

Operating Instructions

— Electrode Inverter

— CRAFT-STICK 141

— CRAFT-STICK 161, CRAFT-STICK 161P

— CRAFT-STICK 201P



CRAFT-STICK 161

CRAFT-STICK

Imprint

Product identification

Electrode Inverter	Item number
CRAFT-STICK 141	1073141
CRAFT-STICK 161	1073161
CRAFT-STICK 161P	1073162
CRAFT-STICK 201P	1073201

Manufacturer

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Indications regarding the operating instructions

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1 Introduction

You have made a good choice by purchasing the Schweisskraft electrode inverter.

Read the operating manual thoroughly before commissioning the device.

It gives you information about the proper commissioning, intended use and safe and efficient operation and maintenance of your electrode inverter

The operating manual is part of electrode inverter package. Always keep this operating manual in the location where your electrode inverter is being operated. All local accident prevention regulations and general safety instructions for the operating range of your electrode inverter must also be complied with.

1.1 Copyright

The contents of these instructions are copyright. They may be used in conjunction with the operation of electrode inverter. Any application beyond those described is not permitted without the written approval of Stürmer Maschinen GmbH.

For the protection of our products, we shall register trademark, patent and design rights, as this is possible in individual cases. We strongly oppose any infringement of our intellectual property.

1.2 Customer service

Please contact your dealer if you have questions concerning your electrode inverter or if you need technical advice. They will help you with specialist information and expert advice.

Germany:

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Dr.-Robert-Pfleger-Str. 26
D-96103 Hallstadt

Repair service:

Fax: 0049 (0) 951 96555-111
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Spare part orders:

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We are always interested in valuable experience and knowledge gained from using the application which then could be shared and be valuable to develop our products even further.

1.3 Limitation of liability

All information and notes in these operating instructions were summarised while taking applicable standards and rules, the state-of-the-art technology and our long-term knowledge and experiences into consideration.

In the following cases the manufacturer is not liable for damages:

- Non-observance of the operating instructions,
- Inappropriate use
- Use of untrained staff,
- Unauthorised modifications
- Technical changes,
- Use of not allowed spare parts.

The actual scope of delivery may deviate from the explanations and presentations described here in case of special models, when using additional ordering options or due to latest technical modifications.

The obligations agreed in the delivery contract, the general terms and conditions as well as the delivery conditions of the manufacturer and the legal regulations at the time of the conclusion of the contract are applicable.

2 Safety

This section provides an overview of all important safety packages for the protection of the operating personnel as well as for safe and fault-free operation. Other task based safety notes are included in the paragraphs of the individual phases of life.

2.1 Symbol explanation

Safety instructions

The safety notes in these operating instructions are highlighted by symbols. The safety notes are introduced by signal words which express the concern of the risk.



DANGER!

This combination of symbol and signal words indicates an imminently dangerous situation which may lead to death or severe injuries if they are not avoided.



WARNING!

This combination of symbols and signal words indicates a possibly dangerous situation which may lead to death or severe injuries if they are not avoided.



CAUTION!

This combination of symbol and signal words indicates a possibly dangerous situation which may lead to minor or light injuries if they are not avoided.



ATTENTION!

This combination of symbol and signal words indicates a possibly dangerous situation which may lead to property and environmental damages if they are not avoided.



NOTE!

This combination of symbol and signal words indicates a possibly dangerous situation which may lead to property and environmental damages if they are not avoided.

Tips and recommendation



Tips and recommendation

This symbol highlights useful tips and recommendation as well as information for all efficient and trouble-free operation.

It is necessary to observe the safety notes written in these operating instructions in order to reduce the risk of personal injuries and damages to property.

2.2 Personal protective equipment

The personal protective equipment serves to protect persons against impairments of safety and health while working. The staff member has to wear personal protective equipment while performing different tasks on and with the machine which are indicated in the individual paragraphs of these instructions.

The personal protective equipment is explained in the following paragraph:



Welders face shield or Helmet with welder face shield

The welding shield, which is worn on the head and in front of the face or attached to a suitable protective helmet, protects eyes and face, equipped with suitable filters.



Protective gloves with pulse protection

The protective gloves with pulse protection prevent the hands from sharp-edged components, as well as from friction, abrasions, light burns or deeper injuries.



Safety boots

The safety boots protect the feet from crushing, falling parts and slipping on slippery surfaces.



Protective clothes

Protective clothes are made of a tightly fitted fabric without the protruding parts of low tear strength.



Protective apron

The protective apron mainly protects the front of the body from sparks or radiation during welding.

2.3 General safety regulations

- Before commissioning, check the device for externally visible damage and defects.
- Repair defects and damage immediately.
- Work on the electrical equipment may only be carried out by a qualified electrician.
- Do not use the device in a damp, wet environment, rain, etc.
- Only use original spare parts and accessories.
- Disconnect the mains plug before carrying out repair and maintenance work and after use.
- Make sure the ON/OFF switch is off when plugging the plug into the power outlet to prevent accidental start-up.

2.4 Safety labels on device

Several warning signs and safety labels are attached to the device, which must be observed and followed. The safety labels attached to the device must not be removed. Damaged or missing safety labels can lead to incorrect actions, personal injury and damage to property. They must be replaced immediately. If the safety markings are not visible and understandable at first glance, the device must be taken out of operation until new safety labels have been applied.

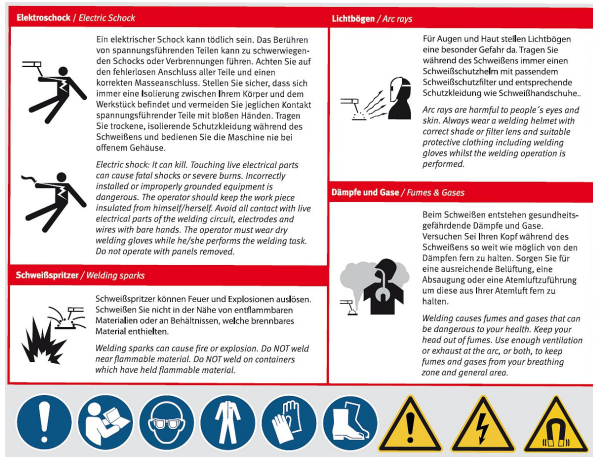


Fig. 1: Safety labels

3 Intended Use

The device is used exclusively for arc welding according to MMA and TIG (only models 161P and 201P).

The electrode inverters are built and tested according to EN 60974-10 in EMC class A.



WARNING!

This Class A welding device is not intended for use in residential installations where the power supply is provided by a low-voltage public power supply system. It may be difficult to ensure electromagnetic compatibility in these areas due to both conducted and radiated interference.



WARNUNG!

Danger in case of misuse!

Misuse of the device can lead to dangerous situations.

- Only operate the device in the power range specified in the technical data.
- Never bypass or disable the safety devices.
- Only operate the device in a technically perfect condition.

Intended use also includes compliance with all information in these instructions. Any use exceeding the intended use or any other use is considered misuse.

Stürmer Maschinen GmbH accepts no liability for design and technical modifications to the electrode inverter. Claims of any kind for damage due to improper use are excluded.

