ISO OERLIKON AG Schweisstechnik
CH-5737 Menziken AG – Tel. +41 (0)62 771 83 05
E-Mail info@iso-oerlikon.ch – www.iso-oerlikon.ch

Original Operating Manual
Stud welding unit
C130

ISO OERLIKON AG
Hauptstrasse 23
5737 Menziken

Telefon: 062 771 83 05
Fax: 062 771 84 54
E-Mail: info@iso-oerlikon.ch
Web: www.iso-oerlikon.ch

2024/R11

Thank you for purchasing a stud welding system produced by ISO OERLIKON AG

Please read this operating manual carefully, so you obtain an overview allover all devices' functions and you can reach the best results by welding.

If you have questions about your stud welding system, please do not hesitate to contact your technical consultant or establish contact with us:

ISO OERLIKON AG Schweisstechnik
CH-5737 Menziken AG – Tel. +41 (0)62 771 83 05
E-Mail info@iso-oerlikon.ch – www.iso-oerlikon.ch

1 Important basic information

1.1 Scope of delivery

The delivery scope of the stud welding unit c130 is composed of the following parts:

- One stud welding unit c130
- One operating Manual

1.2 Conventions of presentation

1.2.1 Symbols and signal words

Symbol / Signal word	Meaning
 **Information**	Draws your attention to the operation's way and to the importance of safety information.
 **RISK**	Directs your attention to risky situations, which **most probable** will result either in a severe injury or can be deathly, if they are not avoided.
 **WARNING**	Draws your attention to risky situations, which **could** result either in a severe injury or can be deathly, if they are not avoided.
 **PRECAUTION**	Directs your attention to a risky situation, which can result in a light or moderately heavy injury, if it is not avoided.
NOTE:	Describes possible damages and other important information.

1.2.2 Technical terms / Denominations

This operating manual makes use of the following technical terms / Denominations:

- Technical personnel: Personnel which is acquaints with technical welding jobs, their related dangers and also with the protective measures which go with them.
- Electrician: It means a person which owing to his specialized (electro technical) apprenticeship, knowledge and practical experiences as well as to the knowledge about the relevant norms and specifications is able to review the jobs of his sphere of responsibility and is also able to recognize the possible risks.

1.2.3 Presentation

For this operating manual the following presentation rules apply:

- Every enumeration will have a hyphen (-) at the beginning.
- Instruction texts will be numbered.
- Cross references in *italics*.

1.2.4 Position of objects in the workspace

The following denominations describe the position of objects in the workspace (Location) are used in this operating manual:
The designations left, right, at the front or at the back refers always to the position of the operator, standing up in front of the device and with the face looking at it.

1.3 Denominations at the stud welding unit c130

CE	European CE standard mark on the identification plate. The stud welding unit c130 complies with all the standard safety requirements contained in all applicable EU directives.
	In the front, above the devices chassis Persons wearing a cardiac pacemaker are not aloud to exceed a safe distance of 12 meters around the stud welding unit c130
	In the front, above the devices chassis Before installing and putting the stud welding unit c130 into service one has to read the operating manual completely and understand the contents.
	In the front, above the devices chassis WARNING about electromagnetic fields
	In the front, above the devices chassis Be careful, red hot welding spatter! Wear protective goggles!

1.3.1 Identification plate

	Producer
Model	Producer code
Part number	Serial number
Supply voltage	Welding voltage
Power consumption	Max. peaked welding current
	Open circuit voltage (Contact test voltage)
Cooling mode/Protection class	Capacitance

1.4 Co-valid documents

This operating manual is composed of the following parts:

- Operating Manual c130 in connections with either
- Operating Manual P05-K or
- Operating Manual P05-i or
- Operating Manual P05-S

1.5 EC-declaration of conformity

In accordance with the directive 2006/42EG, annex II A
(Original EC-declaration of conformity)

Herewith the producer

HRUSCHKA GmbH
Carl-Zeiss-Str. 8,
D-85247 Schwabhausen
Tel.: 00 49 8138 6694610

declares that the following product:

Model:	c130
Serial number:	4000-5000
Construction year:	2024

jointly with the welding gun P05-K, P05-S,P05-i as a complete welding system

meets all relevant stipulations contained in above mentioned directive.

