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Special Tools Required

- Forcing disks 4931 599 021
- Special pliers 4931 599 057
- (Dis-) Assembly tool 4931 5990 84
- Sleeve 4931 599 038
- Screw locking device Omnifit 80 4931 945 651

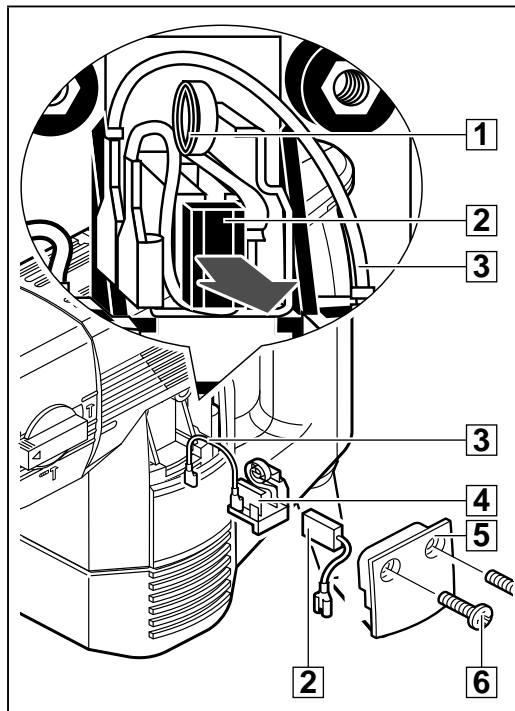
Important!

- Before beginning the maintenance work, perform an initial check with a high voltage test according to VDE (see chapter Electrical and Mechanical Test Instructions).
- Before all repair work, pull the power plug from the socket!

Disassembly

Removing the carbon brushes

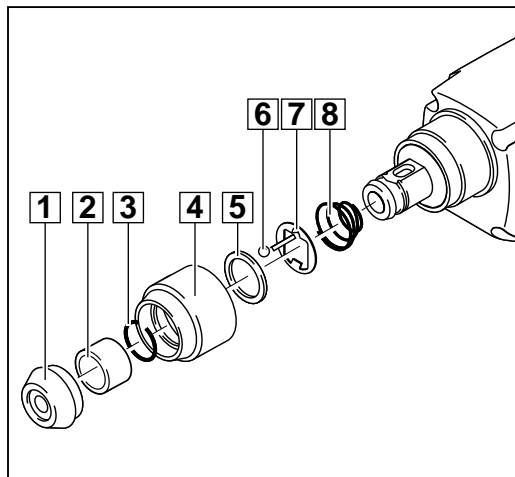
- 1 Loosen the two screws (6) on both sides and remove the respective service covers (5).
- 2 Remove the cables (3) and pull the brush holders (4) from the housing.
- 3 Put the springs (1) aside (see illustration) and pull out the carbon brushes (2).
- 4 Pull the carbon brush cables together with the carbon brushes (2) from the housing.



1


**Only applicable for PN 3500:
Dismantling the SDS-Plus-reception**


- 1 Remove the rubber cap (1).
- 2 Remove the spacer (2).
- 3 Depress the sliding sleeve (4) and lever off the locking ring (3) with aid of a screwdriver.
- 4 Remove the sliding sleeve (4) and the retaining ring (5).
- 5 Depress the retaining disk (7) and press out the ball (6) with aid of a screwdriver or remove it with a magnet.
- 6 Remove the retaining disk (7) and the spring (8).



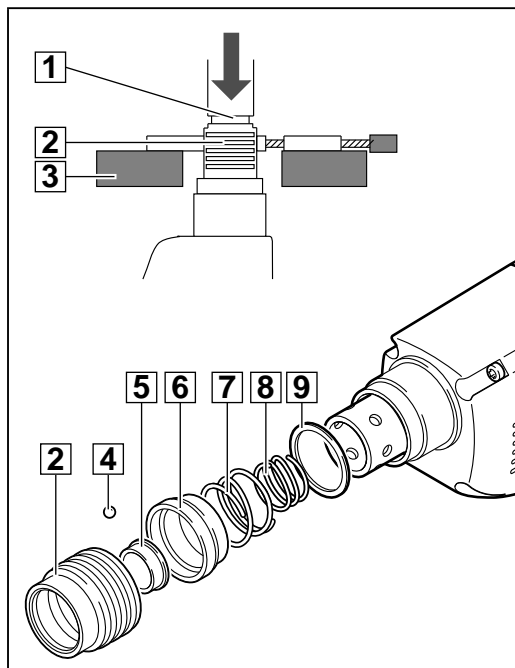
2

Only applicable for PN 3500 X: Dismantling the FIXTEC-reception

- 1** Removing the locking sleeve (2):
 Fix the locking sleeve (2) in a pulling-off device (3) and press it out. At the same time, press down the spindle (1) with a suitable sleeve.


- 2** To remove the balls (4) (six pieces):
 Depress the seal ring (6) and remove the balls with aid of a magnet.

- 3** Remove the remaining parts:
 - seal ring (6)
 - outer spring (7)
 - ejector ring (5)
 - inner spring (8) and
 - washer (9).



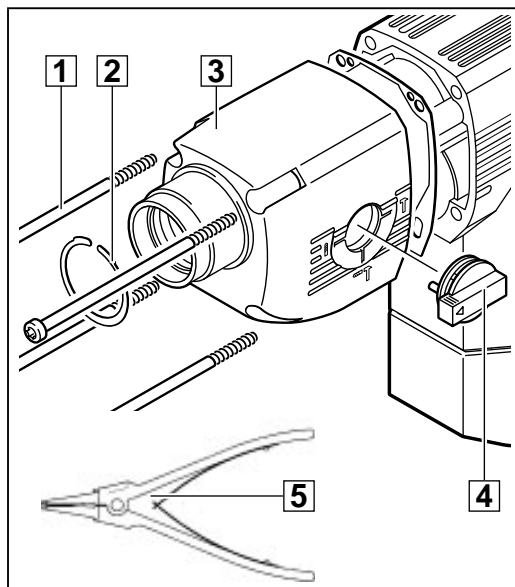
2

Detaching the gear housing

- 1** Switch the lever (4) to the "0"-position and break it off with aid of pliers. The lever (4) gets destroyed.
 Should this not be possible, fix the lever (4) in a vice and break it off by moving the machine to and fro. Remove any broken part from inside the machine.

- 2** Remove the four housing screws (1).

- 3** **Only applicable for PHE 3500 X:** Open the locking ring (2) on the spindle with aid of special pliers (5) (service tool) and remove it together with the gear housing (3).



3

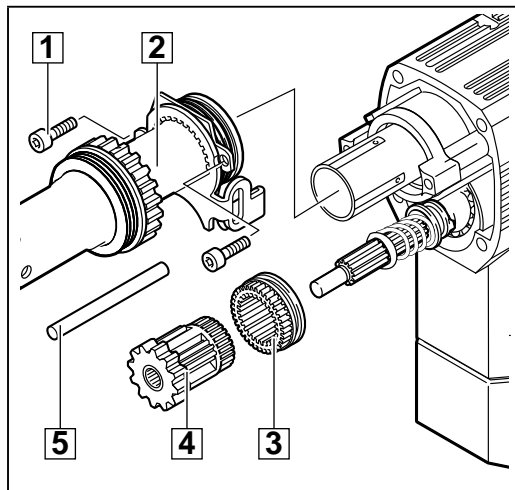
Removing the spindle

- 1** Remove the two screws (1).

- 2** Remove the straight pin (5).

- 3** Remove the planetary gear (4) and the ring gear (3).

