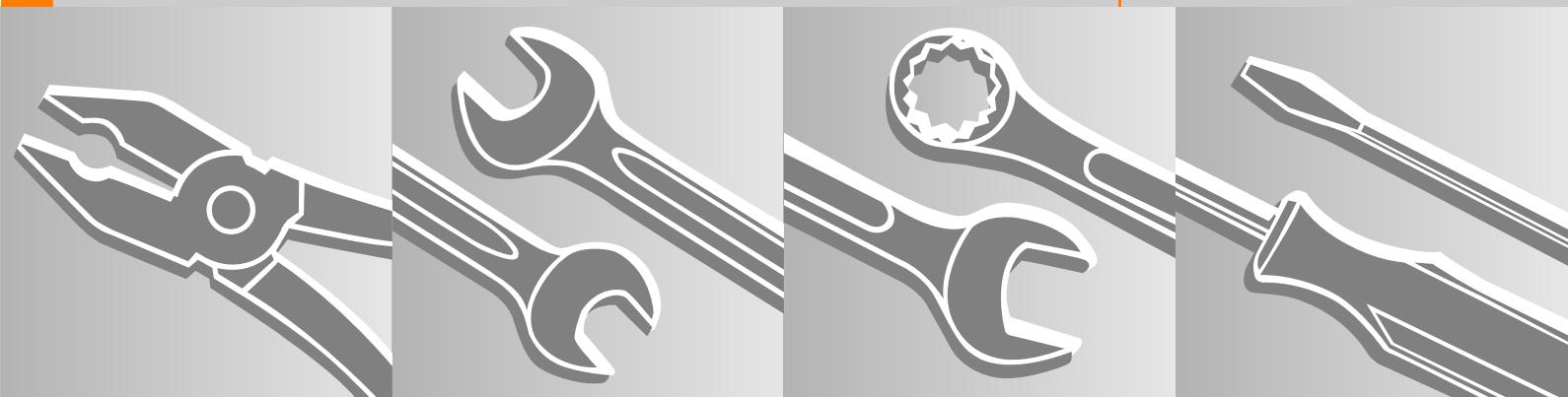


# STIHL KombiTools

2013-08



**FS-KM, FS,  
FS 38, FS 40, FS 45,  
FS 46, FS 50, FS 55,  
FS 56, FS 70, FS 73,  
FS 75, FS 80, FS 83,  
FS 85, FS 87, FS 90,  
FS 100, FS 110, FS 120,  
FS 130, FS 200, FS 240,  
FS 250, FS 260 R,  
FS 460 R,  
FSE 60, FSE 65**

**FR 85, FR 130, FR 220,  
FR 350, FR 410, FR 450,  
FR 460, FR 480**

**FCS-KM, FCB-KM, FCS,  
FC 56, FC 73, FC 75,  
FC 83, FC 85, FC 100,  
FC 110,  
FCE 60**

**FBD-KM**

**FH-KM, FH,  
FH 75**

**HL-KM, HL, HL 45,  
HL 75, HL 90, HL 95,  
HL 100**

**HT-KM, HT,  
HT 56, HT 70, HT 73,  
HT 75, HT 100, HT 101,  
HT 130, HT 131,  
HTE 60**

**KW-KM (4602),  
KW (4602),  
KW 85**

**BC-KM,  
BC 35**

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**STIHL®**

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## 1. Introduction

This service manual contains detailed descriptions of all typical repair and servicing procedures for KombiTools.

If there is no specific reference to individual machines, the procedure is the same for all machines. There may be minor differences in the illustrations, depending on the machine, but the methods used and the sequence of operations are identical.

You will find detailed descriptions of repair procedures on engine components in the separate manuals covering the basic engine and components.

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

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

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

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

Symbols are included in the text and pictures for greater clarity.

The meanings are as follows:

In the descriptions:

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



Reference to another chapter, i.e. chapter 4.2 in this example

In the illustrations:

- Pointer (short arrow)
- Direction of movement

If a procedure applies to **all** machines in a series, e.g. HT 75, 80, 85, the machines are not listed separately, i.e. they are **only** referred to as HT. However, if only one specific machine or assembly is concerned, it is mentioned by name, e.g. HT 75.

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

### Always use original STIHL replacement parts.

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

This symbol may appear alone on small parts.

### Storing and disposing of fuels

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

## **1.1 Safety Precautions**

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

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

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

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

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

Improper handling may result in burns or other serious injuries.

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

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

## 2. Assignment of Gearboxes to Models

Gearbox	Gearbox Type	Installed in Model	Remarks
BC	WG	BC, BC-KM, BC 35	
FC	AG	FC 44, 72, 75, EC 70	1)
FC/FCB	AG	FC, FCB, FCB-KM, FC 55, FC 56, FC 73, FC 75, FC 100, FCE 60	2)
FCS	AG	FCS, FCS-KM, FC 83, 85, 110	
FS	AG	FS, FS-KM, FS 25-4, FS 55, FS 55 T, FS 56, FS 65-4, FS 70, FS 80 (from 1996), FS 83, FS 85, FS 87, FS 90, FS 100, FS 110, FS 110 RX, FS 120, FS 130, FS 200, FS 240, FS 250, FS 260 R, FS 460 R FR 85, FR 130, FR 220, FR 350, FR 410, FR 450, FR 460, FR 480	
HL	BG	HL 0°, HL 30°, HL 0–90°, HL 135°, HL-KM 0°, HL-KM 30°, HL-KM 0–90°, HL-KM 135°, HL 45, HL 73, HL 75, HL 90, HL 95, HL 100, HLR 85	
HL 0°	AG	HL 0°, HL-KM 0°, HL 75 0°, HL 90 0°, HL 95 0°, HL 100 0°	
HL 30°	AG	HL 30°, HL-KM 30°, HL 75 30°	
HL 0–90°	AG	HL 0–90°, HL-KM 0–90°, HL 73 0–90°, HL 75 0–90°	
HL 135°	AG	HL 135°, HL-KM 135°, HL 75 135°, HL 95 135°, HL 100 135°	
FH	BG	FH 0–90°, FH 135°, FH-KM 0–90°, FH-KM 135°, FH 75 0–90°, FH 75 135°	
FH 0–90°	AG	FH 0–90°, FH-KM 0–90°, FH 75 0–90°	
FH 135°	AG	FH 135°, FH-KM 135°, FH 75 135°	
HT, HT-KM	AG	HT, HT-KM HT 56, HT 70, HT 73, HT 75, HT 100, HT 101, HT 130, HT 131, HTE 60, HTR 85	
KW (4602)	WG	KW, KW-KM, KW 85	
FBD-KM	AG	FBD-KM	2)
SP	BG	SP-KM, SP 10, SP 90, SP 92	2)

### Remarks

1) Height adjustment of depth wheel on deflector

2) Height adjustment of depth wheel on segment

WG = Worm gear

AG = Angle gear

BG = Blade drive gear

### 3. Specifications

#### 3.1 Tightening Torques

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

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

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

Insert the screw in the hole and rotate it counterclockwise until it drops down slightly and engages in the existing thread. Tighten the screw clockwise to the specified torque.

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

##### **Micro-encapsulated screws and screws coated with threadlocking adhesive:**

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

##### **Important**

Use a hot air blower to heat and release screws that have been secured with adhesive. Be careful with polymer components.

Power screwdriver setting for polymer: P and DG screws max. 500 rpm.

Do not use an impact wrench for releasing or tightening screws.

Do not mix up screws with and without binding heads.

Fastener	Thread size	For component	Torque Nm	Remarks
Collar screw	IS-M5x6 LH	Friction clutch / gearbox	8.0	14), 18)
Screw	IS-DG5x20	Oil tank / gearbox housing	5.5	14)
Screw	IS-P4x14	Line limiting blade / deflector	2.5	6), 7), 9)
Screw	IS-M5x18	Cutting attachment deflector	4.3	9), 10)
Screw	IS-P5x14	Line limiting blade / deflector	2.5	9), 10)
Locknut	M10x1 LH	Cutting attachment	25.0	7), 10)
Screw	IS-M5x16	Cutting attachment deflector / gearbox housing	4.3	7), 10)
Screw	IS-M11x10	Screw plug / gearbox	9.5	10)
Screw	IS-M6x20	Gearbox housing / drive tube	9.0	2)
Screw	IS-M6x20	Gearbox housing / drive tube	10.0	4), 12)
Screw	IS-M6x25	Deflector / gearbox housing / clamp / locknut	5.0	2)
Screw	IS-M6x30	Deflector / gearbox housing / clamp / locknut		5)
Screw	IS-M5x8	Clamp / deflector		5)

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	IS-DG5x12	Skirt / deflector (with washer)	5.5	2)
Hex head screw	M10x18	Segment / deflector	15.0	2)
Screw	IS-M11x10	Screw plug / gearbox	10.0	2), 7)
Screw	IS-M5x20	Guide / blade / gearbox housing	9.5	6), 12), 13)
Screw	IS-M4x16	Gearbox cover / gearbox housing	3.5	4), 12), 13)
Screw	IS-M5x20	FS gearbox housing / HS gearbox housing	7.0	4), 12), 13)
Nut	M5	DS550 mm blade / screw	9.5	4), 12), 13)
Screw	IS-M11x8	Screw plug / gearbox cover	5.5	4), 12), 13)
Screw	IS-M11x8	Screw plug / gearbox housing	5.5	4), 12), 13)
Screw	IS-M6x30	Gearbox housing / drive tube / nut	8.0	3)
Screw	IS-M5x25	Gearbox cover / gearbox housing	6.5	14)
Screw	IS-M5x84	Gearbox housing, left / right	1.5	4), 12)
Locknut	M5	Gearbox housing, left / right (locknut)	6.0	4), 12)
Nut	M5	DS270 mm blade / screw	9.5	4)
Screw	IS-M5x10	Quadrant / gearbox housing	8.0	4)
Screw	IS-M4x16	Guard plate / gearbox cover	3.5	4)
Screw	M8x25L	Blades	25.0	2)
Screw	M5x14	Deflector / gearbox		8)
Screw	M6x25	Clamp / coupling sleeve / locknut		11)
Screw	M5x23	Clamp / loop handle		11)
Screw	M6x30	Cutting attachment deflector / clamp	5.0	6)
Screw	DG 6x28	Gearbox / drive tube clamp	12.0	7), 8)
Screw	IS-DG5x60	Clamp, deflector / drive tube	2.0	3)
Screw	IS-M5x18	Bearing plate / gearbox	9.0	3)
Screw	IS-M5x18	Deflector / gearbox	9.0	3)
Hex head screw	M8x24	Blades	25.0	3)
Hex head screw	M8x20	Segment / deflector	15.0	3)
Screw	M5x12	Quadrant / gearbox housing	8.0	13)
Screw	M4x10	Guard plate / gearbox cover	3.5	13)
Stud	M6x8	Stud / gearbox housing	4.5	13)
Screw	M5x12	Adjusting lever / gearbox housing	8.0	13)
Tines	M12	Tines / rake	4.0	16)
Locknut	M6	Gearbox housing / rake axle	9.0	16)
Screw	D 5x20	Gearbox housing halves	6.0	16), 19), 20)
Screw	M 6x20	Gearbox housing halves / drive tube clamp	10.0	16), 19), 20)
Screw	D 5x12	Sleeve	10.0	16), 19), 20)
Nut	M 8x20 LH	Thrust washer / attachment / gearbox	20.0	17)
Wing nut	M 8	Screw / depth wheel / wing nut	3.0	17)
Screw	D 6x28	Gearbox / drive tube clamp	12.0	17), 19)
Grub screw	M 6x8	Grub screw / gearbox	4.0	17), 21)
Screw	P 5x20	Mud flap / deflector	4.0	17)

Fastener	Thread size	For component	Torque Nm	Remarks
Screw	M 5x18	Deflector / gearbox housing	8.0	17), 19), 20)
Screw	M 4x10	Deflector / gearbox housing	3.0	17), 21)
Screw	M 5x10	Deflector / segment	8.0	17), 19), 20)

## Remarks

- |                 |                                |
|-----------------|--------------------------------|
| 1) FC 56        | 12) HL 45                      |
| 2) FC 75        | 13) HL 75                      |
| 3) FC 85        | 14) HT, HT-KM                  |
| 4) FH 75        | 15) KW 85                      |
| 5) FS 40, FS 50 | 16) SP-KM, SP 10, SP 92        |
| 6) FS 45        | 17) FBD-KM                     |
| 7) FS 55        | 18) Loctite 272, high strength |
| 8) FS 56        | 19) Screws with binding head   |
| 9) FS 75        | 20) Waxed screws               |
| 10) FS 80, 85   | 21) Micro-encapsulated screws  |
| 11) KM 56       |                                |

### **3.2 HT, HT-KM Chain Lubrication**

Fully-automatic speed-controlled oil pump with rotary piston

Oil delivery rate  $7.5 \pm 2.5$  cc/min

### 3.3 Gearbox Grease Capacities

Gearbox	Type of Grease	Amount of Grease for Initial Filling (g)	Amount of Grease for Re-lubrication (g)	Remarks
BC	A	45	max. 5	
FC, FC/FCB	A	15	max. 5	
FCS	A	28	max. 5	
FS 4140, FS 4144	A	15	max. 5	1)
FS 4137	A	9	max. 5	2)
HL/FH - blade drive gear	B	27	max. 5	
HL/FH - blade drive gear	B	21	max. 5	3)
HL 0° - angle drive gear	A	11	max. 5	
HL 30° - angle drive gear	A	11	max. 5	
HL 0–90° - angle drive gear	A	20	max. 5	
HL 135° - angle drive gear	A	11	max. 5	3)
HT, HT-KM	A	8	—	4)
HT, HT-KM	A	11	—	3), 4)
KW (4602)	—	—	—	5)
SP-KM, SP 10, SP 92	B	20	—	4)
FBD-KM	A	25	—	4)

#### Remarks

A STIHL gear lubricant  
 B STIHL multipurpose grease

- 1) Gearbox for FS 55
- 2) Gearbox for FS, FS-KM, FS 25-4, 65-4, 80 (from model year 1996), 87, 90, 100, 110, 120, 130, 200, 240, 250, 260 R, 460 R  
 FR 85, 130 T, 350, 450, 480, 220
- 3) New version
- 4) Lubricated for life
- 5) Faulty gearbox is replaced

## 4. Troubleshooting

### 4.1 Mowing Heads

#### 4.1.1 Polymatic / TrimCut

Condition	Cause	Remedy
Poor cutting performance	Line too short	Readjust line bumping the <b>rotating</b> mowing head on the ground
	On gasoline powered FS: Automatic feed mechanism only operates sporadically	Always open throttle wide and then bump mowing head on the ground
	Automatic feed mechanism worn	Install new mowing head
Head does not cut	Line broken off at spool housing	Open the mowing head and pull line out of housing
	Spool empty	Wind fresh line onto spool
	Lines fused together or jammed	Open the mowing head, correct the problem (cut off fused lines), pull line out of the housing
	Automatic feed mechanism worn	Install new mowing head
	Line wound onto spool in wrong direction	Rewind spool correctly
Line wears rapidly	Line stored in dry condition for too long	Store new line in water bath for several days in a cool place until it is used for the first time. Place line that has not been used for a long period in water bath for several days in a cool place. This increases the toughness and durability of the line

#### 4.1.2 AutoCut

Condition	Cause	Remedy
Poor cutting performance	Line too short  On gasoline powered FS: Automatic feed mechanism only operates sporadically	Readjust line bumping the <b>rotating</b> mowing head on the ground  Always open throttle wide and then bump mowing head on the ground
	Automatic feed mechanism worn	Install new mowing head
Head does not cut	Line broken off at spool housing  Spool empty  Lines fused together or jammed	Open the mowing head and pull line out of housing  Wind fresh line onto spool  Open the mowing head, correct the problem (cut off fused lines), pull line out of the housing
	Automatic feed mechanism worn  Line wound onto spool in wrong direction	Install new mowing head  Rewind spool correctly
Line wears rapidly	Line stored in dry condition for too long	Store new line in water bath for several days in a cool place until it is used for the first time. Place line that has not been used for a long period in water bath for several days in a cool place. This increases the toughness and durability of the line

#### 4.1.3 SuperCut

Condition	Cause	Remedy
Poor cutting performance	Line too short  Automatic feed mechanism only operates sporadically  Automatic feed mechanism worn  Pawl bearings dry  SuperCut 1-2, 2-2, 40-2 only: Automatic line feed mechanism not properly adjusted	Open throttle wide, lift mowing head out of cut if necessary  Operate the mowing head at full throttle  Install new mowing head  Lubricate pawl bearings with oil, see instructions  Adjust automatic line feed mechanism correctly
Head does not cut	Line broken off at spool housing  Spool empty  Lines fused together or jammed  Automatic feed mechanism worn  Line wound onto spool in wrong direction	Open the mowing head and pull line out of housing  Wind fresh line onto spool  Open the mowing head, correct the problem (cut off fused lines), pull line out of the housing  Install new mowing head  Rewind spool correctly
SuperCut 10 and 20 only: Line consumption too high - "shredding"	Line diameter too small	Use 2.4 mm diameter line instead of 2.0 mm
Line wears rapidly	Line stored in dry condition for too long	Store new line in water bath for several days in a cool place until it is used for the first time. Place line that has not been used for a long period in water bath for several days in a cool place. This increases the toughness and durability of the line

#### 4.1.4 PolyCut

Condition	Cause	Remedy
Poor cutting performance	Blades worn, blades broken	Replace all blades
	Line too short	Fit new line
	Collar screw bearing bushings too stiff	Clean and dry the bearing bushings and collar screws, lubricate with STIHL gear lubricant
	Head operated with nylon line <b>and</b> blades at the same time	Operate mowing head with either nylon line <b>or</b> blades
Head does not cut	All blades broken	Replace <b>all</b> blades
	Line broken off at head	Fit new line
Line or blades wear rapidly	Line or blades stored in dry condition for too long	Store new line or blades in water bath for several days in a cool place until they are used for the first time. Place line or blades that have not been used for a long period in water bath for several days in a cool place. This increases the toughness and durability of the line and blades
PolyCut 10, 20, 40 only: Line wears rapidly	Line diameter too small	Use 2.7 mm or 3.0 mm diameter line instead of 2.4 mm

## 4.2 HT Chain Lubrication

**Important!** In the event of trouble with the chain lubrication system, rectify other sources of faults before removing the oil pump.

Condition	Cause	Remedy
Chain receives no oil	Oil tank empty	Fill up oil tank
	Oil inlet hole in guide bar is blocked	Clean oil inlet hole
	Strainer in gearbox housing is blocked	Clean strainer, replace if necessary
	Flanks of pump piston and/or flank of shaft worn	Install new oil pump and/or new shaft
	Oilway blocked	Remove oil pump and clean oilway
Machine losing chain oil	Bore in pump housing worn	Install new pump housing / oil pump
	Oil pump connector leaking	Position connector in oil tank so that it seals properly; replace connector if necessary
	Oil tank gasket leaking	Install new oil tank gasket
Oil pump delivers insufficient oil	Control screw and/or control edge on pump piston worn	Fit new control screw and/or oil pump
	Bore in pump housing worn	Install new oil pump
	Oil pump worn	Install new oil pump

#### 4.3 FH-KM/ HL-KM 135°

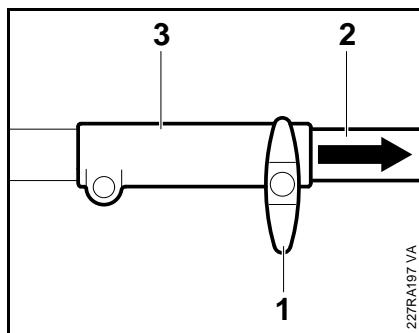
Condition	Cause	Remedy
Cutting attachment or blade drive gear jammed	Angle drive has moved outside operating range (135°)	Set angle drive within normal range on quadrant
	Thrust pin missing	Install thrust pin
	Cam lobe on pin broken	Install new pin
Cutting attachment or blade drive gear does not lock in transport position	Cam lobe on pin broken	Install new pin
	Thrust pin in angle drive is stuck	Free off or replace the thrust pin
	Torsion spring on pin broken or fatigued	Install new torsion spring
	Torsion spring not installed or not attached	Install or attach the torsion spring

## 5. Drive Tube (Boom)

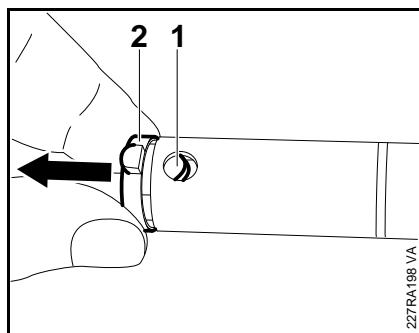
The drive tube is installed on machines with a split drive tube (boom) and KombiTools.

The drive shaft runs in a flexible liner in the drive tube. The upper end of the drive tube is sealed with a sleeve and the lower end with a plug.

- Remove the gearbox, 6.1.1 or 6.1.3

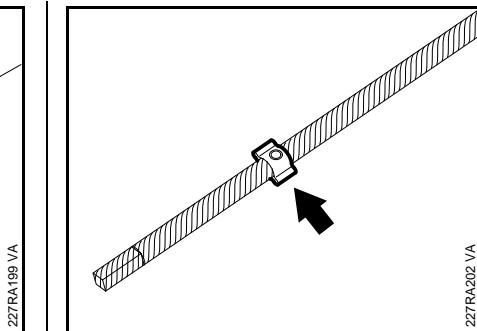
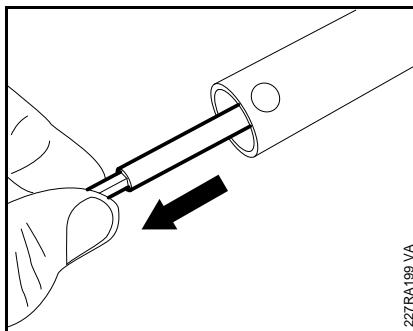


- Loosen the wing screw (1) and pull the drive tube (2) out of the coupling sleeve (3).

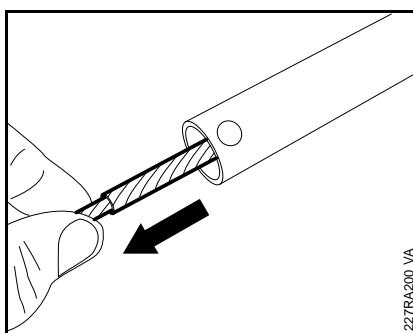


- Press down the lug (1) and hold it there.
- Pull the drive shaft and sleeve (2) out of the drive tube.

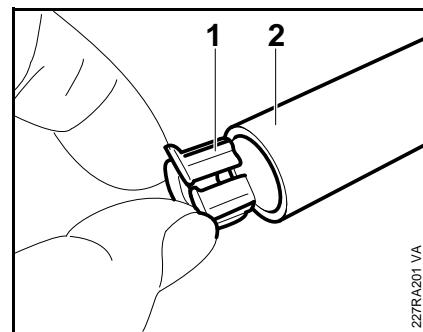
This operation is easier if you push the other end of the drive shaft.



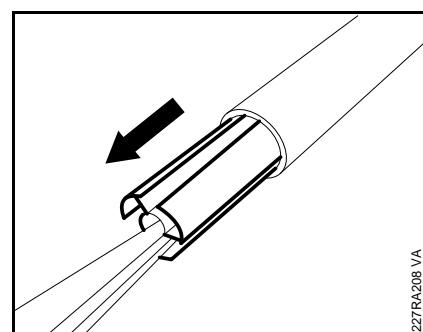
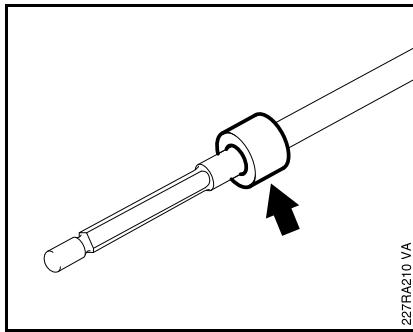
- Pull the rigid drive shaft out of the drive tube.



- On machines with a curved drive tube, pull the flexible drive shaft out of the drive tube.



- Pull the plug (1) out of the drive tube (2).



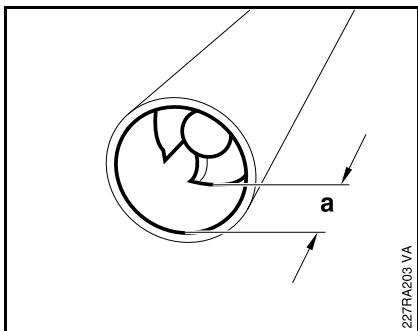
- If sleeve (arrow) is fitted, heat it with a hot air blower.

- Remove the sleeve.

If the drive shaft has turned blue, always install a new one.

- Pull the flexible liner out of the drive tube.

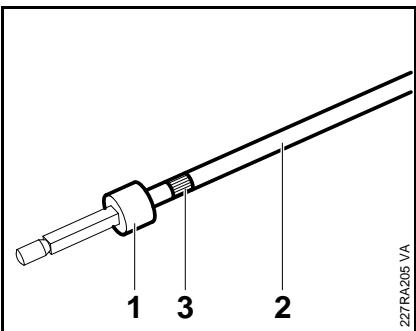
- If necessary, mark the position of the handle hose on the drive tube, carefully cut it open and remove it.



227RA203 VA

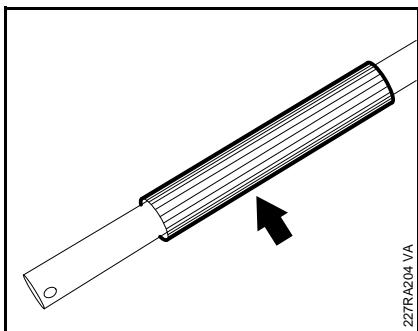
### Assembling

- Push flexible liner into the drive tube (end with plug) until it is recessed "a" =  $20\pm0.5$  mm.
- Fit the plug.



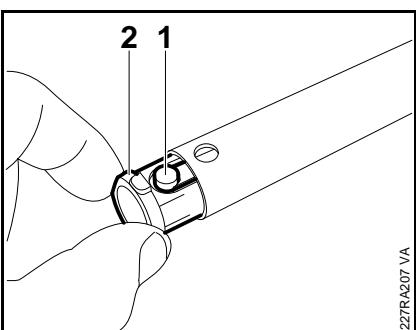
227RA205 VA

- Heat the sleeve (1) to about 50°C, push in on to the drive shaft (2) and press it on to the knurling (3).
- Before installing the drive shaft, coat it with STIHL gear lubricant, **13**
- Apply the lubricant uniformly to the drive shaft. Do not pump lubricant directly into the drive tube.
- Push the drive shaft into the drive tube.



227RA204 VA

- Coat inside of handle hose (where applicable) with a little STIHL Press Fluid, **13**
- Push the handle hose (arrow) on to the drive tube and line it up with the mark.



227RA207 VA

- Press down the lug (1) and push home the sleeve (2) as far as stop.

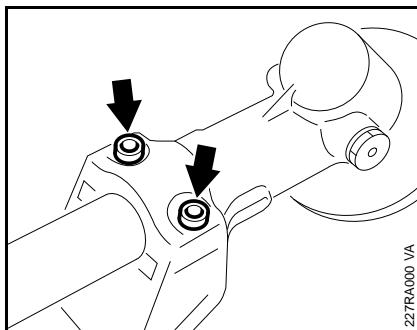
The lug must engage properly, turn the sleeve back and forth if necessary.

- Install the gearbox, **6.1.1** or **6.1.3**

## 6. Gearbox

### 6.1 Removing and Installing

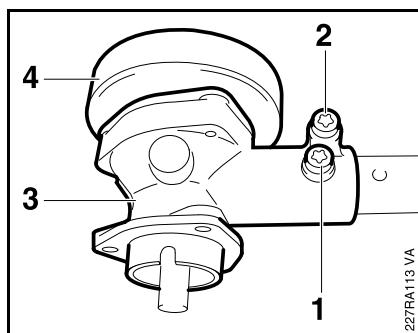
#### 6.1.1 All Gearboxes



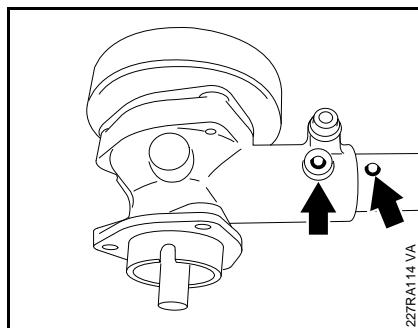
(not FCS, HT, KW)

- Remove mounted tools and deflector as necessary.
- Loosen the screws (arrows).
- Pull the gearbox off the drive tube.
- Degrease clamp mounting area.
- Slide the gearbox onto the drive tube – turn the output shaft back and forth at the same time so that the square end of the drive shaft engages the square socket in the drive pinion.
- Push the gearbox on as far as stop and line it up.
- Tighten down the screws firmly, **3.1**
- On FC and FCB: Mount the deflector, **11.5.1** or **11.5.2**
- On FC and FCB: Mount the gearbox wheel, **11.3.3**

#### 6.1.2 FCS only



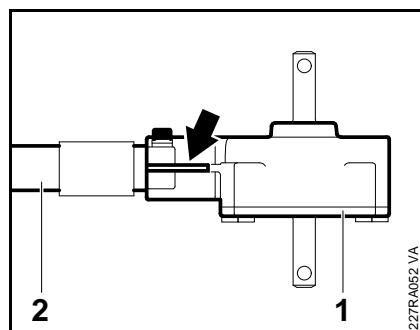
- Remove the deflector, **11.5.1** or **11.5.2**
- Take out the fixing screw (1).
- Loosen the clamp screw (2).
- Pull the gearbox (3) off the drive tube.
- If necessary, remove the gearbox wheel (4), **11.3.3**
- Reassemble in the reverse sequence.



- Push home the drive tube until the holes (arrows) are in alignment.
- Tighten down the fixing screw and clamp screw firmly, **3.1**
- Remove the shafts, **11.6.3**

#### 6.1.3 KW (4602) only

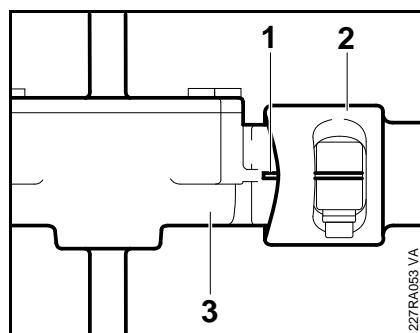
- Loosen the clamp screw and pull the gearbox off the drive tube
- Turn the gearbox back and forth at the same time.



- Degrease the drive tube in the area of the clamp before installing the gearbox.

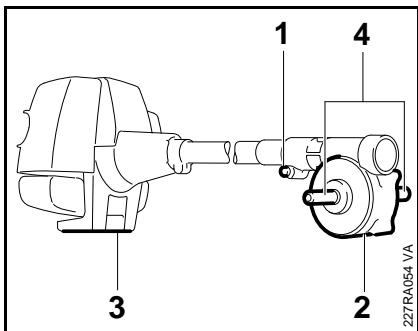
#### Machines with sleeve on drive tube

- Slide the gearbox (1) onto the drive tube (2) until the end of the tube is no longer visible in the slot (arrow). Push gearbox on as far as stop.
- Turn the gearbox back and forth while pushing it into position.

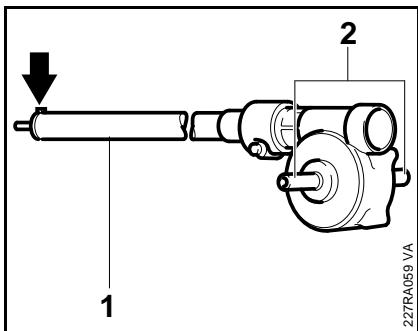


#### Machines with sleeve on gearbox

- If the end of the drive tube end is visible in the clamp (1) (check by pushing the rubber sleeve (2) to one side), push home the gearbox (3) as far as stop.

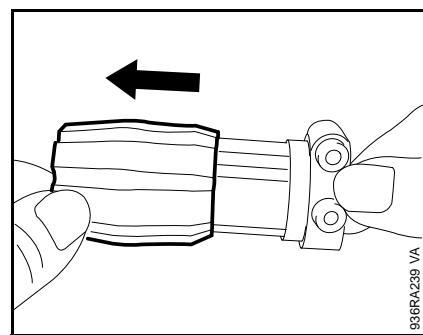


- Line up the gearbox (2) on the drive tube so that the machine support (3) on the engine faces down and the output shafts (4) are horizontal. Tighten down the clamp screw (1).



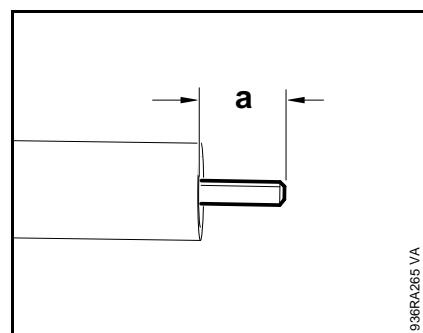
- With the output shafts (2) horizontal, line up the drive tube (1) so that the fixing lug (arrow) on the drive tube points up.
- Tighten down the clamp screw firmly.
- Reassemble in the reverse sequence.

#### 6.1.4 HT only



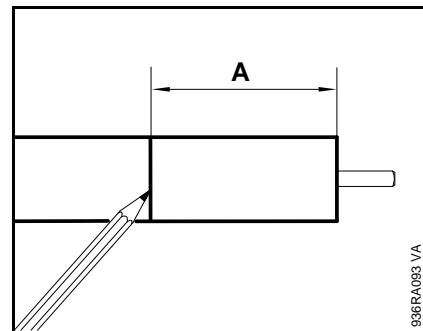
##### Removing

- Loosen the screws (arrows) on the cutting head.
- Pull the cutting head or 30° angle drive (special accessory) off the drive tube.

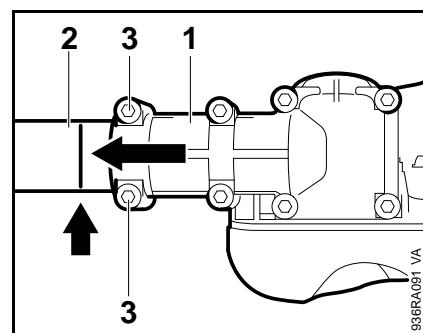


##### Installing

- Check dimension "a", it must not be more than 22 mm. If necessary, rotate shaft slowly until it can be pushed in to the right length.



- Mark the drive tube at distance "A" = 50 mm.



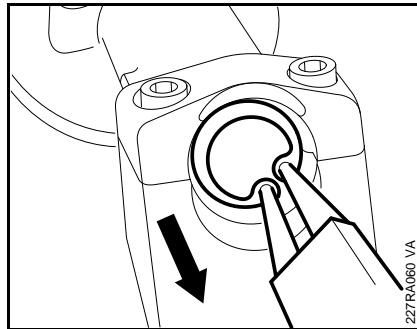
- Push the cutting head (1) onto the drive tube as far as stop. Turn the cutting head back and forth during this process until the square end of the shaft is properly engaged.

The cutting head is correctly positioned when the end of the housing reaches or covers the mark (arrow). Make sure the screws (3) face up and the chain sprocket cover is exactly vertical when the engine is resting on the machine support.

- Moderately tighten the screws (3) alternately first, then finally tighten to the specified torque, 3.1

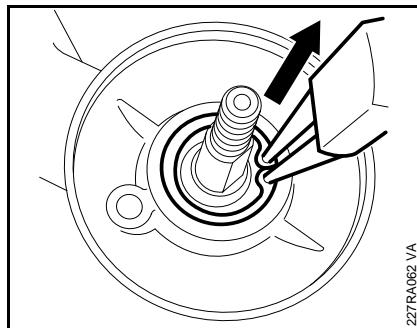
## 6.2 FC, FCB, FS

- On FC and FCB: Remove the deflector, [11.5.1](#) or [11.5.2](#)
- On FC and FCB: Remove the gearbox wheel, [11.3.3](#)

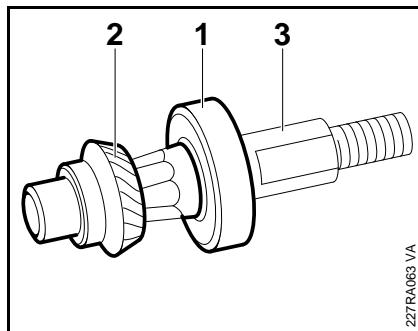


### Disassembling

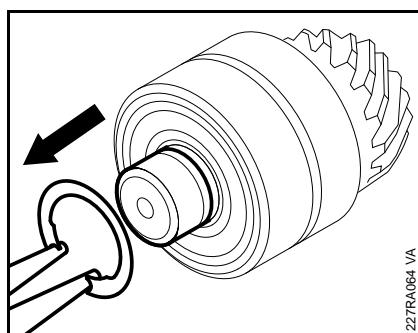
- Remove the gearbox, [6.1.1](#)
- Take the circlip out of the groove in the input end of the housing.



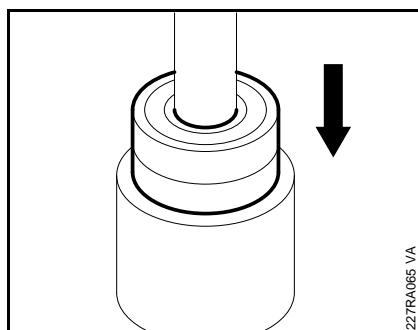
- Take the circlip out of the groove in the output end of the housing.
- Heat the gearbox housing to about 110...140°C and then remove the gearbox components at the input side first and then the output side by knocking the housing against a wooden base.



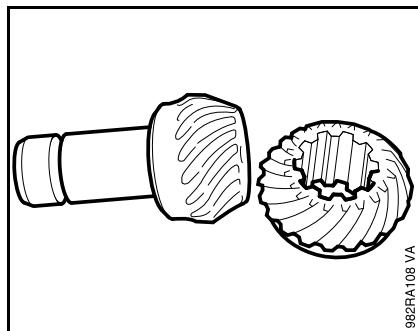
- Pull the ball bearing (1) and bevel gear (2) off the drive shaft (3).



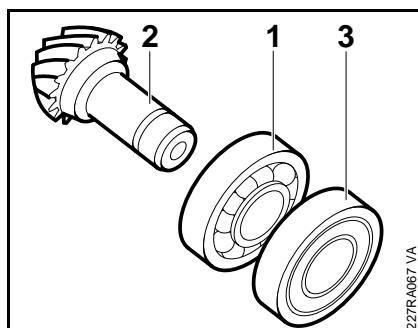
- Remove the circlip from the drive pinion.



- Press the drive pinion out of the ball bearings.
- Clean all parts and inspect them for serviceability.



The drive pinion and bevel gear are available only as a matching pinion set.

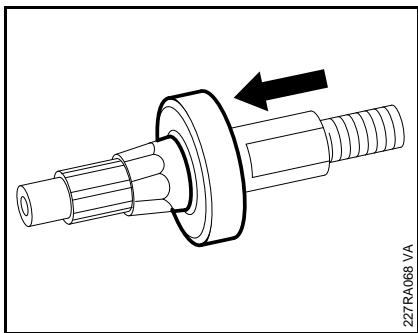


### Assembling

- Heat the ball bearings to about 50°C and push them onto the drive pinion.
- The open ball bearing (1) must be against the pinion (2) and the closed bearing (3) at the end with the groove for the circlip.

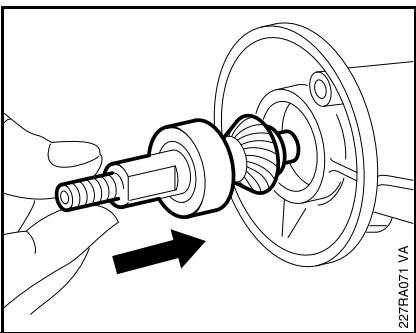
The FS 55 has only one ball bearing.

- Fit the circlip in the groove.



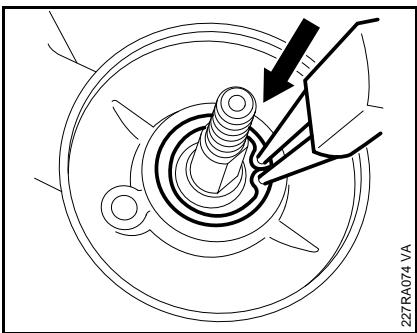
227RA068 VA

- Heat the ball bearings to about 50°C and push them onto the input shaft as far as stop.



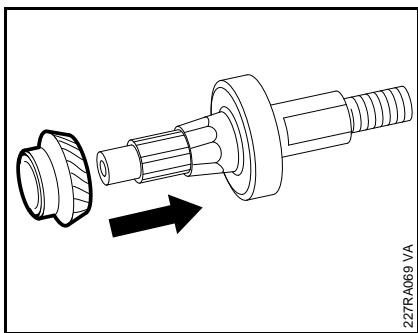
227RA071 VA

- Insert the preassembled output shaft and push it home as far as stop.



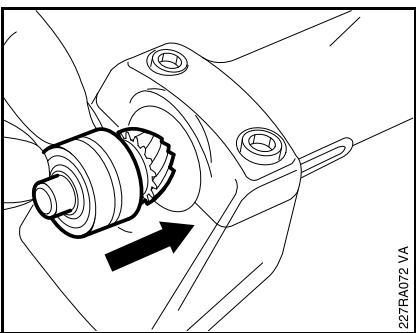
227RA074 VA

- Fit the circlip in the groove at the output end of the housing.



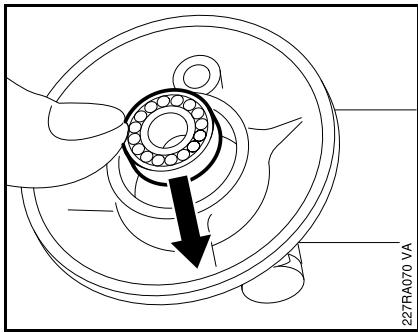
227RA069 VA

- Push the bevel gear, teeth first, onto the input shaft.



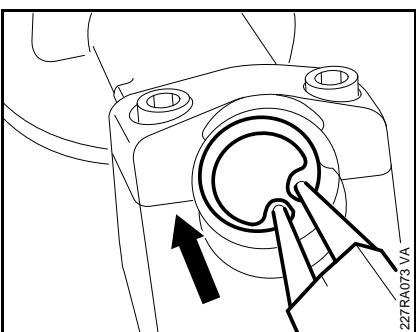
227RA072 VA

- Insert the preassembled drive pinion and push it home as far as stop.
  - Make sure the teeth of the pinion and bevel gear mesh properly.



227RA070 VA

- To install ball bearings and pinion set, heat gearbox housing to about 140°C.
  - Press ball bearing into the housing as far as stop.



227RA073 VA

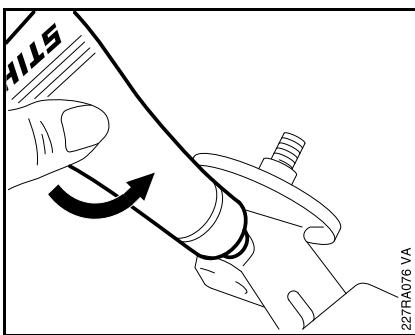
- Fit the circlip in the groove at the input end of the housing.

- Remove the screw plug (arrow) from the gearbox housing and fill the housing with grease.

Use STIHL gear lubricant for lubrication of the gearbox, **■ 13**

- Screw the tube of grease into the hole.
- Fill the gearbox housing with grease, **■ 3.3**

Top up with grease during maintenance work only if no grease is visible on the inside of the screw plug.



- Unscrew the tube of grease.

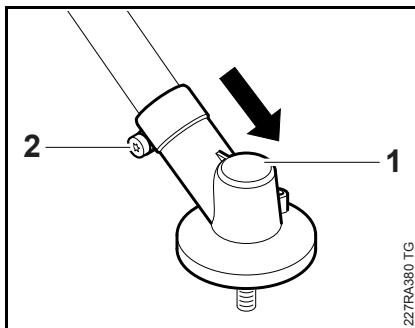
- Fit the screw plug and tighten it down firmly, **3.1**
- Assemble all other parts in the reverse sequence.

## 6.3 FS 56, FS 70

### 6.3.1 Removing and Installing

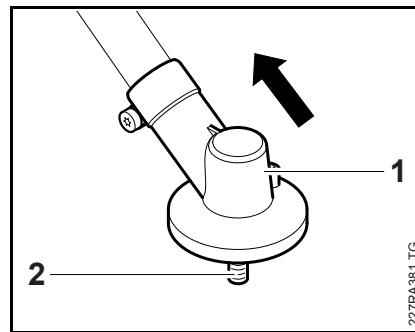
- Remove the deflector, **11.1.2**

#### Removing

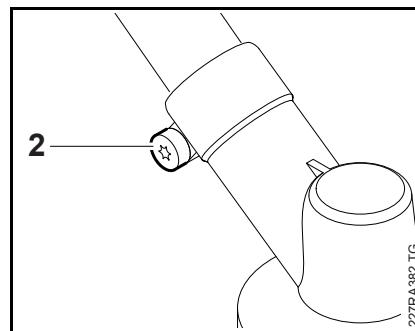


- Loosen the screw (1) and pull off the gearbox (2).
- Check the gearbox and repair or replace if necessary, **6.3.2**

#### Installing



- Line up the gearbox (1) so that the output shaft (2) points down – away from the loop handle.
- Push the gearbox (1) on as far as stop.



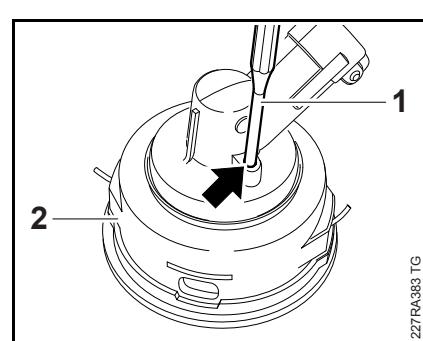
The drive shaft must fully engage the square seat in the pinion set.

- Tighten down the screw (1) firmly.

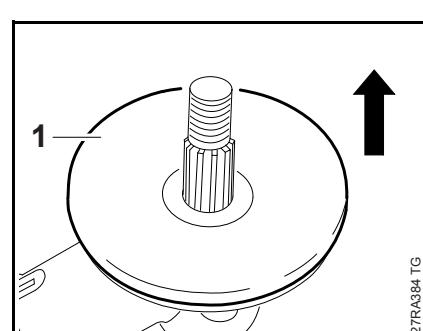
The gearbox must be clamped to the drive tube so that it cannot be moved.

- Reassemble all other parts in the reverse sequence.

