

Operating Instructions

TIG-Inverter

-  CRAFT-TIG 201 DC P PULSE
-  CRAFT-TIG 253 DC PULSE



CRAFT-TIG 201 DC P

TIG-INVERTER

Imprint

Product identification

WIG-Inverter

Item number

CRAFT-TIG 201 DC P PULSE

1074201

CRAFT-TIG 253 DC PULSE

1074202

Manufacturer

Stürmer Maschinen GmbH
Dr.-Robert-Pfleger-Str. 26
D-96103 Hallstadt

Fax: 0951 96555-55

E-Mail: info@schweißkraft.de

Internet: www.schweißkraft.de

Indications regarding the operating instructions

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1 Introduction

With the purchase of the welding machine made by Schweißkraft you have made a good choice.

Read the operating instructions carefully before commissioning.

This informs about the proper commissioning, the intended use as well as the safe and efficient operation and maintenance of the device.

The operating instructions are part of the device. It must always be stored at the place of use of the device. In addition, the local accident prevention regulations and general safety regulations apply to the area of application of the device.

Illustrations in this operating manual serve the general understanding and may deviate from the actual design.

1.1 Copyright

The contents of this manual are protected by copyright. Their use is permitted within the scope of use of the device. Any further use is not permitted without the written permission of the manufacturer.

We hereby apply for trademark, patent and design rights to protect our products, if this is possible in individual cases. We vigorously oppose any infringement of our intellectual property.

1.2 Customer service

If you have any questions about your device or technical information, please contact your dealer. There you will be happy to help with expert advice and information.

Germany:

Stürmer Maschinen GmbH
Dr.-Robert-Pfleger-Str. 26
D-96103 Hallstadt

Repair-Service:

Fax: 0049 (0) 951 96555-111
Email: service@stuermer-maschinen.de

Spare parts orders:

Fax: 0049 (0) 951 96555-119
Email: ersatzteile@stuermer-maschinen.de

We are always interested in information and experiences that arise from the application and can be valuable for the improvement of our products.

1.3 Limitation of liability

All information and instructions in the operating instructions have been compiled taking into account the applicable standards and regulations, the state of the art as well as our many years of knowledge and experience. In the following cases, the manufacturer assumes no liability for damages:

- Failure to observe the operating instructions,
- Improper use,
- Use of untrained personnel,
- Unauthorized conversions,
- Technical changes,
- Use of unauthorized spare parts.

The actual scope of delivery may differ from the explanations and illustrations described here for special versions, when using additional order options or due to the latest technical changes.

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 valid at the time of the conclusion of the contract apply.

2 Safety

This section provides an overview of all major safety packages for personal protection and safe and trouble-free operation. Further task-related safety instructions are contained in the individual chapters.

2.1 Symbol explanation

Safety instructions

Safety instructions are indicated by symbols in these operating instructions. The safety instructions are initiated by signal words that express the extent of the hazard.

DANGER!



This combination of symbol and signal word indicates an immediately dangerous situation. It leads to death or serious injury if it is not avoided.

WARNING!



This combination of symbol and signal word indicates a potentially dangerous situation. It leads to death or serious injury if it is not avoided.

CAUTION!



This combination of symbol and signal word indicates a potentially dangerous situation. It can cause minor or minor injuries if not avoided.

NOTE!



This combination of symbol and signal word indicates a potentially dangerous situation. It can lead to material and environmental damage if it is not avoided.

Tips and recommendations



Tips and recommendations

This symbol indicates useful tips and recommendations as well as information for efficient and trouble-free operation.

To reduce the risk of personal injury and property damage and to avoid dangerous situations, the safety instructions in this manual must be observed.

2.2 Qualification of the staff

The various tasks described in this manual place different demands on the qualifications of the people entrusted with these tasks.



WARNING!

Danger due to insufficient qualification of persons!

Insufficiently qualified persons can not assess the risks involved in handling the machine and expose themselves and others to the risk of serious or fatal injuries.

- All work should only be carried out by qualified persons.
- Keep inadequately qualified persons out of the work area.

Only persons who can be expected to carry out this work reliably are permitted to carry out all work. Persons whose reactivity is influenced, e.g. by drugs, alcohol or medication, are not permitted.

Operator

The operator has been instructed in a briefing by the operator about the tasks assigned to him and possible dangers of improper behavior. The operator may only carry out tasks that go beyond normal operation if this is specified in this operating manual and the operator has expressly entrusted this to him.

Specialist staff

Due to their professional training, knowledge and experience as well as their knowledge of relevant regulations the specialist staff is able to perform the assigned tasks and to recognise and avoid any possible dangers themselves.

2.3 Personal protective equipment

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

The personal protective equipment is explained in the following paragraph:



Welders face protection shield or helmet with welder's face protection shield

Wear a welding helmet fitted with a proper shade of filler to protect your face and eyes when welding or watching (see Safety Standards).



Protective gloves with pulse protection

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



Protective apron

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



Safety boots

The safety boots protect the feet against crushes, falling parts and slipping over on slippery under-ground.



Protective clothes

The protective clothes are tight clothes of little tensile strength.

2.4 General safety instructions



WARNING!

Danger in case of misuse!

The device may only be operated in a technically perfect condition. Any faults must be rectified immediately. Unauthorized modifications to the TIG inverters or improper use of the TIG inverters as well as disregard of the safety regulations or the operating instructions exclude the manufacturer's liability for any resulting damage to persons or objects and invalidate the warranty claim!

The following must be observed:

- The device must not be modified in its design and must not be used for purposes other than those provided for by the manufacturer.
- Never work under the influence of concentration-disturbing diseases, fatigue, drugs, alcohol or medication.
- Keep children and persons not familiar with the TIG inverters away from their working environment.

2.5 Safety markings on the welding machine

Safety signs and instructions are attached to the device (Fig. 1) which must be observed and followed.

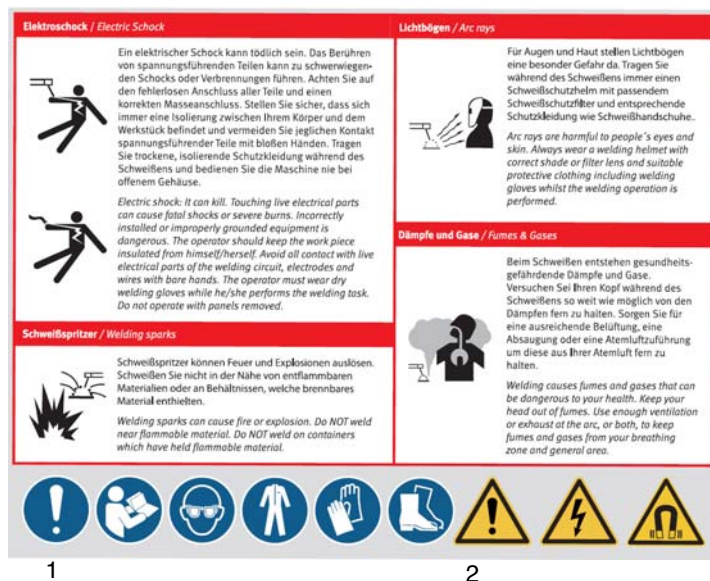


Fig. 1: 1 Mandatory sign | 2 Warning sign

The safety labels and instructions attached to the device must not be removed. Damaged or missing safety markings can lead to malfunctions, personal injury and property damage. They are to be replaced immediately. If the safety markings and instructions are not immediately recognizable and comprehensible, the device must be taken out of operation until new safety markings have been affixed.

3 Intended Use

The device is exclusively designed for arc welding according to MMA and TIG. Intended use also includes compliance with all information in these instructions. No other use is permitted. Any use beyond the intended use or any other use is considered misuse.

WARNING!



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.
- Keep away from all moving parts.

Stürmer Maschinen GmbH does not assume any liability for constructive and technical changes to the device. Claims of any kind due to damage due to improper use are excluded. The TIG inverters welding devices are direct current inverters with high-frequency ignition and pulse function. The required welding current can be infinitely adjusted via a rotary control. The HF ignition enables contactless ignition of the arc. Exceeding the permissible temperature of the power components is indicated by a display on the control panel.

The housing ensures the protection of the components against external influences and against direct contact. Depending on the application, there are different degrees of protection against penetration of solid bodies and water. The degree of protection (Fig. 2) is indicated by the letters IP, followed by two digits: the first digit indicates the degree of protection against solid bodies and the second the degree of protection against water.

	1. Digit	Description	2. Digit	Description	Additional field	Description
IP2 1	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

Fig. 2: Degree of protection IP21

NOTE!



The Schweißkraft welding equipment may only be operated by persons who have been instructed in the use of welding equipment and are familiar with safety regulations.

- Always wear protective clothing when welding to protect against splashes and sparks.
- Make sure that other persons are not endangered by the UV radiation of the arc.

4 Principle of operation

4.1 Principle of tungsten inert gas welding

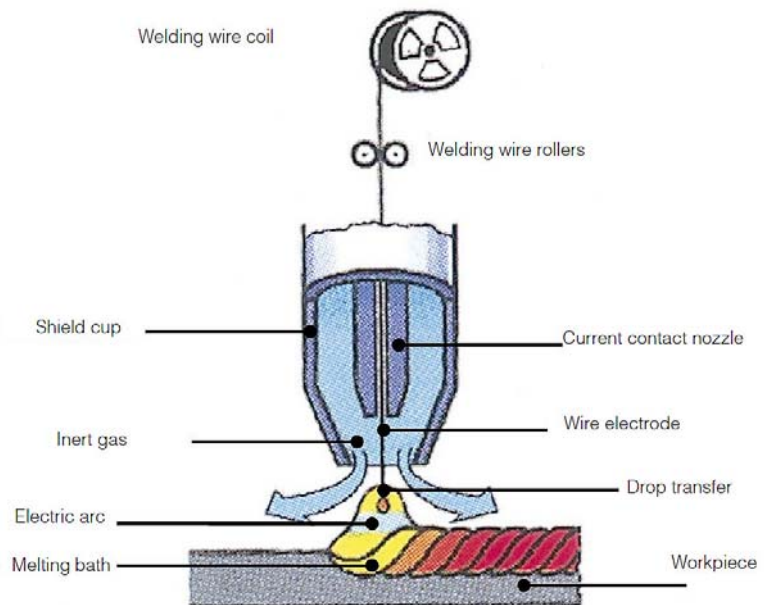


Fig. 3: Metal inert gas welding

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 noble 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 (alternating current 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.

Alternating current welding (AC):

For welding of aluminium. A hemispherical tungsten dome forms on the tungsten electrode and the arc changes in high frequency between the minus and plus poles.

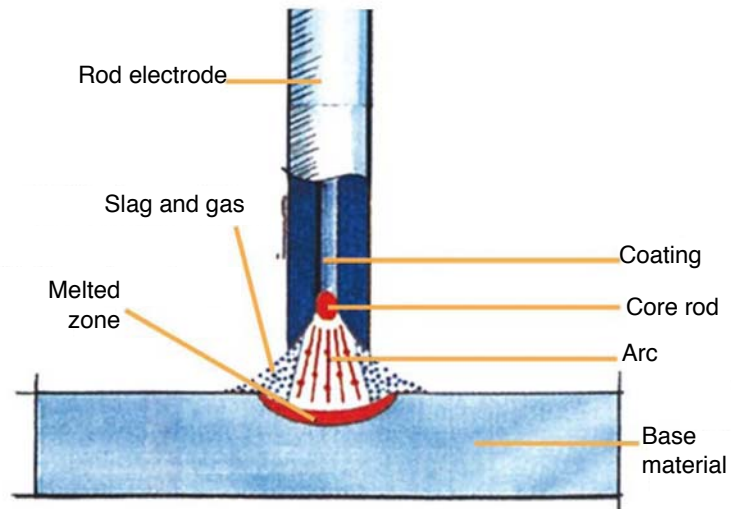
Direct current welding (NC):

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

HF ignition = contactless ignition

Lift-Arc ignition = contact ignition

4.2 Principle of manual arc welding (MMA)



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 additional material. It consists of a core wire and a cladding. The cladding 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 distinction is made between rutile and basic electrodes. Rutile electrodes are easier to weld and have a beautiful flat seam. The slag is also easier to remove. It should be noted that many electrodes have to be redried after prolonged storage because moisture accumulates from the air over time. Otherwise, electrode welding is a very common and easy-to-use welding process.

5 Technical Data

5.1 Table

Parameter	CRAFT-TIG 201 DC P PULSE	CRAFT-TIG 253 DC PULSE
Length (Product) [mm]	500x150x280	480x190x350
Net weight [kg]	9,7	15,1
Norm /EMV-Class	IEC 60974-1:2012 / A	
Connecting cable length [m]	2,2	2,2
Supply voltage [V]	90~275	400±10%
Type of current / Phase (s) [Ph]	AC / 1	AC / 3
Mains frequency [Hz]	50/60	50/60

Parameter	CRAFT-TIG 201 DC P PULSE	CRAFT-TIG 253 DC PULSE
Power input [A]	110V: TIG 23.9 110V: MMA 38.6 230V: TIG 19.7 230V: MMA 30.1	MMA 18.6/ TIG 13.5
Power draw [kVA]	110V: TIG 2.6 110V: MMA 4.2 230V: TIG 4.5 230V: MMA 6.9	10.6 / 7.7
Degree of protection	IP21S	IP21S
Isolation class	H	H
Fuse slow-blow [A]	16	16
Required generator power	>6.9 kVA	>10,6 kVA
Mains plug [A]	16	no
Open circuit voltage [V]	110V: TIG 66.5 110V: MMA 66.7 230V: TIG 66.5 230V: MMA 66.7	MMA 70.5/ TIG 60.5
Operating temperature [C°]	-10~40	-10~40
Weldable electrode Ø [mm]	1.6~4.0	1.6~5.0
Adjustment range TIG DC [A]	5~200	5~250
Adjustment range electrode [A]	5~200	5~250
Duty cycle at I _{max} . 40°C TIG DC [%]	50	60
Duty cycle at I _{max} . 40°C electrode [%]	30	60
Current at ED 100% 40°C WIG [%]	145	195
Current at ED 100% 40°C electrode [%]	135	195
Power consumption TIG DC [kVA]	4,5	5
Power consumption electrode [kVA]	6,9	7.1
Pulse frequency [Hz]	0.5~200	0.5~200
Ignition	high frequency	
Torch cooling	Air	Air
Performance factor [cos phi]	0,99	0,67
Sheet thicknesses [mm]	0.5+10.0	0.5+12.0

5.2 Type plate

				Stürmer Maschinen GmbH, Dr.-Robert-Pfleger-Str. 26, 96103 Hallstadt Deutschland / Germany			
CRAFT-TIG 201 DC P PULSE				Serien-Nr. / Serial no.:			
Artikel-Nr. / Item no.: 1074201				Baujahr / Year of manufacture:			
				STANDARD EN 60974-1:2012 EN 60974-10:2014			
							
5A/10.2V-200A/18V				5A/10.2V-130A/15.2V			
X 50% 60% 100%				X 90% 100%			
I ₂ 200A 180A 145A				I ₂ 130A 125A			
U ₂ 18V 17.2V 15.8V				U ₂ 15.2V 15V			
U ₀ =66.5V U ₀ =230V I _{lim} =19.7A I _{lim} =13.9A				U ₀ =66.5V U ₀ =110V I _{lim} =23.9A I _{lim} =22.7A			
							
5A/20.2V-200A/28V				5A/20.2V-130A/25.2V			
X 30% 60% 100%				X 20% 60% 100%			
I ₂ 200A 145A 135A				I ₂ 130A 75A 60A			
U ₂ 28V 25.8V 25.4V				U ₂ 25.2V 23V 22.4V			
U ₀ =66.7V U ₀ =230V I _{lim} =30.1A I _{lim} =16.5A				U ₀ =66.7V U ₀ =110V I _{lim} =38.6A I _{lim} =17.3A			
							
1-50-60Hz				IP21S			
				AF			
				9.7kg			
				CE			

Fig. 4: Type plate CRAFT-TIG 201 DC P PULSE

6 Transport, packaging, storage

6.1 Transport

Check the delivery

After delivery, check the device for visible transport damage. If you discover any damage to the device, report it immediately to the transport company or dealer.

