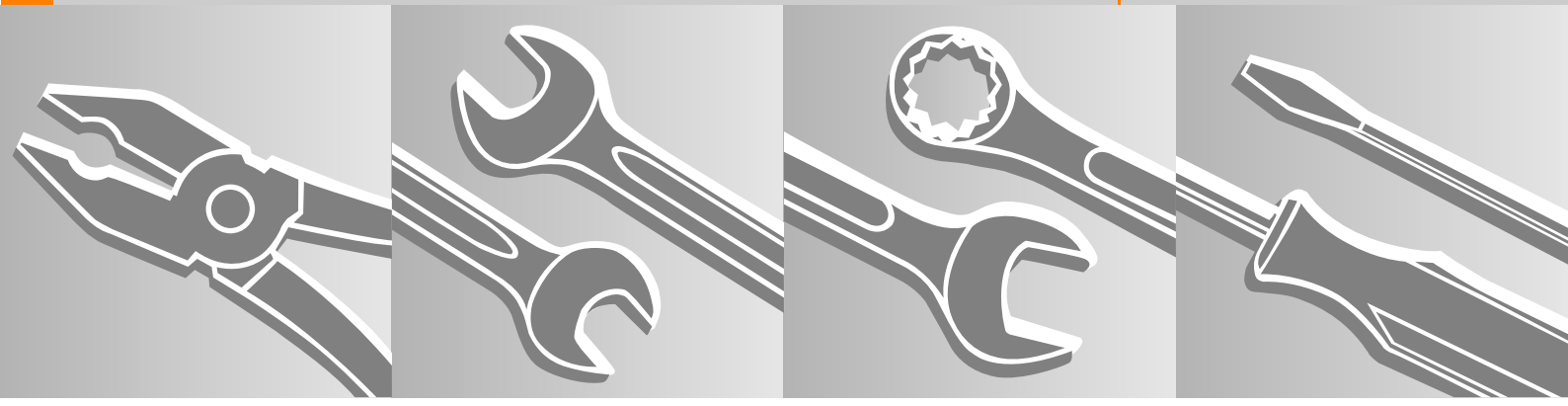
STIHL BT 120

1999-01



CONTENTS

1. SAFETY PRECAUTIONS

If the earth auger 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 owner's manual.

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

Improper handling may result in burns or other serious injuries.

Warning! Do not smoke or bring any fire or flame near the fuel. All work with fuel must be performed outdoors only. Spilled fuel must be wiped away immediately.

STIHL®

This service manual contains only descriptions for servicing the auger drive and replacing the handle frame.
Please refer to the FS 120 service manual for repair procedures on the powerhead and the control handle.

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 needed.
Parts lists on microfiche and CD-ROM are always more up to date than printed lists.

A fault on the machine may have several causes. To help locate the fault, consult the troubleshooting charts for all assemblies in the "Standard Repairs, Trouble-shooting" handbook.

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.

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

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

In the descriptions:

- • = Action to be taken as shown in the illustration (above the text)

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

In the illustrations:

➔ = Pointer

➔ = Direction of movement

Service manuals and all technical information bulletins describing engineering changes are intended exclusively for the use of STIHL servicing dealers. 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 ®.
The symbol may appear alone on small parts.

3. SPECIFICATIONS

3.1 Engine

STIHL single cylinder two-stroke engine with special impregnated cylinder bore

Displacement:	30.8 cm^3 (1.88 cu.in)
Bore:	35 mm (1.38 in)
Stroke:	32 mm (1.26 in)
Power to ISO 8893:	1.3 kW (1.8 bhp) at 9,000 rpm
Cut-off speed (rated) without auger (electronic speed governor):	12,300 rpm
Idle speed:	2,800 rpm
Bearings:	Crankshaft supported in heavy-duty ball bearings, needle cages on small and big ends
Piston pin diameter:	10 mm (0.39 in)
Rewind starter:	ElastoStart
Pawls:	Single pawl system
Reserve pull on rope rotor:	min. 1/2 turn
Starter rope:	3.0 mm (0.12 in) dia. x 800 mm (31.5 in)
Clutch:	Centrifugal clutch without linings
Clutch engages at:	4,300 rpm
Crankcase leakage test	
at gauge pressure:	0.5 bar (7.25 psi)
under vacuum:	0.5 bar (7.25 psi)

3.2 Fuel System

Carburetor:	Diaphragm carburetor
Carburetor leakage test	
at gauge pressure:	0.8 bar (11.6 psi)
Function of tank vent	
at gauge pressure:	≤ 0.3 bar (4.35 psi)
under vacuum:	≤ 0.05 bar (0.725 psi)
Fuel tank capacity:	0.64 l (1.35 US pt)
Octane rating:	min. 90 RON (US/CAN; pump octane min. 87)
Fuel mixture:	Regular brand name gasoline and two-stroke engine oil
Mix ratio:	**50:1** with STIHL two-stroke engine oil **25:1** with other brand name two-stroke, air-cooled engine oils
Air filter:	Paper filter

3.3	**Ignition System**	Type:	Electronic magneto ignition (breakerless) with integral trigger unit and electronic speed governor
		Air gap:	0.2 - 0.5 mm (0.008 - 0.020 in)
		Spark plug (suppressed):	Bosch WSR 6F, NGK BPMR 7 A or Champion RCJ 6Y
		Electrode gap:	0.5 mm (0.020 in)
		Spark plug thread:	M14x1.25
		Length of thread:	9.5 mm (0.37 in)
3.4	**Drilling Gear**	Type:	Straight spur gear drive, two-stage
		Gear ratio:	47.5:1
		Max. on-load drilling spindle speed	190 rpm
		Maximum torque at drilling spindle	79 Nm (53 lb.ft)
		Bearings:	Deep groove ball bearings
		Lubrication:	STIHL gear lubricant 0781 120 1117 or 0781 120 1118 (approx. 20g / 0.7oz)
3.5	**Special Accessories**		
3.5.1	**For User**	Shank extension	4311 680 2350
		Chuck	4311 680 4010
		ElastoStart	0000 190 3400
		ElastoStart rope	0000 195 8200
		STIHL gear lubricant	
		– 80 g/3 oz tube	0781 120 1117
		– 225 g/8 oz tube	0781 120 1118
		STIHL special oil	
		– 100 ml/3.5 fl.oz	0781 417 1315
3.5.2	**For Service**	Carburetor parts kit	4134 007 1060
		Set of gaskets	4134 007 1050

3.6 Tightening Torques

DG and P screws (Plastoform) are used in polymer and lightmetal 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 detrimentally affecting the strength of the screwed assembly, providing the specified tightening torque is observed. For this reason it is **essential to use a torque wrench.**

