

KBM 50 Q (X)





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0. Productinformation



Based on some breakdowns on gear housings in the past, stripped thread on the clamping lever , we mounting a Helicoil – insert in the gear box serially since Mai 2010. (siehe picture)



1. Technical Data

Order Reference		7 270 30 00 23 4
Type		KBM 50 Q
Input	Watts	1200
Output	Watts	680
Speed, full load	R.P.M.	260/520/min
Current type		1~
Protection class		I
Cable length with plug	m	4
Net weight	kg	12
Capacity in steel max. Ø, core drill	mm	12-50
Capacity in steel max. Ø, spiral drill (with drill chuck)	mm	16
Threaded drill	M	16
Tool holder on drill shaft		Quick IN
Magnetic holding power	N	11000
Drilling depth max. with core drill	mm	50
Height (drill jigs)	mm	368
Stroke (adjustable)	mm	135-310
Magnetic foot dimension	mm	180 × 90



2. Maintenance

Please make sure that electric tools are repaired, serviced and tested by specialists only as repairs carried out in an inexperienced manner may cause considerable hazards for the user (BGV A2).

Repeated tests are to be performed in accordance with *DIN VDE 0702-1*.

The regulations in accordance with *DIN VDE 0701 Part 1* are to be observed after any repairs.

Withstand voltage at 1000 V (Protection class 1)

Use original FEIN spare parts only!

During commissioning, while working and during maintenance of the core drilling unit, applicable national accident prevention requirements of the professional organization must be observed.

The law governing technical working equipment (Device Safety Law) applies in terms of proper use.



2.1. General Maintenance Tasks

- Check the power cord (900) for areas of damage.
- Blow out the motor with dry compressed air.
- Check the carbon brushes (2.2.).
- Small functional test (3.1.).

2.1.1. Maintenance intervals:

Depending on the nature and duration of use, no later than after 6 months:

- Clean the drill motor.
- Brush or blow out the brush holder and insulating parts.

2.2. Replacing the carbon brushes:

The drill motor is equipped with carbon brushes that shut off automatically. After the minimum length of the carbon brushes has been reached, the power supply is interrupted. If this happens, the carbon brushes must be replaced by an electrical specialist. If you are using new carbon brushes, make certain to check that they move easily inside the brush holder. Allow new carbon brushes to run for 15 minutes without load.

original **FEIN** carbon brushes!

Use only



3. Electrical / Functional Tests

- 3.1. Minor functional test
- 3.2. Major functional test
- 3.3. Test data
- 3.4. Test devices and auxiliary materials
- 3.5. Wiring diagram
- 3.6. Safety test
- 3.7. Functional test



3.1. Minor functional test

3.1.1. Self-start lock and magnetic foot

Turn on the master switch and the motor switch. Then connect the core drilling machine to the electrical power.

- The motor must not start up.
- The magnetic foot is energized.
- Check the power consumption (0.4 A, see 3.3. Test data).

Motor switch off.

- Magnetic foot remains energized.
- Power consumption must be reduced to one half (0.2 A, see 3.3. Test data).

3.1.2. Motor

Motor switch on.

- Motor starts up.

3.1.3. Characteristic curve of the motor

Place the motor under load.

- Speed is regulated.
- From about 1600 Watts on the speed drops off more sharply.

3.1.4. Overload switch off

Place the motor under heavy load.

- The motor switches off after 10 seconds.

The motor must be run at idle for about 60 seconds before the test.

3.2.1. Major functional test

	Possible causes	Test possibilities
Magnetic foot does not energize: ☒ Check with magnetisable part	power cable disconnected, switch off, connector not plugged in	☒ LED on board must light up briefly while switching on. ☒ check power voltage on X1, X2 continuity
	magnetic foot defective	☒ LED on board is flashing ☒ measure resistance ($504\Omega \pm 5\%$)
	elektronics defective	☒ LED on board is flashing ☒ measure voltage on X7.1 and X7.2 .
Magnetic holding force too weak:  ☒ measure the removal force required 	do not turn on while testing motor switch	☒ measure the voltage on X7.1 and X7.2
	magnetic foot defective	☒ measure resistance ($504\Omega \pm 5\%$)
	standing surface uneven	☒ visual inspection
	elektronics defective	☒ measure the voltage on X7.1 and X7.2

Note: If the magnetic foot is defective, no further tests are possible. Because of magnetic foot monitoring, the motor cannot be turned on.
 → **Connect the spare magnetic foot.**

3.2.2. Major functional test

	Possible causes	Test possibilities
Motor does not start up:	• Switching sequence not maintained	☒ Turn master switch on first, then motor switch
	• Power cord disconnected, switch off, connector not plugged in	☒ LED on board must light up briefly while turning on. ☒ Test mains voltage on X1, X2 ☒ Test continuity
	• Magnetic foot defective	☒ LED on board flashes ☒ Measure resistance (504 Ω ±5%)
	• Error in motor power supply line	☒ Test continuity
	• Motor switch defective	☒ Test
	• Carbon brushes worn out	☒ Visual inspection
	• Motor defective	☒ Test motor without electronics (at max 145 V AC, see 3.3) Measure idle speed
The reasons listed here all cause the automatic startup disable to engage	• Electronics defective	☒ If motor is defective, connect replacement motor to X5, X6 and connect cable from speed recorder to X8. Measure idle speed or voltage



3.2.3. Major functional test

	Possible causes	Test possibilities
Motor only starts up briefly (1s):	• Speed cable defective, intermittent contact	⊗ Check continuity, connection contact
	• Assembled ring magnet	⊗ Visual inspection (loop tracks)
	• Assembled speed recorder, speed recorder defective	⊗ Connect replacement speed recorder
Motor switches off for no apparent reason:	• Intermittent contact on the power cord, switch, plug connections	⊗ LED on board must light up briefly while turning on. ⊗ Check continuity on X1, X2
	• Magnetic foot	⊗ LED on board flashes ⊗ Measure resistance (504 $\pm$ 5%)
	• Electronics	⊗ LED on board flashes ⊗ Measure voltage on X7.1 and X7.2.
	The reasons listed here all result in the automatic startup disable being activated	



3.2.4. Major functional test

	Possible causes	Test possibilities
No discernable control behavior: ☒ Check idle speed	• Electronics defective	☒ Characteristic curve of motor ☒ Place motor under load. ☒ Speed is regulated. ☒ From about 1600 Watts on the speed drops off more sharply.
Speed too high or too low; speed fluctuates: ☒ Check idle speed	• Motor defective	☒ Test motor without electronics (at max 145 V AC, see 3.3) Measure the idle speed
	• Ring magnet defective	☒ Visual inspection (loop tracks)
	• Electronics defective	☒ If motor is defective, connect replacement motor to X5,X6 and connect cable from speed recorder to X8. Measure idle speed or voltage.
	• Additional mechanical load (gears, bearing, vibrations, etc.)	☒ Test ☒ Measure idle current
	• Commutator or carbon brushes defective	☒ Visual inspection for brush sparking

3.2.5. Major functional test

	Possible causes	Test possibilities
Overload switch-off too early, too late or no switch-off	• Electronics defective	☒ Measure time ☒ Activate overload switch-off. Heavier load will switch motor off after 10 seconds.
Motor starts up even though:		
- motor switch was activated before master switch	• Electronics defective	☒ Check again after replacing electronics
- power supply line was plugged in while switches were closed	• Electronics defective	☒ Check again after replacing electronics
- magnet is defective or not connected to the electronics	• Electronics + magnetic foot defective	☒ Check again after replacing electronics / check magnetic foot
- power cord was plugged in with damaged master switch and motor switch	• Electronics defective	☒ Check again after replacing electronics



3.3. Test data

Rated voltage	220 – 240 V
Test voltage / " 10%	230 V
Idle current / " 10% ¹⁾ (2.25-2.88 A)	2.5 A
Idle speed / " 3% (504-536/min)	520/min
Main switch on Voltage on: X7.1, X7.2 " 10% ³⁾	100 V DC
Motor switch on, master switch on, self-start lock active Voltage an: X7.1, X7.2 " 10 % ³⁾	200 V DC
Min. removal force: magnet new / used	4500N/4050 N
Master switch on Current consumption of magnetic foot " 10% ⁴⁾ at 25°C	0.2 A
Motor switch on, master switch on, self-start lock active Current consumption of magnetic foot " 10% ⁴⁾ at 25°C	0.4 A
Resistance of magnetic foot " 5% at 25°C	504 Ohm
Test voltage of motor without electronics	145 VAC

- 1) Motor current + magnetic flux current. Idle may be significantly less for machines that are well worked in.
- 2) Measurement on ground steel plate (St37/500 □250 □25 mm). Activate motor switch first, then master switch. The drill shaft of the drill motor is pressed against the dynamometer by means of a slewing ring.
- 3) Nominal voltage, DC.
- 4) Measured on the power supply line and KBM 50 Q standing on a ground steel plate (St37/500 □250 □25 mm).