6.2 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). Deliver these substances to a collection point for recyclable materials or to the waste disposal company which looks after your region.

6.3 Storage

The welding machine must be installed in closed, dry and well-ventilated rooms with room temperatures between 15 and 35 degrees. It must not be exposed to moisture or intense sunshine.

6.4 Installation conditions

The device has been designed for use in roofed rooms and must be set up in a dry environment:

- Operating range above sea level: below 1000 metres.
- Application temperature range: -10°C to +40°C.
- Relative humidity in the environment must be below 90% (20°C).
- Place the unit at a certain angle to the floor. The angle must not exceed 15°.
- Protect the device from the influence of rain or direct sunlight in hot conditions.
- The content of dust, acid, harmful gases in the ambient air or substances must not exceed the normal standard.
- The ambient air must be free of dust, acids, salts or concentrations of iron or metal powders.
- Ensure that there is sufficient ventilation during welding.
- There must be at least 30 cm between the device and the wall.

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

**DANGER! ELEKTRICAL CONNECTION**

Do not use the device outdoors in the rain!

Ambient conditions must be adequate for IP21 protection!

Moving and positioning

When moving, handle the welding device carefully and do not tip it over. Please use the handle on the top of the welder to move the unit.

Make sure that the welder is well positioned after it has been placed in the final working position. When the welder is used, it is necessary to fix it in place to prevent it from slipping.

When using a forklift truck, its arm length must be long and wide enough to pick up and lift the welder according to its center of gravity.

The welding movements can lead to a possible danger or material hazard. Therefore, make sure that the machine is in a safe position before using it.

7 Scope of delivery

CRAFT-TIG 201 DC P PULSE

- Gas hose 4 m incl. quick connector
- Burner TIG 26 4 m
- Pressure reducer
- 3 m ground cable 16 mm² with ground terminal
- 3 m welding cable 16 mm² with electrode holder
- Operating Instructions

CRAFT-TIG 253 DC PULSE

- TIG-Inverter
- Earth cable CAA 25 mm² SQ 3m with ground clamp
- Gas hose 4 m incl. quick connector
- Hose clamp
- Operating instructions

8 TIG-Inverter characteristics

Current-carrying conductors generate electromagnetic fields (EMF). So far, no negative effect of these magnetic fields on health has been proven. Nevertheless, a hazard cannot be completely excluded.

**NOTE!**

For your own safety you should observe the following to minimize the electromagnetic field lines:

- Lay the cables as far away from your body as possible.
- Never wrap welding cables around your body.
- Connect the earth cable as close as possible to the welding point.
- Special care must be taken with pacemakers!

The TIG-Inverters are TIG welding machines with pulse width modulation and IGBT circuit. These inverter power sources are characterized by low weight and excellent welding properties. Furthermore the power consumption is reduced considerably.

All required parameters can be set on the operating display (gas pre-currents, start current, current rise, current reduction time, final current, gas post-currents, as well as the pulse parameters).

The TIG DC, TIG DC P-series welding machines are suitable for welding in all positions for different sheets of stainless steel, carbon steel, alloy steel, titanium, magnesium, copper, etc. It is also used for welding work on pipes, repairing places, in the petrochemical industry, architectural decoration, car repair, bicycle industry, in crafts and general manufacturing.

Characteristics:

MMA - Manual metal ARC welding
 PWM - Pulse width modulation
 IGBT - Bipolar transistor with isolated gate electrode
 TIG - Wolfram inert gas welding

TIG DC and TIG DC P Characteristics:

- DC TIG and E-Hand (MMA), IGBT technology and pulse width modulation (PWM).
 - High performance MCU, Digital control, Digital display.
 - Preset all parameters with hold process.
 - HF/Lift TIG, current down slope and up slope, gas post-flow, Pulse Frequency.
 - Intelligent protection: over-voltage, under-voltage, over-current, over-heat.
1. E-Hand (MMA): polarity connection can be chosen according to different electrodes.
 2. For DC TIG, DCEP is used normally (workpiece connected to positive polarity, while torch connected to negative polarity). This connection has many characters, such as stable welding arc, low tungsten pole loss, more welding current, narrow and deep weld.
 3. DC Pulsed TIG has the following characters:
 - 1) Pulse heating. Metal in Molten pool has short time on high temperature status and freezes quickly, which can reduce the possibility to produce hot crack of the materials with thermal sensitivity.
 - 2) The workpiece gets little heat. Arc energy is focused. Be suitable for thin sheet and super thin sheet welding.
 - 3) Exactly control heat input and the size of the molten pool. The depth of penetration is even. Be suitable for welding by one side and forming by two sides and all position welding for pipe.
 - 4) High frequency arc can make metal for microlite fabric, eliminate blowhole and improve the mechanical performance of the joint.
 - 5) High frequency ARC is suitable for high welding speed to improve the productivity.

8.1 Function principle

The function principle of the CRAFT-TIG 201 DC P PULSE is shown as the following figure (Fig. 5). Single phases work frequency AC110V/220V (50 Hz) AC is rectified into DC (155/312 V), then is converted to medium frequency AC by inverter device (IGBT), after reducing voltage by medium transformer (the main transformer) and rectifying by medium frequency rectifier (fast recovery diode), and is outputted by inductance filtering. The output is made by inductance filtering. The circuit is controlled by a controller to keep the output voltage stable. The parameters of the welding current can be adjusted continuously and steplessly to satisfy the requirements of the welding task.

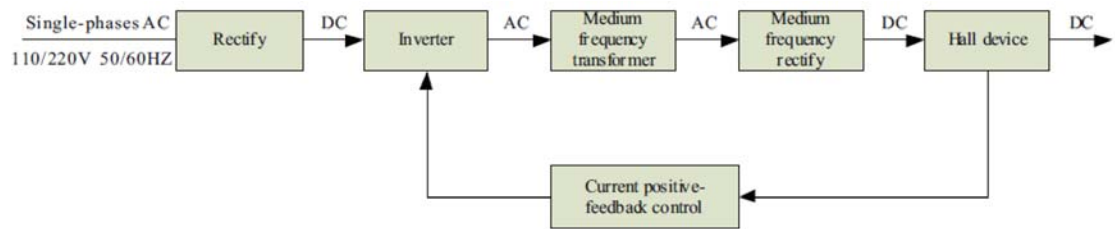


Fig. 5: Function principle of CRAFT-TIG 201 DC P PULSE

The function principle of the CRAFT-TIG 253 DC PULSE is shown as the following figure (Fig. 6). Three-phase 380V line frequency AC is rectified into DC (about 530V), then is converted to medium frequency AC (about 20KHz) by inverter device (IGBT), after reducing voltage by medium transformer (the main transformer) and rectified by medium frequency rectifier (fast recovery diode), and is outputted by inductance filtering. The circuit adopts current feedback control technology to insure current output stability. Meanwhile, the welding current parameters can be adjusted continuously and steplessly to meet with the requirements of welding craft.

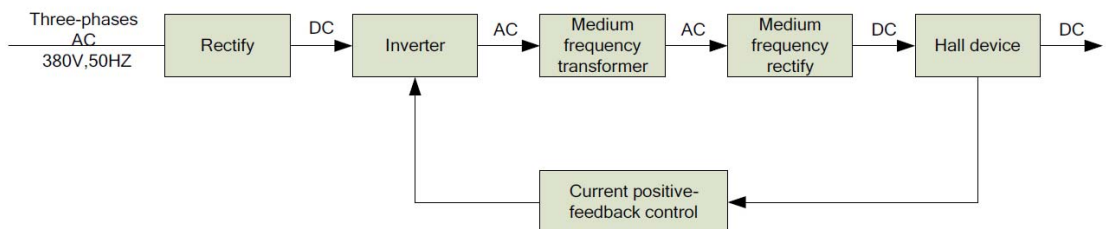


Fig. 6: Function principle of CRAFT-TIG 253 DC PULSE

8.2 Volt-Ampere Characteristic

The TIG-Inverters CRAFT-TIG 201 DC P PULSE, CRAFT-TIG 253 DC PULSE have an optimized volt-ampere characteristic (see diagram). In TIG mode, the ratio between nominal voltage U_2 and welding current I_2 is as follows:

IF $I_2 \leq 600$ A, $U_2 = 10 + 0,04 I_2$ (V); IF $I_2 > 600$ A, $U_2 = 34$ (V)

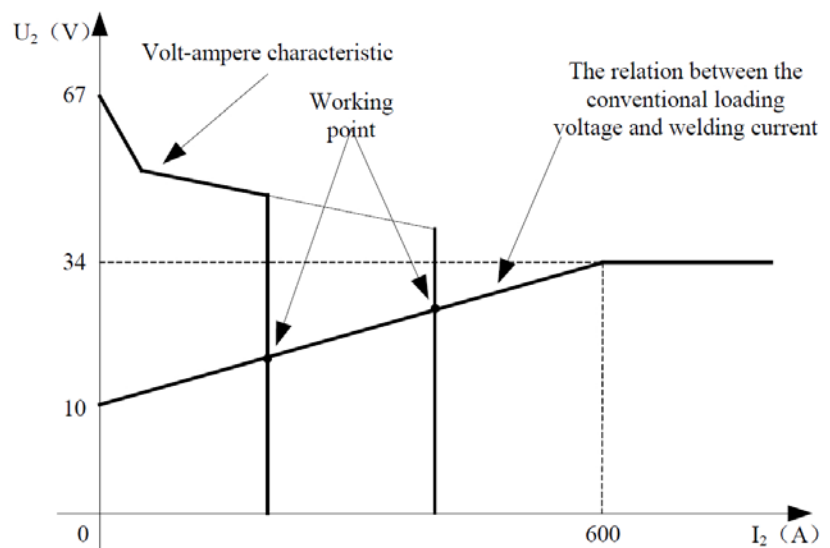


Fig. 7: Volt-Ampere Characteristic

8.3 Duty cycle and thermal protection

The "X"-axis stands for Duty Cycle, which is defined as the portion of the time a welding machine can weld continuously with it's rated output current within a certain time cycle (10 minutes).

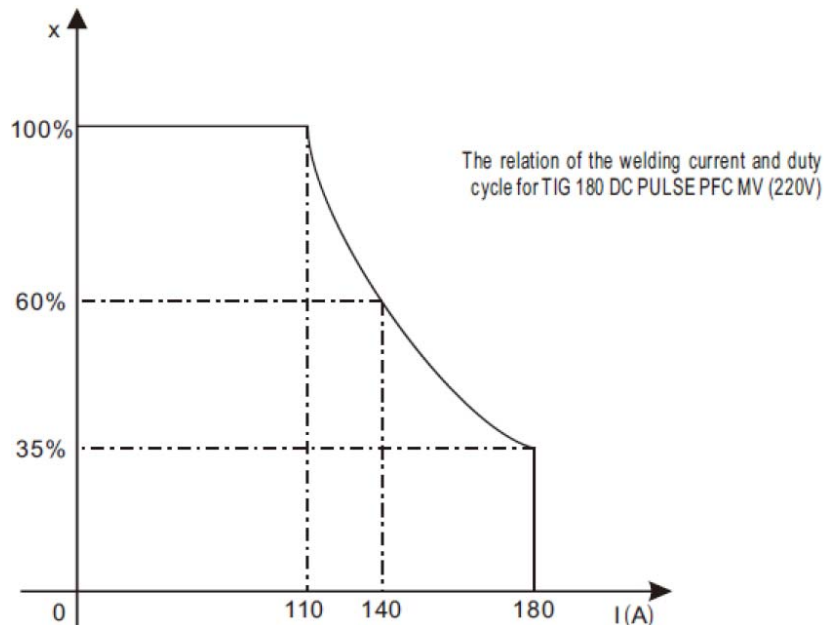


Fig. 8: Example 160 A/ 2.5 minutes welding time

If the welding device is overheated, the thermoswitch responds and puts the welding device out of operation. Display: red LED overheating. If the thermal protection is activated, the device should remain switched on for approx. 15 minutes in order to be cooled down by the fan.

8.4 Assembly of equipment (TIG/WIG)

DC POSITIVE CONNECTION

The workpiece is connected to the positive electrode of the welding machine and the welding torch is connected to the negative electrode. In general, the DC POSITIVE CONNECTION is operated in TIG welding mode.

DC NEGATIVE CONNECTION

The workpiece is connected to the negative electrode of the welding machine and the welding torch is connected to the positive electrode.

Equipment

Components:

- Welding torch control cable consisting of two wires.
- Pedal control consisting of 3 wires.
- Flight socket (has 14 cables for the CRAFT-TIG 201 DC P PULSE and 12 cables for the CRAFT-TIG 253 DC PULSE).
- Wear parts for the TIG welding torch, e.g. tungsten electrode, tip, gas nozzle, electrode shield (short/long).

When using welding equipment with the HF ignition method, the ignition spark may cause interference in the equipment near the welding equipment. Make sure that special safety precautions or shielding measures are taken.

