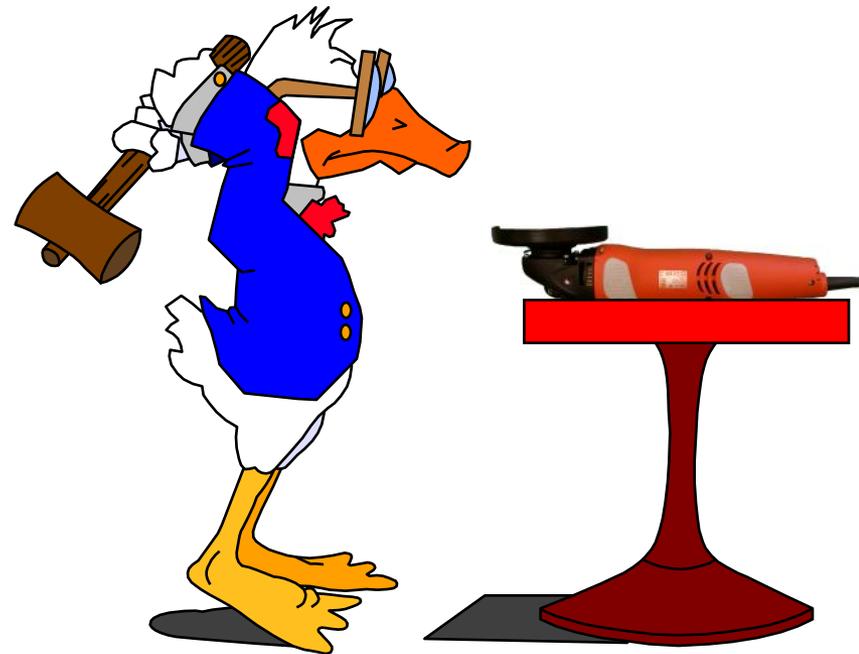




## 1. Starting page





## Contents

1. Technical data
2. Maintenance
3. Electrical function test
4. Disassembly
5. Assembly
6. Tools for maintenance work
7. Modifications, extras, information for maintenance

# FRT: EVO WSB and WSG - Variants



## 1. Technical Data:

Model		WSB	WSB	WSG	WSG	WSG	WSG	WSG	WSG	WSG
		8-115	13-125	8-115	13-125	9-125	13-125 S	13-150	9-70 E	13-70 E
Order reference	With lock	7 221 20	7 221 14	7 221 21	7 221 15	7 221 25	7 221 28	7 221 16	7 221 22	7 221 17
	Without lock	7 221 35	7 221 34							
Idle speed	rpm	10.000	10.000	10.000	10.000	7.000	7.000	7.000	2.500-7.000	2.500-7.000
Power consumption	W	800	1.200	800	1.200	800	1.200	1.200	800	1.200
Power output	W	550	750	550	750	550	750	750	550	750
Mains connection type		1~			1~					
Weight without cable	kg	1,7	2,1	1,7	2,0	1,8	2,1	2,1	1,8	2,1
Safety class		II			II					
Grinding/cutting wheel	DIN ISO 603									
Max. diameter	mm	115	125	115	125	125	125	150	125	125
Thickness	mm	1-6			1-6					
Elastic backing pad										
Max. diameter	mm	115	115/125	115	115/125	115/125	125	150	125	125
Max. circumferential speed	m/s	80			80					
Ø mounting hole	mm	22,23					22,23			
Mounting thread		Quick-action clamp					M14			





## **2. Maintenance**

- 2.1. Regulations**
- 2.2. Cleaning and care**
- 2.3. Carbon brush replacement**
- 2.4. Maintenance intervals**



## 2.1. Regulations

Electrical tools are only to be repaired, serviced and tested by specially trained electricians. Inappropriate maintenance and repair may cause serious operational hazards for the user (*BGV A3*).

Carry out all routine tests in accordance with *DIN VDE 0702*.

After repairs, observe the regulations according to *DIN VDE 0701 Part 1*.

**Only use original FEIN replacement parts!**

At initial operation, observe the relevant accident prevention regulations of the trade and professional associations.

For information on intended use in Germany, refer to the product safety act (Geräte- und Produktsicherheitsgesetz, GPSG).

**When outside of Germany, refer to the locally valid product safety act!**



## 2.2 Cleaning and care

### Injury hazards!



- ... through unintentionally switching on the unit.



- Pull plugs before cleaning work.

### Once a week, more often when used frequently:

- Check cables (290) for signs of damage.
- Clean the cooling vents
- From outside, blow out the interior of the electrical tool through the vent outlets using dry compressed air



### **2.3. Carbon brush replacement:**

**The machine is equipped with carbon brushes with automatic switch-off.**

**When checking the carbon brushes, make sure that they are put back in the same position and can be moved easily in the carbon brush holder.**

**If the carbon brushes are run down to a length of 7 mm, they must be replaced by new carbon brushes.**

**Only use original FEIN carbon brushes, otherwise the regulations for EMC are not being observed!**

**Break in the carbon brushes for 20 minutes at the lowest possible speed without an electrical load.**



## 2.4. Maintenance work

**After approx. 300 operating hours:**

- **Disassemble machine**
- **Thoroughly clean machine**
- **Replace bearing (armature)**
- **Replace magnetic ring**
- **Clean the speed controller (do not moisten)**
- **Check the cables and strands for abrasions**
- **Check for good fit of plugs and sockets**
- **Wash out gears using detergent and regrease**



**3. Electrical function test**

- 3.1. Minor functional test**
- 3.2. Major functional test**
- 3.3. Test data**
- 3.4. Testing devices and aids**
- 3.5. Wiring diagram / Connection plan**
- 3.6. Safety test / final inspection**



**3.1. Minor functional test**

**3.1.1. Minor functional test WSB 8-115 + WSB 13-125**

**3.1.2. Minor functional test WSG 8-115 + WSG 13-125 + WSG 9-125**  
**+ WSG 13-125 S + WSG 13-150**

**3.1.3. Minor functional test WSG 9-70 E + WSG 13-70 E**



## 3.1.1. Minor functional test: WSB 8-115 + WSB 13-125

### Without main power

- Check assembled cable (290) and protective tubing (270) for signs of damage
- Can the lever (480) be adjusted and does it snap in smoothly?
- Can clamping bolt (680) be tightened / loosened?
- Is flange (670) free of damage?
- Are the cooling and ventilation slots free of obstructions?
- Is the fan wheel at the armature (750) free of damage?

### With main power

- Plug in mains plug
- Start motor using switchpad (95) and lock it
- The motor must not start while the lever (810) is open
- Motor must brake when turned off using switchpad (95)



## 3.1.2. Minor functional test: WSG 8-115, WSG 13-125, WSG 9-125, WSG 13-125 S, WSG 13-150

### Without main power

- Check assembled cable (290) and protective tubing (270) for signs of damage
- Is the grinding wheel flange (900) free of damage?
- Can the grinding wheel flange (910) be screwed on and off?
- Are the cooling and ventilation slots free of obstructions?
- Is the fan wheel at the armature (750) free of damage?

### With main power

- Plug in mains plug
- Start motor using switchpad (95) and lock it
- **Must must not brake when turned off using switchpad (95)**



## 3.1.3. Minor functional test: WSG 9-70 E + WSG 13-70 E

### Without main power

- Check assembled cable (290) and protective tubing (270) for signs of damage
- Is the grinding wheel flange (900) free of damage?
- Can the grinding wheel flange (910) be screwed on and off?
- Are the cooling and ventilation slots free of obstructions?
- Is the fan wheel at the armature (750) free of damage?

### With main power

- Plug in mains plug
- Switch on motor using switchpad (95) and lock it
- Change the speed using the pushbutton (570)
- **Must must not brake when turned off using switchpad (95)**



## **3.2. Major functional test**

### **3.2.1 Functional test / troubleshooting**

### **3.2.2. Motor**

### **3.2.3. Switching module**

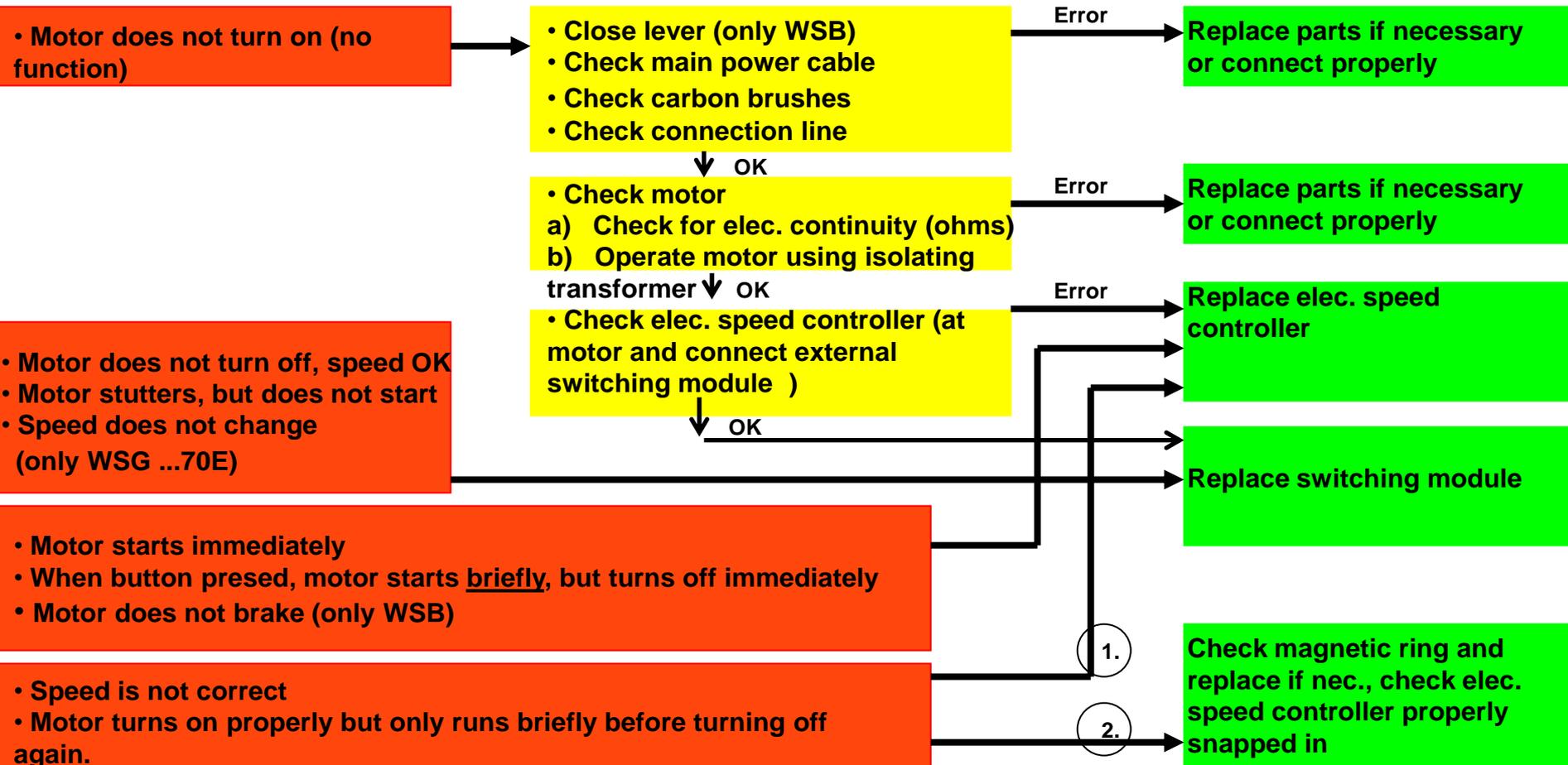
### **3.2.4. Check speed controller 1**

### **3.2.5. Check speed controller 2**

### **3.2.6. Connection lines**



## 3.2.1. Functional test / troubleshooting





**3.2.2. Motor**

**Check motor:**

**a) Electrical continuity test**

**Unplug motor lines BU and BN, measure electrical continuity.**

	<b>WSG</b>	<b>WSB</b>
<b>800 W</b>	4,9 Ω	4,6 Ω
<b>1200 W</b>	3,1 Ω	3,1 Ω

**b) Motor operation using isolating transformer**

**Unplug all motor lines, connect BK-BK (only WSB), apply voltage  
Attach BU and BN**

<b>Rated voltage</b>	<b>100 – 120 V AC</b>	<b>220 – 240 V AC</b>
<b>Testing voltage Isolating transformer</b>	<b>max 65 V AC</b>	<b>max. 130 V AC</b>

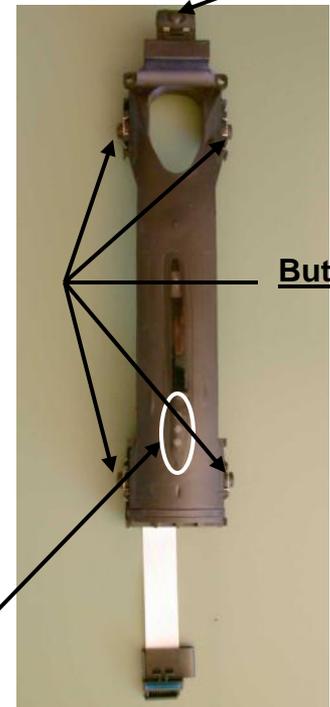


## 3.2.3. Switching module

### Switching module

- Switching module from WSG ..70 E with variable speed  
Contains all functions for testing the various speed controllers (80).
  - Long (LS5V) 3 07 01 255 99 0
  - Short (KS5V) 3 07 01 258 99 0
- Note that the speed indicator LEDs are also controlled by all of the speed controllers (80), so that you can check the the functionality when inserting the speed controller (80) into the mains.
- For the WSB models, you also have to press the “lever button”.

