WSS 12 - 125

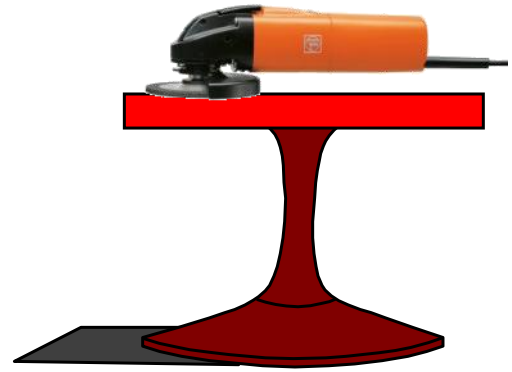

Table of Contents

1. Technical Data
2. Maintenance
3. Electrical Functional Tests
4. Disassembly of the Grinder
5. Assembly of the Grinder
6. Tools
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8. Modification, Extras, Information for Repair

1. Technical Data

Order reference		**220 88**
Type		WSS 12-125
Speed, no load	R.P.M.	10,000
Input	Watts	1200
Output	Watts	750
Type of current		1~
Protective class		2
Cable with plug	m	4
Net weight **(as delivered without cable)**	kg	1,9
Grinding wheel Ø	mm	125
Grinding wheel thickness	mm	1-6
Backing pad Ø	mm	115/125
Max. circumferential speed	m/sec	80
Mounting hole	mm	22.23

2. Maintenance

Please make sure that electric tools are repaired, serviced and tested by specialists only as repairs carried out in an inexpert 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.

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.

3. Electrical Functional Tests

3.1. Minor Functional Test

3.2. Major Functional Test, Part 1

3.3 Major Functional Test, Part 2

3.4. Connection Drawing

3.5. Safety Test

3.1. Minor Functional Test

3.1.1 Check of the self-start lock

- Connect the grinder to the mains in switched-on condition.

  The grinder should not start - otherwise, the electronics are defective.

- Switch grinder off and on again.

  Grinder should start again.

3.1.2	Check no-load speed	Min.	8,550 rpm
		Max.	10,450 rpm

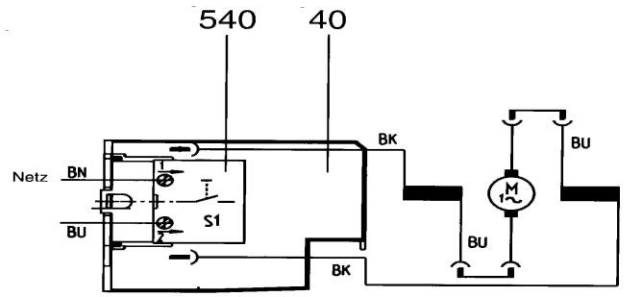
3.2. Major Functional Test, Part 1

	Malfunction	Possible Causes	Test Possibilities
3.2.1	Motor does not start	Switching sequence not maintained.	Switch motor switch off and on again.
		Broken mains cable or plug connections.	Test continuity
		Motor switch defective.	Check.
		Dust deposits in the area of the motor switch (self-start lock is activated)	Clean area.
		Carbon brushes are worn out.	Visual inspection, measurement
		Motor defective.	Check motor without electronics. - Loosen motor connections from electronics. - Operate motor using transformer with max. 75% mains voltage.
		Electronics defective.	Check electronics without motor. - Loosen motor connections from electronics - Connect approx.100 W substitute load (e.g. light bulb) to electronics (see test switch for electronics removed). With 100 W light bulb, on-load voltage must amount to110 V-130 V.

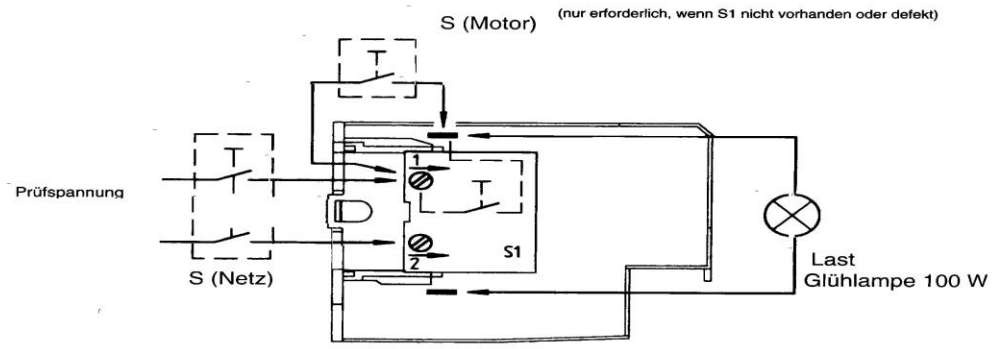
3.3. Major Functional Test, Part 2

	Malfunction	Possible Causes	Test Possibilities
3.2.2	Motor switches off “for no reason“.	Loose contact (loose contact in mains feedline leads to the initiation of the self-start lock, for example).	Test continuity.
		Electronics defective.	See above.
3.2.3	Speed varies.	Electronics defective. Additional mechanical loading (drive, bearing, vibrations, ...) collector, carbon brushes defective.	See above. Check. Visual check of brush sparking.
	Machine too weak, regular behaviour not noticeable.	Electronics defective.	Measure motor voltage. Voltage must rise when the machine is loaded.
3.2.4	Motor starts if the machine is switched on and plugged into the mains.	Electronics defective.	No further check necessary.

3.4. Connection Drawing



Prüfschaltung für ausgebaute Elektronik



- Taste S (Netz) drücken und halten.
- Taste S (Motor) drücken und halten.
- → Lampe "Last" muss leuchten
- Taste S (Netz) loslassen.
- Taste S (Netz) drücken
- → Lampe "Last" darf nicht leuchten/

3.5. Safety Test according to the latest revision of VDE 0701

Sequence of the Safety Test

1. 15 min. test run (no-load)
2. Switch test: - when lever (440) not closed, the switch (540) can not be switched on.
3. Voltage return test
4. Insulation test: Contact gear housing (430).
5. High voltage test:
   5.1. Gear housing (430)
   5.2. 2 Top cover attachment screws (500)
6. No-load current test
7. No-load rotary speed test
8. Sliding switch (480) on “Off” position
9. Check nameplate

High voltage testing:

Test voltage:	2500 Volt
Breaking current, max:	5 mA
Contact time,min:	3 Sec/ meas.pt.

