Service Tools needed

Allan key 7/32":	Id.No. 9170 0231 20
Allan key 3/16":	Id.No. 9170 0230 80
Allan key 3/16" long:	Id.No. 9170 0231 30
Extractor:	Id.No. 9170 7327 01
Clamping jaws:	Id.No. 9170 0236 40
Pinion nut:	Id.No. 9170 0236 30
Clutch adjusting device:	Id.No. 9170 0737 90
Adjusting device for backlash of the drive shaft pinion:	Id.No. 9170 0232 70
Mandril:	Id.No. 9170 0232 40
Mandril:	Id.No. 9170 0732 70

Important!

- Before maintenance carry out an introduction examination with high voltage check according to VDE (see chapter Electrical and Mechanical Test Instruction).
- Always disconnect the plug from the socket before carrying out any work on the machine.

Dismantling

Removing the additional handles

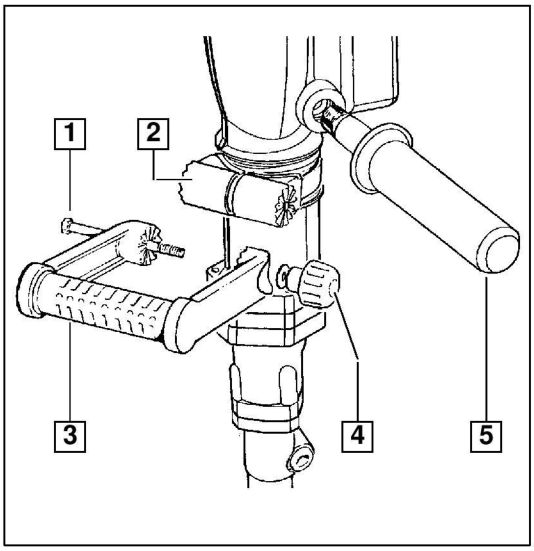
1 Unscrew and remove the drilling handle (5).

2 Remove the knurled nut (4) from the additional handle (3) and pull out the screw (1) as well as the washer. If necessary, hit it lightly with a hammer.

☞ Whenever it might be necessary to use a hammer to loosen parts, please note that only plastic or rubber hammers may be used.

3 Remove the handle (3).

☞ Please take care that the tightening strap (2) will not come free when removing the handle (danger of injuries).

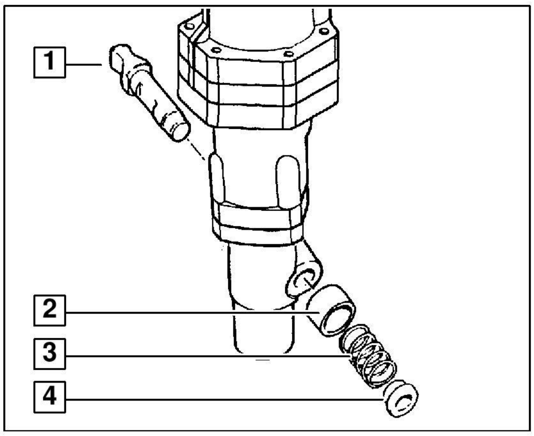


1

Dismantling the tool locking mechanism

1 Expel the latch bar (1) from the retaining ring (4) and the nosepiece with a mandril.

2 Remove the retaining ring (4), the spring (3), and the distance sleeve (2).



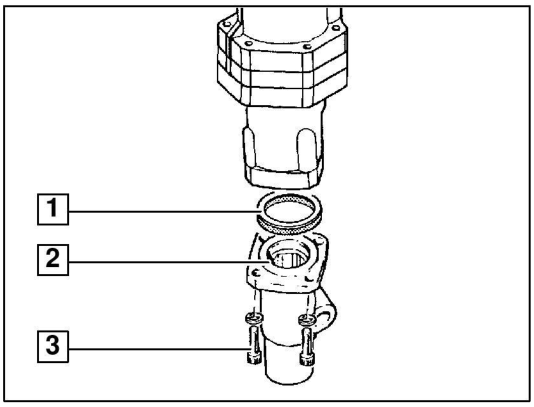
2

Dismantling the nosepiece

1 Remove the four screws (3) with Allan key 7/32" from the nosepiece (2) and then remove the spring washers.

☞ The screws (2) are additionally secured and therefore restricted.

2 Loosen the nosepiece (2) by hitting it lightly with a hammer, then remove it. Take out the driver sealing felt (1).



3

Dismantling the transmitter housing

1 Unscrew the six screws (7) with Allan key 3/16" and remove them together with the spring washers.

2 Loosen the transmitter housing (9) by hitting it lightly with a hammer, then remove it. It contains the anvil assembly consisting of anvil (2), driver (5), and various other parts.

3 Remove the compression ring.

4 Remove the anvil assembly from the transmitter housing (9).

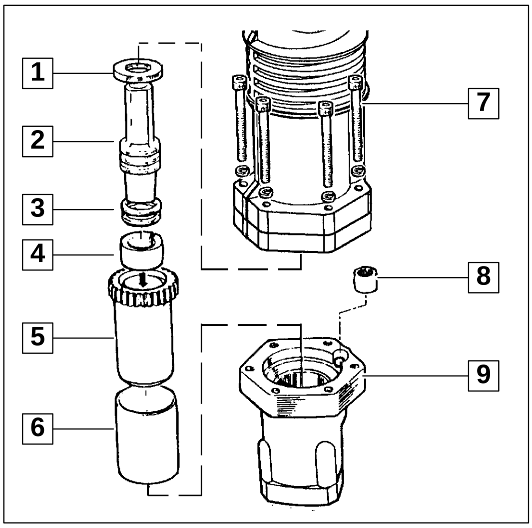
5 Remove the recoil transfer ring (1) and the anvil rings (3).

6 Pull the anvil (2) from the driver (5) and remove the junk ring (4).

7 Press the driver bearing (6) from the transmitter housing.

8 Remove the recoil buffer and the two gaskets from the anvil (2).

9 Press the drive shaft bearing (8) from the transmitter housing (9), using service tool 9710 7327 01.

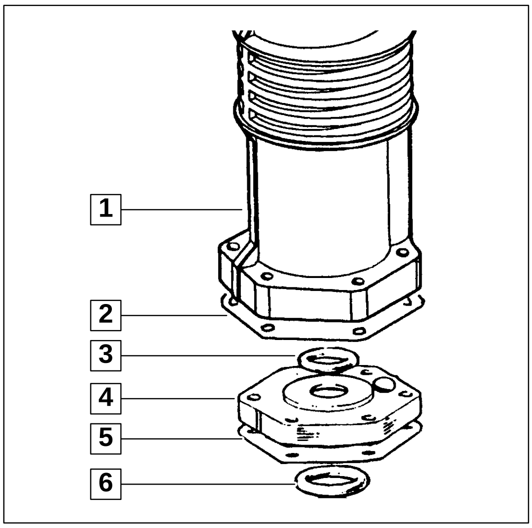


4

Dismantling the buffer housing

1 Remove the buffer housing (4) from the hammer casing (1).

2 Remove the buffer housing ring (6) and the gasket (5), as well as the buffer housing gasket (2) and the recoil buffer (3).



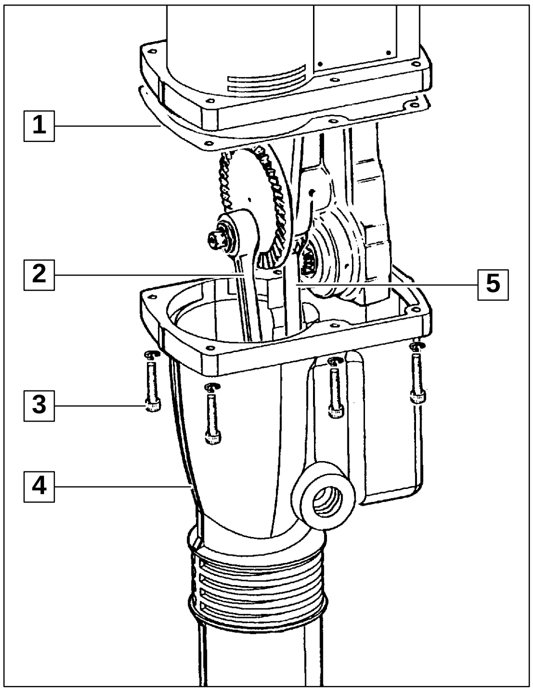
5

Dismantling the hammer casing

1 Unscrew the six Allan screws (3) with the Allan key long 3/16" and remove the spring washers.

2 Loosen the hammer casing (4) by hitting it lightly with a hammer and carefully remove it over the drive shaft pinion (5) and the striker while holding onto the connecting rod (2).