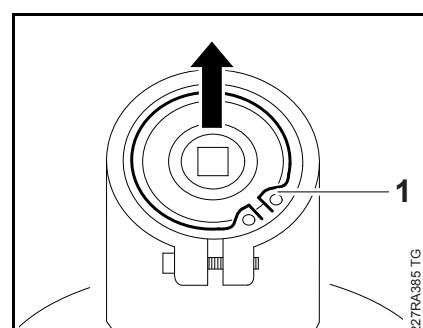
### 6.3.2 Disassembling



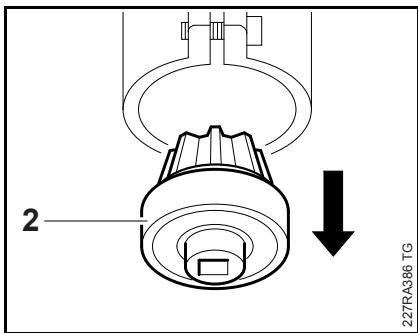
- Block the gearbox by inserting a suitable punch (1) in the hole (arrow).
- Unscrew the cutting attachment (2).



- Remove the thrust plate (1).

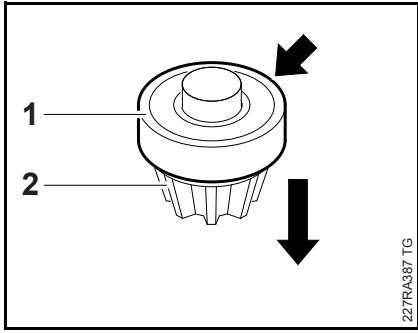


- Remove the circlip (1).



227RA386 TG

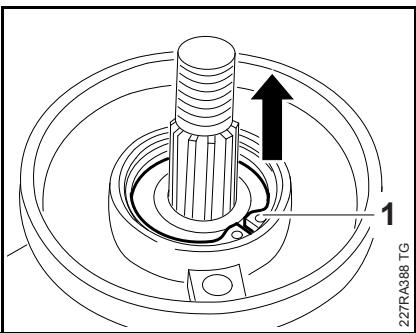
- Wear protective gloves.
- Heat rear area (arrow) of gearbox to about 150°C (300°F).
- The complete input pinion set (1) can then be pulled out.



227RA387 TG

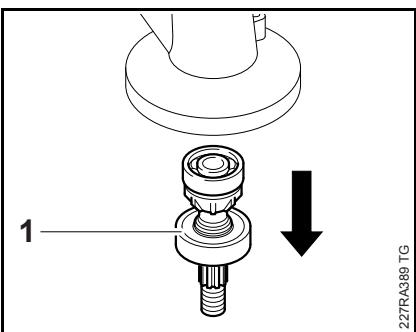
- Check ball bearing and replace it if necessary.
- Support ball bearing (1) on its outer race (arrow).
- Use a suitable tool to press out the bevel gear (2).

Always install new ball bearings.



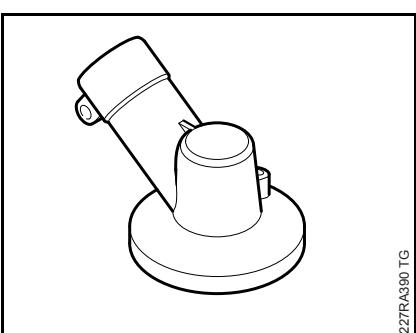
227RA388 TG

- Remove the circlip (1).



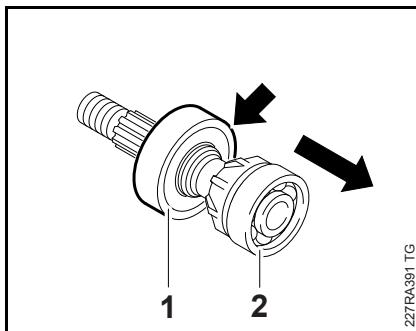
227RA389 TG

- Heat output end of gearbox to 150°C (300°F).
- The complete output pinion set (1) can then be pulled out.



227RA390 TG

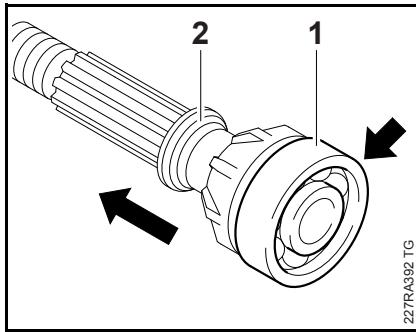
- Check and clean the gearbox housing and replace if necessary.



227RA391 TG

Always install new ball bearings.

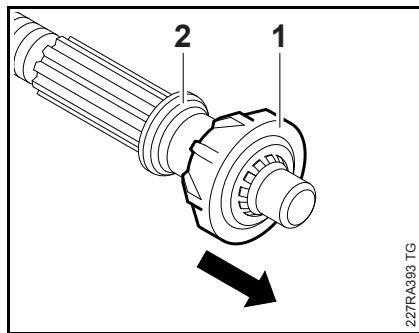
- Support ball bearing (1) on its outer race (arrow).
- Use a suitable tool to press out the output shaft (2).



227RA392 TG

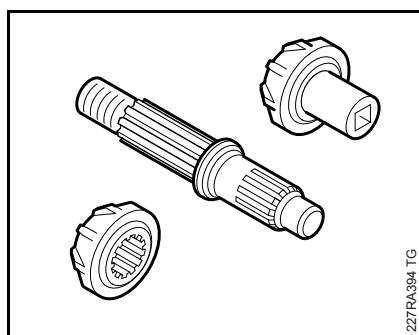
Always install new ball bearings.

- Support ball bearing (1) on its outer race (arrow).
- Use a suitable tool to press out the output shaft (2).



- Pull the bevel gear (1) off the shaft (2).

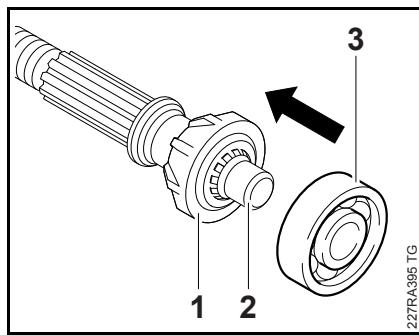
227RA393 TG



227RA394 TG

- Check and clean the individual parts and replace pinion set if necessary.
- If pinion set is in order, install new ball bearings.

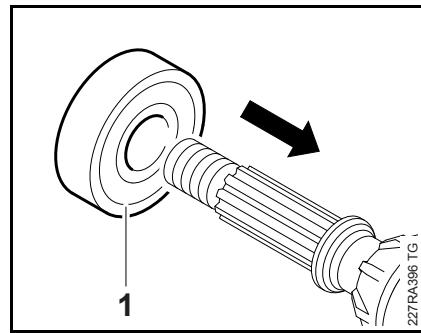
## Assembling



227RA395 TG

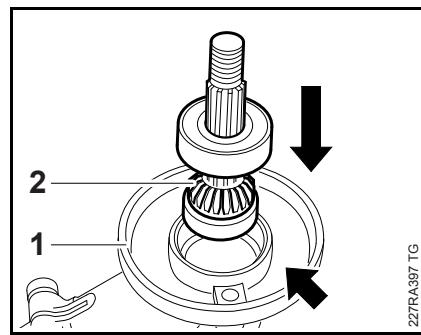
- Apply thin coating of grease to short stub, **13**
- Push bevel gear (1) onto short stub of output shaft (2).

- Apply suitable tool to inner race to press new ball bearing (3) onto short stub as far as stop.



227RA396 TG

- Apply suitable tool to inner race to press new ball bearing (1) onto long stub as far as stop.

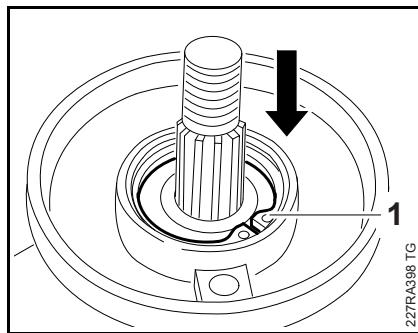


227RA397 TG

- Heat output end (arrow) of gearbox housing (1) to about 150°C (300°F).

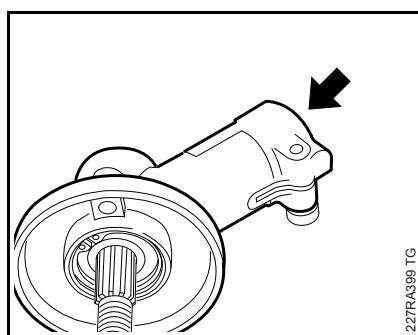
- Hold pinion set so that the bevel gear (2) faces the gearbox housing.
- Push the pinion set into the gearbox housing (1) as far as stop.

Fit the pinion set quickly because the ball bearings will otherwise absorb heat and expand.



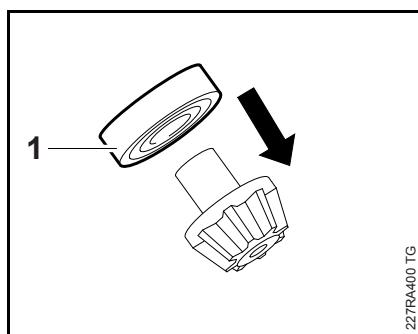
227RA398 TG

- Fit the circlip (1).



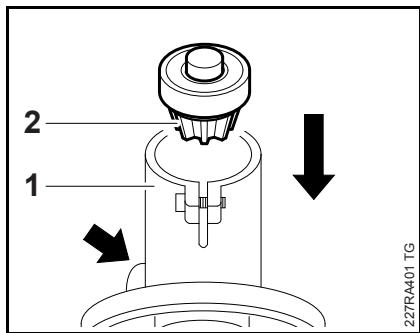
227RA399 TG

- Fill gearbox with grease from the input end (arrow), **13**
- Note specified quantity, **3.3.**



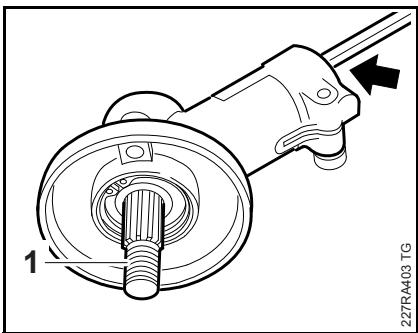
227RA400 TG

- Apply suitable tool to inner race to press new ball bearing (1) onto bevel gear stub as far as stop.

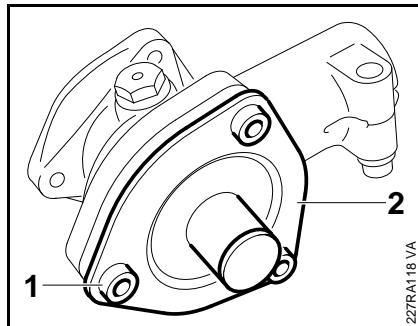


- Heat input end (arrow) of gearbox housing (1) to about 150°C (300°F).
- Hold the input pinion (2) so that its teeth face the gearbox housing.
- Press the input pinion (2) fully home.
- If necessary, use suitable square rod to rotate input pinion until it meshes with the output pinion.

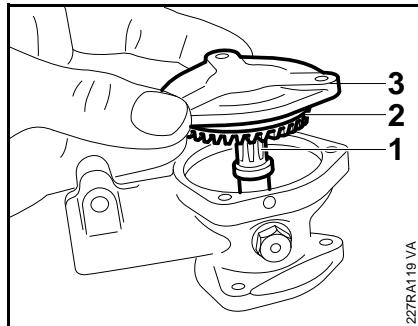
Install the input pinion quickly because it will otherwise absorb heat and expand.



- Clamp the puller arms.
- Pull out the oil seal (2).
- Check operation
- Use suitable square rod to rotate the input pinion (arrow). The shaft (1) must turn easily and freely at the same time.
- Install the gearbox, [6.3.1](#)



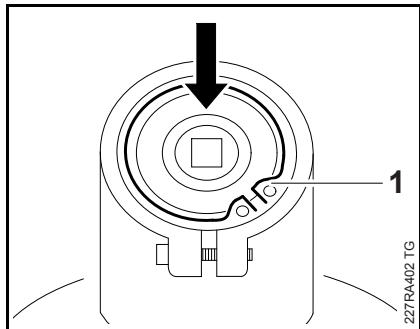
- Take out the screws (1) and remove the bearing plate (2).



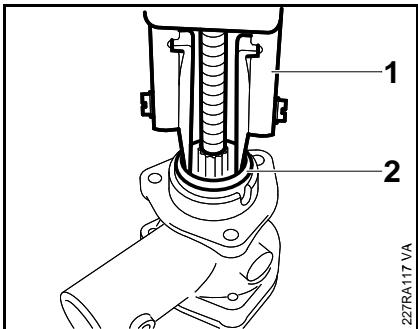
## 6.4 FCS

### Disassembling

- Remove the gearbox, [6.1.2](#)
- Remove the gearbox wheel, [11.3.3](#)

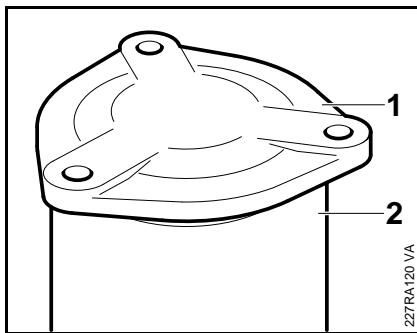


- Fit the circlip (1).

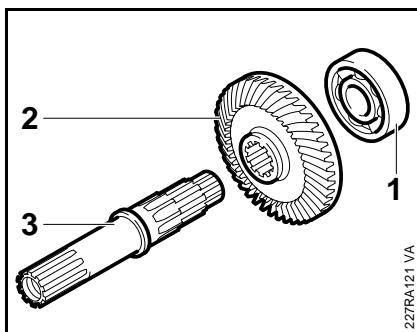


- Free off the oil seal in its seat by tapping it with a suitable tube or a punch.
- Apply puller (1) 5910 890 4400 with jaws 0000 893 3700 (with No.1 profile).

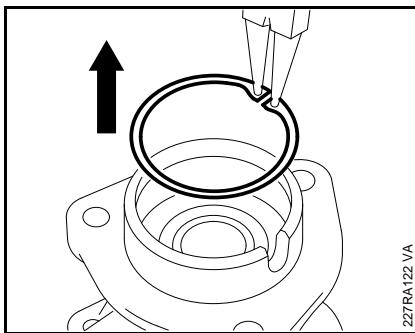
- Drive the output shaft (1) out of the ball bearing by knocking it on a wooden base and then pull it out of the housing together with the bevel gear (2) and gearbox cover (3).
- Remove the O-ring from the gearbox cover.



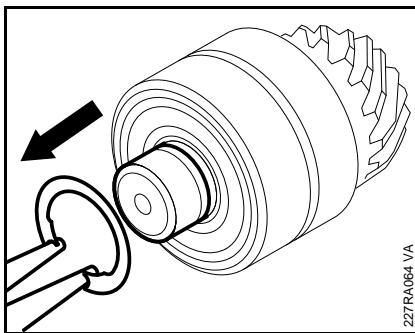
- Place the gearbox cover (1), output shaft facing down, on a tube (2) with an inside diameter of 55 mm and a length of 80 mm.
- Use a hot air blower to heat the center of the gearbox cover until the ball bearing falls out with the output shaft and bevel gear.



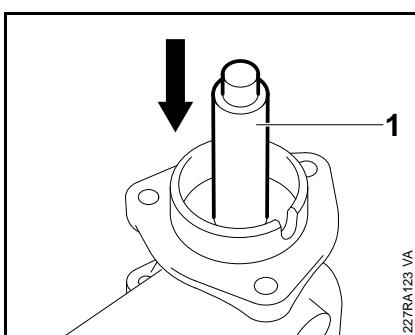
- Heat the ball bearing (1) a little and pull it off the output shaft (3) together with the bevel gear (2).



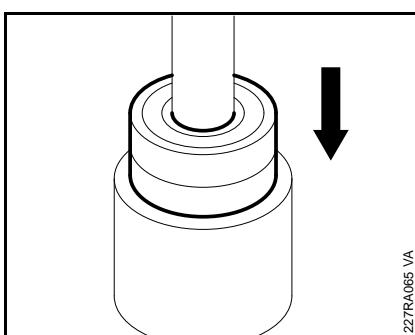
- Take the circlip out of the groove in the output end of the housing.



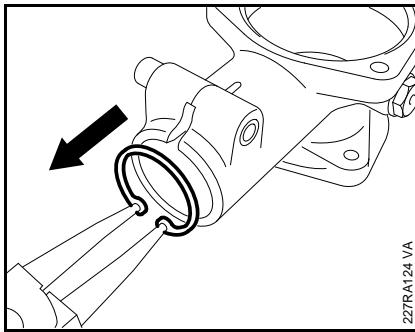
- Remove the circlip from the drive pinion.



- Use press arbor (1) 4119 893 7200 to remove the ball bearing.

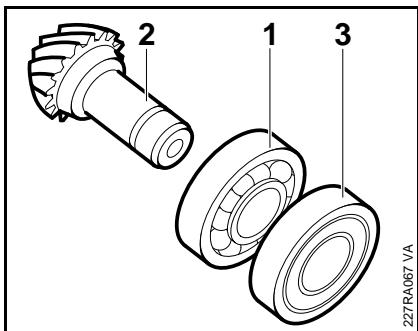


- Press the drive pinion out of the ball bearings.
- Clean all parts and inspect them for serviceability.



- Take the circlip out of the groove in the input end of the housing.
- Heat the input end of the gearbox housing to about 110...140°C and then remove the gearbox components from the input end by knocking the housing against a wooden base.

The drive pinion and bevel gear are available only as a matching pinion set.

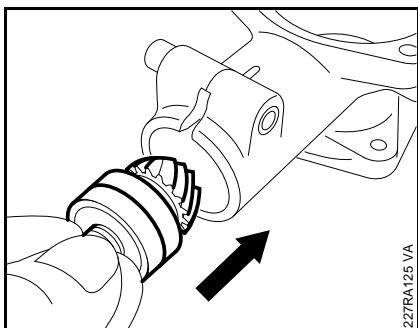


### Assembling

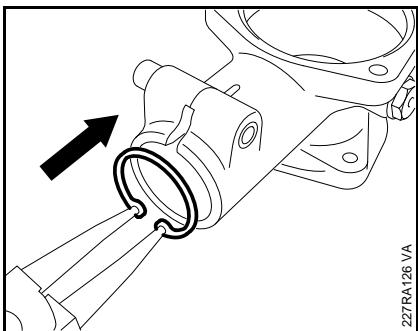
- Heat the ball bearing at the input end to about 50°C and push it onto the drive pinion.

The open ball bearing (1) must be against the pinion (2) and the closed bearing (3) at the end with the groove for the circlip.

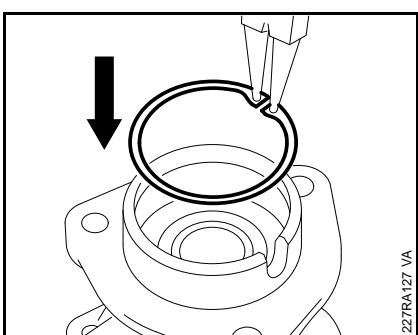
- Fit the circlip in the groove.



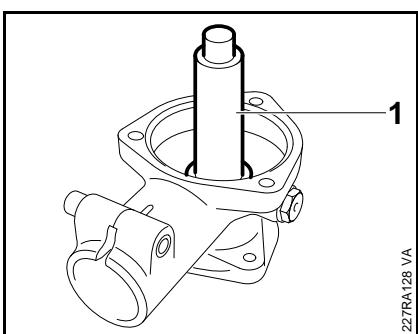
- Heat input end of gearbox housing to about 110 – 140°C.
- Place the preassembled drive pinion in position and press it home as far as stop.



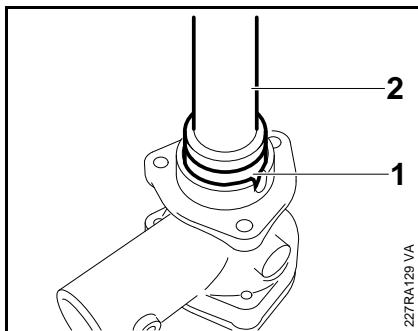
- Fit the circlip in the groove at the input end of the housing.



- Fit the circlip in the groove at the output end of the housing.

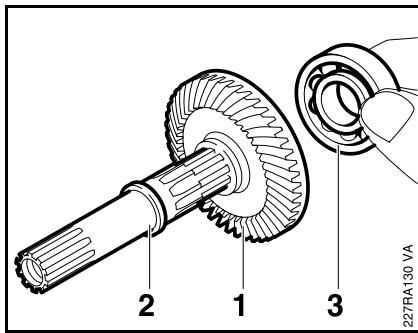


- Use press arbor (1) 4119 893 7200 to press home the ball bearing until it butts against the circlip.

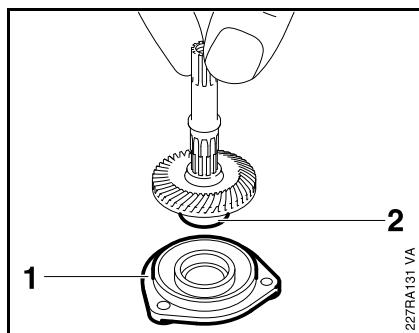


- Lubricate sealing lips of oil seal with grease, **13**

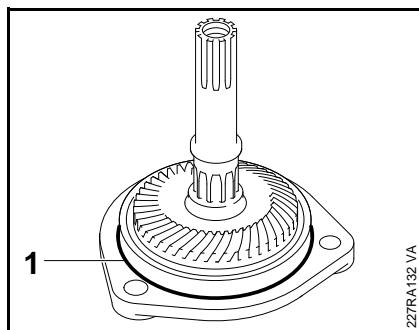
- Use press arbor (2) 4119 893 7200 to press home the oil seal (1), open side facing ball bearing, until it butts against the ball bearing.



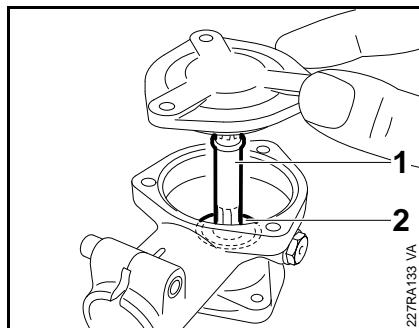
- Push the bevel gear (1) onto the output shaft (2).
- Heat the ball bearing (3) to about 50°C and push it onto the output shaft as far as stop.



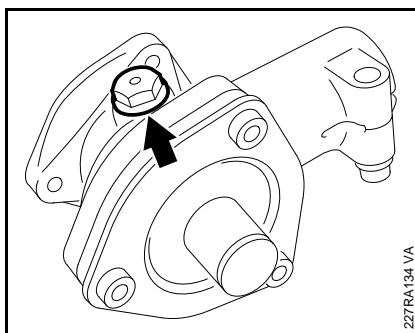
- Heat the gearbox cover (1) to about 140°C and push home the ball bearing (2) (on drive shaft) as far as stop.



- Wait for the gearbox cover to cool down and then fit a new O-ring (1).



- Push the preassembled output shaft (1) into the ball bearing (2).
- Fit the bearing plate, insert the screws and tighten them down firmly, **3.1**
- Reassemble all other parts in the reverse sequence.



- Remove the screw plug (arrow) from the gearbox housing and the fill the housing with grease.

The initial series of gearboxes was produced with a grease nipple. Use a standard grease gun to pump grease into the gearbox housing of versions with a grease nipple.

Use STIHL gear lubricant for lubrication of the bevel gear gearbox, **13**

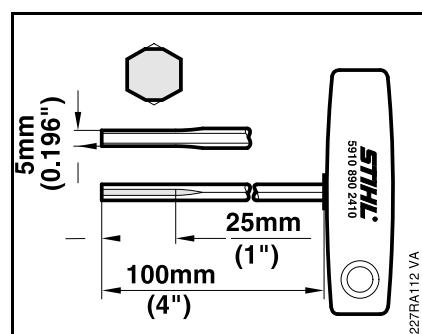
- Screw the tube of grease into the hole.
- Fill the gearbox housing with grease, **3.3**

Top up with grease during maintenance work only if no grease is visible on the inside of the screw plug.

- Unscrew the tube of grease.
- Fit the screw plug and tighten it down firmly, **3.1**
- Fit the gearbox wheel, **11.3.3**
- Install the gearbox, **6.1.2**

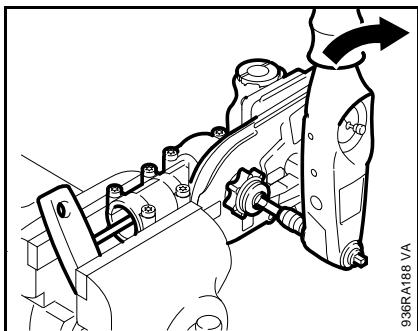
## 6.5 Disassembling HT

- Remove the cutting head from the drive tube, **6.1.4**
- Remove the chain sprocket cover.
- Remove the bar and chain.



### HT gearbox with friction clutch

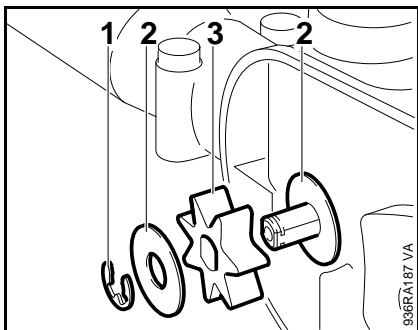
- Shorten a standard T-handle, 5 mm square section screwdriver or STIHL T-handle 5 mm hex socket screwdriver 5910 890 2410 to the length shown above.
- Modify the hexagon cross section as shown.



936RA188 VA

- Clamp the gearbox in a vise.
- Insert modified T-handle screwdriver as far as stop in the pinion's square socket in the gearbox.
- Loosen and unscrew the collar screw clockwise.
- Remove the cup springs, washers and chain sprocket.

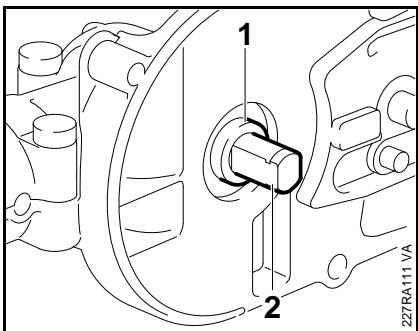
Make sure cup springs are installed in correct sequence. Replace damaged cup springs.



936RA187 VA

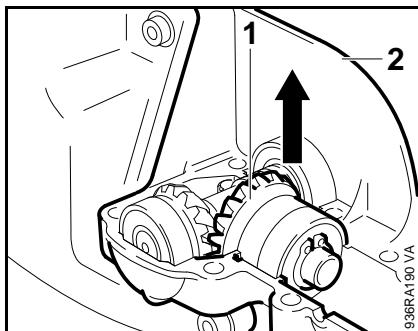
#### HT gearbox with friction clutch

- Pry the E-clip (1) off the shaft and remove the washers (2) and chain sprocket (3).



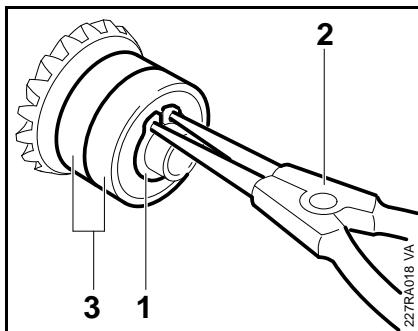
227RA111 VA

- On machines up to December 2002, remove the oil tank, [11.7.1](#)



936RA190 VA

- Take the pinion (1) out of the gearbox housing (2).

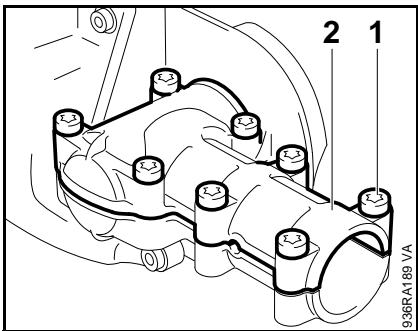


227RA188 VA

#### HT

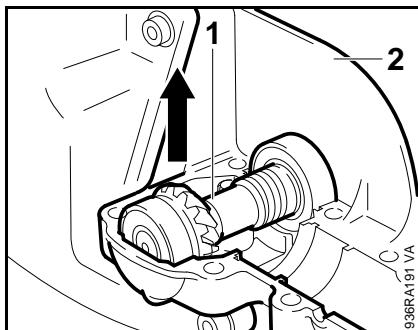
The following illustrations show the versions from December 2002. The only difference is that the oil tank can be left on the gearbox housing on the new versions.

- Pry the ring (1) off the shaft (2).



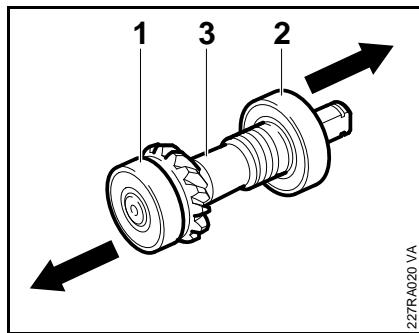
936RA189 VA

- Remove all the screws (1) from the gearbox cover (2).
- Remove the gearbox cover (2).

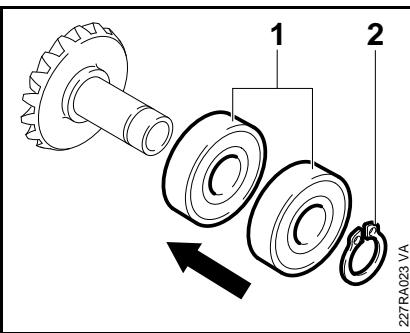


936RA191 VA

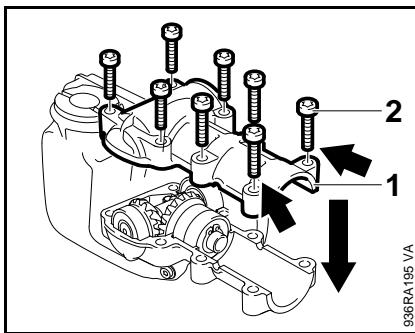
- Take the shaft (1) out of the gearbox housing (2).



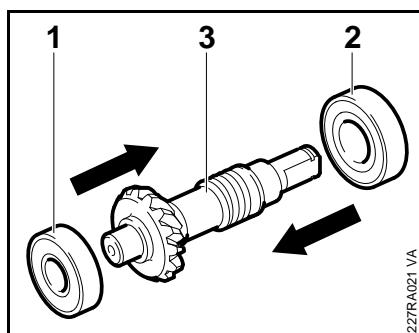
- Pull the ball bearings (1+2) off the shaft (3).



- Press on the ball bearings (1).
- Fit the circlip (2).

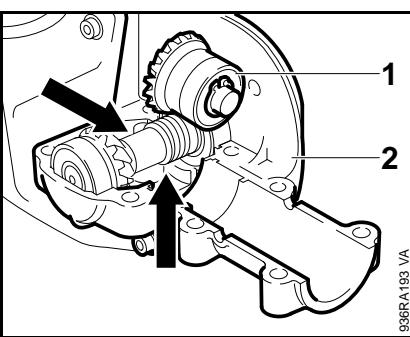


- Fit the gearbox cover (1).
- Insert the screws (2) in the gearbox cover (1) and, with the exception of the clamp screws (arrows), tighten them down firmly, **3.1**

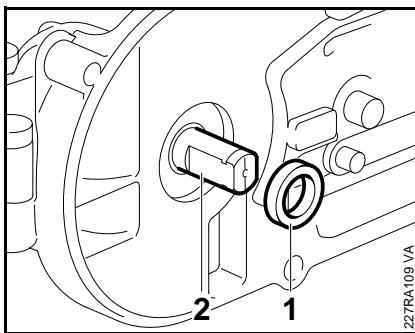


## Assembling

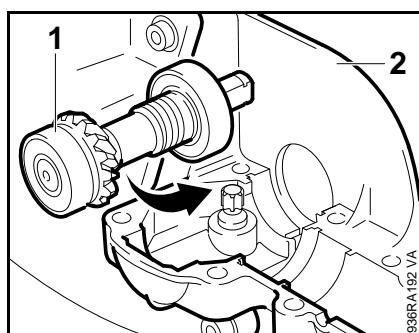
- Press ball bearing ball "609" (1) on to the pinion end of the shaft (3).
- Press ball bearing ball "6001" (2) on to the shaft (3).



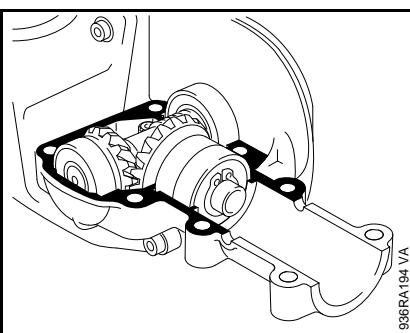
- Fill recess for pinion in gearbox housing with STIHL gear lubricant, **13**
- Fit the pinion (1) in the gearbox housing (2).



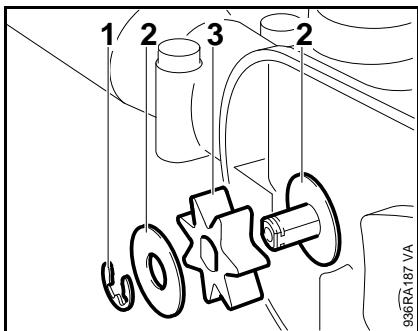
- Press the ring (1) onto the shaft (2).
- On machines up to December 2002, install the oil tank, **11.7.1**



- Fit the shaft (1) in the gearbox housing (2).

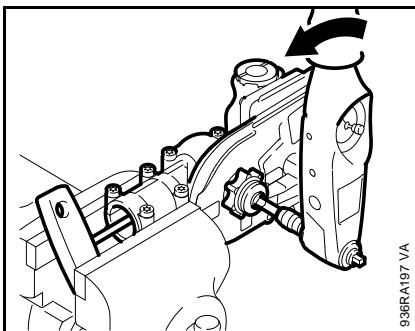


- Apply thin coating of Dirk sealant, **13**, to mating face of gearbox housing (marked black in illustration).

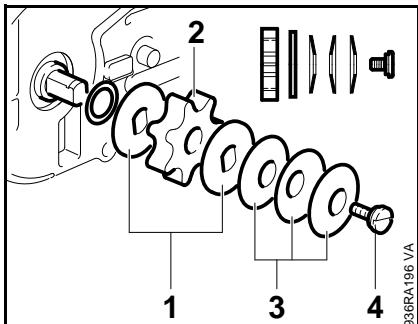


#### HT gearbox without friction clutch

- Fit washers (2), chain sprocket (3) and E-clip (1) on the shaft.
- Fit the bar and chain.
- Fit the chain sprocket cover.
- Install the cutting head on the drive tube, **6.1.4**



- Clamp the gearbox in a vise.
- Insert modified T-handle screwdriver as far as stop in the pinion's square socket in the gearbox.
- Tighten down the collar screw counterclockwise, **3.1**
- Check clutch slip torque, **6.5.1**
- Fit the bar and chain.
- Fit the chain sprocket cover.
- Install the cutting head on the drive tube, **6.1.4**



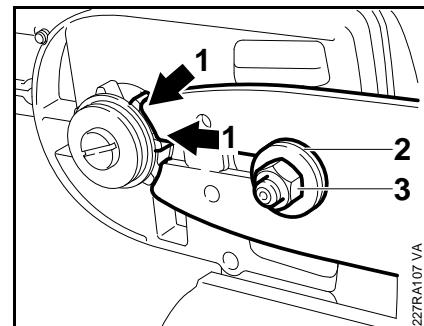
#### HT gearbox with friction clutch

- Slip the washers (1) and chain sprocket (2) onto the shaft.
- Fit the cup springs (3).

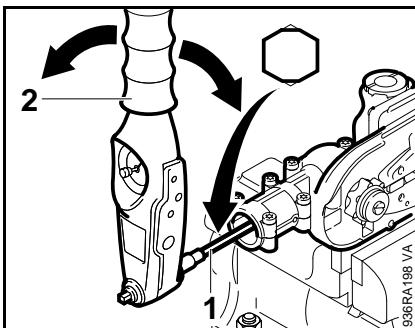
Note correct assembly sequence.

- Fit collar screw (4) with Loctite 272, **13**
- Screw home the collar screw counterclockwise and tighten it down firmly, **3.1**

#### 6.5.1 Checking Clutch Slip Torque



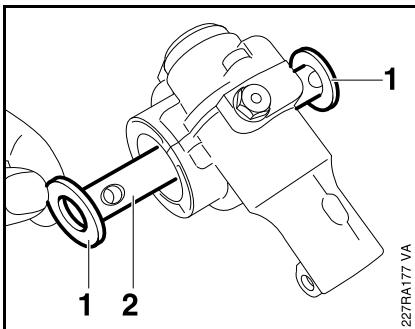
- Remove the cutting head from the drive tube, **6.1.4**
- Clamp the gearbox's hook in a vise.
- Remove the complete chain tensioner, **11.7.5**
- Position the guide bar (1) against the gearbox, slide it in the direction of the chain sprocket so that the top part of its tail engages between two teeth (arrows).
- Fit several washers (2) with an inside diameter of 8.4 mm (total thickness 6 mm) or the ring for the chain sprocket cover on the bar stud.
- Fit the nut (3) and tighten it down firmly (the chain sprocket is now locked in position).



- Use a standard 5 mm square section bit for a torque wrench or STIHL bit (1) 5910 890 0102 (5 mm hex section) and torque wrench (2) to check that clutch slip torque is between 5 and 14 Nm.

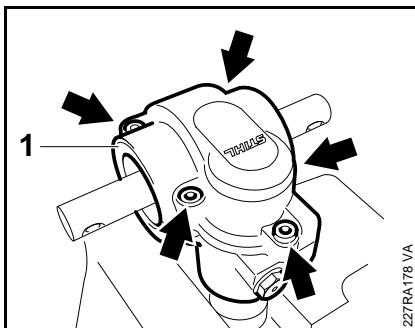
- Modify the hexagon cross section as shown.
  - In case of deviations from these torque values, replace the washers, chain sprocket and cup springs.
  - Reassemble in the reverse sequence.

## 6.6 BC

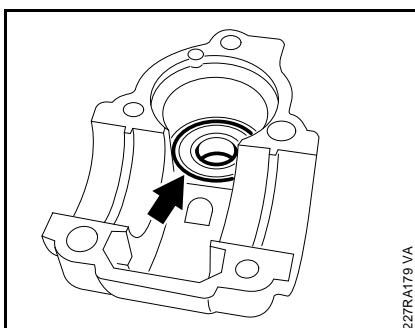


### Disassembling

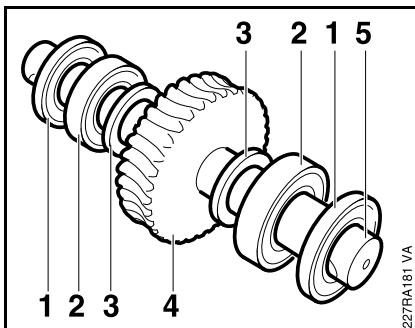
- Remove the gearbox, 6.1.1
- Remove the rotor blades.
- Take the washers (1) off the output shaft (2).



- Take out all the screws (arrows) and remove the housing cover (1).

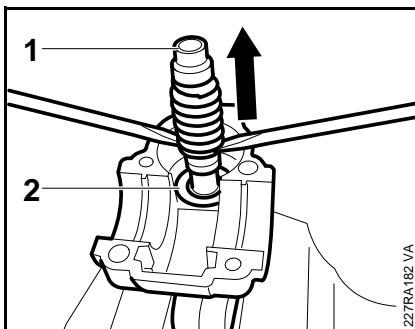


- Use hot air blower to heat the housing cover in area of ball bearing to about 80°C.
- Remove the ball bearing (arrow) by knocking the housing cover against a wooden base.

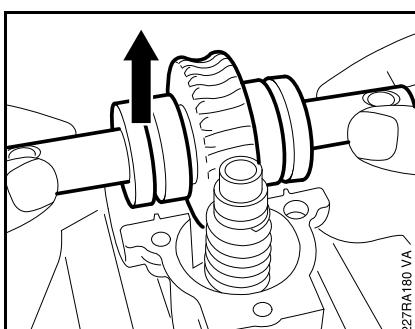


- Pull the oil seals (1), ball bearings (2), thrust washers (3) and worm wheel (4) off the output shaft (5).

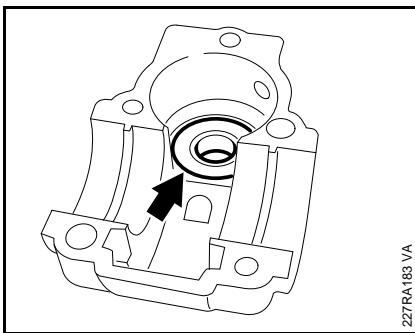
– Remove the key from the shaft.



- Pull or lever the worm (1) out of the ball bearing (2).

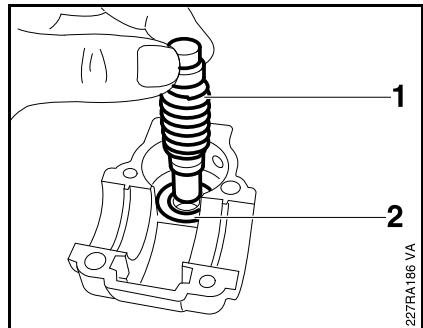


- Lift the complete output shaft out of the gearbox housing.



227RA183 VA

- Heat the gearbox housing to about 100°C and fit the ball bearing (1) or, if necessary, use press arbor (2) 4116 893 7205 to press it home as far as stop.

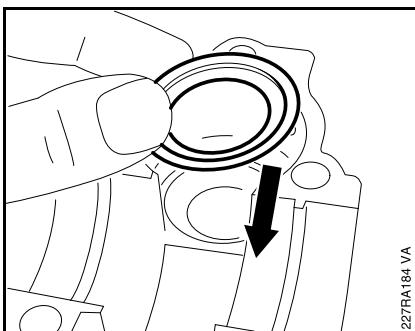


227RA186 VA

- Use hot air blower to heat the housing cover in area of ball bearing to about 80°C.
- Remove the ball bearing (arrow) by knocking the housing cover against a wooden base.
- Remove the washer.
- Clean all parts and inspect them for serviceability.

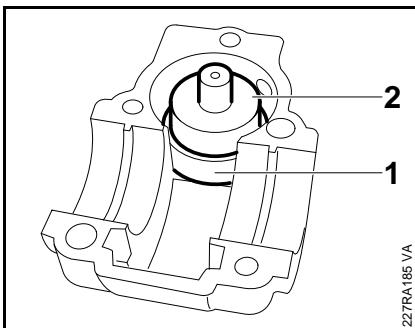
Worm wheel and worm are available only as a matching pair.

### Assembling



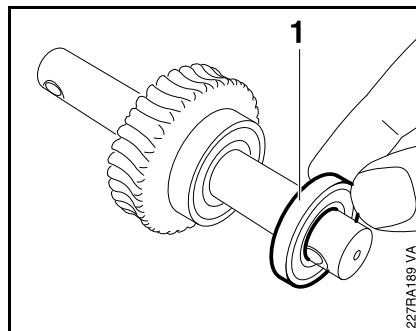
227RA184 VA

- Place washer, convex side first, in the gearbox housing.



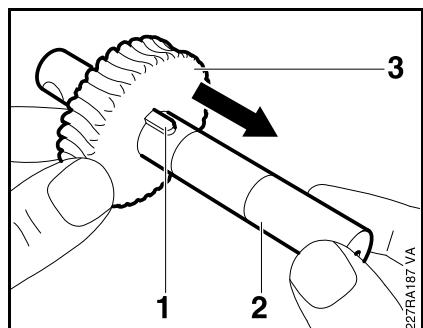
227RA185 VA

- Slip the washer (1) and ball bearing (2) over the output shaft.



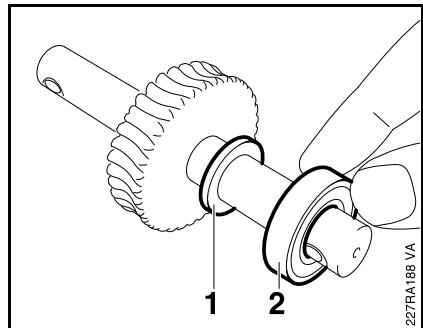
227RA189 VA

- Lubricate the sealing lips of the oil seal with grease, ■ 13
- Push the oil seal (1), open side facing the ball bearing, onto the output shaft.
- Fit the thrust washer, ball bearing and oil seal on the other end of the output shaft.

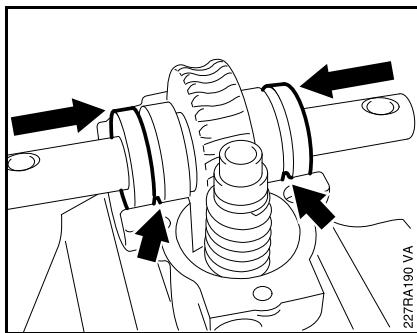


227RA187 VA

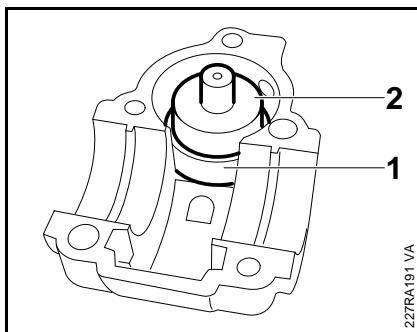
- Fit the key (1) in the slot in the output shaft (2).
- Fit the worm wheel (3) and push it over the key.



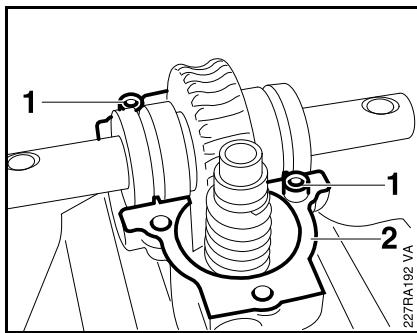
227RA188 VA



- Place the preassembled output shaft in position in the gearbox housing.
- Push the oil seals up against the ribs (arrows).



- Heat the gearbox housing to about 100°C and fit the ball bearing (1) or, if necessary, use press arbor (2) 4116 893 7205 to press it home as far as stop.

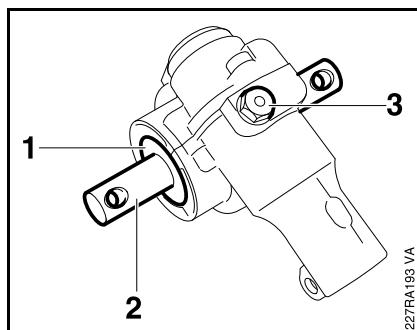


- Fit the sleeves (1) in the gearbox housing.

- Apply a thin bead of Dirk gray sealant, 13, to the gearbox housing mating face (2).

Follow maker's instructions.