4 Technical Data

4.1 Type plate

 Schweisskraft www.schweisskraft.de		Stürmer Maschinen GmbH, Dr.-Robert-Pfleger-Str. 26, 96103 Hallstadt Deutschland / Germany	
CRAFT-STICK 201 P		Serien-Nr. / Serial no.:	
Artikel-Nr. / Item no.: 1073201		Baujahr / Year of manufacture:	
		STANDARD	EN 60974-1:2012 EN 60974-10:2014
	10A/10.4V-200A/18V		
	X	40%	60%
	10A/20.4V-200A/28V		
	X	40%	60%
	10A/20.4V-200A/28V		
	X	40%	60%
	10A/20.4V-200A/28V		
	X	40%	60%
	10A/20.4V-200A/28V		
	X	40%	60%
	10A/20.4V-200A/28V		
	X	40%	60%
	10A/20.4V-200A/28V		
	X	40%	60%
U₂=65.3V U₁=230V I_{max}=19.5A I_{res}=12.3A		U₂=68.7V U₁=230V I_{max}=28.8A I_{res}=18.2A	
 1-50-60Hz		 IP21S	 AF 6.7Kg 

4.2 Tables

Parameter	CRAFT-STICK 141	CRAFT-STICK 161
Supply voltage 50 / 60 Hz	230 V	230 V
Type of current	AC	AC
Input current	33,4 A	36,5 A
Total power	7,7 kVA	8,7 kVA
Required generator output	>7,7 kVA	>8,7 kVA
Norm / Marking	EN 60974-1:2012, EN 60974-10:2014 / CE	
Electrode power consumption	4,3 kVA	5,2 kVA
Slow-blow fuse	16 A	16 A
Open circuit voltage	99,6 V	75,3 V
Electrode setting range	10 – 140 A	10 – 160 A
Electrode duty cycle at I_{max} [40°]	30%	40%
Electrode welding current at DC 100% / 40°C	80 A	90 A
ARC FORCE	yes	yes
HOT START	yes	yes
Electrode diameter	1,6 ~ 3,2 mm	1,6 ~ 4,0 mm
Insulation class EMC class	H A	H A
Degree of protection	IP21S	IP21S
Operating temperature	-10°C to +40°C	-10°C to +40°C
Dimensions (LxWxH)	320 x 135 x 255 mm	320 x 135 x 255 mm
Weight	4,6 kg	4,9 kg
Thickness of machined sheets [mm]	1,0 to 6,0	1,0 to 6,0

Parameter	CRAFT-STICK 161P	CRAFT-STICK 201P
Supply voltage 50 / 60 Hz	230 V	230 V
Type of current	AC	AC
Input current	MMA 22,1 A / TIG 14,7 A	MMA 28,8 A / TIG 19,5 A
Total power	5,1/3,4 kVA	6,6/4,5 kVA
Required generator output	>5,1 kVA	>6,6 kVA
Norm / Marking	EN 60974-1:2012, EN 60974-10:2014 / CE	
Power consumption Electrode	5,1 kVA	6,6 kVA
Power consumption WIG DC	3,4 kVA	4,5 kVA
Slow-blow fuse	16 A	16 A
Open circuit voltage	MMA 70.6 V / TIG 65.6 V	MMA 68.7 V / TIG 65.3 V
Electrode setting range	10 – 160 A	10 – 200 A
TIG DC setting range	10 – 160 A	10 – 200 A
Electrode duty cycle at I_{max} [40°]	30%	40%
Duty cycle at I_{max} [40°] TIG DC	30%	40%
Electrode welding current at DC 100% / 40°C	90 A	130 A
TIG DC Current at DC 100% / 40°C	90 A	130 A
ARC FORCE	yes	yes
HOT START	yes	yes
PFC	yes	yes
Electrode diameter	1,6 ~ 4,0 mm	1,6 ~ 4,0 mm
Insulation class EMC class	H A	H A
Degree of protection	IP21S	IP21S
Operating temperature	-10°C to +40°C	-10°C to +40°C
Dimensions (LxWxH)	365 x 150 x 280 mm	365 x 150 x 280 mm
Weight	6,7 kg	6,7 kg
Thickness of machined sheets [mm]	1,0 to 7,0	1,0 to 8,0

5 Transport, packaging, storage

5.1 Delivery and Transport

After delivery, check the device for visible transport damage. If the electrode inverter is damaged, report this immediately to the transport company or the dealer.

5.2 Packaging

All used packaging materials and packaging aids are recyclable and should be taken to a materials recycling depot to be disposed of.

The delivery packaging is made of cardboard, so please dispose carefully by having it chopped up and given to the recycling collection.

The film is made of polyethylene (PE) and the cushioned parts of polystyrene (PS). These materials should be taken to a collection point for recyclable materials or to the local waste disposal company.

5.3 Storage

The electrode inverter must be installed in closed, dry and well-ventilated rooms with room temperatures between 15 and 35 degrees. Do not expose it to moisture or intense sunlight.

5.4 Installation requirements

The device has been designed for use in covered rooms and outdoors and must be installed in a dry environment. The environment in which the electrode inverter is used should be below +40°C and the humidity should be low. The environment must be free of dust, acids, salts or concentrations of iron or metal powders.

Ensure that there is sufficient space in front of the device so that the operating elements can be easily reached and viewed. Position the device so that the air inlet and outlet are not obstructed. Make sure that no metal parts, dust or other foreign objects can enter the device.

The environmental conditions must be appropriate for protection class IP21!



DANGER! ELECTRICAL VOLTAGE!

Do not use the device outdoors in the rain!

6 Operating principle

The EASY-STICK 121 welding unit is an electrode inverter for welding with all common rutile, stainless steel and cast iron electrodes with direct current as well as with TIG function. The required welding current can be adjusted steplessly via a control dial. The **Hot-Start** function provides stable ignition of the arc and the **Anti-Stick** function prevents the electrode from sticking. These functions are automatically activated and deactivated. The **Arc-Force** control adjusts the dynamics to the welding process and can be controlled. The unit is cooled with an air fan. If the permissible temperature of the power components is overshoot, the welding current is automatically switched off. This is indicated by a control lamp on the control panel. The housing protects the components against external influences and direct contact. Depending on the application, there are different degrees of protection against penetration by solid bodies and water. The degree of protection is indicated by the letters IP followed by two digits: The first digit indicates the degree of protection against solid bodies and the second digit the degree of protection against water.

	1. Digit	Description	2. Digit	Description	Additional field	Description
IP21	2	Protect against solid objects over 12 mm e.g. hands, large tools	1	Protected against vertically falling dripping water	S	Tested when moving parts are at a standstill

6.1 Principle of electrode welding

Electrode welding is an uncomplicated welding method with which almost all metals can be welded. This method can also be used outdoors and with special equipment even under water. In electrode welding, the arc length is determined by hand. The distance between the electrodes determines the arc length. Welding is mainly carried out under direct current; e.g. rutile electrodes are easy to weld under minus-pole direct current; basic electrodes under plus-pole direct current. The electrode is an arc carrier and also an additional material. It consists of a core wire and a coating. The coating protects the molten pool from harmful atmospheric oxygen and stabilizes the arc. In addition, a slag forms which protects and shapes the weld seam. Depending on the thickness and composition of the coating, a difference is made between rutile and basic electrodes. Rutile electrodes are easier to weld and have a nice flat seam. The slag is also easier to remove. It should be noted that many electrodes It should be noted that many electrodes must be dried back after prolonged storage, because moisture accumulates from the air over time back after longer storage, because moisture accumulates from the air over time. Otherwise, electrode welding is a very common and easy-to-use welding process.

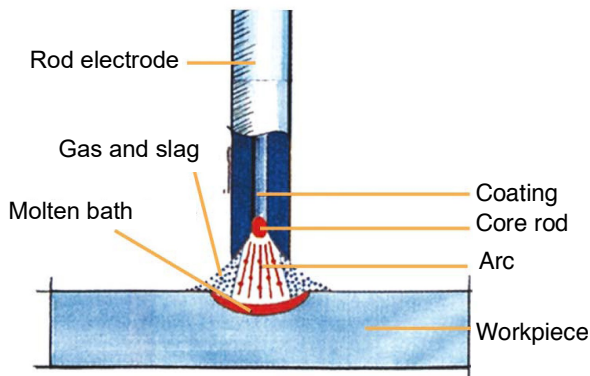


Fig. 3: Functional principle manual arc welding

Welding current and electrode diameter:

Ø Electrode (mm)	Setting range of welding current (A)
1.60	30 - 50
2.00	40 - 70
2.50	70 - 110
3.25	110 - 140
4.00	140 - 180
5.00	180 - 200

6.2 Principle of TIG welding

In TIG welding (Wolfram Inert* Gas Welding) an arc is drawn between a non-meltable tungsten electrode. Pure argon is usually used as the shielding gas - a inert gas that does not combine with any element and therefore also prevents reactions of the molten metal. The filler wire is supplied without current, either manually (manual welding) or mechanically (automatic welding). However, there are welding operations that do not require filler materials. It depends on the material used whether direct or alternating current is used. The main advantage of TIG welding is the wide range of materials to be welded. Materials from 0.3 mm thickness (automated) such as alloyed steels, high-alloy steels, aluminium (a.c. welding), magnesium, copper and their alloys, unalloyed steels, nickel, gold, silver, titanium and many more can be welded. Can be used for welding all material thicknesses and root layers with thicker cross-sections. The TIG process achieves the best results compared to other welding processes due to pore-free welds with a very high tensile strength.

