

FEIN - Repair - Tools

WS 14 - 125





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Drawings / Spare part lists please see in the internet :

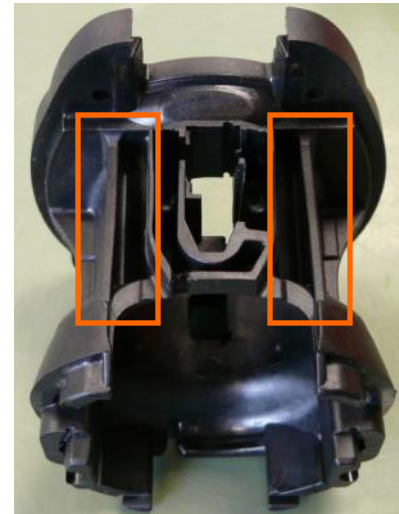
www.fein.de / FEIN Service / Spare parts

FEIN - Repair - Tools



0. Technical Change, field coil unit

Old



New

For improvement of durability of our tools a technical change on the air conducting ring was made. As shown in the right picture some additional reinforcements were put on the housing, to increase the stability in general and as a prevention against breakage of the air conducting ring. Since production date 06 / 2009 only reinforced air conducting rings will be used.

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0. Repair information, Difference field coil unit



WS 14 - Screw retainer

RED

Field coil unit with rubber bush



WS 13 (EVO) - Screw retainer

WHITE

Field coil unit without rubber bush

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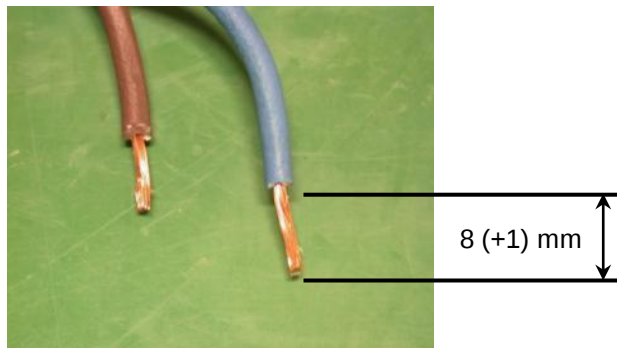


0. Repair informationen,

Change of power cable 220 V and 110 V / 120 V versions

In case of changing power cable dismantle the cord ends max. 8 (+1) mm. Because of the bigger wire cross section on the 110 V / 120 V versions the power cables are assembled with core cable ends. The crimping of the core cable ends must be done as a trapeze crimping, to guarantee a safety and durable clamping.

It's recommended, especially on 110 V and 120 V machines, to use the preassembled original cables. Even on 220 V – machines a cable with core cable ends can be used, as described before, but it's not necessary.



220 V - Version



110 V / 120 V - Version

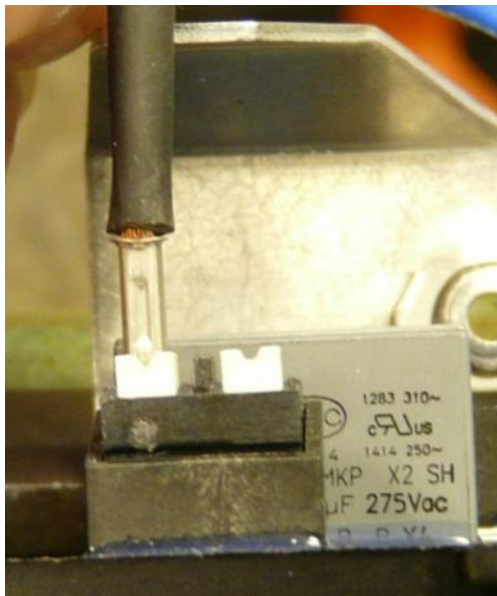
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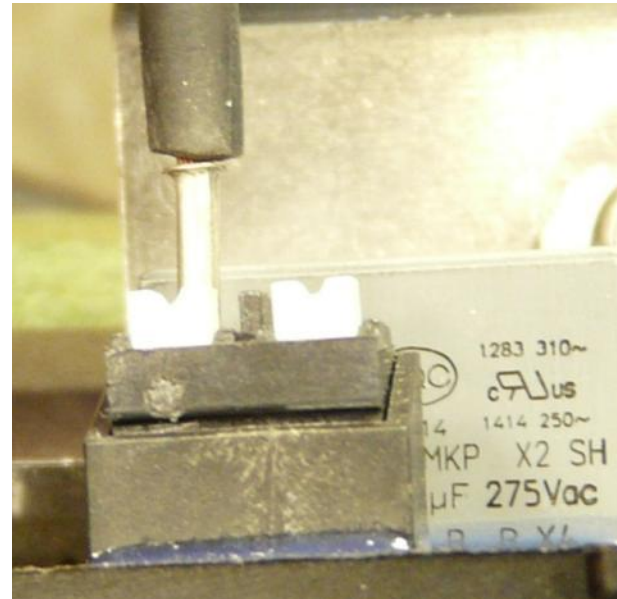
0. Repair informations,

Change of power cable 220 V and 110 V / 120 V – versions

By connecting the cable core ends into the clamp, please watch necessarily for the correct position .
(see picture) Otherwise the clamp will be damaged and the cable gets loose.
If this happen, the function of the machine is not warranted. The correct fixing can be checked
by pulling the cable slightly. A pushing down of the white buttons are very helpful for the connection of
the cable inside the clamp.



Right !



Wrong !

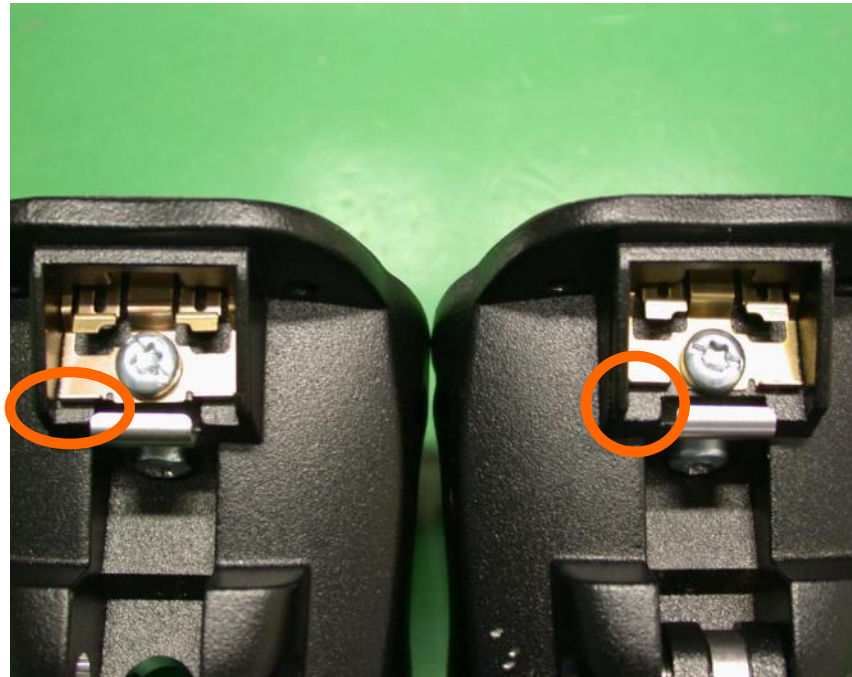


0. Repair informationen, Lock spring adjustment only on WSS - Versions

With change of the gear case or the field coil unit the lockspring **must** be adjusted in every case to adjust the tolerances of the separate components.