- Fit the gearbox cover, insert the screws and tighten them down firmly, 3.1



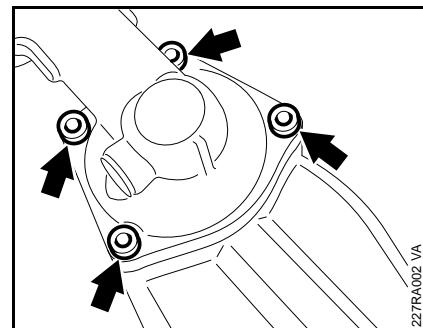
- Slip the washers (1) onto the right and left-hand ends of the output shaft (2).
- Remove the screw plug (3) from the gearbox housing.
- Use STIHL gear lubricant for lubrication of the gearbox, 13
- Screw the tube of grease into the hole.
- Fill the gearbox housing with grease, 3.3

Top up with grease during maintenance work only if no grease is visible on the inside of the screw plug.

- Unscrew the tube of grease.
- Fit the screw plug and tighten it down firmly, 3.1
- Assemble all other parts in the reverse sequence.

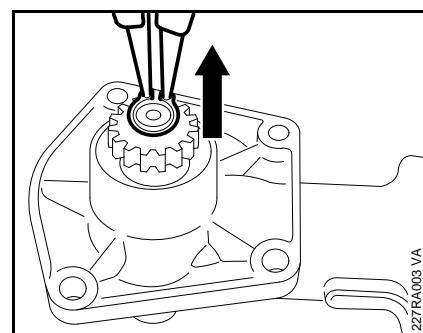
## 6.7 Cutter Bar

### 6.7.1 HL 0°

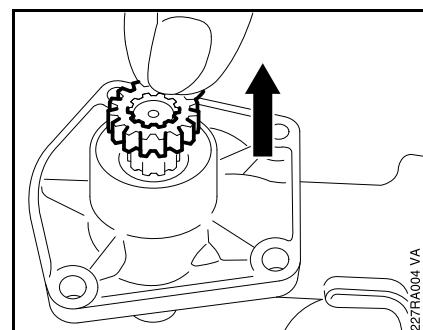


#### Disassembling

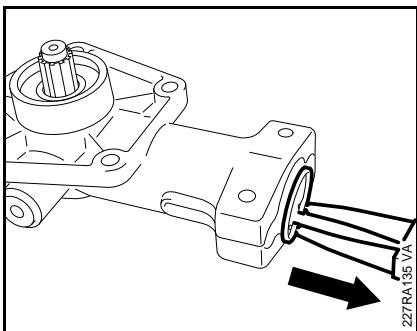
- Remove the gearbox, 6.1.1
- Take out the screws (arrows).
- Remove the angle drive gearbox.



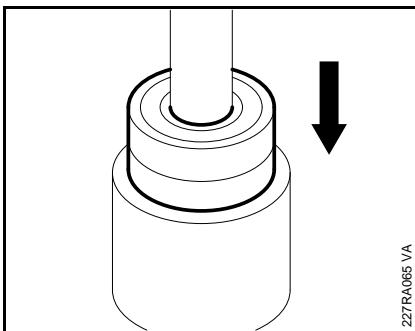
- Use pliers (1) 0811 611 8200 to remove the circlip.



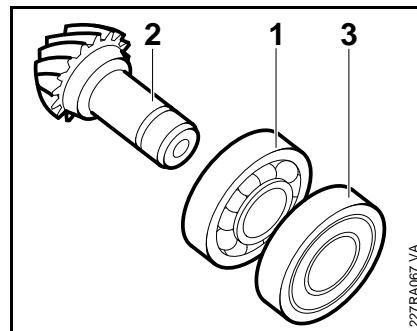
- Pull off the pinion.



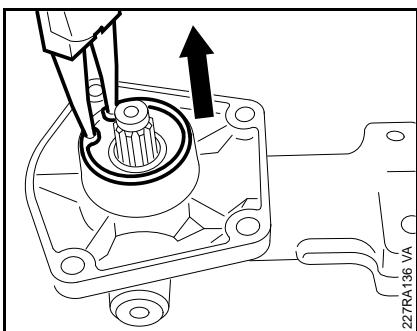
- Take the circlip out of the groove in the input end of the housing.



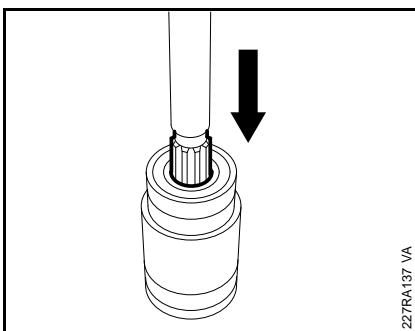
- Press the drive pinion out of the ball bearings.



227RA067 VA



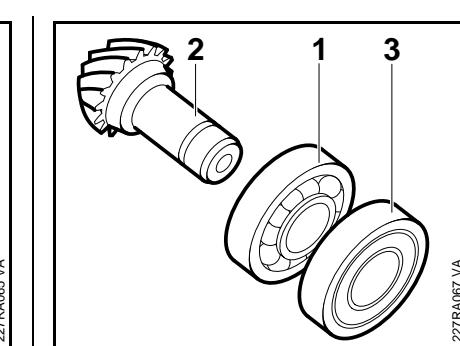
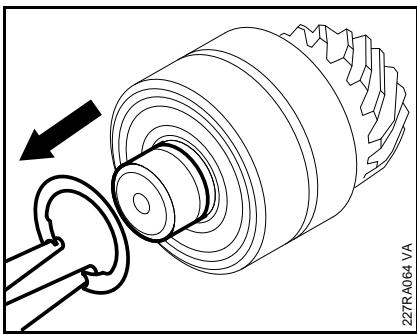
- Take the circlip out of the groove in the output end of the housing.
- Heat the gearbox housing to about 110...140°C and then remove the gearbox components at the input end first and then the output end by knocking the housing against a wooden base.



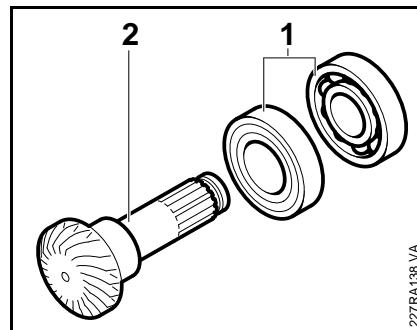
227RA137 VA

- Press the output pinion out of the ball bearings.
- Clean all parts and inspect them for serviceability.

The drive pinion and output pinion are available only as a matching pair.



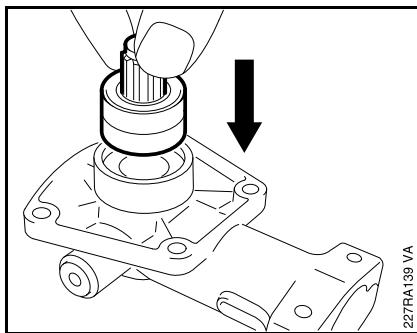
- Heat the ball bearings to about 50°C and push them onto the drive pinion.
- The open ball bearing (1) must be against the pinion (2), and the closed bearing (3) at the end with the groove for the retaining ring.
- Fit the hookless retaining ring in the groove.



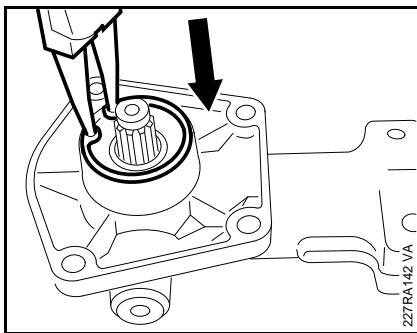
227RA138 VA

- Heat the ball bearings (1) at the output end to about 50°C and push them onto the drive pinion (2).
- The open sides of the ball bearings must face each other.
- Heat the gearbox housing to about 140°C to install the pinion.

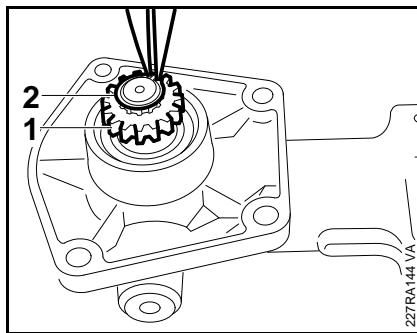
- Remove the hookless retaining ring from the drive pinion.



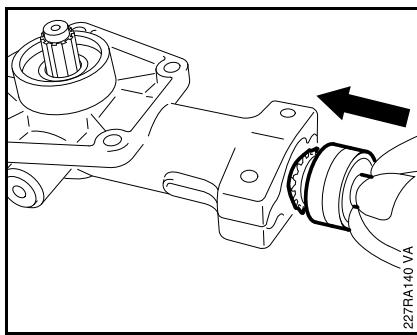
- Place the preassembled output pinion in position and press it home as far as stop.



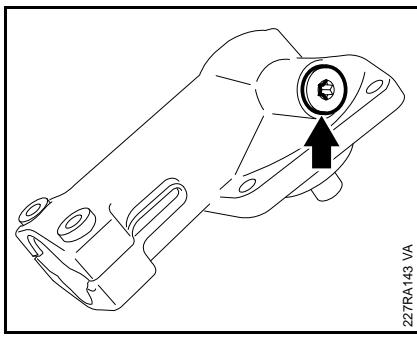
- Fit the circlip on the output end of the housing.



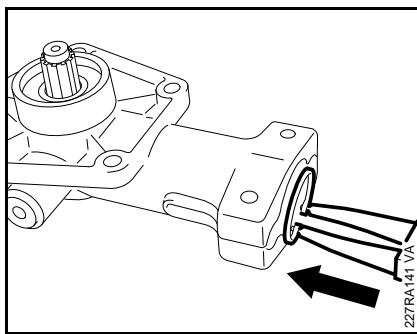
- Push on the pinion (1) and secure it with the circlip (2).
- Place the angle drive gearbox in position, insert the screws and tighten them down firmly, **3.1**
- Reassemble all other parts in the reverse sequence.



- Place the preassembled drive pinion in position and press it home as far as stop.
- Check that the teeth of the pinions mesh properly.



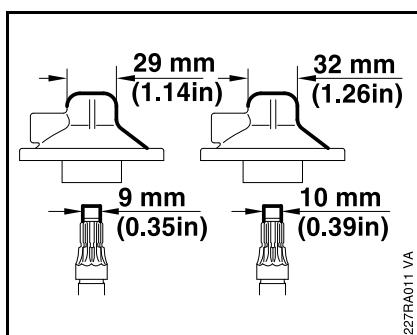
- Unscrew the screw plug (arrow) from the gearbox housing.
  - Screw the tube of grease into the hole.
  - Use STIHL gear lubricant for lubrication of the gearbox, **13**
  - Fill the gearbox housing with grease, **3.3**



- Fit the circlip in the groove at the input end of the housing.

Top up with grease during maintenance work only if no grease is visible on the inside of the screw plug.

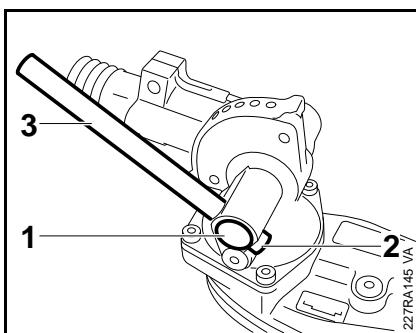
- Unscrew the tube of grease.
- Fit the screw plug and tighten it down firmly, **3.1**



A strengthened ball bearing (10x26x8) for the drive shaft was installed as part of a line modification. The drive shaft and gearbox housing were modified accordingly.

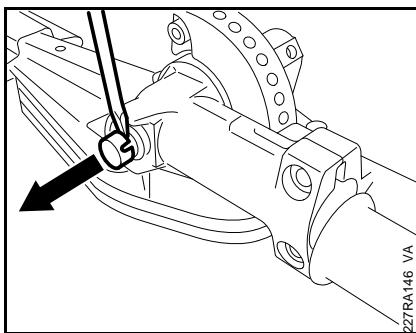
- Reassemble in the reverse sequence, **6.2**

### 6.7.3 HL 0-90°

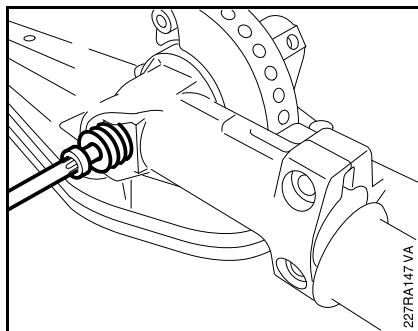


#### Disassembling

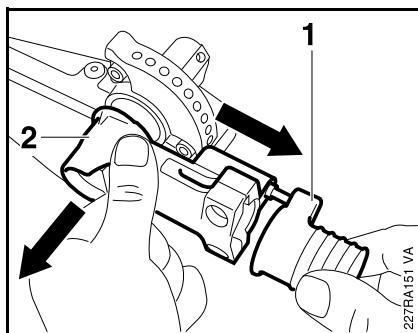
- Remove the gearbox, [6.1.1](#)
- Pry away the plug (1), take out the screw (2) and remove the adjusting lever (3).
- Unscrew the nut exposed after removing the plug (1).



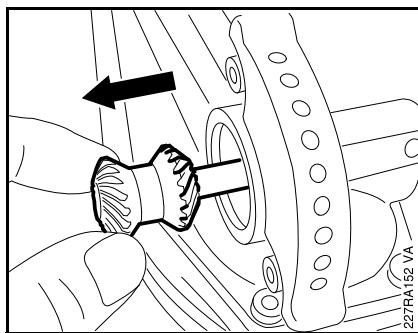
- Pry the cap off the screw.



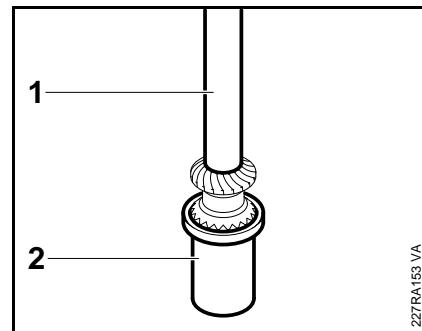
- Loosen the screw and pull it out.
- Remove the O-ring, washer and cup springs.



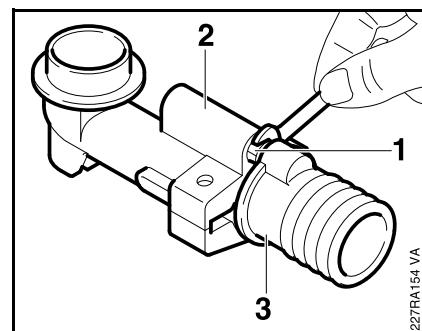
- Pull back the lock housing (1) and remove the gearbox housing (2) sideways from the blade drive gear.



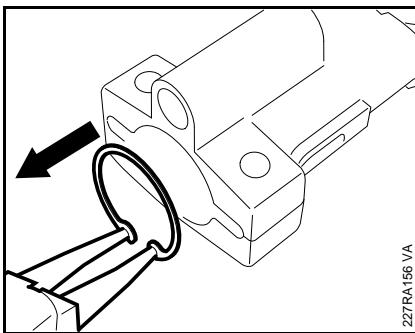
- Pull the double pinion off the bearing bushing.



- Use drift (1) 1111 893 4700 to press the needle sleeves out of the double pinion.
- Support double pinion on press sleeve (2) 4119 893 2400 for this purpose.

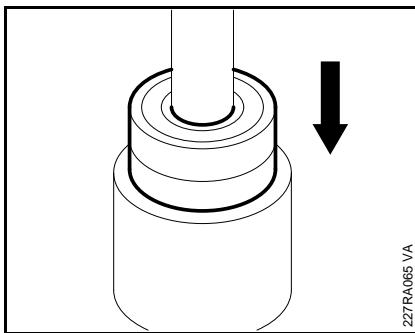


- Unscrew the screw sleeve (1) from the gearbox housing (2) and pull it out together with the lock housing (3).



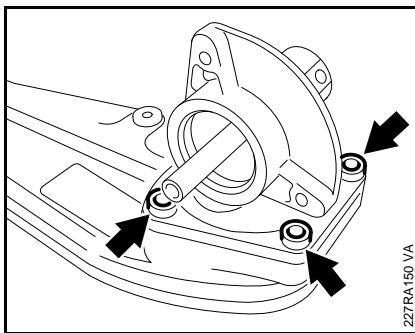
227RA156 VA

- Take the circlip out of the groove in the input end of the housing.
- Remove the washer.
- Heat the gearbox housing to about 110...140°C and then remove the gearbox components at the input end by knocking the housing against a wooden base.



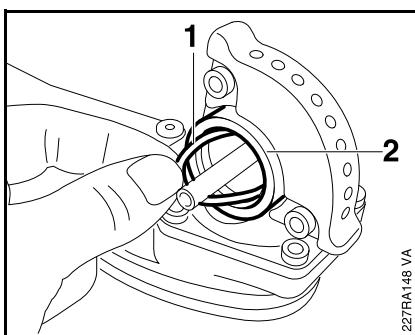
227RA065 VA

- Press the drive pinion out of the ball bearings.
- Remove the washer (if fitted).



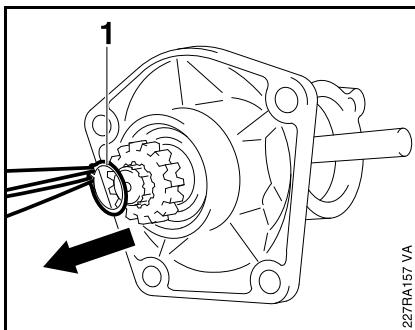
227RA150 VA

- Take out the screws (arrows).
- Remove the gearbox housing.



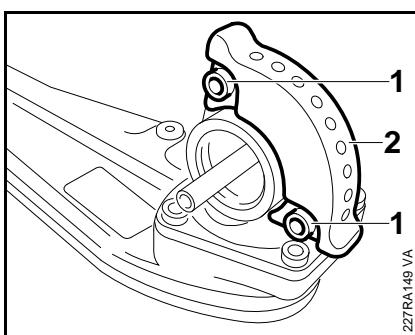
227RA148 VA

- Take O-ring (1) out of the groove in the gearbox housing (2).



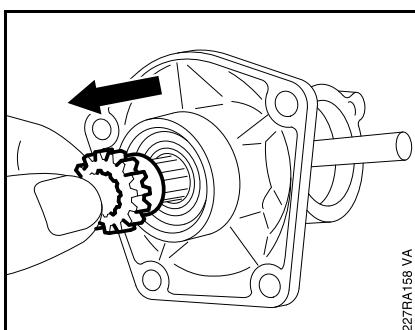
227RA157 VA

- Use pliers 0811 611 8200 to remove the circlip (1).



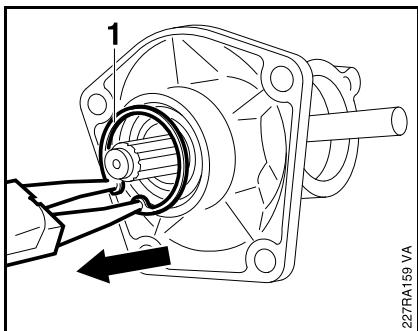
227RA149 VA

- Take out the screws (1) and remove the quadrant (2)



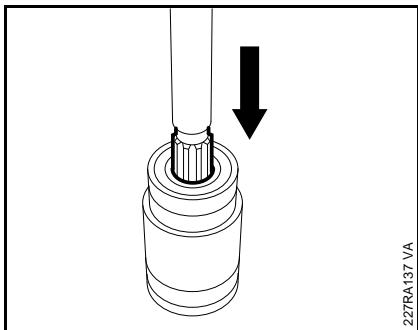
227RA158 VA

- Pull off the pinion (1).



227RA159 VA

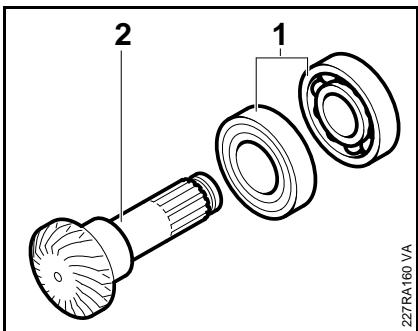
- Use pliers 0811 611 8200 to remove the circlip (1) from the housing groove.
- Take out the washer.
- Heat the gearbox housing to about 110...140°C and then remove the gearbox components at the input end by knocking the housing against a wooden base.
- If necessary, pull the bearing bushing out of the heated gearbox housing.



227RA137 VA

- Press the output pinion out of the ball bearings.
- Clean all parts and inspect them for serviceability.

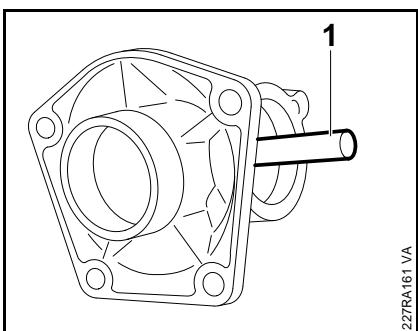
The drive pinion, double pinion and output pinion are available only as a matching set of pinions.



227RA160 VA

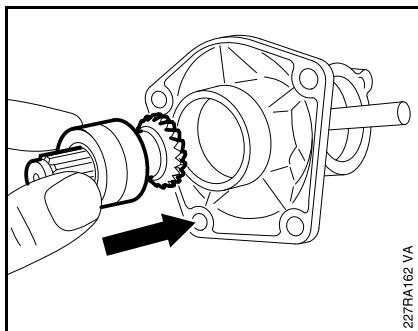
### Assembling

- Heat the ball bearings (1) at the output end to about 50°C and push them onto the drive pinion (2).
- The open sides of the ball bearings must face each other.
- Heat the gearbox housing to about 140°C.



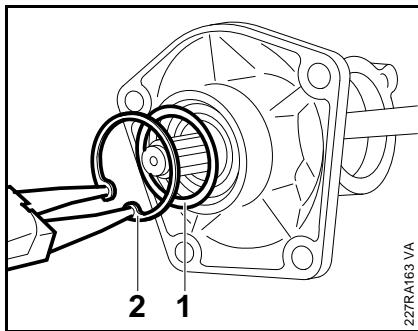
227RA161 VA

- If the bearing bushing (1) was removed, press it home as far as stop.



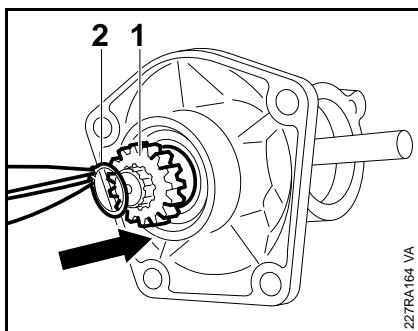
227RA162 VA

- Place the preassembled output pinion in position and press it home as far as stop.



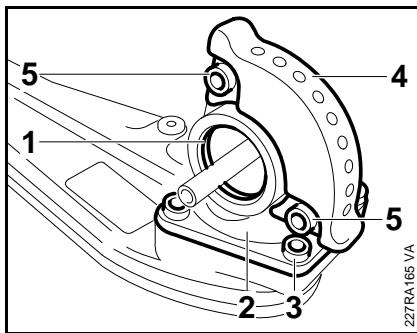
227RA163 VA

- Fit the washer (1).
- Fit the circlip (2) in the housing groove.

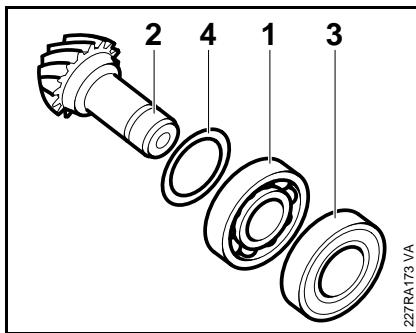


227RA164 VA

- Push on the pinion (1) and secure it with the circlip (2).



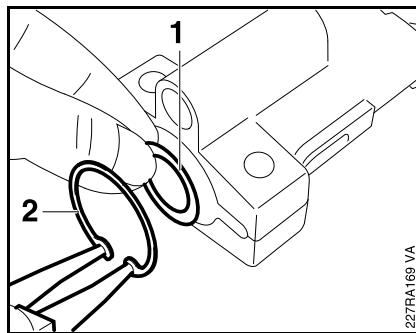
- Fit a new O-ring (1) in the housing groove.
- Place the gearbox housing (2) in position, insert all screws (3) and tighten them down firmly, 3.1
- Fit the quadrant (4), insert and tighten down the screws (5) firmly, 3.1



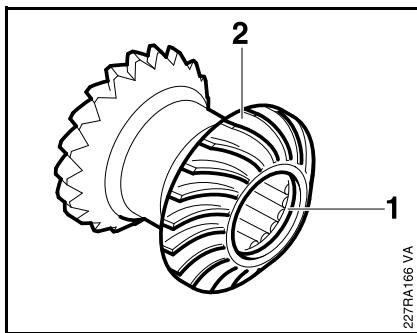
- Slip the washer (4), if fitted, over the pinion.

Washer is not required on a new set of pinions.

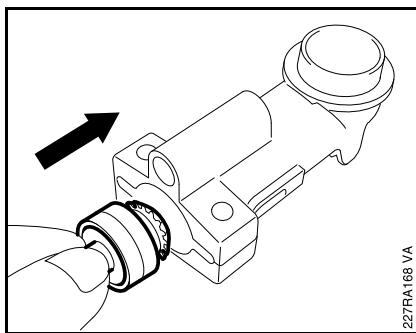
- Heat the ball bearings to about 50°C and push them onto the drive pinion.
- The open ball bearing (1) must be against the pinion (2) and the closed bearing (3) at the end with the groove for the circlip.
- Fit the circlip in the groove.
- Heat the gearbox housing to about 140°C to install the pinion.



- Fit the washer (1).
- Fit the circlip (2) in the housing groove.

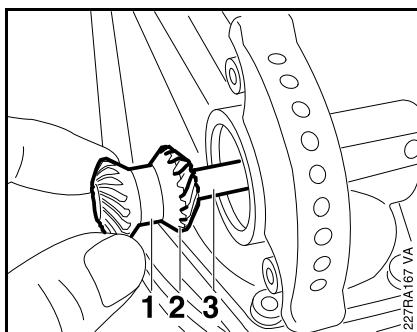


- Press home needle sleeves (1) at both ends of the double pinion (2) until they are recessed about 1 mm from the edge

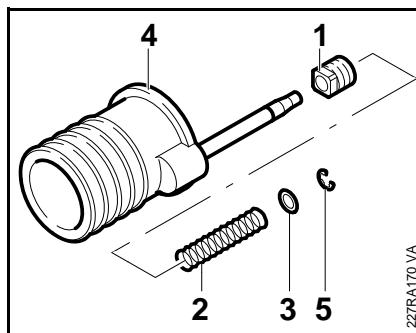


- Place the preassembled drive pinion in position and press it home as far as stop.

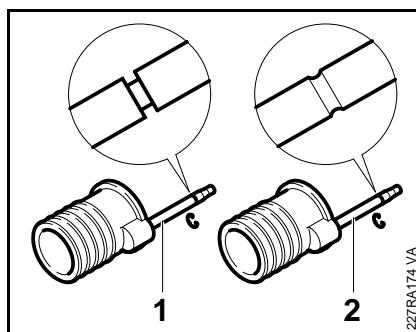
Check that the teeth of the pinions mesh properly.



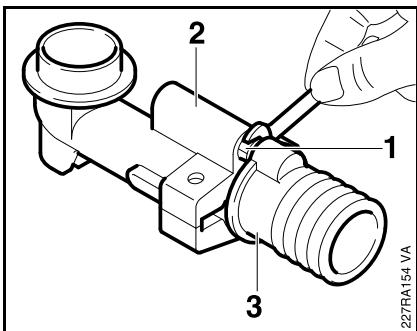
- Push the double pinion (1), large pinion (2) first, on to the bearing bushing (3).



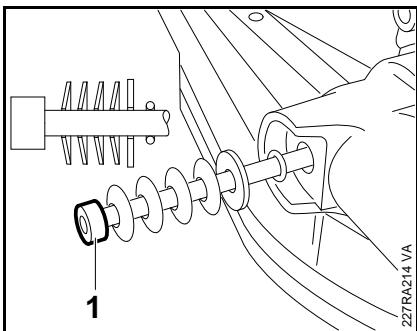
- If required, push the screw sleeve (1), spring (2) and washer (3) onto the locking pin on the lock housing (4) and secure with the snap ring (5).



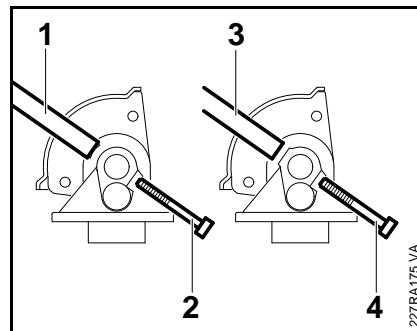
- Use 3.2 snap ring (DIN 6799) on original version of locking pin (1) and 5x0.8 snap ring (DIN 7993) on new version of locking pin (2).



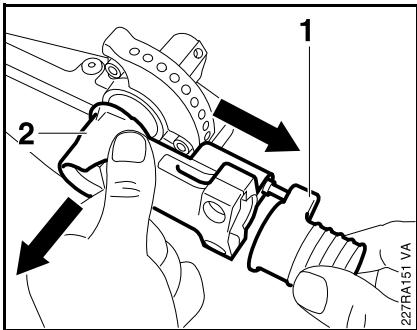
- Push the locking pin on lock housing (3) into the gearbox housing (2) and screw home the screw sleeve (1).



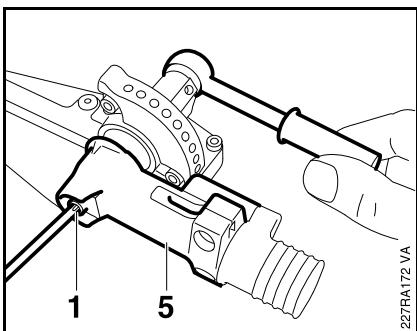
- Push the screw (1) into the gearbox housing and secure hand-tight.



- Install original version of adjusting lever (1) with M5x40 screw (2) or new version of adjusting lever (3) with M6x50 screw (4).



- Pull back the lock housing (1) and push home the gearbox housing (2) as far as stop.

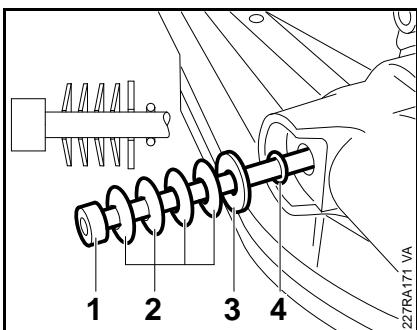


- Insert and tighten down the screw (1) firmly, **3.1**

Check that gearbox housing (5) is still adjustable.

- Fit the nut on the other end of the screw and tighten it down firmly (while counterholding the screw), **3.1**

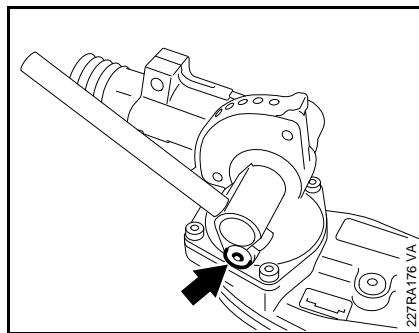
- Fit the cap on the screw head.



- Fit cup springs (2) (convex side against screw head), washer (3) and new O-ring (4) over the screw (1).

The new adjusting lever and the new gearbox housing have a flat mating surface.

- Fit the plug on the screw head.



- Remove the screw plug (arrow) from the gearbox housing and the fill the housing with grease.

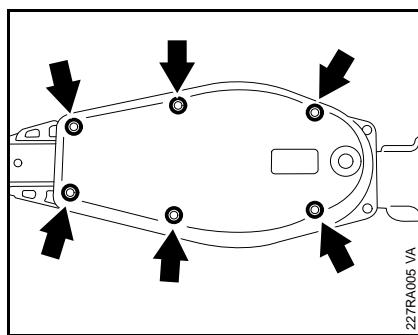
Use STIHL gear lubricant for lubrication of the bevel gear gearbox, **13**

- Screw the tube of grease into the hole.
- Fill the gearbox housing with grease, **3.3**

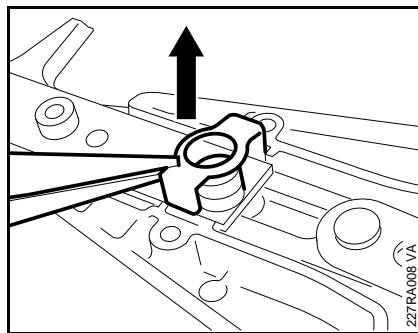
Top up with grease during maintenance work only if no grease is visible on the inside of the screw plug.

- Unscrew the tube of grease.
- Fit the screw plug, **3.1**
- Install the gearbox, **6.1.1**

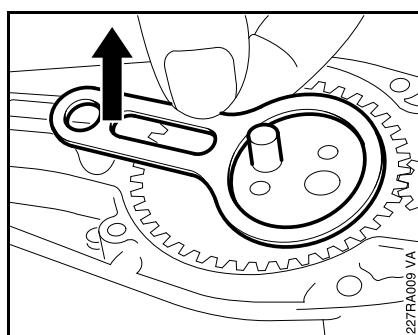
#### 6.7.4 Cutting Blades



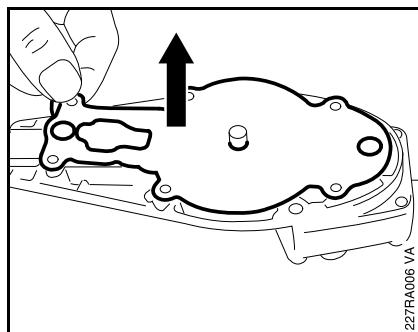
- Remove the gearbox, **6.1.1**
- Take out the screws (arrows).
- Remove the wear guard (FH only).
- Remove the gearbox cover.
- If necessary, pull the needle sleeve out of the gearbox cover.



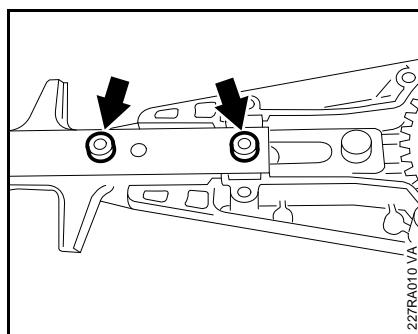
- Remove the seal.



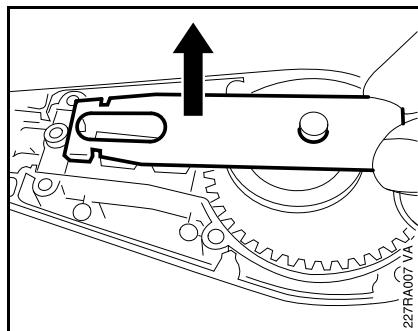
- Take the connecting rod off the spur gear and the pin on the blade.



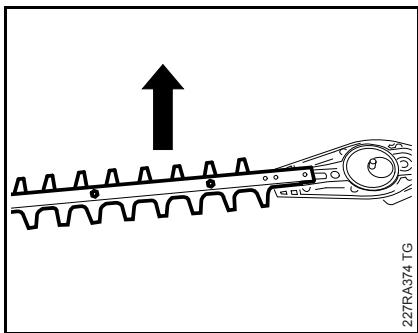
- Remove the gasket.



- Remove the screws (arrows) from the gearbox housing.

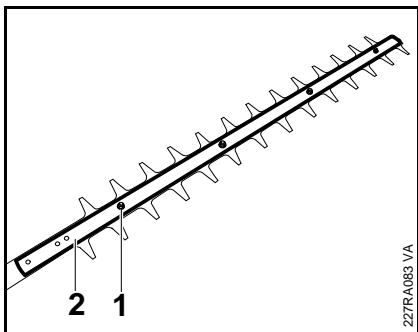


- Remove the thrust plate from the shaft.



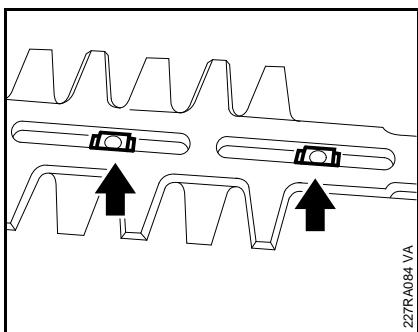
227RA374 TG

- Remove the cutting attachment.



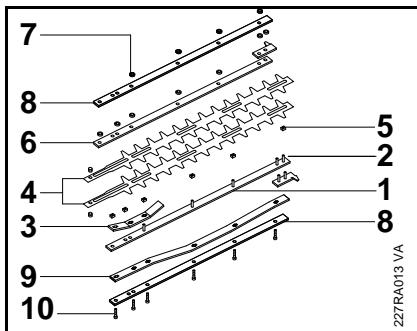
227RA083 VA

- Unscrew the nuts (1).
- Remove, if fitted, guard, guides (2) and flat spring.



227RA084 VA

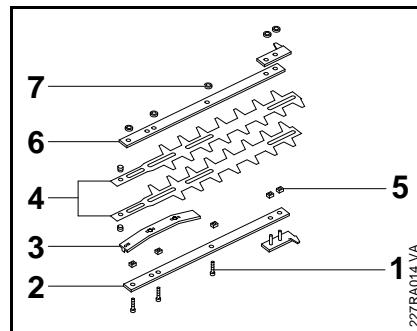
- Take out the sliders (arrows).
  - Separate the blades.
  - Reassemble in the reverse sequence.



227RA013 VA

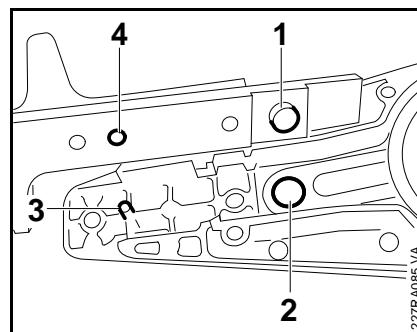
- Place the guide (1) on the workbench with the screw heads (2) facing down
- Fit the flat spring (3) (pockets facing up) on the screws.
- Put both blades (4) together with their cutting edges facing each other and locate them on the pockets.
- Place the sliders (5) in the pockets.
- Fit the second guide (6).
- Fit new locknuts (7) and tighten them down firmly,  
    **3.1**

The guide (8), flat spring (9) and screws (10) are only installed in older type cutting attachments.



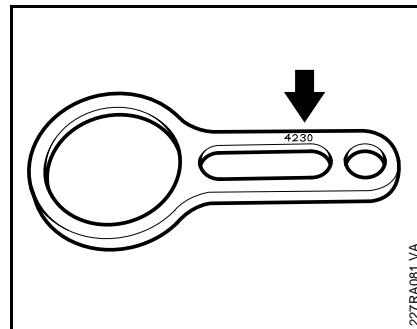
227RA014 VA

Assemble cutting blades for FH machines in the same way.



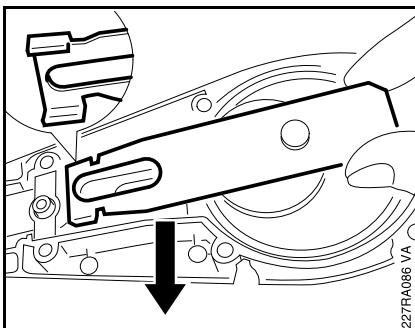
227RA085 VA

- The pin (1) must engage the bore (2) in the connecting rod.
- The peg (3) fits in the hole (4).

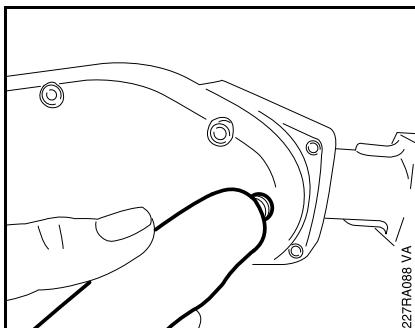


227RA081 VA

- Fit the connecting rod so that the marking (see arrow) faces the spur gear.

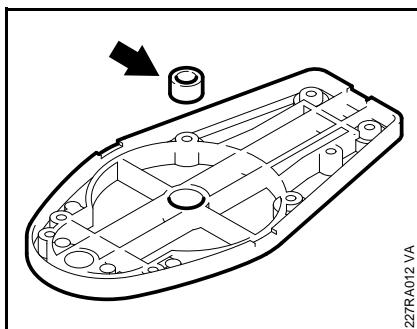


- Fit the thrust plate so that its bent corners face the connecting rod.
- Use a new gasket.



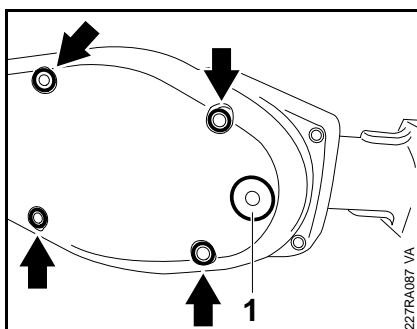
Use STIHL multipurpose grease for lubrication of the bevel gear gearbox, **13**

- Screw the tube of grease into the hole.
- Fill the gearbox housing with grease, **3.3**



- Push home the new needle sleeve (arrow) as far as stop.

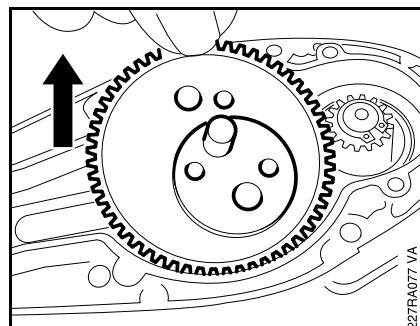
Note that a replacement gearbox cover comes with the needle sleeve already installed.



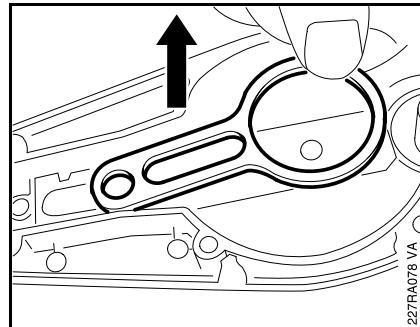
- Fit screws (arrows) in gearbox cover and tighten them down firmly, **3.1**
- Remove the screw plug (1) from the gearbox housing.

## 6.7.5 HL/FH

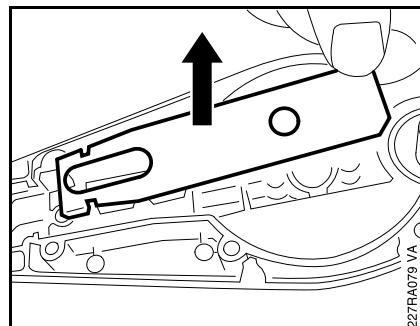
- Remove the cutting blades, **6.7.4**



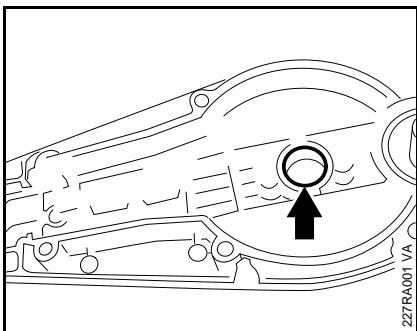
- Take the spur gear out of the gearbox housing.



- Take the connecting rod out of the gearbox housing.



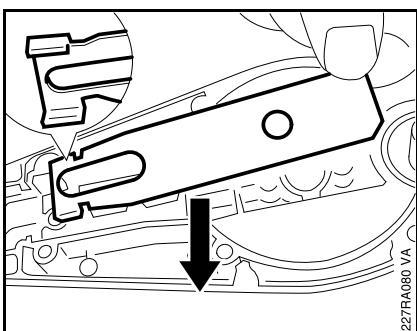
- Take the thrust plate out of the gearbox housing.



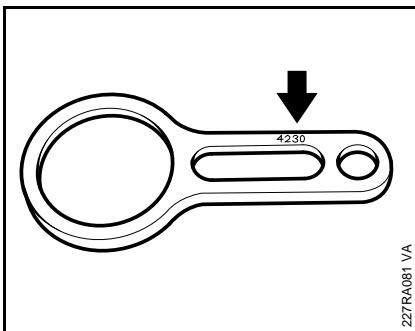
- Pull the needle sleeve (arrow) out of the gearbox housing.
  - Push home the new needle sleeve as far as stop.

Note that a replacement gearbox cover comes with the needle sleeve already installed.

- Reassemble in the reverse sequence.

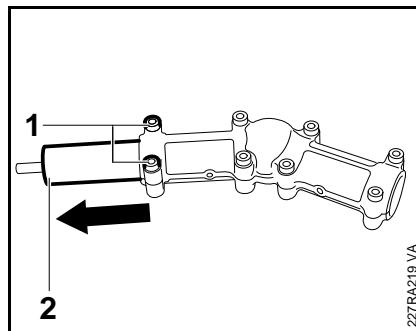


- Fit the thrust plate so that its bent corners face the connecting rod.



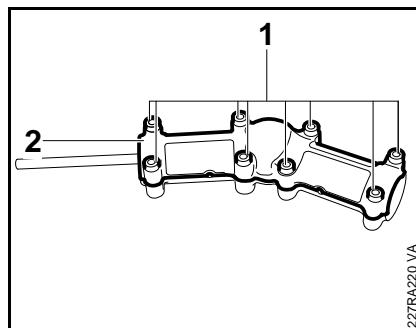
- Fit the connecting rod with the marking (see arrow) facing up.
  - Fit the spur gear with the chamfered side of the teeth facing the connecting rod.
  - Assemble all other parts in the reverse sequence.

### 6.7.6 Angle Drive (special accessory for HT, HL)



#### Disassembling

- Loosen the screws (1).
- Pull the drive tube (2) out of the angle drive.

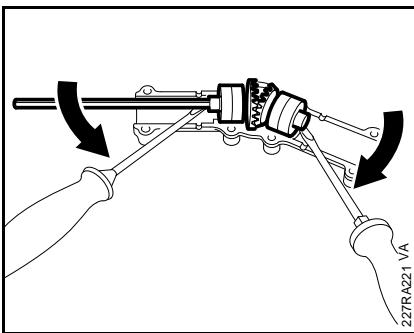


- Remove the screws (1).
- Separate the two halves of the gearbox housing (2).



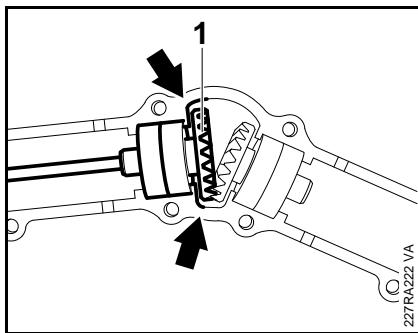
#### Removing

- Remove the cutting head, if fitted, [6.1.4](#)
- Remove the HL cutting head, if fitted, [6.1.1](#)
- Loosen the screws (1).
- Pull the angle drive off the drive tube.

