

# REPAIR INSTRUCTIONS



## Hot Air Tools energy HT1600 / HT3400

© 2016 Weldy AG, CH-6056 Kaegiswil / Switzerland

These repair instructions may not be distributed or reproduced in part or in whole in any form without prior written consent from Weldy AG.

**Weldy AG, Galileo-Strasse 10, CH-6056 Kaegiswil / Switzerland**  
Tel. +41 41 662 74 74 / Fax +41 41 662 74 16

[distributors@weldy.com](mailto:distributors@weldy.com)

## Table of contents

<b>1</b>	<b>Scope of applicability</b> .....	<b>3</b>
<b>2</b>	<b>Safety precaution</b> .....	<b>3</b>
<b>3</b>	<b>Remarks</b> .....	<b>3</b>
<b>4</b>	<b>Safety</b> .....	<b>3</b>
<b>5</b>	<b>Errors and possible causes</b> .....	<b>4</b>
<b>6</b>	<b>Tool</b> .....	<b>6</b>
6.1	Tool disassembling .....	6
6.2	Tool assembling .....	7
<b>7</b>	<b>Electric components</b> .....	<b>8</b>
7.1	Power supply cord.....	8
7.2	Internal wiring.....	10
7.3	Potentiometer.....	11
7.4	Electronic circuit boards .....	12
<b>8</b>	<b>Motor</b> .....	<b>16</b>
8.1	Function check.....	16
8.2	Commutator check.....	16
8.3	Check carbon brushes .....	17
8.4	Replace motor with blower .....	18
<b>9</b>	<b>Cleaning</b> .....	<b>19</b>
9.1	Tool.....	19
9.2	Electronic circuit.....	19
<b>10</b>	<b>Heating element</b> .....	<b>20</b>
<b>11</b>	<b>Wiring diagram</b> .....	<b>22</b>
<b>12</b>	<b>Test procedure for energy HT1600 / HT3400 (prot. class II)</b> .....	<b>23</b>
<b>13</b>	<b>Equipment required for WELDY repair service</b> .....	<b>26</b>
<b>14</b>	<b>Troubleshooting</b> .....	<b>27</b>
14.1	Tool does not heat .....	27
14.2	Motor does not run.....	28
14.3	Air temperature too low / too high .....	29

## 1 Scope of applicability

These repair instructions are reserved exclusively for qualified and authorized service centres. Only experienced and qualified personnel are allowed to do repair work on WELDY tools. Additional national requirements relative to personnel carrying out repair work are to be observed by each service centre.

## 2 Safety precaution

A well-equipped ESD-protected working place is essential for doing qualified work. For safety reasons use only identical original WELDY replacement parts for each type of tools when servicing.

### Warning!



If you open the tool or remove its parts, except the ones which 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 WELDY **test procedure** (see chapter 12) and any additional local requirements. Check with your local Statutory Authority for testing requirements.

## 3 Remarks

- Each repaired tool has to pass the **test procedure**!
- If there exists any additional national testing requirements exceeding the WELDY test procedure, the repaired tool has also to pass those requirements.
- If it is impossible to repair a tool, it should be returned immediately to the manufacturer.
- When ordering spare parts use the order numbers of the spare parts list. **When servicing use only identical original WELDY replacement parts!**
- Due to our continuing program of research and development, the specifications herein are subject to change without prior notice.

## 4 Safety



**Caution:** The following instruction 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!

## 5 Errors and possible causes

Error	Possible cause	Method of resolution
No function  Tool does not heat and motor does not run	Wiring error	If the flex wires for power supply (blue and brown) at the print adapter front terminal are inverted, the electronic circuit was destroyed (chapter 7.4.3)
	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 9)
	Heating element defective	Replace heating element (chapter 9)
	Triac defective	Replace print adapter front (chapter 7.4.3) or print adapter rear (chapter 7.4.4)
	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 or blocked	Replace carbon brushes (chapter 8.3)
	Check motor (chapter 8)	Replace motor (chapter 8.4), respectively print adapter rear (chapter 7.4.4)
Air temperature not achieved	Incorrect temperature measurement	Measure temperature according to chapter 0
	Heating element with incorrect voltage rating	Replace heating element (chapter 9)
	Mica tube is missing	Assemble mica tube

<b>Error</b>	<b>Possible cause</b>	<b>Method of resolution</b>
Air temperature exceeds range	Photo transistor polluted	Clean photo transistor 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	
Temperature limit switch acts often / over and over	Tool's air flow is too little	Clean air filters (chapter 9)
		Check nozzle and heating element for obstruction (clean or replace)
	Temperature limit switch in blower housing defective	Replace print adapter front (chapter 7.4.3)
	Motor does not run, respectively turns too slowly	Replace motor (chapter 8.4)