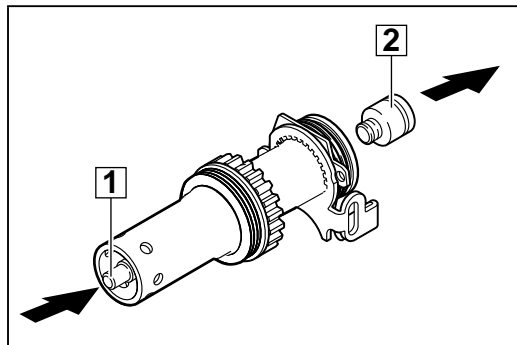
- 4** Remove the complete spindle sleeve (2) from the cylinder.



4

Removing the striker

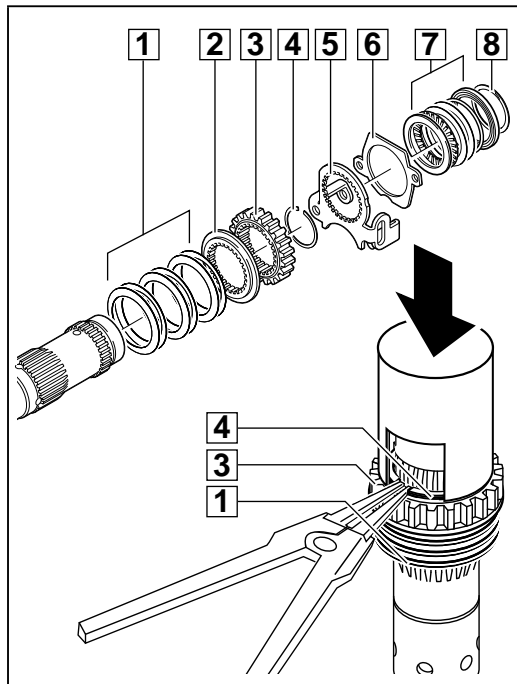
- 1 Place the spindle vertically.
- 2 Briefly hit the plunger (1) with a mandrel. The striker (2) comes free.



5



Dismantling the spindle (removing the outer parts)

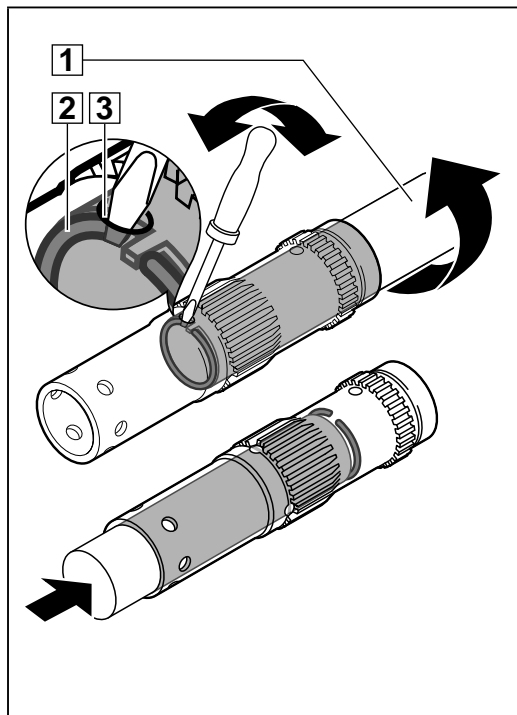
- 1 Removing the rear thrust bearing (7): Lever off the special locking ring (8) with aid of a screwdriver.
- 2 The thrust bearing can be removed in the following component parts:
 - washer
 - thrust bearing washer
 - two compensating washers and
 - profile ring with damper O-ring.
- 3 Remove the retaining disk (6) and the locking slide (5).
- 4 Removing the spindle wheel (3): Press the spindle wheel (3) with a sleeve against the disk springs (1) - the locking ring (4) is released and can be removed with pliers. Remove the spindle wheel (3).
- 5 Remove the ratchet (2) and the disk springs (1).



6

Dismantling the spindle (removing the inner locking ring)

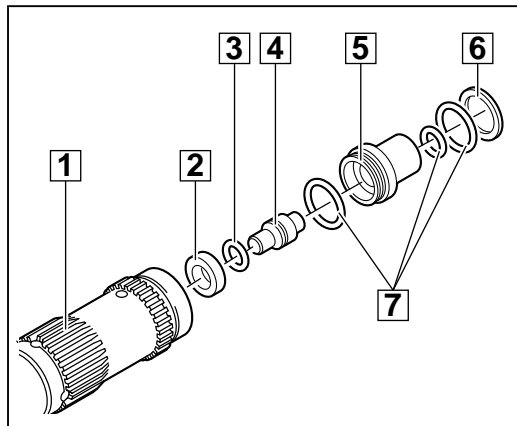
- 1  In the middle of the spindle (1) there are four deairing holes and one service boring (3). The service boring (3) has the smallest diameter.
- 2 Turn the round wire locking ring (2) with aid of the service tool (4931 599 084) such that one end projects the service boring (3) by approx. 2 mm.
- 3 Put a screwdriver through the service boring (3) and place it under the locking ring (2).
- 4 Move the screwdriver to and fro and at the same time turn the locking ring (2) with aid of the service tool in direction of arrow.
 -  Turn the locking ring (2) until it is completely levered off the groove.
- 5 Press the locking ring (2) from the spindle.



7

**Only applicable for PN 3500:
Dismantling the spindle (removing the inner parts)**

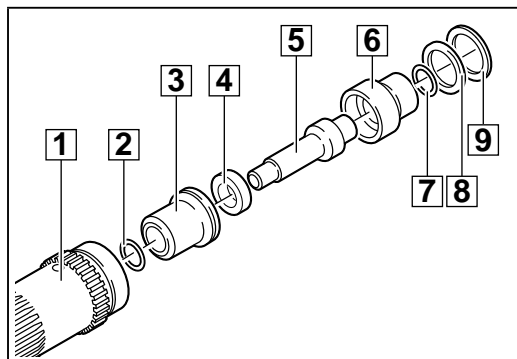
- 1 Press the following parts from the spindle (1):
 - washer (6)
 - pressure sleeve (5)
 - plunger (4) and
 - brake disk (2).
- 2 Remove the O-rings (3) and (7).



8

**Only applicable for PN 3500 X:
Dismantling the spindle (removing the inner parts)**

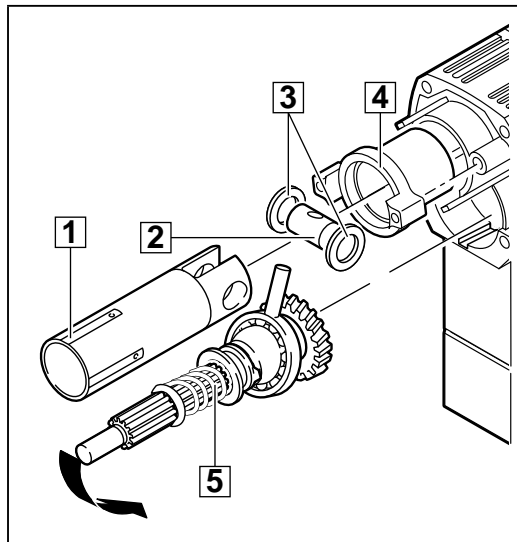
- 1 Press the following parts from the spindle (1):
 - washer (9)
 - pressure sleeve (6)
 - plunger (5)
 - brake disk (4) and
 - pressure sleeve (3).
- 2 Remove the O-rings (2), (7) and (8).



8


Removing the back gear shaft and the cylinder

- 1 Pull out the bearing housing (4). If necessary, loosen the bearing housing (4) by hitting the gear housing lightly with a plastic hammer.
- 2 Remove the back gear shaft (5) by turning or canting it (see arrow in illustration).
- 3 Completely remove the cylinder (1) and the back gear.
- 4 Push out the bolt (2) by hand and remove the two disks (3).