The correct adjustment of the lockspring guarantees the switch interlock with opened lever.

Delivery status



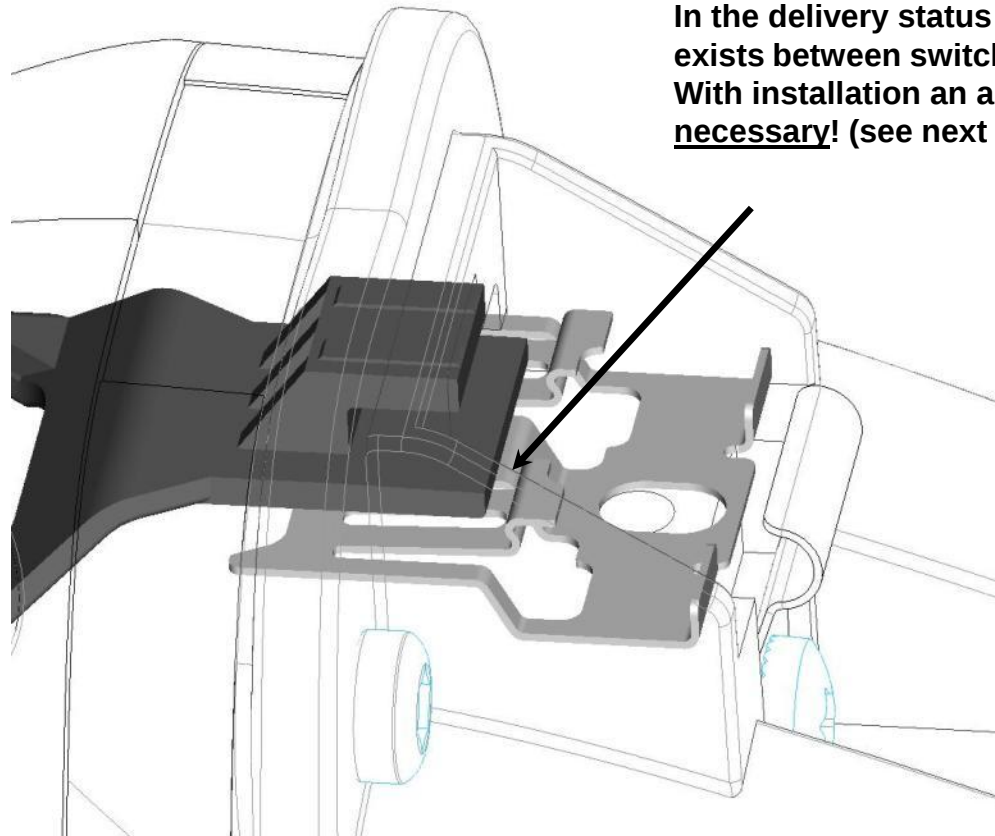
Status after adjustment





0. Repair informationen, Lockspring adjustment only on WSS - Versions

Delivery status

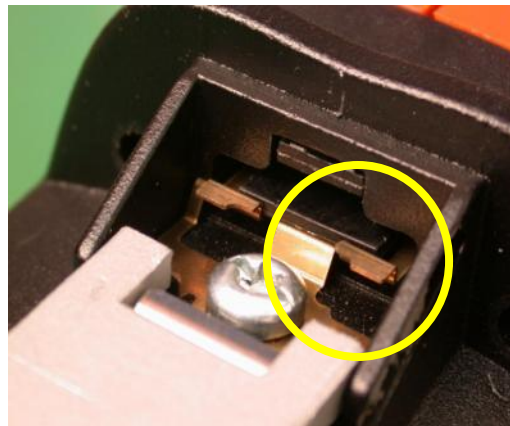


In the delivery status a gap always exists between switch rod and lockspring. With installation an adjustment is always necessary! (see next page)

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0. Repair informationen, Lockspring adjustment only on WSS - Versions



1. Open the lever and loosen the screw.
2. Put the special adjustment tool in and adjust the lockspring in the right position -
!!! no gap between switch rod and lockspring !!!
3. Tighten the screw - lock spring is now adjusted and all the tolerances of the machine are removed.
With the adjusted lockspring the machine can't be switched on with open lever - **Lock on switch!!!**

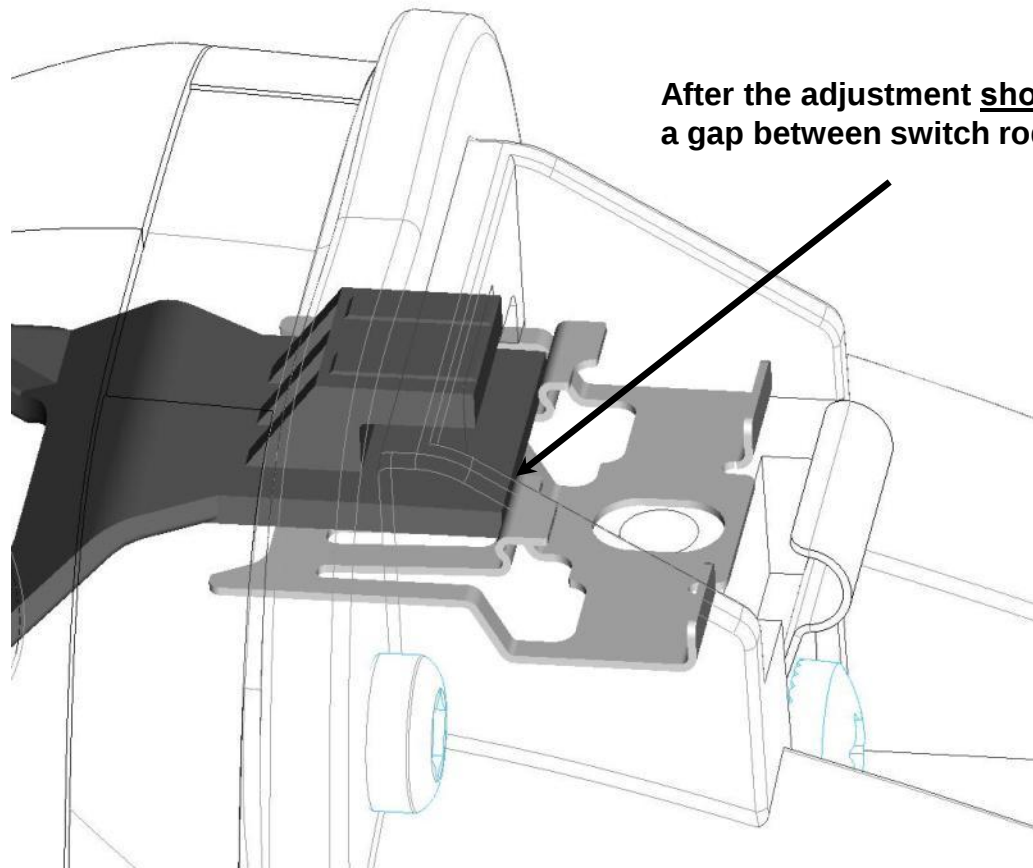
Tools:

- screw driver
torx 20
- adjustment tool
(64108003010)



0. Repair informationen, Adjustment lockspring only on WSS - Versions

Status after adjustment



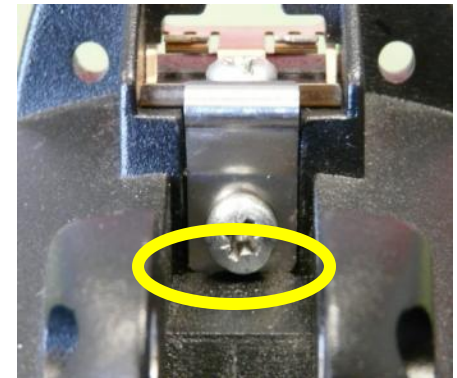
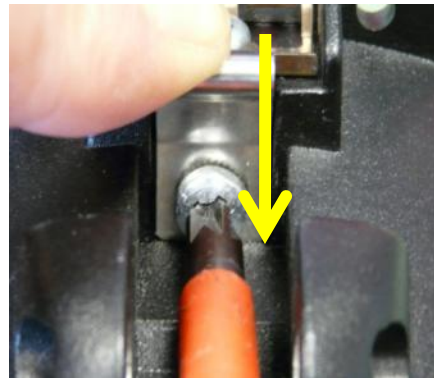
After the adjustment shouldn't be a gap between switch rod and lockspring.

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0. Repair informationen,

Adjustment lockspring only on WSS - Versions



1. Der Spannhebel sollte im geschlossenen Zustand gar nicht oder nur geringfügigen Überstand zum Getriebegehäuse haben. (linkes Bild)
2. Die richtige Position des Spannhebels wird durch die Haltefeder gewährleistet.
3. Bei der Einstellung der Haltefeder muß diese mit dem Finger nach unten gedrückt werden, bis die Haltefeder am Getriebegehäuse anliegt. Jetzt kann die Schraube festgezogen werden.

Nur bei korrekt schließendem Spannhebel ist die Schaltfunktion, speziell das Ausschalten, gewährleistet.

Wenn die Haltefeder nicht korrekt eingestellt ist, läßt sich die Maschine unter Umständen trotz Betätigen des Schaltschiebers nicht ausschalten, da die Schaltstange durch Verbiegen eingeklemmt ist.

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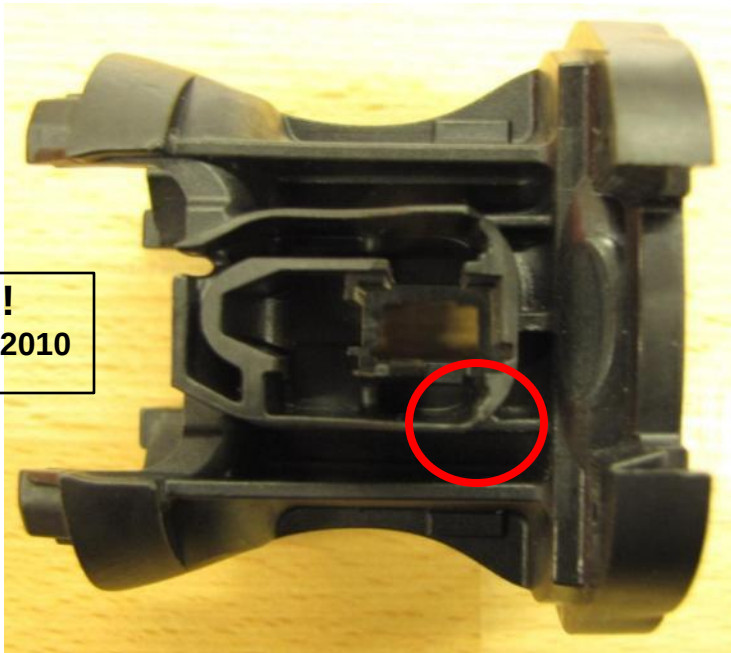


0. Reparaturinformationen,

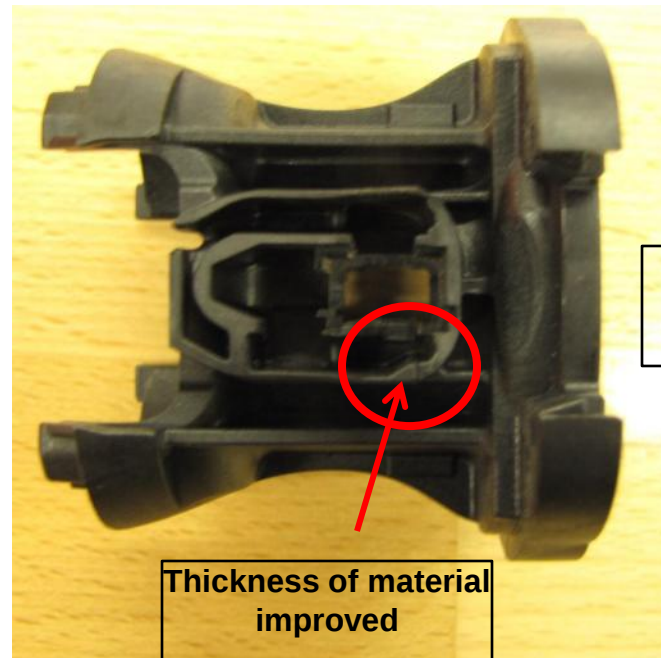
Klemmende Schalter bei WS 14

Bei Maschinen mit Herstellungsdatum bis 03 / 2010 kann es zu Ausfällen durch klemmende Schalter (Pos. 70) kommen. Der Grund dafür resultiert aus einer Lageveränderung der Polpaketeinheit im Motorgehäuse. Verantwortlich dafür ist eine Beschädigung (Bruch) der Polpaketeinheit im Bereich des Luftleitringes (siehe Bilder unten – roter Kreis). Um solche Ausfälle zu vermeiden ist im Reparaturfall bei älteren Maschinen eine Sichtkontrolle auf derartige Beschädigungen unbedingt durchzuführen und ggf. Polpaketeinheit und Schalter auszutauschen.

Old !
until 03 / 2010



New !
from 04 / 2010



**Thickness of material
improved**



1. Technical details

Id. - number		7 221 40 00 23 0
Typ		WSS 14 - 125
No load speed	1/min	10.000
Power input	Watt	1200
Power output	Watt	750
Current		1~
Safety class		II
Length of cable with plug	m	4
Weight (without cable)	kg	2,1
Disc diameter Ø	mm	125
Disc thickness	mm	1-6
Diameter elastic backing pad Ø	mm	115 / 125
max. peripheral speed	m/sec	80
Mounting hole	mm	22,23



2. Maintenance

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!