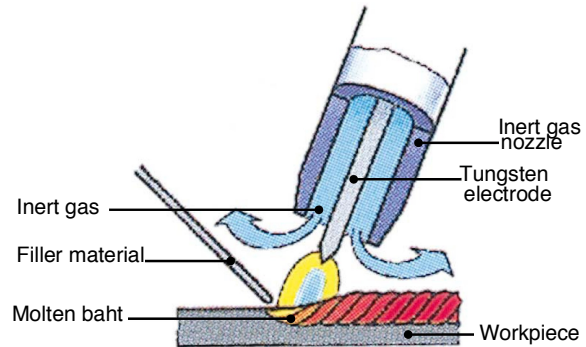


Fig. 4: Principle of TIG welding

Direct current welding:

For welding alloyed steels and non-ferrous metals. The tungsten electrode is ground to a point. The arc burns stable.

Lift-Arc ignition: = contact arc ignition during TIG welding with minimum current. No sticking of the TIG electrode. (only for the models CRAFT-STICK 161P, 201P).

6.2.1 Selection and preparation of electrode

Welding current and electrode diameter:

Ø Electrode (mm)	Setting range of welding current (A) Minus pole
1.0	10 - 70
1.6	60 - 150
2.4	100 - 250
3.2	200 - 400

The electrode is pointed depending on the welding current.

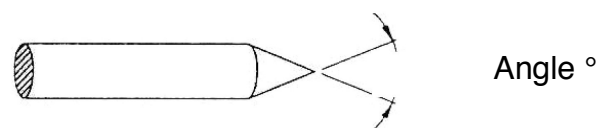


Fig. 5: Angle of the tungsten electrode

Angle [°]	Current range [A]
30	0 - 30
60 - 90	30 - 120
90 - 120	120 - 250
120	> 250

Type of electrode:

Electrode	Color	Usage
Tungsten waxed	grey	Universal
Tungsten pure	green/blue	Aluminium and aluminium alloys
Thoriated tungsten	red	Iron-stainless steel-copper

Fill material

The fill material is selected in the form of wire or rods. It is also possible to use sheet metal strips of the same material as the base metal. However, the metal to be applied must always be clean. The composition of the fill material must avoid the formation of porosity. It is chosen depending on the material to be welded. When using a suitable material and working at a uniform speed, the weld must be smooth, free of porosity and have a good appearance.

6.2.2 Welding process

Step 1: Heat the starting point in the working area with small circular movements of the burner until the fusion bath is formed.

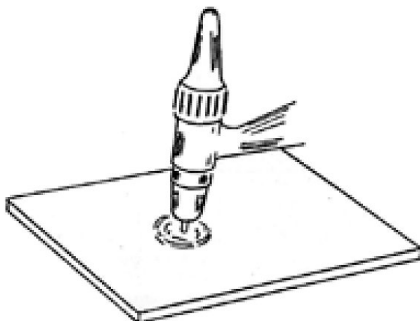


Fig. 6: Preparing the work area

Step 2: The electrode must be positioned approx. 6 mm away from the workpiece. Once the bath is formed, proceed slowly and at a constant speed to form a bath of uniform thickness and width.



Fig. 7: Work area

Step 3: Hold the rod at a distance of about 20 mm from the workpiece when using an fill material.

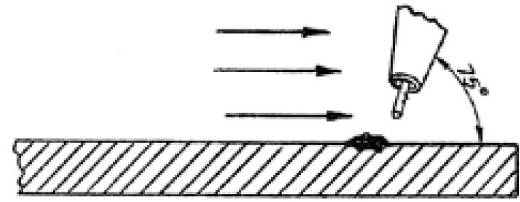


Fig. 8: Rod workpiece distance

Step 4: Remove the burner and add material by touching the rod in the bath when the molten bath becomes liquid.

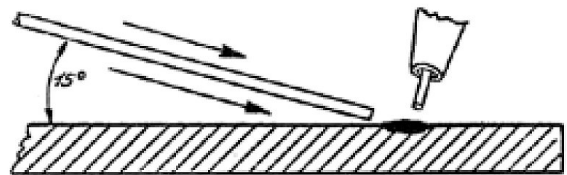


Fig. 9: Add material

Step 5: Pull the rod back and bring the burner near the molten bath.

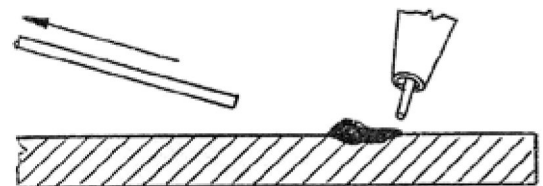


Fig. 10: Pull out the rod

Step 6: Repeat this process speedily and evenly to achieve a homogeneous weld.

7 Description of the operating elements

7.1 Representation

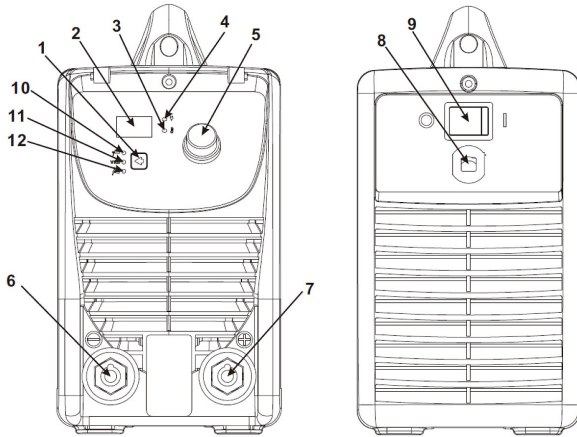


Fig. 11: Device view CRAFT-STICK 201P

1. Knob for setting operating mode MMA, MMA VRD, TIG (only models 161P & 201P)
2. Welding Current display
3. LED Alarm lamp for the current and voltage when overload, overheating, power failure
4. LED Operation control lamp
5. Knob for setting the welding current
6. „-“ - Output terminal
7. „+“ - Output terminal
8. Power cord (rear panel)
9. ON/OFF switch (rear panel)
10. LED operating mode indicator MMA (only models 161P and 201P)
11. LED operating mode indicator MMA VRD (only models 161P and 201P)
12. LED operating mode indicator TIG (only models 161P and 201P)

Alarm indicator (3):

Lights up in case of current overload, overvoltage, overheating, mains failure or internal defect in the power circuit. The device protection is activated. The welding current is switched off until the system detects that the overload has been significantly reduced. The alarm display then goes out.

TIG Mode (12, Models 161P and 201P):

In the TIG mode (only models 161P and 201P), a low current is initially set until the arc is generated by lifting the electrode after light contact with the workpiece. The current is then increased to the preset value.

VRD Function (11)

VRD stands for voltage reduction device. This is a safety device that reduces the voltage in MMA mode as long as there is no welding process to reduce the risk of electric shock. The disadvantage is that it makes arc ignition more difficult, especially when restarts are performed and when some electrode types, such as low hydrogen electrodes, are used.

Knob for setting the welding current (5)

The desired welding current can be set steplessly with the welding current adjustment knob (5).

7.2 Scope of delivery

Craft-Stick 141 and Craft-Stick 161

- 3 m Welding cable 16 mm² with electrode holder
- 3 m Ground cable 16 mm² with ground terminal

Craft-Stick 161 P and Craft-Stick 201 P

- 3m Welding cable 16 mm² with electrode holder
- 3m Ground cable 16 mm² with ground terminal 200 A

8 Operation



Use welders face shield or helmet with welder face shield!



Use protective gloves with pulse protection!



Wear safety boots!



Wear protective clothes!



Wear protective apron!



DANGER! ELECTRICAL VOLTAGE!

Do not use the device outdoors in the rain!



DANGER OF EXPLOSION!