Furthermore the device complies also with the EU-directives:

Low voltage directive 2014/35/EU
Electromagnetic compatibility 2014/30/EU

Following applied harmonized norms found partial application:

EN 60204-1:2018 Safety of machinery – Electrical equipment of machines– Part: General requirements
EN 60974-1:2018/A1:2019 Arc welding equipment Part 1
EN 60974-10:2021 Arc welding equipment Part 10
RoHS EN IEC 63000:2018

Following national German norm found partial application:

VDE 0544-1

Person who is authorized to compile the technical documentation:

Name: Michael Flemke Address: AuTech GmbH
Viktoriastr. 2
D-84144 Geisenhausen
Tel.: 00 49 8743/968550

Place and date of issue
Schwabhausen, 08.01.2024

Signature Thiel Thomas (Manager / CEO)

2 Safety

WARNING

Upon non-observance of the safety indications threatens risks originated from:

- electric shock and consequently danger of life and limb
- Cardiac arrest from electromagnetic fields
- Burn risk from red hot electric arc and/or welding spatter
- Deafness or damages at the auditory canals from loud bang sounds
- Intoxication from toxic vapours which could result by welding

In your own interest observe all safety indications contained in this operating manual

2.1 Conduct in the case of emergency

Cut the stud welding unit c130 off from the electricity supply.

Send immediately for authorized personnel, who are able to detect the cause of the emergency and can solve the problem.

2.2 Intended use

The stud welding unit c130 is exclusively allowed to be used in commercial industrial but not in private sectors. Only technical personnel are allowed to install and operate this device.

The stud welding unit was conceived and is appropriated for welding the welding elements reproduced in *Chapter 13.2*. Here are principally mean welding elements according to EN ISO 13918-PT, EN ISO 13918-UT, EN ISO 13918-IT. Any other use is not valid and is a non-intended use.

Following guns can be connected to the welder c130: Contact welding gun P05-K, Gap welding gun P05-S, contact welding gun P05-i. The intended use can only be reached by reading and observing also the welding gun's operating manual.

If it is necessary to replace some welders parts, use only original-spare parts. Use only original spare parts and parts subject to wear. By using parts of other producers we can not warranty that they were produced fulfilling the necessary use and safety guidelines. Use the welder and its accessories only if they are in perfect conditions. Refrain from executing any working method or mode of operation that could be classified as risky.

2.3 Reasonably foreseeable misuse

- By operation of the welder or its accessories making use of safety or protection equipment in non-intact state and/or not in working order, e. g. after a welder's fall
- By operation of damaged devices and accessories.
  All welders, welder parts or gun parts as well as accessories in no perfect conditions have to be changed immediately.
- By faults have to be eliminated immediately.
- By high-handed changes on the devices and accessories construction.
  Making modifications, extensions or conversions at the welder unit or its accessories without authorization of the producer is not allowed.
- Any conversion and modification measure requires the written authorization from Hruschka GmbH.
- By ignoring the error message E3 (Safety discharge).When appearing the error message E3 the welder have to be switched off and switched on again, for going on with the welding job. Anyway, the fault's cause has to be found and eliminated in order to avoid more safety discharge incidents.
- Operating the devices if they have been stored or transported at a temperature by -0 degree C and if they have not been acclimatized and tempered for an appropriate time. (Possible condensation may occur on the electronical devices and electrical components).
- Operating obviously defective devices and accessories with unusual behavior of the device functions. E.g. unusually fast or very slow loading. If electrolyte (a liquid similar to oil) leaks from the device, the display flickers, the device often restarts for no reason.
- Operating the equipment when the working environment is unsuitable. E.g. if other welding machines are being used on the component at the same time. This particularly applies to welding machines with high-voltage ignition (WIG welding machines). When the device is positioned so that it is in the jet of grinding or cutting machines and the metal dust is blown into the housing.

2.4 Safety measures at the end of work

- Turn the welding unit off and disconnect the mains plug.
- Make sure that the welding unit cannot be started-up without permission.
- Remove the mass clamps from the component.
- Ensure that the required maintenances- and testing intervals be obeyed.

2.5 Safety measures in case of malfunction

- Switch the stud welding unit c44/c66 off and disconnect the mains plug.
- Make sure that the welding unit cannot be started-up and mark it.
- Remove the mass clamps from the component.
- Make sure that the welding equipment cannot be started-up.

2.6 Personnel

- The stud welding unit c130 can only be operated by technical personnel that are trained and instructed or rather qualified personnel.
- Personnel in training, learning, instruction or in formation can operate the stud welding unit c130 but only under permanent supervision of a trained and instructed person.
- Instructed person:
  It means a person with a minimum age of 18 years, which either have received enough information or is supervised from a qualified employee and in this way have acquired the qualification to recognize risks and avoid dangers arising from the stud welding unit c130.
- Qualified person:
  This is a person which, based in the own specialized knowledge acquired at a professional training, work experience and not all too much time dated back employment, has a reliable comprehension of safety related tasks.
  The qualified person has have to disposal and to maintain the own knowledge about the state of the art with regard to the works to be performed and the possible risks.