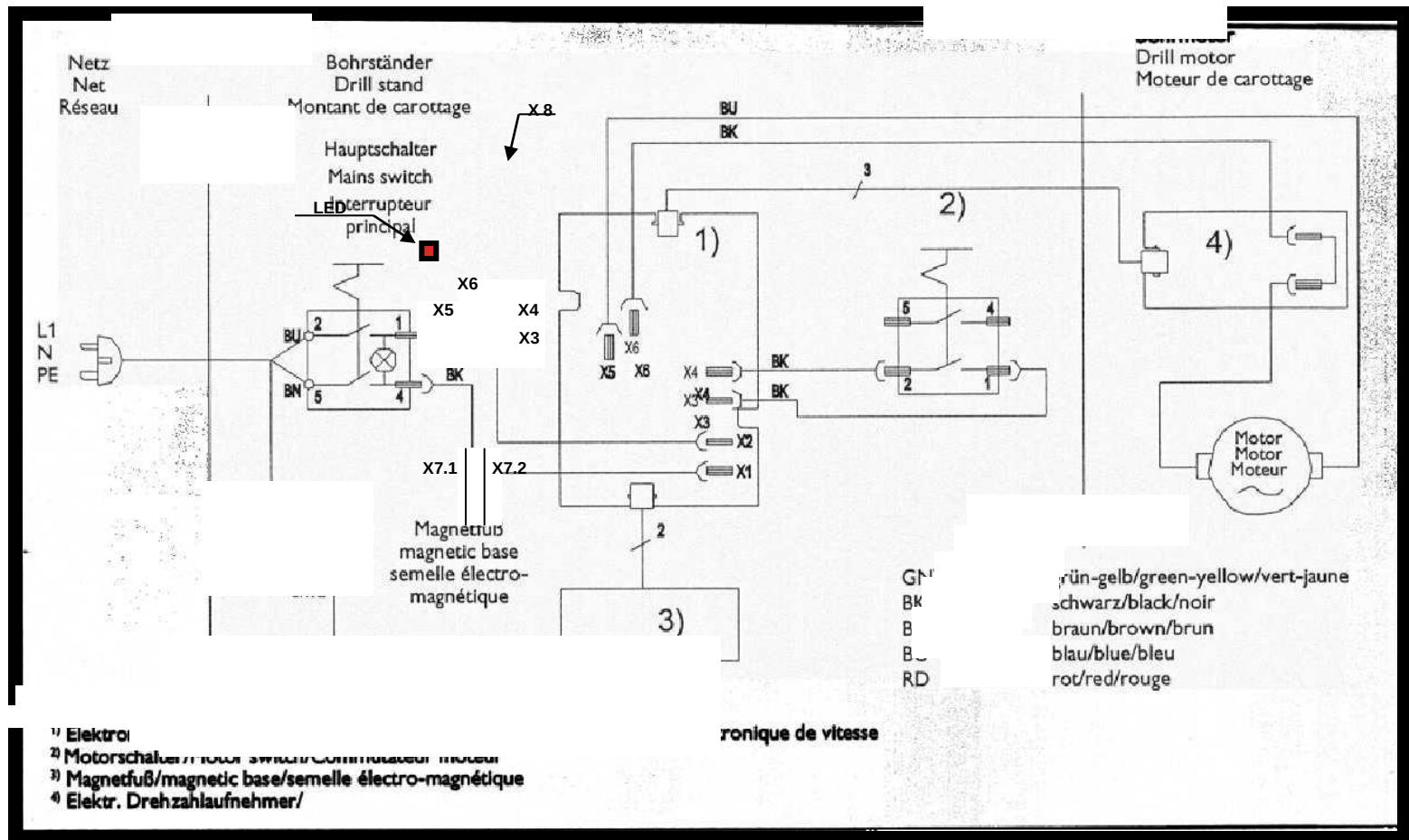




3.4. Test devices and auxiliary materials

- Multimeter for effective value measurement (voltage, current, resistance).
- Speed measuring device
- Dynamometer for measuring pressing forces up to about 5000 N.
- Ground steel plate, for example ST 37
(dimensions in mm: ca.. 500x250x25)
- Isolating transformer, adjustable
(for testing the motor without electronics at 145 V AC)

3.5. Circuit diagram / connection diagram



3.6. Safety test (immediately after about 15 min. runup)

	Test steps	Test type
1.	Removal force	1. Place KBM on ground steel plate (St 37) . 2. Plug the power cord into the power socket. 3. Turn the motor switch on; only after that turn the master switch on 4. Measure the removal force, min 4500N (new) or min 4050N (used) with dynamometer
2	Restart disable	1. Connect the KBM 50Q to 230 V/50 Hz 2. Master switch and motor switch "ON" 3. If the machine starts up, disconnect the power cord 4. Connect the power plug to the electrical power again = machine must not start up
3.	Protective ground line test	1. Disconnect Measurement points: gear head against PE on plug Idle voltage on the measurement device: 4 V-24 V, AC or DC Measurement current: min. 0.2 A Test time: 3 sec PE resistance: max 0.3 Ohm with power cord 4m long
4.	Isolation test	1. Disconnect 2. Connect L1 and N 3. Master switch and motor switch "ON" Measurement points: gear head and screws (270) against L1/N Test time: 3 sec Test voltage: 500 V DC Isolation resistance: min. 2.0M Ohm
5.	High-voltage test	1. Disconnect 2. Connect L1 and N 3. Master switch and motor switch "ON" Measurement points: gear head and screws (270) against L1/N Test time: 3 sec Test voltage: 1000 V AC Triggering current: 5 mA



Please note!

The requirements of DIN VDE 0701 Part 1 (Appendix "E" for electr. tools), current version, are definitive for the safety test.



3.7. Functional test

1. Set both switches to the “0” position.
2. Connect KBM 50 Q to the power supply (230 V/50 Hz).

Turn on the master switch and motor switch.

3. Idle current test: min. 2.25 A
 max. 2.88 A

4. Idle test measured on the drill shaft:

Run up time: min. 10 sec

Test time: min. 3 sec

Speed: min. 504 rpm - gear level 2
 max. 536 rpm - gear level 2



4. Disassembly of the Core Drill Unit

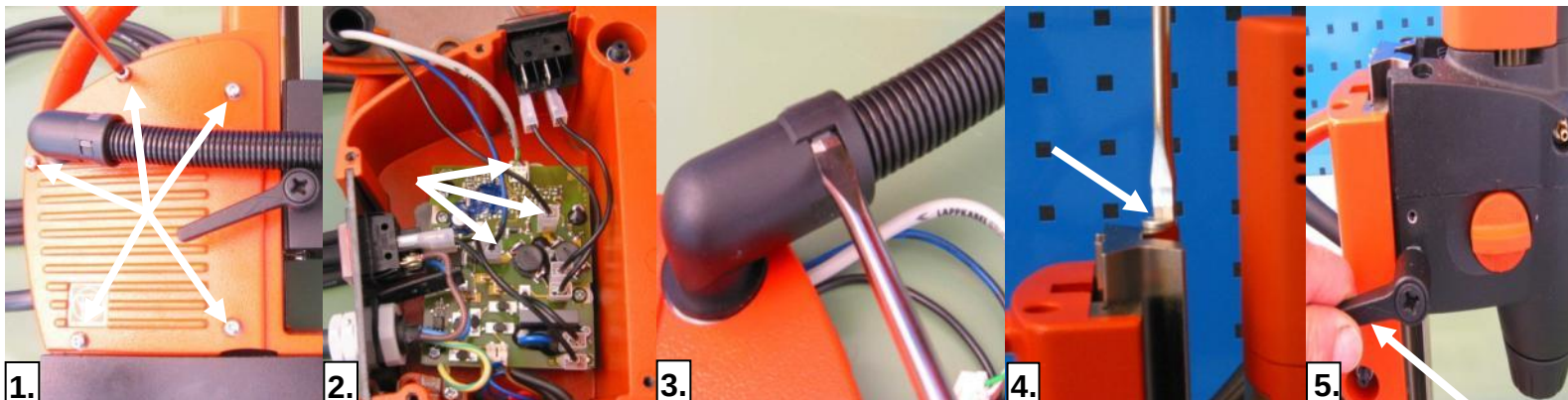
- 4.1. Preparation
- 4.2. Drill motor - loosen the drill rig
- 4.3. Drill motor - gear
- 4.4. Motor housing
- 4.5. Drill rig

4.0. Preparation



1. Disconnect >>> pull the plug <<<
2. Set switch to “OFF” position
3. Remove accessory clamped in place.

4.1. Drill motor – loosen the drill rig



1. Remove the cover [\(1050\)](#) from the drill rig housing [\(700\)](#).
2. Disconnect the cable [\(250, 260, 265\)](#) from the board [\(990\)](#).
3. Loosen the safety strap on the SEM bracket [\(1060\)](#) with a screwdriver and disconnect the protective hose.
4. Remove the upper flat-headed screw [\(810\)](#).
5. Loosen the clamping lever [\(620\)](#) and lift the drill motor [\(10-620\)](#) up and out.

Tools:

- PH2 cross-slotted screwdriver
- Slotted screwdriver, 1.2 × 6.5

4.2.1. Drill motor - gear



1. Remove the cylinder screw [\(590\)](#) and take off the gear case [\(280\)](#).
2. Remove the spur wheel shaft [\(510\)](#) with the spur wheel [\(520\)](#) .
3. Dismount the switch button [\(530\)](#) after removing the locking ring [\(570\)](#) .
Dismount the spur wheel shaft [\(460\)](#) with spur wheel [\(490\)](#) and switching wheel [\(480\)](#) .
4. Remove the locking ring [\(450\)](#), spur wheel [\(440\)](#) and feather key [\(470\)](#) and remove the locking ring [\(420\)](#). (Remove the grease).