## 6 Tool



**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 Tool disassembling

	<p>Disconnect tool from the line/mains!</p>
	<p>Loosen PT pan head cap screws (4x)</p>
	<p>Remove the rubber band</p>
	<p>Extract handle</p>
	<p>Put housing front aside</p>

<p>energy HT      www.weldy.com</p>	<p>Extract print adapter front from blower housing top</p>
-------------------------------------	--

## 6.2 Tool assembling

<p>energy HT      www.weldy.com</p>	<p>Fix the cables by cable ties</p>
-------------------------------------	-------------------------------------

<p>energy HT      www.weldy.com</p>	<p>Insert print adapter front in blower housing top. Make sure groove (below terminals) and cam fit properly</p>
-------------------------------------	--

<p>energy HT      www.weldy.com</p>	<p>Make sure, that the black O-Ring and Potentiometer knob are assembled.</p>
-------------------------------------	---

<p>energy HT      www.weldy.com</p>	<p>Put handle over the tool. Make sure that the power supply cord and the potentiometer have the correct positions in the handle</p>
-------------------------------------	--



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

## 7 Electric components

The electronic circuit boards are equipped with spring terminals. Extract, respectively insert flex wires from/to terminals by using an actuating tool (i.e. Wago 210-719) or a screw driver (size 0).

### 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 circuits and breaks by using a continuity checker/buzzer
- Replace cord guard as well as required


*Continuity checker/buzzer, visual inspection*

#### 7.1.1 Remove power supply cord from terminal

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

	Disassemble tool according to chapter 6.1
	Extract power supply cord from strain relief clamps
	Disconnect power supply cord from terminals: Press actuating tool in terminals, extract flex wires
	Extract power supply cord from cord guard and handle



	<b>Repair instructions</b> <b>energy HT1600 / HT3400</b> <b>Revision: B</b>	Page	9 / 29
		Created	29.01.16 CA
		Released	29.01.16 PKA
		Modified	06.12.16 CA

### 7.1.2 Assemble power supply cord and cord guard

Remove power supply cord from terminals according to chapter 7.1.1. Replace cord guard if it is damaged.

 <p>energy HT</p>	<p>Insert replacement power supply cord from outside into the handle</p>
 <p>energy HT</p>	<p>Insert power supply cord into new cord guard (included at spare part power supply cord)</p>
 <p>energy HT</p>	<p>Press actuating tool in terminals, insert flex wires to terminals up to end stops, extract actuating tool</p> <p>Keep an eye on correct colour code!</p>
 <p>energy HT</p>	<p>Press power supply cord between strain relief clamps. The strain relief clamps are available in different colours, depending on the power supply cord size. Make sure to re-insert strain relief clamps of the same original colour when servicing.</p> <p>Make sure that the cord guard is on correct position.</p>
	<p>Assemble tool according to chapter 6.2</p>

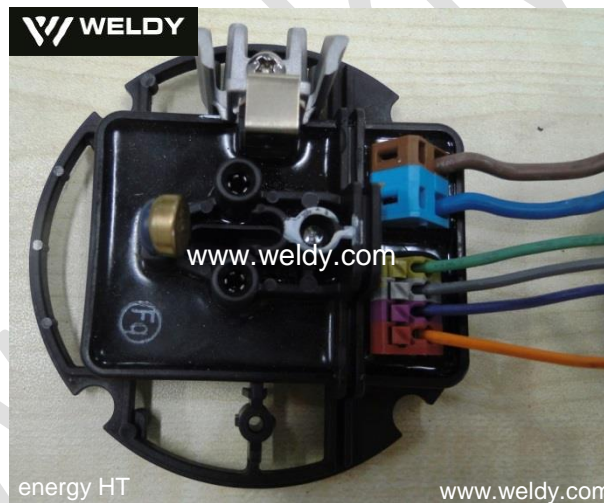
### Note

- 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.

