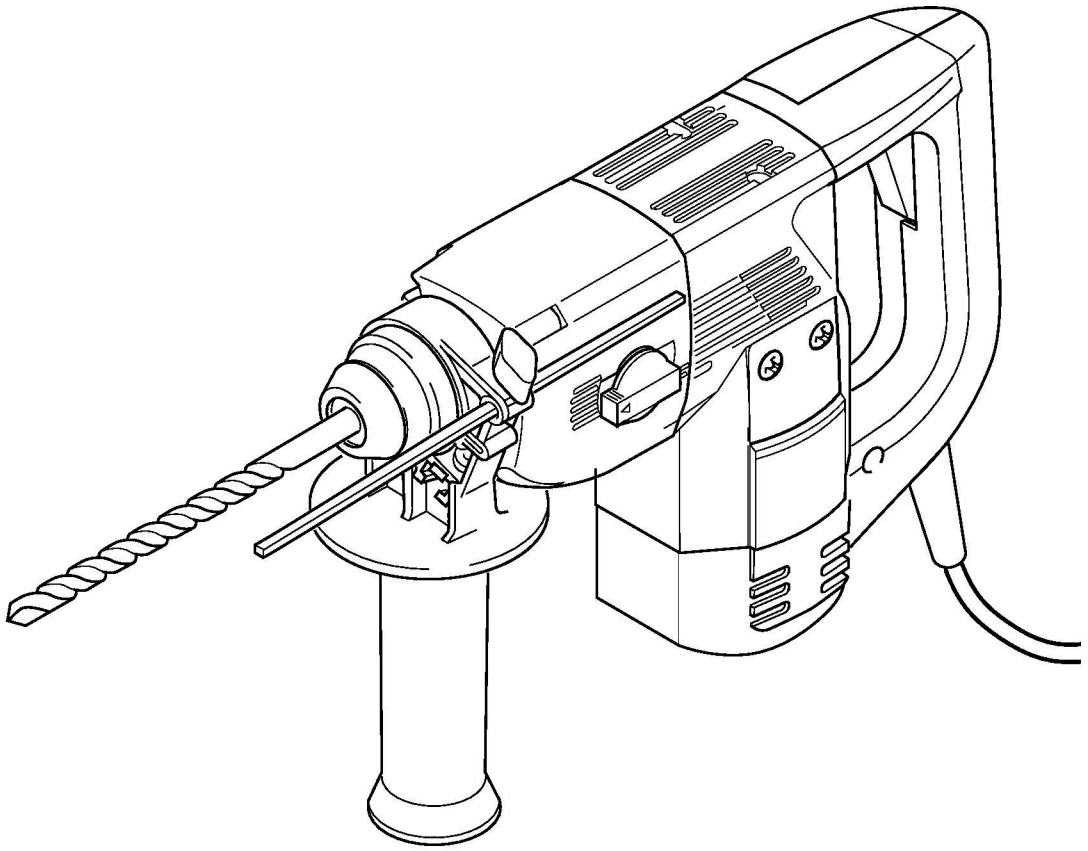
KANGO®

Repair Instructions
K 350



4939 5936 01 (05/99)

K 350

Important! Before carrying out any repairs, the hammer should be checked for electrical safety and for mechanical performance. For electrical safety the hammer should be placed on a non-conductive surface which is either of a wooden construction (with the mains supply disconnected) which contains no metal parts or a bench which is insulated by a rubber mat. The hammer should then be checked by high voltage flash testing. On completion of dismantling procedure all electrical components should then be checked for electrical safety. The hammer should **ONLY** be checked for hammer performance if the unit passes the electrical safety test.

Disassembly

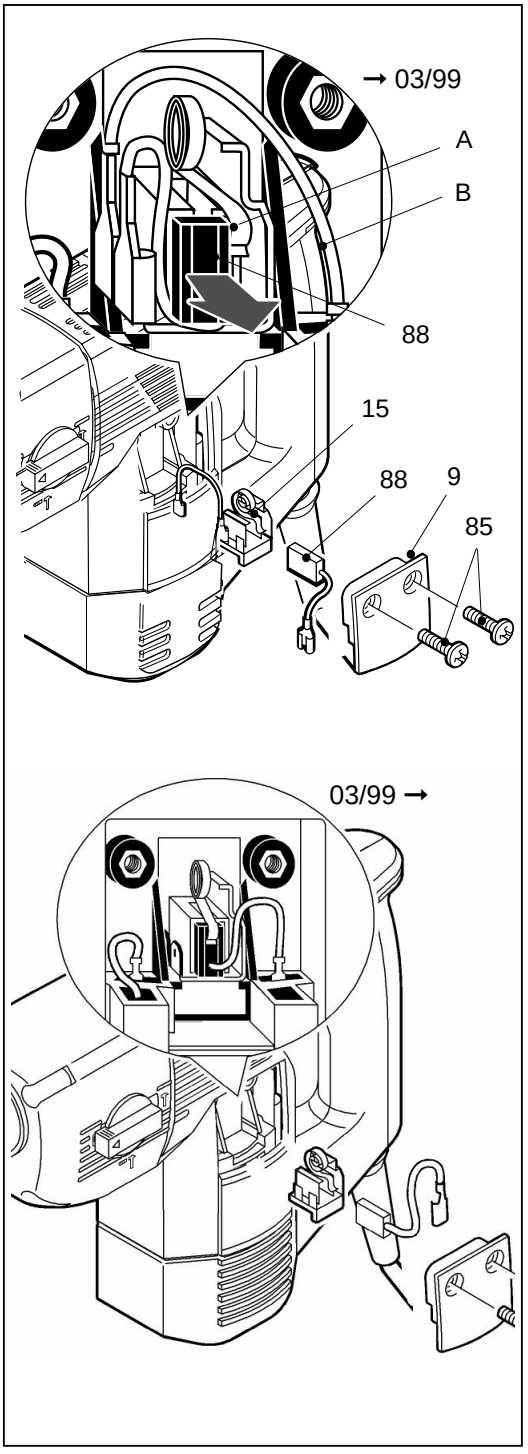
Removing the carbon brushes

1 Remove the attaching bolts (85) and the protective cap (9).

2 Disconnect the wire (B) and pull the brush holder (15) from the housing.

3 Move the spring (A) aside (see illustration) and remove the carbon brushes (88). Disconnect the carbon brush cables.

☞ From date of construction 03/99, the carbon brush connection is located directly on the field.



1

Dismantling the SDS-Plus-Reception

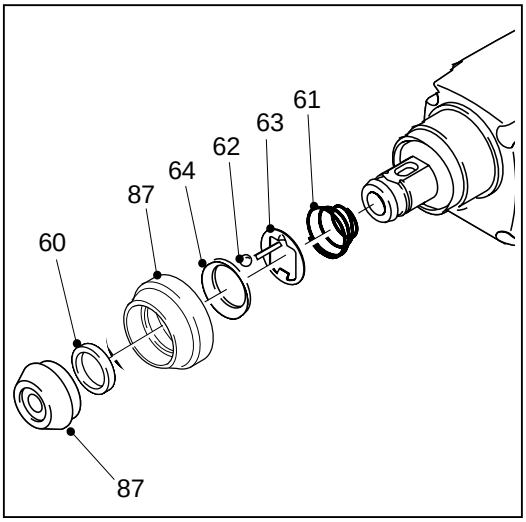
1 Remove the rubber cover (87).