Tools:

- Allen wrench SW4
- Seeger ring tongs (outer, offset)
- Seeger ring tongs (outer, straight)
- Plastic hammer

4.2.2. Drill motor - gear

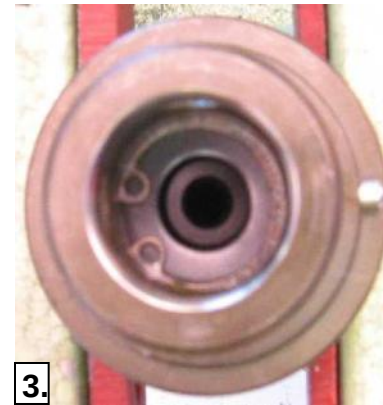


1. Drive the drill shaft **(320)** forward out of the gear case **(300)**.
2. Remove the locking ring **(310)** and drive out the grooved ball bearing **(300)** with the sleeve.
3. Remove the bearing **(100, 290)** with the Kukko bearing inside remover.

Tools:

- Plastic hammer
- Sleeve
(E/I/H=40/24/60)
- Seeger ring tong
(inner, straight)
- Bearing inside
remover (Kukko)
- (21-00, 21-02)
-Fork wrench
SW:12,14,22

4.2.3. Drill motor - gear

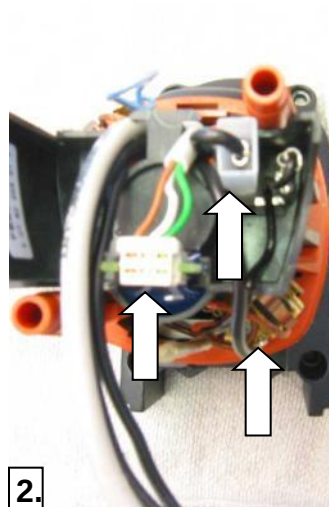


1. Remove the locking ring [\(410\)](#) and pull the clamping sleeve [\(400\)](#) forward.
Caution: The clamping sleeve is under tension!
2. Remove the balls [\(390\)](#) and shank spring [\(380\)](#) .
3. Dismount the locking ring [\(390\)](#) .
4. Remove the disk [\(350\)](#) , sleeve [\(340\)](#) and the compression spring [\(330\)](#) .
Caution: All parts are under tension from the compression spring.

Tools:

- Seeger ring tong (inner, straight)
- Seeger ring tong (outer, straight)

4.3.1. Motor housing / cover



1. Remove the screws [\(270\)](#) and lift off the cover [\(210\)](#) .
2. Pull out all the cables.
3. Pry off the electronic speed recorder [\(170\)](#) by bending back the locking lugs.
4. Remove the screws [\(200\)](#) and take out the brush holder [\(190\)](#).
(Take the carbon brushes out of the brush holder and pull out the cable.)

Tools:

- PH2 cross-slotted screwdriver
- Slotted screwdriver, 1.2 × 6.5

4.3.2. Motor housing



1. Remove the screws **(140)** .
2. Separate the intermediate bearing **(90)** from the motor housing.
3. Dismount the armature **(40)** from the motor housing **(10)** .
4. Remove the air guide ring **(30)** from the motor from the motor housing.
5. Remove the field magnet **(20)** from the motor housing **(10)** .

Caution: Cables must not be left hanging anywhere!

Tools:

- PH2 cross-slotted screwdriver
- Plastic hammer

4.3.3. Motor housing / armature



1. Remove the Nilos ring (135) . Pull the groove ball bearing (70) together with the sealing ring (80) from the armature (40) with the removal tool.
2. Pry off the insulating sleeve (150) and ring magnet (160) with a screw driver.
3. Remove the groove ball bearing (50) with the removal tool.

Tools:

- 2 screwdrivers
- Ball bearing Pull-of cone (64104150008)
- Clamping body D26 (64107026000)
- Clamping body D19 (64107019007)

4.3.4. Motor housing / intermediate bearing

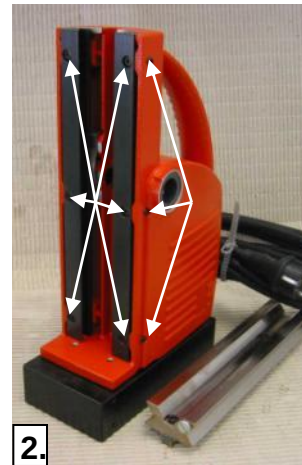
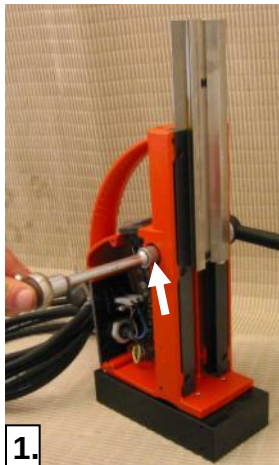


1. Remove the bearing [\(100,120\)](#) with a Kukko - bearing inside removal tool.
2. Pry out the radial shaft seal ring [\(110\)](#) with a screw driver.
3. Pull out the hose socket [\(600\)](#) .

Tools:

- Bearing inside removal tool (Kukko)
- (21-00, 21-02)
- Fork wrench
SW:12,14,22
- Screwdriver (slotted)
- Socket wrench (SW 7)

4.4.1. Drill Rig

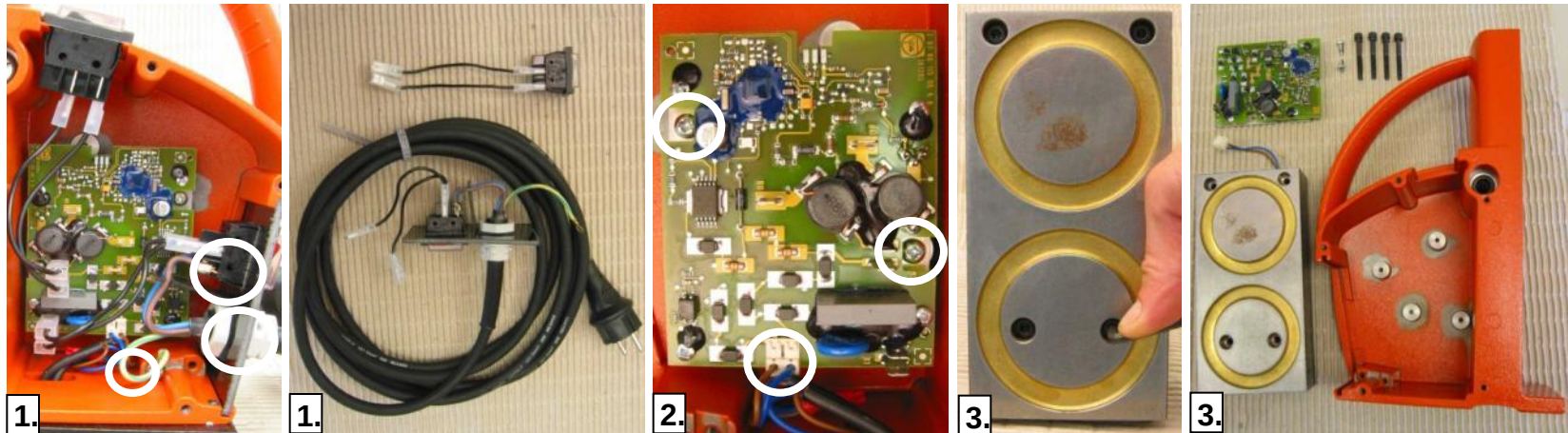


1. Turn the feed on the star handle as far up as it will go. Loosen the hexagonal nut [\(870\)](#) and remove the disks [\(850\)](#) and cup springs [\(860\)](#) . Pull out the drive shaft [\(820\)](#) . Unscrew the hand grips [\(840\)](#) from the drive shaft [\(820\)](#) .
2. Loosen the threaded pins [\(760\)](#) and cylinder screws [\(730\)](#) . Remove the guide [\(800\)](#) , lifting it upward. Dismount the guide strip [\(720\)](#) completely.

Tools:

- Nut and ratchet
- SW 13
- Allen wrench
- SW 2,5, 3 and 4
- Screwdriver

4.4.2. Drill rig



1. Remove all connecting cables from the electronic speed controller [\(990\)](#) .
Loosen the grounding connection from the assembled cable [\(900\)](#) and pull out the entire plate [\(940\)](#) sideways from the housing [\(700\)](#) .
2. Remove the electronic speed controller [\(990\)](#) from the housing [\(700\)](#) after removing the connection cable to the magnet [\(880\)](#) and removing the screws [\(1080\)](#) .
3. After you have removed the cylinder screws [\(890\)](#) , take the magnetic foot [\(880\)](#) out of the housing [\(700\)](#) .