## 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 colour (compare with illustration)
- Tool disassembling and assembling according to chapters 6.1 and 6.2



*Visual inspection*



### Note

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

### 7.3 Potentiometer

	Disassemble tool according to chapter 6.1
 <p>energy HT</p>	<p>Loosen potentiometer fastening nut by using a socket wrench; nut must not be completely removed from potentiometer for sidewise extraction</p>
 <p>energy HT</p>	<p>Extract flex wires from terminals according to chapter 7.4.3</p> <p>Check potentiometer <span style="float: right;"><i>Ohmmeter</i></span></p> <p>Flex wires red – grey: 20kΩ          Flex wires red – violet: 0..20kΩ *          Flex wires grey – violet: 0..20kΩ *</p> <p>* Check min. and max. resistance value          (Resistance tolerance: ± 20%)</p>
	<p>Connect flex wires according to chapter 7.2          Assemble tool according to chapter 6.2</p>

WWW.WELDY.COM

## 7.4 Electronic circuit boards



**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!

### 7.4.1 Visual inspection

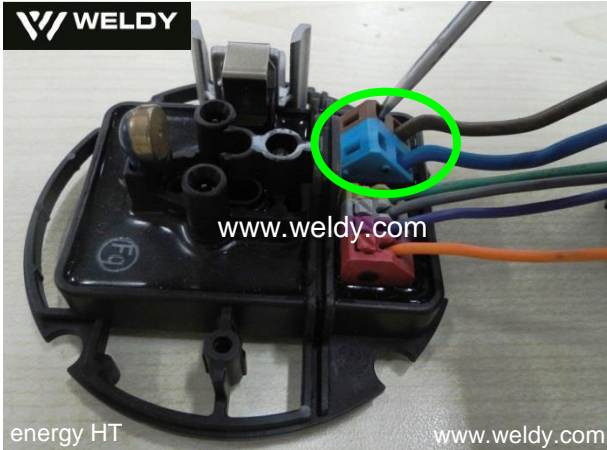
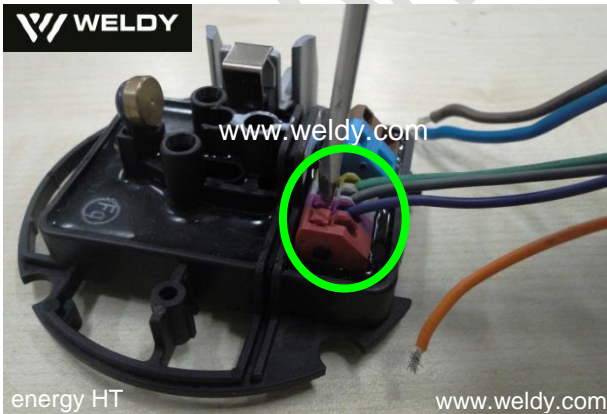
Check electronic circuit boards for visual error indications:

- Scorch marks, destroyed components
- Expanded/swelled parts

### 7.4.2 Function check

According to test procedure, chapter 0

### 7.4.3 Replacement of the electronic circuit board front in blower housing top

	Disassemble tool according to chapter 6.1
 <p>energy HT <span style="float: right;">www.weldy.com</span></p>	<p>Power supply lines (blue and brown flex wire): Press actuating tool in terminals, extract flex wires</p>
 <p>energy HT <span style="float: right;">www.weldy.com</span></p>	<p>Signal lines (other colours): Press terminal levers with the actuating tool; extract flex wires</p>



Assemble the new electronic circuit board.

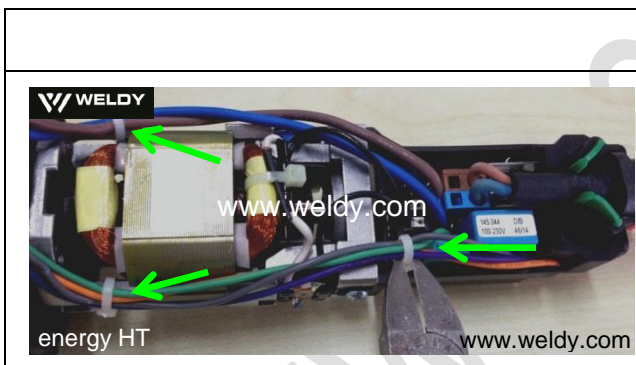
Make sure, that the heat sink is assembled on it!