- Do not weld in rooms where there is a risk of fire or explosion. Special regulations apply here!
- No welding work may be carried out on containers in which gases, fuel, oils, dyes or the like have been stored, even if they have been emptied for a long time. There is a risk of explosion due to residues.
- Do not carry out welding work near pressurised containers.
- Do not weld in environments where dust, gas or explosive vapours are present.
- Do not use damaged or leaking gas cylinders.
- Never touch the gas cylinders with the electrode or other live parts!



RISK OF FIRE!

- Avoid the dispersion of open fire, which can be caused by sparks, slag and glowing material.
- Fire protection devices must be in the vicinity of the workplace.
- Remove flammable materials and fuels from the work area.



ATTENTION!

Welded joints which are subject to special stresses and must meet high safety requirements may only be carried out by specially trained and certified welders.



ATTENTION! MAGNETIC FIELD!

Magnetic fields from power circuits can influence the function of pacemakers. Persons wearing vital electronic devices of this type must consult their physician before being in areas where such welding equipment is present.

Interference may occur in the following areas/ devices. Appropriate countermeasures must be taken:

- Data transmission systems,
- Communication systems,
- Control,
- Security devices,
- Calibration and measuring equipment.



NOTE!

The welding equipment may only be operated by persons who have been instructed in the use of welding machines and are familiar with safety regulations. Always wear protective clothing when welding and ensure that other persons are not exposed to the UV radiation of the arc.

With the CRAFT-STICK welding units, welding with all common rod electrodes is possible. The device has the automatic functions "**Hot Start**", "**Anti-Stick**" and "**Arc Force**". The **Hot-Start** function provides stable ignition of the arc and the **Anti-Stick** function prevents the electrode from sticking. These functions are automatically activated and deactivated. The **Arc-Force** control adjusts the dynamics to the welding process and can be controlled.

With the CRAFT-STICK 161P and CRAFT-STICK 201P welding machine, all materials can be welded using the TIG process with all common electrodes, with the exception of aluminium.



NOTE!

The Craft-Stick P models have better efficiency and lower power consumption than the standard models. Especially when operating the standard models, make sure that the house installation is sufficiently dimensioned.

8.1 Operating conditions

Working altitude: ≤ 1000 m above sea level

Operating temperature: -10°C to $+40^{\circ}\text{C}$

Humidity: $< 90\%$ (20°C)

Substrate: solid, level (max inclination angle 15°).

Protect the unit from rain and direct sunlight.

Environment free of dust, chemicals (acids, corrosive substances).

Ensure adequate ventilation. Minimum distance of the device to the wall: 30 cm.

8.2 Electrical connection

Check that the voltage indicated on the type plate corresponds to the nominal voltage of your voltage mains. The device may only be used at a connection with a 1-phase voltage of 230 V (+/-10%), which has been installed by an authorised specialist. The required power consumption must be available and the mains socket must be properly grounded. The fusing of the supply lines to the mains socket must comply with the regulations.

For some applications, extension cords must be used to reach the workplace. To ensure full performance of the unit, the required conductor cross-sections must be observed depending on the cable length.

If necessary, a qualified electrician must ensure that the electrical installation is carried out in such a way as to ensure the correct operation of the welding machine.

8.3 Welding with rod electrode (MMA)

Important! Before welding, read the instructions of the electrode manufacturer on the electrode packaging.

They contain the following information:

- Recommended welding current,
- Ground Polarity; Connect to "+" or "-" Connection,
- Welding current type: direct current, alternating current.

The cable provided is for connecting the welding material to the device (Fig. 12, DCEP - left: MMA welding). The welding material must be clean at the connection with the earth terminal in order to achieve good contact. The earth terminal must always be connected directly to the workpiece and to the "-" connection on the device side - according to the instructions of the electrode manufacturer.

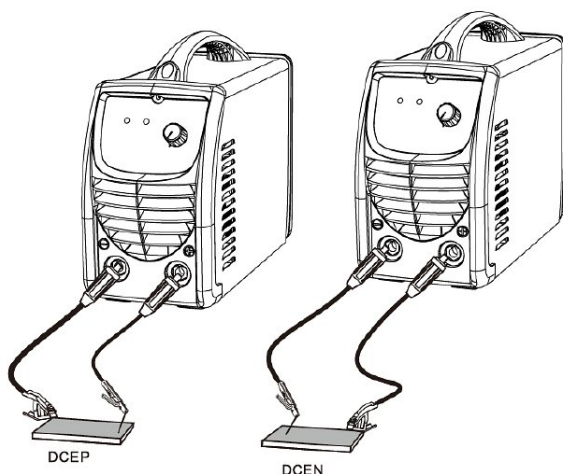


Fig. 12: Connection for arc welding

The electrode holder - cable must be connected to the "+" connection - according to the instructions of the electrode manufacturer.

Step 1: Connect the cables to the particular terminal on the unit and tighten clockwise (bayonet lock).



ATTENTION!

Different electrodes demand different polarities to ensure optimal results. Therefore, special attention must be paid to polarity and the instructions of the electrode manufacturer must be followed exactly.

If the polarities are reversed (according to the instructions of the electrode manufacturer), make the connections as shown in Fig. 12, DCEN - right.

Step 2: Switch on the unit with the ON/OFF switch on the rear panel.

Step 3: Select the MMA, MMA VRD mode with the MMA/MMA VRD/LIFT TIG switch (161P and 201P models only).

Step 4: Adjust the welding current with the welding current adjustment knob 5.

Step 5: Set the **Hot Start** and **Arc Force** welding parameters with the knobs (161P and 201P models only).

Step 6: Insert the non-coated end of the electrode into the pliers. Connect the earth clamp to the workpiece to be welded.

Step 7: Pull the electrode over the workpiece. The arc is automatically ignited with the **Hot-Start** function. Carry out the welding process. Adjust the welding current as required.

Step 8: To stop the welding process, remove the electrode from the workpiece so that the arc goes out.

Step 9: After completion of welding the Power Source should be left turned ON for 2 to 3 minutes. This allows the fan to run and cool the internal components.

Step 10: Switch the ON/OFF switch to the OFF position.

In case of overheating, the LED alarm indicator (Fig.11; Pos. 3) lights up and the unit switches off. Overheating can occur when welding at high currents for a long time. Leave the unit switched on to allow it to cool down while the fan is running.

8.4 TIG welding (only models 161P and 201P)



ATTENTION

Place the gas cylinder in a safe place and make sure that it is securely fastened.

Connect the TIG burner gas line to the pressure reducer and follow the manufacturer's instructions supplied with the pressure reducer.

Recommended gas: pure ARGON 4/8 l/Min.

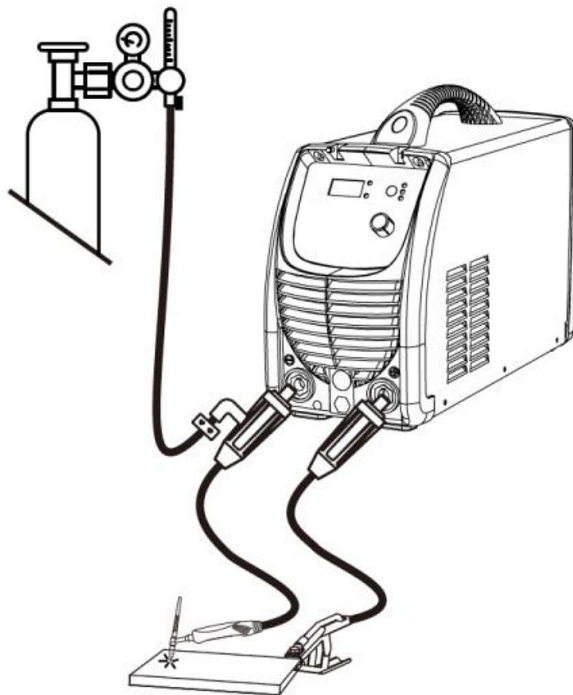


Fig. 13: Connection for TIG welding

- Step 1: Check that the unit is switched off.
- Step 2: Connect the ground cable to the "+" connector. Tighten clockwise (bayonet lock).
- Step 3: Clamp the ground terminal firmly to the workpiece. The workpiece must be clean at the connection with the earth terminal to provide good contact (blank metal, no corrosion, no paint).
- Step 4: Connect the TIG torch to the "-" connection. Tighten the cable clockwise (bayonet lock). Connect the gas line.
- Step 5: Open the gas valve and adjust the regulator. The gas flow should be 5 to 10 l/min, depending on the application. Check that the gas pressure is constant and stable.