Lever button or speed button



Button

LED speed indicator



## 3.2.4. Check speed controller 1

### Withlight bulb (100W) and external switching module

1. Unplug all motor lines.
2. Disconnect the speed controller (80) from the field magnet (15).
3. Unplug the ribbon cable and attach the test switching module (KS5V or LS5V).
4. Attach lamp to connector (br and bl).
5. Press two diagonal buttons for motor operation (and lever button for WSB)

>If light bulb flashes briefly, electronics are OK<

## 3.2.5. Check speed controller 2



1.



2.



3.

1. Move motor case down to button height (see diagram).
2. Image: Test equipment (“shortened” motor case, switching module and open machine)
3. Check speed controller with motor and external switching module
  1. Disconnect speed controller (80) from field magnet (15).
  2. Unplug ribbon cable.
  3. Plug in test switching module (KS5V or LS5V).
  4. Press one button for motor operating (and lever button for WSB).

>If motor begins to “stutter”, electronics are OK<



**When motor casing is moved down, electrically live parts are largely covered and the carbon brush holders are safely fastened!**



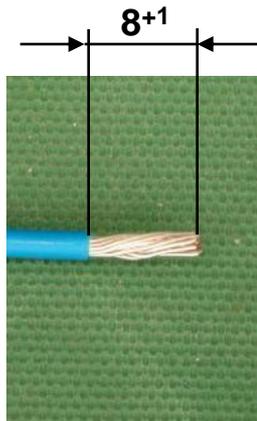
## 3.2.6. Connection lines

**Cable strands:**

**Do not solder!**

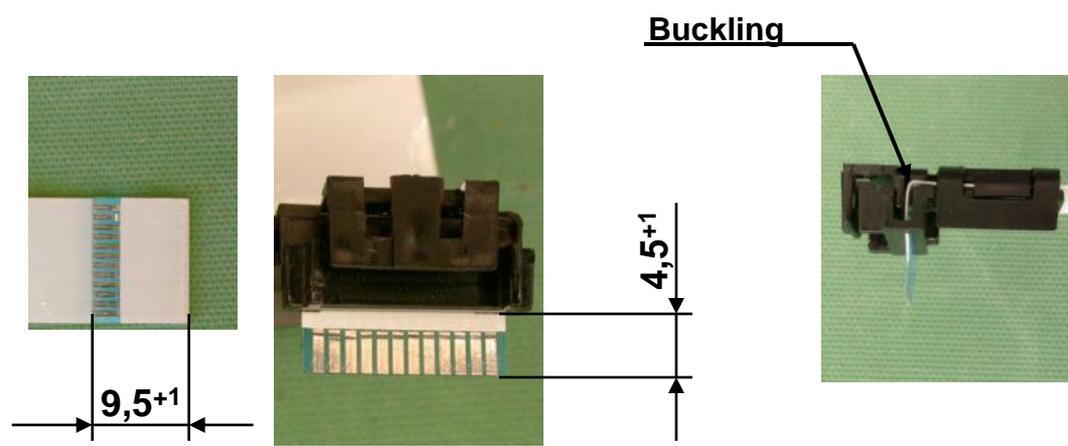
**And do not use ferrules!**

**Removing insulation:  
8+1 mm**



**Ribbon cable:**

**Check that the ribbon cable does not slip through the plug holder while fastening it to the speed controller (80). Also make sure that the plug connector fits properly and that the cable is not buckled.**



# FRT: EVO WSB and WSG - Variants



## 3.3. Test data: EVO >> 230 V version

Model		WSB	WSB	WSG						
		8-115	13-125	8-115	13-125	9-125	13-125 S	13-150	9-70 E	13-70 E
Order reference		7 221 20	7 221 14	7 221 21	7 221 15	7 221 25	7 221 28	7 221 16	7 221 22	7 221 17
		7 221 35	7 221 34							
Mark of conformity		CE								
Dimensioning voltage	V	230	230	230	230	230	230	230	230	230
Frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Dimensioning current	A	3,60	5,50	3,60	5,50	3,60	5,50	5,50	3,60	5,50
No-load current	A	1,71-2,09	1,89-2,73	1,71-2,09	1,89-2,73	1,71-2,09	1,89-2,73	1,89-2,73	1,71-2,09	1,89-2,73
No-load current / start	A	1,90	2,30	1,90	2,30	1,90	2,30	2,30	1,90	2,30
Dimensioning output	W	800	1.200	800	1.200	800	1.200	1.200	800	1.200
Power output	W	550	750	550	750	550	750	750	550	750
Max. idle speed	rpm	7.650-9.350	8.550-9.350	7.650-9.350	8.550-9.350	6.940-7.260	5.940-7.260	5.940-7.260	5.490-6.710	5.490-6.710
Idle speed Step 1	rpm	-	-	-	-	-	-	-	2.300-3.200	2.300-3.200
Max. speed at full load	rpm	6.300-7.700	7.650-9.350	6.300-7.700	7.650-9.350	4.860-5.940	4.860-5.940	4.860-5.940	5.490-6.710	4.900-5.900
Mains connection type		1~	1~	1~	1~	1~	1~	1~	1~	1~
Safety class		II								
Weight without cable	Kg	1,7	2,1	1,7	2,0	1,8	2,1	2,1	1,8	2,1





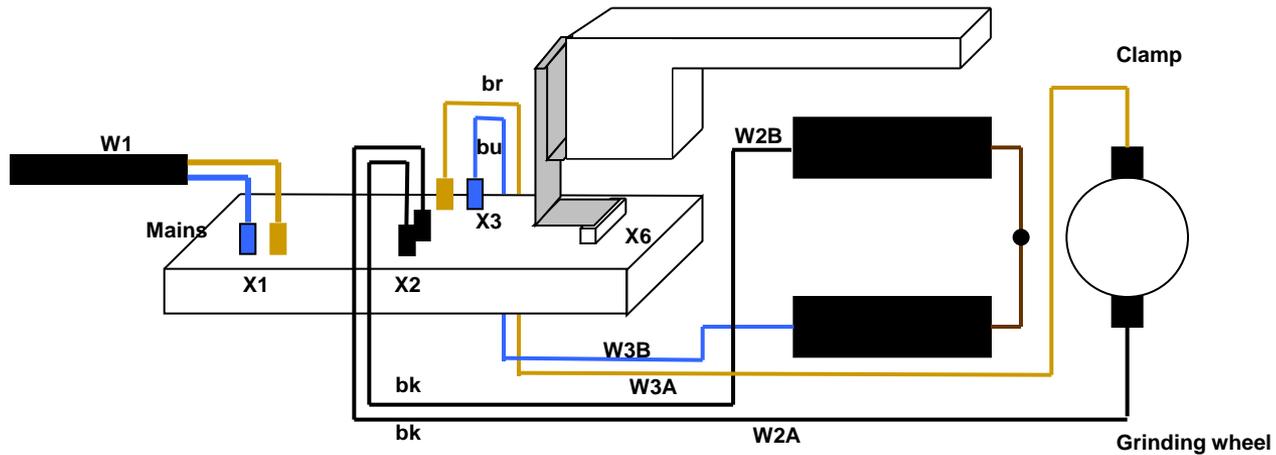
### **3.5. Wiring diagram / Connection plan**

**3.5.1. Wiring diagram / Connection plan, WSB...**

**3.5.2. Wiring diagram / Connection plan, WSB...**



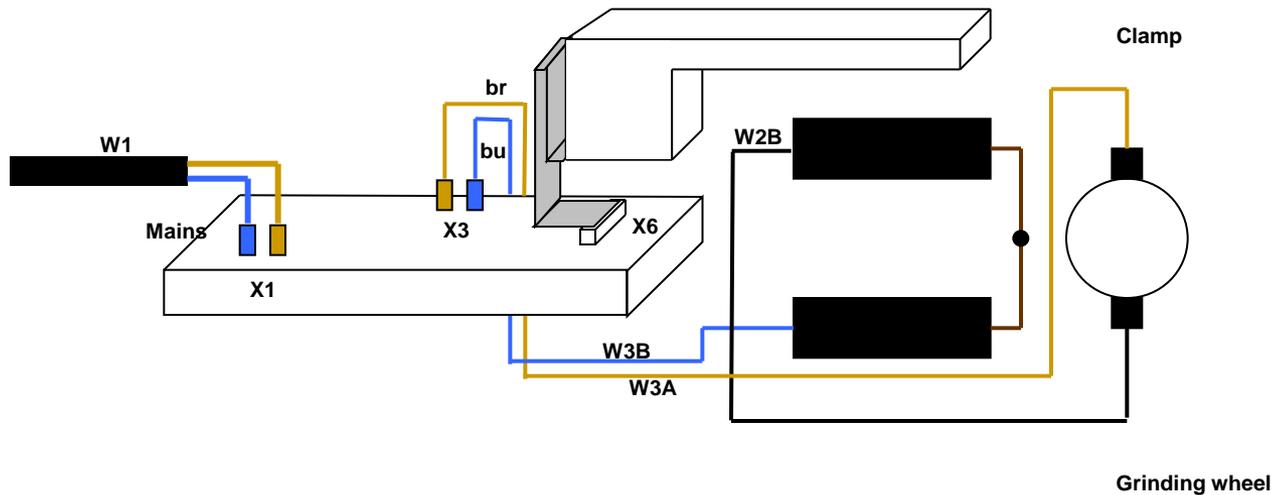
## 3.5.1. Wiring diagram / Connection plan, WSB...