Armature:

Protective insulation through shaft insulation

Insulation testing:

Ins. resistance:	Min. 2.0 MOhm
Contact time, min:	3 Sec/ meas.pt.

	Nominal Values	Min.	Max.
No-load current:	2.1 A	1.89 A	2.42 A
No-load speed:	9,500 rpm	8,550 rpm	10,450 rpm
On-load speed:	7,000 rpm	6,300 rpm	7,000 rpm
On-load current:	5.5 A		

4. Disassembly of the Grinder

4.1. Preparation

4.2. Remove Housing Cover and Cable

4.3. Electronics, Switches and Carbon Brushes

4.4. Bearing Plate, Gear and Motor Housing

4.5. Removal of Armature and Field Magnet

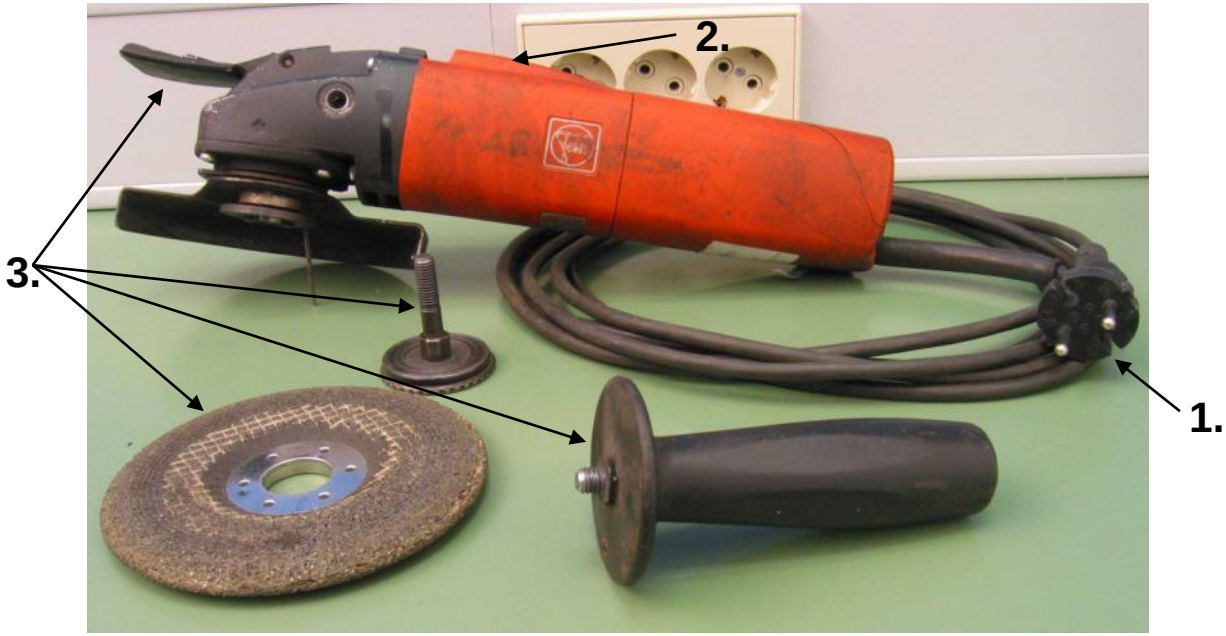
4.6. Armature

4.7. Remove Protective Guard

4.8. Bearing Plate and Drive Shaft

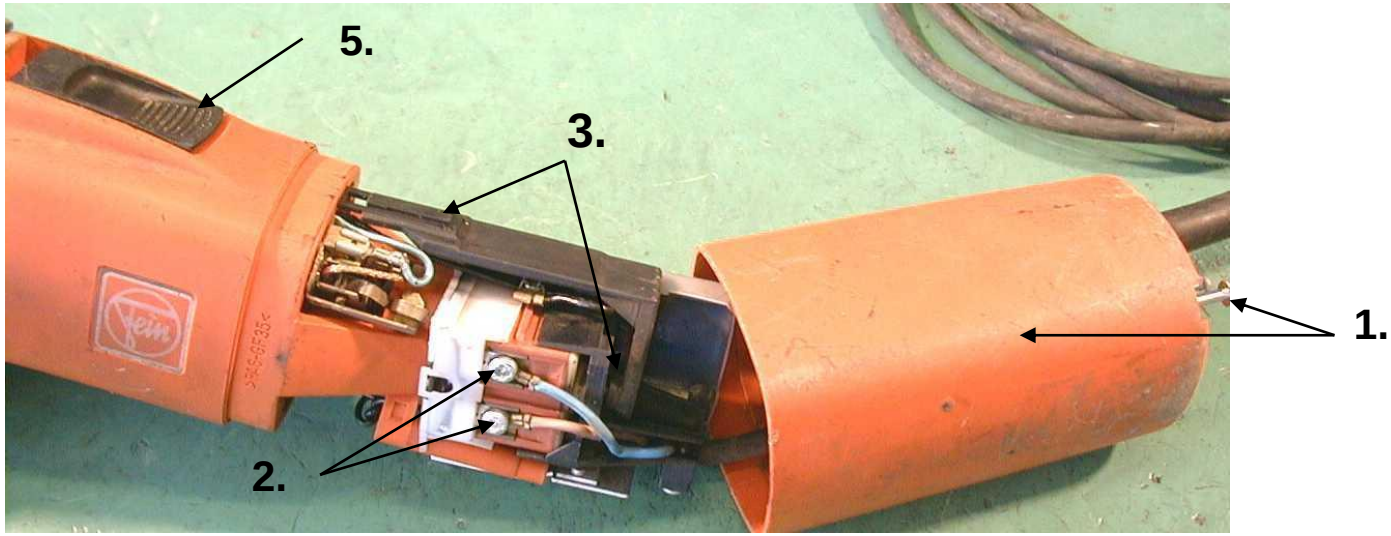
4.9. Gear Housing and Complete Pressure Bolts

4.1. Preparation



1. Disconnect >>> pull the plug <<<
2. Set switch to “OFF” position
3. Fold clamping lever (440) completely to the front and remove clamping unit (180). Take out unclamped accessory.

