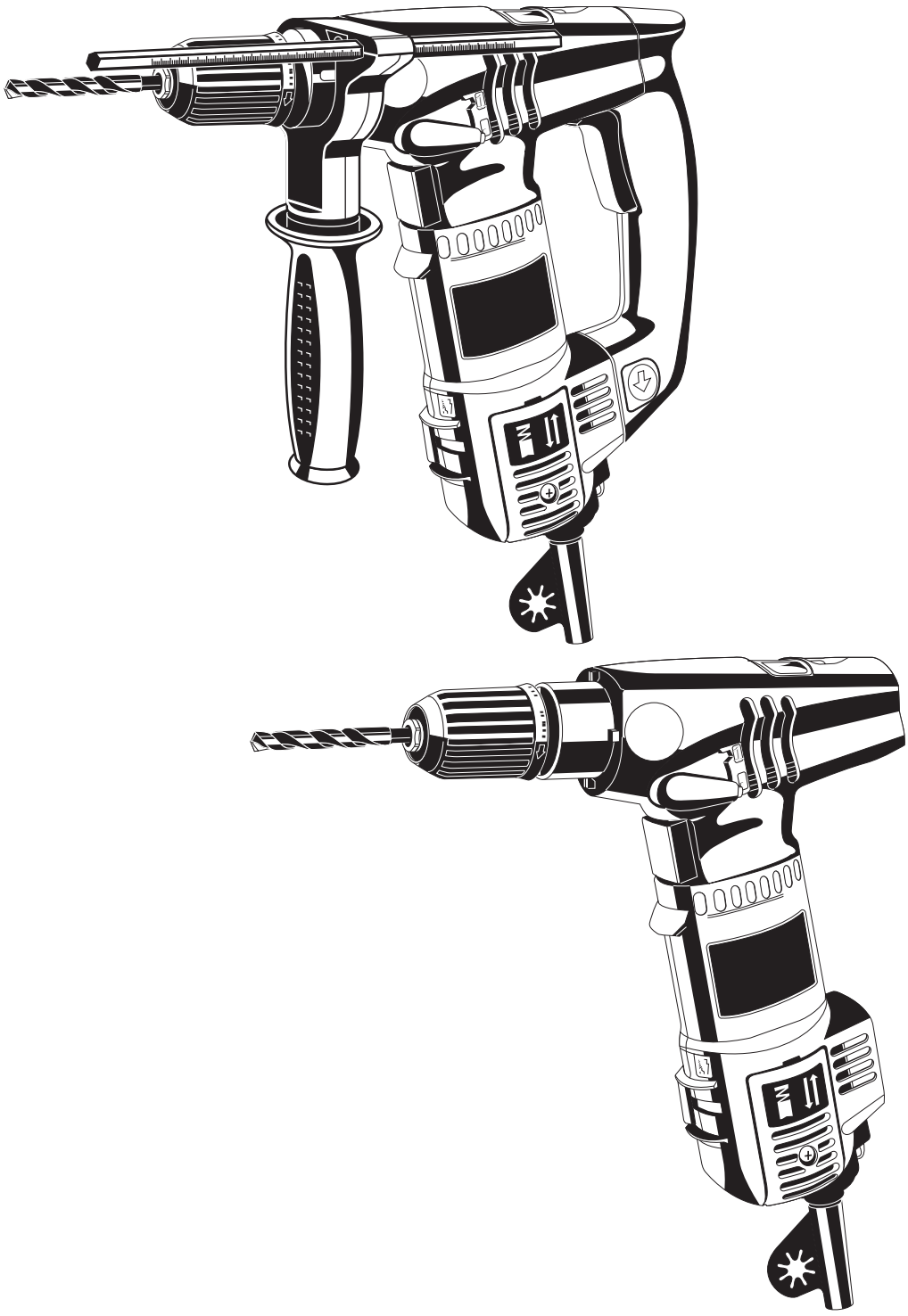
A&M
Electric Tools GmbH

Repair Instructions No.110.05/00
Ergomax



4939 5210 01 (04/05)

Ergomax

Special Tools Require	■ Forcing disks	4931 599 018
	■ Special plier	4931 599 079

Important!