2 Remove the spacer (60).

3 Remove the sliding sleeve (87) and the retaining ring (64).

4 Depress the support plate (63) and press out the ball (62) with the aid of a screwdriver or remove it with a magnet.

5 Remove the support plate (63) and the pressure spring (61).



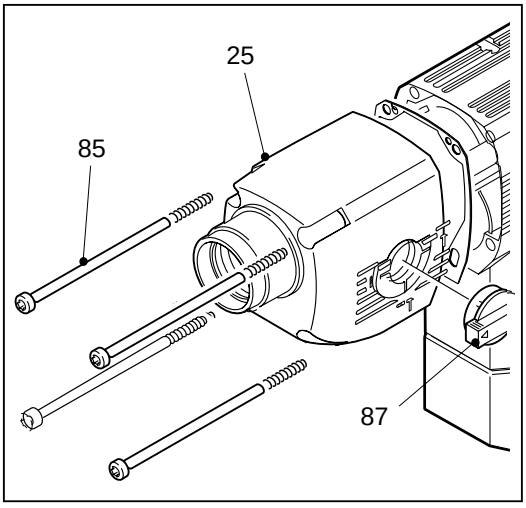
2

Removing the gear housing

1 Removing the switch lever (87):
Switch the lever to the hammer only position and break it off with aid of pliers (the lever is being destroyed).
Note: Should this not be possible mount the switch in a vice and break it off by rocking the machine. Remove any broken parts from the machine.

2 Remove the four housing bolts (85).

3 Remove the gear housing.



3

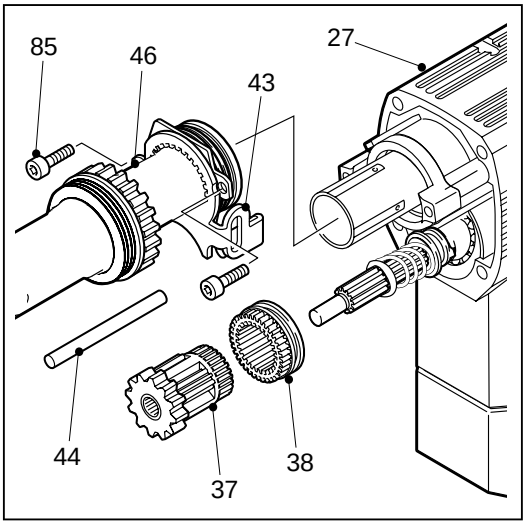
Removing the spindle

1 Remove the two bolts (85).

2 Remove the pin (44).

3 Remove the offset gear (37) and the ring gear (38).

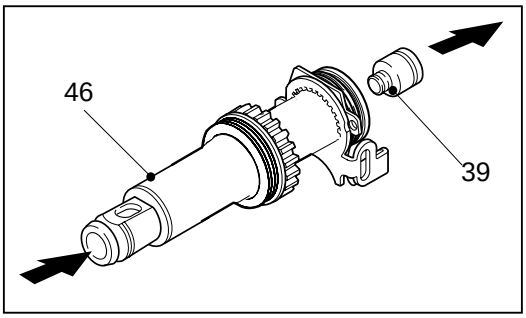
4 Remove the complete spindle sleeve (46) from the cylinder.



4

Removing the striker

1 Position the spindle (46) vertically and briefly hit the plunger using a suitable drift - the striker (39) comes free.



5

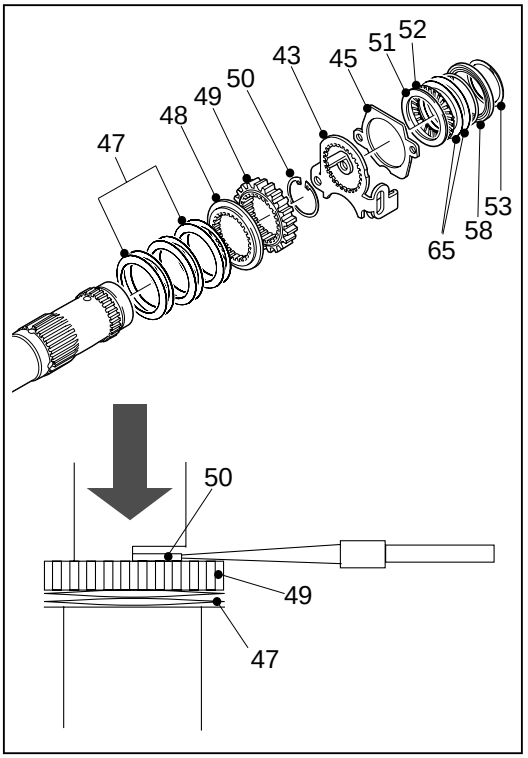
Dismantling the spindle (removing the outer parts)

1 Removing the rear thrust bearing assembly: Lever off the spiral clip (53) with a screwdriver. Remove the thrust bearing assembly in the following component parts:
- washer (58)
- thrust bearing (52)
- two compensating washers (65)
- profile ring with damper O-ring (51)

2 Remove the retaining plate (45) and the slider (43).

3 Removing the spindle gear (49):
Press the spindle gear (49) using a suitable sleeve against the cup springs (47) - the spring ring (50) is released and can be removed with pliers. Remove the spindle gear (49).

4 Remove the stop washer (48) and the cup springs.



6

Dismantling the spindle (removing the inner locking ring)

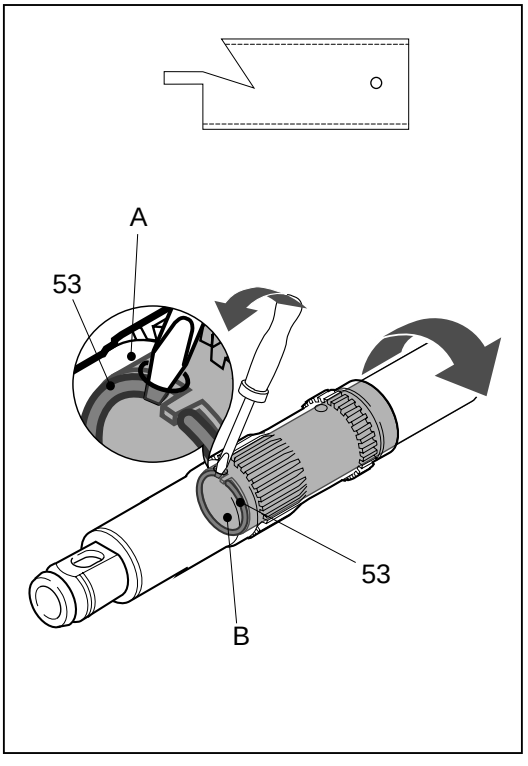
To remove the locking ring, service tool 4.931 5990 84 is needed (see illustration 7).

1 Turn the locking ring (53) with aid of service tool, such that one end projets the service boring by approx. 2 mm.

2 Put a screwdriver through the service boring and place it under the locking ring (53).

3 Move the screwdriver to and fro and at the same time turn the locking ring with aid of the service tool in direction of arrow. Turn the locking ring until it is completely levered off.

