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REPAIR INSTRUCTIONS



Hot Air Tool TRIAC AT

Serial number from 1106067414
Software version from 1.00

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ISO 9001:2000

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1 Scope of applicability

These repair instructions are reserved exclusively for Leister service centres. Only experienced and qualified personnel trained by Leister Technologies AG, CH-6056 Kaegiswil, are allowed to do repair work on Leister tools. Additional national requirements relative to personnel carrying out repair work are to be observed by each service centre.

2 Safety precautions

A well-equipped working place (see "Equipment required for Leister repair service") is essential for doing qualified work. For safety reasons use only identical original Leister replacement parts for each type of tool when servicing.

Warning!




If you open the tool or remove its parts, except the ones they are accessible without using a tool, some live parts could appear. Its contact can cause danger to life! Insure tool is **disconnected from the line/mains** before any work is commenced!

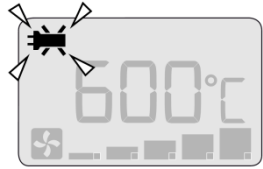
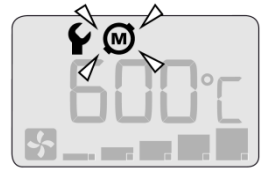
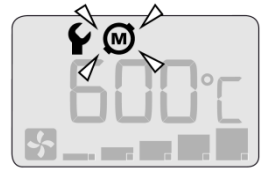
Repaired tools must pass the Leister **test procedure** and any additional local requirements. Check with your local Statutory Authority for testing requirements.

3 Remarks

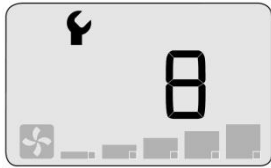
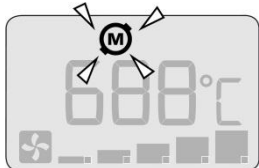


- If it is impossible to repair a tool, it should be returned immediately to the manufacturer, Leister Technologies AG, CH-6056 Kaegiswil, Switzerland, carriage paid to Kaegiswil. Leister will repair the tool within 24 hours after its arrival.
- When ordering spare parts use the order numbers of the spare parts list. When servicing use only identical original Leister replacement parts!

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4 Errors and possible causes

| Error | Possible cause | Method of resolution |
|---|--|--|
| No function Tool does not heat and motors does not run | Wiring error | If the flex wires for power supply (blue and brown) are inverted at the print adapter front terminal, the electronic circuit was destroyed |
| | Break of power supply cord | Replace power supply cord (chapter 7.1) |
| | Electronic circuit defective | Check internal wiring and replace print adapter rear (chapter 7.4.4) |
| Tool does not heat  | Heating element not correctly plugged into the socket | Check heating element and its installation (chapter 10) |
| | Heating element defective | Replace heating element (chapter 10) |
| | No heating element current detected/measured | Replace print adapter front (chapter 7.4.3) |
| Tool does not heat, motor runs  | Triac defective | Replace print adapter front (chapter 7.4.3) |
| | Temperature limit switch defective | |
| | Photo transistor defective | |
| Motor does not run  | Motor flex wires not properly connected to terminal | Connect flex wires properly |
| | Carbon brushes too short | Replace carbon brushes (chapter 8.3) |
| | Check motor (chapter 8.1) | Replace motor (chapter 8.4), respectively print adapter rear (chapter 7.4.4) |
| Air temperature not achieved | Heating element with incorrect voltage rating | Replace heating element (chapter 10) |
| | Mica tube is missing | Assemble mica tube |
| Air temperature exceeds range | Thermocouple defective | Replace thermocouple |
| | Incorrect temperature measurement | Replace print adapter front (chapter 7.4.3) |
| Incorrect voltage measurement | Coorrect line/mains voltage, but incorrect measurement | Replace print adapter front (chapter 7.4.3) |

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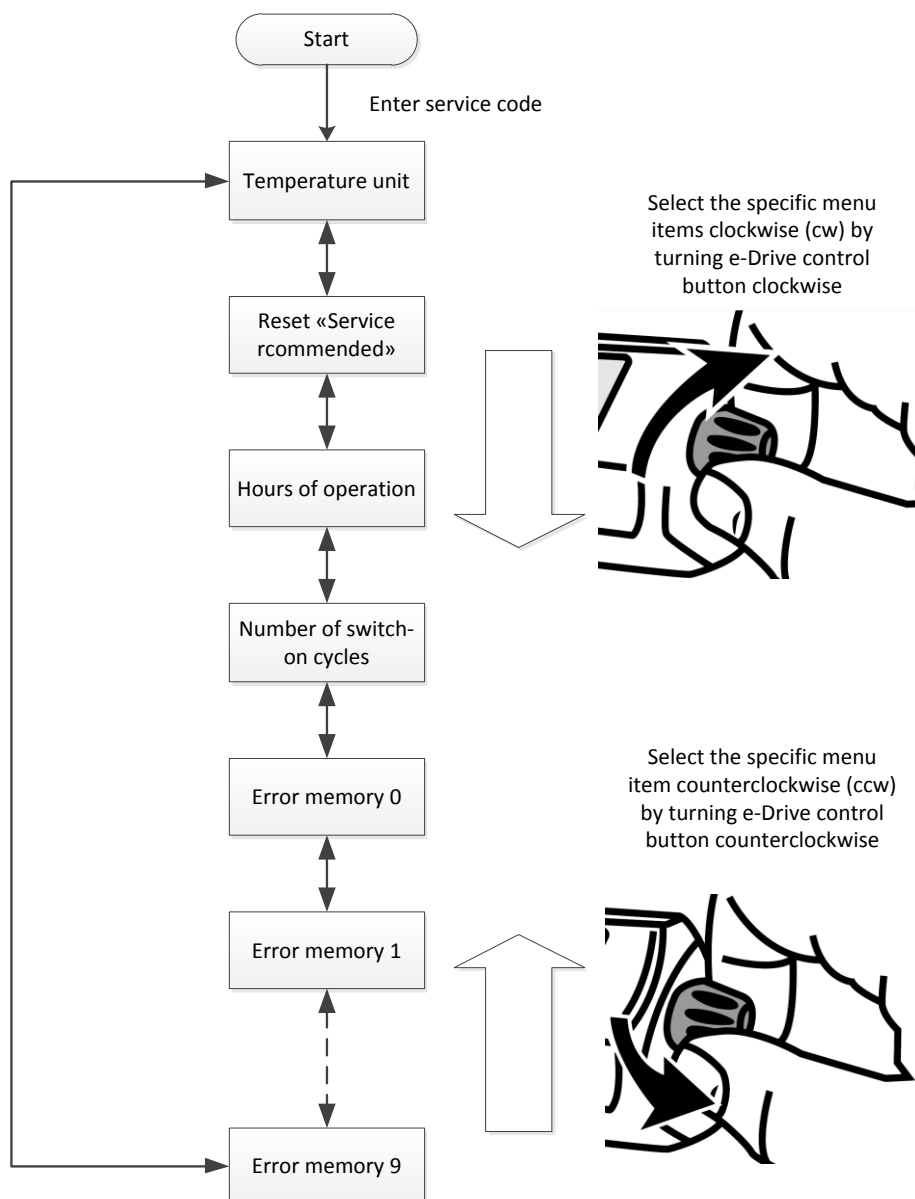
| Error | Possible cause | Method of resolution |
|--|--|---|
| Temperature controller defective  | Thermocouple not connected (loose contact) | Connect thermocouple |
| | Thermocouple defective | Replace thermocouple |
| | Incorrect temperature measurement | Replace print adapter front (chapter 7.4.3) |
| Excessive noise | Bearing defect | Replace motor (chapter 8.4) |
| Power consumption of blower motor > 100W | Commutator defective: Worn out lamella | Replace motor (chapter 8.4) |
| Power consumption of blower motor > 100W Unsteady noise (jolting, loose contact) | Commutator defective: Bluish discoloration | Replace motor (chapter 8.4) Replace carbon brushes (chapter 8.3) |
| | Commutator defective: Deep groove (U-shaped) | |
| | Significant carbon brush abrasion | |
| "Service recommended" announcement  | Timer "Service recommended" elapsed | Check carbon brushes (chapter 8.3.) |
| Temperature limit switch acts often / over and over  | Triac AT air flow is too little | Clean air filters (according to operating manual) |
| | Temperature limit switch in blower housing defective | Check nozzle for obstruction (clean or replace) |
| | Motor does not run, respectively turns too slowly | Replace print adapter front (chapter 7.4.3) |
|  | Triac AT announces an error message | Replace motor (chapter 8.4) |
| | | Troubleshooting according to chapter 14 |

5 Service menu




Caution: Service menu requires the tool to be connected to line/mains!