# FRT: EVO WSB and WSG - Variants



## 3.5.2. Wiring diagram / Connection plan, WSB...





**3.6. Safety test / final inspection**

**3.6.1 Safety test WSB 8-115 + WSG 8-115**

**3.6.2. Safety test WSB 13-125 + WSG 13-125**

**3.6.3. Safety test WSG 9-125 + WSG 9-70 E**

**3.6.4. Safety test WSG 13-125 S + WSG 13-150 + WSG 13-70 E**



## 3.6.1. Safety test / (immediately after approx. 15 min. run-in)

### WSB 8-115

### WSG 8-115

#### Safety test:

..as performed at FEIN

	Test steps	Test type
1.	Visual inspection	<ol style="list-style-type: none"> <li>If necessary, detach mounted tool</li> <li>Cable</li> <li>Housing</li> <li>Mechanical actuation elements</li> <li>Check type identification label</li> </ol>
2.	Insulation resistance measurement	<ol style="list-style-type: none"> <li>Activate</li> <li>Connect L1 and N to plug</li> <li>Switchpad: does not have to be pressed &gt; through-connection exists already. Measuring points: Gear head and screws (400+320) against L1/N Testing time: 3 sec Testing voltage: 500 VDC Insulation resistance: min. 2.0 M Ohm</li> </ol>
3.	High voltage test	<ol style="list-style-type: none"> <li>Activate</li> <li>Connect L1 and N to plug</li> <li>Switchpad: does not have to be pressed &gt; through-connection exists already. Measuring points: Gear head and screws (400+320) against L1/N Testing time: 3 sec Testing voltage: 2500 VAC</li> <li>Trip current: 5mA &gt; overload relay must not respond</li> </ol>
4.	Speed test	<ol style="list-style-type: none"> <li>Switch on machine</li> <li>Measuring point: on drive shaft (430) Test time: min. 12 sec Speed tolerance field: min. 7,650 rpm, max. 9,350 rpm</li> </ol>
5.	No-load current test	<ol style="list-style-type: none"> <li>Switch on machine</li> <li>Test time: min. 3 sec No-load current tolerance field: min.1.71 A, max. 2.09 A</li> </ol>

**Attention!**  
**The safety test must be performed in accordance with the stipulations given by the current DIN VDE 0701 Part 1 (appendix "E" for electr. tools).**



## 3.6.2. Safety test / (immediately after approx. 15 min. run-in)

**WSB 13-125**

**WSG 13-125**

**Safety test:**

..as performed at FEIN

	Test steps	Test type
1.	Visual inspection	<ol style="list-style-type: none"> <li>If necessary, detach mounted tool</li> <li>Cable</li> <li>Housing</li> <li>Mechanical actuation elements</li> <li>Check type identification label</li> </ol>
2.	Insulation resistance measurement	<ol style="list-style-type: none"> <li>Activate</li> <li>Connect L1 and N to plug</li> <li>Switchpad: does not have to be pressed &gt; through-connection exists already. Measuring points: Gear head and screws (400+320) against L1/N Testing time: 3 sec Testing voltage: 500 VDC Insulation resistance: min. 2.0 M Ohm</li> </ol>
3.	High voltage test	<ol style="list-style-type: none"> <li>Activate</li> <li>Connect L1 and N to plug</li> <li>Switchpad: does not have to be pressed &gt; through-connection exists already. Measuring points: Gear head and screws (400+320) against L1/N Testing time: 3 sec Testing voltage: 2500 VAC</li> <li>Trip current: 5mA &gt; overload relay must not respond</li> </ol>
4.	Speed test	<ol style="list-style-type: none"> <li>Switch on machine</li> <li>Measuring point: on drive shaft (430) Test time: min. 12 sec Speed tolerance field: min. 8,550 rpm, max. 9,350 rpm</li> </ol>
5.	No-load current test	<ol style="list-style-type: none"> <li>Switch on machine</li> <li>Test time: min. 3 sec No-load current tolerance field: min.1.89 A, max. 2.73 A</li> </ol>

**Attention!**

**The safety test must be performed in accordance with the stipulations given by the current DIN VDE 0701 Part 1 (appendix "E" for electr. tools).**



## 3.6.3. Safety test / (immediately after approx. 15 min. run-in)

**WSB 9-125**

**WSG 9-70E**

**Safety test:**

..as performed  
at FEIN

	Test steps	Test type
1.	Visual inspection	<ol style="list-style-type: none"> <li>If necessary, detach mounted tool</li> <li>Cable</li> <li>Housing</li> <li>Mechanical actuation elements</li> <li>Check type identification label</li> </ol>
2.	Insulation resistance measurement	<ol style="list-style-type: none"> <li>Activate</li> <li>Connect L1 and N to plug</li> <li>Motor switch: does not have to be pressed &gt; through-connection exists already. Measuring points: Gear head and screws (400+320) against L1/N Testing time: 3 sec Testing voltage: 500 VDC Insulation resistance: min. 2.0 M Ohm</li> </ol>
3.	High voltage test	<ol style="list-style-type: none"> <li>Activate</li> <li>Connect L1 and N to plug</li> <li>Motor switch: does not have to be pressed &gt; through-connection exists already. Measuring points: Gear head and screws (400+320) against L1/N Testing time: 3 sec Testing voltage: 2500 VAC Trip circuit: 5mA &gt; overload relay must not respond</li> </ol>
4.	Speed test	<ol style="list-style-type: none"> <li>Switch on machine</li> <li>Measuring point: on drive shaft (430) Test time: min. 12 sec Speed tolerance field: min. 6,940 rpm, max. 7,260 rpm</li> </ol>
5.	No-load current test	<ol style="list-style-type: none"> <li>Switch on machine</li> <li>Test time: min. 3 sec No-load current tolerance field: min.1.71 A, max. 2.09 A</li> </ol>

### **Attention!**

**The safety test must be performed in accordance with the stipulations given by the current DIN VDE 0701 Part 1 (appendix "E" for electr. tools).**



## 3.6.4. Safety test / (immediately after approx. 15 min. run-in)

### WSG 13-125S

### WSG 13-150

### WSG 13-70E

#### Safety test:

..as performed at FEIN

	Test steps	Test type
1.	Visual inspection	<ol style="list-style-type: none"> <li>If necessary, detach mounted tool</li> <li>Cable</li> <li>Housing</li> <li>Mechanical actuation elements</li> <li>Check type identification label</li> </ol>
2.	Insulation resistance measurement	<ol style="list-style-type: none"> <li>Activate</li> <li>Connect L1 and N to plug</li> <li>Motor switch: does not have to be pressed &gt; through-connection exists already. Measuring points: Gear head and screws (400+320) against L1/N Testing time: 3 sec Testing voltage: 500 VDC Insulation resistance: min. 2.0 M Ohm</li> </ol>
3.	High voltage test	<ol style="list-style-type: none"> <li>Activate</li> <li>Connect L1 and N to plug</li> <li>Motor switch: does not have to be pressed &gt; through-connection exists already. Measuring points: Gear head and screws (400+320) against L1/N Testing time: 3 sec Testing voltage: 2500 VAC Trip circuit: 5mA &gt; overload relay must not respond</li> </ol>
4.	Speed test	<ol style="list-style-type: none"> <li>Switch on machine</li> <li>Measuring point: on drive shaft (430) Test time: min. 12 sec Speed tolerance field: min. 4,900 rpm, max. 5,900 rpm</li> </ol>
5.	No-load current test	<ol style="list-style-type: none"> <li>Switch on machine</li> <li>Test time: min. 3 sec No-load current tolerance field: min. 1.89 A, max. 2.73 A</li> </ol>

### Attention!

The safety test must be performed in accordance with the stipulations given by the current DIN VDE 0701 Part 1 (appendix "E" for electr. tools).



## 4. Disassembly / WSB 13-125

### 4.1. Preparation

#### 4.2.1. Speed control / disconnecting

#### 4.2.2. Speed control / removal

### 4.3. Carbon brushes and carbon brush holder

#### 4.4.1. Disassembling the gears

#### 4.4.2. Disassembling the gearbox case

#### 4.4.3. Disassembling the protective cover

#### 4.4.4. Disassembling the gear plate

### 4.5. Disassembling the armature

#### 4.6.1. Disassembling the field magnet unit / pressure plates

#### 4.6.2. Disassembling the field magnet unit / switching module

## 4.1. Preparation

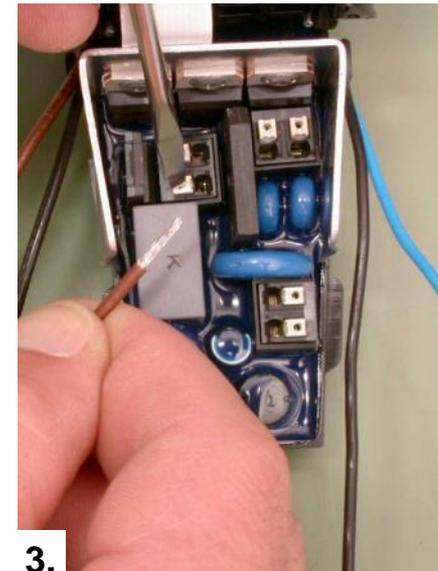


1. **Activate >>> unplug connector <<<**  
**Move lever forwards (480) and remove clamping (680). Clamped accessories.**
2. **Unscrew five Eject PT screws (320) and remove the motor case (265).**

### Tools:

- Phillips screwdriver PH2

## 4.2.1. Speed control / disconnecting



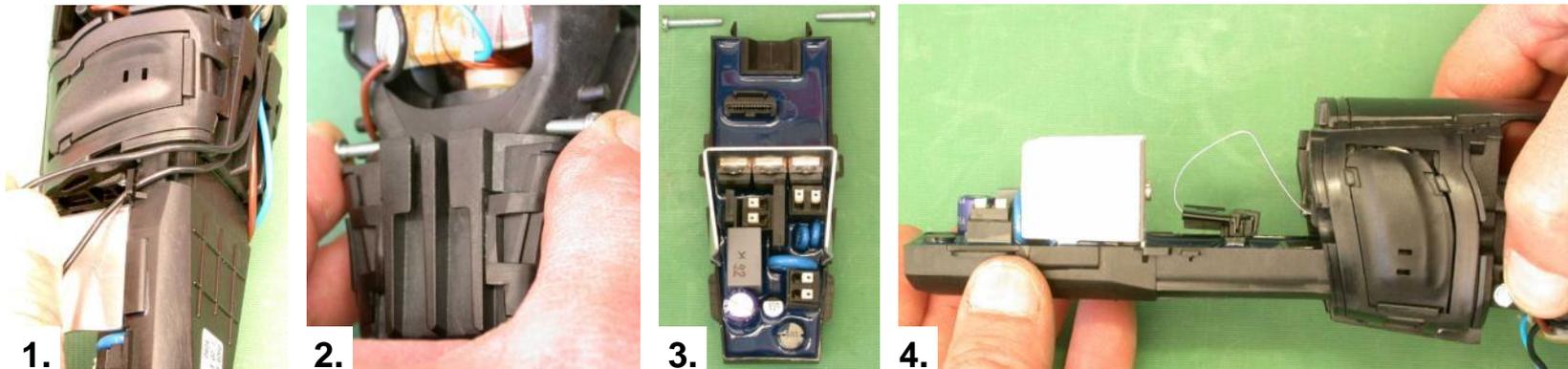
1. Press down unlocking pins and remove power cable strands (290)  
Remove clamping block from speed controller (80).
2. Unfasten Ejoyt PT screws (180) and cable clamp (160).
3. Press down remaining unlocking pins and remove cable strands (230+240) from carbon brush holder (195) and field magnet unit (10).

### Tools:

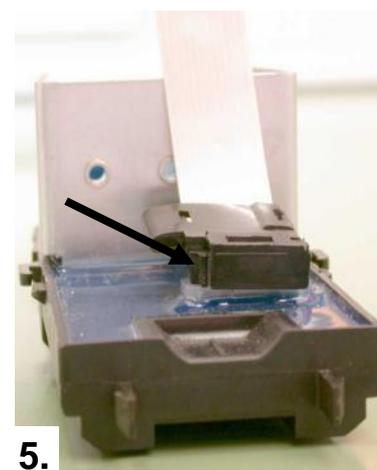
- Screw driver 2.5x75



## 4.2.2. Speed control / removal



1. Remove cable strands from strand guide of speed controller (80).
2. Insert two M3x18 bolts into the bore holes of the field magnet unit (10). Lightly press the bolts together (loosen lock) and remove speed controller.
3. Unlock ribbon cable plug from switching module (60) and unplug it.