4 Press the locking ring from the spindle.

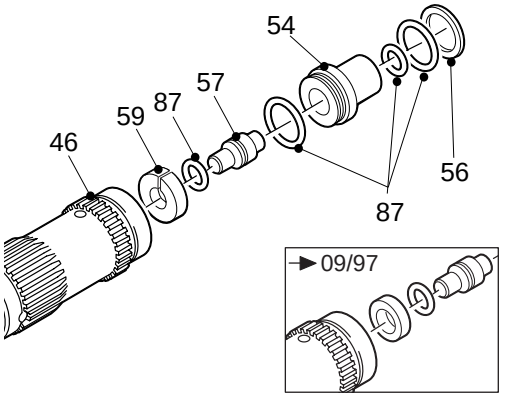


7

Dismantling the spindle (inner parts)

1 Press the following parts from the spindle (46):
- backing flange (56)
- sleeve (54)
- snap die (57)
- sleeve (59)

2 Remove the O-rings (87).



8

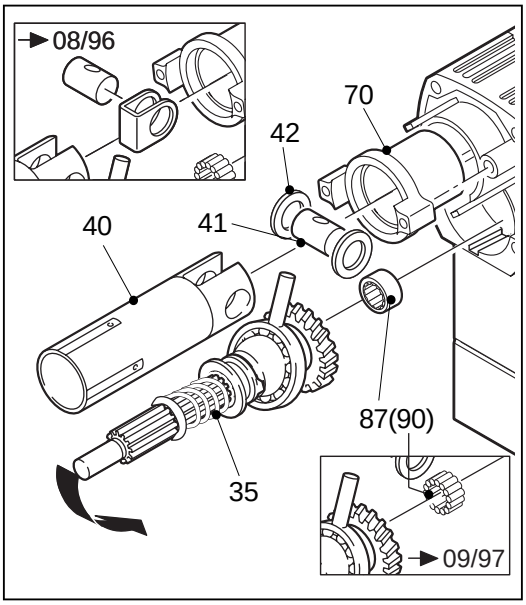
Removing the back gear shaft and the cylinder

1 Pull out the bearing housing (70) or loosen the bearing housing by hitting the gear housing lightly with a plastic hammer.

2 Remove the tumble drive (35) and the cylinder (40).

3 Press out the bolt (42) by hand and remove the two disks (41) (older machines: guide ring (see box).

4 Remove the needle bearing (87) with aid of an interior extractor. In case of older machines, remove the 13 rollers (90) from the back gear shaft.



9

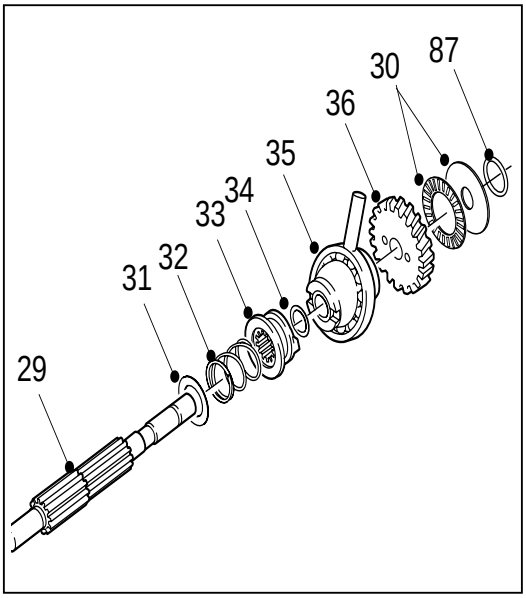
Dismantling the back gear shaft

1 Remove the “O” ring (87).

2 Remove the disk and the thrust bearing (30).

3 Press off the reduction gear (36).

4 Remove the remaining parts from the reduction gear shaft (29):
- tumble drive (35)
- disk (34)
- coupling sleeve (33)
- spring (32)
- disk (31)



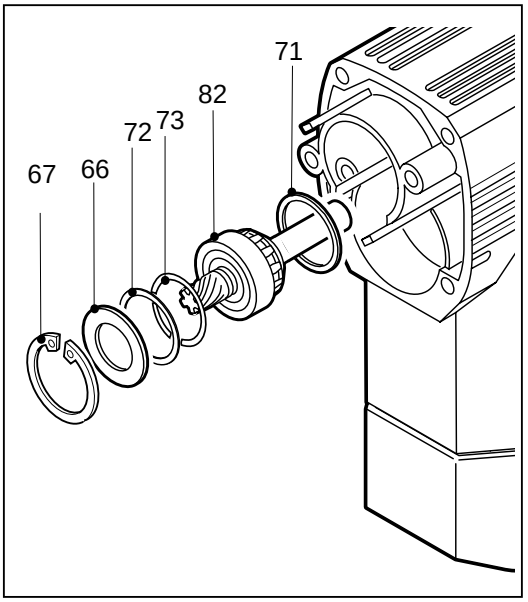
10

Removing the angle drive

1 Remove the locking washer (67).

2 Remove the shaft (82) together with the discs (72 & 73) and the ring (71). (If necessary by hitting the gear box lightly with a plastic hammer).

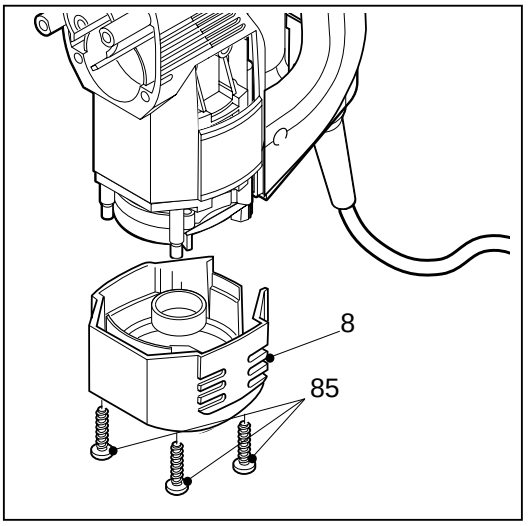
Note: Depending on the tolerance of the bearing, the tool can be equipped with the two or three discs (72 &73). Note the numbers of the discs and use the same number when re-assembling.



11

Removing the motor cover

1 Remove the four bolts (85) and remove the protective cap (8).



12

Dismantling the handle

1 Remove the pin (4).

2 Disconnect the field supply cables (18,19) from the contacts and pull them from the field housing.

3 Remove the attaching screws (85) and the handle cover (86).

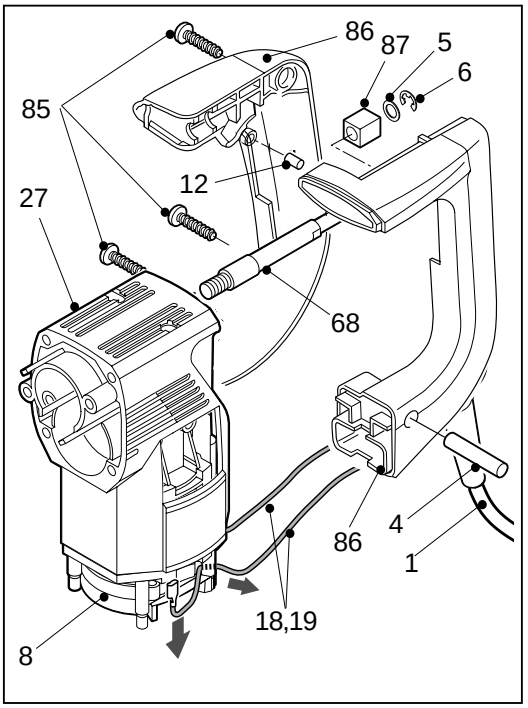
4 Remove the silicone buffer (12).

