tucadur® 2020

Tungsten Carbide Coating Unit

Order No. 0 700 000

Instruction Manual

1 List of contents

2 Tips on using the manual

This manual has been written for the device user to ensure a problem-free operation, care and maintenance.

Important instructions and information concerning safety and operational reliability have been highlighted.

The symbols used in the manual have the following meanings:

CAUTION!

Working and operating processes which must be observed to the letter to exclude any risk to persons.

IMPORTANT!

Working and operating processes which must be observed to the letter to avoid any damage to the device.

INFORMATION!

Technical information to which the device operator must give special attention.

The illustrations and diagrams are numbered in sequence within each chapter. Some of these illustrations have keys. References to illustrations within the text e. g. (5.1/2) have the following meaning:

5.1 = Figure 5.1

2 = Position 2 in the key to the figure.

Please feel free to call our customer service department at any time should you encounter technical problems which are not dealt with in this manual:

Telephone	**+49 (0) 22 04 / 8 39 - 0**
Telefax	**+49 (0) 22 04 / 8 39 - 60**

INFORMATION!

www.joke.de

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3 Safety instructions

This device has been built according to the latest technical standards and generally accepted safety regulations. Nevertheless, it can constitute a hazard to the device itself or other equipment during use.

ACHTUNG!

(1) **Only use the device if in perfect working order and for its intended purpose. You must always pay attention to the instruction manual and safety instructions therein and be aware of the risks! Repair any faults which could affect the device's safety immediately by yourself or have these repaired.**

The unit is designed exclusively for tungsten carbide coating using the electrodes listed in the instructions. Any other use will be deemed to be contrary to its intended purpose. The manufacturer cannot be held liable for any resulting damages. The risk is borne solely by the user.

Correct use also includes compliance with the instruction manual and an observation of the care and maintenance conditions.

(2) Keep the instruction manual handy at the device's place of use.

(3) Pay attention to and observe generally applicable statutory and otherwise binding regulations relating to accident prevention and environmental protection in addition to the information provided in the instruction manual!

CAUTION!

(4) All personnel commissioned to work on or with the device must have read this instruction manual, and particularly the safety instructions chapter, before starting work. This applies especially for personnel who only work with the device occasionally.

(5) Do not carry out any modifications, additions or conversions to the device.

(6) Spare parts must meet the technical requirements specified by the manufacturer. This can only be guaranteed with original JOKE spare parts.

ACHTUNG!

(7) Any work on/with the device may only be carried out by qualified, appropriately trained and authorised personnel. Pay attention to minimum statutory age limits!

(8) Restrain from any type of work that could jeopardise your safety.

(9) Personnel undergoing training or in a general apprenticeship should only be allowed to work with the machine under the constant supervision of an experienced operator!

3 Safety instructions

(10) Work on the electrical equipment of the device may be performed only by an electrical specialist according to electrotechnical regulations..

(11) The device may only be used if all protective and safety equipment is in place and in proper working order.

(12) Do not leave the device unattended when switched on!

(13) Stop and secure the device immediately in the event of malfunctions! Faults must remedied at once!

(14) Observe processes for switching on and off and control indicators according to the operating manual!

(15) The mains cable, foot switch cable and compressed air line must be laid so as to be tension free and not hinder the user. Nothing must be allowed to stand on the cables.

(16) The device must be operated only in dry rooms and must not under any circumstances be exposed to moisture.
The device has no explosion protection!

IMPORTANT!

(17) The clamped electrode must not become incandescent during coating!

(18) The coating gun must not be operated without a bulb, or if the latter is blown.

4 Warranty

joke warrant the correct manufacture of every joke Technology GmbH product which is delivered in accordance with the terms of contract and delivery.

This warranty does not cover damages caused by normal wear and tear, incorrect handling, negligent use, the fitting of non-original spare parts, inadequate care and/or a failure to comply with this technical manual.

IMPORTANT!

The device may only be used by appropriately trained personnel. If it is not, all warranty claims will be forfeited according to the terms of delivery.

Disposal

This product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electrical equipment.