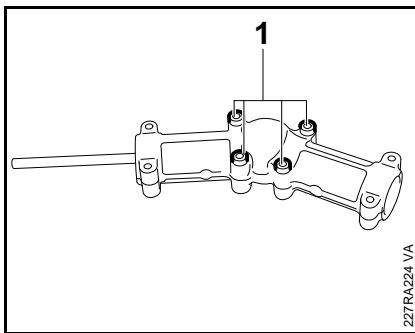


- Pry the pinions with ball bearings out of the gearbox housing.

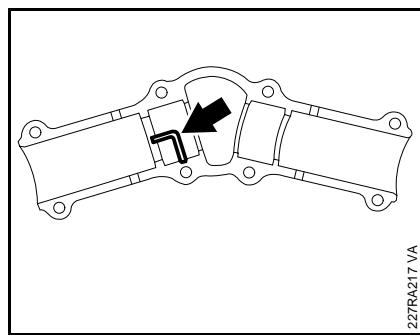
Replacement pinions are only supplied as a matching pair with preassembled ball bearings.



- Fill the recesses in the gearbox housing (arrows) with gear lubricant, **13**
- Note that the large pinion (1), with shaft and ball bearings, must be installed in the bearing shell with the vent channel.
- Fit the pinions in the gearbox housing.
- Check that the ball bearings are properly seated in the gearbox housing.



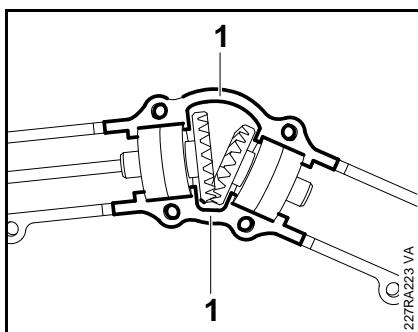
- Marry up the two halves of the angle drive housing.
- Fit screws (1), without washers, and tighten them down firmly in crosswise pattern, **3.1**



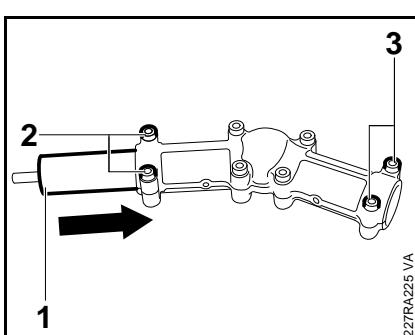
## Assembling

- Clean the two halves of the gearbox housing, **13**
- Clean the vent channel (arrow) in **both** halves of the gearbox housing, **13**

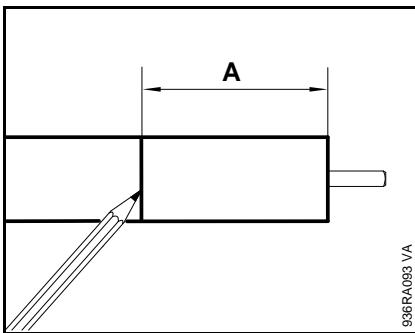
Use STIHL gear lubricant for lubrication of the bevel gear gearbox.



- Coat mating faces (1) with Dirk sealant, **13**

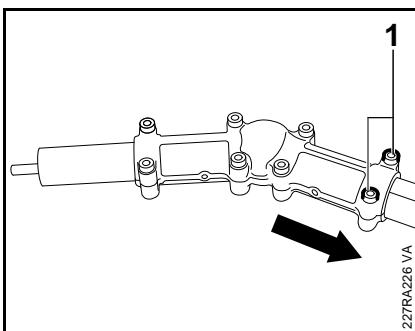


- Push short drive tube (1) into angle drive housing as far as stop.
- Fit the screws (2) with washers and tighten them down in an alternate pattern, **3.1**
- Fit screws (3) with washers but do not tighten down yet.



### Installing

- Apply a mark to the end of the long drive tube (from powerhead) at distance "A" = 50 mm.



- 30° Push the 30° angle drive onto the drive tube as far as stop. Turn the angle drive back and forth during this process until the square end of the shaft engages properly.

The 30° angle drive is correctly fitted when the edge of the housing reaches or covers the mark on the drive tube.

- Moderately tighten the screws (1) alternately first, then finally tighten to the specified torque,  
    3.1

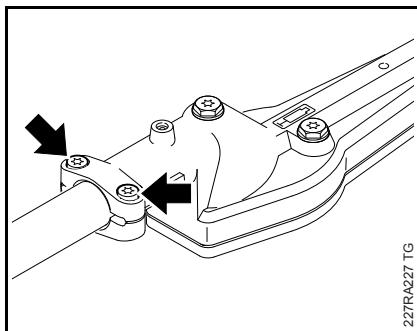
- Mount the cutting head, 6.1.4

## 7. Gearbox (new versions)

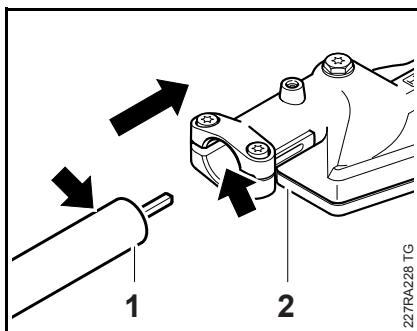
### 7.1 Removing and Installing

#### 7.1.1 HL 0°

##### Removing

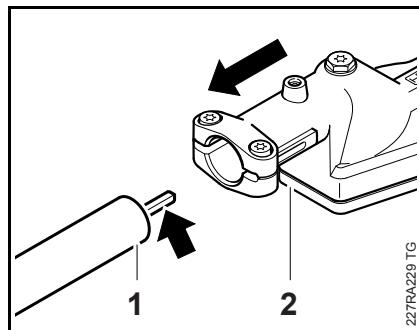


- Fit the blade guard over the cutting attachment.
- Loosen the screws (arrows).

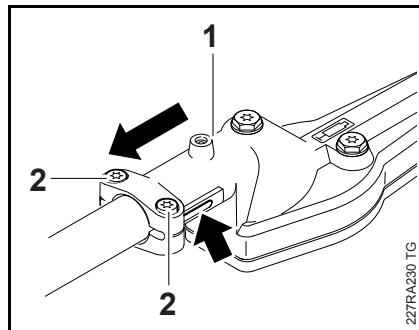


- Pull the gearbox (2) off the drive tube (1).
- Degrease clamp mounting areas (arrows), **13**

##### Installing



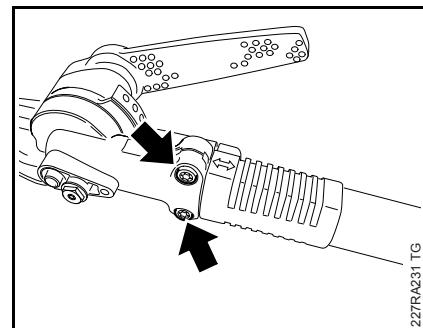
- Push the gearbox (2) onto the drive tube (1) – turn the gearbox (2) back and forth at the same time until the square end of the drive shaft (arrow) engages the square socket in the gearbox



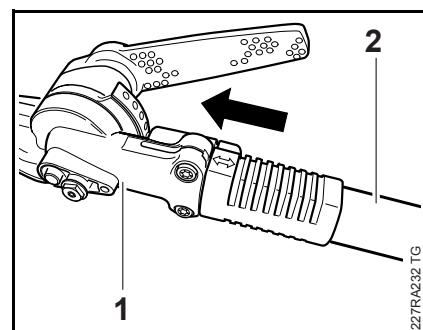
- Push the gearbox (1) on as far as stop and line it up.
- The end of the tube must not be visible in the clamp's slot (arrow).
- Tighten down the screws (2) firmly.
- Tightening torques, **3.1**

#### 7.1.2 HL 135°

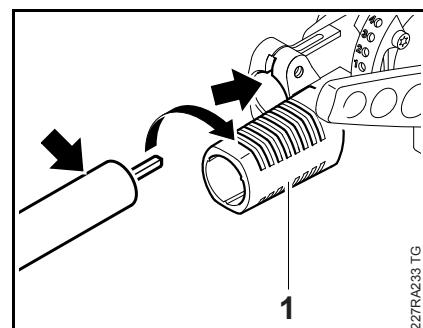
##### Removing



- Fit the blade guard over the cutting attachment.
- Loosen the screws (arrows).

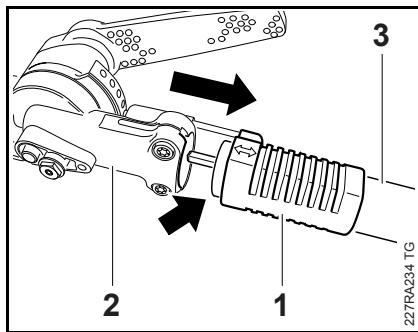


- Pull the gearbox (1) off the drive tube (2).

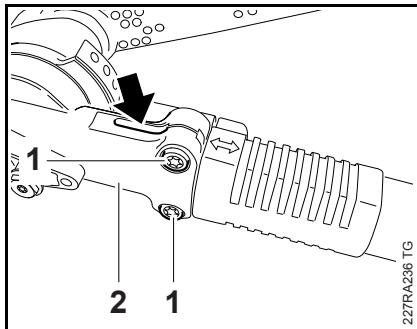


- Turn the sleeve (1) to one side.
- Degrease clamp mounting areas (arrows), **13**

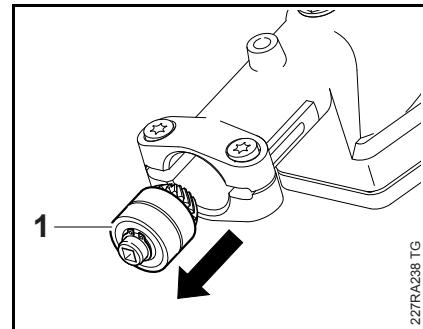
## Installing



- Line up the bore in the sleeve (1) with bore in the gearbox.
- Push the gearbox (2) onto the drive tube (3) through the sleeve (1). Pull back the sleeve (1) a little at the same time and position the gearbox on the drive tube (arrow).

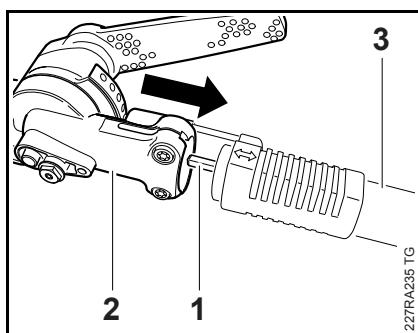


- Push the gearbox (2) on as far as stop and line it up.
- The end of the tube must not be visible in the clamp's slot (arrow).
- Tighten down the screws (1) firmly.
- Tightening torques, **3.1**



- Heat the gearbox housing to about 110...140°C and then remove the gearbox components (1) at the input end by knocking the housing against a wooden base.

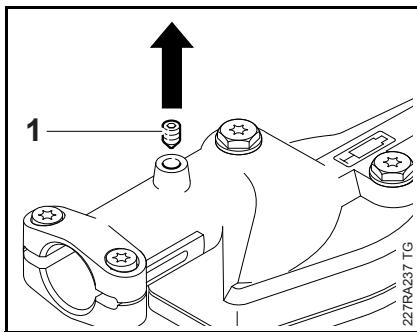
This operation must be carried out quickly because the outer bearing races will otherwise absorb heat and expand.



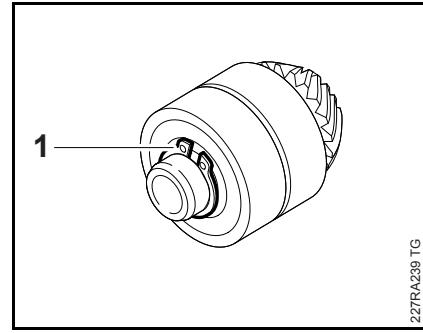
- Push the gearbox (2) onto the drive tube (1) – turn the gearbox (2) back and forth at the same time until the square end (1) of the drive shaft engages the square socket in the gearbox.

## 7.2 Disassembling the HL 0° Gearbox

### 7.2.1 Disassembling the Input Pinion



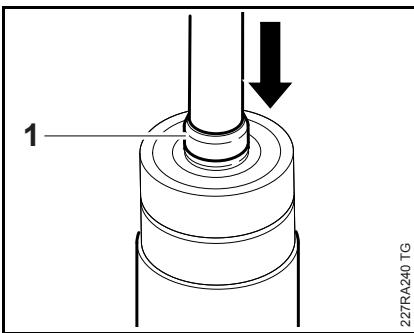
- Remove the gearbox, **6.2**
- Take out the grub screw (1).
- Wear protective gloves.



- Inspect the pinion, if damaged, replace the input and output pinions.

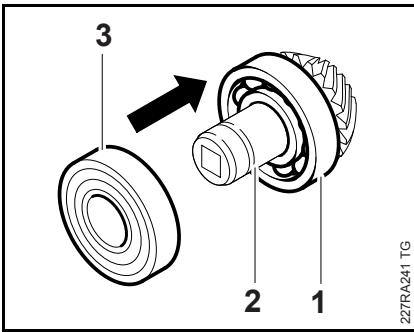
New pinions come preassembled.

- Remove the circlip (1).



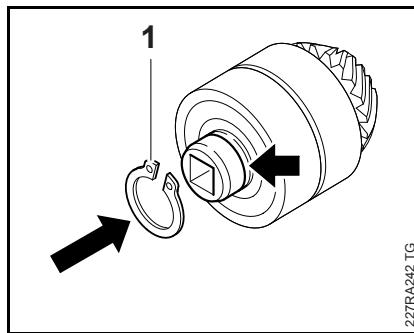
- Support the input pinion (1) on the outer bearing race and press it out of the ball bearings.

## Assembling

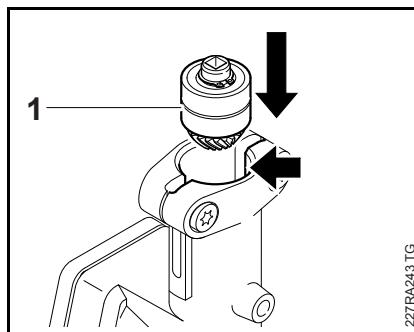


- Heat the new ball bearings to about 50°C and push them onto the input pinion.
- Push the open ball bearing (1) onto the input pinion (2) as far as stop first, then push on the closed ball bearing (3), open side facing the pinion, until it butts against the first bearing.

This operation must be carried out quickly because the inner bearing races will otherwise absorb heat and expand.

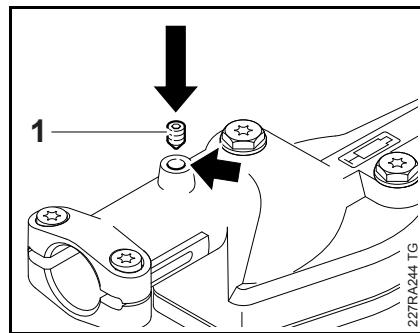


- The closed side of the ball bearing must face the circlip.
- Fit the circlip (1) and make sure it is properly seated in the groove (arrow).



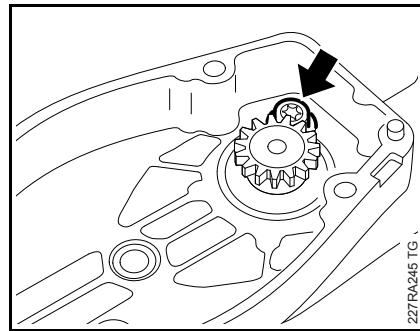
- Heat the gearbox housing to about 110 – 140°C and push preassembled input pinion (1) into the bore (arrow) as far as stop.

This operation must be carried out quickly because the outer bearing races will otherwise absorb heat and expand.

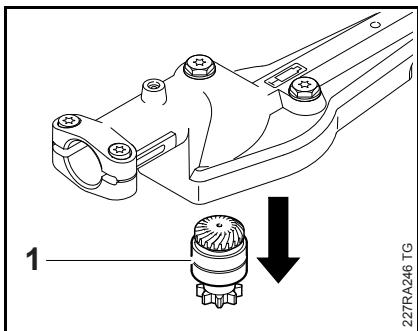


- Insert the grub screw (1) in the bore (arrow) and tighten it down as far as stop.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.1**
- Lubricate the gearbox, **7.4**

### 7.2.2 Disassembling the Output Pinion

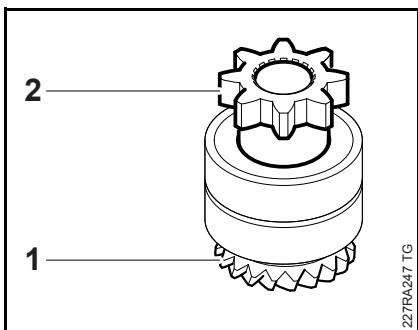


- Remove the blade drive gear, **7.2.3**
- Take out the lock screw (arrow) and remove the washer.



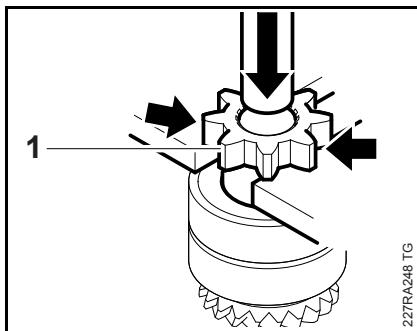
- Wear protective gloves.
- Heat the gearbox housing to about 110...140°C and then remove the gearbox components (1) at the output end by knocking the housing against a wooden base.

This operation must be carried out quickly because the outer bearing races will otherwise absorb heat and expand.

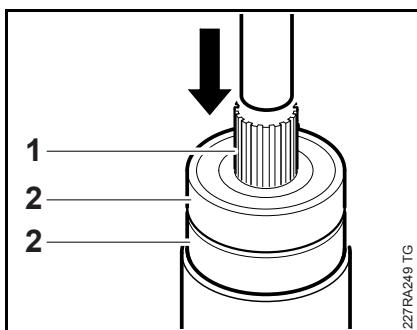


- Inspect the pinion (1); if damaged, replace the input and output pinions, [7.2.1](#)
- Inspect the spur gear (2). If it is damaged, replace it together with the spur gear in the blade drive gearbox, [7.2.3](#)

New pinions come preassembled.

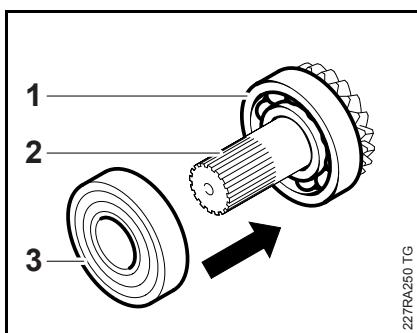


- Support the spur gear (1) by its teeth (arrows) and press out the output pinion.



- Support the output pinion (1) on the outer bearing race and press it out of the ball bearings (2).

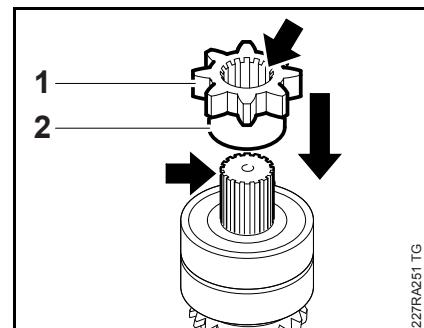
### Assembling



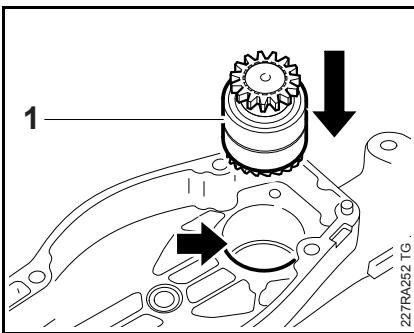
- Heat new ball bearings to about 50°C

- Push the open ball bearing (1) onto the input pinion (2) as far as stop first, then push on the closed ball bearing (3) – closed side must face spur gear.

This operation must be carried out quickly because the inner bearing races will otherwise absorb heat and expand.

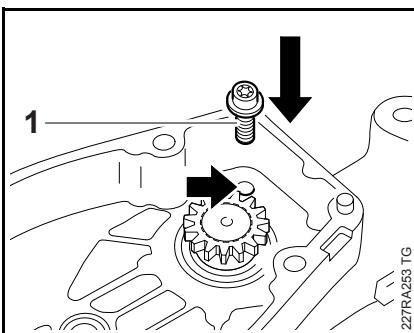


- Collar (2) of spur gear (1) must face the ball bearing.
- Place the spur gear (1) in position – the splines (arrows) must mesh.
- Press spur gear (1) onto the output pinion as far as stop.



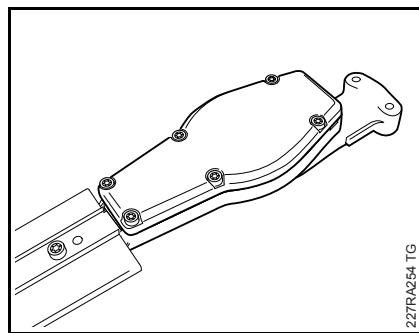
- Heat the gearbox housing to about 110 – 140°C and push preassembled output pinion (1) into the bore (arrow) as far as stop.

This operation must be carried out quickly because the outer bearing races will otherwise absorb heat and expand.

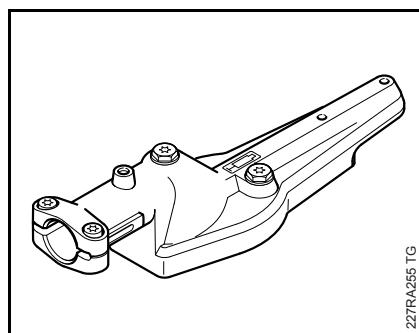


- Insert screw (1) with washer in the bore (arrow) and tighten down firmly.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, [7.1](#)
- Lubricate the gearbox, [7.4](#)

### 7.2.3 Blade Drive Gear

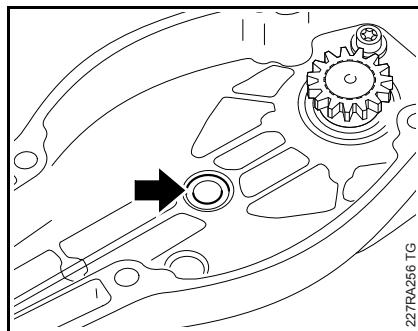


- Remove the cutting attachment, [7.5.1](#)
- Remove the spur gear with connecting rod, [7.3.4](#)



- Check and clean the gearbox housing and replace if necessary.

If new gearbox housing is installed, transfer input and output pinions from original gearbox housing – providing they are serviceable.



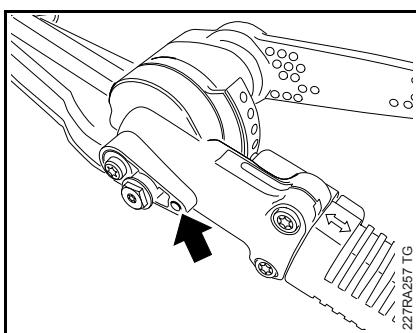
- Check the needle bearing (arrow) and replace if necessary

Do not reuse needle bearings after removal – always install new bearings.

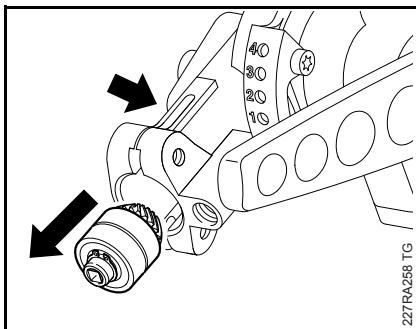
- Check the needle bearing in the gearbox cover and replace if necessary, [7.5.1](#)
- Install the spur gear with connecting rod, [7.3.4](#)
- Install the cutting attachment, [7.5.1](#)
- Reassemble all other parts in the reverse sequence.
- Tightening torques, [7.1](#)
- Lubricate the gearbox, [7.4](#)

## 7.3 Disassembling HL 135° Gearbox

### 7.3.1 Input Pinion



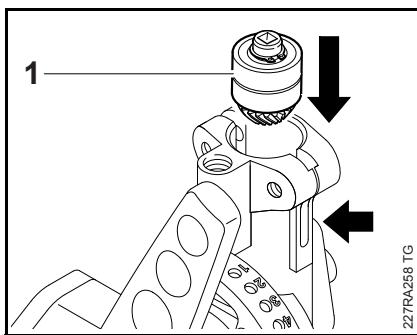
- Remove the gearbox, **7.1.2**
- Remove the lock mechanism, **7.3.6**
- Take out the grub screw (arrow).
- Wear protective gloves.



- Heat the gearbox housing in area of bearing seat (arrow) to about 110 – 140°C and remove the components from the input end by knocking the housing against a wooden base.

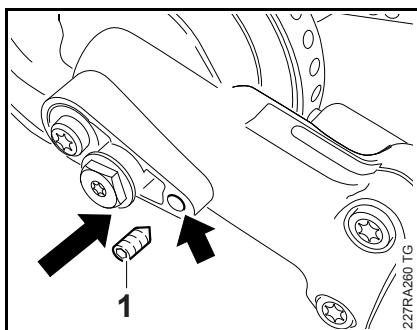
This operation must be carried out quickly because the outer bearing races will otherwise absorb heat and expand.

- Disassemble the input pinion, **7.2.1**



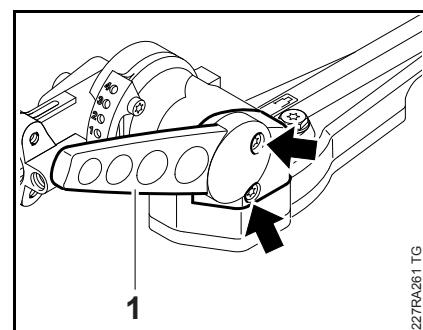
- Heat the gearbox housing in the area of the bearing seat (arrow) to about 110 – 140°C and push the preassembled input pinion (1) into the bore as far as stop.

This operation must be carried out quickly because the outer bearing races will otherwise absorb heat and expand.

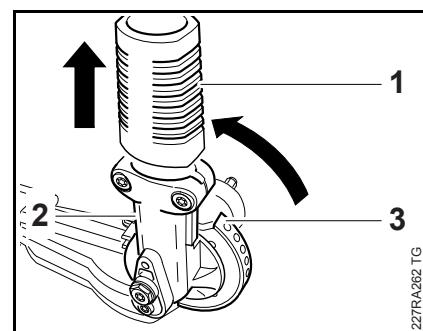


- Insert the grub screw (1) in the bore (arrow) and tighten it down as far as stop.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.1**
- Lubricate the gearbox, **7.4**

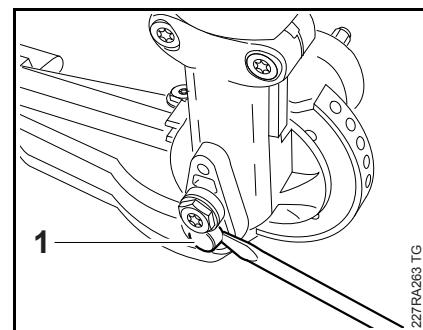
## 7.3.2 Output Pinion in Angle Drive



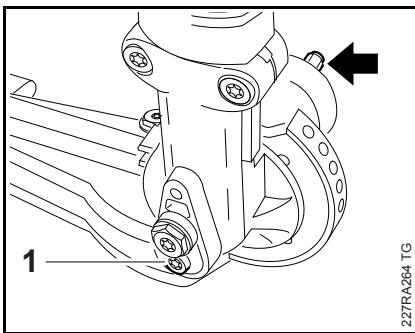
- Take out the screws (arrows).
- Remove the adjusting lever (1).



- Pull back the sleeve (1) and rotate gear housing (2) in direction of transport position until lock pin is clear of the quadrant (3).



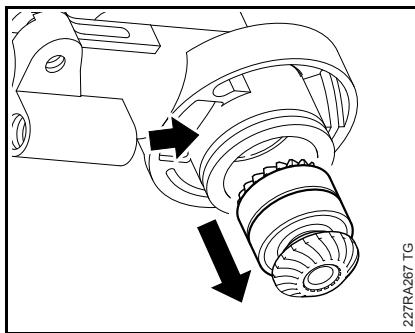
- Pry off the cap (1).



- Take out the screw (1) while counterholding the nut (arrow).
- Pull out the screw (1) with cup springs, washer and sealing ring.

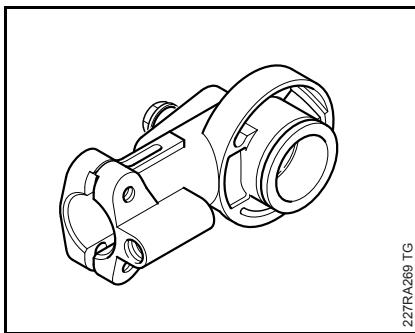
Always install new sealing rings.

227RA264 TG



- Heat the gearbox housing in area of bearing seat (arrow) to about 110 – 140°C and remove the components from the output end by knocking the housing against a wooden base.

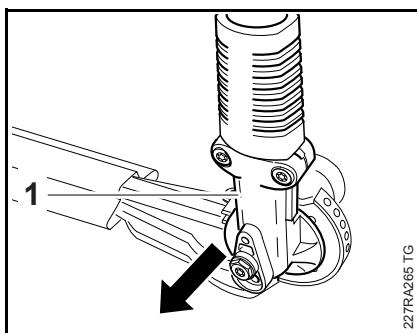
227RA267 TG



227RA269 TG

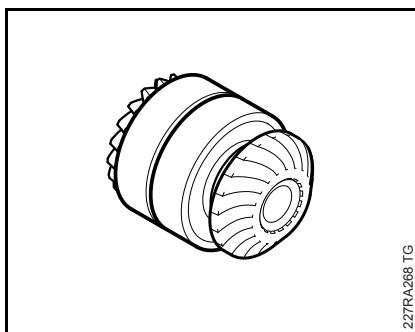
- Check the gearbox housing and replace if necessary.

If a new gearbox housing is installed, transfer the input pinion from original housing – providing it is serviceable.



227RA265 TG

- Pull out angle drive (1) – turn it back and forth at the same time.
- Wear protective gloves.

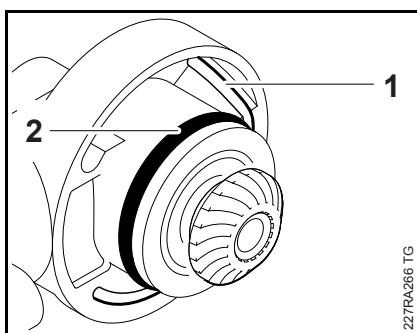


227RA268 TG

- Inspect the pinion, if damaged, replace the input and output pinions.

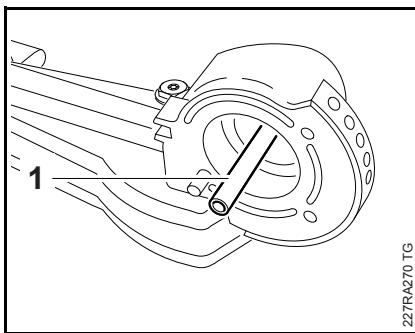
If the output pinion to the blade drive gear is damaged, also install a new output pinion in the blade drive gear.

New output pinions are supplied fully assembled, i.e. no disassembly work is necessary.



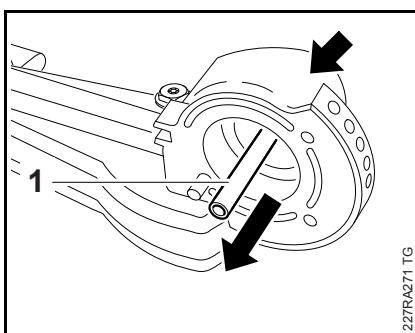
227RA266 TG

- Remove the clip (1) and sealing ring (2).



227RA270 TG

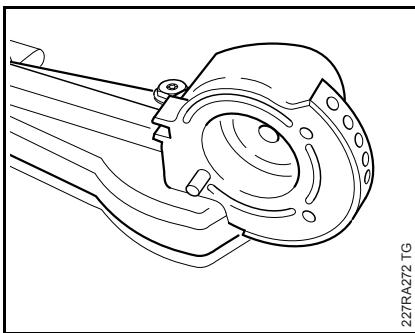
- Check the bearing bushing (1) and replace it if necessary



227RA271 TG

- Heat the gearbox housing in the area of the bearing bushing (arrow) to about 110 – 140°C and pull out the bearing bushing (1).

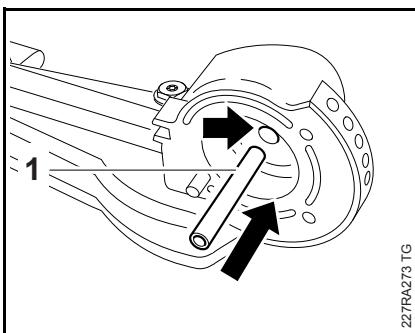
This operation must be carried out quickly because the bearing bushing will otherwise absorb heat and expand.



227RA272 TG

- Check the gearbox housing and replace if necessary.

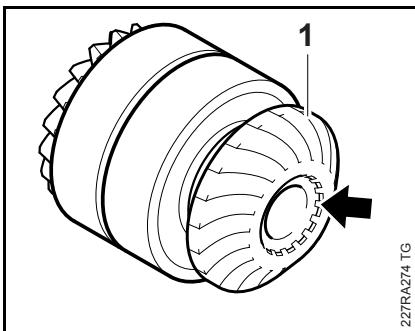
If a new gearbox housing is installed, transfer the bearing bushing, blade drive, blade drive gear lock, quadrant and cutting attachment from the original gearbox housing  
– providing they are serviceable.



227RA273 TG

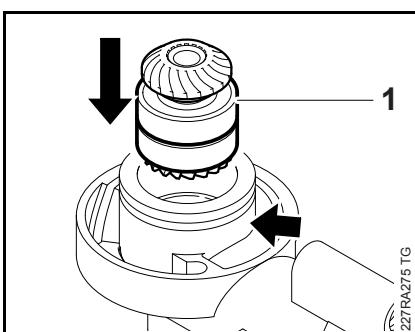
- Heat the gearbox housing in the area of the bearing bushing to about 110 – 140°C and push the bearing bushing (1) into the bore (arrow) as far as stop.

This operation must be carried out quickly because the bearing bushing will otherwise absorb heat and expand.



227RA274 TG

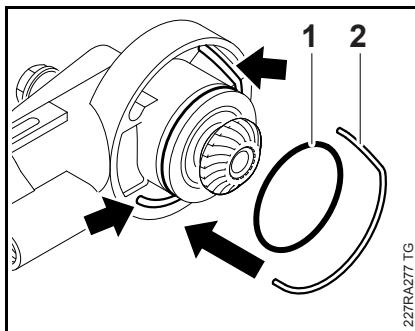
- Position the output pinion (1) so that its internal teeth (arrow) point towards the blade drive.



227RA275 TG

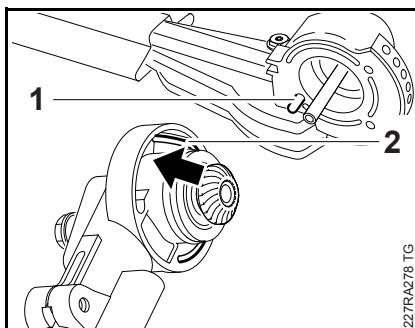
- Heat the gearbox housing in the area of the bearing seat (arrow) to about 110 – 140°C and push the preassembled input pinion (1) into the bore as far as stop.

This operation must be carried out quickly because the outer bearing races will otherwise absorb heat and expand.



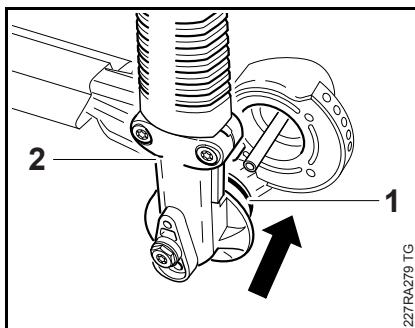
227RA277 TG

- Install a new sealing ring (1).
- Check the clip (2) and replace it if necessary
- Push the clip (2) into its seat (arrow) as far as stop.



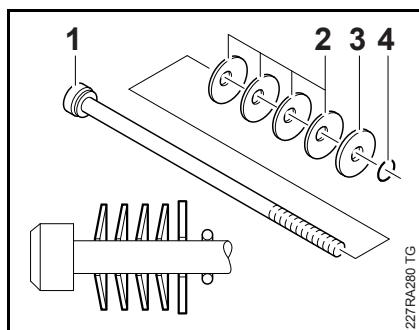
227RA278 TG

- To ensure that the thrust pin (1) does not push out the clip (2) when you install the gearbox housing, position the housing so that the thrust pin is in line with the recess (arrow).

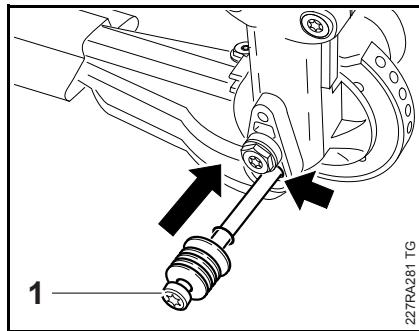


227RA279 TG

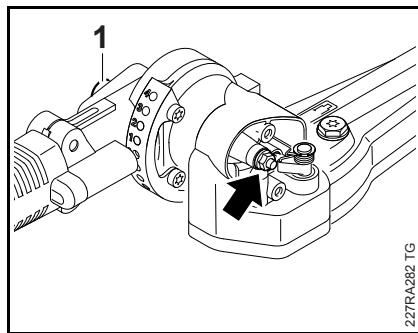
- Apply thin coating of grease to the sealing ring (1).
- Push on the gearbox housing (2) as far as stop – turning it back and forth at the same time.



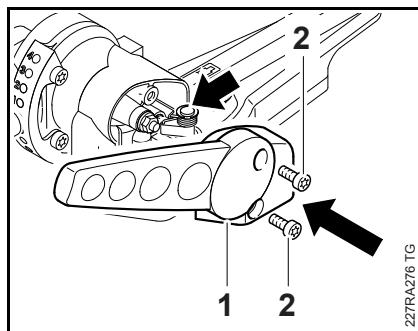
- Check the individual parts and replace as necessary.
- Fit the cup springs (2) on the screw with their convex side facing the screw head (1).
- Fit the washer (3) and sealing ring (4).



- Push the preassembled screw (1) into the hole (arrow).
- Tighten it down firmly – but make sure the gearbox housing can still be moved.

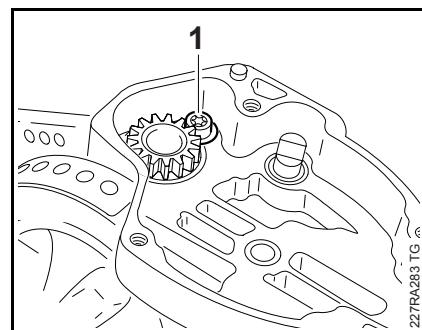


- Maintain the setting of the screw (1), fit a new locknut (arrow) and tighten it down firmly.
- Check operation and turn gearbox housing until locking mechanism engages the quadrant.

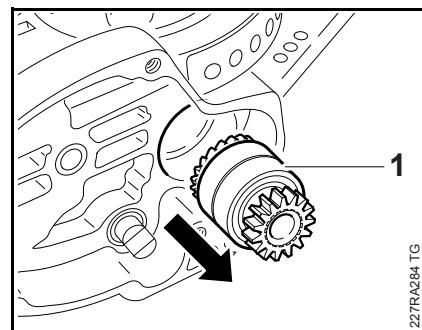


- Check the blade gear lock and replace if necessary, **7.3.5**
- Make sure the torsion spring (arrow) is properly seated and place the adjusting lever (1) in position.
- Check operation of blade gear lock, **7.3.5**
- Insert and tighten down the screws (2) firmly.
- Lubricate the gearbox, **7.4**
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.1**

### 7.3.3 Output Pinion in Blade Drive Gear

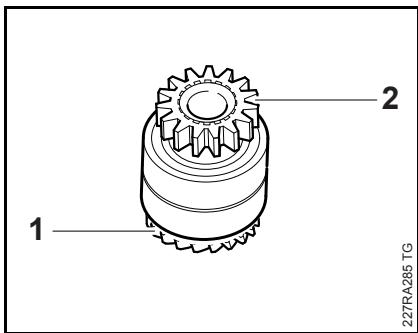


- Remove the blade drive gear, **7.3.4**
- Take out the lock screw (1) and remove the washer.



- Wear protective gloves.
- Heat the gearbox housing to about 110...140°C and then remove the gearbox components (1) at the output end by knocking the housing against a wooden base.

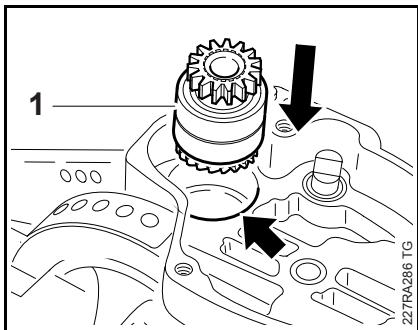
This operation must be carried out quickly because the outer bearing races will otherwise absorb heat and expand.



- Inspect the pinion (1). If it is damaged, it must be replaced together with output pinion in the angle drive – also check input end and replace input pinion if necessary, **7.3.1**
- Inspect the spur gear (2). If it is damaged, replace it together with the spur gear in the blade drive gearbox, **7.2.3**

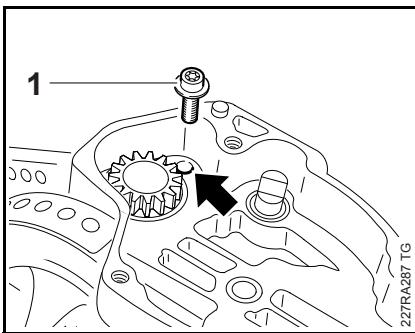
New pinions come completely preassembled.

### Assembling



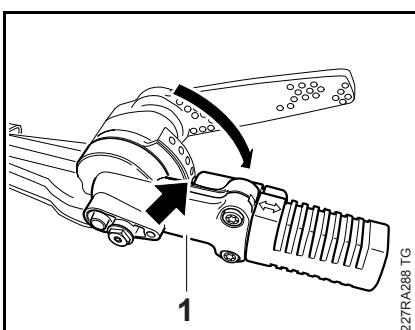
- Heat the gearbox housing to about 110 – 140°C and push preassembled output pinion (1) into the bore (arrow) as far as stop.

This operation must be carried out quickly because the outer bearing races will otherwise absorb heat and expand.

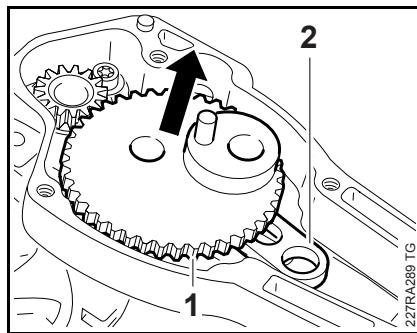


- Insert screw (1) with washer in the bore (arrow) and tighten down firmly.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.1**
- Lubricate the gearbox, **7.4**
- Check blade drive gear lock, **7.3.5**

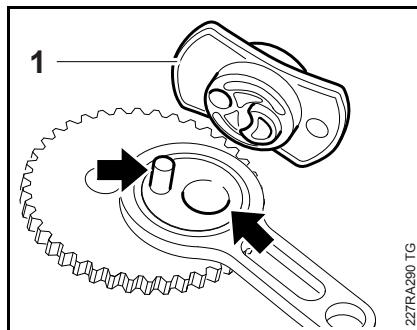
### 7.3.4 Blade Drive Gear



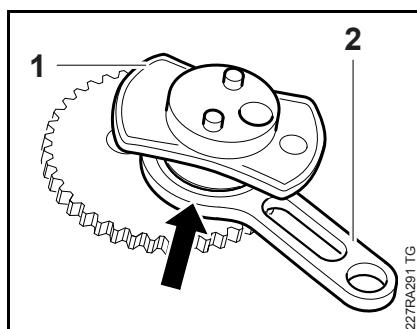
- Set angle drive (1) to position “0” (arrow)
  - blade drive gear lock is disengaged.



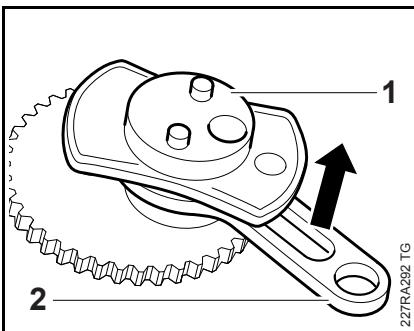
- Remove the cutting attachment, **7.5.2**
- Remove spur gear (1) with connecting rod (2).



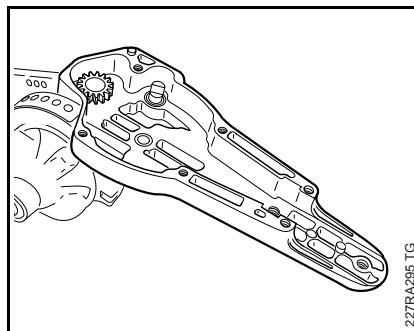
- Turn over the spur gear with connecting rod.
- Position service tool (1) 4237 890 2200 on peg and in bore (arrows) of spur gear.



- Position service tool (1) 4237 890 2200 against the spur gear and push the connecting rod (2) onto the service tool.

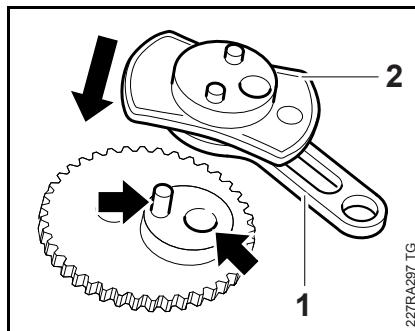


- Remove the connecting rod (2) with service tool (1) from the spur gear.

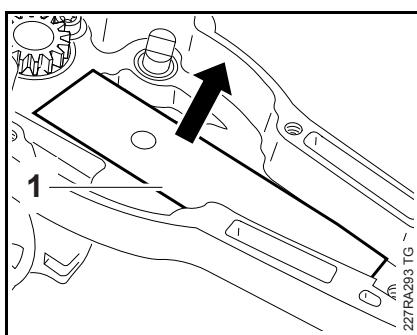


- Check and clean the gearbox housing and replace if necessary.

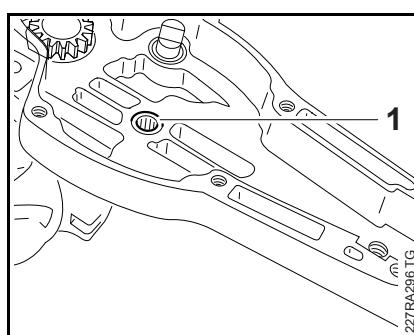
If a new gearbox housing is installed, transfer the bearing bushing, angle drive, output pinion and blade drive gear lock from the original gearbox housing – providing they are serviceable.



- Position lower connecting rod (1) with service tool (2) 4237 890 2200 on peg and in bore (arrows).



- Remove the thrust plate (1).



Apply a little grease to the thrust plate (1) so that it sticks to the connecting rod.