4.2. Remove Housing Cover and Cable

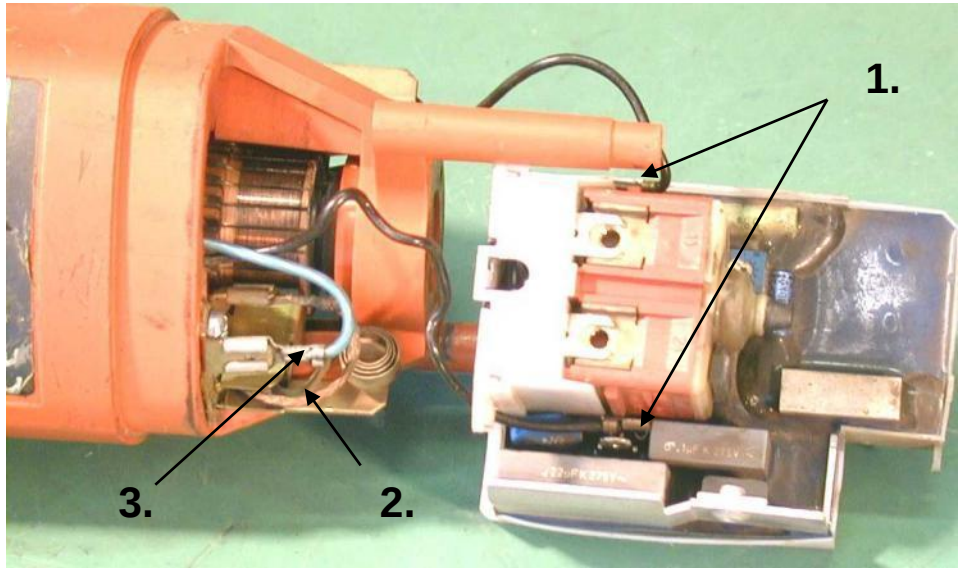


1.Loosen screws (500) and pull off housing cover (550).
2.Loosen screws (530) on circuit breaker (540) and pull off wires.
3.Lift switch rod (520) from switch (540) and unhook frominterlock (510) or switch bar.
4.Strain relief (30), complete with cable and housing cover, can be set to the side.
5.Lift out sliding switch (480).

Tools:

- PH2 cross-slotted screw-driver (to loosen screws)
- Cable hook or screwdriver (to lift out switch rod)

4.3. Electronics, Switches and Carbon Brushes

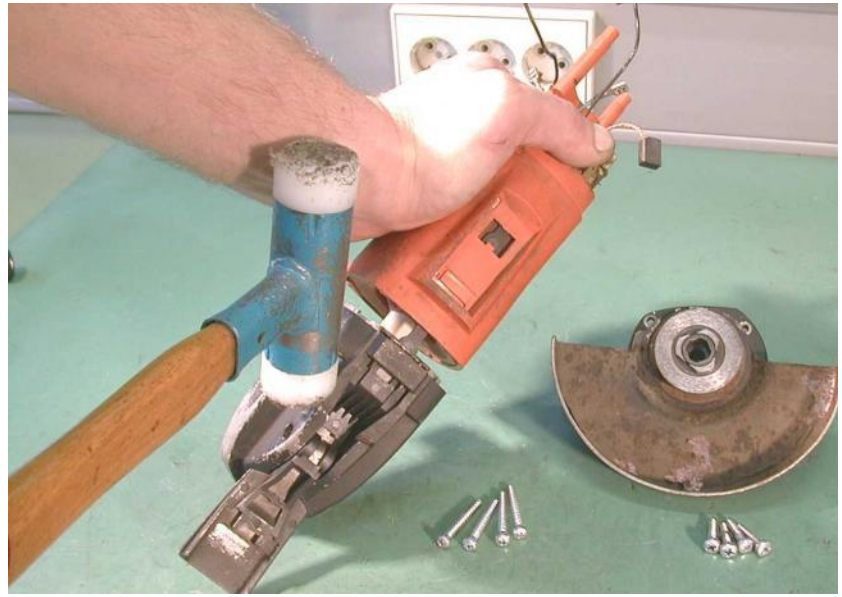


1. Pull field magnet cable from the electronics (40) and pull off electronics + pushed on circuit breaker (540).
2. Pull back pretension springs from the brush holders (80) and remove carbon brushes (70) on both sides.
3. Pull field magnet cable out of the brush holder (60).
4. Free field magnet cable. Check whether the cable has been blocked or is clamped somewhere.

Tools:

- Cable hook (For pretensioned springs)
- Flat tongs (To pull cable out)

