



## Starting page



**KBM 52 U**



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1. Technical data
2. Maintenance
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Spare design and parts list are available on the Internet ([www.fein.com](http://www.fein.com))



## 1. Technical data

<u>Order reference</u>		<u>7 270 31</u>
Model		KBM 52 U
Power consumption	Watt	1200
Power output	Watt	640
Speed at full load	1/min	130-260 / 260-520
Type of current		1 ~
Safety class		1
Cable length with plug	m	4
Weight	kg	13.7
Drill - Ø Steel max.		
Core drill	mm	12-50
Twist drill (with drill chuck)	mm	23 (16)
Tapping drill		M 16
Drilling depth max.	mm	50
Chuck		QuickIN / MK 3
Magnetic holding force	N	11000
Height (drill jigs)	mm	368
Cam (adjustable)	mm	135-310
Magnetic foot measurement	mm	180 x 90



## 2. Maintenance

- Check power cable for damage
- Vent motor using dry compressed air
- Check carbon brushes
- General functional control

Carbon brush replacement:

The drill motor has carbon brushes with automatic switch-off.

The replacement should be executed by an electrician, preferably in an authorised FEIN - workshop.

During the insertion of the new carbon brush observe free movement in the carbon brush holder.

New carbon brushes have to break in for 15 min in an idling cycle.



**Only use original Fein - carbon brushes and Fein - replacement parts**





### **3. General inspection**

- 3.1. General functional test
- 3.2. Test data
- 3.3. Testing devices and aids
- 3.4. Connection plan
- 3.5. Security inspection after completed repair



**For a detailed troubleshooting and inspection possibilities  
see Excel - table at the end of the presentation !**



## 3.1 General functional test

### Self-start lock and magnetic foot:

Switch on the main switch (magnet), press and hold the motor sensor switch

- The motor must not start
  - Magnetic foot attaches
- Check power input (0.15 A)

Let go of motor sensor switch

- Magnetic foot remains on
- Power input remains the same (0.15 A)

### Motor test:

Turn on and load motor

- Measure idle speed
- Speed is adjusted when loaded
- at approx. 1600 Watt strong speed reduction
- after 10 sec. automatic stop ( overload protection )



### 3.2. Test data

Rated voltage		220 - 240 V
Testing Voltage / " 10 %		230 V
No-load current / " 10 %	(2.25-2.88 A)	2.5 A
Idle speed / " 5 %	(494-546 Rpm/min)	520 Rpm/min
Main switch on		
Voltage on X5 "10 %	(90-110 V/DC)	100 V/DC
Pushing off force magnet		min. 2800 N
Power input magnetic foot		approx. 0.15 A / AC
Main switch on, motor on		
Voltage on X5 "10 %	(180-220 V/DC)	200 V/DC
Resistance magnetic foot +/- 5 % at 25 °C	(479-529 Ohm)	504 Ohm
Testing voltage - motor without electronics		145 V/AC (approx. 520 Rpm/min in 2. gear)