5 Remove the locking ring (6) and the washer (5).

6 Remove the AVS-rubber (87).

7 Remove the handle (86).

8 Unscrew and remove the handle bolt (68).

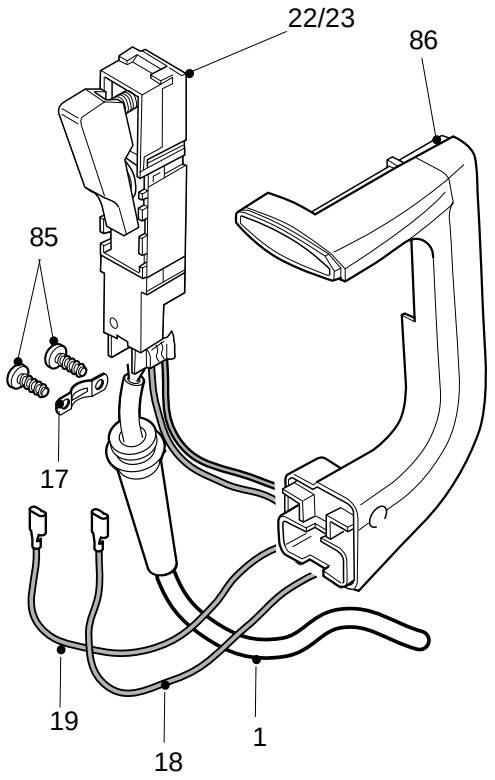


13

Removing the electrical parts

1 Unscrew the cable collar (17).

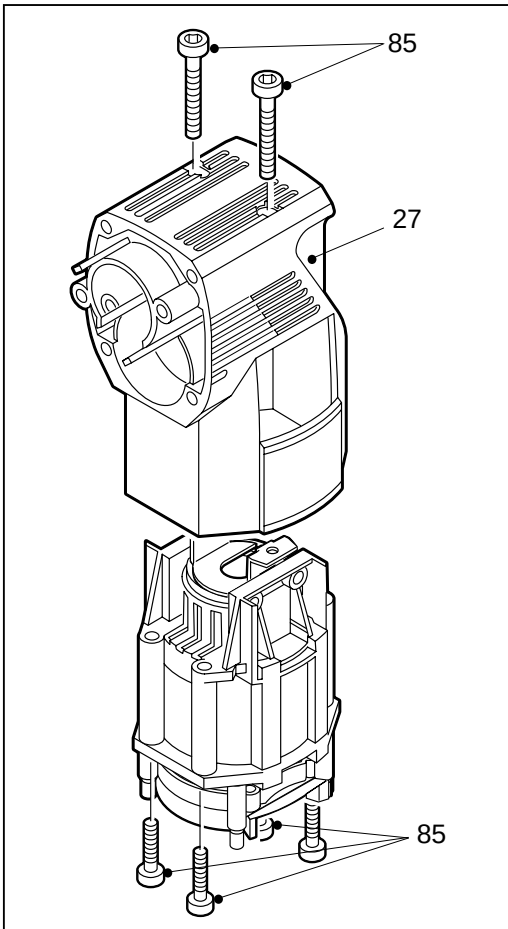
2 Remove following parts:
- switch (22/23)
- capacitor (24)
- cable (1)
- wire (18/19)



14

Removing the motor

1 Remove the bolts (85) and pull out the motor (if necessary, hit the motor housing (27) lightly with a plastic hammer).



15

Removing and dismantling the armature

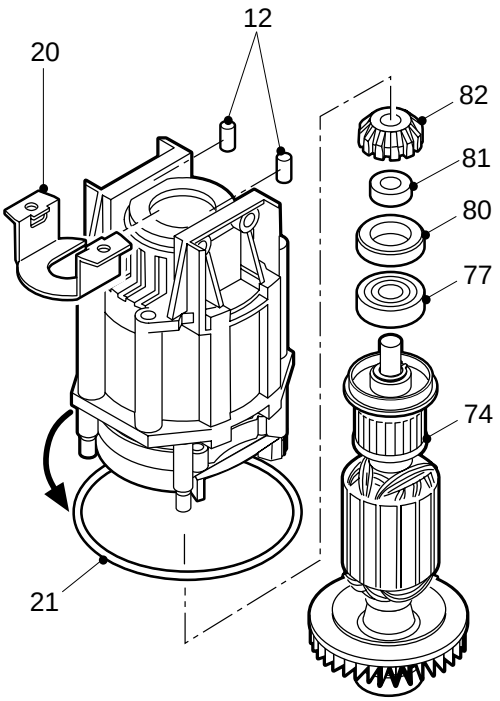
1 Remove the seal ring (21).

2 Lever off the bearing cover (20) and remove the silicone buffers (12).

3 Pull out the entire armature (74).

4 Press off the gear wheel (82).

5 Remove the spacer (81), sleeve (80) and the bearing (77).

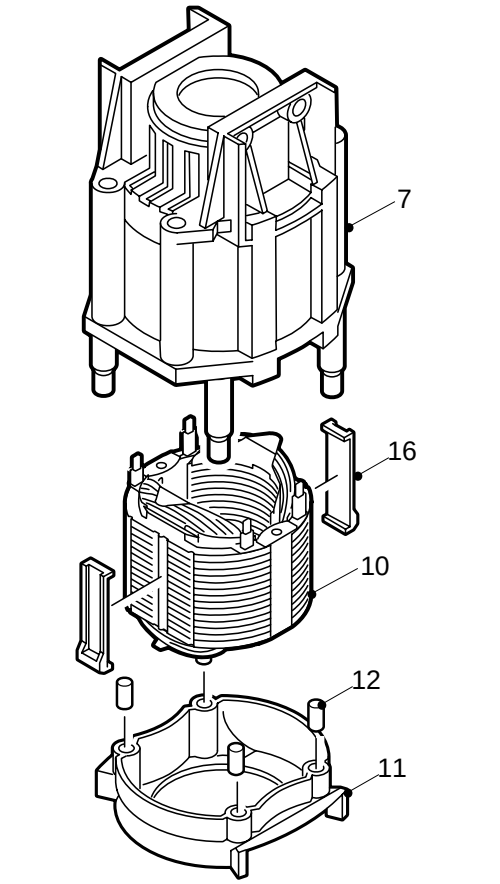


16

Removing the field

1 Remove the air deflector ring (11) and the silicone buffers (12).

2 Pull the field coil (10) from the casing (7) and remove the centering ledges (16).



17

Maintenance

General

For best performance hammers should be serviced at regular intervals, any indication that the hammer is not performing as specified should be investigated to prevent any adverse damage occurring.

ALL SEALS, GASKETS, GREASE OR OTHER PARTS DEEMED NECESSARY FOR SERVICING ARE IN THE SERVICE KIT.

ALL NEEDLE ROLLER BEARINGS SHOULD BE PRESSED WITH THE ROUNDED EDGE ENTERING THE BORE FIRST, AND THE PRESS TOOL PRESSING AGAINST THE FLAT SURFACE OF THE BEARING.

Cleaning

All mechanical parts with the exception of any sealed bearings should be cleaned in a suitable cleaning fluid. Electrical parts should be cleaned by the use of compressed air.