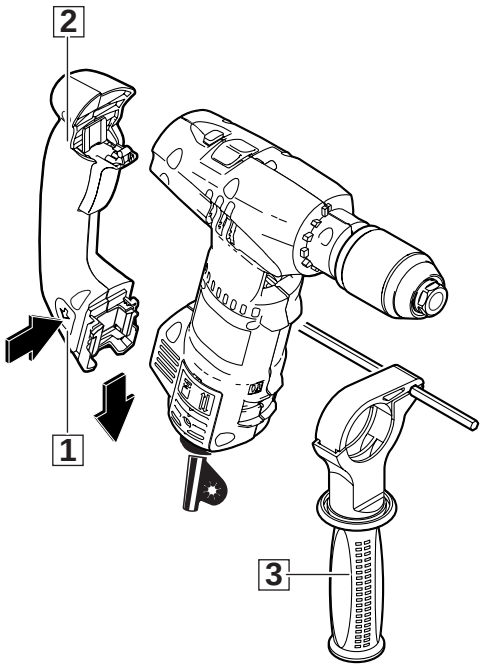
- Before beginning the maintenance work, perform an initial check with a high voltage test according to VDE (see chapter Electrical and Mechanical Test Instructions).
- Before all repair work, pull the power plug from the socket!

Disassembly

Removing the handle

1 On both sides, depress the red button (1) on the handle (2) and pull off the handle (2) in direction of arrow.

2 Carefully pull off the auxiliary handle (3) together with the depth gauge.

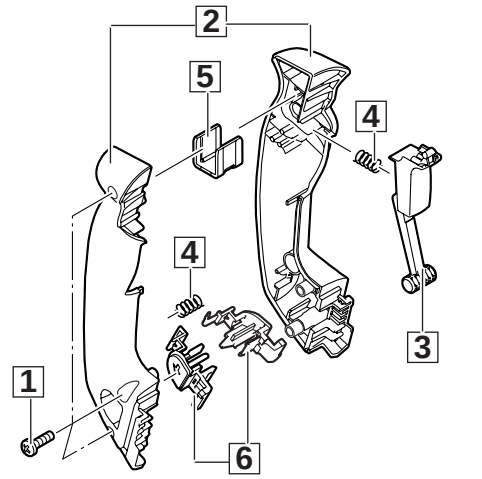


1

Dismantling the handle

1 Loosen 3 screws (1). Press together both engage devices (6) and pull apart the two parts of the handle (2).

2 Remove the switch button (3), the pressure springs (4), and the holding bracket (5).



2

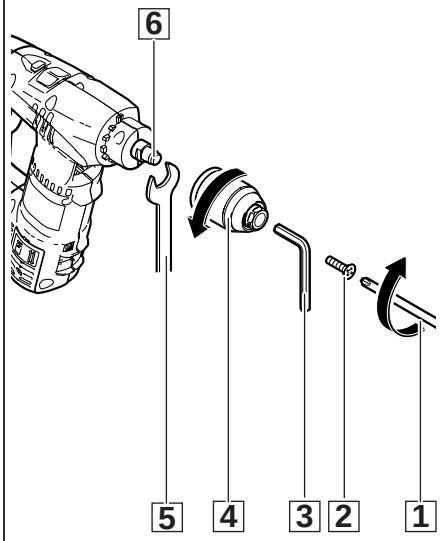
Detaching the quick action chuck

1 Loosen the screw (2) with aid of a screwdriver (1), turning clockwise.

☞ Attention!
The screw (2) has a left-handed thread.

2 Should the screw be stuck (2) it may be loosened as follows:
Apply a fork wrench (5) to the nose (6). Fix an Allen key (3) in the chuck (4) and hit the key (3) in the unscrew direction (right-handed thread) of the chuck (4). Now the screw (2) can be removed with aid of a screwdriver, turning clockwise.

3 Apply a fork wrench (5) to the nose (6). Fix an Allen key (3) in the chuck (4) and set the manual gear switch to “1”.
Hit the Allen key (3) with a plastic hammer in the opening direction **(right-handed thread)** and remove the chuck (4), turning it anti-clockwise.



3

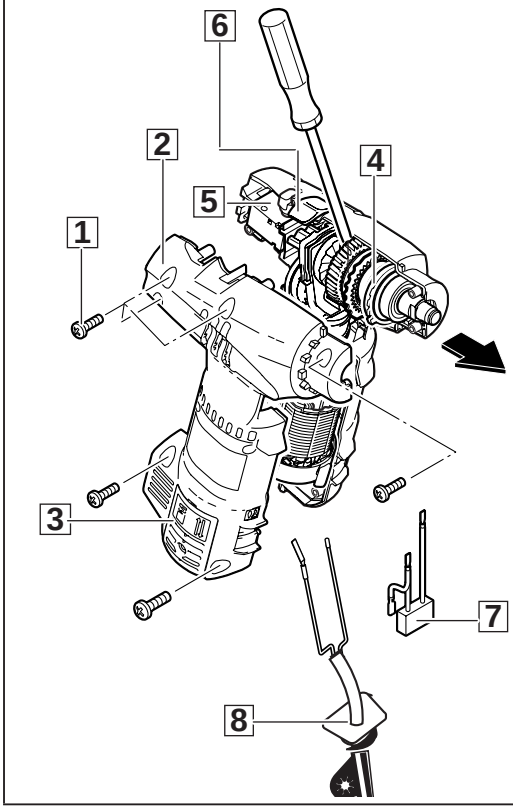
Detaching the housing, Removing the drill spindle

1 Loosen 14 screws (1) at the housing and remove the right half of the housing (2) as well as both service covers (3).

2 Use a screwdriver at the front part of the spindle (4) to lift the gear/spindle unit and pull off the complete unit to the front (in direction of arrow).