3 Remove the gasket (1).



6

Dismantling the piston

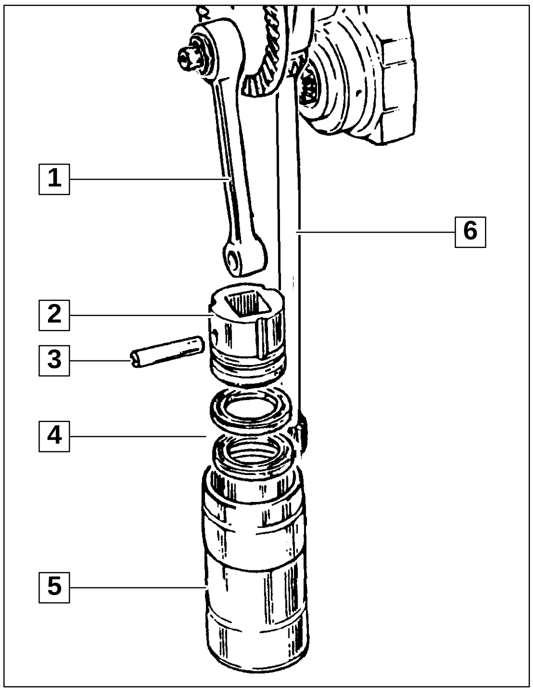
1 Remove the striker (5) from the piston (2).

2 Push the gudgeon pin (3) from the piston (2).

3 Remove the piston (2) from the connecting rod (1).

4 Remove both piston seals (4) from the piston (2).

☞ Drive shaft (6) only PH 11 H.



7

Removing the connecting rod

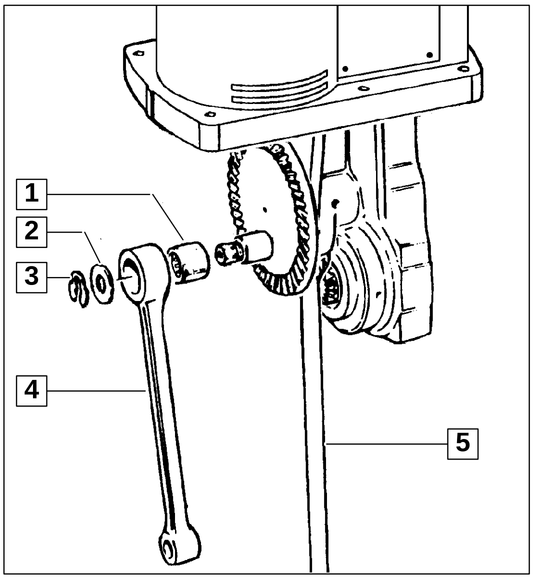
1 Remove the crank pin circlip (3) with a screwdriver.

2 Remove the crank pin washer (2).

3 Remove the connecting rod (4).

4 Press the big end bearing (1) from the connecting rod.

☞ Drive shaft (5) only PH 11 H.

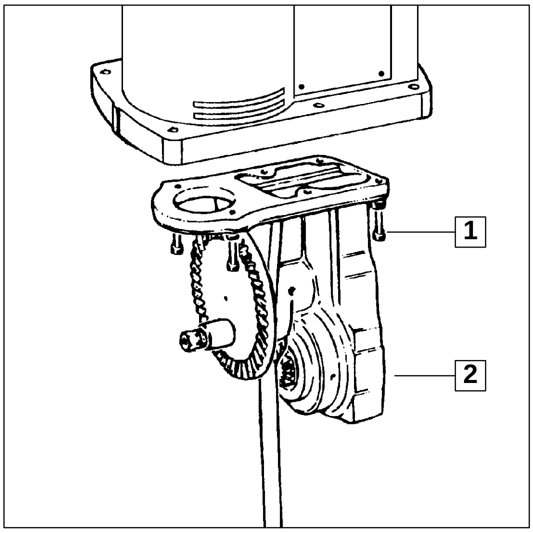


8

Removing the gear

1 Unscrew and remove the six screws (1) with Allan key 3/16”, together with the spring washers.

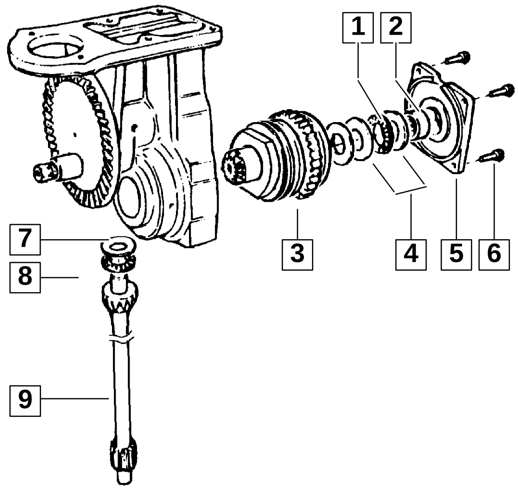
2 Remove the gear carrier (2) and fix it in a vice.



9

Dismantling the gear

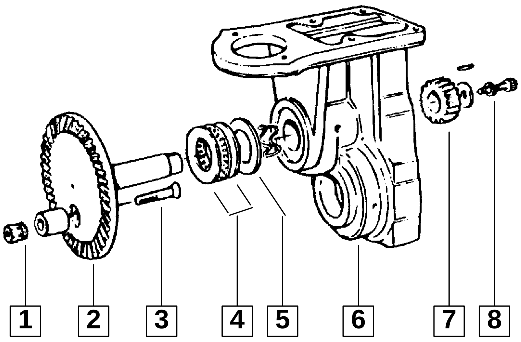
1. Remove the clutch shaft bearing cap (5) (four Allan screws (6) with Allan key 3/16”).
2. Press the needle bearing from the clutch shaft bearing cap (5) using a suitable mandril.
3. Remove the clutch thrust races (4) and the clutch thrust bearing (1).
4. Pull the clutch drive (3) from the gear carrier.
5. Remove the drive shaft (9) and the thrust bearings (7 and 8).



10

Dismantling the crank disk

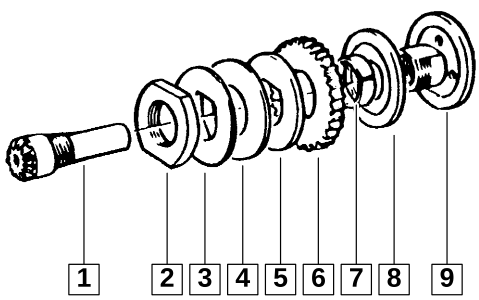
1. Fix the crank disk (2) of the gear carrier in a vice.
2. Remove the Allan screw (8) with Allan key 3/16” together with the spring washer and the washer.
3. Remove the 19–tooth gear (7).
4. Remove the gear carrier (6).
5. Remove the crank disk thrust bearing (4) and the disk springs (5).
6. Loosen the crank pin nut (1) from the crank disk (2) and remove the crank pin screw (3). Attention: Left–handed thread!



11

Dismantling the clutch

1. Fix the clutch witch the clutch bush (9) in a vice and straighten the clutch lock washer (3).
2. Unscrew the clutch lock nut (2) while steadying the clutch shaft (1) with Allan key 3/16”.
3. Remove the clutch lock washer (3), the clutch spring (4), first clutch plate (5), the 39–tooth gear (6), and the second clutch plate (5).
4. Press the bearing (7) from the 39–tooth gear (6).
5. Unscrew and remove the clutch shaft (1) from the clutch bush (9) using Allan key 3/16”.