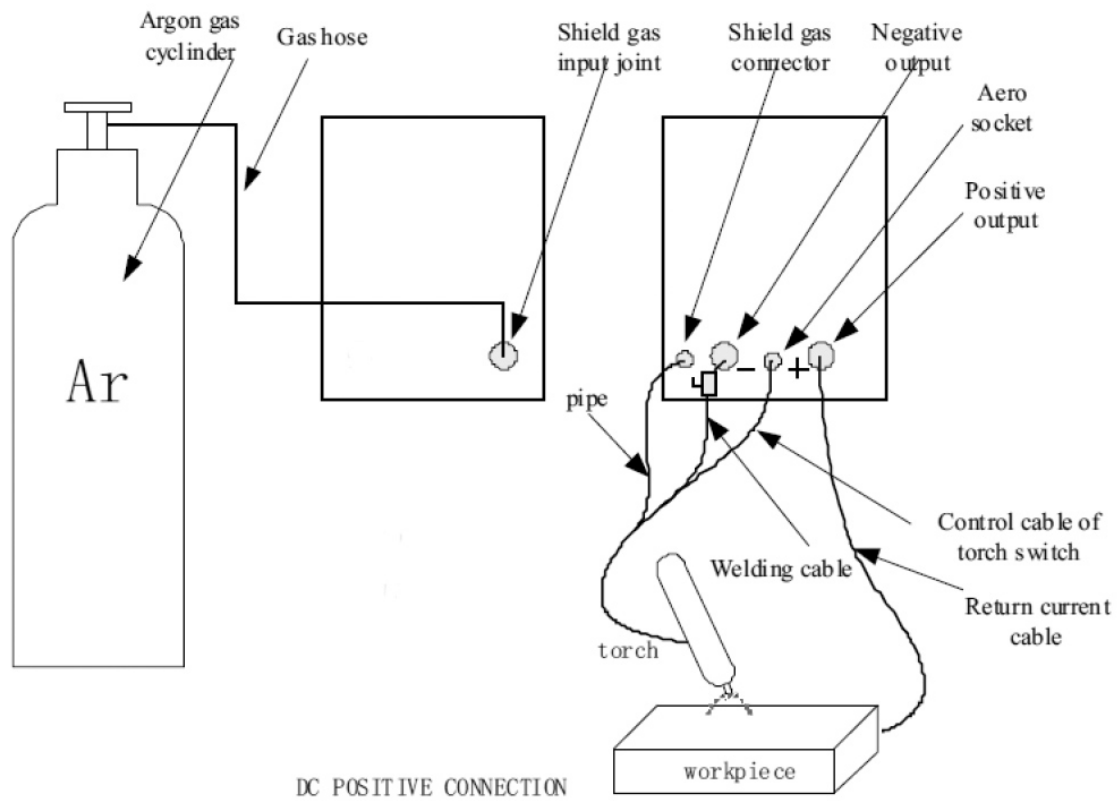


Fig. 9: Connection of the equipment CRAFT-TIG 253 DC PULSE

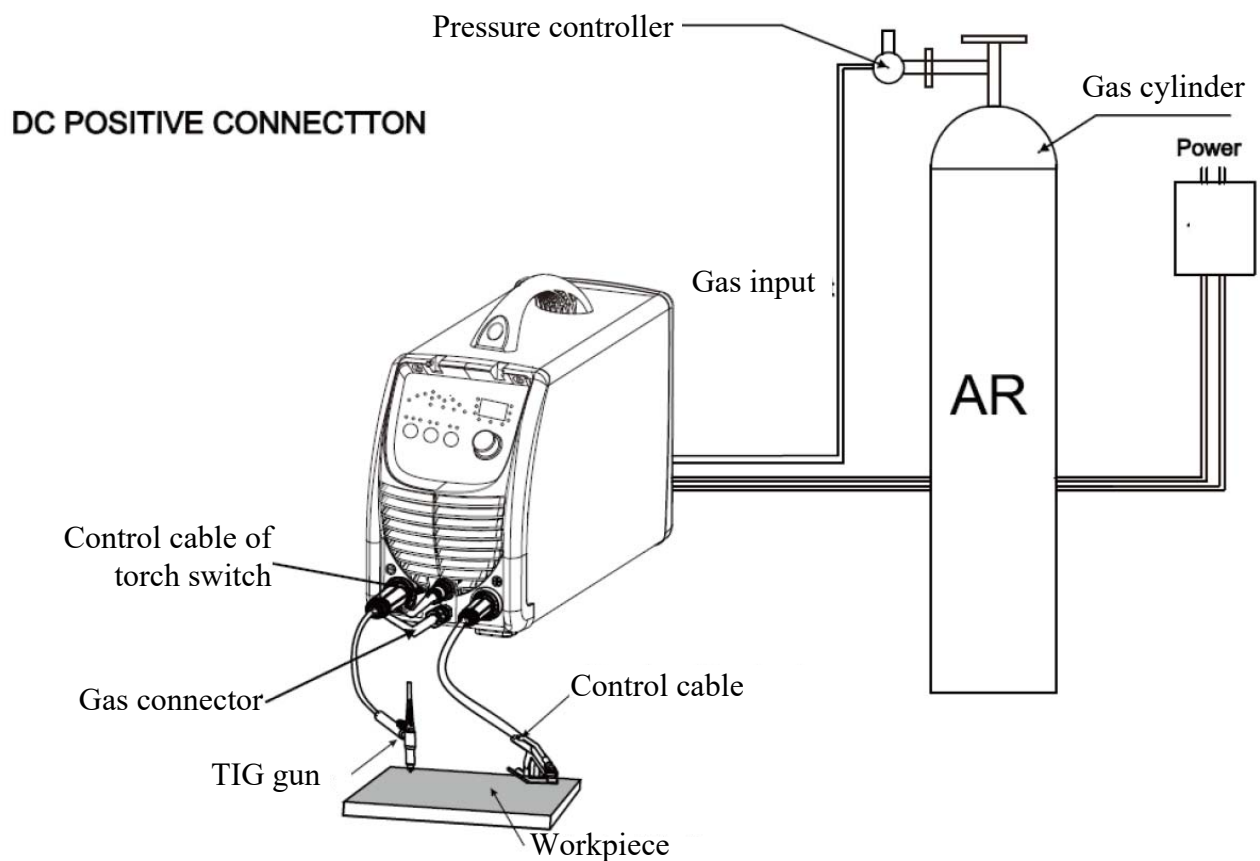


Fig. 10: Connection of the equipment CRAFT-TIG 201 DC P PULSE

8.5 Polarity connection (MMA)

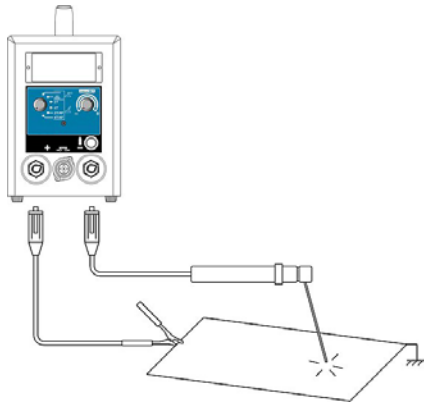
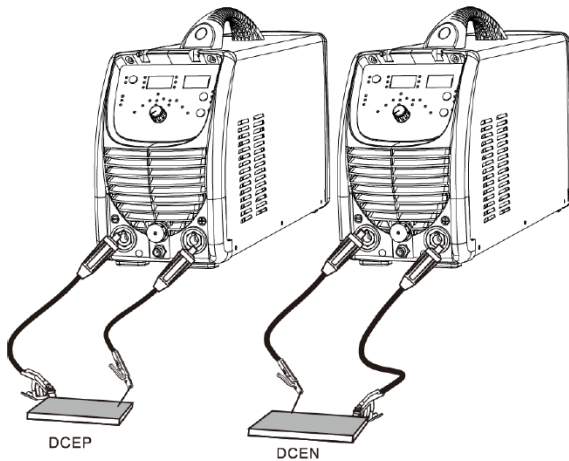


Fig. 11: Polarity connection

MMA (DC): Select the connection type DCEN or DCEP according to the electrode to be used. Refer to the Electrode instructions for information.

The provided cables are for the connection of the welding material with the device. The welding material must be clean at the connection with the ground clamp to achieve good contact. The ground clamp must always be connected directly to the workpiece and to "+" or "-" Connection on the device side - according to the instructions of the electrode manufacturer.

CRAFT-TIG 253 DC PULSE:



CRAFT-TIG 201 DC P PULSE

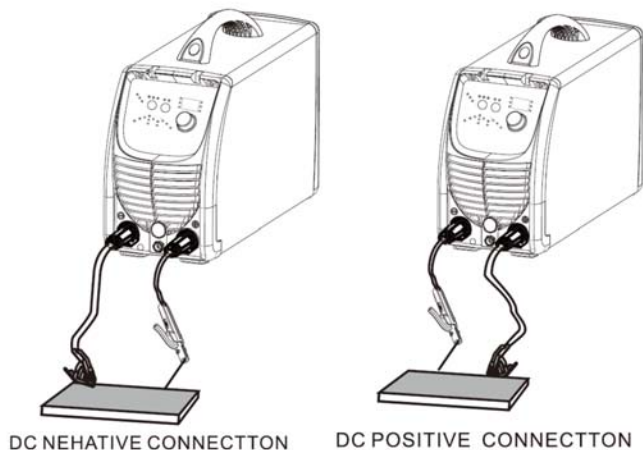


Fig. 12: Direct current connection options CRAFT-TIG 253 DC PULSE (left), CRAFT-TIG 201 DC P PULSE (right)

CRAFT-TIG 201 DC P PULSE and CRAFT-TIG 253 DC PULSE:

Two sockets are available for connecting the output cables to this welding machine. In E-Hand welding, the electrode holder is connected to the positive socket, while the ground wire (workpiece) is connected to the negative socket, called DCEP.

Depending on the electrode, however, a different polarity is required for optimum results and therefore polarity should be taken into account. Information on correct polarity can be found in the information provided by the electrode manufacturers.

DCEP: Electrode is connected to the "+" pole socket.

DCEN: Electrode is connected to the "-" pole socket.

MMA (DC): Selection of the DCEN or DCEP connection according to the different electrodes. Please refer to the electrode manual.

MMA (AC): No polarity connection requirements.

Step 1: Connect the earth cable to the "-" pole, fastening it clockwise.

Step 2: Connect the ground clamp to the workpiece. The contact with the workpiece must be a solid contact with clean, bare metal, without corrosion, paint or scale at the contact point.

Step 3: Connect the electrode leads to the "+", turn it clockwise to tighten.

Step 4: Each unit is equipped with a power cord. This should be connected to the input voltage of the welding power cable at the appropriate position. Be sure to select the correct voltage.

Step 5: Ensure good contact with the appropriate input of the power supply connector or socket to prevent oxidation.

Step 6: Measure with a multimeter whether the input voltage is in the fluctuation range.

Step 7: The power supply ground must be well grounded.

9 Description of the operating and connection elements

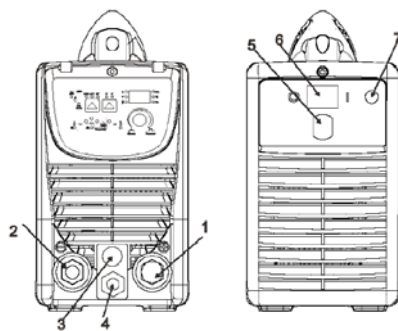


Fig. 13: Operating and connection elements

CRAFT-TIG 201 DC P PULSE:

- 1 „+“ Connection: Positive output of the welding machine with reference to polarity.
- 2 „-“ Connection: Negative output of the welding machine with reference to polarity.
- 3 Socket: Connected to the torch control switch cable (has 14 wires and line 8 - line 9 are connected to the torch switch control cable).
- 4 Inert gas connection: Is connected to the gas inlet of the welding torch.
- 5 Power supply toggle switch: In "ON" position, the welding machine is switched on. In "OFF" position, the welder is switched off.
- 6 Power source input: For connecting the power source.
- 7 Quick connection for the inert gas: For connecting one coupling of the gas hose. The other end of the gas hose is connected to the argon cylinder.

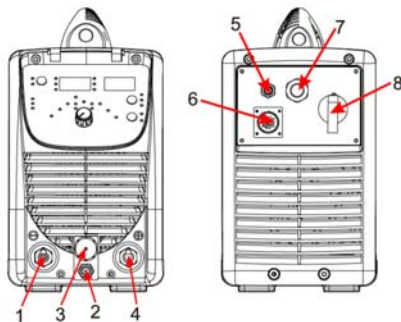
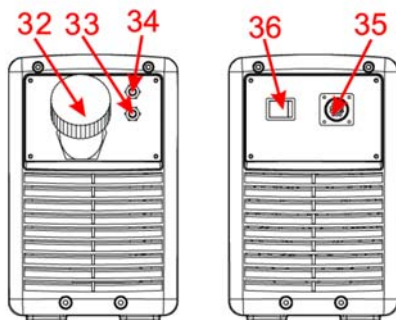


Fig. 14: Operating and connection elements

CRAFT-TIG 253 DC PULSE:

- 1 „-“ Connection: Negative output of the welding machine with reference to polarity.
- 2 Inert gas connection: Is connected to the gas inlet of the welding torch.
- 3 Socket: Connected to the welding torch control switch cable.
- 4 „+“ Connection: Positive output of the welding machine with reference to polarity.
- 5 Quick connection for the inert gas: For connecting one coupling of the gas hose. The other end of the gas hose is connected to the argon cylinder.
- 6 Water tank connection: Connected to the water tank.

- 7 Power source input: For connecting the power source.
- 8 Quick connection for the inert gas: For connecting one coupling of the gas hose. The other end of the gas hose is connected to the argon cylinder.



Water cooler:

- 32 Water inlet.
- 33 Water return connection (red).
- 34 Water supply connection (blue).
- 35 Power supply switch.
- 36 Connection for controlling the water cooler.

Fig. 15: Operating and connection elements

Control panels

Overview:

Main features of the control panel are the logical way in which the control is arranged. All the main parameters needed in daily use can be easily set:

- can be selected using the keys.
- changed with the setting dial.
- shown on the display during welding.

The figure below shows an overview of the main settings required for daily use. In the following section you will find a detailed description of these settings.

CRAFT-TIG 201 DC P PULSE:

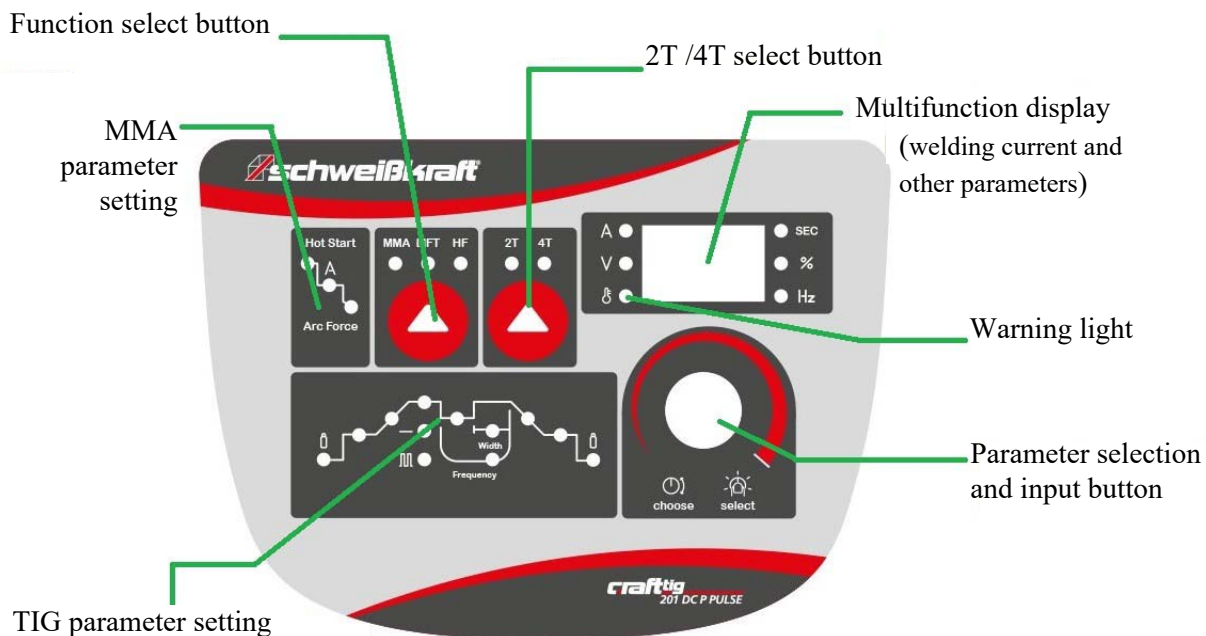


Fig. 16: Control panel CRAFT-TIG 201 DC P PULSE

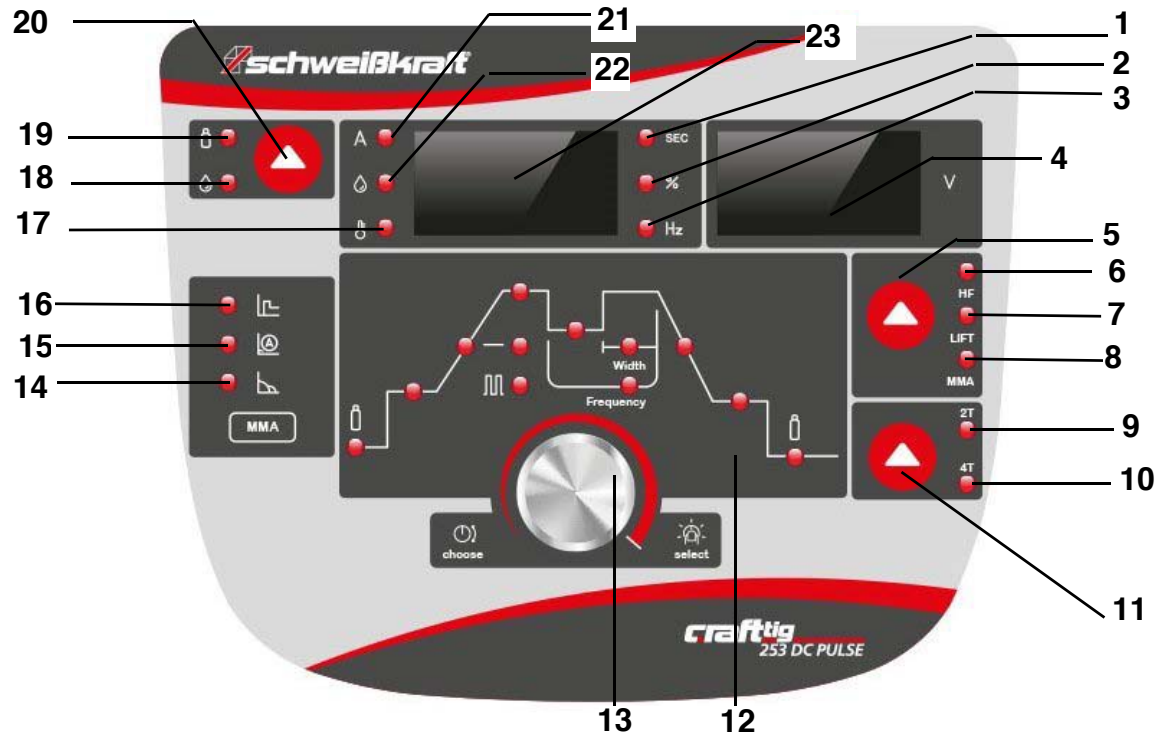
CRAFT-TIG 253 DC PULSE:


Fig. 17: Control panel CRAFT-TIG 253 DC PULSE

Overview:

No.	Parameter	No.	Parameter
1	Digital display „Time value“	13	Parameter select/adjust Knob
2	Digital display „Percentage“	14	Arc force setting indicator
3	Digital display „Frequency value“	15	Welding current setting indicator
4	RH voltage display	16	MMA hot start setting indicator
5	Welding output mode button	17	Alarm indicator
6	Display HF-TIG mode	18	Water cooling mode indicator
7	Display Lift-TIG mode	19	Air cooling mode indicator
8	Display MMA mode	20	Selection button for water / air cooling
9	Display 2T mode	21	Warning light
10	Display 4T mode	22	Water cooling system error indicator
11	Trigger control mode button	23	LH Multifunction display
12	TIG parameter setting indicator		

LH Multifunction display (23)

Before welding this displays the setting selected or being adjusted using the control knob (22). During welding it displays welding current. The parameter setting displayed is indicated by the LEDs beside the display; Current (A), Time (S), Percentage (%) and Frequency (Hz). If left inactive for several seconds, display will revert back to main welding current setting.