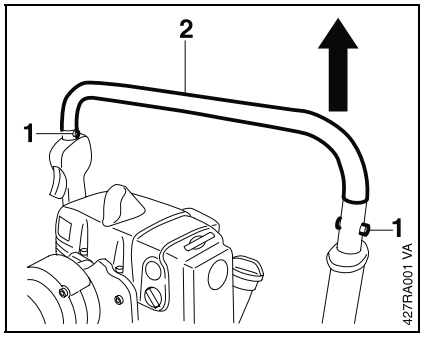
Fastener	Thread size	For component	Torque Nm	lbf.ft
Collar nut	M5	Clutch housing	8.5	6.3
Spline screw	IS-M5x30	Gear housing/clutch housing	8.0	5.9
Spline screw	IS-M5x52	Gear housing/clutch housing	8.0	5.9
Spline screw	IS-M5x30	Cover/gear housing	8.0	5.9
Screw plug	M11x10	Gear housing	8.5	6.3
Spline screw	IS-M5x12	Brake band	4.0	3.0
Spline screw	IS-M5x10	Flat spring	8.0	5.9
Spline screw	IS-DG5x14	Clamp	4.0	3.0
Spline screw	IS-M6x18	Handlebar/gearbox	10.0	7.5
Spline screw	IS-M5x30	Handlebar/handlebar	4.0	3.0
Plastoform screw	IS-P4x16	Control handle/handle moldings	1.0	0.75
Spline screw	IS-M5x12	Clamp Control handle/handlebar	2.0	1.5
Spline screw	IS-DG5x20	Shroud	6.0	4.4
Pivot pin	M8x10	Activating lever	18.0	13.3

Use the following procedure to fit a DG or P screw in an existing thread:

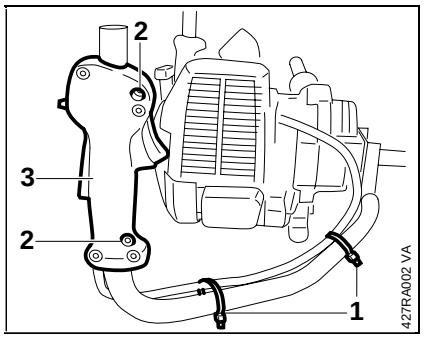
– Place the DG or P screw in the hole and rotate it counterclockwise until it drops down slightly.
– Tighten the screw clockwise to the specified torque.

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

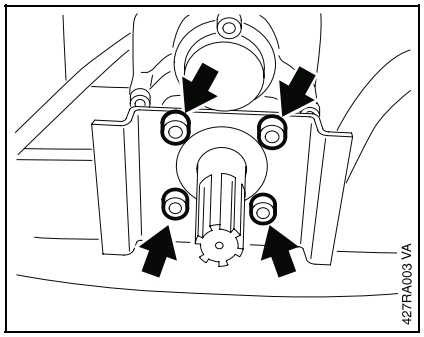
Note: Power screwdriver speed settings for polymer: Plastoform screws max. 600 rpm, DG screws max. 500 rpm



- Unscrew nuts and remove screws (1).
- Pull out the handlebar (2).

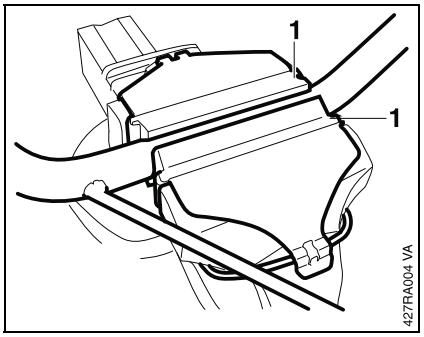


- Cut through cable ties (1).
- Release screws (2).
- Pull off the control handle (3).



- Remove the mounting screws.

- Take the handlebar off the gearbox.



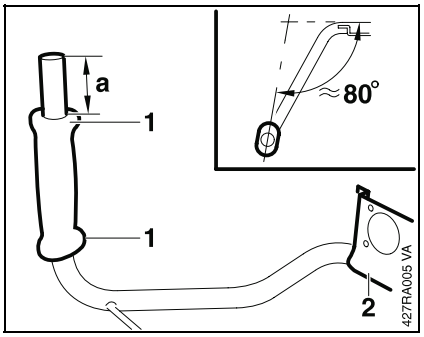
- Use jaws (1) 5910 893 2700 to clamp the handlebar in a vise.

- To replace left handle, carefully cut it open and ease it off the handlebar.

Install in the reverse sequence.

- Coat inside of handle with a little lubricant (e.g. washing-up liquid).

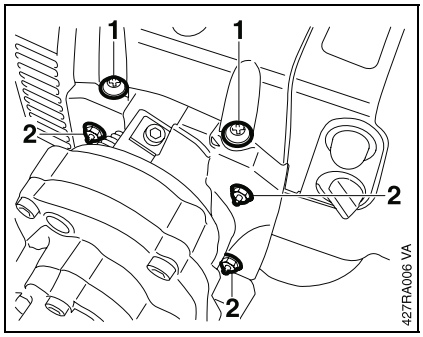
Note: If you use too much lubricant, the handle will twist on the handlebar. Allow it to dry for a while after fitting.



- Slip the handle over the handlebar so that its long ends (1) point toward the mounting plate (2) at an angle of about 80 degrees.

- The distance (a) from the handlebar to the handle should be approx. 55 mm (2 in).

- Tighten control handle screws to torque of 2 Nm (1.5 lbf.ft), handlebar screws to 4 Nm (3 lbf.ft) and the handlebar mounting screws on the gearbox to 10 Nm (7.5 lbf.ft).



Disassembling

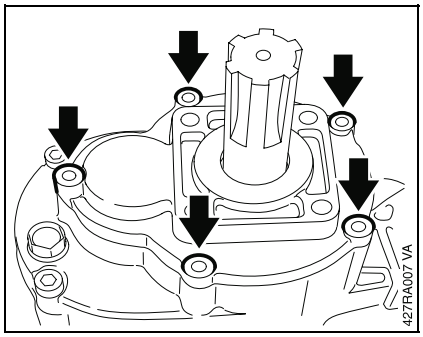
- Remove the handlebar - see 4.1.

- Remove shroud mounting screws (1).

- Unscrew the nuts (2).

