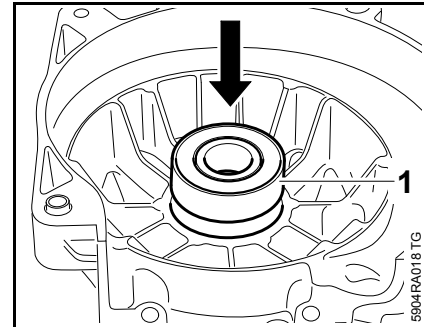
- To protect the guide sleeves, set clutch housing (1) on ring (2) 5910 893 7005
- Orient ring (2) so that the clutch housing rests evenly on it
- Press out ball bearing using a suitable pipe (3)
  - Replace ball bearing
- Examine clutch housing, replace if necessary
- Examine rubber insert and clamp, install in new clutch housing if necessary,  9.1

#### 4 -point antivibration system

- Examine both rubber buffers, push onto new clutch housing, if necessary,  9.2
- Examine clutch, replace if necessary,  4.2

### Installation

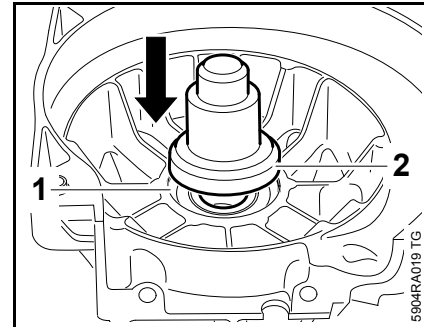
Rubber insert or rubber buffers must be removed.



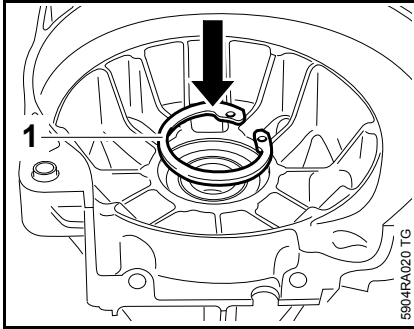
- Heat the area around the bearing seat to approx. 120 °C (250 °F)
- Press the ball bearing (1) home as far as possible

The ball bearing must be fitted rapidly, as it absorbs heat and expands.

If it is impossible to heat the clutch housing, the ball bearing must be pressed in cold.



- Press the new ball bearing (1) fully home with press arbor (2) 1118 893 7200

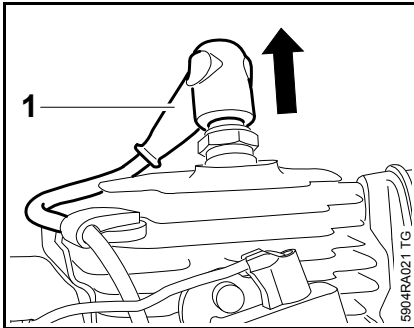


- Install circlip (1) so that it is seated completely in the groove

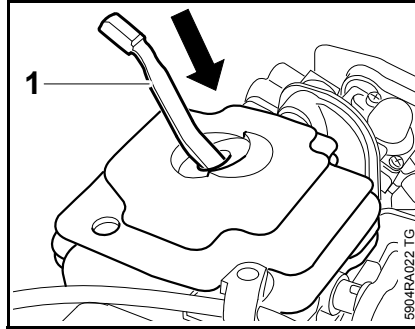
- Install the clutch drum, 4.1
- Reassemble remaining parts in reverse order

#### 4.2 Clutch

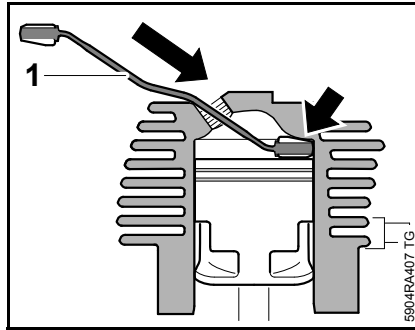
- Remove clutch housing, 4.1



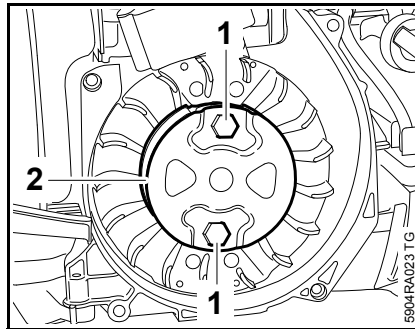
- Remove the spark plug boot (1)
- Unscrew spark plug



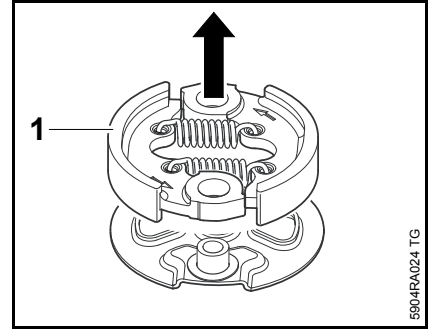
- Insert locking strip (1) 0000 893 5904 in the cylinder



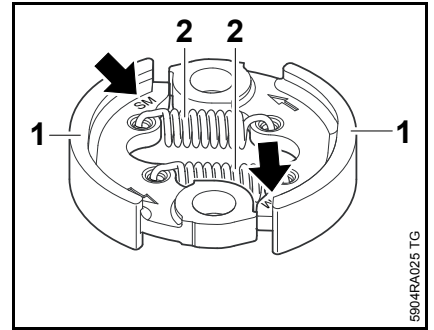
- Locking strip (1) 0000 893 5904 must rest against the cylinder wall (arrow)
- Position as shown



- Remove bolts (1) SW 10
- Remove clutch (2) complete with cover washers



- Remove clutch (1) from the lower cover washer

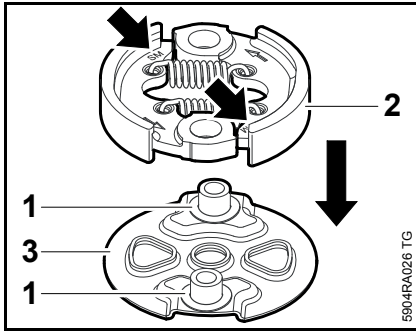


- Lift up clutch shoes (1) and unhook tension springs (2)

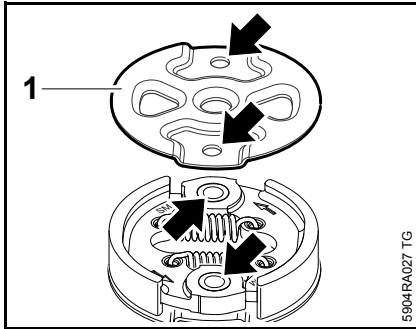
Clutch shoes must be oriented so that the markings (arrows) are visible.

- Hook in new clutch springs
- Reassemble the clutch shoes in reverse order

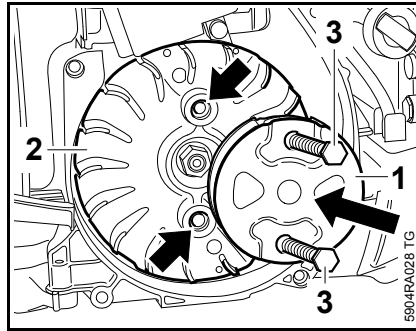





- Position washers (1) on the pegs
- Orient clutch (2) so that the markings (arrows) are visible
- Slide clutch (2) onto the pegs on the lower cover washer (3)



- Position upper cover washer (1) so that the holes (arrows) match





- Fit coupling (1) complete with cover washers in the threaded holes (arrows) of the flywheel (2)
- Insert and tighten down the screws (3) SW 10
- Pull the locking strip out of the cylinder
- Install clutch housing,  4.1
- Reassemble remaining parts in reverse order

## 5. Engine

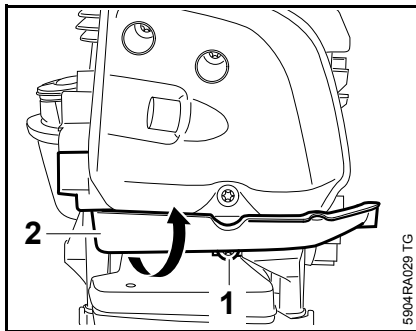
### 5.1 Muffler

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

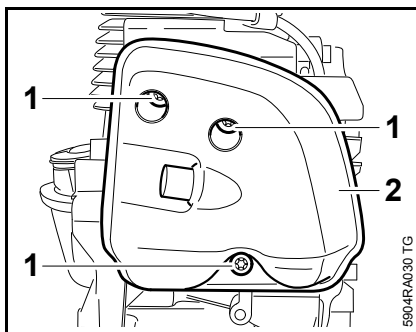
Troubleshooting,  3

- Remove shroud,  5.4
- Remove protective hip plate,  11.9.3

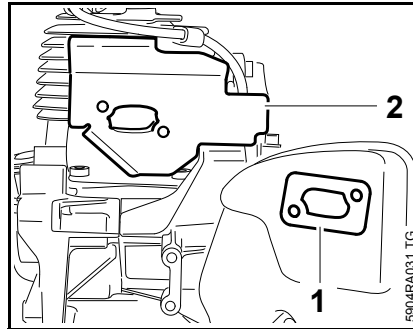
To keep dirt particles from entering the cylinder, move piston to top dead center before removing the muffler.



- Remove screw (1)
- Tilt insert (2) upward and out

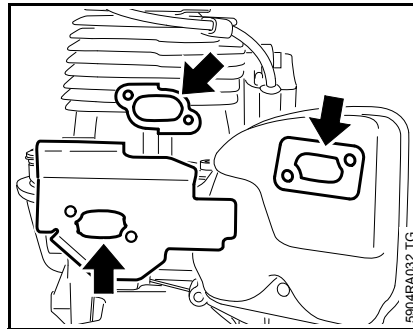


- Remove screws (1)
- Take out and examine the muffler (2), replace if necessary



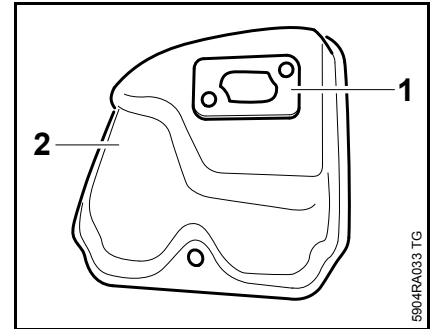
- Remove the exhaust gasket (1) and cooling plate (2)
- Installing and removing the spark arresting screen, see Instruction Manual

#### Installation

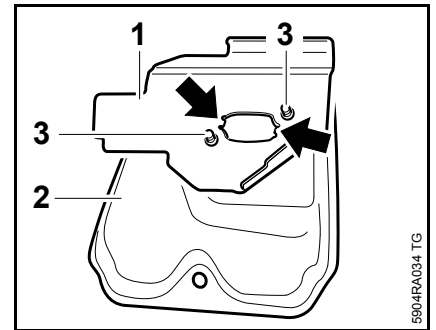


- Cover exhaust bore and remove any fouling on the cylinder and exhaust bore
- Examine and clean the mating surfaces (arrows) on the exhaust bore, cooling plate and muffler, remove any gasket residues if necessary – there must not be any gasket residues or dirt particles in the exhaust bore

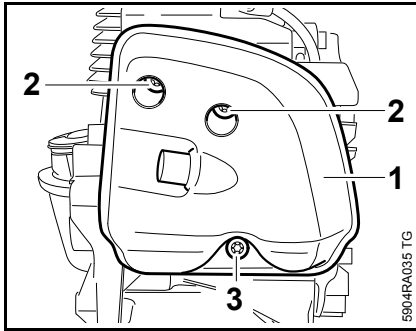
Parts with damaged mating surfaces must be replaced.



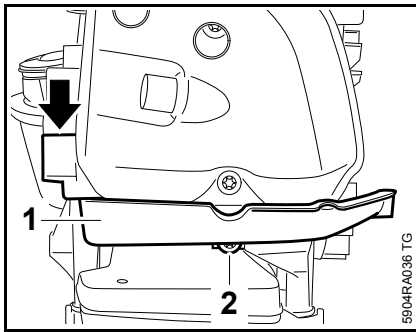
- Position and orient exhaust gasket (1) on muffler (2)



- Slide cooling plate (1) with the lugs (arrows) into the recesses of the muffler (2) and position
- Hold cooling plate (1) and insert screws (3)
  - Position of the gasket and the cooling plate is secured



- Carefully position muffler (1) and insert screws (2) – do not tighten
- Check gasket and cooling plate for proper position and fit lower screw (3)
- Insert and tighten down all three screws



- Guide insert (1) behind the muffler with tab (arrow) in front and position
- Orient insert (1) parallel to muffler
- Screw in the screw (2) and tighten
- Reassemble remaining parts in reverse order

## 5.2 Leak testing

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

This makes adjustment of the prescribed idle speed difficult, if not impossible.

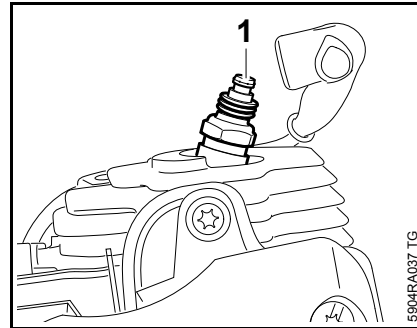
Moreover, the transition from idle speed to part or full throttle is not smooth.

Always start with the vacuum test and then continue with the pressure test.

The engine can be thoroughly checked for leaks under vacuum and at gauge pressure using the pump 0000 850 1300.

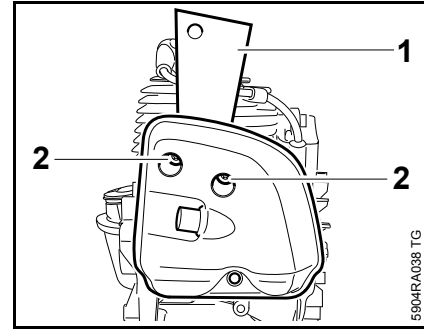
### 5.2.1 Preparations

- Remove shroud, 5.4



- Take off the spark plug boot and remove the spark plug
- Set the piston to the top dead center (this can be checked through the spark plug hole)

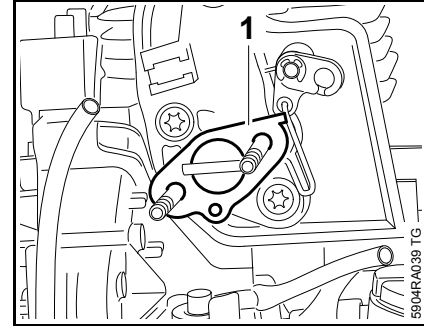
- Screw in spark plug (1) and tighten it securely
- Remove cooling plate and gasket and position muffler with two screws, 5.1



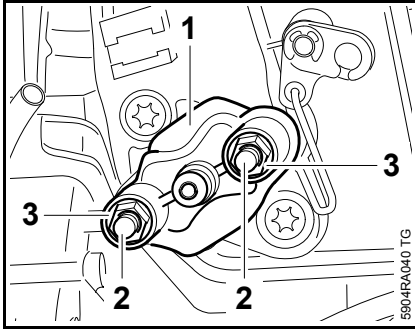
- Slide sealing plate (1) 0000 855 8106 between cylinder exhaust port and muffler
- Tighten screws (2) lightly.

The sealing plate must fill the full width between the screws.

- Remove the carburetor, 11.3



Gasket (1) must be in place.

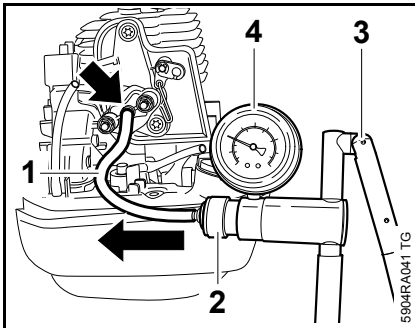


- Orient flange (1) 5910 850 4201 and push it onto the studs (2)
- Tightly screw on nuts (3)

### 5.2.2 Vacuum test

Oil seals tend to fail when subjected to a vacuum. In other words, the sealing lip lifts away from the crankshaft during the piston's induction stroke because there is no internal counterpressure.

This kind of fault can be detected by testing with pump 0000 850 1300.



- Push the hose (1) of pump 0000 850 1300 onto the connector (arrow)
- Slide ring (2) to the left – Vacuum test

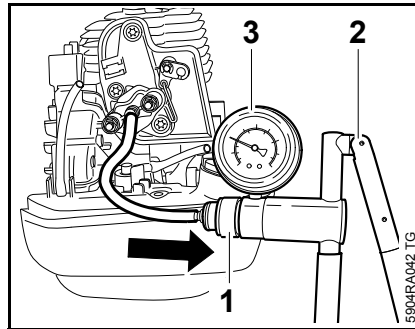
- Operate lever (3) until the pressure gauge (4) indicates a vacuum of 0.5 bar

If the vacuum reading remains constant, or does not decrease by more than 0.3 bar within 20 seconds, it may be assumed that the oil seals are in good condition. If the vacuum in the crankcase is reduced further, the oil seals must be replaced, 5.3.

- After testing, slide the ring on the pump back to the right to vent the pump.
- Continue with pressure test, 5.2.3

### 5.2.3 Pressure test

The same preparatory steps are required as for the vacuum test, 5.2.2.



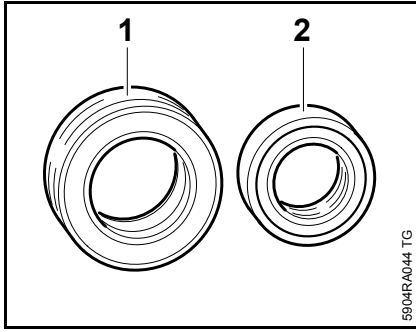
- Slide ring (1) to the right – Pressure test
- Operate the lever (2) until the pressure gauge (3) indicates a pressure of 0.5 bar. If this pressure remains constant for at least 20 seconds, the engine crankcase is airtight

- If the pressure drops, the leak must be located and the defective part replaced

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

- After testing, slide the ring on the pump to the left to vent the pump – disconnect the hose
- Remove flange 5910 850 4201 on intake elbow
- Install the carburetor, 11.3
- Remove muffler and remove sealing plate 0000 855 8106
- Install gasket, cooling plate and muffler, 5.1
- Reassemble remaining parts in reverse order

### 5.3 Oil seals

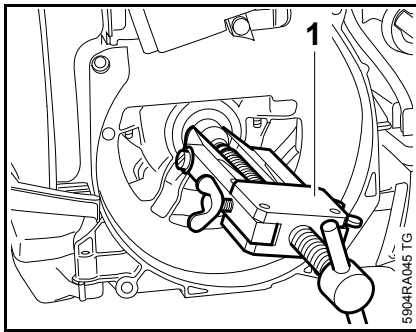


With new oil seals, oil seal (1) 15x25x5 must be replaced on the ignition side and oil seal (2) 12x22x5 on the starter side.

It is not necessary to dismantle the complete engine if only the oil seals need to be replaced.

#### Ignition side

- Remove clutch, 4.2
- Remove the flywheel, 6.5



Avoid damage to the crankshaft stub.

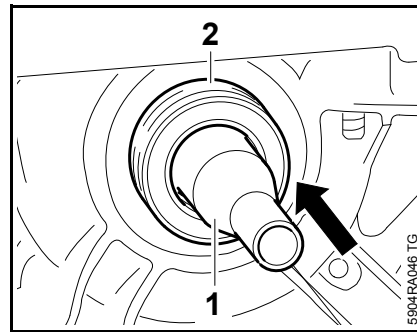
- Free the oil seal in its seat by tapping it with a suitable tube or a punch.

- Apply the puller (1) 5910 890 4400 with jaws (profile no. 3.1) 0000 893 3706

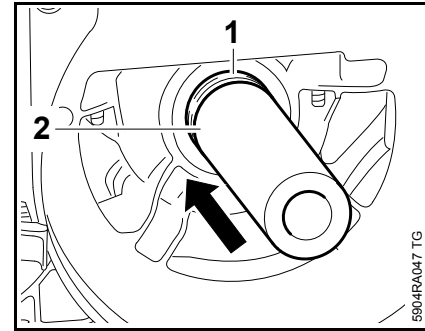
- Clamp the puller arms
- Pull out the oil seal

#### Installation

- Clean the mating surface, 14
- Grease the sealing lips of the new oil seal, 14



- Fit the installing sleeve (1) 1141 893 4600
- Slide the oil seal (2) over the installing sleeve with the sealing lip facing the crankcase
- Remove the assembly sleeve



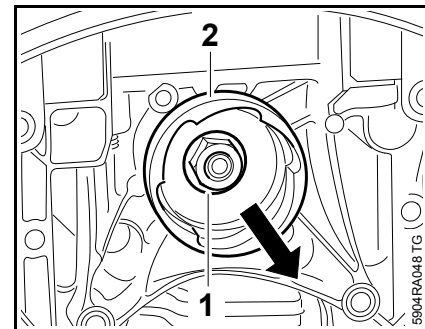
- Press the new oil seal (1) fully home with press sleeve (2) 4238 893 2400

The seating face must be flat and free from burrs.

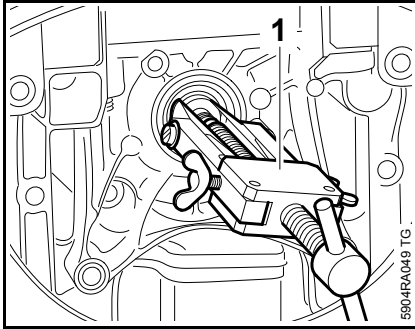
- Clean the cone of the crankshaft to ensure it is completely grease-free, 14
- Reassemble remaining parts in reverse order

#### Starter side

- Remove starter, 8.2
- Block the piston, 4.2



- Unscrew the nut (1)
- Remove the starter cup (2)



Avoid damage to the crankshaft stub.

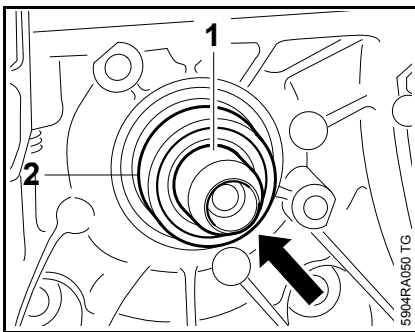
- Free the oil seal in its seat by tapping it with a suitable tube or a punch.

- Apply the puller (1) 5910 890 4400 with jaws (profile no. 3.1) 0000 893 3706

- Clamp the puller arms
- Pull out the oil seal

### Installation

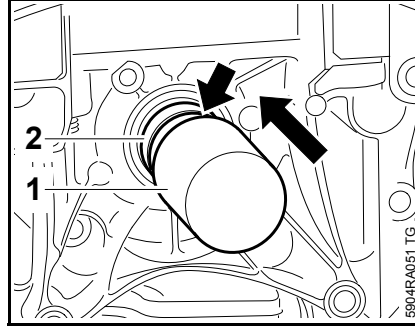
- Clean the mating surface
- Grease the sealing lips of the new oil seal, 14



- Fit the installing sleeve (1) 4119 893 4600

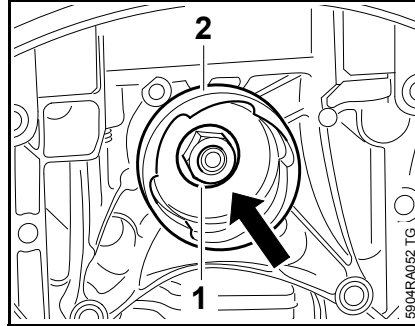
- Slide the oil seal (2) over the installing sleeve with the sealing lip facing the crankcase

- Remove the assembly sleeve



- Orient press sleeve (1) 4147 893 2400 with the base (arrow) facing the crankcase and press in the oil seal (2)

The seating face must be flat and free from burrs.



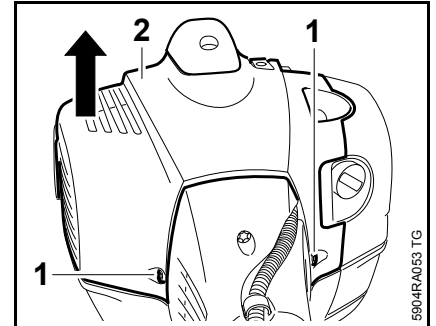
- Slide on the starter cup (2)

- Tightly screw on nuts (1)

- Reassemble remaining parts in reverse order

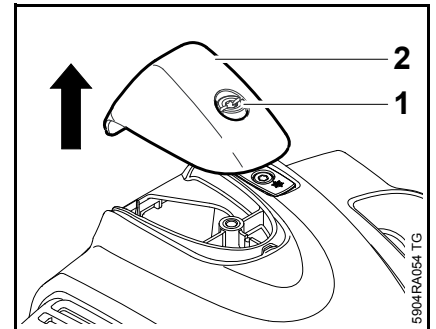
### 5.4 Shroud

- Remove starter, 8.2



- Remove screws (1)

- Remove the shroud (2)

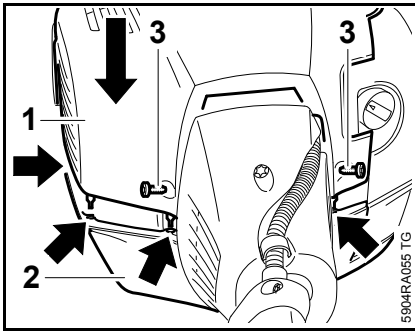


- Remove screw (1)

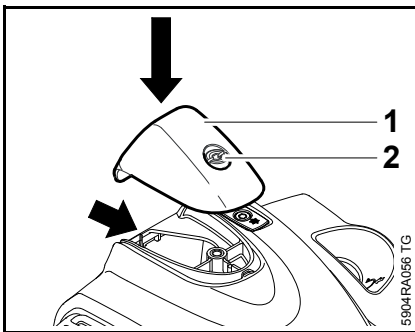
- Remove cover (2)

- Check spacer (if present) and slide for summer/winter operation and convert, if necessary, with a new shroud

## Installation



- Fit shroud (1) so that the pins engage the holes (arrows) of the protective hip plate (2)
- Insert and tighten down the screws (3)
- Remove starter, [8.2](#)



- Slide cover (1) with the tab into the slot (arrow) and position
- Screw in the screw (2) and tighten

## 5.5 Cylinder

Before removing the cylinder, decide whether or not the crankshaft is to be removed.

### With cylinder installed

The piston must be blocked through the spark plug hole to prevent the crankshaft turning in order to remove the clutch.

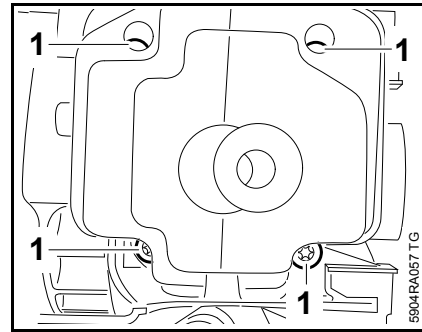
### With cylinder removed

The crankshaft is blocked by placing the piston on the wooden assembly block in order to remove the clutch.

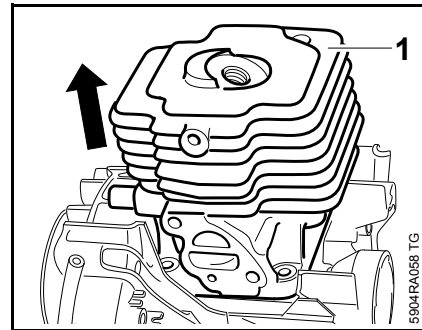
The mating surfaces must be in perfect condition and without any damage whatsoever. The cylinder must be replaced if the mating surfaces are damaged [3.7](#).

- Remove starter, [8.2](#)
- Remove shroud, [5.4](#)
- Remove drive tube assembly, 1-point antivibration system, [12.1](#), 4-point antivibration system, [12.2](#)
- Remove clutch housing, [4.1](#)
- Take off the spark plug boot and remove the spark plug, [4.2](#)
- Remove filter housing, [11.2](#)
- Remove the carburetor, [11.3](#)
- Remove the spacer flange, [11.7](#)
- Remove the ignition module, [6.2](#)  
Ignition module/control unit M-Tronic, [6.2.1](#)

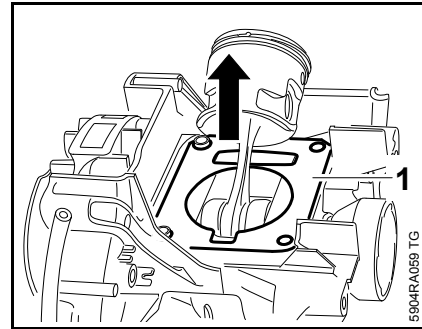
- Remove the muffler, [5.1](#)



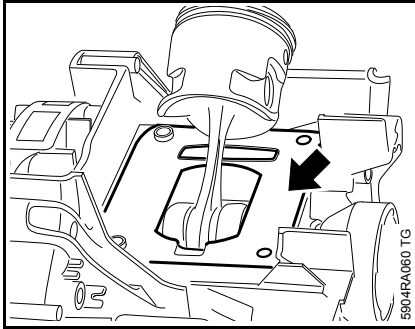
- Unscrew the pan head screws (1)



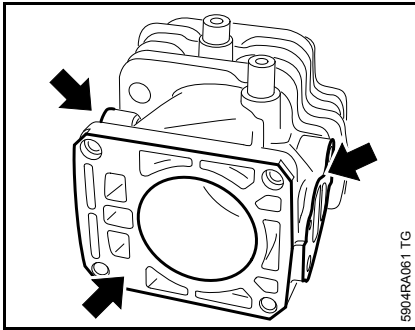
- Carefully pull off the cylinder (1)



- Remove the cylinder gasket (1)



- Examine and clean the mating surface (arrow), 14



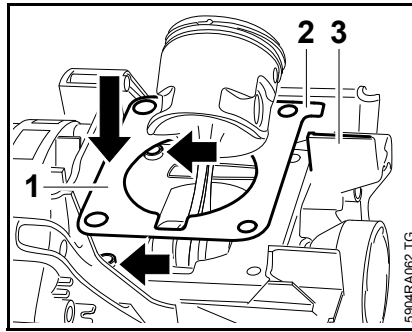
- Examine and clean the mating surfaces (arrows), and remove any gasket residues, 14

Always use a new cylinder gasket after removing the cylinder.

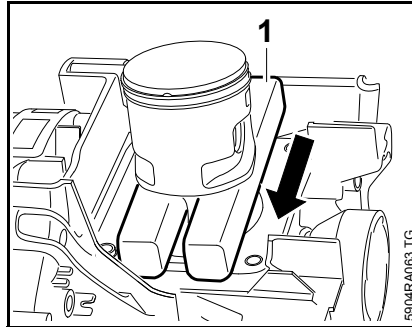
- Examine the piston rings and replace if necessary, 5.7, 5.8

If the piston or the piston rings are damaged, then the inside of the cylinder must also be inspected for damage, replace cylinder if necessary.

## Installation

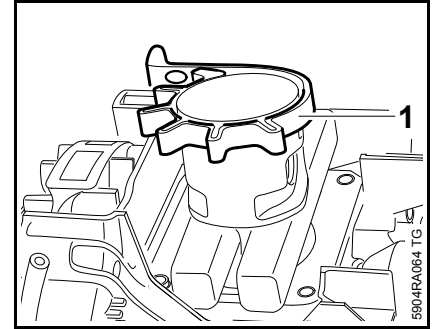


- Orient new cylinder gasket (1) so that the tab (2) is located at the ridge (3)
  - the openings must match with the crankcase
- Guide cylinder gasket (1) over the piston and lay it in the sleeves (arrows)
  - Cylinder gasket is secured



- Place wooden assembly block (1) 1108 893 4800 between piston and crankcase

Avoid damage to the cylinder gasket.



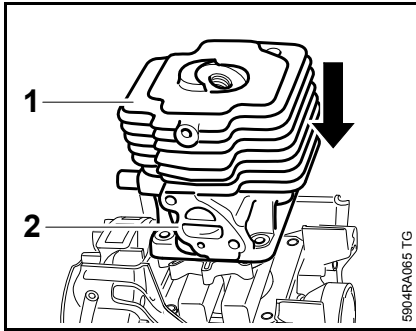
- Coat piston, piston rings and inside of cylinder with oil, 14

- Use the clamping strap (1) 0000 893 2600 to compress the rings around the piston

- Ensure that piston rings are correctly positioned, 5.8

The clamping strap (1) must be fitted in such a way that the piston rings do not protrude beyond the piston sides.





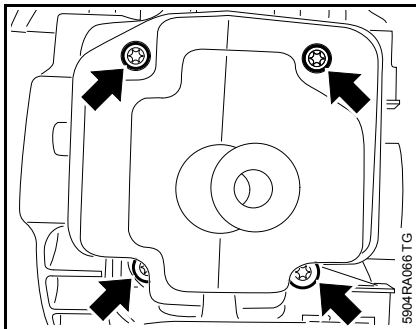
- Orient cylinder (1) so that the intake duct (2) faces the filler neck

When fitting the cylinder over the piston, ensure that the clamping strap securely encloses the piston and that none of the piston rings protrudes  
 – danger of breakage.

- Slide cylinder over piston; the clamping strap is removed at the same time

- Remove clamping strap and wooden assembly block

Ensure that the cylinder gasket is correctly positioned.



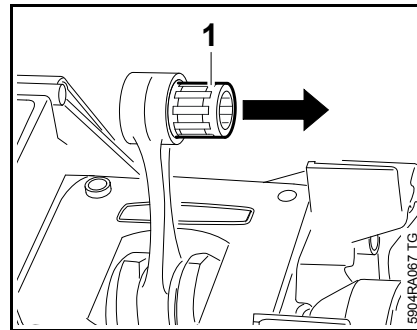
- Push cylinder onto the guide sleeves as far as it will go  
 – Cylinder gasket is secured

- Position the screws (arrows) and tighten through the holes crosswise

- Reassemble remaining parts in reverse order

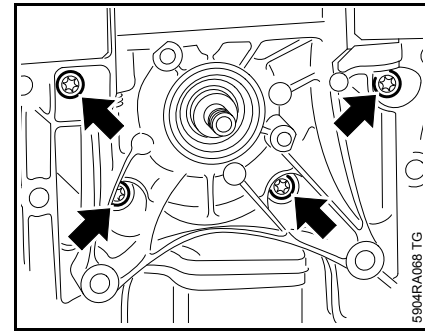
## 5.6 Crankshaft

- Empty the fuel tank in accordance with regulations, 1.1
- Remove the starter cup, 5.3
- Remove the flywheel, 6.5
- Remove the cylinder, 5.5
- Remove piston, 5.7
- Remove insert, 5.1
- Remove fuel tank, 11.9.3
- Always fit new ball bearings and oil seals when removing the crankshaft, 5.6.1 and 5.3.

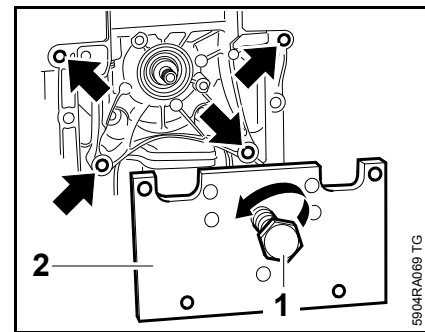


- Take out the needle bearing (1), examine and clean it, replace if necessary

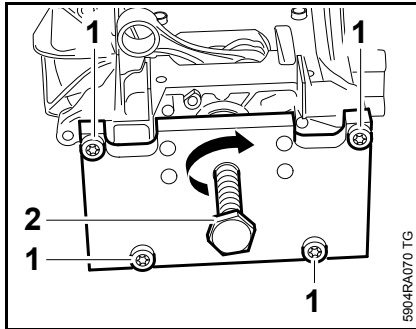
## Starter-side half of the crankcase



- Take out the screws (arrows)



- Unscrew spindle (1) until it no longer rests on the crankshaft stub
- Position puller (2) 5910 890 4503 so that the holes line up with the threaded holes (arrows) of the starter side half of the crankcase

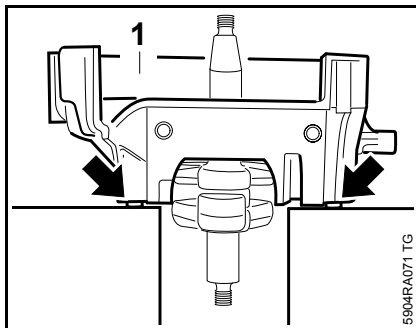


- Insert and tighten down the screws (1)
- Turn spindle (2) clockwise until the crankshaft stub has been forced out of the ball bearing

The starter-side half of the crankcase is pulled off by this procedure.

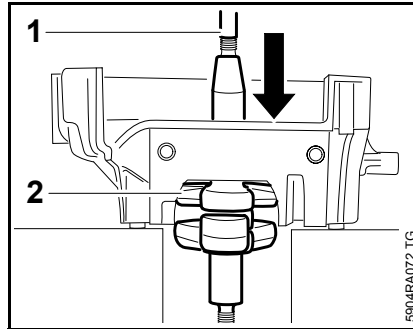
- Undo the screws and remove the puller
- Replace ball bearings and oil seals, [5.6.1](#) and [5.3](#)

### Ignition-side half of the crankcase



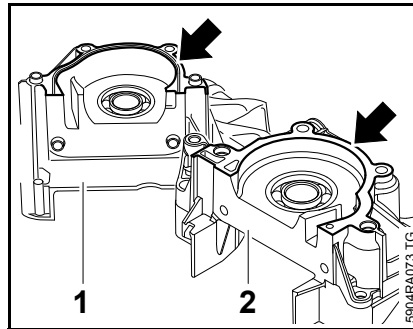
- Position the crankcase half (1) on suitable surfaces so that it is held securely and the installed guide sleeves (arrows) are not damaged

There must be sufficient clearance downward so that the crankshaft can be pressed out.



- Position a suitable punch (1) on the cylinder side crankshaft stub and press out crankshaft (2)

Crankshaft, con-rod and the needle bearing between them form a complete unit which must always be replaced as such.



- Examine ignition side (1) and starter side (2) halves of case for cracks and check all mating surfaces (arrows) for damage

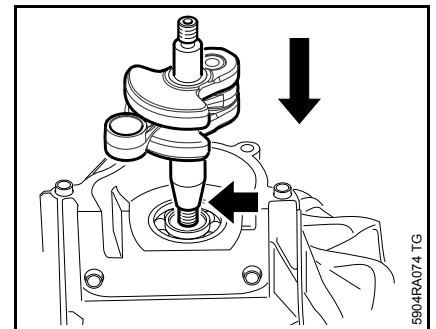
If the original crankcase is reused, the oil seals and ball bearings must be replaced, all gasket residues removed and the mating surfaces cleaned thoroughly (also in the circumferential groove of the ignition-side half of the case). The mating surfaces must be absolutely flawless and clean to guarantee a perfect seal.

- Replace ball bearings and oil seals, [5.6.1](#) and [5.3](#)
- Before installation, clean the crankshaft, [14](#)

### Installation

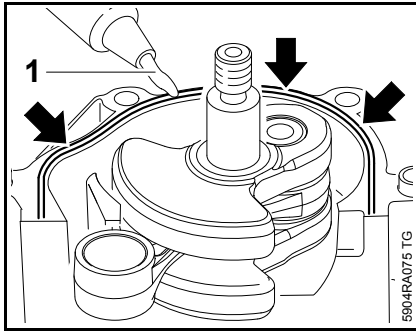
#### Ignition-side half of the crankcase

Avoid damage to the crankshaft stub.

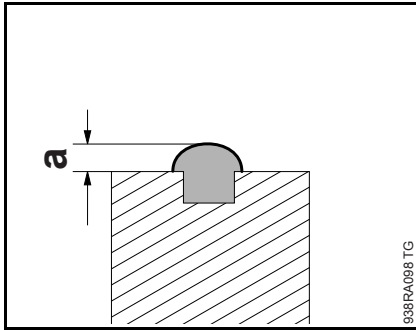


- Orient the crankshaft with the conical crankshaft stub (arrow) facing the ignition-side ball bearing
- Heat only the inner race of the ball bearing to approx. 120 °C (250 °F)
- Press crankshaft stub fully home

The crankshaft must be fitted rapidly, as the heat is transmitted to the crankshaft stub and the inner bearing race contracts.



- Apply sealant (1) to the groove on the circumference (arrows)



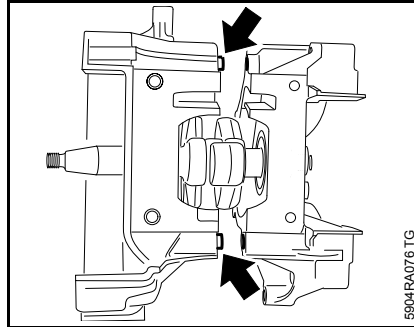
- Apply sealant so that a bead with a height of  $a = 2 - 3 \text{ mm}$  is formed

Sealant must not protrude into the inside of the crankcase.

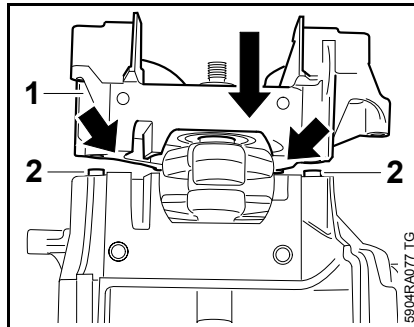
- Coat the cylindrical crankshaft stub with oil

### Starter-side half of the crankcase

Avoid damage to the crankshaft stub.

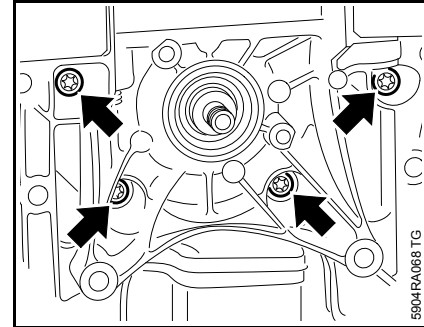


- Make certain that the guide sleeves (arrows) lineup with the holes



- Position the clutch-side half of the crankcase on the cylindrical crankshaft stub so that the cylinder mating surfaces (arrows) match
- Heat only the inner race of the ball bearing to approx.  $120 \text{ }^\circ\text{C}$  ( $250 \text{ }^\circ\text{F}$ )
- Slide the crankcase half (1) on until the guide sleeves (2) are in as far as they will go

The crankcase must be fitted rapidly, as the heat is transmitted to the crankshaft stub and the inner bearing race contracts.



- Fit screws (arrows) and tighten evenly and alternately on opposite sides until the halves of the crankcase are completely assembled
- Tighten screws (arrows)
- Examine and install the piston, [5.7](#)
- Examine and install the cylinder, [5.5](#)
- Reassemble remaining parts in reverse order

### 5.6.1 Ball bearing / crankcase

The two halves of the crankcase can be replaced individually if they are defective.

New crankcases are delivered with the relevant components pre-assembled


– see spare parts list

Those parts which are not supplied with the new crankcase must be removed from the old crankcase – examine and replace, if necessary, beforehand.

When fitting a new crankcase, the machine's serial number must be stamped on the crankcase with 2.5 mm figure stamps.

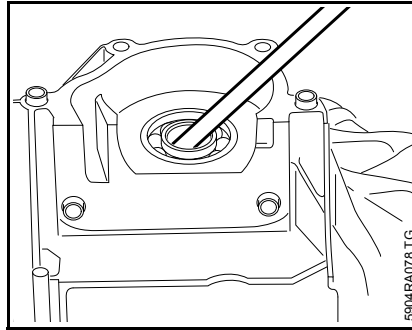
If the original crankcase is reused, the oil seals and grooved ball bearings must be replaced, all gasket residues removed and the mating surfaces cleaned thoroughly. The mating surfaces must be absolutely flawless and clean to guarantee a perfect seal.

Examine both halves of the crankcase for cracks and check all mating surfaces for signs of damage.

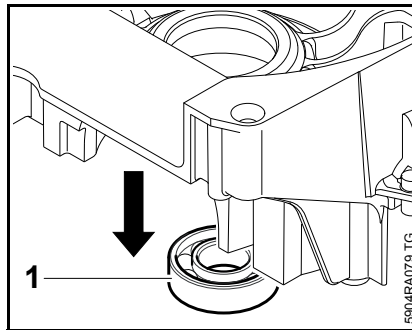
– Refer also to troubleshooting,  3.7

– Remove crankshaft,  5.6

### Ignition-side half of the crankcase



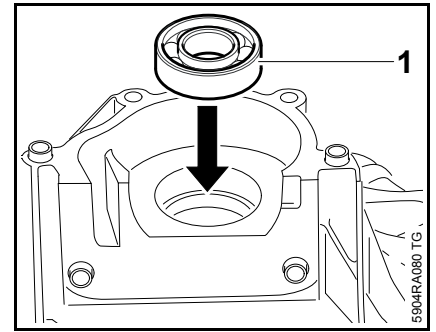
- Carefully drive the oil seal out with a punch
  - Examine and clean the crankcase, replace if necessary.
- Replace ball bearings if the crankcase is in good condition



- Heat the area around the bearing seat to approx. 120 °C (250 °F)

The bearing (1) drops out on its own when this temperature is reached.

### Installation

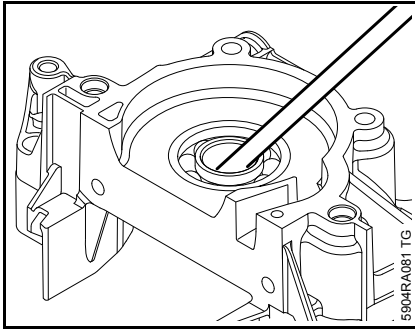


- Heat the area around the bearing seat to approx. 120 °C (250 °F)
- Press the ball bearing (1) home as far as possible

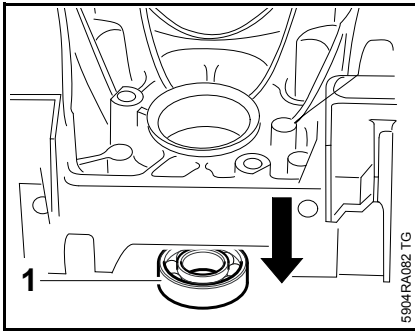
The ball bearing must be fitted rapidly, as it absorbs heat and expands.

- Check that the ball bearing is seated properly, if necessary, use press arbor 1118 893 7200 to press the ball bearing fully home

## Starter-side half of the crankcase



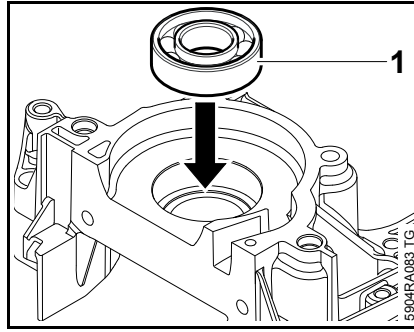
- Carefully drive the oil seal out with a punch
- Examine and clean the crankcase, replace if necessary.
- Replace ball bearings if the crankcase is in good condition



- Heat the area around the bearing seat to approx. 120 °C (250 °F)

The bearing (1) drops out on its own when this temperature is reached.

## Installation



- Heat the area around the bearing seat to approx. 120 °C (250 °F)

- Press the ball bearing (1) home as far as possible

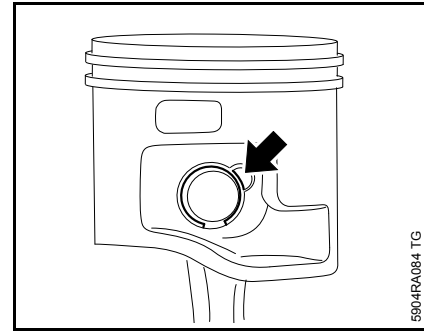
The ball bearing must be fitted rapidly, as it absorbs heat and expands.

- Check that the ball bearing is seated properly, if necessary, use press arbor 4119 893 7200 to press the ball bearing fully home
- Install crankshaft, 5.6
- Install the oil seals. 5.3
- Reassemble remaining parts in reverse order

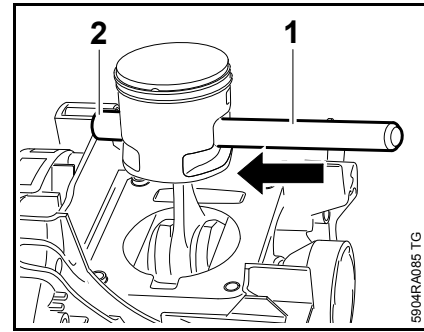
## 5.7 Piston

- Remove the cylinder, 5.5

The assembly drift can be inserted through the fitted snap ring, thus only one snap ring must be removed.



- Use a suitable tool to pry the hookless snap ring out at the recess (arrow)



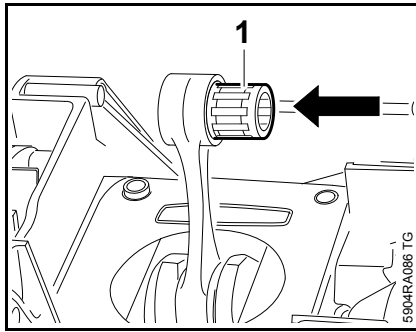
- Push the assembly drift (1) 1110 893 4700 stub end first through the installed snap ring and press the piston pin (2) out of the piston


If the piston pin is stuck, tap the end of the drift gently with a hammer to loosen it.

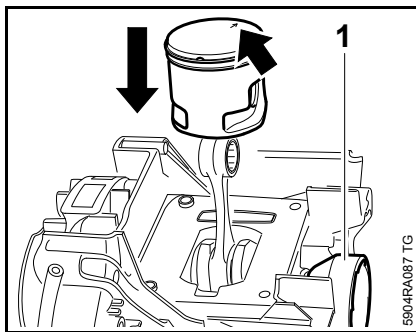
The piston must be held steady during this process to ensure that jolts are not transmitted to the connecting rod.