Tools:

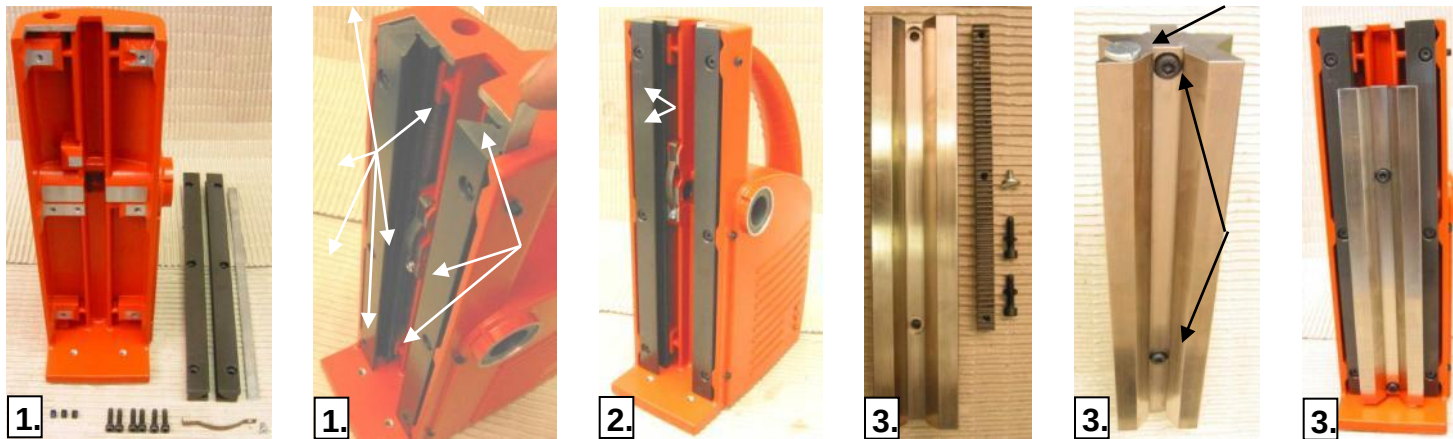
- Flat pliers
- Allen wrench
SW 4



5. Assembly of the Core Drill Unit

- 5.1 Drill rig
- 5.2 Motor housing
- 5.3. Drill motor - gear - Quick IN
- 5.4. Drill motor connecting to the drill rig

5.1.1. Drill rig / guide rails



1. Lightly apply the guide rails (720) with cylinder screws (730) . Push the pressure bar (710) behind the guide rail. Lightly set the threaded pins (760) in place.
2. Fasten the leaf spring (740) in place with a oval head screw (750).
3. Screw the gear rack (780) onto the guide (800) with a cylinder screw (790) and lock washer (770) . Screw in the lower flat-headed screw (810) . Insert the guide (800) into the guide rail (720) .

Caution: Lightly grease the dovetail guide in the guide rail (720) with grease 0 40 106 0100
Lightly grease the gear rack (780) with grease 0 40 101 0100 4.

Tools:

- Allen wrench
SW 2,5, 3, 4
- PH2 cross-slotted
screwdriver
- Grease:
04010601001
- Grease:
04010101004

5.1.2. Drill rig / drive shaft / guide



1. Push the slide socket [\(702, 703\)](#) into the housing [\(700\)](#) with the appropriate spindle.
2. Set the drive shaft [\(820\)](#) in place. Add the U disk [\(850\)](#) , spring washers [\(860\)](#) (in the shape of an X) and the U disk [\(850\)](#) . Lightly screw on the hexagonal nut [\(870\)](#) . Screw in the hand grips [\(840\)](#) .
3. Adjust the guide bar [\(720\)](#) with the threaded pins [\(760\)](#) and tighten the cylinder screws [\(730\)](#) .

**Caution: You should be able to move the guide [\(800\)](#) with no play!
Secure threaded pins in place [\(760\)](#) with Loctite 222!**

Tools:

- Spindle
Ø=30 mm
Ø=17.5 mm
- Nut
SW 13
- Allen
SW 2.5, 3, 4
- Loctite 222

5.1.3. Drill rig / magnet

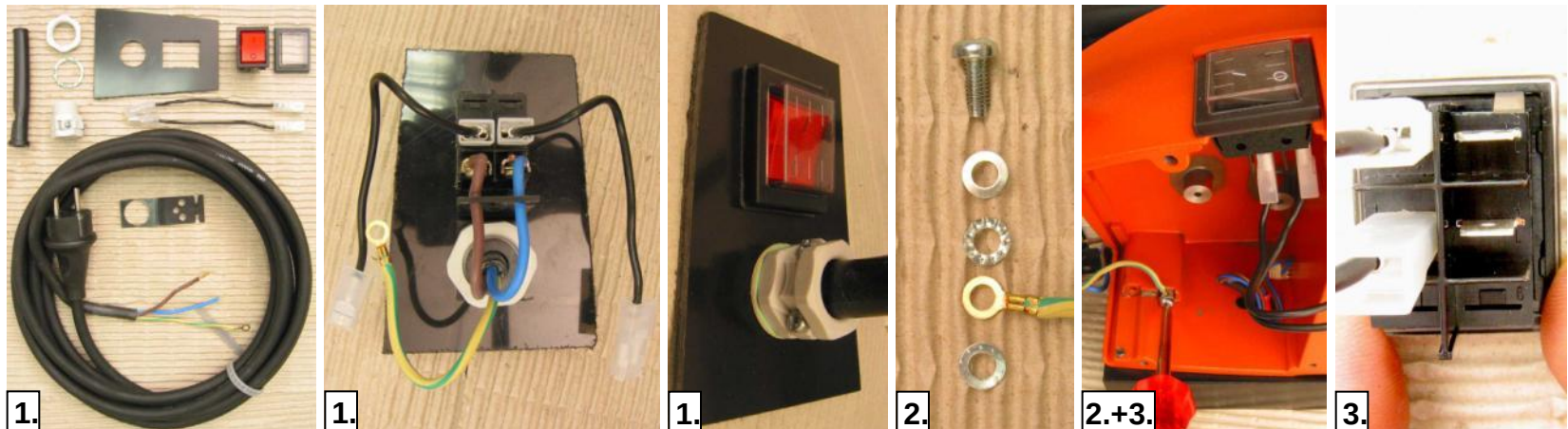


1. Screw the magnetic foot [\(880\)](#) onto the housing with the cylinder screw [\(890\)](#) and lock washer [\(770\)](#) .

Tools:

- Allen wrench
SW 4

5.1.4. Drill rig / power cord and switch

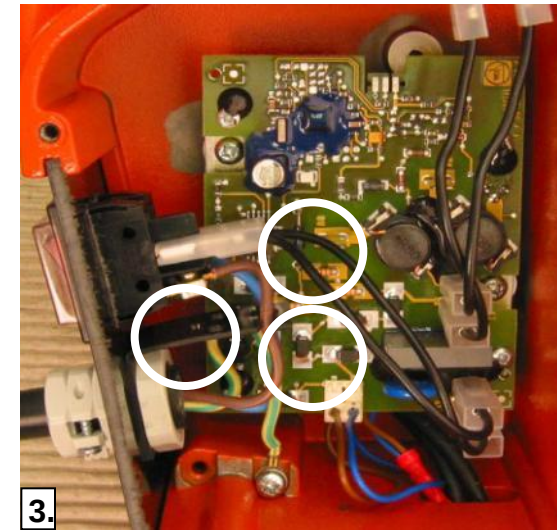


1. Assemble the plate [\(940\)](#) with electrical parts . Plug the cable [\(1000\)](#) onto the master switch [\(970\)](#) according to the circuit diagram. **Caution: The plate is not symmetrical, note position!**
2. Mount the grounding connection with parts [\(1020, 1030, 1080\)](#) .
3. Plug the cable [\(1000\)](#) onto the Off switch [\(1010\)](#) according to the circuit diagram. Push the Off switch [\(1010\)](#) into the housing [\(900\)](#) .

Tools:

- PH2 cross-slotted screwdriver
- Flat pliers
- Pipe grip

5.1.5. Drill rig / speed controller

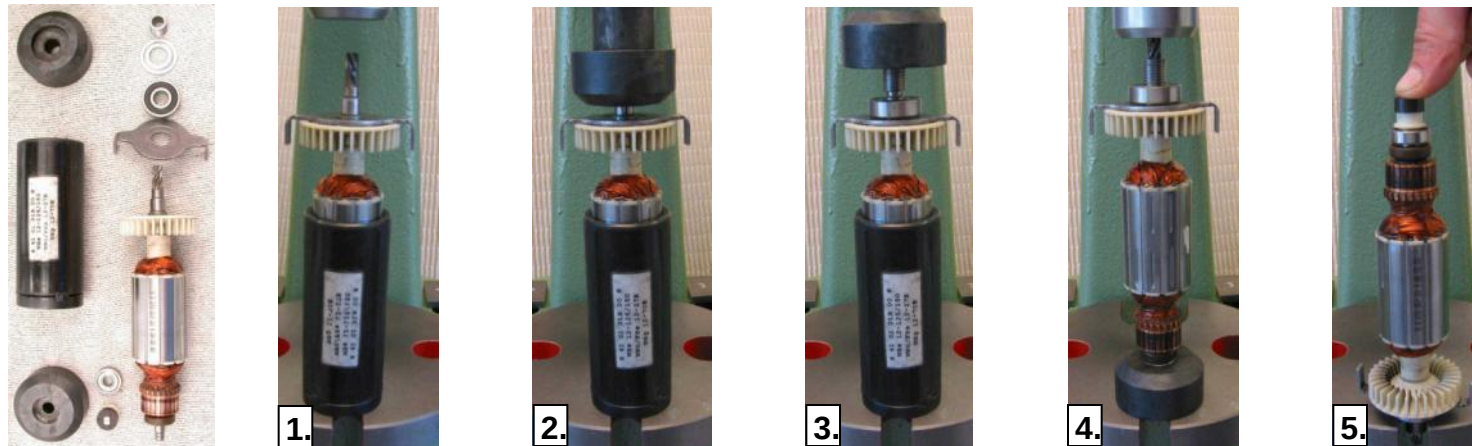


1. Fasten the electronic speed controller [\(990\)](#) in place in the drill jig [\(700\)](#) with a oval head screw [\(1080\)](#) .
2. Push the assembled plate [\(940\)](#) into the groove in the housing [\(700\)](#) provided for that purpose.
3. Plug in all cables [\(1000\)](#) and the cable for the magnetic foot onto the electronic speed controller [\(990\)](#) according to the circuit diagram.