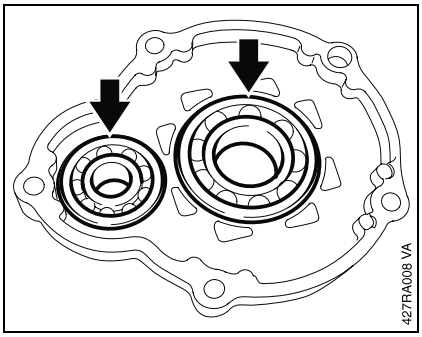
- Pull away clutch housing with gearbox.

- Inspect clutch drum and replace if necessary - see 5.2.



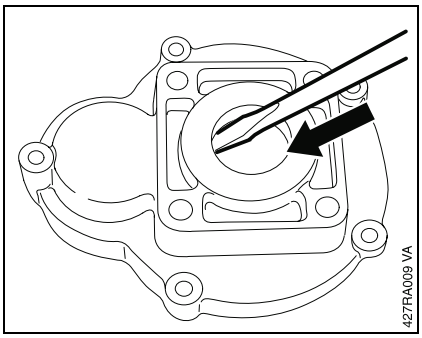
- Take out the cover mounting screws.

- Remove the cover.

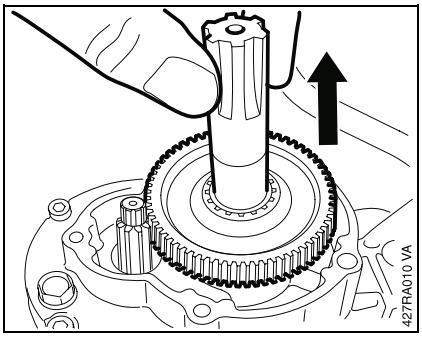


- Heat cover to approx. 80°C (175°F).

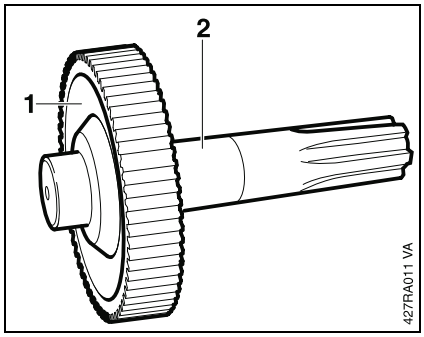
- Remove both ball bearings by knocking the cover against a wooden base.



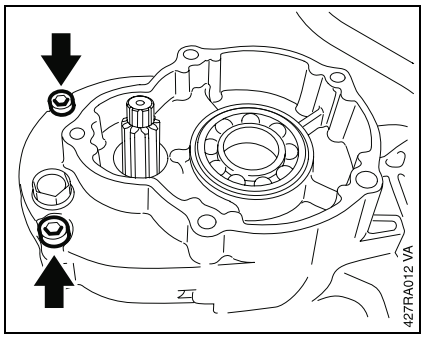
- Use a screwdriver to carefully knock the oil seal out of the cover.



- Remove the shaft with drive gear from the gear housing.

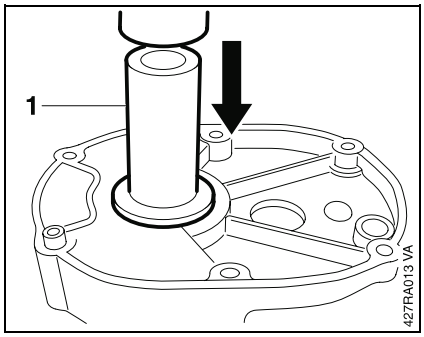


- Take the drive gear (1) off the shaft (2).

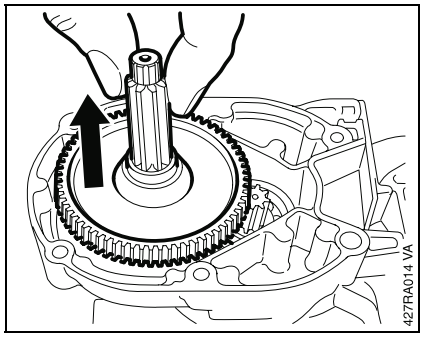


- Take out the screws.

- Pull the gear housing off the clutch housing.



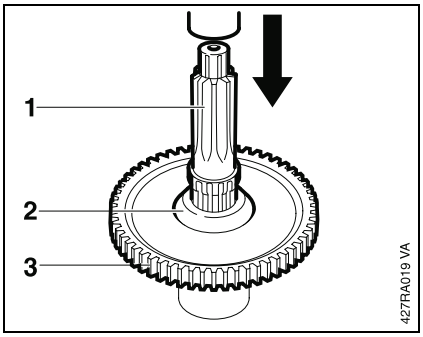
- Use press sleeve (1) 1115 893 4600 to remove ball bearing from gear housing.



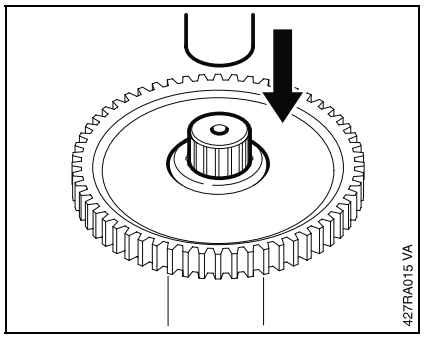
- Take shaft with drive gear out of the clutch housing.

- If it is necessary to replace the clutch housing, remove the clutch drum and auger brake - see 5.2 and 5.3.2.

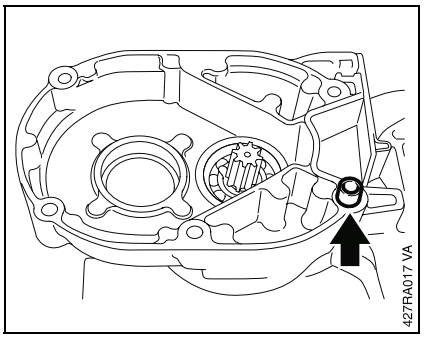
- Clean all parts and inspect them for serviceability.



- Press the shaft (1) into the drive gear (3) as far as stop, from side with high shoulder (2).

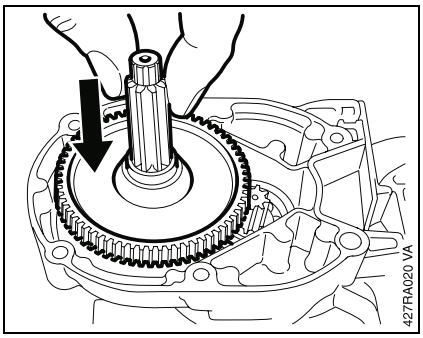


- Press shaft out of drive gear.