5 Device overview

Overview of the entire unit

Figure 5.1 tucadur® 2020 device overview

1	Control unit with tool compartment	7	Tungsten carbide electrode
2	ON/OFF switch	8	Contact magnet with cable and plug
3	Vibration control knob	9	Foot switch with cable and plug
4	Coating gun with cable and plug	10	Layer thickness control knob
5	Illumination	11	Mains cable

Figure 5.1 tucadur® 2020 (connector)

5 Device overview

Use

The unit is used to apply tungsten carbide layers to metallic surfaces.

The tungsten carbide layer (up to 40 µm thick) increases wear resistance of the coated workpiece, without affecting the properties of the base material.

Applications: for working examples, refer to appendix 12.

Principle of operation

tucadur® tungsten carbide coating functions according to the principle of the electron radius.

A tungsten carbide electrode is attached to the positive pole of a d.c. circuit. The electrode in the coating gun is caused to oscillate.

The workpiece is connected to the negative pole.

During the short contact pulse between the workpiece and electrode, the electrode is briefly heated to such an extent that during discharge, hard metal particles of the electrode are entrained and fuse with the tool surface.

6 Technical data

Power supply

Supply voltage	230 V 50/60 Hz
Connected load	350 VA
Fuse	16 A
Degree of protection	IP 20

Performance data

Achievable layer thickness	2-40 µm
Max. hardness of coating	82 HR 30N
Vibration	100 Hz

Dimensions and weight

Control unit	11,7 kg
Control unit W x H x D	220 x 225 x 335 mm

Environmental data

Sound pressure level	<70 db(A)

7 Operation

Operating tucadur® for the first time

1. Place the control unit on the workbench.
2. Remove the equipment accessories from the tool compartment. To open the tool compartment, pull both black knobs.
3. Connect mains cable (5.1/10) to the socket.

IMPORTANT!

The ON/OFF switch should be set to "OFF"

4. Connect coating gun (5.1/4) to the control unit.
5. Connect contact magnet (5.1/6) to the control unit.
6. Connect the foot switch to the control unit and place in a suitable position on the floor.
7. Screw electrode (5.1/6) firmly into the coating gun using the hexagon head screw driver.
8. Place the contact magnet on the workpiece surface.
9. Set ON/OFF switch (5.1/2) to "ON".
10. Adjust desired layer thickness using control knob (5.1/9).
11. Select vibration frequency using control knob (5.1/3).

The unit is now operational!

INFORMATION!

The coating process is triggered by operating the foot switch (5.1/10).

If the foot switch is not held down, the working process will be interrupted!

7 Operation

General operating instructions

Workplace

The following prerequisites must be fulfilled in order to ensure perfect treatment of the workpiece:

- A vibration-proof, clean workplace with good seating comfort and adequate lighting.
- A small movable vice that enables perfect clamping of all small components.

Pre-treatment and cleaning

The workpieces to be coated must be metallically clean. They must not present any scale or other impurities which would otherwise compromise uptake and adhesion of the tungsten carbide coating. Brightly polished workpieces can be cleaned with petroleum, alcohol or another degreasing medium. Components tarnished with scale or other impurities can be perfectly cleaned with fine or wet blasting.

Operating the unit

Switching the device on:

- After setting the toggle switch to the "ON" position, the indicator lamp lights up and the unit is operational.
- Foot switch:
- If the foot switch is connected, the indicator lamp goes out and the unit operates as follows when the mains switch is switched on:
- When the foot switch is depressed, the indicator lamp and the device are switched on and both are switched off again when the pedal is released.
- This impulse switching is required during coating of very fine parts.

7 Operation

Contact magnet

The contact magnet is to be applied to the workpiece to be coated, or if this is not possible, to the vice. The magnet and workpiece must always be bright and clean, to ensure that a good electrical contact results.

IMPORTANT!

The keeper on the contact magnet is to be removed and reapplied after use (to avoid demagnetisation).