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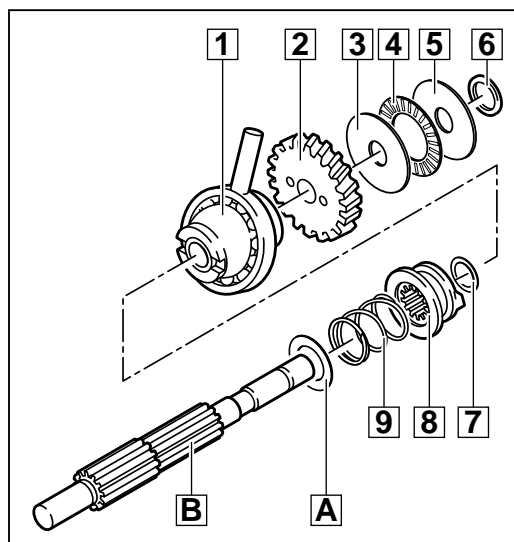
Dismantling the back gear shaft

- 1 Remove the rubber O-ring (6).
 Attention! The rubber O-ring (6) fits tightly and is difficult to remove.

- 2 Remove the washer (5) and the thrust bearing (4) as well as the disk (3).

- 3 Press off the back gear wheel (2).


- 4 Remove the remaining parts from the back gear shaft (B):
 - tumble drive (1)
 - washer (7)
 - coupling box (8)
 - spring (9) and
 - washer (A).



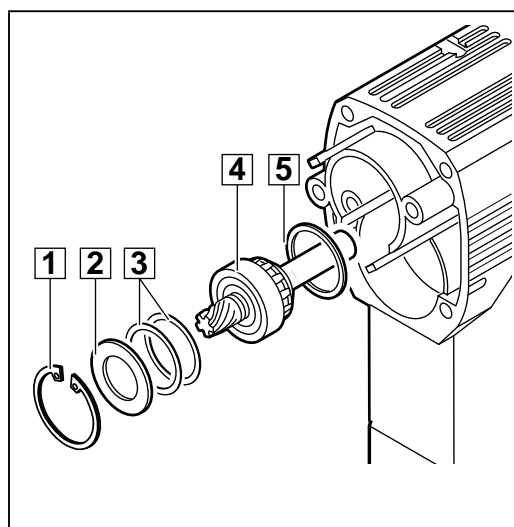
10

Removing the angle drive

- 1 Remove the locking ring (1) with aid of special pliers.
- 2 Remove the angle drive (4) together with the disk (2), the washers (3) as well as the support ring (5).
If necessary, hit the gear housing lightly with a plastic hammer for support.

- 3
 Depending on the tolerance of the bearing the tool can be equipped with two or three washers (3).

- 4 If this bevel wheel will be used again, please note the number of the washers. Mount the same number when re-assembling.

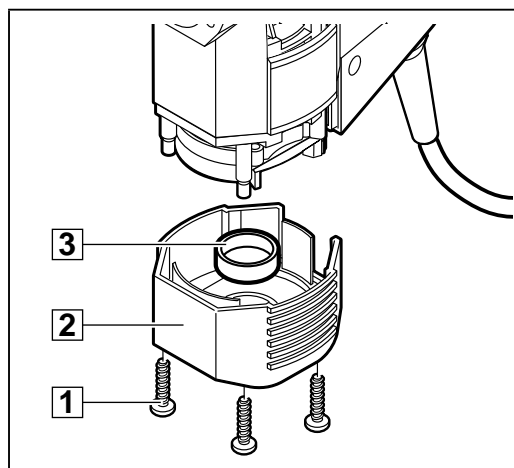


11

Removing the motor cover

- 1 Loosen the four screws (1) and remove the motor cover (2).

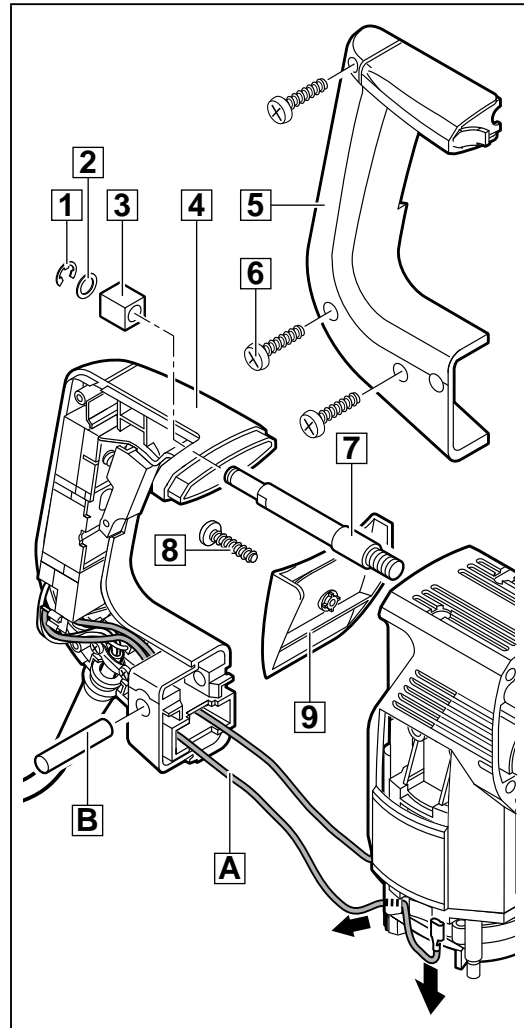
- 2 Remove the rubber cap (3) in case of damage.



12

Dismantling the handle

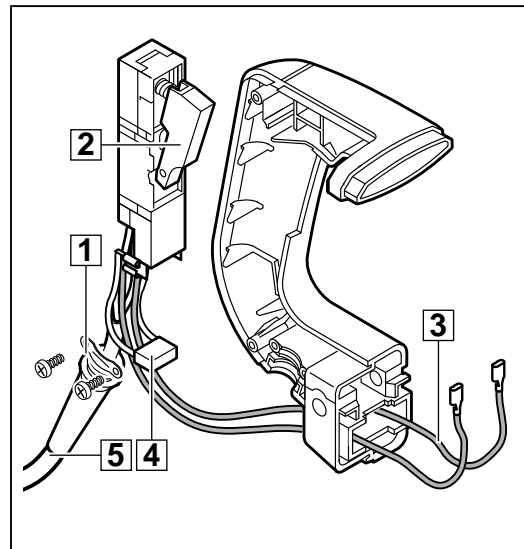
- 1 Expel the pin (B).
- 2 Pull the field supply cables (A) from the contacts and remove them from the field housing.
- 3 Loosen the screw (8) and remove the gear cover (9).
- 4 Loosen the screws (6) and remove the handle cover (5).
- 5 Lever off the locking ring (1) with aid of special pliers and remove it together with the washer (2).
- 6 Pull the handle back slightly and remove the AVS-rubber (3).
- 7 Remove the handle (4).
- 8 Unscrew and remove the handle bolt (7).