3. Electrical function control

- 3.1. Short function control
- 3.2. Major function control 1
- 3.3. Major function control 2
- 3.4. Wiring plan
- 3.5. Safety test



3.1. Short function control

3.1.1. Check of the interlock

- Plug in the grinder in switch on mode.

Grinder shouldn't run - otherwise electronic defect.

- Switch the grinder off and on again.

Grinder must run again.

3.1.2. Check no load speed = 10 000 U/min



3.2. Major function control 1

	Malfunction	Possible Causes	Test Possibilities
3.2.1	Motor does not start	Switching sequence not maintained. Broken mains cable or plug connections. Motor switch defective. Dust deposits in the area of the motor switch (self-start lock is activated) Carbon brushes are worn out. Motor defective. Electronics defective.	Switch motor switch off and on again. Test continuity Check. Clean area. Visual inspection, measurement Check motor without electronics. - Loosen motor connections from electronics. - Operate motor using transformer with max. 75% mains voltage. 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 to 110 V-130 V.

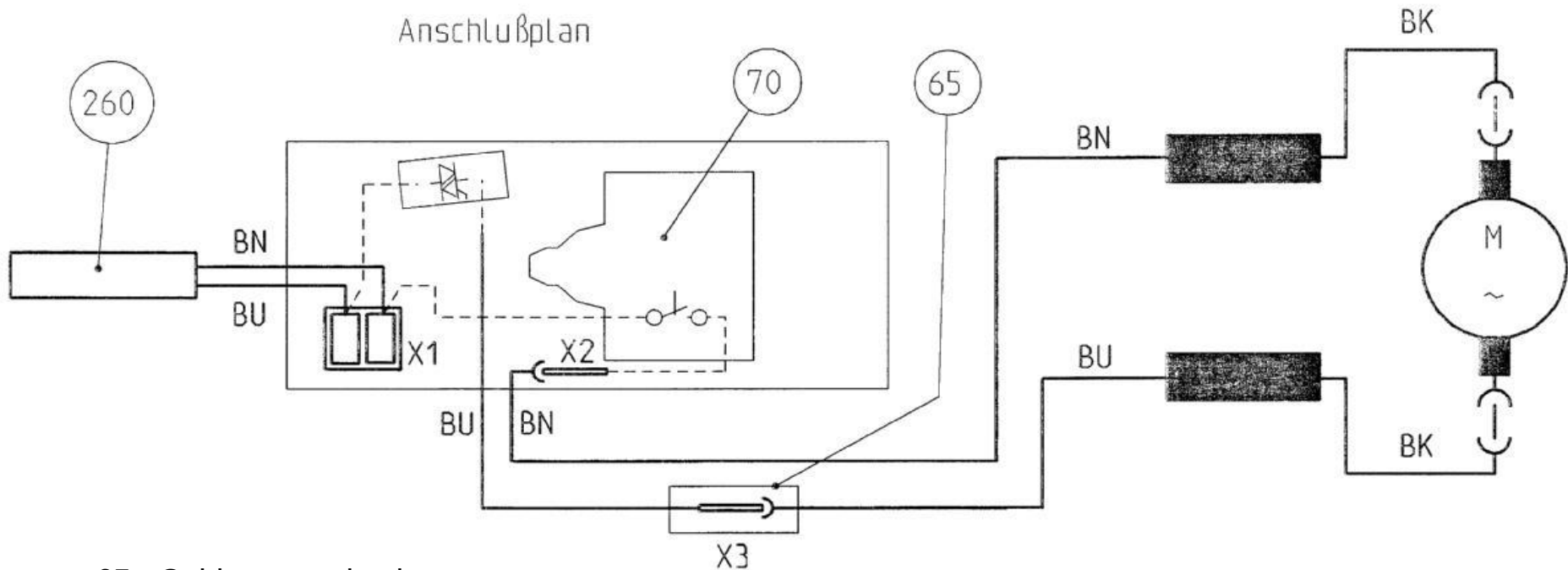


3.3. Major function control 2

	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. Wiring plan



- 65 - Cable protection hose
- 70 - Switch
- 260 - Power cable
- X2,X3 - Plug connection



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(480) **not** closed, the switch (110) can not be switched on.
3. Voltage return test
4. Insulation test : Contact gear housing (135)
5. High voltage test :
 - Gear housing (135)
 - 5 motor housing screws (290)
6. No load current test
No load speed test
8. Sliding switch (110) in „Off “ - position
- 9.

High voltage test :

Test voltage : 3,5 kV

Breaking current max: < 5 mA

Contact time min: 3 Sec/ meas.pt.

Armature:

Protective insulation through shaft insulation

7. Insulation test:

Ins.- resistance : > 2,0 MOhm

Contact time, min: 3 Sec/ meas.pt.



4. Disassembly

- 4.1. Preparation
- 4.2. Remove flange and wheel guard
- 4.3. Remove motorhousing and power cable
- 4.4. Bearing plate, gear housing, brush holder
- 4.5. Disconnect armature / field coil unit
- 4.6. Dismount armature
- 4.7. Dismount switch rod / electronic
- 4.8. Dismount electronic
- 4.9. Dismount switch
- 4.10. Disassembly switch lever unit
- 4.11. Disassembly armature
- 4.12. Drive shaft
- 4.13. Gear housing



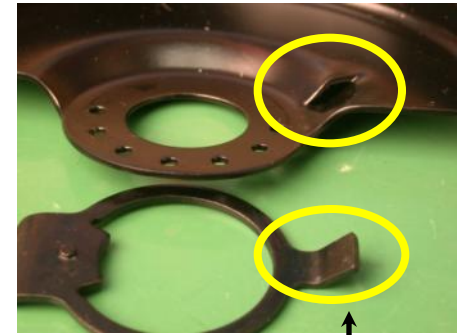
4.1. Preparation



1. Disconnect the tool from the mains
2. Set switch „Off“ position
3. Open the clamping lever and remove the clamping unit.
Take off the inserted accessories.