The service menu enables a selection of the temperature unit, reset of the announcement "Service recommended" and shows the error memory. Select the specific menu items by turning e-Drive control button clock- (cw) or counterclockwise (ccw). Display and setting options will be described in the following chapters.

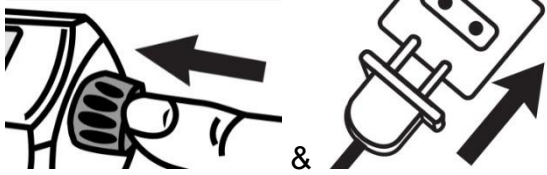
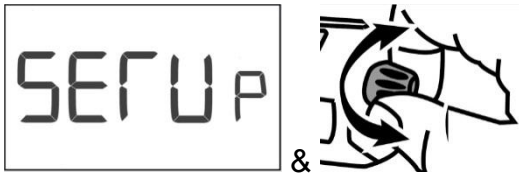



- No heating output as long as the Triac AT is in service menu mode
- Numbers of more than 4 digits are displayed as ticker
- Quit service menu by disconnecting tool from rated voltage only

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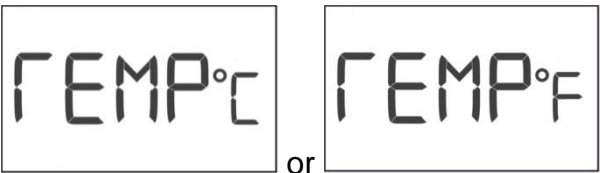

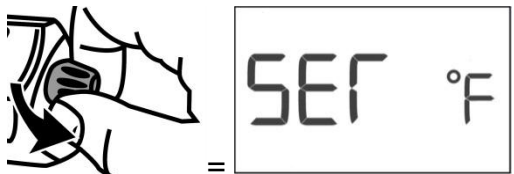
5.1 Service code

Requiring a service code prevents the user to enter the service menu accidentally.

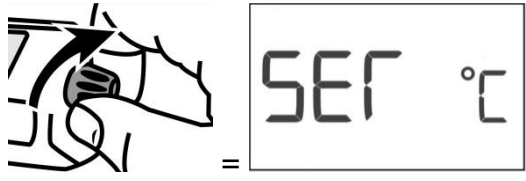


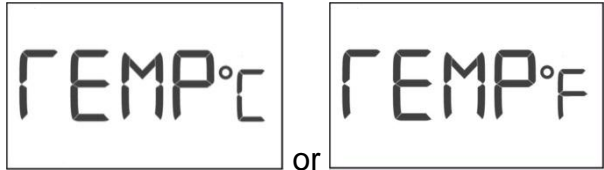
| | |
|--|--|
|  | <p>Press e-Drive control button and connect tool to line/mains at the same time</p> |
|  | <p>For 2 seconds "Setup" appears. Within this time first turn e-Drive control button one step to the right, then one step to the left (without pressing e-Drive control button at the same time)</p> |
|  | <p>First menu item pops up</p> |

5.2 Temperature unit

Triac AT enables to display the set and actual temperatures in °C or °F units. Select °C or °F unit in the service menu.

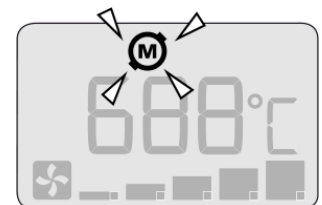
| | |
|---|--|
|  | <p>Menu item "Temperature unit" shows the selected temperature unit</p> |
|  | <p>Press e-Drive control button shortly to alter the temperature unit</p> |
|  | <p>Turning e-Drive control button counterclockwise selects °F temperature unit</p> |

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| | |
|--|---|
|  | Turning e-Drive control button clockwise selects °C temperature unit |
|  | Save the temperature unit selection and quit the menu item by pressing e-Drive control button for a long time (at least 1 second) |
|  | Not save the temperature unit selection and quit the menu item by pressing e-Drive control button shortly |
|  | Then menu item "Temperature unit" shows the selected temperature unit |

5.3 Reset of "Service recommended" announcement

After expiration of a preset time limit the display shows the announcement "Carbon brushes nearing end of life". The icon "Motor" flashes, but the Triac AT hot air tool may be used further on with no restrictions.












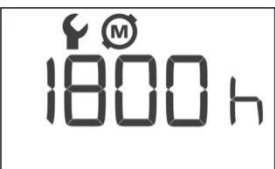
As long as this time is not expired the menu item "Reset service recommended" shows the number of hours until expiration.

If the warning notice "Reset service recommended" is still enabled, the number of hours will be displayed with a negative prefix. This number of hours corresponds with the time the warning notice was launched.

The operating time may be reset in the service menu. Doing so, the preset time limit of 1800h will be relaunched.


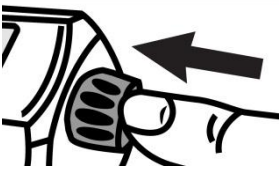




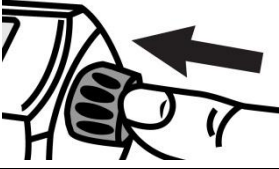
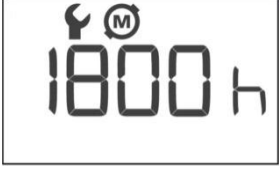
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5.3.1 From software version 1.02

| | |
|---|--|
|  | Menu item "Reset service recommended" indicates the number of hours until warning notice "Service recommended" will appear |
|  | Reset warning notice "Service recommended" by pressing e-Drive control button shortly |
|  | Unit "h" for hours is flashing |
|  =  | Select clearance for reset by turning e-Drive control button clockwise; this is indicated with a flashing "R" |
|  =  | Note: By turning e-Drive control button counterclockwise the clearance for release will be cancelled |
|  | Reset warning notice "Service recommended" and quit the menu item by pressing e-Drive control button for a long time (at least 1 second) while clearance |
|  | Not save the input and quit the menu item by pressing e-Drive control button shortly |
|  | Menu item "Reset service recommended" reappears |

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5.3.2 Software version 1.01 and earlier


| | |
|---|---|
|  | <p>Menu item "Reset service recommended" indicates the number of hours until warning notice "Service recommended" will appear</p> |
|  | <p>Reset warning notice "Service recommended" by pressing e-Drive control button shortly</p> |
|  | <p>"R" is displayed constantly</p> |
|  | <p>Select clearance for reset by turning e-Drive control button clockwise Software bug: Turning e-Drive control button clockwise more than one step, clearance for reset is alternately enabled and disabled; because clearance is not shown, the reset procedure possibly must be performed for several times</p> |
|  | <p>By turning e-Drive control button counter-clockwise the clearance for release will be cancelled</p> |
|  | <p>Reset warning notice "Service recommended" and quit the menu item by pressing e-Drive control button for a long time (at least 1 second) while clearance</p> |
|  | <p>Not save the input and quit the menu item by pressing e-Drive control button shortly</p> |
|  | <p>Menu item "Reset service recommended" reappears</p> |

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5.4 Operating hours counter


The operating hours counter indicates the blower operating time in hours.

Note: Tools with software versions up to 1.01 indicate the time the electronic circuit was energized. So, the warning notice "Service recommended" will be launched too early for tools connected to line/mains voltage, but not switched on.

| | |
|---|---|
|  | Menu item "Operating hours counter" indicates the operating hours |
|---|---|

5.5 Number of operation activations

Triac AT increases the number of operation activations with each connection of the tool to line/mains voltage. Line/mains interrupts are recorded as well.

| | |
|---|---|
|  | Menu item "Number of operation activations" indicates the number of operation activations |
|---|---|










5.6 Error code memory

The error code memory enables a previous history access for analysis purposes. Detailed descriptions of the error codes are given in chapter 14.

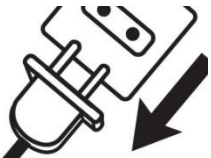
The error code memory records the latest 10 errors in register positions 0 to 9. If the same error iterates, the number of iterations (repetitions) will be recorded as well. A maximum of 255 iterations may be recorded. If this number exceeds the counter reading remains on 255.

As soon as a new error occurs, the previous error will not increase any more.