Step 6: Check the mains connection and connect the device to the mains.

Step 7: Turn on the power with the ON/OFF switch on the rear panel. The power indicator will light.

Step 8: Select the LIFT TIG mode with the MMA/MMA VRD/LIFT TIG knob (Pos. 1, Fig. 11).

Step 9: Set the welding current with the knob (Pos. 5, Fig. 11) for setting the welding current

Step 10: Open the gas valve on the handle of the TIG torch and start the welding arc by placing the electrode tip on the workpiece to be welded - "Lift - Arc" - and slowly lift it to a distance of 3 - 4 mm. Perform the welding process. Adjust the welding current as required.

Step 11: Switch off the arc after the welding process has finished: Remove the electrode from the workpiece, let the gas escape for a few seconds (6 - 8 seconds) to prevent oxidation of the electrode. And then when the electrode has cooled down, close the gas valve.

Step 12: Wait 2 to 3 minutes before switching off the device so that it can cool down.

Step 13: Turn off the unit with the ON/OFF switch.

9 Troubleshooting

9.1 Electrode welding

Fault	Possible cause	Solution
Air bubbles in the weld seam (porosity).	1. Wet electrodes. 2. Welding current too high. 3. Surfaces dirty with oil, paint etc.	1. Dry the electrodes before use. 2. Reduce the welding current. 3. Clean the edges before welding.
Visible cracks in the weld seam immediately after solidification.	1. Edges too rigid. 2. Weld throat too small. 3. Cooling too fast.	1. Avoid stresses due to edge shape. 2. Reduce the working speed to obtain a more uniform deposit. 3. Preheat the workpiece and cool it slowly.
Cracks due to poor filling of the throat.	1. Welding current too low. 2. Electrode too large for connection. 3. Throat unsuitable. 4. Wrong welding sequence.	1. Increase the welding current. 2. Use electrodes with a smaller diameter. 3. Enlarge the throat. 4. Follow the correct welding sequence.
Parts of the workpiece not molten to the sheet metal or joint.	1. Electrodes too thin for the workpiece to be welded. 2. Welding current too low. 3. Electrode used at the wrong angle. 4. Too fast movement of the electrode. 5. Slag or dirt on the surface of the workpiece.	1. Use electrodes with a larger diameter and preheat the workpiece. 2. Increase the welding current. 3. Correct the welding angle towards the base plate. 4. Reduce the speed of the electrode. 5. Clean the surfaces before welding.
Non-metallic material in the weld pool (slag inclusions).	1. Particles in the lower layers of the preceding passages. 2. Prepared joint too narrow. 3. An irregular surface promotes slag containment. 4. Poor penetration of slags trapped under the weld pool. 5. Rust or splinters prevent complete melting. 6. Wrong electrode for the intended welding position.	1. In case of bad welding, remove the slag and replace the base with a small diameter electrode. 2. Provide adequate space for cleaning the slag. 3 If necessary, grind off the entire bad or irregular area. 4. Remove all slags from the corners. Use smaller electrodes to allow proper penetration. 5. Clean the edge before welding. 6. Use electrodes appropriate to the position to be welded, otherwise removing the slag will be difficult.
Fuse is triggered	1. High power consumption	1. Ensure that the house installation is sufficiently dimensioned.

9.2 TIG welding

Fault	Possible cause	Solution
The electrode melts when the arc is skipped.	1. Electrode connected to output "+".	1. Connect electrode to output "-".
The weld bath is dirty.	1. Electrode contaminated by contact with the weld bath or rod. 2. Gas contaminated with air.	1. New sharpen the electrode. 2. Check the gas pipes or replace the cylinder.
The electrode melts or oxidizes when the arc is skipped.	1. The gas does not reach the weld bath. 2. Burner blocked by contamination. 3. Gas hose is cutting in. 4. Gas path contains impurities. 5. Gas valve closed. 6. Burner valve closed. 7. Electrode too small for the current used.	1. Check for obstructions in the gas pipes and check the cylinder. 2. Clean the burner. 3. Replace the gas hose. 4. Disconnect the gas supply from the burner and increase the pressure to blow the impurities out. 5. Open the gas valve. 6. Open the burner valve. 7. Reduce the welding current or replace the electrode with a larger one.
Visibly bad welding.	1. Insufficient shielding gas. .	1. Raise the gas flow or check the gas supply pipe.
Arc during TIG welding is unstable.	1. Tungsten electrode too large for the welding current.	1. Select the correct electrode size.
The welding arc does not stabilize.	1. Grounding clamp not attached to the workpiece or clamp not connected to the correct poles. 2. Burner cable not connected. 3. Wrong gas flow, bottle empty or valve closed.	1. Connect the earth clamp to the workpiece to be welded or connect the cables of the burner and the earth to the correct connections. 2. Connect the burner cable to contact "-". 3. Correct the gas flow rate, change the bottle or open the valve.
Arc does not jump smoothly over.	1. Tungsten electrode too large for the welding current. 2. Tungsten electrode not adequate for the work to be performed. 3. Gas flow too high. 4. Use of the wrong gas. 5. Bad contact between earth clamp and workpiece.	1. Select the correct electrode size. 2. Select the correct electrode type. 3. Select the correct gas flow rate for the work to be performed. 4. Select the correct gas type. 5. Make sure that there is good contact between the grounding clamp and the workpiece.
Fuse is triggered	1. High power consumption	1. Ensure that the house installation is sufficiently dimensioned.

9.3 List of error codes

Type of error	Error code	Description	Lamp display
Thermal relay	E01	Overheating (thermal relay 1)	yellow light (thermal protection) permanently on
	E02	Overheating (thermal relay 2)	yellow light (thermal protection) permanently on
	E03	Overheating (thermal relay 3)	yellow light (thermal protection) permanently on
	E04	Overheating (thermal relay 4)	yellow light (thermal protection) permanently on
	E09	Overheating (program run error)	yellow light (thermal protection) permanently on
Welding equipment	E10	Loss of phase	yellow light (thermal protection) permanently on
	E11	no water	yellow light (water leak) permanently on
	E12	no gas	red light permanently on
	E13	Undervoltage	yellow light (thermal protection) permanently on
	E14	Overvoltage	yellow light (thermal protection) permanently on
	E15	Overcurrent	yellow light (thermal protection) permanently on
	E16	Overload of the wire feeder	
	E17	Overload wire feed slide	
	E18	Wire feeder cover opened	
	E19	Input voltage error	
Switch	E20	Key error on the operating panel after the machine was switched on.	yellow light (thermal protection) permanently on
	E21	Other error on the control panel when the machine was switched on.	yellow light (thermal protection) permanently on
	E22	Welding torch error after the machine has been switched on.	yellow light (thermal protection) permanently on
	E23	Torch failure during the normal welding process.	yellow light (thermal protection) permanently on
Accessories	E30	Cutting torch switch-off	red light flashes
	E31	Water cooling shutdown	yellow light (water leak) permanently on
	E32	Charge protection signal of the battery	
	E33	Error fan / ventilation wheel	
	E34	Short circuit of the water circulation	
Communication	E40	Connection problems between the wire feed and the power source	
	E41	Connection error	
	E42	Connection error robot	
	E43	Connection error WIFI	

10 Care, maintenance and repair



DANGER!

Risk of fatal electric shock!

Contact with live components may result in fatal injury. Switched-on electrical components can make uncontrolled movements and lead to serious injuries.

- Before starting cleaning and maintenance work, switch off the device and pull out the mains plug.
- Connections and repairs to the electrical equipment may only be carried out by a qualified electrician.



NOTE!

After care, maintenance and repair work, check that all guards and protective devices have been properly installed on the device and that no tools are left inside or in the working area of the device. Damaged protective devices and equipment parts must be repaired or replaced by customer service or a specialist workshop.