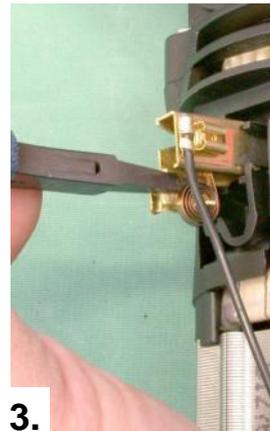
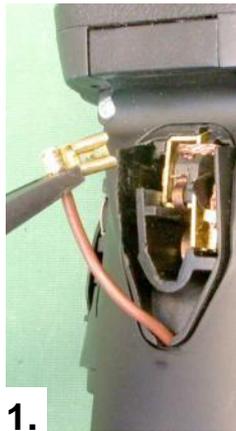


### Tools:

- Screw driver 2.5x75
- Bolts M3x18



## 4.3. Carbon brushes and carbon brush holder

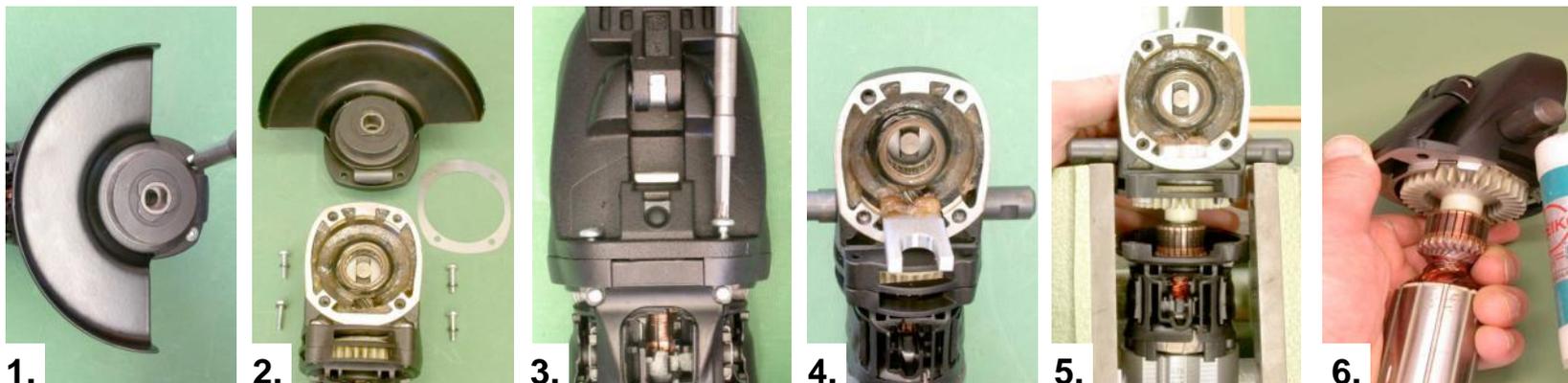


1. Unplug brown cable strand (230) from carbon brush holder (195).
2. Remove carbon brush holder (195) from field magnet unit shaft (15).
3. Completely remove carbon brush holder (195) together with black cable strand (240) from field magnet unit (15) .
4. **The carbon brush holders are not all identical!**  
**The carbon brush holders (195) must be removed before disassembling the armature (750). Otherwise you will damage the armature (750) and the carbon brushes (195).**

Tools:  
• Flat pliers



## 4.4.1. Disassembling the gears



**The carbon brush holders (195) must be completely disassembled!**

1. Remove the four oval head screws (610).
2. Remove the entire bearing plate (510) together with the protective cover (640) and compensating disc (590) from the gearbox case (405).
3. Remove the 4 Eجت PT bolts (810+820) from the field magnet unit (15).
4. Screw the two forcing bolts (special tool) into the threaded bores for handles (830). Using the armature lock (special tool), fasten the entire armature (750) into the gearbox case (405).
5. Lightly tap against the forcing bolts (special tool) to separate the field magnet unit (15) from the gearbox case (405).
6. After removing the armature disassembly aid (special tool), you can separate the gearbox case (405) by lightly tapping a forcing bolt (special tool) (750).

### Tools:

- Torx (TX 15)
- Phillips screwdriver (PH 2)
- Vice
- Plastic hammer
- Forcing bolt (special tool) 64114030000
- Armature lock (special tool) 64131005005



## 4.4.2. Disassembling the gearbox case



1. Fasten the forcing bolt (special tool) into the threaded bores for handles (830). Fasten the threaded bolts (special tool) into the vice. Drive out the bolt (500) using a split pin.  
Remove the lever (480), bolts (430) and cam ring (490).
2. Drive out the bushing (470) using a split pin.
3. See parts:
4. Remove the oval head screw (420) and the fastening spring (410).
5. Drive out the needle sleeve (460) using Kukko needle bearing remover and hammer

### Tools:

- Split pin driver  $\varnothing=5$
- Split pin driver  $\varnothing=7$
- Ball peen hammer 200g
- Phillips screwdriver PZ2
- Needle bearing remover Kukko: 21-45

## 4.4.3. Disassembling the protective cover

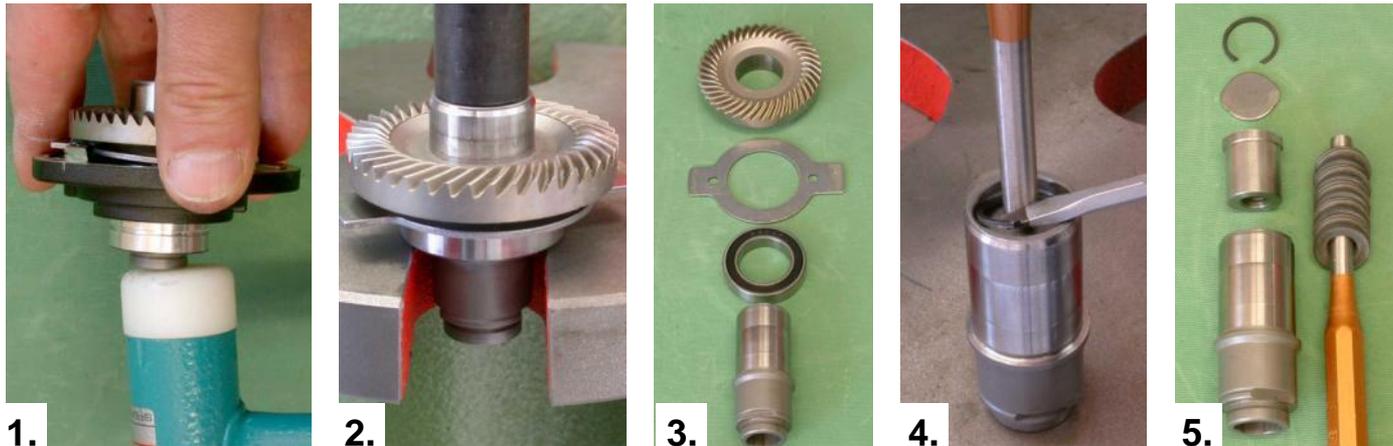


1. Using two screwdrivers, wedge off the flange (670).
2. Remove circlip (660).  
**Parts have been pre-tensioned > injury hazard!**
3. Remove spring washer (650), protective cover (640), lever (630) and compression spring (620).

### Tools:

- 2x slotted screwdrivers 9x150
- Circlip pliers, straight (opener)

## 4.4.4. Disassembling the gear plate



1. Drive out entire drive shaft (530) from the bearing plate (510) using a plastic hammer.
2. Using a mandrel press, press off the drive shaft (530) from the grooved ball bearing (520) and gear (285) (dispose grooved ball bearing (520) afterwards).
3. Image: Parts
4. Insert pressure plate (560) using a split pin and mandrel press up to limit. Wedge out snap ring (570) using a screwdriver.
5. Image: Parts

### Tools:

- Plastic hammer
- Mandrel press
- Split pin driver  $\varnothing=7$
- Slotted screwdriver 3.5x80
- Press mandrel  $\varnothing 19.9 \times 60$



## 4.5. Disassembling the armature



1.



2.



3.



4.



5.



6.

1. Image: Entire armature (750).
2. Insert drive pinion (285) into pull-out plate (special tool) and use punch and mandrel press to press it off of the armature (750).
3. Remove the grooved ball bearing (800) using the pull-off cap (special tool) and clamping chuck (special tool).
4. Image: disassembled parts
5. Press off the ring magnet (780) and grooved ball bearing (770) using split pin driver and press-out plate (special tool) against mandrel press.
6. Image: disassembled parts

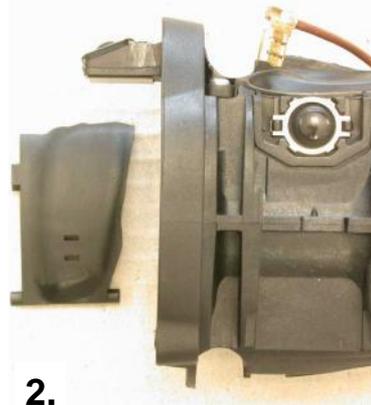
### Tools:

- Punch
- Mandrel press
- Pull-off cap  
64104150008
- Clamping chuck  
26mm  
64107026000
- Split pin driver  $\varnothing=4$
- Press-off plate  
(special tool)  
64102071008
- Pull-out plate  
(special tool)  
64102069007
- Pipe (special tool)  
64101008005

## 4.6.1. Disassembling the field magnet unit / pressure plates



1.



2.



3.



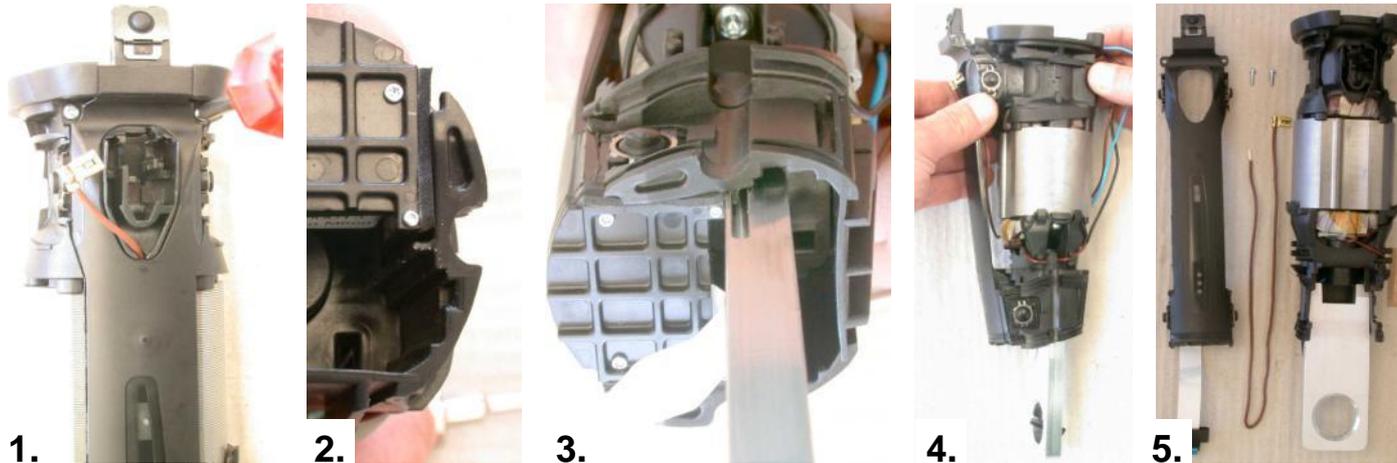
4.

1. Gently lift off the pressure plate (95) (on gear side) at the right using screwdriver and wedge it out by pressing a screwdriver to the right from the left side.
2. Remove the pressure plate (95).
3. Using a screwdriver, wedge the pressure plate (95) (mains cable side) out of the lock.
4. Wedge out the pressure plate fram (95) and pressure plate (95)

### Tools:

- 2 x slotted screwdrivers 3.5x80

## 4.6.2. Disassembling the field magnet unit / switching module



1. Remove the two screws (70) from the switching module (60).
2. Lift off the switching module (60) from the field magnet unit (15).
3. Insert the spreading tool (special tool) tightly into the field magnet unit (15).
4. Grip the switching module (60) on the gear side and lift it off of the field magnet unit (15)
5. Image: Parts

### Tools:

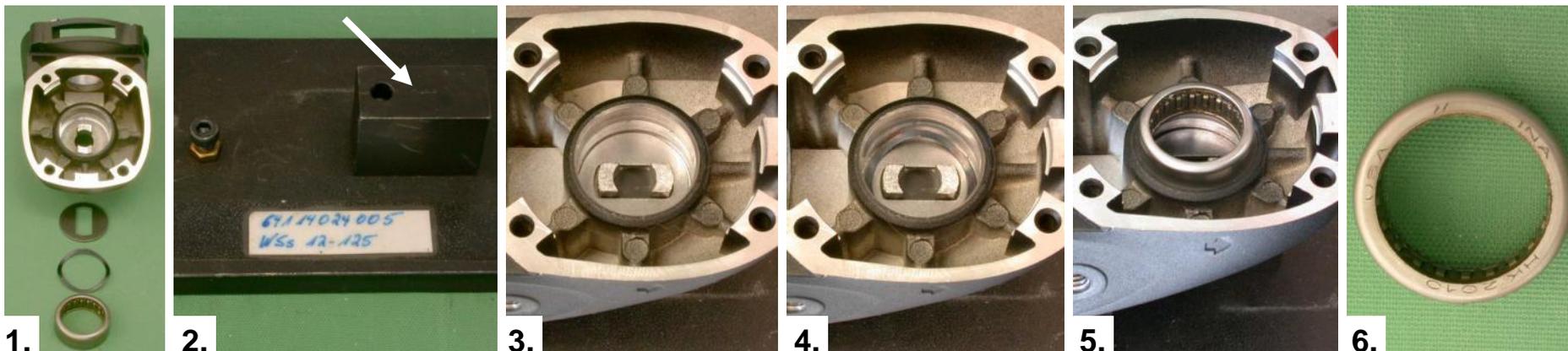
- Phillips screwdriver PH1
- Spread-out tool (special tool) 64131006009



## 5. Assembly WSB 13-125

- 5.1. **Gearbox case 1**
- 5.2. **Gearbox case 2**
- 5.3. **Gear plate**
- 5.4. **Protective plate**
- 5.5. **Armature, new**
- 5.6. **Switching module**
- 5.7. **Pressure plates**
- 5.8. **Armature**
- 5.9. **Carbon brushes**
- 5.10. **Cable strand placement 1**
- 5.11. **Cable strand placement 2**
- 5.12. **Case shells**
- 5.13. **Bearing plate**
- 5.14. **Customer-ready assembly**

## 5.1. Assembling gearbox case 1



1. Image: Parts
2. Place the gearbox case (405) backwards onto the support (arrow) of the press-in tool (special tool).
3. Insert the cam plate (440).
4. Insert ondular washer (450).
5. Insert the needle sleeve (460) with the correct position so that it is flush.  
**Warm up the gearbox case to 80-100°C.**  
**The bearing labelling should not be visible when pressed in.**
6. Image: Bearing labelling

### Tools:

- Press-in tool (special tool) 64114024005 or metal block 15x30x25
- Hot air dryer
- Mandrel press



## 5.2. Assembling the gearbox case 2



1.