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| | |
|---|--|
|  | Menu item "Error code memory" indicates recorded error code (Error message and troubleshooting see chapter 14) Note: The error code is of three digits; lowercase digit indicates position in the error memory |
|  | Display alters by pressing e-Drive control button shortly |
|   | Display shows first occurrence of an error; unit "h" for hours and position number in the error memory are displayed alternating |
|  | Display alters by pressing e-Drive control button shortly |
|   | The number of iterations (repetitions) of this specific error code is displayed; "R" for repetition and position number in the error memory are displayed alternating Note: Number of 0 means, error occurred once but with no repetition |
|  | Display alters by pressing e-Drive control button shortly |
|  | Menu item "Error code memory" re-indicates recorded error code |

5.7 Quit menu

| | |
|---|---|
|  | There is no e-Drive control button manipulation to quit the service menu; disconnect tool from the line/mains |
|---|---|

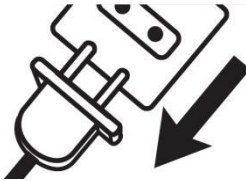

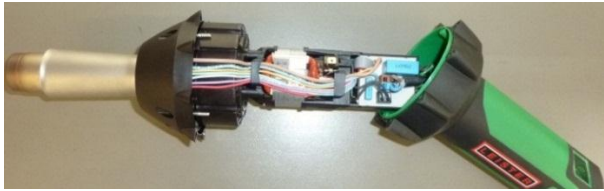
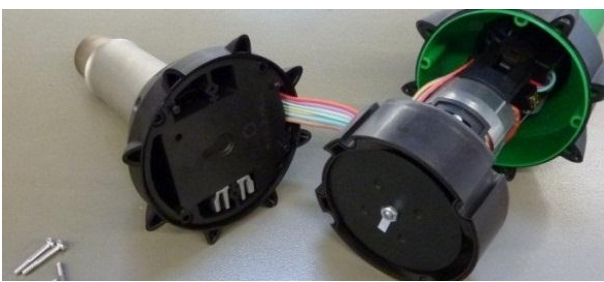

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6 Electronics



Caution: The following test procedure sometimes requires the tool to be connected to the line/mains. Insure the tool is disconnected from the line/mains before any work is commenced!

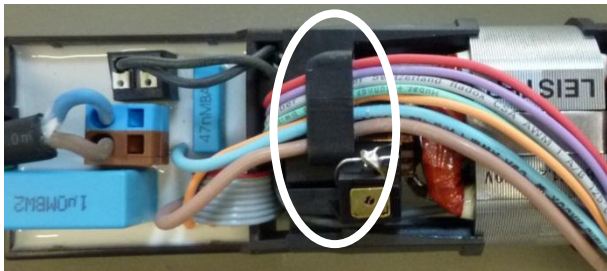
6.1 Opening tool

| | |
|---|---|
|  | Disconnet tool from the line/mains! |
|  | Loosen PT pan head cap screws KA35x20 (4x) |
|  | Extract handle |
|  | Put housing front aside |
|  | Extract print adapter front from blower housing top Attention: Do not damage thermocouple! |

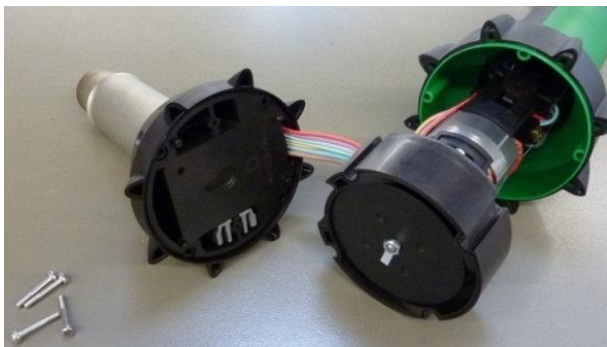
6.1.1 Handle

Replace handle if it is fairly worn out (abrasion, mechanical damage) or if the rubber is refractory or extremely soaked (sticky). It is recommended to affix a spare part nameplate to the replacement handle.

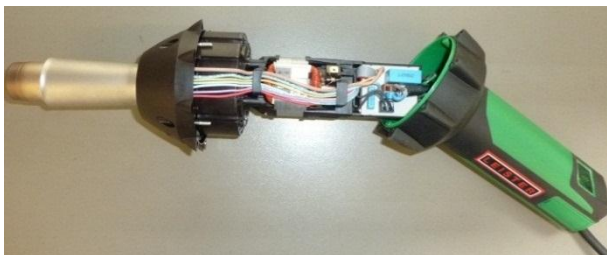
6.2 Tool assembling



Insert flex wires in correct order in retaining bracket: Brown, blue, orange, green, grey, violet, red (bottom-up in the photo)



Insert print adapter front in blower housing top
Make sure groove and cam fit properly



Put handle over the tool



Tighten PT pan head cap screws KA35x20 (4x) to cross

7 Electric components

7.1 Power supply cord

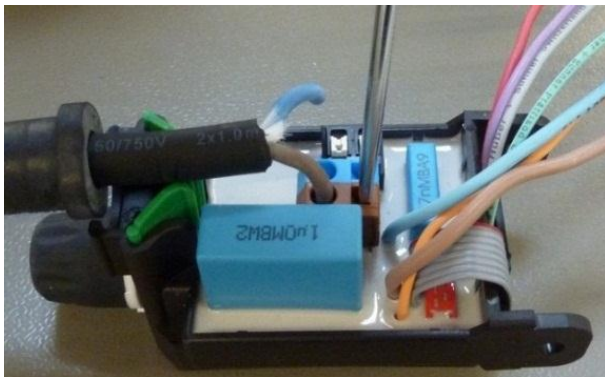
- Check power supply cord for mechanical damages (jacket insulation, sharp kink, plug)
- Check strain relief and terminal
- Check for short circuit and breaks by using a continuity checker/buzzer
- Replace cord guard as well when indicated

Continuity checker/buzzer, visual inspection

Replace power supply cord if it shows mechanical damage, short circuit or break



Extract power supply cord from strain relief clamps



Disconnect power supply cord from terminals: Press slotted screw driver size 1 in terminal, extract flex wires



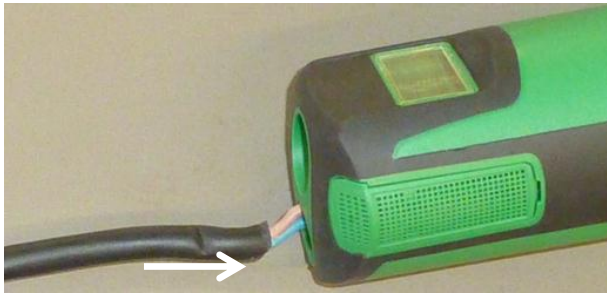
Extract power supply cord from cord guard and handle

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Insert replacement power supply cord from outside into the handle

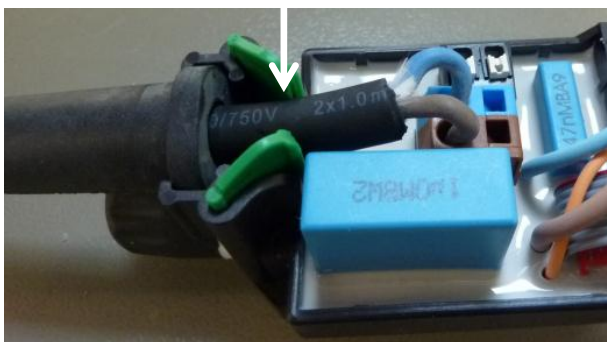


Insert power supply cord into cord guard



Press slotted screw driver size 1 in terminal;
connect flex wires to terminal

Keep an eye on correct color code!