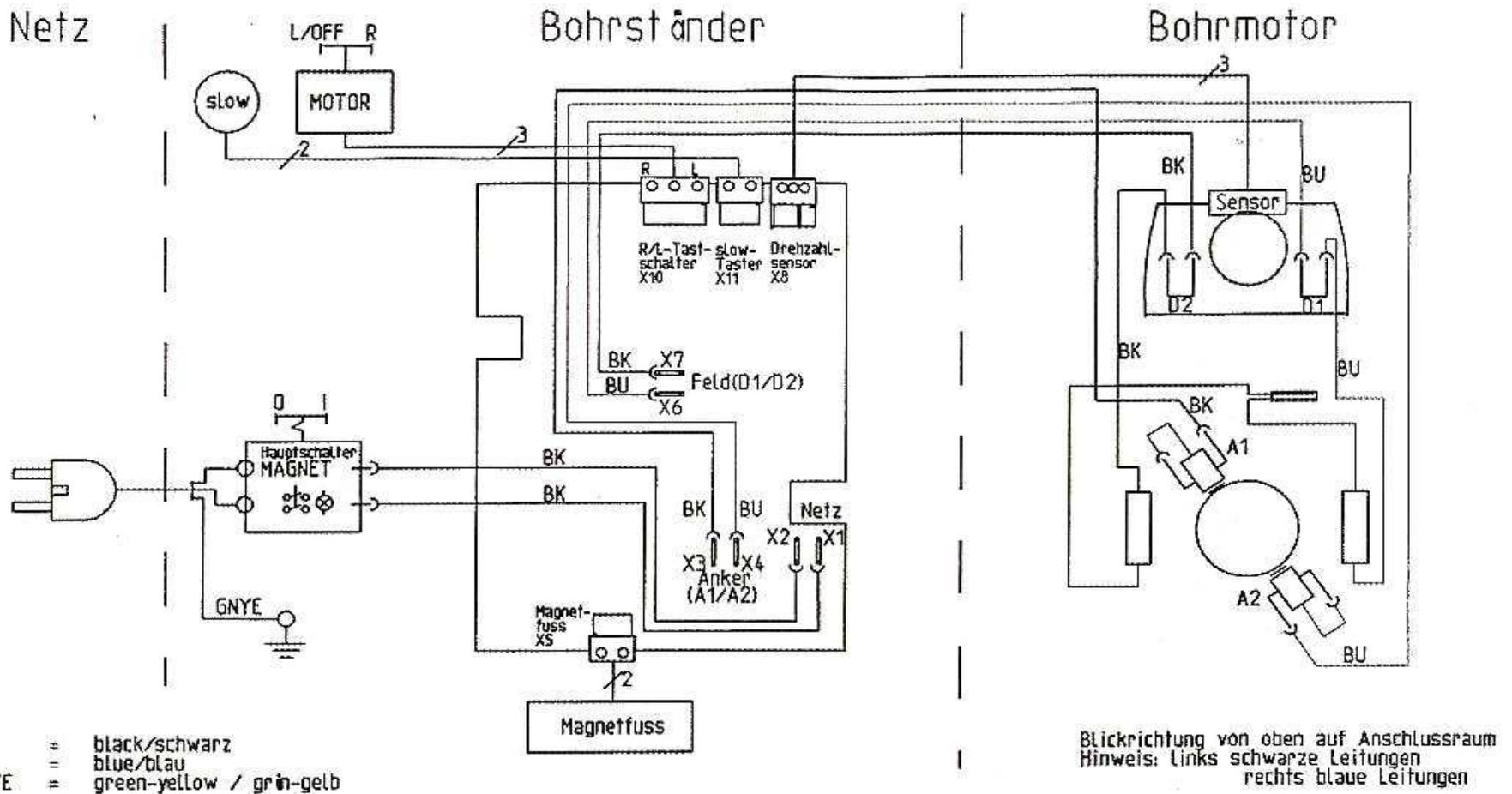


### **3.3. Testing devices and aids**

- Multimeter for effective measuring (voltage, current, resistance)
- Speed gauge
- Force measurement tin for measurement of pressing force up to approx. 5000 N
- Smoothed steel plate ( ST 37 - approx. 500x250x25 mm )
- Adjustable isolating transformer (inspection motor without electronics with 145 V)