Alarm indicator (17)

Lights up when overvoltage, overcurrent, input phase loss or electrical overheating (due to exceeding the duty cycle) is detected and protection is activated. When the protection is activated, the welding power is deactivated until the safety system detects that the overload has been sufficiently reduced and the indicator light goes out. Can also be triggered if an internal circuit fault occurs.

Water cooling mode indicator (18)

When using the integrated water cooler, the system is equipped with a pressure sensor. If the coolant pressure is insufficient, this indicator lights up and the welding output cannot be active. This is to protect the torch and the cooling system.

Water/air cooling selection button (20)

If you are using the built-in water cooling system with a water-cooled burner, select the "Water" option (20/18). This activates the water cooler capacity (the water cooler must also be switched on at the rear wall) and the water cooling protection system. If you are using an air-cooled burner, select the "Air" option (20/19).

Note that the welder is supplied with a water-cooled torch system as standard. If you operate a water-cooled torch without water cooling, the torch can quickly be damaged. Damage to burners or components due to lack of water is not covered by the warranty.

MMA settings

Hot start (19)

Hot start provides extra power when the weld starts to counteract the high resistance of the electrode and workpiece as the arc is started. setting range (0-10).

Arc force (21)

An MMA welding power source is designed to produce constant output current (CC). This means with different types of electrode and arc length; the welding voltage varies to keep the current constant. This can cause instability in some welding conditions as MMA welding electrodes will have a minimum voltage they can operate with and still have a stable arc. Arc Force control boosts the welding power if it senses the welding voltage is getting too low. The higher the arc force adjustment, the higher the minimum voltage that the power source will allow. This effect will also cause the welding current to increase. 0 is Arc Force off, 10 is maximum Arc Force. This is practically useful for electrode types that have a higher operating voltage requirement or joint types that require a short arc length such as out of position welds.

HF ignition

HF (High Frequency) sends a high-energy current through the torch system, which can "jump" between the tungsten and the workpiece and ensures an arc start without any contact between the tungsten and the workpiece. The disadvantage of HF ignition is that it generates an electrical pulse, significant electrical and radio signal interference. This restricts its use in sensitive electronic devices such as computers.

LIFT TIG ignition

is a compromise that minimises tungsten contamination while eliminating the electrical interference of HF start systems. Lift arc starting works by lightly resting the tungsten on the work piece, activating the torch trigger signal and then lifting the tungsten off. The control circuit will sense when the tungsten is removed from the work piece and send a low powered pulse of electricity through the tungsten that will cause the TIG arc to initiate. Because the tungsten is not 'live' when it is in contact with the work, contamination is minimised.

TIG mode selection key of the models:

- CRAFT-TIG 201 DC P PULSE
- CRAFT-TIG 253 DC PULSE

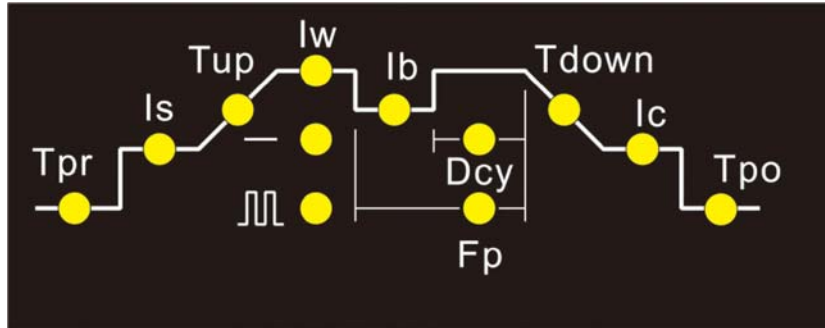
Select and set parameters for the models:

Press the encoder to select the parameter, if the parameter indicator lights up, the selected parameter can be changed via the setting dial.



Fig. 18: TIG mode selection key

Overview of parameters CRAFT-TIG 201 DC P PULSE and CRAFT-TIG 253 DC PULSE:



Adjustable parameters after selection of 2T or 4T mode	
Tpr	Gas pre-flow time
Unit	S
Setting range	0 - 2
Factory setting	
Is	Starting current (only with 4T)
Unit	A
Setting range	5 - 100% of main current Iw
Factory setting	
Tup	Upslope time
Unit	s
Setting range	0 - 10
Factory setting	
Iw	Welding current
Unit	A
CRAFT-TIG 201 DC P PULSE	DC P PULSE 5 to 130 (110 V) 5 to 220 (220 V)
CRAFT-TIG 253 DC PULSE	DC PULSE 5 to 250
Ib	Base current

Adjustable parameters after selection of 2T or 4T mode	
Unit	A
CRAFT-TIG 201 DC P PULSE	DC P PULSE 5 to 130 (110 V) 5 to 220 (220 V)
CRAFT-TIG 253 DC PULSE	DC PULSE 5 to 250
Important! Only selectable when "pulse key" has been pressed.	
Dcy	Ratio of pulse duration to base current duration
Unit	%
Setting range	5 - 95
Factory setting	
Important! Only selectable when "pulse key" has been pressed.	
Fp	Pulse frequency
Unit	Hz
Setting range	0,5 - 200
Factory setting	
Important! Only selectable when "pulse key" has been pressed.	
Tdown	Downslope time
Unit	S
Setting range	0 - 10
Factory setting	
Ic	Crater arc current (only with 4T)
Unit	A
Setting range	5 -100% of main current Iw
Factory setting	
Tpo	Gaspost-flow time
Unit	S
Setting range	1 - 10
Factory setting	

Electrode rod (MMA) welding parameters (CRAFT-TIG 201 DC P PULSE and CRAFT-TIG 253 DC PULSE):



Fig. 19: Welding parameter display for electrode rod welding

Power supply/alarm indicator (CRAFT-TIG 201 DC P PULSE, CRAFT-TIG 253 DC PULSE):

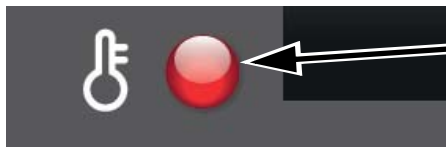


Fig. 20: Display of overheating protection

Welding current and other parameter display by models CRAFT-TIG 201 DC P PULSE and CRAFT-TIG 253 DC PULSE:

Before start of welding Indicate the open-circuit voltage when you push the encoder for 3s and the display shows the pre-set value of T_{pr} , I_s , T_{up} , I_w , D_{cy} , I_w , F_p , I_b , T_{down} , I_c , T_{po} . After the start of welding, display shows the present actual value of the welding current.

The control panel indicates which position has been reached in the welding process by brightening the light.

NOTE:

Only the welding current I_w for TIG mode or the welding current for manual welding (MMA) can be set during welding.

Setting the control current for the model CRAFT-TIG 253 DC PULSE:

The welding machine can accept remote current control from a potentiometer/ analogue signal or a digital up/down button signal. Potentiometer remote control will change the current from the 5A minimum to the maximum set using the machine current control. Using an up/ down button remote signal, the current may be increased or decreased in 1A increments, or 'scrolls' up to 30A at a time if the button is held down. This is very useful for precision work.

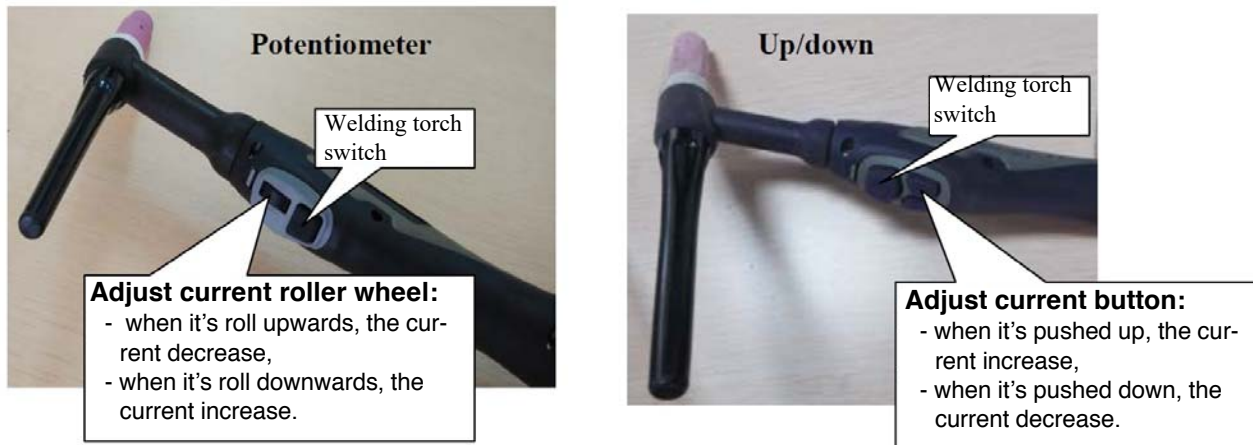


Fig. 21: Replacement of welding pistol torch

Control via wireless equipment on the model CRAFT-TIG 253 DC PULSE:

The welding device can be configured to communicate exclusively with wireless foot pedal or remote control panel. This is done by a simple process of synchronising the wireless remote control and the machine frequencies. Each interface frequency assigned is unique, so it is possible to use several wireless control systems/machines in the same area with no problems. The direct range of the wireless control system is approximately 100m, this will be affected by the physical location of the machine and the remote control.



Fig. 22: Wireless equipment CRAFT-TIG 253 DC PULSE

Synchronise a remote control to a welding machine

Step 1: Ensure the welding power supply is switched off.

Step 2: Press and hold the parameter select/adjust knob on the front panel of the power supply (2-4 seconds) while at the same time turning the machine ON using the ON-OFF switch on the back of the welding power supply.

Step 3: When the display on the front panel of the power supply is blank, release the control knob. Turn on the remote control or foot pedal while at the same time pressing any buttons on the remote control panel or foot pedal, the digital meter on the front panel of the welding power supply flick twice to indicate the synchronization is successful and complete. (Synchronization has to accomplish in 10s after the display is blank.)

Step 4: Switch the machine off and back on again to start welding operation.

Step 5: If the operation is unsuccessful, repeat steps 1 to 4.

NOTE!

- During operation, the front panel control on the power supply is still functional but the remote control panel or foot pedal has higher priority level.
- When the remote control panel or foot pedal is idles for 10 seconds, it will automatically go into "sleep" mode.
- Only front Panel Control is active when wireless remote control or foot pedal is in "sleep" mode. Any operation on the wireless remote control panel or foot pedal will "wake it up and resumes control of the machine.

How to remove the control function of Remote control box on the welding machine CRAFT-TIG 253 DC PULSE:

Step 1: Ensure the welding power supply is switched off.

Step 2: Press the encoder on the front control panel of the power supply, meanwhile turn on the machine.

Step 3: Pressing the encoder about 10 seconds, until the control panel display "rSt", then it sucueed.

10 Welding

With the CRAFT-TIG welding machine, most materials can be welded using the TIG method.

Welding with rod electrodes is also possible. The CRAFT-TIG machines have the function "Arc Force".

Display overheating:

If the device is overheated, it is displayed on the panel. Overheating can occur after long welding with high current. After the unit has cooled down, the previous display appears again.

WARNING!**Danger in case of insufficient qualification of the staff!**

Insufficiently qualified persons cannot assess the risks when handling the machine and expose to the danger of serious or fatal injuries themselves and others.

- All work must only be carried out by qualified personnel.
- Keep insufficiently qualified persons away from the work area.
- Keep unneeded personnel away from the work area and the surrounding area.

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.



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!



ATTENTION

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



DANGER! ELECTRICAL VOLTAGE!

- Open-circuit voltage is present when the device is switched on. Never touch the electrode with any part of your body!
- Do not use the unit outdoors in the rain!
- Do not connect welding equipment together. The open circuit voltage could lead to fatal injuries!



WARNING!

Danger from dust and gases!

During welding hazardous gases are produced:

- Avoid inhalation of harmful substances.
- During the welding process, keep your head as far away as possible.
- Ensure sufficient ventilation, suction or, if necessary, supply of breathing air.
- Take special care when welding stainless steel electrodes, hardfacing electrodes and over-welding coatings!
- Never weld near chlorinated hydrocarbons. Together with the arc they form a lethal poison gas mixture.
- Protective gases can displace the breathing air and lead to suffocation. Therefore, always ensure adequate ventilation. Many gases used in welding are invisible and odourless.
- Read and understand the operating instructions of the filler material manufacturers and carefully read the safety data sheets.
- When opening the gas valve, never face the valve and open the valve slowly.

WARNING!**Danger due to burns!**

Moving parts or thermal parts can damage your body or other people.

- Workpieces become very hot during welding, wear suitable protective clothing.
- Make sure that the wire, the electrode, the electrode coil, the welding head, the nozzle and the semi-automatic welding gun are heated by the current and become very hot!

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.

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.
- Never weld next to flammable materials.
- Have suitable extinguishing agents ready.
- Special safety regulations apply to compressed gases.
- Never weld on tanks or containers until you know exactly what was inside and whether the appropriate protective measures should be taken.
- Make sure that no part of the electrical circuit comes into contact with the workplace or the floor if you do not weld



DANGER! ELECTRICAL VOLTAGE!

- Never touch any live parts!
- There is a danger of an electric shock!
- Always wear dry and closed gloves and flame-retardant clothing with insulating properties.
- Make sure that the insulation of the workplace is such that no person can be physically damaged by contact with the workplace.
- Always make sure there is insulation between your body and the component.
- Special care and precautions should be taken when using the welder and equipment in confined spaces.
- Take care not to use the welding device in a humid environment.
- Make sure that the welder is always standing securely so that it cannot fall down. Use a safety catch for the unit when working at great heights.
- When working at higher altitudes above the ground, wear a safety harness to avoid a dangerous fall if you are exposed to an electric shock.
- Do not switch on the machine until all cables have been connected correctly.
- Ensure that all accessories are correctly connected and that the ground connection is always correct.