2.



3.



4.



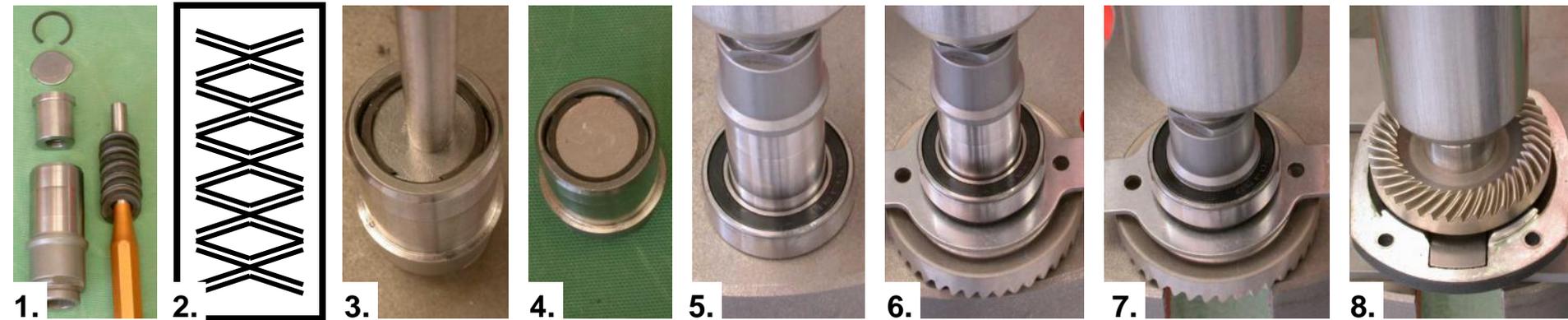
5.

1. Tighten the fastening spring (410) using the oval head screw (420).
2. Image: Parts
3. Fasten the forcing bolt (special tool) into the threaded bores for handles (830). Firmly insert the forcing bolt (special tool), tighten the vice. Drive the bushings (470) into the gearbox case (405) using a split pin so that they are flush along the sides.
4. Lightly grease the bolts (430) and the cam ring (490). Insert the bolts (430) into the gearbox case (405).
5. Insert the lever (480) using the cam ring (490) into the gearbox case (405) and drive in the bolts (500) using split pin drivers.

### Tools:

- Split pin driver Ø=5
- Split pin driver Ø=7
- Ball peen hammer 200g
- Phillips screwdriver PZ2
- Molykote DX paste for bolts and cam ring  
11200 140020
- Forcing bolt (special tool) 64114030000

## 5.3. Assembling the gear plate



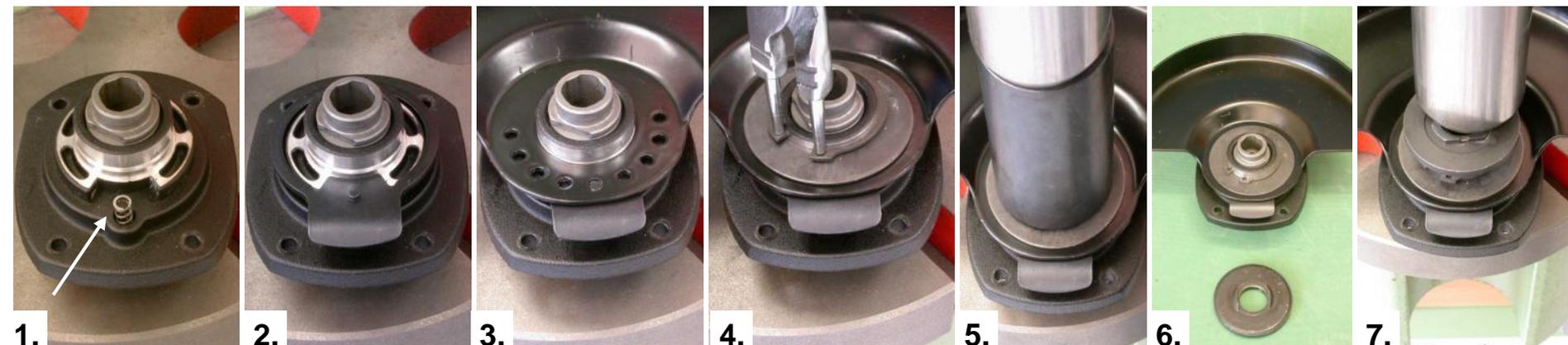
1. Image: Disassembled parts.
2. Layering of spring columns (540).
3. Insert the spring column (540), thrust piece (550) and pressure plate (560) into drive shaft (530). Using the split pin driver and mandrel press, Push the pressure plate downwards until it stops. Insert snap ring (570) > check position!
4. Image: Insertion position of snap ring (570).
5. Press drive shaft (530) onto grooved ball bearing (520).
6. Lay closing plate (580) onto gear (285). Press drive shaft (530) with grooved ball bearing (520) onto gear (285).
7. Press (530) up to stop.
8. Press grooved ball bearing (520) into bearing seat of bearing plate (510).

**Tools:**

- Mandrel press
- Split pin driver Ø=7



## 5.4. Assembly of protective plate



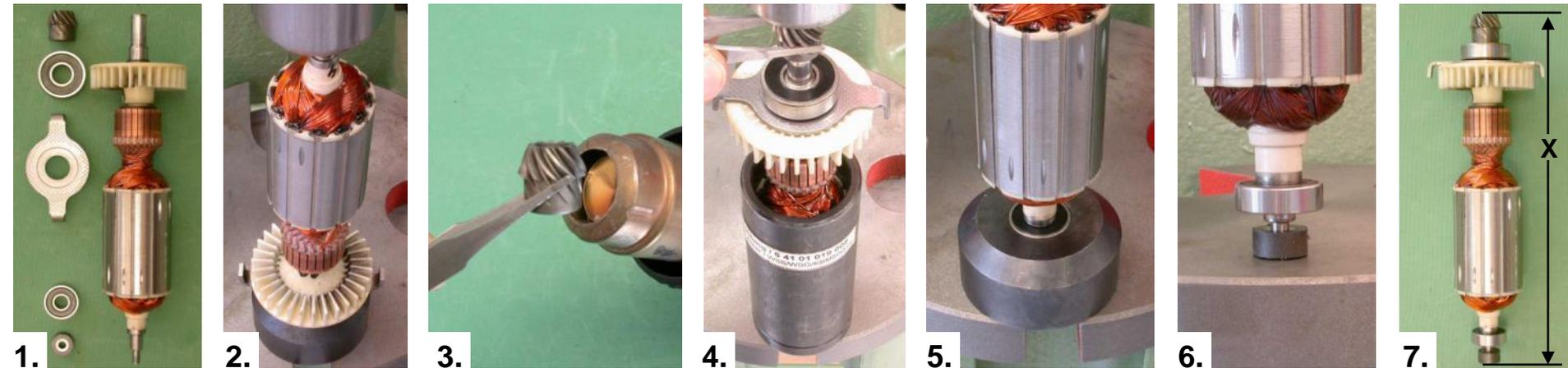
1. Insert compression spring (620) into bearing plate (510).
2. Place lever (630) onto compression spring (620).
3. Put on the protective cover (640).
4. Place the spring washer (650) on and snap the circlip (660) onto the drive shaft (530)
5. Press the circlip (660) together with the sleeve into the seat.
6. Orientate the flange (670) with the 2 corners facing the drive shaft (530).
7. Press the flange (679) onto the drive shaft (530), adjust and press again if necessary.

### Tools:

- Mandrel press
- Circlip pliers, straight (opener)
- Sleeve: A//H: 40/30,5/60



## 5.5. Assembly of new armature



1. Image: Insert the armature (750) and parts
2. closing plate(790) with the correct position and press in the grooved ball bearing
3. Warm up the drive pinion (285) to approx. 80-100°C.
4. Take up the armature (750) in the press-on tool (special tool), press the drive pinion (285) under the mandrel press.
5. Press in the grooved ball bearing (770).
6. Press in the ring magnet (780) until it is flush.
7. Installation dimension "X" of ring magnet (780):

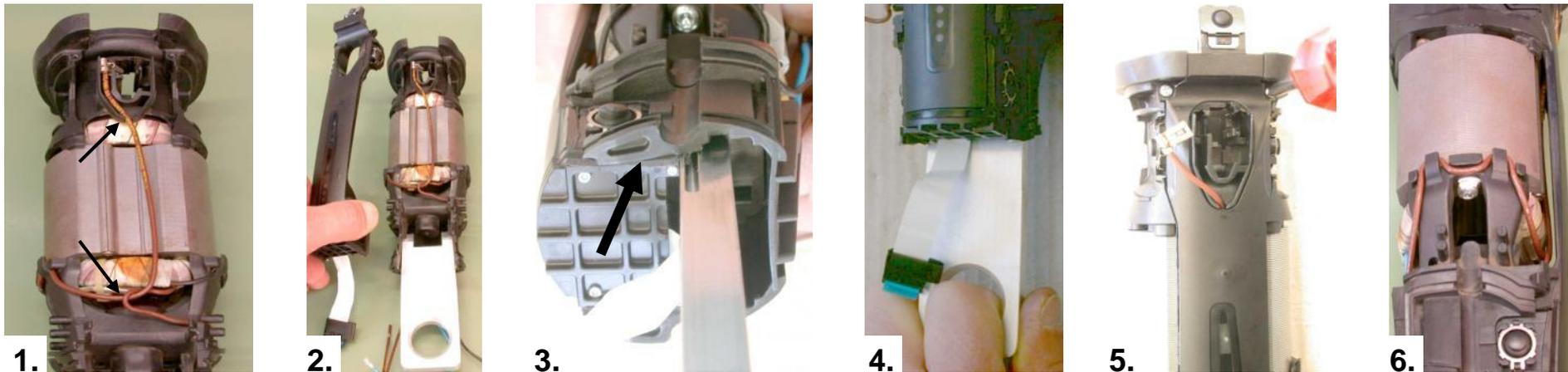
X for 800 watt = 169.3 " 0.1 mm

X for 1200 watt = 185.3 " 0.1 mm

### Tools:

- Mandrel press
- Ball bearing support Ø=26
- Ball bearing support Ø=19
- Hot air dryer
- Press-on tool (special tool) 64101019008
- Sleeve A/H: 30/5.5/60