4.2. Remove flange and wheel guard



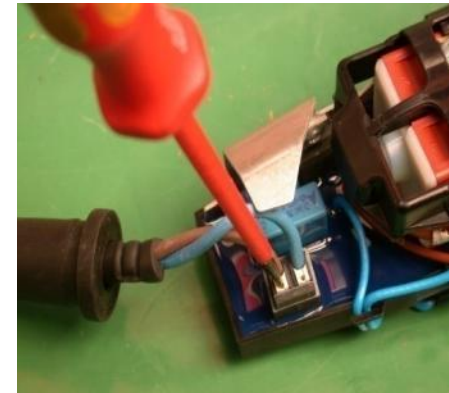
1. Remove flange from the drive shaft with a pulling off device
2. Remove securing ring - **Attention:** ring is pre loaded - **Risk of injury**
3. Remove securing ring, spring plate, notching ring, spring and wheel guard
4. **!!! Attention new wheel guard with stop, new safety rules !!!**

Tools:

- pulling off device
- spring-ring plier
- outer ring , straight



4.3. Remove motorhousing and power cable



-
1. Unscrew the screws (5x) on the motor housing
 2. Remove top cover
 3. Remove strain relief (2 screws) and lower part housing
 4. Disconnect power cable from the connecting clamp by using a screw driver

Tools:

- screwdriver torx 20
- screwdriver slotted for disconnect power cable



4.4. Bearing plate, gear housing, brush holder



1. Unscrew 4 screws on the gear cover and remove them
2. Take off the gear cover, remove the grease if necessary
3. Unscrew 4 screws on the gear housing - **Attention:** different screw length
4. Remove the dust protection on the brush holder on the top
5. Pull out both brush holder including the carbon brushes

Tools:

- screwdriver torx 20
- flat plier



4.5. Disconnect armature / field coil unit



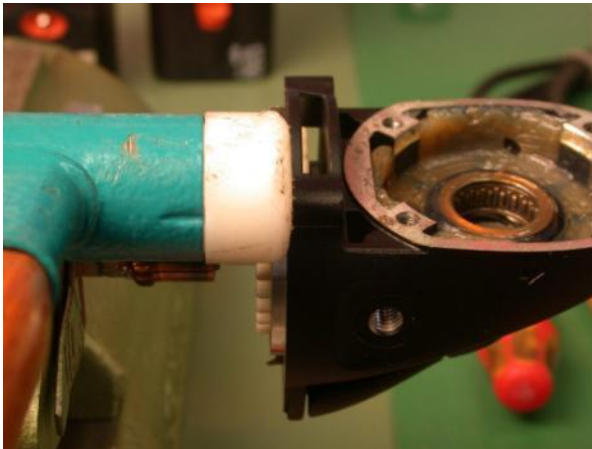
1. Remove gear housing with armature from the field coil unit by 2 screw driver, please make sure, that the brush holder incl. The carbon brushes are pulled out completely - **Risk of breakage during pulling off the armature !!!!**
2. Pull off the armature from the field coil unit, if the rubber ring will stack in the field coil unit - pull it out from the unit with a cable hook

Tools:

- screwdriver slotted
- cable hook



4.6. Dismount armature



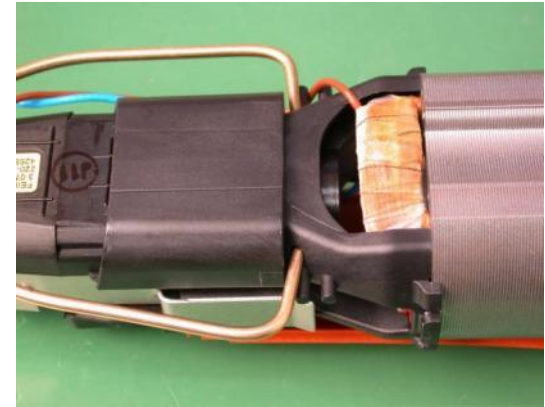
1. Clamping the armature with gear housing in a vice,
pull off the gear housing by slightly hits with a plastic hammer

Tools:

- plastic hammer



4.7. Dismount switch rod / electronic



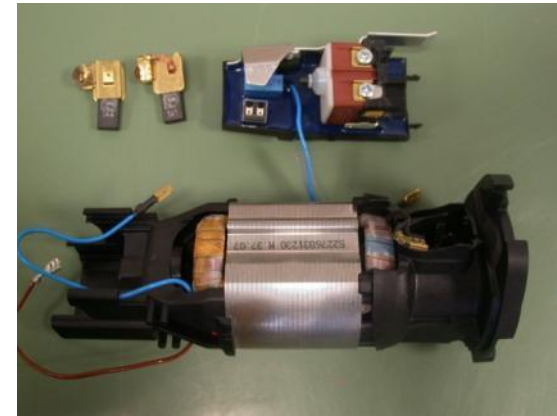
1. Pushing out the plastic cover in front
2. Remove the plastic cover
3. Unlock the electronic with a wire clip

Tools:

- wire clip



4.8. Dismount electronic



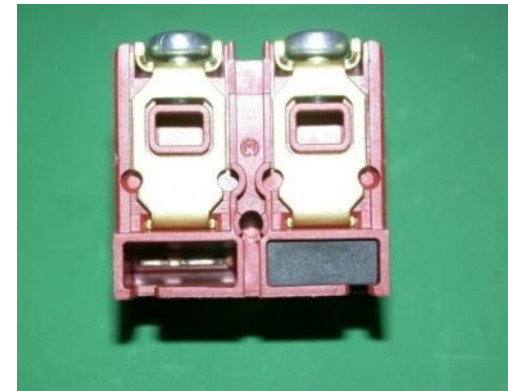
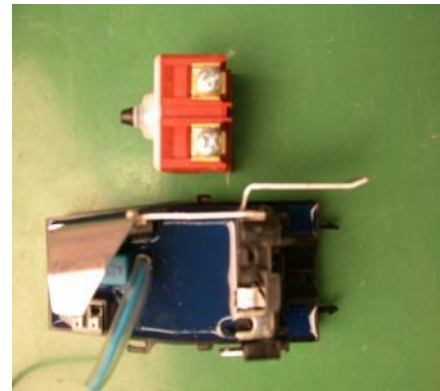
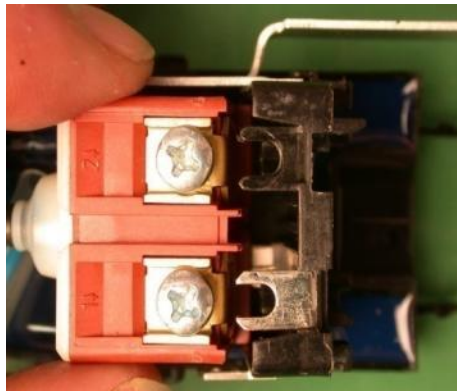
1. Bend up the switch rod slightly and remove it completely with the switch rod unit -
!!! Attention - Risk of breakage !!!
2. Disconnect the plugs on the electronic and pull the electronic off
3. Pull off the brushholder with a flat plier from the cable

Tools:

- flat plier



4.9. Dismount switch



-
1. Unscrew the screws on top of the switch
 2. Pull off the switch carefully from the bracket