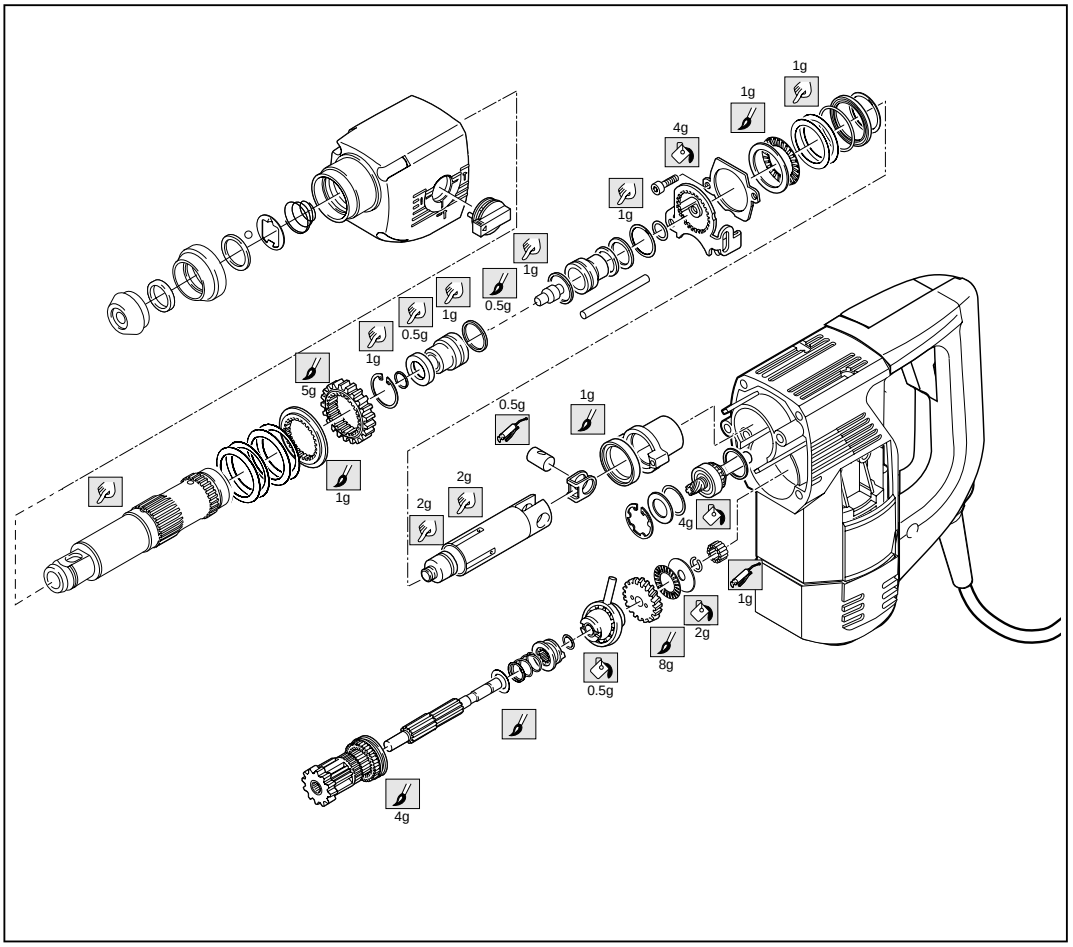
PRECAUTIONS MUST BE TAKEN FOR PERSONAL SAFETY THE USE OF EYE PROTECTION AND GLOVES IS RECOMMENDED.

Check for wear

Check the disassembled parts for wear (visual inspection) and replace worn parts.

Lubrication

At service and repair intervals the lubrication should be carried out as shown in the diagram below. All parts in the service kit should be fitted. The total amount of grease for the 350 is 30 grms (1 tube) (9170 3043 23, blue). Lubrication of the hammer is as shown on the grease chart.



ALL SCREWS SHOULD BE REFITTED WITH LOCKTITE 222 OR SIMILAR.

ELECTRICAL TESTING

Electrical tests Before assembly all electrical parts MUST be checked for safety, and that they conform to specification.

Testing the Armature (Flash Testing)

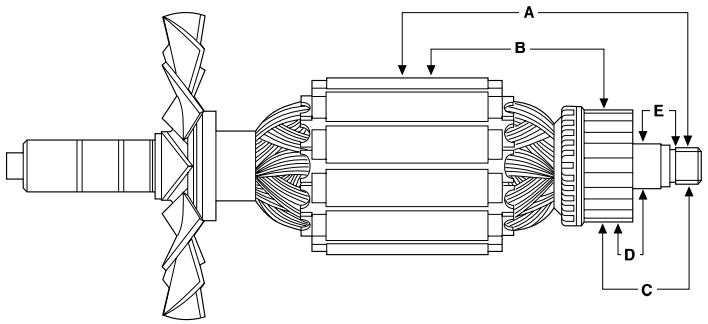
Supplementary Insulation

Apply 1250 volts rising to 2500 volts A.C. between laminations and spindle (A). See diagram.

Basic Insulation

Apply 750 volts rising to 1500 volts A.C. between commutator segments and laminations (B). See diagram.

A	Armature shaft to lamination pack	2500 volts
B	Lamination pack to commutator	1500 volts
C	Armature shaft to commutator	4000 volts
D	Commutator to commutator bush	1500 volts
E	Commutator bush to shaft	2500 volts



ELECTRICAL PERFORMANCE TEST READINGS

ARMATURES			
MODEL	**110V/120V**		**220V/230V/240V**
350	0.927Ω		3.297Ω
FIELD COILS			
	110V/120V	**220V/230V**	**240V**
350	0.121Ω	0.429Ω	0.499Ω
PERFORMANCE			
	110V/120V	**220V/230V**	**240V**
350	17 amps	10 amps	9 amps

Note: On all test readings + or - 5% of figures shown is acceptable.

Assembly

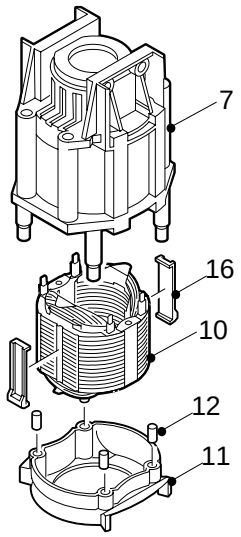
Mounting the field

1 Fit the centering ledges (16) to the field coil (10).
Caution: Care must be taken to ensure the correct positioning of the centering ledges (16) (see illustration).

2 Insert the field coil (10) into the field housing (7) (lightly hit the field housing with a plastic hammer).

3 Insert the silicone buffers (12) into the air deflector ring (11).

4 Den Luftleitring (11) einsetzen.
Caution: Care must be taken to ensure the correct positioning of the air deflector ring (see illustration).



1

Assembling and mounting the armature

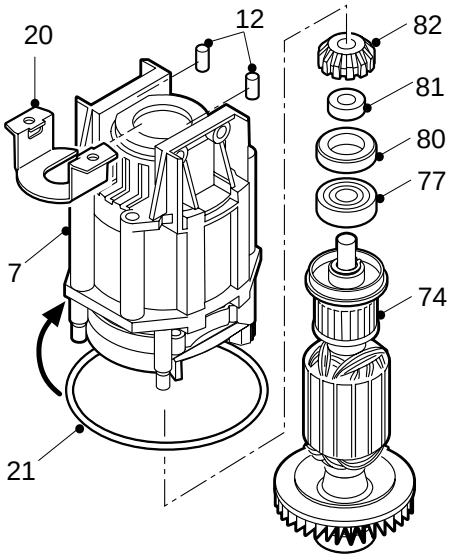
1 Push the bearing (77), the spacer (81) and the seal ring (80) seal nearest to the commutator onto the armature shaft and press on the gear wheel (82).