## 3.4. Connection plan





## 3.5. Security inspection after completed repair (directly after approx. 15 min. of breaking in)

	Test steps	Test type
1.	Pressing off force	<ol style="list-style-type: none"> <li>1. Place KBM on smoothed steel plate (St 37).</li> <li>2. Attach mains power cable to mains socket</li> <li>3. Motor switch on, only then main switch on</li> <li>4. Pressing off force, min 4500N (new) or min 4050N (used), measure with force measurement tin</li> </ol>
2.	Self-start lock	<ol style="list-style-type: none"> <li>1. Connect KBM 50Q to 230 V/50 Hz</li> <li>2. Main switch and then motor switch "on"</li> <li>3. If machine runs, then pull mains plug</li> <li>4. Connect mains plug into the mains socket again = Machine must not start again</li> </ol>
3.	protective earth conductor test	<ol style="list-style-type: none"> <li>1. Activate Measuring points: Gear head against PE on the plug Open circuit voltage on the measuring device: 4 V - 24 V, AC or DC Measurement current: min. 0.2 A Testing time: 3 sec PE resistance: max. 0.3 Ohm with 4 m long mains power cable</li> </ol>
4.	Insulation resistance measurement	<ol style="list-style-type: none"> <li>2. Activate</li> <li>2. Connect L1 and N to plug</li> <li>3. Main switch and motor switch "ON" Measuring points: Gear head and screws (270) against L1/N Testing time: 3 sec Testing voltage: 500 V DC Insulation resistance: min 2.0 M Ohm</li> </ol>
5.	High voltage test	<ol style="list-style-type: none"> <li>1. Activate</li> <li>2. Connect L1 and N to plug</li> <li>3. Main switch – and motor switch "ON" Measuring points: Gear head and screws (270) against L1/N Testing time: 3 sec Testing voltage: 1000 V AC Trip circuit: 5mA &gt; overload relay must not respond</li> </ol>

### Attention!

Basis for the security inspection are the specifications of the current DIN VDE 0701 Part 1 (Appendix "E" for electr. tools).



## 4. Disassembly

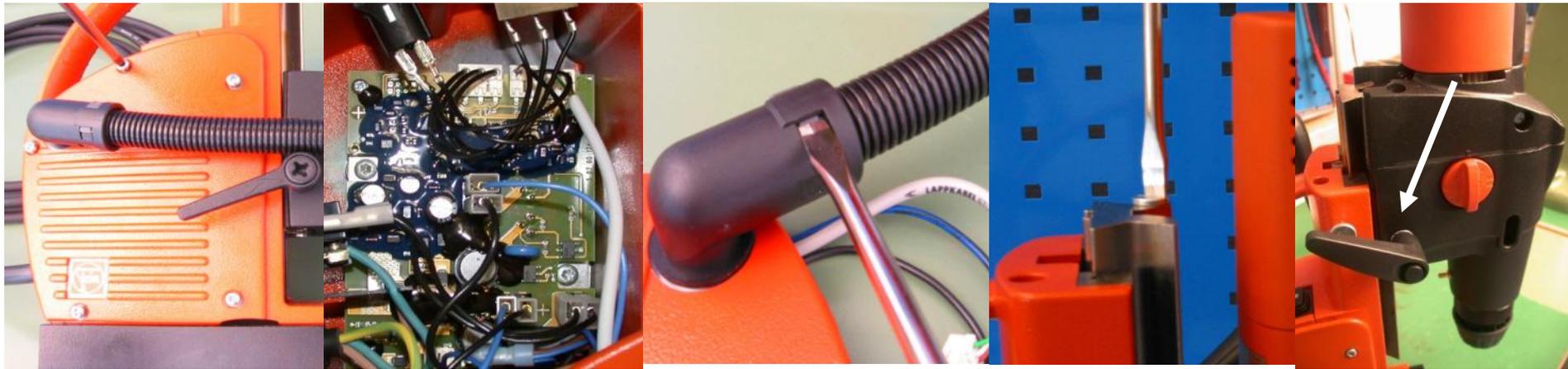
- 4.1. Preparation
- 4.2. Drill motor - remove drill rig
- 4.3. Drill motor - remove gear
- 4.4. Dismantling gear
- 4.5. Dismantling chuck
- 4.6. Dismantling motor
- 4.7. Dismantling drill rig

## 4.1. Preparation

1. Disconnect device from mains
2. Switch in "OFF" - position
3. Remove mounted tools



## 4.2. Drill motor - remove drill rig



1. Release screws and remove cover from drill rig case
2. Remove connection cable of the motor (E,F) from the circuit board (990)
3. Release the safety latch on the SEM angle with the screwdriver and remove protective tubing
4. Remove top flat-headed screw (810)
5. Release clamp lever (500) and remove drill motor