10.1 Care after work



Use protective gloves!



NOTE!

Never use aggressive cleaning agents for any cleaning work. This can damage or destroy the device.

Step 1: Disconnect the mains plug from the socket.

Step 2: Clean the outside of the device with a dry cloth.

10.2 Maintenance and repair

Maintenance and repair work may only be carried out by qualified personnel.

If the electrode inverter does not function properly, contact a specialist dealer or our customer service. The contact details can be found in chapter 1.2 Customer service.

All protective and safety devices must be mounted again immediately after completion of repair and maintenance work.

Check daily:

- Check the regulator and switches on the control panel and on the rear of the device for function and ease of movement.
- After switching on, check for unusual noises.
- Check the display, check whether the set values match the displayed values.
- Check the fan wheel for proper function.
- Check plug connections
- Check mains cable for damage.

Replace defective parts or contact customer service.

Check/clean monthly:

- Carefully clean the inside of the unit with compressed air.
- Attention: Use protective goggles!**
- Check screws and bolts for secure seating.

Clean dirty or rusted screws and bolts, replace defective parts or contact customer service.

Check every three months:

- Check display, check whether set values and displayed values correspond.

Replace defective parts or contact customer service.

Check yearly:

- Measure the insulation impedance between the main circuit, the printed circuit board and the housing. If it is less than 1 MΩ the insulation is damaged and must be replaced or re-insulated. Contact customer service if necessary.

11 Disposal, reusing used machines

In your own interest and to protect the environment make sure that all machine components are exclusively disposed of in as intended and permitted.

11.1 Decommissioning

Disused machines must be decommissioned immediately to prevent misuse at a later point and putting the environment or persons at risk.

Step 1: Remove all environmentally hazardous processing materials from the used machine.

Step 2: If necessary, disassemble the machine into assemblies and components that are easy to handle and suitable for recycling.

Step 3: The machine components and processing materials must be disposed of using the intended disposal methods.

11.2 Disposal of electrical equipment

Electrical equipment contains a variety of recyclable materials and environmentally harmful components.

These components must be disposed of separately and properly. In case of doubt, contact the municipal waste disposal department.

If necessary, a specialist waste disposal company should be called upon to help with processing.

11.3 Disposal via communal recycling points

Disposal of used electrical and electronic equipment (to be used in the countries of the European Union and other European countries with a separate collection system for this equipment).



The symbol on the product or its packaging indicates that this product is not to be treated as normal household waste, but must be returned to a collection point for the recycling of electrical and electronic equipment. By contributing to the correct disposal of this product, you protect the environment and the health of your fellow human beings. Environment and health are endangered by incorrect disposal. Material recycling helps to reduce the consumption of raw materials. For more information about recycling this product, contact your local community, municipal waste management company or the store where you purchased the product.

12 Spare parts



DANGER!

Risk of injury caused by the use of incorrect spare parts!

The use of incorrect or faulty spare parts may cause risks for operating staff and damage as well as malfunctions.

- Exclusively genuine spare parts made by the manufacturer or spare parts authorised by the manufacturer shall be used.
- Always contact the manufacturer if you are unsure.



NOTE!

The manufacturer warranty shall be rendered void in the event of a use of unauthorised spare parts.

12.1 Spare parts orders

Spare parts are available from authorised retailers or directly from the manufacturer.

Contact details:

Fax: 0049 (0) 951 96555-119

email: ersatzteile@stuermer-maschinen.de

Always quote the following key data with your spare parts orders:

- Device type
- Article number
- Position number
- Year of manufacture
- Quantity
- Desired shipping type (post, freight, sea, air, express)
- Shipping address

Spare parts orders without the aforementioned data cannot be taken into account. The supplier shall determine the shipping type if no relevant data was provided. Information about the device type, article number and year of manufacture can be found on the type plate. The type plate is mounted on the device..

Example

The fan for the electrode inverter CRAFT-STICK 141 must be ordered. The fan is identified in the spare parts drawing 1 with the number 4.

By ordering spare parts, send a copy of the spare parts drawing (1) with the marked part (Fan) and marked position number (4) to the dealer or spare parts department and provide the following information:

Type of device:	Electrode Inverter CRAFT-STICK 141
Item number:	1073141
Position number:	4
Drawing number:	1

12.2 Spare parts drawings

The following spare parts drawing is intended to help identify the necessary spare parts. To order, please send a copy of the list of spare parts with the marked components to your dealer.