13

Detaching the electric components

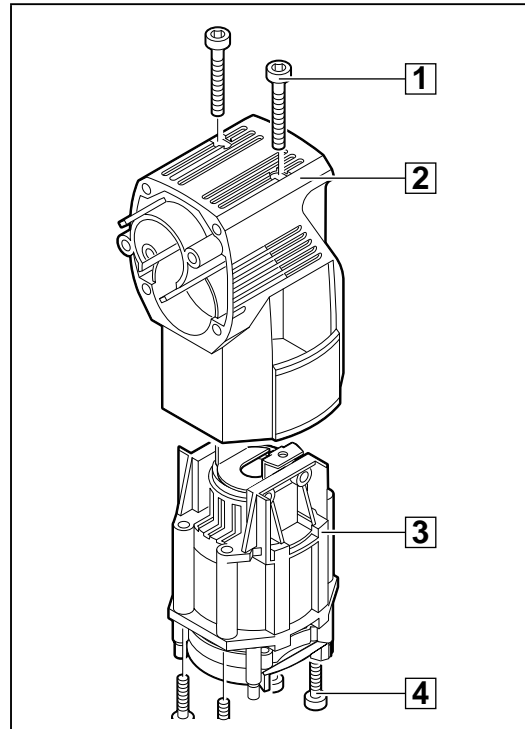
- 1 Unscrew the strain relief (1).
- 2 Remove the following parts:
 - switch (2)
 - capacitor (4)
 - mains cable (5) and
 - field cable (3).



14

Removing the motor

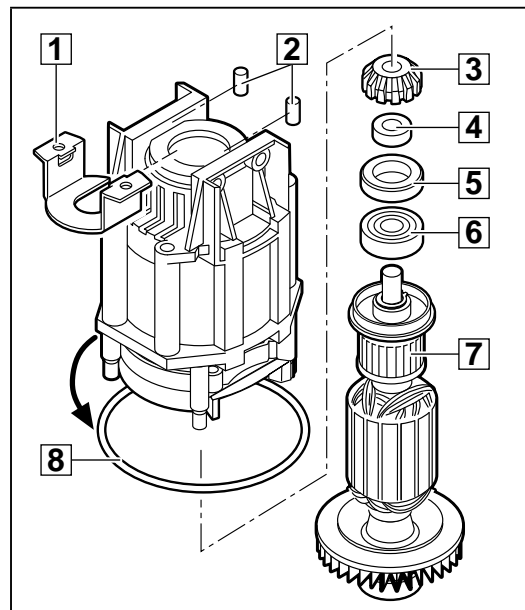
- 1 Loosen the screws (1) and pull out the motor (3).
If necessary, hit the motor housing (2) lightly with a plastic hammer for support.



15

Removing and dismantling the armature

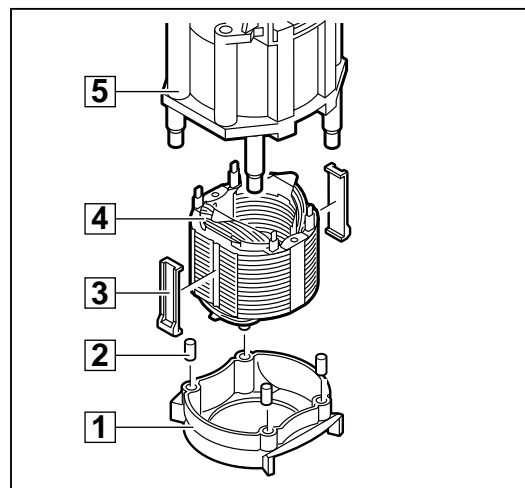
- 1 Remove the seal ring (8).
- 2 Lever off the angle (1) and remove the silicone buffer (2).
- 3 Pull out the complete armature (7).
- 4 Press off the toothed wheel (3).
- 5 Remove the washer (4) and the seal ring (5).
- 6 Apply the pulling-off device below the ball bearing (6) and press off the ball bearing (6).



16

Removing the field

- 1 Remove the air deflector plate (1) and damaged silicone buffers (2).
- 2 Pull the field (4) from the motor housing (5) and remove the centring ledges (3). If necessary, hit the motor housing lightly with a plastic hammer for support.

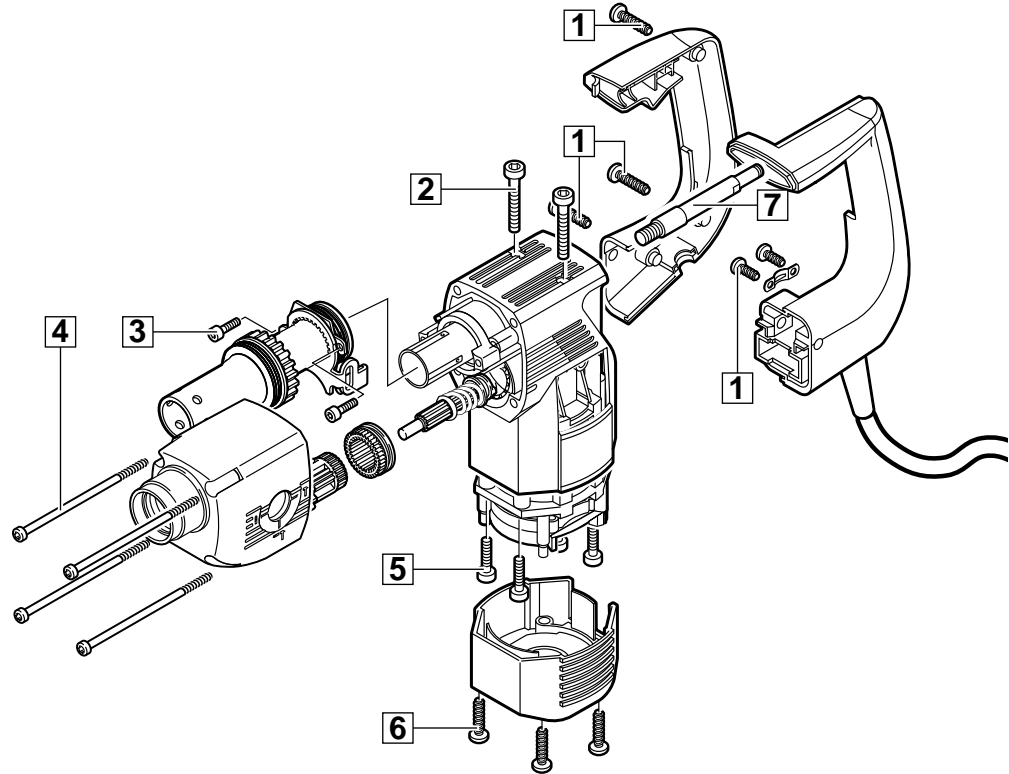


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Maintenance

General

It is recommended to regularly submit the tool to maintenance, or as soon as the hammer mechanism gets weak, or when the carbon brushes switch off. When carrying out maintenance all parts of the maintenance set must be exchanged. Use the respective maintenance set provided for each machine.