Electrodes

The proper choice of electrodes depends on the size and shape of the surfaces to be coated. Workpieces with simple shapes can be coated with a 1.6 or 2.1 mm square electrode. Dies with complicated inside shapes or small holes are coated using the corresponding round, triangular or square electrode. For small holes of less than Ø 1.2 mm, the 1 mm round electrode is ground down on a diamond or silicone grinding disc to dimensions of at least 0.2 mm less than those of the hole to be coated.

Clamping the electrode:

The electrode should project by approx. 15 mm from the electrode holder of the gun. The screw must be tightened carefully to avoid breaking the electrode.

Layer thickness

The layer thickness control knob is used to adjust the energy for the layer thickness. The thinnest layer of approx. 2 µm is achieved at control knob setting 2. The thickest layer is achieved at control knob setting 40 and amounts to between 30 - 40 µm depending on the base material. 40 µm is achieved only in exceptional cases.

IMPORTANT!

The clamped electrode must not become incandescent during coating!

If this is the case, the layer thickness control knob must be turned back until the electrode no longer becomes incandescent. With an incandescent electrode, the coating will be insufficient.

7 Operation

Handling the coating gun

The gun is easy to hold in one hand, though the latter should preferably be supported. Pay attention to press the gun lightly against the workpiece. The gun is to be passed slowly and evenly over the surface, until a layer as pore-free as possible is achieved. This is recognisable when the coating becomes matt grey. Take care not to touch the electrode holder and electrode while working.

INFORMATION!

The gun is normally held in such a way that the electrode is positioned at an angle of 15-20° to the surface to be coated. If as a result of this angle, the electrode contacts the opposite edge while processing small holes or profiles, the electrode can also be held parallel to the bore.

In case of very fine mould components, coating in stages is an advantage, since fusion penetration of the exposed points can be somewhat attenuated in this manner.

With continuous operation and a high energy output, the electrode becomes warm and the holder therefore heats up, resulting in gradual warming of the coating gun. In this case, the gun must be switched off and allowed to cool. If continuous operation is necessary, we recommend an additional gun in order to be able to work alternately with 2 coating guns.

Changing the bulb

IMPORTANT!

The gun must not be operated without a bulb, or if the latter is blown!

The bulb must be replaced immediately in each case using the screwing sleeve supplied. The electrode holder must project centrally from the housing and be freely movable. The bulb socket must not press against the electrode holder (oscillation anchor).

8 Troubleshooting

Fault/Malfunction	Possible cause	Remedy
Electrode incandescent.	Layer thickness setting too high (electrode cross-section too small)	Reduce layer thickness using control knob (5.1/9).
No material application	Faulty contact	Check connecting cable and plug connections, in addition to contact magnet.
Electrode “adheres” during coating	Electrode vibration setting too low	Increase vibration using the control knob
Heavy sparking during coating	Workpiece or electrode heavily soiled	Clean workpiece surface and electrode
Coating does not adhere to base material	Impurities on workpiece or layer thickness setting too low	Clean workpiece. Increase energy for layer thickness using the control knob

9 Care and maintenance

Care

Clean the control unit only using a dry cloth or soft brush.

IMPORTANT!

Do not damp clean!

Pay attention to clean contact connections each time before using the unit.

The control unit is maintenance-free.

If any malfunctions occur, send the unit to our service department for verification or repair.

10 Wearing and spare parts

	Order no.
1 set of tungsten carbide electrodes = 21 pieces	0 700 035

Consisting of:

3 pieces 1.3 mm round

3 pieces 1.1 mm square

3 pieces 1.8 mm round

3 pieces 1.6 mm square

3 pieces 2.3 mm round

3 pieces 2.1 mm square and triangular

Single tungsten carbide electrodes

1.3 mm round	0 700 046
1.8 mm round	0 700 047
2.3 mm round	0 700 048
1.1 mm square	0 700 039
1.6 mm square	0 700 040
2.1 mm square	0 700 041
2.1 mm triangular	0 700 042

Spare parts	**Order no.**
Mains cable	0 700 128
Foot switch with cable and plug	0 700 130
Contact magnet with cable and plug	0 700 117-1
Coating gun with illumination, cable and plug	0 700 213
Hexagon head screw driver	0 700 134
Fuses and gun accessories (complete set)	0 700 140

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