2 Insert the complete armature (74) into the case (7).

3 Push the silicone buffers (12) onto the case (7).

4 Fit the bearing cover (20) in the case (7).

5 Push the seal ring (21) onto the field housing.

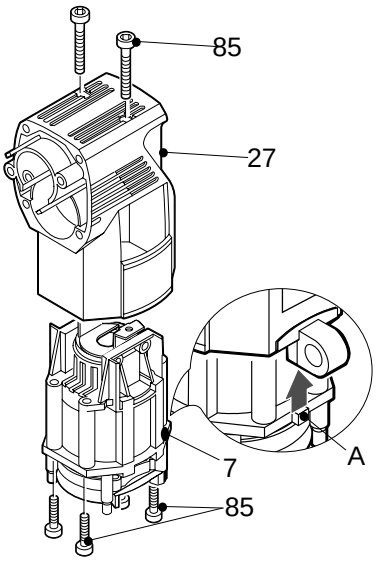


2

Mounting the motor

1 Insert the motor (7) into the motor housing (27).
Caution: Care must be taken to ensure the correct positioning, the lug (A) must fit in the recess on the motor housing (27).

2 Fasten the motor with bolts (85) (2,5Nm).



3

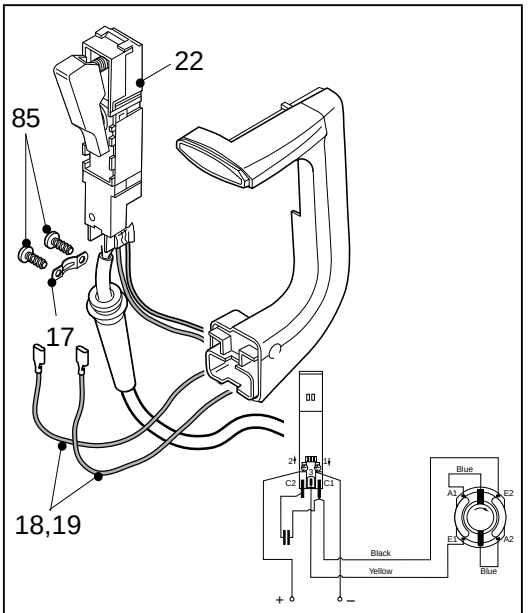
Assembling the electrical parts

1 Connect all cables to the switch (see illustration and wiring diagram).

2 Push the field cables (18,19) through the handle (see illustration).

3 Insert the switch (22), the capacitor (24).
Note: Install the field supply cables (A) below the mains cable near the cable collar (17).

4 Fasten the cable collar (17) with screws (85) (1Nm).



4

Mounting the handle

1 Screw (10 Nm) the handle bolt (68) with screw locking device onto the motor housing (27).

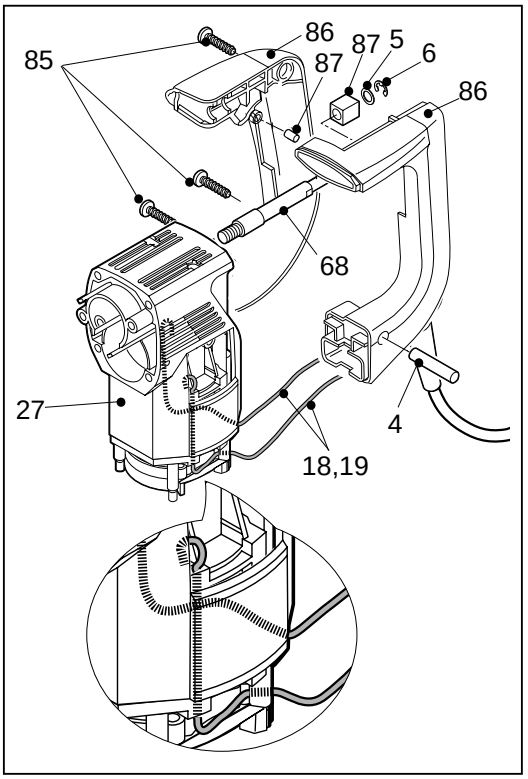
2 Push the handle (86) over the bolt (68) and fix the AVS-rubber (87) with the washer (5) and locking ring (6).

3 Insert the silicone buffer (87) into the handle cover (86).

4 Fasten the handle cover (86) with the bolts (85) (1,2 Nm).

5 Push the field supply cables (18,19) through the channels of the field housing (see illustration) and connect them with the field (diagonally).

6 Fasten the handle with the grooved dowel pin (4).
Press in the grooved dowel pin (4) or knock it in with a rubber hammer.

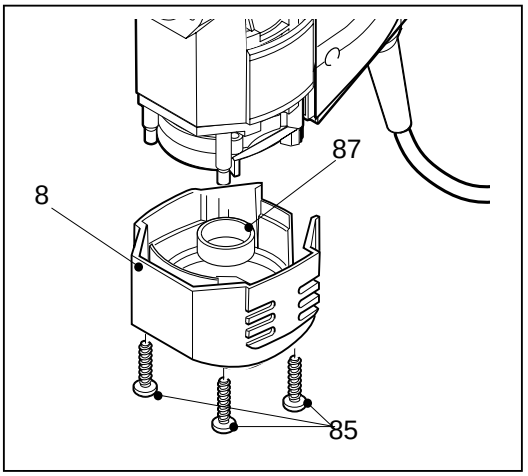


5

Mounting the motor cover

1 Fit the protective cap (8) and fasten it with the bolts (85) (1,8 Nm).

☞ Take care that the protective cap (87) is firmly stuck in the motor cover (8).



6

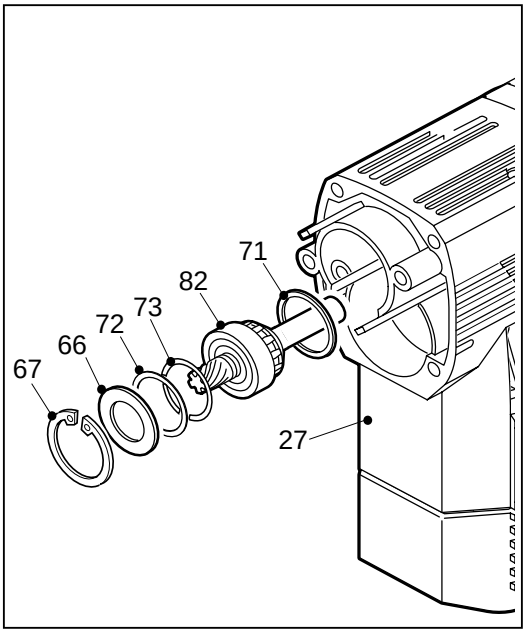
Assembling the angle drive

1 Insert the support ring (71).

2 Grease the shaft (82) and insert into the gear box (27) by turning it slightly.

3 Insert the disks (72 &73).
Note: Depending on the tolerance of the bearing, two or three disks (72 &73) are needed. For assembly, use the same amount of disks as removed.

4 Insert the locking washer (67) such that the lugs face the bearing (see illustration).

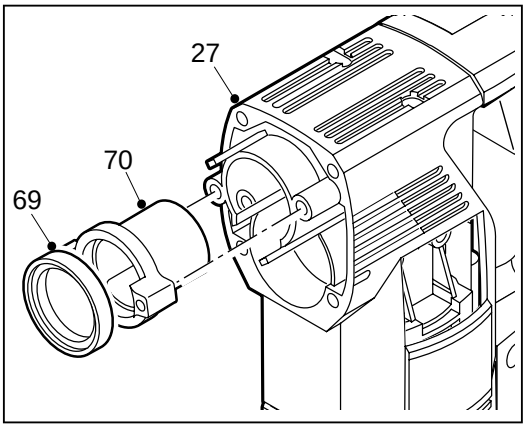


7

Mounting the spindle bearing

1 Press the sintered bearing (69) into the bearing housing (70).

2 Insert the bearing housing (70) into the gear box (27).
Note: Do not press in the bearing housing (70) completely for easier mounting of the back shaft (29) and the cylinder (40).
Caution: Care must be taken to ensure the correct positioning of the bearing housing (70).