Torques

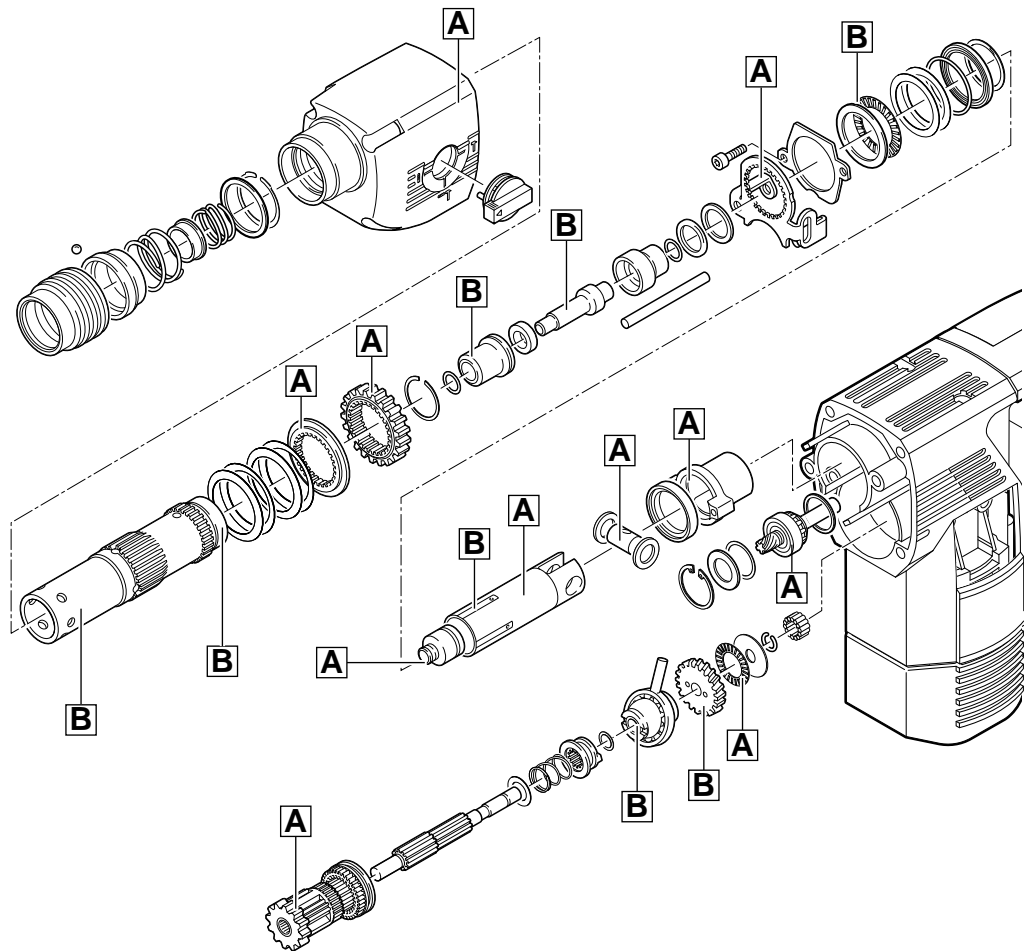
Handle cover screws (1)	1,2 Nm
Motor screws (2)	2,5 Nm + screw locking device
Spindle sleeve screws (3)	6,0 Nm + screw locking device
Screws (4)	2,5 Nm
Motor screws (5)	2,5 Nm + screw locking device
Motor cover screws (6)	1,8 Nm
Handle bolt (7)	10,0 Nm

Cleaning	Clean all parts – with the exception of the electrical parts – with cold cleaning agent. Caution! No cleaning agent should penetrate into the bearing. Clean the electrical parts with a dry brush.
Check for wear	Check the disassembled parts for wear (visual inspection) and replace worn parts.
Electrical tests	Before reassembling, perform an electrical test on all relevant parts (see chapter Electrical and Mechanical Test Instructions).
Lubrication	Each time maintenance is performed, the machine is to be lubricated as stated in the lubrication plan. After the machine is fully disassembled, completely remove the old grease and replace with new grease. The grease must be applied to the machine as indicated in the lubrication plan.

Legend

A Thickly cover with a total of 31 g Darina grease

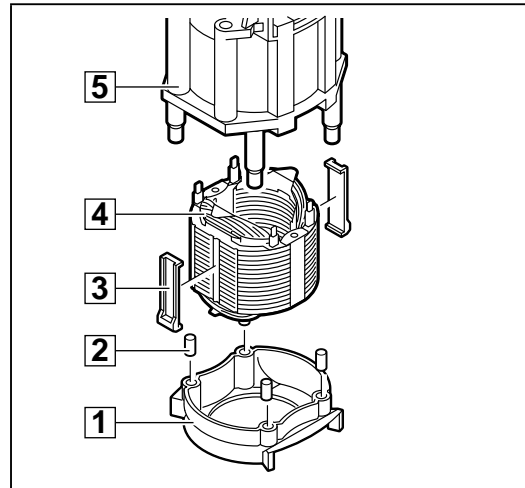
B Thinly cover with a total of 14 g Tivela grease



Assembly

Mounting the field

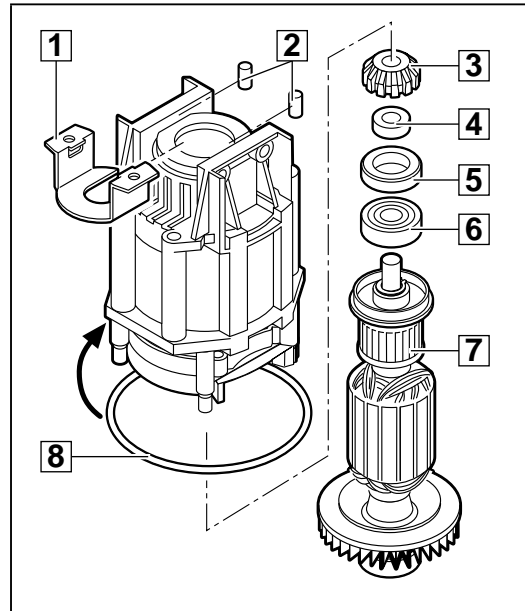
- 1 Fit the centring ledges (3) to the field (4) (take care of the right position; see illustration).
- 2 Insert the field (4) into the motor housing (5) (hit the back of the field housing lightly with a plastic hammer for support).
- 3 If necessary, insert new silicone buffers (2) into the air deflector plate (1).
- 4 Insert the air deflector plate (1).
 ☞ Take care of the right position: see illustration.



1

Assembling and mounting the armature

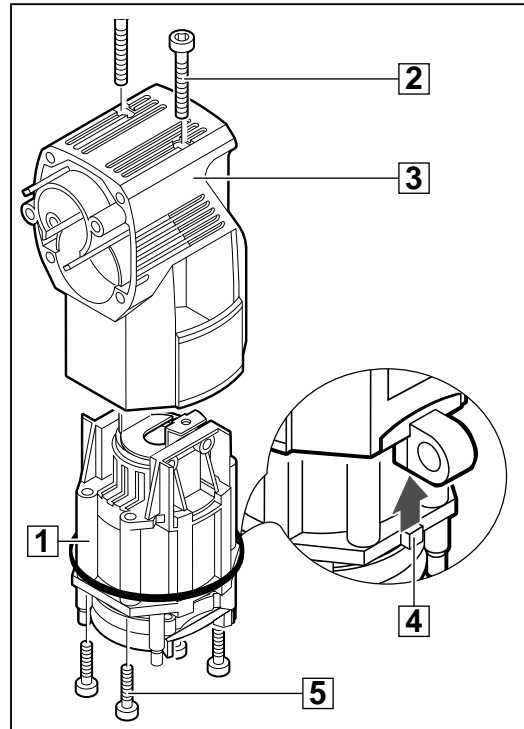
- 1 Push the bearing (6), the washer (4) and the seal ring (5) over the armature shaft.
 ☞ Take care of the right position: the small boring- \varnothing must face the toothed gear.
- 2 Press on the toothed gear (3) as far as it will go.
- 3 Insert the complete armature (7) into the field.
- 4 Fit the silicone buffers (2) to the field housing.
- 5 Fix the armature with the angle (1) inside the field housing.
- 6 Fit the seal ring (8) to the field housing.
- 7
 ☞ The armature must turn easily.