Tools:

- PH2 cross-slotted screwdriver
- Flat pliers

5.2.1. Motor housing / armature



1. Set the terminating plate [\(60\)](#) in place
2. Press on the bearing [\(70\)](#) .
3. Press on the retaining ring (80) and the Nilos ring [\(135\)](#) .
4. Press on the bearing [\(50\)](#) .
5. Push the insulating sleeve [\(150\)](#) and magnet ring [\(160\)](#) on manually.

Tools:

- Spindle press
- Press-on fixture (64101019008)
Ball bearing attachment
D = 26
(64107026000)
- Ball bearing attachment
D = 19
(64107019007)

5.2.2. Motor housing / intermediate gear case



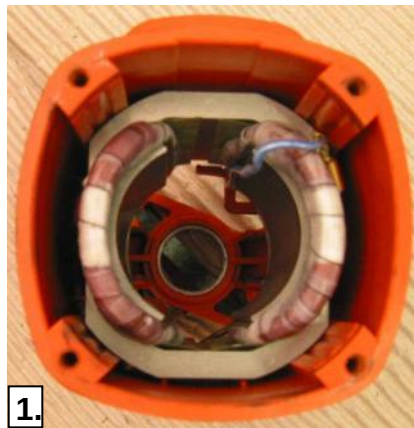
1. Install the sealing ring (110) flush in the intermediate bearing (90) .
Caution: note position!
2. Press the groove ball bearing (120) into the intermediate bearing (90) .
3. Press the groove ball bearing (100) into the intermediate bearing (90) .
4. Screw the hose socket (600) into the intermediate bearing (90) .
Caution: Screw in only lightly!

Tip: Warm up the intermediate gear case around about 80°C.

Tools:

- Spindle press
- Spindle:
Ø=15.9 mm
Ø=21.9 mm
Ø=31.9 mm

5.2.3. Motor housing / field coil

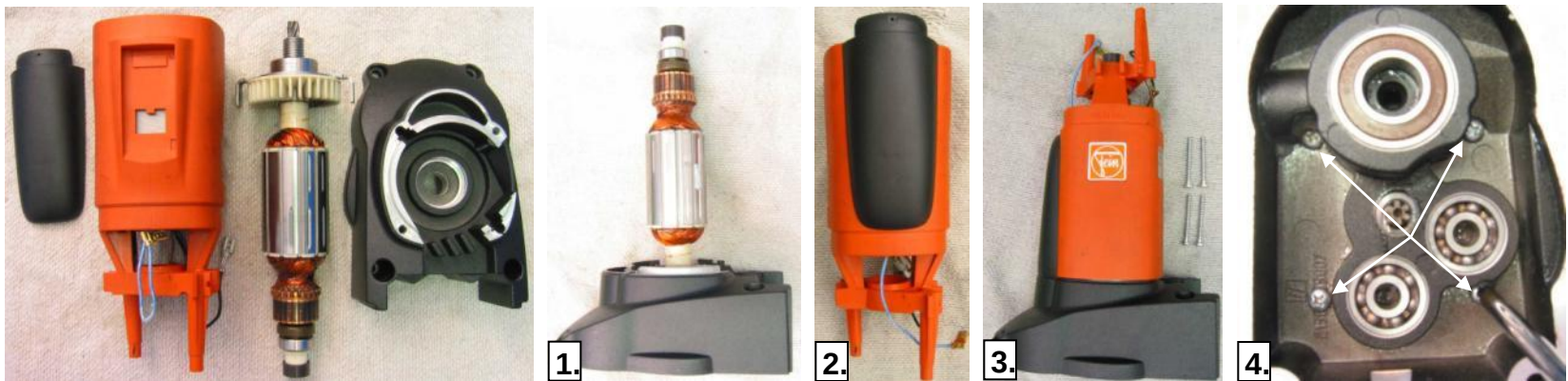


1. Place the field coil (20) in the motor housing (note position) and press it in with the sleeve (E//H/59,5/54/65).
2. Set the air guide ring (30) in place in the motor housing (note position).

Tools:

- Spindle press
- Sleeve
(E//H/59.5/54/65)
- Cable hook

5.2.4. Motor housing



1. Place the preassembled armature [\(40\)](#) in the preassembled intermediate gear case [\(90\)](#) .
2. Place the covering flap [\(130\)](#) in the motor housing [\(10\)](#) .
3. Place the preassembled intermediate gear case [\(90\)](#) in the preassembled motor housing [\(10\)](#) .
4. Screw the intermediate gear case [\(90\)](#) together with the motor housing [\(10, 140\)](#).

Caution! Seal the screw heads with Loctite 574.

Tools:

- Plastic hammer
- Loctite 574
- PH2 cross-slotted screwdriver

5.2.5. Motor housing / cable



1. Fasten the brush holder (190) onto the motor housing (10) with screws (200) tightened to 1.2 Nm.
2. Plug the electronic speed controller (170) onto the motor housing (10) . Attach the connection cable of the field coil (20) according to the circuit diagram.
3. Connect all cables according to the circuit diagram and to the tension relief element on the labyrinth of the electronic speed controller (170) .

Tools:

- PH2 cross-slotted screwdriver

5.2.6. Motor housing / cover



Tools:

- PH2 cross-slotted screwdriver

1. Place the cover (210) on the motor housing (20) . Draw all cables along by pulling on the ends of the cables. Fasten the cover (210) with two screws (270) .

5.3.1. Drill motor - gear - Quick-IN

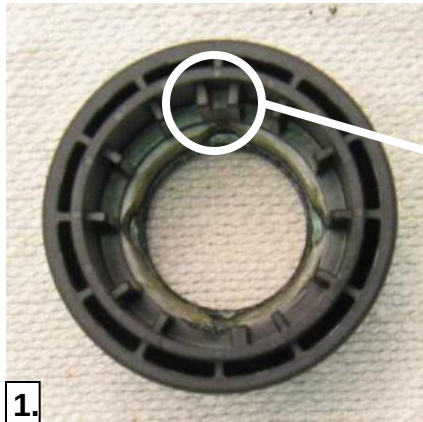


1. Place the compression screw (330) , sleeve (340) and disk (350) on the drill shaft (320) and place the locking ring (360) on the drill shaft. Press all parts together on the drill shaft (320) with bolt until the locking ring locks.
2. Strike the clamping sleeve (370) up to a height where it is flush, then set the key feather (430) in place.
3. Place the shank spring (380) in the correct position on the drill shaft (320) . Lightly grease the bore hole for the balls (390) and set the balls (390) in place.

Tools:

- Seeger ring tongs (inner, straight)
- spindle (Ø =17.5 mm)
- 200 g hammer
- Grease (04010601001)
- Vice
- Soft clamping claw

5.3.2. Drill motor - gear - Quick-IN



1.



1.



2.



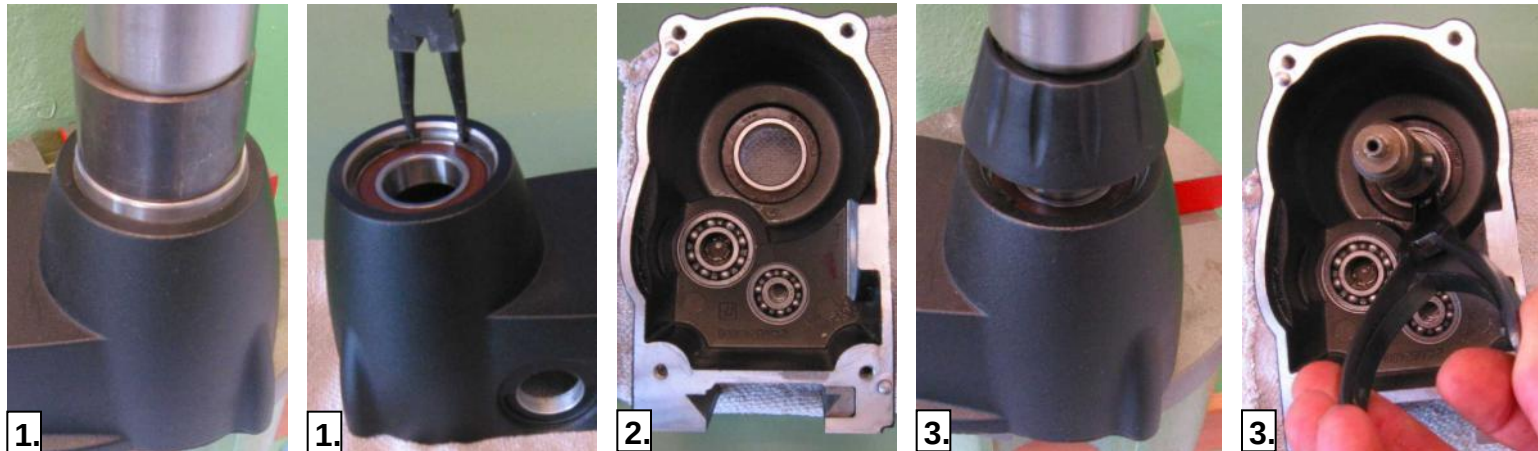
3.