4.4. Bearing Plate, Gear and Motor Housing

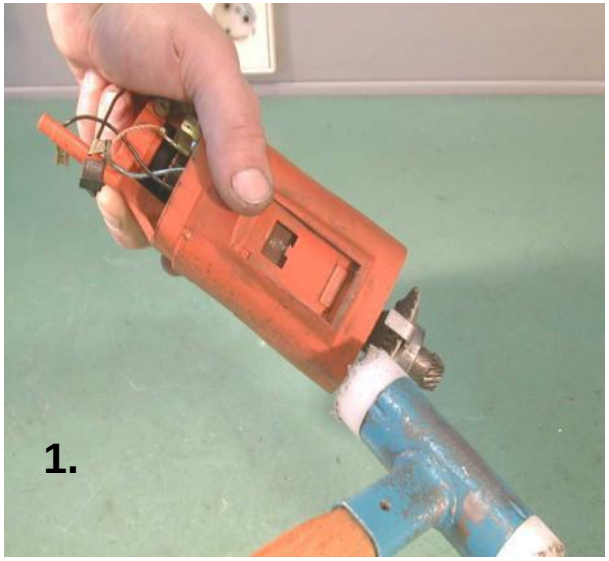


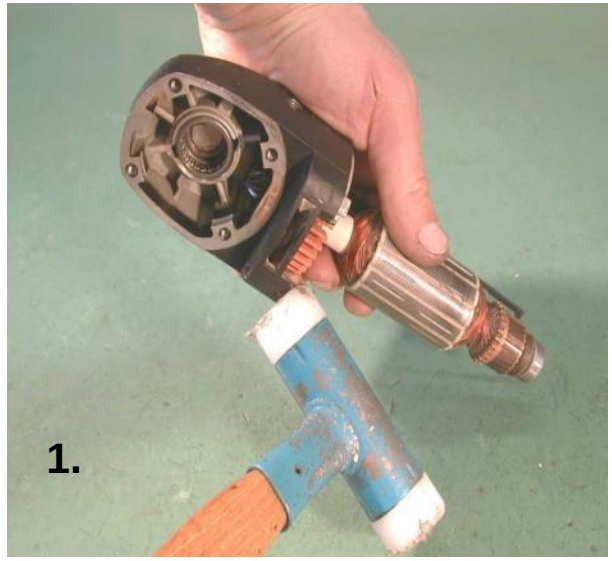
1. Screw out oval head screws (150) on the bearing plate (250).
   Turn protective guard in order to reach all screws.
2. Screw out Ejot-PT screws (140) on gear housing (430).
3. Hold the motor housing (90) with the gear side facing down and hit lightly on the gear housing with a plastic hammer.
   !!! Select rigid housing parts !!!

Tools:

- PH2 cross-slotted screwdriver
- Plastic hammer

4.5. Removal of Armature and Field Magnet



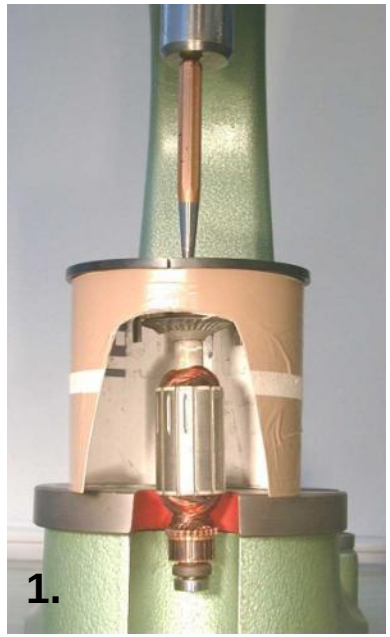


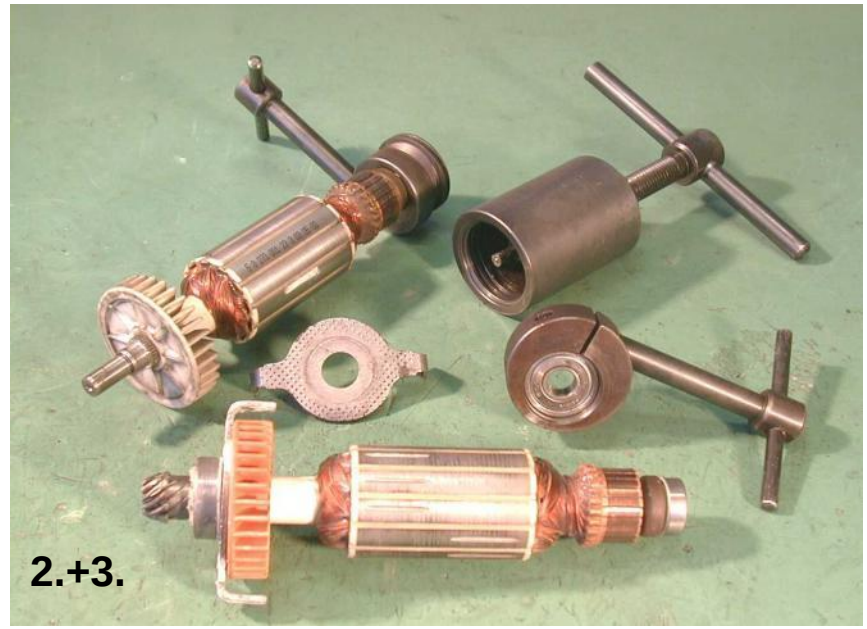
1.Loosen the gear housing (430) and the armature (100) from the bearing seat by hitting lightly against the motor housing (90), and/or against the gear housing (430).
2.Remove the air conducting ring (110).
3.The field magnet is loosened through further blows (490) .

!!! Field magnet strands should never be left dangling down !!!

Tools:
•Plastic hammer

4.6. Armature





1. Lay armature pinion (170) in draw-off plate and press down using centre punch and a spindle press.
2. Pull off both armature bearings (50,450) using the clamping body and the pull-off cone.
3. Remove closure plate (120).

Tools:

- Spindle press
- Support pipe (64101002004) D=120mm
- Pull-off plate (64102069007)
- Centre punch
- Pull-off cone (64104150008)
- Clamping body (64107019007) D=19 mm
- Clamping body (64107026000) D=26 mm

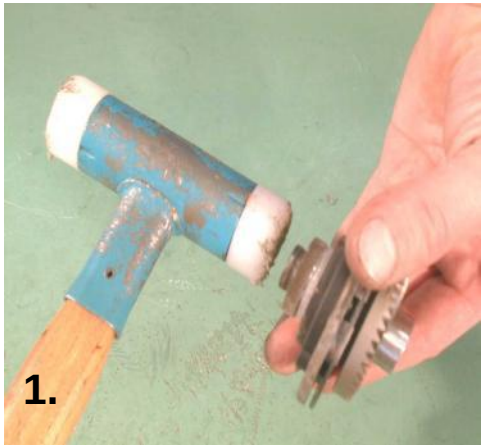
4.7. Remove Protective Guard

1. **Remove grinding wheel flange (190) using pull-off fixture.**
2. **Remove locking ring (200) with Circlip ring tongs (outer).**
3. **Remove spring washer (175) , protective guard (130) , lever (240) , and pressure spring (220).**

Tools:

- Pull-off fixture (KUKKO 43-1)
- Seeger ring tongs (outer)

4.8. Bearing Plate and drive shaft



1. **Remove shaft (300) complete with ball bearings (230), closure plate (260) and bevel gear (280) from the bearing plate (250) by hitting lightly on the front face of the shaft (grinding wheel side).**
2. **Place deep groove ball bearing (230) on bush and press out the drive shaft (300) with the help of the sleeve on the press.**
3. **Relieve locking ring (320) by pressing down on the pressure plate (310) with the help of a punch (D=6.5mm).**

!!! Attention - pretensioned spring package !!!