2

Mounting the motor

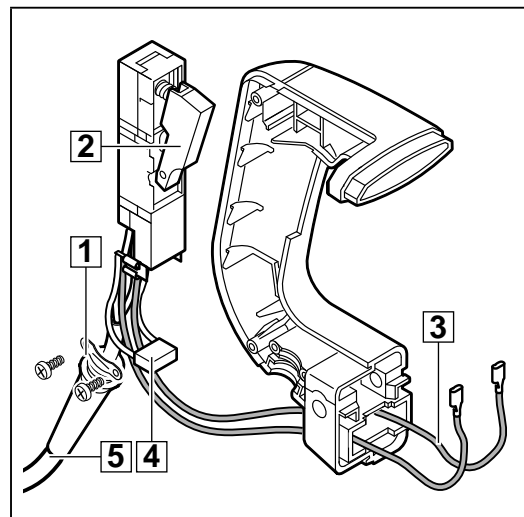
- 1 Insert the motor (1) into the motor housing (3) (take care of the right position: the lug (4) must fit into the relief of the motor housing).
- 2 Fasten the motor with the screws (2) and (5) (2,5 Nm).



3

Mounting the electric components

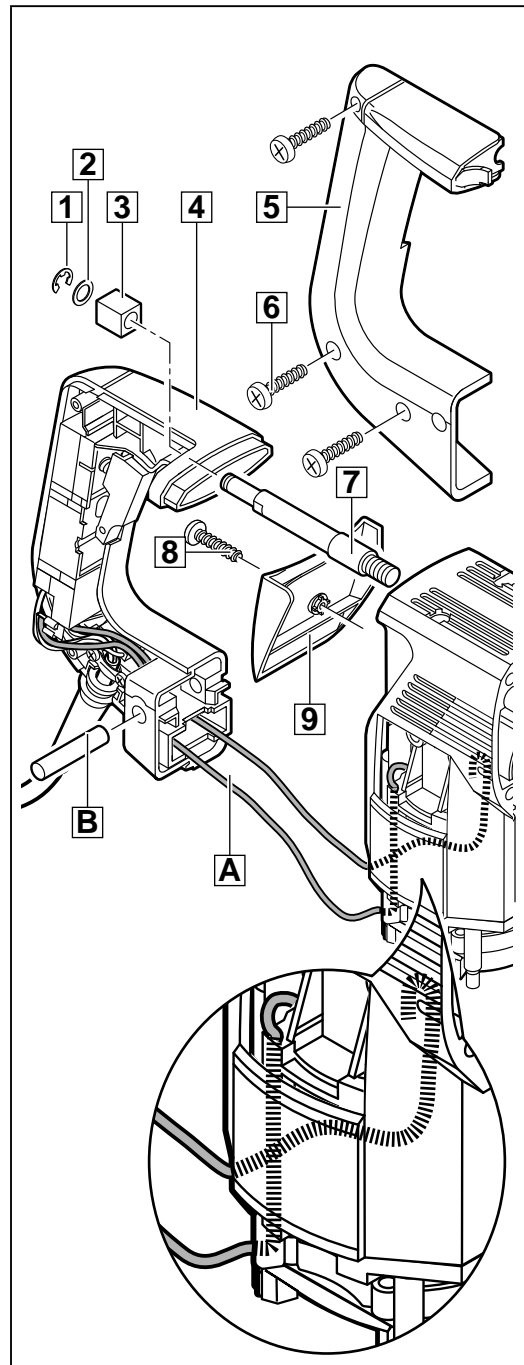
- 1 Connect all cables with the switch according to the wiring diagram.
- 2 Lead the field supply cables (3) through the handle as shown in illustration.
- 3 Insert the switch (2) and the capacitor (4) into the provided relief.
- 4 Insert the mains cable (5) into the handle.
- 5 Screw down the strain relief (1) (1 Nm).



4


Mounting the handle

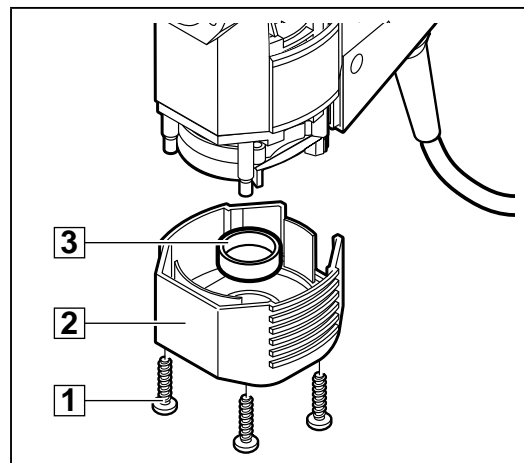
- 1 Fix the handle bolt (7) in the housing (10 Nm).
- 2 Push the handle (4) over the bolt and fix the AVS-rubber (3) with the washer (2) and the locking ring (1).
- 3 Fasten the handle cover (5) with the screws (6).
- 4 Fix the handle with the bolt (B). Press in the bolt (B) or knock it in with a plastic hammer.
- 5 Fit the gear cover (9) and secure it with the screw (8).
- 6 Lead the field supply cables (A) through the channels of the field housing and connect them with the field (connect them diagonally).



5

Mounting the motor cover

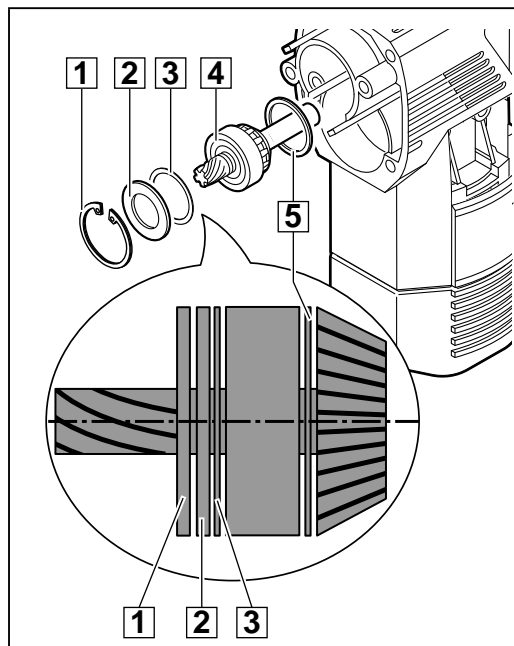
- 1 Fit the motor cover (2) (mind the right position) and secure it with the screw (1) (1,8 Nm).
 Apply glue to the back of the rubber cap (3) and fix it in the motor cover (2).



6

Mounting the angle drive

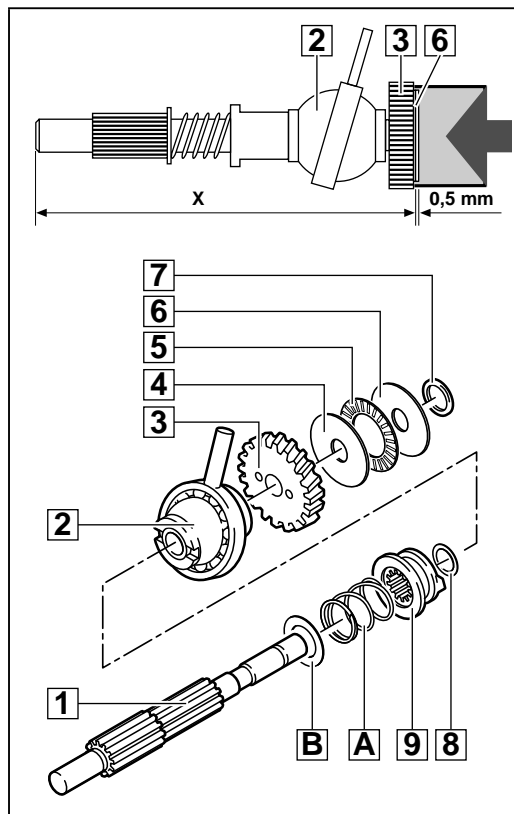
- 1 Insert the support ring (5).
- 2 Grease the angle drive (4) and insert it into the motor housing by turning it slightly.
- 3 Insert the washers (3) and (2).
 - ☞ Depending in the tolerance of the bearing, two or three washers (3) might be needed. For assembly, use the same amount of washers as were removed when dismantling.
- 4 Fit the locking ring (1).