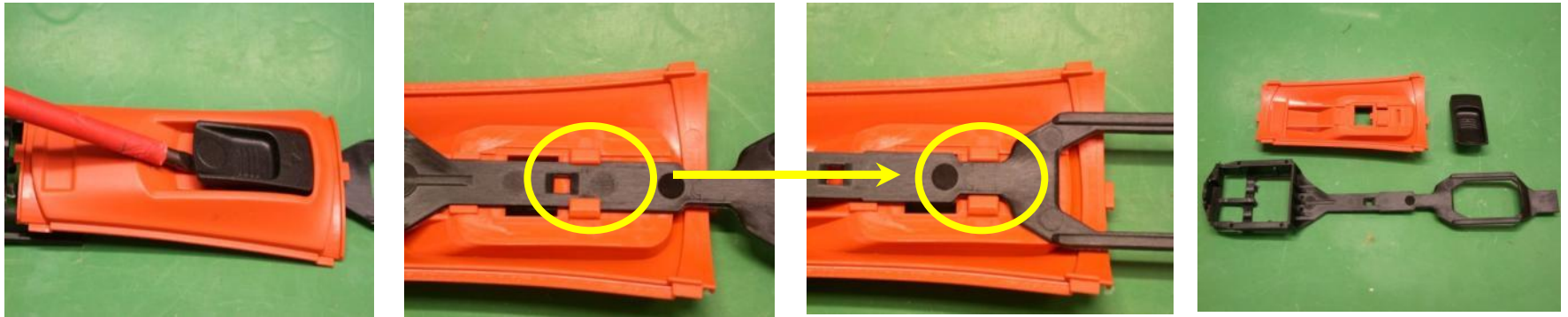
!!! Attention - different material on the brackets - 1 x plastic, 1 x metal - risk of breakage on the plastic one !
Please use only switches with the piece of rubber inside - additional dust protection and electrical safety !!!

Tools:

- flat plier



4.10. Disassembly switch lever unit



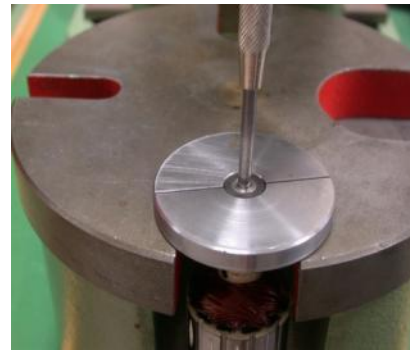
1. Pull out the sliding switch with a slotted screwdriver
2. Push the switch rod back as far as possible and take it out from the cover

Tools:

- screwdriver slotted



4.11. Disassembly armature



-
1. Put the armature into the tube with the pulling off device and press the pinion down with a punch drift
 2. Press down the magnet ring with a pulling off device and a 3,9 mm punch drift
 3. Change the ball bearings if necessary

Tools:

- press
- tube
(64101002004)
D=120mm
- pulling off device
(64102069007)
- pulling off device
(64102072000)
- punch drift



4.12. Drive shaft



-
1. Press down the spindle with ball bearing, cover plate and gear from the plate
 2. Put the spindle with the ball bearing onto a bush and press the spindle out of the ball bearing and the gear
 3. If necessary press down the pressure plate in the spindle with a 6 mm punch drift

!!! Attention - preloaded spring package !!! take out the securing ring with a slotted screwdriver

!!! Put the spring package on a punch drift or a wire to prevent loss of spring plates !!!

Werkzeuge:

- bush
- punch drift (D=6mm)
- slotted screwdriver



4.13. Gear housing



-
1. Screw on the mounting device onto the gear housing and clamp it in a vice
2. Push out the bolt with a 4,5 mm punch drift
3. If necessary push out the bushes with a 6,5 mm punch drift
4. Take out the lever, the bolt and the eccentric ring
5. If necessary you can drive out the needle bearing with slightly hammer hits after warming up the gear housing

Tools:

- hammer 200g
- punch drift
D=4,9mm
- punch drift
D=6,9mm
- mounting device
(64122020006)



5. Assembly

- 5.1. Armature
- 5.2. Gear housing
- 5.3. Assembling clamping lever
- 5.4. Armature / Gearhousing
- 5.5. Assemble switch
- 5.6. Preassembling switch rod
- 5.7. Preassembling field coil unit
- 5.8. Armature / Field coil unit
- 5.9. Drive shaft
- 5.10. Cover plate
- 5.11. Brush holder / Carbon brushes
- 5.12. Motorhousing
- 5.13. Wheel guard
- 5.14. Lockspring adjustment (see under point 7.)

FEIN - Repair - Tools



5.1. Armature



-
1. Put in the armature into the pressing on device.
 2. Put on the cover plate, ball bearing and the ball bearing support plate, press on the ball bearing.
 3. Put in the ball bearing in to the support plate and press it on.
 4. Warm up the pinion (approx. 100°C) and press it on.
 5. Press on the magnet ring with the base plate as distance holder support.

Werkzeuge:

- forceps o.Ä.
- hot air gun
- support plate:
inner $\varnothing = 7,1 \text{ mm}$
- support plate:
inner $\varnothing = 8,3 \text{ mm}$
- mandrel press
- two part base plate



5.2. Gear housing WSS 14



1. Put in the gearhousing to the pressing in device.
2. Lay in the thrust washer and the spring washer to the gearhousing.
3. Press in the needle bearing to the gear housing.

!!! Please make sure that the labelled site of the needle bearing is shown to the pressure pin !!!

Werkzeuge:

- press in device:
64114024005
- mandrel press





5.2. Gear housing WSG 14



1. Put in the locking pin to the gear housing.
2. Lay in the pressure spring.
3. Put on the cover to the locking pin and push it on as long as the cover snap in.



!!! Please fix the locking pin by backpressure or mounting on the cover plate first !!!



5.3. Assemble clamping lever WSS 14



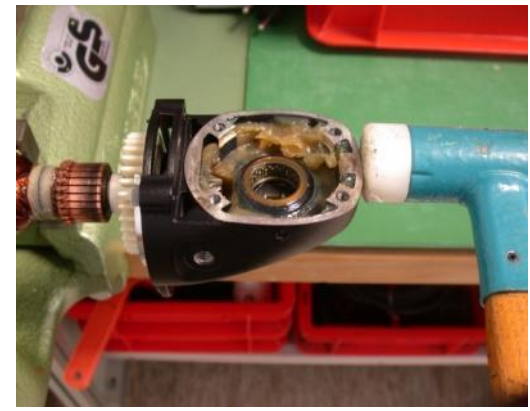
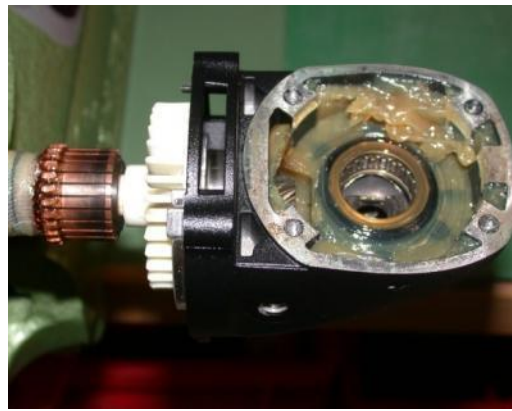
1. Screw on the mounting device to the gear housing and put in the pressure pin.
2. Clamp in the mounting device together with the gear housing to a vice.
3. Mount on the clamping lever with the excentric ring and the bolt in closed position.
(Lubricate the excentric ring with Molykote-Paste-D slightly)
Drive in the bolt with a hammer and a punch.