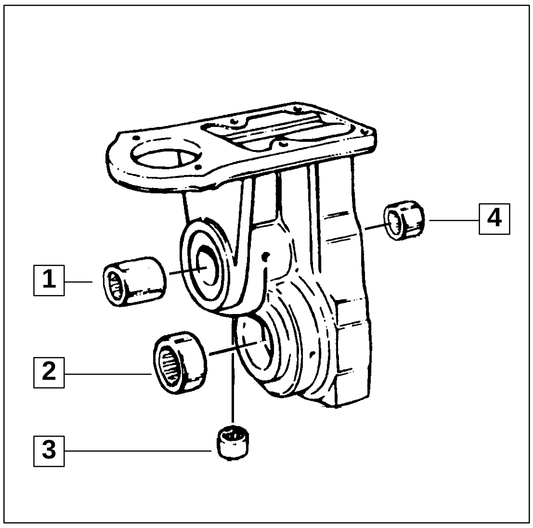


12

Dismantling the gear carrier

1 To remove the bearing (3) of the drive shaft proceed as follows:
Fill plasticine into the bearing, then press out the bearing using an exactly fitting mandril. To press the bearing out, it is also possible to use a suitable extractor.

2 Press out the crank disk bearings (1 and 4) as well as the clutch shaft head bearing (2) using a suitable mandril.



13

Removing the plastic handle

1 Unscrew the four screws (7) at the plastic handle (3) and remove the handle.

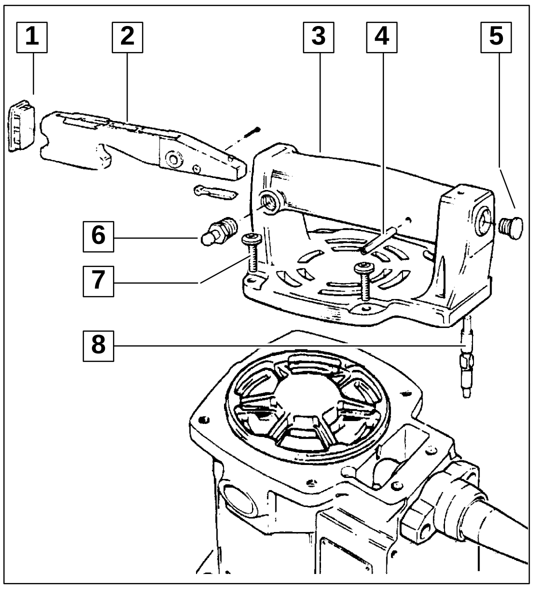
2 Depress the rocker (2) and remove the plunger (8) from the handle.

3 Lever off the two handle plugs (1 and 5) using a screwdriver.

4 Press out the rocker pivot (4) using a suitable mandril.

5 Remove the rocker (2).

6 Unscrew and remove the lock button (6).



14

Dismantling the switch and the mains supply

1 Unscrew the four Philips screws and remove the switch cover plate (6).

2 Remove the switch box seal (10).

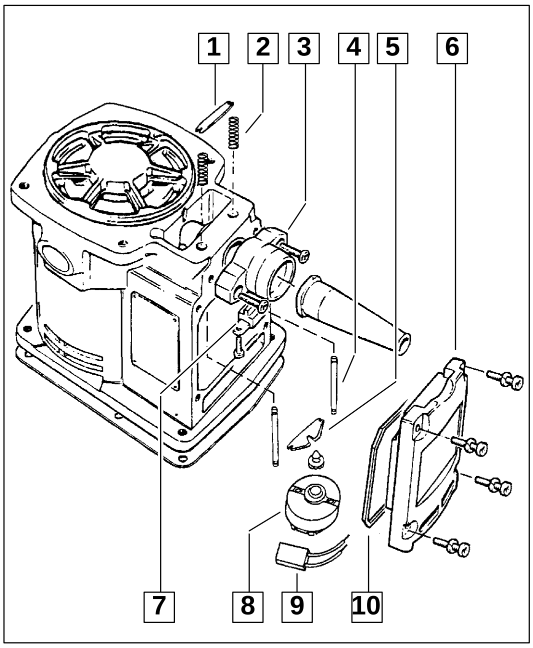
3 Slightly lift the switch (8), remove the cover and loosen the four cord connections.

4 Loosen the capacitor (9) from the field feed lines.

5 Unscrew the cord guard housing (3) and pull it off together with the cord ends.

6 Unscrew the cord grip (7).

7 Lever off the outer plunger abutment plate (1), remove the pressure springs (2), then remove the push rods (4) together with the inner plunger abutment plate (5).

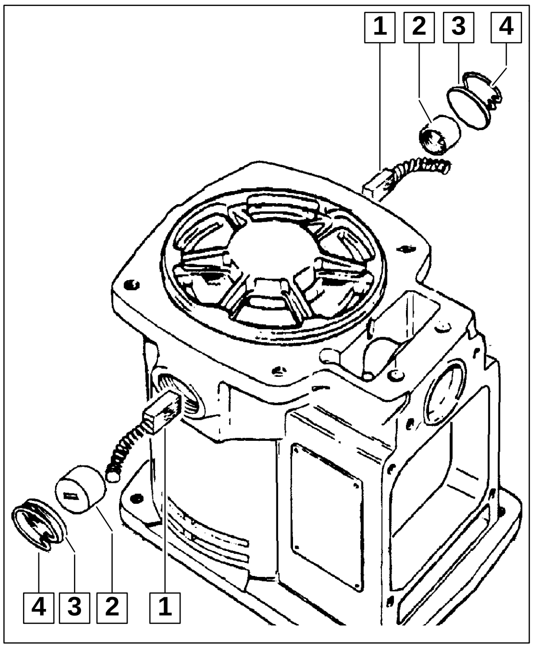


15

Removing the carbon brushes

1 Lever off the two end cap spring rings (4) at the hammer casing and remove the two outer brush end caps (3).

2 Unscrew the two inner brush end caps (2) and remove the carbon brushes.



16

Dismantling the motor

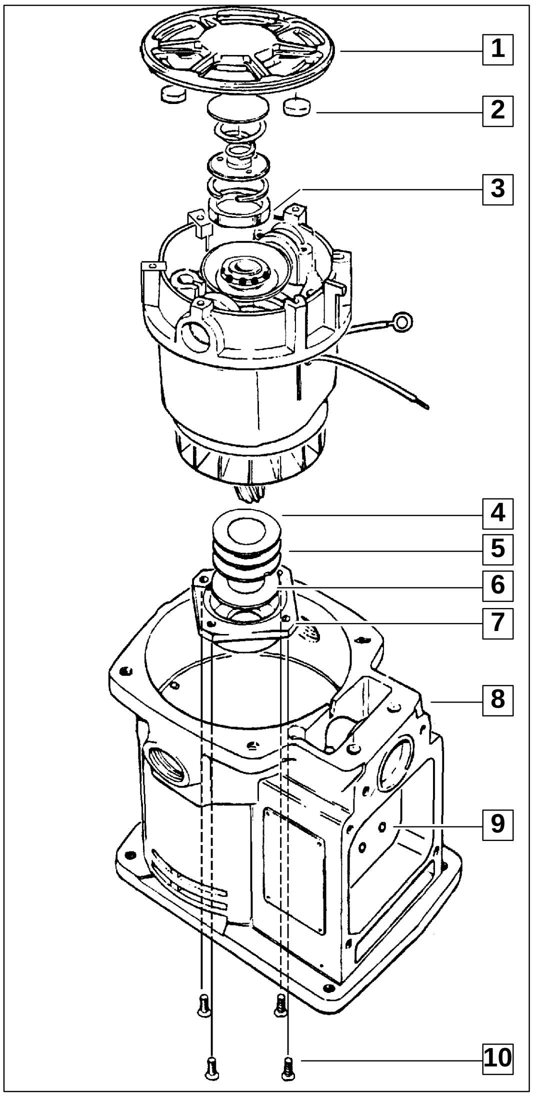
1 Remove the motor end plate assembly (1) and from this remove the outer ring of the top bearing (3) as well as the two terminal packs (2).