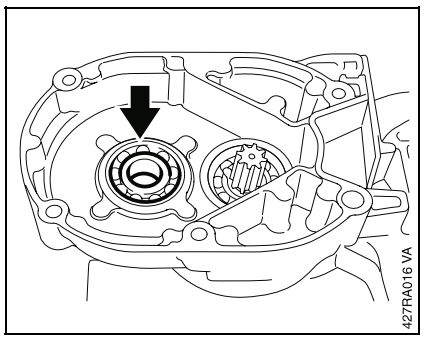
Assembling

- Check that sleeve is in place (see illustration) and fit it in the clutch housing if necessary.

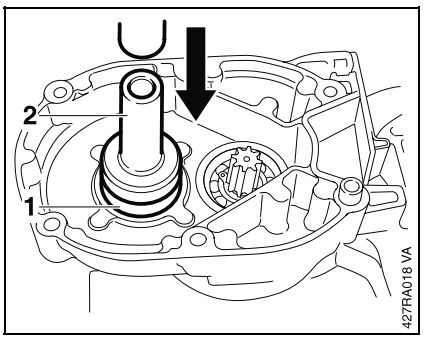


- Position shaft with drive gear in ball bearing in the clutch housing.

- Lubricate teeth of drive gear - see 6.2.

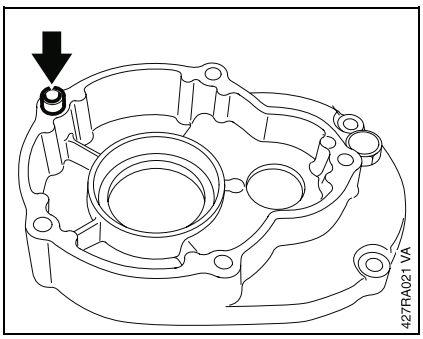


- Use puller to remove ball bearing from the clutch housing.

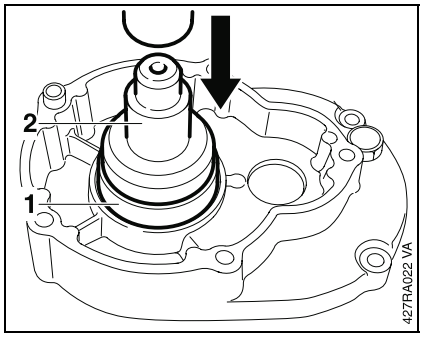


- Use press sleeve (2) 1113 893 4600 to install the ball bearing (1).

- Lubricate the ball bearing - see 6.2.

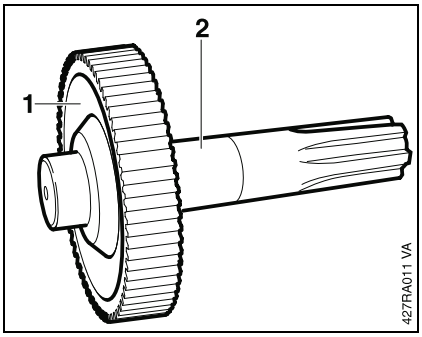


- Check that sleeve is in place (see illustration) and fit it in the gear housing if necessary.

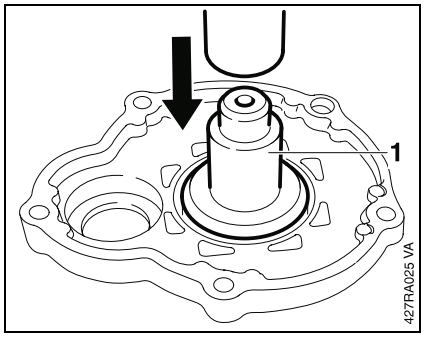


- Use press arbor (2) 1117 893 7200 to install ball bearing (1).

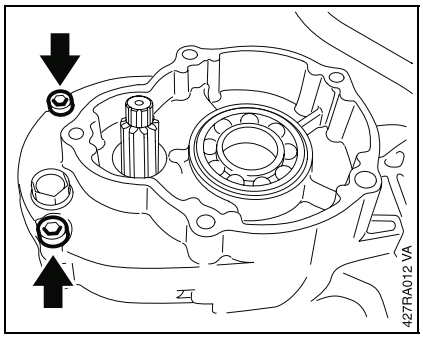
- Lubricate the ball bearing - see 6.2.



- Fit the drive gear (1) on the shaft (2).



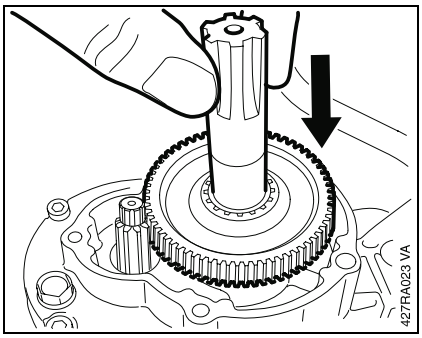
- Use press arbor (1) 1117 893 7200 to press home oil seal as far as stop.



- Apply thin coating of sealing paste to mating face on clutch housing - see 6.2.

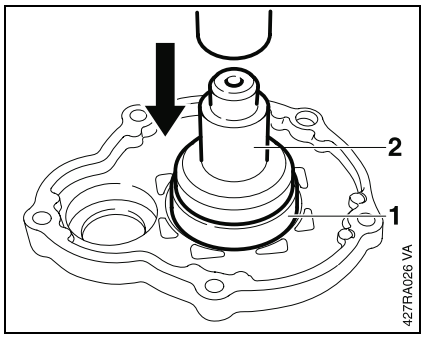
- Place gear housing on the clutch housing.

- Insert screws and tighten down to 10 Nm (7.5 lbf.ft).



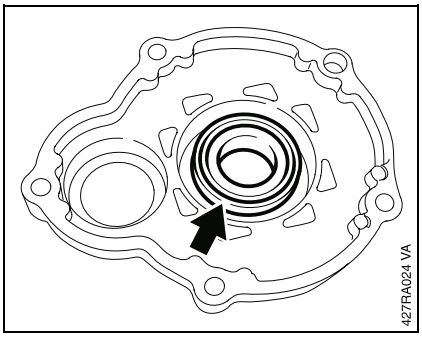
- Position shaft with drive gear in ball bearing in the gear housing.

- Lubricate teeth of drive gear - see 6.2.

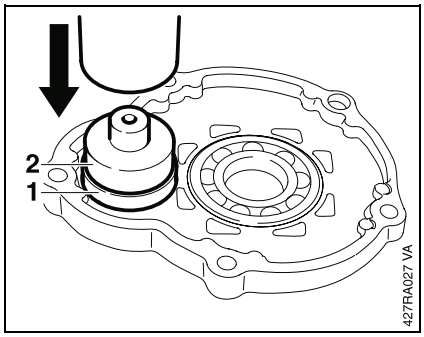


- Use press arbor (2) 1117 893 7200 to press home the ball bearing (1).