Power supply lines (blue and brown flex wire): Press actuating tool in terminals, connect flex wires

Signal lines (other colours): Connect flex wires without operating terminal levers; make sure terminal colours correspond with flex wire colours

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

### 7.4.4 Replacement of the electronic circuit board rear in the handle



Disassemble tool according to chapter 6.1

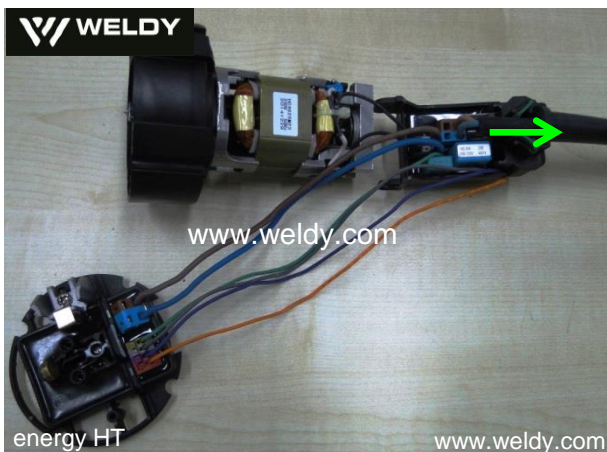
Remove the 3 cable ties



Press terminal lever by using the actuating tool, extract flex wires



Unscrew both screws



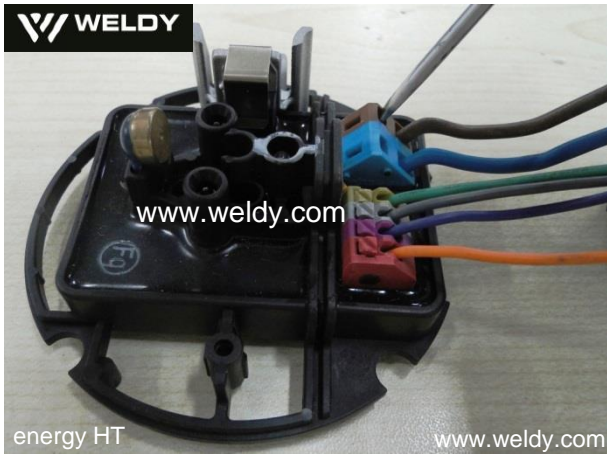
Remove rear electronic circuit support



Remove power supply cord: Press actuating tool in terminals, extract flex wires



Extract potentiometer knob. Loosen potentiometer fastening nut by using a socket wrench; nut must not be completely removed from potentiometer for sidwise extraction



Power supply (blue and brown flex wire): Press actuating tool in terminals, extract flex wires



Remove signal lines from terminals: Press terminal levers with the actuating tool; extract flex wires




Remove rocker switch 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

See chapter 0, test procedure for energy HT1600 / HT3400

	<b>Repair instructions</b> <b>energy HT1600 / HT3400</b> <b>Revision: B</b>	Page	16 / 29
		Created	29.01.16 CA
		Released	29.01.16 PKA
		Modified	06.12.16 CA

## 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. Disassemble tool according to chapter 6.1
2. Loosen motor flex wires from print adapter rear
3. Connect motor to rated voltage by using a wattmeter  
→ Motor must run steadily and its power consumption may not exceed 100W
4. Disconnect motor from rated voltage!
5. Assemble tool according to chapter 6.2

*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*

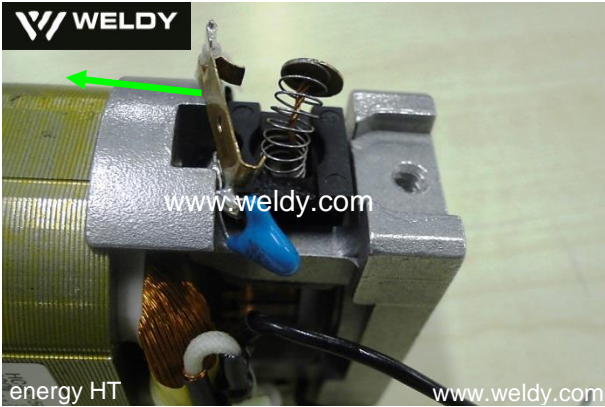

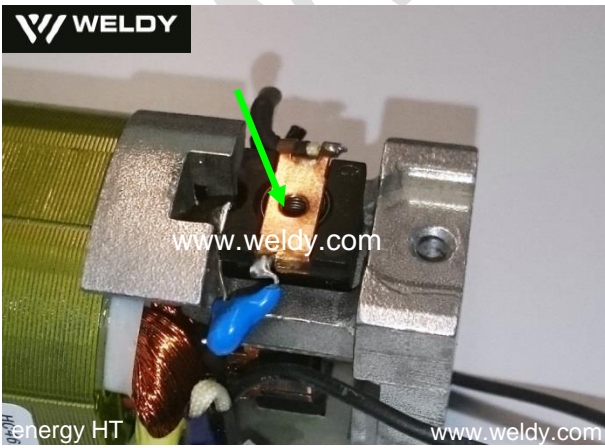
If a defect is detected, replace motor (see chapter 8.4)



### 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 not to be replaced make sure to re-insert them the same way (same place, same direction); otherwise the abrasion due to commutator adaption would exceed.