2 Remove the two seals (5) of the field feed lines.

3 Unscrew and remove the four cartridge locating screws (10).

4 Loosen the motor in its housing (4) by hitting it lightly with a hammer and carefully let it slide out from the housing. When expelling the motor please take care that the cable ends will not get sheared off.

5 Unscrew and remove the pinion bearing cartridge (9) together with the washers (4 and 5) as well as the cam plate (6).



17

Dismantling the armature

1 Remove the screws (3) of the two carbon brush terminals (4).

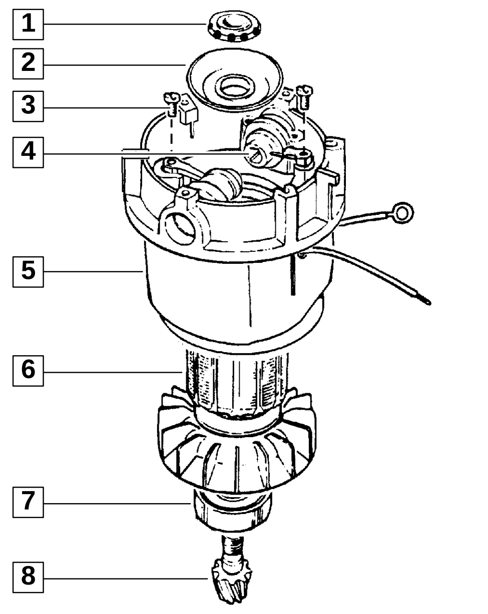
2 Remove the ball retainer cage of the top bearing (1).

3 Grasp below the bearing shroud (2) with a suitable extractor and press against the armature shaft. Lift off the bearing disk of the top bearing together with the bearing shroud (2).

4 Pull the main insulating liner (5) from the armature (6).

5 To remove the pinion fix the armature in a vice using service tool 02364, place the pinion nut 02363 on the pinion and unscrew it using a suitable fork wrench (right–handed thread).

6 Remove the pinion bearing (7) with a suitable extractor.



18

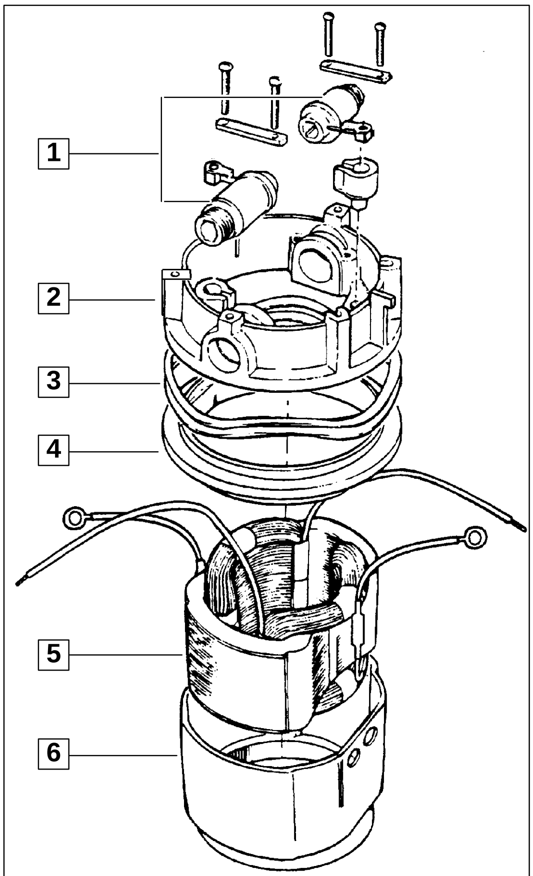
Dismantling the field housing

1 Remove the carbon brush terminals (1).

2 Remove the brush holder housing (2) from the field housing (6).

3 Remove both waved washers (3) as well as the pressure ring (4).

4 Press the field coil (5) from the housing (6) using a throttle.



19

Maintenance

General

It is recommended to submit the tool to maintenance after every 150 work hours, if the hammer mechanism gets weak, or if the carbon brushes switch off.
When carrying out maintenance all parts of the maintenance set 9170 3168 90 must be exchanged.

Cleaning

With the exception of the electrical parts all parts must be cleaned with cold cleanser.
Attention! No cleanser must enter the encapsulated bearings.
Clean the electrical parts with a dry brush.

Abrasion test

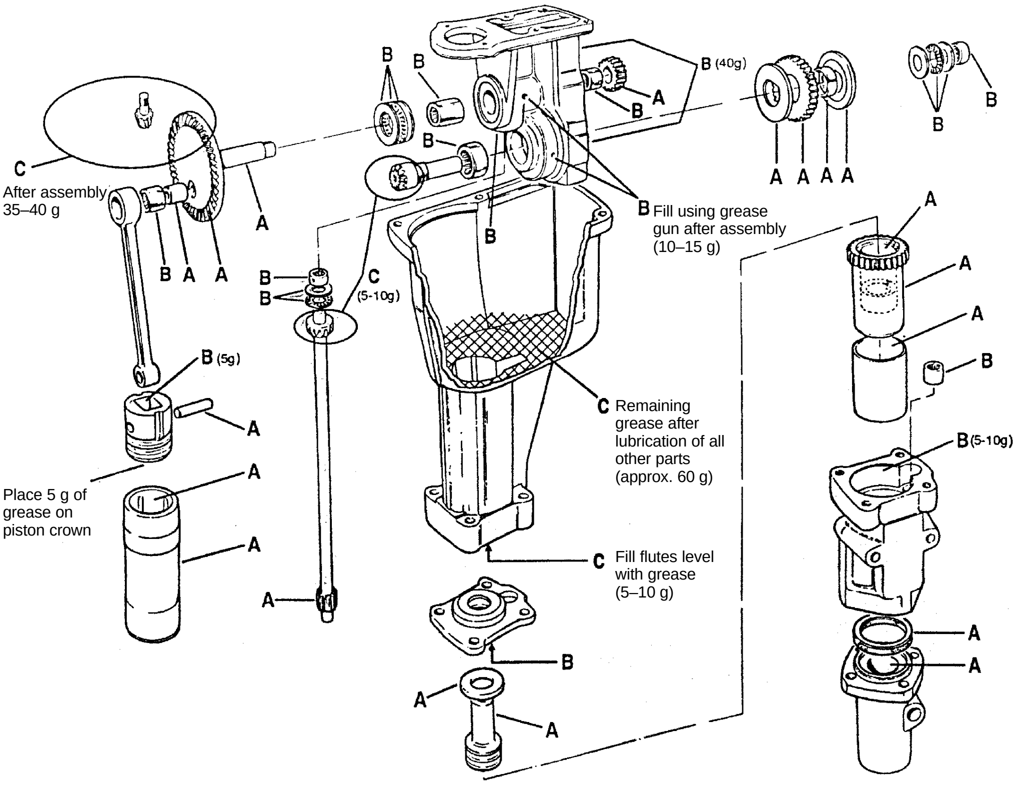
Check the dismantled parts for abrasion (visual check) and exchange if necessary.

Electrical test

Before assembly submit all relevant parts to an electrical examination (see chapter Electrical and Mechanical Test Instruction).