- Lubricate the ball bearing - see 6.2.

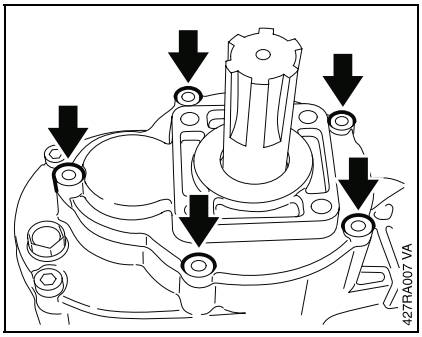


- Fit the oil seal, sealing lip facing up, in the cover.



- Use press arbor (2) 4116 893 7205 to press home the ball bearing (1) .

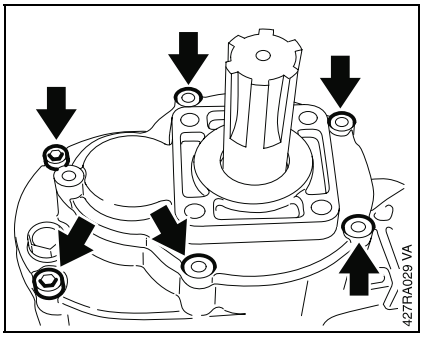
- Lubricate the ball bearing - see 6.2.



- Apply thin coating of sealing paste to mating face - see 6.2.

- Place cover in position.

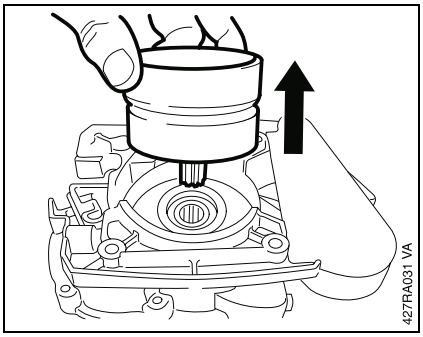
• Insert screws and tighten down to 10 Nm (7.5 lbf.ft).



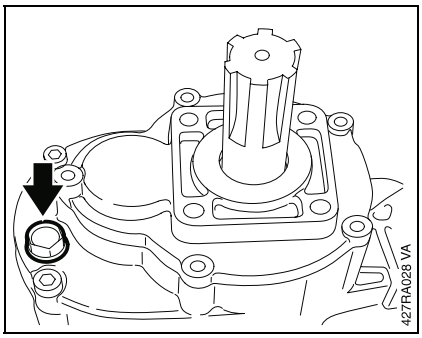
- Disassemble the gearbox - see 5.1.

• Take out the screws.

- Pull the gear housing off the clutch housing.



• Pull the clutch drum out of the ball bearings.



• Remove the screw screw plug.

- Fill housing with approx. 20 g (3/4 oz) gear lubricant - see 6.2.

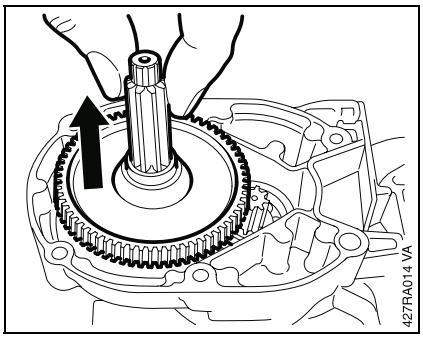
Service note:

Top up with grease (max. 5 - 10 g/ 1/4 oz) during maintenance work only if no grease is visible on the inside of the screw plug.

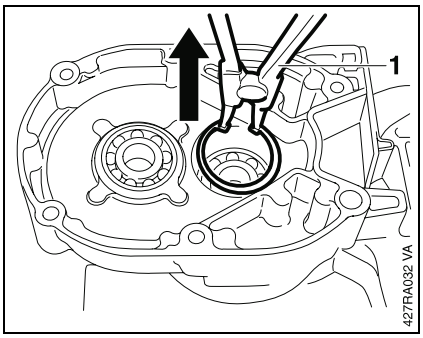
- Insert screw plug and tighten down to 8.5 Nm (6.3 lbf.ft).

- Place gearbox in position and fit nuts.

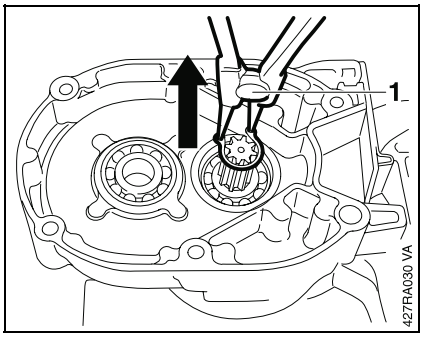
- Tighten nuts to a torque of 8.5 Nm (6.3 lbf.ft) and shroud screws to 6.0 Nm (4.4 lbf.ft).



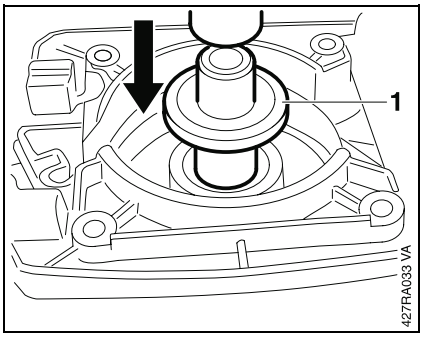
• If necessary, take the shaft with drive gear out of the clutch housing.



• Use pliers (1) 0811 641 8380 to remove the circlip from the clutch housing.



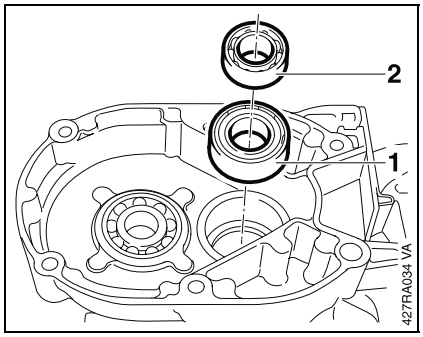
• User pliers (1) 0811 611 8200 to remove circlip from stub of clutch drum.



• Use press arbor (1) 1119 893 7200 to remove the ball bearing.