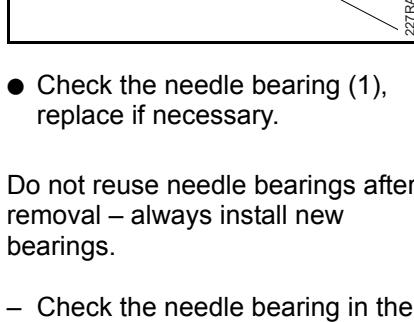
- Check the needle bearing (1), replace if necessary.

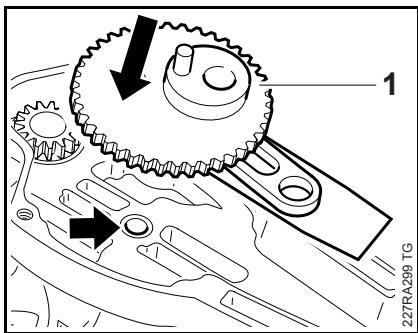
Do not reuse needle bearings after removal – always install new bearings.

- Check the needle bearing in the gearbox cover and replace if necessary, 7.5.2

- Inspect the spur gear (1), thrust plate (2) and connecting rod (3), and replace if necessary.

As the spur gear and input pinion mesh with each other, always replace both components as a matching pair in the case of damage.





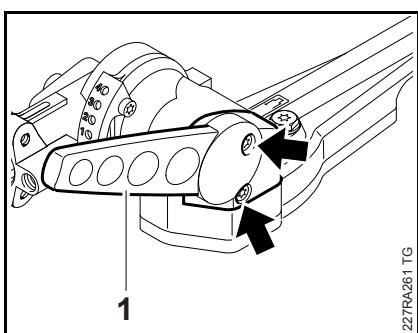
- Remove the service tool and turn over the spur gear with connecting rod and thrust plate.
- Carefully position the spur gear (1) with connecting rod and thrust plate in the gearbox housing. The peg on the spur gear must engage the needle bearing (arrow).

Make sure the connecting rod does not slip off the spur gear because the needles might otherwise fall out of the bearing.

- Install the cutting attachment, **7.5.2**
- Tightening torques, **3.1**
- Lubricate the gearbox, **7.4**
- Check operation of blade drive gear lock, **7.3.5**

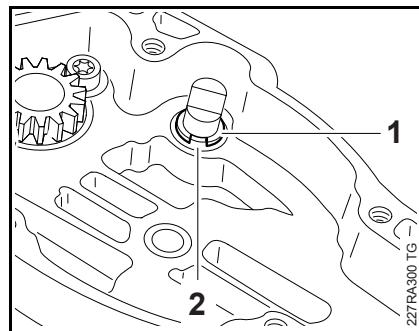
### 7.3.5 Blade Drive Gear Lock

#### Cam pin

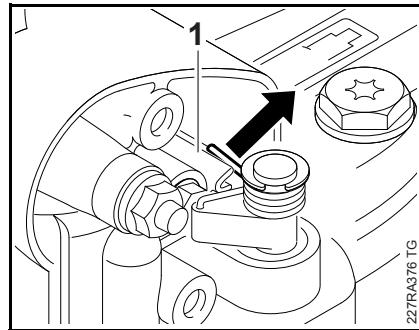


- Take out the screws (arrows).
- Remove the adjusting lever (1).

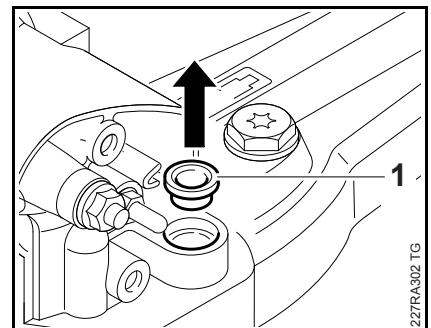
- Remove the blade drive gear, **7.3.4**



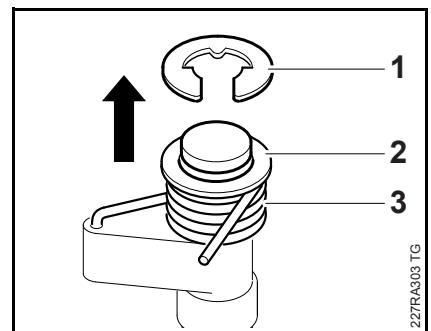
- Remove the retaining ring (1).
- Remove the washer (2).



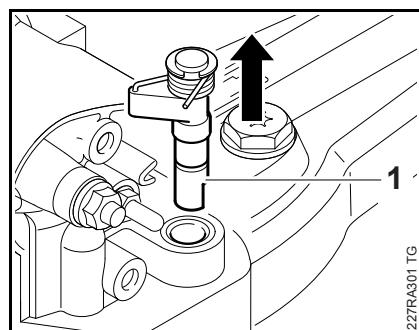
- Pry the leg of the spring out of its seat (1).



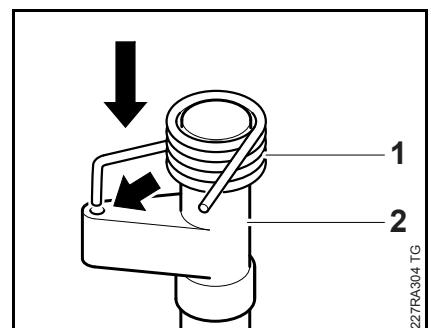
- Pull out the bushing (1), check it and replace if necessary.
- Install in the reverse sequence.



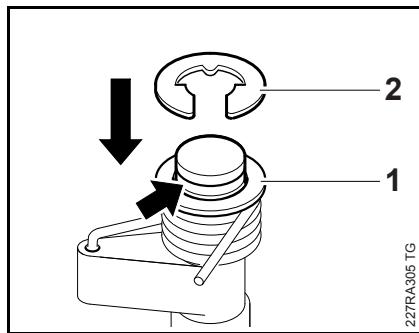
- Remove the E-clip (1).
- Remove the washer (2) and torsion spring (3).
- Check the individual parts and replace as necessary.



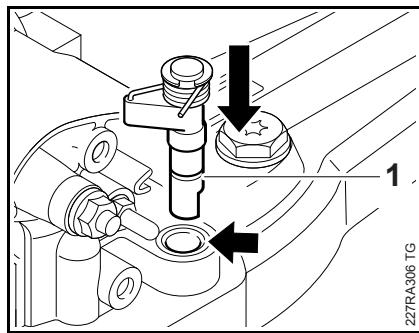
- Pull out the cam pin (1).



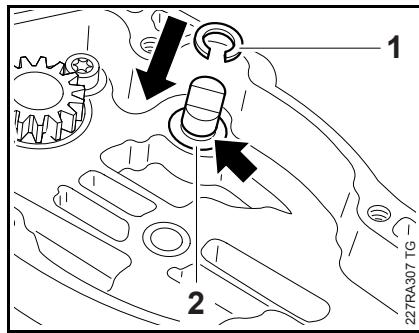
- Push the torsion spring (1) onto the cam pin (2) and engage it in the bore (arrow).



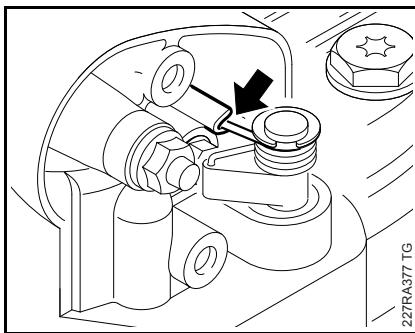
- Fit the washer (1).
- Fit the E-clip (2) and make sure it is properly seated in the groove (arrow).



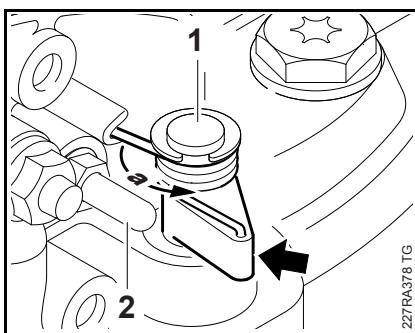
- Push the preassembled cam pin (1) into the housing bore (arrow).



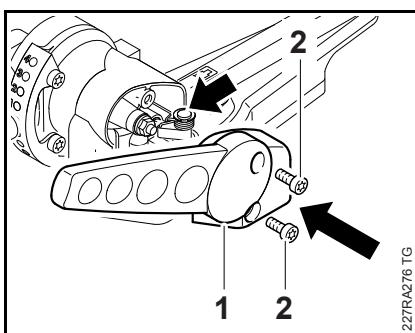
- Hold the cam pin in position and turn the gearbox housing over.
- Fit the washer (1).
- Fit the E-clip (2) and make sure it is properly seated in the groove (arrow).



- Engage the leg of the spring in its seat (arrow) – torsion spring is now preloaded.



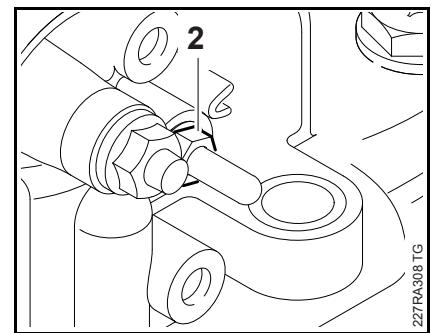
- Check operation of cam pin.
- Rotate the cam pin (1) counterclockwise,  $a = \text{max } 100^\circ$
- Let go of the cam pin – the cam lobe (arrow) must butt against the thrust pin (2).



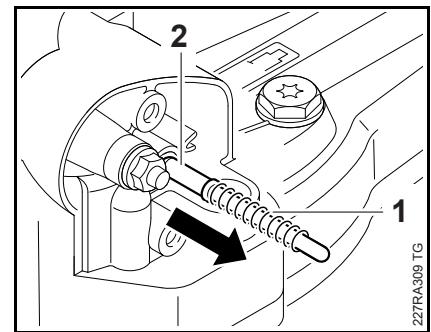
- Make sure the torsion spring (arrow) is properly seated and place the adjusting lever (1) in position.

- Insert and tighten down the screws (2) firmly.
- Check operation of blade gear lock, **7.3.5**
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **3.1**
- Lubricate the gearbox, **7.4**

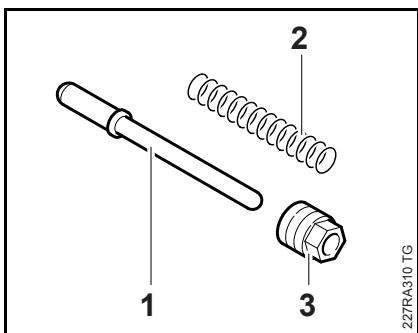
### Thrust pin



- Remove the adjusting lever, **7.3.2**
- Remove the blade drive gear, **7.3.4**
- Remove the cam pin of the blade drive gear lock, **7.3.5**
- Unscrew the plug (1).

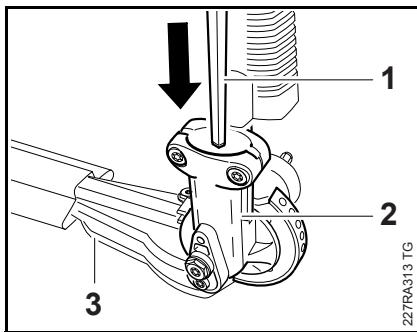


- Pull out the spring (1) and thrust pin (2).

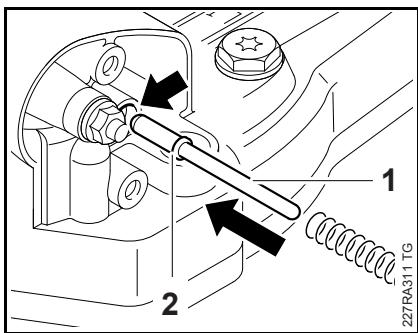


- Inspect the thrust pin (1), spring (2) and plug (3) and replace if necessary.

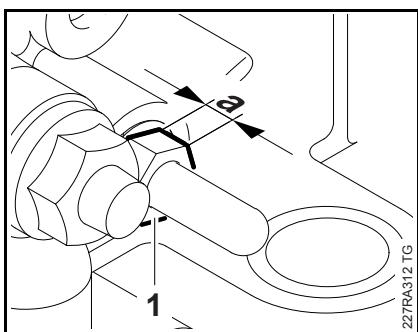
#### Check operation



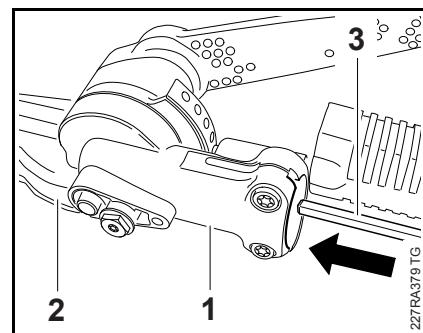
- Turn the angle drive gear (2) so that it is outside the quadrant range.



- Push the thrust pin (1), flange (2) first, into the bore (arrow).
- Fit the spring over the thrust pin and into the bore.



- Screw home the plug (1) until its hexagon projects  
a = about 3 mm.
- Reassemble all other parts in the reverse sequence.
- Tightening torques, **4.3.1**



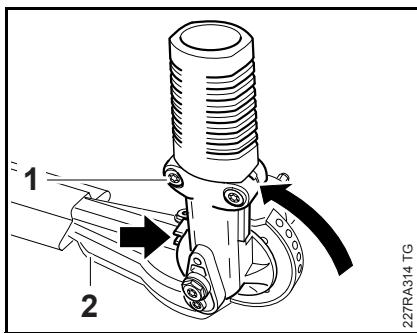
- Turn the angle drive gear (1) to the working position and lock it in position on the quadrant.

- Push a suitable square rod (3) into the input pinion and rotate it by hand.

The blade drive gear (2) must run freely when the angle drive gear is within the working angle of 135° (quadrant range).

- Troubleshooting, **4.3**

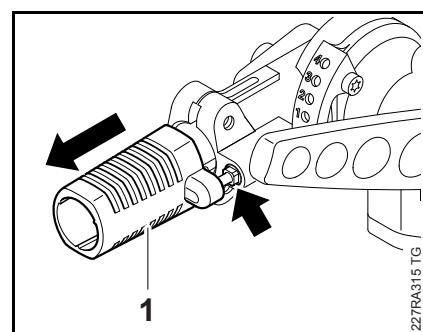
#### 7.3.6 Lock Mechanism



- Turn the angle drive gear (1) to the idle or transport position and engage it in the lock mechanism (arrow).

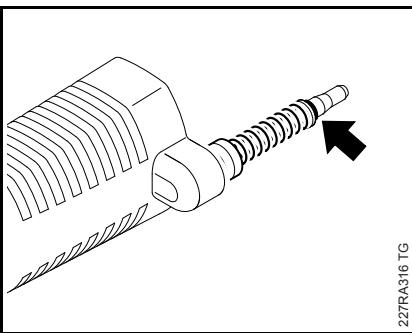
The blade drive gear (2) must be blocked in this position.

The engine must not be started or accelerated when the blade drive gear is outside the working range (quadrant range) since the drive shaft may otherwise be damaged.



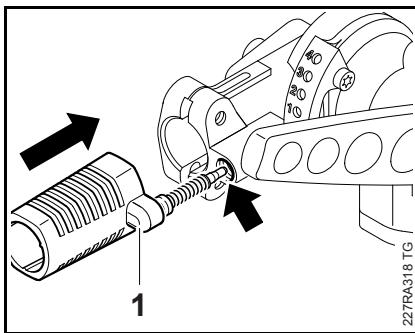
- Pull back the lock mechanism (1) and unscrew the screw sleeve (arrow).

- Pull out the lock mechanism.



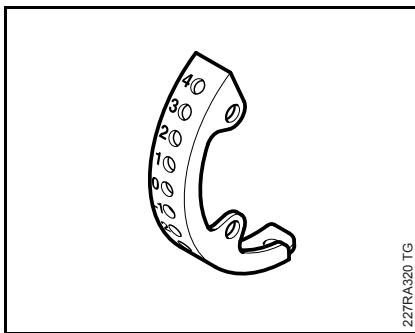
227RA316 TG

- Remove the snap ring (arrow).
- Remove the washer, spring and screw sleeve.



227RA318 TG

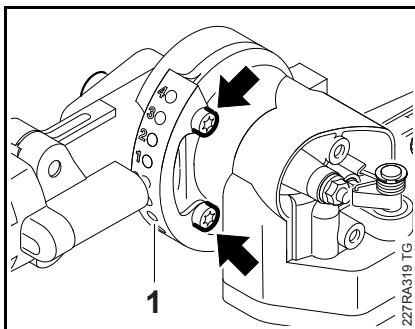
- Push the preassembled lock mechanism (1) into the bore (arrow) and place the screw sleeve in position.
- Use a 7 mm open-end wrench to tighten down the screw sleeve firmly.



227RA320 TG

- Inspect the quadrant for damage and replace it if necessary.
- Reassemble in the reverse sequence.
- Tightening torques, **3.1**

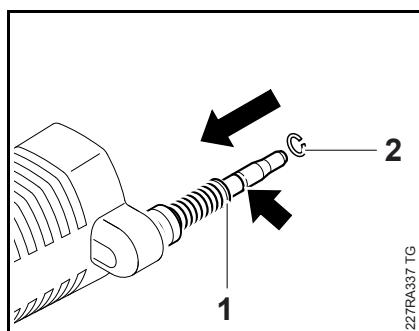
### 7.3.7 Quadrant



227RA319 TG

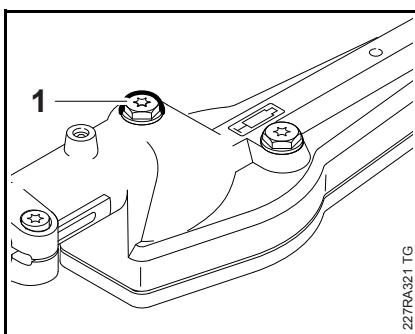
For the sake of clarity the adjusting lever is not shown in this view.

- Take out the screws (arrows).
- Remove the quadrant (1).



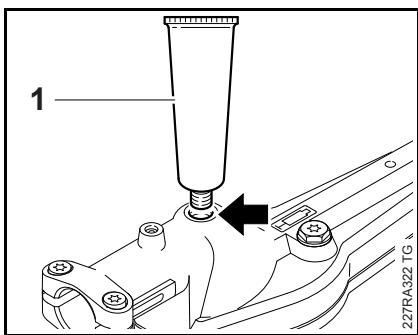
227RA337 TG

- Push the washer (1) back a little and engage snap ring (2) in the groove (arrow).



227RA321 TG

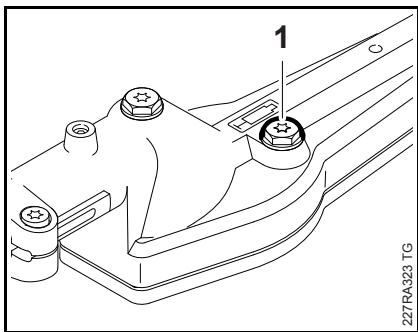
- Remove the screw plug (1).



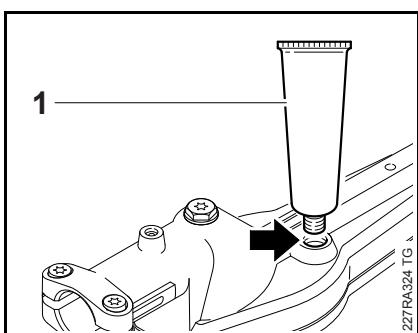
- Screw the tube of grease (1) into the hole (arrow) and fill the gearbox housing with grease.

- Grease capacities, **3.3**
- Unscrew the tube of grease.
- Fit the screw plug and tighten it down firmly.

#### Output



- Remove the screw plug (1).

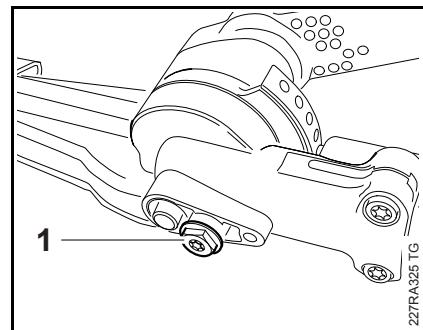


- Screw the tube of grease (1) into the hole (arrow) and fill the gearbox housing with grease.

- Grease capacities, **3.3**
- Unscrew the tube of grease.
- Fit the screw plug and tighten it down firmly.

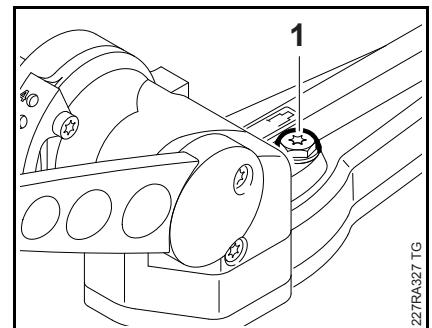
#### 7.4.2 HL 135°

##### Input

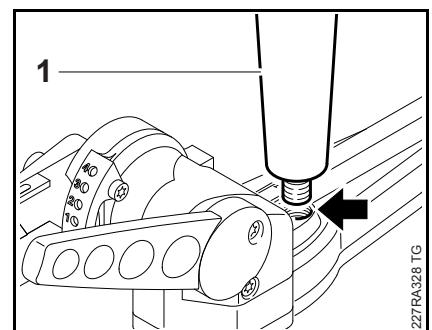


- Remove the screw plug (1).

##### Output



- Remove the screw plug (1).



- Screw the tube of grease (1) into the hole and fill the gearbox housing with grease.

- Grease capacities, **3.3**
- Unscrew the tube of grease.
- Fit the screw plug and tighten it down firmly.

- Screw the tube of grease (1) into the hole (arrow) and fill the gearbox housing with grease.

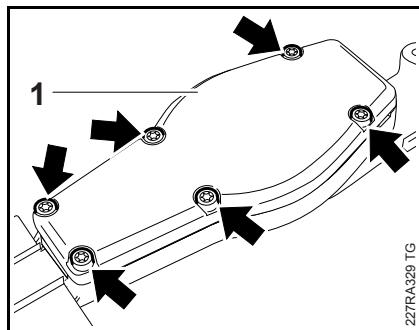
- Grease capacities, **3.3**
- Unscrew the tube of grease.
- Fit the screw plug and tighten it down firmly.

## 7.5 Cutting Attachment

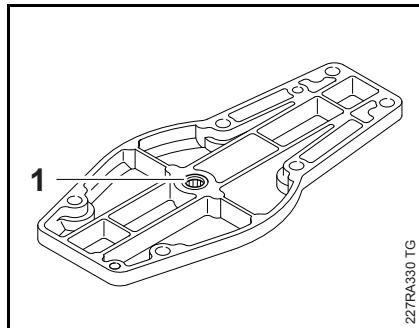
### 7.5.1 Removing and Installing H 0°

#### Removing

- Fit the bar scabbard.
- Wear protective gloves to reduce the risk of injury.



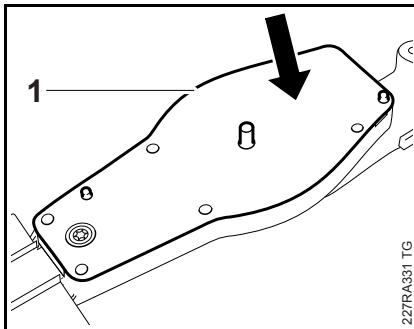
- Take out the screws (arrows).
- Remove the gearbox cover (1).



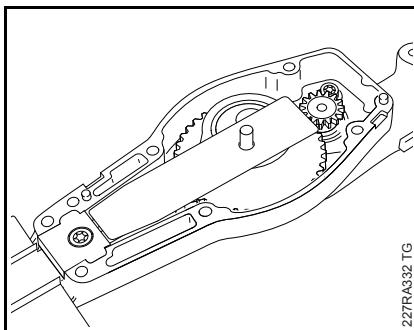
- Inspect the gearbox cover (2) and replace if necessary – the new gearbox cover comes with needle bearing.
- Check the needle bearing (1), replace if necessary.

If the needle bearing is damaged, also check the needle bearing in the gearbox housing, **7.2.3**

Do not reuse needle bearings after removal – always install new bearings.

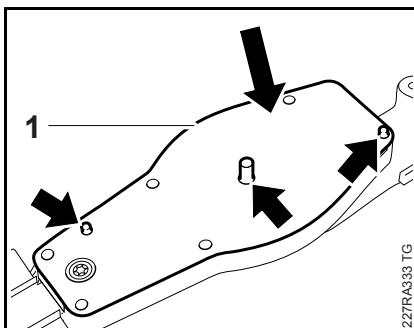


- Remove the gasket (1).



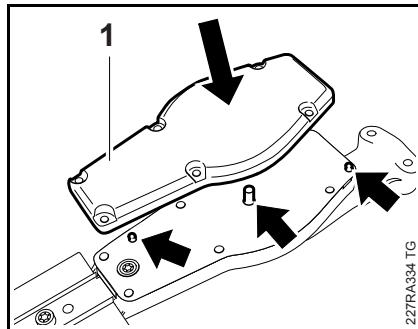
- Removing and installing procedures are now as for HL 135° gearbox, **7.5.2**

#### Installing

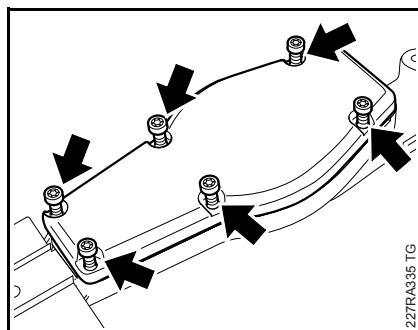


- Fit the gasket (1) and locate it on the pegs (arrows).

Use a new gasket.



- Place the gearbox cover (1) in position so that it engages the pegs (arrows) on the gearbox housing and the spur gear.

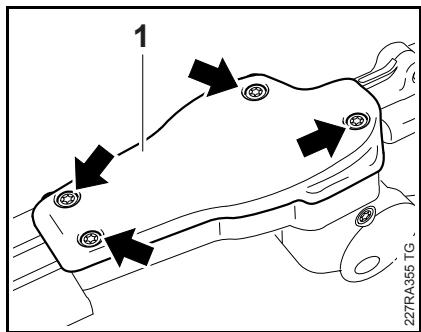


- Insert the screws (arrows) and locate gasket in position with gearbox cover.
- Tighten down the screws firmly in a crosswise pattern.
- Tightening torques, **3.1**
- Lubricate the gearbox, **3.3**

## 7.5.2 Removing and Installing HL-KM 135°

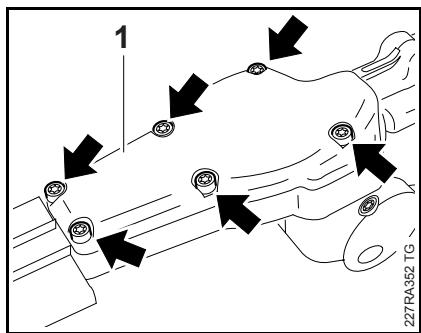
### Removing

- Fit the blade scabbard.
- Wear protective gloves to reduce the risk of injury.

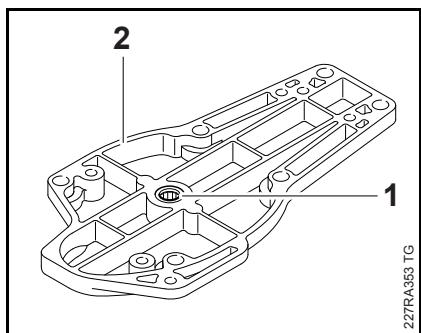


### FH-KM versions

- Take out the screws (arrows).
- Remove the guard plate (1).



- Take out the screws (arrows).
- Remove the gearbox cover (1).

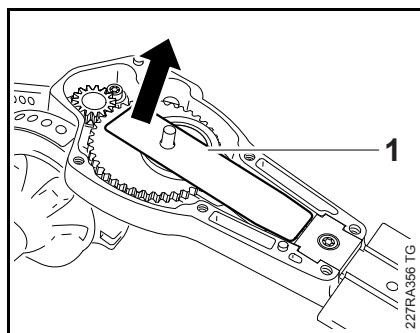


– Inspect the gearbox cover (2) and replace if necessary – the new gearbox cover comes with needle bearing.

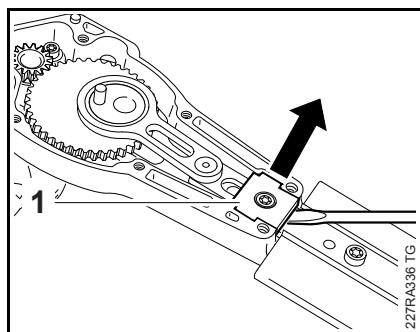
- Check the needle bearing (1), replace if necessary.

If the needle bearing is damaged, also check the needle bearing in the gearbox housing, **7.3.4**

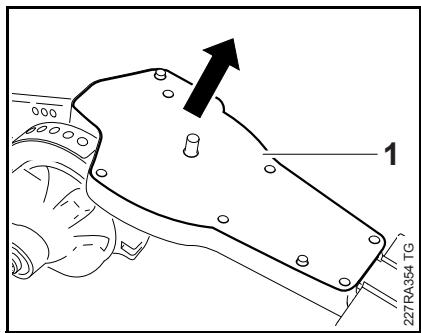
Do not reuse needle bearings after removal – always install new bearings.



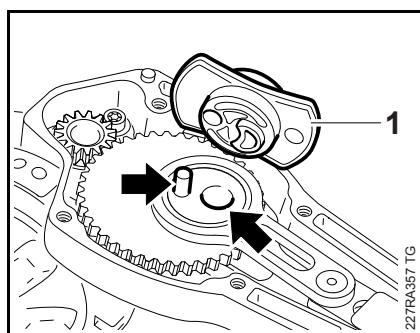
- Remove the thrust plate (1).



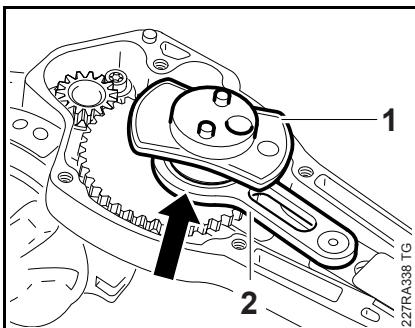
- Pry the seal (1) out of its seat.



- Remove the gasket (1).

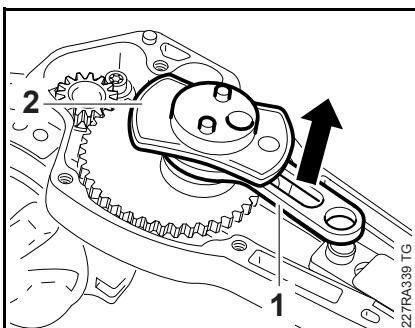


- Position service tool (1) 4237 890 2200 on peg and in bore (arrows) of spur gear.

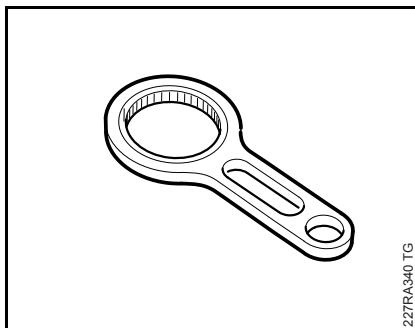


- Press the service tool (1) against the spur gear and push on the connecting rod (2) while turning it back and forth.

When performing this operation, make sure the service tool 4237 890 2200 is properly seated in the connecting rod so that no needles fall out.



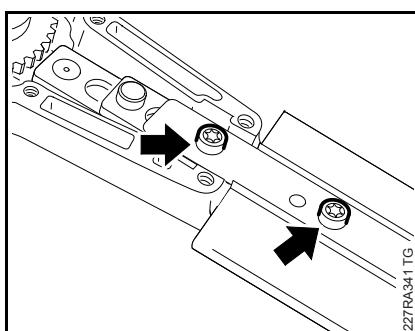
- Remove the connecting rod (1) with service tool (2) from the spur gear.



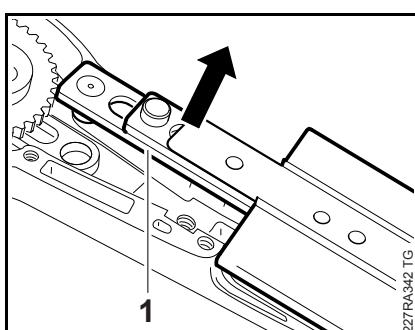
- Inspect the needle bearing and replace if necessary.

The needles in the connecting rod are loose and can fall out.

The needle bearing and connecting rod are supplied as an assembly with a shipping keeper.

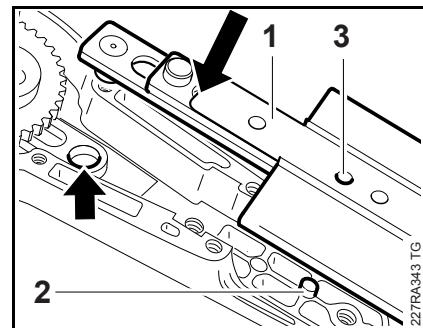


- Take out the screws (arrows).

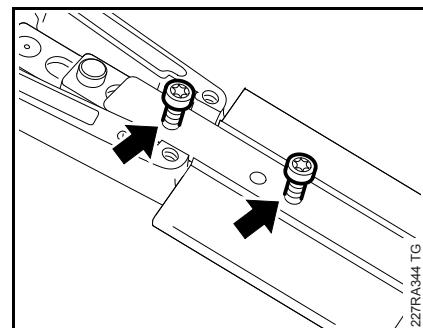


- Remove the cutting attachment (1).
- Inspect the gearbox and clean it if necessary,

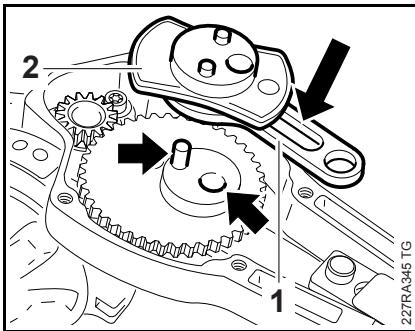
## Installing



- Fit the cutting attachment (1) so that the pin on the cutting blade engages the hole (arrow) in the lower connecting rod and the peg (2) engages the hole (3) in the cutting attachment.

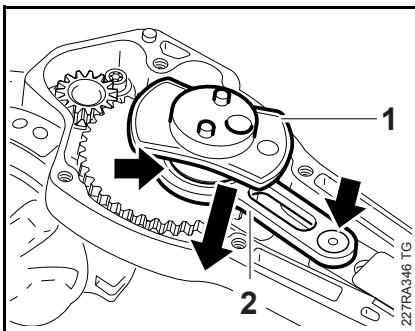


- Fit the screws (arrows).
  - Fit the screws and tighten them down firmly.
  - Tightening torques, [3.1](#)

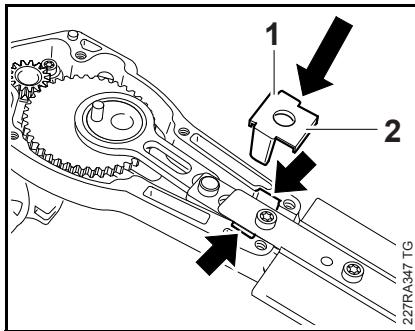


- Push the service tool (2) with connecting rod (1) into the spur gear's bore and onto the peg (arrows)

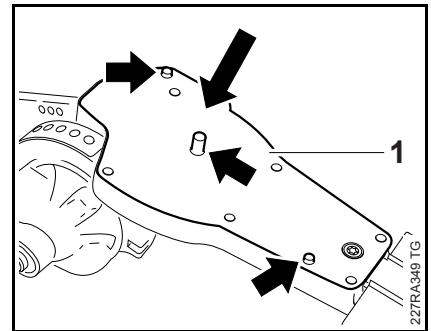
When performing this operation, make sure the service tool (2) 4237 890 2200 is properly seated in the connecting rod so that no needles fall out.



- Press the service tool (1) against the spur gear and push the connecting rod (2) onto the pegs (arrows) on the spur gear and cutting blade.

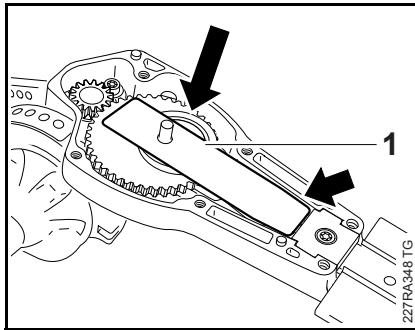


- Position the seal (1) with its long side (2) facing the cutting blade.
- Push the seal's tabs into the guides (arrows) in the gearbox housing as far as stop.

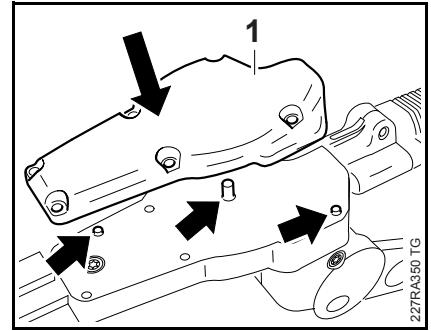


- Fit the gasket (1) and locate it in position with the pegs (arrows).

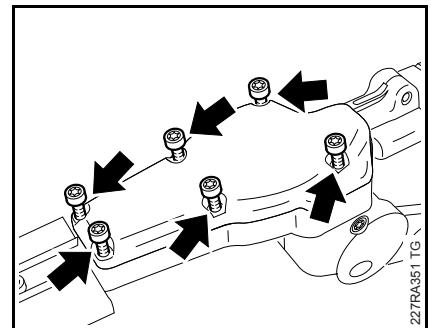
Use a new gasket.



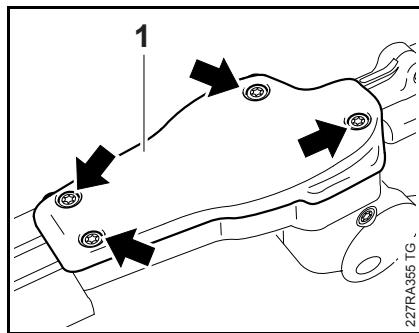
- Align the thrust plate (1) with its tapered end (arrow) pointing towards the cutting blade.



- Place the gearbox cover (1) in position so that it engages the pegs (arrows) on the gearbox housing.



- Insert the screws (arrows) and locate gasket in position with gearbox cover.
- Tighten down the screws firmly in a crosswise pattern.

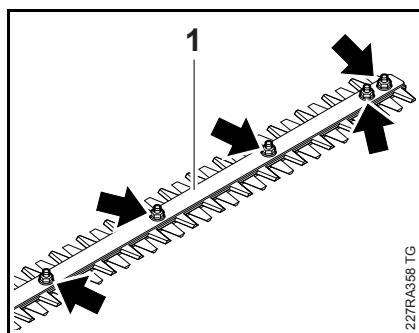


#### FH-KM versions

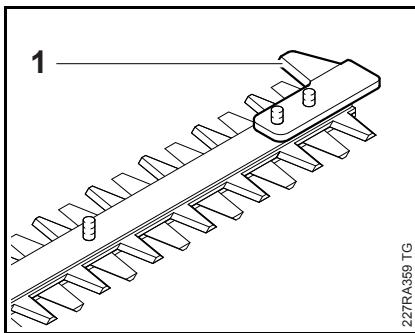
- Fit the guard plate (1).
- Insert the screws (arrows) and tighten them down firmly.
- Tightening torques, **3.1**
- Lubricate the gearbox, **3.3**

#### 7.5.3 Disassembling the Cutting Attachment

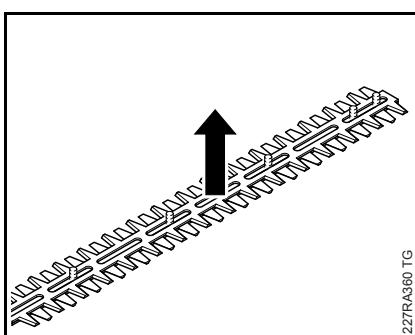
- Wear protective gloves to reduce the risk of injury.
- Remove the cutting attachment, HL-KM 0° gearbox, **7.5.1**  
HL-KM/FH-KM 135° gearbox, **7.5.2**
- Remove the blade scabbard.



- Unscrew the nuts (arrows).
- Remove the guide (1).

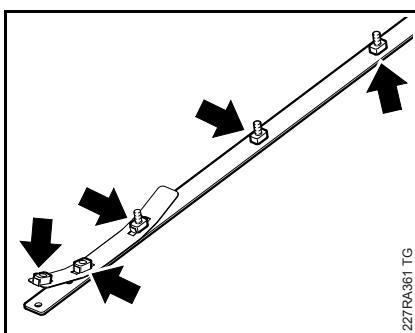


- Remove the tip guard (1) (special accessory) – if fitted.

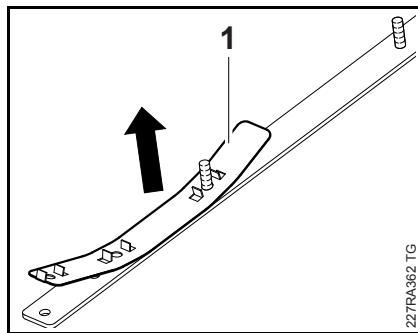


- Remove the blades, clean and inspect the running faces and install new blades if necessary.

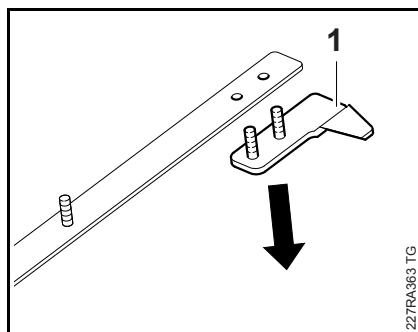
Check dimensions  
– see the parts list.



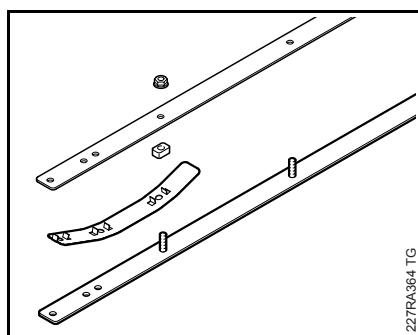
- Remove the sliders (arrows).



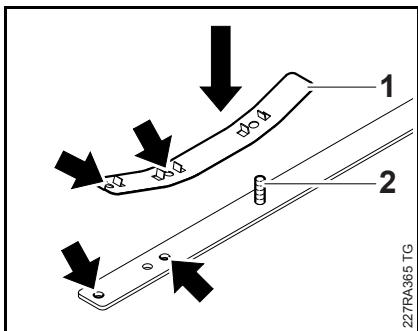
- Remove the flat spring (1).



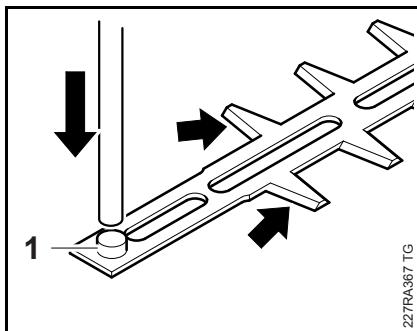
- Remove the other tip guard (1) (special accessory) – if fitted.



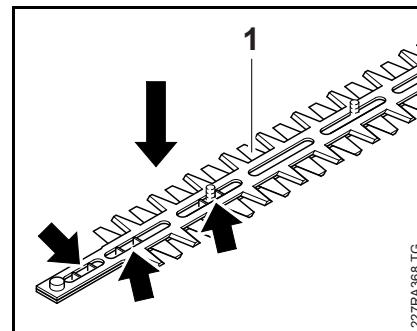
- Inspect and clean individual parts and replace as necessary.



- Position the flat spring so that its holes line up with the holes (arrows) in the guide.
- Fit the flat spring (1) over the stud (2).

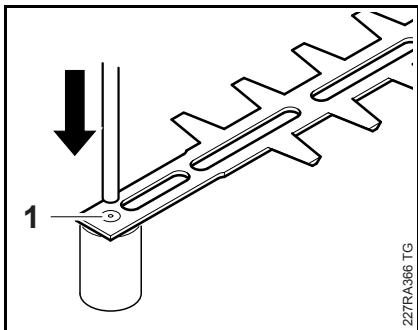


- Pin must be fitted on the same side as the ground cutting edges (arrows).
- Press new pin (1) into hole in blade as far as stop.

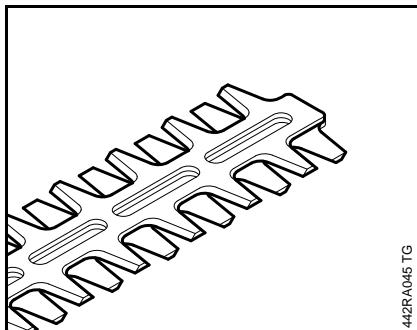


- Place the blades on the guide (1).

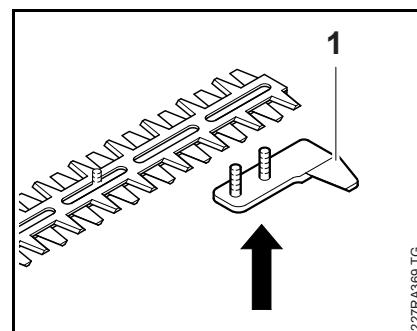
The tabs on the flat spring must engage the slots (arrows) in the blades.



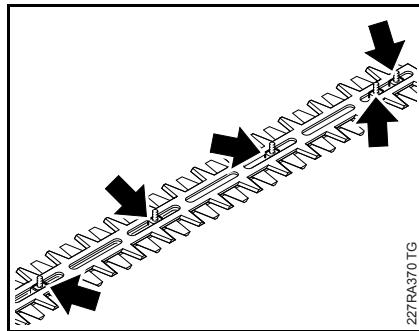
- Check the pin (1) and replace it if necessary.
- Press out the pin (1).



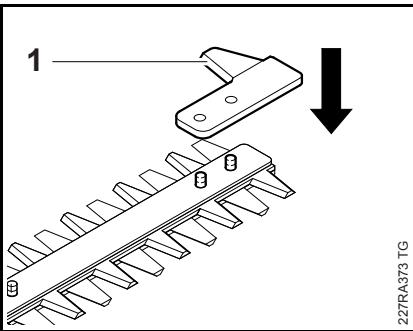
- Coat the sliding faces with resin solvent, 13
- Put both blades together with their flat sides facing each other.



- Push the tip guard (1) into place (special accessory) – if fitted.