- Remove the piston
- Examine the piston rings and replace if necessary, 5.8

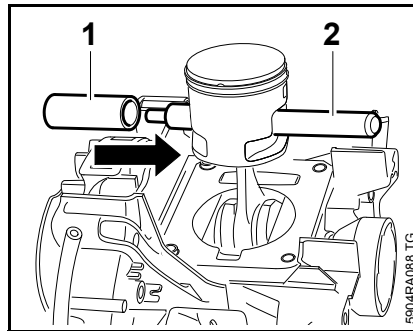
## Installation



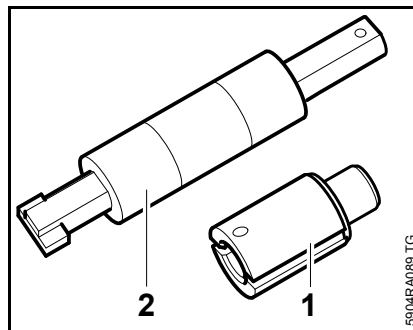
- Remove needle bearing from the rod eye, examine and clean it, replace if necessary
- Coat the needle cage (1) with oil and insert it in the rod eye
- Examine the piston rings and replace if necessary,  5.8



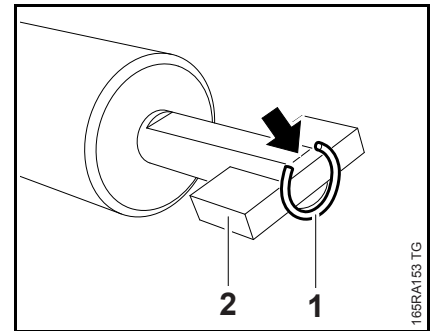
- Orient the piston as illustrated so that the marking (arrow) faces rearward and the starter cup (1) is on the right
- Position the piston on the rod eye



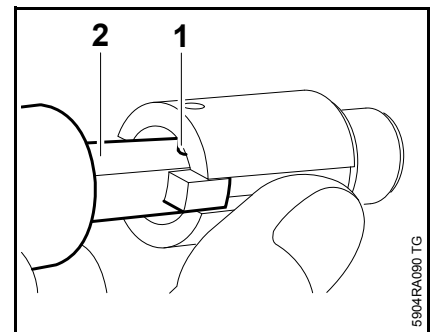
- Push assembly drift (2) into the piston on the side with the installed snap ring
- Push the assembly drift (2) 1110 893 4700 with the stub end first through piston hole and rod eye (needle cage) and secure the piston
- Coat the piston pin with oil
- Fit the piston pin (1) on the stub of the assembly drift (2) and slide it into the piston



- Remove the sleeve (1) 5910 893 1709 from the installing tool (2) 5910 890 2211

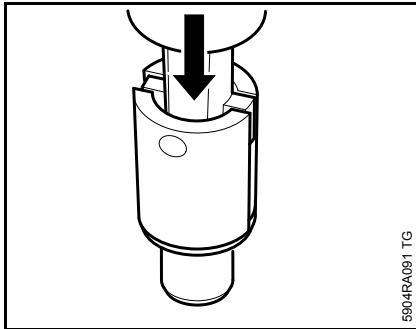


- Attach the snap ring (1) to the magnet (2) and align it so that the snap ring gap is on the flat side (arrow)



- Push the slotted opening of the sleeve over the magnet and snap ring

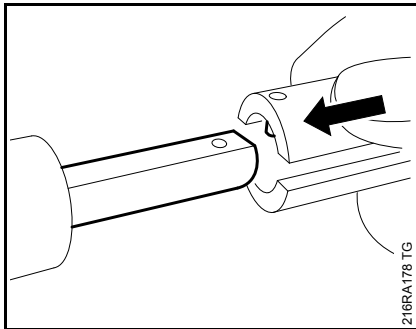
The inner pin (1) must point towards the flat face of the shaft (2).



5904RA091 TG

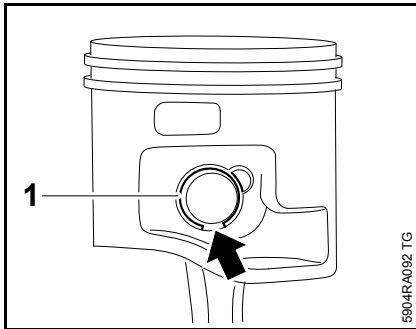
- Press the assembly tool down in the sleeve until the magnet is at the end of the guide slits.

Stand the tool on a suitable surface.



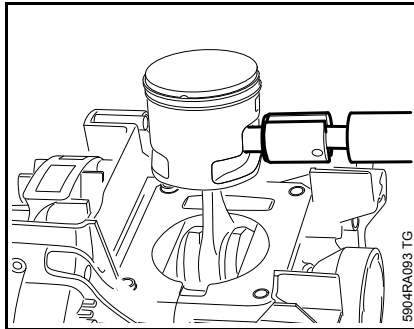
216RA178 TG

- Remove sleeve and fit it over the opposite shaft end of the assembly tool, with the internal pin pointing towards the flat surface.



5904RA092 TG

The snap ring (1) must be fitted so that the gap in the ring (arrow) points downwards in axial direction of the piston.



5904RA093 TG

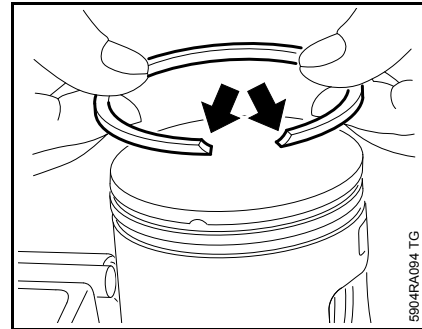
- Position installing tool 5910 890 2211 with the taper sleeve on the piston boss, hold the piston steady and press the tool shank home until the snap ring slips into the groove

The tool must be precisely aligned in axial direction of the piston pin.

- Install new oil seals, 5.3
- Install the cylinder, 5.5
- Reassemble remaining parts in reverse order

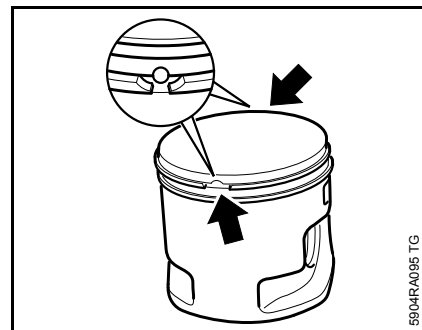
## 5.8 Piston rings

- Remove piston, 5.7
- Remove piston rings from piston
- Use a piece of old piston ring to scrape the grooves clean



5904RA094 TG

- Align the new piston rings so that the radiuses at the ends of the ring (arrows) face upwards







5904RA095 TG

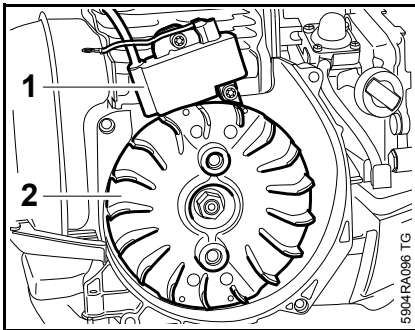
- Carefully slide the piston rings over the piston
  - danger of breakage
- Position the piston rings so that the radiuses at the ring gaps encircle the fixing pins in the piston grooves (arrows)
- Check the correct installed position of the piston rings again (arrows)
- Install the piston, 5.7
- Reassemble remaining parts in reverse order

## 6. 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.

Troubleshooting on the ignition system should always start with the spark plug,  3.5

- Remove drive tube assembly, 1-point antivibration system,  12.1, 4-point antivibration system,  12.2
- Remove clutch housing,  4.1



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

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

1. High-voltage output with permanently installed ignition lead.
2. Permanently installed lead with lug for the short circuit wire




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

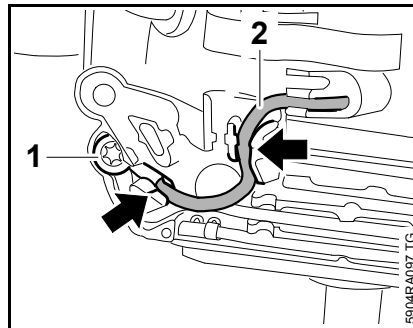
### 6.1 Ignition timing

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


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

### 6.2 Ignition module


- Remove shroud,  5.4
- Unplug the spark plug boot
- Remove drive tube assembly, 1-point antivibration system,  12.1, 4-point antivibration system,  12.2



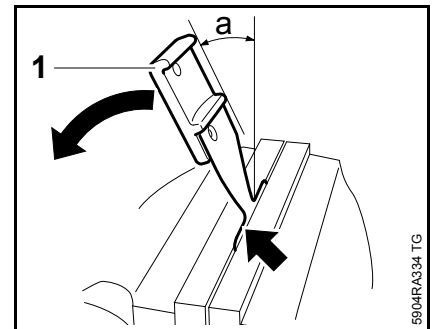
- Remove screw (1) and pull lead (2) of the ignition module out of the guides (arrows)

- Detach short circuit wire and cable holder from engine,  6.6.2

So that the air gap between ignition module and flywheel can be set using setting gauge 0000 890 6400 during installation, the clutch housing must be removed.

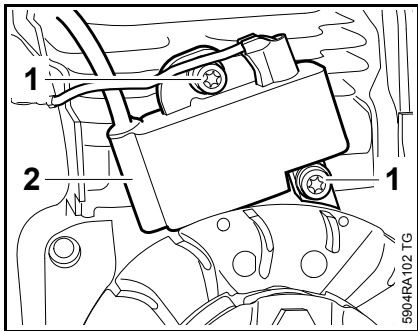
- Remove clutch housing,  4.1

Alternatively, setting gauge 0000 890 6400 can be used to set the air gap between ignition module and flywheel with the clutch housing installed. To do this, the gauge must be bent one time.

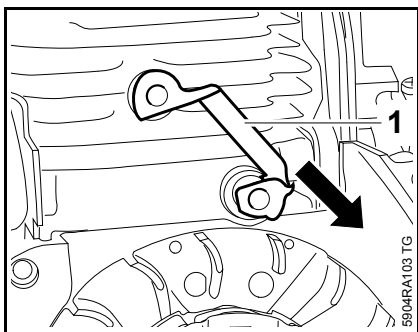


- Clamp the measuring tongue (arrow) in a vise and bend the grip toward the measuring tongue until the grip (1) is at an angle of  $a = 30^\circ$  relative to the measuring tongue



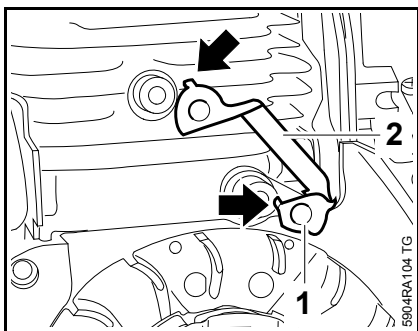


- Remove screws (1) with washers
- Remove the ignition module (2)



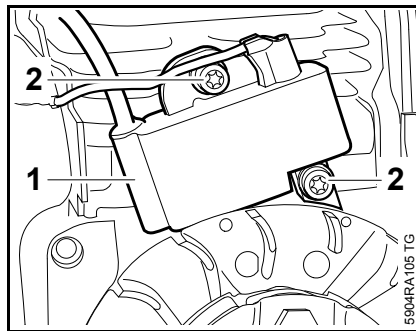
- Remove the insulating element (1)
- Examine spark plug boot and cable holder, replace if necessary, [6.4](#)
- Troubleshooting, [3.5](#)

### Installation

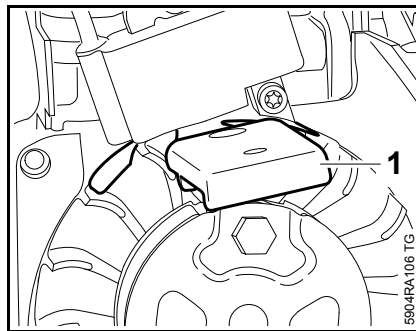


- Position insulating element (1) so that the connection bar (2) faces the carburetor

- Secure insulating element (1) with the stubs (arrows) on the cylindrical bumps

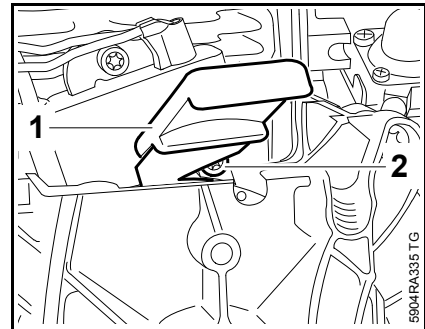


- Fit ignition module (1) and insert screws (2) with washers – do not tighten them down

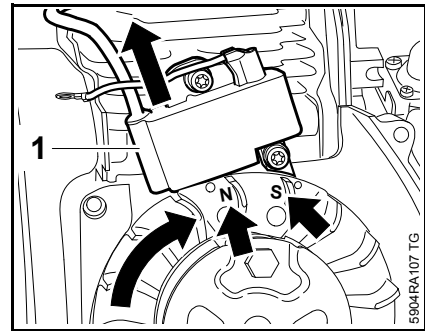


- Push back ignition module and slide setting gauge (1) 0000 890 6400 between the legs of the ignition module and the magnetic poles of the flywheel

### Adjustment with clutch housing installed

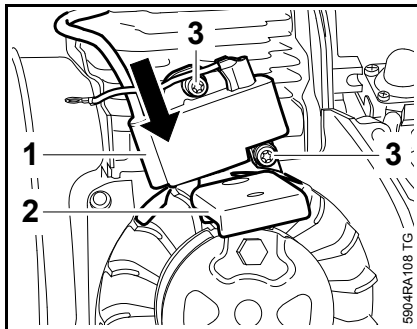


- Push back ignition module and slide setting gauge (1) 0000 890 6400 between the legs of the ignition module and the magnetic poles of the flywheel
- Slide setting gauge (1) in the direction of the muffler until there is enough space to tighten the lower screw (2)



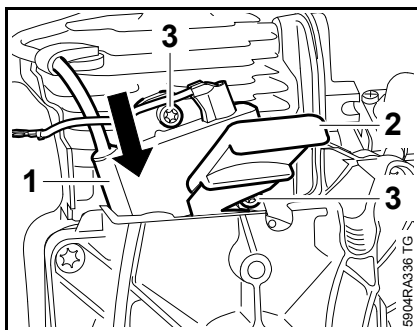
Shown without setting gauge for a better view.

- Push back and hold ignition module (1)
- Flywheel must turn freely
- Turn the flywheel until the pair of magnetic poles "N/ S" (arrows) is at the ignition module (1) – not the pair of magnetic poles "S/ N"



- Press ignition module (1) against the setting gauge (2) and tighten screws (3)
- Remove the setting gauge (2)

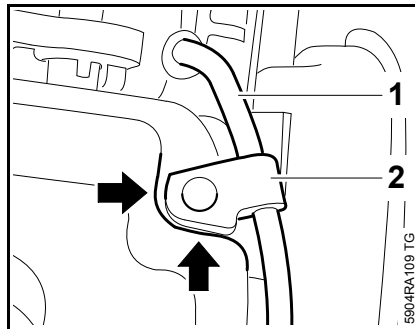
#### Adjustment with setting gauge 0000 890 6400 with clutch housing installed



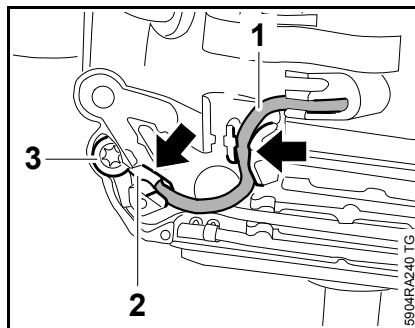
- Press ignition module (1) against the setting gauge (2) and tighten screws (3)
- Remove the setting gauge (2)

#### Checking operation

- Turn the flywheel: it must not touch the ignition module



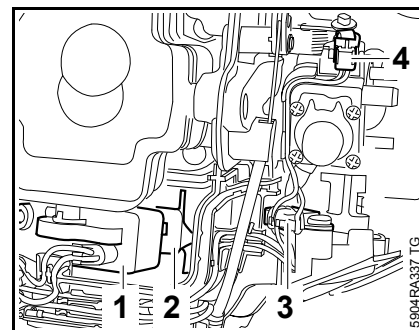
- Position ignition lead (1) and press cable holder (2) into the hole of the cooling fin
- Orient cable holder (2) so that it aligns with the contour (arrows) of the cooling fin
- Install clutch housing, [📖 4.1](#)
- Install cable holder and short circuit wire, [📖 6.6.2](#)



- Press lead (1) of the ignition module with the lug (2) into the mount
- Starting at the lug (2), press the lead (1) of the ignition module into the guides (arrows) as far as it will go
- Screw in the screw (3) and tighten
- Reassemble remaining parts in reverse order

#### 6.2.1 Control unit (ignition module) M-Tronic

- Remove shroud, [📖 5.4](#)
- Unplug the spark plug boot
- Remove drive tube assembly, 1-point antivibration system, [📖 12.1](#), 4-point antivibration system, [📖 12.2](#)
- Remove clutch housing, [📖 4.1](#)

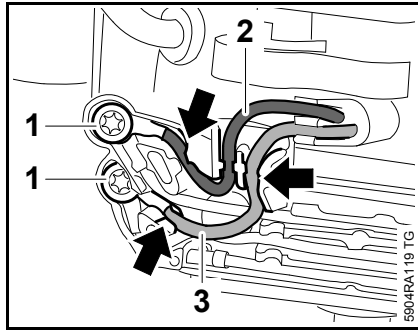


The contactless electronic ignition system basically consists of a control unit (1), flywheel (2), switchgear (3) and solenoid valve (4).

The ignition module accommodates all the components required to control the ignition timing and fuel flow. There are only three electrical connections leaving the control unit:

1. High-voltage output with permanently installed ignition lead.
2. Permanently installed blue lead with lug for the short circuit wire
3. Permanently installed red lead with lug for the M-Tronic.

Testing of the ignition module is not limited to only a spark test. If no ignition spark is obtained or other functions do not work, a diagnosis must be carried out according to the troubleshooting chart; replace control unit or M-Tronic wiring harness if necessary.



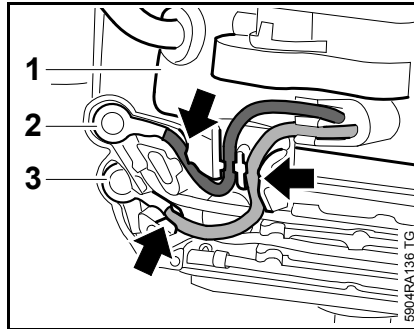
- Remove screws (1)
- Pull the red lead (2) and blue lead (3) out of the guides (arrows)
- Remove throttle cable and short circuit wire from engine, [📖 6.6.3](#)
- Remove M-Tronic leads from cable holder and remove cable holder, [📖 6.6.3](#)

Further removal of the control unit is the same as for the ignition module without M-Tronic, [📖 6.2](#).

### Installation

Installation and adjustment of the control unit is the same as for the ignition module without M-Tronic, [📖 6.2](#).

- Insert cable holder and insert M-Tronic leads in the cable holder, [📖 6.6.3](#)
- Install throttle cable and short circuit wire on engine, [📖 6.6.3](#)



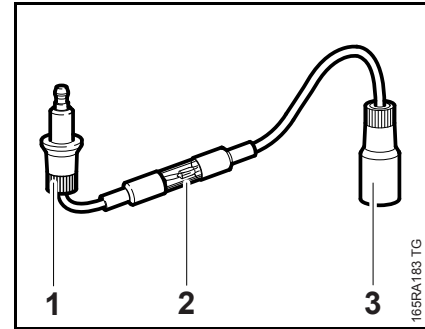
- Insert lead (red) of the ignition module (1) with the lug (2) in the mount – crimped side must face cable holder
- Insert lead (blue) of the ignition module (1) with the lug (3) in the mount – crimped side must face cable holder
- Starting at the lug, press both leads into the guides (arrows) as far as they will go
- Reassemble remaining parts in reverse order

### 6.3 Testing the ignition module

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.

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

### Using the ZAT 4 ignition system tester 5910 850 4503



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

Danger! High voltage – risk of electrocution.

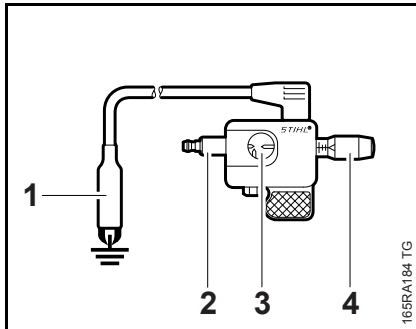
- Crank the engine quickly with the rewind starter and check sparkover in the window (2) of the ignition system tester

The engine may start and accelerate during the test.

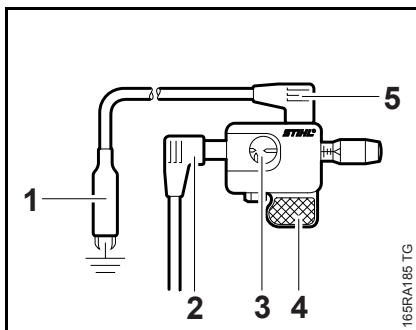
If a spark is visible, the ignition system is in order.

- If no spark is visible in the window (2), check the ignition system with the aid of the troubleshooting chart, [📖 6.7](#)

## Using the ZAT 3 ignition system tester 5910 850 4520



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

**Danger!** High voltage – risk of electrocution.

- Crank the engine quickly with the rewind starter and check sparkover in the window (3) of the ignition system tester

The engine may start and accelerate during the test.

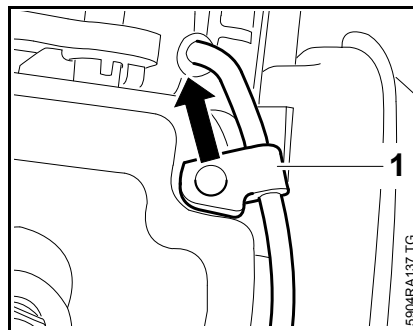
If a spark is visible in the window (3), the ignition system is in order.

- If no spark is visible in the window (3), check the ignition system with the aid of the troubleshooting chart, [☞ 6.7](#)

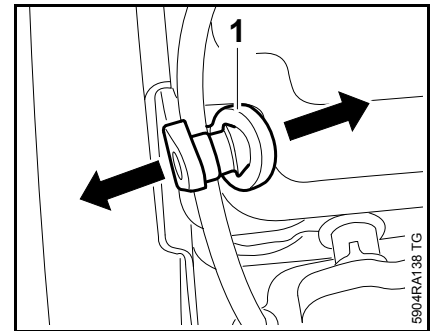
### 6.4 Spark plug boot / ignition lead

Ignition module and ignition lead form a complete unit. If the ignition lead is damaged, the ignition module must be replaced.

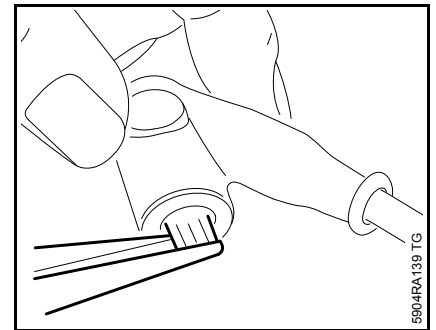
- Remove shroud, [☞ 5.4](#)
- Unplug the spark plug boot



- Pull out cable holder (1)

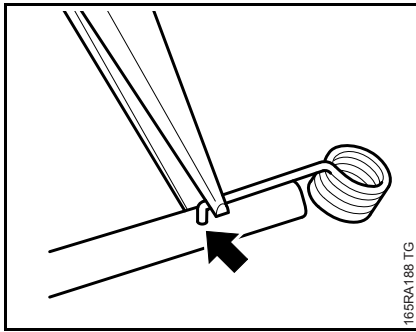


- Open and remove cable holder (1)



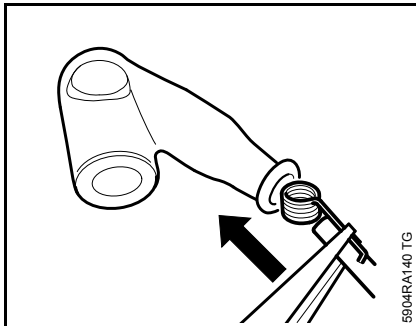
- Use suitable pliers to pull the torsion spring out of the spark plug boot
- Unhook the torsion spring from the ignition lead
- Pull the boot off the ignition lead


## Installation



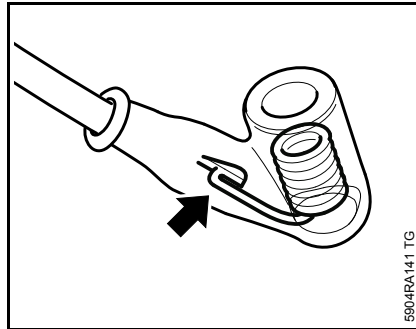
– With a new ignition module, use a pointed tool to pierce the center of the new lead's insulation approx. 15 mm from the end of the ignition lead

- Pinch the hook of the torsion spring into the center of the ignition lead (arrow) where it has been pierced

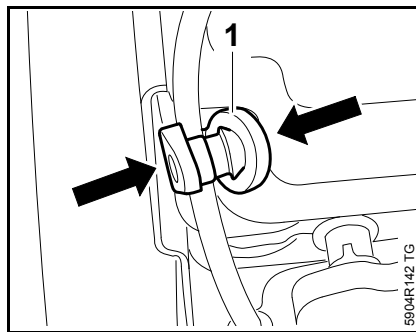


– Coat the inside of the spark plug boot with STIHL press fluid,  14

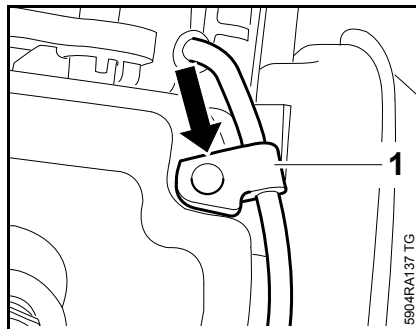
- Push the ignition lead and torsion spring into the spark plug boot



- Ensure that the torsion spring (arrow) is located in the recess

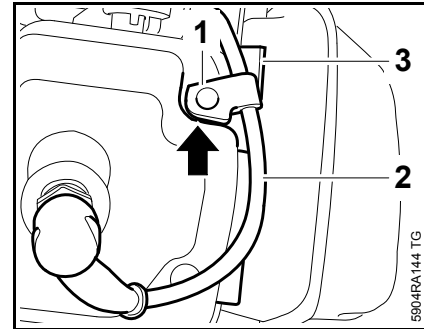


- Position cable holder (1) around the ignition lead and press together



- Press cable holder (1) completely into the hole on the cooling fin

– Plug in the spark plug boot







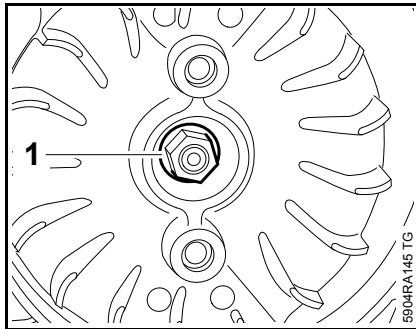
- Orient cable holder (1) so that it aligns with the contour (arrow) of the cooling fin

- Run ignition lead (2) so that it is not stretched against the ignition module and runs along the cooling plate (3)

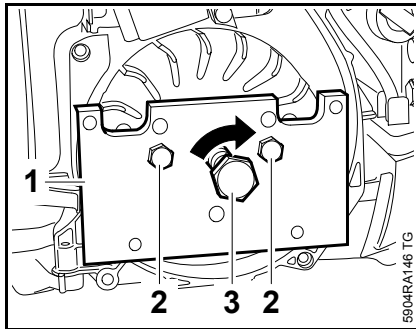
– Reassemble remaining parts in reverse order

## 6.5 Flywheel

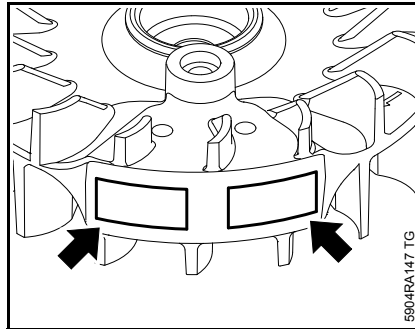
- Remove shroud,  5.4
- Remove clutch housing,  4.1
- Block the piston with the locking strip,  4.2
- Remove clutch,  4.2



- Unscrew the flywheel nut (1)



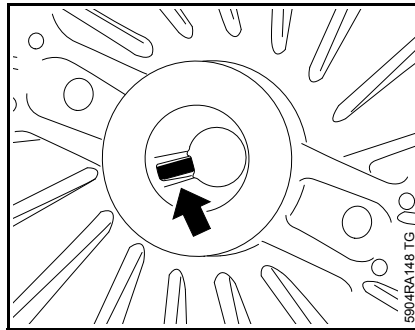
- Position puller (1) 5910 890 4503, screw in and tighten hexagon bolts (2) of the clutch
- Turn bolt (3) clockwise until the flywheel come loose and remove flywheel
- Detach puller (3) 5910 890 4503 from flywheel




The flywheel and magnet poles (arrows) must not display any signs of damage or blue discoloration; replace flywheel if necessary.

### Installation

Flywheel and crankshaft stub must be free from grease for installation.



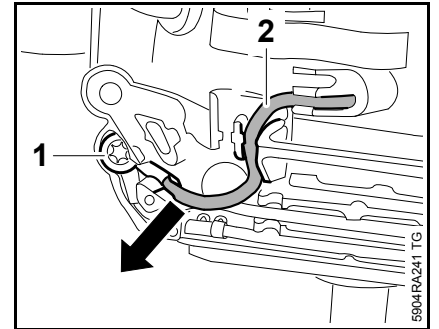
Ensure that the machined key (arrow) engages the slot in the crankshaft.

- Set the air gap between ignition coil and flywheel,  6.2
- Reassemble remaining parts in reverse order


## 6.6 Short circuit wire

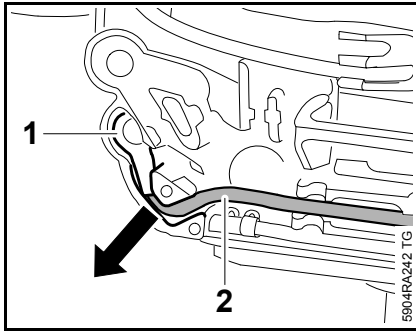
The short circuit wire and ground wire form a single unit together with the throttle cable; the throttle cable must be replaced if there is any sign of damage.

### 6.6.1 Testing



Check the short circuit wire if the spark plug and ignition lead with spark plug boot are in order.

- Remove shroud,  5.4
- Unscrew screw (1) and remove clamp (2) of the ignition module



- Pull the lug (1) of the short circuit wire (2) out of the mount
- Connect ohmmeter to ground and the lug of the short circuit wire
- For versions with control handle for loop handle, move slide control to position **STOP-0** and hold it there
  - For versions with control handle for bike handle, press and hold lever for stop function

The resistance measured must be approx. 0 Ω. If it is much higher, the reason is a break in the wire and the throttle cable must be replaced, [6.6](#).

- Release slide control or lever for stop function = position "I"

The resistance measured must be infinitely high, otherwise replace the throttle cable, [6.6](#).

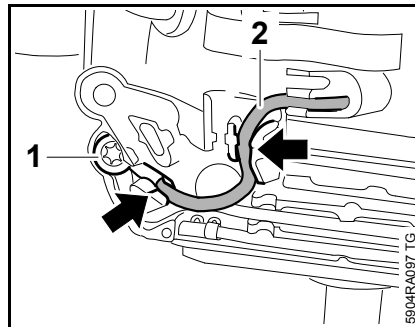
The ground wire must also be tested for contact and continuity.

If the ground wire is damaged, the throttle cable must also be replaced.

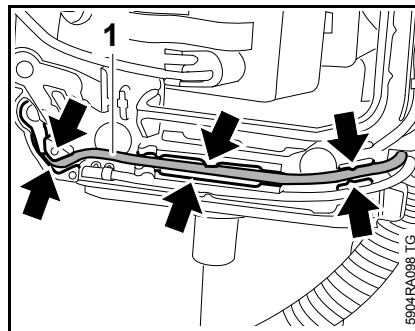
- If no fault can be found, test the ignition system in accordance with flow chart, [6.7](#)
- Reassemble parts in reverse order

### 6.6.2 Short circuit wire on engine, removal and installation

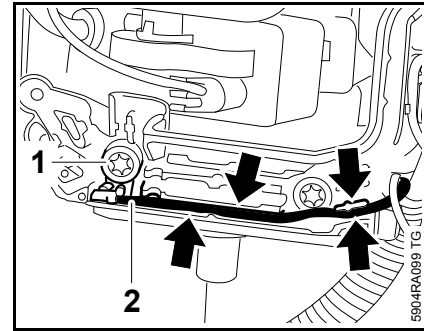
- Remove shroud, [5.4](#)
- Unplug the spark plug boot
- Remove drive tube assembly, 1-point antivibration system, [12.1](#), 4-point antivibration system, [12.2](#)
- Remove machine cover, [4.1](#)



- Remove screw (1) and pull lead (2) of the ignition module out of the guides (arrows)

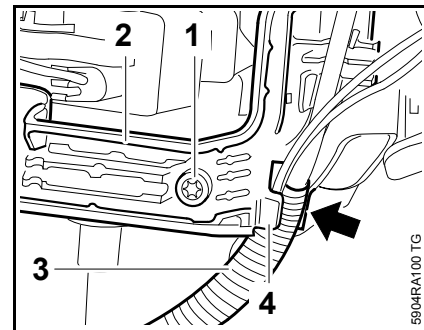


- Remove short circuit wire (1) from the guides (arrows)

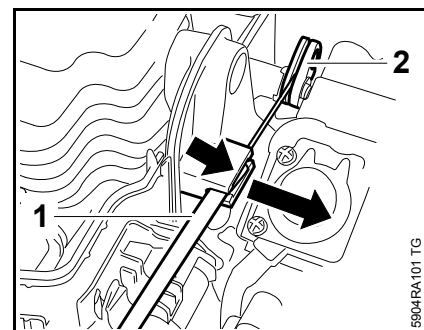


The blade receptacle is permanently connected to the connector tag and cannot be pulled off.

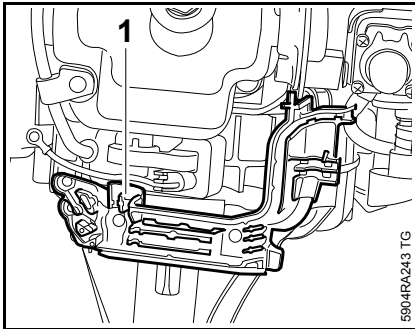
- Remove screw (1)
- Remove ground wire (2) from the guides (arrows)



- Remove screw (1)
- Lift up cable holder (2) slightly, pull out protective tube (3) by the tab (4) and out of the guide (arrow)



- Pull throttle cable (1) out of the mount (arrow) and unhook it from the lever (2)

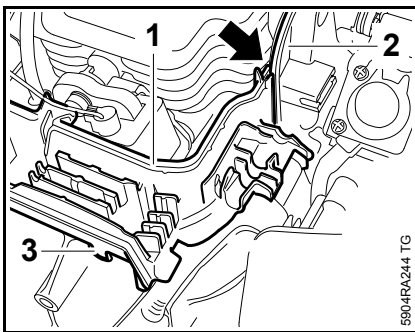


- Take out and examine the cable holder (1), replace if necessary

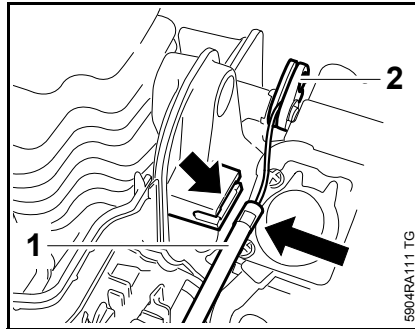
- Remove short circuit wire on control handle, control handle for loop handle, 6.6.4  
Control handle for bike handle, 6.6.5

### Installation

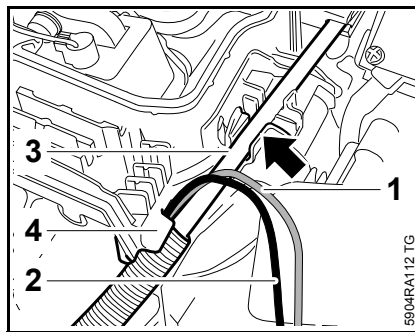
- Install short circuit wire on control handle, control handle for loop handle, 6.6.4  
Control handle for bike handle, 6.6.5



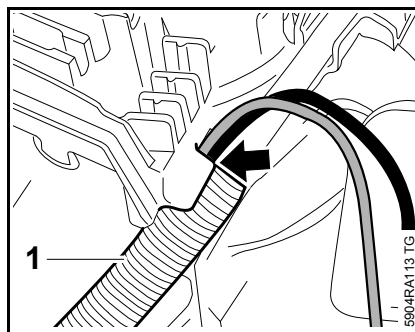
- Position the cable holder (1) on the clutch housing so that it engages behind the groove (arrow) of the spacer flange (2) and the tab (3) is seated in the recess of the clutch housing



- Hook throttle cable (1) onto lever (2) and press grommet into the mount (arrow)

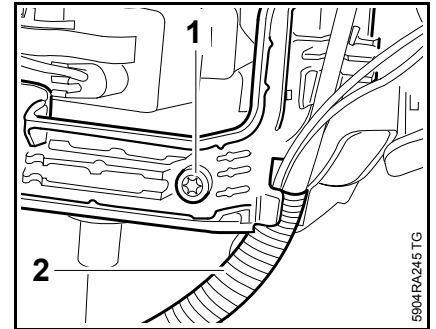


- Orient throttle cable so that short circuit wire (1) and ground wire (2) face the cable holder
- Position Bowden cable (3) in the guide (arrow) and guide protective tube under the tab (4)

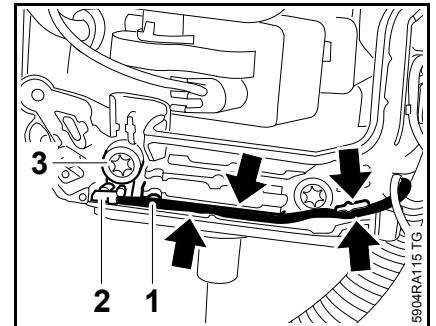


- Position protective tube (1) of the throttle cable in the guide of the clutch housing so that it is aligned with the edge (arrow) of the cable holder

As strain relief, the protective tube is clamped between the tab of the cable holder and the guide of the clutch housing.

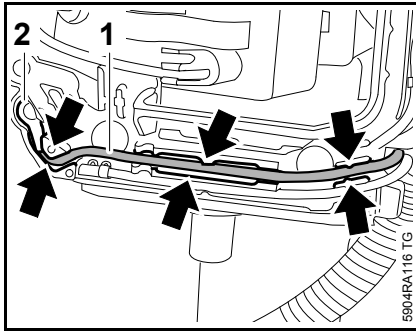


- Screw in screw (1)  
– do not tighten
- Check orientation and position of the protective tube (2), align if necessary, and tighten screw (1)

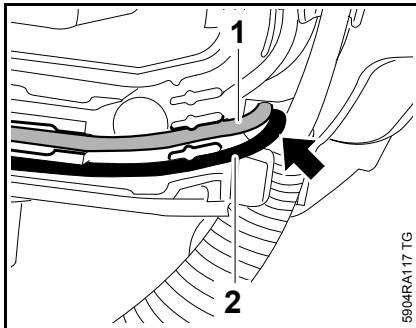


- Place connector tag (2) of the ground wire (1) in the recess and, starting at the recess, press into the guides (arrows) as far as it will go
- Screw in screw (3)  
– do not tighten

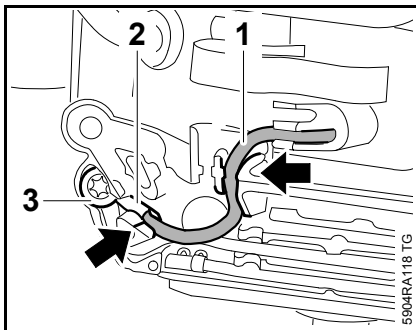




- Press short circuit wire (1) with the lug (2) into the mount
- Starting at the lug (2), press the short circuit wire (1) into the guides (arrows) as far as it will go



To provide strain relief for the wires, the short circuit wire (1) and ground wire (2) must form small loops (arrow) at the protective tube  
 – Ensure that wires are not crossed.

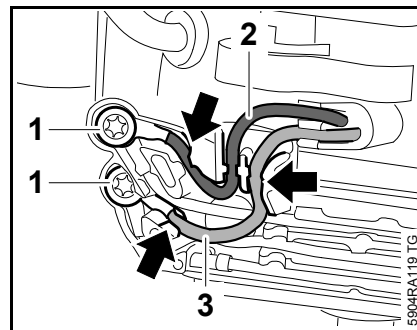


- Press lug (2) into the mount with the crimped side facing the cable holder

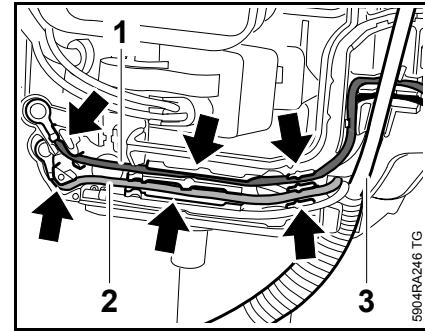
- Starting at the lug (2), press the lead (1) of the ignition module into the guides (arrows) as far as it will go
- Screw in the screw (3) and tighten
- Reassemble remaining parts in reverse order

### 6.6.3 Short circuit wire with M-Tronic on engine, removal and installation

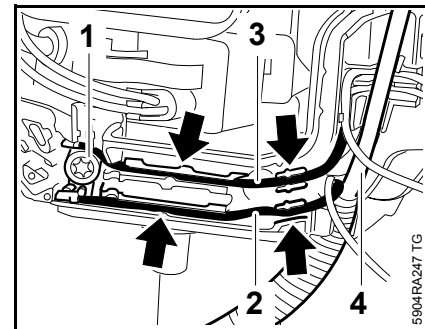
- Remove shroud, [12.1](#)
- Unplug the spark plug boot
- Remove drive tube assembly, 1-point antivibration system, [12.1](#), 4-point antivibration system, [12.2](#)
- Remove machine cover, [4.1](#)



- Remove screws (1)
- Pull the red lead (2) and blue lead (3) of the control unit (ignition module) out of the guides (arrows)

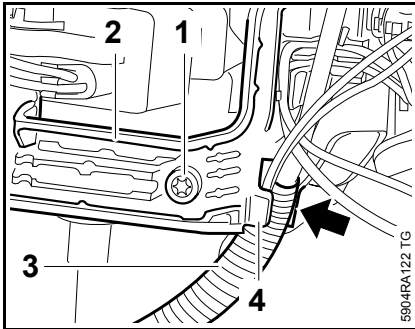


- Pull the red lead (1) of the M-Tronic out of the guides (arrows) up to the throttle cable (3)
- Remove blue lead (2) of the short circuit wire from the guides (arrows)

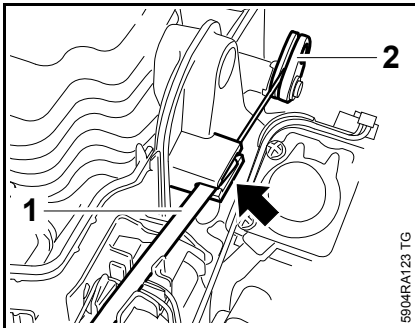


The blade receptacles are permanently connected to the connector tags and cannot be pulled off.

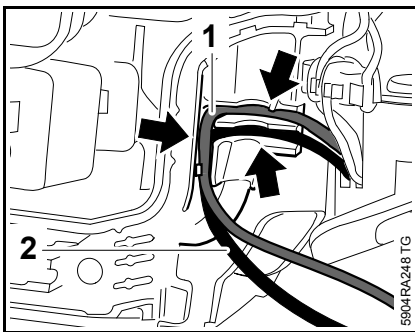
- Remove screw (1)
- Remove ground wire (2) of the short circuit wire from the guides (arrows)
- Pull the ground wire (3) of the M-Tronic out of the guides (arrows) up to the throttle cable (4)



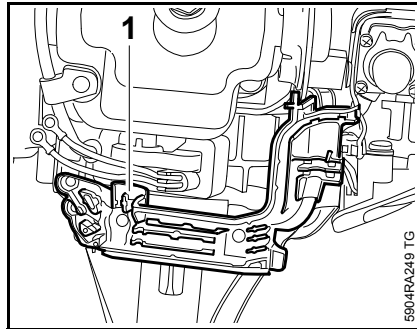
- Remove screw (1)
- Lift up cable holder (2) slightly, pull out protective tube (3) by the tab (4) and out of the guide (arrow)



- Pull throttle cable (1) out of the mount (arrow) and unhook it from the lever (2)



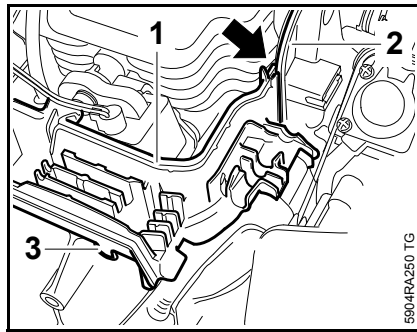
- Pull red lead (1) and ground wire (2) of the M-Tronic out of the guides (arrows)



- Take out and examine the cable holder (1), replace if necessary
- Remove short circuit wire on control handle, control handle for loop handle, [📖 6.6.4](#)  
Control handle for bike handle, [📖 6.6.5](#)

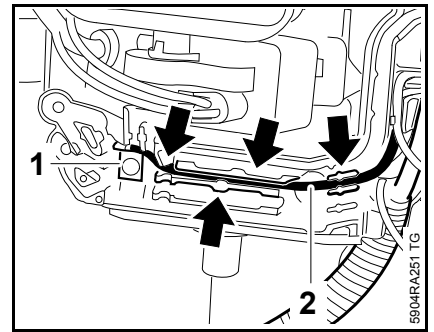
### Installation

- Install short circuit wire on control handle, control handle for loop handle, [📖 6.6.4](#)  
Control handle for bike handle, [📖 6.6.5](#)

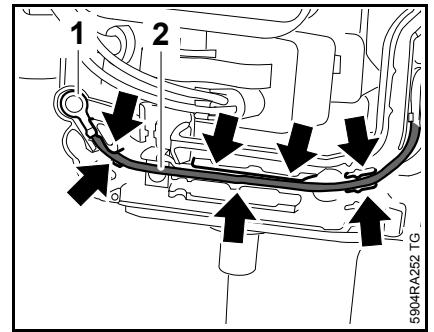


- Position the cable holder (1) on the clutch housing so that it engages behind the groove (arrow) of the spacer flange (2) and the tab (3) is seated in the recess of the clutch housing

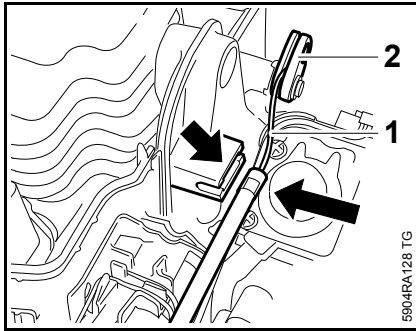
The leads of the M-Tronic are run along the throttle cable guide of the cable holder under the throttle cable in the guides. So that the total length of the leads installed is correct, they must be completely routed in the cable holder and secured in the guides before installation of the throttle cable.



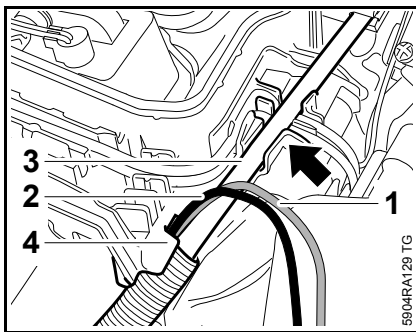
- Place ground wire (2) with connector tag (1) in the recess and, starting at the recess, press into the guides (arrows) as far as it will go



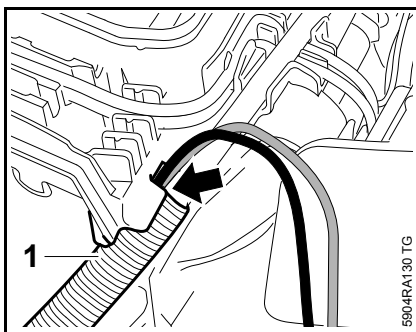
- Press red lead (2) of the M-Tronic with the lug (1) into the mount and, starting at the mount, press into the guides (arrows) as far as it will go



- Hook throttle cable (1) onto lever (2) and press grommet into the mount (arrow)



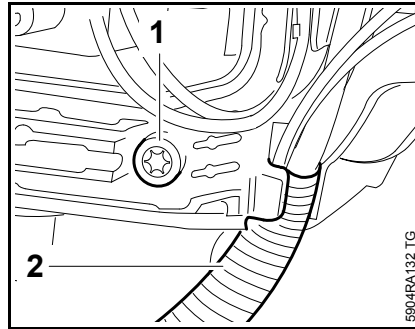
- Orient throttle cable so that short circuit wire (1) and ground wire (2) face the cable holder
- Position Bowden cable (3) in the guide (arrow) and guide protective tube under the tab (4)



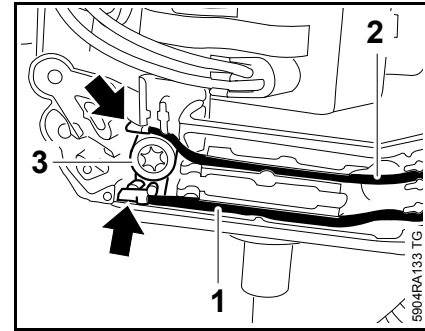
- Position protective tube (1) of the throttle cable in the guide of the clutch housing so that it is aligned with the edge (arrow) of the cable holder

As strain relief, the protective tube is clamped between the tab of the cable holder and the guide of the clutch housing.