Press power supply cord between strain
relief clamps

Note

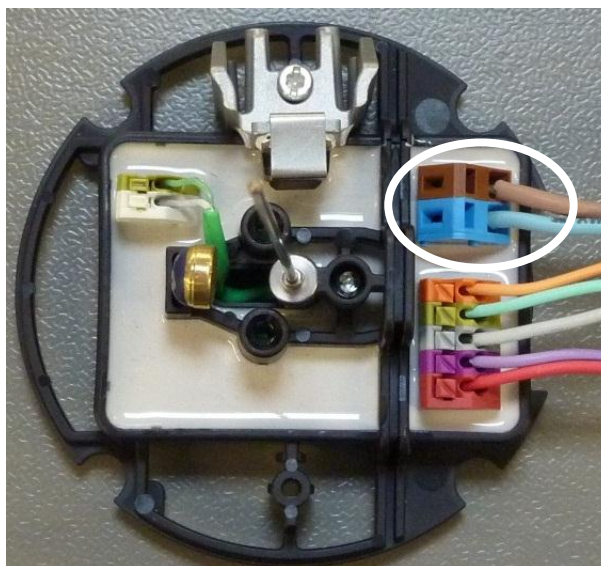
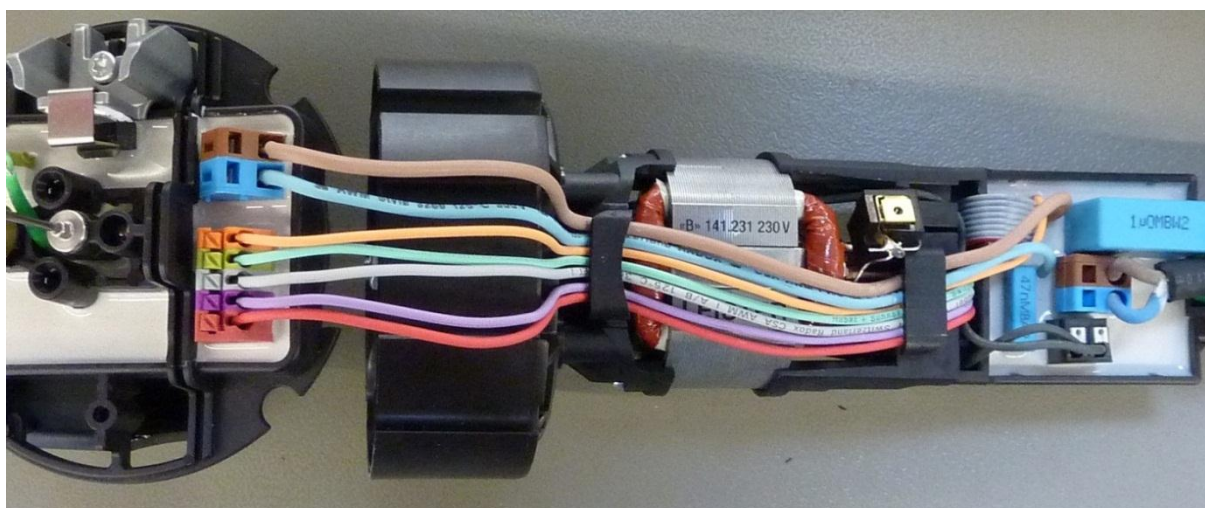
- Do not shorten the power supply cord! If the customer did so or if a third-party cord is used, the power supply cord has to be replaced.

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7.2 Internal wiring

- Check all flex wires for breaks, short circuits and mechanical damages
- Check correct wiring. Terminal and flex wires are of the same color (compare with illustration)




Visual inspection




Note

- Incorrect flex wires connection causes destruction of the electronic circuit boards!

7.3 Thermocouple

| | |
|---|---|
| | Open tool according to chapter 6.1 |
|  | <ul style="list-style-type: none"> • Check thermocouple for mechanical damages • Check correct connection of thermocouple (observe color code; short circuits caused by untwisted ends of flex wires) |
|  | <ul style="list-style-type: none"> • Measure ambient temperature • Disconnect thermocouple flex wires from terminal (press terminal lever with screw driver; extract flex wires) • Connect thermocouple to thermometer (calibration: Type K) <ul style="list-style-type: none"> ➔ Ambient temperature ($\pm 5^{\circ}\text{C}/10^{\circ}\text{F}$) • Heat thermocouple by using a hot air tool <ul style="list-style-type: none"> ➔ Temperature must increase • Short-circuit both thermocouple flex wires (green and white) • Measure resistance between short-circuited flex wires and thermocouple jacket <ul style="list-style-type: none"> ➔ Resistance $> 1\text{M}\Omega$ |
|  | <ul style="list-style-type: none"> • Replace thermocouple when indicated • Extract thermocouple from its support • Connect thermocouple to replacement electronic circuit board: Press terminal levers with a screw driver, connect thermocouple flex wires and insert thermocouple in support until it snaps in |
| | Reassemble tool in reverse order, terminate assembling according to chapter 6.2 |

| | | | |
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7.4 Electronic circuit boards



Caution! The following measurement sometimes requires the tool to be connected to the line/mains. Insure the tool is disconnected from the line/mains before any work is commenced!

7.4.1 Visual inspection


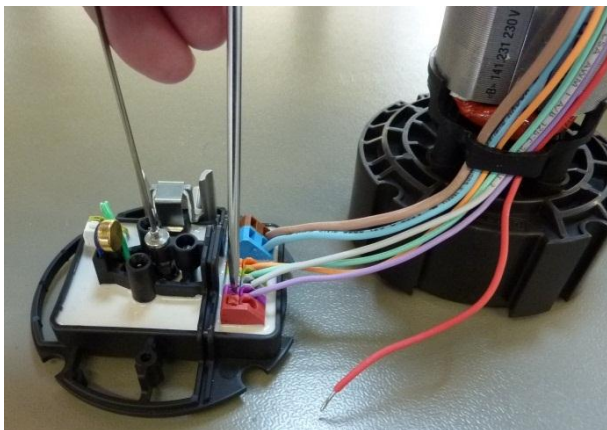
Check electronic circuit boards for visual error indications:

- Scorch marks, destroyed components
- Expanded/swelled parts

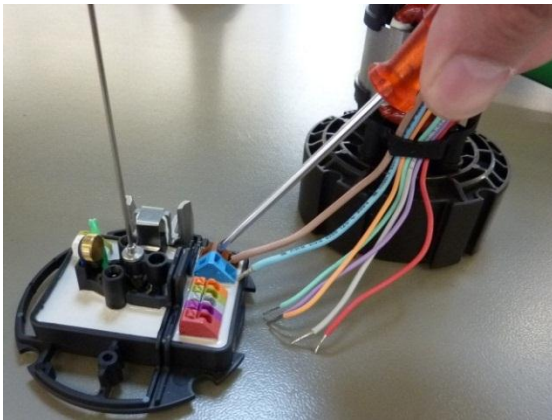
7.4.2 Function check

According to test procedure chapter 12

7.4.3 Replacement of the electronic circuit board in blower housing top

| | |
|---|---|
| | Open tool according to chapter 6.1 |
|  | Power supply (blue and brown flex wire): Press slotted screw driver in terminal, extract flex wires |
|  | Signal lines: Press terminal lever with a screw driver; extract flex wires |
| | Replace thermocouple according to chapter 7.3 and reassemble it to replacement electronic circuit board |

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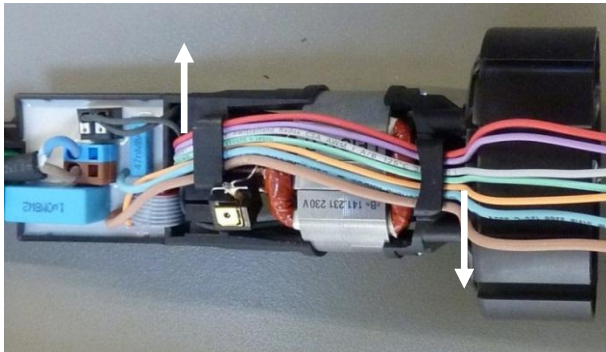
Power supply (blue and brown flex wire): Press slotted screw driver in terminal, connect flex wires

Signal lines: Connect flex wires without operating terminal levers; make sure terminal color corresponds with flex wire color

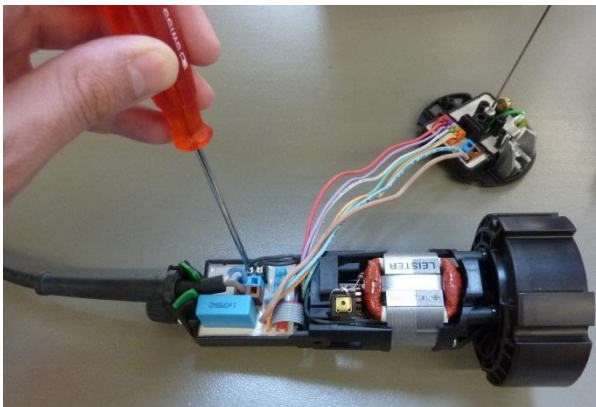
Reassemble tool in reverse order, terminate assembling according to chapter 6.2

7.4.4 Replacement of the electronic circuit board in the handle

Open tool according to chapter 6.1



Extract flex wires off the support



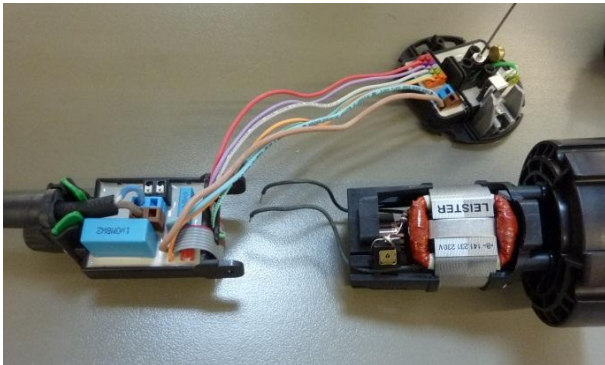
Remove motor flex wires from terminals: Press terminal lever by using a screw driver, extract flex wires