Lubrication

At each maintenance the tool must be lubricated as shown in the lubrication chart. After having dismantled the entire tool remove the used grease completely and replace by new grease. For assembly a total of 350 g of grease is necessary. Please pay attention to the following lubrication chart:



Grease application code

A Liberally coat
B Pack
C Generously apply

Assembly

Assembling the field housing

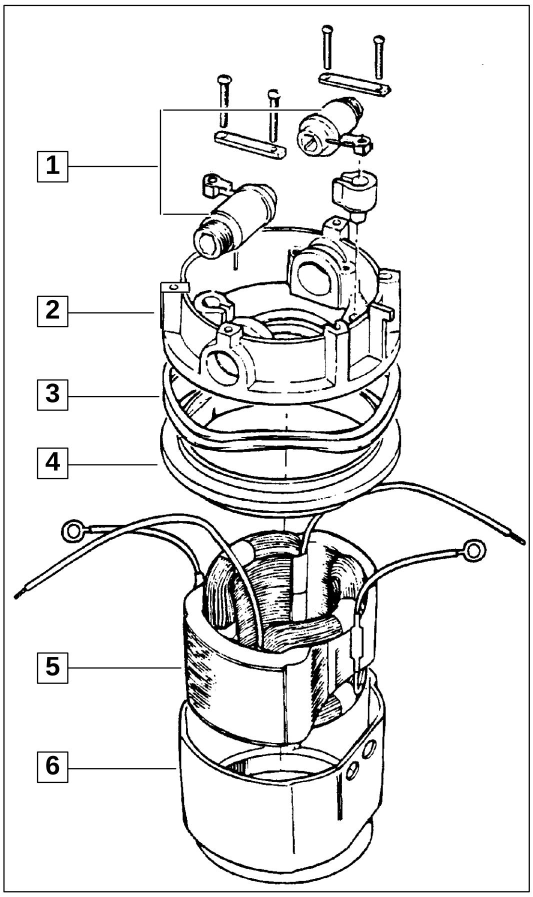
1 Insert the field coil (5) into the main insulating liner (6) and lead the cords through the openings. Mind the right position of the throttle between field coil and housing.

2 Fit the pressure ring (4) with its reliefs facing the cords. Take care that no cords are jammed.

3 Fit the two waved washers (3) and then fit the brush holder housing (2). Take care that the cords are properly pulled through the reliefs.

4 Secure the cord ends with screws.

5 Secure the brush holder terminals (1) with screws.



1

Assembling the armature

1 Fix the armature (6) with clamping jaws (Id. No. 9170 0236 40) in a vice.

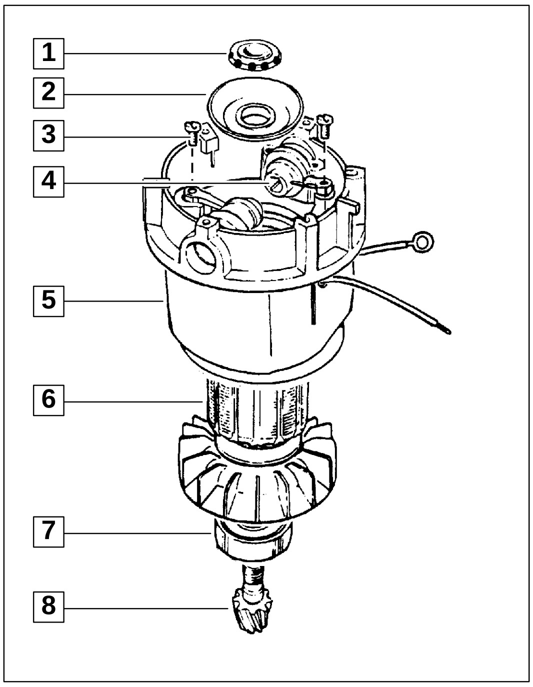
2 Press on the pinion bearing (7).

3 Fit the pinion nut (Id.No. 9170 0236 30) over the pinion (8) and screw the pinion on by hand (right–handed thread).

4 Push the field housing with the field coil over the armature (6).

5 Fit the bearing shroud (2) to the armature shaft.

6 Fit the inner ring of the top bearing (1) to the shaft and press on using a mandril (Id.No. 9170 0232 40). Fit the ball retainer cage of the bearing.



2

Assembling the motor

1 Insert the following parts one after the other into the pinion bearing cartridge (9):
– dished washer thin (8) (concave to the armature)
– notched washer (7)
– the two dished washers thick (6) (convex to the armature).

2 Push the pinion bearing cartridge over the pinion onto the armature shaft.

3 Insert the armature and the field into the hammer casing (10) and lead the cord ends through the borings in the switch. Mind the right position: the lug (4) must face the switch.

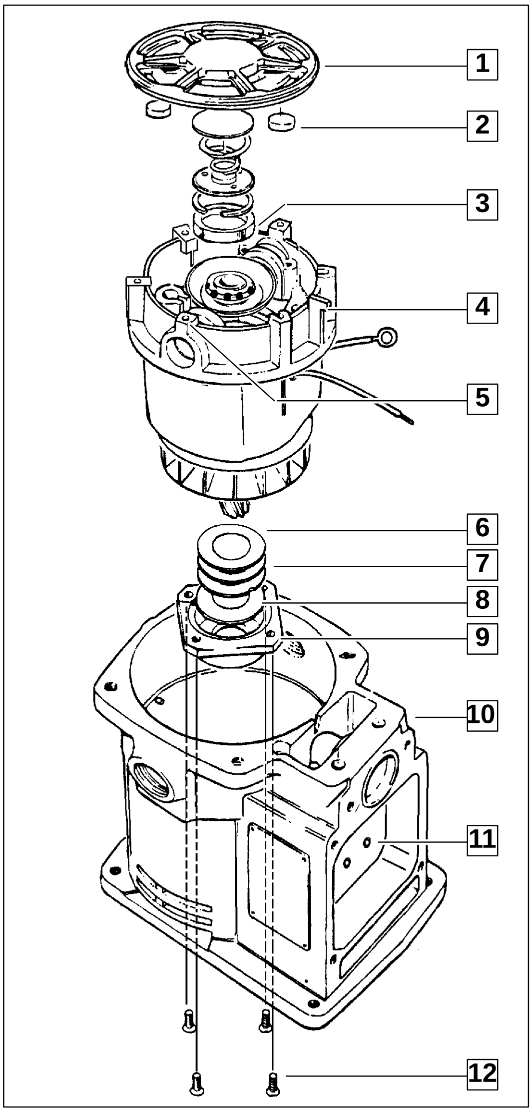
4 Press the armature and the field into the hammer casing until the lug (4) fits.

5 Secure the pinion bearing cartridge (9) with the four screws (12).

6 Insert the outer ring of the top bearing (3) and the two terminal pads (2) into the motor end plate (1).

7 Fit the motor end plate to the hammer casing (10). (The pin of the motor end plate must fit into one of the two reliefs above the carbon brush openings (5).

8 Fit the seal (11) over the field feed lines.



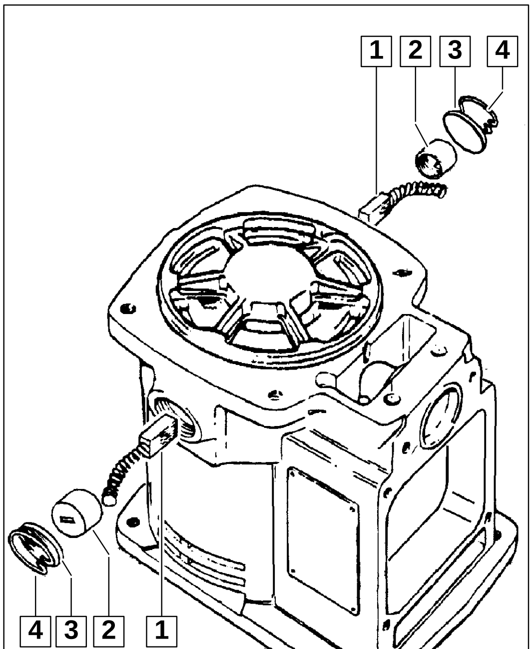
3

Mounting the carbon brushes

1 Insert the two carbon brushes (1).

2 Screw on the inner brush end caps (2).

3 Fit the outer brush end caps (3) and secure them with the end cap spring ring (4).



4

Assembling the switch

1 Push the mains cord through the cord guard (6) and the cord guard housing (3).

2 Secure the cord grip (8).

3 Secure the cord guard housing (3) with screws.

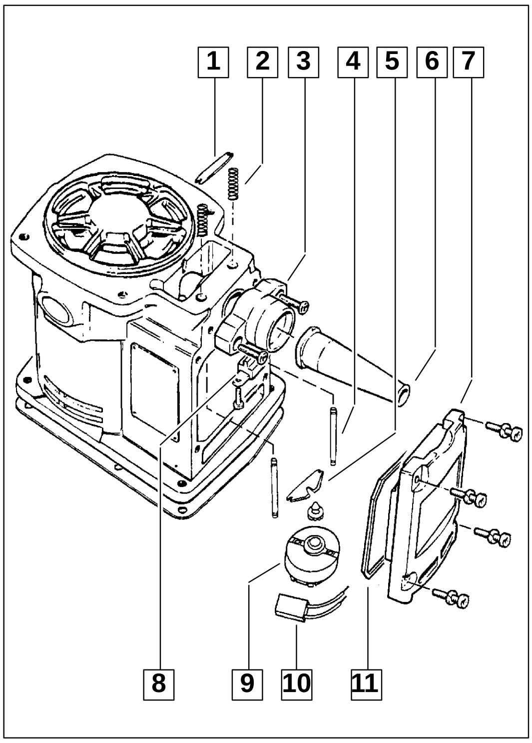
4 Insert the switch rods (consisting of parts 4 and 5) into the switch housing, fit the two pressure springs (2) and fit the plunger abutment plate (1) on top.