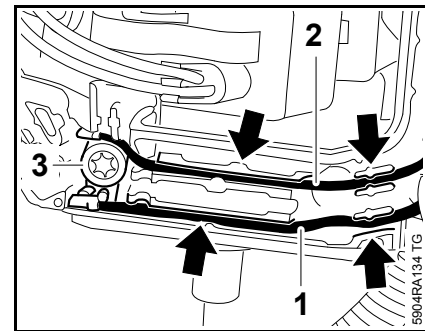
- Hold the cable holder with throttle cable in this position
- Pull the red and black lead of the M-Tronic out of the guides again up to the throttle cable



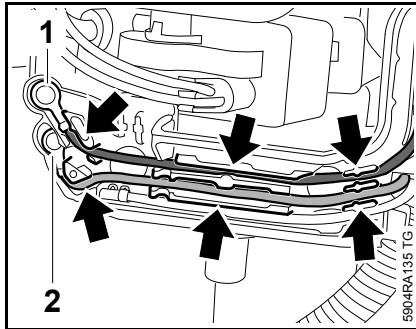
- Screw in screw (1) – do not tighten
- Check orientation and position of the protective tube (2), align if necessary, and tighten screw (1)



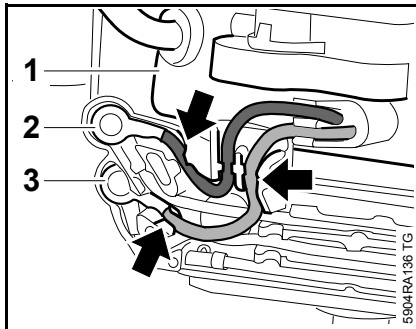
- Position ground wire (1) of the short circuit wire and ground wire (2) of the M-Tronic with the connector tags (arrows) in the recess
- Screw in screw (3) – do not tighten



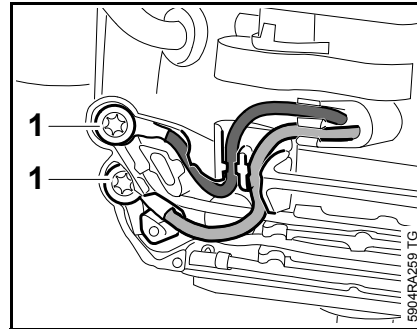
- Starting at the connector tags, press ground wire (1) of the short circuit wire and ground wire (2) of the M-Tronic into the guides (arrows) as far as they will go
- Tighten screw (3)



- Insert lead (red) of the M-Tronic with the lug (1) in the mount – crimped side must face cable holder
- Insert lead (blue) of the short circuit wire with the lug (2) in the mount – crimped side must face cable holder
- Starting at the lug, press both leads into the guides (arrows) as far as they will go



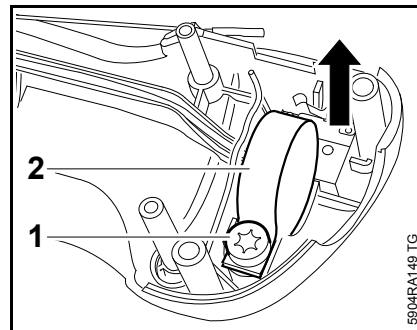
- Insert lead (red) of the control unit (ignition module) (1) with the lug (2) in the mount – crimped side must face cable holder
- Insert lead (blue) of the control unit (ignition module) (1) with the lug (3) in the mount – crimped side must face cable holder
- Starting at the lug, press both leads into the guides (arrows) as far as they will go



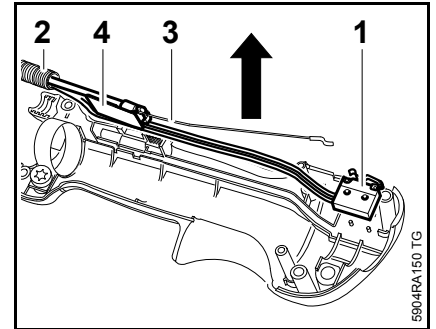
- Insert and tighten down the screws (1)
- Reassemble remaining parts in reverse order

#### 6.6.4 Short circuit wire on control handle for loop handle, removal and installation

- Remove throttle trigger and trigger interlock, [10.1.1](#)
- Remove slide control, [10.1.2](#)

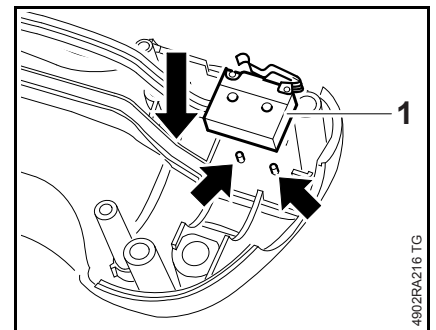


- Unscrew screw (1) and remove clamp (2)

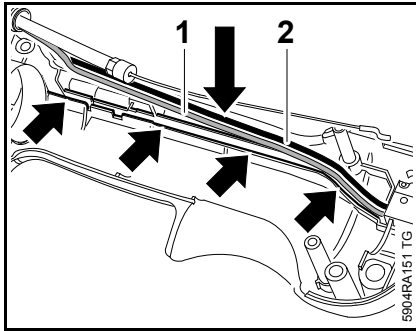


- Ease out microswitch (1)
- Pull out wiring harness (2) with throttle cable (3) and slide (4)
- Remove throttle cable and short circuit wire from engine, without M-Tronic, [6.6.2](#), with M-Tronic, [6.6.3](#)

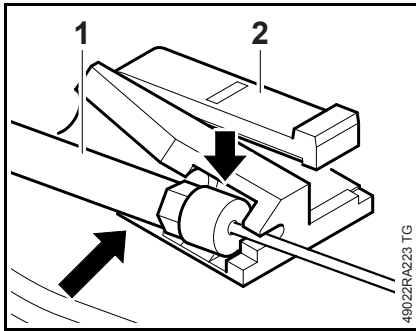
#### Installation



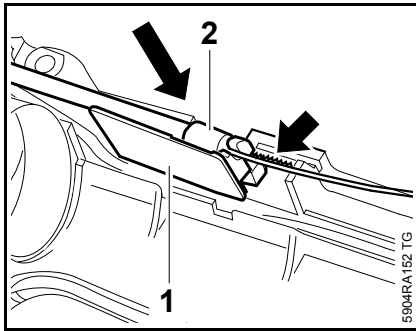
- Push the microswitch (1) onto the pins (arrows) as far as possible



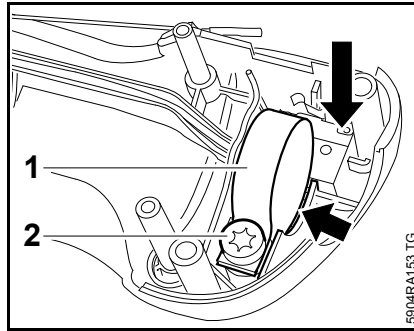
- Press short circuit wire (1) and ground wire (2) into the cable guide (arrows) as far as they will go – short circuit wire must be routed under ground wire



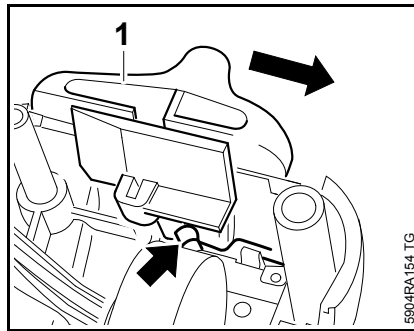
- Press throttle cable (1) into mount (arrow) of the slide (2) until it snaps into place



- Push slide (1) with throttle cable (2) into the middle of the serrated mount (arrow)



- Position clamp (1) in the mount (arrow) and screw in screw (2) – do not tighten
- Install slide control, [10.1.2](#)



- Set slide control (1) to position **STOP-0**, the contact spring (arrow) must actuate the microswitch – this can be heard as a clicking noise

– Install throttle trigger and trigger interlock, [10.1.1](#)

– Install control handle for loop handle, [10.1](#)

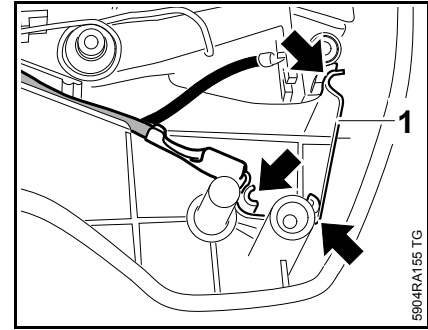
– Install throttle cable and short circuit wire on engine, without M-Tronic, [6.6.2](#), with M-Tronic, [6.6.3](#)

– Adjust throttle cable on control handle for loop handle, [10.2.4](#)

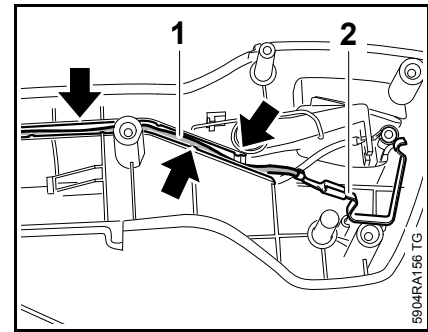
– Reassemble remaining parts in reverse order

### 6.6.5 Short circuit wire on control handle for bike handle, removal and installation

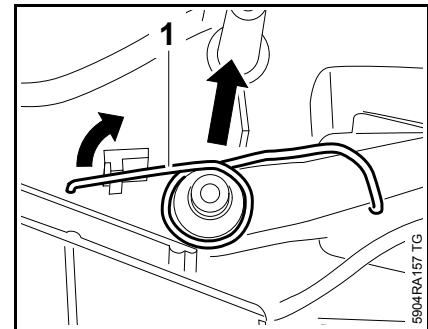
– Remove throttle trigger and trigger interlock, [10.2.2](#)



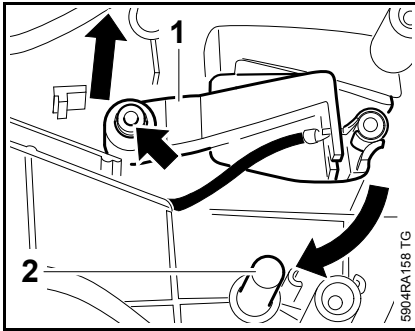
- Remove contact spring (1) from the guides (arrows)



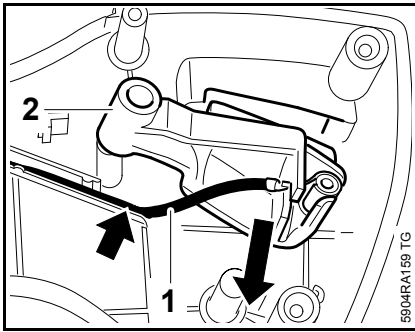
- Remove short circuit wire (1) with contact spring (2) from the guide (arrows)



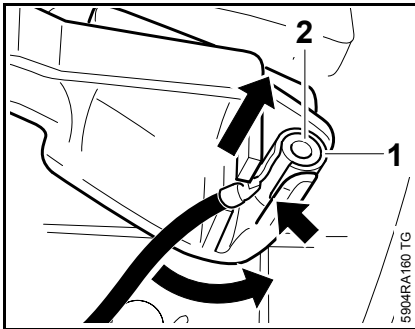
- Relieve and remove torsion spring (1)



- Push lever (1) in the direction of the post (2) of the throttle trigger and remove from post (arrow)



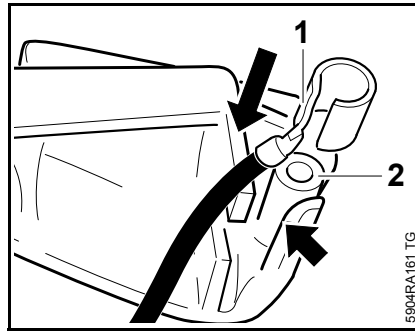
- Remove ground wire (1) with lever (2) from the guide (arrow)



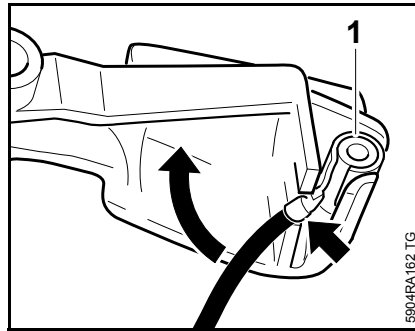
- Twist eyelet (1) as far as it will go (arrow) and remove from the post of the lever (2)

– Remove throttle cable and short circuit wire from engine, without M-Tronic, 6.6.2, with M-Tronic, 6.6.3

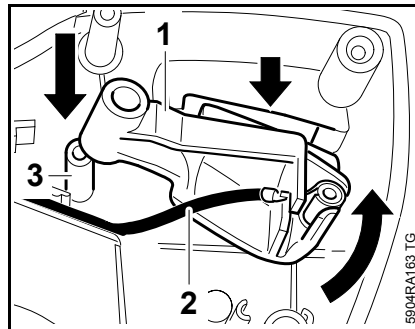
## Installation



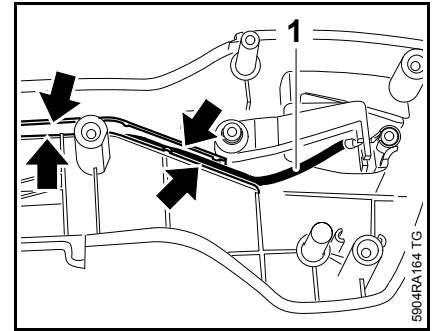
- Slide eyelet (1) onto the post (2) of the lever so that the eyelet opening faces the stop (arrow)



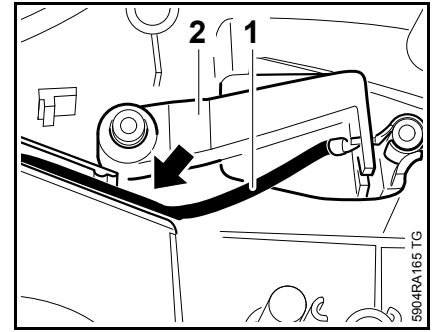
- Twist eyelet (1) as far as it will go into the locking groove (arrow).



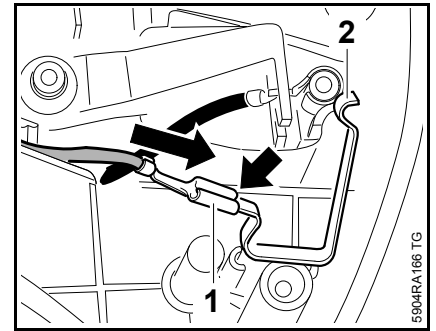
- Push lever (1) with ground wire (2) onto the post (3) and turn in the opening (arrow)



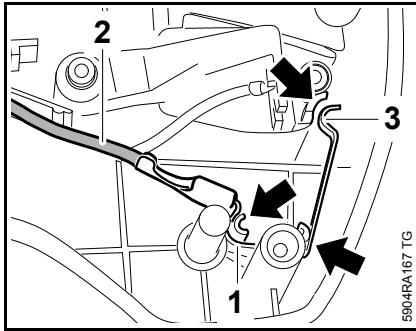
- Press ground wire (1) as far as it will go into the guide (arrows)



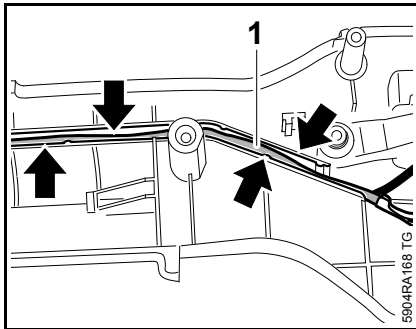
The ground wire (1) must not be stretched between lever (2) and guide (arrow).



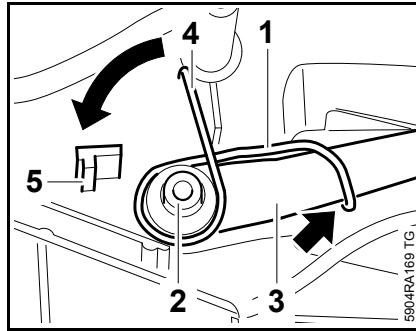
- Push blade receptacle (1) of the short circuit wire onto the contact spring (2) as far as it will go – crimped side must face curvature (arrow) of the contact spring



- Press contact spring (1) with short circuit wire (2) into the guides (arrows) as far as it will go, in the process slightly lifting the contact point (3)



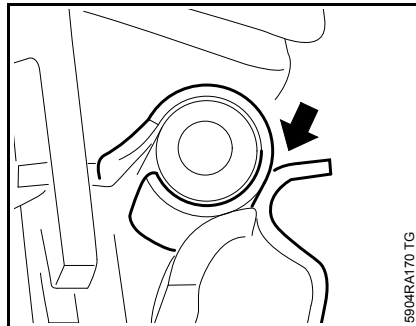
- Press short circuit wire (1) as far as it will go into the guide (arrows)



- Slide torsion spring (1) onto the axle (2) so that the hook (arrow) engages in the lever (3)
- Turn torsion spring (4) counterclockwise and position on stop (5)

Torsion spring is tensioned and can pop out.

#### Checking operation



Eyelet of the ground wire must touch the contact spring in STOP position (arrow)

- Install throttle trigger and trigger interlock, [10.2.2](#)
- Install control handle for bike handle, [10.2.1](#)
- Adjust throttle cable on control handle for bike handle, [10.2.4](#)
- Reassemble remaining parts in reverse order

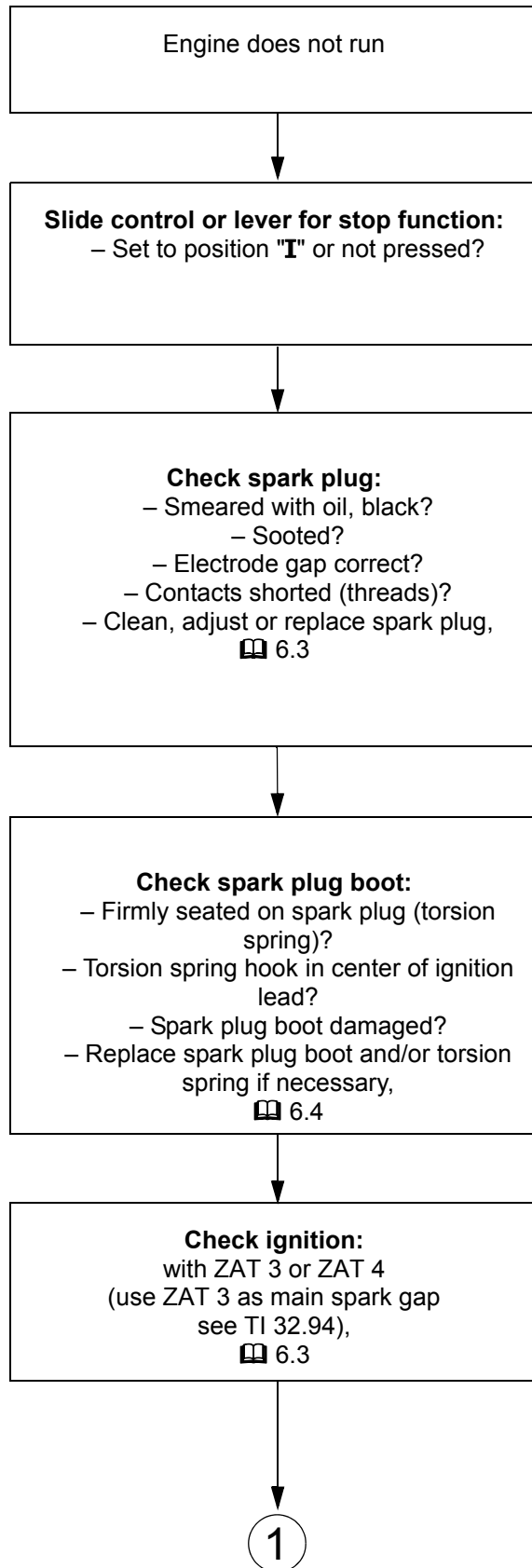
#### 6.6.6 Ground wire

Testing and installation of ground wire is the same as for the short circuit wire

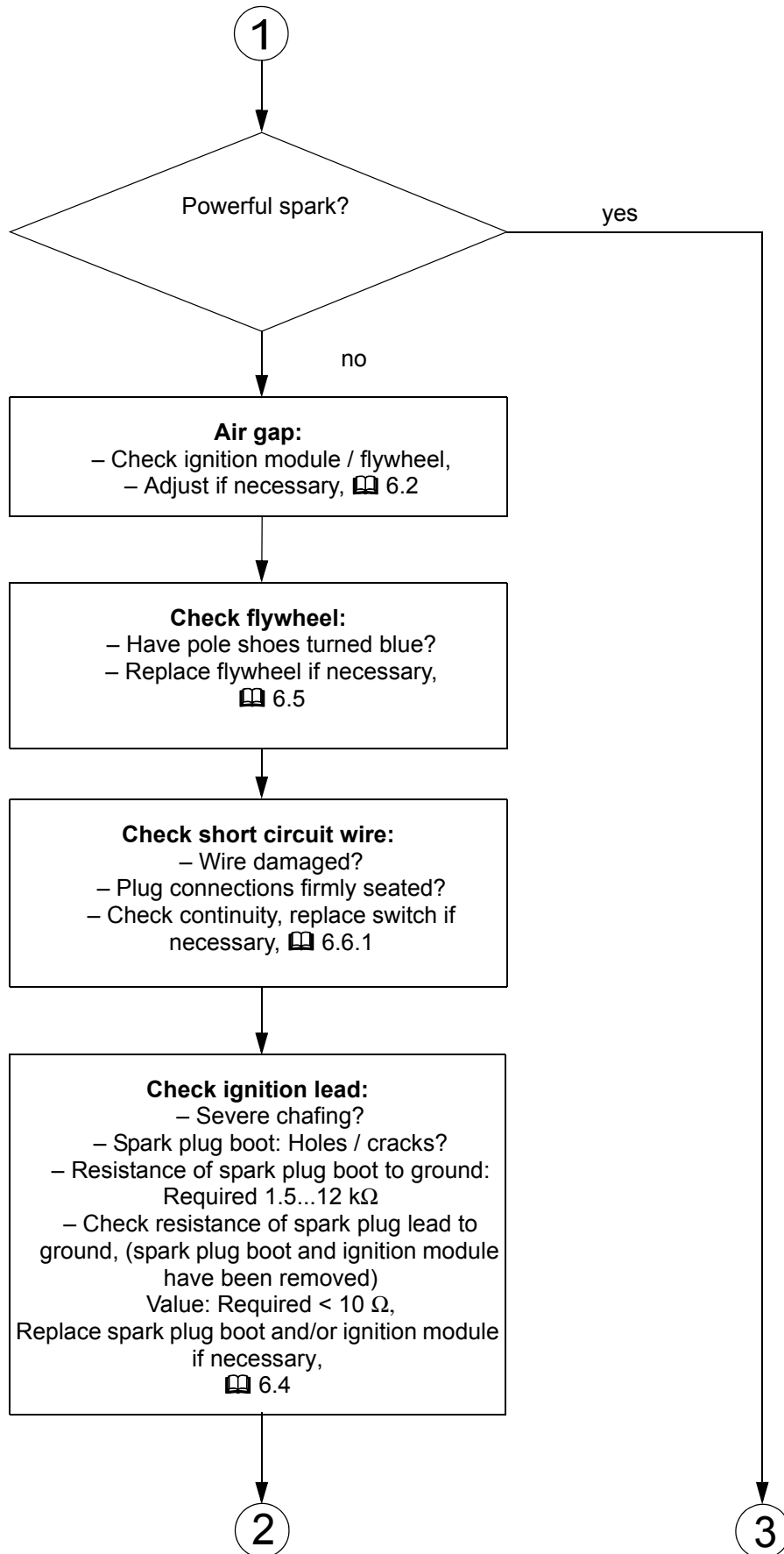
- Check contacts and operation, replace throttle cable if necessary, [6.6](#)

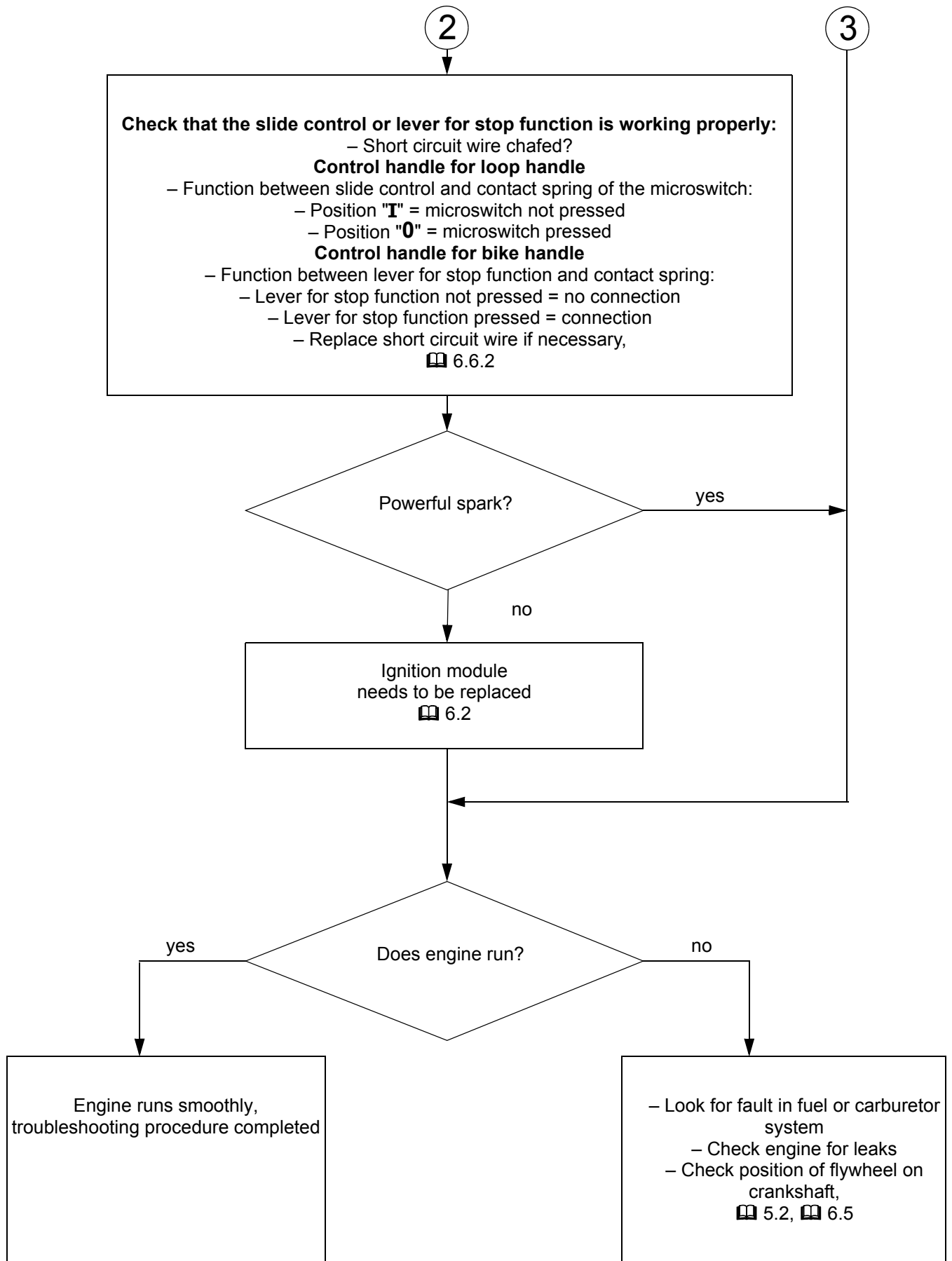
#### 6.6.7 Contact spring versions with control handle for bike handle

Testing and installation of the contact spring is described in the chapter "Short circuit wire control handle for bike handle", [6.6.5](#).

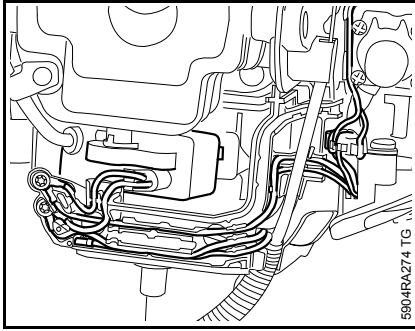








## 7. M-Tronic



The fully electronic M-Tronic engine management system controls the ignition timing and fuel flow, taking all external conditions into account.

A basic or standard setting of the carburetor is no longer required. The M-Tronic electronically adjusts the fuel-air mixture in the carburetor.

The M-Tronic controls all operating states such as start, idle, part throttle and full throttle while accounting for the external conditions, e.g., use at varying attitudes, as well as changing temperatures or fuel quality – the carburetor does not have any adjusting screws.

Troubleshooting and test procedures are described in the following chapters, Testing, 7.3, Troubleshooting, 7.5.

### 7.1 Calibrating the control unit

Calibration of the control unit may be necessary if the outstanding running behavior and usual performance of the engine can no longer be attained.

Sequence of operations for calibration:

- Remove cutting attachment, all mounting hardware for the cutting attachment and the thrust plate

- Let the engine warm up for approx. 120 seconds at full throttle; during this time, carry out several short load changes (let engine idle – then accelerate again to full throttle)
- Let the engine idle for approx. 5 seconds
- Let the machine run four or five times for approx. 30 seconds at full throttle in the cut-off range. Let the engine idle for periods of approx. 5 seconds each between the full-throttle phases.

### 7.2 Resetting the control unit to factory defaults

If the control unit and/or the carburetor is replaced in customer service, the M-Tronic must be reset to the factory defaults.

- Set choke lever to position ▲
- Start engine – do **not** blip the throttle trigger!
- Let engine run in this start position for at least 90 seconds
- Actuate the stop switch – calibration is completed

The control unit is adjusted to the carburetor while the engine runs in the position Start ▲. The control unit saves the information when the engine is switched off immediately.

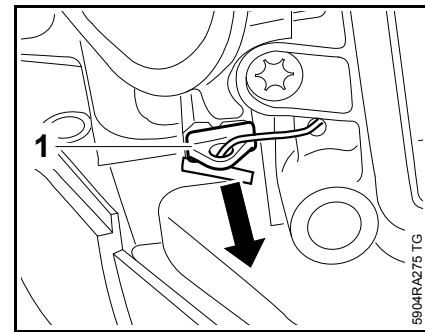
## 7.3 Testing

### 7.3.1 Test preparations

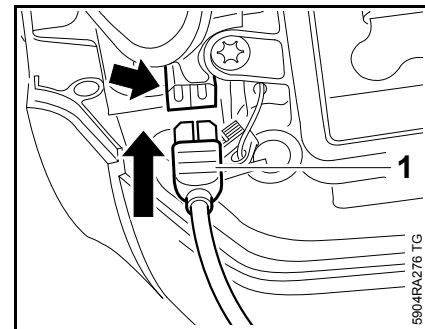
The following steps must be carried out before testing.

- Carry out troubleshooting according to troubleshooting chart, 7.5
- Remove shroud, 5.4
- Remove coarse dirt from around the screwed connections, control unit, switchgear, solenoid valve and diagnostic jack
- Remove the air filter cover, 11.1

### 7.3.2 Connect the test lead




- Remove the plug (1)



- Connect M-Tronic test lead (1) 5910 840 0903 to the diagnostic jack (arrow)

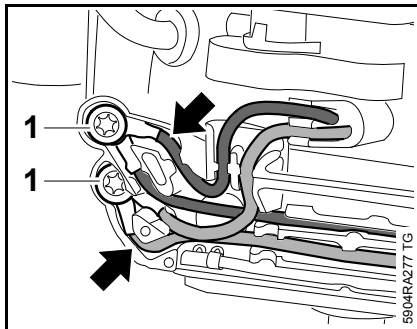
After ending the test procedure, disconnect the test lead and reseal the diagnostic jack with the plug.

### 7.3.3 Check screwed and plug connections as well as switch

- Carry out test preparations,  7.3.1

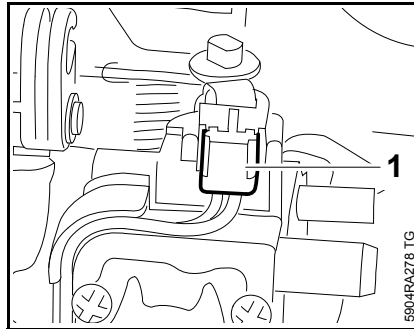
There must be a reliable connection for communication between control unit, switching device and solenoid valve. If communication between control unit and solenoid valve is interrupted or faulty, the control unit does not initiate an ignition spark.

- In the event of a malfunction or if there is no ignition spark, first check the plug connections and wiring harness between control device and solenoid valve



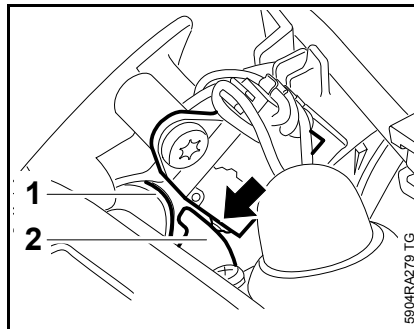
Screws (1) must be tight.

Leads (arrows) must be seated completely and firmly in the cable lugs.






Plug (1) must be seated completely and firmly in the recess of the solenoid.

- If necessary, remove plug (1) and check contacts

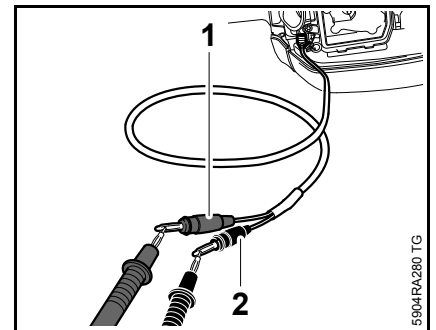


- Set choke lever (1) to position ▲; the cam on the lever (2) must actuate the microswitch (arrow)
  - Clicking noise

### 7.3.4 Checking the solenoid valve

- Carry out test preparations,  7.3.1
- Check contacts and operation,  7.3.3
- Move choke lever to position "I"
- Connect the test lead,  7.3.2

#### Measuring resistance






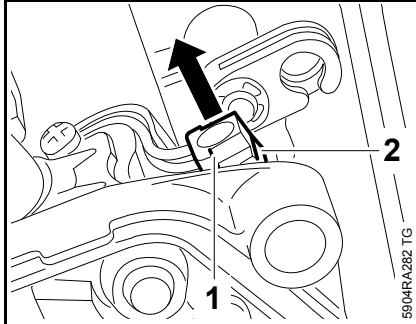
- Measure resistance between plugs (1) and (2) of the M-Tronic test lead

Target value: between 28 and 42 ohms

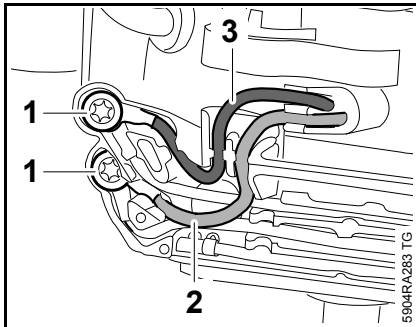
- If the target value is not attained, check electrical leads for interruption, e. g., due to cable breakage between solenoid valve and diagnostic jack

### 7.3.5 Checking the start detection function

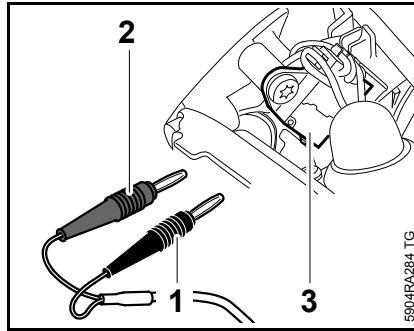
- Carry out test preparations,  7.3.1
- Check contacts and operation,  7.3.3
- Connect the test lead,  7.3.2



- Disconnect the plug (1) from the solenoid valve (2)




- Remove screws (1)
- Pull out the blue lead (2) and red lead (3)
- Move choke lever to position "▲" – slide control or lever for stop function on control handle is not pressed





- Connect M-Tronic test lead to multimeter
- Insert black plug (1) in the "com" / "ground" jack and the red plug (2) in the "volt" / "ohm" jack
- Set multimeter to "diode test"
- Test diode on switchgear (3) (microswitch) in accordance with multimeter instruction manual

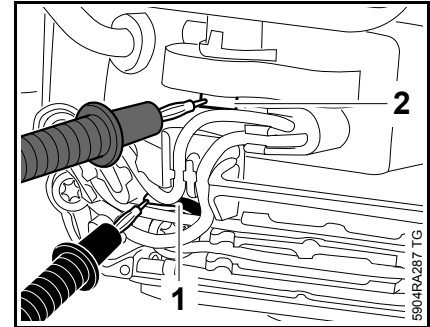
If the switchgear (microswitch) is intact and the choke lever is set to the "▲" position, the following target values will be attained:

- Measurement in direction of flow, target value: 0.3 volts to 0.7 volts
- Move choke lever to position "I" – slide control or lever for stop function on control handle is not pressed
- Reverse-biased measurement Target value: 1.2 volts to infinity
- If target values are not attained, replace M-Tronic wiring harness,  7.4

### 7.3.6 Checking the wiring harness

- Carry out test preparations,  7.3.1
- Check contacts and operation,  7.3.3
- Move choke lever to position "I"


#### Checking the ground connection




- Measure the resistance between blade receptacle (1) and screw (2) at the control unit (ignition module)

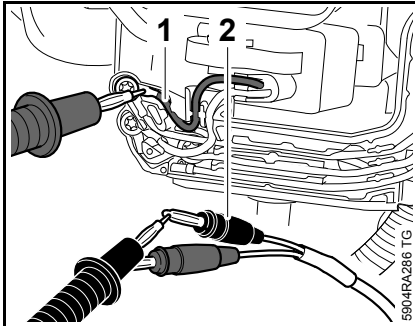
Target value: < 10 ohms.

#### If the target values are not attained

- Check electrical leads for interruption, e. g., cable breakage – if necessary, replace M-Tronic wiring harness,  7.4.

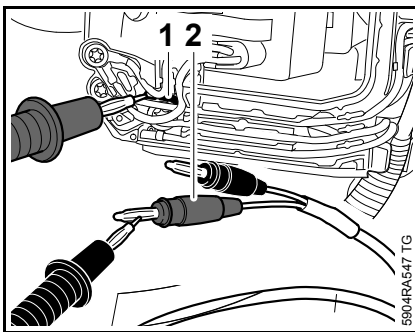
### Check leads between control unit and diagnostic jack

- Connect the test lead,  7.3.2



- Measure the resistance between red lead (1) and black plug (2) of the diagnostic cable

Target value: < 10 ohms.




- Measure the resistance between black lead (1) and red plug (2) of the diagnostic cable

Target value: < 10 ohms.

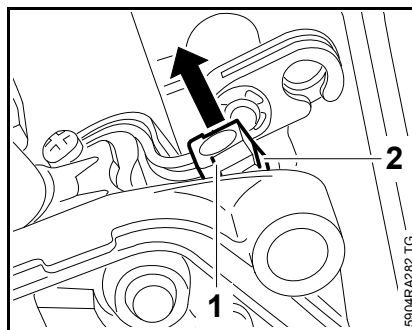
### If the target values are not attained

- Check that screw on control unit (ignition module) and screw on angled terminal socket are firmly seated, if necessary, remove screws and clean with angled terminal socket, then reinsert and tighten

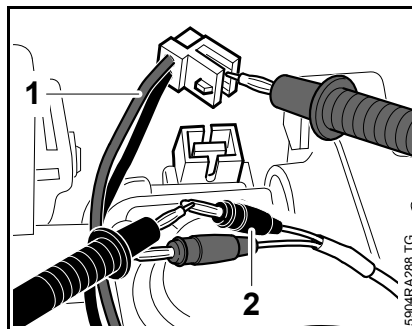
- Check continuity between blade receptacle and angled terminal socket
  - Blade receptacle and angled terminal socket must be firmly connected with one another; in the event of contact problems, the M-Tronic wiring harness must be replaced,  7.4.

### Check leads between solenoid valve and diagnostic jack

- Connect the test lead,  7.3.2

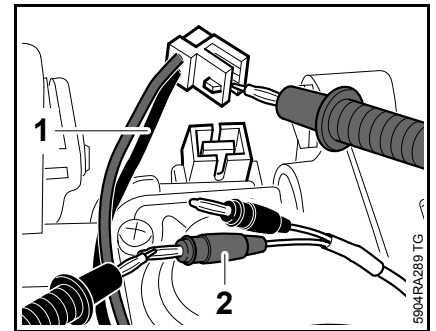


- Disconnect the plug (1) from the solenoid valve (2)



- Measure the resistance between red lead (1) at the plug of the solenoid and black plug (2) of the diagnostic cable

Target value: < 10 ohms



- Measure the resistance between black lead (1) at the plug of the solenoid and red plug (2) of the diagnostic cable

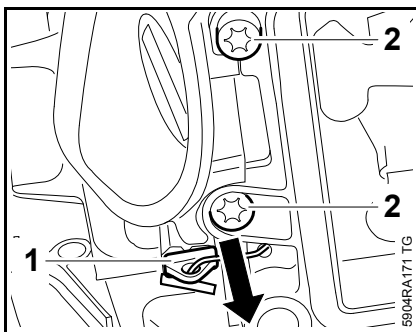
Target value: < 10 ohms

### If the target values are not attained

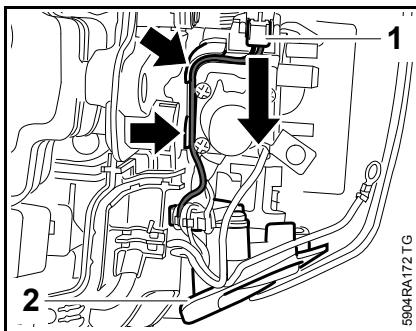
- Check contact surfaces between lug and screw and check leads for interruptions, e. g., cable breakage – the leads must be firmly seated in the blade receptacle and in the lug.

## 7.4 Removal and installation

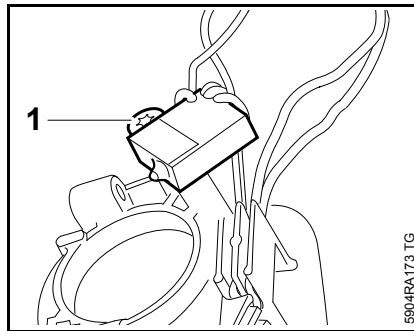
- Remove shroud, 5.4
- Remove the air filter cover, 11.1
- Check M-Tronic, 7.3
- Detach M-Tronic leads from cable holder and remove wiring harness with throttle cable on engine, 6.6.3



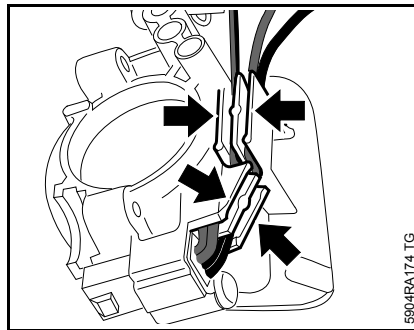
- Remove the plug (1)
- Remove screws (2)



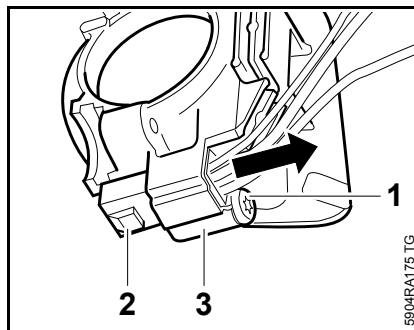
- Remove the plug (1)
- Pull leads out of the guides (arrows)
- Remove bushing (2) with M-Tronic



- Unscrew screw (1) and remove switchgear



- Pull leads out of the guides (arrows)

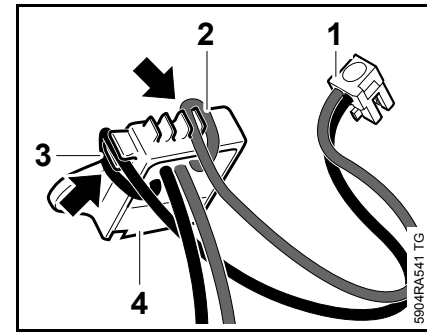


- Unscrew screw (1) and remove diagnostic connector (2) from the mount of the bushing (3)

## Installation

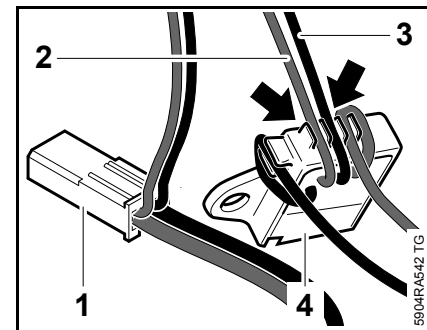
With a new switchgear, first the thin leads must be inserted in the guides of the switchgear.

Leads and plug connections must not be damaged.



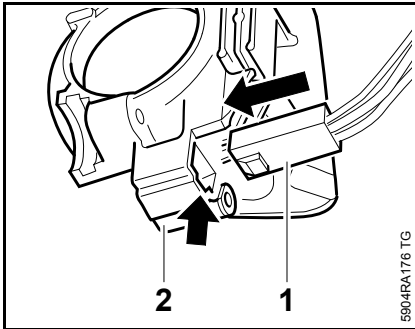
Leads with plug (1) to solenoid valve of the carburetor.

- Press red lead (2) and black lead (3) into the guides (arrows) of the switchgear (4) so that they form a loop
  - see illustration

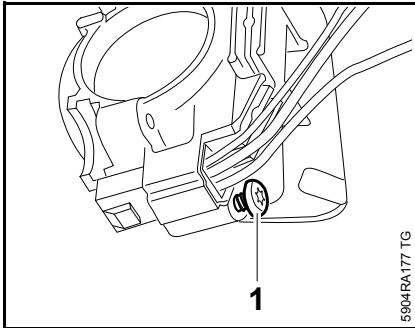


Leads with diagnostic plug (1).

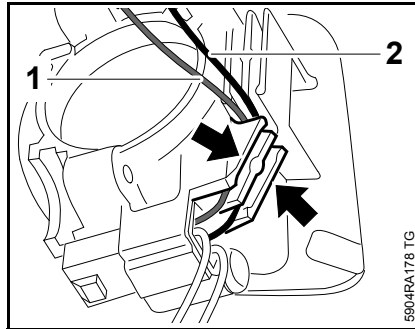
- Press red lead (2) and black lead (3) completely into the guides (arrows) of the switchgear (4)
  - see illustration



- Orient diagnostic connector (1) so that the tab faces the recess (arrow)
- Push the diagnostic connector (1) into the bushing (2) as far as it will go

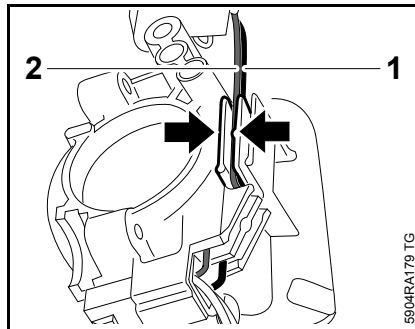


- Insert and tighten screw (1) – firm seating of the diagnostic connector is ensured



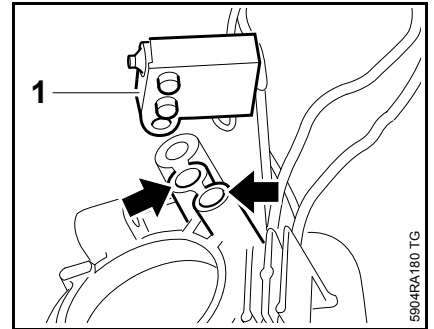
Insert the thin leads of the

- Press red lead (1) and black lead (2) as far as they will go into the guides (arrows) on the plug

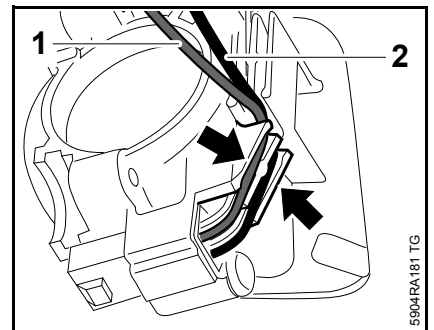


Run the black lead under the red lead – for left guide, see illustration

- Press black lead (1) and red lead (2) as far as they will go into the guide that is offset by 90° (arrows)



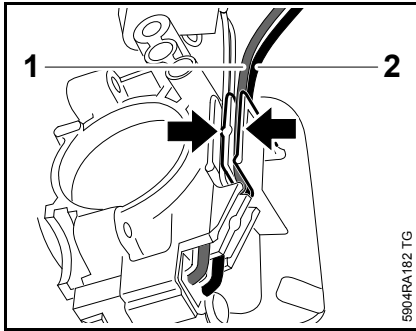
- Insert switchgear (1) with the pegs in the mounts (arrows)
- Insert and tighten down the screw



Run the thick leads to the ignition module over the thin leads.