Spare parts drawing Craft-Stick 141

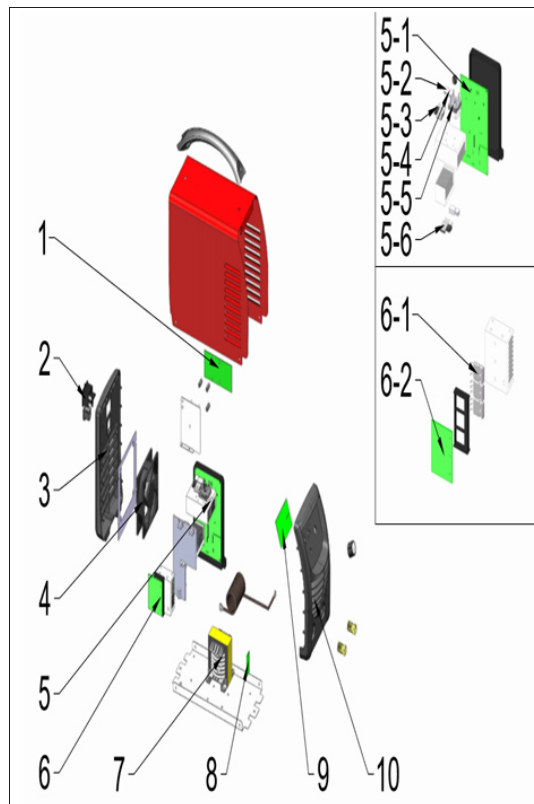


Fig. 14: Spare parts drawing CRAFT-STICK 141

Spare parts drawing Craft-Stick 161

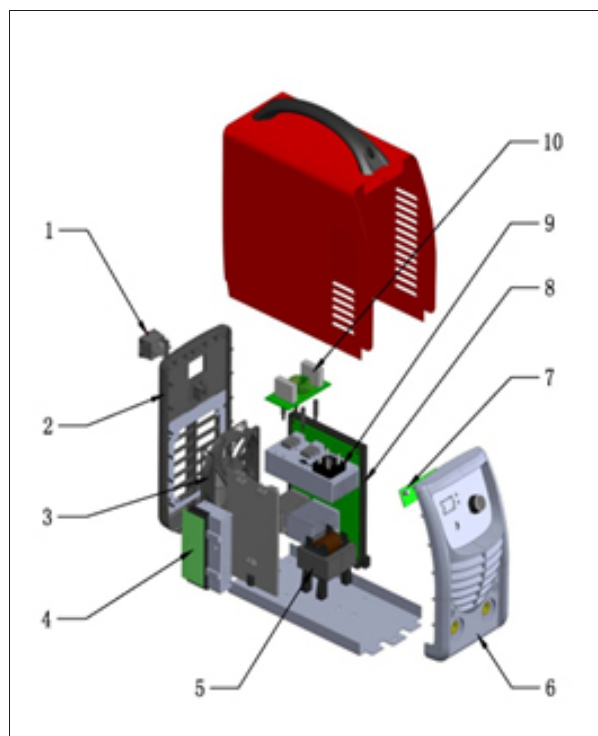


Fig. 15: Spare parts drawing CRAFT-STICK 161

Spare parts drawing Craft-Stick 161 P and 201 P

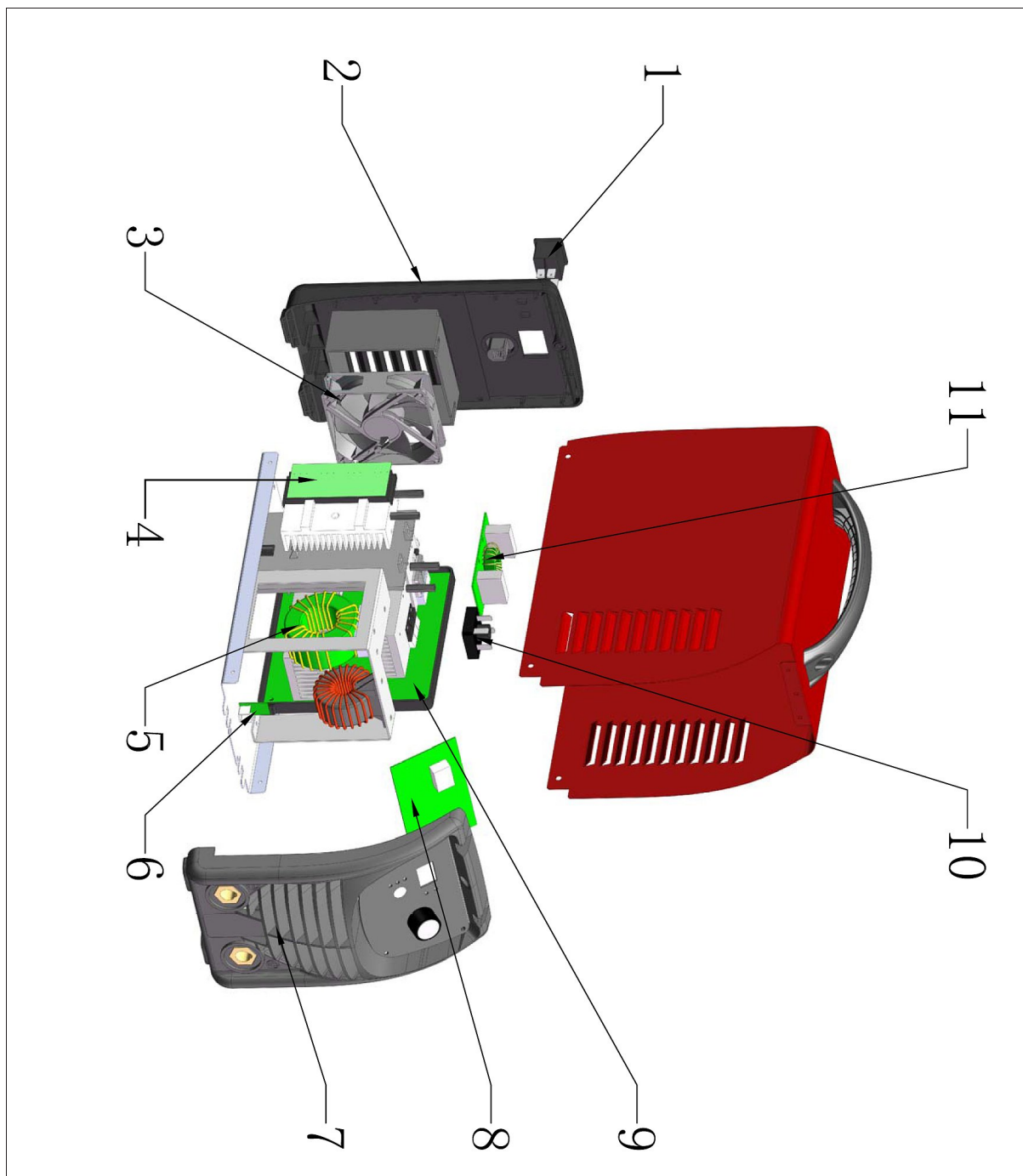


Fig. 16: Spare parts drawing CRAFT-STICK 161P and 201 P

13 Electrical circuit diagrams

Electrical circuit diagram CRAFT-STICK 141 and CRAFT-STICK 161

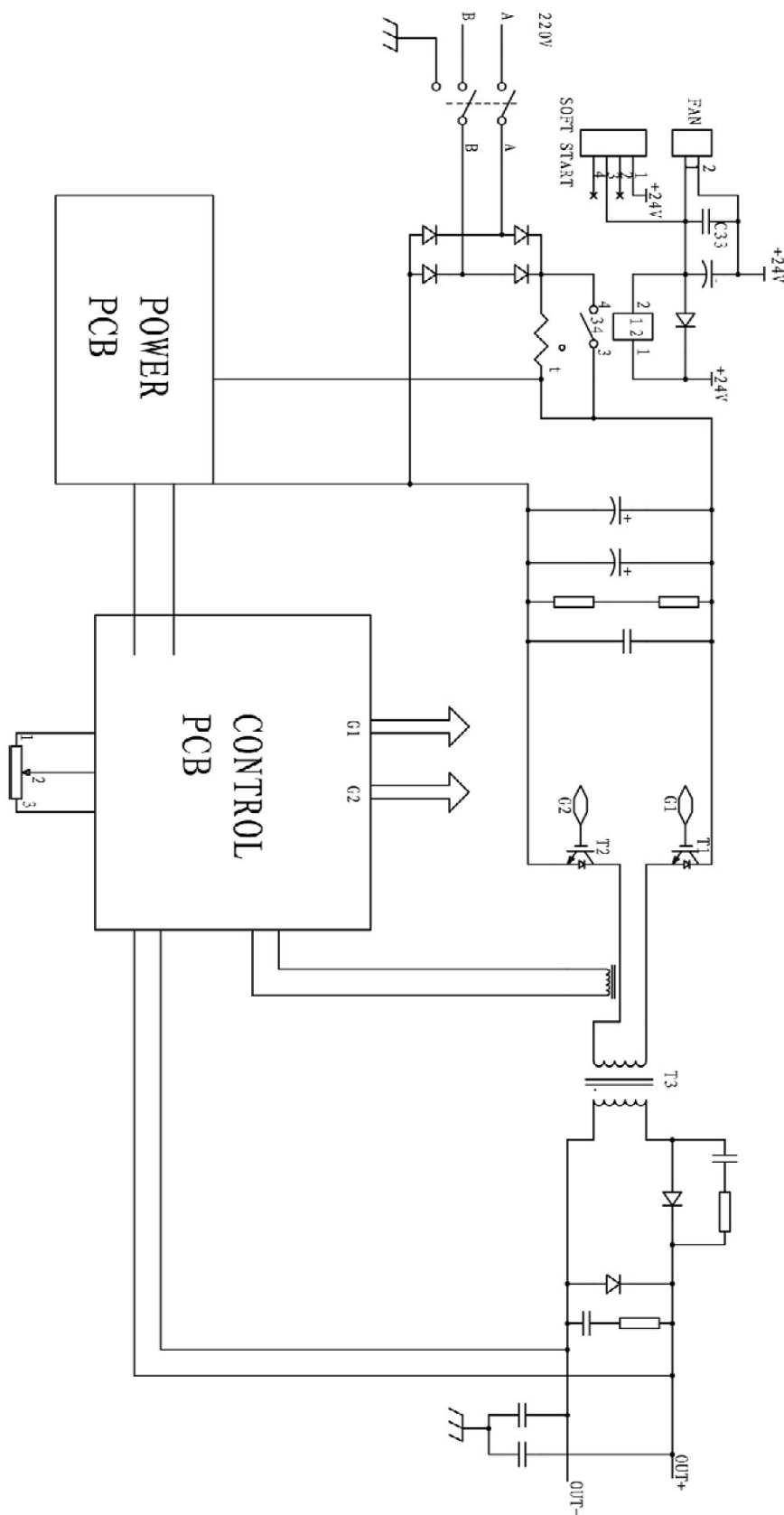


Fig. 17: Electrical circuit diagram CRAFT-STICK 141 and CRAFT-STICK 161

Electrical circuit diagram CRAFT-STICK 161P

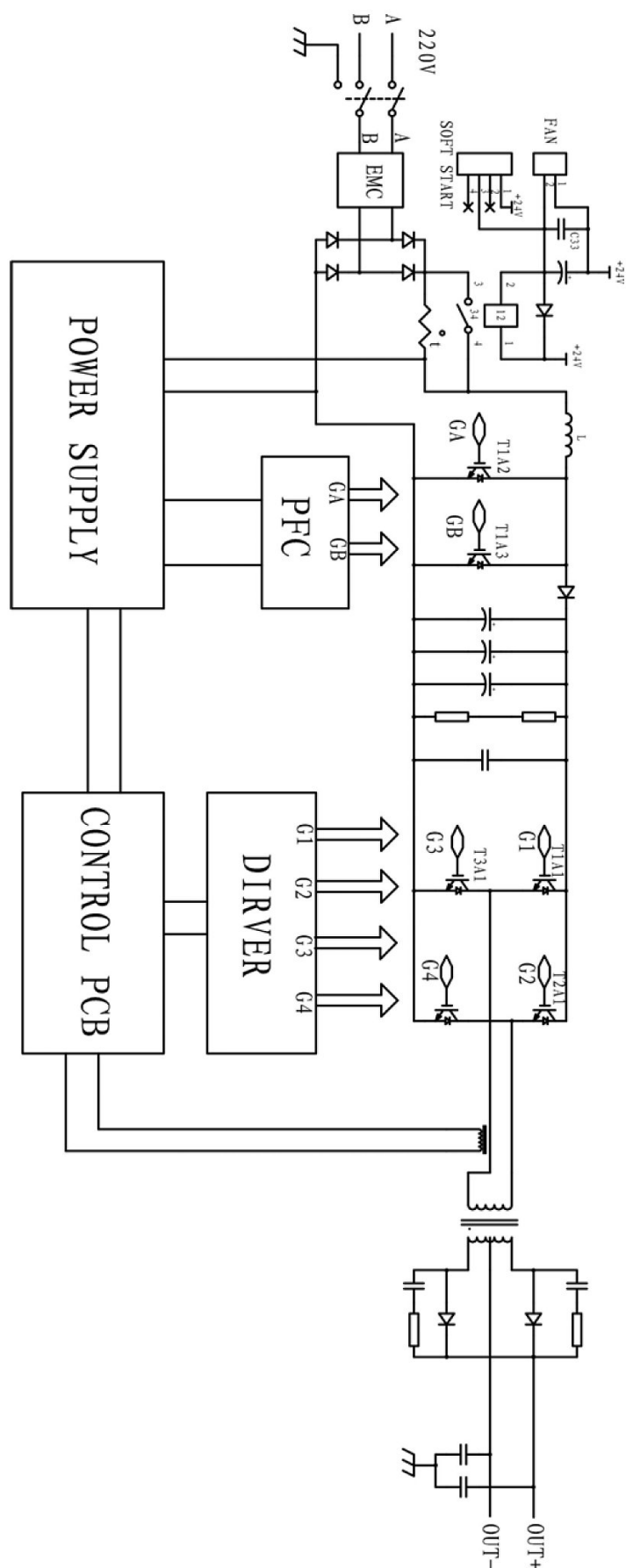


Fig. 18: Electrical circuit diagram CRAFT-STICK 161P

Electrical circuit diagram CRAFT-STICK 201P

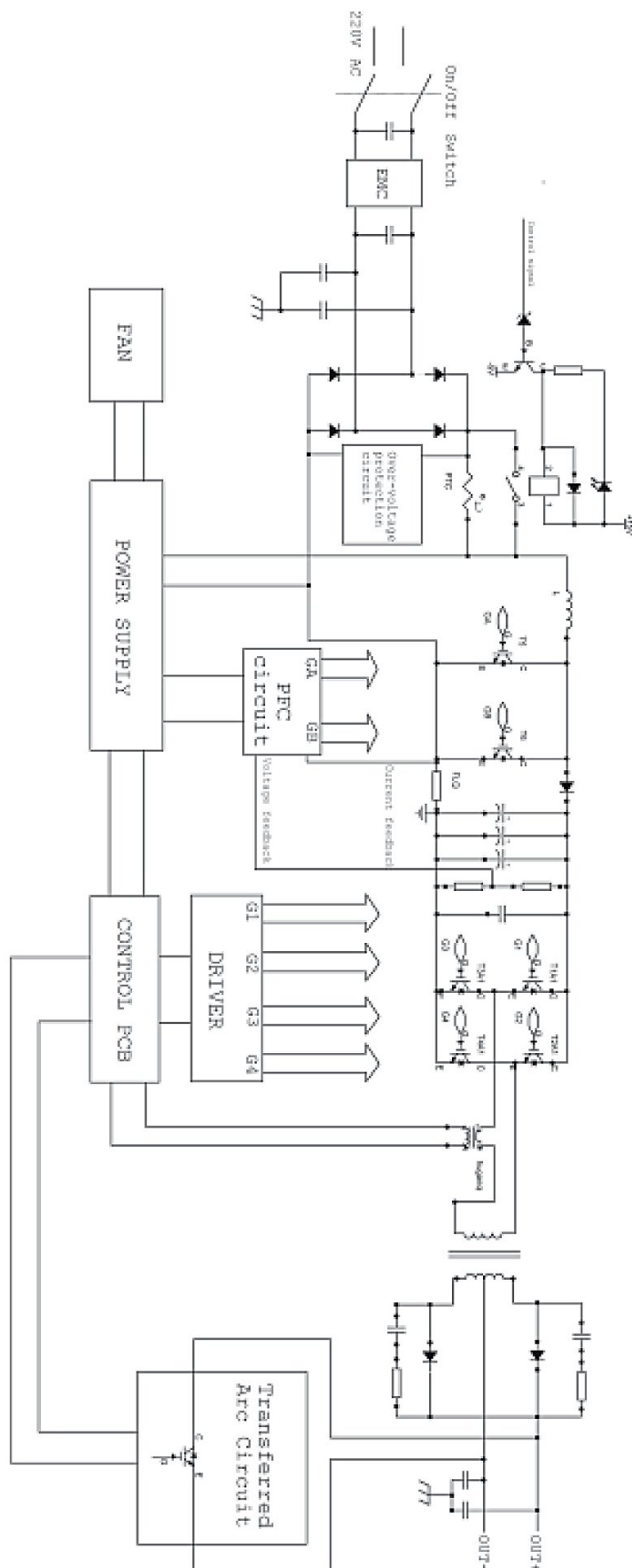


Fig. 19: Electrical circuit diagram CRAFT-STICK 201P

14 EC Declaration of Conformity

For the following products

Manufacturer / distributor: Stürmer Maschinen GmbH
Dr.-Robert-Pfleger-Straße 26
D-96103 Hallstadt

Product group: Schweisskraft®

Type of machine: Electrode Inverter

Designation of the device *: ☐ CRAFT-STICK 141 **Item number *:** ☐ 1073141
☐ CRAFT-STICK 161 ☐ 1073161
☐ CRAFT-STICK 161P ☐ 1073162
from serial number S.021RM.378-GS 31807082419
☐ CRAFT-STICK 201P ☐ 1073201

Serial number*: _____

Year of manufacture*: 20____

* please fill in according to the information on the type plate