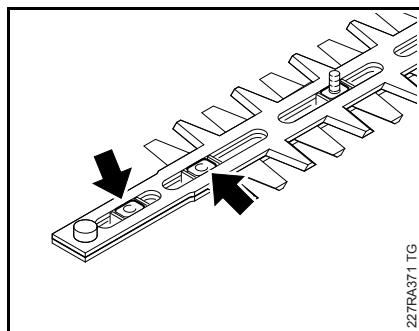


227RA370 TG



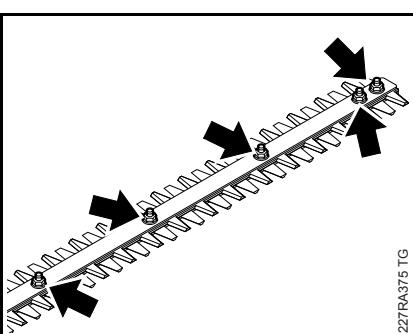
227RA373 TG

- Push the sliders (arrows) over the screws and into the slots.
  - Move the blades back and forth a little until the sliders engage in the slots of both blades – the sliders must not project beyond the blades.



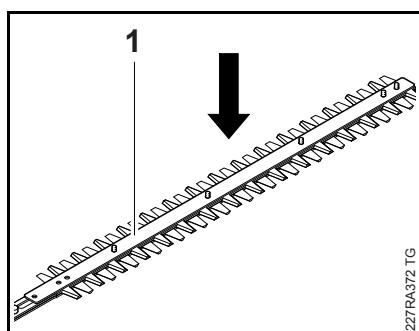
227RA371 TG

- Fit sliders between the tabs of the flat spring (arrows).



227RA375 TG

- Fit new self-locking nuts (arrows) and screw them down against the guide – do not overtighten.
  - Check operation. The blades must move freely without any play.
  - Install the cutting attachment, HL-KM 0° gearbox, [7.5.1](#) HL-KM/FH-KM 135° gearbox, [7.5.2](#)

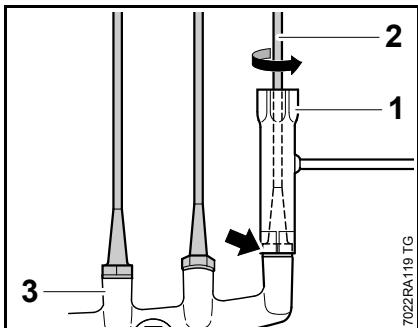


227RA372 TG

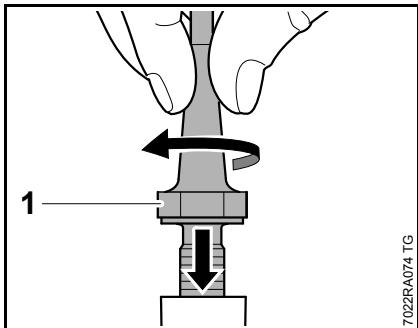
- Fit the guide (1).

## 8.1 Tines on Rakes

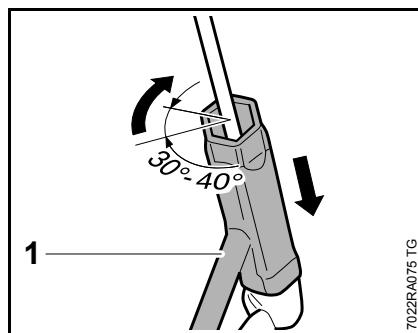
Broken, badly worn or missing tines must be replaced.



- Fit the combination wrench (1) over the tine (2) and engage it on the hexagon (arrow).
- Hold the rake (3) steady to unscrew and remove the tine (2) counterclockwise.

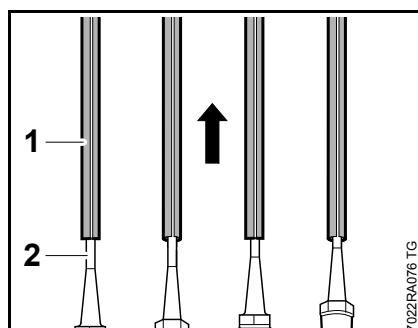


- Screw the new tine (1) clockwise into the rake by hand as far as stop.
- Fit the combination wrench over the tine and engage it on the hexagon.
- If necessary, continue turning the tine (1) clockwise with the combination wrench until it butts against the rake.



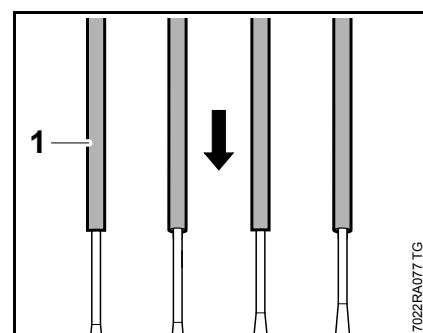
- Turn the combination wrench (1) another 30° to 40° clockwise to achieve a tightening torque of about 4 Nm
  - do not turn the tine any further than specified; the tine's thread may otherwise be damaged.

### 8.1.1 Protective Tubes on Tines



- If protective tubes (1) are damaged, cut them open without damaging the tines (2).
- Remove the protective tubes (1).

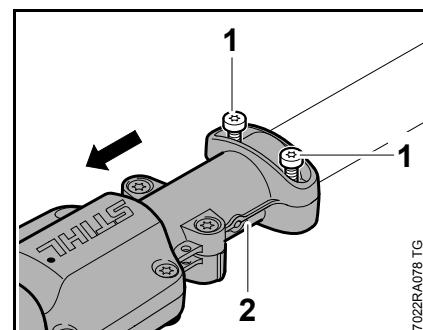
## Installing



- Coat tines and inside of protective tubes with STIHL press fluid, **13**
- Push the new protective tubes (1) onto the tines – turn them back and forth at the same time if necessary.

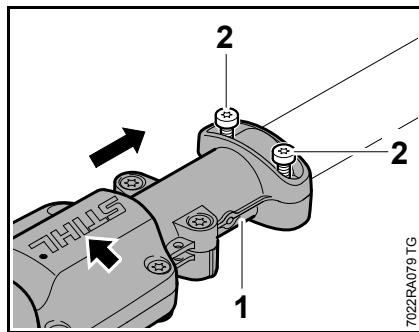
## 8.2 Rake Drive Removing and Installing

- Remove the tines, **8.1**



- Loosen the screws (1) and pull off the rake drive (2).

## Installing



- Clean the end of the drive tube and its seat in the rake drive gear housing  
– the clamp area must be free from grease.
- The drive tube must be recessed 50 mm in the rake drive's clamp; mark the drive tube beforehand if necessary.
- Position the rake drive gear (1) so that the STIHL logo (arrow) is in line with the label on the drive tube.
- Push on the rake drive gear (1) (turning it back and forth) as far as stop and tighten down the screws (2) firmly.

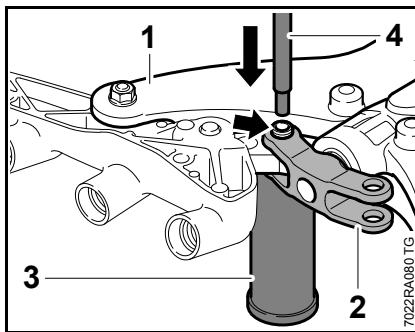
## Check operation

- Start the engine and open the throttle briefly – the rakes must move.

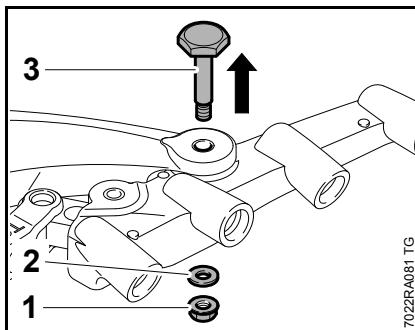
## 8.3 Rakes

The rake drive gear is equipped with two rakes. The removal and installation procedure is the same for both.

- Remove the tines, **8.1**
- Remove the rake drive, **8.2**
- First check whether it is only the connecting arm that needs to be replaced, **8.3.1**



- Turn the rake drive (1) over  
– piston pin on forkhead is pressed out from the underside of the gearbox.
- Support the forkhead (2) on the press sleeve (3) 1114 893 4601 and press out the piston pin (arrow) with assembly drift (4) 4237 893 4700.
- Turn the rake drive over.

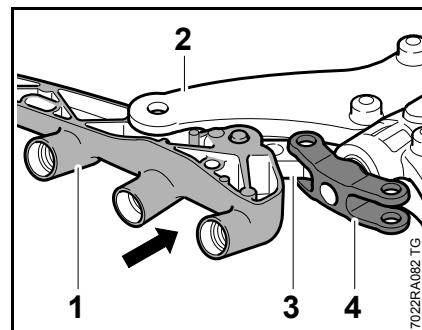


- Hold the pivot bolt (3) steady (19 mm wrench, old version 16 mm) and unscrew the nut (1).
- Remove the nut (1) and washer (2), pull out the pivot bolt (3) lift away the rake.
- Inspect the rake and connecting arm, replace if necessary – if the needle cage is damaged, install a new connecting arm.

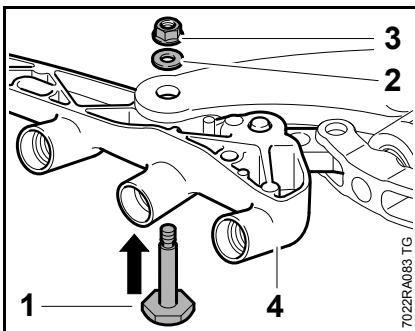
A new rake comes with the connecting arm preassembled.

- Check the other rake and remove it if necessary.
- Clean bearing points and area around them as well as the bores, **13**

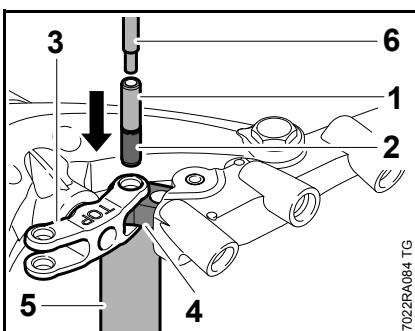
## Installing



- Check needle cage in connecting arm, clean if necessary and lubricate with STIHL multipurpose grease, **13**
- Position the rake (1) so that its open side faces the half of the gear housing (2) with the "STIHL" logo.
- Push the rake (1) into the gear housing so that the connecting arm (3) engages the forkhead (4) and the holes line up.



- Push the pivot bolt (1) into place from the side with the "STIHL" logo.
- Fit the washer (2) and new locknut (3) and tighten down firmly while holding the pivot bolt steady (19 mm wrench, old versions 16 mm) – the rake (4) must move freely.



Press home the piston pin (1) from the top side of the gear housing ("STIHL" logo).

- Inspect the needle cage in the connecting arm; clean if necessary and lubricate with STIHL multipurpose grease – if the needle cage is damaged, install a new connecting arm, **13**
- Fit centering pin (2) 4249 893 9400 on the piston pin (1) and push it through the forkhead (3) and connecting arm (4) – the needle cage may be damaged if the pin is not properly centered.

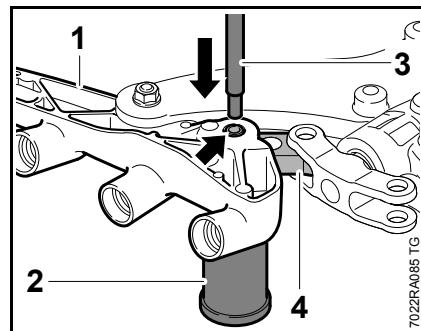
- Support the forkhead (3) on the press sleeve (5) 1114 893 4601 and use assembly drift (6) 4237 893 4700 to press home the piston pin (1) until it projects about 2 mm at each side.

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

### 8.3.1 Connecting Arm

The removal and installation procedure is the same for both connecting arms.

- Remove the tines, **8.1**
- Remove the rake drive, **8.2**

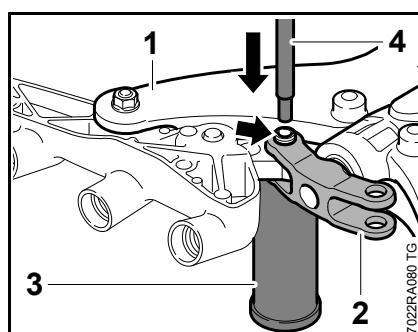


- Support the rake (1) on the press sleeve (2) 1114 893 4601 and press out the piston pin (arrow) with assembly drift (4) 4237 893 4700.

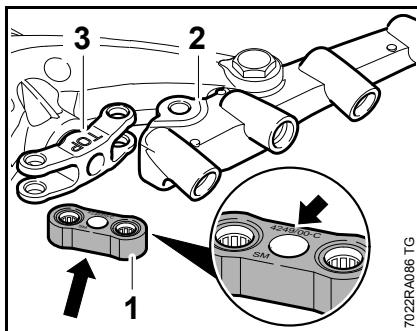
- Remove the damaged connecting arm (4).
- Inspect connecting arm of other rake and remove it if necessary.
- Examine and clean the forkhead, rakes and piston pins, replace if necessary.

### Installing

- Position the rake drive so that the "STIHL" logo faces up.

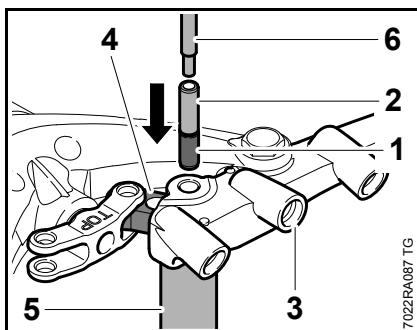


- Turn the rake drive (1) over – piston pin on forkhead is pressed out from the underside of the gearbox.
- Support the forkhead (2) on the press sleeve (3) 1114 893 4601 and press out the piston pin (arrow) with assembly drift (4) 4237 893 4700.

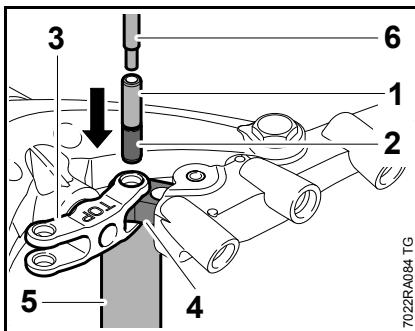


The needle cages of the new connecting arm are already lubricated with grease – take care to ensure that no dirt particles get into the needle cages.

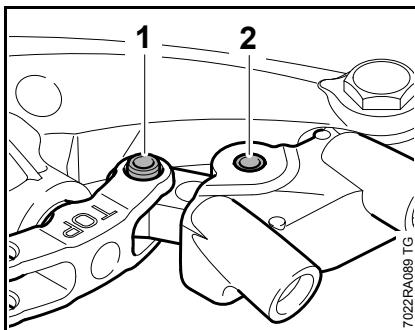
- Fit the new connecting arm (1), lettering (arrow) facing up, between the rake (2) and forkhead (3) and line up the holes.



- Fit centering pin (1) 4249 893 9400 on the piston pin (2) and push it through the rake (3) and connecting arm (4) – the needle cage may be damaged if the pin is not properly centered.
- Support the rake (3) on the press sleeve (5) 1114 893 4601 and press home the piston pin (2) with assembly drift (6) 4237 893 4700.



- Press home the piston pin (1) from the top side of the gear housing ("STIHL" logo).
- Support the forkhead (2) on the press sleeve (3) 1114 893 4601 and press home the piston pin (4) with assembly drift (5) 4237 893 4700.

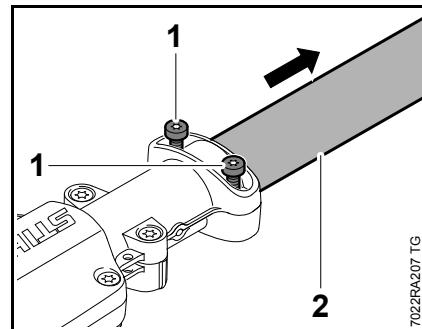


The piston pin (1) must project about 2 mm at each side of the forkhead.

- The piston pin (2) must be flush on both sides of the rake.
- Check operation
  - Reassemble all other parts in the reverse sequence.

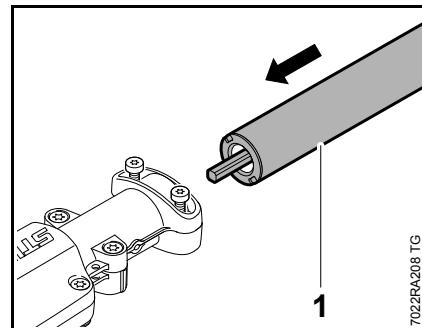
## 8.4 Drive Tube (Boom) Removing and Installing

- Remove drive tube from attachment.

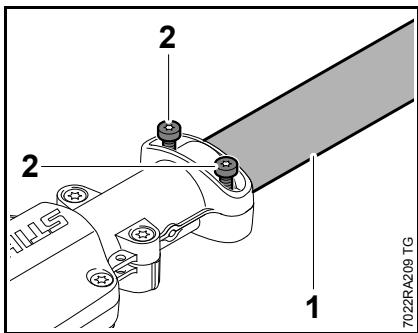


- Loosen the clamp screws (1) and pull out the drive tube (2).
- Check the drive tube and repair or replace if necessary, [8.4.1](#)

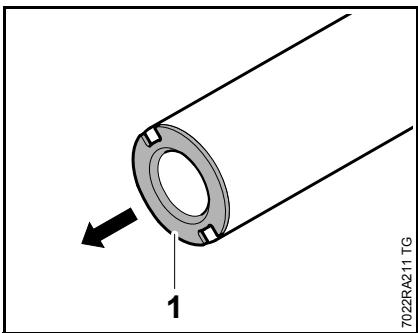
### Installing



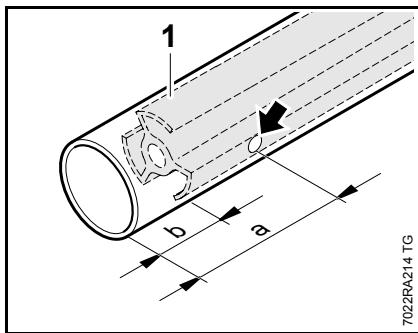
- Push the end of the drive tube (1) without fixing hole fully into the gear housing while turning the other end of the drive shaft back and forth until it slips into the drive pinion's square socket – the drive tube must be pushed in to the end of the slot in the clamp.



- Position the drive tube (1) so that its safety label is in line with the "STIHL" logo on the gear housing, then tighten down the clamp screws (2) firmly – the safety label must be visible in the normal working position.



- Use hook 5910 890 2800 to pull out the plug (1) at both ends and check or replace as necessary.



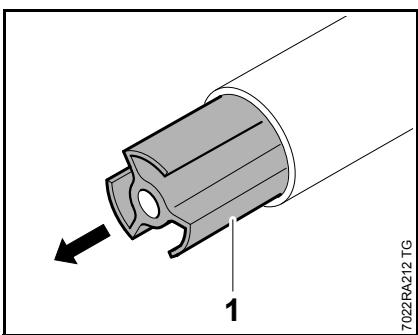
- Push the flexible liner (1) into the end of the drive tube with the fixing hole (arrow) – distance from hole to end of drive tube a = about 68 mm.
- Flexible liner (1) must be 25 mm (b) from end of tube.

### Check operation

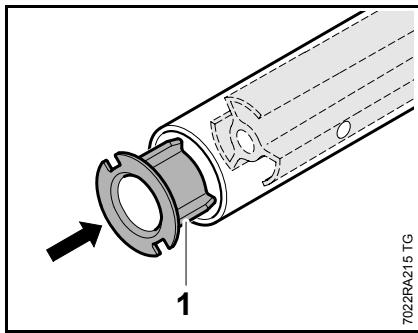
- Turn the drive shaft – the rakes must move.

#### 8.4.1 Disassembling the Drive Tube (SP 92)

- Remove drive tube from attachment.
- Remove the drive tube, 8.4
- Remove the carrying ring if necessary, 8.4.3

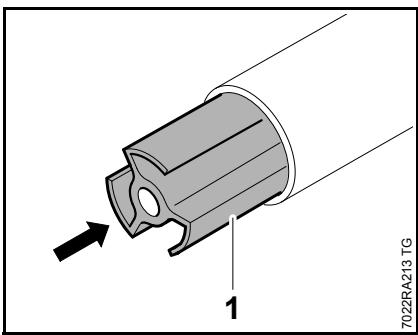


- Pull the flexible liner (1) out of the drive tube.
- Check the flexible liner and replace if necessary.



- Push the plugs (1) into both ends of the drive tube as far as stop.

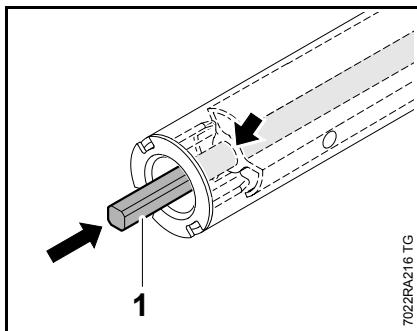
### Assembling



- Push the flexible liner (1) into the drive tube.

- Pull the drive shaft (1) out of the drive tube.

If the drive shaft has turned blue or is warped, install a new one.



The drive shaft is supported in the flexible liner inside the drive tube.

If the drive shaft has turned blue or is warped, install a new one.

- Before installing the drive shaft, coat it with STIHL multipurpose grease, **8.1**
- Apply the grease evenly to drive shaft
  - pumping grease into the flexible liner and then sliding the dry drive shaft home does not guarantee adequate lubrication.
- Push the drive shaft (1) into the flexible liner (arrow).

Remove the carrying ring if necessary, **8.4.3**

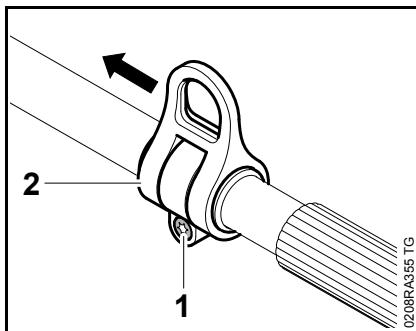
- Install the drive tube, **8.4**

#### 8.4.2 Disassembling Drive Tube (SP-KM)

- see chapter **5**

#### 8.4.3 Carrying Ring – pivot-mounted (SP 92)

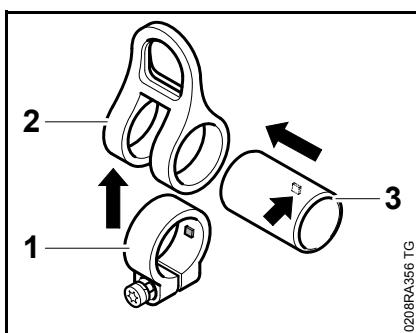
- Remove the drive tube, **8.4**



- Loosen the screw (1) and pull off the carrying ring (2).

- Check the carrying ring, replace if necessary.

#### Assembling



- Fit the clamp (1) in the carrying ring (2) and push the tube (3) through the carrying ring (2) and clamp (1) so that the lug in the clamp (1) engages the recess (arrow) in the tube (3).

- Fit the carrying ring on the attachment end of the drive tube.
- The dimensions on the drive tube are measured from the attachment end of the drive tube.

#### Distances for:

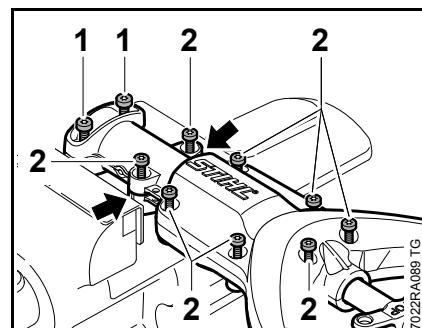
loop handle = 315 mm,  
handle hose = 390 mm

- Reassemble in the reverse sequence.

## 8.5 Gear Housing

- Remove the tines, **8.1**
- Remove the rake drive, **8.2**
- Remove the rakes, **8.3**

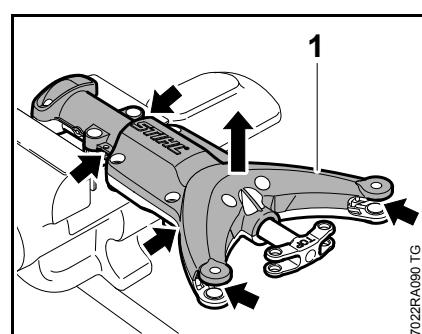
#### Clamping gear housing in a vise



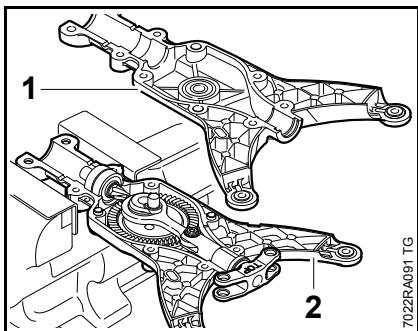
Use protective jaws.

- Clamp gear housing in area of drive tube seat (arrows) in a vise
  - do not overtighten since the gear housing may otherwise be damaged.
- Take out the screws (1) and (2).

#### Opening the gear housing



- Pry the upper half of the gear housing (1) away at several points (arrows) at the same time and remove it.



Inspect both halves of the gear housing (1, 2) and replace if necessary.

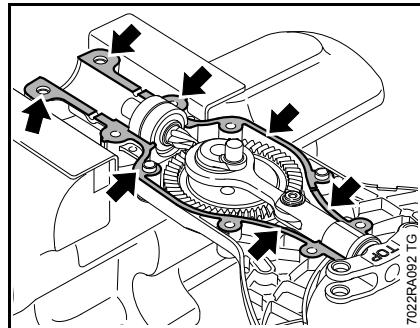
If cracks or damaged sealing faces are found, replace the half of the gear housing concerned.

New gear housings come with bushings and ball bearings already installed.

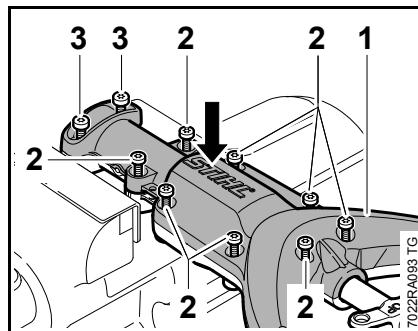
- Examine the forkhead, drive pinion and ring gear in the lower half of the gear housing and replace as necessary.
- Install the drive pinion in the new gear housing, **8.5.2**
- Install the forkhead in the new gear housing, **8.5.3**
- Install the ring gear in the new gear housing, **8.5.4**
- If only the gear housing is re-sealed or only the upper half of the gear housing is replaced, check the quantity of grease and replenish with STIHL multipurpose grease and apply to ring gear, **3.3**, **13**

- If the lower half of the gear housing is replaced, apply specified quantity of STIHL multipurpose grease to ring gear – gearbox components must be lubricated with grease before installation, **3.3**, **13**

- Clean sealing faces of both halves of gear housing and remove any gasket residue  
– the sealing faces must be free from grease. **13**



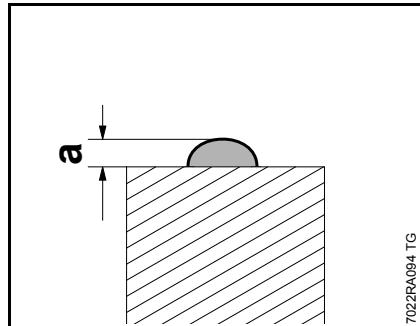
- Apply temperature resistant sealant (Dirko HT red) to the center of the sealing faces (arrows), **13**



- Carefully position upper half of gear housing (1) on ring gear's stub and push it into place.
- Insert the screws (2) and tighten them down firmly in a crosswise pattern.
- Insert the clamp screws (3) – do not tighten them down yet.

#### Check operation

- Rotate the drive pinion – the forkhead must perform a reciprocating motion  
– the drive pinion must turn freely.
- Reassemble all other parts in the reverse sequence.



- The bead of sealant should be about 1 mm high (a).

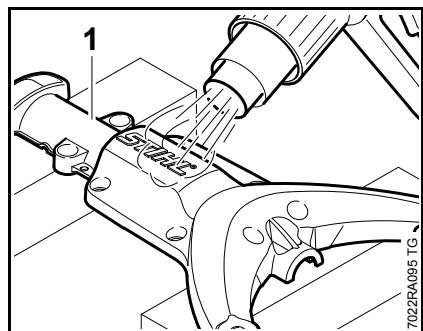
Make sure the sealant does not project into the gear housing.

## 8.5.1 Bearings / Bushings

If the two halves of the gear housing are in order, the ball bearings and bushings may also be replaced separately.

- Open the gear housing, [8.5](#)

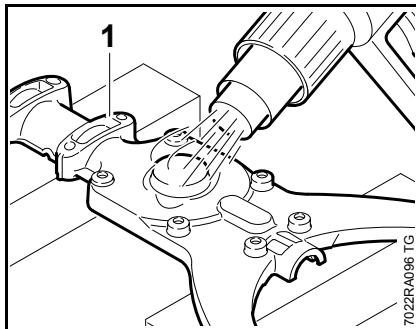
### Ball bearing in upper half of gear housing



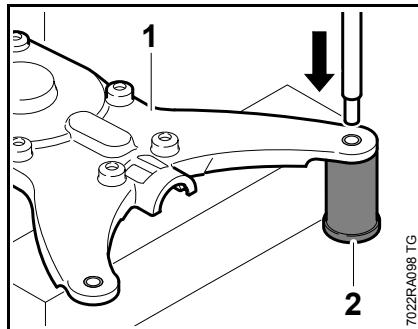
- Support both ends of the upper gear housing (1) and heat area of bearing seat to about 180°C (360°F) until the ball bearing drops out.

### Ball bearing in lower half of gear housing

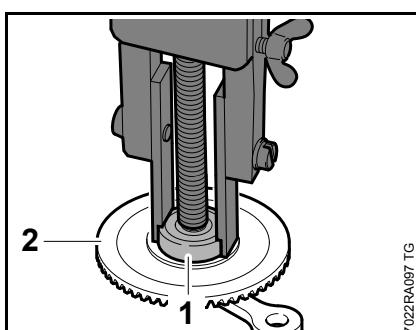
- Remove the drive pinion, [8.5.2](#)
- Remove the forkhead, [8.5.3](#)



- Use soft base to reduce risk of damaging the ring gear.
- Support both ends of the lower gear housing (1) and heat area of bearing seat to about 180°C (360°F) until the ring gear and ball bearing drop out.



- Position the lower half of the gear housing (1) on the press sleeve (2) 1114 893 4601 so that the bushing's collar slips into the press sleeve. Then use a suitable drift to press out the bushing.

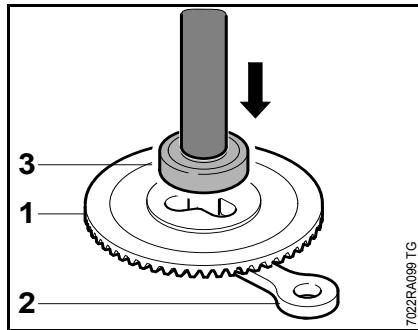


Use puller 5910 890 4400 with No. 7 jaws 0000 893 3703.

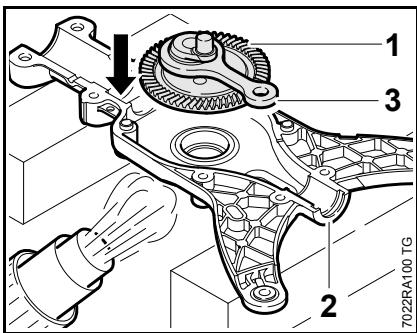
- Apply puller to ball bearing (1) and pull it off the ring gear (2).

### Bushings

If the two halves of the gear housing are in good condition, the bushings can be replaced separately.



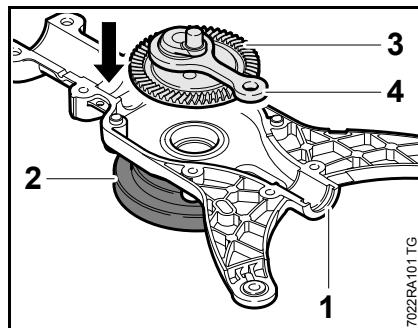
- Place the ring gear (1) on a firm base with the connecting rod (2) facing downwards.
- Place new ball bearing (3) on stub, apply suitable piece of pipe to inner bearing race and press home as far as stop.



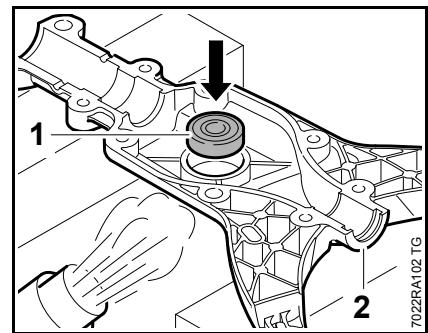
Install ring gear (1) with ball bearing quickly because the bearing absorbs heat and begins to expand.

- Support both ends of lower half of gear housing (2), inside facing up, and heat area of bearing seat from below to about 180°C (360°F).
- Hold the ring gear (1) with the ball bearing facing the lower half of the gear housing (2) and the connecting rod (3) facing the forkhead.
- Push the ring gear (1) with ball bearing into the bearing seat as far as stop.

#### If no suitable base is available



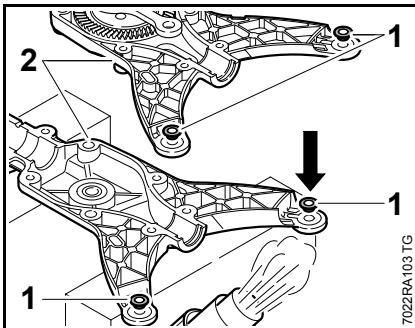
- Heat outside of lower half of gear housing (1) in area of bearing seat to about 180°C (360°F) and place it on ring gauge (2) 4112 893 6400.
- Hold the ring gear (3) with the ball bearing facing the lower half of the gear housing (1) and the connecting rod (3) facing the forkhead.
- Push the ring gear (3) with ball bearing into the bearing seat as far as stop.



Install the ball bearing (1) quickly because it absorbs heat and begins to expand.

- Support both ends of upper half of gear housing (2), inside facing up, and heat area of bearing seat from below to about 180°C (360°F).
- Push the ball bearing (1) into its seat as far as stop.

## Installing the bushings



Install bushings (1) from inside the two halves of the gear housing (2).

Install the bushings (1) quickly because they absorb heat and begin to expand.

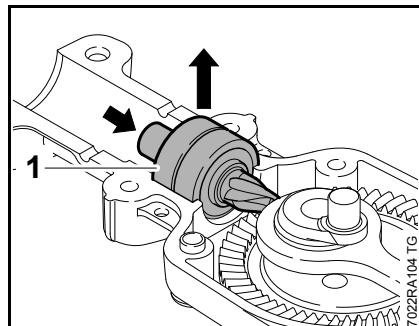
- Support both ends of the gear housing (2), inside facing up, and heat area of bore to about 180°C (360°F).
- Push bushing (1) into the bore as far as stop – the bushing's collar must be properly seated; use suitable drift to press it fully home if necessary.

Gearbox components must be lubricated with STIHL multipurpose grease before installation, **8.13**

- Install the forkhead, **8.5.3**
- Install the drive pinion, **8.5.2**
- Apply STIHL multipurpose grease to ring gear, **3.3**, **13**
- Assemble the gear housing, **8.5**
- Reassemble all other parts in the reverse sequence.

## 8.5.2 Drive Pinion

- Open the gear housing, **8.5**

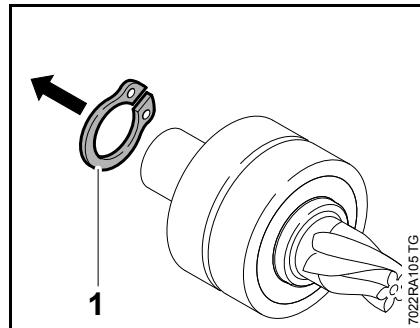


- Take the drive pinion (1) with ball bearings out of their seat. If necessary, carefully pry out at the drive end (arrow)
  - take care not to damage the drive pinion (1) or lower half of the gear housing.
- Inspect the drive pinion and ball bearings and replace ball bearings or complete drive pinion if necessary
  - a new drive pinion is supplied with ball bearings and circlip.

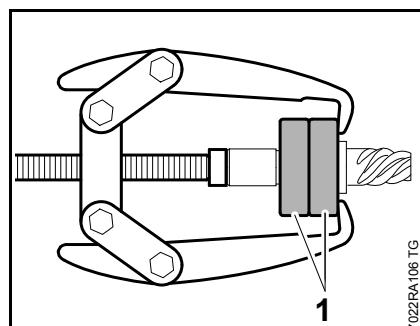
If the teeth of the drive pinion are damaged, also inspect the ring gear, remove any fragments and replenish the gear grease, **3.3**, **13**.

- If the drive pinion is in good condition, replace the ball bearings.

## Disassembling

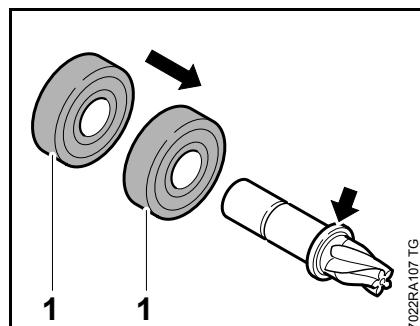


- Remove the circlip (1).

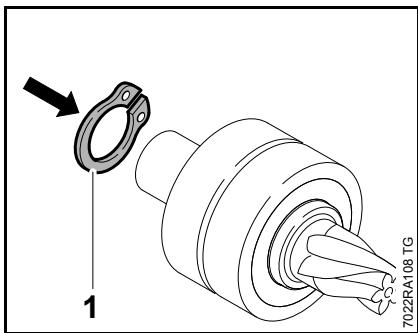


- Remove the ball bearings (1) with a suitable puller.

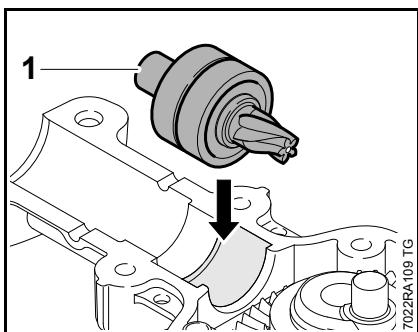
## Assembling



- Press the new ball bearings (1) onto the drive pinion and against its collar (arrow).



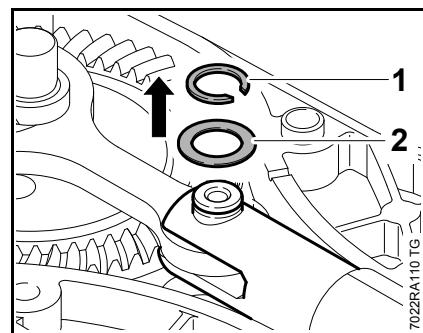
- Fit the circlip (1).



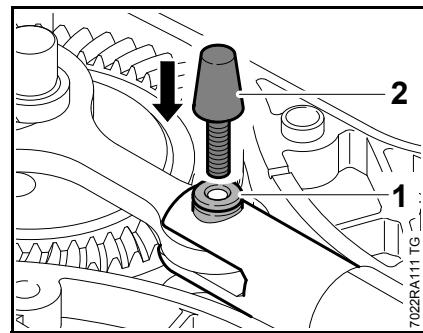
- Coat teeth with STIHL multipurpose grease, **8.5**
- Push the drive pinion (1) with ball bearings into the bearing seat as far as stop.
- Check amount of grease again and, if necessary, apply STIHL multipurpose grease to ring gear, **3.3**, **8.5**
- Assemble the gear housing, **8.5**
- Reassemble all other parts in the reverse sequence.

### 8.5.3 Forkhead

- Open the gear housing, **8.5**
- Remove the drive pinion, **8.5.2**

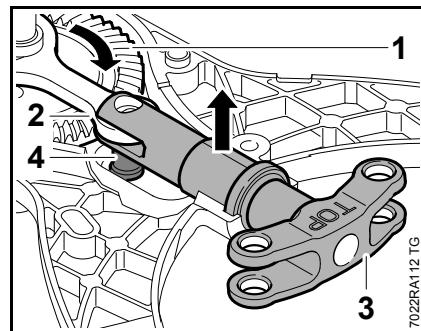


- Use pliers 0816 610 1451 to remove the snap ring (1) – always install a new snap ring.
- Remove the washer (2).

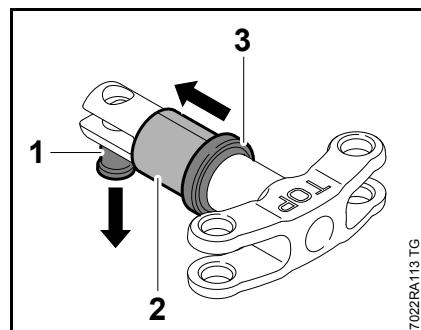


The other end of the pin (1) has a collar. It must therefore be driven out downwards so that the connecting rod can be removed.

- Screw installing mandrel (2) 4249 893 about 4 turns into the pin (1).
- Push the pin (1) downwards with the mandrel (2) and out of the connecting rod's small end.
- Unscrew and remove the mandrel.

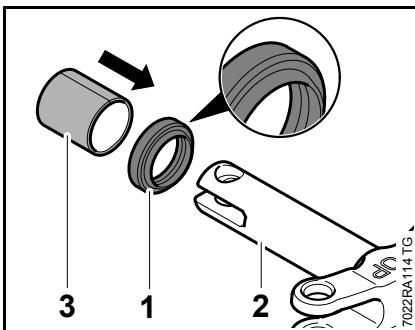


- Rotate the ring gear (1) until the connecting rod (2) is clear of the forkhead (3). It may be necessary to push the forkhead (3) away from the connecting rod.
- Remove the forkhead (3) with pin (4) upwards.

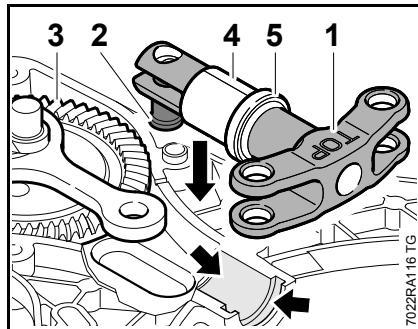


- Pull out the pin (1) and take off the bushing (2) and scraper ring (3).
- Check individual parts, replace if necessary.

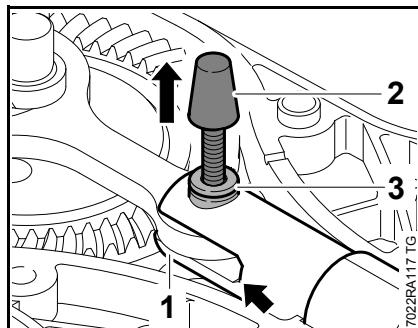
## Installing



- Coat stub of forkhead and inside of scraper ring and bushing with STIHL multipurpose grease, **13**
- Carefully fit the scraper ring (1), sealing lip facing the forkhead (2) – take care not to damage the sealing lip.
- Fit the bushing (3).



- Line up the forkhead (1) with the pin (2) pointing down and towards the connecting rod – "TOP" facing up.
- If necessary, rotate the ring gear (3) to move the connecting rod away from the forkhead (1).
- Fit the forkhead (1) so that the bushing (4) and scraper ring (5) are in their seats (arrows) in the lower half of the gear housing.

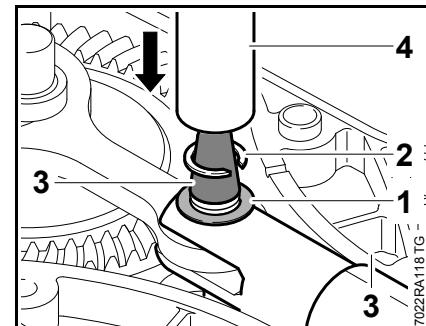


- Coat pin with STIHL multipurpose grease, **13**
- Push the pin (1) into the underside of the forkhead (opposite "TOP" - see arrow) until its end is flush with the inner face of the slot.

Push the forkhead (1) in direction of connecting rod so its slot (arrow) engages the connecting rod; if necessary, rotate ring gear until holes are in alignment.

- Screw installing mandrel (2) 4249 893 about 4 turns into the pin (3). Then pull the pin (3) into the forkhead as far as stop.

- Screw the installing madrel (2) 4249 893 1100 into the pin (3) as far as stop.



- Fit the washer (1) and place a new snap ring (2) on cone of installing mandrel (3) 4249 893 1100.
- Use thrust piece (4) 4116 894 1000 to push the snap ring (2) on until it engages the groove in the pin.
- Unscrew the installing mandrel.
- Check amount of grease and, if necessary, apply STIHL multipurpose grease to ring gear, **3.3**, **13**
- Assemble the gear housing, **8.5**
- Reassemble all other parts in the reverse sequence.

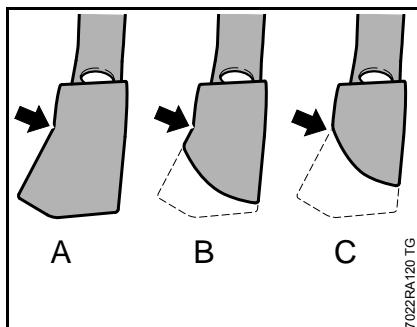
### 8.5.4 Ring Gear

Removal and installation are described in the chapter on "Gear Housing", **8.5**

### 9.1 Blade

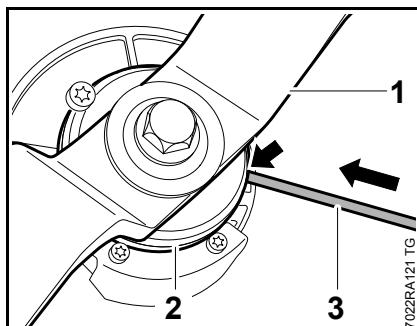
Do not attempt to straighten or weld a worn, bent or cracked blade  
– it may break – always install a new blade.

To determine the amount of wear, check the angle (arrow) on the blade and the contour of the cutting edges.

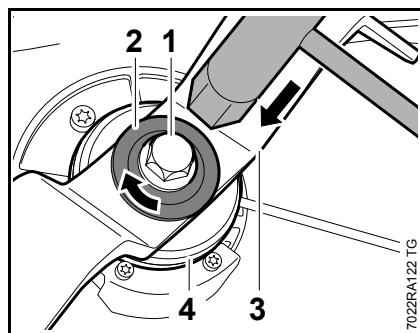


**A** = new blade  
**B** = blade partly worn  
– and may still be used  
**C** = blade worn – and must be replaced

#### Removing

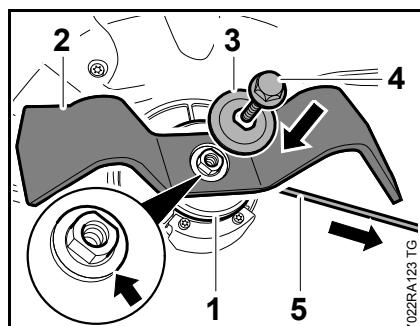


- Rotate the blade (1) until the hole (arrow) in the thrust plate (2) is in line with the notch in the gearbox housing; then insert the stop pin (3) to block the shaft.



- Loosen and remove the 16 mm screw (1) clockwise with the combination wrench – left-hand thread.
- Remove the thrust washer (2) and blade (3).
- Inspect the thrust plate (4), replace it if necessary.

#### Installing



Make sure the thrust plate (1) is in place.