1. Place the clamping sleeve (400) on the drill shaft (320) . Hook the shank spring (380) in the clamping sleeve (400) ,
2. Tension it by turning anticlockwise (about 90°) until the clamping sleeve (370) fixes the balls in place in the clamping area and unlocks. **! Check function with a screwdriver or other tool !**
3. Secure the clamping sleeve (400) in place with a locking ring (410) .

Tools:

- Screwdriver
- Seeger ring tongs (outer, straight)
- Vice (soft jaws)

5.3.3. Drill motor - gear - Quick-IN

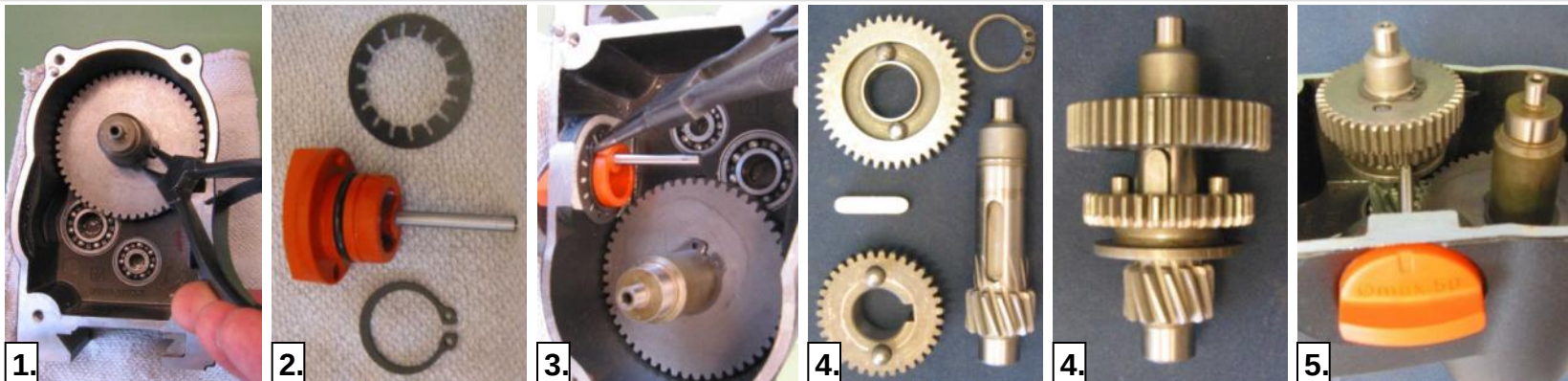


1. Press the groove ball bearing [\(300\)](#) into the outer bearing [\(280\)](#) and secure it in place with a locking ring [\(310\)](#) .
2. Press the groove ball bearing [\(100, 290\)](#) in place.
3. Press the drill shaft [\(320\)](#) into the groove ball bearing [\(300\)](#) and secure it in place with a locking ring [\(450\)](#) .

Tools:

- Bearing press-in rings
(EØ=45 mm)
(EØ=27 mm)
(EØ=21 mm)
- Seeger ring tongs (inner, straight)
- Seeger ring tongs (outer, straight)
- Spindle press

5.3.4. Drill motor - gear - Quick-IN

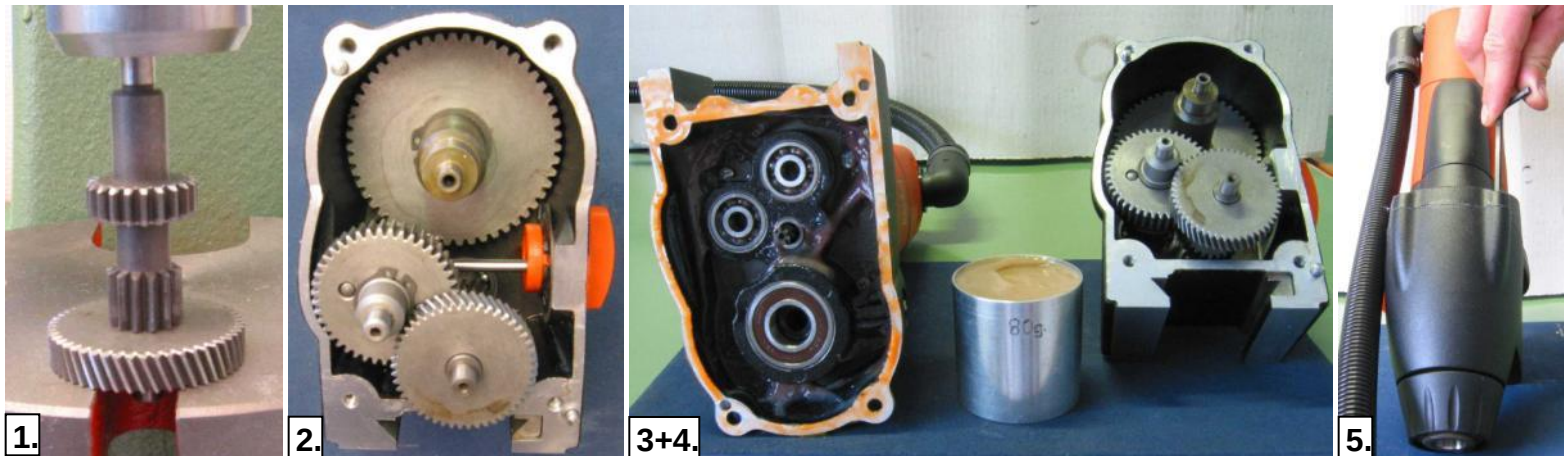


1. Set the spur wheel (440) in place and secure it with a locking ring (420) .
2. Mount the round sealing ring (550) (grease lightly) on the switch grip (530) and press the cylinder pin (540) onto the switch grip (530) as far as it will go.
3. Place the switch grip (530) in the outer bearing (280) and after setting the spring washers (560) in place, secure it with a locking ring (570) .
4. Place the key groove (470) on the spur wheel shaft (460) . Push the spur wheel (480) onto the spur wheel shaft (460) . Set the spur wheel (490) in place and secure it with a locking ring (500) .
5. Place the assembled spur wheel shaft (460) on the groove ball bearing (290) . Insert the cylinder pin (540) in the switching groove of the switching wheel (480) .

Tools:

- Seeger ring tongs (outer, straight)

5.3.5. Drill motor - gear - Quick-IN



1. Press the spur wheel [\(520\)](#) onto the spur wheel shaft [\(510\)](#) .
2. Set the assembled spur wheel shaft [\(510\)](#) in the groove ball bearing [\(100\)](#) .
3. Fill the external bearing [\(280\)](#) with 80 g of gear grease (0 40 118 0300 9).
4. Clean both seal surfaces of the gear parts [\(90, 280\)](#) . Coat one seal surface with Loctite No. 574.
5. Set the intermediate bearing [\(90\)](#) in place and screw it together with cylinder screws [\(590\)](#) and lock washers [\(580\)](#) .

Tools:

- Spindle press
- Grease (04011803009)
- Sealant (Loctite No.574)
- Allen wrench (SW 4)

5.4.1. Drill motor – connecting to the drill rig



1. Push the drill motor onto the guide [\(800\)](#) on the drill jig and fasten it in place with a clamping lever [\(620\)](#) . Screw the flat headed screw [\(810\)](#) tight.

Caution: Check whether the drill motor moves by itself in the guide because of its own weight. This must be prevented because of the danger of injury by tightening the hexagonal nut [\(870\)](#) .

2. Place the counternut [\(1070\)](#) on the cover [\(1050\)](#) . Screw the round sealing ring [\(1040\)](#) onto the bracket [\(1060\)](#) . Pull all cables through and push the protective hose [\(240\)](#) in as far as it will go up to the stop.

Tools:

- PH2 cross-slotted screwdriver
- Slotted screwdriver, 1.2 × 6.5

5.4.2. Drill motor – connecting to the drill rig



1. Plug all cables into the electronic speed controller [\(990\)](#) according to the circuit diagram.
2. Fasten the cover [\(1050\)](#) in place with a oval head screw [\(1080\)](#).