is hereby confirmed to comply with the essential protection requirements set out in Council Directive **2014/30 / EU** (EMC Directive) on the approximation of the laws of the Member States relating to electromagnetic compatibility and in Directive **2014/35 / EU** relating to electrical equipment Use within certain voltage limits and in the WEEE Directive **2012/19 / EU**. The abovementioned products comply with the requirements of this Directive and comply with the safety requirements for arc welding equipment in accordance with the following product standards

The following harmonised standards have been applied:

DIN EN 60974-1:2018-12 Arc welding equipment – Part 1: Welding power sources

DIN EN 60974-10:2022-11 Arc welding equipment – Part 10: Electromagnetic compatibility (EMC) requirements (**Filter class A**)

According to EC Directive **2006/42/EG Artikel 1** the above products fall exclusively within the scope of the Directive **2014/35/EU** concerning electrical apparatus for use within certain voltage limits.

Electromagnetic compatibility EMC (DIN EN 60974-10)

The device is built and tested in accordance with the EN 60974-10 class A standard. This Class A welding equipment is not intended for use in residential areas where power is supplied by a low voltage public power supply system.

Responsible for the documentation: Kilian Stürmer, Stürmer Maschinen GmbH,
Dr.-Robert-Pfleger-Str. 26, D-96103 Hallstadt

Hallstadt, 06.02.2023

A handwritten signature in blue ink, appearing to read "K. Stürmer", written over a horizontal line.

Kilian Stürmer
Manager



15 Notes