5 Connect the line side and the field side cord ends as well as the capacitor (10) to the four connecting points of the switch (9). (The capacitor to the field clamps.)

6 Fit the cap to the switch (9) and ensure proper fit.

7 Check the correct function of the switch by depressing the switch button several times.

8 Fit the switch box seal (11) and secure the switch cover plate (7) with four screws.



5

Assembling the plastic handle

1 Screw the lock button (6) to the plastic handle (3).

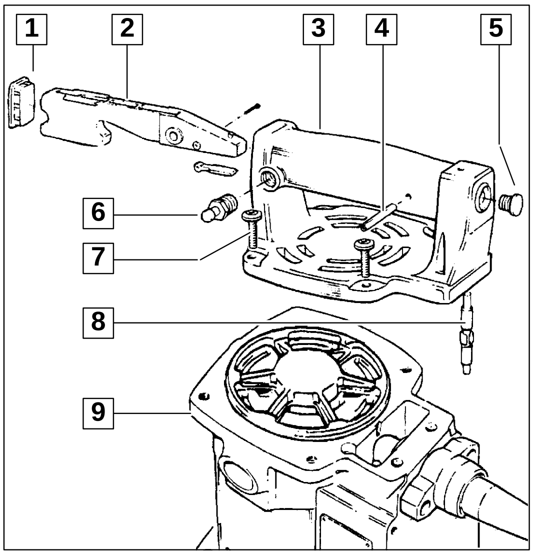
2 Insert the rocker (2), align the borings and press in the rocker pivot (4) by hitting it with a hammer.

3 Fit the two handle plugs (1 and 5).

4 Insert the slightly greased plunger (8) and check for well running.

5 Screw the plastic handle (3) to the hammer casing (9), against the pressure of the waved washers (four screws; 3–4 Nm).

6 Check if the switch is working.



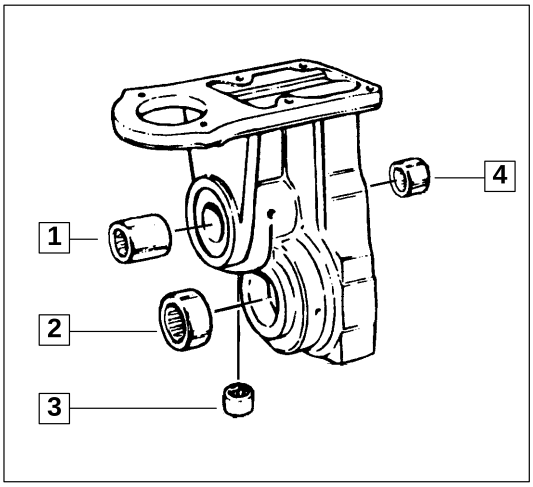
6

Assembling the gear carrier

1 Press in the crank disk bearings (1 and 4) flush.

2 Press in the clutch shaft head bearing (2) such that it is flush at the inner side.

3 Press in the bearing (3) of the drive shaft proceed to stop.



7

Mounting the clutch

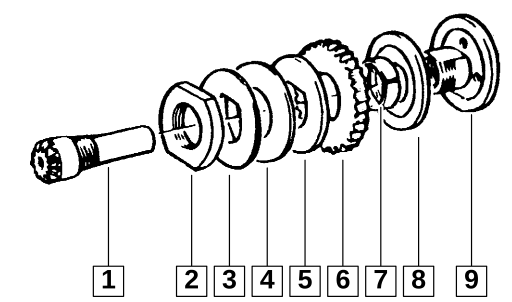
1 Press the bearing (7) into the 39–tooth gear (6).

2 Fix the clutch bush (9) in a vice.

3 Fit the pinion (1).

4 Mount the following parts one after the other on the clutch shaft:
– clutch plate (with the coating facing upward)
– 39–tooth gear (6)
– clutch plate (5) with the coating facing the 39–tooth gear
– clutch spring (4) concave to the clutch plate
– clutch washer (3)
– fit the clutch lock nut (2)

5 Insert the mounted clutch into the adjusting device (Id.No. 9170 0236 50) and secure the pinion using Allan key 3/16”.



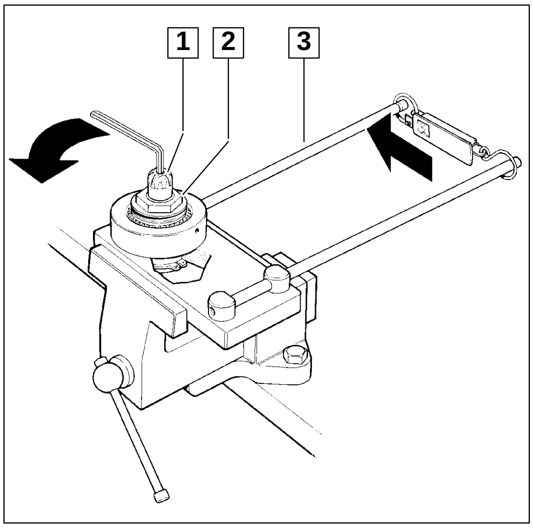
8

Adjusting the clutch

1 Set the spring balance of the adjustment device (3) (Id.No. 9170 0737 90) to zero.

2 Turn the pinion (1) with Allan key 3/16” anti–clockwise and read from the spring balance when the clutch is slipping. This should be the case at values between 8 and 9 (approx. 6 Nm). If the clutch is slipping values less than 8, tighten the clutch nut.
Should these values not be gained after all, insert another disk spring.

3 Secure the clutch nut (2) by bending the clutch washer upward.



9

Mounting the crank disk

1 Insert the crank disk (2) into the gear carrier (3) without bearing and disks.

2 Provisionally fix the gear reception with two screws to the hammer casing (1) in order to adjust the face clearance.

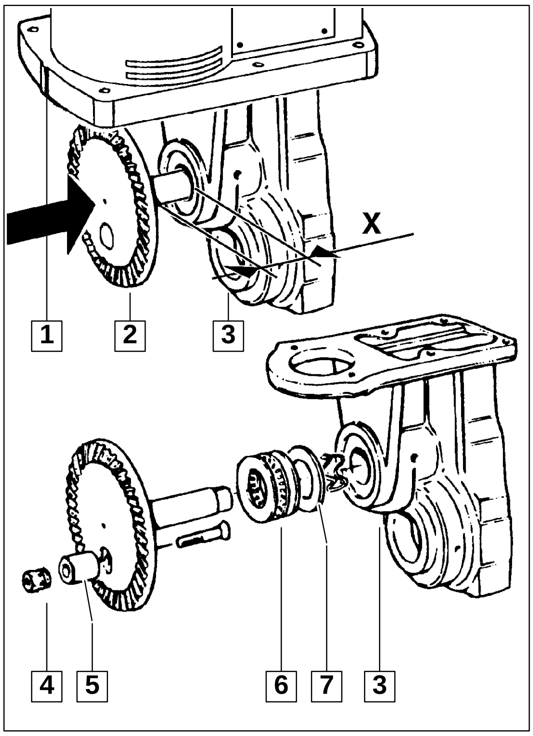
3 Measure the distance X between the taughtly inserted crank disk and the casing wall with a feeler gauge and deduct 0.5 mm from this value.