3 Branch off the switch board (5) and remove it. Remove the sliding switch (6).

4 Remove the capacitor (7) and the connection cable (8).



4

Dismantling the gear

☞ When the gear is removed, the compensating washers (U) fall off. The ball (1) falls from the drill spindle (V).

1 Remove the following parts from the spindle:
disc (2),
pressure spring (3),
spring ring (4) (with aid of Seeger circlip ring special pliers),
disc (5),
balls (6).

2 Depress the racking lever (R) and remove it together with the sliding switch (Q).

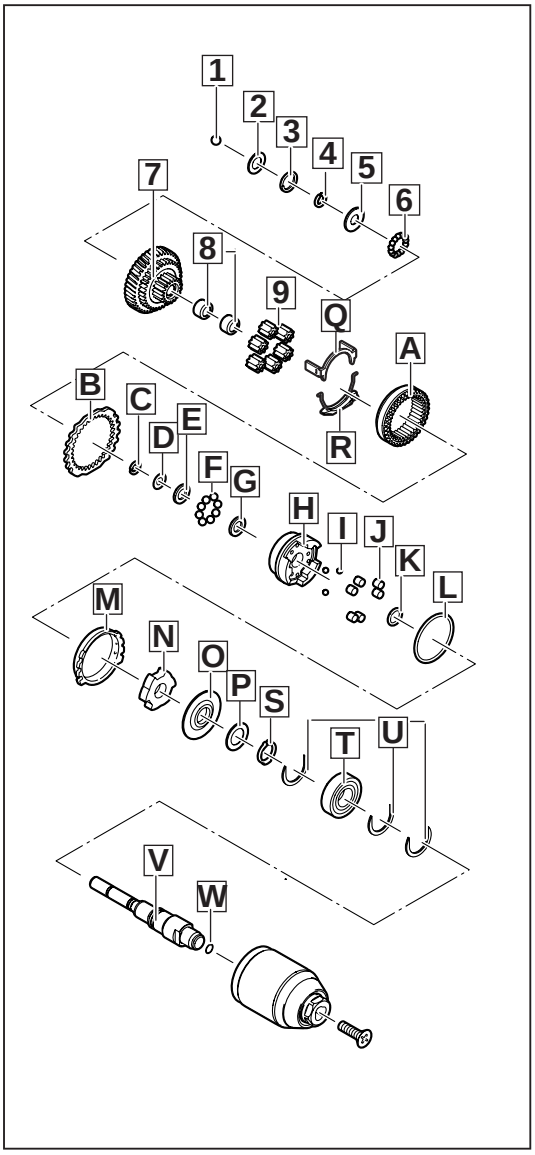
3 Remove the toothed gear (7). Press off 2 needle bearings (8) with aid of forcing disks.

4 Remove the following parts:
6 planetary wheels (9),
internal geared wheel (A),
locking washer (B),
spring ring (C),
discs (D) and (E),
balls (F),
disc (G),
pinion cage (H),
springs (I) and cylinder pulleys (J),
O-rings (K) and (L),
sleeve (M).