*Calliper gauge, scale*

	Disassemble tool according to chapter 6.1
 <p>energy HT</p>	<p>Carefully remove the clip of the carbon brush support and remove carbon brush. Caution, spring is under tension!</p>
 <p>energy HT</p>	<p>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!</p>
 <p>energy HT</p>	<p>Re-insert carbon brushes in the same fitting positions. Close carefully the clip.</p> <p>Important:</p> <ul style="list-style-type: none"> <li>• Check the hold of the clip!</li> <li>• Check the soldering spot of the blue capacitor</li> </ul>
	<p>Function check according to chapter 8.1 Assemble tool according to chapter 6.2</p>

### 8.4 Replace motor with blower

	Disassemble tool according to chapter 6.1
 <p>energy HT</p>	Remove the 3 cable ties
 <p>energy HT</p>	Press terminal lever by using the actuating tool, extract flex wires
 <p>energy HT</p>	Unscrew both screws
 <p>energy HT</p>	Remove rear electronic circuit support → Motor with blower is now separated
	Reassemble tool in reverse order in using of the new motor with blower, terminate assembling according to chapter 6.2

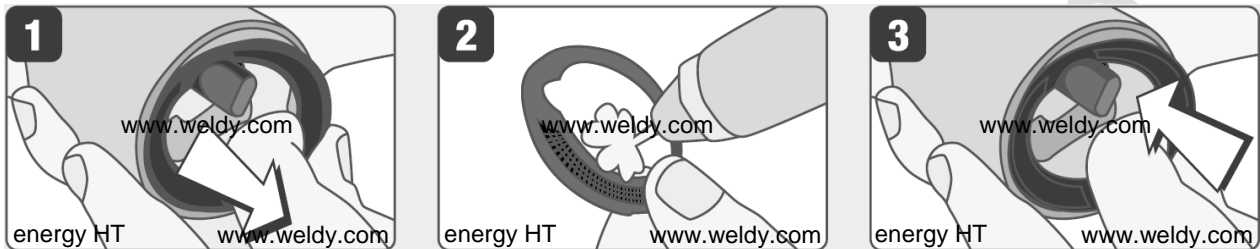
## 9 Cleaning

### 9.1 Tool

Clean the tool!

If the air filter of the handle is defective or missing, it is to be replaced. If the air filter is clogged, clean it according to the operating manual and give a message to the customer like as follows:

**Clean the air filter at the end of the handle with a small brush or compressed air if polluted!**



### 9.2 Electronic circuit

Clean the electronic circuit!

	<p>Loosen PT pan head cap screws (4x) and remove heater tube and mica tube.</p> <p>Heating element may be removed now; gasket will be extracted with heating element from the blower housing top</p>
	<p><b>IMPORTANT:</b> Blow out the electronic circuit, but especially the photo resistor by compressed air!</p>

### 10 Heating element

<p style="text-align: center;">www.weldy.com</p> <p>energy HT <span style="float: right;">www.weldy.com</span></p>	<p>Loosen PT pan head cap screws (4x) and remove heater tube and mica tube</p>
<p style="text-align: center;">www.weldy.com</p> <p>energy HT <span style="float: right;">www.weldy.com</span></p>	<p>Heating element may be removed now; gasket will be extracted with heating element from the blower housing top</p>

- 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. *Visual inspection*
- Measure resistance of heating element by using an ohmmeter *Ohmmeter*



Tool	energy HT1600		energy HT3400	
	Voltage [V]	Power [W]	Resistance [ $\Omega$ ]	Power [W]
100	1450	approx. 7		
120	1550	approx. 9	2300	approx. 6
230	1550	approx. 34	3300	approx. 16



Carefully attach heating element; make sure the plug pins are plugged into the sockets ("cages") of the blower housing top when assembling



Check heating element position: Groove of heating element must match cam of blower housing top



Insert gasket; make sure both grooves match cams of blower housing top



Cover heating element with mica tube; ensure by slightly turning the mica tube passes through the gasket

Note: If the heating element must be replaced, replace the mica tube as well! The mica tube is included at the spare part heating element.