8

Assembling the back gear shaft

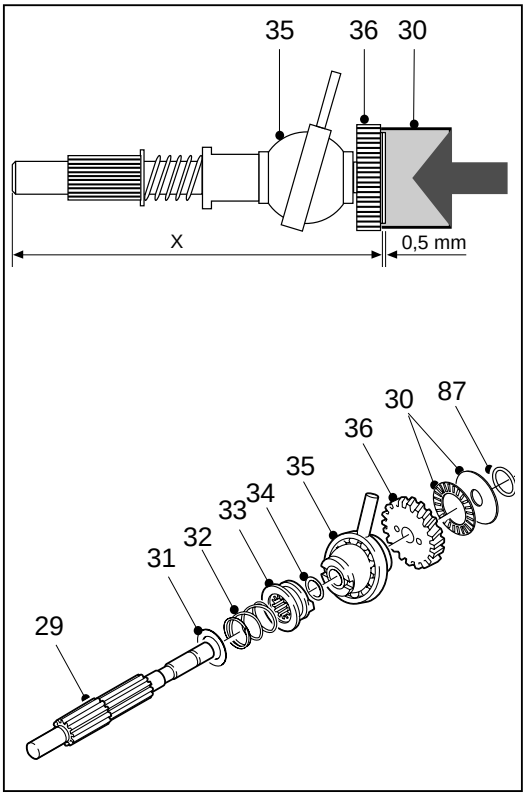
1 Fit the following parts onto the back of reduction gear shaft (29) in the following order:
- disk (31)
- spring (32)
- coupling sleeve (33)
- disk (34)
- tumble drive (35)

2 Press on the reduction gear (36) with 0.05 mm to the tumble drive.
Caution: the smooth surface must face the tumble drive (35).

3 Lightly grease the thrust bearing (30) and insert it into the reduction gear (36).

4 Fit the disk (30) and check the distance:
- if the distance is more than 100.5mm, do not fit the disk (30).
- if the distance is less than 100.5mm fit another disk (30) and check the distance again.

5 Push on the O-ring (87).



9

Mounting the back gear shaft and the cylinder

1 Insert the two disks (42) and the bolt (41) into the cylinder (40).

☞ Replace the hoop (43) with two washers (42).

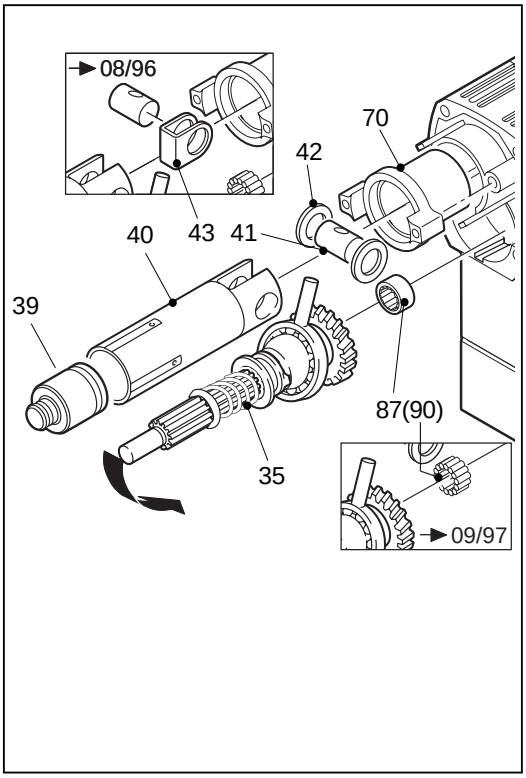
2 Insert the rolls (87)/(90) into the back gear shaft one after the other and fix it with grease.

☞ Mount the rolls (87) completely with the cage (from date of manufacture 09/97).

3 The back gear (35) can only be inserted as follows:

- Put together the cylinder and the back gear for adjustment before mounting them.
- Turn the tumble drive to the lowest position and leave it there
- Insert the cylinder into the end shield
- Insert the tumble drive into the mounted cylinder.

4 Grease the striker (39) and insert it into the cylinder.



10

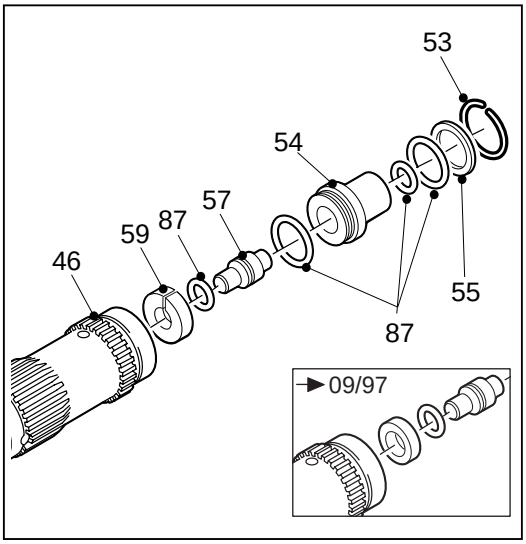
Assembling the spindle (mounting the inner parts)

1 Push the O-rings (87) into the sleeve.

2 Fit the sleeve (59), the O-ring (87), and the sleeve (54) to the snap die (57) and insert them into the spindle (46).

3 Insert the disk (55) into the spindle upto the O-ring.

4 Press the locking washer (53) with a suitable sleeve into the spindle (46) until the locking washer (53) engages.
Caution: Check the service boring (visual check) to make sure the locking ring (53) has engaged.



11

Assembling the spindle (mounting the outer parts)

1 Mount the cup springs (47) (see illustration).

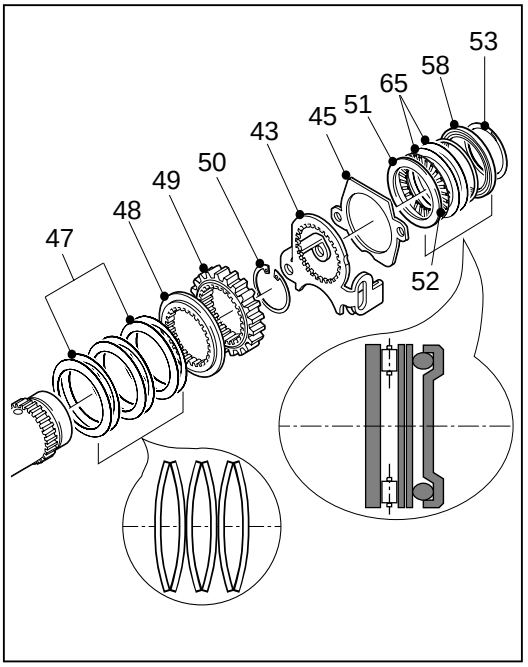
2 Mount the clutch (the stop washer (48) with indentations against the toothing of the spindle gear (49)).