Tools:

- PH2 cross-slotted screwdriver
- Slotted screwdriver, 1.2 × 6.5



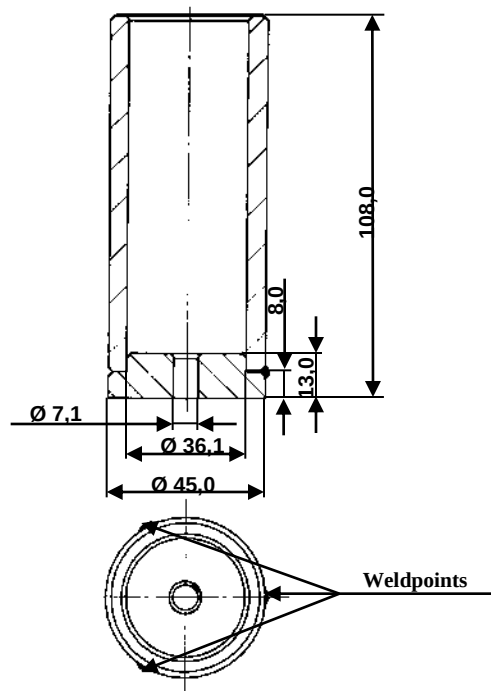
6. Tools

- 6.1. All mechanical tools
- 6.2. Special tools / technical drawings
- 6.3. Types of grease and quantities
- 6.4. Adhesives ,sealants

- Spindle press up to 3t
- Vice
- Soft clamping jaws
- Plastic hammer
- Locksmith's hammer 200 g
- Screwdriver PH 2
- Slotted screwdriver
- Seeger ring tongs (inner/straight)
- Seeger ring tongs (outer/offset)
- Seeger ring tongs (outer /straight)
- Flat pliers
- Pipe pliers/ water pump pliers
- Fork wrench SW: 12, 14, 22
- Socket wrench SW: 7
- Bearing removal tool Kukko
- Bearing removal tool Kukko
- Nut SW 13 + extension + ratchet
- Sleeve E//H
- Sleeve E//H
- Spindle D = 30 mm
- Spindle D = 17.5 mm
- Spindle D = 15.9 mm
- Spindle D = 21.9 mm
- Spindle D = 31.9 mm
- Bearing pressing ring ED = 45 mm
- Bearing pressing ring ED = 27 mm
- Bearing pressing ring ED = 21 mm

Commercially available

6.2. Special tools / technical drawings



- Pull-of cone
- Clamping body D = 19 mm
- Clamping body D = 26 mm
- Ball bearing attachment D = 19
- Ball bearing attachment D = 26
- Press-on fixture
- Cable hook

6 41 04 150 00 8
6 41 07 019 00 1
6 41 07 026 00 0
6 41 07 019 00 7
6 41 07 026 00 0
6 41 01 019 00 8
0 72 00 310 06 6

Press-on fixture

For fastening the armature securely in place [\(40\)](#)

6 41 01 019 008

6.3. Types of grease / quantities of grease

Lubricant, company designation	Appearance	Technical data and consistency class	Application	Article No. of the complete package and type of package	Grease quantity and item
Greases					
0 40 <u>101</u> 0100 4 (old Sst1)	Light brown, beige, naturally cloudy, compact-pasty	Drop point: about 180°C Operative range: -30°C to +120°C NLGI:2	Normally loaded spur gears and roller bearings as well as plain bearings for higher speeds	Tube 85 g 32160003014 Tin 800 g 3213200701 Tin 4500 g 32132010015	Gear rack Item No. 780 Grease lightly
0 40 <u>106</u> 0100 1 (old Sst6)	Yellow Short-fibred	Drop point: about 190°C Operative range: -60°C to +130°C NLGI: 2	Neutral to ferrous and non-ferrous metals and stable plastics: PA, PF, PTFE, fluorelastomeres. FEIN: ZTN, ZTH, 2Z, 2RS – Roller bearing	Tube 85 g 32160003061 Tin 850 g 32132007033	Guide rail Item No. 720 (dovetail guide only) Grease lightly
0 40 <u>118</u> 0300 9	Beige, soft, flowing	Drop point: about 200°C Operative range: -40°C to 150°C NLGI: 00	Gear lubricant in electrical tools and tool machines. FEIN: Used in robots (permanent use), KBS and KBM	Tube 80 g 32160003182 Tin 850 g 32132007189 Tin 4500 g 32132010182	Gear : 80g Groove ball bearing: Item. No. 100, 290

6.4. Adhesives, sealants

Order Ref.	Designation	Color	Content	Description	Item quantity
0480050003	Loctite 574	Orange	250 ml	Surface sealing, fast curing, gap up to 0.5 mm < for aluminum connections>	Sealing surface of gear parts (90, 280) Screw heads (140)
0480050033			100 ml		
09000600401	Loctite 222 (old 221)	Purple	50 ml	Screw locking/ straight threads, low tightness screw locking, for tightening and sealing of threaded connections, vibration tight, can be disassembled easily, most favourable gap 0.05 mm, max 0.12 mm, for threads< M16, fine threads<M36, -55C to +150C, hand tight 15-30 min, final tightness 3hrs., storage time min 12 months	Threaded pins (760)



7. Change / Repair information

KBM 50 Q

until Nov. 2005



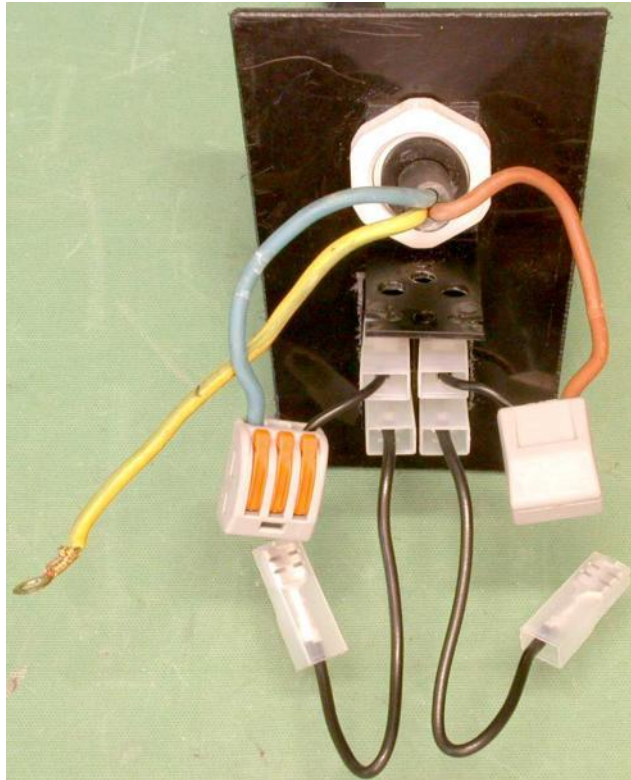
KBM 50 QX

from Nov. 2005

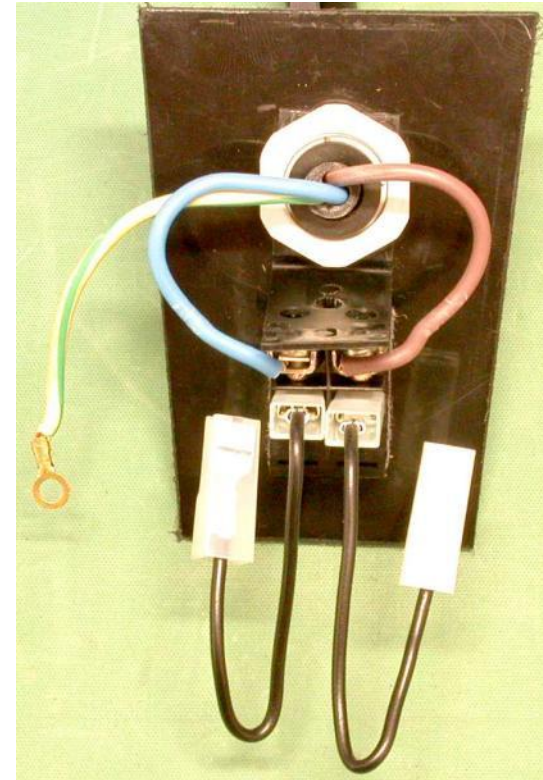
In the course of a product optimization a reconstruction sentence became from November, 2005 for elektr. speed regulator for the KBM 50 Q introduced. With it the designation of the engine has also changed, now KBM 50 QX. Because the old material number (30762257996) is not available any more, the reconstruction sentence (30762274020) must be applied in the repair case fundamentally.