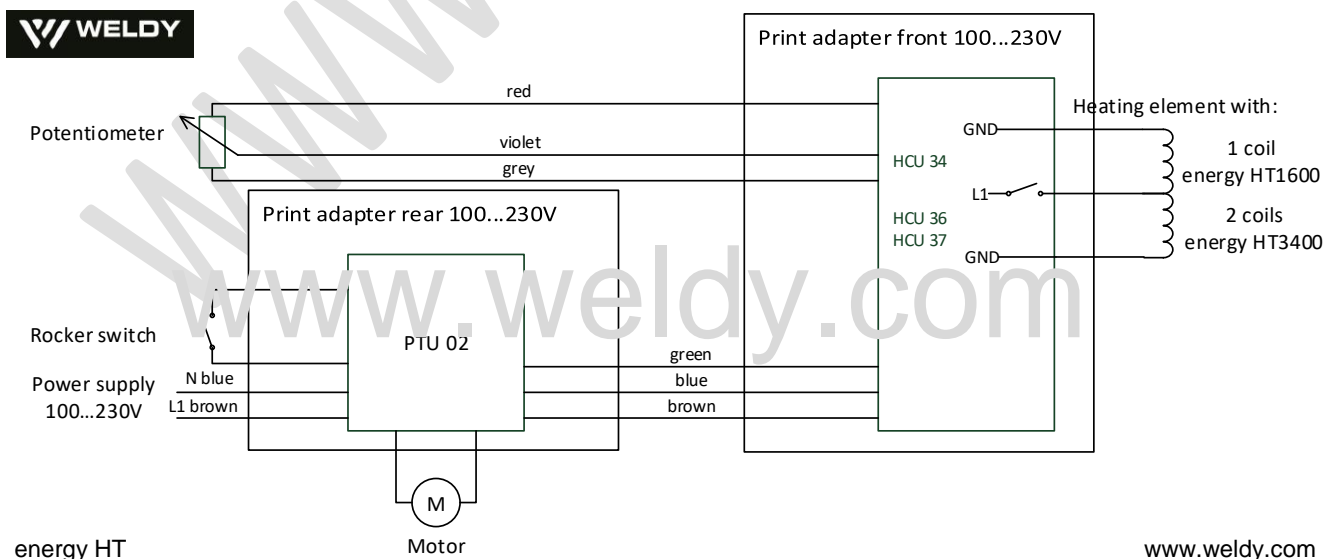


Assemble heater tube; make sure both grooves match cams of the blower housing top



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

## 11 Wiring diagram









## 12 Test procedure for energy HT1600 / HT3400 (prot. class II)




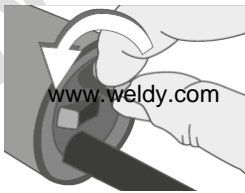

### Insulation test



- Function check of the high voltage tester:  
Shorten tips → Signal lamp illuminates and horn sounds
- Connect tool to a short circuit receptacle (short circuit between the two pins of the plug)
- Set line/mains switch of the tool to position "1" (ON)
- Apply a high voltage of 3000V (release current 5mA) for 1 second between the short circuit receptacle (pins of the plug) and protection tube of the heating element; no flash-over or breakdown must occur

### Function test

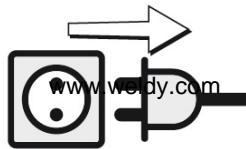
	<ul style="list-style-type: none"> <li>• energy HT1600: Attach tubular nozzle <math>\varnothing</math> 5/8mm to heater tube</li> <li>• energy HT3400: No nozzle to be used</li> <li>• Set rocker switch and potentiometer to position "0", connect tool to rated voltage</li> </ul>
	<p>Switch the tool on</p>
	<p>Tool may not heat as long as potentiometer is set to position "0", but motor must run → Check power consumption of motor → Check smooth running of motor</p>
	<p>Set potentiometer to position "1": Tool starts heating</p>
	<p>Set potentiometer to position "8": Tool heats with almost maximum heat output</p>
	<p>Set potentiometer to position "9": Tool heats with maximum heat output</p>
	<p>Wait for 3 minutes, until maximum set temperature is achieved and remains stable</p>

Tool	energy HT1600	energy HT3400	
Voltage [V]	Nom. current [A]	Nom. current [A]	Check current consumption (or power consumption) during the heating-up procedure
100	14.0		
120	13.5	20.0	
230	7.0	15.0	
			Temperature measurement energy HT1600: Insert external thermocouple 5mm into the centre of the tubular nozzle; thermocouple must not touch nozzle at all Temperature: 630..730°C
			Temperature measurement energy HT3400: The temperature must be measured without using a nozzle; the distance between heater tube and external thermocouple must be 1..2mm Temperature: 580..650°C
			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; current/power consumption will re-increase
			Set potentiometer to position "0"
			Let the tool cool down