WARNING!

Danger from sparks and welding spatter!

- The arc throws the spatter and sparks. Always wear oil-free protective clothing! Cover your hair with a cap.
- Wear ear plugs when welding in a constrained position or in small spaces.
- Always wear safety glasses with side shields when you are in a welding zone.



WARNING!

- Protect your body and eyes from electric arc radiation.
- Ensure adequate ventilation of the machine.
- Switch off the machine if welding is not taking place. (Energy consumption)
- If the device switches to safety mode, check the error before switching the device off and on again.



WARNING!

Always make sure that the ground connection is correctly attached to the component.

Attach the earth connection as close as possible to the spot to be welded. Frame constructions, chains, cables or the like can lead the earth incorrectly and cause fires.

Make sure that the welding device, the workpiece clamps, the electrode holder and the earth cable are in good condition. Replace damaged cables immediately.

Never cool the electrodes with water!

**WARNING!****Danger due to incorrect storage and incorrect use of inert gas cylinders!**

- Only use inert gases in cylinders designed for this purpose.
- Ensure that all gas lines and hoses are intact.
- Ensure that inert gas cylinders are properly secured. Always keep the cylinders in an upright position, e.g. securely chained, on a chassis or fixed support.
- When storing the bottles, make sure that they are properly secured and that there are no mechanical or thermal hazards.
- Store the gas cylinder at a safe distance from the arc and hot parts.
- If the gas cylinder is not in use, close it with the protective cap.
- Always keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Use only compressed gas cylinders that contain the correct inert gas for the process and properly functioning regulators. The components must be designed for the gas and pressure used.
- All hoses, clamps, etc. must be suitable for the application, maintained and in good condition.
- Never allow the electrode, electrode holder or any other "hot" part to touch a gas cylinder.
- Protect gas cylinders from excessive heat, mechanical shock, physical damage, slag, open flames, sparks and electric arcs.
- Never let the welding electrode or ground clamp touch the gas cylinder, do not lay any cables over the cylinder.

10.1 Welding methods

The selector switch can be used to switch between TIG and electrode welding.

10.2 Welding current

The desired welding current intensity can be set steplessly from the minimum value to the maximum value with the rotary knob. The set value can be read on the display.

10.32-T operation

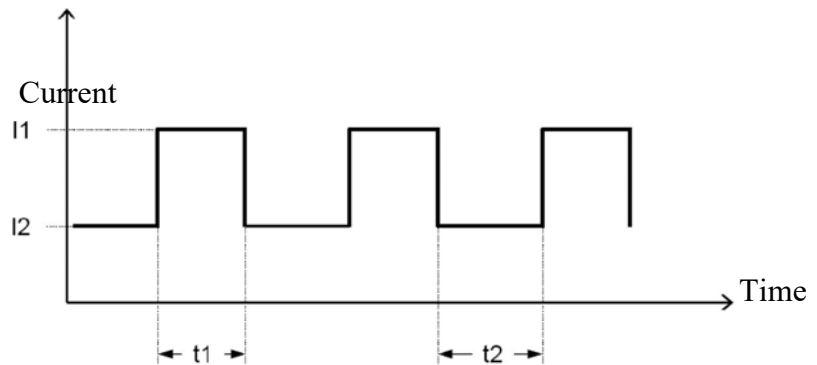
If the machine is set to 2-T operation, the welding process is started when the torch button is pressed. If the torch button is released, the current is reduced to a fixed value and the arc extinguishes.

10.44-T operation

If the system is set to 4-T operation, the welding process starts with 50% of the set welding current when the torch button is pressed. When the torch button is released, the welding current rises to the set value. When the torch button is pressed again, the welding current drops to a pre-set value. Releasing the button results in the extinction of the arc.

10.5 Pulse function

In a pulse welding process, the current intensity alternates between a stronger pulse current and a lower background current according to a preset frequency.



Quick pulse:

With this pulse in the range of approx. 50-300 Hz, for example, a high penetration can be achieved with less heat input. You can recognize the fast pulse by the high sound level due to the high frequency.

Long pulse:

The alternation of the two welding currents is easily visible here. The frequency is very low and lies between 1 and 2 Hz. The additional material can be added very nicely drop by drop during the long pulse, resulting in a uniform and beautiful seam pattern.

10.6 Starting with welding

- 1 Switch on the device with the switch on the back.
- 2 Use the selector switch to select the method you want.

10.7 TIG welding

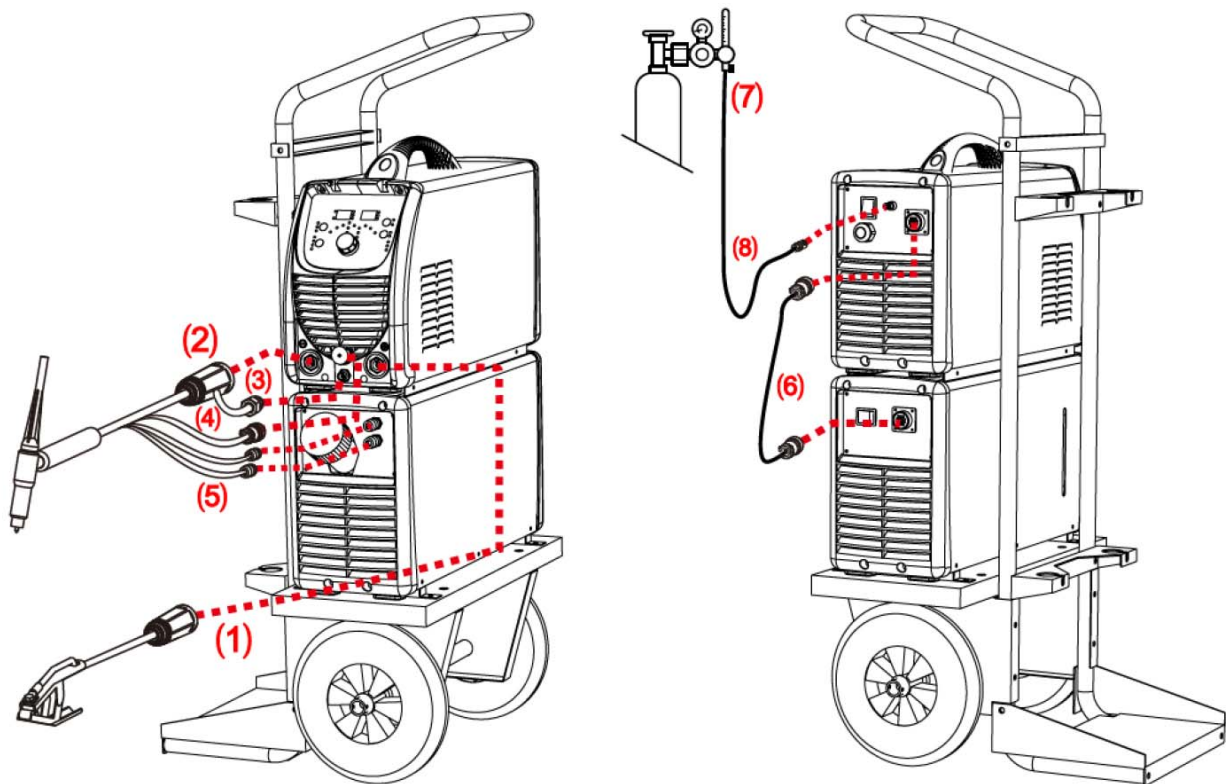


Fig. 23: Set up installation for TIG Welding CRAFT-TIG 253 DC PULSE

Assembly workflow (Fig. 23) model CRAFT-TIG 253 DC PULSE:

- Step 1: Switch the ON/OFF Switch (located on the rear panel) to OFF.
- Step 2: Connect the ground cable (Pos.1) to the "+" pole, fix it by turning it clockwise.
- Step 3: Connect the ground clamp (Pos.1) to the workpiece. The contact with the workpiece must be a solid contact with clean, bare metal, without corrosion, paint or scale at the contact point.
- Step 4: Connect the welding torch (Pos. 2) to the "-" pole, turn it clockwise and tighten it.
- Step 5: Connect the TIG torch gas connection (Pos. 3) to the TIG gas outlet and the TIG torch remote plug to the remote socket. Make sure all connections are tight and secure.
- Step 6: Connect the TIG burner remote connector to the remote jack. Make sure that all connections are tight and tight.
- Step 7: If using a water-cooled torch, connect the water cooling lines from the TIG torch to the front of the water cooler and ensure that the red and blue return and supply lines match the connections.
- Step 8: When using a water-cooled burner, connect the water cooling cable from the back of the power source to the back of the water cooler.
- Step 9: Connect the gas regulator to the gas cylinder and connect the gas line to the gas regulator (item 7).
- Step 10: Connect the gas line to the gas connection of the machine, which is located on the rear side, via the quick-release fastener. Check that there are no leaks.

Step 11: Open the gas cylinder valve and adjust the regulator. The flow rate should be between 5 -10 l/min depending on the application.

Step 12: Re-check the flow pressure of the regulator when the burner valve is open, as the static gas flow setting may drop after the gas flow.

Step 13: Each machine is equipped with a power cord. The cable should be connected to the input voltage side of the welding power cable at the appropriate position.

Step 14: Use a multimeter to measure whether the input voltage is within the fluctuation range.

Step 15: The power supply ground must be well grounded.

Use of TIG welding CRAFT-TIG 253 DC PULSE:

Step 1: Connect the equipment as described in the previous section.

Step 2: Turn the power switch to the "ON" position, the power indicator should start to light. The fan will begin to rotate. The unit is working properly.

Step 3: Select the LIFT-TIG or HF-TIG welding mode.

Step 4: If a water-cooled torch and water cooler is used, check that the water cooler has sufficient coolant and all connections are tight. Set the water/air adjustment knob (Fig.17, Pos. 28) to "Water (Fig.17, Pos.20)". The water cooler should now go into operation. If you are using an air-cooled burner, set the button (Fig.17, Pos.20) to "air" (Fig.17, Pos.19).

Step 5: Set the necessary welding parameters using the control button.

Step 6: The tungsten must be ground to a blunt tip for optimum welding results. It is important to grind the tungsten electrode in the direction in which the grinding wheel rotates.

Step 7: Install the tungsten electrode about 3 mm to 7 mm out of the gas cup. Make sure that you have a clamping sleeve of the correct size.

Step 8: Fasten the rear cap.

Step 9: Start welding. If necessary, readjust the welding current regulator to obtain the required welding conditions.

Step 10: After completion of the welding process, the power source should remain switched on for 2 to 3 minutes. This will allow the fan to still run and cool the internal components.

Step 11: Turn the ON/OFF switch to OFF.

10.8 Welding with rod electrode (MMA)

Insert the uncoated end of the electrode into the pliers. Connect the earth clamp to the workpiece to be welded. Pull the electrode over the workpiece. To finish welding, remove the electrode from the workpiece so that the arc goes out.

Overload indicator:

If the welding current is too high, the display shows an overload. This can occur if a large diameter electrode is used and the unit is set to maximum. Allow the unit to cool down. After the unit has cooled down, the previous display appears again.

IMPORTANT! Before welding, read the electrode manufacturer's instructions 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

10.9 TIG welding

Selection and preparation of the electrode:

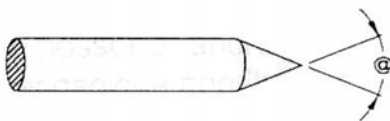
The electrode must be suitable for the maximum current without melting, because the molten tungsten would contaminate the welded metal. Tungsten forms hard inclusions which impair the resistance of the weld.

Welding current and electrode diameter

Electrode diameter [mm]	Setting range of the welding current [A]
1.0	10-70
1.6	60-150
2.4	100-250

Preparation of the DC electrode

The electrode is pointing depending on the welding current.



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

Connect the power cord to the cable and make sure that the outlet is grounded.

10.10 Argon ARC welding application

TIG welding (4T operation)

The starting current and the melting current can be preset. This function can compensate for the possible crater at the beginning and end of the welding process. This makes 4T suitable for welding medium thick sheets.

Impulse TIG Long-term welding (4T) with the models CRAFT-TIG 201 DC PULSE and CRAFT-TIG 253 DC PULSE:

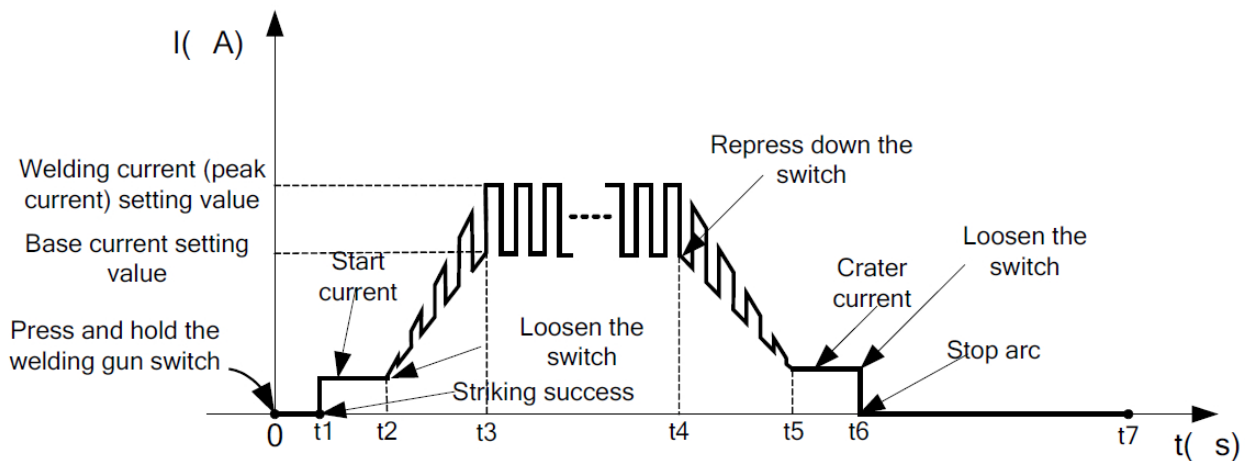


Fig. 24: 4T operation

- 0:** Press and hold the gun switch, Electromagnetic gas valve is turned on. The shielding gas starts to flow;
- 0 to t_1 :** Pre flow time, adjustment range of pre flow time: 0 to 2s;
- t_1 :** Ignite arc, with the set range of the starting current:
 - 5 to 100% of the main current
- t_2 :** Release the gun switch. The output current increases to the welding current within the set time.
- t_2 to t_3 :** The current increases to the welding current within the set time.
 - Adjustment range 0 to 10 s for model CRAFT-TIG 253 DC PULSE.
- t_3 to t_4 :** The welding process is running. During this period the gun switch is released.
- Note:** When the pulse output function is switched on, the output current is pulsed. If the output current function is switched off, the output current is equal to the welding current I_w .
- t_4 :** Press the welding torch switch once more, the output current drops to the crater current; if the pulse output function is switched on, the sloping current is pulsed.
- t_4 to t_5 :** Post flow time, adjustment range of post flow time: 0 ~10s;
- t_5 to t_6 :** The crater current time; Adjustment range of the crater current:
 - 5 to 100% of the main current
- t_6 :** Loosen the gun switch, stop arc and keep on argon flowing.
- t_6 to t_7 :** Post-gas time can be set by the post-gas time adjustment knob on the front panel 0 ~10s.
- t_7 :** Electromagnetic valve is closed and stop argon flowing. Welding is finished.