7

Assembling the back gear shaft

- 1 Push the following parts over the back gear shaft (1) in this order:
 - washer (B)
 - spring (A)
 - coupling box (9)
 - washer (8) and
 - tumble drive (2).
- 2 Press on the back gear wheel (3); the smooth surface must face the tumble drive (2).
 - ☞ The play between the back gear wheel (3) and the tumble drive (2) must be set to 0.05 mm.
- 3 Lightly grease the thrust bearing (5) and fit it together with the disk (4) to the back gear wheel (3).
- 4 Fit the disk (6) and check the distance "X":
 - ☞ If the distance is more than 100.5 mm, do not fit the disk (6).
 - ☞ If the distance is less than 100.5 mm, fit another disk (6) and check the distance again.
- 5 Insert the O-ring (7).




8

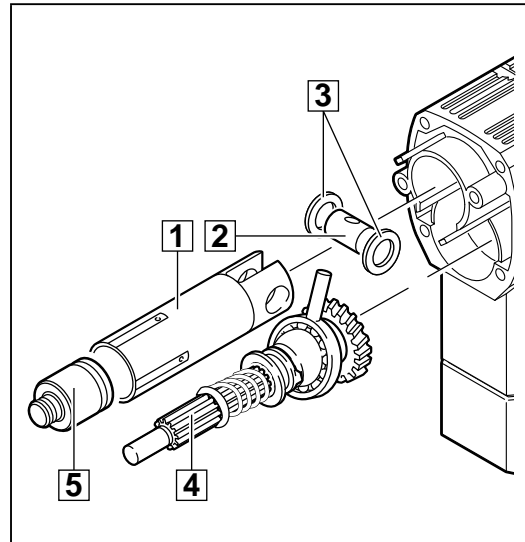
Mounting the back gear shaft and the cylinder

- 1 Insert the two disks (3) and the bolt (2) into the cylinder (1).

- 2 The back gear assembly (4) can only be inserted as follows:
Put together the cylinder (1) and the back gear assembly (4) for adjustment before mounting them.

- 3 Grease the striker (5) and insert it into the cylinder (1).

 Insert the tumble drive into the cylinder and insert them together into the gear box.

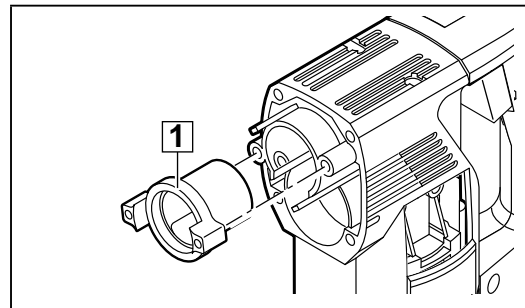


9

Mounting the spindle bearing

- 1 Insert the bearing ring (1) into the motor housing (do not yet insert it all the way, mind the right position).

- 2 Press in the bearing ring (1) as far as it will go.



10

**Only applicable for PN 3500:
Assembling the spindle (mounting the inner parts)**


- 1 Fit the O-rings (8) to the pressure sleeve (5).

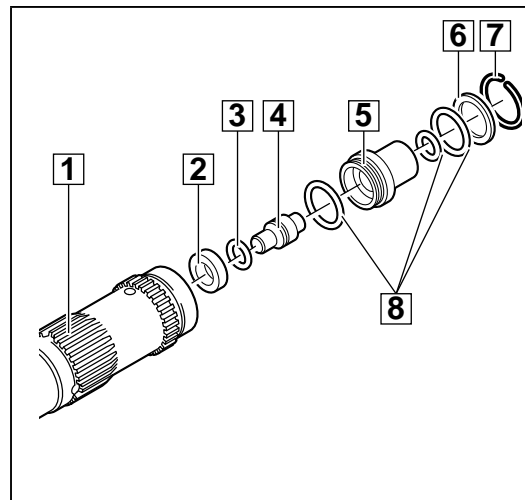
- 2 Press the brake disk (2) into the spindle (1). Mind the right position!

- 3 Mount the O-ring (3) on the plunger (4) and insert the plunger into the pressure sleeve (5). Insert the pressure sleeve into the spindle.

- 4 Insert the washer (6) into the spindle and mount it on top of the O-ring.

- 5 Press the locking ring (7) (round wire ring) with aid of a used cylinder into the spindle until the locking ring engages.


 Carry out a visual check!

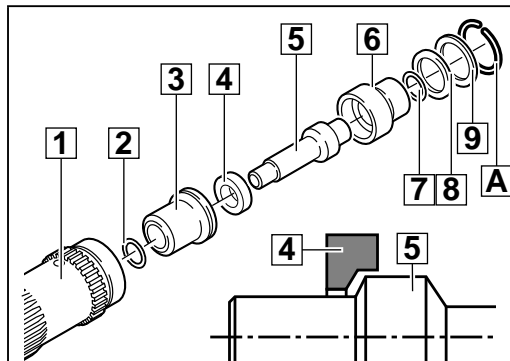


11

**Only applicable for PN 3500 X:
Assembling the spindle (Mounting the inner parts)**

- 1 Insert the O-rings (2) and (7) into the pressure sleeves (3) and (6). Fit the O-ring (8) to the pressure sleeve (6).
- 2 Press the pressure sleeve (3) into the spindle (1).
- 3 Push the brake ring (4) and the pressure sleeve (6) over the plunger and insert them together into the spindle (1).
- 4 Insert the washer (9) into the spindle and mount it on top of the O-ring (8).
- 5 Press the locking ring (A) into the spindle with aid of a special tool until the locking ring engages.

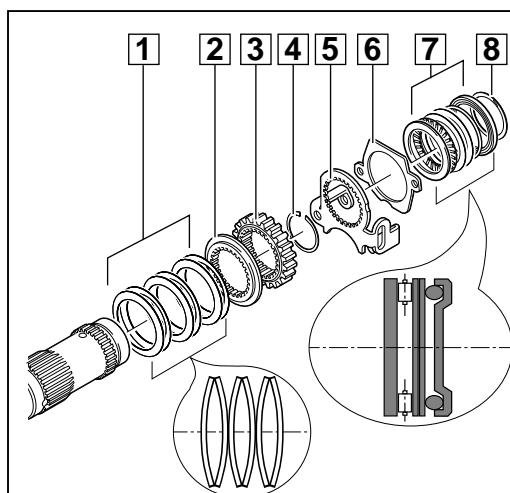
 Carry out a visual check!



11

Assembling the spindle (Mounting the outer parts)

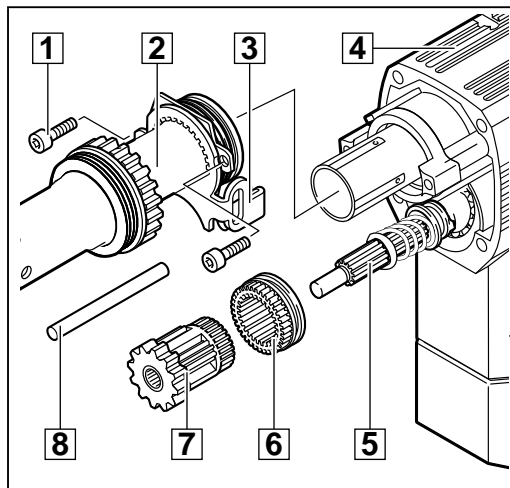
- 1 Mount the disk springs (1) with the bulging head-on (see illustration).
- 2 Mounting the clutch: Mount the ratchet (2) with indentations against the toothing of the spindle wheel (3).
- 3 Fit the locking ring (4) and press it against the disk springs with aid of a press.
- 4 Fit the locking slide (5) and the retaining disk (6). Take care of the right position!
- 5 Mounting the rear thrust bearing (7):
 - washer
 - thrust bearing washer
 - two compensating washers and
 - profile ring with damper O-ring.
- 6 Secure the rear thrust bearing (7) with a special locking ring (8).