3 Fit the spring ring (50) and press it on (against the pressure of the cup springs (47)).

4 Mount the slides (43) and the retaining plate (45).

5 Mounting the rear thrust bearing assembly:
- profile ring with damper O-ring (51)
- two compensating washers (65)
- thrust bearing (52)
- washer (58)

6 Secure the rear thrust bearing assembly with the locking washer (53).



12

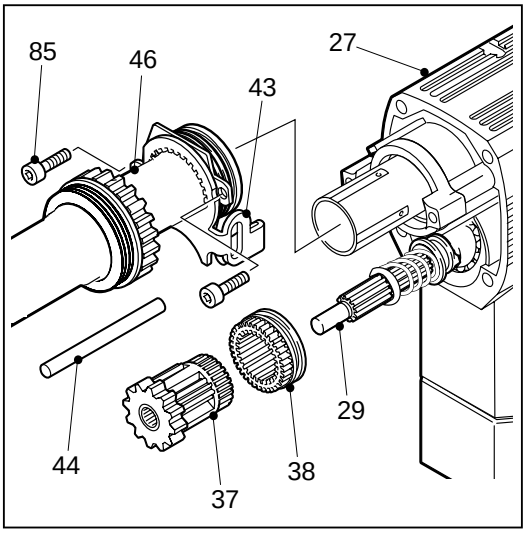
Mounting the spindle

1 Fasten the spindle (46) to the motor housing (27) with the two screws (85) (6 Nm, for additional security use Loctite 222 or Omnifit.).

2 Push the ring gear (38) over the back gear shaft (29) and let it engage in the locking slide (43).

3 Push the planetary gear (37) onto the back gear shaft (29) and fit them into the ring gear (38).

4 Push the straight pin (44) through the locking slide (43) and insert it into the motor housing (27).



13

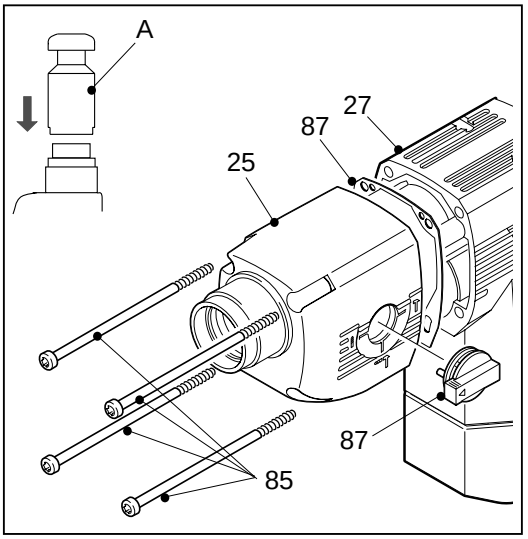
Mounting the gear housing

1 Insert a service tool (A) into the gear (25) (the sleeve protects the corrugated seal ring inside the gear (25) from damage during assembly).

2 Fit the gasket (87) to the gear housing (25).

3 Fasten the gear box (25) to the motor housing (27) and fix it with bolts (85) (2,5+0,5Nm).

4 Fit the switch lever (87) (mount it in the “hammer” position, the pin must grasp the elongated hole of the locking slide).



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Mounting the SDS-plus Reception

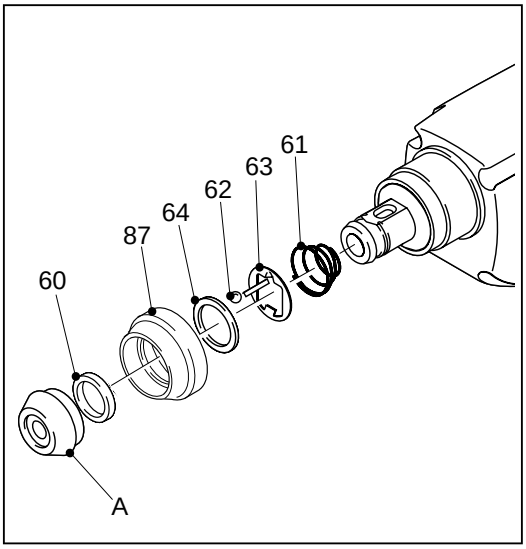
1 Insert the spring (61) and the support plate (63).

2 Depress the support plate (63) and insert the ball (62).

3 Fit the retaining ring (64) and the sliding sleeve (87).

4 Fit the spacer (60).

5 Push down the sliding sleeve (87) and fit the rubber (A).



15

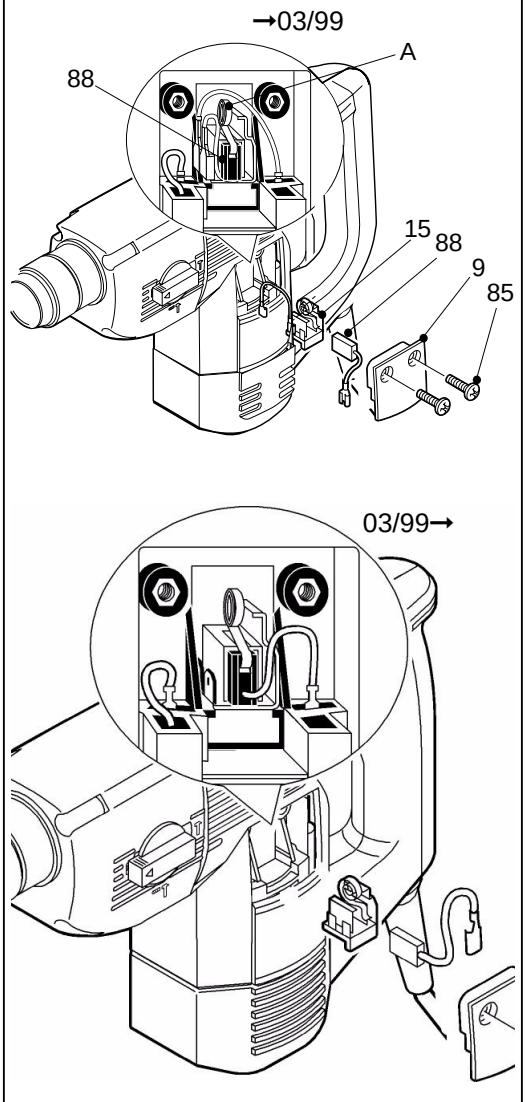
Mounting the carbon brushes

1 Insert the brush holder (15) into the housing and connect the cable to the field.

2 Insert the carbon brush (88) into the brush holder (15) and put the spring (A) onto the carbon brush. Fit the flat plug.

3 Fasten the service cover (9) with the bolts (85).

☞ From date of construction 03/99, the carbon brush connection is located directly on the field.



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WARNING **After completed assembly, the machine should be submitted to a flashover test with 4000 volts. It is advisable to run the machine with half the rated voltage to make sure that the brushes are inserted correctly. After 10 minutes the machine should be run with full rated voltage. The performance test values should be compared with these values.**

With the breaker completely assembled and with the switch “ON” apply 2000 volts initially and increase rapidly to 4000 volts between the main casting and one of the pins of the plug on the power supply cord. Apply test to both live and neutral pins.

WARNING **Do not touch the other pin during this test since it is live.**

The full voltage of 4000 volts should be maintained without breakdown or flashover for a few seconds.

If the armature has been tested, remove the carbon brushes before carrying out the test, (thus avoiding over-stressing the armature insulation system.) As a result, a further over-stressing of the armature insulation is avoided. In this case the test voltage must be carried out between the conductive cast part and each pin one after the other.

WARNING **If the machine is not switched on, faults could be not found and the user could suffer an electric shock. Make sure the switch is in the “On” position.**

Fault finding

With the aid of the Fault Finding chart (below) the source of any malfunction may be quickly identified and repaired.