5 Press off the fastening device (N) with aid of a service tool. Remove:
spacer (O),
disc (P), and
ring (S).

6 Press the ball bearing (T) from the drill spindle (V).

7 Remove the spring (W) from the spindle (V).



5

Detaching the set collar, Removing the field

1 Pull the wires (1) from the field (2).

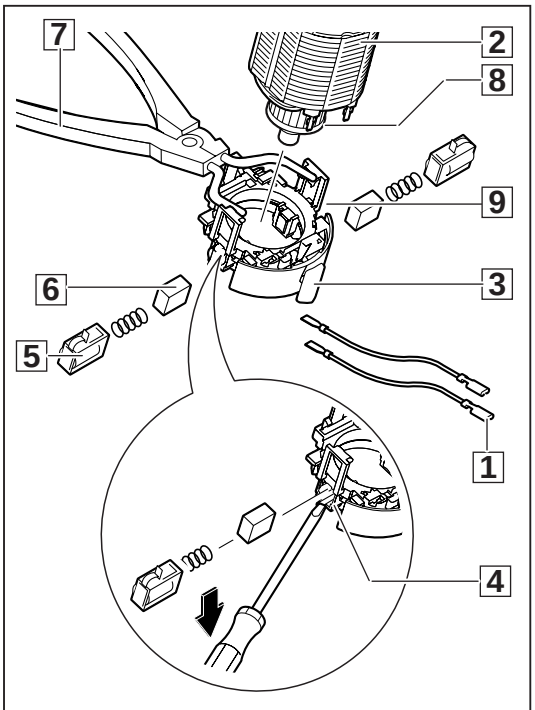
2 Set the set collar (3) to the middle position.

3 Carefully lift the plastic strap (4) with aid of a screwdriver and remove the carbon brush holders (5) together with the carbon brushes (6).

☞ Attention! The plastic straps (4) may easily break.

4 Pull the armature (8) from the field (2).

5 Slightly bend open the holders (9) with aid of special pliers (7) (4931 599 079) and remove the set collar (3) from the field (2).



6

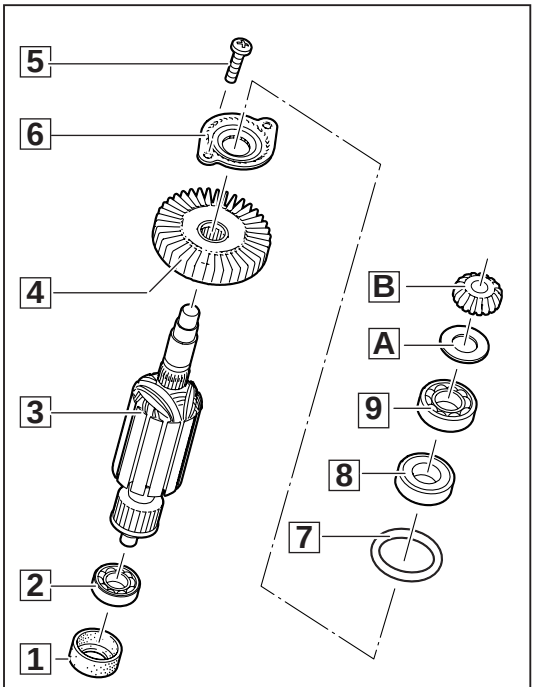
Detaching the armature

1 Loosen 2 screws (5) at the bearing cover (6) and pull off the armature (3). Remove the O-ring (7).

2 Press off the toothed wheel (B) with aid of forcing disks.

3 Remove the disc (A) as well as the ball bearing (9), the sealing sleeve (8), the bearing cover (6) and the fan (4).

4 Remove the rubber sleeve (1) and press off the ball bearing (2) with aid of forcing disks.



7

Detaching the connecting shaft

1 Remove the adjusting plate (1) from the end plate (2).

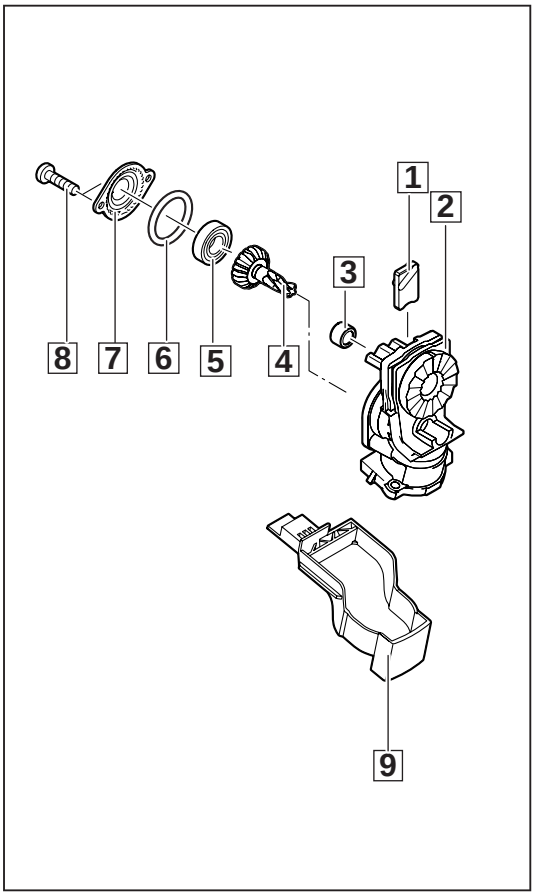
2 Lever off the switch button (9).