4 Remove the gear reception and the crank disk.

5 Fix the crank pin bush to the crank disk and fix it with the crank pin nut (4) (left–handed thread, 19 Nm).

6 Corresponding to the determined value, put together a suitable amount of washers and fit these washers to the crank disk shaft.

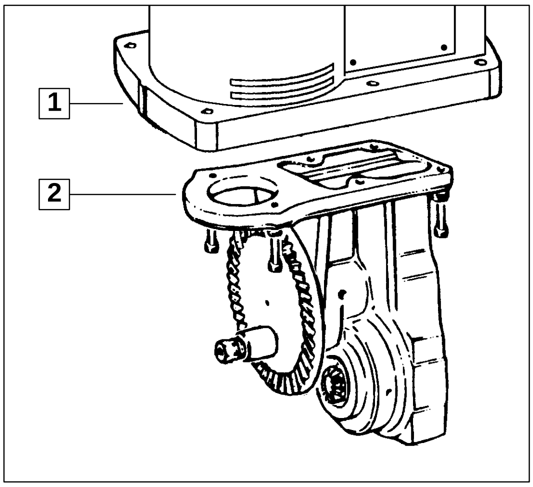
7 Fit the crank disk thrust bearing (6) and the disk spring (7) to the crank disk shaft and insert it into the gear carrier.



10

Mounting the gear

1 Fit the gear carrier (2) to the hammer casing (1), secure it with screws (six screws and washers), and additionally secure them.



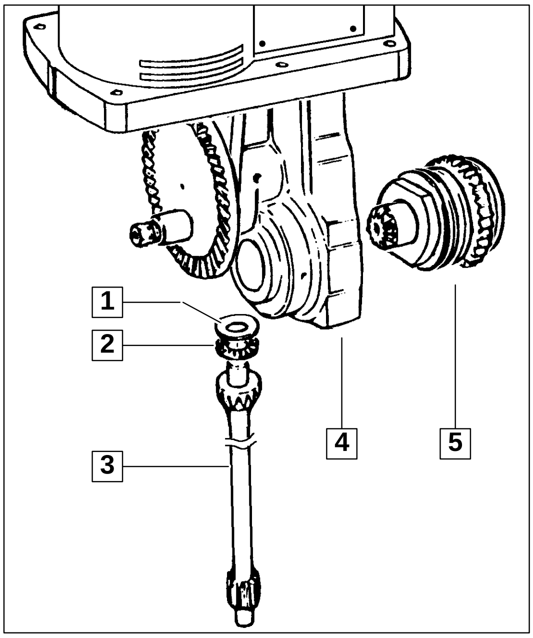
11

Mounting the drive shaft (only applicable for PH 11 H)

1 Fit the drive shaft thrust bearing (2 and 1) and the drive shaft thrust race to the drive shaft (3).

2 Insert the drive shaft into the gear carrier.

3 Lightly grease the clutch (5) and insert it into the gear carrier (4).



12

Adjusting the back lash of the drive shaft

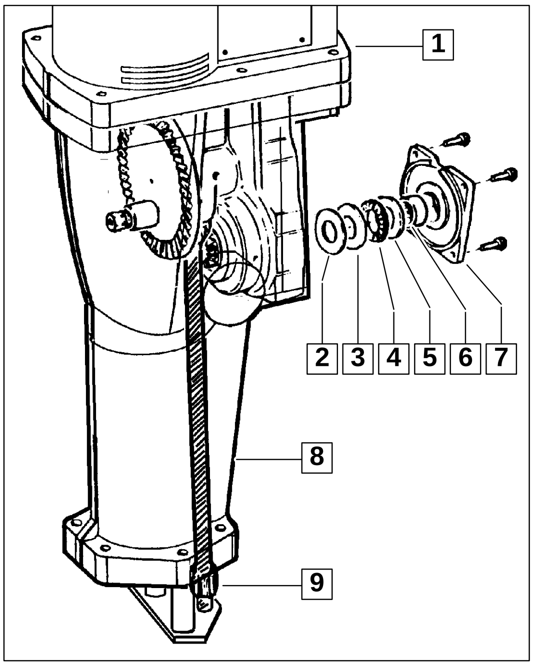
1 Fit the service tool (8) (Id.No. 9170 0232 70) to the hammer casing (1) and fix it with 2 screws.

2 Fit the following parts one after the other to the clutch shaft:
- clutch shaft shim (2)
- clutch thrust race (3)
- clutch thrust bearing (4)
- front clutch thrust race (5)
- clutch shaft bearing cap (7) with clutch shaft tail bearing (6).

3 Fix the clutch shaft bearing cap (7) with two screws.

4 Checking the back lash at the drive shaft (9): The drive shaft must be easy to turn without considerable back lash. If necessary, remove the clutch shaft bearing cap and add further disks.

5 Remove the service tool.

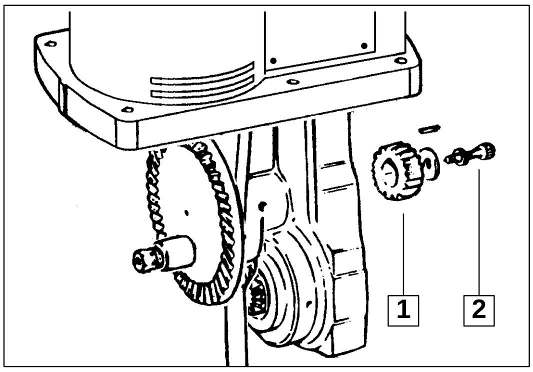


13

Fixing the crank disk

1 Fit the 19–tooth gear to the crank disk.

2 Fit the washers to the Allan screw and fix the toothed wheel to the crank disk.



14

Mounting the piston and the connecting rod

1 Fit the two piston seals (8) to the piston. Ensure proper fit!

2 Insert the connecting rod (5) into the piston and fix with the gudgeon pin (7).

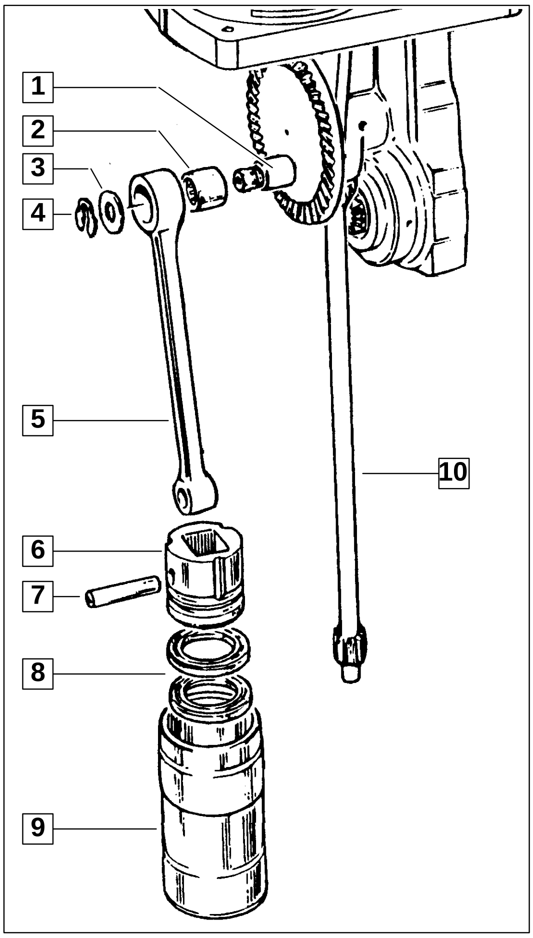
3 Press the crank pin nut into the connecting rod (5) opening.

4 Fit the connecting rod to the crank pin bush (1) of the crank disk. The connecting rod must not touch the teeth of the crank disk.