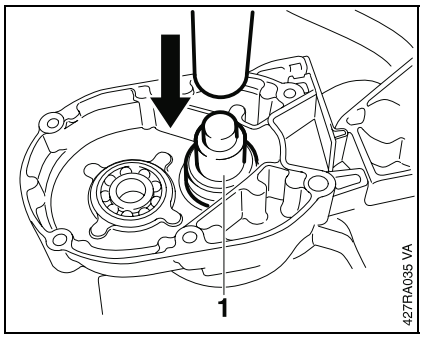
5.3 Quickstop Auger Brake

5.3.1 Checking Function



- Clean all parts and inspect them for serviceability.

Note: Install ball bearings in the sequence shown, i.e. sealed ball bearing (1), open ball bearing (2).



- Use press arbor (1) 1118 893 7200 to press home ball bearing as far stop.

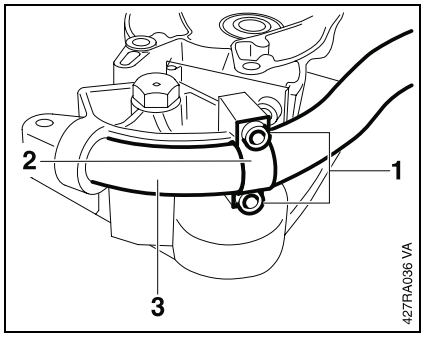
Assemble all other parts in the reverse sequence.

- Start the engine.

- With the auger brake activated (locked), open the throttle wide for no more than 3 seconds - the drilling spindle must not rotate.

Note: If the brake does not operate properly it must be serviced immediately.

5.3.2 Disassembling



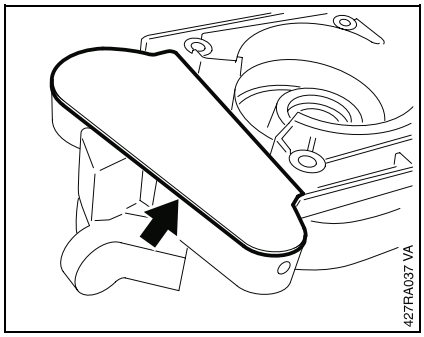
- Remove the clutch drum - see 5.2.

- Activate the auger brake (brake spring relaxed).

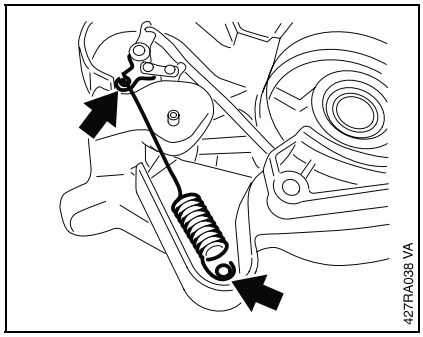
- Take out the screws (1).

- Remove clamp (2).

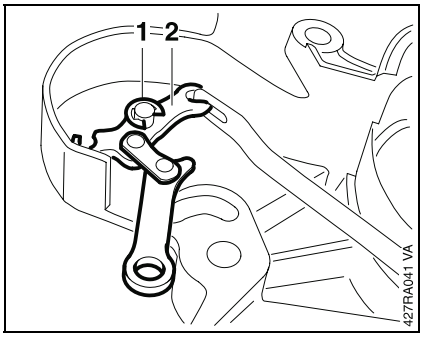
- Remove the activating lever (3) from the retainer.



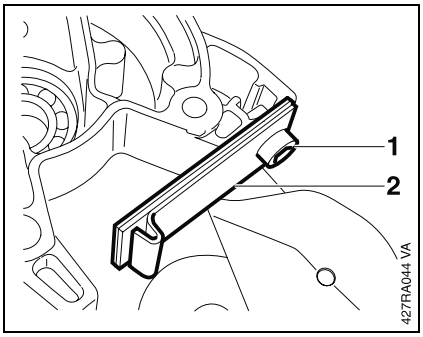
- Remove the cover.



- Unhook the brake spring from the anchor pin and bell crank.

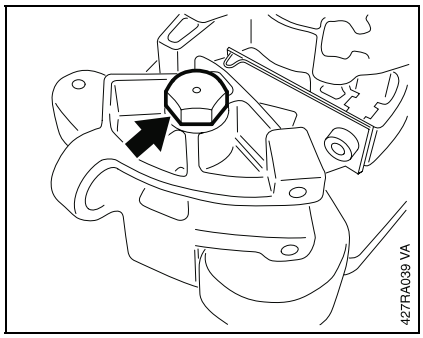


- Remove the E-clip (1).
- Slip the bell crank (2) off the pin and disconnect from the brake band at the same time.

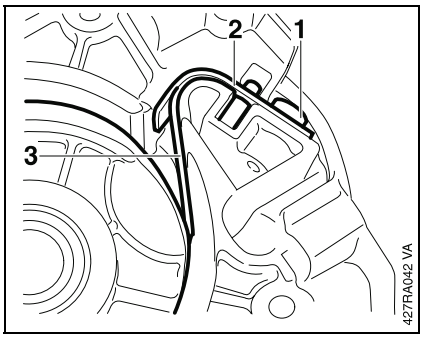


- If necessary, take out the screw (1).
- Remove the flat springs (2).

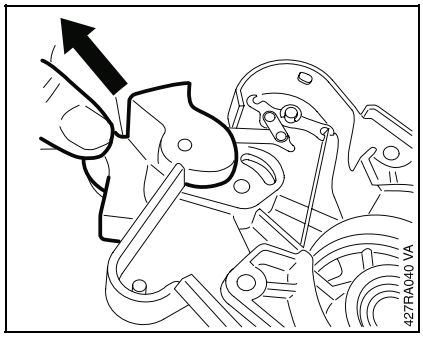
- Inspect parts and replace if damaged.
- Clean entire housing recess in which auger brake is installed.
- If the grooves of the pins for the brake spring and bell crank are worn, fit new pins - see 5.3.4 and 5.3.5.



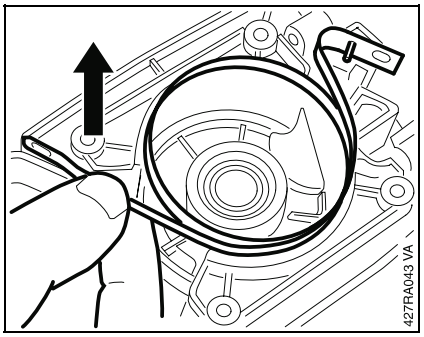
- Unscrew the bearing pin.



- Take out the screw (1).
- Ease the stiffener (2) and brake band (3) out of the clutch housing.