3 Loosen 2 screws (8) at the bearing cover (7).

4 Remove the O-ring (6).

5 Remove the grooved ball bearing (5) and remove the toothed wheel with the connecting shaft (4) from the end plate (2) (if necessary, use a plastic hammer for support).

6 Press out the needle bearing (3).



8

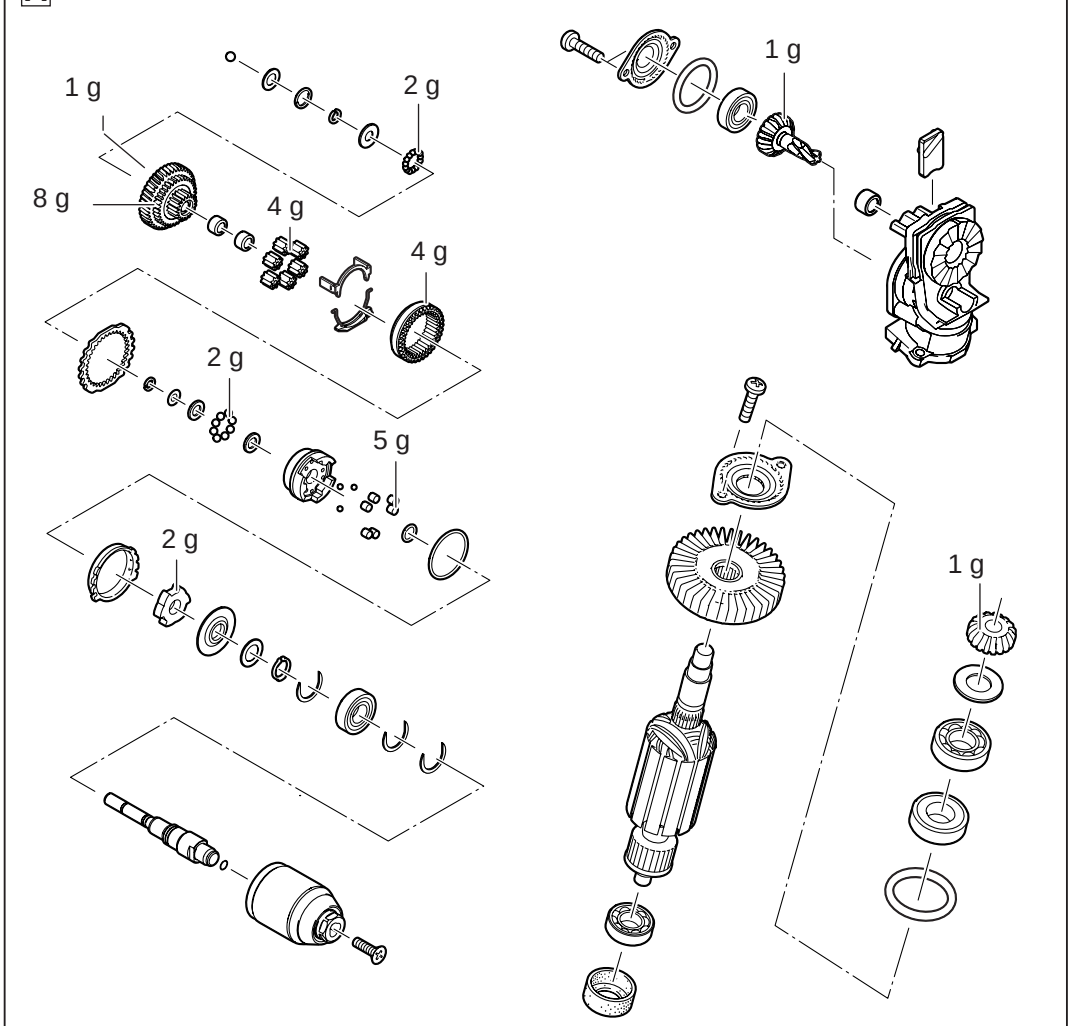
Maintenance

General	It is recommended to submit the machine to maintenance after the carbon brushes have switched off.
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

Legend

A Cover with Alvania R3 (30 g) (4931 215905)



Torques	Screws in plastic	1.8 Nm
	Screws in metal	3.0 Nm
	Chuck locking screw	6.0 Nm

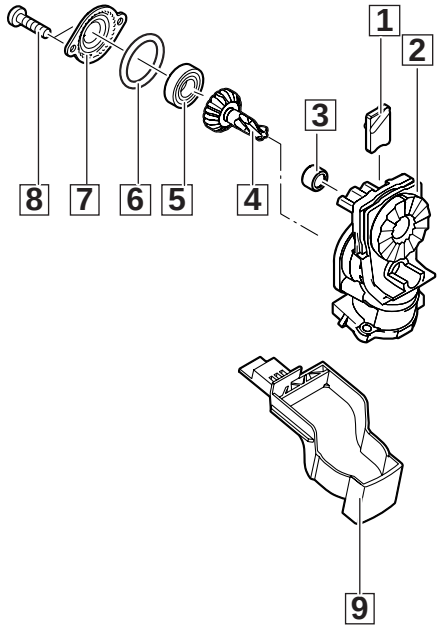
Screw locking device

Secure bearing cover screws with locking device Loctite 222 or Omnifit 80.