TIG welding (2T operation)

Impulse TIG Short time welding (2T) for the models CRAFT-TIG 201 DC P PULSE and CRAFT-TIG 253 DC PULSE:

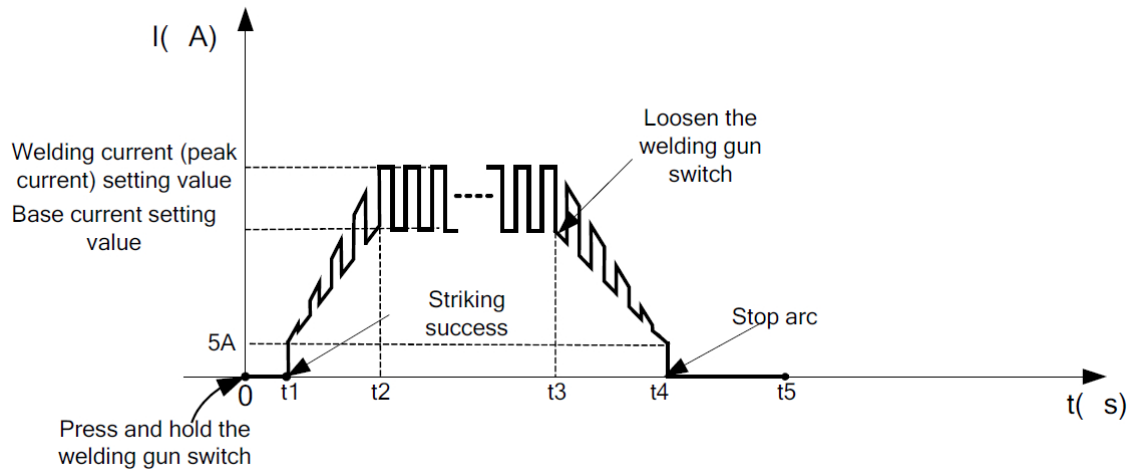


Fig. 25: 2T operation

- 0:** Press the gun switch and hold it. Electromagnetic gas valve is turned on. The shielding gas starts to flow.
- 0 to t1:** Pre-flow time, adjustment range of pre flow time: 0 to 2s.
- t1 to t2:** Arc ignition, the output current increases obliquely from the minimum current (5A). When the output pulse function is switched on, the diagonally rising current is pulsed.
- t2 to t3:** The welding torch switch is kept pressed during the entire welding process.
- Note:** When the output pulse function is switched on, the output current is pulsed. When the output pulse function is off, the output current is DC current.
- t3:** Release the welding torch switch, the output current drops obliquely; when the output pulse function is switched on, the obliquely falling current is pulsed.
- t3 to t4:** The output current decrease obliquely to the minimum current (5A), stops ARC; setting range of the current decrease time: 0 to 10s.
- t4 to t5:** Post-flow time, adjustment range of post flow time: 0 ~10s;
- t5:** Electromagnetic valve closes and stops argon flow. The welding process is finished.

Short-circuit protection function on the models CRAFT-TIG 201 DC P PULSE and CRAFT-TIG 253 DC PULSE:

1. **TIG/LIFT:** If the tungsten electrode touches the workpiece during welding, the current will drop to 5A, trying to avoid tungsten inclusions. This increases the service life of the tungsten electrode and prevents tungsten distortion.
2. **TIG/HF/DC:** When the tungsten electrode touches the workpiece during welding, the current drops to 0 within 1 second. This is an attempt to avoid tungsten inclusions. This increases the service life of the tungsten electrode and prevents tungsten distortion.
3. **MMA welding:** If the electrode touches the workpiece for more than two seconds, the welding current automatically drops to 0 to protect the electrode.

Prevent the arc from breaking:

With the TIG method, the arc is prevented from breaking by special means. When an arc is interrupted, the HF function keeps the arc stable.

Important information to be observed before starting the welding process:

- First check the welding and connection uns condition, requirements and settings. Incorrect settings and damage may result in malfunctions during operation, such as ignition sparks, gas leaks, lack of control and so on.
- Check whether there is sufficient argon in the protective gas cylinder. You can test the electromagnetic gas valve by pressing the switch on the front panel.
- Never point the welding torch at your hand or any other part of your body. When you press the switch on the welding torch, the arc is ignited with a high frequency, a high voltage ignition, and the ignition spark can cause interference in the equipment.
- The flow rate is set according to the welding energy used in the welding work. Turn the gas flow regulator screw to adjust. This is located on the pressure gauge of the gas hose. The gas flow is indicated on the gas cylinder.
- The spark ignition works better if you keep a distance of 3 mm from the workpiece to the tungsten electrode during ignition.

11 MMA welding

CRAFT-TIG 253 DC PULSE:

- Step 1: Connect the polarity in the given form.
- Step 2: Turn the power switch so that the power switch is in the "ON" position. The power indicator will then light, the fan will light, and the unit will function properly.
- Step 3: Select the MMA function with the 4T/2T/MMA selector switch.
- Step 4: Set the required output current by turning the current control knob.
- Step 5: Place the electrode in the electrode holder and clamp it in place.
- Step 6: Strip the electrode over the workpiece to create an arc and hold the electrode evenly to maintain the arc.
- Step 7: Start welding. If necessary, adjust the welding current via the control knob to obtain the required welding conditions.
- Step 8: After completion of the welding process, the power source should remain switched on for 2 to 3 minutes. This allows the fan to cool the internal components.
- Step 9: Set the ON/OFF switch (located on the back panel of the housing) to the OFF position.

12 Electrical connection

Check that the voltage indicated on the type plate corresponds to the nominal voltage of your voltage source. The device may only be used on sockets and extension cables with earthing plugs that have been installed by an authorized electrician. The fusing of the supply lines to the mains sockets must comply with the regulations. The mains socket must be properly earthed.

The CRAFT-TIG 201 DC P PULSE welding units connect with 230V supply voltage.

The CRAFT-TIG 253 DC PULSE welding units connect with 400V supply voltage.

If the power supply voltage is above the safe working voltage, the built-in over-voltage and undervoltage protection reacts. The alarm light goes on and at the same time the current output is cut off.

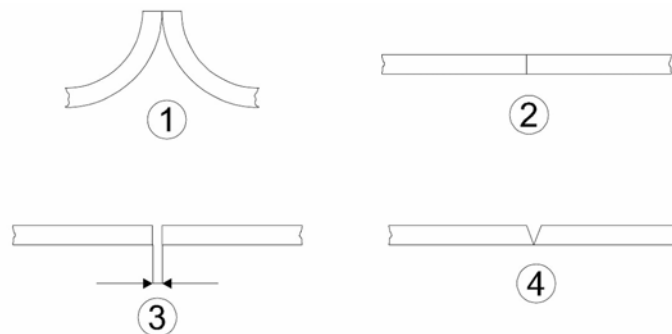
If the supply voltage is continuously below the safe working voltage range, it will shorten the life of the welding machine.

The following measures may be applied to remedy the situation:

- Change the mains supply of the power supply input. e.g. connect the welding unit to a stable supply voltage of the distributor.
- Adjust the voltage stabilizer on the front of the power cable inlet.

13 Welding instructions

Welding seam shapes



WIG-DC welding

Workpiece thickness [mm]	Tungsten electrode Ø [mm]	Welding current [mm]	Argon gas flow rate [L/min]	Welding seam [mm]	Weld shape
0,4	1,0 – 1,6	5 – 30	4 – 5	1	1, 2
1,0	1,0 – 1,6	10 – 30	5 – 7	1	1, 2
1,5	1,0 – 1,6	50 – 70	6 – 9	1	2
2,5	1,6 – 2,4	70 – 90	6 – 9	1	2
3,0	1,6 – 2,4	90 – 120	7 – 10	1 – 2	2, 3
4,0	2,4	120 – 150	10 – 15	2 – 3	4, 3

Workpiece thickness [mm]	Tungsten electrode Ø [mm]	Welding current [mm]	Argon gas flow rate [L/min]	Welding seam [mm]	Weld shape
5,0	2,4 – 3,2	120 – 180	10 – 15	2 – 3	4, 3
6,0	3,2	150 – 200	10 – 15	3 – 4	4, 3

Welding with rod electrode:

Workpiece thickness [mm]	Electrode Ø [mm]	Welding current [A]
<1	1,5	20 – 40
2,0	2,0	40 – 50
3,0	3,2	90 – 110
4,0 – 5,0	3,2 – 4,0	90 – 130
6,0 – 12,0	4,0 – 5,0	160 – 200

13.1 Notes to the welding technology

13.1.1 Joint forms in TIG/MMA

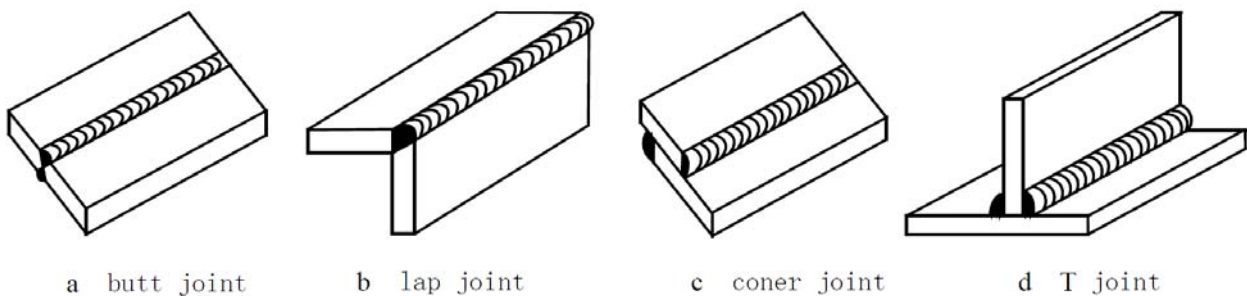


Fig. 26: Possible joint forms

13.1.2 The explanation of welding quality

The relation of welding area color & protect effect of stainless steel					
Welding area color	Argent / Golden	blue	red-grey	grey	black
Protect effect	best	better	good	bad	worst

The relation of welding area color & protect effect of Ti-alloy					
Welding area color	Bright argent	Orange - yellow	blue-purple	caesious	White powder of titanium oxid
Protect effect	best	better	good	bad	worst

13.1.3 TIG Parameters matching

Parameter of the models CRAFT-TIG 201 DC P PULSE and CRAFT-TIG 253 DC PULSE:

The corresponding relationship between gas nozzle diameter and electrode diameter	
Gas nozzle diameter [mm]	Electrode diameter [mm]
6.4	0.5
8	1.0
9.5	1.6 or 2.4
11.1	3.2
Notice: the above parameters originate from Welding Dictionary P.142, Volume 1 of Edition 2.	

Welding current range [A]	DC positive connection	
	Gas nozzle diameter [mm]	Gas flow rate [l/min]
10 ~ 100	4 ~ 9,5	4 ~ 5
101 ~ 150	4 ~ 9,5	4 ~ 7
151 ~ 200	6 ~ 13	6 ~ 8
201 ~ 300	8 ~ 13	8 ~ 9

Tungsten electrode diameter[mm]	Sharpened of the electrode diameter [mm]	Angle of cone [°]	Background current [A]
1.0	0.125	12	2 ~ 15
1.0	0.25	20	5 ~ 30
1.6	0.5	25	8 ~ 50
1.6	0.8	30	10 ~ 70
2.4	0.8	35	12 ~ 90
2.4	1.1	45	15 ~ 150
3.2	1.1	60	20 ~ 200

TIG of stainless steel (single run welding)						
Work-piece thickness [mm]	Joint form	Tungsten electrode diameter[mm]	Welding wire diameter [mm]	Argon gas flowrate [L/min]	Welding current [DCEP]	Welding speed [cm /min]
0,8	Butt joint	1,0	1,6	5	20 ~ 50	66
1,0	Butt joint	1,6	1,6	5	50 ~ 80	56
1,5	Butt joint	1,6	1,6	7	65 ~ 105	30

TIG of stainless steel (single run welding)						
Work-piece thickness [mm]	Joint form	Tungsten electrode diameter [mm]	Welding wire diameter [mm]	Argon gas flowrate [L/min]	Welding current [DCEP]	Welding speed [cm /min]
1,5	Corner joint	1,6	1,6	7	75 ~ 125	25
2,4	Butt joint	1,6	2,4	7	85 ~ 125	30
2,4	Corner joint	1,6	2,4	7	95 ~ 135	25
3,2	Butt joint	1,6	2,4	7	100 ~ 135	30
3,2	Corner joint	1,6	2,4	7	115 ~ 145	25
4,8	Butt joint	2,4	3,2	8	150 ~ 225	25
4,8	Corner joint	3,2	3,2	9	175 ~ 250	20
Notice: the above parameters originate from Welding Dictionary P150, Volume 1 of Edition 2.						

Parameters of piping back sealing welding for mild steel							
Pi-ping diameter [mm]	Tungsten electrode diameter [mm]	Gas nozzle diameter [mm]	Welding wire diameter [mm]	Welding current [A]	Arc voltage [V]	Argon gas flowrate [L/min]	Welding speed [cm /min]
38	2,0	8	2	75 ~ 90	11 ~ 13	6 ~ 8	4 ~ 5
42	2,0	8	2	75 ~ 95	11 ~ 13	6 ~ 8	4 ~ 5
60	2,0	8	2	75 ~ 100	11 ~ 13	7 ~ 9	4 ~ 5
76	2,5	8 ~ 10	2,5	80 ~ 105	14 ~ 16	8 ~ 10	4 ~ 5
108	2,5	8 ~ 10	2,5	90 ~ 110	14 ~ 16	9 ~ 11	5 ~ 6
133	2,5	8 ~ 10	2,5	90 ~ 115	14 ~ 16	10 ~ 12	5 ~ 6
159	2,5	8 ~ 10	2,5	95 ~ 120	14 ~ 16	11 ~ 13	5 ~ 6
219	2,5	8 ~ 10	2,5	100 ~ 120	14 ~ 16	12 ~ 14	5 ~ 6
273	2,5	8 ~ 10	2,5	110 ~ 125	14 ~ 16	12 ~ 14	5 ~ 6
325	2,5	8 ~ 10	2,5	120 ~ 140	14 ~ 16	12 ~ 14	5 ~ 6
Notice: the above parameters originate from Welding Dictionary P167, Volume 1 of Edition 2.							

14 Care and maintenance



Tips and recommendations

To ensure that the device is always in a good operating condition, regular care and maintenance work must be carried out.



NOTE!

The maintenance instructions must be read carefully before care and maintenance of the TIG Inverter. The TIG Inverter may only be used by persons who are familiar with the TIG Inverter.


WARNING!
Danger in case of insufficient qualification of the staff!!

Insufficiently qualified persons cannot assess the risks associated with maintenance work on the machine and expose themselves and others to the risk of serious injury.

- Have all maintenance work carried out by qualified personnel only.


WARNING!

- Before carrying out any maintenance work, the machine must be switched off and waited at least 5 minutes until the capacity potential has been reduced to 36 V!
- After maintenance, repair and cleaning work, check whether all fairings and protective devices have been properly mounted on the TIG Inverter again and whether there are no tools left inside or in the working area of the TIG Inverter.

Interval	Maintenance task	
Daily	Observe that whether panel knob and switch in the front and at the back of arc welding machine are flexible and put correctly in place.	If the knob has not been put correctly in place, please correct; If you can't correct or fix the knob, please replace immediately.
	After switching on the power, make sure that the ARC welding unit does not vibrate, make whistling noises or emit strange odours.	If any of the problems mentioned above occur, try to find the cause and fix it. If you cannot do this, contact Service.
	Observe that whether the display value of LED is intact.	Replace if necessary.
	Check whether the min/max value of the LED display matches the set value.	If there are deviations which have an effect on the normal arc strength, please adjust this value.
	Check if the fan is damaged or does not rotate normally.	If the fan is damaged, replace it immediately. If the fan does not rotate after the ARC welding process, the unit is overheated. Check if there is something blocking the rotor blade. If it is blocked, remove the cause. If the fan does not rotate after the above problems have been resolved, nudge the fan in the direction of rotation. If the fan rotates normally, the starting capacity should be replaced. If not, replace the fan.
	Check if the quick connector is loose or overheated.	If the ARC welding machine is experiencing the problems indicated above, the quick connectors should be fastened or replaced.
	Check if the power output cable is damaged.	If it is damaged, it should be isolated or replaced.