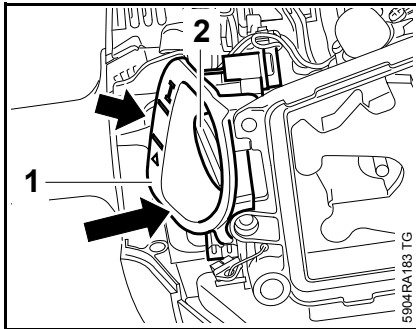
- Press red lead (1) and black lead (2) as far as they will go into the guides (arrows) on the plug





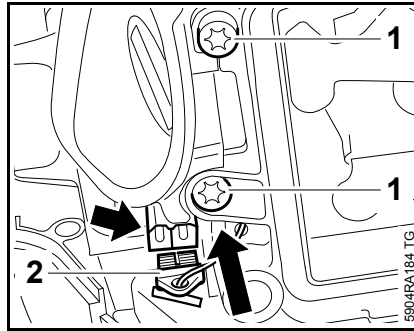
Run the black lead under the red lead – for right guide, see illustration

- Press black lead (2) and red lead (1) as far as they will go into the guide that is offset by 90° (arrows)

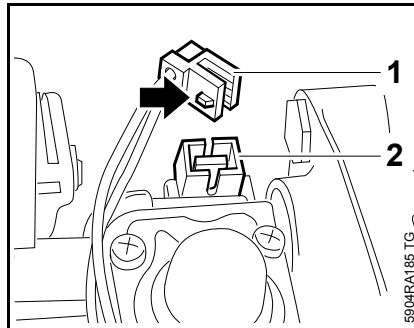


– Move choke lever to position "I"

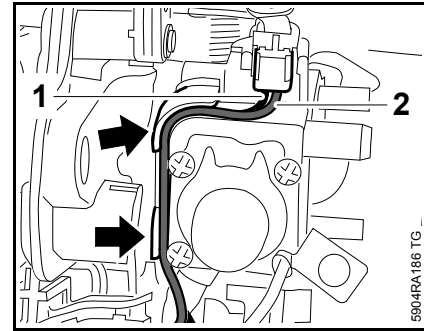
- Orient bushing (1) so that the scale (arrow) faces the cylinder
- Guide bushing (1) over the choke lever (2) and position




- Insert and tighten down the screws (1)
- Press plug (2) into the diagnostic connector (arrow) as far as it will go



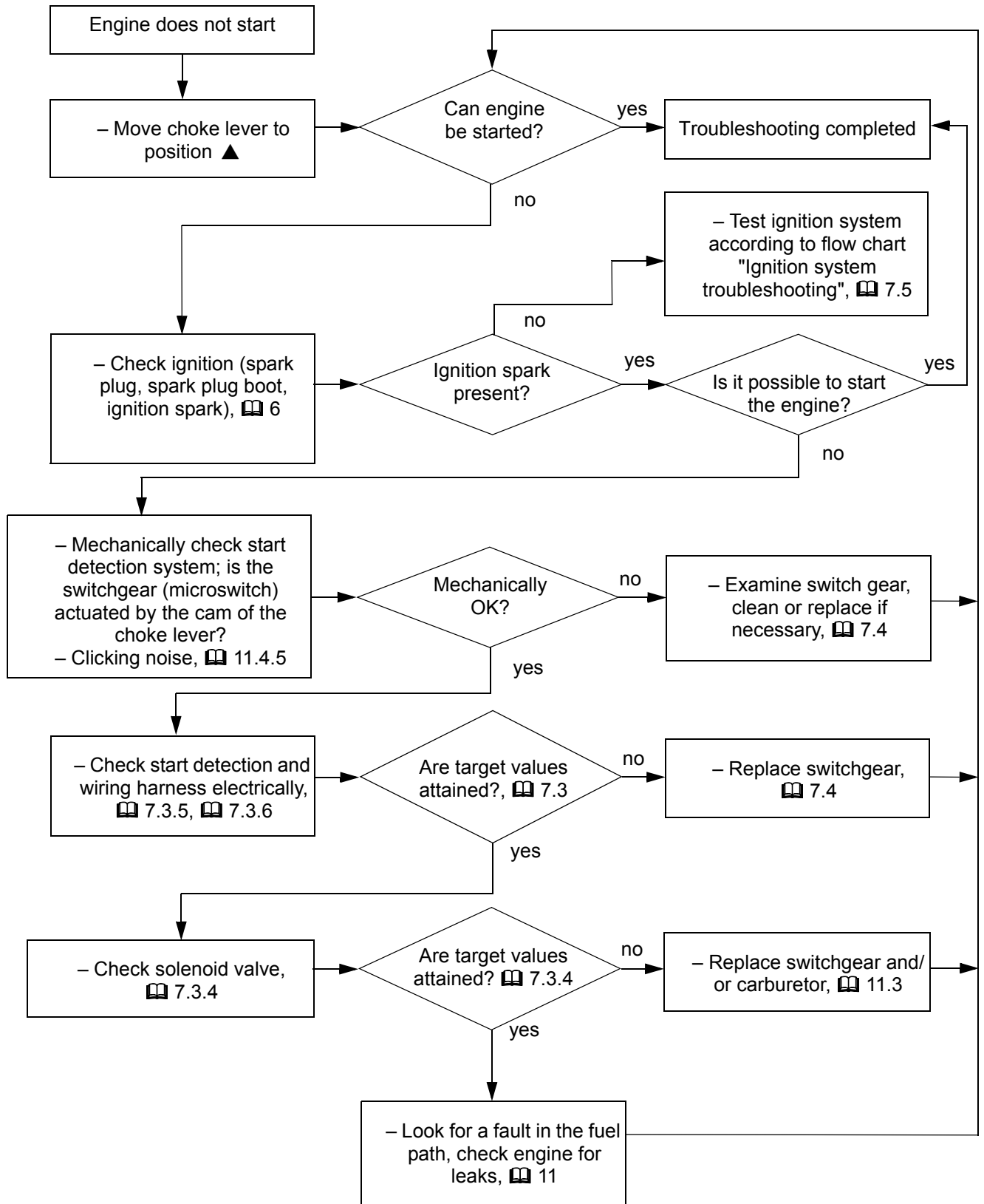
- Orient plug (1) so that the lug (arrow) aligns with the groove in the mount (2)
- Push plug into the mount as far as it will go



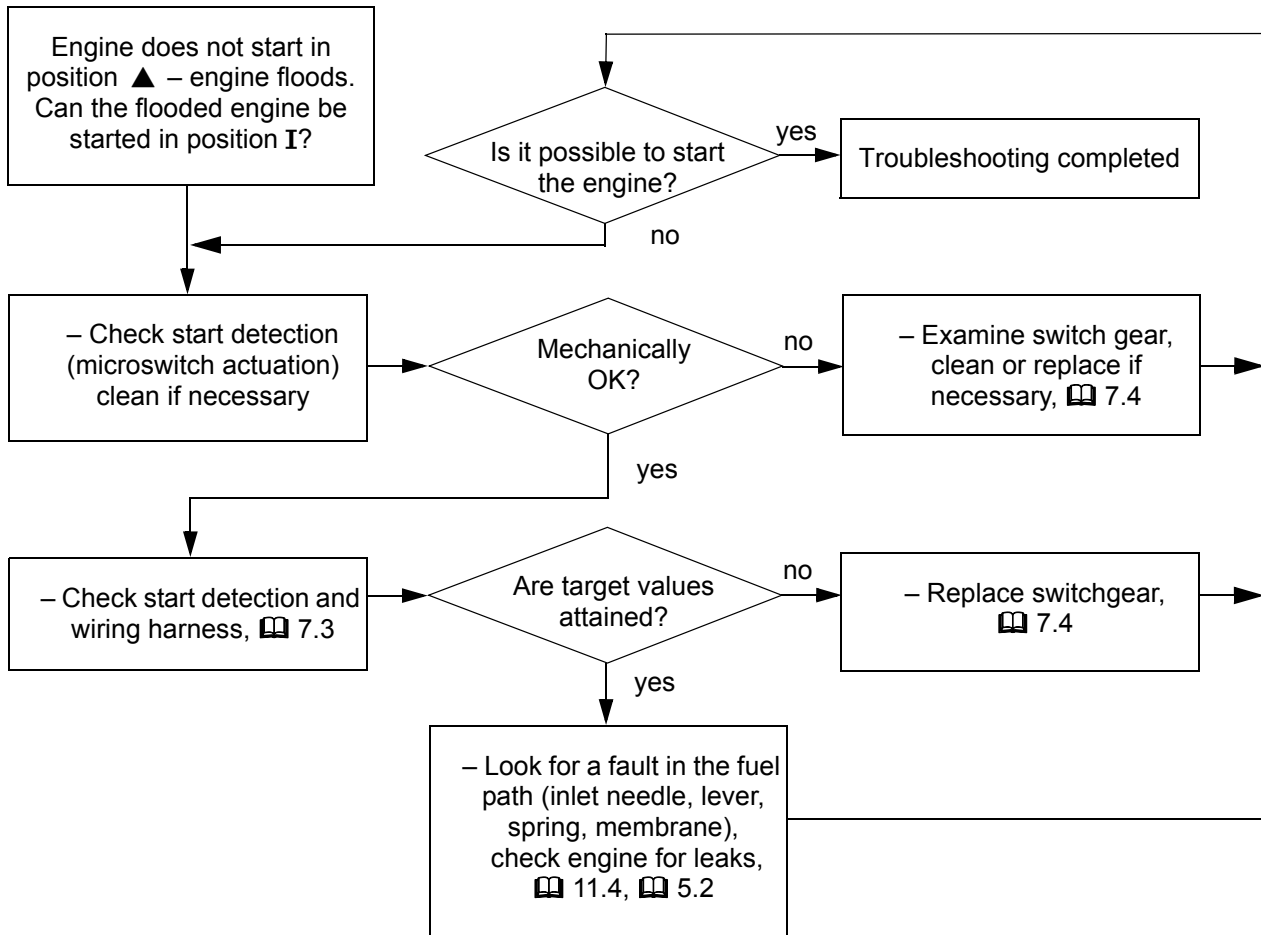
Do not expose plug to tensile loads, thus run leads so that they form a 90° loop at the plug.

- Press black lead (1) as far as it will go into the guides (arrows), starting at the plug
- Press red lead (2) as far as it will go into the guides (arrows), starting at the plug
- Install wiring harness and throttle cable on engine, install M-Tronic leads in cable holder,  6.6.3
- Reassemble remaining parts in reverse order

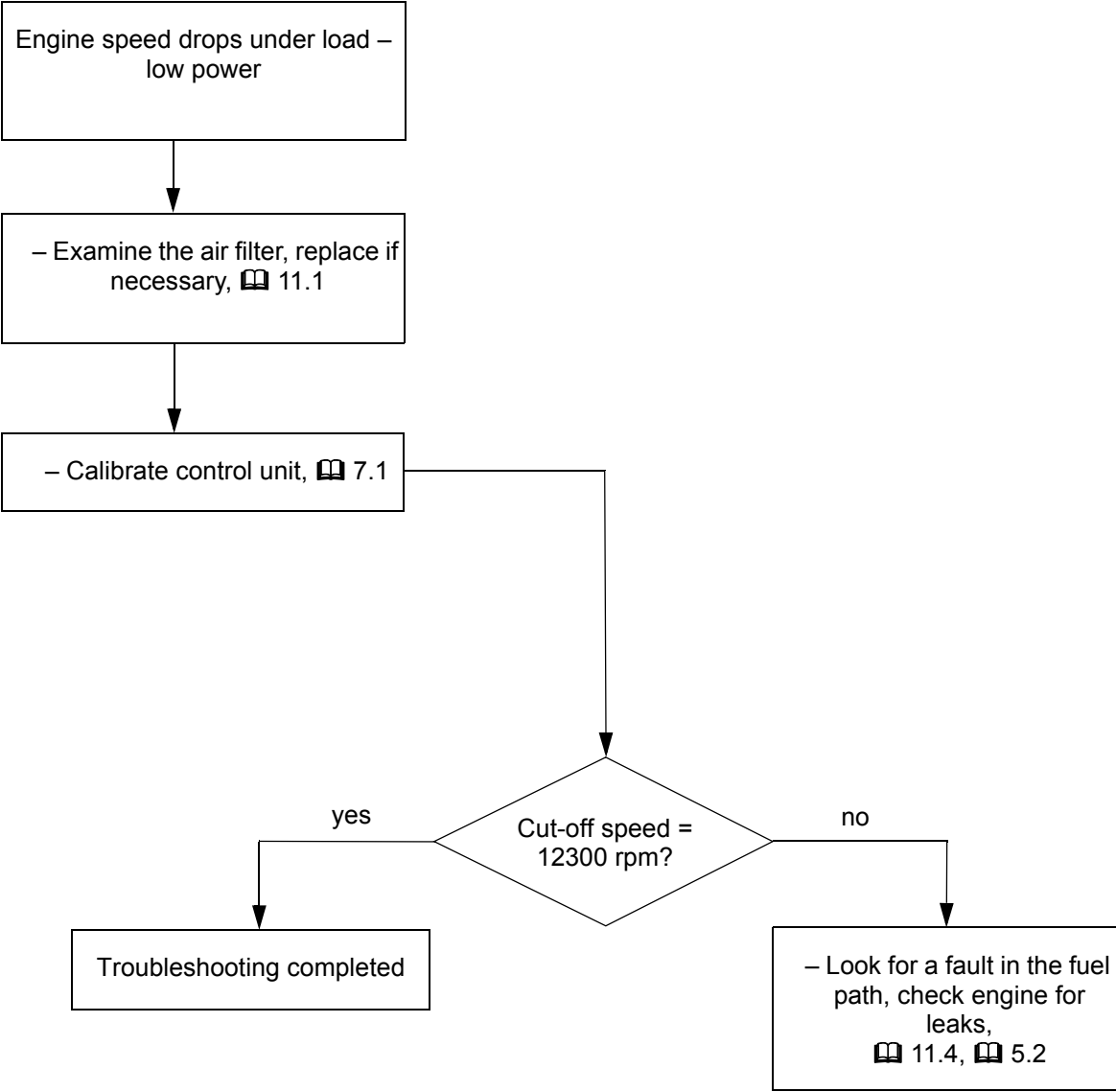
7.5.1 Engine does not start



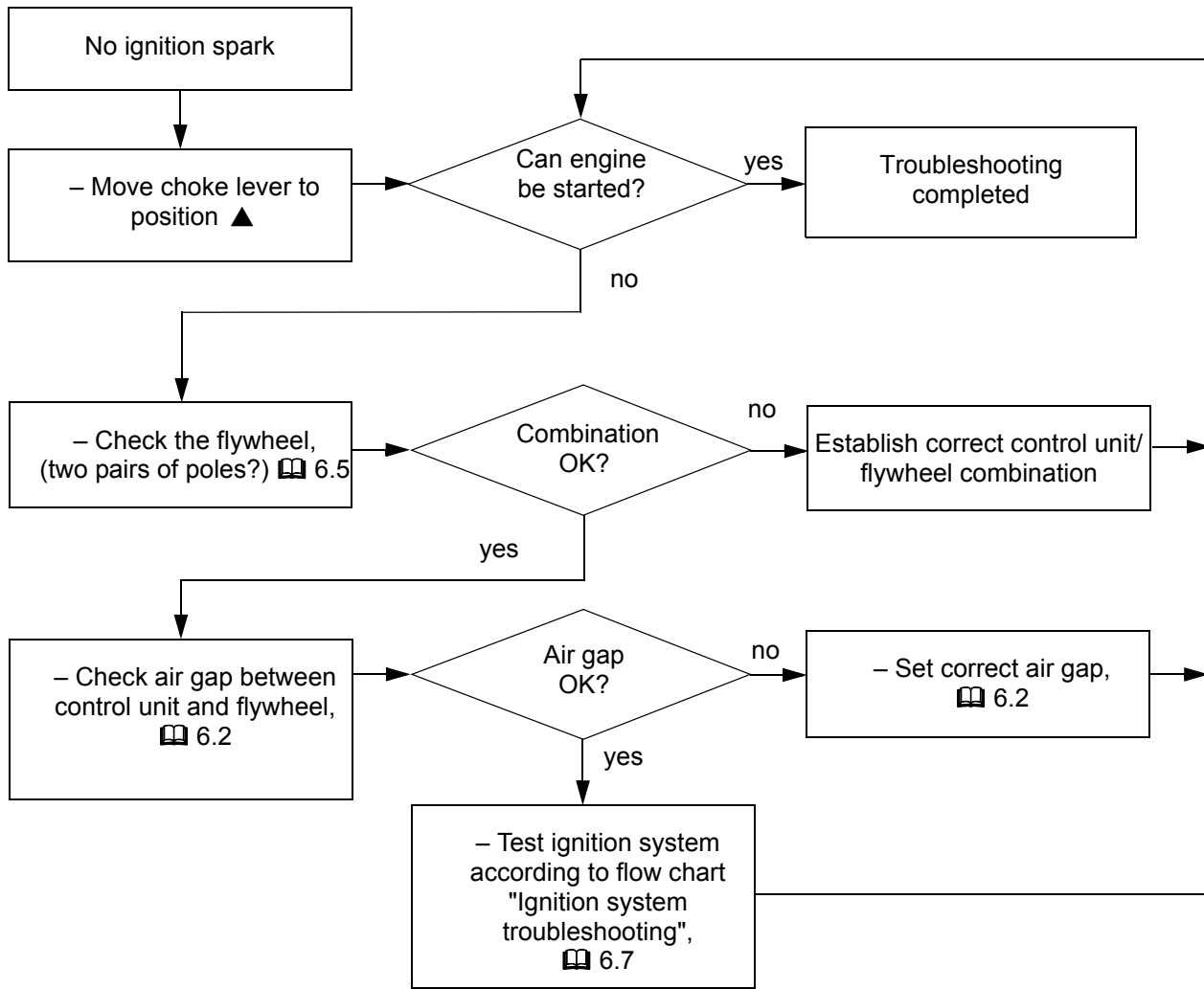
**7.5.2 Engine does not start in position ▲**



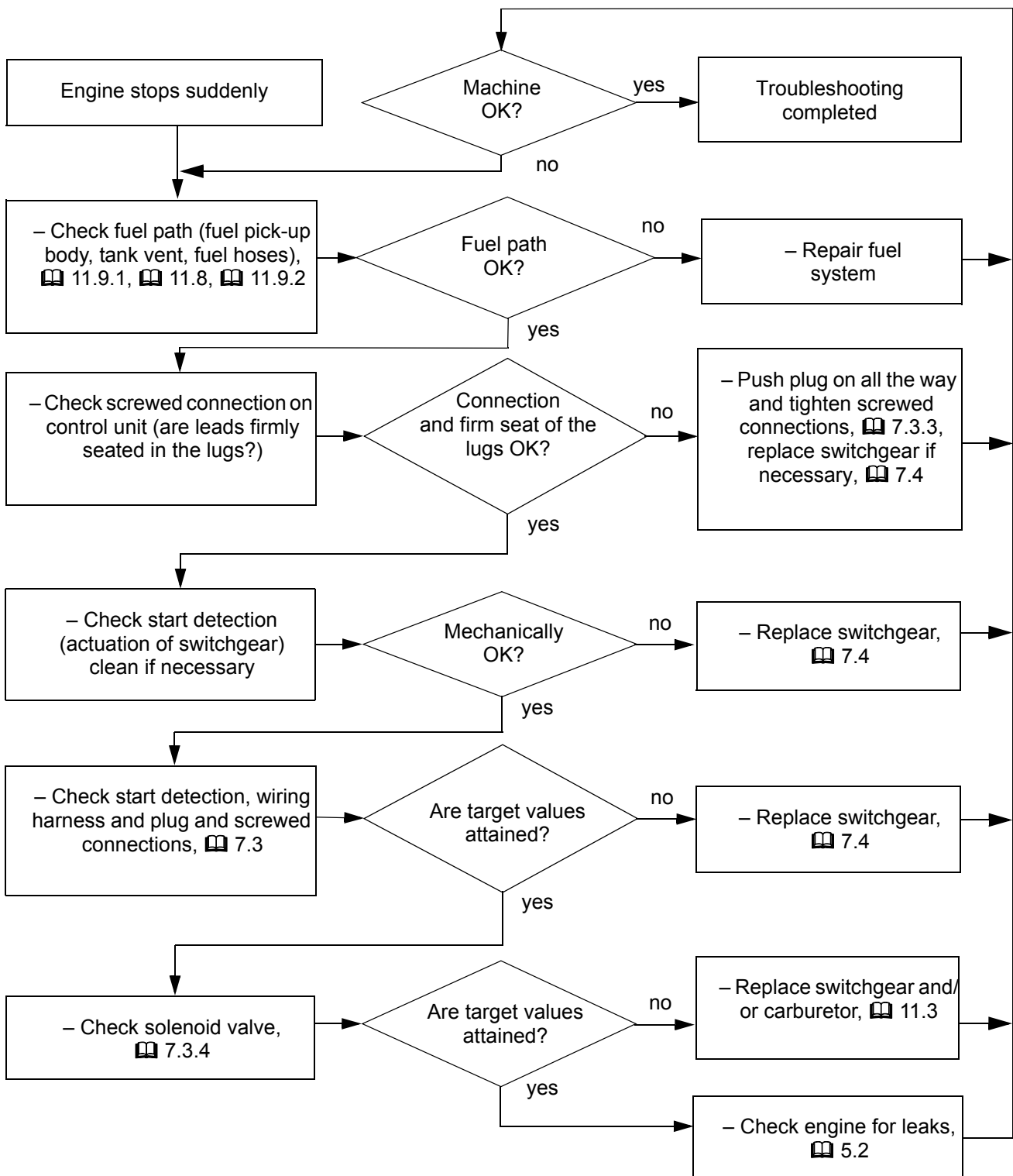
**7.5.3 Engine speed drops under load – low power**



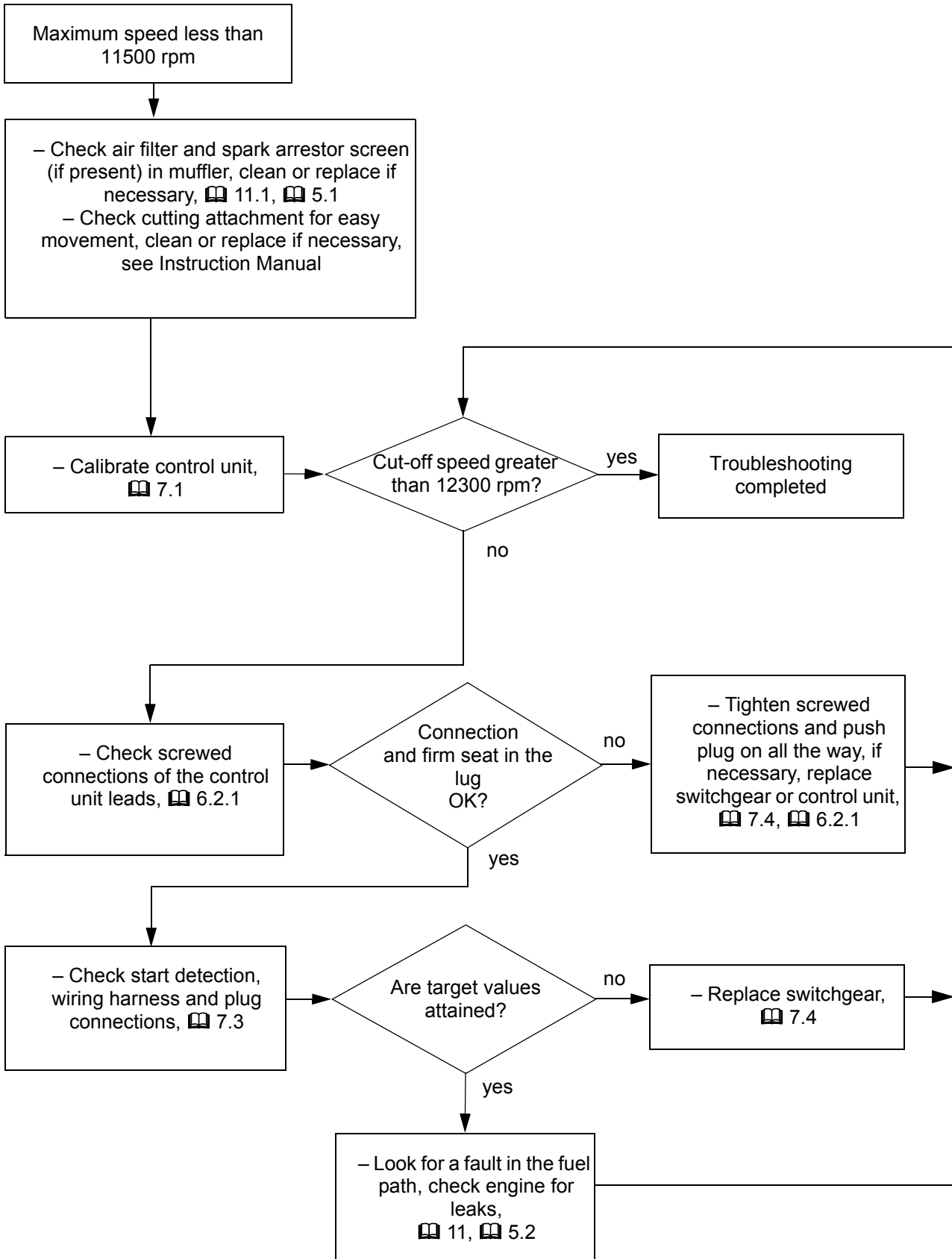
### 7.5.4 Ignition – no ignition spark



## 7.5.5 Engine stops suddenly



## 7.5.6 Cut-off speed not reached




## 8. Rewind starter

### 8.1 General

If the action of the starter rope becomes very stiff and the rope rewinds very slowly or not completely, it may 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.

To clean the rewind spring, it is sufficient to apply a few drops of a standard solvent-based degreasant not containing any chlorinated or halogenated hydrocarbons to the rewind spring.


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,  14.

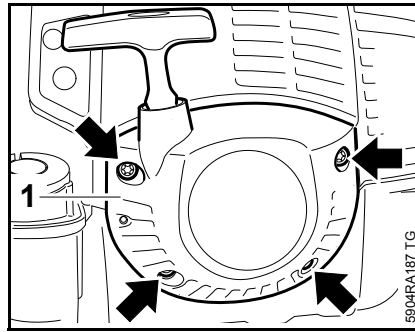
If clogged with dirt or pitch, the entire starter mechanism, including the rewind spring, must be removed and disassembled. Take particular care when removing the rewind spring.

- Clean all components

### ErgoStart

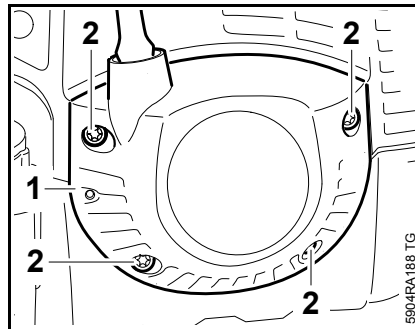
- Relieve the tension of the rewind spring,  8.4

### 8.2 Starter



- Take out the screws (arrows) and remove the starter (1)


### Installation

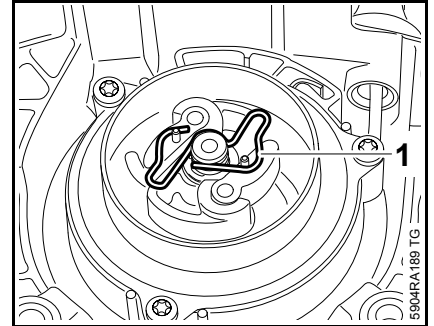


The shroud must be attached.

- Position starter (1) and insert and tighten screws (2)

### 8.3 Pawls

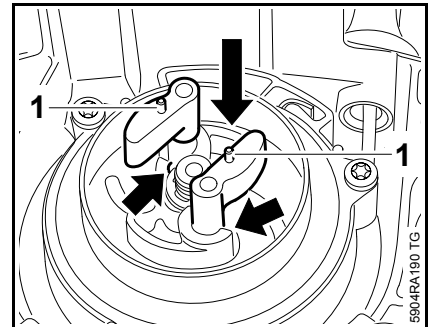
- Remove starter,  8.2




- Carefully ease the spring (1) off the starter post

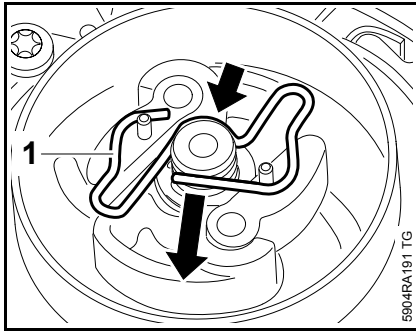
- Remove pawls

### Installation

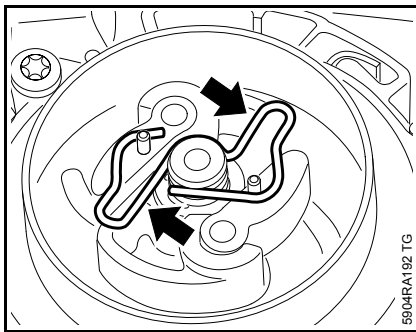


- Press new pawls into holes (arrows) and grease the pegs (1),  14





- Position spring (1) so that its anchor loops engage the pegs of the pawls and the curved part of the spring (arrow) is located in the groove of the rope rotor post
- Then slide the straight part of the spring over the starter post until it engages in the groove



The guide loops of the springs must run along the pawls (arrows).

#### Checking operation

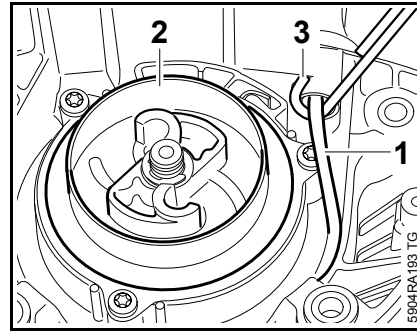
- Pull starter rope, the rope rotor turns, and the pegs of the pawls move in the direction of the anchor loops – the pawls move outward
- Reassemble remaining parts in reverse order

## 8.4 ErgoStart/rope rotor

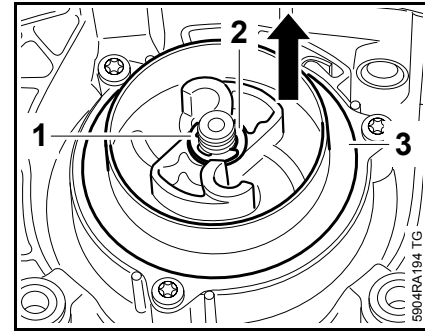
### Relieve tension of rewind spring

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

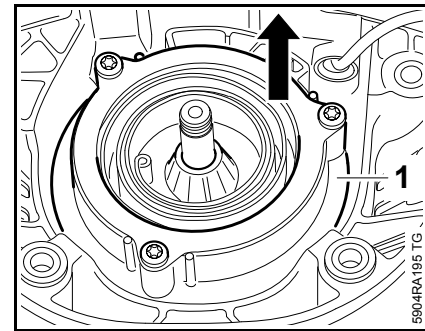
- Remove starter, 8.2
- Remove pawls, 8.3



- Pull out the starter rope (1) between rope rotor and starter cover with assembly hook (3) 5910 893 8800, then hold rope rotor (2) tight
- Take all turns off the rope rotor
- Pull out the rope with the starter grip and carefully release the rope rotor





- Remove the circlip (1)
- Remove the washer (2)
- Remove carrier (3)

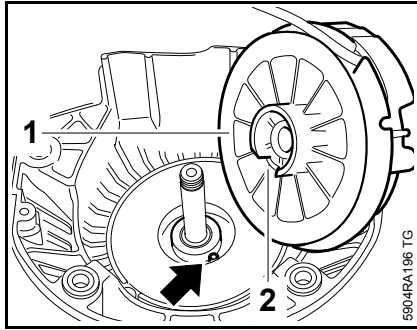


The rewind spring must be relieved.

- Pull off the rope rotor (1)
- Remove the starter rope; remove any remaining scraps of rope, 8.5
- Examine the return spring and replace if necessary, 8.7

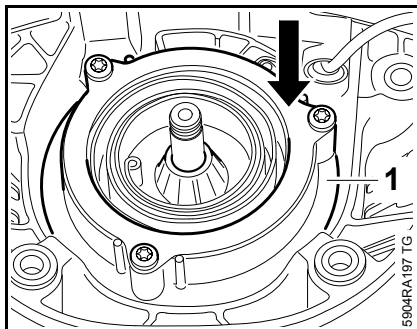
## Installation

- Lubricate the entire length of the starter post with STIHL gear lubricant,  14
- Install starter rope in rope rotor,  8.5

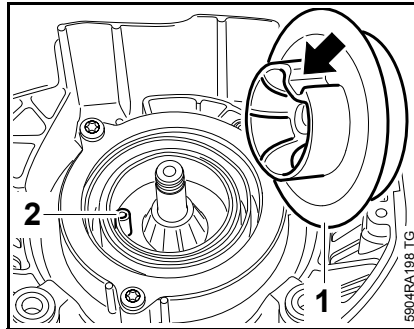


- Orient inner anchor loop (arrow) so that it rests against the base of the starter post
- Orient rope rotor (1) so that the recess (2) engages the inner anchor loop (arrow)

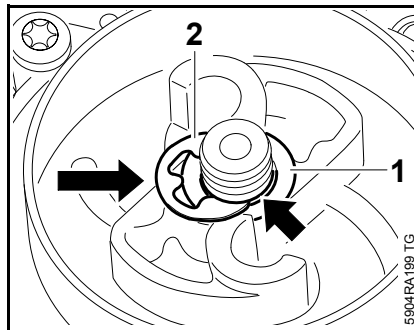
The recess in the hub of the rope rotor acts as carrier for the anchor loop.






- Fit the rope rotor (1) on the starter post so that the recess of the rope rotor engages the anchor loop





- Insert the carrier (1) in the spring housing so that the recess (arrow) engages the anchor loop (2)




- Fit washer (1)
- Slide circlip (2) into the lower groove (arrow) of the starter post
- Install pawls and spring,  8.3
- Tension the rewind spring,  8.6
- Grease the pegs of the pawls,  14
- Reassemble remaining parts in reverse order

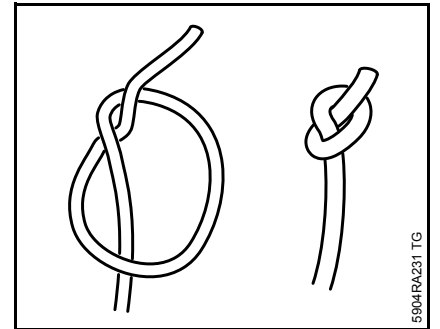
## 8.5 Starter rope / starter grip

- Remove starter,  8.2
- Relieve the tension of the rewind spring,  8.4

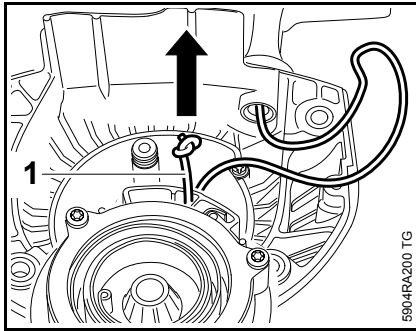
The rewind spring will not be under tension if the starter rope is broken.

- Remove ErgoStart/rope rotor,  8.4
- Remove any remaining rope from the rope rotor if necessary

The starter rope must not be shortened.



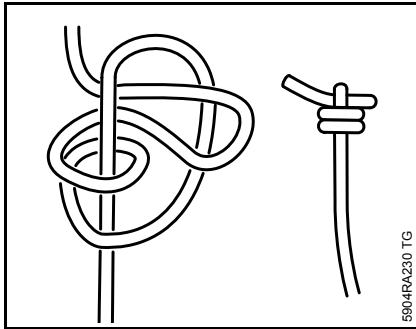
- Make the illustrated knot in the end of the rope at the rope rotor



5904RA200 TG

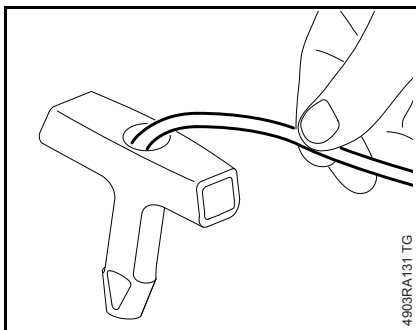
- Push starter rope (1) out a short distance and undo the knot
- Pull the starter rope out of the rope rotor, starter cover and starter grip

### Installation



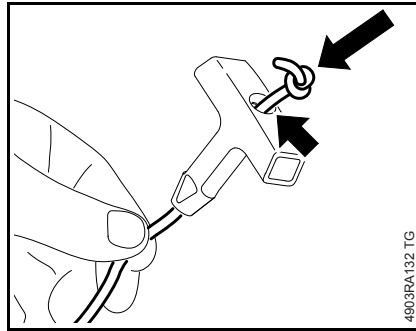
5904RA230 TG

- Make the special knot illustrated in the end of the rope at the starter grip



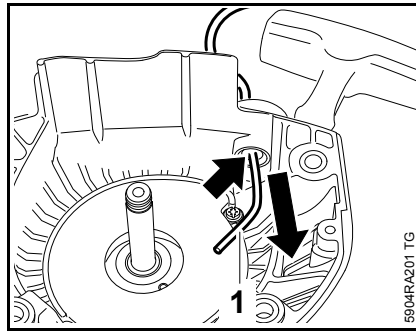
4903RA131 TG

- Thread the new starter rope into the starter grip from above



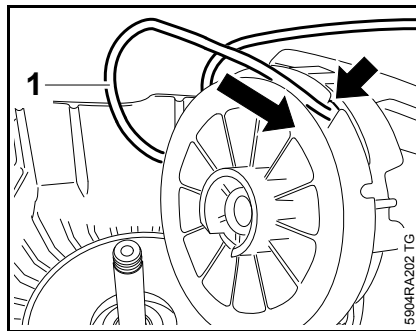
4903RA132 TG

- Pull the rope through the grip until the knot at the end of the rope is in the recess (arrow)



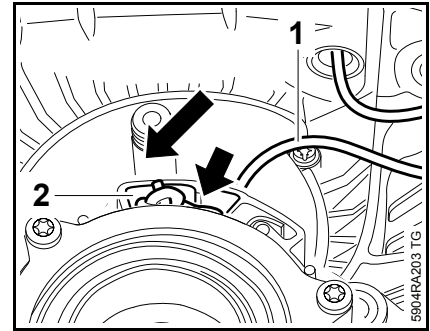
5904RA201 TG

- Then thread the rope (1) through the opening (arrow)



5904RA202 TG

- Thread starter rope (1) into rope rotor
- Secure the rope (1) with a simple overhand knot

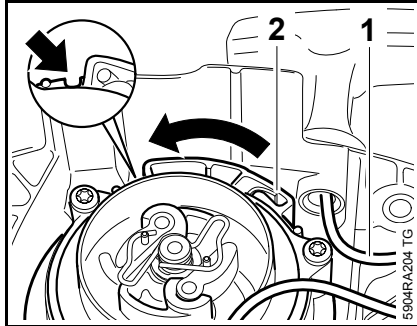


5904RA203 TG

- Insert starter rope (1) in the recess (arrow) and press the knot into the depression (2) as far as it will go
- Install ErgoStart/rope rotor, 8.4
- Tension the rewind spring, 8.6
- Reassemble remaining parts in reverse order

## 8.6 Tensioning the rewind spring

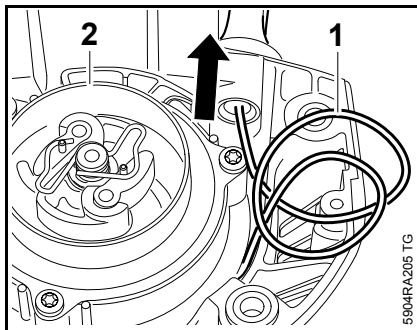
- Remove starter, 8.2



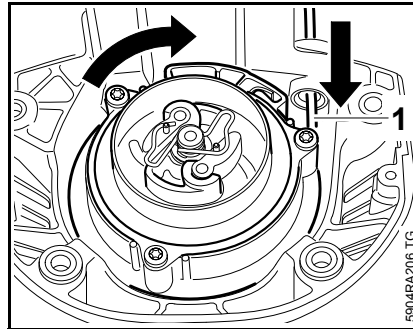
- Pull out part of the starter rope (1) and insert it in the notch (arrow)
- Turn rope (1) with rope rotor (2) six times counterclockwise

The rewind spring is now tensioned.

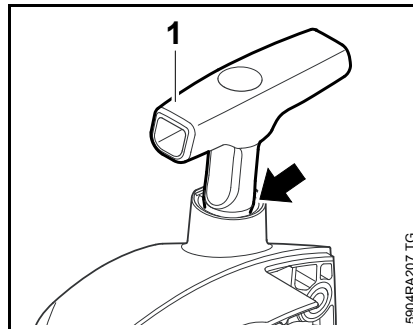
Hold the tensioned rope rotor firmly, as the rewind spring will be damaged if it jumps back suddenly.



- Hold the rope rotor (2) steady
- Pull out the twisted starter rope (1) with the starter grip and straighten it out



- Hold the starter grip firmly to keep the rope (1) tensioned
- Let go of the rope rotor and let the starter rope rewind slowly



The rewind spring is correctly tensioned when the starter grip (1) sits firmly in the rope guide bushing (arrow) without drooping to one side. If this is not the case, the rewind spring must be tensioned by one additional turn.

When the starter rope is fully extended, it must still be possible to rotate the rope rotor at least another full turn before the the max. spring tension is reached. If not, the spring tension must be reduced, otherwise it will break.

### Reduce spring tension

Pull the rope out, hold the rope rotor steady and take off one turn of the rope.

- Reassemble remaining parts in reverse order

## 8.7 Replacing the rewind spring

- Troubleshooting, 3.4

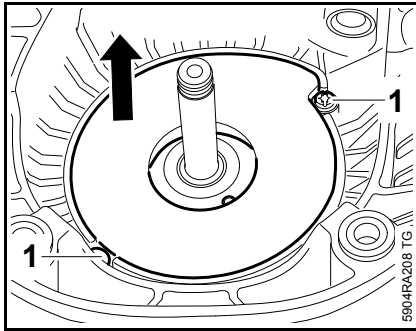
The replacement spring is supplied ready for installation and secured in a spring housing.

- Wear face shield and protective gloves
  - risk of injury
- Remove starter, 8.2
- Relieve the rewind spring if necessary and remove the ErgoStart/rope rotor, 8.4

The rewind spring will not be under tension if it is broken.

If the rewind spring no longer produces sufficient tension, it must be replaced.

- When removing the rewind spring, lay a blanket over the assembly area

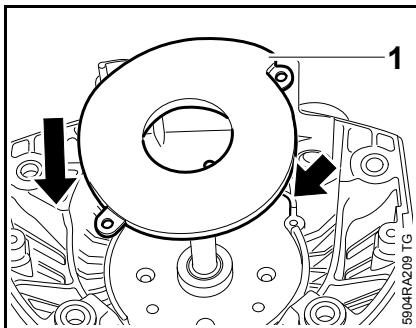



- Remove screws (1) and carefully remove the spring housing with rewind spring  
– The rewind spring may pop out

A worn or broken rewind spring may still be under tension while installed.

- Remove any fragments of the old spring

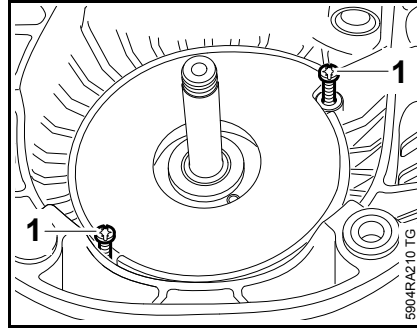
#### Install new rewind spring



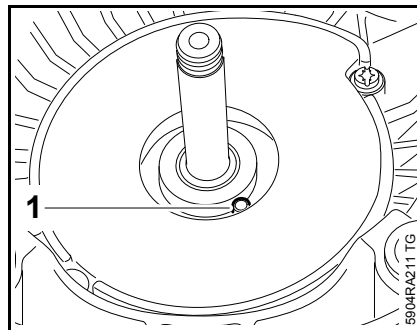
- Lubricate rewind spring with a few drops of STIHL special lubricant before installing it,  14
- Orient the spring housing with rewind spring in the starter cover so that the outer anchor loop (1) is positioned over the mount for the loop (arrow)

- Carefully press the spring housing into the mount in the starter cover as far as it will go

The rewind spring may pop out.



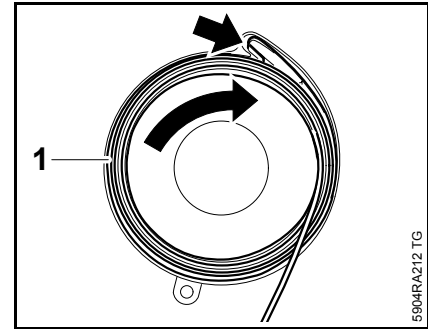
- Insert and tighten down the screws (1)



- Make certain that the inner anchor loop (1) protrudes at the spring housing; orient if necessary – anchor loop must engage the carrier on the rope rotor


#### Reinstalling a rewind spring that has popped out

If the rewind spring pops out during installation, fit it in the spring housing as follows:



- Insert anchor loop in the recess (arrow) of the spring housing
- Fit the rewind spring (1) in the spring housing in a circular fashion, working in clockwise direction

The further course of action is the same as for "Installing a new rewind spring".



- Install the rope rotor,  8.4
- Reassemble remaining parts in reverse order

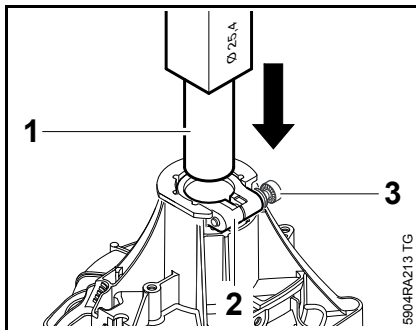
## 9. Antivibration elements

The vibration damping connection between drive tube assembly and clutch housing is made via a rubber insert (1-point antivibration system) or via rubber buffers, annular buffers and springs (4-point antivibration system).

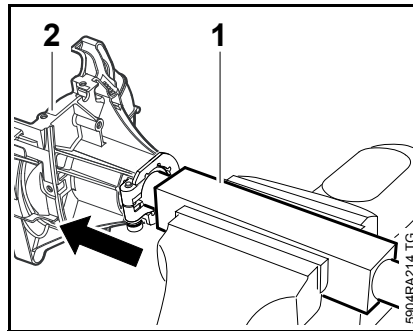
Damaged rubber inserts, rubber buffers, annular buffers or springs must always be replaced.