Assembly

Mounting the connecting shaft

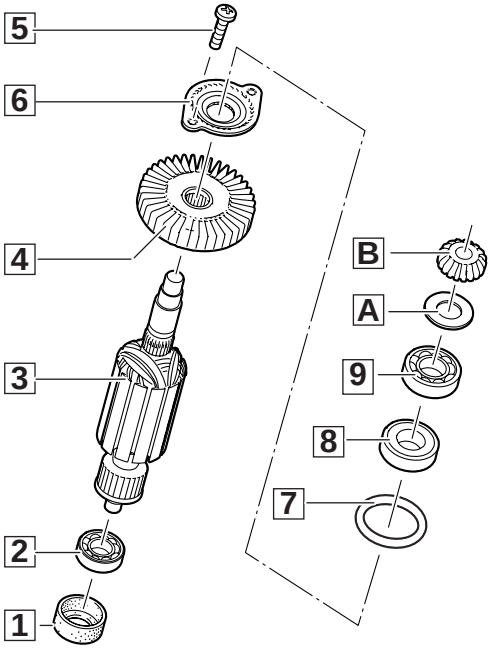
1. Insert the needle bearing (3).
2. Insert the toothed wheel with the connecting shaft (4) and bearing (5) into the end plate (2).
3. Insert the O-ring (6).
4. Fasten the bearing cover (7) with 2 screws (8) (3 Nm) to the end plate (2).
5. Insert the switch button (9). Mind the right position!
6. Insert the adjusting plate (1) into the end plate.



1

Mounting the armature

1. Press the ball bearing (2) onto the armature shaft and pull over the rubber sleeve (1).
2. Fit the fan (4), the bearing cover (6), and the sealing sleeve (8).
   Press in the ball bearing.
   Insert the disc (A).
3. Press on the toothed wheel (B).
4. Insert the armature (3) into the gear, turning it, and fasten it with 2 screws (5) (3 Nm) through the bearing cover (6) to the end plate.



2

Fitting the field, Mounting the set collar

1 Put the field (2) on the armature (8).

2 Carefully bend open the holders on the set collar (3) with aid of special pliers (7) (4931 599 079) and put the set collar (3) on the field (2).

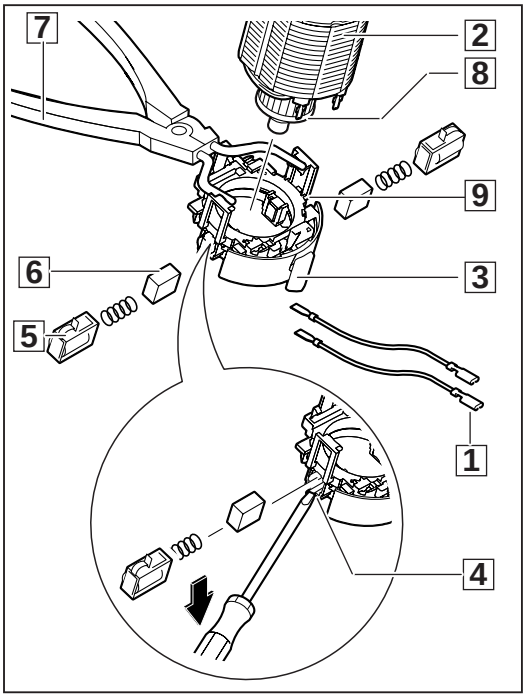
☞ Take care that the holders (9) on the sides engage with the field (2).

3 Turn the set collar (3) to the middle position.

4 Insert the carbon brush holders (5) together with the carbon brushes (6).

☞ Take care that the plastic straps (4) engage with the carbon brush holders (5).

5 Insert the wires (1) into the field (2).



3

Mounting the gear

1 Press the ball bearing (T) onto the drill spindle (V).

2 Put the ring (S), the disc (P), and the spacer (O) on the spindle (V) and press on the fastening device (N).

3 Fit the sleeve (M) and the O-rings (K) and (L). Insert the springs (I) and the cylinder pulleys (J) into the fastening device (N). Secure the cylinder pulleys (J) against falling out with a little grease.