- Position the blade (2) so that is centered by the collar (arrow) on the thrust plate (1).
- Fit the thrust washer (3) with its convex side facing up and the flats of its hole in line with the output shaft.

The blade must locate flat against the thrust plate (1).

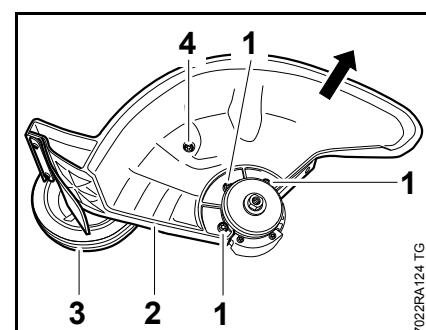
- Insert and tighten down the screw (4) firmly.
- Remove the stop pin (5).

### Check operation

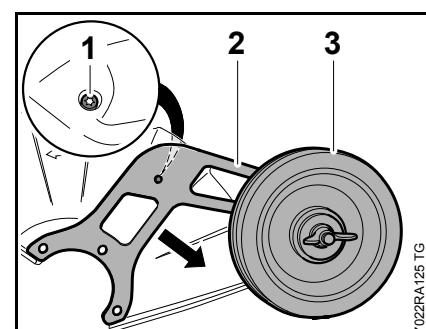
- Turn the blade,  
– it must rotate freely and without runout  
– it must not touch the deflector

### 9.2 Deflector / Mud Flap

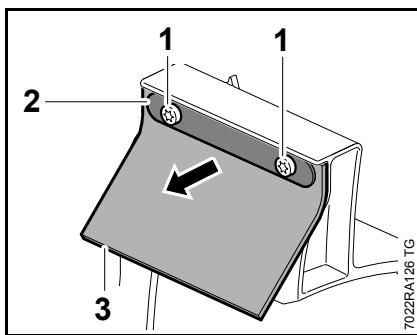
- Remove the blade, [9.1](#)



- Take out the screws (1).
- Remove deflector (2) with depth wheel (3) – the segment is still attached to the deflector with screw (4).



- Take out the screw (1) and remove the segment (2) with depth wheel (3).
- Inspect the segment and depth wheel, replace if necessary, [11.4](#)
- Check deflector and replace it if necessary.



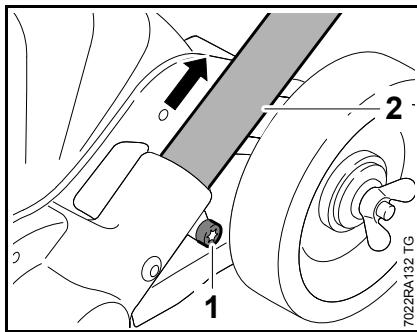
- Take out the screws (1).
- Remove the strap (2) and mud flap (3).
- Reassemble in the reverse sequence.

#### 9.2.1 Depth Wheel

- Depth wheel, **11.4**

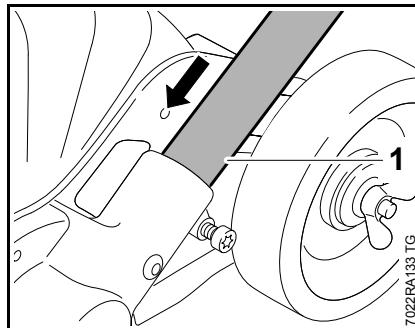
#### 9.3 Drive Tube (Boom) Removing and Installing

- Remove drive tube from attachment.

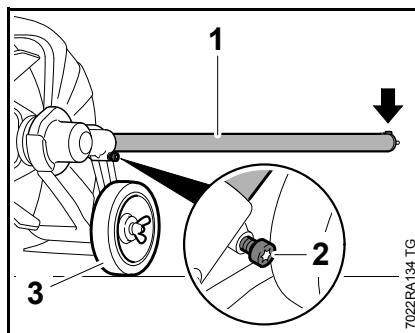


- Loosen the clamp screw (1) and pull out the drive tube (2).
- Check the drive tube and repair or replace if necessary, **5**

#### Installing



- Push the end of the drive tube (1) without fixing hole fully into the gearbox housing while turning the other end of the drive shaft back and forth until it slips into the drive pinion's square socket – the drive tube must be pushed in to the end of the slot in the clamp.



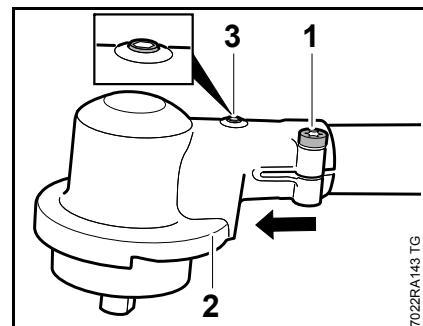
- Line up the drive tube (1) so that the lug (arrow) points vertically upwards when the depth wheel (3) is perpendicular, then tighten down the clamp screw (2) firmly.

#### Check operation

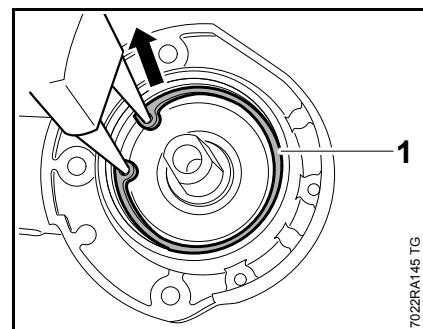
- Rotate the blade. The drive shaft must turn at the same time.

#### 9.4 Gearbox

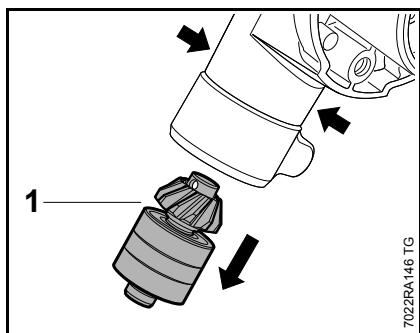
- Remove the blade, **9.1**
- Remove the thrust plate.
- Remove the wear guard, **9.4.1**
- Remove the deflector, **9.2**



- Loosen the screw (1) and pull the gearbox (2) off the drive tube.
- Take out the grub screw (3).

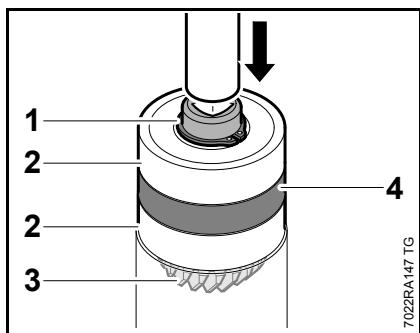


- Use pliers 0816 610 1000 to remove the circlip (1).



The viscosity of the gear lubricant is reduced when it is heated and it may drip  
– risk of burns from hot gear lubricant.

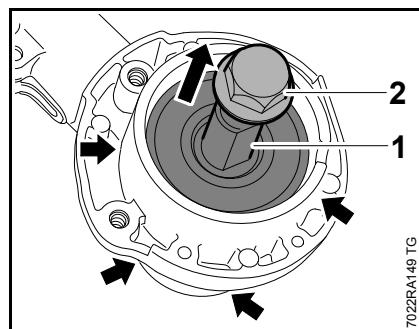
- Collect dripping gear lubricant in a tray.
- Hold clamp end of gearbox downwards and heat area of bearing seats (arrows) to about 140°C (285°F).
- When this temperature is reached, knock the gearbox carefully against a wooden base  
– the complete input pinion set (1) will drop out.



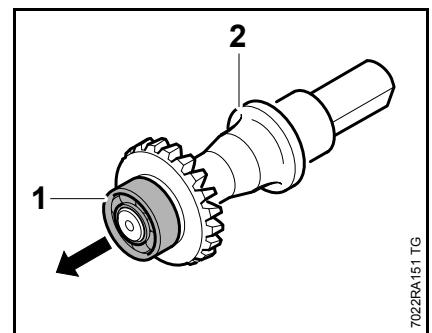
Always install new ball bearings.

- Remove the circlip (1).
- Support the ball bearings (2) on a suitable piece of pipe and use an 8 mm (0.3 in) drift to drive out the pinion.

- Inspect the spacer sleeve (4) and replace it if necessary.



- Fit the screw (2)  
– left-hand thread.
- Position gearbox with its output end facing up and heat the bearing seats (arrows) to about 140°C (285°F).
- When this temperature is reached, use screw head (2) to pull out the complete output shaft (1).
- Check and clean the gearbox, replace if necessary.

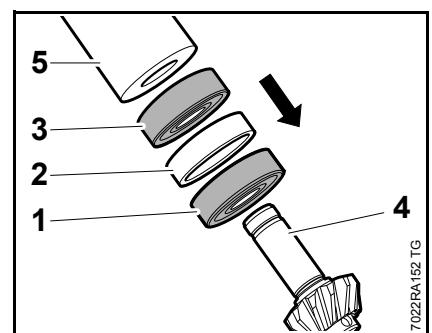


Always install new ball bearings.

- Pull the ball bearing (1) off the output shaft (2).
- Check and clean the output shaft, replace if necessary.

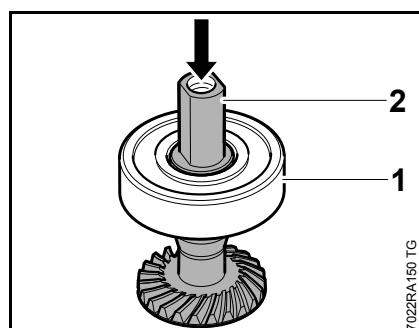
If one pinion is damaged, always replace the complete set of pinions (input and output pinions).

## Assembling



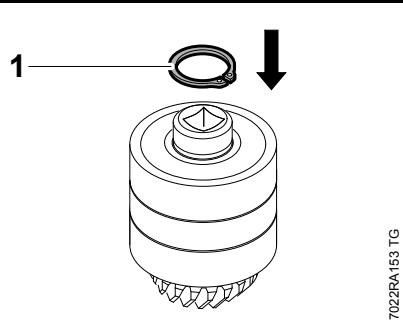
– Heat ball bearings at input end to about 50°C (120°F).

- Use press sleeve (5) 1129 893 2400 to install new ball bearing (1) on the input pinion (4) and then fit the spacer sleeve (2).
- Use press sleeve to install new ball bearing (4).

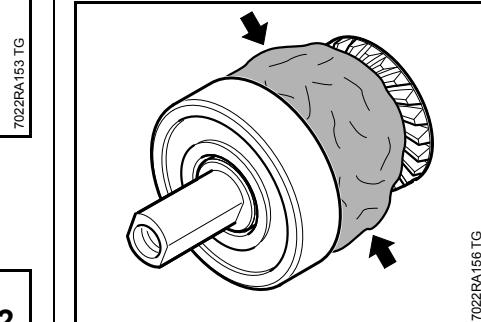


Always install new ball bearings.

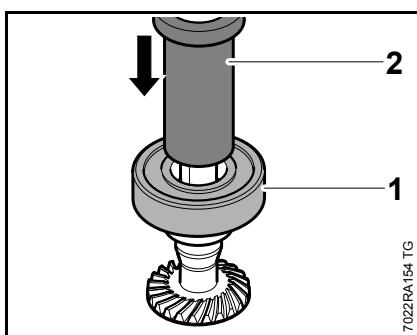
- Support ball bearing(1) on outer race and use suitable tool to press the output shaft (2) out of the bearing.



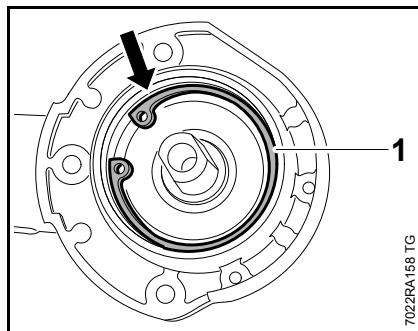
- Heat inner race of new ball bearing (1) to about 50°C (120°F) and push onto the short stub of the output shaft (2).



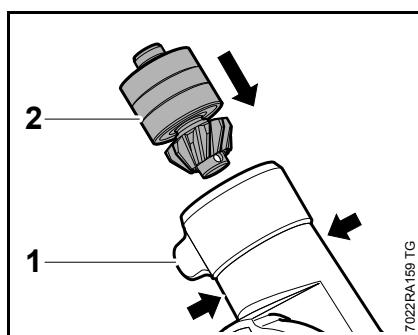
- Fit the circlip (1).



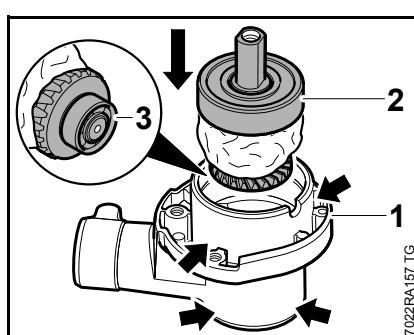
- Apply 25 g (0.9 oz) STIHL gear lubricant (arrows) between the teeth of the ring gear and the ball bearing, **3.3**, **13**



- Fit the circlip (1).

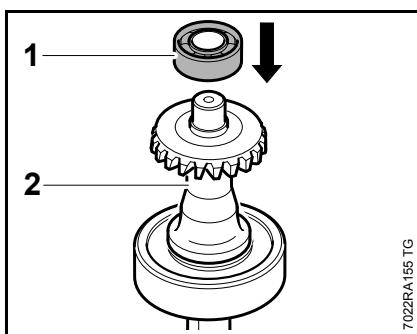


- Coat teeth of drive pinion with STIHL gear lubricant, **13**



Fit pinion assembly quickly because the ball bearings absorb heat and expand.

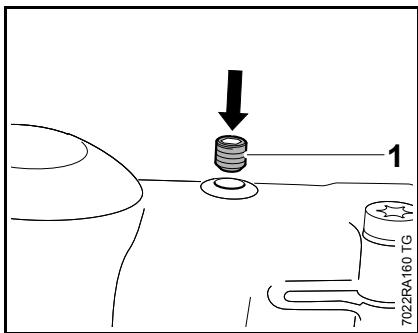
- Heat output end (arrows) of the gearbox housing (1) to about 140°C (285°F).
- Push the complete output shaft (2), small ball bearing(3) first, into the gearbox housing (1) as far as stop.



Fit the ball bearing quickly because it transfers heat to the output shaft and begins to shrink.

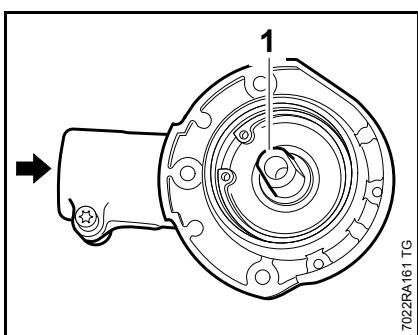
Fit pinion quickly because the ball bearings absorb heat and expand.

- Heat input end of gearbox housing (1) in area of bearing seats (arrows) to about 140°C (285°F).
- Hold drive pinion (2) with its teeth facing the gearbox housing and push it home as far as stop.
- If necessary, rotate output shaft until drive pinion meshes with the shaft.



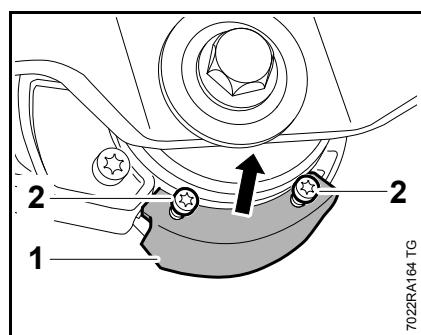
- Fit a new grub screw (1) and tighten it down as far as stop in the housing.

#### Check operation



- Rotate the output shaft (1). The square socket of the drive pinion (arrow) must also rotate
  - the gear assembly must turn freely.
  - Reassemble all other parts in the reverse sequence.

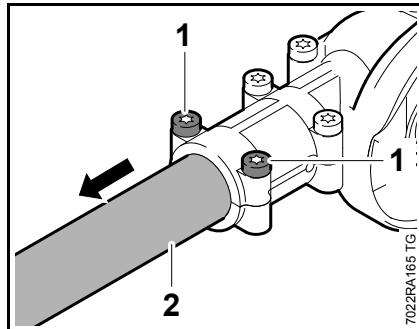
#### 9.4.1 Wear Guard



- Take out the screws (2) and remove the wear guard (1).
  - Inspect the wear guard and replace it if necessary.
  - Reassemble in the reverse sequence.

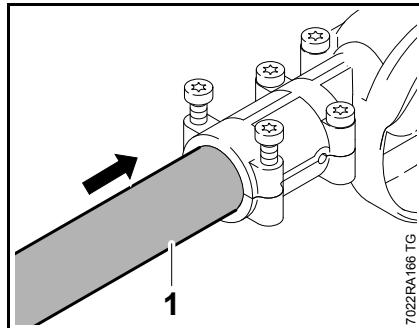
### 10.1 Drive Tube (Boom) Removing and Installing

- Remove drive tube from attachment.

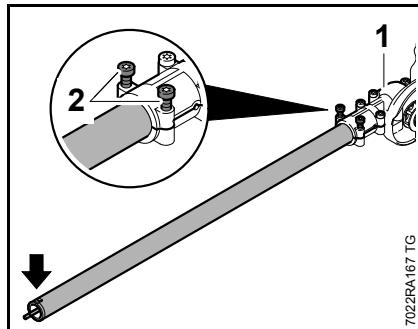


- Loosen the clamp screws (1) and pull out the drive tube (2).
- Check the drive tube and repair or replace if necessary, **8.4.1**

#### Installing



- Push the end of the drive tube (1) without fixing hole fully into the gearbox housing while turning the other end of the drive shaft back and forth until it slips into the drive pinion's square socket – the drive tube must be pushed in to the end of the slot in the clamp.



- Position the drive tube so that the safety label and the lug (arrow) are in line with the gearbox cover (1), and then tighten down the clamp screws (2) firmly.

#### Check operation

- Turn the drive shaft – the saw chain must rotate at the same time.

#### 10.1.1 Disassembling the Drive Shaft

- Disassemble the drive tube, **8.4.1**

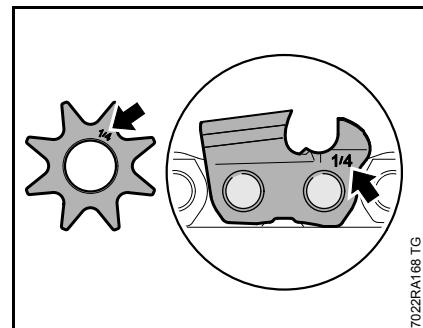
### 10.2 Saw Chain

Wear protective gloves.

- Remove the chain guard.
- Remove the chain sprocket cover.
- Remove the guide bar with chain.
- Inspect the saw chain, guide bar and chain sprocket cover, replace if necessary.
- If the chain is worn or damaged, also check condition of the chain sprocket and replace it if necessary, **10.4**
- If the chain is in order, resharpen it if necessary.

- If the guide bar is in good condition, clean the bar groove and lubricate it with oil.

#### Installing



Check pitch (arrows) – the specifications on the chain sprocket and chain links must match.

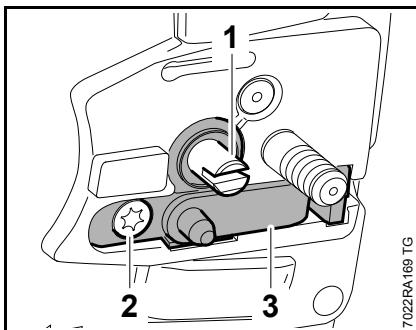
- Fit saw chain in bar groove – check orientation of cutters.
- Fit the guide bar with chain.
- Fit the chain sprocket cover – do not tighten down yet.
- Tension the chain, then tighten down the nut firmly – see instruction manual.

#### Check operation

- The saw chain must be properly lubricated via the oil hole and must not sag on the bottom of the bar. Inspect oil pump and oil port if necessary.

## 10.3 Chain Tensioner

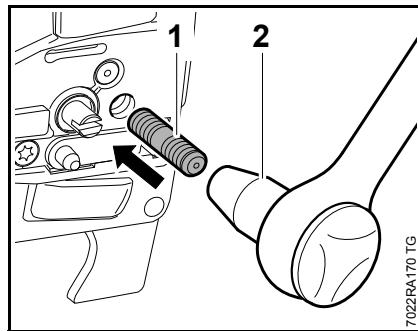
- Remove the cutting attachment, **10.2**



- Rotate the spur gear (1) clockwise until the screw (2) is visible.
- Take out the screw (2) and pull out the tensioner (3).
- Check individual parts of the chain tensioner, replace if necessary
- Clean all disassembled parts, **13**
- Lubricate thread and gears with STIHL grease, **13**
- Install in the reverse sequence.

### 10.3.1 Bar Stud

- Remove the cutting attachment, **10.2**
- Use stud puller 5910 893 0501 to unscrew stud from crankcase.

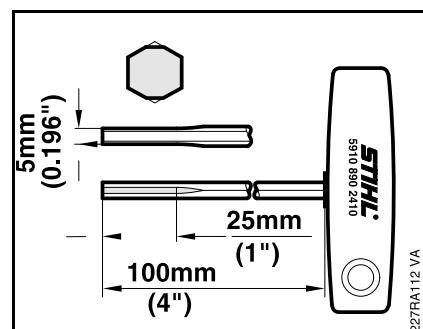


- Before installing, coat the thread (1) of the stud with threadlocking adhesive, **13**
- Use stud puller (2) 5910 890 0501 to fit and tighten down the stud (1).
- Reassemble all other parts in the reverse sequence.

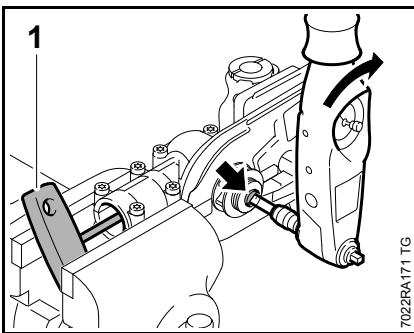
## 10.4 Chain Sprocket

- Remove the drive tube, **10.1**
- Remove the cutting attachment, **10.2**

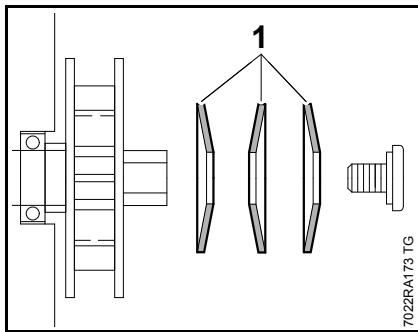
The drive pinion has to be held steady to loosen the screw on the chain sprocket – a hex socket screwdriver has to be modified for this purpose.



- Shorten a standard T-handle, 5 mm square section screwdriver or STIHL T-handle 5 mm hex socket screwdriver 5910 890 2410 to the length shown above.
- Modify hex profile to 5 mm square profile as shown in the illustration.

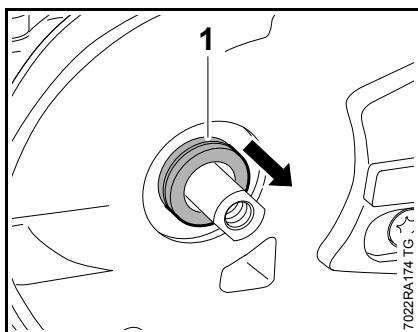


- Wear marks (a) on the chain sprocket must not be deeper than 0.5 mm since they would otherwise reduce the life of the saw chain. Replace sprocket if necessary – use gauge (special accessory) to check depth of wear marks.



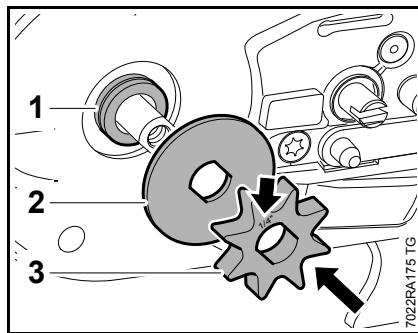
Cup springs produce the preload required for the friction clutch – if they have become flat, they must be replaced.

- Inspect the cup springs (1), replace the pack of 3 if necessary – always replace all the cup springs.

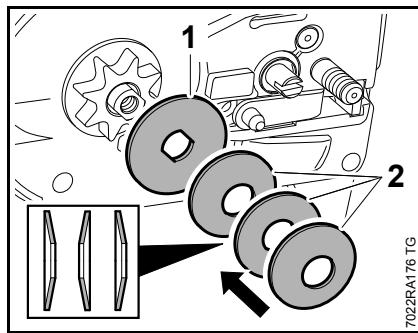


- Pull off the ring (1), check it and replace if necessary.
- Remove threadlocking adhesive from pinion's thread and the screw's thread.
- Clean stub of output pinion.

## Installing

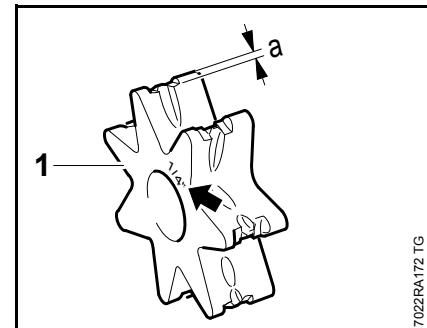


- Fit the ring (1) and washer (2).
- Fit the chain sprocket (3) so that the marking (arrow) faces outwards.



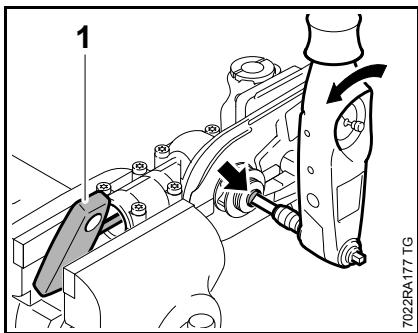
- Fit the washer (1) and then the cup springs (2) in the order and positions shown.

- Clamp the gearbox in a vise.
- Insert modified screwdriver (1) in the drive pinion's square socket as far as stop – the T-handle between the vise jaws.
- Loosen and unscrew the collar screw (arrow) clockwise – left-hand thread.
- Remove the cup springs, washers and chain sprocket.



- Inspect chain sprocket (1) for wear and replace if necessary – note pitch (arrow).

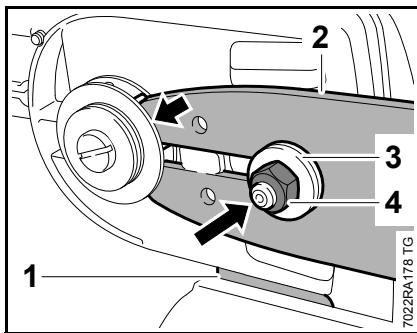
Always replace chain sprocket (1) with washers.



- Clamp the gearbox in a vise.
- Insert modified screwdriver (1) in the drive pinion's square socket as far as stop – the T-handle between the vise jaws.
- Coat thread of collar screw with threadlocking adhesive, **10.2**
- Fit and tighten down the collar screw (arrow) counterclockwise – left-hand thread.
- Test chain sprocket's friction clutch, **10.4.1**
- Mount the cutting attachment, **10.2**
- Install the drive tube, **10.1**

#### 10.4.1 Testing Chain Sprocket Friction Clutch

- Remove the drive tube, **10.1**
- Remove the cutting attachment, **10.2**
- Remove the chain tensioner, **10.3**



- Clamp the gearbox's hooked stop (1) in a vise so that the drive side is fully exposed above the vise.
- Place the guide bar (2) in position so that the upper end of its tail (arrow) engages between two teeth, then fit washers (3) up to a thickness of 6 mm on the stud. Fit nut (4) and tighten it down firmly – the chain sprocket is blocked.

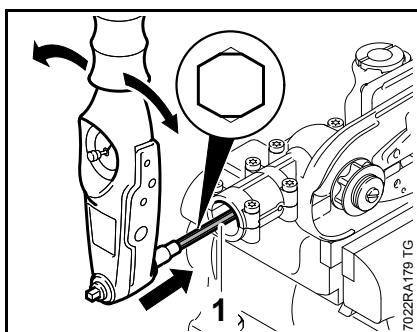
- The drive pinion must not turn until the torque applied is higher than 5 - 14 Nm.

If the torque required deviates from this value, replace the cup springs and, if necessary, the washers.

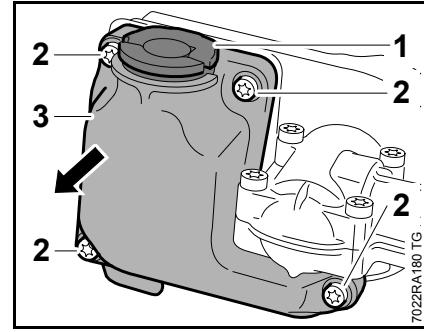
- Remove the guide bar.
- Mount the cutting attachment, **10.2**
- Install the drive tube, **10.1**

#### 10.5 Oil Tank

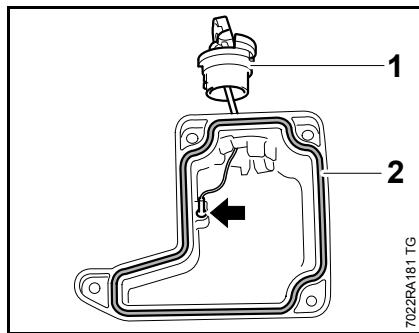
- Remove the drive tube, **10.1**
- Remove the cutting attachment, **10.2**



- Use standard 5 mm square bit for torque wrench  
or  
modify STIHL bit 5910 890 0102 (5 mm hex) as shown under "Removing Chain Sprocket" – do not shorten the bit.
- Insert bit (1) with torque wrench in the drive pinion's square socket and rotate the drive pinion.

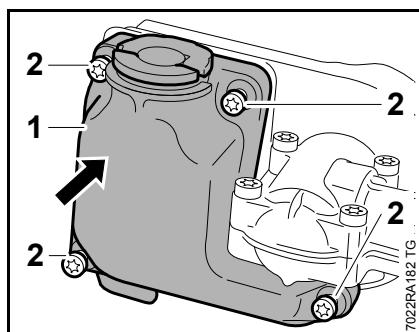


- Clean away loose dirt.
- Open the oil tank cap (1) and empty the oil into a clean container or dispose of it according to local regulations.
- Take out the screws (2) and remove the oil tank (3).



- Inspect the gasket (2) and replace if necessary.
- Inspect the tank cap (1), disconnect it (arrow) and replace if necessary.
- Check the oil pump's strainer and clean or replace if necessary.

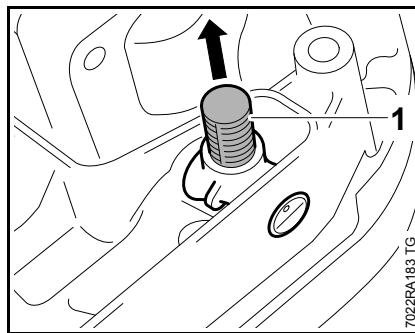
## Installing



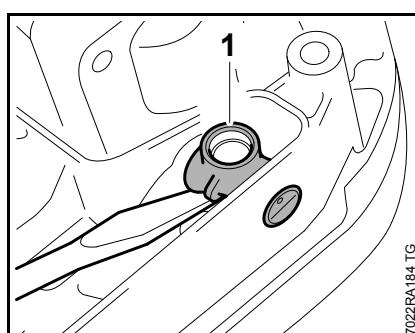
- Place the oil tank (1) in position, fit the screws (2) and tighten them down firmly in a crosswise pattern.
- Reassemble all other parts in the reverse sequence.

### 10.5.1 Oil Pump

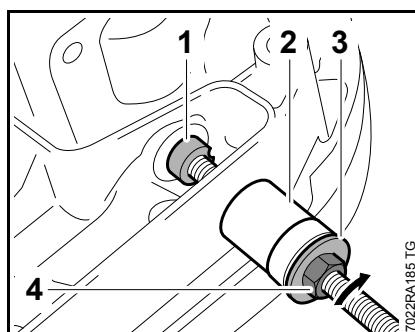
- Remove the drive tube, 10.1
- Remove the cutting attachment, 10.2
- Remove the oil tank, 10.5



- Pull out the strainer (1).



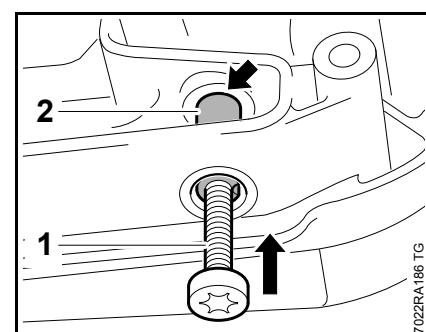
- Pry the connector (1) out of the gear housing.



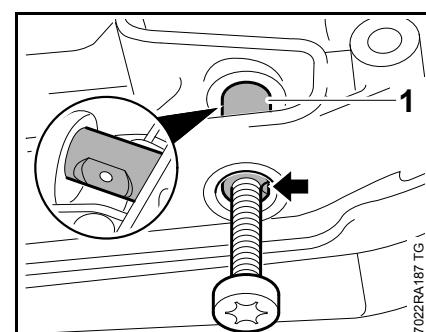
- Screw an M 5 threaded rod into the oil pump (1) as far as stop.
- Fit the guide (2) 1123 893 7700 and washer (3) on the threaded rod.
- Screw nut M 5 (4) on as far as stop, then continue turning until the oil pump (1) has been pulled out of the bore.

- Unscrew the threaded rod from the oil pump.
- Clean the oilway.
- Check the oil pump and replace if necessary.

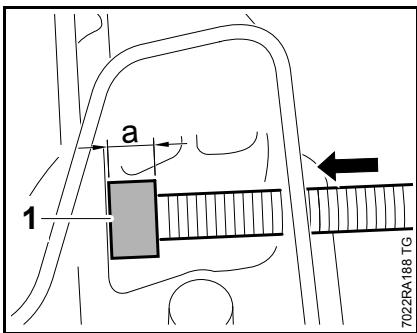
## Installing



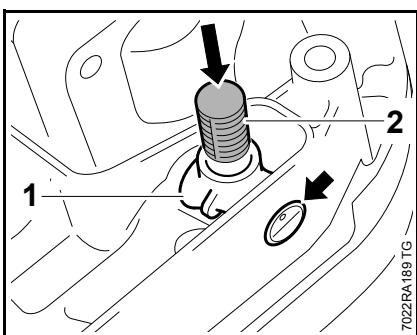
- Fit M 5 screw (1) in the oil pump (2) as far as stop.
- Position the oil pump (2) against the bore (arrow).



- Line up the oil pump (1) so that the groove (arrow) points towards the drive tube mounting – the oil hole in the oil pump (1) is then opposite the groove (arrow) and faces in the direction of the oilway.



- Press the oil pump (1) home until distance "a" is 4 mm.
- Take out the M 5 screw.



- Fit the connector (1) over the oil pump and press it into the guide so that the shoulder (arrow) engages the bore – the shoulder must locate properly in the bore to guarantee a perfect seal.
- Push the strainer (2) into the connector (1) as far as stop.
  - check that the strainer (2) is properly seated in the connector (1).
- Install the oil tank, 10.5
- Install the drive tube, 10.1

#### Check operation

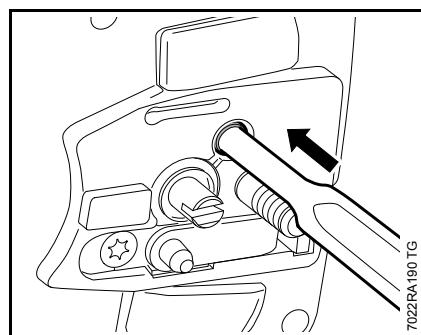
Oil must be delivered through the oil hole during operation.

- Remove the cutting attachment, 10.2

#### 10.5.2 Oil Tank Vent Valve

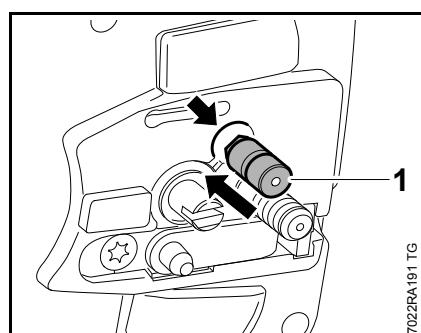
A valve is installed in the housing wall to keep internal tank pressure equal to atmospheric pressure. The valve must be replaced if it is faulty.

- Remove the drive tube, 10.1
- Remove the cutting attachment, 10.2
- Open the oil tank cap and drain the oil tank 1.1.



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

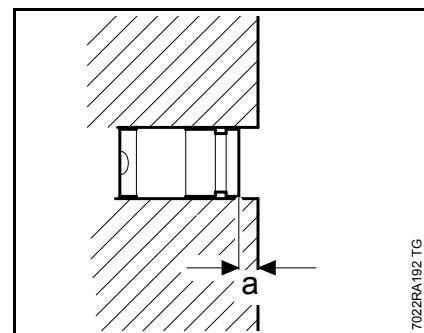
#### Installing



Check correct installed position.

- Place new valve (1) in the gear housing bore (arrow) from outside.

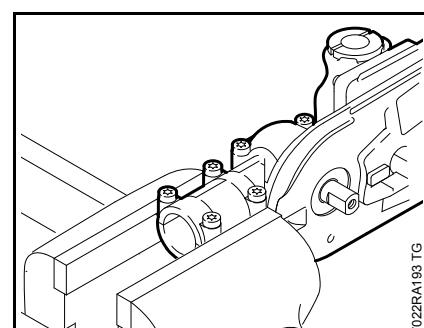
- Use a 6 mm drift to carefully drive the valve into the housing – note installed depth.



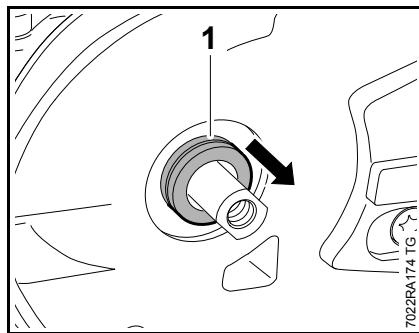
- Drive the new valve into the bore to a depth of 1 +/- 0.2 mm (a).
- Reassemble all other parts in the reverse sequence.

#### 10.6 Disassembling Gearbox

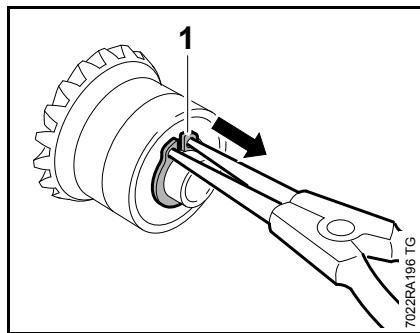
- Remove the drive tube, 10.1
- Remove the cutting attachment, 10.2
- Remove the chain sprocket, 10.4



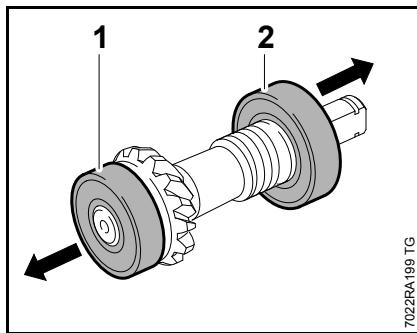
- Clamp the gearbox in a vise.



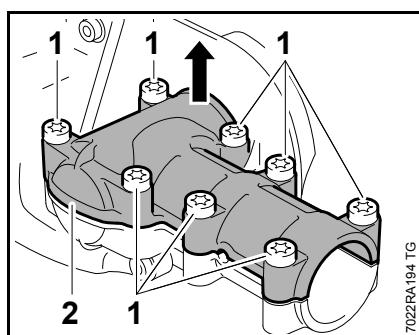
- Pull off the ring (1).



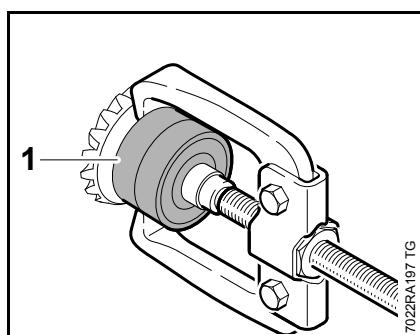
- Remove the circlip (1).



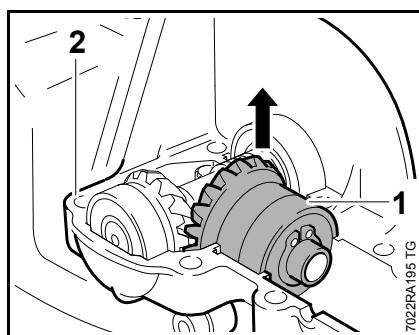
- Pull off the ball bearings (1, 2).



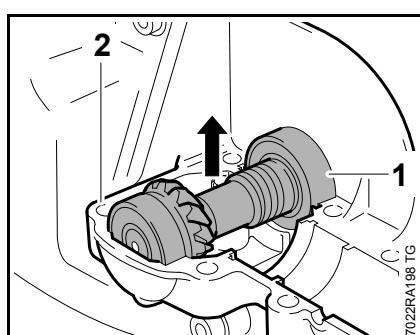
- Take out the screws (1) and remove the gearbox cover (2).



- Remove the ball bearings (1) with a suitable puller.
  - Inspect the input pinion and replace set of pinions (input and output) if necessary.

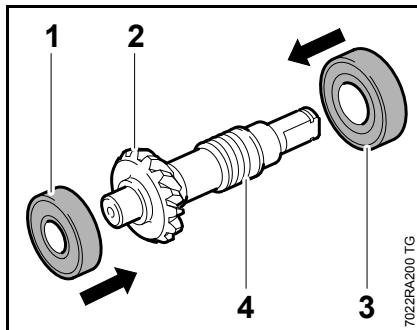


- Remove the input pinion from the gearbox housing (2) - use a screwdriver to release it from the bearing seat if necessary.

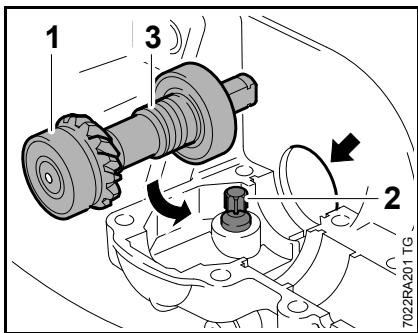


- Remove the shaft from the gearbox housing (2) - use a screwdriver to release it from the bearing seats if necessary.

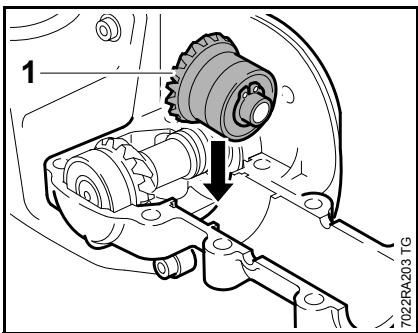
## Assembling



- Apply suitable tool to inner race of the 24 mm ball bearing (1) and press it onto stub until it butts against the pinion (2).
- Apply suitable tool to inner race of the 28 mm ball bearing (3) and press it onto shaft until it butts against the worm (4).

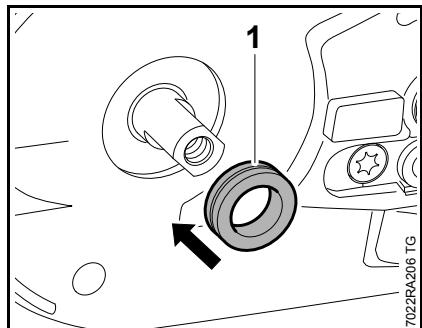


- Coat pinion and worm with STIHL gear lubricant, **13**
- Fit output pinion (1) in the bore (arrow) and press it into its bearing seats so that the teeth of the oil pump (2) mesh with the worm (3) – turn back and forth if necessary.
- Pack cavity below the output pinion with the specified quantity of STIHL gear lubricant, **3.3**, **13**

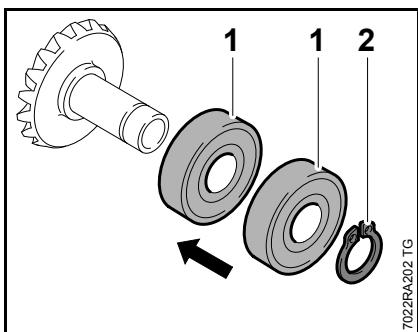


- Coat input pinion with STIHL gear lubricant, **13**
- Press the input pinion (1) into its bearing seat so that its teeth mesh with the output pinion.

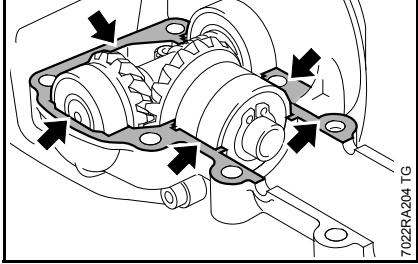
- Fit the gearbox cover (2), insert screws (1) and tighten down firmly – do not tighten down the clamp screws (arrows) yet.



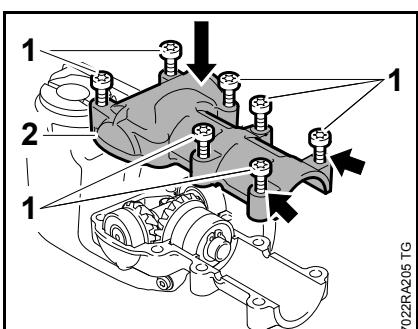
- Fit the ring (1).
- Install the chain sprocket, **10.4**
- Test chain sprocket's friction clutch, **10.4.1**
- Mount the cutting attachment, **10.2**
- Install the drive tube, **10.1**



- Apply suitable tool to inner bearing race and press on first and second ball bearing (1) as far as stop – groove for circlip must be exposed.
- Fit the circlip (2).



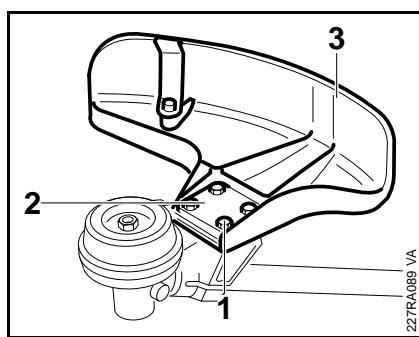
- Clean sealing face (arrows) and apply thin coating of Dirk gray sealant – the sealing face must be free from grease, **13**



- Sealing face of gearbox cover (2) must be free from grease, clean if necessary.

## 11. Other Components

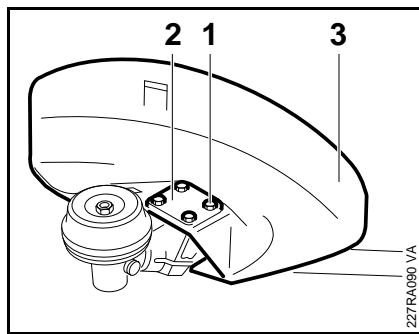
### 11.1 FS Deflector



- Remove the gearbox from the drive tube, **6.1.1**

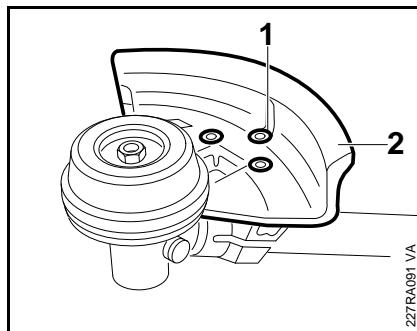
#### Deflector for mowing heads

- Take out the screws (1).
- Remove the backing plate (2) and deflector (3).
- Reassemble in the reverse sequence.