### 9.1 Rubber insert 1-point antivibration system

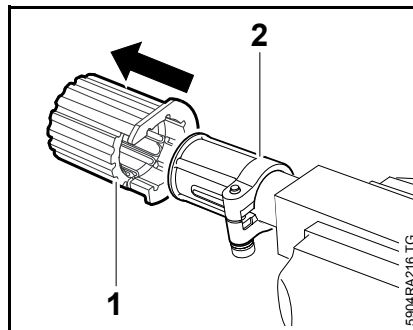
- Remove the drive tube assembly,  12.1
- Remove the clutch housing and clutch drum,  4.1



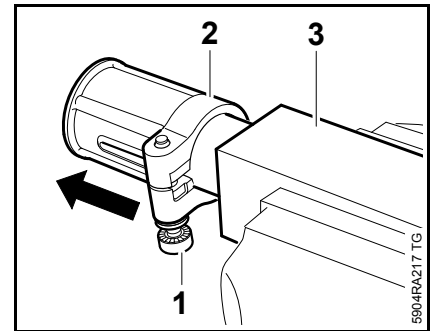
- Insert installing tool (1) 4126 893 4900 with the 25.4 mm shaft into the clamp (2) as far as it will go
- Tighten bolt (3)



- Clamp square profile of installing tool (1) with clutch housing (2) in the vise
- Move the clutch housing back and forth while apply sufficient STIHL press fluid between clamp and rubber insert,  14
- Pull off clutch housing (2)

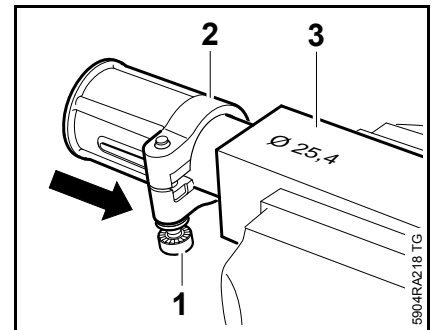


- Pull off rubber insert (1) from clamp (2)

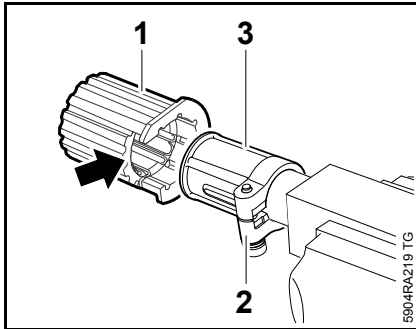


- Loosen bolt (1) and remove clamp (2) from installation tool (3)
- Examine clamp, rubber insert and clutch housing, replace if necessary

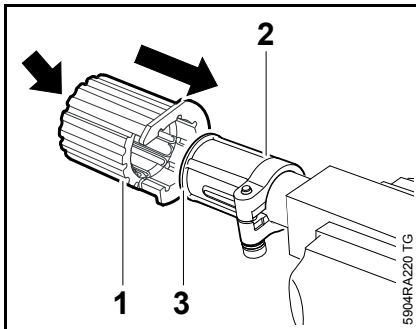
### Installation




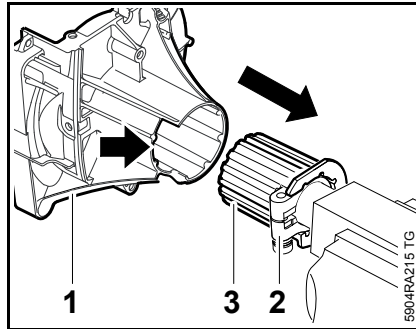
- Clamp square profile of installing tool in vise
- Slide clamp (2) onto installing tool (3) 4126 893 4900 with the 25.4 mm shaft as far as it will go
- Tighten bolt (1)




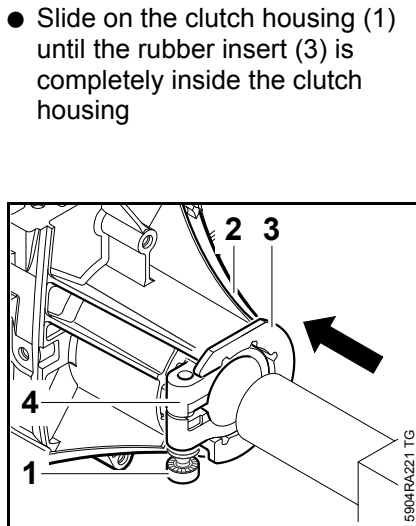
- Orient rubber insert (1) so that the clamping area (2) of the clamp engages the opening (arrow) and the guide ribs (3) line up with the depressions in the rubber insert



- Apply STIHL press fluid to the inside of the rubber insert,  14
- Push the rubber insert (1) onto the clamp (2) until the groove (3) is completely seated in the opening on the opposite side of the rubber insert (arrow)

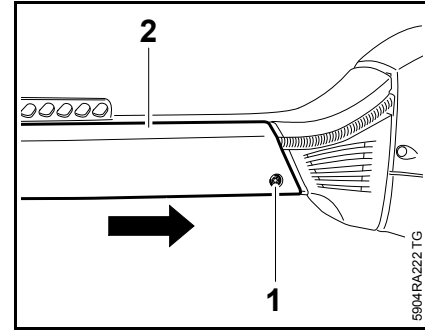


- Apply STIHL press fluid to the outside of the rubber insert,  14
- Orient the clutch housing (1) so that the clamping device (2) of the clamp is aligned with the middle of the opening (arrow) – the guide ribs in the clutch housing must line up with the depressions in the rubber insert

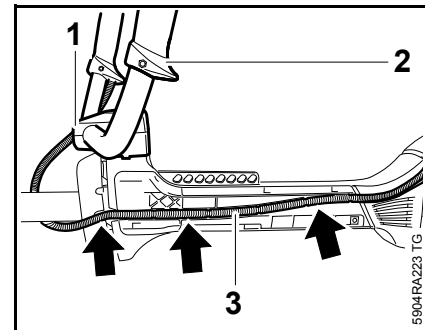



- Slide on the clutch housing (1) until the rubber insert (3) is completely inside the clutch housing
- Loosen bolt (1) and remove clutch housing (2) with rubber insert (3) and clamp (4)
- Reassemble remaining parts in reverse order

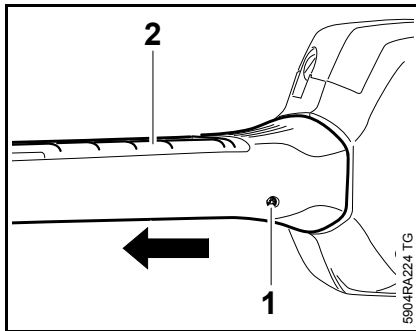
## 9.2 Rubber buffers/springs 4-point antivibration system



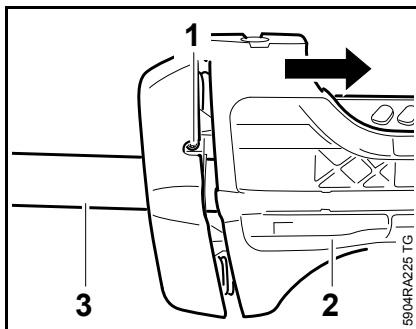
- Remove screw (1)
- Push protective shell (2) toward engine and remove



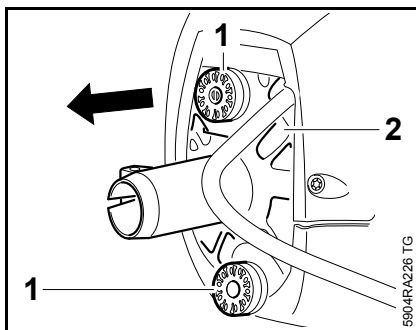
- Remove clamping screw (1) and remove control handle for bike handle (2) – remove spring
- Pull throttle cable (3) out of the guide (arrows) and set aside bike handle with control handle
- If handlebar adjustment is stiff, disassemble clamps and guides and clean the bike handle,  14



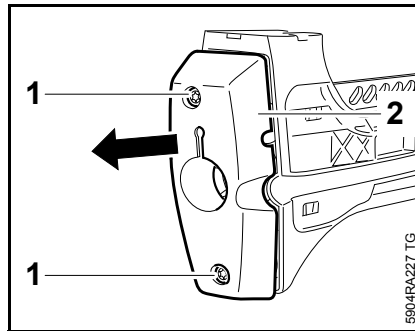
- Loosen screw (1) on underside of the antivibration housing (2)
- Pull out drive tube assembly with antivibration housing (2) at the clutch housing



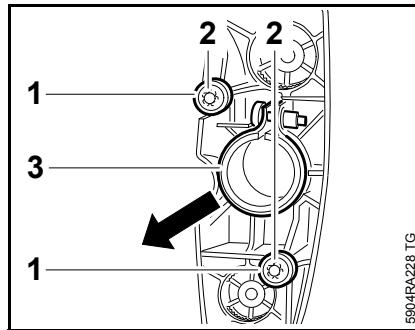
- Loosen screw (1) and remove complete antivibration housing (2) from drive tube assembly (3)



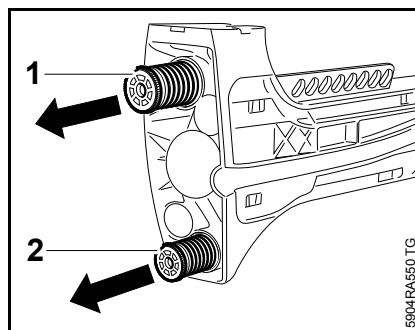
- Remove rubber buffers (1) from clutch housing (2)



- Remove screws (1) and pull out support (2)

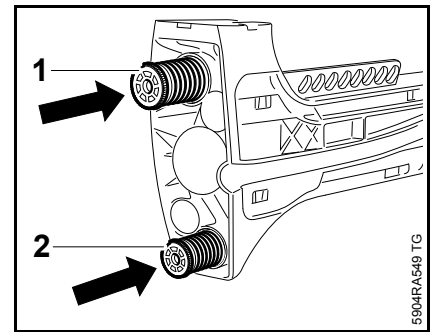


- Examine clamp, annular buffers and support, replace if necessary
- Pull annular buffers (1) over the spring nuts (2) and remove
- Lever off the clamp (3)

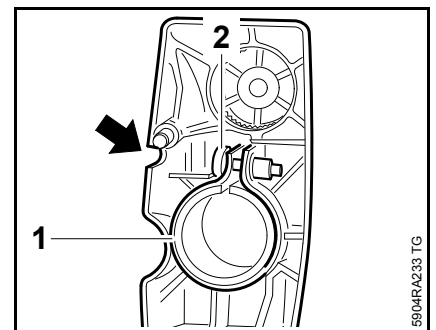


- Insert screwdriver through the holes in the plugs of the large antivibration spring (1) and small antivibration spring (2)
- Remove the screws and antivibration springs

## Installation

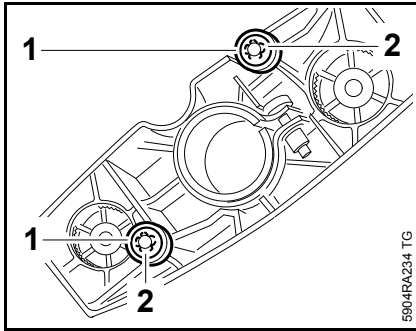


- Insert screwdriver through the holes in the plugs of the large antivibration spring (1) and small antivibration spring (2)
- Screw the screw into the antivibration housing and fasten antivibration springs

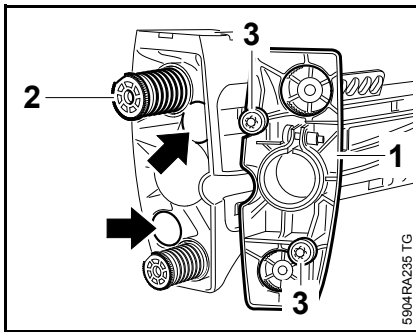


- Push the clamp (1) on so that the head of the screw (2) points toward the recess (arrow)
- Coat inside of annular buffer with STIHL press fluid, 14

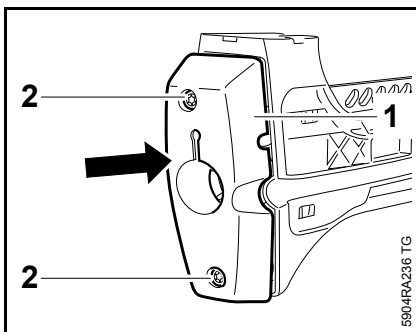




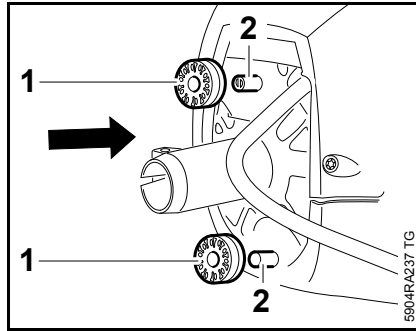
- Push annular buffers (1) over the spring nuts (2)
  - Annular buffers must be completely behind the spring nuts



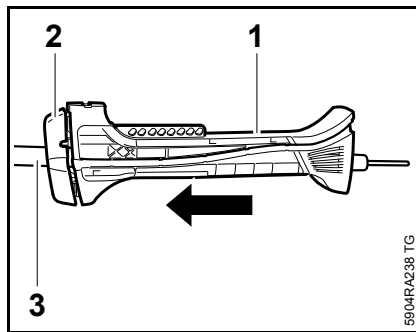
- Orient support (1) so that the large spring recess engages the large antivibration spring (2) and the annular buffers (3) align with the holes (arrows)



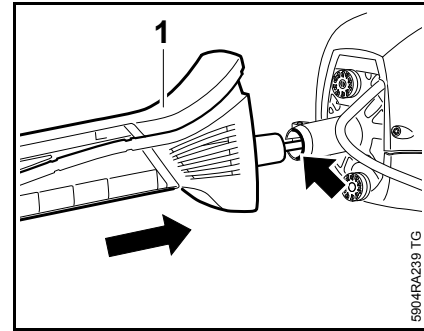
- Press on the support (1) and hold it in place – the bearing plugs are seated in the serrations and can no longer twist
- Insert and tighten down the screws (2)



- Press the rubber buffers (1) onto the plugs (2) of the clutch housing as far as they will go

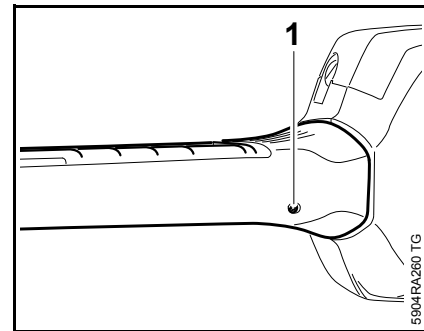


- Orient antivibration housing (1) so that the support (2) faces the drive tube assembly (3)
- Push the antivibration housing (1) onto the end of the drive tube assembly (3) with the built-in shakeproof washer until the drive tube assembly (3) protrudes a little on the opposite side

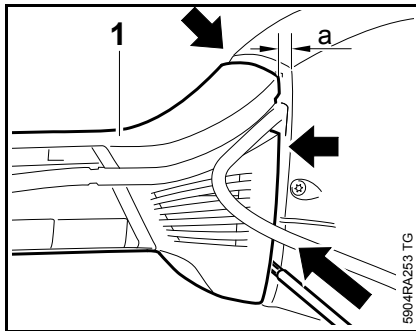


- Apply STIHL press fluid to the outside of the rubber buffer, 14

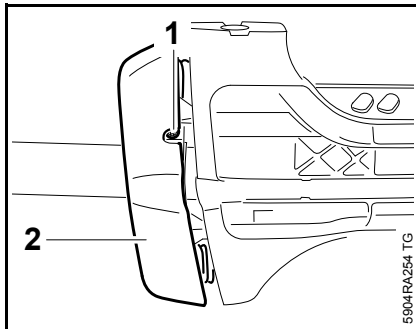
- Insert the drive tube assembly (1) in the hole (arrow) of the clutch housing as far as it will go



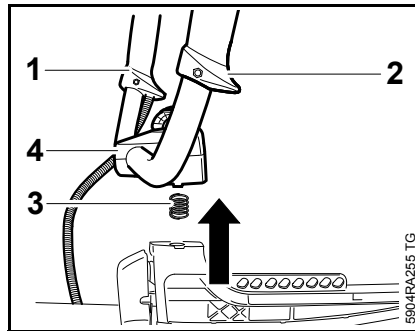
- Orient drive tube assembly and tighten screw (1)
  - Drive tube assembly is clamped and secured



- Push the antivibration housing (1) into the rubber buffer, so that a circumferential gap (arrows) of  $a = 6 \text{ mm}$  between it and the shroud/ protective hip plate results
- Hold the antivibration housing (1) in this position
- Through the gap, check that the rubber buffers are seated properly

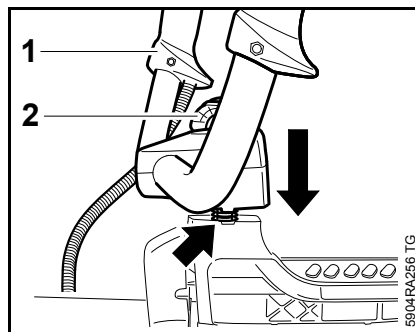


- Tighten screw (1) through the opening in the support (2)
  - Antivibration housing is clamped and secured
- Position bike handle on antivibration housing so that the throttle cable is routed under the drive tube assembly – narrow side of the support and clamping screw must face the cutting attachment

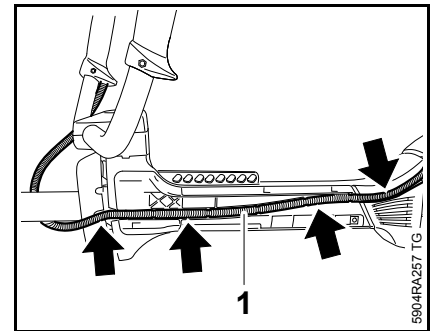


- Orient bike handle (1) so that the control handle (2) is on the muffler side
- Slide spring (3) into the mount on the clamp (4)

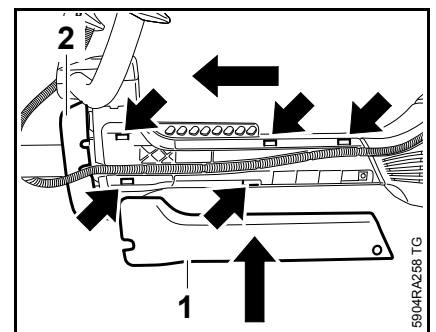
Throttle cable must be routed under the drive tube assembly.



- Position bike handle (1) on profile of the antivibration housing and insert clamping screw (2) in the thread (arrow) and tighten it



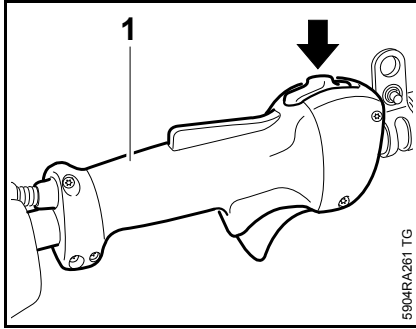
- Starting at the engine, insert the throttle cable (1) in the guide (arrows)



- Position fairing (1) with the hooks in the openings (arrows) and slide toward support (2)
- Insert and tighten down the screw

## 10. Actuating levers

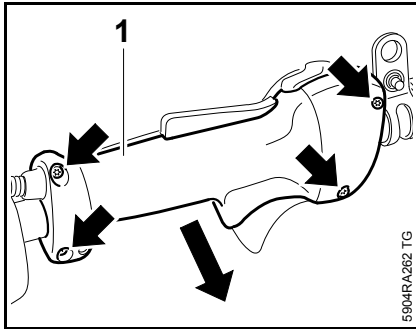
### 10.1 Control handle for loop handle



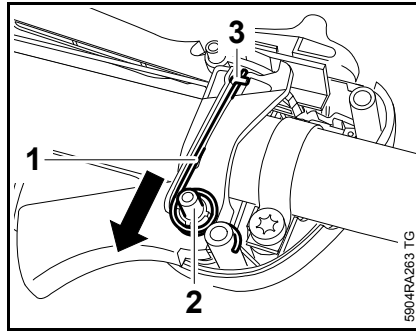
The control handle for the loop handle (1) with slide control (arrow) is pushed directly onto the drive tube assembly (diameter 25.4 mm) and clamped down with clamps.

- Installing and removing the control handle for the loop handle, 10.1

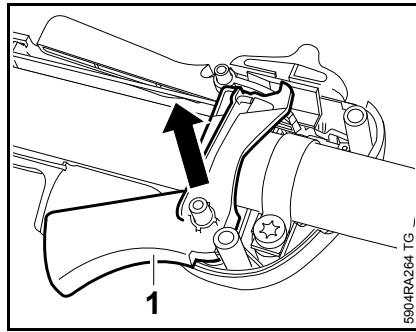
#### 10.1.1 Throttle trigger / throttle trigger interlock



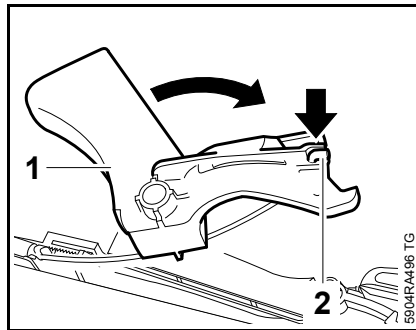
- Take out the screws (arrows)
- Remove handle molding (1)



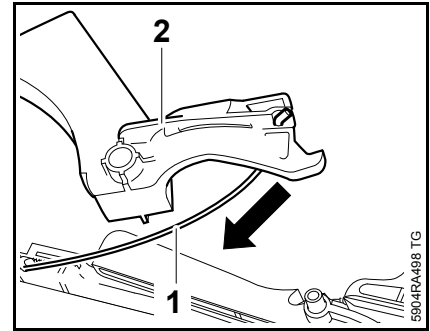
- Remove torsion spring (1) from the guide (2) and pull out under the throttle cable (3)



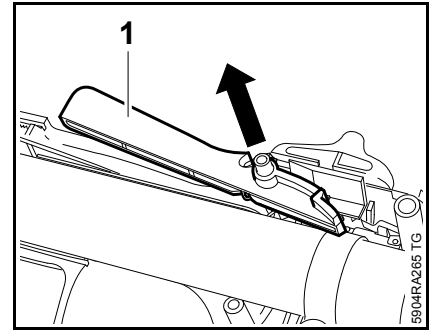
- Remove throttle trigger (1)



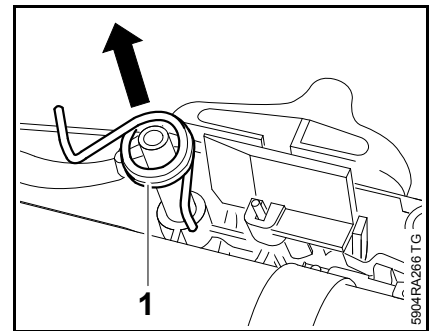
- Rotate throttle trigger (1) by 90° clockwise until the hook (2) rests against the surface (arrow)



- Thread out the throttle cable (1) on throttle trigger (2)

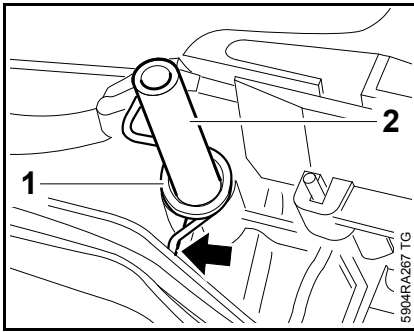


- Carefully pull out trigger interlock (1) – tension on the torsion spring is released suddenly



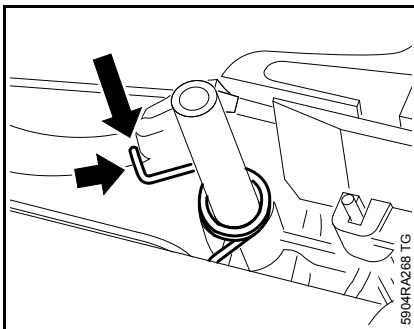
- Remove torsion spring (1)  
–The slide control may pop out

## Installation

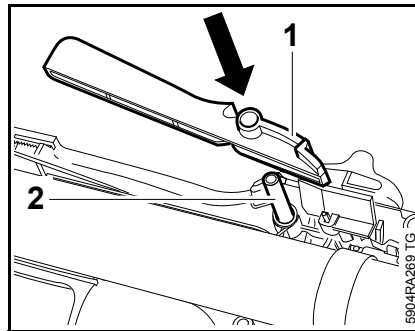


Shown without drive tube assembly for a better view.

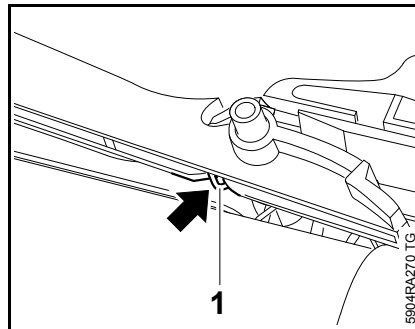
- Push torsion spring (1) onto the post (2) so that the end that is angled downward rests against the ridge (arrow) on the left



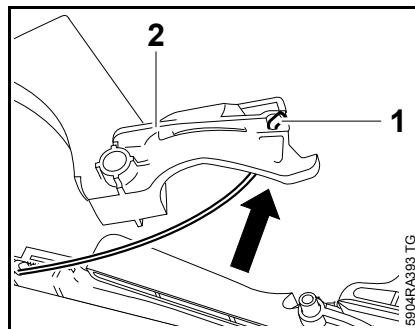
- Use a suitable tool to press the upper end (arrow) of the torsion spring toward the handlebar and hold it there



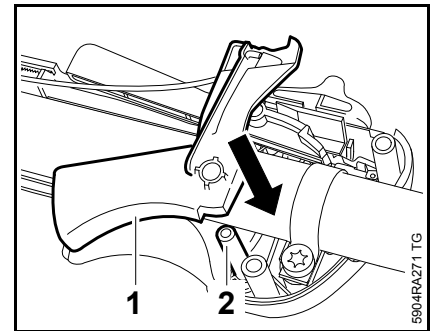
- Slide throttle interlock (1) onto the post (2)
- Release upper end of the torsion spring



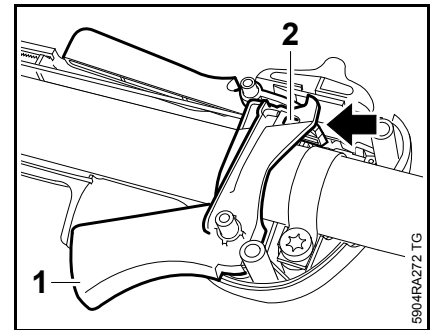
- Torsion spring (1) must lie in the notch (arrow)



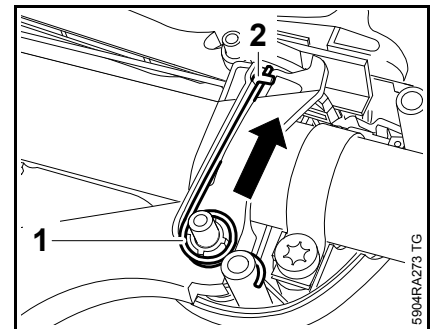
- Thread throttle cable (1) into throttle trigger (2)
- Turn throttle trigger by 90° counterclockwise



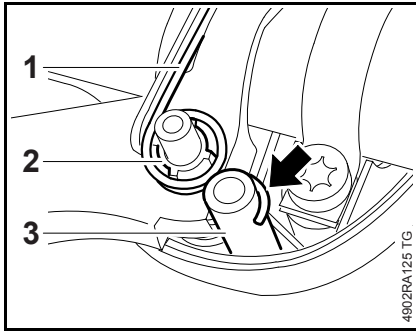
- Slide throttle trigger (1) onto the post (2)



- Orient throttle trigger (1) so that the lug (2) engages the trigger interlock (arrow)

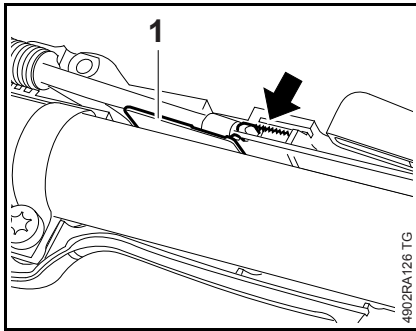


- Push torsion spring (1) under the throttle cable (2)

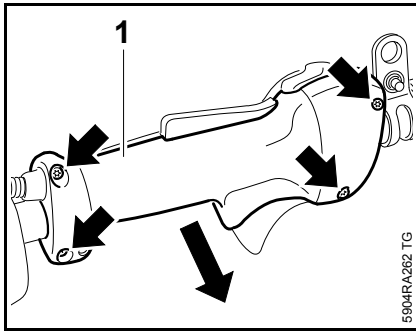


- Push the torsion spring (1) into the mount (2) as far as it will go

The bent end (arrow) must rest against the peg (3).



- Push slide (1) into the mount so that engages the middle of the serration (arrow)



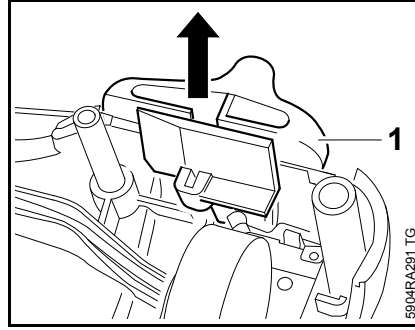
- Position handle molding (1), insert and tighten down the screws (arrows)

### Checking operation

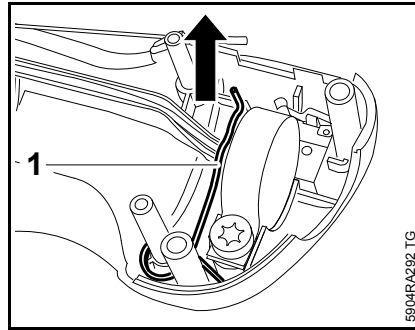
- Check throttle cable setting, adjust if necessary, 10.2.4

### 10.1.2 Slide control

- Remove control handle for loop handle, 10.1
- Remove throttle trigger / throttle trigger interlock, 10.1.1

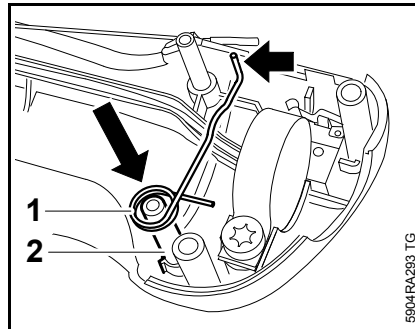


- Remove slide control (1)

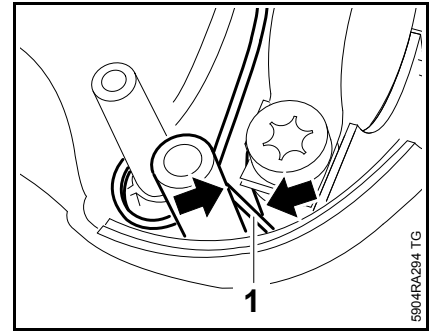


- Remove torsion spring (1)

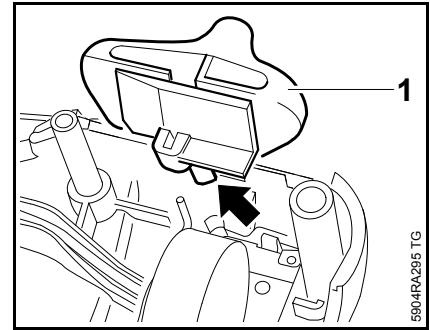
### Installation



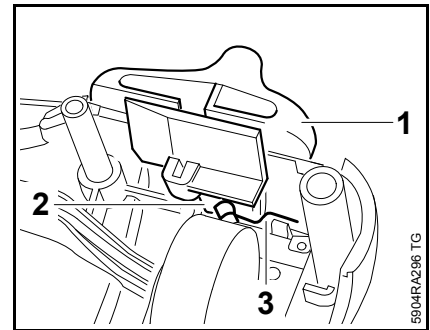
- Slide torsion spring (1) onto the post (2) so that the angled end (arrow) faces upward



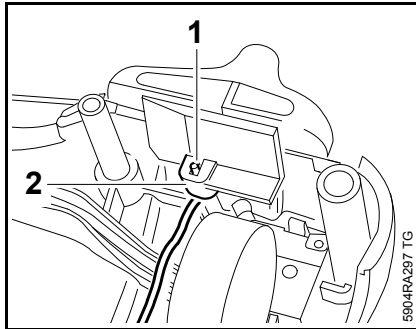
- Short end (1) must lie between the ridges (arrows)



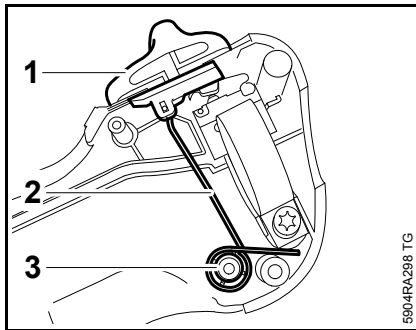
- Orient slide control (1) so that the cam (arrow) faces downward



- Position slide control (1) so that the cam (2) is seated to the left of the contact spring (3)



- The torsion spring (1) must be seated in the mount (2)



- Check installation position of torsion spring (2) and slide control (1) – see illustration

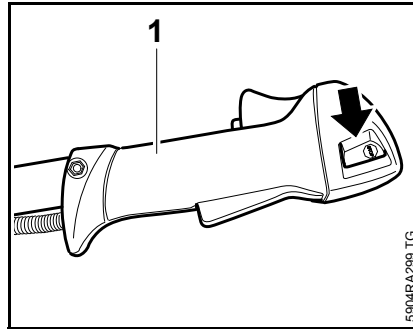
For the throttle trigger to be seated correctly, the torsion spring (2) must be pushed onto the post (3) over the ribbed base

– Torsion spring is completely inside the handle molding.

### Checking operation

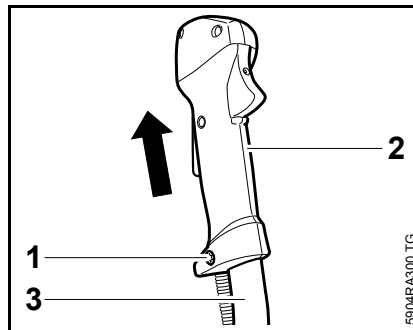
- Set slide control to position **STOP-0**, the contact spring must actuate the microswitch – this can be heard as a clicking noise
- Install throttle trigger / throttle trigger interlock, 10.1.1
- Check throttle cable setting, adjust if necessary, 10.2.4
- Reassemble remaining parts in reverse order

## 10.2 Control handle for bike handle



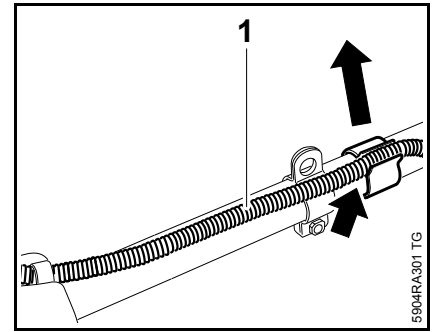
The control handle for bike handle (1) with lever for stop function (arrow) is pushed directly onto the bike handle (diameter 25.4 mm or 22 mm) and secured with a transverse screw.

### 10.2.1 Removal and installation



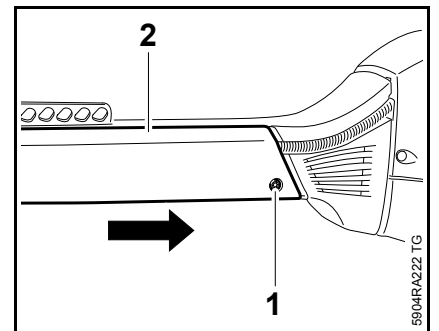
- Unscrew and remove the screw (1), remove nut on the opposite side
- Remove control handle (2) from bike handle (3)

## 1-point antivibration system

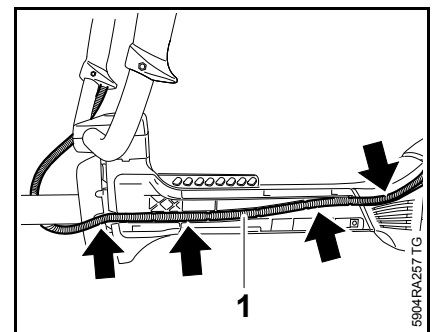


- Remove protective tube (1) from the guide (arrow)

## 4-point antivibration system

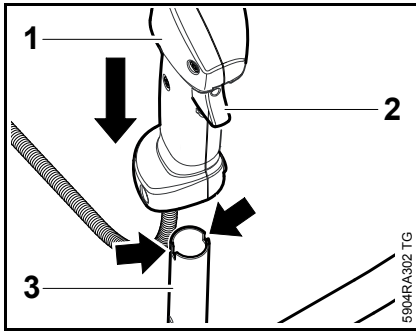


- Remove screw (1), push fairing (2) toward engine and remove

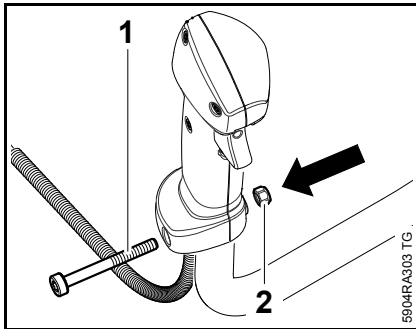


- Remove protective tube (1) from the guide (arrows)
- Examine throttle cable or short circuit wire and replace if necessary, 6.6
- Examine actuating lever, replace if necessary, 10.2

## Installation



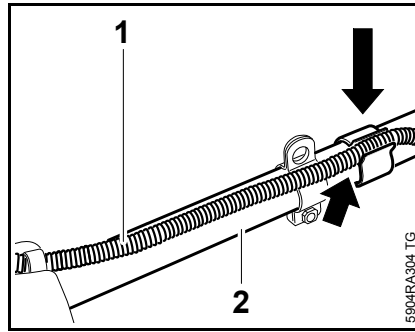
- Orient control handle for bike handle (1) so that the throttle trigger (2) faces toward the cutting attachment
- Push control handle for bike handle (1) onto handlebar (3) and twist it gently back and forth until it is aligned with the openings (arrows)



- Push bolt (1) through control handle for bike handle and handlebar
- Push new hexagon nut (2) in the mount on the opposite side, then screw in the bolt and tighten it

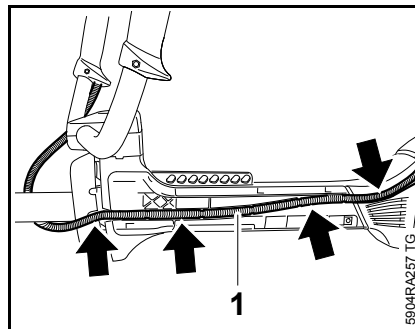
The control handle must be clamped firmly onto the handlebar and must be immovable.

## 1-point antivibration system

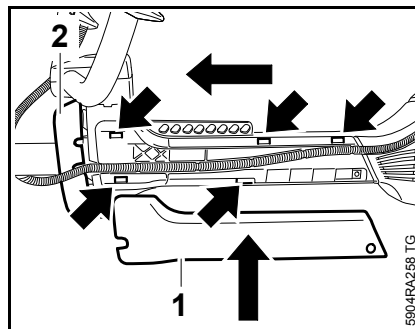


- Press protective tube (1) into the guides (arrow) so that the protective tube (1) lies against the drive tube assembly (2) and does not form any kinks

## 4-point antivibration system



- Press protective tube (1) into the guide (arrows) as far as it will go – protective tube must lie tight against the machine

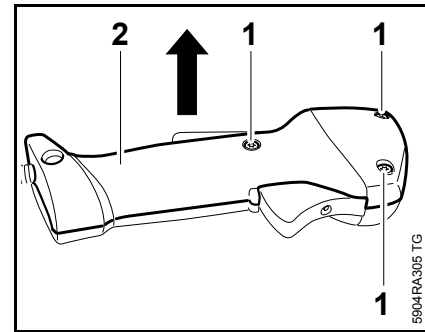


- Press fairing (1) with the hooks in the openings (arrows) and slide toward support (2)

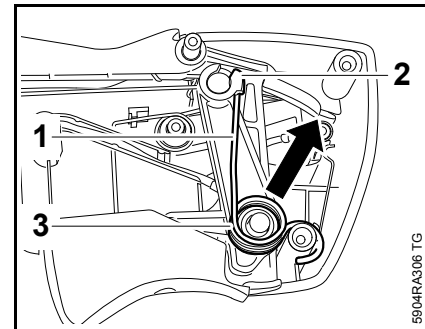
- Insert and tighten down the screw

## 10.2.2 Throttle trigger / throttle trigger interlock

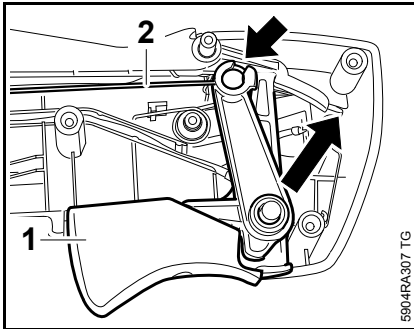
- Remove control handle for bike handle, [10.2](#)



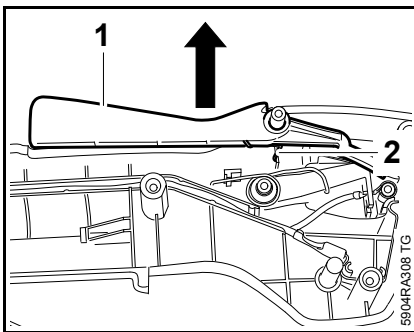
- Unscrew screws (1) and carefully remove handle molding (2) – trigger interlock can pop out



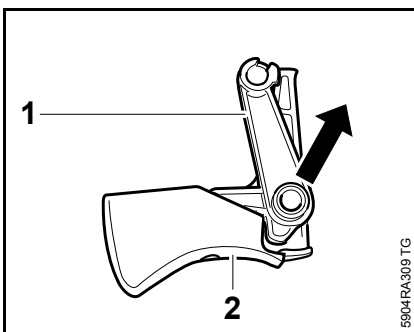
- Lift and relieve tension on the end of the torsion spring (1) at the stop (2)
- Remove torsion spring (3)



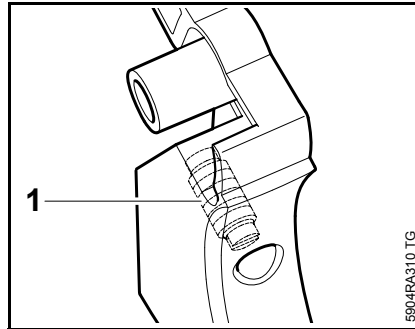
- Remove throttle trigger (1) and unhook throttle cable (2) from throttle trigger (arrow)



- Carefully pull out trigger interlock (1) – tension on the torsion spring (2) is released suddenly
- Remove torsion spring



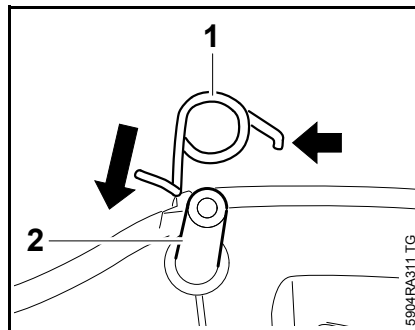
- Remove the lever (1) from the throttle trigger (2)
- Examine trigger interlock, lever and torsion springs, replace if necessary



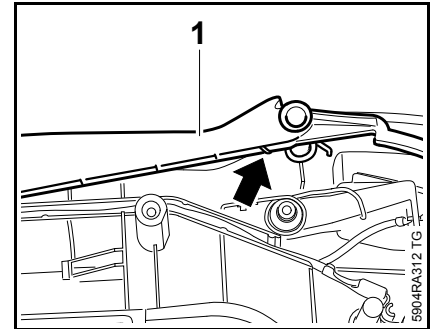
- Stud (1) must be present, install new stud if necessary

A new throttle trigger is supplied with a pre-installed stud.

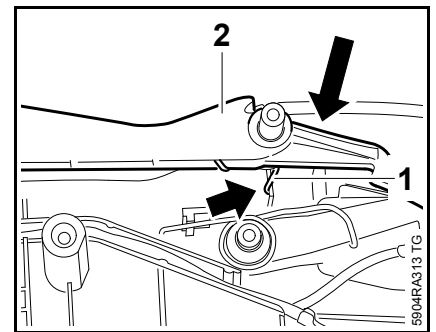
- With a new throttle trigger or after the position of the stud has been changed, the throttle cable must be readjusted, 10.2.4



- Slide torsion spring (1) onto the post (2) so that the angled end (arrow) faces the handle housing



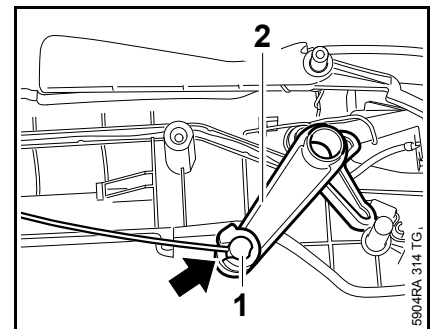
- Push on the trigger interlock (1) and hook on the torsion spring (arrow)



- Turn the angled end of the torsion spring (1) clockwise until it is aligned behind the rib (arrow)

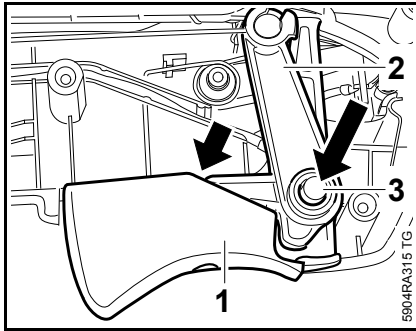
- Push trigger interlock (2) on as far as it will go and make certain that the angled end (1) rests behind the ridge (arrow)

- Trigger interlock may pop out

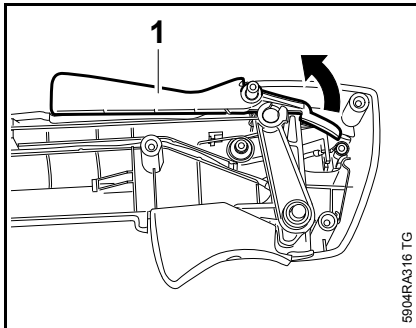


- Press nipple (1) of the throttle cable into the hole of the lever (2) and guide it into the slot (arrow)

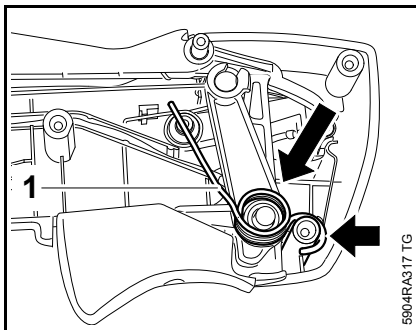




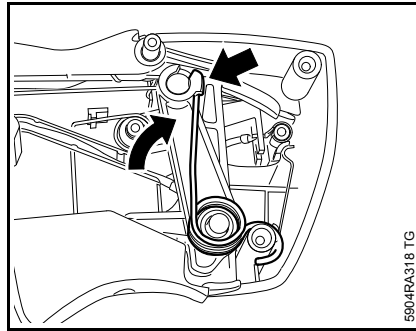
- Slide throttle trigger (1) onto post (3)
- Slide lever (2) into the throttle trigger (1) so that the lever (arrow) rests against the stud



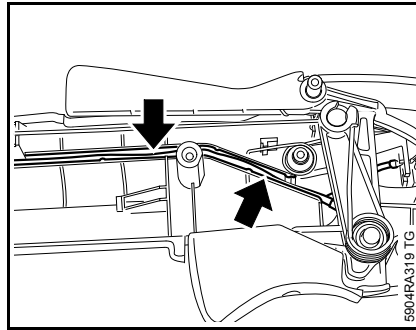
- Turn the trigger interlock (1) slightly and push the throttle trigger on further until it engages the trigger interlock



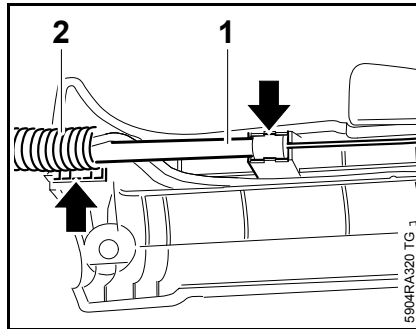
- Slide torsion spring (1) onto throttle trigger and secure it with the anchor loop on the cylindrical raised part (arrow)



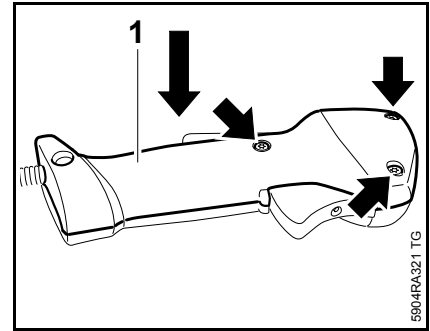
- Turn torsion spring clockwise and hook it into the lever (arrow)



Ground wire and short circuit wire must be inserted completely in the guides (arrows).



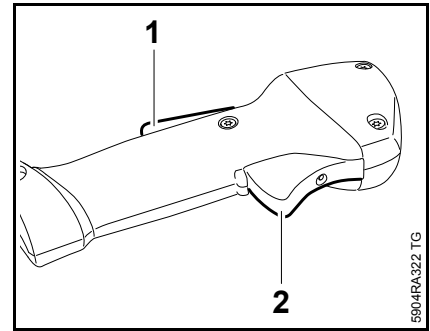
- Route throttle cable (1) and protective tube (2) in the guides (arrows) and hold in place



- Carefully fit handle molding (1) until it snaps into place
- Levers may pop out

- Insert and tighten down the screws (arrows)



### Checking operation




When the trigger interlock (1) is not pressed, the throttle trigger (2) is blocked and must not move.


- Release throttle trigger (2) – the throttle trigger must return completely to the stop

### 10.2.3 Lever for stop function

- Remove control handle for bike handle,  10.2.1
- Remove throttle trigger and trigger interlock,  10.2.2

Removal and installation are described in the chapter "Short circuit wire on control handle for bike handle",  6.6.5

### 10.2.4 Adjusting the throttle cable

- Remove shroud,  5.4

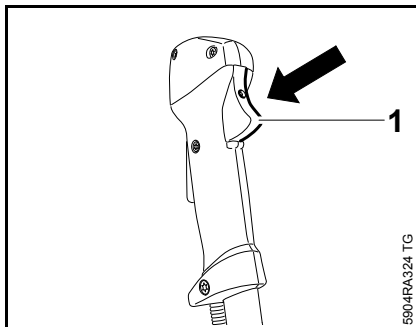
The throttle trigger must be adjusted in order for the throttle shutter of the carburetor to open and close completely when the throttle is opened.

The adjustment tasks vary for the control handles for the loop handle and bike handle.

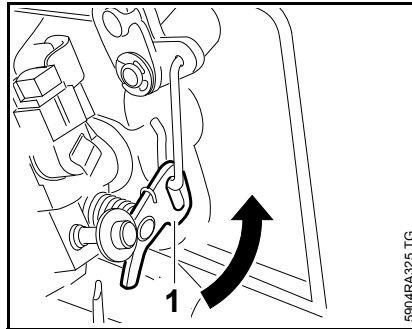
With both versions, make certain that the throttle cable grommets are seated in the guides and are inserted as far as possible

- Position of the throttle cable grommets influences the throttle cable adjustment.

#### Checking throttle cable setting



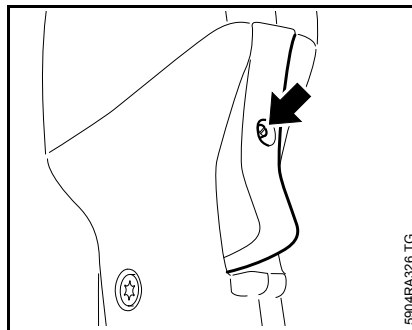
- Press throttle trigger (1) as far as it will go and hold it there



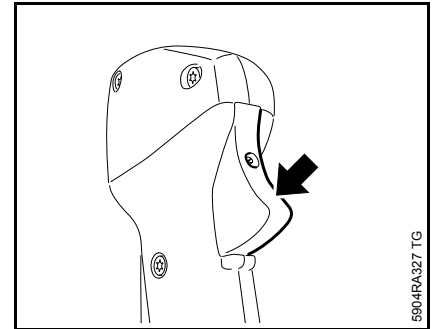
- Push the lever (1) onto the throttle shaft

If it is possible to continue turning the lever (1) in the direction of full throttle, then the throttle shutter is not completely open in the full-throttle position.

#### Adjusting throttle cable on control handle for bike handle



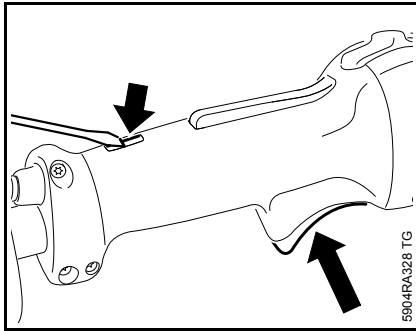
- Press throttle trigger and turn screw (arrow) until the throttle shutter is open completely
- Turn the stud clockwise  
= Throttle cable is tensioned  
(throttle shutter opens more)
- Turn the stud counterclockwise  
= Throttle cable is relieved  
(throttle shutter opens less)



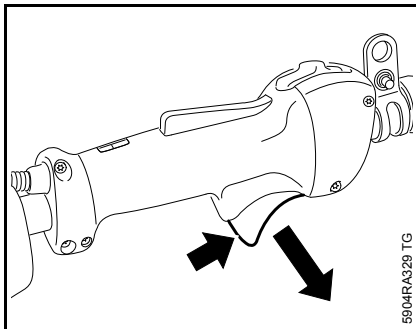
- Release throttle trigger (arrow) – the throttle trigger must return completely to the stop in the initial position

#### Adjusting throttle cable on control handle for loop handle

With the control handle for the loop handle, the throttle cable grommet is snapped into a slide and the throttle cable is adjusted by moving the slide.