### Tools:

- Screwdriver  
Torx 20
- slotted screwdriver

\*(990) refers to the replacement parts list

## 4.3. Drill motor - remove and disassemble gear



1. Remove cylinder head screw (450) and detach outside bearing (280)
2. Remove spur gear (370) with spur wheel (380)
3. Disassemble control button (390) after removing the circlip (430).  
Disassemble spur gear (320) with spur wheel (350) and control gear (340).  
(Remove grease)

\*(450) refers to the replacement parts list



## 4.4. Dismantling gear



1. Remove circlip (310) and gear wheel (300), take out feather key (290)
2. Remove circlip (270) from outside bearing and press both shaft sealing rings (260) with compressed air out of the casing through the breather hole (arrow). The cooling liquid opening has to be closed for this.
3. Remove circlip (270) from under the sealing ring and press drill shaft (280) forward out of the outer bearing
4. Remove ball bearing with Kukko - inner bearing remover.

### Tools:

- Circlip pliers outer
- Circlip pliers inner
- Mandrel press
- Fork spanner SW 12, 14, 22
- Kukko bearing remover (21-00, 21-02)

\*(310) refers to the replacement parts list



## 4.5. Dismantling chuck



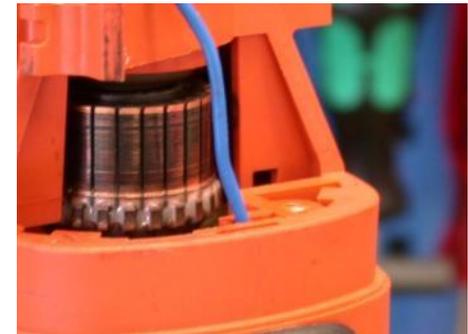
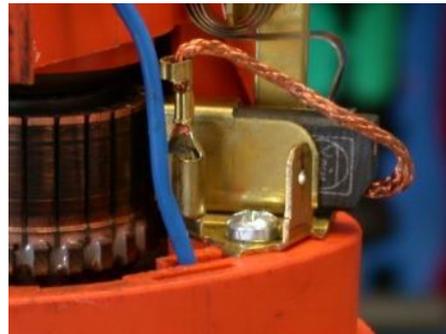
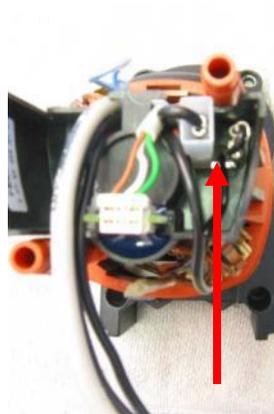
1. Drive out chuck from drill shaft with expulsion block MK 3
2. Remove circlip (1620) and pull off clamping sleeve - **⚠ pre-tension !**
3. Remove balls and spring (1610),  
remove circlip (1580) from the inside of the knurled nut, take off knurled nut
4. Disassemble circlip (1550) from the inside of the chuck, remove disk, sleeve and compression spring

**⚠ All parts are pre-tensioned with the compression spring**

\*(1620) refers to the replacement parts list



## 4.6. Dismantling motor



- 
1. Remove screws (220) and carefully detach cover (200) (Cable)
  2. Pull off cable (blue and black) coming from the field magnet
  3. Wedge off electronic speed sensor (170) by bending back the latch
  4. Remove screws (190) and detach brush holder (180) with carbon brush.

\*(220) refers to the replacement parts list



## 4.6. Dismantling motor



1. Remove screws (140).
2. Remove intermediate bearing (90) from motor case.
3. Disassemble armature (40) from motor case (10).
4. Remove air pipe ring (30) from motor case.
5. Drive field magnet (20) out of the motor case (10) with light strokes from the hammer.