#### Deflector for all cutting attachments

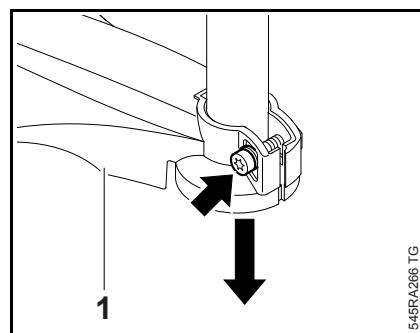
- Take out the screws (1).
- Remove the backing plate (2) and deflector (3).
- Reassemble in the reverse sequence.



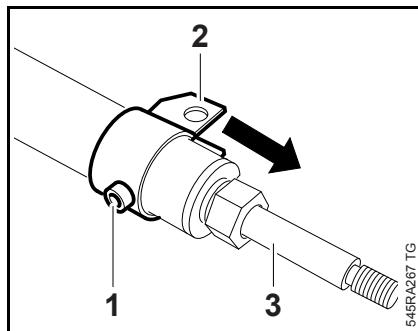
#### Limit stop for circular saw blades

- Take out the screws (1).
- Remove the limit stop (2).
- Reassemble in the reverse sequence.

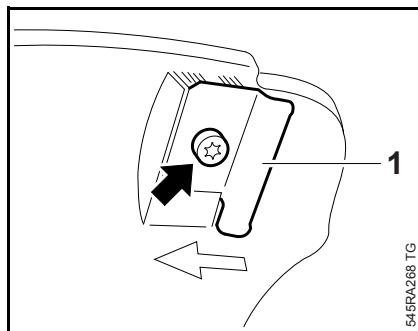
#### 11.1.1 Deflector for Machines without Gearbox FS 40, FS 50



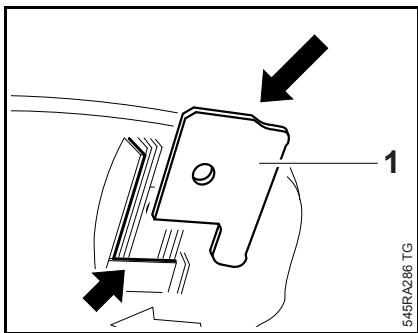
- Take out the clamp screw (arrow) and remove the hex nut.
- Pull off the deflector (1).



- Take out the screw (1)
- Pull off the clamp (2).
- Reassemble in the reverse sequence.
- Inspect bearing housing (3), replace if necessary, see FS, FC, KM 4144 service manual.



- Take out the screw (arrow).
- Remove the line limiting blade (1), check and sharpen or replace as necessary.

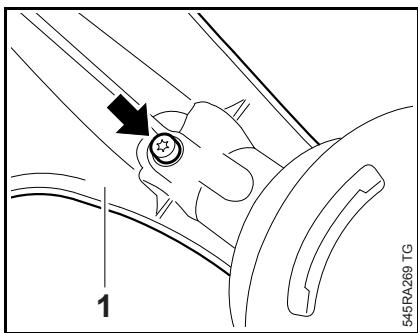


- Push the line limiting blade (1) into its seat (arrow).
- Insert screw and tighten it down firmly.

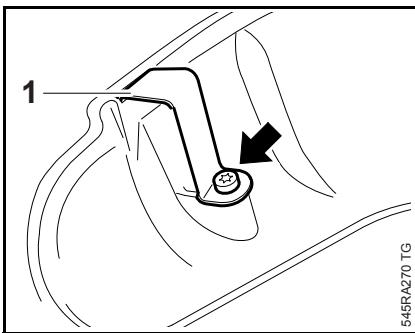
To avoid stripping the thread in the plastic housing, locate screw in existing thread and tighten in down carefully.

- Reassemble all other parts in the reverse sequence.

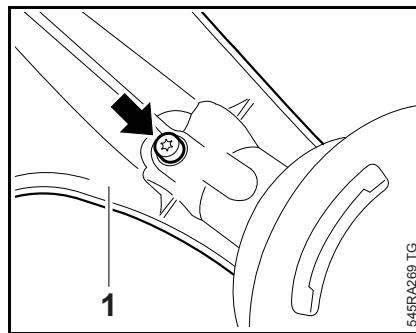
#### 11.1.2 Deflector for Machines with Gearbox – FS 56



- Take out the screw (arrow).
- Remove the deflector (1).

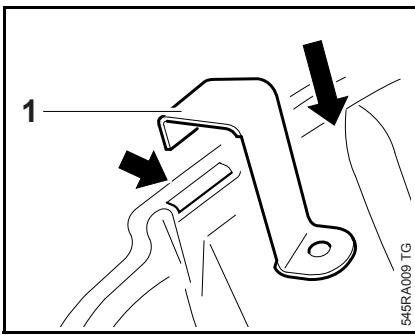


- Take out the screw (arrow).
- Remove the line limiting blade (1), check and sharpen or replace as necessary.



- Position the deflector (1) against the gearbox.
- Insert screw (arrow) and tighten it down firmly.
- Reassemble all other parts in the reverse sequence.

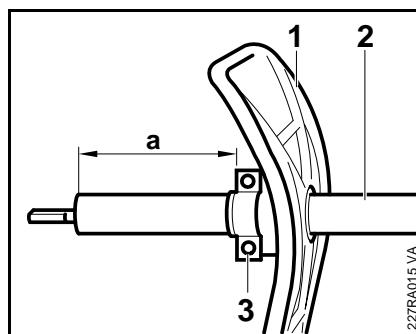
#### 11.2 BC Deflector



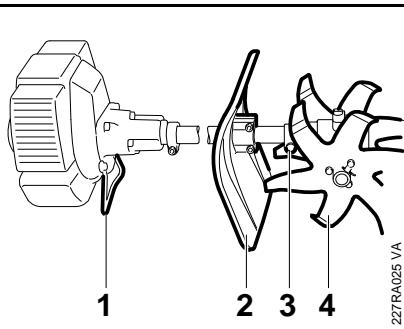
- Push the line limiting blade (1) into its seat (arrow).
- Insert screw and tighten it down firmly.

To avoid stripping the thread in the plastic housing, locate screw in existing thread and tighten in down carefully.

- Check the gearbox, repair or replace as necessary.



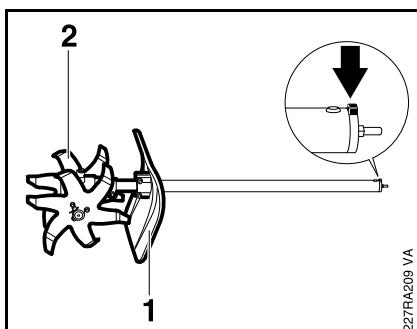
- Remove the gearbox, [6.1.1](#)
- Loosen the clamp screws (3) and pull the deflector (1) off the drive tube (2).
- Push the deflector (1) onto the drive tube (2) until distance "a" is 100 mm.
- Install the gearbox, [6.1](#)



### BC 35 only

- Align the deflector (2) on the drive tube so that the machine support (1) on the engine and the longer end of the deflector point down and the rotor blades (4) are upright.
- Tighten down the clamp screws (3) firmly, [3.1](#)

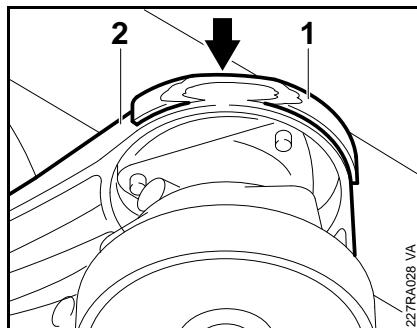
It should not be possible to rotate the deflector on the drive tube.



- BC with short drive tube and BC-KM: Deflector (1) and rotor blades (2) must be upright and the lug (arrow) on the drive tube must point vertically upwards.

## 11.3 FCS

### 11.3.1 Wear Guard

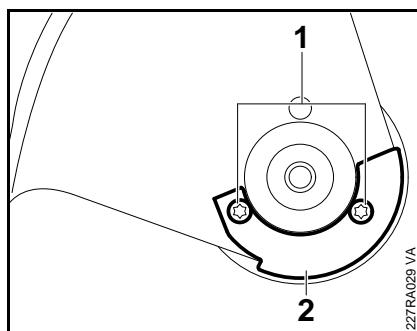


The wear guard protects the gearbox. Replace the wear guard if it is worn or its surface is damaged.

#### Checking

- Inspect wear guard (1) for damage.
- Replace the wear guard (1) if it has worn through to the deflector (2).

The gearbox may be seriously damaged if a worn wear guard is not replaced in good time.



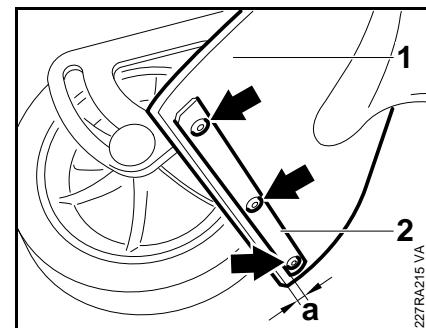
#### Replacing

- Remove the blade.
- Take out the screws (1) and remove the wear guard (2).

- Reassemble in the reverse sequence.

- Inspect gearbox wheel for signs of wear or damage, [11.3.3](#)

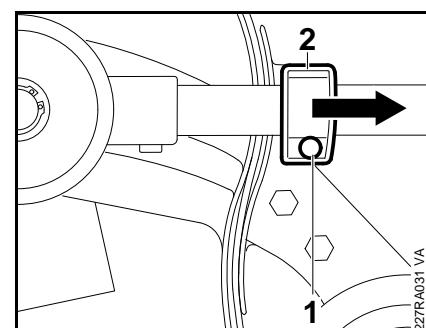
### 11.3.2 Mud Flap



#### Checking

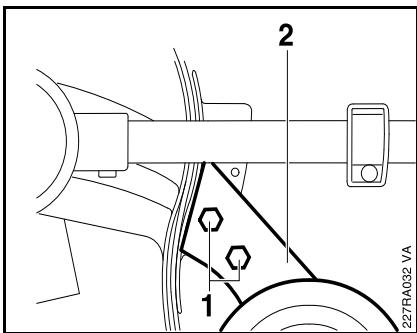
- Inspect the mud flap (1) for signs of wear.

The complete mud flap must be replaced if wear has reduced distance "a" as shown, or if one of the rivets (arrows) or the metal strap (2) is damaged or missing.

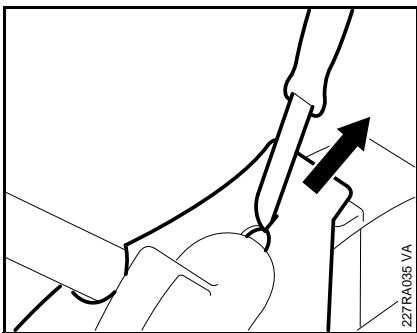


#### Removing

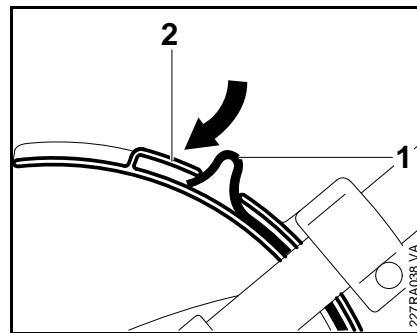
- Loosen screw (1) on the clamp (2) and push the clamp along the drive tube towards the engine.



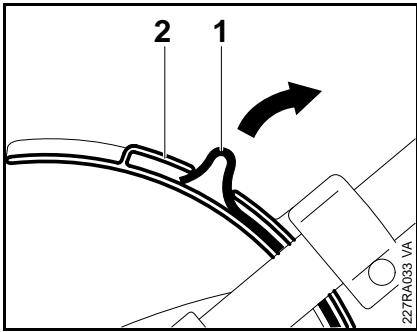
- Take out the screws (1) and remove the segment (2).



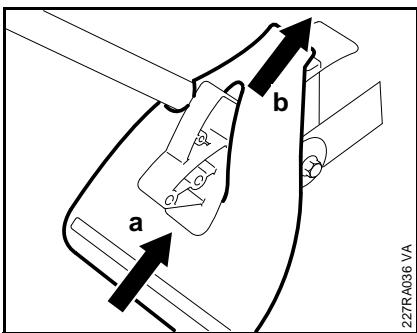
- Use a knife to cut through the mud flap from the slot upwards and then remove the mud flap.



- Slide the end (1) of the mud flap under the recess (2) on the deflector.

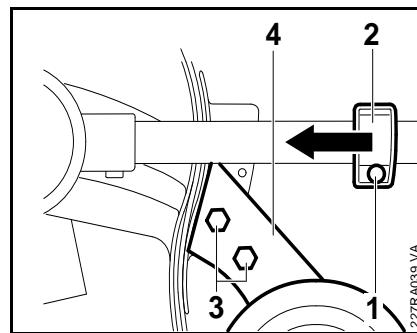


- Pull the end (1) of the mud flap out of the recess (2) on the deflector.

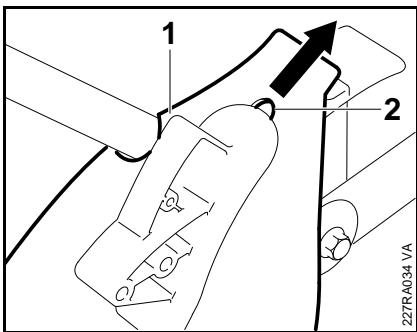


### Installing

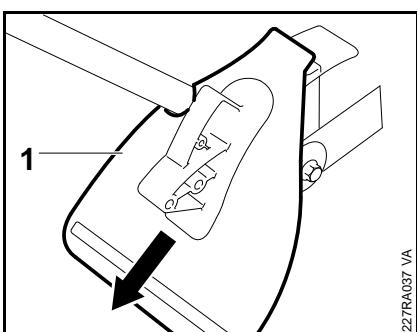
- Engage the mud flap in the bottom of the seat (a), push it up all the way and pull it over the top edge of the seat (b) until it slips into position.



- Secure the segment (4) with the screws (3).
- Slide the clamp (2) down the drive tube towards the gearbox and secure it in position with the screw (1).

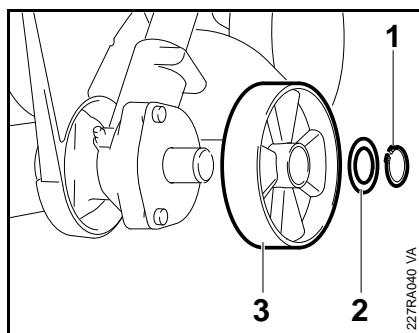


- Pull the mud flap (1) upwards until the slot (2) is visible.



- Pull the mud flap (1) firmly downwards.

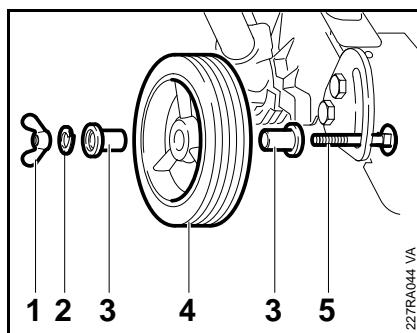
### 11.3.3 Gearbox Wheel



The wheel helps protect the gearbox from wear. Replace the gearbox wheel if its running face is worn in places or badly damaged.

- Remove the circlip (1) from the shaft.
- Take the washer (2) and wheel (3) off the shaft.
- Install a new gearbox wheel.
- Reassemble in the reverse sequence.
- Check the wear guard, [11.3.1](#)

### 11.4 Depth Wheel



Replace a worn or damaged depth wheel.

#### Removing

- Unscrew the wingnut (1) and remove the spring washer (2).

The wingnut may be difficult to remove because the end of the screw thread is caulked.

- Remove the depth wheel (4) with bushings (3).
- Remove the bearing screw (5).

#### Installing

Always use a new wingnut and new bearing screw.

- Fit the new bearing screw 5) in the depth wheel segment.
- Push the bushings (3) with depth wheel (4) onto the bearing screw.
- Tighten down the new wingnut (1) with spring washer (2) firmly.

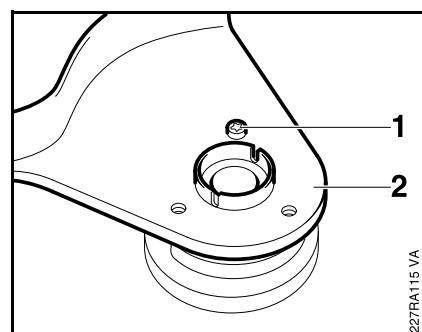
A cup spring was installed instead of a spring washer on early machines. Always use a spring washer when re-installing.

- Use center punch to caulk the end of the bearing screw's thread (to prevent the wingnut working loose).

#### 11.4.1 Deflector

- Remove the wear guard, [11.3.1](#)
- Remove the mud flap, [11.3.2](#)

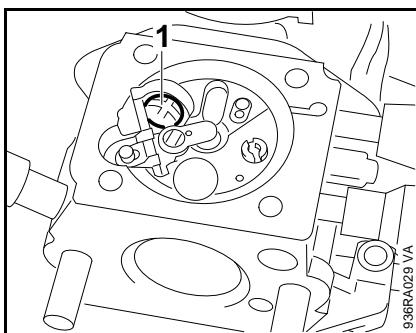
Pull off the mud flap – cut it open only if it is worn or damaged.



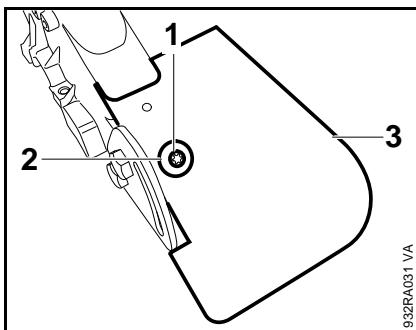
- Take out the screw (1) and remove the deflector (2).
- Reassemble in the reverse sequence.

## 11.5 FC, FCB

### 11.5.1 FC Deflector (Wheel Adjustment on Segment)

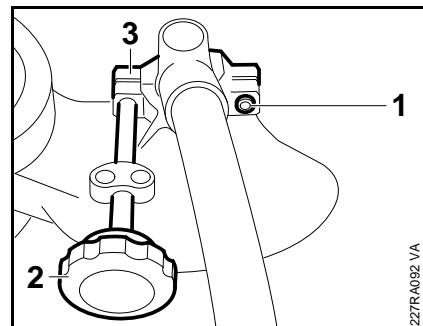


- Take out the clamp screws (1).
- Remove the clamp (2).
- Remove the deflector (3) from the gearbox.
- To replace the deflector, first remove the depth wheel,  
    **11.5.5**

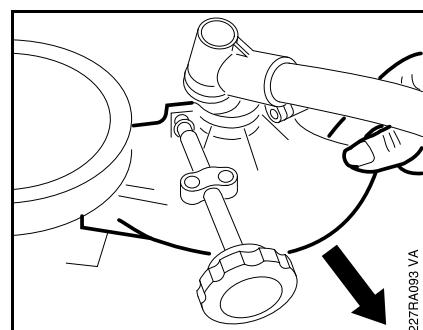


- Take out the screw (1) and remove the washers (2).
- Remove the mud flap (3).
- Reassemble in the reverse sequence.

### 11.5.2 FC Deflector (Wheel Adjustment on Deflector)

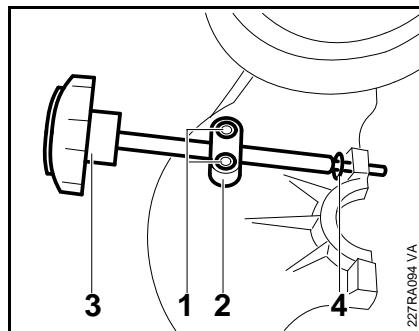


- Remove the blade.
- Take out the clamp screw (1) and the screw with knob (2).
- Remove the clamp (3).

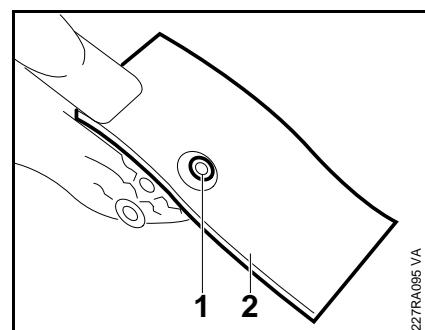


- Remove the deflector from the gearbox.

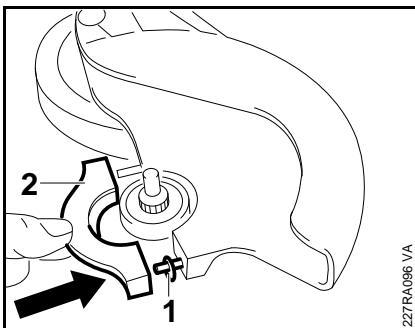
Perform the following operations to replace the deflector:



- Remove screws (1) from retainer (2).
- Pull out the screw with knob (3) and remove the washer (4).

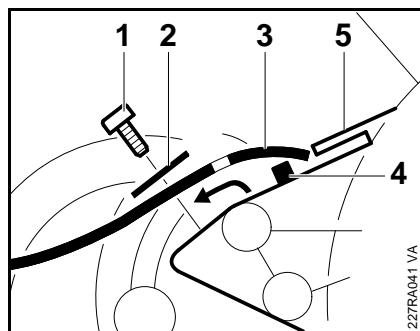


- Take out the screw (1)
- Remove the mud flap (2).
- Remove the depth wheel,  
    **11.5.4**
- Reassemble in the reverse sequence.

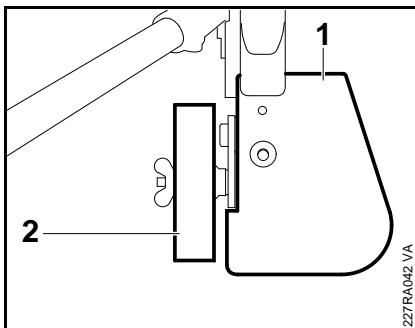


- Fit the washer (1) on the clamp screw.
- Place the clamp (2) in position.
- Fit new self-locking nuts and tighten them down firmly, 3.1
- Assemble all other parts in the reverse sequence.

### 11.5.3 Mud Flap



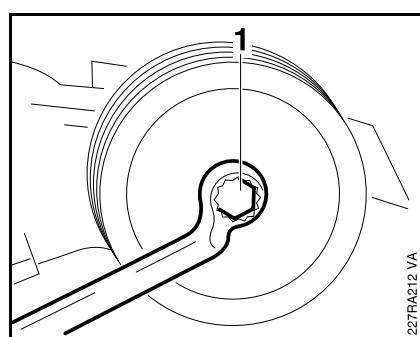
- Take out the screw (1) and remove with washer (2).
- Pull the skirt (3) off the lug (4) and out of the deflector (5).



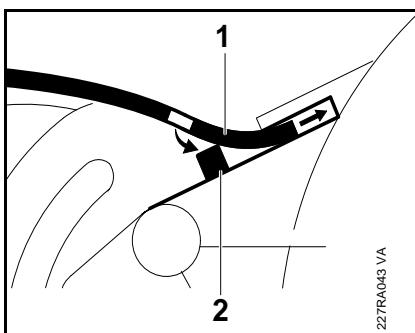
- Position the new mud flap (1) correctly in relation to wheel (2).

If the wheel is on the left, the mud flap must project to the right.

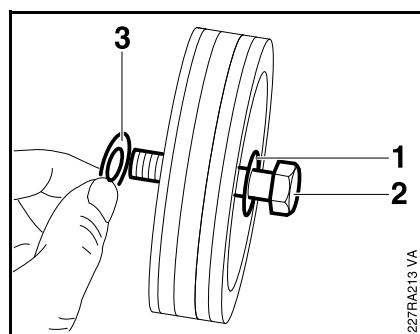
### 11.5.4 Depth Wheel



- Take out the bearing screw (1).
- Remove the depth wheel.

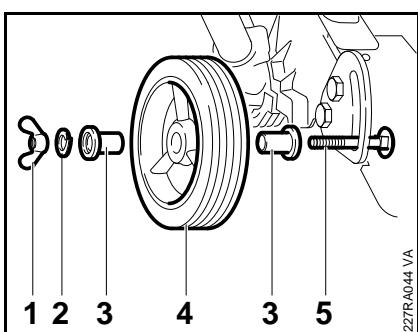


- Push the mud flap (1) into the slot in the deflector until it can be engaged on the lug (2).
- Fit the washer on the screw.
- Insert the screw and tighten it down firmly, 3.1



- Fit the washer (1) on the bearing screw (2).
- Insert the bearing screw in the depth wheel.
- Fit the washer (3).
- Position the depth wheel against the deflector.
- Insert the bearing screw and tighten it down firmly, 3.1

### 11.5.5 Depth Wheel (Wheel Adjustment on Segment)



Replace a worn or damaged depth wheel.

#### Removing

- Unscrew the wingnut (1) and remove the spring washer (2).

The wingnut may be difficult to remove because the end of the screw thread is caulked.

- Remove the depth wheel (4) with bushings (3).
- Remove the bearing screw (5).

#### Installing

Always use a new wingnut and new bearing screw.

- Fit the new bearing screw 5) in the depth wheel segment.
- Push the bushings (3) with depth wheel (4) onto the bearing screw.

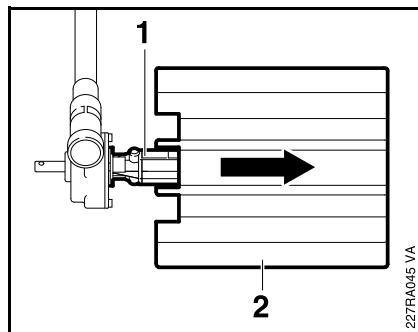
- Tighten down the new wingnut (1) with spring washer (2) firmly.

A cup spring was installed instead of a spring washer on early machines. Always use a spring washer when re-installing.

- Use center punch to caulk the end of the bearing screw's thread (to prevent the wingnut working loose).

## 11.6 KW (4602)

### 11.6.1 Sweeper Drums



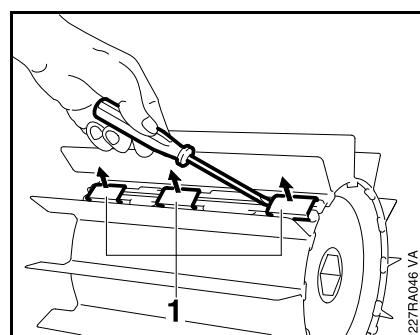
- Remove the cotter pin from the axle (1).

- Pull the sweeper drum (2) off the axle (1).

Always replace sweeper drums in pairs.

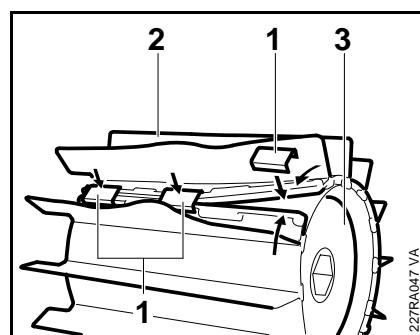
- Push the sweeper drum onto the axle and secure it with a new cotter pin.
- Examine axle for damage and replace if necessary, [11.6.3](#)
- Reassemble in the reverse sequence.

### 11.6.2 Sweeper Belts



- Remove the sweeper drums, [11.6.1](#)

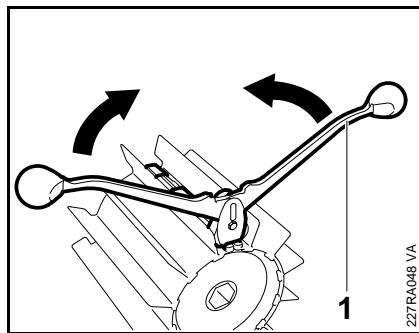
- Use a screwdriver to remove the clips (1).



- Examine drum (3) for signs of damage.

- Wrap the new sweeper belt (2) around the drum (3) and fit the new clips (1).

Always replace the sweeper belts in pairs.



- Close the clips with special pliers (1).

- Repeat the procedure for the second sweeper belt.

The special pliers (1) for securing the clips are available from packaging tool suppliers:

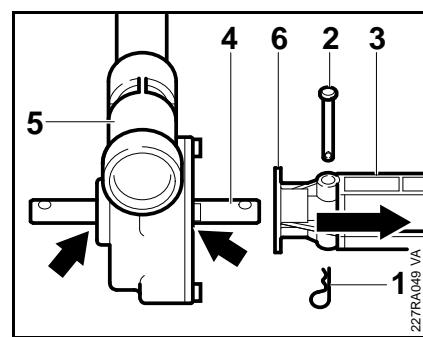
In Germany, for example, from:

Banholzer & Wenz GmbH  
Felix-Wankel-Straße 13,  
73760 Ostfildern-Nellingen,

Modell Signode SRC-3423, Order No. 0008635

- Install the sweeper drums, [11.6.1](#)

### 11.6.3 Axle

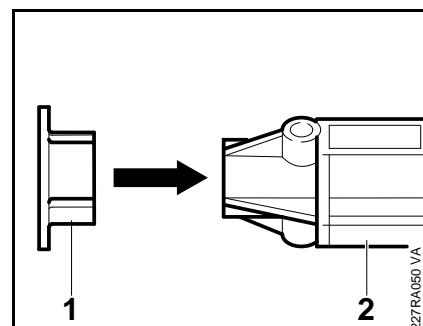


- Remove the sweeper drums, [11.6.1](#)
- Remove the spring clip (1) and pull out the clevis pin (2).
- Pull the axle (3) off the output shaft (4) on the gearbox (5).

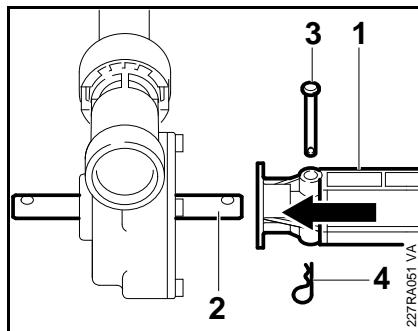
Inspect gearbox housing for signs of oil (arrows) and replace the gearbox if necessary.

- Pull the grass shield (6) out of the axle (3).

Examine axle and grass shield for signs of damage (e.g. worn bores) and replace if necessary.

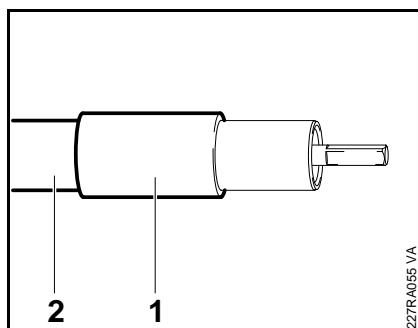


- Push the grass shield (1) firmly on to the axle (2) as far as stop.

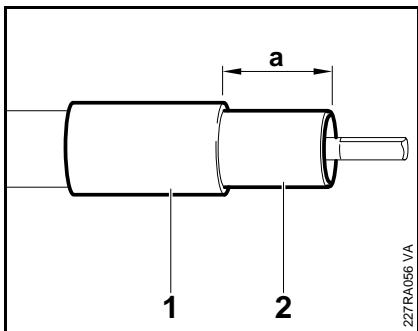


- Push the axle (1) on to the output shaft (2).
- Insert the clevis pin (3) through the output shaft (2). Secure the clevis pin with the spring clip (4).
- Install the sweeper drums, [11.6.1](#)
- Reassemble in the reverse sequence.

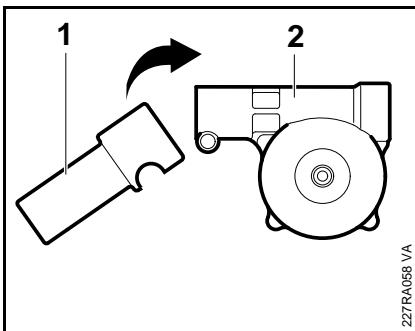
### 11.6.4 Sleeve on Drive Tube



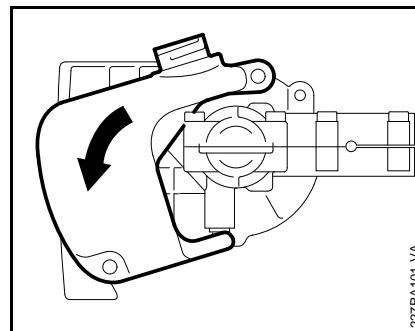
- Remove the gearbox, [6.1.3](#)
- Remove the worn sleeve (1) from the drive tube (2) – cut it open with a knife if necessary.



227RA056 VA



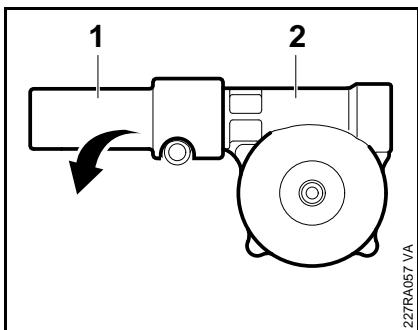
227RA058 VA



227RA101 VA

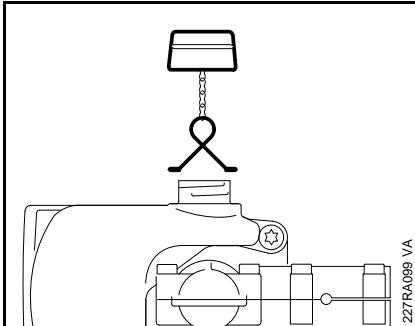
- Degrease the end of the drive tube.
- Push new sleeve (1) onto the end of the drive tube (2); distance "a" is 37.5 mm.
- Install the gearbox, **6.1.3**

#### 11.6.5 Sleeve on Gearbox



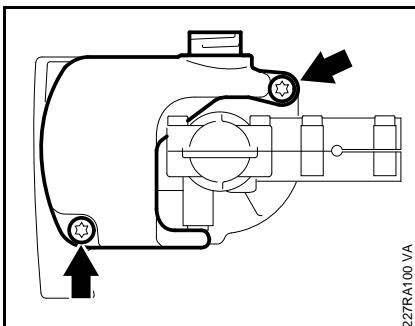
227RA057 VA

- Remove the gearbox, **6.1.3**
- Pull the sleeve (1) off the gearbox (2).



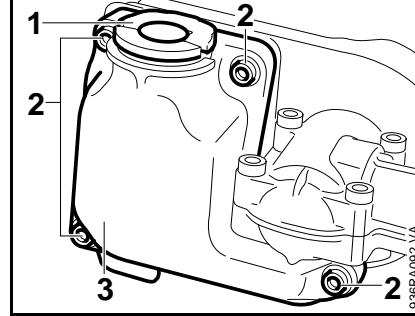
227RA098 VA

- Remove the oil tank cap with the cap retainer.
- Collect the oil in a clean container or dispose of it properly according to local regulations.



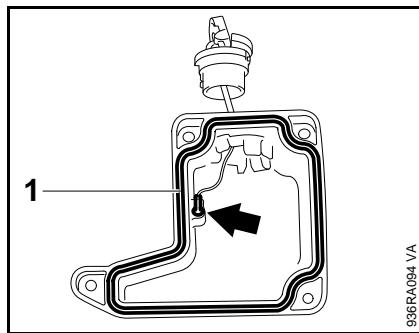
227RA100 VA

- Remove the screws (arrows) from the oil tank.



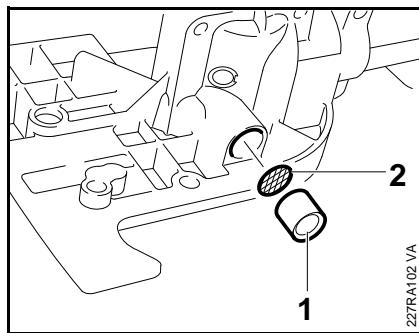
93RA092 VA

- Clean the cutting head thoroughly.
- Open the oil tank cap (1) and empty the oil into a clean container or dispose of it according to local regulations.
- Remove the screws (2) from the oil tank.
- Remove the oil tank (3).

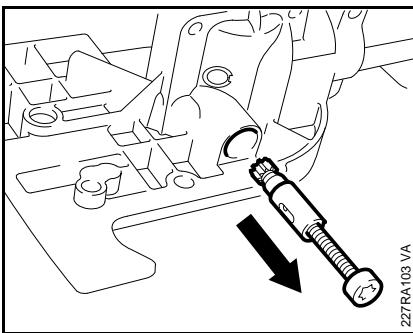


- Inspect the gasket (1) and replace it if necessary.
- Disconnect the oil tank cap if necessary (arrow).
- Reassemble in the reverse sequence.

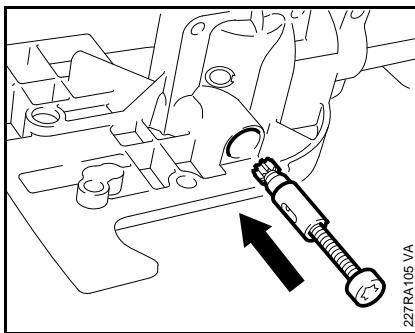
#### 11.7.3 Oil Pump (up to 2002)



- Remove the oil tank, [11.7.1](#)
- Pry the rubber buffer (1) out of the gearbox housing.
- Remove the strainer (2).

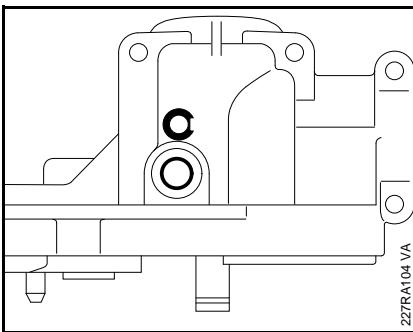


- Screw an M 5 screw (at least 25 mm long) into the oil pump.
- Pull the oil pump out with the screw.
- Clean the oilways.

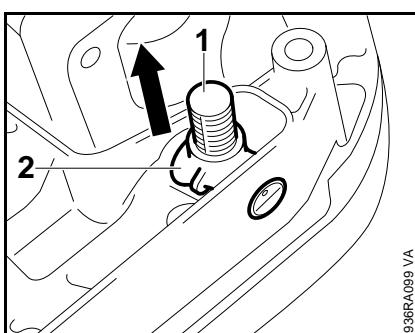


- Screw the M 5 screw into the oil pump and then press home the oil pump.
- Take out the M 5 screw.
- Assemble all other parts in the reverse sequence.

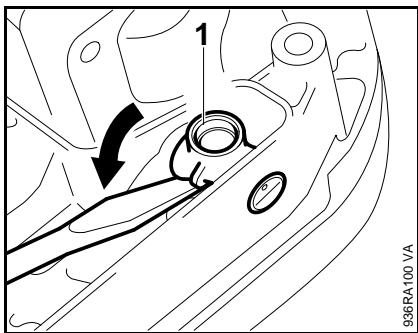
#### 11.7.4 Oil Pump (from 2002)



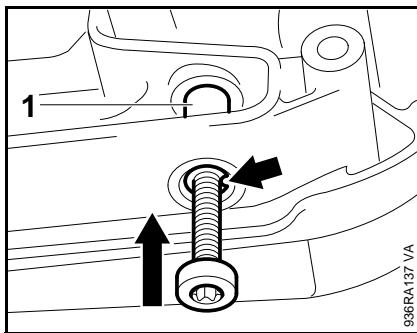
- Fit the oil pump as shown by the symbol next to the bore. The groove must point towards the drive tube mounting.



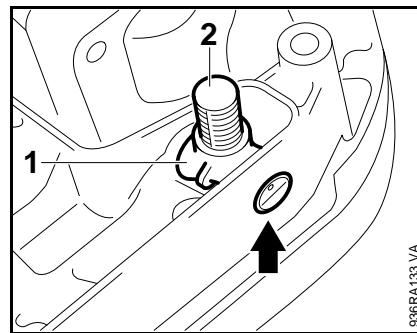
- Remove the oil tank, [11.7.2](#)
- Pull the strainer (1) out of the stub (2).



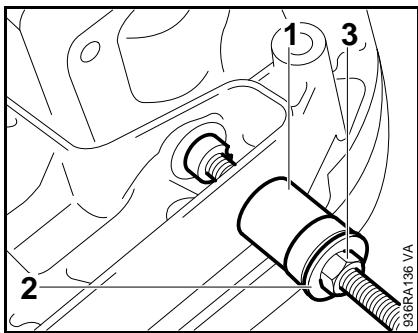
- Pry the stub (1) out of the gearbox housing.
- Screw an M 5 threaded rod into the oil pump as far as stop.



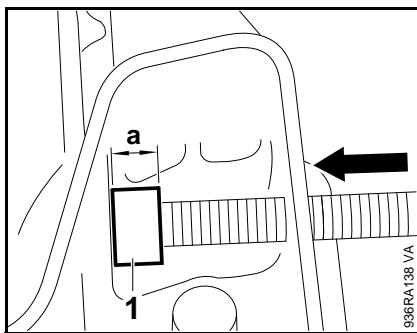
- Clean the oilways.
- Screw the M 5 screw into the oil pump (1) and position the oil pump in its seat.
- Check that the groove (arrow) points toward the drive tube mounting.
- Press home the oil pump.



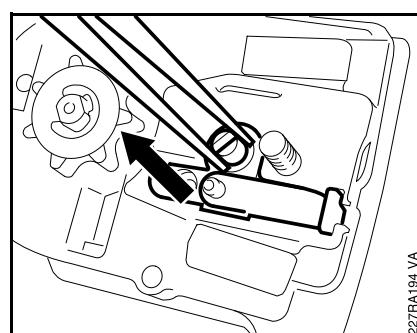
- Fit the stub (1) and strainer (2).
- Check that the strainer is properly seated in the stub and that the stub seals the oil tank against the gearbox housing (arrow).
- Assemble all other parts in the reverse sequence.



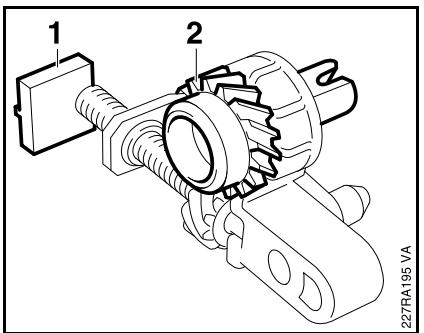
- Fit the guide (1) 1123 893 7700 and washer (2) on the threaded rod.
- Fit an M 5 nut (3).
- Turn the nut clockwise to pull out the oil pump.
- Unscrew the threaded rod from the oil pump.



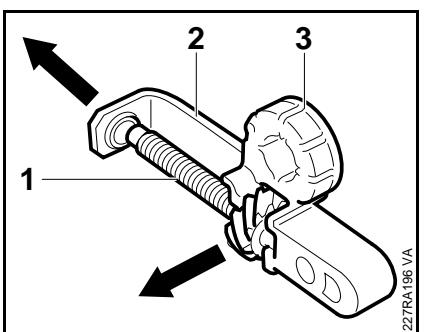
- Press the oil pump (1) home until distance "a" is 4 mm.
- Take out the M 5 screw.



- Remove the chain and bar.
- Remove the complete chain tensioner.



- Remove the thrust pad (1) from the tensioning screw.
- Pull the spur gear (2) out of the cover.



- Unscrew the tensioning screw (1) from the tensioner slide (2). Remove the tensioner slide.
- Pull the tensioning screw (1) out of the cover (3).
  - Reassemble in the reverse sequence.

## 12. Special Servicing Tools

No.	Part Name	Part No.	Application	Rem.
1	Spline screw socket T27x125	0812 542 2104	Tightening IS screws	
2	Pliers	0816 610 1000	Removing and installing circlips	
3	Pliers	0816 610 1451	Removing and installing circlips	
4	Press sleeve	1108 893 2405	Installing ball bearing on FBD-KM output shaft	
5	Press sleeve	1114 893 4601	Removing and installing piston pin, SP 92	
6	Guide	1123 893 7700	Removing the oil pump	
7	Press sleeve	1129 893 2400	Installing ball bearing on FBD-KM input pinion	
8	Ring gauge	4112 893 6400	Supporting lower half of gear housing, SP 92	
9	Thrust piece	4116 894 1000	Installing retaining ring, SP 92	
10	Press arbor	4119 893 7200	Removing and installing ball bearings	
11	Stop pin	4130 893 7800	Removing and installing blade, blocking shaft (FDB-KM)	
12	Assembly drift	4237 893 4700	Removing and installing piston pin, SP 92	
13	Assembly drift	4249 893 1100	Installing retaining ring, SP 92	
14	Centering sleeve	4249 893 9400	Installing pin, SP 92	
15	Torque wrench	5910 890 0301	0.5 to 18 Nm	1)
		5910 890 0302	0.5 to 18 Nm	1)
16	Torque wrench	5910 890 0311	6 to 80 Nm	2)
		5910 890 0312	6 to 80 Nm	2)
17	T-handle screwdriver, QI-T27x150	5910 890 2400	For all IS screws	
18	Hook	5910 890 2800	Removing plug from drive tube	
19	Stud puller	5910 890 3001	Installing and tightening down 8 mm stud	
20	Puller	5910 890 4400	Removing oil seal (gearbox housing)	
	- Jaws (No. 1 and 2)	0000 893 3700	Removing ball bearing, SP 92	
	- Jaws (No. 7)	0000 893 3703		
21	Stud puller	5910 893 0501	Unscrewing 8 mm stud	

### Remarks

- 1) Always use torque wrench to tighten DG and P screws.
- 2) Wrench has optical/acoustic signal.
- 3) On DG and P screws, use for releasing only.

## 13. Servicing Aids

No.	Part Name	Part No.	Application
1	STIHL lubricating grease (225 g tube)	0781 120 1111	Oil seals, oil pump drive, chain sprocket bearing
2	STIHL Press Fluid OH 723	0781 957 9000	Handle hose on drive tube
3	STIHL special lubricant	0781 417 1315	Bearing bore in rope rotor, rewind spring in fan housing
4	Dirko sealant, gray (100 g tube)	0783 830 2120	Sealing faces, gearbox housing
5	Dirko sealant, HT red (90 g tube)	0783 830 2000	Sealing faces, gearbox housing, temperature resistant -50°C to +250°C
6	Standard commercial solvent-based degreasant containing no chlorinated or halogenated hydrocarbons		Cleaning sealing faces
7	STIHL multipurpose grease 40 g tube 80 g tube 225 g tube	0781 120 1021 0781 120 1109 0781 120 1110	Gearbox, drive shaft
8	STIHL gear lubricant 40 g tube 80 g tube 225 g tube	0781 120 1022 0781 120 1117 0781 120 1118	Gearbox, drive shaft
9	STIHL resin solvent (300 ml can)	0782 420 1002	Lubricating and cleaning cutting blades





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