## 5.6. Assembling the switching module

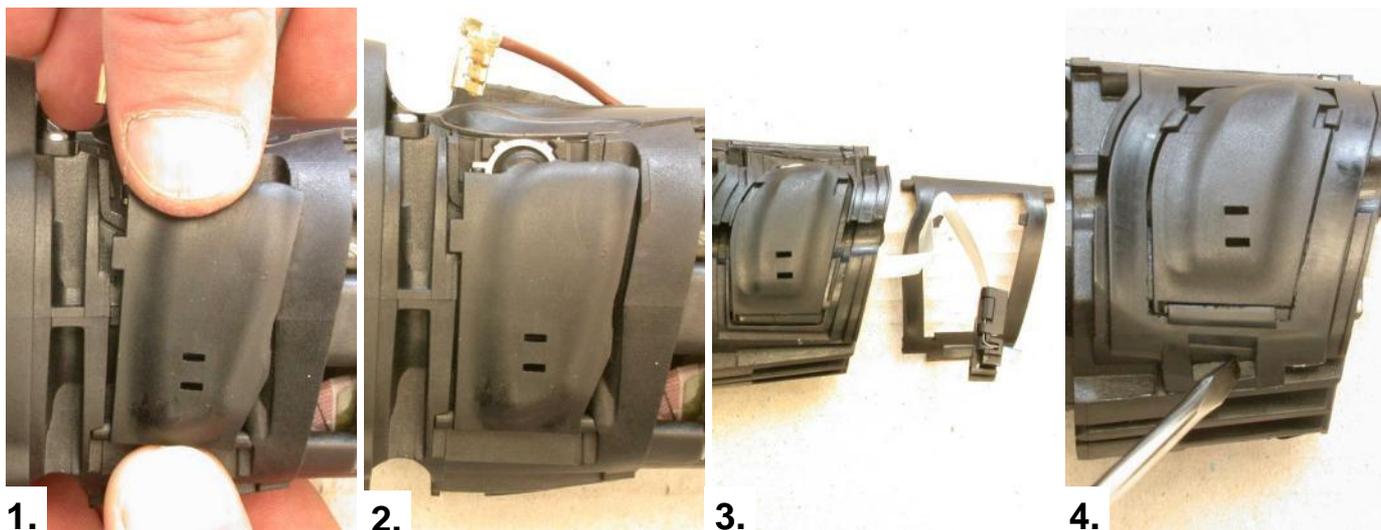


1. Pull the brown cable strand (230) through the brown strand of the field magnet unit (15) and insert it into the carbon brush slot of the field magnet unit (15).  
**! The cable strand must lie precisely in the prescribed channel (arrow) !**
2. Insert the spreading tool (special tool) tightly into the field magnet unit (15). Set the switching module (60) onto the field magnet unit (15).
3. **! The seals (55+56) must be properly seated !**
4. Pull the spreading tool (special tool) out of the field magnet unit (15).
5. Fasten bolts (70) of the switching module (60) onto the field magnet unit (15).
6. Guide the brown cable strand (230) through the strand duct of the field magnet unit (15).

### Tools:

- Spread-out tool (special tool) 64131006009
- Phillips screwdriver PH1

## 5.7. Assembling the pressure plates



1. Lay the pressure plate (95) (gear-side) diagonally into the field magnet unit (10) and press in the lock.
2. Image: Properly assembled pressure plate (95).
3. Insert the pressure plate (95) (electronic side) into the field magnet (10).
4. Hook the pressure plate frame (95) into the field magnet unit (10) and use a screwdriver to snap it into place.

### Tools:

- Slotted screwdriver  
2.5x75

## 5.8. Assembling the armature



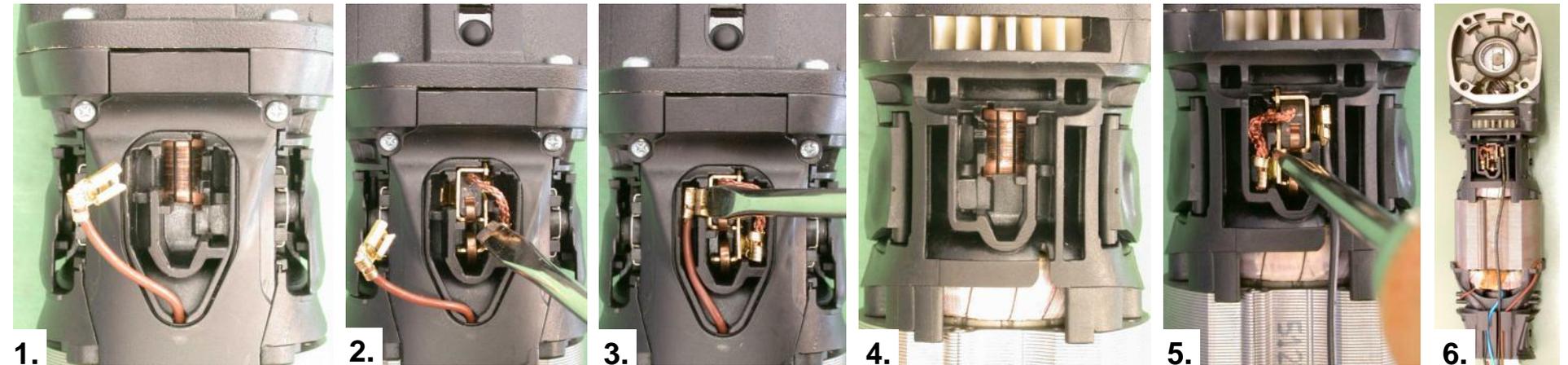
1. Image: Parts
2. Insert the completely assembled armature (750) into the completely assembled gearbox case (405). Hold the gearbox case (40) downwards and, using the plastic hammer, tap it from the bottom until the armature (750) is properly seated in the bearing.
3. Tighten the bolts (820). (20 mm in length)
4. Tighten the bolts (810). (13mm in length)

### Tools:

- Plastic hammer
- Phillips screwdriver PH2



## 5.9. Assembling the carbon brushes



1. Image: Empty carbon brush slot / on switching module side
2. Using a slotted screwdriver, press the carbon brush holder (195) into the carbon brush slot until it stops.
3. Press the flat insertion sleeve (230) (brown strands) onto the flat connecting tongues on the carbon brush holders (195) using slotted screwdrivers.
4. Image: Empty carbon brush slot / lower side of machine
5. With the black cable strand (240) attached, press the carbon brush holder (195) into the carbon brush slot until it stops using a slotted screwdriver.
6. Cable strand placement (240) carbon brush holder / bottom of machine.  
! Carbon brush holders are not symmetrical !

### Tools:

- Slotted screwdriver 5.5x100 or
- Flat pliers



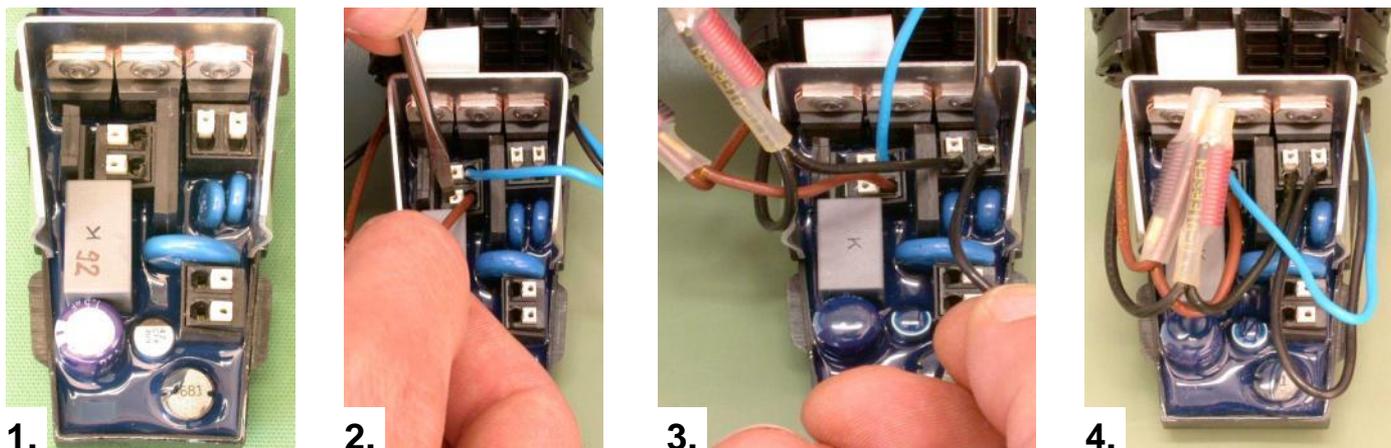
## 5.10. Cable strand placement 1



1. Insert the elec. speed controller (80) into the field magnet unit (15) and insert the ribbon cable from the switching module (60) into the speed controller (80).
2. Insert the speed controller (80) into the field magnet unit (15) until it snaps into place.
3. Insert the brown cable strand (230) as shown in the figure.
4. Insert the black cable strand (240) as shown in the figure.
5. Insert the cable strand as shown in the figure.

Tools:  
• None

## 5.11. Cable strand placement 2



1. Image: Speed controller (80).
2. Connect the blue and brown (230) cable strands as shown in the figure (see also electrical plan).
3. Connect the black cable strands as shown in the figure (see also electrical plan).
4. Insert the cable strand as shown in the figure.

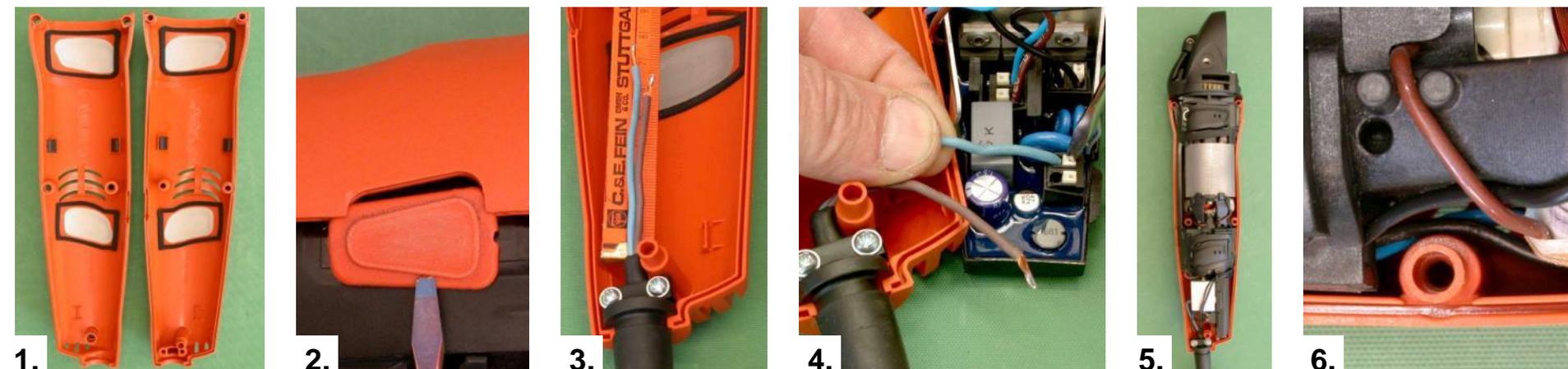
**Do not solder the cable strands + do not use ferrules!**

### Tools:

- Slotted screwdriver 2.5x75



## 5.12. Assembling the case shells



1. Image: Motor casing (265) .
2. Insert cover (250) into motor case (265).
3. Fasten mains power cable (290) and protective tubing (270) using cable clamp (160) and two bolts (180).  
Note length of cable ends (65 + 75 mm)!  
Only apply solder to the wire tips > do not solder through<!
4. Fasten the mains power cable (290) to the speed controller (80).
5. Insert the previously mounted field magnet unit (15) into the motor case (265).
6. Check that the cable strands are properly seated, avoid crushing!

**Tools:**

- Slotted screwdriver 2.5x75



## 5.13. Assembly of bearing plate



1. Set the upper motor case (265) on top.  
Do not crush any of the cable strands!  
Fasten the upper motor case (265) using 5 bolts (320) (18mm in length).
2. Fill the gearbox case with 24g (WSB) or 40g (WSG) of grease.  
Only apply a small amount of grease to the needle sleeve (460) > do not fill!
3. The gear tooth flank clearance can be corrected using compensating discs (590). Apply Loctite 573 to both sides of the compensating discs (590).
- 4.+5. Insert previously mounted bearing plates (510) and tighten using 4 oval head screws (610).

### Tools:

- Loctite 573
- Gear grease 040101  
01004
- Torx screwdriver TX 15
- Phillips screwdriver PH2



## 5.14. Customer-ready assembly



1. Check type plate and replace if necessary.
2. Image: Machine with clamping unit (680) and assembled handle (830) .
3. Image: Machine ready for customer.