Switch the tool off



Disconnect tool from rated voltage

### Checking completeness

- Check printed details on the nameplate: Type, voltage, current and power consumption (must correspond with the above measurements!)
- Company label WELDY 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)
- The air filter 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 WELDY repair service

### Mobile equipment

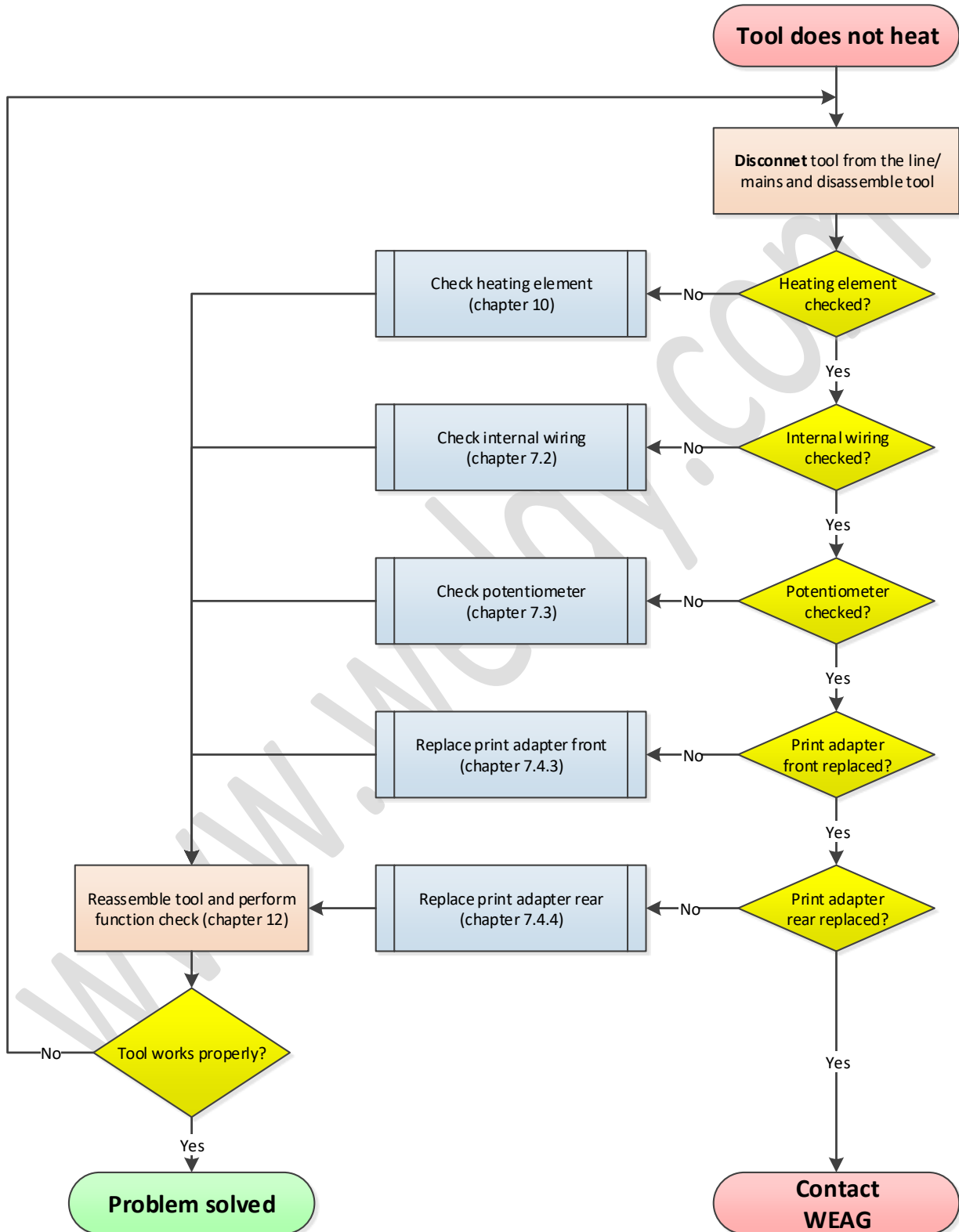
- 1 protective earth conductor tester (e.g. Elabo)
- 1 high voltage tester up to 4000V (e.g. Elabo, Korntal)
- 1 temperature meter with temperature measurement probe (e.g. Fluke, Testo)
- 1 multimeter with following measurement options: (e.g. Fluke)
  - Current
  - Voltage
  - Resistance
  - Continuity (test buzzer)
- 1 water column
- 1 soldering iron
- 1 complete set of tools (screw drivers etc.)
- 1 Actuating tool (e.g. Wago, 210-719)