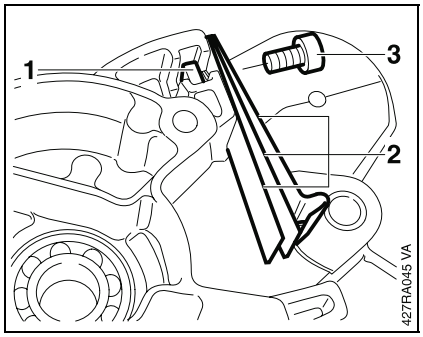


- Remove the retainer.

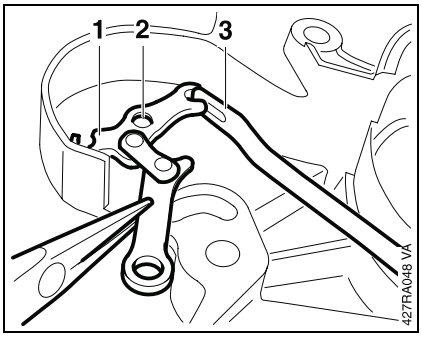


- Remove the brake band from the clutch housing.

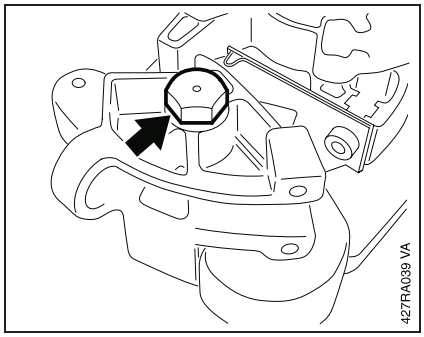
5.3.3 Assembling



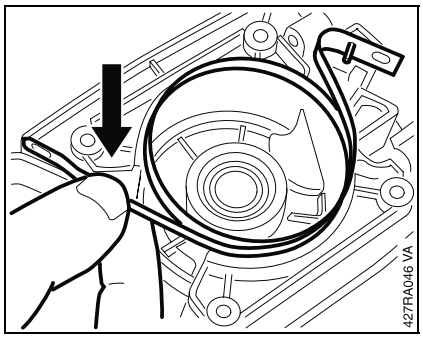
- Fit square nut (1).
- Place flat springs (2) in position.
- Insert screw (3) and tighten down to 8 Nm (5.9 lbf.ft).



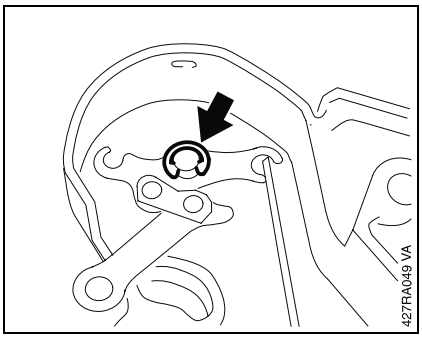
- Position bell crank (1) on pin (2) and engage it in the brake band (3).



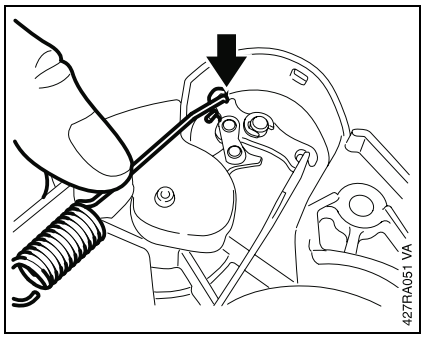
- Screw home bearing pin and tighten it down to 18 Nm (5.9 lbf.ft).



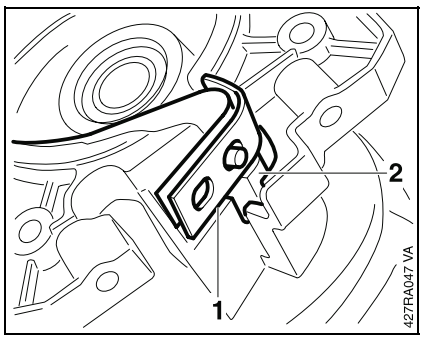
- Lubricate all sliding and bearing points as well as brake band.
- Fit brake band in the clutch housing.



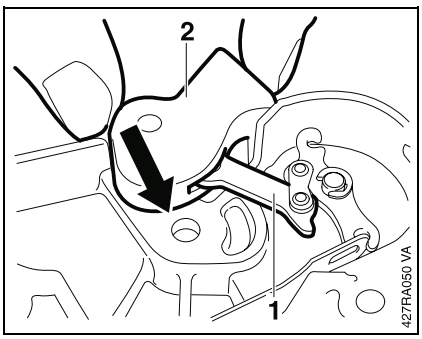
- Push the bell crank down over the pin and secure with E-clip.



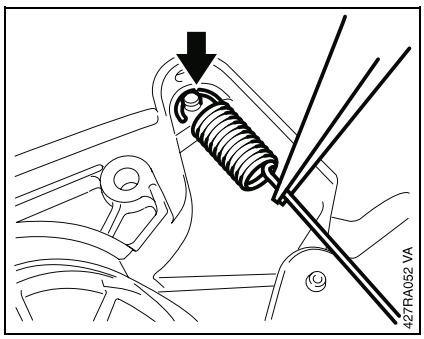
- Attach the brake spring to the bell crank.



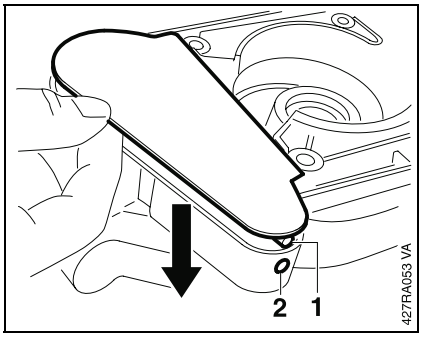
- Fit the stiffener (1) and push it into the slot (2) together with the brake band.
- Insert screw and tighten down to 4 Nm (3 lbf.ft).



- Insert the bell crank (1) in the retainer (2).
- Push the retainer into position.



- Attach brake spring to the anchor pin.

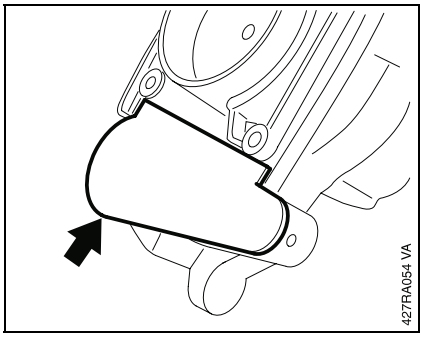


- Fit cover at one side so that the lug locates in the hole.
- Push the cover on until the lug (1) at the other side engages the hole (2).