**The machine can only be delivered to the customer with the protective cover (640) assembled!**

**No other tools may be mounted on the machine!**

Tools:  
• None



**6. Tools for maintenance work**

**6.1. All mechanical tools**

**6.2. Special tools**

**6.3 Lubricants**

**6.4 Adhesive, sealing and other agents**



## 6.1. All mechanical tools

-	Vice	Retail
-	Mandrel press	Retail
-	Ball peen hammer: 200g	Retail
-	Plastic hammer	Retail
-	Punch	Retail
-	Hot air dryer	Retail
-	Split pin driver: Ø: 4 mm, 5 mm, 7 mm	Retail
-	Circlip pliers: straight/opener	Retail
-	Phillips screwdriver: PH1, PH2,PZ2	Retail
-	Slotted screwdriver : 2.5x75, 3.5x80, 5.5x100, 9x150,	Retail
-	Torx screwdriver: TX 15	Retail
-	Flat pliers	Retail
-	Needle bearing remover (Kukko: 21-45)	Retail
-	Press mandrel: Ø19.9x60	Retail
-	Forcing bolt (special tool)	6 411 40 30 00 0
-	Armature pinion lock (special tool)	6 413 10 05 00 5
-	Press-out plate (special tool)	6 410 20 71 00 8
-	Spread-out tool (special tool)	6 413 10 06 00 9
-	Press-in tool (special tool) (or metal block 15x30x25)	6 411 40 24 00 5
-	Pull-out plate (special tool)	6 410 20 69 00 7
-	Pipe (special tool)	6 410 10 08 00 5
-	Press-on tool (special tool)	6 410 10 19 00 8
-	Pull-off cap	6 410 41 50 00 8
-	Clamping chuck: Ø26 mm	6 410 70 26 00 0
-	Ball bearing support: Ø: 19+26 mm	FEIN
-	Sleeve: A/I/H: 40/30,5/60	FEIN
-	Bolts (2x) M3x18	Retail



**6.2. Special tools**

- 6.2.1. Armature pinion lock**
- 6.2. 2. Spread-out tool**
- 6.2. 3. Forcing bolt**
- 6.2.4. Press-out plate**
- 6.2.5. Press-in tool**
- 6.2.6. Press-on tool**
- 6.2.7. Pipe**
- 6.2.8. Pull-out plate**
- 6.2.9. Pull-off cap / clamping chuck**



### 6.2.1. Armature pinion lock

**Special tools:**

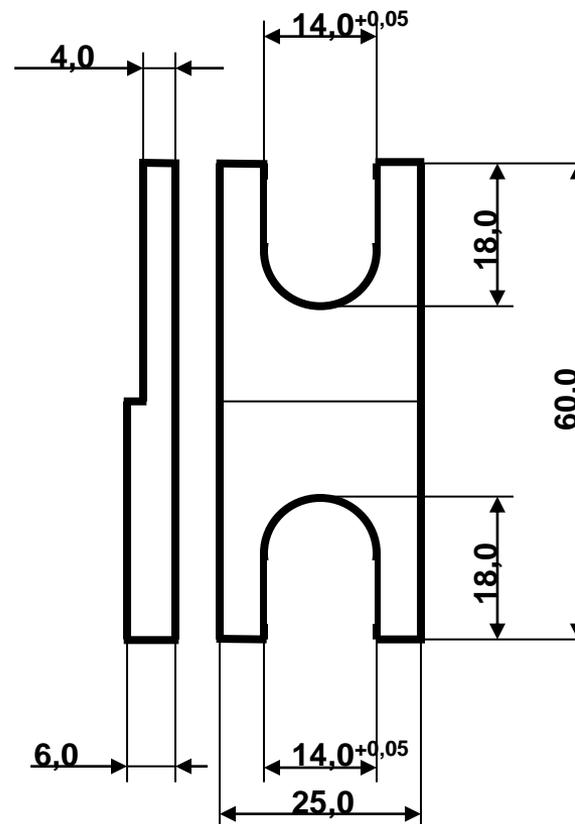
For fastening the armature (750) in the gearbox case (405)

Tolerances for dimensions with unmarked tolerances:  
" 0.2 mm

Material: Aluminium

Article code:

6 41 31 005 00 5





6.2.2. Spread-out tool

**Special tools:**

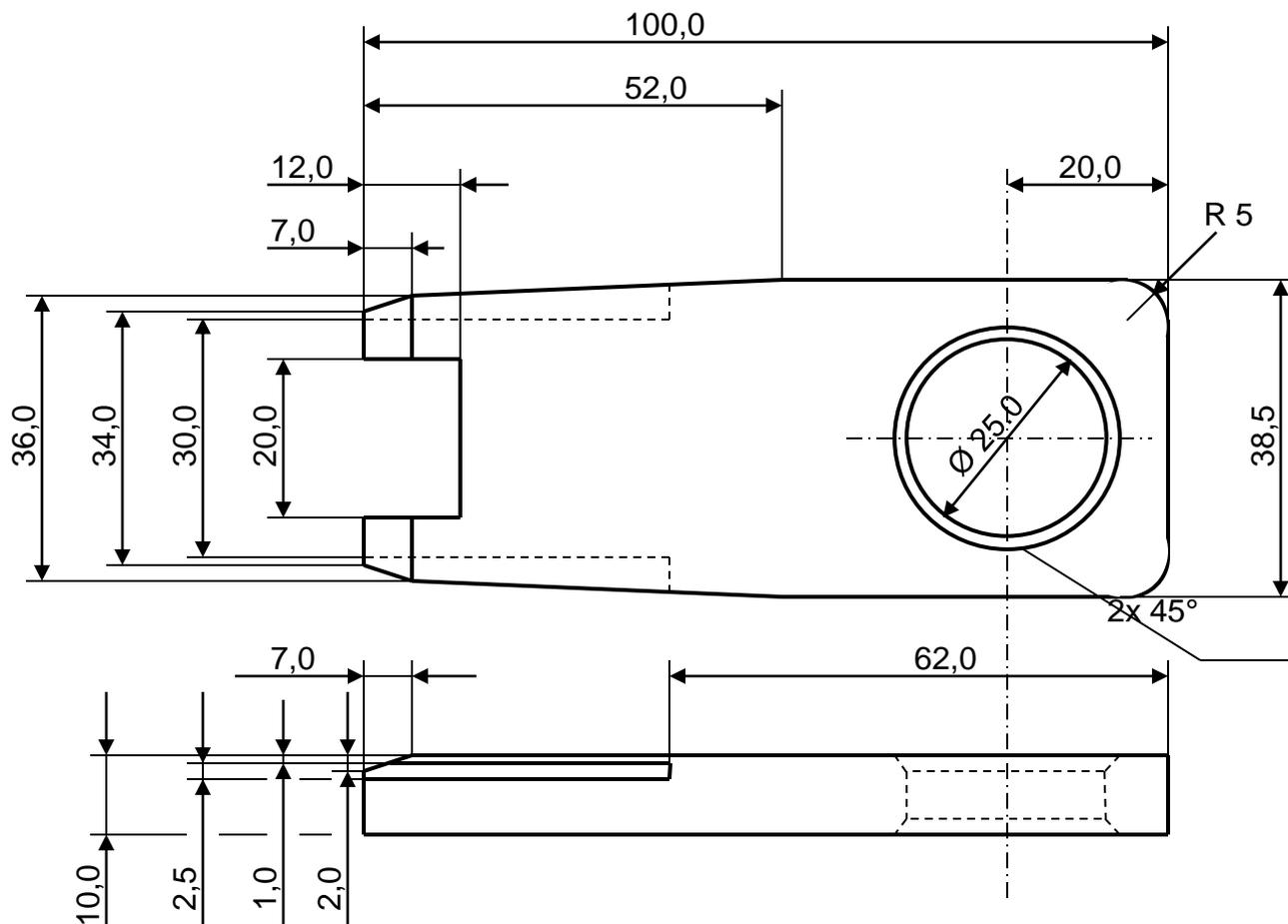
For spreading out the field magnet unit (15)

Tolerances for dimensions with unmarked tolerances: " 0.2 mm

Material: Aluminium

Article code:

6 41 31 006 00 9





**6.2.3. Forcing bolt**

**Special tools:**

Forcing bolt

for fastening to the gearbox case (405)

Quantity: 2

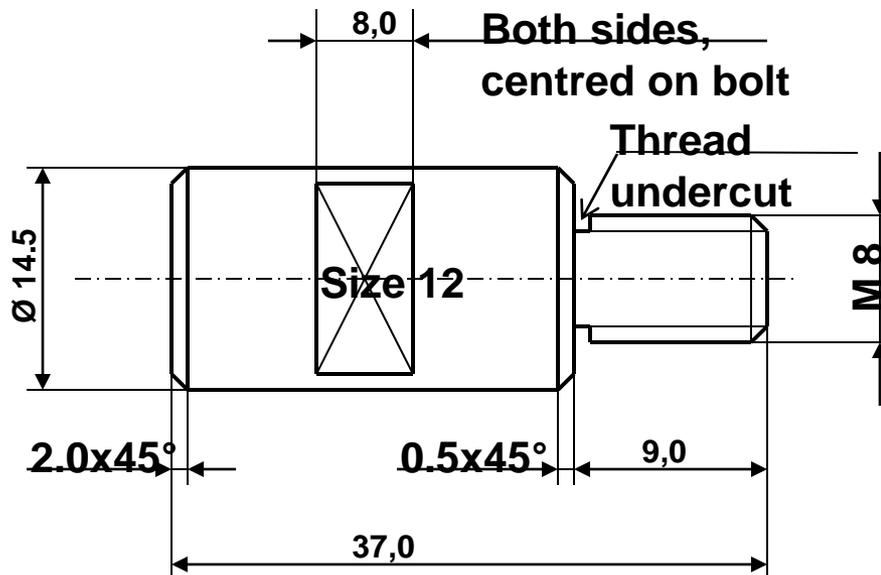
Tolerances for dimensions with unmarked tolerances: " 0.2mm

Material: St 37

Surface: gunmetal

Article code:

6 41 14 030 00 0





6.2.4. Press-out plate

Special tools:

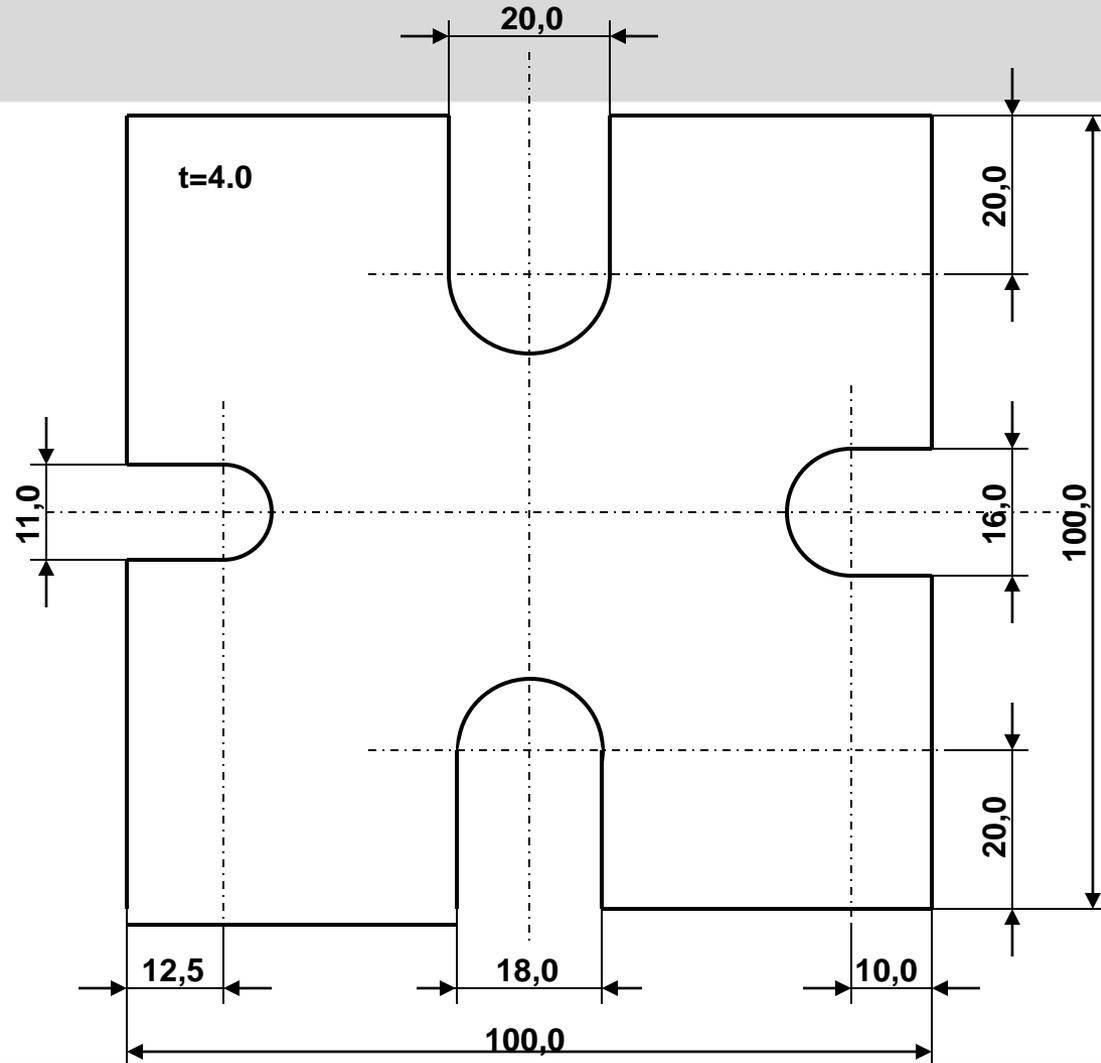
for pressing out grooved ball bearings (770) and ring magnets (780)