5 Fit the crank pin washer (3) and fix the connecting rod with crank pin circlip (4).

6 Grease the striker (9) and push over the piston (6).

☞ Drive shaft only PH 11 H



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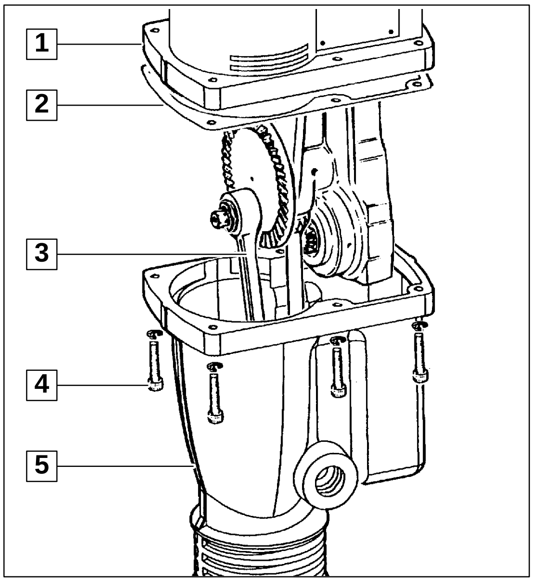
Mount the gear carrier

1 Fit the seal (2) to the hammer casing.

2 Push the gear carrier (5) over the striker and the connecting rod (3) and fix to the hammer case (1) (six screws (4) with spring disks, use Allan key long 3/16”, 16 Nm).



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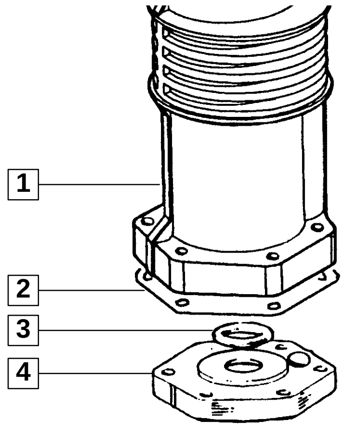
Mounting the buffer housing

1. Press the buffer housing ring (3) into the groove of the buffer housing (4).
2. Fit the buffer housing gasket (2) to the gear carrier (1).
3. Fit the buffer housing (4) to the gear casing (1).



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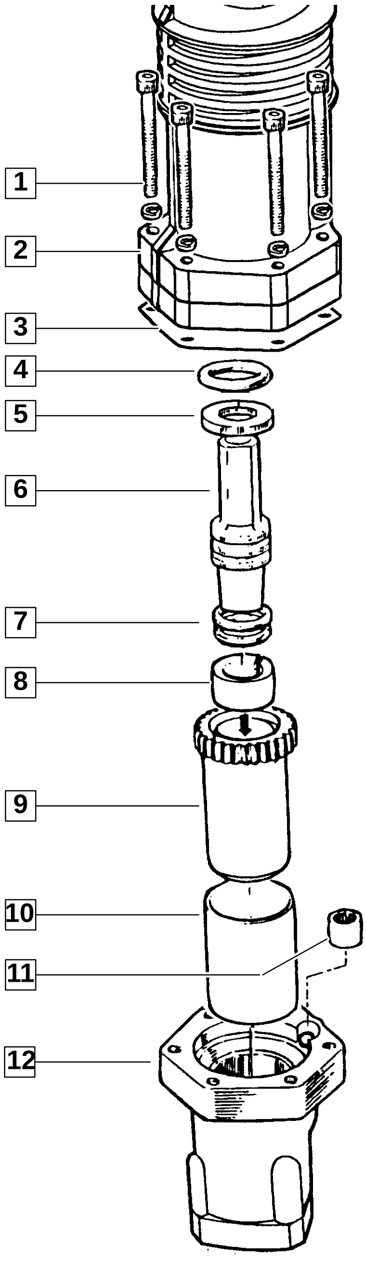
Mounting the transmitter housing

1. Press the drive shaft bearing (11) into the transmitter housing (12) using a mandril (Id.No. 9170 0732 70). Ensure proper fit! The round through groove must face the nosepiece.
2. Press the driver bearing (10) into the transmitter housing.
3. Insert the junk ring (8) into the driver (9), with the bezel at the inner diameter facing the anvil (6).
4. Insert the anvil ring (7) into the transmitter housing (12).
5. Push the anvil rings (7) onto the anvil (6) and press the anvil into the driver (9).
6. Insert the recoil transfer ring (5) into the driver (9).
7. Insert the recoil buffer (4) and fit the gasket (3) to the transmitter housing (12). Fit the transmitter housing to the gear casing (2) and secure with screws (six screws (1) with lock washers; 34 Nm). Additionally secure the screws.



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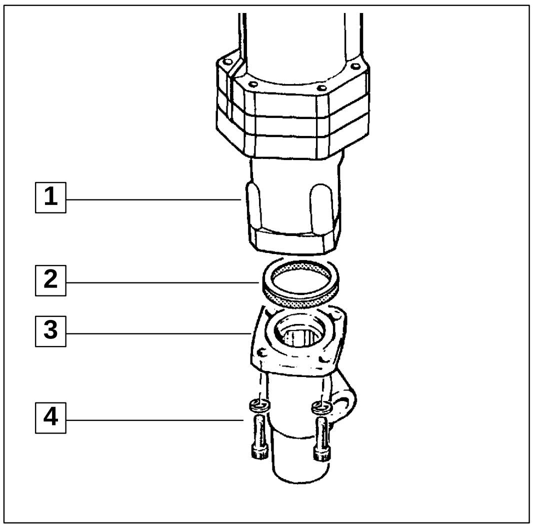
Mounting the nosepiece

1 Fit the nosepiece (3) together with inserted driver sealing felt (2) to the transmitter housing (1). Fix it with screws (four screws (4) and lock washers, 34 Nm) using Allan key 7/32". Secure the screws with safeguard.



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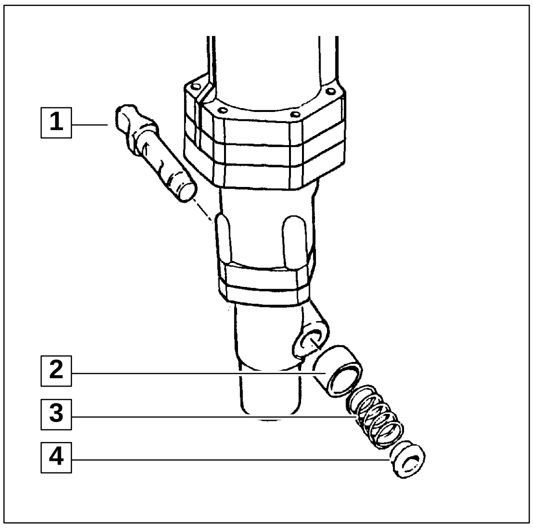
Mounting the too locking mechanism

1 Insert the latch bar (1) into the transmitter housing.

2 Insert the distance sleeve (2) and the spring (3).

3 Insert the retaining ring (4) by hitting it lightly with a hammer.



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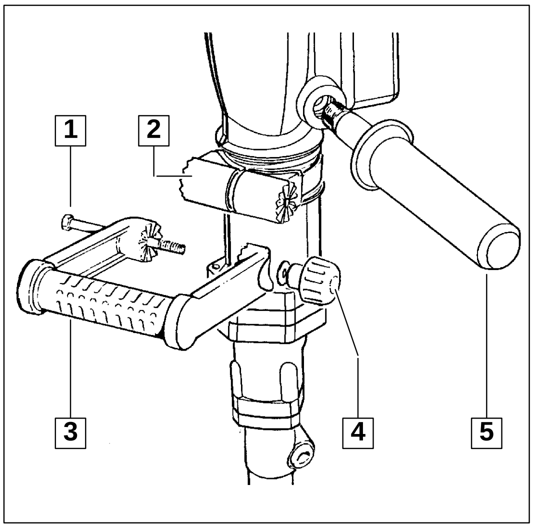
Mounting the additional handles

1 Fit the tightening strap (2).

2 Fit the additional handle (3) over the tightening strap tops and insert the screw (1).

3 Secure with washer and knurled nut (4).

4 Fit the drilling handle (5).



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Test run and electrical examination

Carry out a test run and check for strange noises.
Carry out an electrical test (see chapter Electrical and Mechanical Test Instruction).