- Position screwdriver at the notch of the slide (arrow) and press in
  - Slide is unlocked
- Press throttle trigger and move slide (arrow) until the throttle shutter is open completely
  - Push slide (arrow) in direction of the protective tube = Throttle cable is tensioned (throttle shutter opens more)
  - Push slide (arrow) in direction of the trigger interlock = Throttle cable is relieved (throttle shutter opens less)



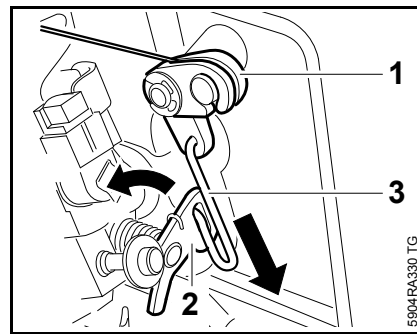
- Release throttle trigger (arrow) – the throttle trigger must return completely to the stop in the initial position

When the throttle trigger is not actuated, the throttle cable must not be under tension, otherwise the throttle shutter may no longer close completely, which would result in a high idle speed.

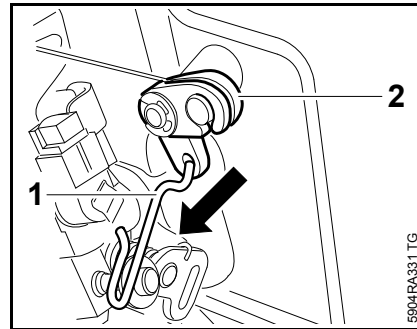
- Reassemble parts in reverse order

### 10.2.5 Throttle rod

- Remove the shroud, 5.4

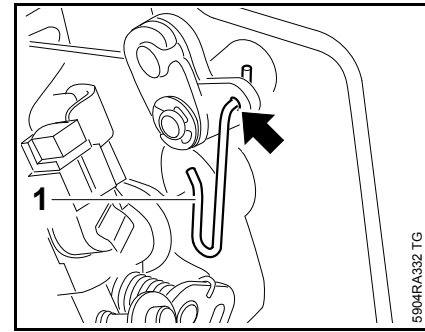


- Hold lever (1) and press lever (2) of the throttle shaft in the direction of full-throttle until the throttle rod (3) slides out of the lever (2)

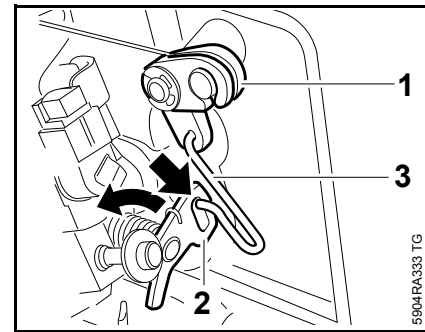


- Unhook the throttle rod (1) from the lever (2)
- Check lever (2), replace if necessary, 11.7

### Installation



- Push throttle rod (1) into hole (arrow) and hook it in



- Hold lever (1) and push lever (2) of the throttle shaft in the direction of full-throttle
- Hook throttle rod (3) into groove (arrow) and release lever (2)

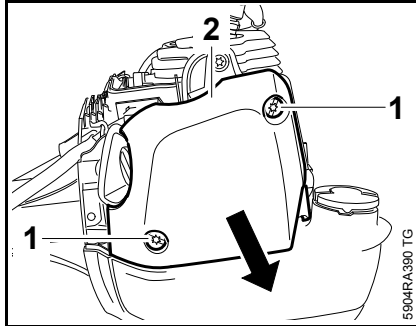
### Checking operation

- When the throttle trigger on the control handle is pressed all the way, the lever of the throttle shaft must move as far as it can go in the direction of full-throttle, adjust throttle cable if necessary, 10.2.4
- Reassemble remaining parts in reverse order

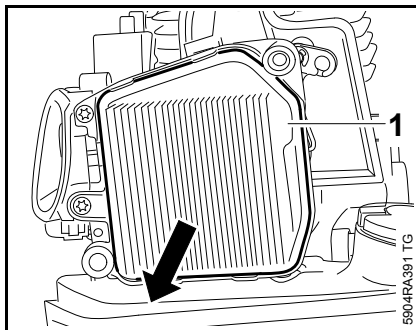
## 11. Fuel system

### 11.1 Air filter

- Refer also to troubleshooting, 3.6, 3.7



- Remove screws (1)
- Remove the filter cover (2)

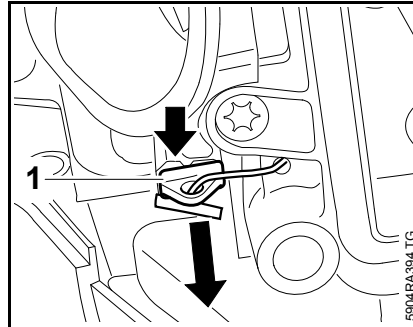


- Remove the air filter (1)
- Examine air filter, clean or replace if necessary
  - see Instruction Manual
- Reassemble parts in reverse order

### 11.2 Filter housing

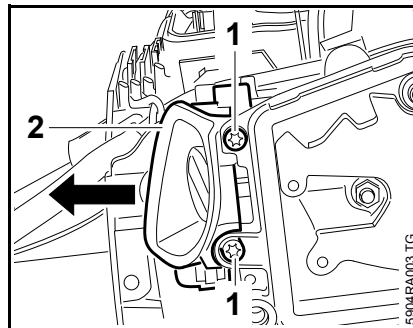
- Remove the air filter, 11.1

#### Versions with M-Tronic



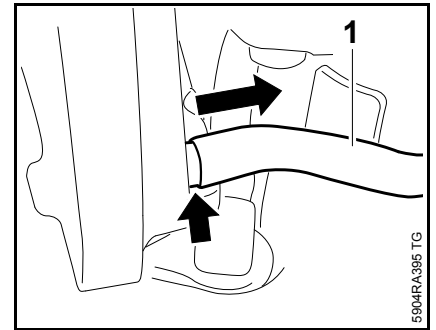
- Remove plug (1) on diagnostic connector (arrow)

#### All versions

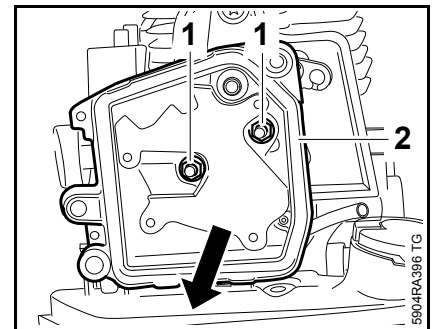


- Remove screws (1)
- In versions with M-Tronic, the grommet (2) is not removed because it is connected to the switchgear.
- Remove grommet (2)

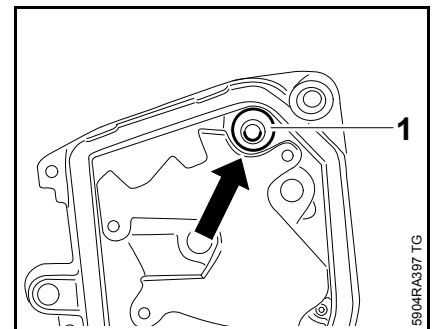
#### All versions



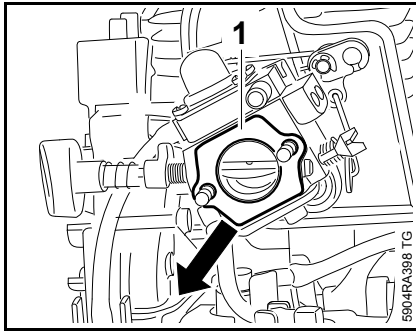
- Remove tank vent hose (1) at the connector (arrow) – always use a new tank vent hose




- Unscrew nuts (1) and pull off filter housing (2)



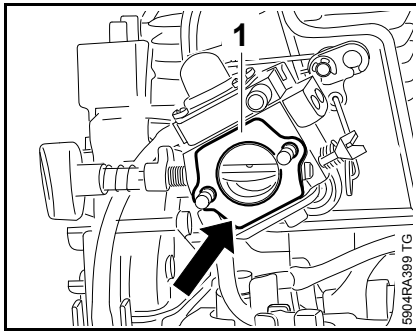
- Press out grommet (1) in the direction of the carburetor
- For versions with M-Tronic: check the plug of the diagnostic connector, replace if necessary



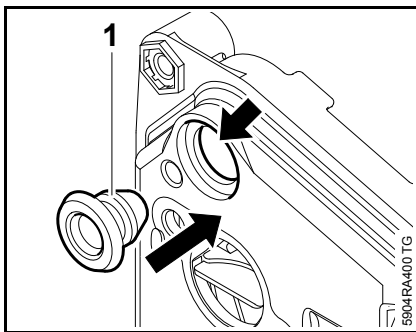
- Remove gasket (1) – always use a new gasket


– Check mating surfaces on carburetor and filter housing, clean if necessary,  14

### Installation



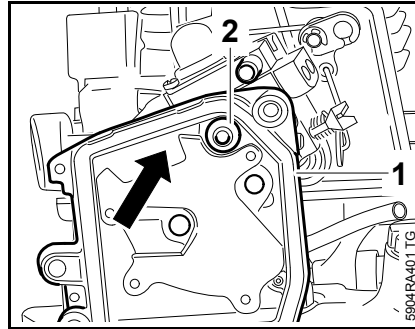
- Push on new gasket (1)




– To simplify installation, coat the outside of the grommet with STIHL press fluid,  14

- Orient grommet (1) so that the cone faces the hole

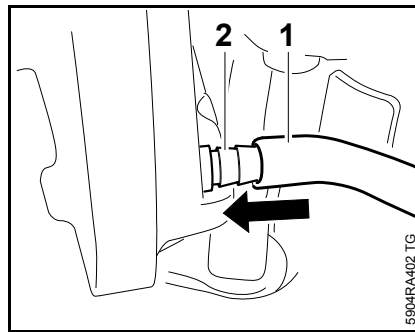
- Press grommet (1) into hole (arrow) on the back of the air filter housing until it encloses the hole completely




– To simplify installation, coat the inside of the grommet with STIHL press fluid,  14

- Slide filter housing (1) onto the studs so that the support of the carburetor engages the grommet (2)

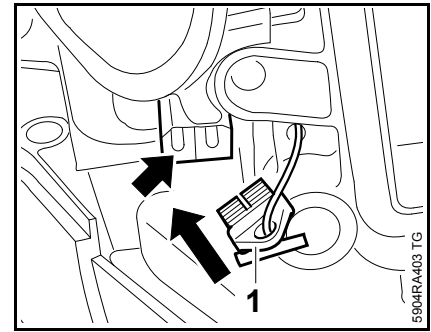
– Fit nuts and screw them tight.



– Use STIHL press fluid to simplify assembly,  14

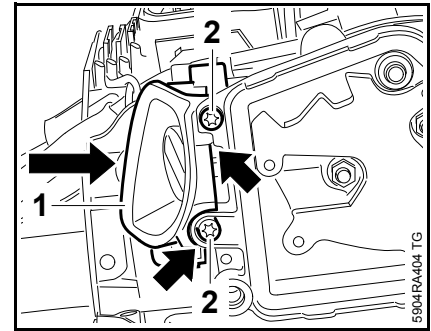
- Push the new tank vent hose (1) completely onto the connector (2)

### Versions with M-Tronic



- Press plug (1) into the diagnostic connector (arrow) as far as it will go

### All versions





- Push the grommet (1) into the mounts (arrows)

- Insert and tighten down the screws (2)

– Reassemble remaining parts in reverse order

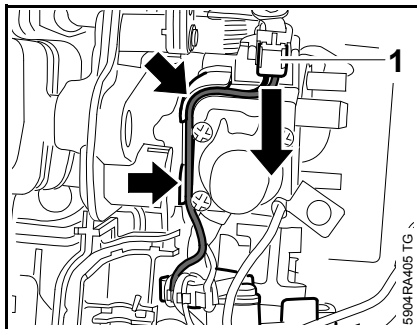
### 11.3 Carburetor

- Remove filter housing,  11.2
- Open filler cap and drain fuel tank
- Collect fuel in a clean container,  1

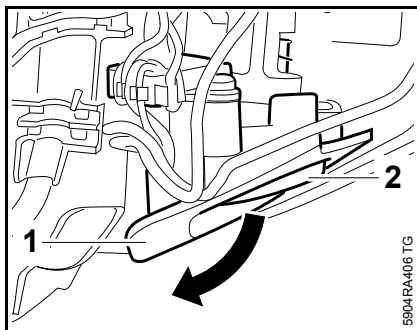
The fuel hose may only be removed when the tank filler cap is open.

#### Versions with M-Tronic

Leads and plug connections must not be damaged.

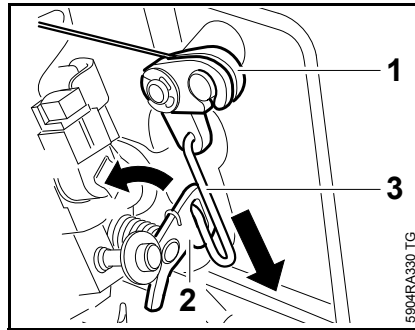


- Remove plug (1) on solenoid valve of the carburetor
- Pull leads out of the guides (arrows)

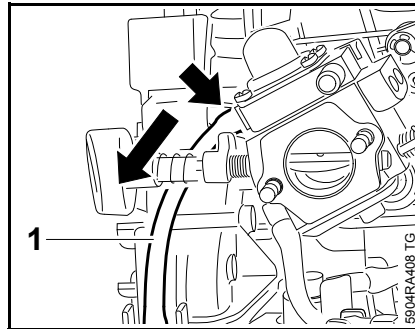


- Pull bushing (1) with switchgear over the choke lever (2) and lay it aside

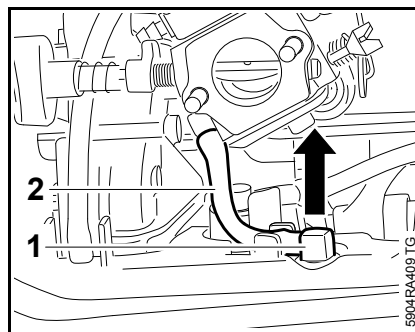
#### All versions



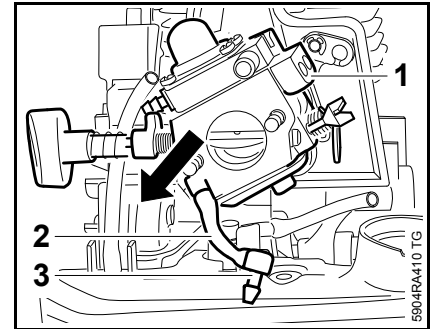
- Hold lever (1) and press lever (2) of the throttle shaft in the direction of full-throttle until the throttle rod (3) slides out of the lever (2)




- Pull off the fuel return line (1) at the connector (arrow)

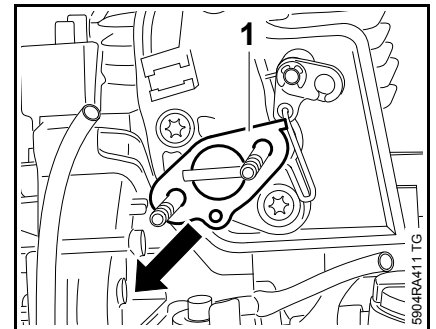


- Pry out connector (1) with fuel hose (2)




- Remove carburetor (1)


- Examine the fuel hose (2), with connector (3), replace if necessary,  11.9.2



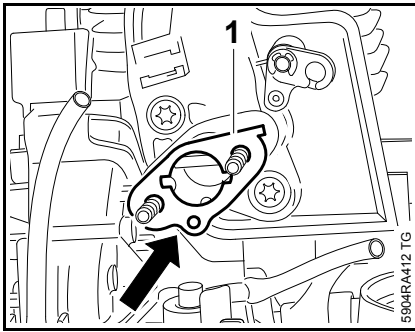
- Remove gasket (1) – always use a new gasket

– Check and clean mating surfaces on carburetor and spacer flange,  14

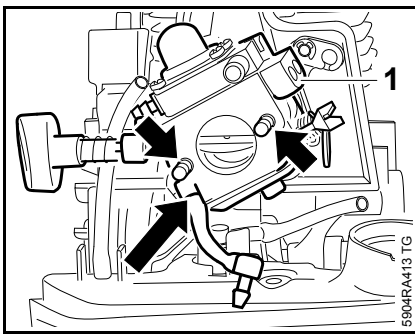
– Examine the carburetor and repair or replace it if necessary.

– Replace removed fuel hoses,  11.9.2

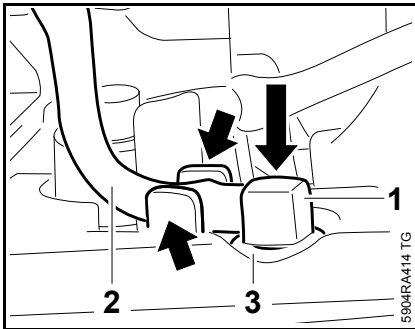
## Installation



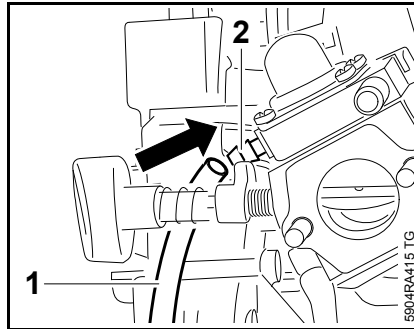
- Push on new gasket (1)



- Press carburetor (1) over the studs (arrows)



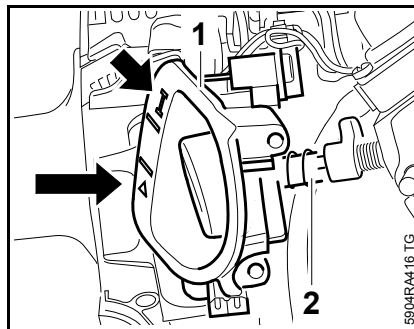
- Push connector (1) with fuel hose (2) into the fuel suction hose (3) so that it is between the ribs (arrows) – fuel hose is secured




- Push the new fuel return line (1) completely onto the connector (2)

## Versions with M-Tronic

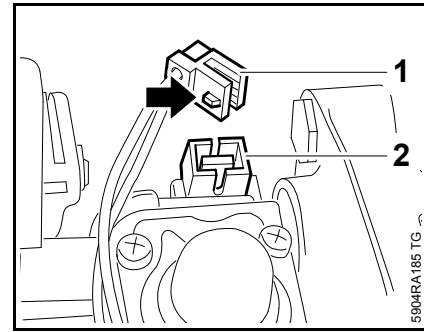
Leads and plug connections must not be damaged.



- Orient bushing (1) with switchgear so that the scale (arrow) faces the cylinder
- Guide bushing (1) with switchgear over the choke lever (2) and position

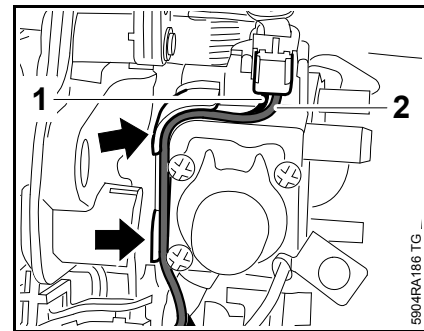
– Install filter housing,  11.2

## Versions with M-Tronic



- Orient plug (1) so that the lug (arrow) aligns with the groove in the mount (2)

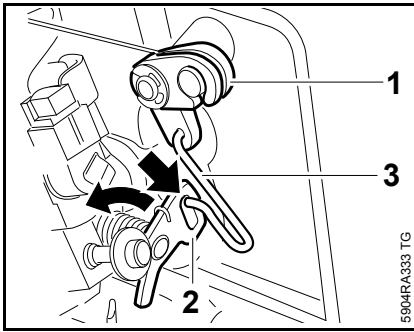
– Push plug into the mount as far as it will go



Do not expose plug to tensile loads, thus run leads so that they form a 90° loop at the plug.

- Press black lead (1) as far as it will go into the guides (arrows), starting at the plug
- Press red lead (2) as far as it will go into the guides (arrows), starting at the plug

## All versions



- Hold lever (1) and push lever (2) of the throttle shaft in the direction of full-throttle
- Hook throttle rod (3) into groove (arrow) and release lever (2)

## Checking operation

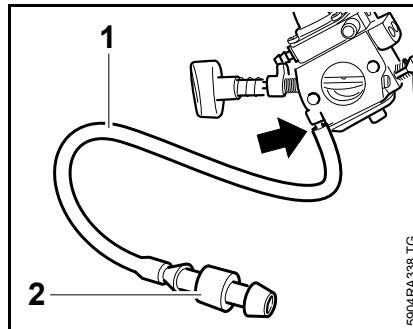
- When the throttle trigger on the control handle is pressed all the way, the lever of the throttle shaft must move as far as it can go in the direction of full-throttle, adjust throttle cable if necessary, control handle for loop handle, [10.1](#) control handle for bike handle, [10.2](#)
- Install air filter, [11.1](#)
- Reassemble remaining parts in reverse order

## 11.3.1 Leakage test

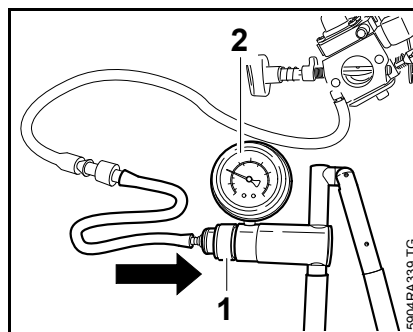
The tank vent must also be checked and replaced if problems develop with the carburetor or fuel supply, [11.8](#)

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

- Remove the carburetor, [11.3](#)



- Push the fuel line (1) 1110 141 8600 onto the double connector (2) 0000 855 9200.
- Push the fuel line with double connector onto the fuel port (arrow)



- Push pressure hose of the pump 0000 850 1300 onto the double connector

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

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



1. Metering diaphragm or gasket is damaged, replace if necessary, [11.4.1](#)
2. The inlet valve is not sealing (foreign objects in the valve seat, sealing cone of the inlet needle is damaged or inlet control lever is sticking), remove to clean, [11.4.2](#)
3. Pump diaphragm or gasket damaged, replace if necessary, [11.4.3](#)

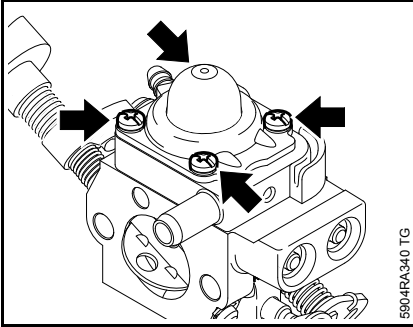
- Check tank vent if necessary, [11.8.1](#)
- After completing the test, slide ring (1) to the left and vent the system, then disconnect fuel line from elbow connector of carburetor
- Install filter housing, [11.2](#)
- Reassemble remaining parts in reverse order



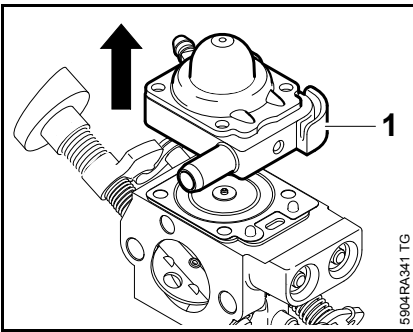
## 11.4 Repairing the carburetor

### 11.4.1 Metering diaphragm

- Troubleshooting,  3.6
- Remove the carburetor,  11.3



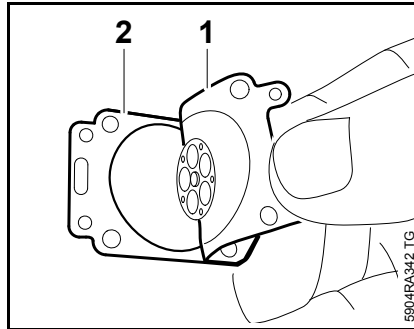
- Take out the screws (arrows)



- Remove the complete flange (1)

If the gasket and diaphragm are stuck to the carburetor, they must be removed very carefully

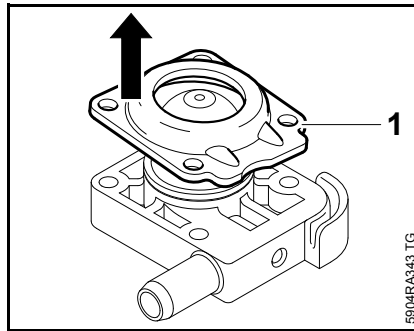
- Remove metering diaphragm with gasket



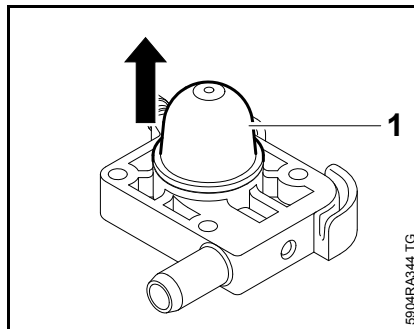
- Carefully separate the metering diaphragm (1) and gasket (2).

The diaphragm material is subjected to continuous alternating stresses and eventually shows signs of fatigue. In other words, the diaphragm distorts and swells and must be replaced.

- Examine the metering diaphragm for signs of damage and wear, fit a new gasket

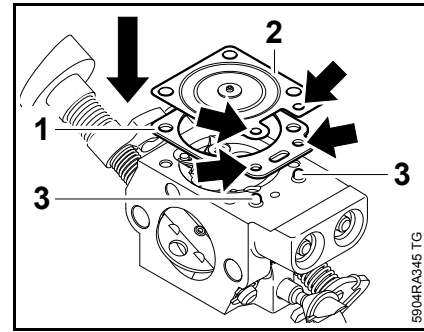


- Remove the end cover (1)



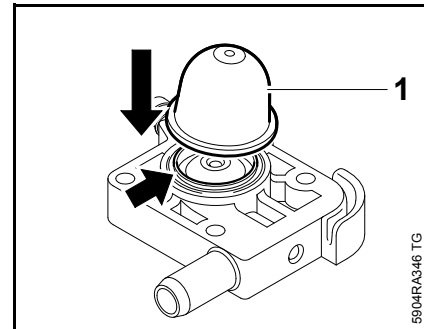
- Remove cap (1)

## Installation



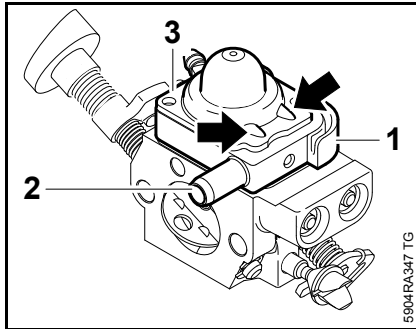
- Note the order in which the metering diaphragm (2) and gasket (1) are installed

- Align the gasket (1) and metering diaphragm (2) so that the small holes (arrows) align with the pins (3)
- Position gasket (1) and metering diaphragm (2) on the pins (3)

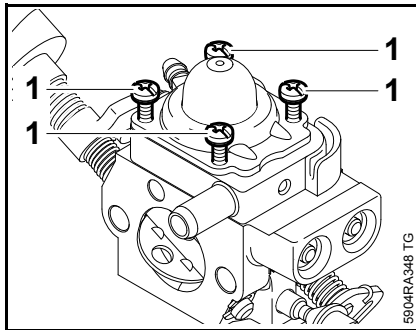


- Position cap (1) in the circular groove (arrow)

- Position end cover



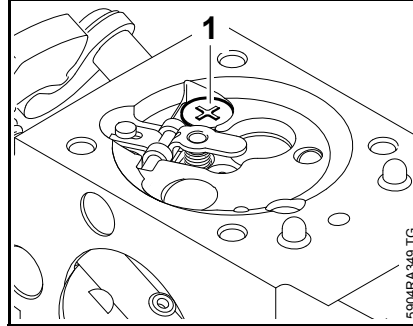
- Orient flange (1) so that connector (2) is on the same side as the choke shutter and position it so that it engages the pins on the carburetor
- Orient end cover (3) so that the bulges (arrows) face in the direction of the idle speed screw **LA**



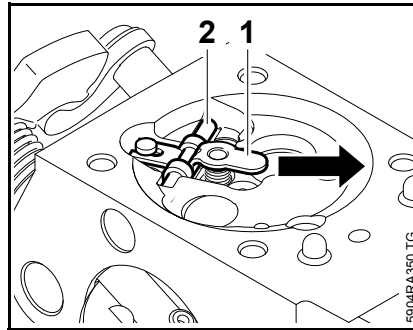
- Fit and tighten screws (1)
- Check that the metering diaphragm and gasket are correctly seated, then tighten down the screws crosswise
- Reassemble remaining parts in reverse order

### 11.4.2 Inlet needle

- Remove the metering diaphragm, 11.4.1

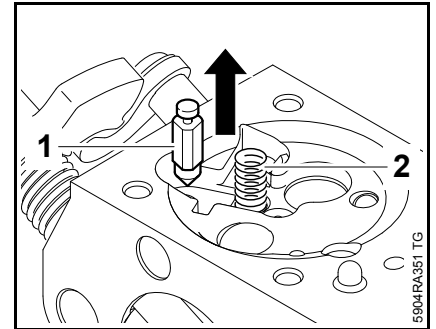


- Remove screw (1)

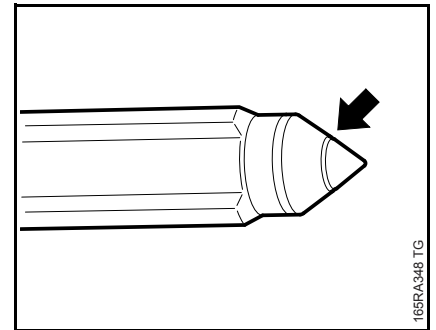


- Pull the inlet control lever (1) with spindle (2) out of the groove in the inlet needle

The spring under the inlet control lever may pop out.

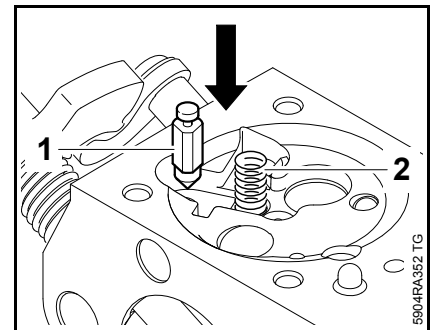


- Pull out the inlet needle (1)
- Take out and examine the spring (2), replace if necessary

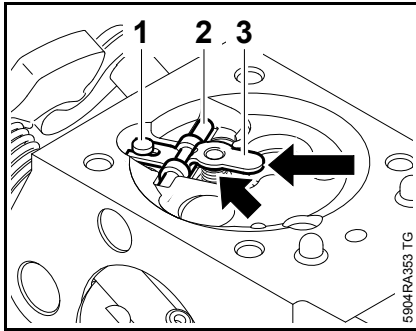


- The inlet needle must be replaced if a circular indentation (arrow) is visible on the tip of its sealing cone

### Installation



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



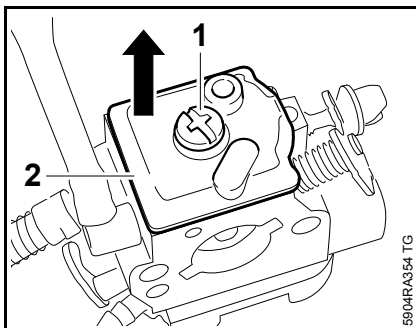
- First fit the spindle (2) of the inlet control lever (3) at the conical seat (arrow) of the spring, then slide the clevis on the inlet control lever into the groove on the inlet needle (1)

Ensure that the spring locates on the nipple of the inlet control lever.

- Press the inlet control lever down and secure it with the screw.
- Check that the inlet control lever moves easily
- Install the metering diaphragm, 11.4.1

### 11.4.3 Pump diaphragm

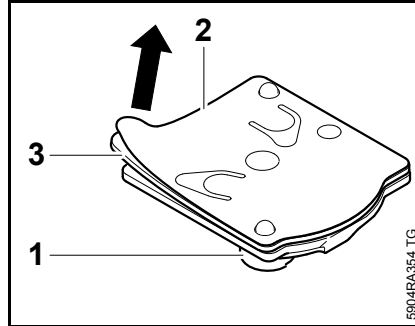
- Troubleshooting, 3.6
- Remove the carburetor, 11.3



- Remove screw (1)

- Remove the end cover (2)

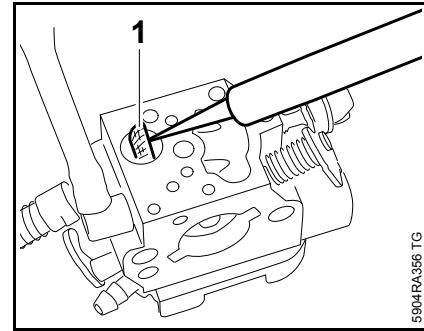
If the gasket and pump diaphragm are stuck to the carburetor, they must be removed very carefully.



- Carefully remove the pump diaphragm with gasket from the end cover (1)
- Carefully separate the pump diaphragm (2) and gasket (3)

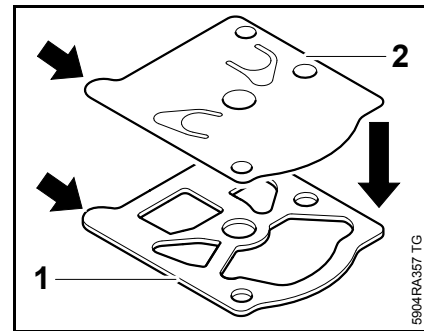
The diaphragm material is subjected to continuous alternating stresses and eventually shows signs of fatigue. In other words, the diaphragm distorts and swells and must be replaced.

- Examine the pump diaphragm for signs of damage and wear, fit a new gasket
- Examine fuel strainer for contamination and damage, clean or replace if necessary

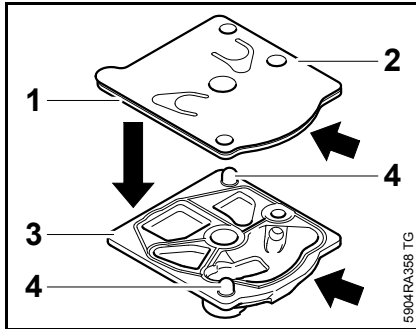


- Pull fuel strainer (1) with needle out of the carburetor housing and clean or replace it
- Reassemble parts in reverse order

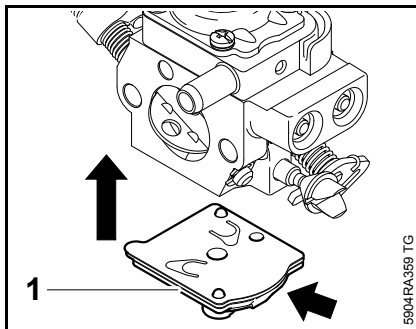
### Installation



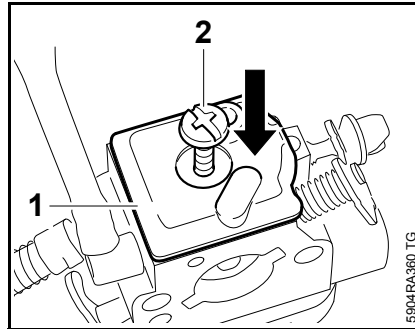
- Orient new gasket (1) and pump diaphragm (2) so that the tabs (arrows) match



- Position gasket (1) with pump diaphragm (2) on the end cover (3) so that the protrusions (arrows) match and are secured via the pins (4)



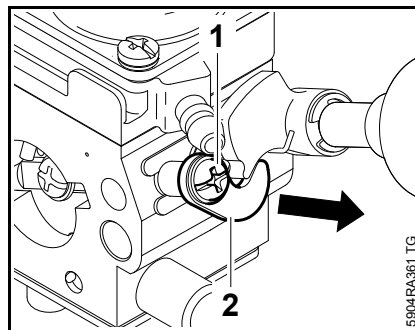
- Position the end cover (1) on the carburetor housing from below so that the gasket and pump diaphragm remain secured to the end cover
- Orient end cover (1) so that the protrusion (arrow) is on the same side as the idle speed screw **LA** and fit until the pins of the end cover align with the holes in the carburetor housing



- Check that the pump diaphragm and gasket are correctly seated
- Hold end cover (1) in position, screw in and tighten screw (2)
- Reassemble remaining parts in reverse order

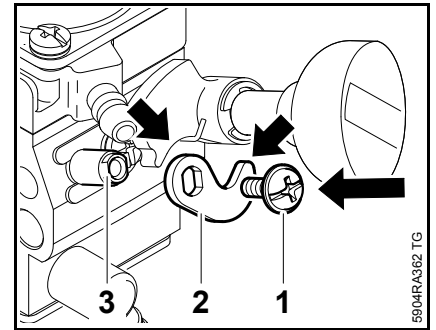
#### 11.4.4 Throttle shaft lever

- Remove the carburetor, 11.3
- Troubleshoot carburetor, 3.6



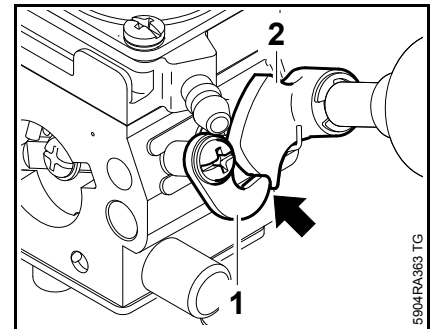
- Remove screw (1)
- Remove lever (2)

## Installation



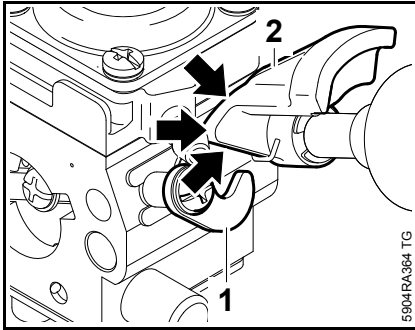
- Orient lever (2) so that the hook engages the choke lever (arrows)
- Slide the lever (2) onto the throttle shutter shaft so that it aligns with the flat faces (3)
- Screw in the screw (1) and tighten

## Checking operation



In the "warm start" position, lever (1) must engage the notch (arrow) of lever (2) and align with the contact surface of the cam.

### Checking operation, versions with M-Tronic

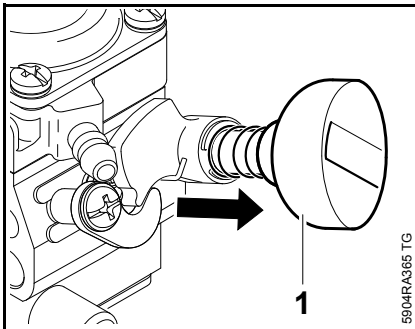


Lever (1) must align with the contact surface (arrows) on the cam of lever (2).

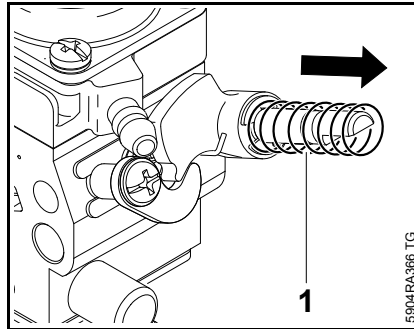
- Reassemble remaining parts in reverse order

### 11.4.5 Choke lever/choke knob

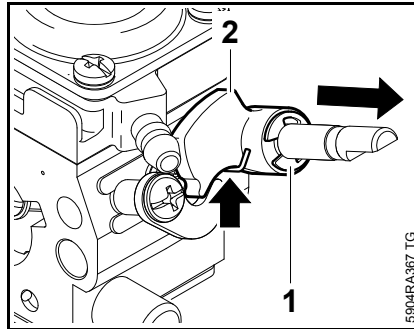
- Remove the carburetor, 11.3



- Remove choke knob (1) with a firm tug
  - choke knob is held in place by the depression on the shaft

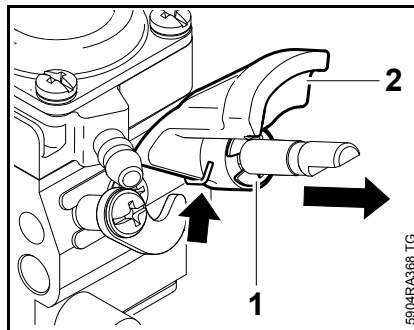


- Remove spring (1)



- Push out circlip (1)
- Pull out lever (2) with torsion spring (arrow)
- Remove torsion spring

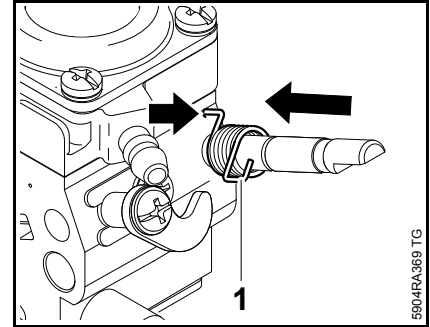
### Versions with M-Tronic



- Push out circlip (1)
- Pull out lever (2) with torsion spring (arrow)
- Remove torsion spring

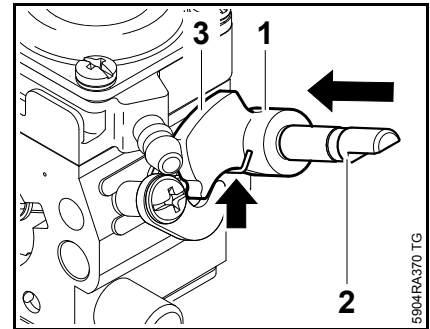
### Installation

#### All versions



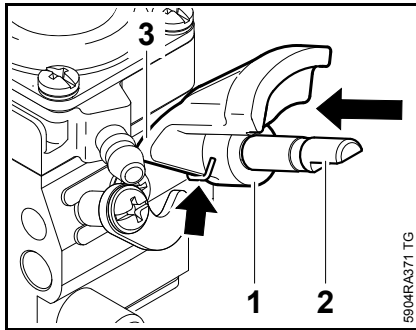
- Orient the torsion spring (1) so that the angled end points toward the carburetor
- Slide torsion spring (1) onto the choke shaft and slide the angled end into the hole (arrow) – torsion spring is secured

#### Versions without M-Tronic



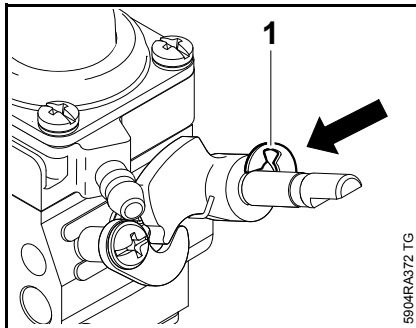
- Orient the lever (1) so that the flat surface aligns with the choke shaft (2) and the cam (3) faces the throttle shaft lever
- Slide lever (1) onto choke shaft (2), turn torsion spring counterclockwise and hook it into lever (arrow)

### Versions with M-Tronic

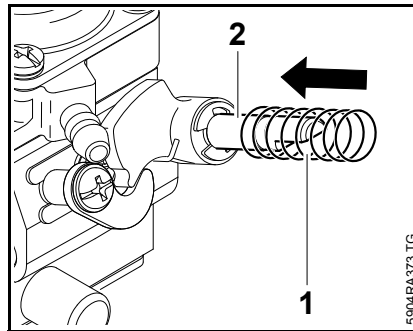


- Orient the lever (1) so that the flat surface aligns with the choke shaft (2) and the cam (3) faces the throttle shaft lever
- Slide lever (1) onto choke shaft (2), turn torsion spring counterclockwise and hook it into lever (arrow)

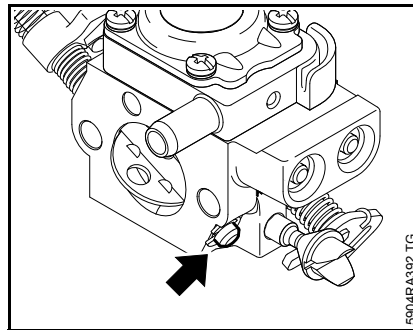
### All versions



- Slide on the lever as far as it will go – the groove for the circlip must be visible
- Push circlip (1) into place

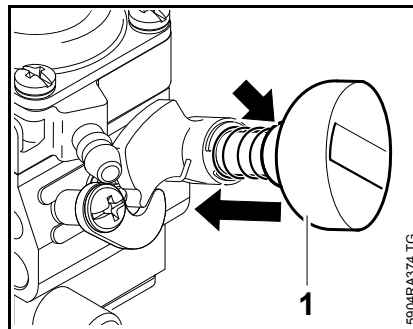


- Push the spring (1) onto the choke shaft (2)



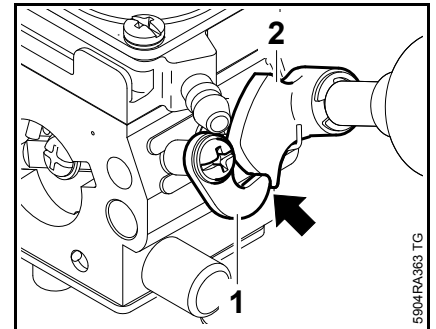
When pressing on the choke knob, the choke shaft must be held in place.

- Place the opposite end (arrow) of the choke shaft on a solid surface



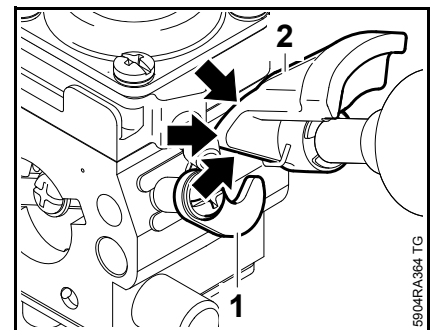
- Press the choke knob (1) firmly onto the choke shaft until it snaps into place – spring must rest against the base (arrow) of the black lever

### Checking operation without M-Tronic



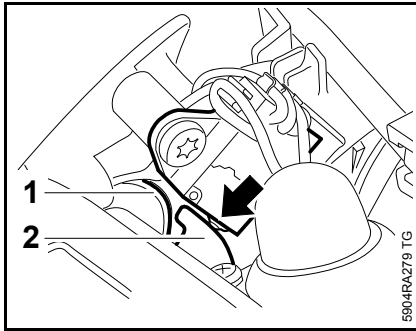
In the "warm start" position, lever (1) must engage the notch (arrow) of lever (2) and align with the contact surface of the cam.

### Checking operation with M-Tronic



Lever (1) must align with the contact surface (arrows) on the cam of lever (2).

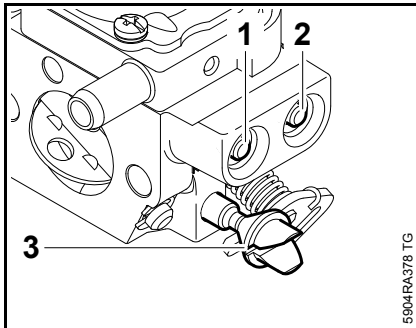
- Install the carburetor, [11.3](#)
- Install filter housing and grommet, [11.2](#)



- Set choke lever (1) to position ▲; the cam on the lever (2) must actuate the microswitch (arrow)
  - clicking noise

- Reassemble remaining parts in reverse order

#### 11.4.6 Adjusting screws, carburetor without M-Tronic



Grommet not shown for a better view.

There are three adjusting screws on the carburetor:

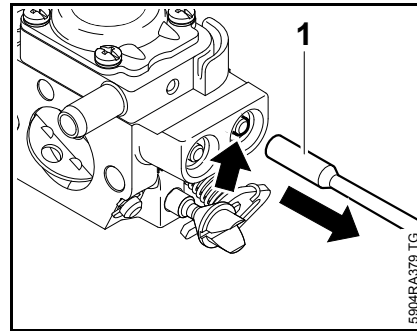
- H** = High speed adjusting screw (1)
- L** = Low speed adjusting screw (2)
- LA** = Idle speed adjusting screw (3)

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

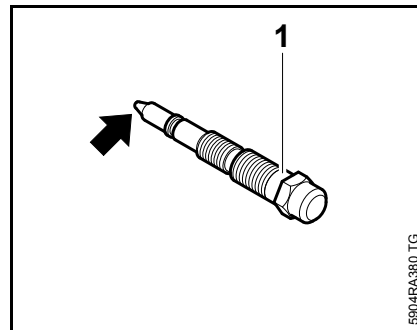
The high speed screw **H** and the low speed screw **L** have a special hexagonal head and can only be adjusted with screwdriver 5910 890 2307

- no limiter caps are used.
- Remove the carburetor, 11.3
- See also Troubleshooting on the carburetor, 3.6

#### Low speed screw

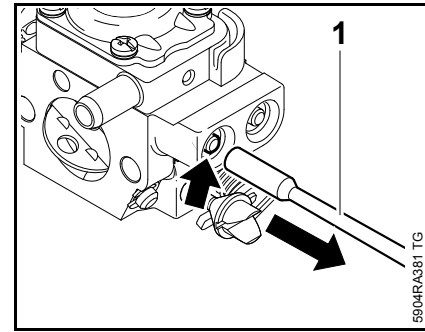


- Unscrew low speed screw **L** (arrow) with screwdriver (1) 5910 890 2307

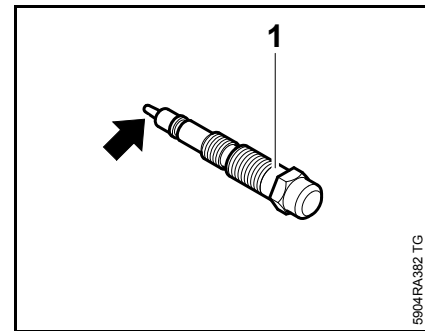


- Examine the tip (arrow) for signs of damage or wear. Fit a new low speed screw **L** (1) if necessary
- Turn the low speed screw **L** in as far as possible
- Continue with the high speed screw **H**

#### High speed screw



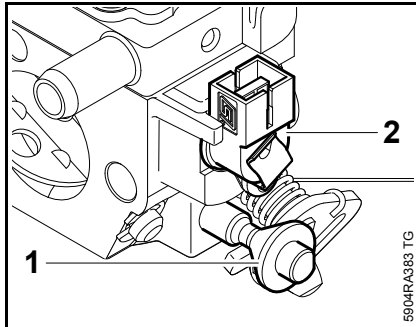
- Unscrew high speed screw **H** (arrow) with screwdriver (1) 5910 890 2307



- Examine the tip (arrow) for signs of damage or wear. Fit a new high speed screw **H** (1) if necessary
- Turn the high speed screw **H** in as far as possible
- Make the basic setting, 11.6.1

## 11.5 Carburetor adjustment with M-Tronic

The carburetor is adjusted by the M-Tronic, thus no manual adjustments to the carburetor are necessary or possible.