Tolerances for dimensions with unmarked tolerances: " 0.2mm

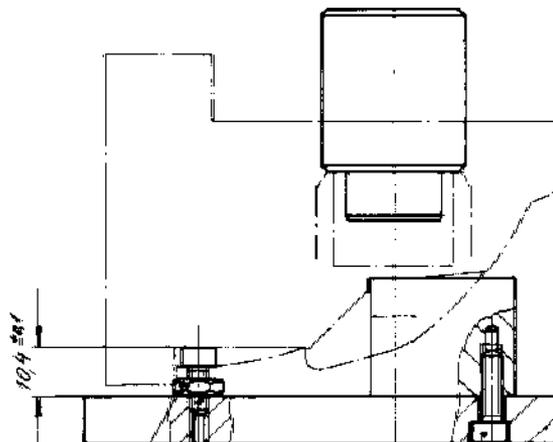
Material: Sb 4-5 / case-hardened steel, nitrided

Article code:

6 41 02 071 00 8



### 6.2.5. Press-in tool

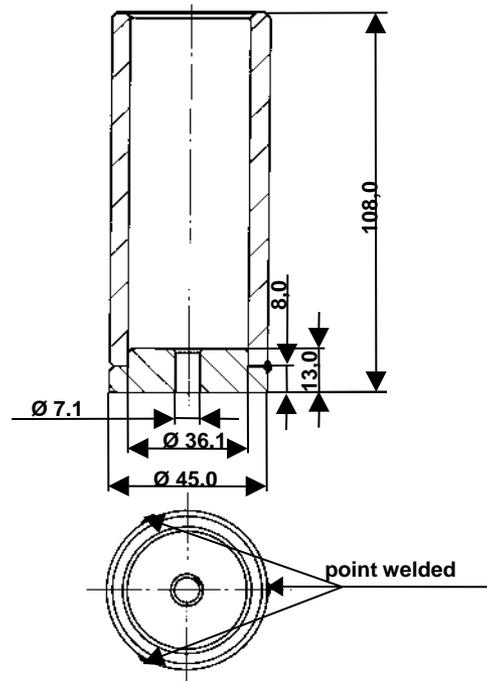


#### Press-in tool

For pressing in needle sleeves (460)

6 41 14 024 005

6.2.6. Press-on tool

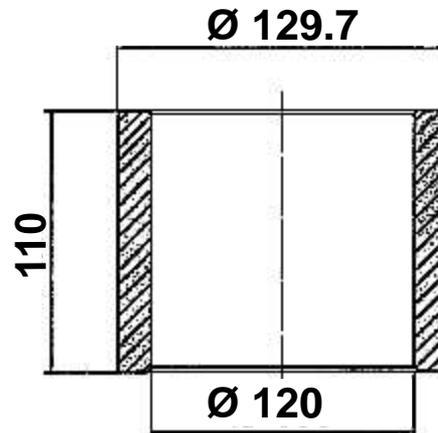


**Press-on tool**

For securely fastening armature (750)

6 41 01 019 008

6.2.7. Pipe



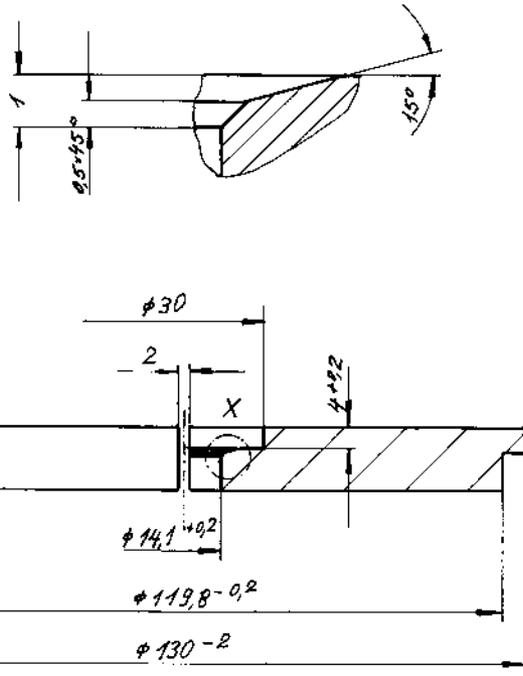
Pipe

Can be placed on pull-out plate

6 41 01 002 00 4



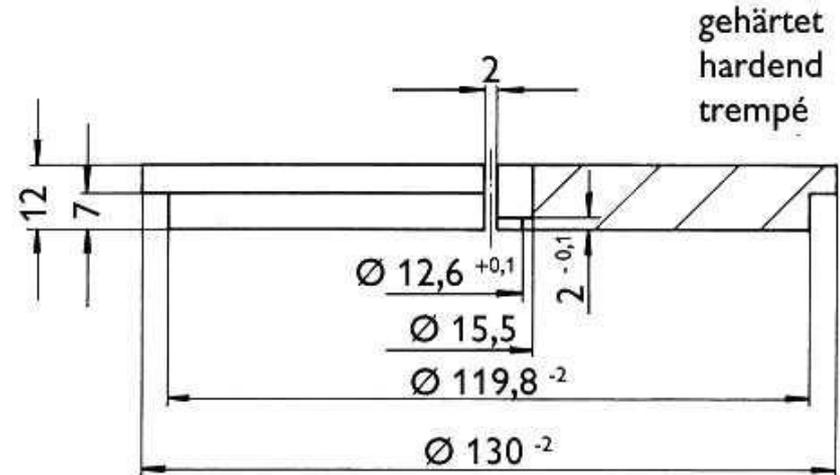
6.2.8. Pull-out plates



**Pull-out plate**

For pulling out bevel drive of armature (285)  
 (WSB 8-115, WSB 13-125, WSG 8-115, WSG 13-125 )  
 (+ WSS 12-125)  
 6 41 02 069 007

**! Not for WSB !**



**Pull-out plate**

For pulling out bevel drive of armature (285)  
 (WSG 9-125, WSG 13-150, WSG 13-125 S, WSG 9-70E, WSG 13-70E)  
 (+ WSG 12-125/150, WPO, FSs 12-27E)  
 6 41 02 067 005

## 6.2.9. Pull-off cap / clamping chuck

### **Pull-off cap**

For pulling off grooved ball bearing (800) with the help of the clamping chuck.

6 41 04 150 00 8



### **Clamping chuck**

For clamping grooved ball bearing ( 800) .

Clamping chuck 26mm (800) : 6 41 07 026 00 0





## 6.3. Lubricants

Grease type Operating designation	Appearance	Technical data	Use	Article code, of compl. package and type of package	Grease quantity and position
0 40 101 0100 4  (old Sst1)	Light brown, beige, naturally cloudy, ointment consistency	Drop point: approx. 180°C Temperature range: -30°C to +120°C	Normally loaded spur gear and roller bearing, also slide bearing with higher speed	85g tube 3 21 600 0301 4 800g tin 3 21 320 070 1 4500g tin 3 21 320 1001 5	Gears (405): 24g  <b>!!! For WSG 13-150: 40g !!!</b>
0 40 106 0100 1  (old Sst6)		Drop point: approx. 190°C Temperature range: -60°C to +130°C	Roller bearing grease Highest-speed roller bearings. Neutral against E and NE metals and resistant plastics: PA, PF, PTFE, fluorocarbon rubber	5g tube 32160005063 85g tube 32160003061 850g tin 32132007033	Needle sleeve (460 for WSB otherwise 410): 0.6 – 1g
1 40 02 011 200 Order no.			Molykote paste D	250g 14002011204	Bolt (430 only WSB) and eccentric (390) grease lightly



## 6.4. Adhesive, sealing and other agents

Order ref.	Designation	Colour	Contents	Description	Position, quantity
09000600401	Loctite 222 (old 221)	Purple	50 ml	Screw retainer/ through thread, screw-retainer low strength, For securing and sealing threaded joints, safe against vibrations, easy to disassemble, best gap 0.05 mm, max 0.12 mm, for threads < M16, fine thread < M36, -55C to +150C, hand-tight 15-30 min, final tightness 3h, storage time min 12 months	For all types of plastic joints
04800500027 04800500011	Loctite 573	green	250ml 50ml	Slow curing, easy to disassemble, very resistant against loads and vibrations. For sealing flange joints on gear and motor casings, differential casings, bearing covers, etc. Hand-tight after approx. 30 min. Final tightness after 12 to 24 hrs. Temperature resistant from -55 to +150°C Surface sealing, sealing gap max. 0.1 mm < for steel joints >	Compensating disc (590), brush thin coating onto both sides



## **7. Modifications, extras, information for maintenance and repair technicians**

- 7.1. Differences between types WSB 8-115 and WSB 13-125**
- 7.2. Differences between types WSB 8-115 and WSB 13-125**
- 7.3. Modifications, extras, information for the maintenance**
- 7.4. Modifications, extras, information for the maintenance**
- 7.5. Modifications, extras, information for the maintenance**



## 7.1. Differences between types WSB 8-115 and WSB 13-125



**WSB 8-115:**  
Motor casing (265) approx. 245 mm long



**WSB 13-125:**  
Motor casing (265) approx. 265 mm long



**WSB 8-115:**  
Field magnet of field magnet unit (15) approx. 35 mm long



**WSB 13-125:**  
Field magnet of field magnet unit (15) approx. 55 mm long



**WSB 8-115:**  
Metal sheathing for armature (750) approx. 35 mm long



**WSB 13-125:**  
Metal sheathing for armature (750) approx. 55 mm long



## 7.2. Differences between types WSB 8-115 and WSB 13-125



**WSB 8-115:**  
Switching module (60) approx. 190 mm long



**WSB 13-125:**  
Switching module (60) approx. 210 mm long



## 7.3. Modifications, extras, information for the maintenance

### Speed controller type plate:



Production date: week number/year > E.g.: 0404 = week 4, 2004

Article code

Voltage: 220V-240V

Frequency: 50 Hz/ 60 Hz

### Machine type plate:



1. Company logo
2. Material no.
3. Country of manufacture and manufacturer's address
4. Symbol / safety class II
5. Warning symbol: Read documentation!
6. European mark of conformity
7. Warning symbol: Wear eye protection!
8. Prohibitory sign Do not dispose with domestic waste!
9. Year of manufacture / month of manufacture / serial production number in month of manufacture
10. Max. grinding wheel diameter
11. Max. speed and power consumption of machine
12. Dimensioning voltage and frequencies
13. Product designation



## 7.4. Modifications, extras, information for the maintenance

### Switching module type plate:



Article code: Switching module

Switching module type:

- L = length (1200 watt)
- K =short (800 watt)
- S 5 = 5 occupied keys
- S 4 = 4 occupied keys
- V = variable speed

Production date



## 7.5. Modifications, extras, information for the maintenance

### Production start:

**02.2004: WSB 8-115, WSB 13-125, WSG 8-115, WSG 13-125**

**07.2004: WSG 9-125, WSG 13-150**

**03.2005: WSG 13-125 S**

**11.2005: WSG 13-70E**

**12.2005: WSB 8-115, WSB 13-125 dead-man model  
(without lock on switch)**

**Difference: Cover (250) between motor cases (265) is black.**