4 Put the following parts on the spindle:
pinion cage (H),

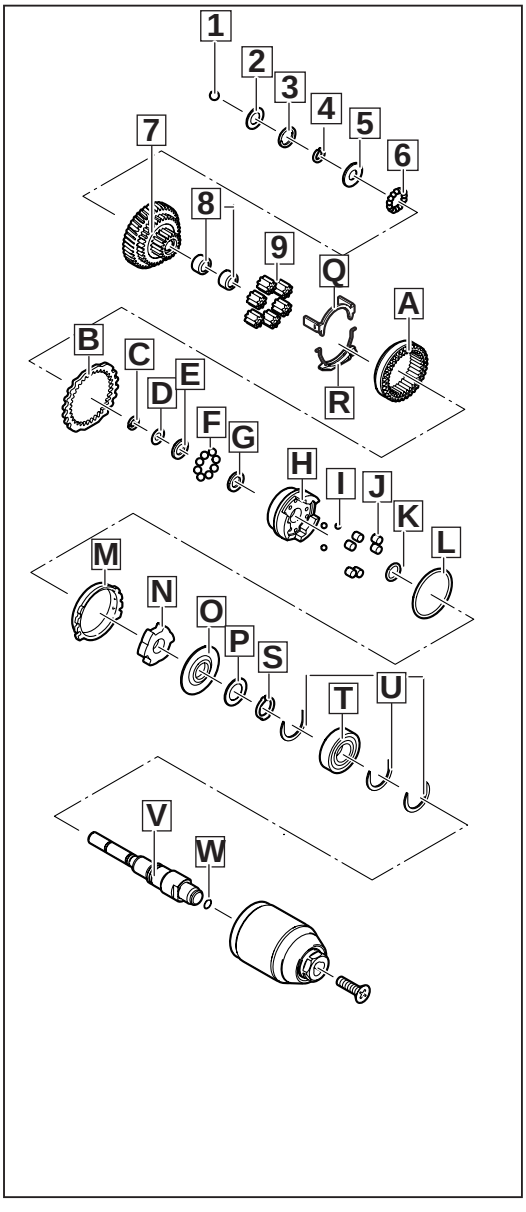
☞ sleeve (M) (put it on the pinion cage (H) at an angle),
disc (G),
balls (F),
discs (E) and (D),
spring ring (C),
locking washer (B),
internal geared wheel (A)
6 planetary wheels (9).
Press 2 needle bearings (8) into the toothed gear (7).

5 Put the toothed gear (7) on the spindle.
Insert the balls (6), and
fit the disc (5),
the spring ring (4),
the pressure spring (3),
and the disc (2).

6 Insert the ball (1) into the drill spindle (V).

7 Insert the sliding switch (Q) into the internal geared wheel (A). Mind the right position! Slightly depress the racking lever (R) and fit it to the sliding switch (Q).

8 The compensating washers(U) are inserted later.



4

Inserting the motor and the gear into the housing

1 Insert the complete motor with the end plate into the housing.

2 Insert and connect the switch board (5).

☞ Take care that the wires to the switch board (5) are properly laid.

3 Insert the capacitor (7) and the connection cable (8).

4 Set the switch handle (D) to the middle position between positions 1 and 2.

5 At an angle, insert the front part of the gear spindle (4) and align.

☞ Mind proper seat of the locking washer (9), the ring (A), and the racking lever (B). Mind the position of the larger teeth (C).

6 Shortly turn the fan of the armature (until it engages), so that the toothed gears can grasp.

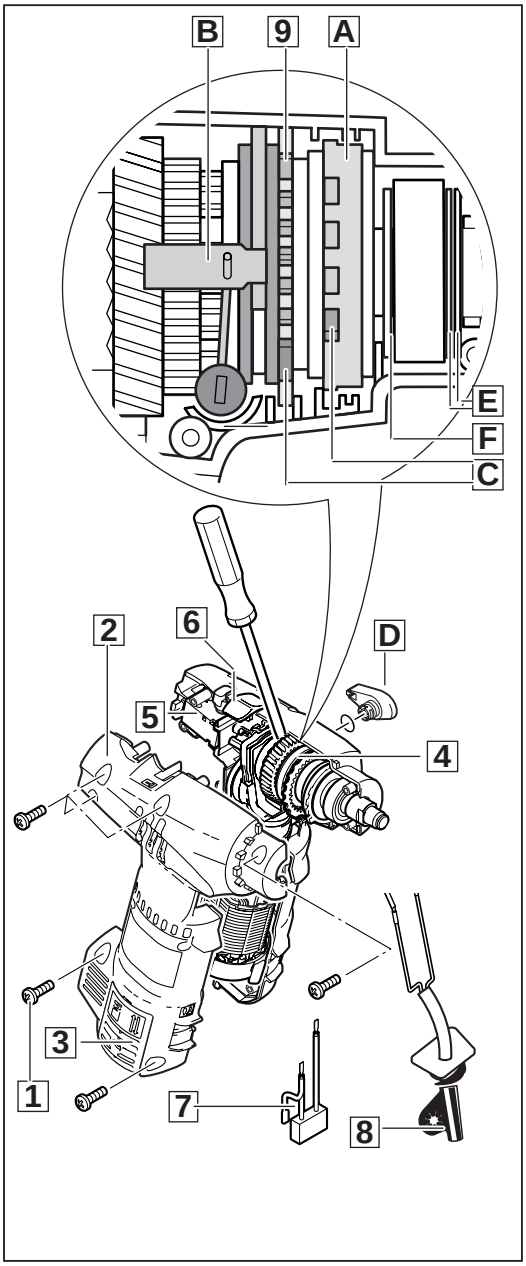
7 Insert the compensating washers according to step 4, page 7.