7.1. Main switch

Main switch new

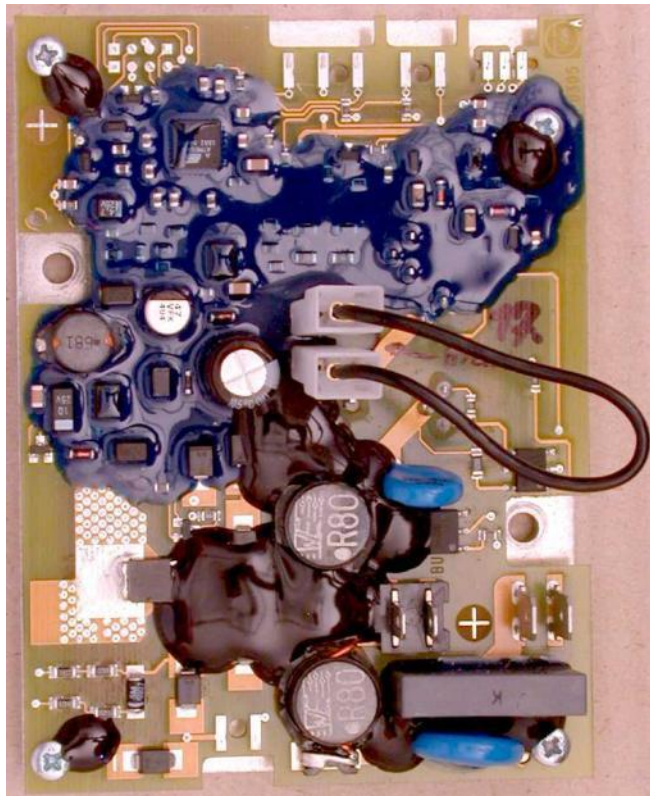


Main switch old

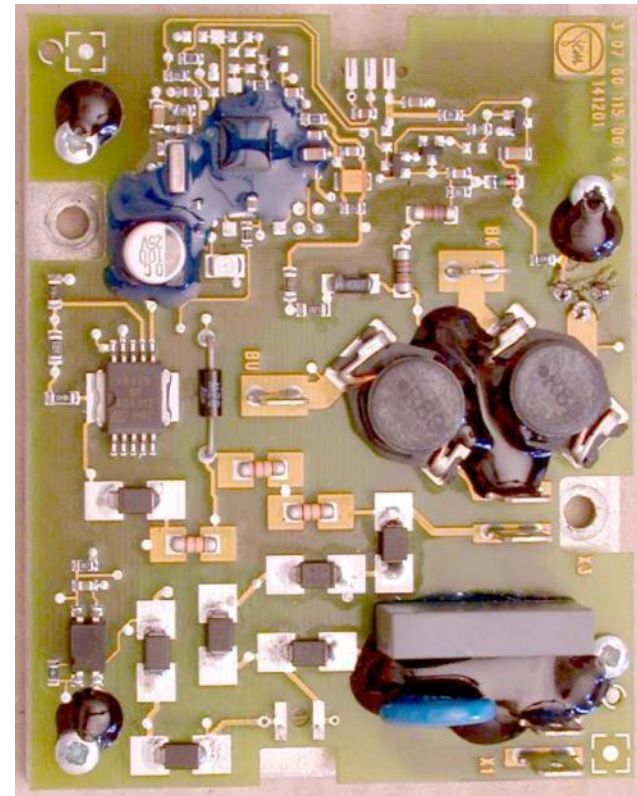


7.2. Elektronik

Elektronik new

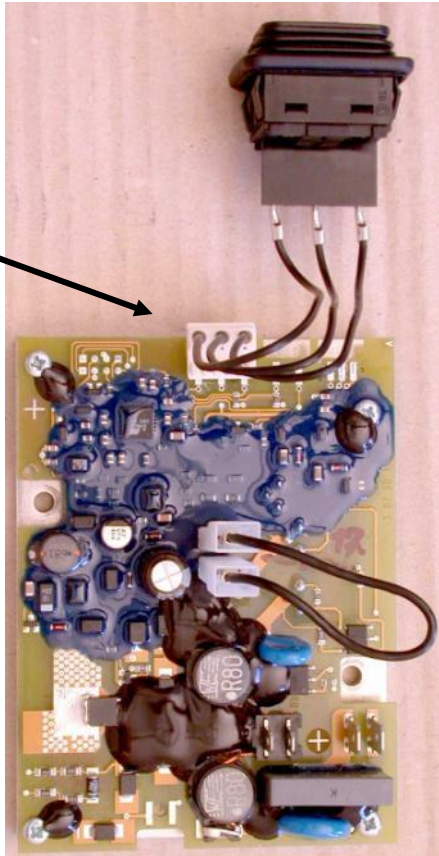


Elektronik old

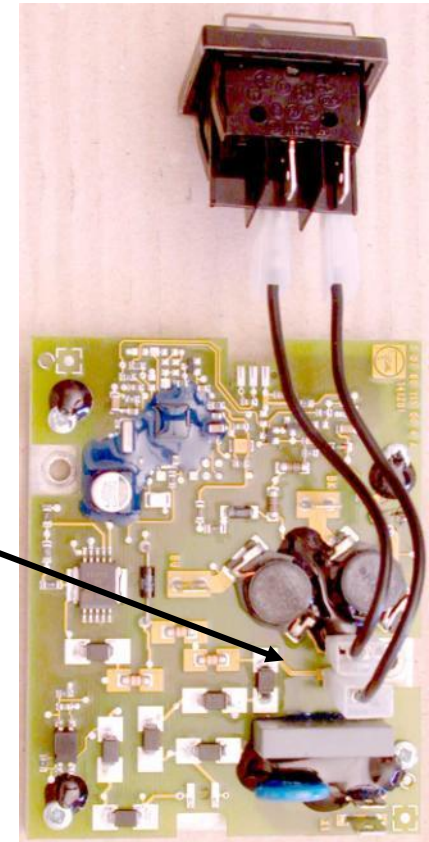


7.3. Connection new / old

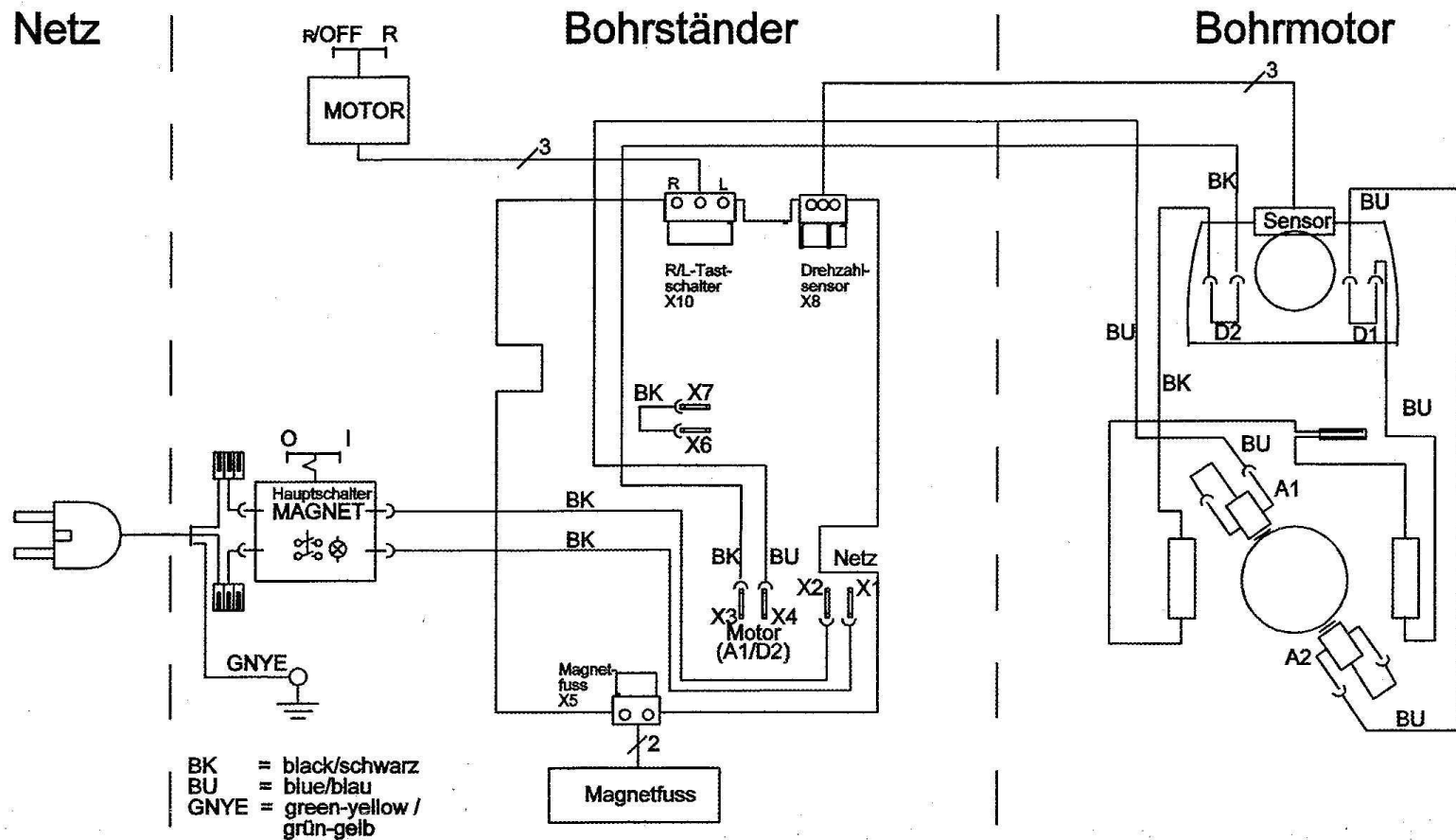
Connection of new
Motor switch on the
new electronic



Connection of
Motor switch on the
old electronic



7.4. Connection plan new



7.5. Trouble shooting