**The cables must not get caught anywhere!**

\*(140) refers to the replacement parts list

## 4.6. Dismantling motor

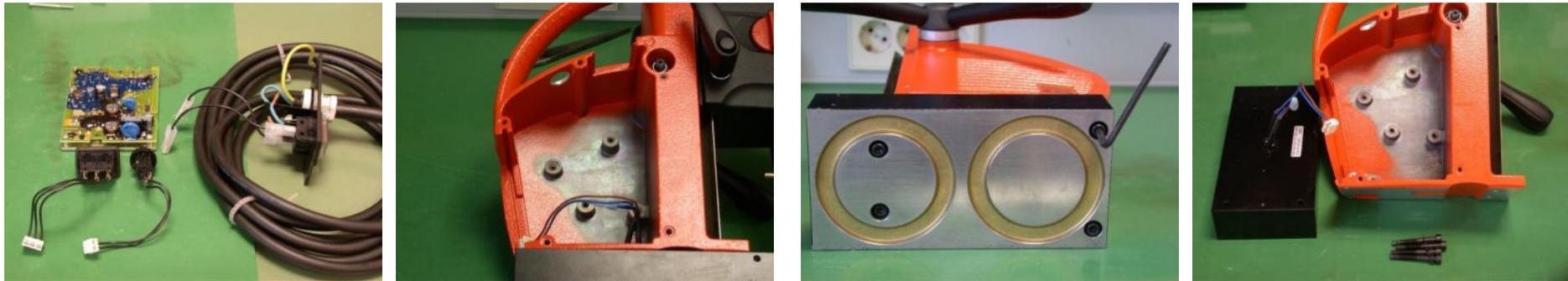


1. Remove nilos ring (135). Pull off grooved ball bearing (70) with sealing ring (80) from the armature (40) with pull-off tool.
2. Wedge off insulating sleeve (150) and ring magnet (160) with screwdriver.
3. Pull off grooved ball bearing (50) with pull-off tool.

\*(135) refers to the replacement parts list



## 4.7. Dismantling drill rig



1. Remove mains power cable with SEL - angle, disassemble motor sensor switch (1010), slow sensor (1015) and electronics (990)
2. Unscrew 4 screws (890) on the magnetic foot (880) and remove drill rig (700)
3. Remove dove-tailed guides (800), slide bars (720) and pressure plate (710) from the stand body



\*(1010) refers to the replacement parts list





## 5. Assembly

5.1. Drill rig

5.2. Motor

5.3. Gear

5.4. Electric wiring

## 5.1. Assembly - Drill rig



1. Gently attach guiding rail (720) with cylinder head screw (730). Push pressure strip (710) behind the guiding rail. Attach headless screw (760).
2. Fasten flat spring (740) with oval head screw (750).
3. Attach gear rod (780) with cylinder head screw (790) and safety disc (770) onto guide (800). Screw in bottom flat-headed screw (810). Insert motor guiding rail (800) into guiding rail (720).



**Lightly grease Dove-tailed guides in guiding rails (720) with grease 0 40 106 0100 1.  
Lightly grease gear rod (780) with grease 0 40 101 0100 4**

\*(720) refers to the replacement parts list

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## 5.1. Assembly - Drill rig



1. Press sliding bushing (702, 703) into case (700) with according mandrel.
2. Insert drive shaft (820). Apply plain washer (850), spring washer (860) (in X form) and plain washer (850). Lightly screw in hexagon nut (870). Insert grips (840). Adjust guiding rail (720) with headless screw (760) and fasten cylinder head screw (730).

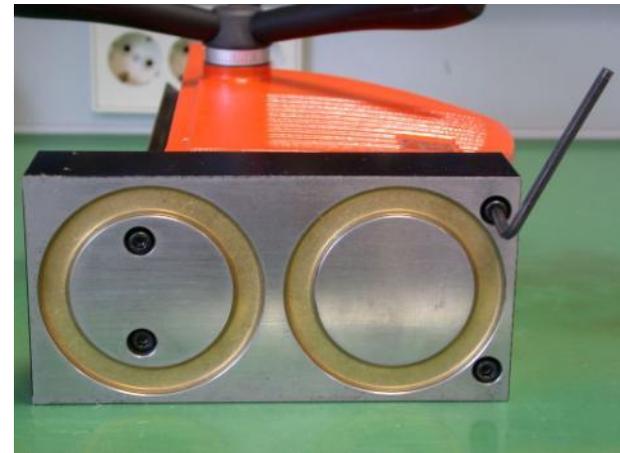
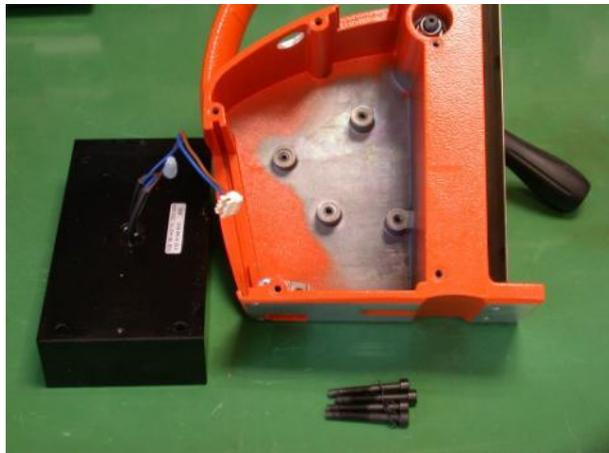