Remove locking ring (320) with offset Seeger ring tongs.

!!! Push wire, etc. through the spring column to prevent a loss or confusion of the springs !!

Tools:

- Plastic hammer
- Sleeve (ED40/ID24,5/H60)
- Spindle (D19.5/H60)
- Punch (D=6.5mm)
- Seeger ring tongs offset (inner)
- Wire, etc.

4.9. Gear Housing and Complete Pressure Bolts

1. Screw gear housing (430) tightly in mounting fixture and clamp in vice.
2. Drive out bolts (410) using a punch (D =4.5mm).
3. Drive out bush (400) using a punch (D =6.5mm).
4. Needle bush (420) is driven out over the pressure bolts (380) using a punch (D =4.5mm). (Or pushed out using a press)
5. After removing the spring ring (370), the brake sleeve (350) and spring washers (360) can be taken out using the Circlip ring tongs.
   !!! Attention - pretension spring package !!!

Tools:

- •Machinist‘s hammer 200g
- •Punch D=4.9mm
- •Punch D=6.9mm
- •Mounting fixture (64122020006)
- •Seeger ring tongs (inner)

5. Assembly of the Grinder

5.1. Armature

5.2. Gear Housing / Inside

5.3. Gear Housing / Outside

5.4. Install Field Magnet

5.5. Install Armature

5.6. Carbon Holder / Carbon Brushes

5.7. Electronics and Feedlines

5.8 Drive shaft

5.9. Bearing Plate

5.10. Protective Guard

5.1. Armature

1. Place armature (100) into the pressing fixture with the collector side down.Put closure plate (120) on top and press on ball bearing (450) with the help of the ball bearing piece (D=26).

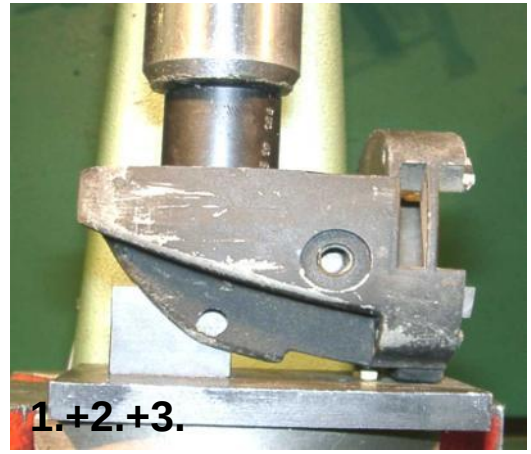
2. Heat up bevel wheel gear (170) (to approx. 100°C) and press on.

3. Press on ball bearing (50) with closed side to the collector, using the ball bearing support (D=19).

Tools:

- Pincers, etc..
- Heat source e.g.Hot air blower
- Press-on fixture: 64101019008
- Ball bearing support: D =26
- Ball bearing support: D = 19

5.2. Gear Housing / Inside



1. **Lay gear housing (430) in pressing fixture.**
2. **Insert pressure bolts (350-380) supplied in the gear head.**
   (Grease sliding surfaces lightly with Molykote paste D)
3. **Insert ball bearing compensation washer (340) and**
   press in needle bush (420) flush with flat surface of the bearing housing.

!!!Attention: Inscribed needle bearing side points towards the pressure bolts!!!

Tools:

•Press-in fixture: 64114024005

5.3. Gear Housing / Outside

1. **Place gear housing (430) in assembly fixture and plug in interlock (510) and holding spring (460).**
2. **Drive in bush (400) flush on the inside with punch (D=6.9).**
3. **Rapid clamping lever (440) with eccentric ring (390) and mount bolt (410) in "closed condition". (Grease eccentric ring lightly with Molykote Paste D)**

Tools:

- Mounting fixture: 64122020006
- Locksmith's hammer : 200g
- Punch: D = 6.9
- Punch: D = 4.9

5.4. Motor Housing/Field Magnet


1.


2.


3.

1. **Place the 4 field magnet strands in the inside and insert field magnet (490) into the motor housing (90).**

   !!! Attention: Pay attention to the position of the field magnet !!!

2. **With the help of the pipe (I/E/H=54/59,5/65), press in the field magnet until you feel the stop.**

3. **Guide strands into the fixation foreseen in the motor housing.**

Tools:

- Pipe: I/E/H = 54/59,5/65
- Cable hook

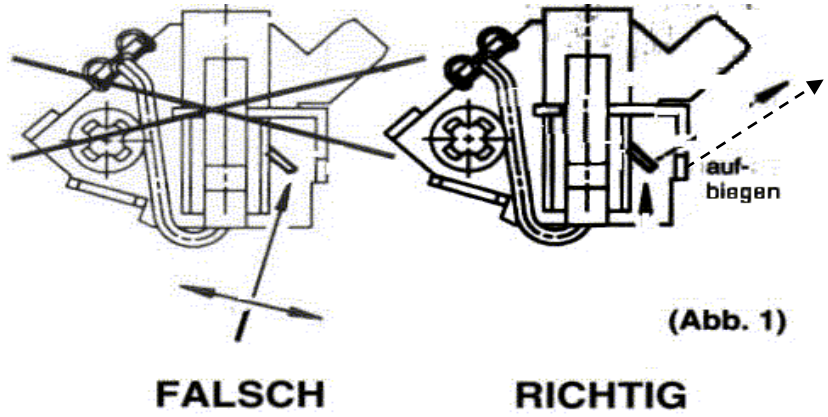
5.5. Install Armature

1. Set preassembled armature (100) into preassembled gear housing (430) by hand.
2. Lay air conducting ring (110) in the correct position in the motor housing (90). (Free slot on the switch side)
3. Insert the armature assembled in the gearbox into the motor housing and, if necessary, press the parts together with a plastic hammer with light blows on the gear housing.
4. Screw in 4 screws (140) and attach sliding switch (480).