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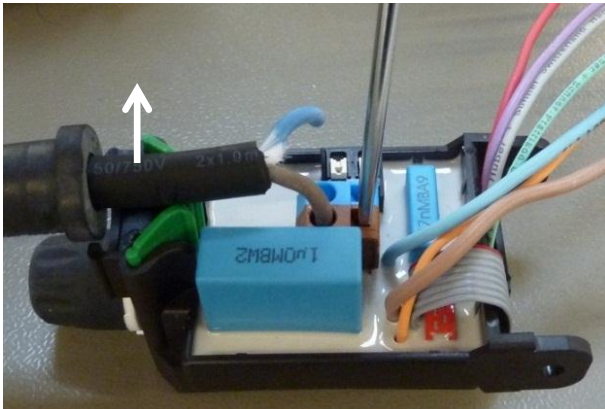
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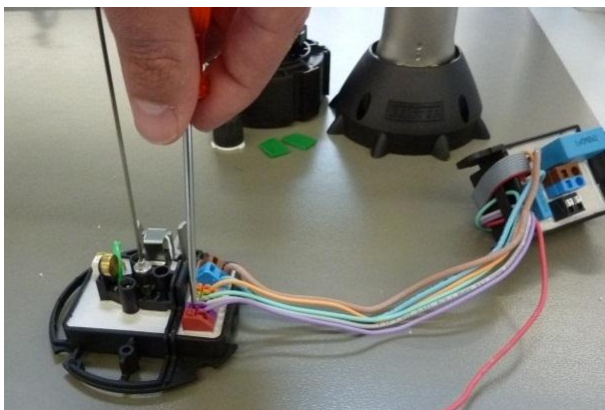
Detach rear electronic circuit support which is snapped on the motor end bell




Remove power supply cord: Press slotted screw driver (size 1) in terminal, extract flex wires

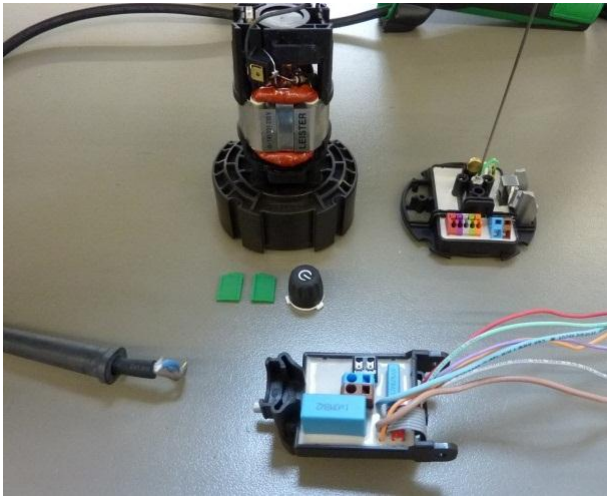


Power supply (blue and brown flex wire): Press slotted screw driver (size 1) in terminal, extract flex wires



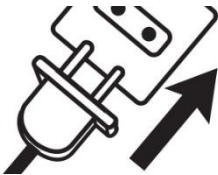


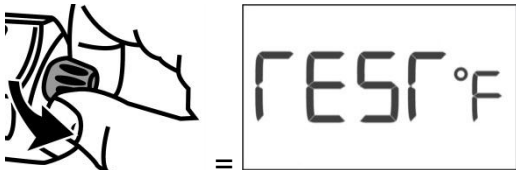
Remove signal lines from terminals: Press terminal lever with a screw driver; extract flex wires

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| | |
|---|---|
|  | Remove e-Drive control button knob and strain relief clamps from electronic circuit board support |
| | Reassemble tool in reverse order, terminate assembling according to chapter 6.2 |

7.4.5 Function check of the electronic circuit board in the handle

When switching on the replacement electronic circuit the first time the software requires an initial operation test.

| | |
|---|--|
|  | Connect Triac AT to rated voltage (according to nameplate) |
|  | Start Triac AT by pressing e-Drive control button for a long time (at least 1 second) |
|  | Display indicates "Test 2" (initial operation); tool must not heat, motor does not run |
|  | Turn e-Drive control button counterclockwise for at least one position; temperature unit °F is displayed |

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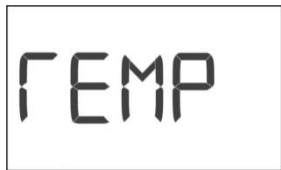
Turn e-Drive control button clockwise for at least one position; temperature unit °C is displayed



Save displayed temperature unit by pressing e-Drive control button shortly (may be altered in service menu, chapter 5.2); then tool starts heating



Triac AT heats with maximum power (possibly reduced by heating element protection only); blower runs on level 3; display shows thermocouple temperature without addition of ambient temperature; so, temperatures with negative prefix are possible during initial operation test



The measured temperature will be verified after 1000 gated line/mains half-waves; if the temperature is within the specified range the display indicates "TEMP" as acknowledge




Attach covering cap to heater tube (block air outlet)



The heating element protection circuit supervises the temperature and display indicates "HEP" (Heating Element Protection), if the maximum level is exceeded



The initial operation test is successfully completed if no errors and no warnings are reported; this will be saved and the display indicates "10"

| | | | | |
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8 Motor

8.1 Function check



Caution! The following measurement sometimes requires the tool to be connected to the line/mains. Insure the tool is disconnected from the line/mains before any work is commenced!

1. Loosen motor flex wires from print adapter rear
2. Connect motor to rated voltage
→ Motor must run steadily and its power consumption may not exceed 100W
3. Disconnect motor from rated voltage!

Wattmeter



Notes

- Excessive noise indicates a bearing defect
→ Replace motor (see chapter 8.4)
- Power consumption >100W indicates a commutator defect
→ Replace motor (see chapter 8.4)
- Unsteady noise (jolting, loose contact)
→ Check carbon brushes (see chapter 8.3)
- Vibrations
→ Slightly loosen hexagon nut and position impellers by rotating against each other in such a way until the unbalance is cancelled; fasten hexagon nut

8.2 Commutator check

Check commutator:

- Worn out lamella
- Bluish discoloration
- Deep groove (U-shaped)

Visual inspection

If a defect is detected, replace motor (see chapter 8.4)

8.3 Check carbon brushes

Remove carbon brushes, measure its length and replace them if their length measure 4mm or even less. Check both carbon brushes! If the carbon brushes are to be replaced reset timer "Service recommended" in the service menu (chapter 5.3). If the carbon brushes are not to be replaced make sure to re-insert them the same way (abrasion). *Calliper gauge, scale*

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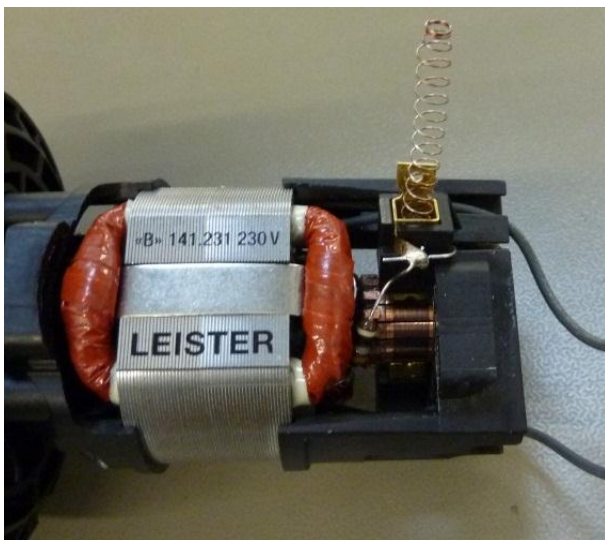
Open tool according to chapter 6.1



Carefully bend up the ear of the carbon brush support and remove carbon brush
Caution, spring is under tension!
Notice fitting position



Measure length of carbon brush
Check contact surface for scorch marks
(if a "carbon brush jam" is detected replace carbon brushes as well as carbon brush supports)
Check both carbon brushes!