### Installed equipment

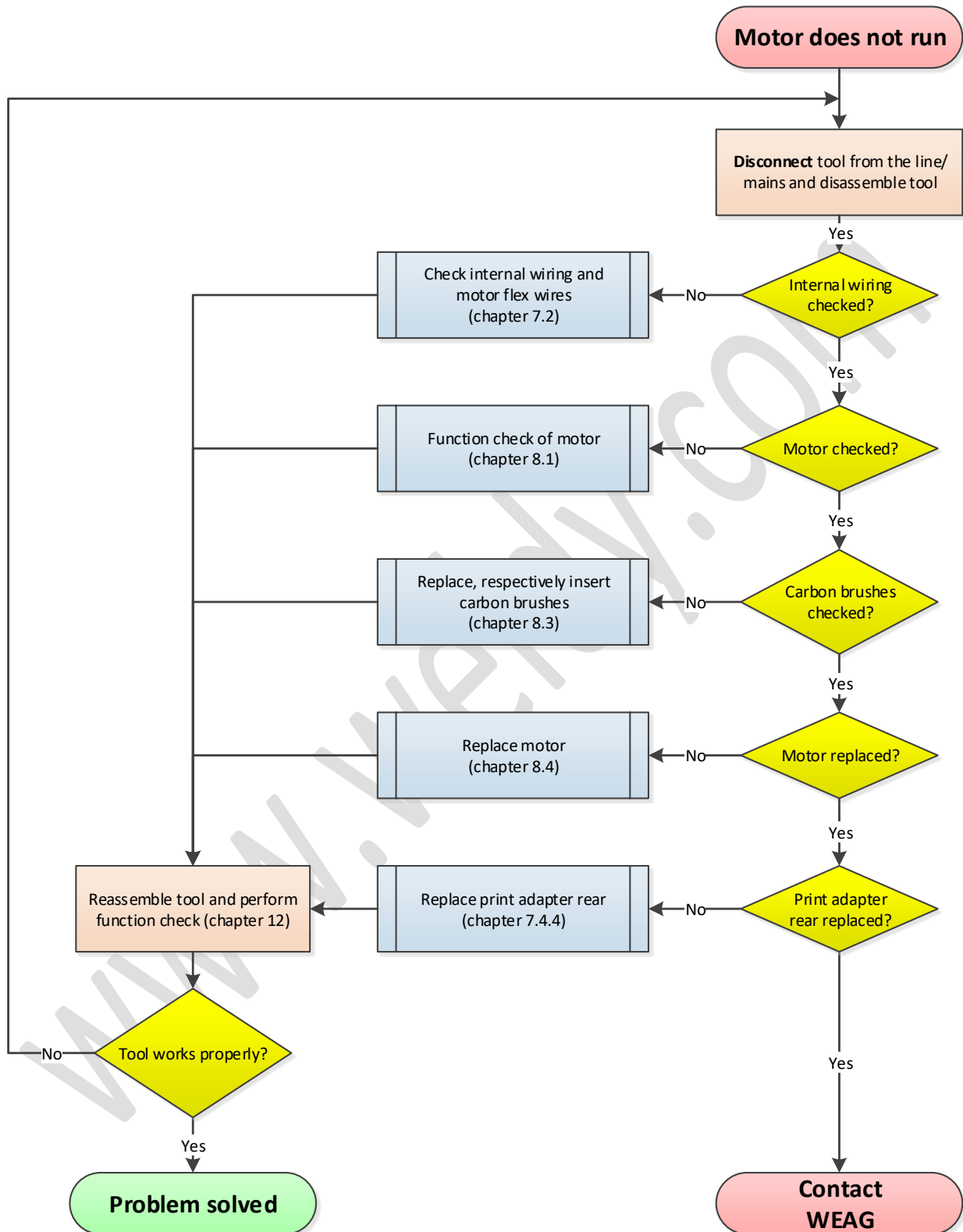
- ESD-protected working environment
- Transformer; possibly separated into variable and isolating transformer. Data:
  - 3 x 0..500V
  - 3 x 30A
- 3 built-in voltmeters (500V)
- 3 built-in ammeters (30A) or wattmeter

## 14 Troubleshooting

### 14.1 Tool does not heat



## 14.2 Motor does not run



## 14.3 Air temperature too low / too high