**Guide (800) should be able to move freely! Secure headless screws (760) with Loctite 222 !**

\*(702) refers to the replacement parts list



## 5.1. Assembly drill rig - magnet



1. Screw magnetic foot (880) with cylinder head screw (890) and safety disc (770) to case.

\*(880) refers to the replacement parts list



## 5.2. Assembly - motor (armature)



1. Apply closing plate (60)
2. Press on bearing (70).
3. Press on sealing ring (80) and apply nilos ring (130).
4. Press on bearing (50).
5. Press on insulating sleeve (150) and magnetic ring (160) manually.

### •Tools:

- Mandrel press
- Press-on tool (64101019008)
- Ball bearing support D = 26
- Ball bearing support D = 19

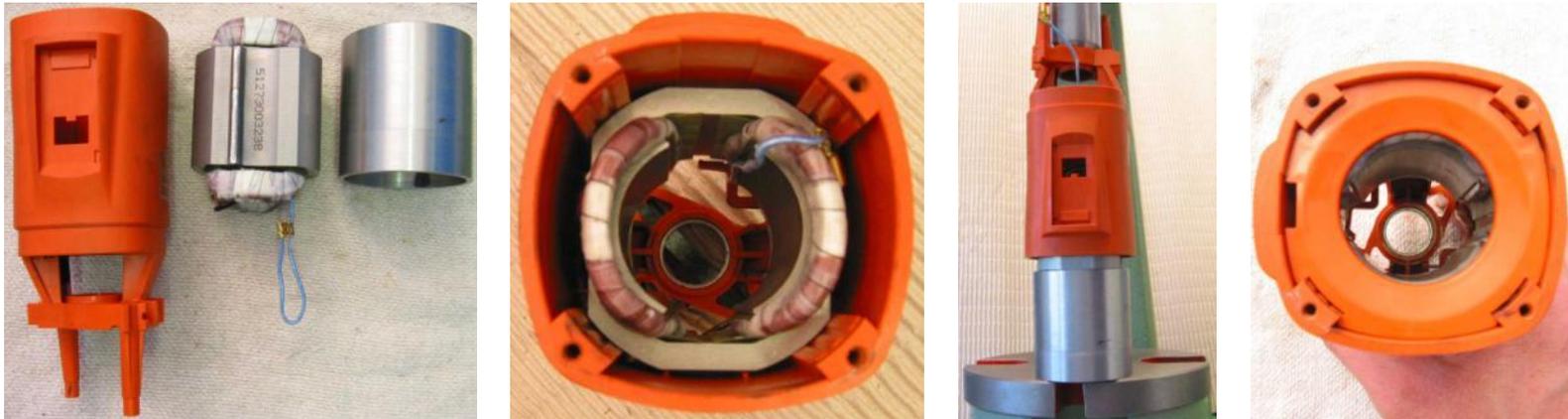
\*(60) refers to the replacement parts list



# FRT: KBM 52 U



## 5.2. Assembly - motor (field magnet)



1. Insert field magnet (20) into motor case (observe position) and press in with sleeve (A/I/H/59.5/54/65).
2. Place air pipe ring (30) in motor case (observe position).