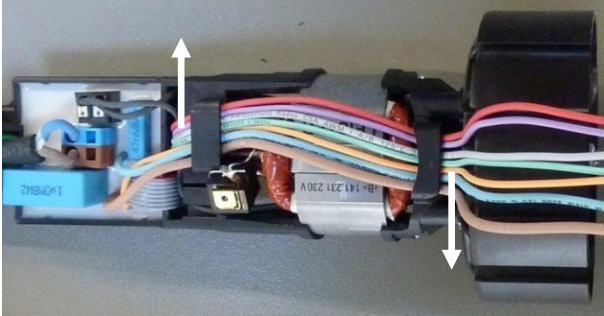
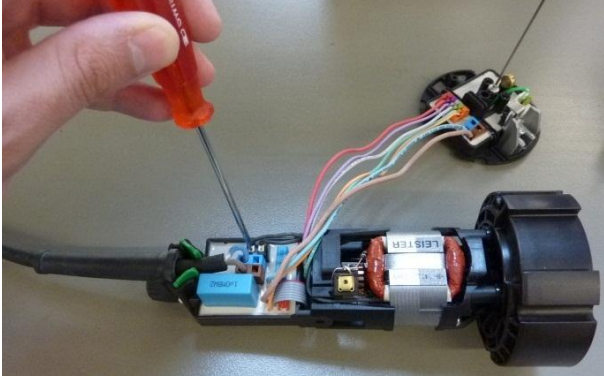

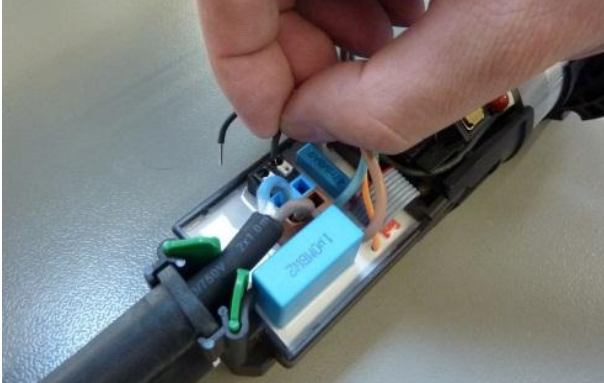


Re-insert the carbon brushes in the same fitting position

Reset timer "Service recommended" in the service menu (chapter 5.3)

Function check according to chapter 8.1


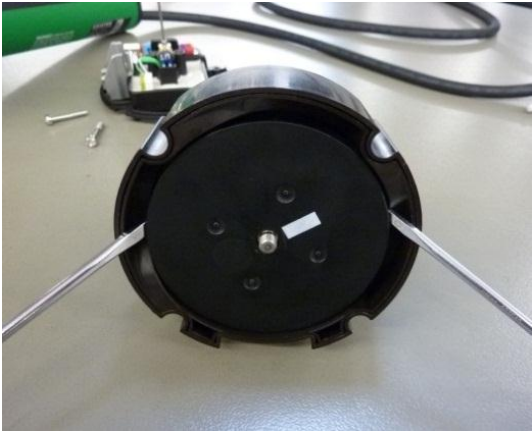

8.4 Replace motor

| | |
|---|--|
| | Open tool according to chapter 6.1 |
|  | Remove motor flex wires: Extract flex wires off the supports on the motor |
|  | Remove motor flex wires: Press terminal levers by using a screw driver, extract flex wires |
|  | Detach rear electronic circuit support which is snapped on the motor end bell |
|  | Reassemble tool in reverse order, terminate assembling according to chapter 6.2 Note: Connect motor flex wires without operating terminal levers Reset timer "Service recommended" in the service menu (chapter 5.3) |

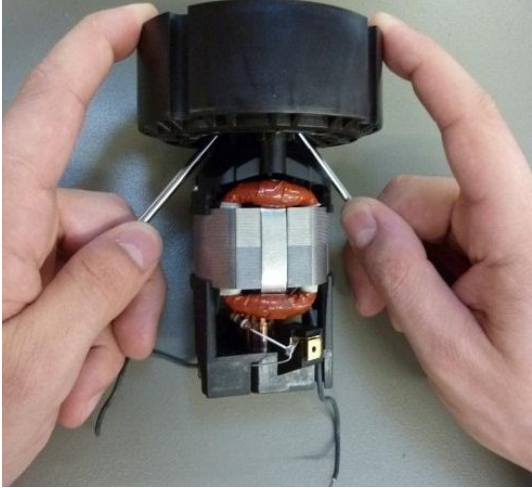
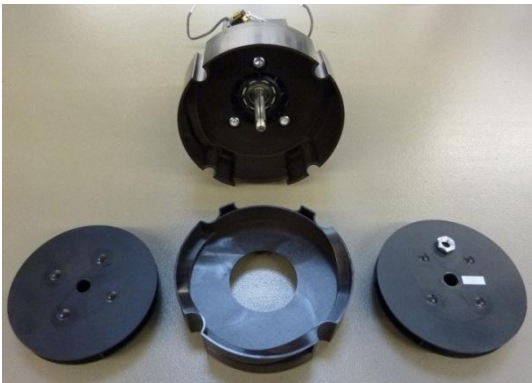
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8.5 Replace impellers

Replace impellers if they are damaged or essentially deformed. We advise polluted impellers to be replaced rather than to be cleaned.

| | |
|---|--|
| | <p>Open tools according to chapter 6.1</p> |
|  | <p>Loosen hexagon nut by using a socket wrench (no. 8)</p> |
|  | <p>Remove upper impeller by using two screw drivers</p> |
|  | <p>Remove deflector</p> |

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| | |
|--|--|
|  | <p>Move the lower impeller to the top; as soon as it is enough far from the bottom, it may be removed the same way as the upper turbine.</p> <p>Note: After extraction the impellers are damaged and not to be used anymore!</p> |
|  | <p>Assemble replacement impellers in reverse order</p> <p>Note: The deflector is asymmetrically shaped; there is just one fitting position</p> |
| <p>Function check according to chapter 8.1</p> | |

9 Cleaning

Clean the tool!

If the air filters of the handle are defective or missing, they are to be replaced. If the air filters are clogged, clean them according to the operating manual and give a message to the customer like as follows:

Clean the air filters at the end of the handle with a small brush if polluted!

10 Heating element



Loosen PT pan head cap screws KA35x20 (4x) and remove heater tube with mica tube



Heating element may be removed now; gasket will be extracted with heating element from the blower housing top

- Do a visual check of the heating element at every repair; replace the heating element if it is either mechanically damaged or if any heating channels are clogged
- Check resistance of heating element by using an ohmmeter

Ohmmeter



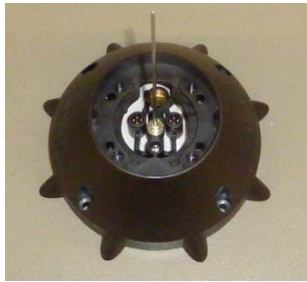
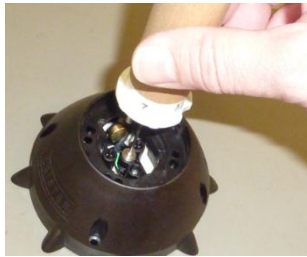

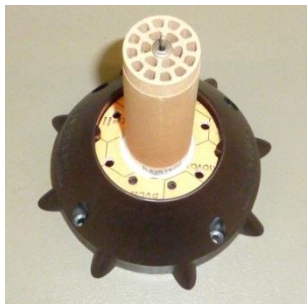

| Voltage [V] | Power [W] | Resistance [Ω] |
|-------------|-----------|-------------------------|
| 100 | 1350 | approx. 7 |
| 120 | 1550 | approx. 9 |
| 230 | 1550 | approx. 34 |

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| | |
|---|--|
|  | <p>Prior to assembling the heating element assemble thermocouple to print adapter front as described in chapter 7.4.3; connect all flex wires, then insert entire sub-assembly in blower housing top</p> |
|  | <p>Carefully attach heating element over thermocouple; make sure the plug pins are plugged into the sockets ("cages") of the blower housing top when assembling</p> |
|  | <p>Check heating element position: Groove of heating element must match cam of blower housing top</p> |
|  | <p>Insert gasket; make sure both grooves match cams of blower housing top</p> |
|  | <p>Cover heating element with mica tube; ensure by slightly turning the mica tube passes through the gasket</p> <p>Note: If the heating element must be replaced, the mica tube usually must be replaced as well</p> |