Position of the screw (1) must not be changed

– changing the factory default setting leads to impaired engine performance.

Solenoid valve (2) is pre-set at the factory and must not be disassembled.

– In case of malfunctions, check M-Tronic, [☞ 7.5](#)

## 11.6 Carburetor adjustment without M-Tronic

The new carburetors have been adjusted for optimum performance and fuel efficiency in all operating states at the factory.

The high speed screw **H** and low speed screw **L** can only be adjusted with screwdriver 5910 890 2307.

It is no longer necessary or possible for the user to adjust these adjusting screws.

The idle speed screw **LA** remains unchanged and can still be set by the user to adjust the idle speed.

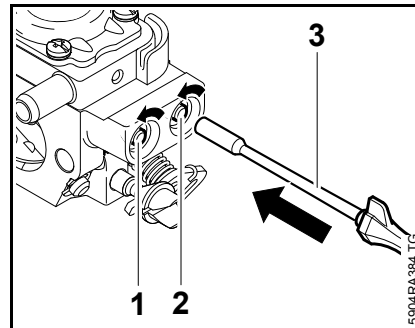
### 11.6.1 Basic setting

Only necessary if the high speed screw **H** or low speed screw **L** has to be replaced or for cleaning and setting the carburetor.

Basic setting and fine adjustment are required after the adjusting screws have been removed and installed.

Before the start of the fine adjustment, the adjusting screws must be pre-set; this can not be done if the engine is running or if the carburetor has been removed from the machine.

With the low speed and high speed screws in their seats, turn them counterclockwise.



● Set adjusting screws using screwdriver (3) 5910 890 2307

● Turn high speed adjusting screw **H** (1)  
1 3/4 turns Turn low speed screw **L** (2)  
1 1/4 turns

Now the basic setting of the high speed screw **H** and the low speed screw **L** has been established.

– Continue with fine adjustment

### Fine adjustment

Carburetor and air filter must be installed.

– Attach deflector and cutting attachment (mowing head), see Instruction Manual  
– Cutting attachment must rotate freely, clean if necessary

– Examine the spark arresting screen (if installed); clean or replace it if necessary, [☞ 3.7](#) or [☞ 5.1](#)

– Examine air filter, replace if necessary  
– a dirty air filter may not be cleaned, [☞ 11.1](#)

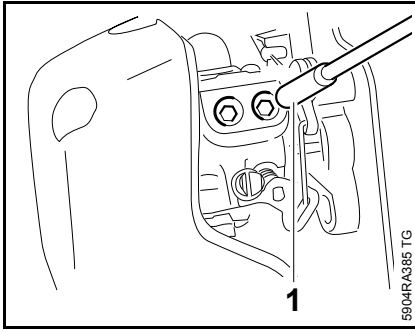
– Set adjusting screws using screwdriver 5910 890 2307

Basic setting of the high speed screw **H** and low speed screw **L** must have been established.

– Let the engine warm up



## Setting idle speed



- Position screwdriver (1) 5910 890 2307 in low speed screw L and high speed screw H

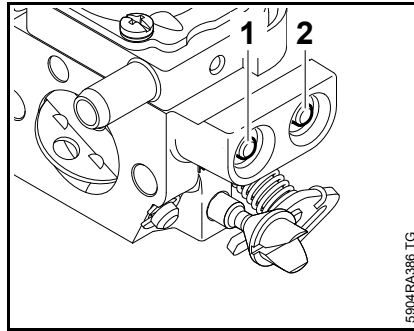
– Set idle speed with a speed tester. Set the specified speeds within the tolerance range of  $\pm 200$  rpm

1. Using the idle speed screw LA set speed to 3300 rpm
2. Turn the low speed screw L left or right to set the highest speed

If this speed is more than 3700 rpm, stop the adjustment and start again with step 1.

3. With the idle speed screw LA set the speed again to 3300 rpm
4. With the low speed screw L set the speed to 2800 rpm

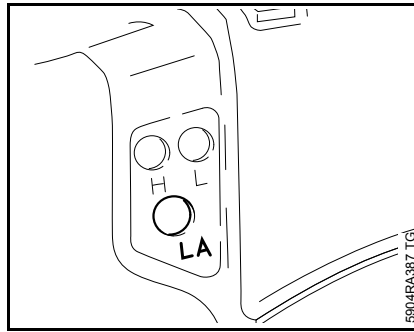
Fine adjustment of the cut-off speed is not required.



The fine adjustment of the high speed screw H (1) and low speed screw L (2) is now complete.


The settings of the high speed screw H and the low speed screw L can no longer be changed by the user.




### 11.6.2 User adjustment



The new carburetors provide an optimum fuel-air mixture in all environments and operating states, thus all that is eventually necessary or possible is correction of the idle speed using the idle speed screw LA.

To avoid problems, the following steps must be performed for all settings:

- Troubleshooting,  3.6

- Check cutting attachment, adjust if necessary
- Examine the spark arresting screen (if installed); clean or replace it if necessary,  3.7 or  5.1
- Examine air filter, replace if necessary
  - a dirty air filter may not be cleaned,  11.1

Check running behavior:  
The engine must accelerate well when the throttle is opened and idle smoothly.

### Setting the idle speed

The basic and fine adjustment of the adjusting screws must be set.

- Let the engine warm up

### Engine stops when idling

- Turn the idle speed screw LA clockwise until the cutting attachment begins to turn, then back off 1 turn

### Cutting attachment rotates during idling

- Turn the idle speed screw LA counterclockwise until the cutting attachment stops turning, then back off 1 turn

### Erratic idling behavior, poor acceleration

- Check basic and fine setting of the adjusting screws, adjust them or service carburetor, if necessary, 11.6.1, 11.4

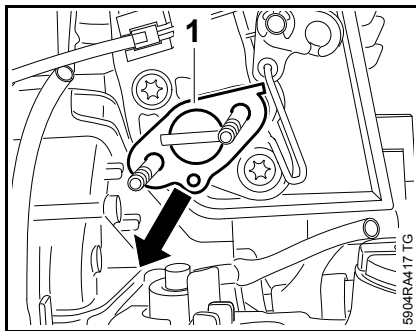
### Correcting the carburetor setting for use at high altitudes

Engine not running satisfactorily

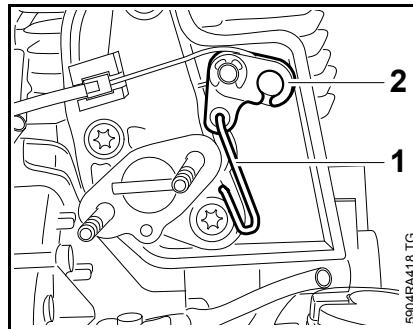
- Check basic and fine setting of the adjusting screws, adjust them or service carburetor, if necessary, 11.6.1, 11.4

### 11.7 Spacer flange

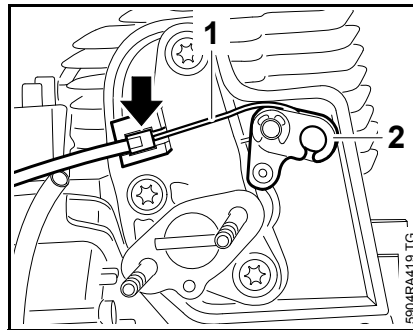
- Troubleshooting, 3.7
- Remove the carburetor, 11.3



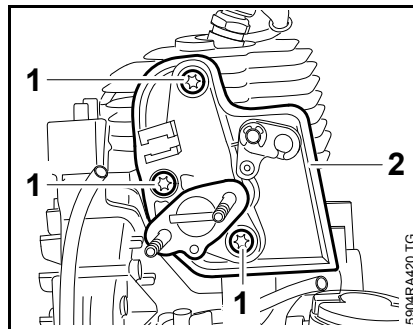
- Remove gasket (1) – use a new gasket



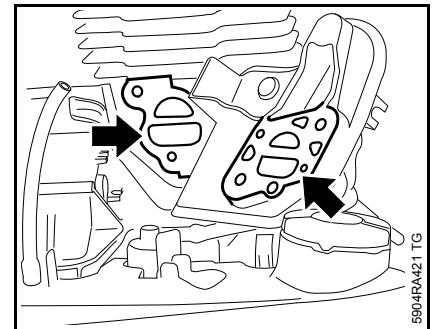
- Unhook the throttle rod (1) from the lever (2)



- Unhook throttle cable (1) at lever (2) and remove it from the mount (arrow)

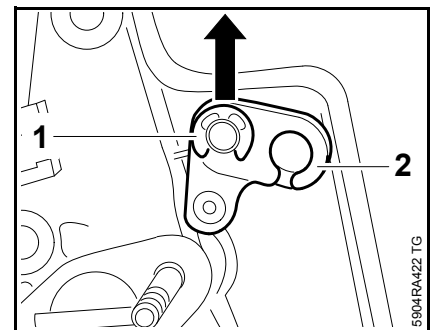


- Unscrew screws (1) and remove spacer flange (2)
- Remove gasket – use a new gasket
- Check spacer flange, replace if necessary – even tiny cracks can lead to impaired engine performance, 3.6, 3.7



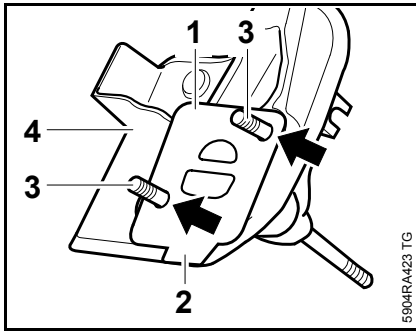
- Examine and clean the mating surfaces (arrows), remove any gasket residues if necessary. 14

The mating surfaces must be in perfect condition and without any damage whatsoever. If the mating surfaces are damaged, the cylinder or spacer flange must be replaced.

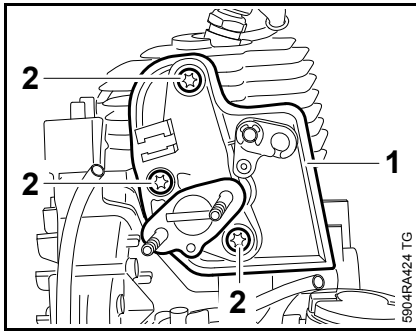


- Press out the circlip (1) and remove the lever (2)

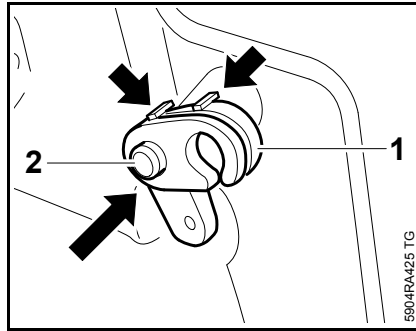
## Installation



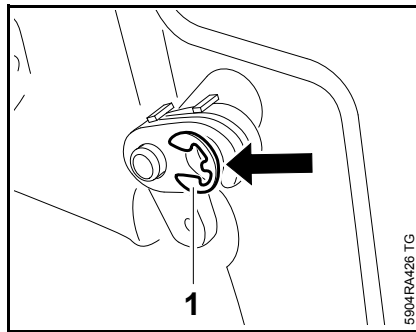
- Align the new gasket (1) so that the tab (2) faces downward and the holes (arrows) match
- Insert two screws (3) and affix gasket to spacer flange (4)



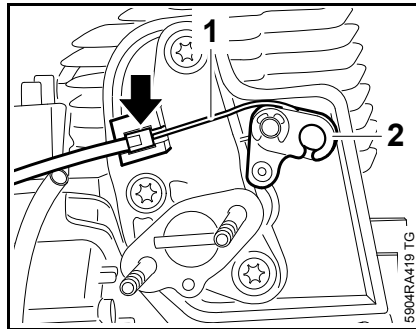
- Position spacer flange (1) with gasket on cylinder intake port
- Insert and tighten down the screws (2)



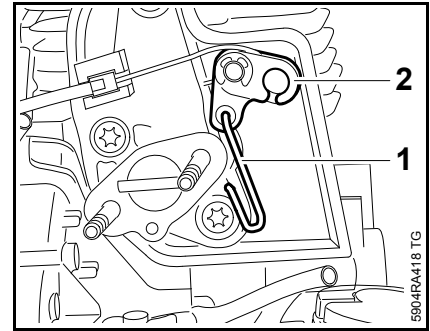
- Orient lever (1) so that the pins (arrows) face the spacer flange and push it onto the post (2)



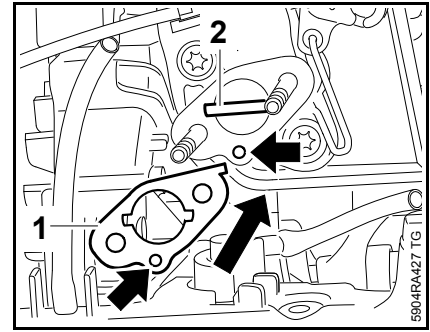
- Push circlip (1) into place



- Hook throttle cable (1) onto lever (2) and press it into the mount (arrow)



- Hook the throttle rod (1) onto the lever (2)





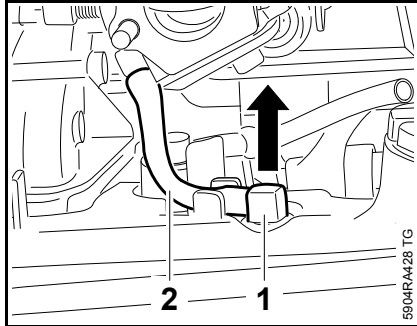
- Orient gasket (1) so that the holes (arrows) match and the openings engage the ridge (2)
- Press gasket (1) over the studs
- Reassemble remaining parts in reverse order

## 11.8 Tank vent

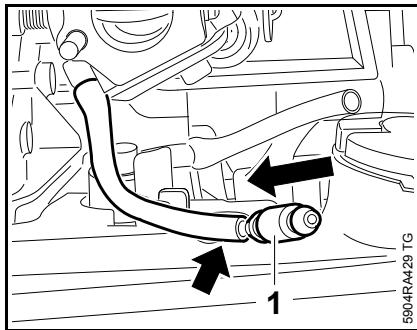
### 11.8.1 Testing

If problems develop in the carburetor or fuel supply, the tank vent must always also be tested and replaced if necessary. Correct functioning is determined by testing the fuel tank under vacuum or at gauge pressure via the fuel hose.

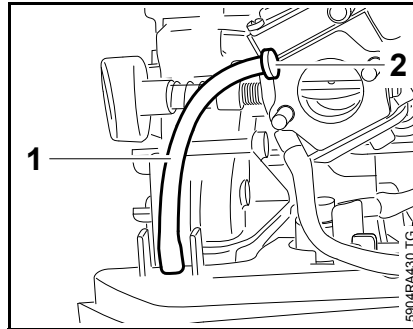
- Open filler cap and drain fuel tank,  1
- Close the filler cap
- Remove filter housing,  11.2



- Pull out connector (1) with fuel hose (2)
- Pull connector off of fuel hose

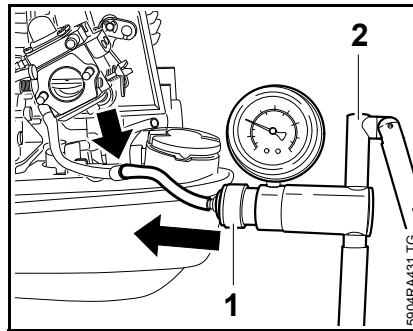


- Push the connector (1) 0000 855 9200 into the fuel suction hose (arrow)





- Pull off the fuel return line (1) at the connector of the carburetor and seal with a suitable stopper (2)

### Testing with negative pressure

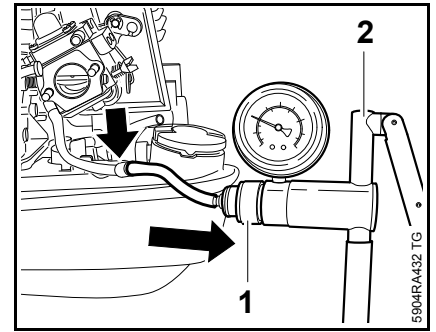


- Slide ring (1) to the left and connect the pump (2) 0000 850 1300 to the double nipple (arrow)
  - Create vacuum in fuel tank



Pressure is equalized via the tank vent. A negative pressure must not build up inside the tank.

- Clean the area around the tank vent
- Always use a new fuel hose
- Replace the tank vent or tank if necessary,  11.8 or  11.9.3

### Testing with gauge pressure

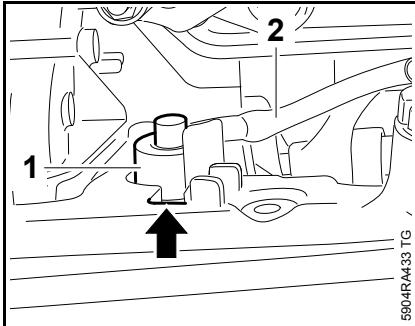


- Slide ring (1) to the right and connect the pump (2) 0000 850 1300 to the double nipple (arrow)
  - Create excess pressure in fuel tank
- Actuate the pump until the pressure gauge shows a pressure of 0.5 bar. If this pressure remains constant for at least 20 seconds, the tank and tank vent are airtight. If the pressure drops, the leak must be located and the defective part replaced.

- Replace the tank vent or tank if necessary,  11.8 or  11.9.3
- Always use a new fuel hose
- Reassemble parts in reverse order

## 11.8.2 Removal and installation

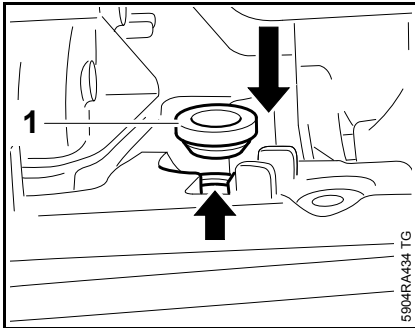
- Remove the carburetor,  11.3




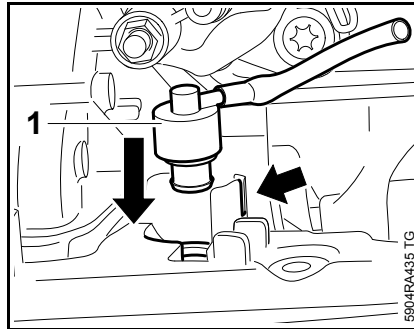
- Pry out the tank vent (1) via the mounting rib (arrow)
- Remove tank vent (1) from hose (2), examine and replace if necessary
- Remove the grommet


Always fit a new tank vent.

### Installation



- Orient grommet (1) so that the cone faces the fuel tank
- Coat outside of grommet with STIHL press fluid,  14
- Press grommet (1) into hole (arrow) until it encloses the hole completely



- Coat mounting surface of tank vent with STIHL press fluid,  14
- Push new tank vent into hose
- Orient tank vent (1) so that the connector with hose lines up with the opening (arrow)
- Press tank vent (1) with hose completely into the grommet

Hose must be pressed completely onto the connectors of the tank vent and the filter housing and run so that it is free of kinks.



- Reassemble remaining parts in reverse order

## 11.9 Fuel intake


### 11.9.1 Pickup body

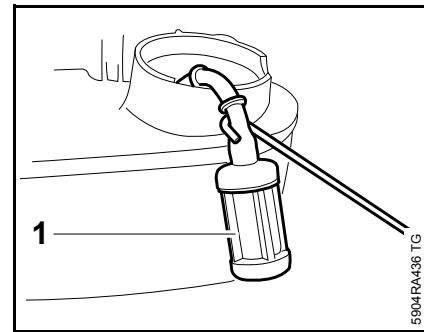
Impurities which are entrained into the fuel tank with the fuel are trapped by the pick-up body. With time, the fine pores in the pick-up body become clogged with very fine dirt particles. This reduces the intake diameter and fuel can no longer be delivered in sufficient quantities.

Always check the fuel tank and pick-up body first if problems develop in the fuel supply.

- Troubleshooting,  3.6 or  3.7

Clean the fuel tank if necessary.

- Open the filler cap and drain the tank.
- Fill a little clean gasoline into the tank, close the tank and shake it thoroughly.
- Reopen the tank and empty it.
- Ensure that the fuel is disposed of correctly and without harming the environment,  1
- Open the filler cap




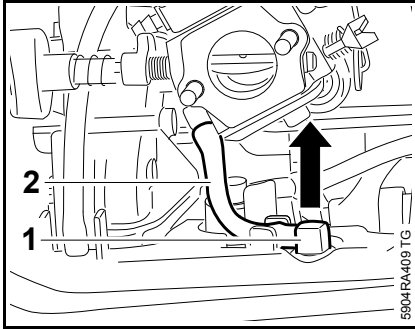
- Use hook 5910 893 8800 to pull the pickup body (1) out of the fuel tank


Take care not to overextend the fuel hose.

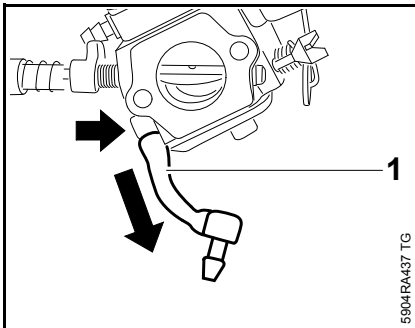
- Pull off pickup body (1) and examine it, replace if necessary
- Reassemble parts in reverse order


### 11.9.2 Fuel hose

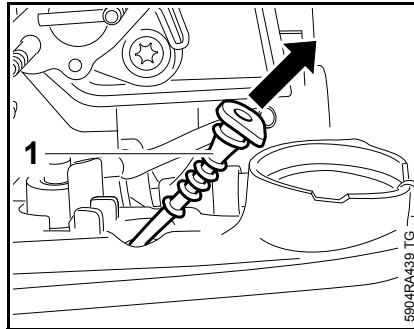
- Open the filler cap
- Remove filter housing,  11.2



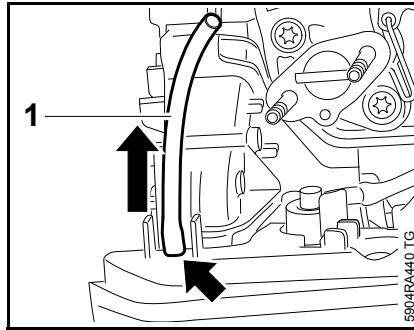
- Pull out connector (1) with fuel hose (2)
- Remove the carburetor,  11.3



- Pull off fuel hose (1) with connector at the carburetor (arrow)
- Pull connector off of fuel hose
- Remove the pickup body,  11.9.1



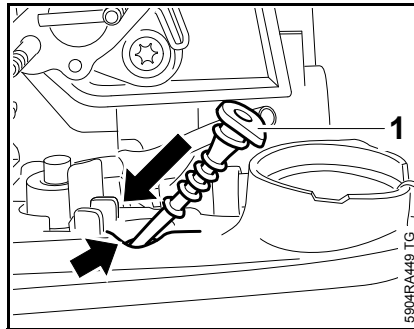
- Pull the fuel suction hose (1) out of the inside of the tank



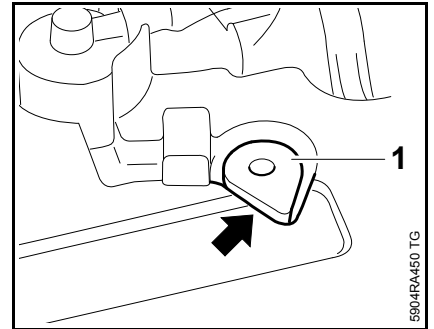
- Pull off the fuel return line (1) at the connector (arrow)


Always use new fuel hoses.

#### Installation

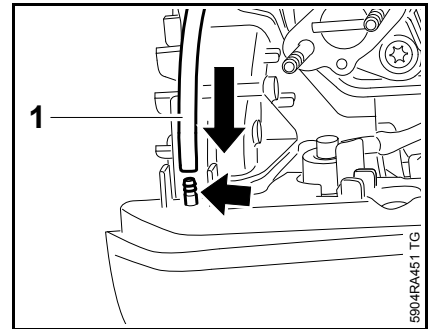


- Push fuel suction hose (1) into hole (arrow) in fuel tank

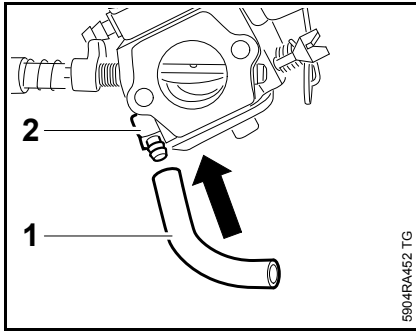


- Use STIHL press fluid to simplify assembly,  14

- Orient the fuel suction hose (1) and press it into the hole in the housing as far as it will go – the flange must be flush with the guide (arrow)

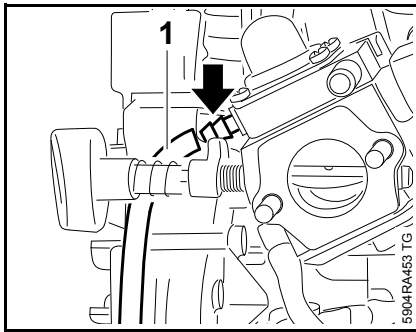


- Push the new fuel return line (1) completely onto the connector (arrow)

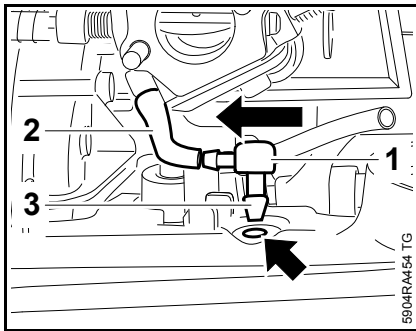


- Connect the fuel hose (1) to the connector (2)

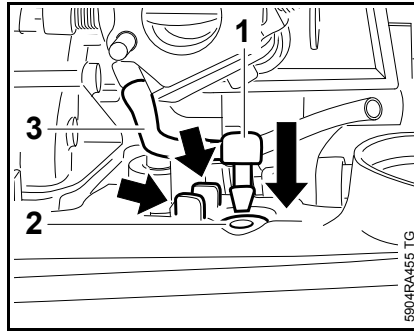
– Slide carburetor onto stud bolts



- Push the fuel return line (1) completely onto the connector (arrow)

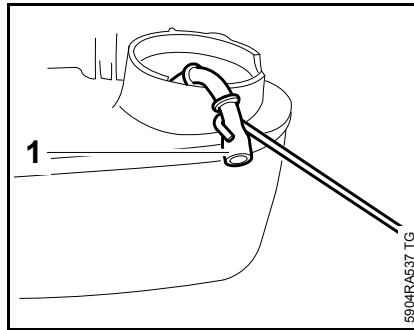


- Press connector (1) onto fuel hose (2) so that the second connector (3) faces the hole (arrow) of the fuel suction hose
  - Connector must be pushed all the way into the fuel hose



– Coat connector with STIHL press fluid, 14

- Push connector (1) into the fuel suction hose (2) so that the fuel hose (3) is between the ribs (arrows)
  - Connector must be pushed all the way into the fuel suction hose



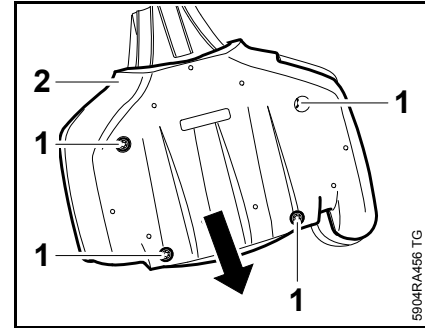
- Use hook 5910 893 8800 to pull the fuel suction hose (1) out of the fuel tank

Take care not to overextend the fuel suction hose.

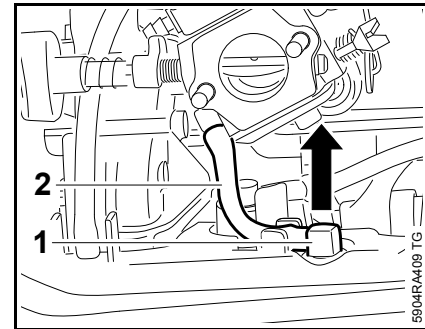
- Fit the pickup body, 11.9.1
- Close the filler cap
- Reassemble remaining parts in reverse order

### 11.9.3 Fuel tank

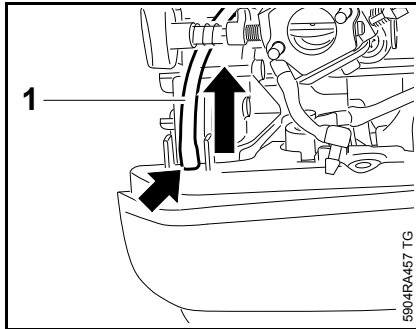
- Empty the fuel tank, 1
- Remove shroud, 5.4
- Remove filter housing, 11.2



- Remove screws (1)
- Remove the protective hip plate (2)

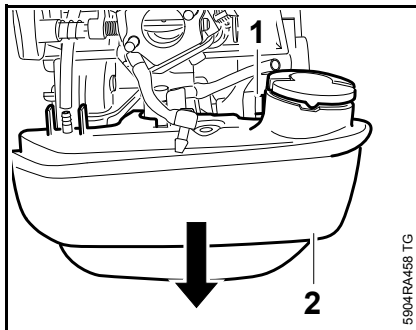


- Pull out connector (1) with fuel hose (2)



- Pull off the fuel return line (1) at the connector (arrow)

Always use a new fuel return line.

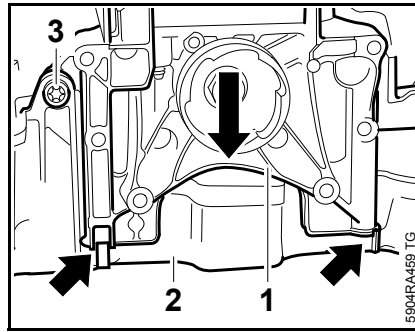


- Unscrew screw (1) and remove fuel tank (2) downward

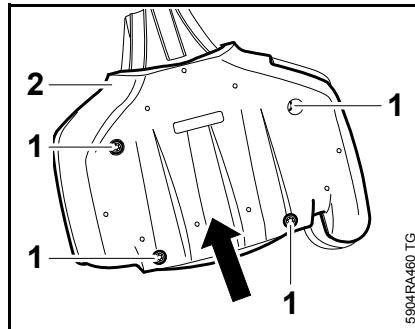
Only reuse those parts of the old fuel tank which are not supplied with the new fuel tank – see spare parts list.

- Check tank vent, replace if necessary

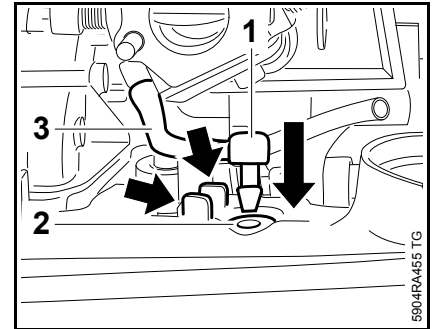
## Installation



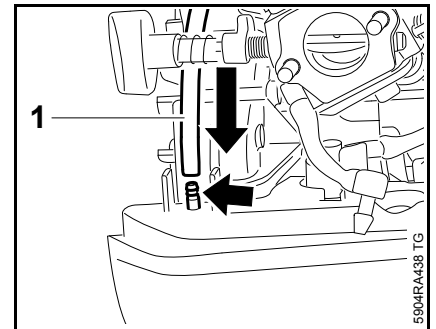
- Insert the engine unit (1) in the fuel tank (2) so that the domes (arrows) on the starter and ignition side engage the recesses of the fuel tank
- Screw in the screw (3) and tighten



- Fit protective hip plate (2) so that the bulge is at the tank filler port
- Insert and tighten down the screws (1)



- Push connector (1) into the fuel suction hose (2) so that the fuel hose (3) is between the ribs (arrows)
  - Connector must be pushed all the way into the fuel suction hose



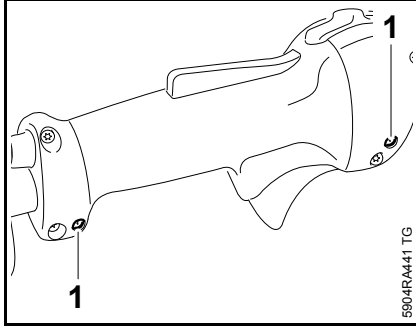
- Push the new fuel return line (1) completely onto the connector (arrow)
  - Reassemble remaining parts in reverse order



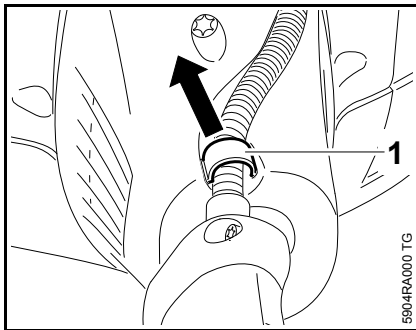
## 12. Drive tube assembly

### 12.1 Drive tube assembly with loop handle

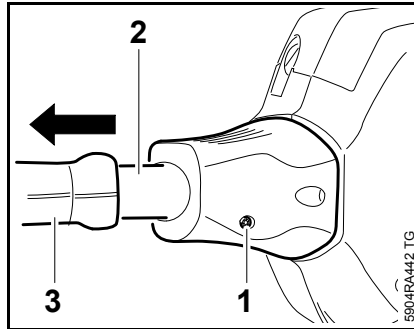
Before removing the drive tube assembly, the control handle for the loop handle must be detached.




- Undo the screws (1)




- Ease out the cable holder (1)

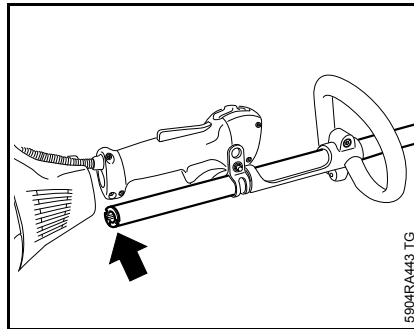




- Undo the screw (1)
- Pull the drive tube assembly (2) out of the clutch housing and control handle for loop handle (3)
- Examine the drive tube assembly, repair or replace if necessary,  12.2.1

With a new drive tube assembly, the installed parts or components must be converted.

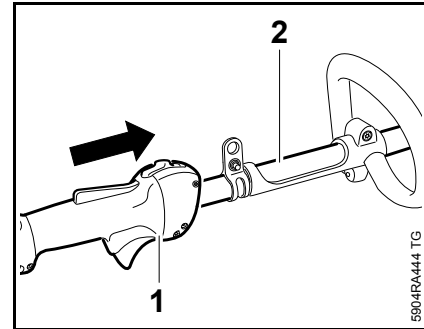
#### Installation

- Degrease clamping area,  14



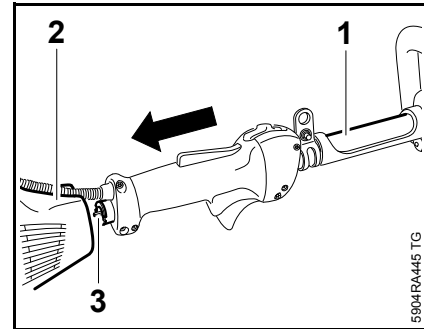
Loop handle and carrying ring must be installed,  12.2.3,  12.3.3.

- Orient end of drive tube assembly (arrow), with stopper installed, so that it faces the engine



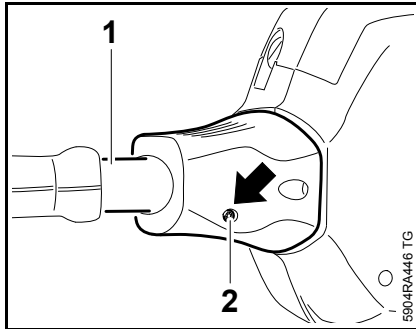
The clamps in the control handle for the loop handle must be loosened.

- Push the control handle for the loop handle (1) onto the side of the drive tube assembly (2), with the stopper installed



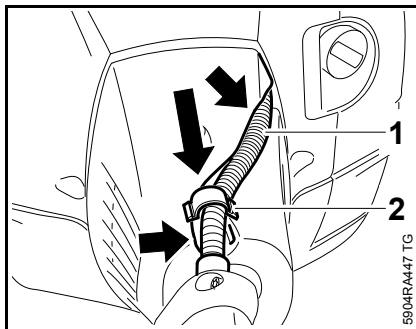
- Push the drive tube assembly (1) through the cover (2) in the clutch housing with gentle twisting motions until the square profile (3) of the drive shaft engages the clutch drum

The drive tube assembly must be seated in the clamp as far as it will go.

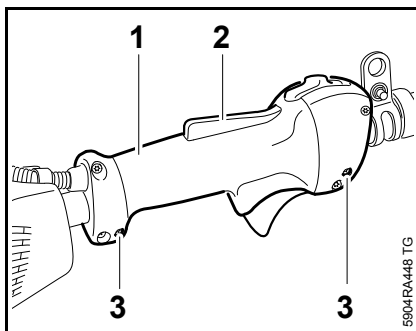


- Orient drive tube assembly (1) and tighten screw (2) through the opening (arrow)
  - Drive tube assembly is clamped and secured

The sticker on the drive tube assembly must be visible when using the machine.



- Insert protective tube (1) in the guide (arrows) and install cable holder (2)

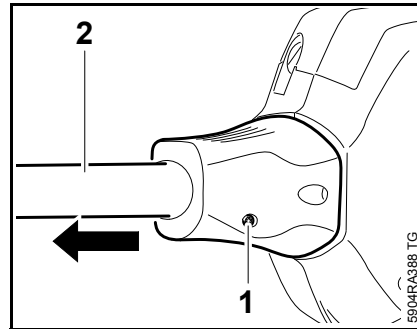


- Orient control handle for loop handle (1) so that the trigger interlock (2) faces up

- Tighten screws (3)
  - Control handle for loop handle is clamped and secured
- Check instruction label on drive tube assembly for damage and legibility, replace if necessary

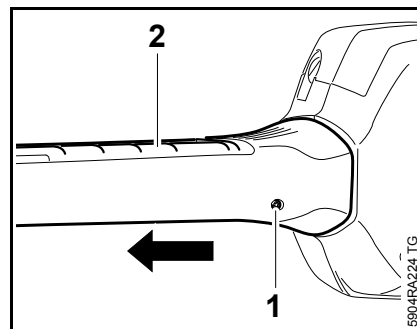
## 12.2 Drive tube assembly with control handle for bike handle

- Remove control handle for bike handle and remove protective tube from guides. 10.2



- Undo the screw (1)
- Pull the drive tube assembly (2) out of the clutch housing

## Versions with antivibration housing



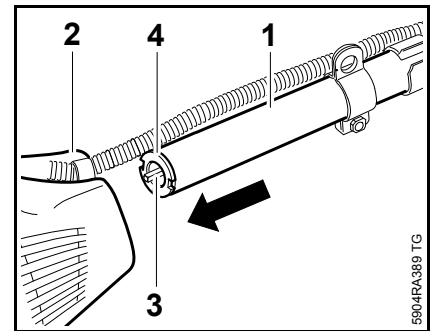
- Undo the screw (1)

- Pull drive tube assembly with antivibration housing (2) out of the clutch housing
- Examine the drive tube assembly, repair or replace if necessary, 12.2.2

With a new drive tube assembly, the installed parts or components must be converted.

## Installation

- Degrease clamping area, 14




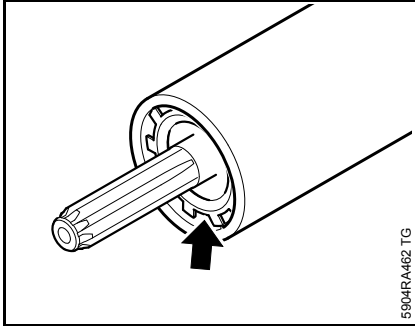
Throttle cable support and carrying ring must be installed, 12.3.4, 12.3.3.

- Orient end of drive tube assembly with stopper installed (4) so that it faces the engine
- Push the drive tube assembly (1) through the cover (2) in the clutch housing with gentle twisting motions until the square profile (3) of the drive shaft engages the clutch drum, if necessary, turn the square profile of the drive shaft or the drive shaft at the gearbox on the opposite end

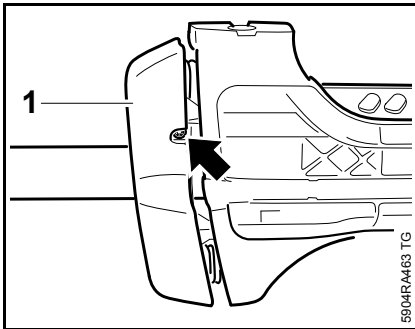
- The drive tube assembly must be seated in the clamp as far as it will go.

## Drive tube assembly with 28 mm diameter for 4-point antivibration system

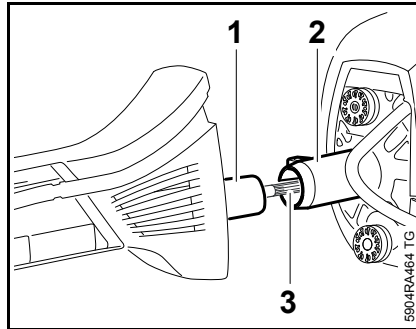
- Degrease clamping area,  14



- Orient end of drive tube assembly with shakeproof washer installed (arrow) so that it faces the engine

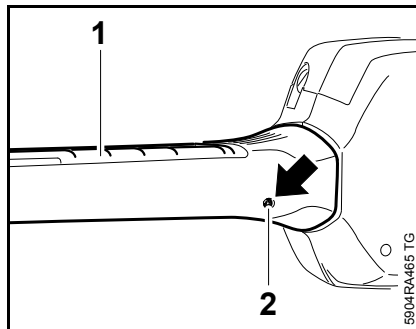


Antivibration housing (1) must be pushed on and clamping screw (arrow) must be loosened.





- Push the drive tube assembly (1) into the clutch housing (2) with gentle twisting motions until the serration (3) of the drive shaft engages the clutch drum

The drive tube assembly must be seated in the clutch housing as far as it will go.







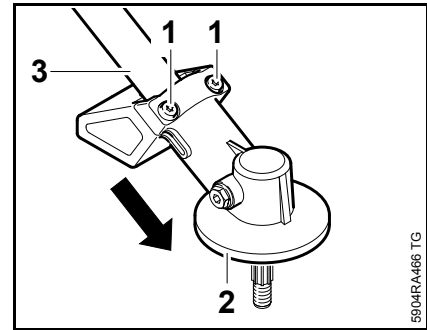
- Orient drive tube assembly (1) and tighten screw (2) through the opening (arrow)
  - Drive tube assembly is clamped and secured

The sticker on the drive tube assembly must be visible when using the machine.

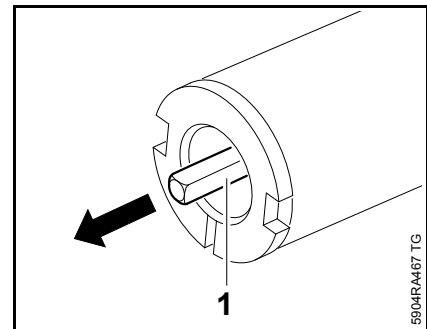
- Secure antivibration housing,  9.2
- install bike handle with control handle,  9.2
- Check instruction label on drive tube assembly for damage and legibility, replace if necessary

## 12.2.1 Disassembling the drive tube assembly with a diameter of 25.4 mm

- Remove the drive tube assembly,  12.1
- If necessary, install bike handle with control handle,  9.2
- If necessary, install carrying ring and throttle cable support,  12.3.3,  12.3.4

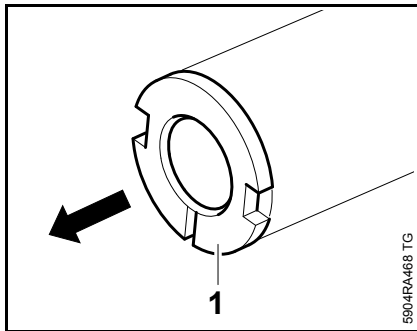


- Undo the screws (1)
- Pull gearbox (2) off of drive tube assembly (3)

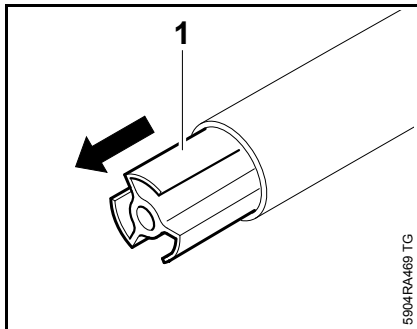


- Pull drive shaft (1) with square profile out of the drive tube assembly

If the shaft has blue tarnish on it, it must be replaced.

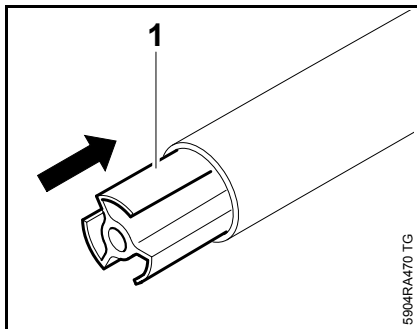


- Pry out plug (1)

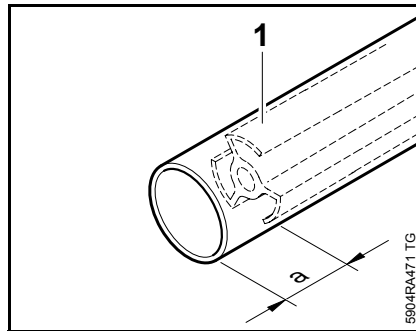


- Pull flexible liner (1) out of the drive tube assembly

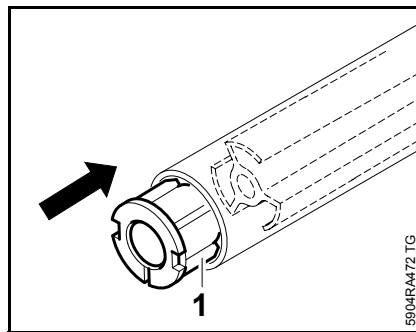
### Assembly



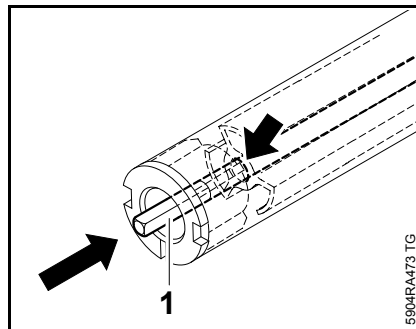
- Push flexible liner (1) into drive tube assembly



- Push flexible liner (1) inside the drive tube assembly until depth  $a = 30$  mm




- Press plug (1) into the drive tube assembly as far as it will go



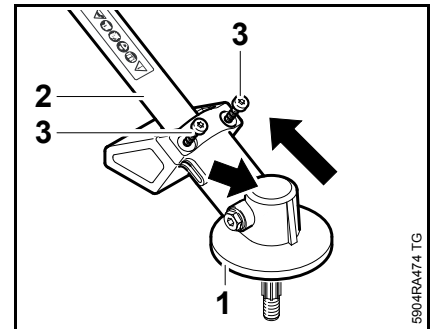
The drive shaft is supported by the flexible insert in the drive tube assembly.

If the shaft has blue tarnish on it, it must be replaced.

- Coat the drive shaft with STIHL gear lubricant for brushcutters before installation,  14

- Apply lubricant to the drive shaft evenly
- Only pressing lubricant into the hole of the flexible liner and pushing in the unlubricated drive shaft does not ensure sufficient lubrication

- Push drive shaft (1) with square profile into opening (arrow) of the flexible insert



- Slide on the gearbox (1) on the opposite end of the installed stopper as far as it will go

- Orient drive tube assembly (2) so that the sticker aligns with the dome (arrow) on the gear housing, then tighten screws (3)
- The sticker on the drive tube assembly must be visible when using the machine

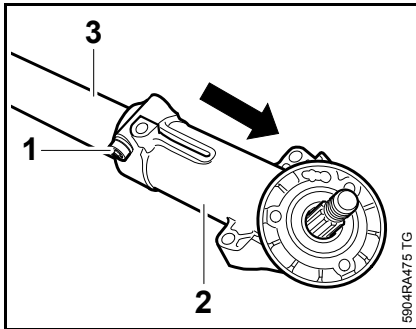
- With gentle twisting motions, push the drive shaft into the gearbox as far as it will go, turn output shaft on gearbox, if necessary

### Checking operation

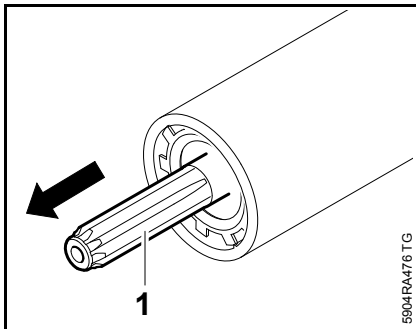
- Turn the square profile of the drive shaft; the output shaft on the gearbox must also turn
- Reassemble parts in reverse order

### 12.2.2 Disassembling the drive tube assembly with a diameter of 28 mm

- Remove the drive tube assembly, 12.2
- Remove bike handle, if necessary, 9.2
- Remove 4-point antivibration system, if necessary, 9.2

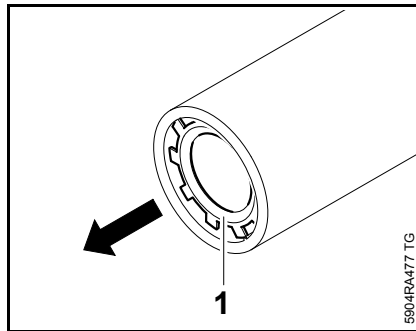


- Undo the screw (1)
- Pull gearbox (2) off of drive tube assembly (3)

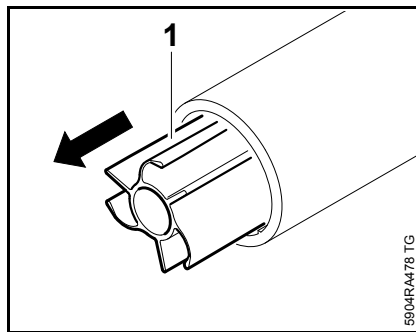


- Pull drive shaft (1) with serration out of the drive tube assembly

If the shaft has blue tarnish on it, it must be replaced.