### Tools:

- Mandrel press
- Sleeve (A/I/H/59.5/54/65)
- Cable hook

\*(60) refers to the replacement parts list





## 5.2. Assembly (assemble motor)



1. Insert pre-assembled armature (40) into pre-assembled intermediate bearing (90).
2. Insert cover cap (120) into the motor case (10).
3. Insert pre-assembled intermediate bearing (90) into pre-assembled motor case (10).
4. Screw together (140) intermediate bearing (90) with motor case (10).



**Diagonally tighten screws and seal screw heads with Loctite 574**

### Tools:

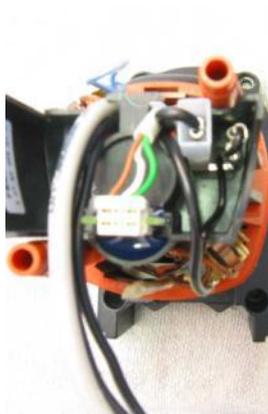
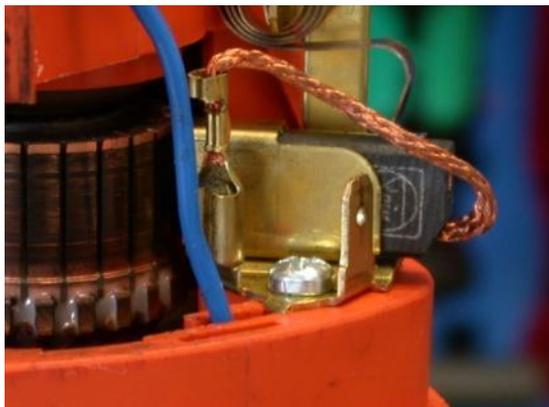
- Plastic hammer
- Loctite 574
- PH2 cross-slotted screwdriver

\*(40) refers to the replacement parts list





## 5.2. Assembly - motor (connect cable)



1. Attach brush holder (180) with screws (190) and motor case (10) with 1.2 Nm.
2. Mount electronic speed sensor (170) onto motor case (10).  
Connect connection cable of the field magnet (20).
3. Connect all cables according to the circuit diagram and lead through to the strain relief at the labyrinth of the electronic speed sensor (170).
4. Attach case cover with screws.

### Tools:

- PH2 cross-slotted screwdriver

\*(180) refers to the replacement parts list



## 5.3. Gear - drill shaft



1. Press bearing (250) onto drill shaft (280) and fix with circlip (255)
2. Insert drill shaft into outside bearing (230) and carefully press in as far as it will go
3. Assemble circlip (270)
4. Press in lower radial shaft sealing ring (260) as far as it will go (**open** side to the drill shaft tip)
5. Press in lower radial shaft sealing ring (260) until under the puncture ( **closed** side to the outside) and fix with circlip (270)

### Tools:

- Circlip pliers outside, inside
- Mandrel press

\*(250) refers to the replacement parts list

### 5.3. Gear - gear wheels



1. Insert feather key (290) into shaft, assemble gear wheel (300) and fix with circlip (310)
2. Assemble switch lever (390) for 1. and 2. gear
3. Insert both transmissions and control switch (function)
4. Fill gear with grease (120 g - 04011803009)

Tools:

- Circlip pliers outside, straight and cranked

\*(290) refers to the replacement parts list



### 5.3. Assembling gear and motor

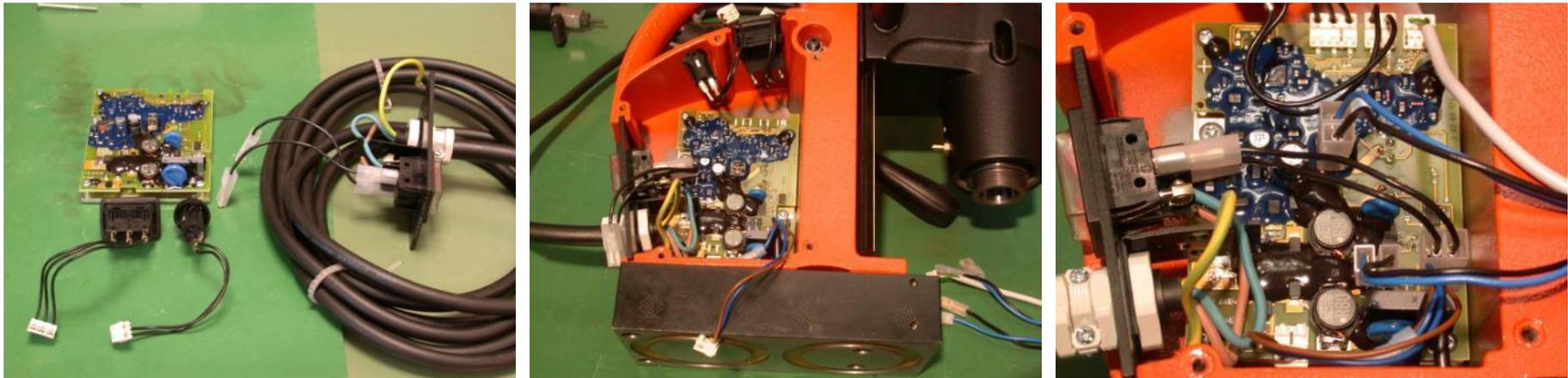


1. Insert outer bearing incl. gear into drill jigs and assemble cylinder head screw
2. Place motor with intermediate bearing on outer bearing and attach with 4 screws

Tools:

- slotted screwdriver
- Hexagon socket  
Size 4

## 5.4. Electric wiring



- 
1. Insert SEL angle with mains power cable and switch, circuit board, motor sensor switch and slow sensor into drill rig
2. Connect cable as seen in the picture, observe colour connection, otherwise the machine will run in the wrong direction (left - right movement switched )



## 6. Tools

- 6.1. General tools
- 6.2. Special tools
- 6.3. Lubricants, adhesives and sealants



## 6.1. All mechanical tools

• Mandrel press up to 3t		Retail
• Vice (soft clamping jaws)		Retail
• Plastic hammer		Retail
• Ball peen hammer 200g		Retail
• Screwdriver PH 2		Retail
• Slotted screwdriver		Retail
• Circlip pliers (inside/straight)		Retail
• Circlip pliers (outside/cranked, straight)		Retail
• Flat pliers		Retail
• Gas pipe pliers/ water pump pliers		Retail
• Fork spanner SW: 12, 14, 22		Retail
• Socket spanner SW: 7		Retail
• Bearing remover Kukko (21-00, 21-02)		Retail
• Nut SW 13 + Extension + ratchet		Retail
• Sleeve A/I/H	40/24/60	Retail
• Sleeve A/I/H	59,5/54/65	Retail
• Mandrel	D = 30 mm	Retail
• Mandrel	D = 17.5 mm	Retail
• Mandrel	D = 15.9 mm	Retail
• Mandrel	D = 21.9 mm	Retail
• Mandrel	D = 31.9 mm	Retail
• Bearing press-in ring	AD = 45 mm	Retail
• Bearing press-in ring	AD = 27 mm	Retail
• Bearing press-in ring	AD = 21 mm	Retail



## 6.2. Special tools

■ Pull-off cap	6 41 04 150 008
■ Clamping chuck	6 41 07 019 001
■ Clamping chuck	6 41 07 026 000
■ Press-on tool	6 41 01 019 008
■ Cable hook	0 72 00 310 066
■ Ball bearing support D = 19 mm	
■ Ball bearing support D = 26 mm	
■ Press-in sleeve radial shaft sealing ring	outer diameter 54.8 mm
	inner diameter 40.2 mm
	height 60 mm
	material Aluminium



## 6.3. Lubricants, adhesives and sealants

### Grease :

0 40 118 0300 9  
0 40 106 0100 1  
0 40 116 0100 0

120 g Gear  
1 g Nilos ring (130)  
Clearance between the radial shaft sealing (260)

### Sealants :

0 48 005 0033

Loctite 574

### Adhesives :

0 90 006 0050 2

Loctite 222