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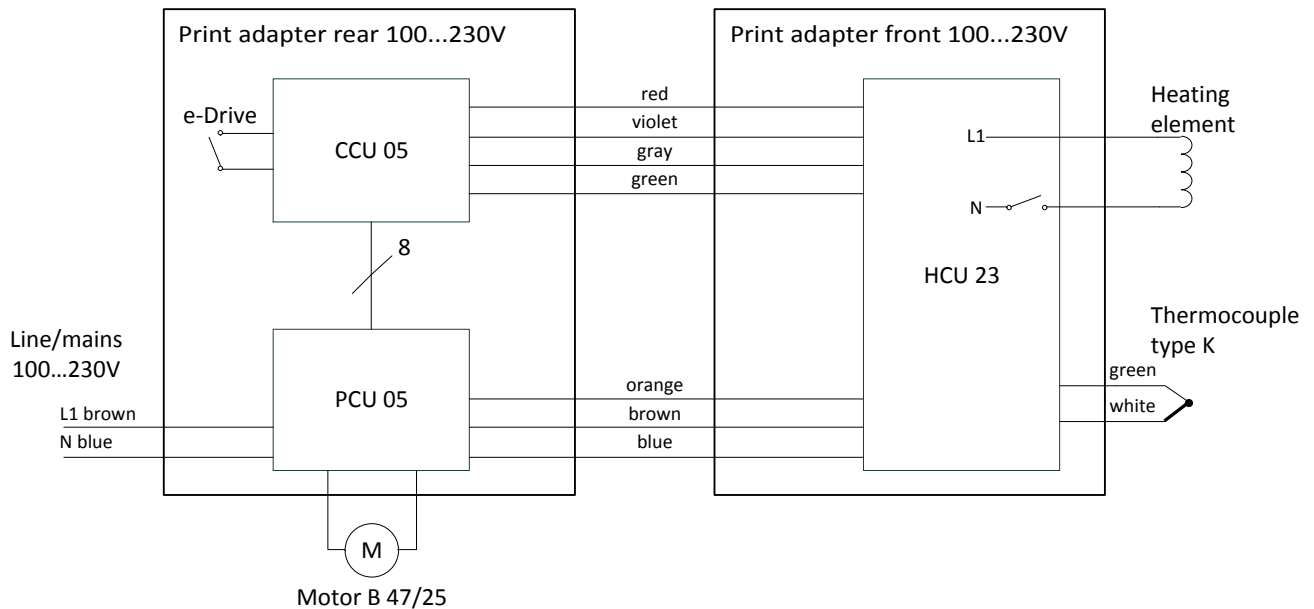



Assemble heater tube; make sure both grooves match cams of the blower housing top



Tighten PT pan head caps screws KA35x20 (4x) to cross

11 Wiring diagram



| | | | | |
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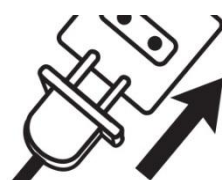
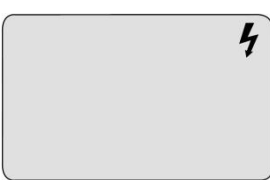

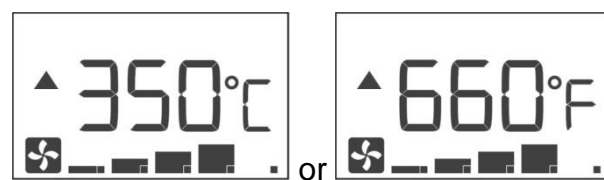

12 Test procedure for TRIAC AT (protection class II)

Insulation test

- Function check of the high voltage tester:
Shorten tips → Signal lamp illuminates and horn sounds
- Apply a high voltage of 2500V (release current < 30mA) for 1 second between line/mains plug and protection tube of the heating element; no flashover or breakdown must occur



Function test

| | | |
|---|----------------------|---|
|  | | Attach tubular nozzle \varnothing 5/8mm to heater tube and connect Triac AT to rated voltage |
|  | | Check display (tool does not heat, blower motor does not run) |
|  | | Switch tool on (press e-Drive control button for at least 1 second) |
|  | | Turn e-Drive control button at least one step clock- and one step counterclockwise (temperature setting) Press e-Drive control button and then turn at least one step clock- and one step counterclockwise (airflow setting) |
| | | Set temperature to 700°C (1290°F) and airflow to step 5 |
| Rated voltage | Rated current | Check maximum power consumption, respectively maximum current during heating up procedure |
| 100 V | 14.0 A | |
| 120 V | 13.5 A | |
| 230 V | 7.0 A | |
|  | | Wait for 5 minutes until set temperature is achieved; no error or warning message may occur |

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Check air outlet temperature: Insert external thermocouple 5mm into the center of the tubular nozzle; thermocouple must not touch nozzle at all

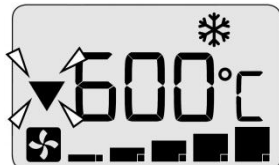
Temperature 700°C (1290°F) $\pm 20^{\circ}\text{C}$ (40°F)
If temperature is below 600°C (1110°F), the mica tube is possibly not assembled



Attach covering cap to heater tube (block air outlet): After a few seconds the heating element protection circuitry must act; current/power consumption will be reduced
Remove covering cap



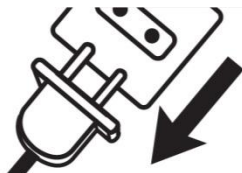
Switch tool off (press e-Drive control button for at least 1 second)




Let the tool cool down



Tool switches off automatically after termination of the cooling down procedure (check display)



Disconnect tool from rated voltage

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Checking completeness

- Check printed details on the nameplate: Type, voltage, current, power consumption (must correspond with the above measurements!)
- Check serial number (xxyyzz0000)
 - xx: year of production
 - yy: month of production
 - zz: day of production
 - 0000: consecutive number
- Company label LEISTER must be neatly printed on the handle
- Warnings must be printed on the handle
- Check power supply cord mechanically and electrically (correct plug type for country, conductor cross-section as per rated current)
- Both air filters must be fitted
- All screws must be tightened
- Check for cleanliness and possible damage
- Shake tool: Heating element may not hit heater tube (otherwise mica tube is missing)


13 Equipment required for Leister repair service

Mobile equipment

- 1 protective earth conductor tester (e.g. Elabo)
- 1 high voltage tester up to 4000V (e.g. Elabo, Korntal)
- 1 temperature meter with temperature measurement probe (e.g. Fluke, Testo)
- 1 multimeter with following measurement options: (e.g. Fluke)
 - Current
 - Voltage
 - Resistance
 - Continuity (test buzzer)
- 1 rotational speed meter
- 1 water column
- 1 soldering iron
- 1 complete set of tools (screw drivers etc.)

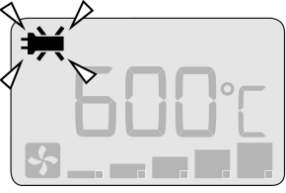
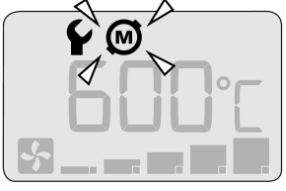
Installed equipment

- ESD-protected working environment
- Transformer, possibly separated into variable and isolating transformer
 - Data: 3 x 0..500V
 - 3 x 30A
- 3 built-in voltmeters (500V)
- 3 built-in ammeters (30A) or wattmeters

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14 Error messages and repair methods

The Triac AT display indicates error messages as hex codes. They are saved in the error memory. Several error codes are indicated with special views (see column Reason).

| Error no. | Reason | Description / Repair method(s) |
|----------------------------------|--|---|
| E001h | Thermocouple interrupt (test 2) | <i>Error is indicated in test 2 (initial operation) only; occurring during normal operation would initiate limited operation.</i> Thermocouple defective or incorrectly connected 1.) Check thermocouple connection (chapter 7.3) 2.) Replace thermocouple (chapter 7.3) 3.) Replace print adapter front (chapter 7.4.3) |
| E002h | Thermocouple short-circuited | Thermocouple defective or incorrectly connected 1.) Check thermocouple connection (chapter 7.3) 2.) Replace thermocouple (chapter 7.3) |
| E003h | Heating element interrupted  | Heating element burnt-out or not assembled 1.) Check heating element connection (chapter 10) 2.) Replace heating element (chapter 10) |
| E005h | Motor interrupt  | Carbon brushes worn out or coil interrupt 1.) During test 2 (initial operation): Check motor connection 2.) Check motor (chapter 8.1) |
| E010h | Invalid log command | Communication error print adapter rear / print adapter front 1.) Check cable loom 2.) Replace print adapter front (chapter 7.4.3) 3.) Replace print adapter rear (chapter 7.4.4) |
| E011h E012h E013h E014h | Calibration value - ADC Gain Vu 8 - ADC Offset Vu 1 - ADC Gain Vu 1 - ADC Ambient temperature out of tolerance | Print adapter front defective or uncalibrated <i>Incorrect data communication can cause the same error.</i> 1.) Check cable loom 2.) Replace print adapter front (chapter 7.4.3) |
| E015h E016h | Ambient temperature - too high - too low | Blower housing temperature (print adapter front) > 90°C <i>Blower housing temperature may exceed ambient temperature upto 25°C due to motor lost heat.</i> 1.) If this temperature is not plausible, replace print adapter front (chapter 7.4.3) |
| E01Bh | Overvoltage | Line/mains voltage > 265V detected (if line/mains voltage at turn-on instant was > 150V; otherwise the limit is 138V) 1.) Check line/mains voltage 2.) Replace print adapter front (chapter 7.4.3) |