Tools:

- PH2 cross-slotted screwdriver
- Plastic hammer

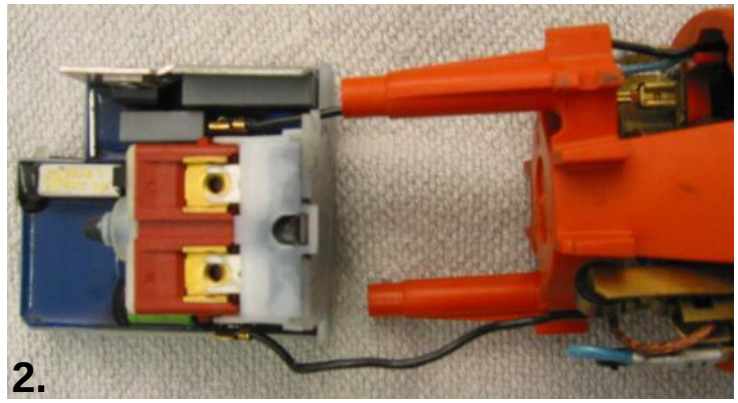
5.6. Carbon Holder and Carbon Brushes

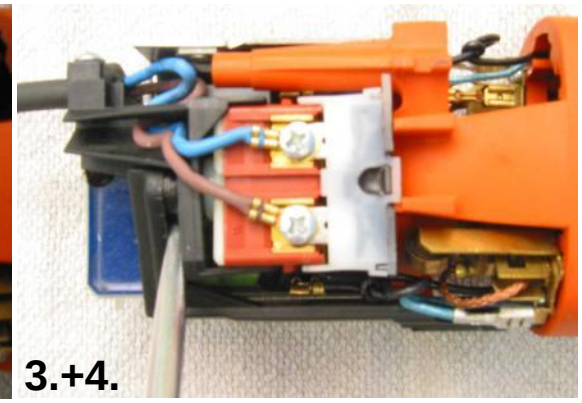


1.Mount carbon holder (60) supplied with carbon brushes (70) on motor housing (90) and connect.
2.Attention: Carbon holder supplied is delivered with premounted carbon brush.
After installation of the new carbon holder, the carbon brush stop attached to the side must be loosened by bending up slightly (Fig.1).
3.The carbon brush can be moved freely as a result and rests on the collector.
The stop should be loosened only with the armature mounted.
4.When loosening the stop, pay special attention to ensure that the guide track of the carbon brushes is not bent on the carbon holder.
5.The easy movement of the carbon brushes is to be checked after this. If the carbon brushes are only changed, it will not be necessary to loosen the stop on the carbon holder.

Tools:
- Cable hook
- PH2 cross-slotted screwdriver

5.7. Electronics and Feedline





Tools:

- Cable hook
- PH2 cross-slotted screwdriver

1. Premount cable (580) on strain relief (30) (Insert guide cable and protective hose beforehand through the top cover)

2. Plug switch (540) onto electronics (40) and connect field magnet strands with electronics (take switch rod position (520) into account). Do not forget pressure pad (560)!

3. Set complete electronics block (electronics, switch, strain relief, connection cable) onto the motor housing from behind. Lay cable strands between the two ribs of the strain relief (30).

4. Connect switch rod (520) with interlock (510).

5. Put top cover (550) on (pay attention to carbon holder strands) and screw tight.

6. Test run. Check for vibrations, check start lock !

5.8. Drive shaft

1. Press ball bearing (230) , closing plate (260) and bevel gear (280) onto shaft (300) using the sleeve (D=20.5). **2.**
Insert spring column (210) into drive shaft (300) (Pay attention to lamination). **3.**
Insert pressure piece (290) and pressure plate (310) (grease lightly). **4.**
Insert locking ring (320). Press spring column together and mount locking ring (320).

! Pay attention to position of the locking ring !

Tools:

- Sleeve: (D = 20.5mm)
- Gearbox grease: 040100101004
- Punch: (D = 6.9)

5.9. Bearing Plate

1. **Press premounted drive shaft into bearing plate (250).**
2. **Insert complete bearing plate into gear housing (430) and screw tight.**
3. **! Check flank play ! Adjust with compensation washer (270) if necessary.**
4. **Remove bearing plate and fill with 20g gearbox grease (0 40 101 01000 4).**

! Grease needle bearing cage only lightly, do not fill with grease !

5. **Mount bearing plate. ! Perform test run !**

Tools:

- Sleeve: (D =30.5)
- Sleeve: (D = 20.5)
- PH2 cross-slotted screwdriver
- Gearbox grease: 040101010004

5.10. Protective Guard

1. Put pressure spring (220) , lever (240) , protective guard (130) , spring washer (175) and locking ring (200) on top.
2. Place sleeve (D=30.5) onto locking ring (200) and drive into the slot with the plastic hammer.
>Check whether the locking ring sits cleanly in the slot<
3. Open rapid clamping lever (440) and turn in clamping unit supplied (180) until stop and close lever.
4. Turn in side handle (590).
5. Angle grinder is ready for test run and safety test

Tools:

- Seeger ring tongs
- Plastic hammer
- Sleeve:
(D = 30.5mm)

6. Tools

6.1. All Mechanical Tools

6.2.1. Special Tools / Technical Drawings

6.2.2. Special Tools / Technical Drawings

6.2.3. Special Tools / Technical Drawings

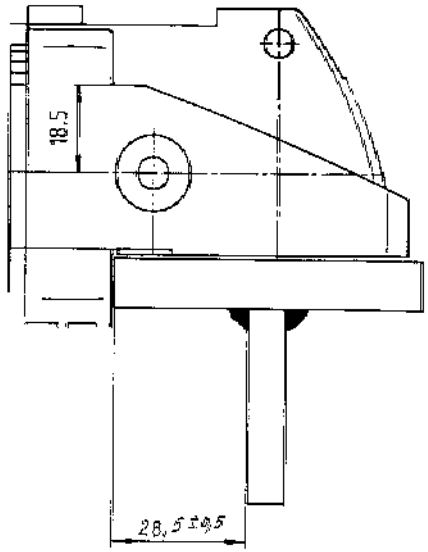
6.3. Types of Grease / Quantities of Grease