Interval	Maintenance task	
Monthly	Cleanliness condition Check the stud in the ARC welding unit for tightness.	Use the dry compressed air to clean the inside of the ARC welder. Mainly to remove the dust on the cooler, the main voltage transformer, the inductive resistor, the IGBT module, the fast charging diode and the PCB. If it is loose, screw it tight. If it can be over-tightened, replace it. If it is rusted, remove the rust on the bolt to make sure it is working properly.
Quarterly	Check whether the current corresponds to the value shown in the display.	If the values do not match, the welder should be adjusted. The current value can be measured with the ammeter set.
Yearly	Measure the insulation impedance along the main circuit, PCB and enclosure.	If it is at 1MΩ, the insulation is damaged and must be replaced or reinforced.

15 Troubleshooting

- The ARC welding machines are tested and correctly calibrated before being shipped from the factory.
- Do not make any unauthorized changes to the unit.
- Maintenance, care and servicing must be carried out carefully and conscientiously. If any wire is loose or incorrectly positioned, this may pose a hazard to the user.
- Only qualified personnel authorised by us may service and repair the machine!
- Always switch off the machine before connecting accessories.

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	

Troubleshooting table of the models CRAFT-TIG 201 DC P PULSE and CRAFT-TIG 253 DC PULSE:			
S/N	Malfunction	Cause	Solution
1	If the power supply is switched on and the current light is on, no fan function.	A foreign object in the fan.	Remove the foreign object.
		The starting capacitor of the fan is defective.	Replace the capacitor.
		The fan motor is defective.	Replace the fan.
2	The number display on the display is not in sync.	The LED of the display is deffekt.	Replace the LED.
3	The max. and min. displayed value does not match the set value.	The maximum value does not match.	Set the potentiometer $I_{\max}$ on the control board.
		The minimum value does not match.	Adjust the potentiometer $I_{\min}$ on the measuring blade.
4	No open circuit voltage at output (MMA)	The device is defective	Check the main circuit and the Pr4.
5	The arc cannot be ignited (TIG): There is a spark on the HF ignition board. ___ There is a spark on the HF ignition board.	The welding cable is not connected to the two outputs of the welding device.	Connect the welding cable to the output of the welding machine.
		The earthing cable is not connected stable enough.	Repair or replace it.
		The earthing cable is not connected stable enough.	Check thr ground cable.
		The welding cable is too lon	Use a suitable grounding cable.
		There is oil or dust on the workpiece.	Check it and remove the oil or dust.
		The distance between the tungsten electrode and the workpiece is too long.	Reduce the distance (about 3m).
		The HF ignition board does not work.	Repair or replace Pr8.
		The distance between the dischargers is too short.	Adjust the distance (approx. 0.7 mm).
		A malfunction of the welding gun switch.	Check the welding gun switch, the control cable and the socket.
6	No gas flow (TIG)	Gas cylinder is close or gas pressure is low	Replace the gas cylinder or open the gas cylinder tap.
		A foreign object in the valve	Remove the foreign object.
		Electromagnetic valve is damaged.	Replace
7	Inert gas flows constantly	The gas test on the front panel is switched on.	Set the gas test on the front panel to OFF.
		A foreign object in the valve	Remove the foreign object.
		Electromagnetic valve is damaged.	Replace
		The gas pre-flow time adjustment knob on the front panel is damaged.	Repair it or replace it.

Troubleshooting table of the models CRAFT-TIG 201 DC P PULSE and CRAFT-TIG 253 DC PULSE:

S/N	Malfunction	Cause	Solution
8	The welding current cannot be adjusted.	The welding current potentiometer on the front panel connector is not good or damaged.	Repair or replace the potentiometer.
9	The displayed welding current does not correspond to the current value.	The min. displayed value does not correspond to the current value.	Set the Imin potentiometer on the power board.
		The maximum value displayed does not correspond to the current value.	Set the potentiometer Imax on the power board.
10	The penetration depth of the melt pool is not sufficient.	The welding current is set too low.	Increase the welding current.
11	The alarm lamp on the front panel is switched on. Overheating protection is active.	Too high welding current	Reduce the welding current output.
		Working time is too long	Reduce the duty cycle. (Work with interruptions)

Troubleshooting table of the model CRAFT-TIG 253 DC PULSE for TIG welding:

S/N	Malfunction	Cause	Solution
1	The tungsten electrode burns away quickly.	Wrong gas or no gas.	Use pure argon. Check that the gas cylinder is filled with gas, connected, switched on and that the burner valve is open.
		Insufficient gas flow.	Check that the gas is connected. Check that hoses, gas valve and burner are not affected.
		Burner cap not inserted correctly.	Make sure that the burner cap is positioned so that the O-ring is in the burner body.
		Welding torch connected to DC+	Connect the burner to the DC- connector.
		Wrong tungsten electrode is used.	Check and change the tungsten electrode type if necessary.
		Tungsten electrode was oxidized after welding is finished.	Maintain inert gas flow 10-15 seconds after arc stop. 1 second for each 10 amp welding current.
		Tungsten electrode melts back into the nozzle during AC welding.	Check that the correct type of tungsten is used. Make sure that the compensation control is not set too high. Reduce the balance if necessary.

Troubleshooting table of the model CRAFT-TIG 253 DC PULSE for TIG welding:			
S/ N	Malfunction	Cause	Solution
2	Dirty tungsten electrode.	The tungsten electrode has touched the weld pool.	Keep the tungsten electrode away from contact with the molten bath. Hold the welding torch so that the tungsten electrode is 2 to 5 mm away from the workpiece.
		The tungsten electrode melts in the molten pool.	Check that the correct type of tungsten electrode is used. Too much welding current for the electrode size, reduce the amperage or switch to a larger electrode.
		The flux cored wire has touched the electrode.	Avoid contact between the flux-cored wire and the tungsten electrode during the welding process, and insert the flux-cored wire into the weld pool protrusion in front of the electrode.
3	Porosity - poor weld pattern and colour.	Wrong gas / low gas flow / gas leak.	Use pure argon. The shielding gas is connected, check that the hoses, the gas valve and the welding torch are not restricted. Set the gas flow between 6 and 12 l/min. Check the hoses and couplings for holes and leaks.
		Dirty base material.	Remove dirt and material such as paint, grease, oil and dirt from the base material.
		Dirty cored wire.	Remove all grease, oil and dirt from the workpiece
		Wrong cored wire.	Check the cored wire used and replace if necessary.
4	Yellow debris / smoke at the aluminum nozzle and discoloration at the tungsten electrode.	Wrong gas.	Verwenden Sie pures Argon.
		Low gas flow	Set the gas flow to between 10 -15 l/min flow rate.
		Insufficient gas post-flow.	Increase the gas post-flow time.
		Aluminium gas nozzle is too small.	Increase the diameter of the aluminium gas nozzle.
5	Unstable arc during welding.	Welding torch connected with DC+.	Connect the welding torch to the DC- output terminal.
		Dirty base material.	Remove materials such as paint, lubricant, oil, and dirt, including mill scale, from the base material.
		The tungsten electrode is dirty.	Remove 10 mm from the dirty tungsten electrode.
		The arc is too long.	Keep the welding torch slightly lower in the distance above the workpiece from 2 to 5 mm.
6	HF is active but no welding current	Open welding circuit.	Check that the ground wire is connected.
		No gas	Check that the gas is connected and the gas cylinder valve is open. Check that the hoses, the gas valve and the welding torch are not affected. Set the gas flow to a value between 10 -15 l/min.
		The tungsten electrode melts into the molten bath.	Check that the correct type of tungsten electrode is used. Current too high for tungsten electrode size. Reduce the amperage or change to a larger electrode.

Troubleshooting table of the model CRAFT-TIG 253 DC PULSE for TIG welding:

S/ N	Malfunction	Cause	Solution
7	The arc moves during welding.	Insufficient gas flow.	Set the gas flow to a value between 10 -15 l/min.
		Incorrect arc length.	Hold the welding torch slightly lower in the distance above the workpiece from 2 to 5 mm..
		Wrong tungsten electrode Electrode is in bad condition.	Check if the correct type of tungsten electrode is used. Remove 10 mm of the welding end of the tungsten electrode and sharpen it again.
		Insufficiently prepared tungsten electrode.	Grinding marks should be along the length of the Wolframe electrode, not circular. Use suitable abrasives such as a grinding machine with a grinding wheel.
		Dirty base material or wire electrode.	Remove materials such as paint, lubricant, oil, and dirt, including mill scale, from the base material. Remove all lubricant, oil, or impurities from the filler material.
		Incorrect wire electrode.	Check the wire electrode and replace if necessary.
8	The arc is difficult to ignite. The arc does not begin to weld.	Incorrect device setting.	Check that the device setting is correct.
		No gas, wrong gas flow rate.	Check that the gas is connected and the gas cylinder valve is open.
			Check that the hoses, the gas valve and the welding torch are not affected. Set the gas flow to a value between 10 -15 l/min.
		Incorrect tungsten electrode size or type.	Check and change the electrode size or electrode type if necessary.
		The tungsten electrode is contaminated.	Remove 10 mm of the contaminated tungsten electrode and regrind the tungsten electrode.
		Loose connection	Check all connections and tighten them.
		The ground clamp is not connected to the worktable.	If possible, connect the ground clamp directly to the workpiece.
		Loss of high frequency	Check the welding torch and cables for faulty insulation or poor connection.

Troubleshooting table of the model CRAFT-TIG 253 DC PULSE:

S/ N	Malfunction	Cause	Solution
1	No arc	Incomplete welding circuit.	Check the ground wire. Check all connecting cables.
		No power supply.	Check that the device is switched on and that there is a power supply.
		Incorrect mode selected.	Check that the MMA selector switch is selected.

Troubleshooting table of the model CRAFT-TIG 253 DC PULSE:			
S/ N	Malfunction	Cause	Solution
2	Porosity - small holes or cavities resulting from gas inclusions in the weld metal.	The arc length is too long.	Shorten the arc length.
		The workpiece is dirty, contaminated or wetted with moisture.	Remove dirt and materials such as paint, lubricant, oil, and dirt, including the mill scale of the base material.
		Wet electrode.	Only use dry electrodes.
3	Excessive splashes	Current too high.	Reduce the current or select a larger electrode.
		The arc length is too long.	Shorten the arc length.
4	Weld seam is at the very top, too little connectivity.	Insufficient heat supply.	Increase the current or select a larger electrode.
		The workpiece is dirty or damp.	Remove impurities and materials such as paint, lubricant, oil, and dirt including the mill scale of the base material.
		Poor welding technology.	Use the correct welding technique or contact support from a specialist.
5	Excessive penetration depth - burn-through	Excessive heat input.	Reduce the current or select a larger electrode.
		Incorrect infeed speed.	Increase the welding speed.
6	Uneven welding results	Shaking or restless hand.	Use two hands for assist when possible.
7	Insufficient penetration depth	Insufficient heat supply.	Increase the current or select a larger electrode.
		Poor welding technology.	Use the correct welding technique or contact support from a specialist.
		Poor weld preparation.	Check the seam form and make sure that the material is not too thick. If necessary, contact a specialist for support.
8	Deformation - movement of the base material during welding	Excessive heat input.	Reduce the current or use a smaller electrode.
		Poor welding technology.	Use the correct welding technique or contact support from a specialist.
		Poor seam preparation or wrong seam shape.	Check the seam form and make sure that the material is not too thick. If necessary, seek assistance from a specialist.
9	The electrode welds with different or unexpected arc properties.	Incorrect polarity connection.	Change the polarity, check the electrode manufacturer's specifications for correct polarity.

16 Disposal, Recycling of old equipment

In your own interests and in the interest of the environment, please ensure that all components of the machine are disposed of in the proper and approved way.

16.1 Decommission

Disused equipment must be taken out of service immediately in order to avoid later misuse and endangering the environment or people.

Step 1: Remove all environmentally hazardous fluids from the old unit.

Step 2: If necessary, dismantle the machine into manageable and usable assemblies and components.

Step 3: Guide the machine components and operating materials to the appropriate disposal routes.

16.2 Disposal of electrical equipment

Please note that electrical appliances contain a variety of recyclable materials as well as environmentally harmful components.

Make sure that these components are disposed of separately and properly. In case of doubt, please contact your municipal waste disposal.

If necessary, the help of a specialized waste disposal company can be used for the treatment.

16.3 Disposal via municipal collection points



Disposal of used electrical and electronic equipment (Applicable in the countries of the European Union and other European countries with a separate collection system for these appliances).

The symbol on the product or its packaging indicates that this product should not be treated as normal household waste, but must be returned to a collection point for the recycling of electrical and electronic equipment. By helping to properly dispose of this product, you are protecting the environment and the health of others. Environment and health are endangered by improper 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, or the shop where you purchased the product.

17 Spare parts



DANGER!

Danger of injury due to use of wrong spare parts!

The use of incorrect or faulty replacement parts may cause danger to the operator and cause damage and malfunction.

- Only use original spare parts from the manufacturer or replacement parts approved by the manufacturer.
- In case of doubt, always contact the manufacturer.

17.1 Spare parts order

The spare parts can be obtained from the dealer or directly from the manufacturer. The contact details are in chapter 1.2 Customer Service.

Specify the following key data for inquiries or ordering spare parts:

- Device type
- Item number
- Position number
- Construction year
- Amount
- Desired shipping method (post, freight, sea, air, express)
- Delivery address

Spare parts orders without above given information can not be considered. If the shipping method is missing, shipping will be at the discretion of the supplier.

Information on the device type, article number and year of manufacture can be found on the type plate, which is attached to the device.

Example

The front cover for the CRAFT-TIG 201 DC P PULSE must be ordered. The front cover is identified in the spare parts drawing 1 with the number 12.

When ordering spare parts, send a copy of spare parts drawing 1 with marked front cover component and marked position number 12 to the authorised dealer or to the spare parts department and provide the following information:

Type of device: CRAFT-TIG 201 DC P PULSE

Item number: 1074201

Drawing number: 1

Position number: 12

17.2 Spare parts drawings

The following drawings should help to identify necessary spare parts in case of service. To order, send a copy of the parts drawing with the marked components to your authorized dealer.