12

Mounting the spindle


- 1 Fit the spindle (2) to the motor housing (4) and fasten it with two additionally secured screws (1) (6 Nm).
- 2 Push the ring gear (6) over the back gear shaft (5) and let it engage in the locking slide (3).
- 3 Push the planetary gear (7) over the back gear shaft (5) and fit it into the ring gear (6).
- 4 Push the straight pin (8) through the locking slide (3) and insert it into the motor housing (4).

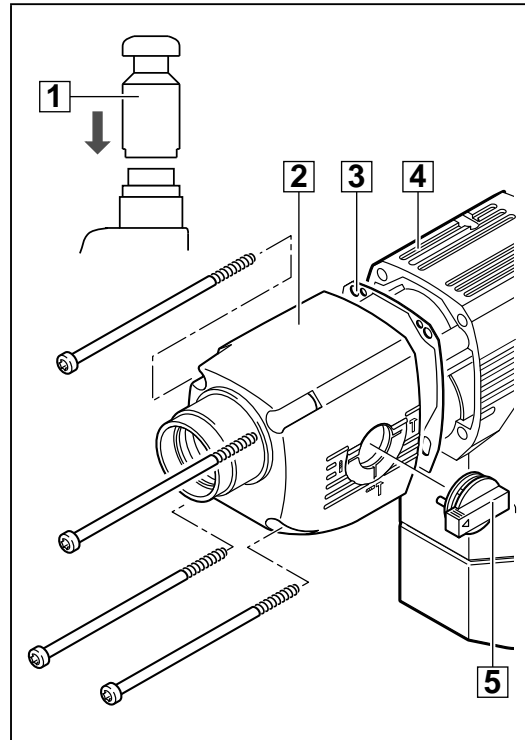


13

Mounting the gear housing

- 1 Insert the sleeve (1) (service tool) into the gear housing (2) (the sleeve protects the rotary shaft seal in the gear housing from damage during assembly).
- 2 Fit the gasket (3) to the motor housing (4).
- 3 Fit the gear housing (2) to the motor housing (4) and screw it down (2,5 Nm)
- 4 Fit the switch lever (5) (mount it in the „drilling“ position).

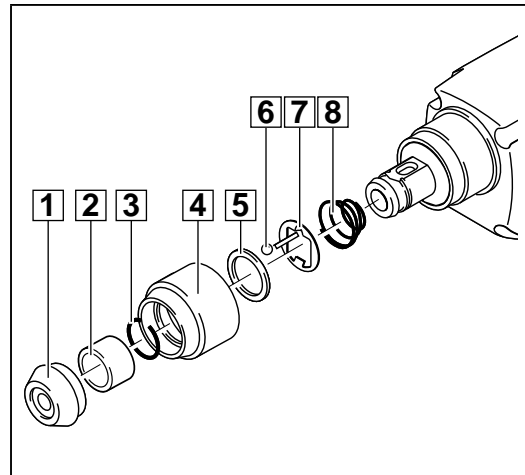
 The pin must grasp the elongated hole in the locking slide.



14

**Only applicable for PN 3500:
Mounting the SDS-plus-reception**

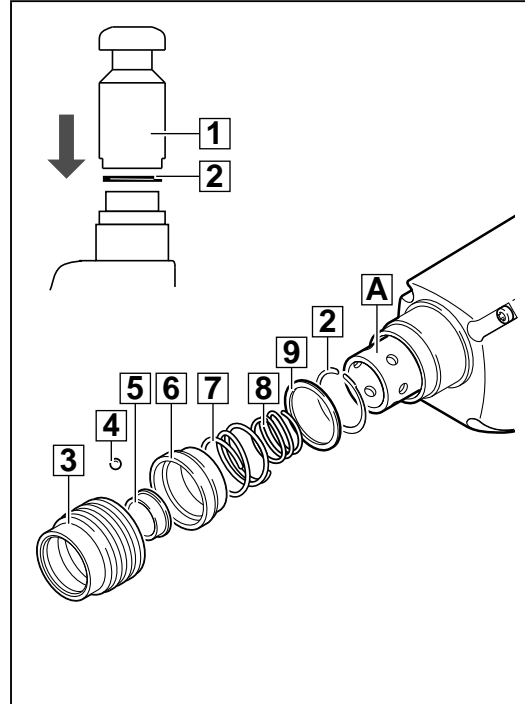
- 1 Insert the spring (8) and the retaining disk (7).
- 2 Depress the retaining disk (7) and insert the ball (6).
- 3 Fit the retaining ring (5) and the sliding sleeve (4).
- 4 Depress the sliding sleeve (4) and insert the seal ring (3) into the pass.
- 5 Fit the spacer (2).
- 6 Push down the sliding sleeve and fit the rubber cap (1).



15

Only applicable for PN 3500 X: Mounting the FIXTEC-reception

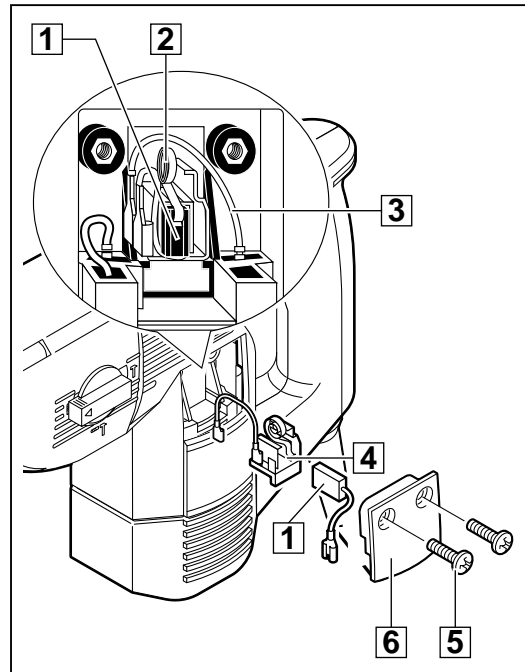
- 1 Press in the seal ring (2) with aid of the sleeve (1) (service tool) until it engages.
- 2 Fit the following parts in the below order:
 - washer (9)
 - inner spring (8)
 - outer spring (7) and
 - locking ring (6).
- 3 Depress the locking ring (6) and insert the balls (4).
- 4 Insert the ejector ring (5).
- 5 Depress the locking ring (6) (cover the balls with your hand so they cannot fall out) and press in the ejector ring (5) with aid of a used SDS-plus adapter.
- 6 Press a locking ring into the spindle in order to secure the ejector when mounting the locking sleeve (3).
- 7 Fix the locking sleeve (3).
- 8 Remove the locking ring fitted to secure the ejector.



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Mounting the carbon brushes

- 1 Insert each carbon brush holder (4) into the housing and connect the cables (3) with the field.
- 2 Insert each carbon brush (1) into the respective carbon brush holder (4) and place the spring (2) on the carbon brush (1). Fit the flat plug.
- 3 Screw down the respective service covers (5).



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Test Run

Test run the machine and pay attention to noises.
Let the machine run-in.

Electrical Test

Perform an electrical test on the machine (see chapter Electrical and Mechanical Test Instructions).