- Install the activating lever.

- Install the clutch drum - see 5.2.

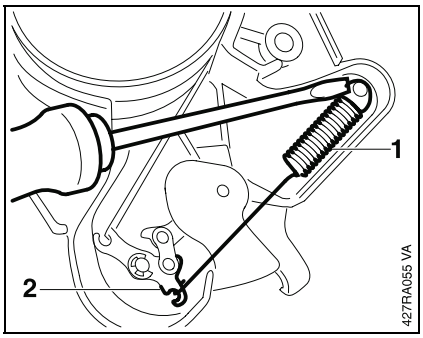
Note: Rotate the clutch drum and check that moves freely without rubbing against the brake band.



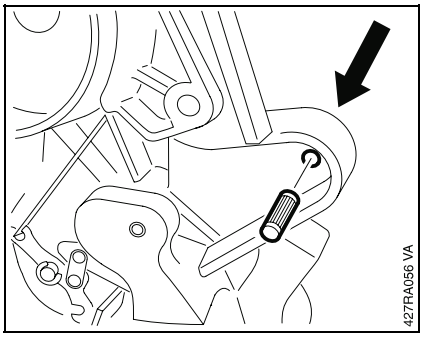
- Remove the gearbox- see 5.1.

- Activate the auger brake (brake spring relaxed).

- Remove the cover.



- Carefully ease the brake spring (1) off the anchor pin and the bell crank (2).

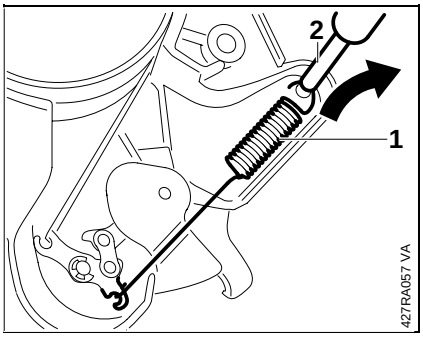


- Use a suitable punch to drive the anchor pin out of the clutch housing in the direction of the arrow.

Important: Do not drive out the pin in the other direction as this would damage the annular bead formed in the bore when the pin was originally installed.
In such a case neither the new anchor pin nor the brake spring would locate properly.
Furthermore, the clutch housing could be damaged and possibly impair correct operation of the auger brake.

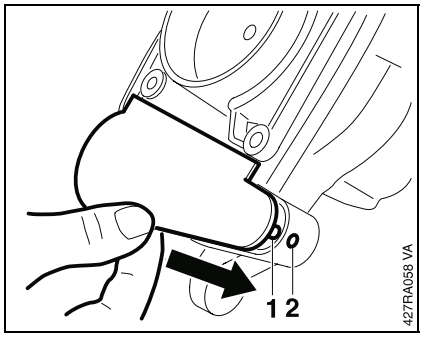
- Position the pin in the bore so that its knurling meshes with the existing knurling in the bore. Turn the pin back and forth for this purpose.

- Carefully tap home the pin squarely until it is flush with the outer face.



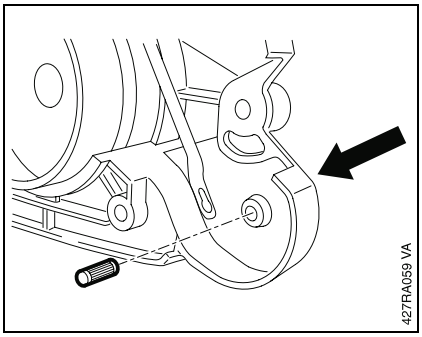
- Attach brake spring to bell crank.

- Use assembly tool (2) 1117 890 0900 to attach the brake spring (1) to the anchor pin.



- Fit cover at one side so that the lug locates in the hole.
- Push the cover on until the lug (1) at the other side engages the hole (2).

- Install the gearbox - see 5.1.



- Remove the bell crank - see 5.3.2.

Note: The clutch drum and brake band can be left in position.

- Use a suitable punch to drive the anchor pin out of the clutch housing in the direction of the arrow.

Important: Do not drive out the pin in the other direction as this would damage the annular bead formed in the bore when the pin was originally installed.
In such a case neither the new anchor pin nor the brake spring would locate properly.
Furthermore, the clutch housing could be damaged and possibly impair correct operation of the auger brake.

- Position the pin in the bore so that its knurling meshes with the existing knurling in the bore. Turn the pin back and forth for this purpose.

- Carefully tap home the pin squarely until it is flush with the outer face.

- Install the bell crank - see 5.3.3.

6. Special Servicing Tools and Aids
6.1 Servicing Servicing Tools

No.	Part Name	Part No.	Application	Rem.
1	Jaws	5910 893 2700	Holding handlebar in vise	
2	Press sleeve	1115 893 4600	Removing ball bearing from gear housing and installing ball bearing in clutch housing	
3	Press arbor	1117 893 7200	Installing ball bearings in gear housing, cover and oil seal	
4	Press arbor	4116 893 7205	Installing ball bearing in cover	
5	Pliers A10	0811 611 8200	External circlip on clutch drum	
6	Pliers C19	0811 641 8380	Internal circlip in clutch housing	
7	Press arbor	1119 893 7200	Removing ball bearing from cutch housing	
8	Press arbor	1118 893 7200	Installing ball bearing in clutch housing	
9	Assembly tool	1117 890 0900	Attaching brake spring	
10	T-handle screwdriver Q-T27x150	5910 890 2400	All IS screws	1)
11	Torque wrench	5910 890 0301	0.5 - 18 Nm (0.4 - 13.5 lbf.ft)	2)
		5910 890 0302		3)
12	Torque wrench	5910 890 0311	6 - 80 Nm (4.4 - 60 lbf.ft)	2)
		5910 890 0312		3)
13	Socket T27x125	0812 542 2104	IS screws	

6.2 Servicing Aids

No.	Part Name	Part No.	Application
1	Lubricating grease (225 g/8 oz tube)	0781 120 1111	Oil seals
2	STIHL gear lubricant - 80 g/3 oz: - 225 g/8 oz:	 0781 120 1117 0781 120 1118	Lubricating gearbox, ball bearings
3	Sealing paste (100 g/3 1/2 oz tube)	0783 810 1101	Sealing faces on gear and clutch housings

Remarks:

1) On DG/P screws, use for releasing only.
2) Always use torque wrench to tighten DG/P screws.
3) Wrench has optical/acoustic signal.

englisch/English

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