6.4. Adhesives, Sealants and Auxiliary Materials

6.1. All Mechanical Tools

•Spindle press up to 3t	commercially available
•Vice	commercially available
•Support pipe 120 mm	6 41 01 002 004
•Draw-off plate	6 41 02 069 007
•Pull-off cone	6 41 04 150 008
•Clamping body D = 19 mm	6 41 07 016 001
•Clamping body D = 26 mm	6 41 07 026 000
•Press-on fixture	6 41 01 019 008
•Press-in fixture	6 41 14 024 005
•Punch D = 4.5 mm	commercially available
•Punch D = 6.5 mm	commercially available
•Cable hook	07200310066
•Centre punch	commercially available
•Plastic hammer	commercially available
•Locksmith's hammer	commercially available
•Screwdriver PH 2	commercially available
•Seeger ring tongs (inner)	commercially available
•Seeger ring tongs (outer)	commercially available
•Draw-off fixture, (KUKKO 43-1)	commercially available
•Spindle	(D=19.5mm/H=60mm)
•Sleeve	(ID=24.5mm/ED=40mm/H=60mm)
•Sleeve	(ID=20.5mm/ED=30mm/H=60mm)
•Sleeve	(ID=30.5mm/ED=30mm/H=60mm)
•Pipe	(ID=54mm/ED=59.5mm/H=65mm)
•Hot air blower	commercially available
•Pincers	commercially available

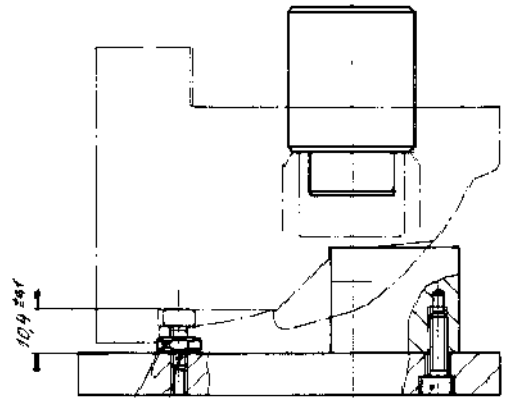
6.2.1. Special Tools / Technical Drawings



Assembly/Disassembly Fixture

For clamping the gear housing (430)

6 41 22 020 006

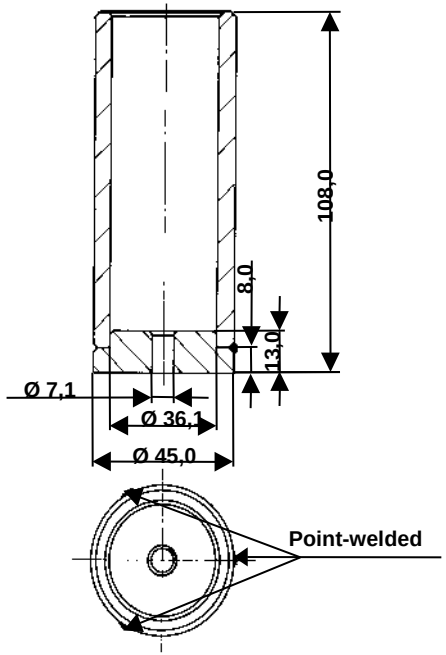


Pressing-In Fixture

For pressing in the needle bush (420)

6 41 14 024 005

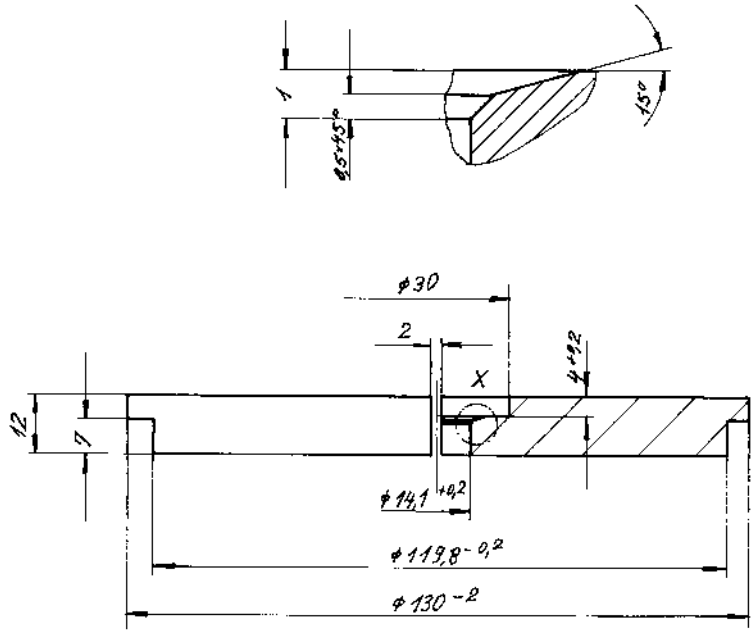
6.2.2. Special Tools / Technical Drawings



Press-on fixture

For secure fixing of the armature (100)

6 41 01 019 008

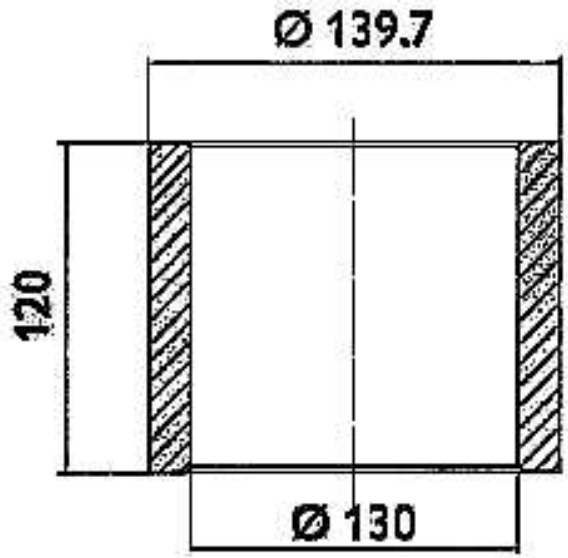


Draw-off plate

For drawing off the armature bevel wheel gear (170)

6 41 02 069 007

6.2.3. Special Tools / Technical Drawings



Pipe

To support the draw-off plate
(see 6.2.2.)