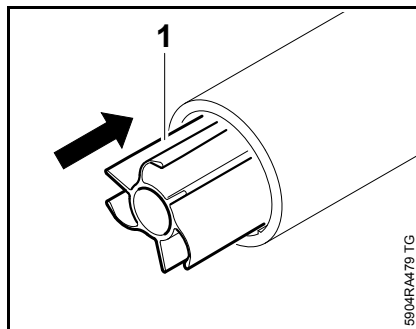


- Pry out shakeproof washer (1)  
– Replace shakeproof washer after removal

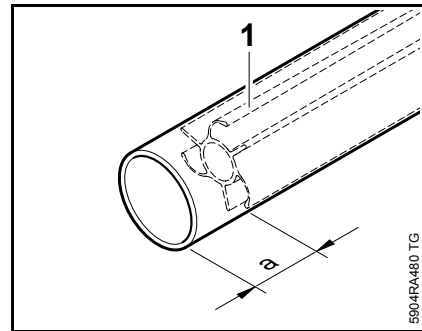


- Pull flexible liner (1) out of the drive tube assembly

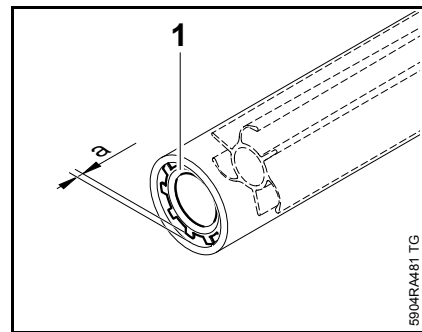
#### Assembly



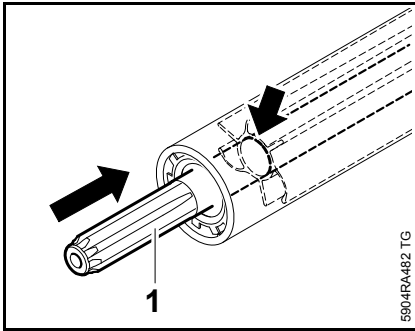
- Push flexible liner (1) into drive tube assembly



- Push flexible liner (1) inside the drive tube assembly until depth  $a = 25$  mm




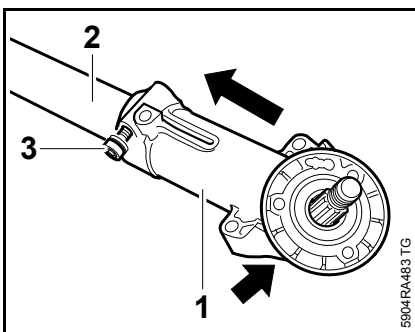
- Push new shakeproof washer (1) inside the drive tube assembly until depth  $a = 6$  mm



The drive shaft is supported by the flexible insert in the drive tube assembly.

If the shaft has blue tarnish on it, it must be replaced.

- Coat the drive shaft with STIHL gear lubricant for brushcutters before installation,  14
- Apply lubricant to the drive shaft evenly
  - Only pressing lubricant into the hole of the flexible liner and pushing in the unlubricated drive shaft does not ensure sufficient lubrication
- Push drive shaft (1) with serration into opening (arrow) of the flexible insert



- Push gearbox (1) onto the end without the shakeproof washer until it rests against the drive tube assembly (2)

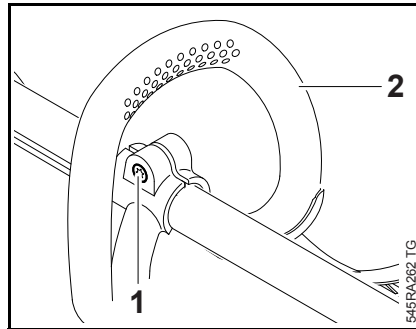
- Orient drive tube assembly (2) so that the sticker aligns with the dome (arrow) on the gear housing, then tighten screw (3)
  - The sticker on the drive tube assembly must be visible when using the machine


- With gentle twisting motions, push the drive shaft into the gearbox as far as it will go, turn output shaft on gearbox, if necessary

### Checking operation

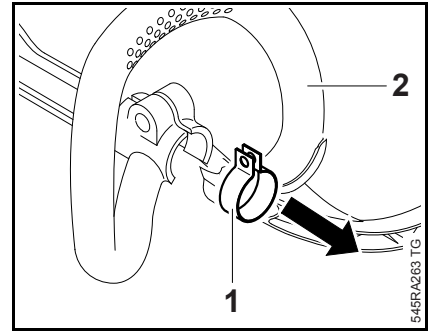
- Turn the serrated end of the drive shaft; the output shaft on the gearbox must also turn
- Reassemble parts in reverse order

### 12.2.3 Loop handle with barrier bar



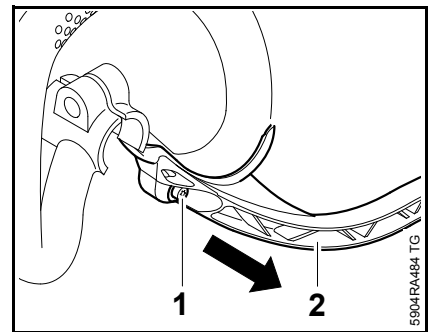
- Remove the drive tube assembly,  12.1

- Undo the screw (1)
- Slide loop handle (2) off of drive tube assembly



- Undo and remove the screw

- Pull the clamp (1) out of the loop handle (2)



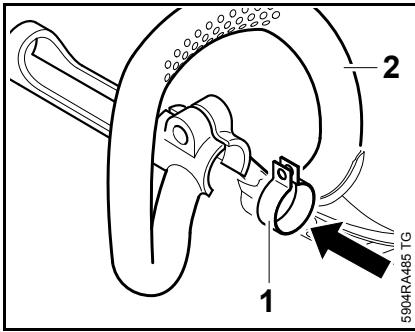
- Unscrew screw (1) and remove with washer

- Remove barrier bar (2)

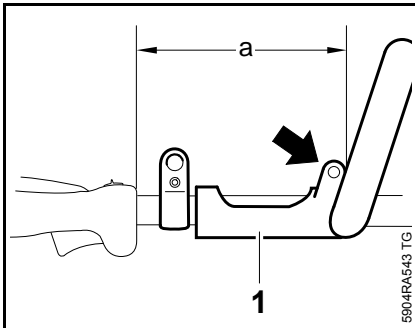
- Check the various parts and replace if necessary


- Reassemble the parts in reverse order

## Installation



- Insert clamp (1) in loop handle (2)
- Fit screw
  - do not tighten

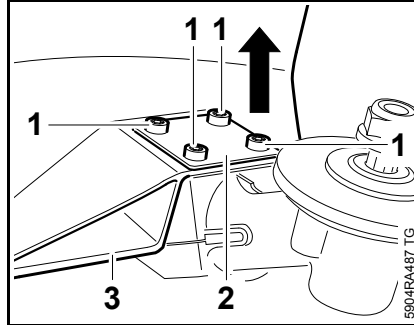


- Install drive tube assembly,  12.1
- Orient loop handle (1) at a distance of approx.  $a = 35$  cm from control handle and tighten screw (arrow)
- Reassemble remaining parts in reverse order

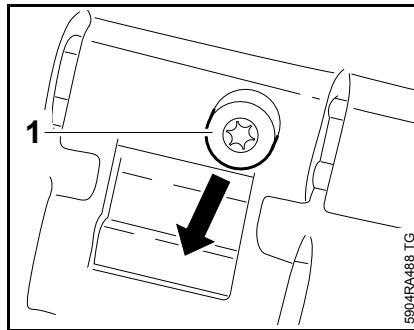
## 12.3 Deflector

### 12.3.1 Deflector for gearbox with 25.4 mm drive tube assembly diameter

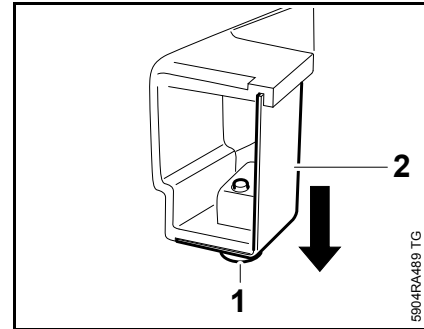
To preserve the threads in the plastic parts, screw the screws into the existing threads and tighten carefully.



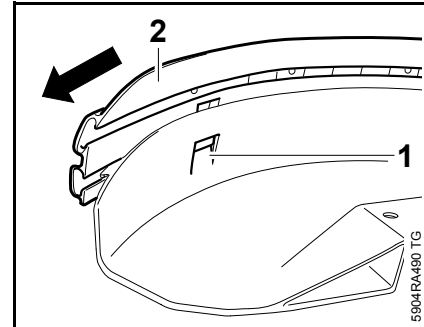
- Remove screws (1)
- Remove plate (2) and deflector (3)




- Unscrew the bolt (1)
- Push out mount with line limiting blade

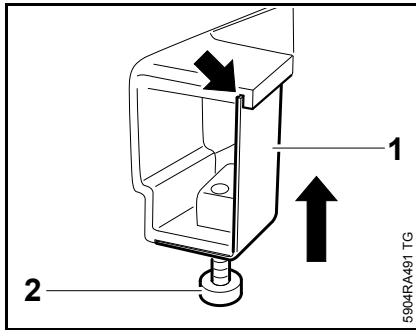


- Unscrew the bolt (1)
- Slide line limiting blade (2) down slightly and remove
- Examine line limiting blade, sharpen or replace if necessary

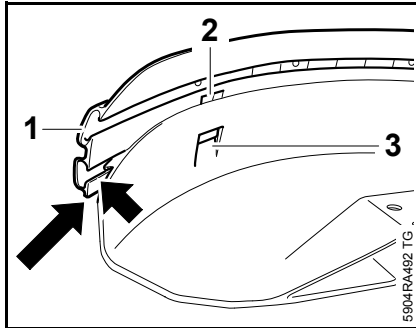


- Press tab (1) and slide out strip (2)
- Examine gearbox, repair or replace if necessary,  12.4.2

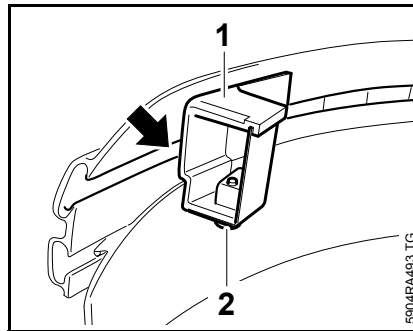
## Installation



- Position line limiting blade (1) and slide it into the mount (arrow)
- Carefully screw in the screw (2) and tighten

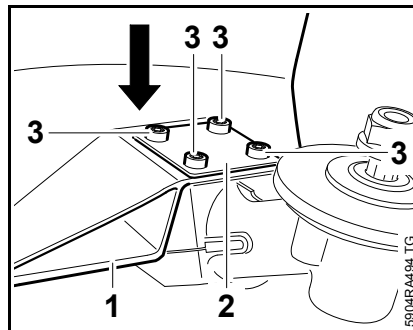


- Orient the strip (1) so that the recess (2) faces the tab (3) and slide it onto the deflector with the lower guide (arrow) until the tab (3) snaps into place



- Orient the mount (1) with the line limiting blade so that the head of the bolt (2) faces the deflector and slide it into upper guide (arrow) as far as the tab

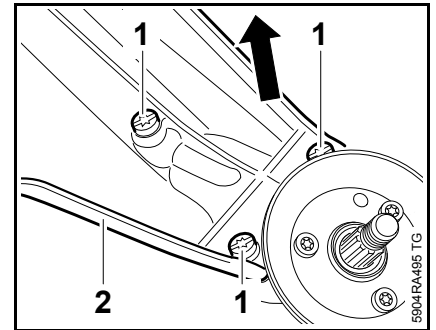
- Insert and carefully tighten down the bolt
  - Threads in plastic can strip



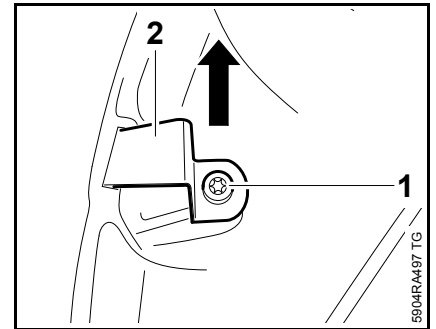
- Position deflector (1) and fit plate (2)
- Insert and tighten down the screws (3)

## 12.3.2 Deflector for gearbox with 28 mm drive tube assembly diameter

Installation and removal of the deflector for metal tools and the shredder deflector are the same as described in this chapter.



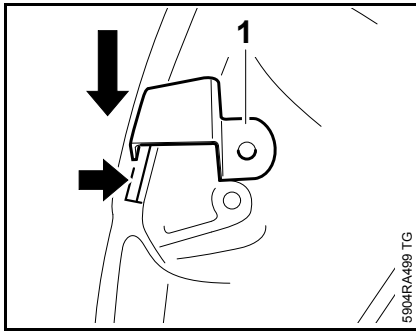
- Remove screws (1)
- Remove deflector (2)



- Unscrew the screw (1)
  - Slide out and examine line limiting blade (2), resharpen or replace if necessary



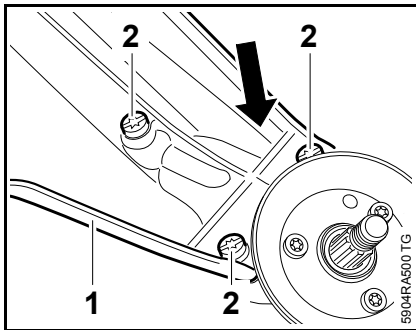
## Installation



- Push the line limiting blade (1) into the mount (arrow)
- Insert and tighten down the screw

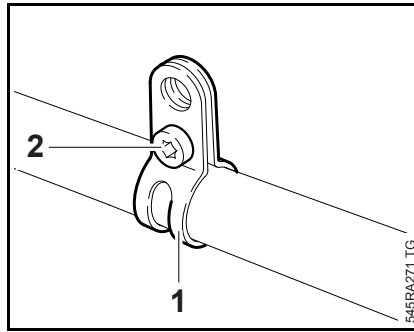
To preserve the threads in the plastic housing, screw the screws into the existing threads and tighten carefully.

- Examine gearbox, repair or replace if necessary – see "Kombi-Tools" Service Manual




- Position the deflector (1) on the gearbox
- Insert and tighten down the screws (2)

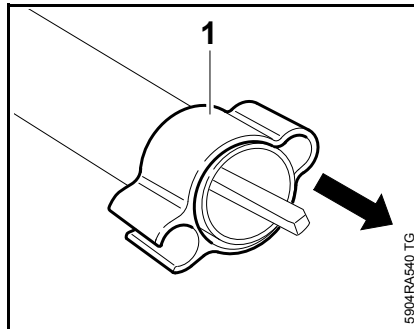
## 12.3.3 One-piece carrying ring



- Unscrew screw (1) and bend open and remove clamp (2)
- Install parts in reverse order

## 12.3.4 Support

- Remove drive tube assembly,  12.1

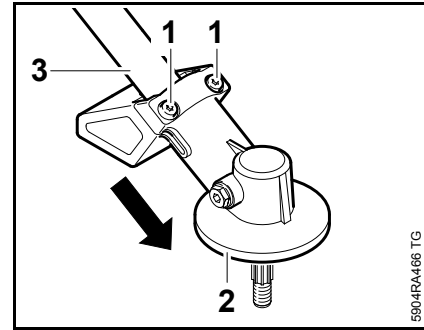



- Remove throttle cable holder (1)
- Install parts in reverse order

## 12.4 Gearbox for drive tube assembly 25.4 mm with square profile

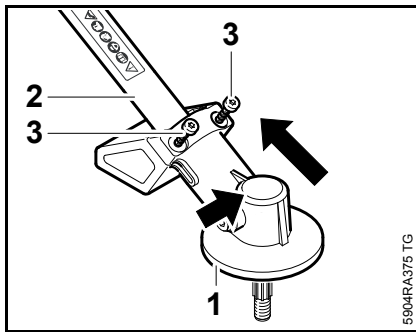
### 12.4.1 Removal and installation

- Removing cutting attachment



- Undo the screws (1)
- Pull gearbox (2) off of drive tube assembly (3)
- Examine gearbox, repair or replace if necessary,  12.4.2

## Installation



Drive tube assembly is installed on the machine.

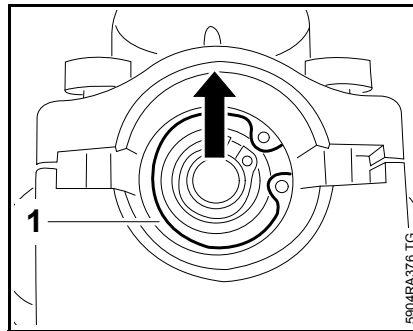
- Degrease clamping area, 14
- Orient gearbox (1) so that the sticker on the drive tube assembly aligns with the dome (arrow) on the gear housing
- With gentle twisting motions, slide the gearbox (1) onto the drive tube assembly (2) as far as it will go, until the drive shaft aligns with the square profile of the drive pinion, turn the output shaft on the gearbox if necessary
- Tighten screws (3)

## Checking operation

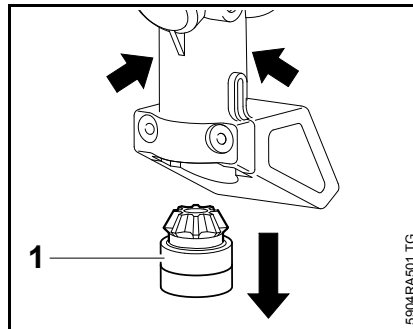
- Unplug the spark plug boot and turn the engine; the output shaft on the gearbox must also turn

### 12.4.2 Disassembly

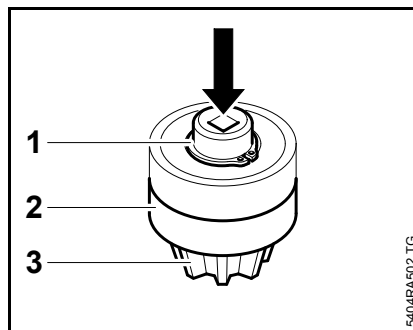
- Removing cutting attachment
- Remove gearbox, 12.4.1
- Observe safety instructions when heating parts, 1



- Remove the circlip (1)



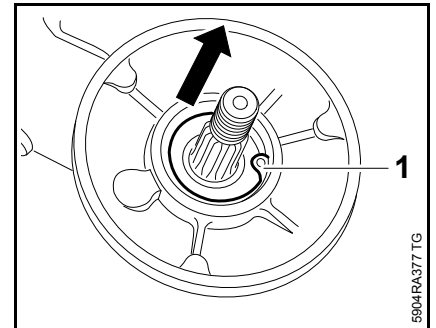
- Heat gearbox in the area (arrows) of the bearing seats of the drive tube assembly connection to approx. 120 °C (250 °F)
- Once this temperature is reached, the entire drive side set of pinions (1) can be pulled out



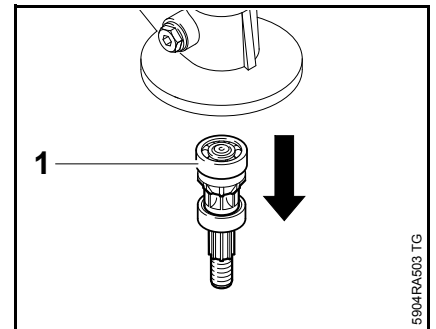
Always use new ball bearings.

- Remove the circlip (1)

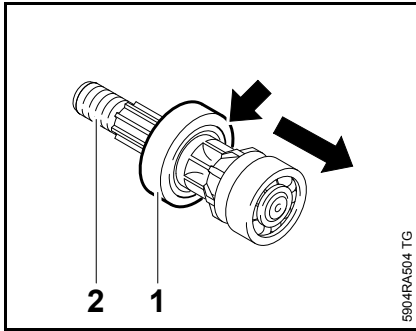
- Position set of pinions on the outer race of the ball bearing (2) and use a suitable tool to press out the drive pinion (3)



- Remove the circlip (1)

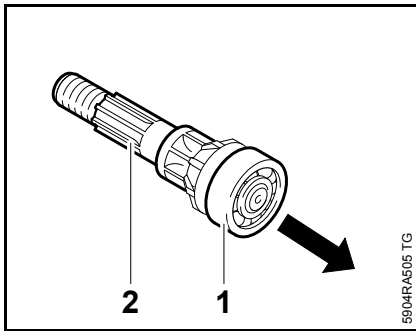


- Heat the output end of the gearbox to 120 °C (250 °F)
- Once this temperature is reached, the entire output side set of pinions (1) can be pulled out
- Check gearbox, clean and replace if necessary



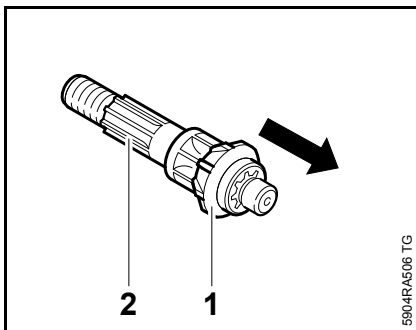
Always use new ball bearings.

- Position ball bearing (1) on the outer race of the bearing (arrow) and use a suitable tool to press out the drive shaft (2)



Always use new ball bearings.

- Pull ball bearing (1) off of the drive shaft (2)



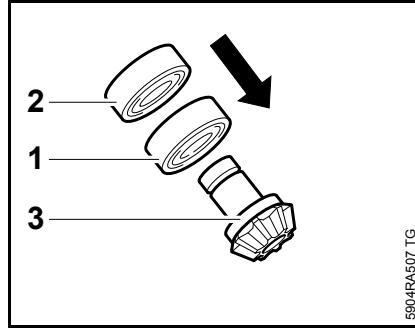
- Pull spur bevel gear (1) off of the drive shaft (2)

– Clean and examine all parts, replace set of pinions if necessary

– Fit new ball bearings if the set of pinions is in good condition

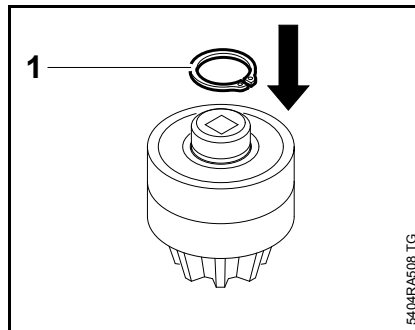
If a pinion is damaged, the complete set of pinions (drive pinion and output pinion) must be replaced.

### Assembly

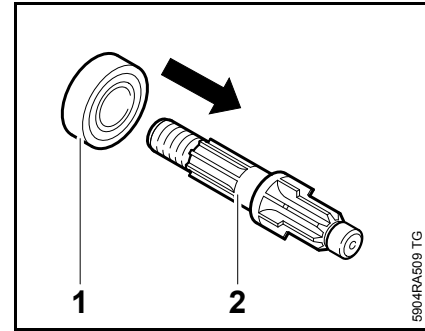


- Using a suitable tool on the inner race, press the new ball bearing (1) onto the stub of the drive pinion (3) as far as it will go

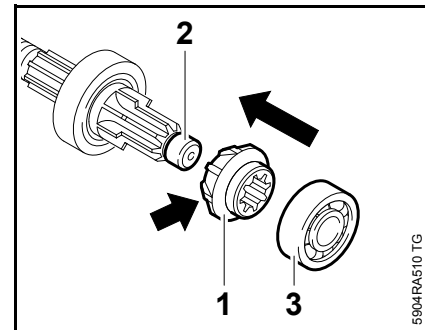
- Position the new ball bearing (2) so that the closed side faces outward, using a suitable tool on the inner race, press it onto the stub of the drive pinion (3) as far as it will go




- Fit the circlip (1)



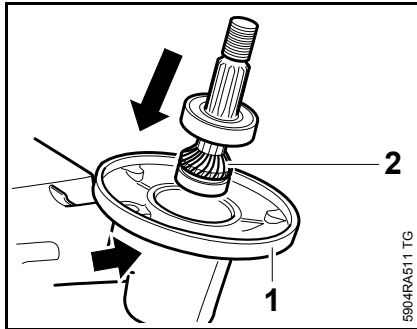
- Using a suitable tool on the inner race, press the new ball bearing (1) onto the long stub of the drive shaft (2) as far as it will go



– Sparingly lubricate the serrations and collar on the short stub of the drive shaft with STIHL gear lubricant,  14

- Orient spur bevel gear (1) so that the serrations (arrow) face the drive shaft and slide it onto the short stub of the output shaft (2)

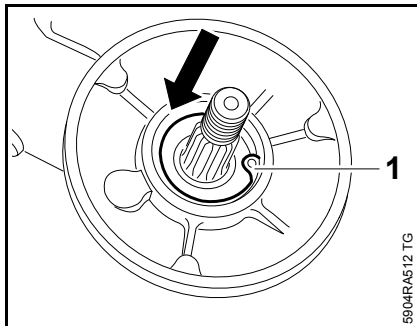
- Press the new ball bearing (3) on as far as possible



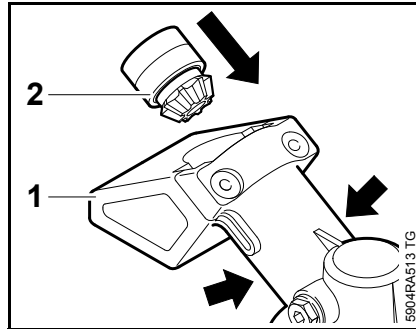
– Coat serrations of the spur bevel gear with STIHL gear lubricant, 14

- Heat the gearbox (1) on the output end (arrow) to approx. 120 °C (250 °F)
- Position set of pinions so that the spur bevel gear (2) faces the gear housing
- Push set of pinions into the gear housing (1) as far as they will go

The set of pinions must be fitted rapidly, as the ball bearing absorbs heat and expands.



- Fit the circlip (1)

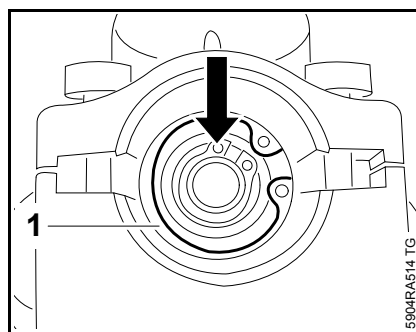


– Coat serrations of the drive pinion with STIHL gear lubricant, 14

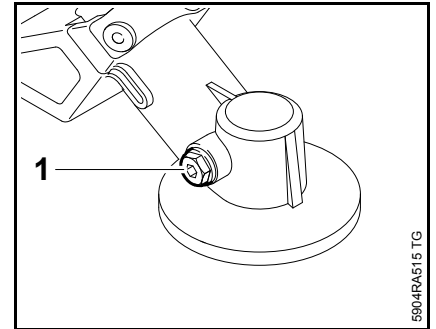
- Heat the gearbox (1) on the drive end in the area of the bearing seats (arrows) to approx. 120 °C (250 °F)
- Position drive pinion (2) so that the bevel gearing faces the gear housing
- Press in the drive pinion (2) as far as it will go

– If necessary, turn the output shaft until the drive pinion engages the output shaft

The drive pinion must be inserted quickly, as it absorbs heat and begins to expand.

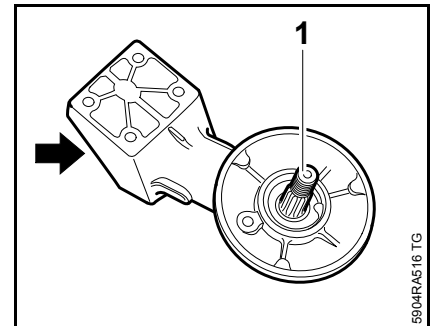


- Fit the circlip (1)



- Remove the screw plug (1)
- STIHL gear lubricant should be pressed into the hole, 14
- Use specified quantity of lubricant, 2.4
- Insert and tighten down the screw plug (1)

#### Checking operation

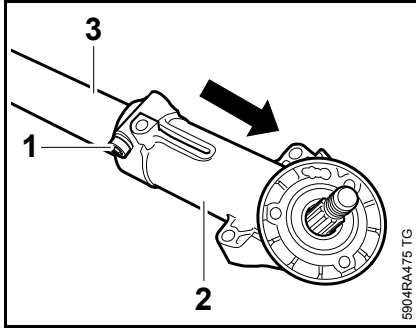


- Turn output shaft (1); the square profile of the drive pinion (arrow) must also turn
  - Gearbox must turn easily
- Install gearbox, 12.4.1

## 12.5 Gearbox for drive tube assembly 28 mm with serration

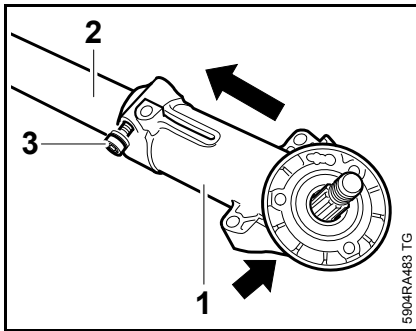
### 12.5.1 Removal and installation

- Removing cutting attachment



- Undo the screw (1)
- Pull gearbox (2) off of drive tube assembly (3)
- Examine gearbox, repair or replace if necessary, 12.5.2

### Installation



Drive tube assembly is installed on the machine.

- Degrease clamping area, 14
- Orient gearbox (1) so that the sticker on the drive tube assembly (2) aligns with the dome on the gear housing (arrow)

- With gentle twisting motions, slide the gearbox (1) onto the drive tube assembly (2) as far as it will go, until the drive shaft aligns with the serrations of the drive pinion, turn the output shaft on the gearbox if necessary

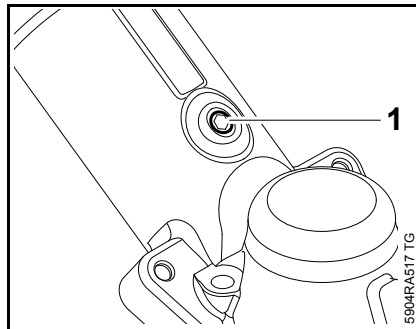
- Tighten bolt (3)

### Checking correct functioning

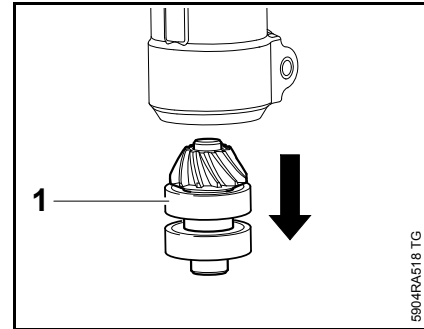
- Unplug the spark plug boot and turn the motor; the output shaft on the gearbox must also turn

### 12.5.2 Disassembly

- Removing cutting attachment
- Remove gearbox, 12.5.1
- Observe safety instructions when heating parts, 1



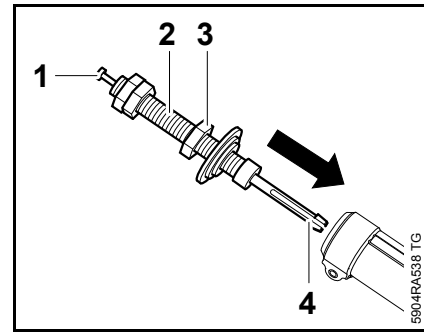
- Unscrew the stud (1)



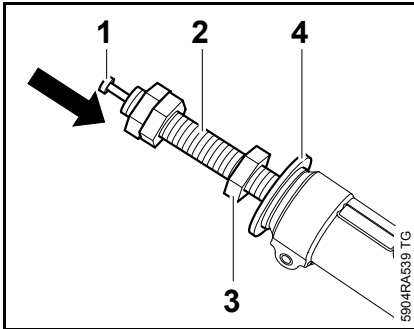
- Heat gearbox in the area of the bearing seats of the drive tube assembly connection to approx. 120 °C (250 °F)

- Once this temperature is reached, the entire drive side set of pinions (1) can be pulled out

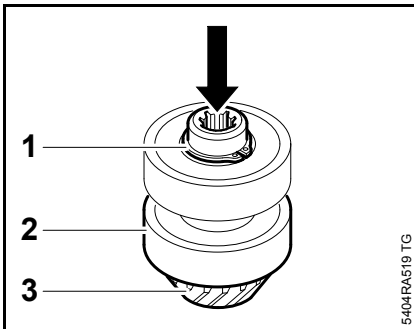
### Cold removal of the drive side set of pinions



- Remove punch (1) from puller (2) 5910 890 4408
- Twist nut (3) as far as the locknuts and push the puller (2) with the insert (4) first into the inner serrations of the drive pinion until it engages

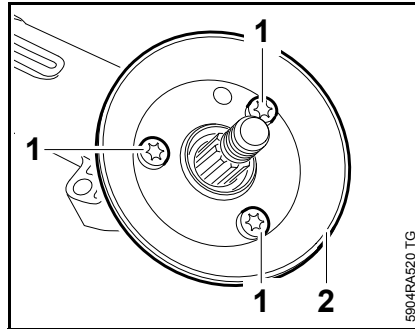


- Push the punch (1) into puller (2) 5910 890 4408 as far as it will go
  - Insert is spread behind the drive pinion
- Position washer (4) on the gear housing, hold locknuts in place and twist nut (3) until the drive pinion set is pulled out of the bearing seats
- Pull out the punch and remove the drive pinion set from the puller

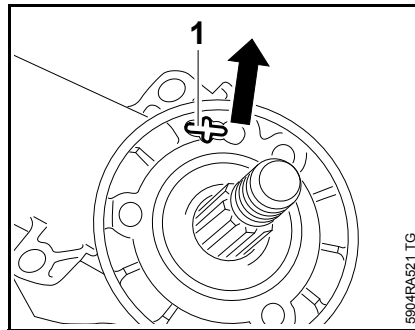


Always use new ball bearings.

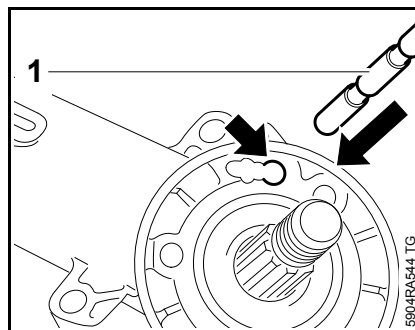
- Remove the circlip (1)
- Position set of pinions on the outer race of the ball bearing (2) and use a suitable tool to press out the drive pinion (3)



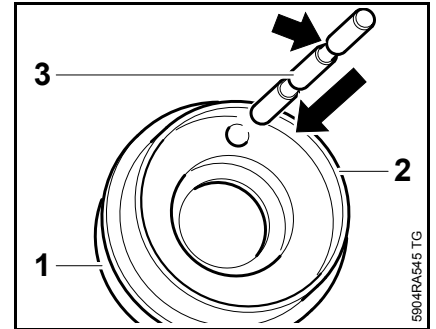
- Unscrew screws (1) and remove guard ring (2)



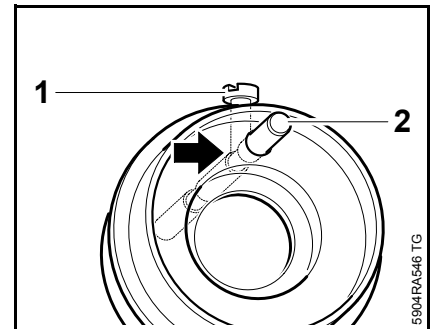
- Pry out the guard plugs (1)



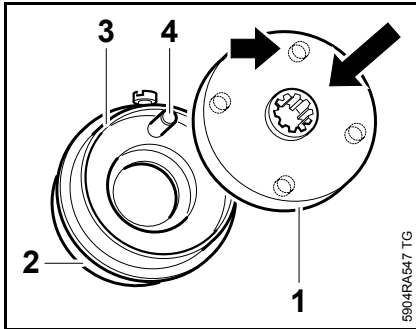
The locking pin (1) of puller 5910 890 4407 must engage the hole (arrow) – puller is secured against twisting with the locking pin.



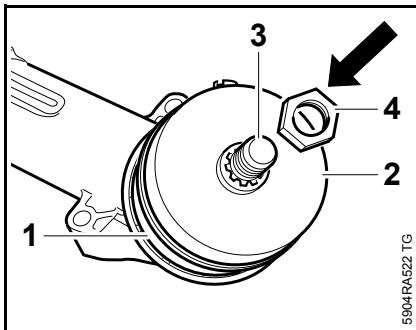
- Orient the ring (1) of puller 5910 890 4407 so that the narrow collar (2) faces away from the gearbox
- Push locking pin (3) into the hole as far as the indentation (arrow)



- Screw in the clamping screw (1) until it rests against the indentation (arrow) of the locking pin (2)
- Tighten clamping screw (1)



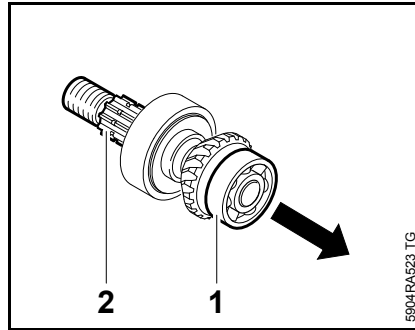
- Fit thrust washer (1) onto ring (2) so that it extends over the narrow collar (3) and engages the hole (arrow) in the locking pin (4)



- Push the ring (1) with the thrust washer (2) over the drive shaft (3) so that the locking pin engages the hole in the gear housing
- Tighten the nut (4)
  - Left-hand thread
- Heat gearbox in the area of the bearing seats on the output end to 120 °C (250 °F)
- Once this temperature is reached, turn the washer (4) counterclockwise until the output side pinion set is pulled out of the bearing seat

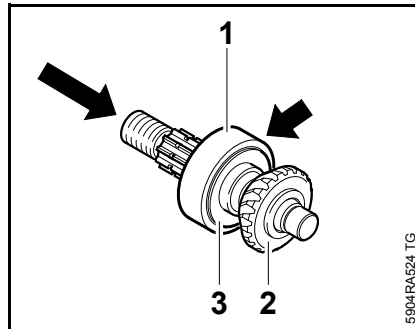
- Withdraw the puller with the drive side pinion set from the gearbox, unscrew the nut and remove the puller

- Check gearbox, clean and replace if necessary



Always use new ball bearings.

- Pull ball bearing (1) off of the drive shaft (2)



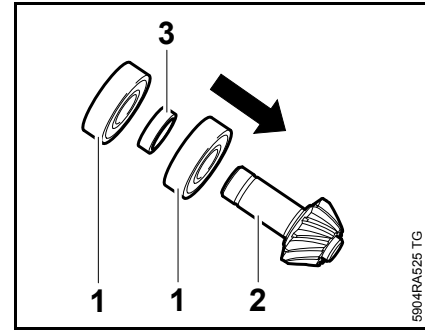
Always use new ball bearings.

- Position ball bearing (1) on the outer race of the bearing (arrow) and use a suitable tool to press out the drive shaft (2)
- Remove washer (3)
- Clean and examine all parts, replace set of pinions if necessary

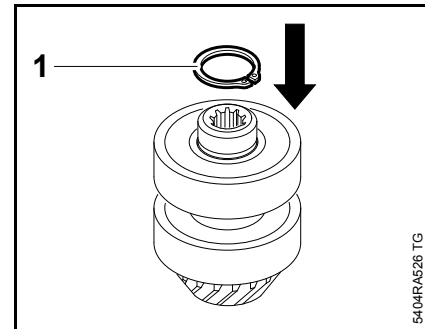
- Fit new ball bearings if the set of pinions is in good condition

If a pinion is damaged, the complete set of pinions (drive pinion and output pinion) must be replaced.

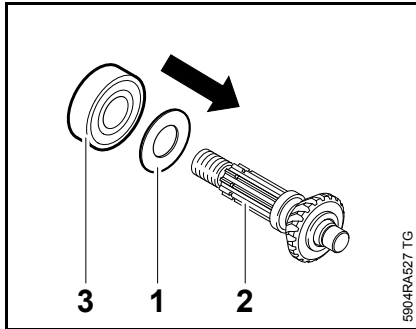
### Assembly



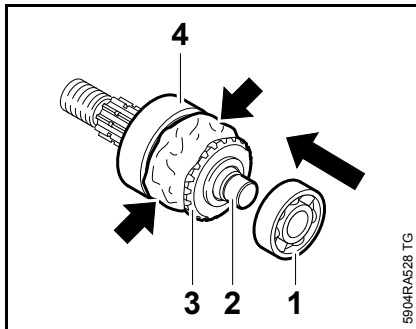
- Using a suitable tool on the inner race, press the new ball bearing (1) onto the stub of the drive pinion (2) as far as it will go
- Slide on spacer sleeve (3) and press the second ball bearing (1) on the inner race home as far as it will go



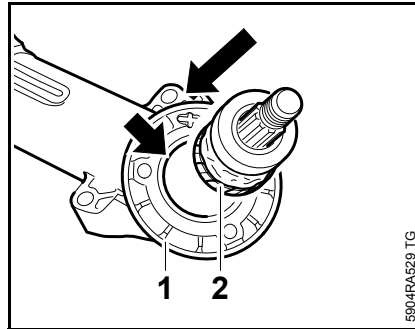
- Fit the circlip (1)



- Slide washer (1) onto long stub of the drive shaft (2) and, using a suitable tool on the inner race, press the new ball bearing (3) home as far as it will go

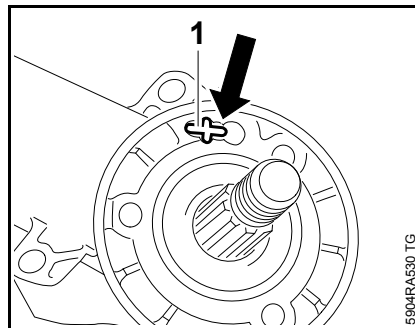


- Sparingly lubricate the collar on the short stub of the output shaft with STIHL gear lubricant, 14
- Push the new ball bearing (1) onto the short stub (2) as far as it will go
- Apply gear lubricant (arrows) between the serrations of the spur bevel gear (3) and the ball bearing (4), 14
- Use specified quantity of lubricant, 2.4

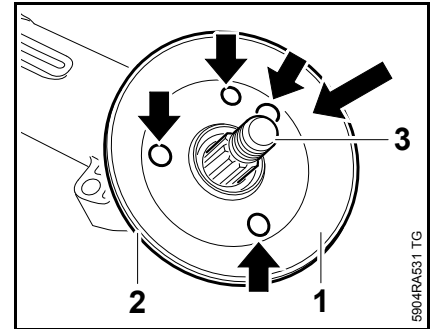


- Coat serrations of the spur bevel gear with STIHL gear lubricant, 14
- Heat the gearbox (1) in the location of the bearings on the output end (arrow) to approx. 120 °C (250 °F)
- Position set of pinions so that the spur bevel gear (2) faces the gear housing
- Push set of pinions into the gear housing (1) as far as they will go

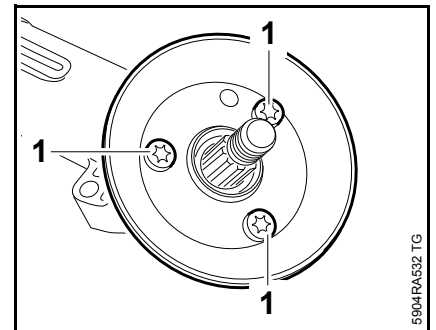
The set of pinions must be fitted rapidly, as the ball bearing absorbs heat and expands.



- Press plug (1) into the mount as far as it will go

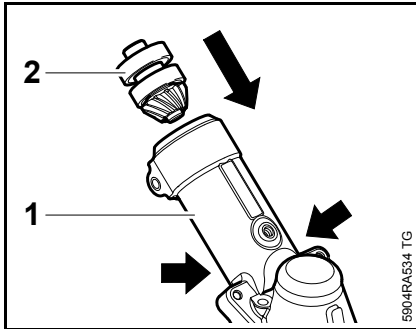


- Position guard ring (1) so that the groove (2) faces the output shaft (3) and all four holes (arrows) match



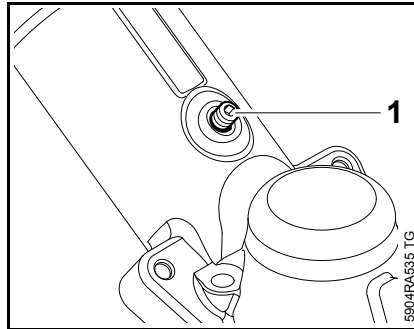
- Insert and tighten down new screws (1)





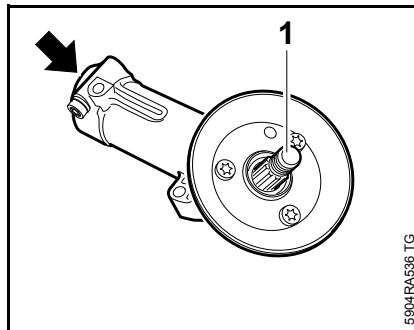
- Heat the gearbox (1) in the location of the bearings on the drive end (arrows) to approx. 120 °C (250 °F)
- Position drive pinion (2) so that the bevel gearing faces the gear housing
- Press in the drive pinion (2) as far as it will go
- If necessary, turn the output shaft until the drive pinion engages the output shaft


The drive pinion must be inserted quickly, as it absorbs heat and begins to expand.



- Insert and tighten down the stud (1)

### Checking operation



- Turn output shaft (1); the inner serration of the drive pinion (arrow) must also turn
  - Gearbox must turn easily
- Install gearbox,  12.5.1

### 13. Special tools

#### New special tools

No.	Designation	Part No.	Use	Re- marks
1	Setting gauge	0000 890 6400	Setting the air gap between ignition module and flywheel / control unit	
2	Installing sleeve	1141 893 4600	Protection of the oil seal (Ignition side)	
3	Press sleeve	4147 893 2400	Pressing in oil seal (Starter side)	
4	Press sleeve	4238 893 2400	Pressing in oil seal (Ignition side)	
5	Test lead	5910 840 0903	M-Tronic diagnostic and testing tasks	
6	Flange	5910 850 4201	Sealing the cylinder exhaust port for leakage test	
7	Screwdriver	5910 890 2307	Adjusting carburetors without M-Tronic	
8	Puller	5910 890 4503	Removing the flywheel and the starter-side half of the crankcase	
9	Puller	5910 890 4407	Pulling out the drive pinion for gearboxes with a drive tube assembly diameter of 28 mm	
10	Puller	5910 890 4408	Pulling out the drive pinion for gearboxes with a drive tube assembly diameter of 28 mm	
11	Sleeve	5910 893 1709	Sleeve for installing tool 11	
12	Ring	5910 893 7005	Support for clutch housing (protection of guide sleeves)	

#### Existing special tools

No.	Designation	Part No.	Use	Re- marks
1	Carburetor and crankcase tester	0000 850 1300	Testing crankshaft in engine and carburetor for leakage	
	- Connector	0000 855 9200	Testing carburetor for leaks	
	- Hose for leakage test	1110 141 8600	Testing carburetor for leaks	
2	Sealing plate	0000 855 8106	Testing crankshaft in engine and carburetor for leakage	
3	Installing tool	0000 890 2201	Installation of starter rope guide bushing	
4	Clamping strap	0000 893 2600	Stretching piston rings on piston	
5	Locking strip	0000 893 5904	Blocking crankshaft	
6	Bit T 27 x 125	0812 542 2104	Removing and installing spline socket head screws with electric or pneumatic screwdrivers; tightening down screws with torque wrench	
7	Wooden assembly block	1108 893 4800	Positioning piston	
8	Press arbor	1118 893 7200	Cold forcible insertion of ignition side ball bearing	

No.	Designation	Part No.	Use	Re- marks
9	Assembly drift	1110 893 4700	Removing and installing piston pins	
10	Combination wrench	1129 890 3401	Spark plug	1)
11	Installing sleeve	4119 893 4600	Protection of the oil seal (Starter side)	
12	Press arbor	4119 893 7200	Cold forcible insertion of starter side ball bearing	
13	Installing tool	4126 893 4900	Rubber element 1-point antivibration system	
14	Clamping device for assembly stand	5910 890 8800	Clamping drive tube assembly of machine to assembly stand	
15	ZAT 4 ignition tester	5910 850 4503	Test ignition system	
16	ZAT 3 ignition tester	5910 850 4520	Test ignition system	
17	Torque wrench	5910 890 0302	Screw connections (0.5 to 18 Nm)	
18	Torque wrench	5910 890 0312	Screw connections (6 to 80 Nm)	
19	Installing tool, 11	5910 890 2211	Fit hookless snap rings in piston	
20	Bit T 27 x 150	5910 890 2400	IS-P screws (4 mm)	
21	Assembly stand	5910 890 3101	Holding machine for repairs	
22	Puller	5910 890 4400	Extracting the oil seal	
	- Jaws (with profile no. 3.1)	0000 893 3706	Extracting oil seal(s)	
23	Assembly hook	5910 893 8800	Remove pick-up body	

**Remarks:**

1) Use only for releasing.

#### 14. Service accessories

No.	Designation	Part No.	Use
1	STIHL multi-purpose grease	0781 120 1109	
2	Grease (225 g tube)	0781 120 1111	Oil seals, sliding and bearing points
8	STIHL gear lubricant for trimmers		Gearbox, drive shaft
	80 g tube	0781 120 1117	
	225 g tube	0781 120 1118	
3	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in starter
4	STIHL press fluid OH 723	0781 957 9000	Rubber elements antivibration elements
5	Tube of sealant Dirko HT red	0783 830 2000	Sealing the crankcase
6	Standard solvent-based degreasant not containing any chlorinated or halogenated hydrocarbons		Cleaning mating surfaces and the carburetor, cleaning the crankshaft stub and tapers in flywheel



**englisch / english**

0455 752 0123. M0,15. A12. FST. Printed in Germany