☞ Insert two thin compensating washers (E) before the bearing, facing the drill, and one thick compensating washer (F) behind the bearing.

8 Insert the sliding switch (6).

☞ The groove of the adjusting plate (see page 6, step 1) must grasp the groove of the sliding switch (6).

9 Put together the housing halves (2) and fasten them, as well as the service covers (3) with 14 screws (1) on both sides.

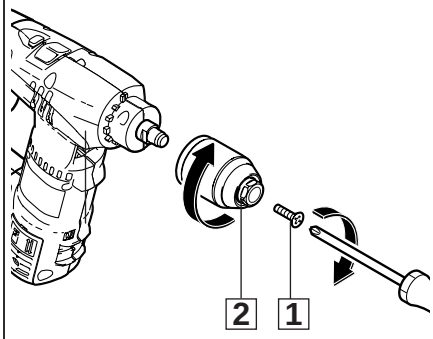


5

Mounting the quick action chuck

1 Screw down the chuck (2), turning it clockwise.

2 Apply locking device to the screw (1), or to a new screw with micro-encapsulation, and fasten it anti-clockwise with 6 Nm.

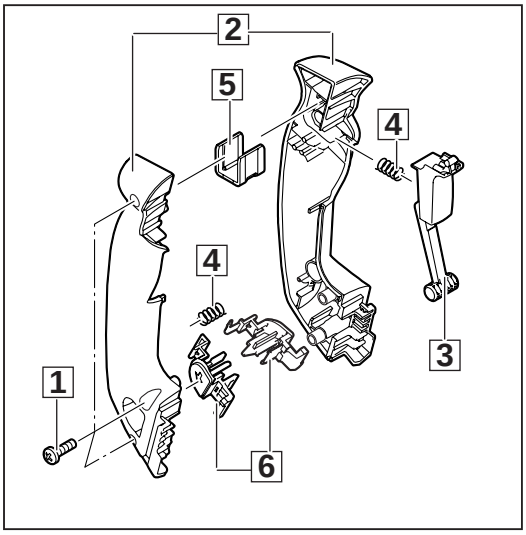


6

Mounting the handle

1 Inert the engage devices (6), holding brackets (5), pressure springs (4) and switch button (3) into the handle parts (2) and put them together.

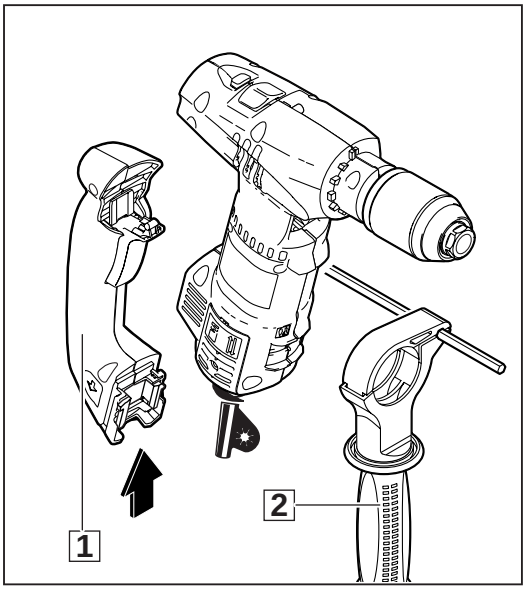
2 Screw together the two handle parts (2) with 3 screws (1).



7

Attaching the auxiliary handle

1 Fit the handle (2) together with the depth gauge, and attach the auxiliary handle (1) to the machine (in direction of arrow).



8

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).