Tools:

- Mounting device:
64122020006
- Hammer : 200g
- Punch:
D = 4,9



5.4. Armature / Gear housing WSS / WSG 14



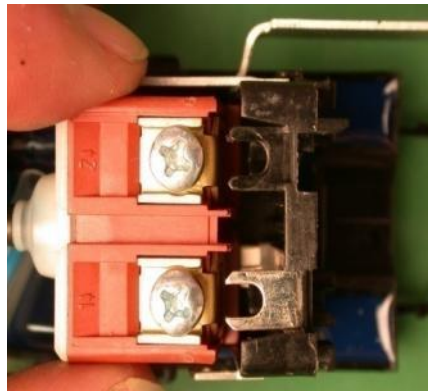
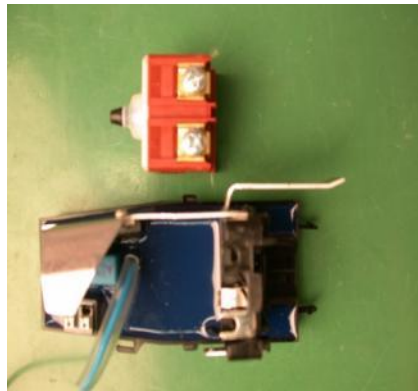
1. Clamp the preassembled armature into a vice.
2. Put on the gear housing to the armature and assemble it by slightly hammer hits.

Tools:

- Vice
- Plastic hammer



5.5. Assemble switch WSS / WSG 14



1. Loosening the screws on top of the switch
2. Move on the switch carefully to the retaining plate
3. Tighten the screws with approx. 0,5 Nm

!!! Attention - two different materials on the retaining plates - 1 x plastic, 1 x metal - risk of breakage on the plastic one !
Please use only switches with a rubber plug - additional dust protection und electrical safety !!!



5.6. Preassembling switch rod WSS 14



1. Put in the switch to the lever insert
2. Put in the switch lever and push it in



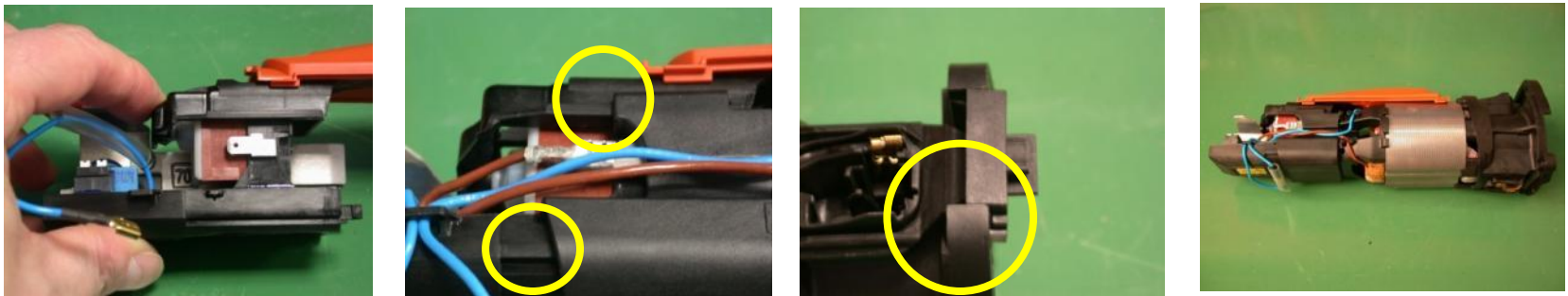
5.6. Preassembling switch rod WSG 14



1. Put in the switch to the lever insert
2. Put in the switch lever and push it in



5.7. Preassembling field coil unit WSS / WSG 14



-
1. Put on the switch rod with the lever insert to the electronic
 2. Slide in the electronic with the lever insert to the mechanical feed on the field coil unit, as long as the electronic snap in
 3. Put the cover in and snap it in - **!!! Attention, don't forget it - safety issue !!!**
!!! Not on WSG 14 !!!
 4. Connect the cables , brown on to the electronic, connect the blue cables together and move over the cable protective tube

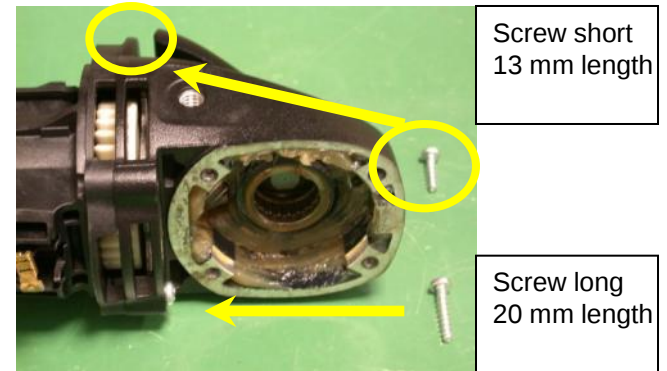


Tools:

- Cable hook
- Flat plier



5.8. Armature / Field coil unit WSS / WSG 14



1. Move the armature with gear housing into the field coil unit -

!!! Put the rubber bush on to the ball bearing before move in !!!

!!! Clamping lever in closed position !!!

2. Screw on the gear housing on to the field coil unit -

!!! Please pay attention on the different screw length !!!



Tools:

- Screw driver torx 20



5.9. Drive shaft WSS 14



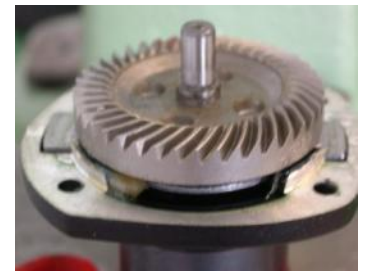
1. Put in the spring package, thrust piece and pressure plate to the driving shaft
!!! Pay attention on the lamination of the spring washer !!!
2. Press the spring package together under a mandrel press and put the circlip in
3. Press on the ball bearing to the driving shaft
4. Press on the cover plate and the gear to the driving shaft

Tools:

- Punch 6mm
- Mandrel press



5.9. Drive shaft WSG 14



- 
1. Press on the ball bearing to the drive shaft
 2. Lay down the gear and the cover plate on a bush and press in the preassembled drive shaft
 3. Press in the preassembled drive shaft to the plate

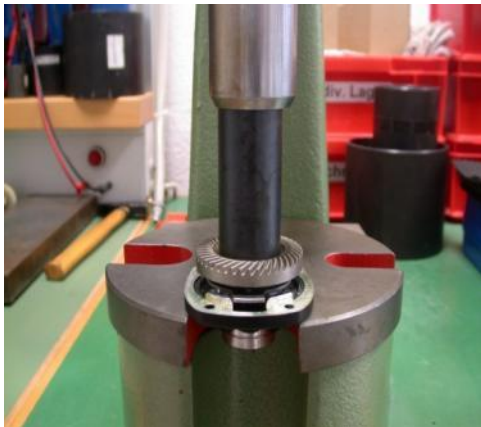
!!! Please pay attention on the right position of the cover plate - short end / long end !!!