6 41 01 008 005

6.3. Types of Grease / Quantities of Grease

Grease, company designation	Appear-ance	Technical Data	Use	Art. No. of the compl. package and type of package	Quantity of grease and item
0 40 101 0100 4 (old Sst1)	Light brown, beige, naturally cloudy, compact-pasty	Drop point: approx. 180°C Operative range: -30°C to +120°C	Normally loaded spur gears and roller bearings as well as plain bearings for higher speeds	Tube 85g 3 21 600 0301 4 Tin 800g 3 21 320 070 1 Tin 4500g 3 21 320 1001 5	Drive (430): 20g
0 40 106 0100 1 (old Sst6)		Drop point: approx. 190°C Operative range: -60°C to +130°C	Roller bearing grease for very high speed roller bearings. Neutral to ferrous and non-ferrous metals and stable plastics: PA, PF, PTFE, fluorelastomers	Tube 5g 32160005063 Tube 85g 32160003061 Can 850g 32132007033	Needle bush (420): 0.6 – 1g
1 40 02 011 200 Order ref.			Molykote Paste D	250g 14002011204	Grease pressure bolts (380) and eccentric ring (390) lightly

6.4. Adhesives, Sealants and Auxiliary Materials

Order Ref.	Designation	Colour	Cont-ents	Description	Item, Quantity
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 0.05mm, max 0.12mm, for threads< M16, fine threads<M36, -55C to +150C, hand tight 15-30 min, final tightness 3hrs., storage time min 12 months	If necessary: lock Ejot-PT screws

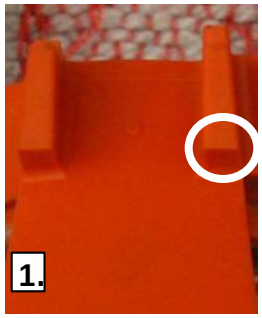
7. Special Parts for Country Versions

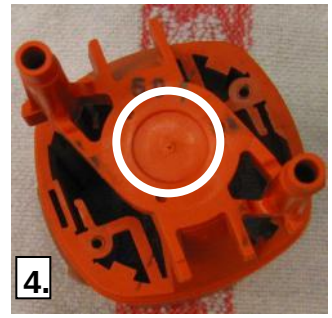
Country	Part No.	Order Number	Qty	Name	Volt/Hertz
Switzerland	------	7 220 88 08 23 1 (N 08)	1	Angle grinder WSS 12-125 (N08)	230/50 (c/s)
	580	3 07 07 355 01 8	1	Cable (2 × 1mm²)	
Australia	------	7 220 88 06 24 5 (N 06)	1	Angle grinder WSS 12-125 (N06)	240/50 (c/s)
	580	3 07 07 370 01 8	1	Cable (2 × 1.1mm²)	
Great Britain	------	7 220 88 24 23 0 (N 24)	1	Angle grinder WSS 12-125 (N24)	230/50 (c/s)
	------	7 220 88 24 11 4 (N 24)	1	Angle grinder WSS 12-125 (N24)	110/50 (c/s)
	581	3 07 07 348 01 4	1	Cable with plug (230V)	
	582	3 07 07 385 01 5	1	Cable with plug (110V)	
USA	------	7 220 88 12 63 3 (N 12)	1	Angle grinder WSS 12-125 (N12)	120/60 (c/s)
	40	3 07 62 216 02 1	1	electronics supplied	
	580	3 07 07 384 01 1	1	Cable (2 × 0.82mm²)	
		3 22 17 309 01 1	1	Information plate	
Canada	------	7 220 88 09 63 9 (N 09)	1	Angle grinder WSS 12-125 (N09)	120/60 (c/s)
	40	3 07 62 216 02 1	1	electronics supplied	
	580	3 07 07 384 01 1	1	Cable (2 × 0.82mm²)	
		3 22 17 265 06 7	1	Information plate	
		3 22 17 269 06 6	1	Information plate	
		3 22 17 307 06 6	1	Information plate	
Overseas	------	7 220 88 13 61 5 (N 13)	1	Angle grinder WSS 12-125 (N13)	110/60 (c/s)
	40	3 07 62 216 02 1	1	electronics supplied	
	580	3 07 07 384 01 1	1	Cable (2 × 0.82mm²)	
Sweden	------	7 220 88 03 23 4 (N 03)	1	Angle grinder WSS 12-125 (N03)	
	480	3 28 05 163 00 2	1	Relay valve	
Gen. model	------	7 220 88 00 62 6	1	Angle grinder WSS 12-125	220/60 (c/s)
220V/60Hz	40	3 07 62 224 02 3	1	electronics supplied	
Korea	------	7 220 88 27 62 9 (N 27)	1	Angle grinder WSS 12-125 (N27)	220/60 (c/s)
	40	3 07 62 224 02 3	1	electronics supplied	

These special parts can be obtained only through our representations in the individual countries.

8. Modifications, Extras, Information for Repair

Date	Occurrence/ Correction
	Previous model: MSf 644-S
Nov. 1999	1. Modified motor housing - optically recognisable through “hump”
	2. On performance plate, e.g.:2001 11.09549 = (YM/Serial number) = November 2001
	3. On the electronics (white sticker), e.g.: 411= (CWY) = Calendar week 41, Year 2001
	4. In the inside of the motor housing (printed on), e.g.: 080 (CWY) = CW 8 in Year 2000
Apr. 2001	5. Manufacturing date of armature (printed beside Article Number), e.g.: 30.03.01





30.09.2002 Deep groove ball bearing (450) was changed from 4 17 01 007 03 8 to 4 17 01 007 26 6