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| Error no. | Reason | Description / Repair method(s) |
|----------------|---|---|
| E020h | Zero crossing detection fail | Zero crossing detection of line/mains voltage failed 1.) Replace print adapter rear (chapter 7.4.4) |
| E02Dh | Print adapter front coded with old software version | Print adapter front launched in prototype stage <i>Print adapter rear detects the same error if either data communication is incorrect or if print adapter front is uncalibrated.</i> 1.) Check cable loom 2.) Replace print adapter front (chapter 7.4.3) |
| E02Eh | Calibration value ambient temperature incorrect during calibration | Print adapter front defective or uncalibrated <i>Incorrect data communication can cause the same error.</i> 1.) Check cable loom 2.) Replace print adapter front (chapter 7.4.3) |
| E02Fh | Write fault error on serial interface | Communication error print adapter rear / print adapter front <i>Faulty zero crossing detection or defective electronic circuit board print adapter rear indicate the same error code.</i> 1.) Check cable loom 2.) Replace print adapter rear (chapter 7.4.4) 3.) Replace print adapter front (chapter 7.4.3) |
| E040h | Print adapter front coded with old software version | Print adapter front launched in prototype stage <i>Contrary to E02Dh faulty software version only launches this error code.</i> 1.) Replace print adapter front (chapter 7.4.3) |
| E042h | Calibration value ADC Offset Vu 8 out of tolerance | Print adapter front defective or uncalibrated <i>Incorrect data communication can cause the same error.</i> 1.) Check cable loom 2.) Replace print adapter front (chapter 7.4.3) |
| E044h | No function test performed | No successfully completed function test saved in EEPROM of print adapter rear 1.) Replace print adapter rear (chapter 7.4.4) |
| E046h | Invalid EEPROM data | Invalid data in EEPROM of print adapter rear 1.) Replace print adapter rear (chapter 7.4.4) |
| E049h | Printed circuit board is in test environment for incoming goods though incoming goods test is already successfully completed (test 1) | Accidentally repeat incoming goods test <i>If this error occurs while the printed circuit board is not in the test adapter for incoming goods test, there is either a solder spot on the printed circuit board or a misplacement of components occurred.</i> 1.) If printed circuit board is connected to the test adapter for incoming goods – remove it because test is already passed 2.) Otherwise replace print adapter rear (chapter 7.4.4) |
| E04Ah | Communication error | Incorrect print adapter front responses 1.) Check cable loom 2.) Replace print adapter front (chapter 7.4.3) 3.) Replace print adapter rear (chapter 7.4.4) |
| E04Bh E04Ch | - Wrong air quantity - Wrong set value at limited operation | Error for further development (removed in version V1.01) 1.) Replace print adapter rear (chapter 7.4.4) |
| E04Dh | Unknown hardware identifier | Hardware version of printed circuit board unknown 1.) Replace print adapter rear (chapter 7.4.4) |
| E04Eh | Incorrect zero crossing detection of supply voltage | 1.) Check voltage supply 2.) Replace print adapter rear (chapter 7.4.4) |

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| Error no. | Reason | Description / Repair method(s) |
|----------------|--|---|
| E054h E058h | Write fault error on serial interface Transmission time on serial interface too short | Communication error print adapter rear / print adapter front <i>Faulty zero crossing detection or defective electronic circuit board print adapter rear indicate the same error code.</i> 1.) Check cable loom 2.) Replace print adapter rear (chapter 7.4.4) 3.) Replace print adapter front (chapter 7.4.3) |
| E062h | Thermocouple temperature too low (test 2) | Thermocouple defective or incorrectly connected <i>Temperature < 50°C after 1000 gated half-waves. Error indication in test 2 (initial operation) only.</i> 1.) Check thermocouple connection 2.) Replace thermocouple (chapter 7.3) |
| E064h | Printed circuit board is in test environment for function test though function test is already successfully completed (test 0) | Accidentally repeat function test <i>If this error is displayed while the printed circuit board is not in the test adapter for function test there is either a solder spot on the printed circuit board or a misplacement of components occurred.</i> 1.) Remove electronic circuit board if it is in the test environment for function test; no action required 2.) Otherwise replace print adapter rear (chapter 7.4.4) |
| E066h | End of test may not be saved (test 2) | Incorrect data in EEPROM 1.) Replace print adapter rear (chapter 7.4.4) |
| E067h | Maximum number of write cycles reached | Too many EEPROM write cycles (983025x) <i>No more data may be saved in the EEPROM.</i> 1.) Replace print adapter rear (chapter 7.4.4) |
| E068h | Thermocouple temperature too high (test 2) | Thermocouple defective or incorrectly connected <i>Temperature > 150°C after 1000 gated half-waves. Error indication in test 2 (initial operation) only.</i> 1.) Check thermocouple connection 2.) Replace thermocouple (chapter 7.3) |
| E069h | Thermocouple temperature too low from the start (test 2) | Thermocouple defective or incorrectly connected <i>When turning on the measured temperature is < -50°C. Error indication in test 2 (initial operation) only.</i> 1.) Check thermocouple connection 2.) Replace thermocouple (chapter 7.3) |
| E06Ah | Thermocouple temperature too high from the start (test 2) | Thermocouple defective or incorrectly connected <i>When turning on the measured temperature is > 50°C. If the tool is still warm, the thermocouple may measure this temperature. Error indication in test 2 (initial operation) only.</i> 1.) Cool the tool down 2.) Check thermocouple connection 3.) Replace thermocouple (chapter 7.3) 4.) Replace print adapter front (chapter 7.4.3) |
| E06Eh | Invalid EEPROM address selected | Safety function prevents data writing in invalid address <i>If this error occurs for several times the processor is defective.</i> 1.) Replace print adapter rear (chapter 7.4.4) |
| E06Fh | EEPROM data written by old software version | Error at first switching-on after software update <i>Tool transfers data in another format. In all other cases the processor is defective.</i> 1.) Switch the tool on once again 2.) Replace print adapter rear (chapter 7.4.4) |

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| Error no. | Reason | Description / Repair method(s) |
|----------------|---|--|
| E072h E073h | - Overvoltage - Undervoltage detected (test 2) | Over-, respectively undervoltage at test 2 (initial operation) <i>If operating voltage is correct, print adapter front is defective or not correctly calibrated.</i> 1.) Check voltage supply 2.) Replace print adapter front (chapter 7.4.3) |
| E074h | Thermocouple interrupt (test 2) | Thermocouple defective or incorrectly connected <i>Thermocouple interrupt is detected at the end of test 2 (initial operation).</i> 1.) Check thermocouple connection 2.) Replace thermocouple (chapter 7.3) |
| E075h | Zero crossing detection failed (test 2) | Missing line/mains voltage synchronization <i>Synchronization with line/mains voltage got lost in test 2 (initial operation), or print adapter rear is defective.</i> 1.) Check voltage supply 2.) Replace print adapter rear (chapter 7.4.4) |
| E076h | Temperature limit switch open (test 2) | <i>Open temperature limit switch detected in test 2 (initial operation).</i> 1.) Check voltage supply 2.) Replace print adapter front (chapter 7.4.3) |
| E077h | Over-current of power switch A | Measured current is too high <i>Possibly a wrong heating element was assembled or measurement circuitry is defective.</i> 1.) Check heating element 2.) Check voltage supply 3.) Replace print adapter front (chapter 7.4.3) |
| E078h E079h | Reserved for future tools | Misplacement of components or defective print adapter rear 1.) Replace print adapter rear (chapter 7.4.4) |
| E07Ah | Service recommended is displayed (test 2) | <i>Test 2 (initial operation) indicates "Service recommended". Usually this warning notice appears after 1800 hours of operation. Carbon brushes should be replaced and this should be saved in the service menu. Because test 2 will be performed with new tools only, print adapter rear is defective.</i> 1.) Replace print adapter rear (chapter 7.4.4) |
| E07Bh | Control deviation (test 2) | <i>The tool is operated in set mode during test 2 (initial operation). So, this warning notice may not occur. Print adapter rear is defective.</i> 1.) Replace print adapter rear (chapter 7.4.4) |
| E07Ch | E-Drive lock activated (test 2) | <i>E-Drive lock was activated in test 2 (initial operation); this is not allowed. Print adapter rear is defective.</i> 1.) Replace print adapter rear (chapter 7.4.4) |
| E07Dh | Disabled error indicated (test 2) | <i>Test 2 (initial operation) detected a disabled error. Print adapter rear is defective.</i> 1.) Replace print adapter rear (chapter 7.4.4) |
| E07Eh | Thermocouple measurement malfunction (test 2) | <i>Thermocouple detects real temperature variations in test 2 (initial operation). The root is possibly a loose contact.</i> 1.) Check voltage supply 2.) Check thermocouple connection 3.) Replace thermocouple (chapter 7.3) |