Werkzeug:

- Durchschlag 6mm
- Dornpresse



5.10. Plate WSS / WSG 14



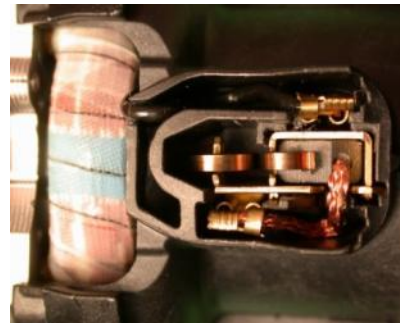
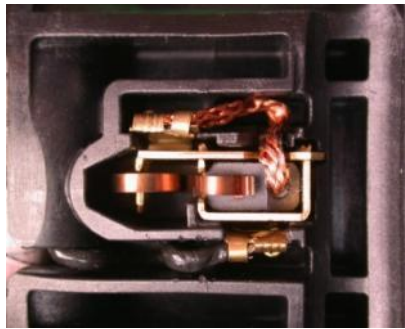
1. Press the preassembled drive shaft in to the plate
2. Put the preassembled plate in to the gear housing and screw it on
3. **! Check the face clearance !** - it might be adjusted with shims
4. Take off the plate and fill in 20g of grease (0 40 101 01000 4)
! Needle bearing has to be slightly lubricated, not filled up with grease !
5. Put the plate on again and screw it on

Tools:

- Bush:
(D = 20,5)
- Screwdriver
torx 20
- Grease:



5.11. Brush holder / Carbon brushes WSS / WSG 14



1. Put the brush holder with the carbon brushes in to the field coil unit and connect it

!!! Attention - brush holder are different, pay attention on the cable connection - don't make a loop and put the copper wires in to the existing cable channel, otherwise the cable could be jammed and function of the switch rod could be blocked !!!

2. Put the brush cover (piece of rubber) on to the top holder (on the switch lever side)

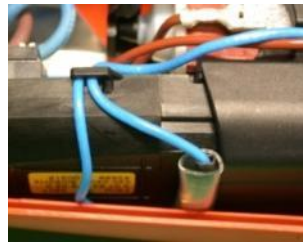


Tools:

- Flat plier
- Cable hook



5.12. Motor housing WSS / WSG 14



1. Put the preassembled motor in to the underpart of the motor housing.
2. Screw the cord grip on.
3. Bring the wiring into the line and put the upper part of the motor housing on.
4. Screw the motor housing together.

Tools:

- screw driver
torx 20



5.13. Wheel guard WSS / WSG 14



1. Lay on the spring, lever, safety guard, spring washer .
2. Adjust the circlip with a circlip plier.
3. Press the circlip with a bush down, till the circlip snap in.



!!! Watch for the right size of the circlip - the spring washer might be adjusted !!!

!!! Attention new wheel guard with a stop because of new safety rules !!!

Tools:

- bush 28mm
- circlip plier
- mandrel press



6. Tools

- 6.1. Tools
- 6.2. Special tools
- 6.3. Typ of grease / quantity
- 6.4. Adhesives, Sealants



6.1. Tools

•Mandrel press 2t	Retail
•Vice	Retail
•Punch Ø = 4,5 mm	Retail
•Punch Ø = 6,5 mm	Retail
•Plastic hammer	Retail
•Steel hammer	Retail
•Screwdriver PH 2	Retail
•inner circlip plier	Retail
•outer circlip plier	Retail
•Pulling off device (KUKKO 43-1)	Retail
•Hot air gun	Retail
•Forceps	Retail
•Bush (ID=24,5mm/AD=40mm/H=60mm)	
•Bush (ID=20,5mm/AD=30mm/H=60mm)	
•Bush (ID=30,5mm/AD=30mm/H=60mm)	
•Tube (ID=54mm/AD=59,5mm/H=65mm)	



6.2. Special tools

- Cable hook	0 72 00 310 066
- Tube Ø120 mm	6 41 01 002 004
- Plate	6 41 02 069 007
- Pulling off bell	6 41 04 150 008
- Clamping sleeve Ø=19 mm	6 41 07 019 007
- Clamping sleeve Ø=26 mm	6 41 07 026 000
- Pressing-on device	6 41 01 019 008
- Pressing-in device	6 41 14 024 005
- Assembly / Disassembly device	6 41 22 020 006
- Adjusting tool (Lock spring)	6 41 08 003 010
- Two part base plate (Magnetring)	6 41 02 072 000



6.3. Type of grease / quantity

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 (430): 20g
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 (420): 0.6 – 1g only on WSS !!!
1 40 02 011 200 Order no.			Molykote paste D	250g 14002011204	Bolt (380)and eccentric (390) grease lightly only on WSS !!!

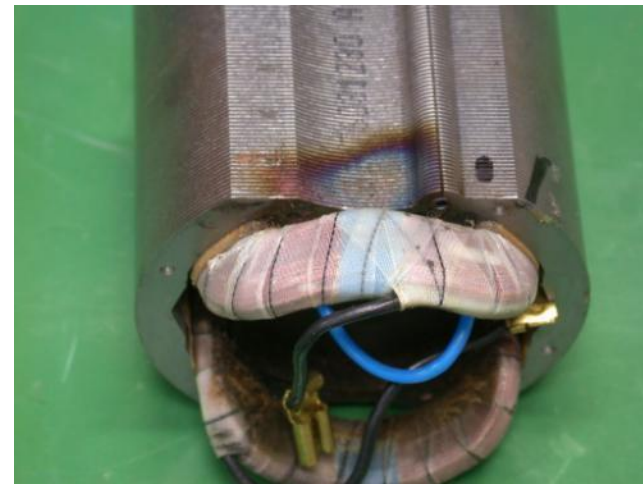


6.4. Adhesives, Sealants

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



7. Special information



The left picture shows an armature which strips on the field coil unit.(no damage on ball bearings)

This occurs a local heating on the field coil unit. (right picture)



7. Special information



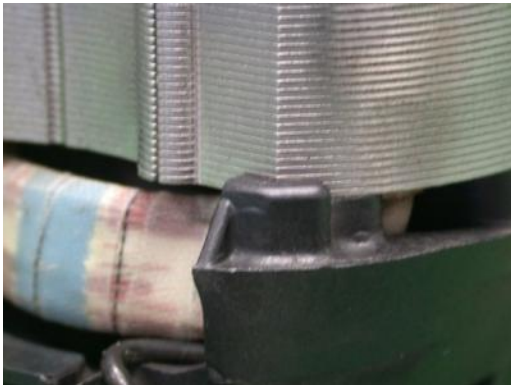
The incorrect adjustment of the field coil unit is the reason for the stripping of the armature. It can be checked by a visual inspection.

Through an incorrect assembling the edge guide is might be broken. (left picture)

Thereby occurs an air gap between the edge guide and the field coil. (right picture)



7. Special information



If the field coil unit is correct assembled, there is no air gap between the edge guide and the field coil. The field coil must touch the plastic cover and has to be tighten.

If this is the reason for a machine failure, the field coil unit has to be changed at all hazards.

A new adjustment is impossible.