17.2.1 Spare parts drawing CRAFT-TIG 201 DC P PULSE

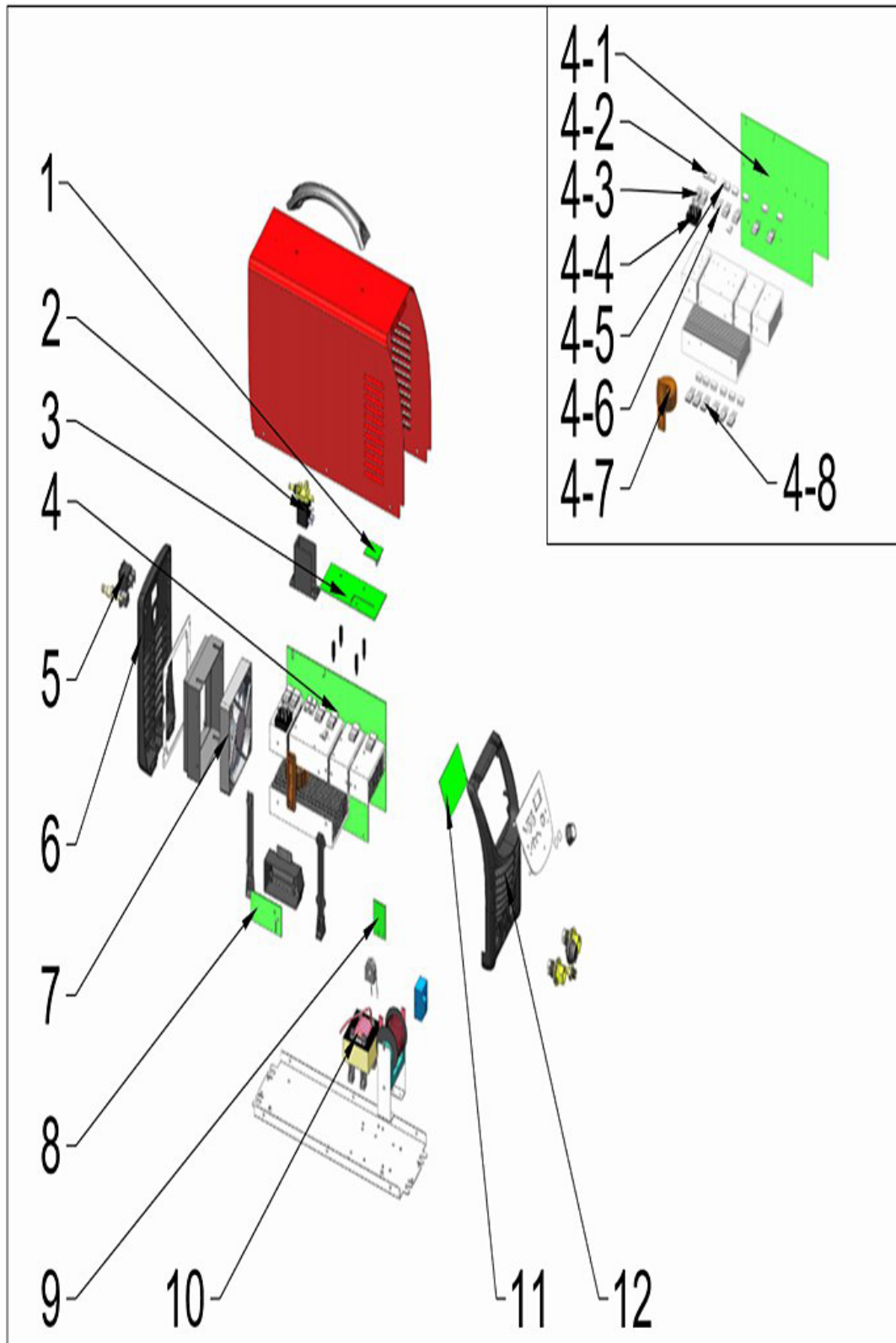


Fig. 27: Spare parts drawing CRAFT-TIG 201 DC P PULSE

17.2.2 Spare parts drawing CRAFT-TIG 253 DC PULSE

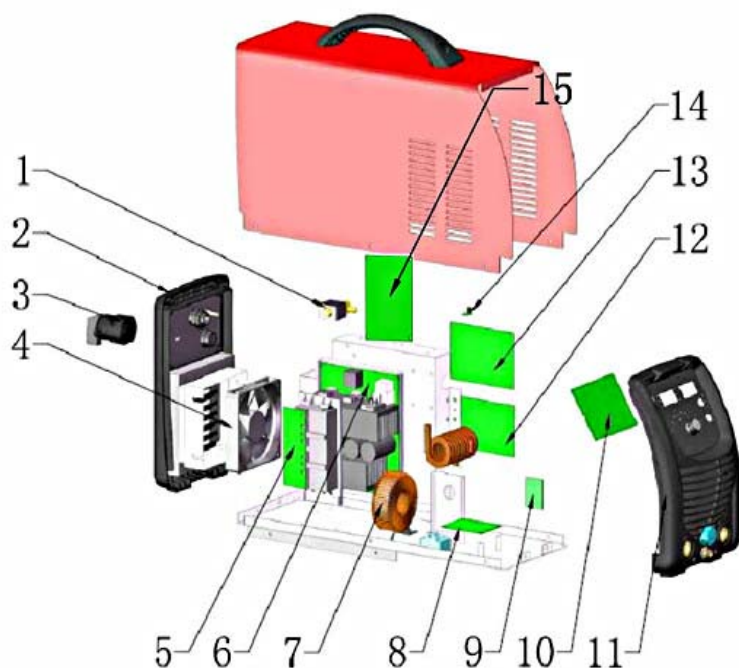


Fig. 28: Spare parts drawing CRAFT-TIG 253 DC PULSE

18 Wiring diagram

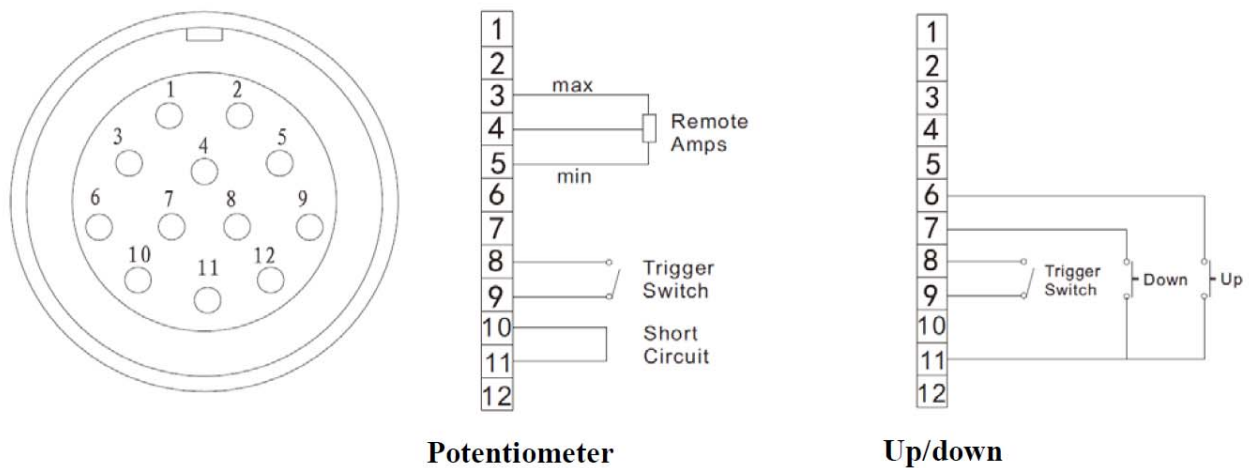
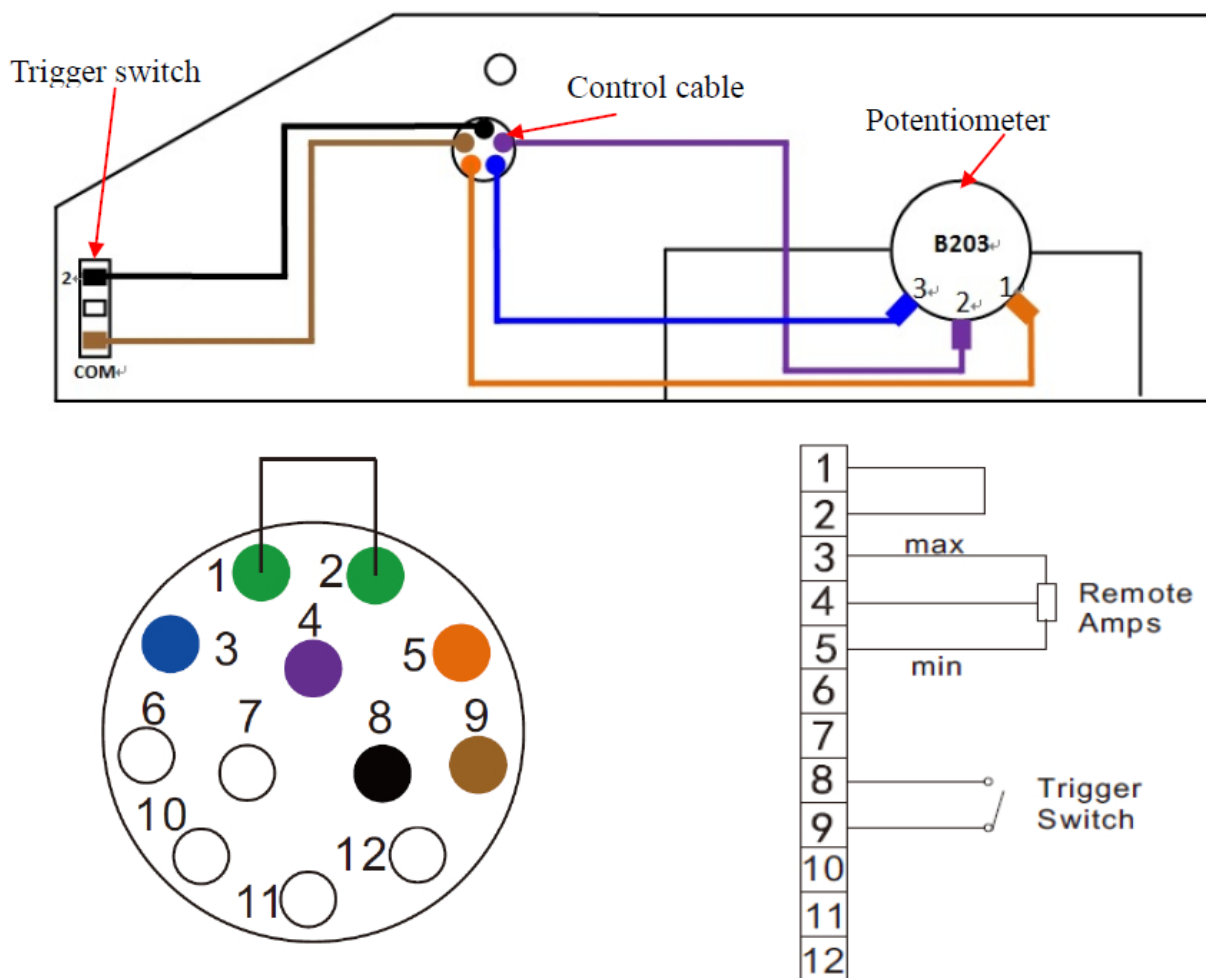


Fig. 29: PIN assignment of the remote control connector of the EASY-TIG 181 DC CRAFT-TIG 253 DC PULSE

Socket pin	Function	
	Potentiometer	Up / Down
1	not connected	not connected
2	not connected	not connected
3	10k ohm (maximum) connection to 10k ohm remote control potentiometer	not connected
4	Wiper arm connection to 10k ohm remote control potentiometer	not connected
5	Zero ohm (minimum) connection to 10k ohm remote control potentiometer	not connected
6	not connected	The button of „UP“ input
7	not connected	The button of „DOWN“ input
8	Trigger Switch Input	Trigger Switch Input
9	Trigger Switch Input	Trigger Switch Input
10	Be shorted with 11	not connected
11	Be shorted with 10	The button of „UP“ & „DOWN“ input
12	not connected	not connected



Remote Control Socket

Fig. 30: PIN assignment of the remote control connector of the CRAFT-TIG 253 DC PULSE

Socket pin	Function
1	Be shorted with 2
2	Be shorted with 1
3	20k ohm (maximum) connection to 20k ohm remote control potentiometer
4	Wiper arm connection to 20k ohm remote control potentiometer
5	Zero ohm (minimum) connection to 20k ohm remote control potentiometer
6	not connected
7	not connected
8	Trigger Switch Input
9	Trigger Switch Input
10	not connected
11	not connected
12	not connected

19.2Electrical circuit diagram CRAFT-TIG 253 DC PULSE

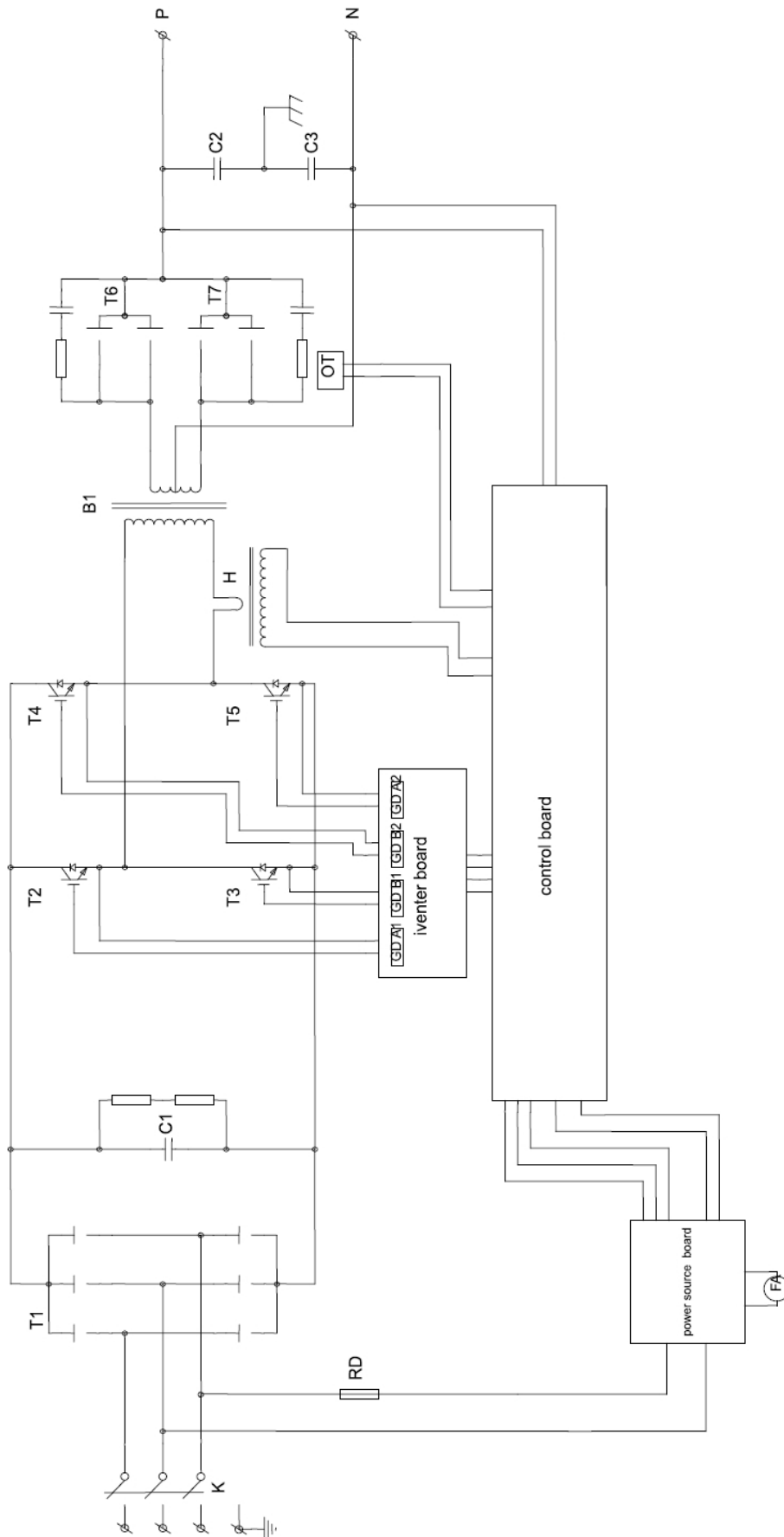


Fig. 32: Electrical circuit diagram CRAFT-TIG 253 DC PULSE

20 EC Declaration of Conformity

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

Product group: Schweißkraft® Welding Technology

Designation of the machine *: **Item number *:**

☐ CRAFT-TIG 201 DC P PULSE

☐ 1074201

☐ CRAFT-TIG 253 DC PULSE

☐ 1074253

Type of machine: TIG Inverter

Serial number*: _____

Year of manufacturer*: 20_____

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

is hereby confirmed that they comply with the essential protection requirements laid down in Directive **2014/30/EU** (EMC Directive) of the Council on the approximation of the laws of the Member States relating to electromagnetic compatibility and in Directive **2014/35/EU** on electrical equipment designed for use within certain voltage limits. The products meet the requirements of the WEEE Directive **2012/19/EU**.

The above mentioned products comply with the provisions of this directive and meet the safety requirements for arc welding equipment according to the following product standards.

The following harmonized standards were applied:

EN 60 974-1:2012 Arc welding equipment - Part 1: Welding power sources

EN 60 974-10:2014 Arc welding equipment - Part 10: Requirements for the electromagnetic compatibility (EMC)

According to EC Directive 2006/42/EC Article 1, the above products fall exclusively within the scope of electrical equipment for use within certain voltage limits.

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

Hallstadt, 17.01.2018



Kilian Stürmer
CEO, Director