Risk arising from electric shock

- Working at the electric equipment involves the risk of an electric shock. This kind of jobs only can be performed by a qualified person from Hruschka GmbH.
- Errors by connecting the welder to the mains electricity could conduce to an electric shock, this connection should be done only by an electrician.
- The stud welding unit c130 only can be operated by technical personnel.

RISK

Risk arising from electromagnetic fields

- Risk of cardiac arrests!
  The welder produces strong electromagnetic fields, which disturb the function of cardiac pacemaker's. Persons wearing an implanted cardiac pacemaker are not allowed in no case to operate the welder and have to keep the safety distance of minimum 12 meter around the welder. Make sure that all persons wearing a cardiac pacemaker obey the safety distance of minimum 12 meter away from the stud welding unit.

	Skilled personnel[2)]	Hruschka GmbH	Electrician [2)] Skilled electrician	Skilled freight personnel[2)]	Third persons[1)]	Disposer [2)]
Transport				x		
Installation	x					
Bringing into service			x			
Operation						
• Normal operation	X					
• Cleaning	x					
• Fault finding, Fault Elimination	x	x				
• Service	x	x				
• Maintenance	x					
• Repairs	x		x			
• Auto test (Welders function)		x				
Storage	x					
Shutdown	x					
Dismantling		x				
Disposal		x				x

[1)] Untrained or improperly trained person, without experience or deficient risk awareness
[2)] Qualified or instructed person

2.7 Local requirements

Draw the attention of all persons staying around the welding place to the possible dangers from magnetic fields, health detrimental vapours, electric shock , welding spatter, lightning and loud bangs.

Perform welding jobs only in spaces/ areas, in the additional sources of danger such like fire, explosions or humidity could not arise.

Make sure that at the workspace a fire extinguisher is ready for use.

Pay attention to keep the workspace good ventilated and lighted.

Make sure that at the works place be well visible hanged up a warning sign for persons wearing a cardiac pacemaker.

2.8 Disposal

The disposal only can be disposed either by the device's producer or by a specialist disposal firm. Please, send the down shut welder back to Hruschka GmbH.

2.9 Operation manual content's observation

This operating manual is destined to the use of technical personnel in commercial industrial sectors.

- Read this operating manual carefully, conscientious and completely. Start the installation and putting into service of the stud welding unit's c130 only if you have understood all contains. The manual includes all you have to know for avoiding personal and material damages. In this way, the operations can go free from incidents and gently to the environment.
- Observe carefully all safety indications and other notices, requirements and information contained in this operating manual.
- Keep this operating manual always ready to hand nearby to the stud welding unit c130.
- If the stud welding unit c130 is internal moved to a new place, the operating manual has to go with.

  The non-compliance of these advices conduces to serious effects on the health until perilous injuries.

2.9.1 Legal hints to this operating manual

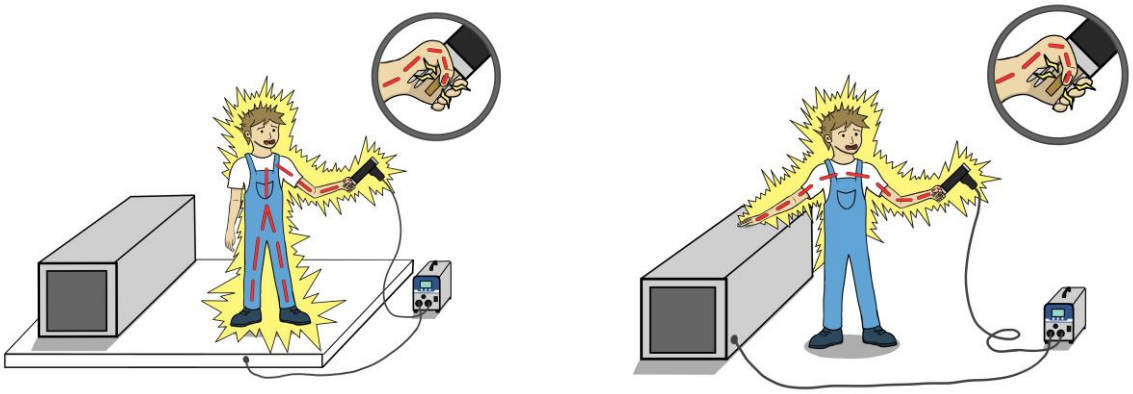
2.10 Residual danger and protective measures

2.10.1 Risk arising from electric shock

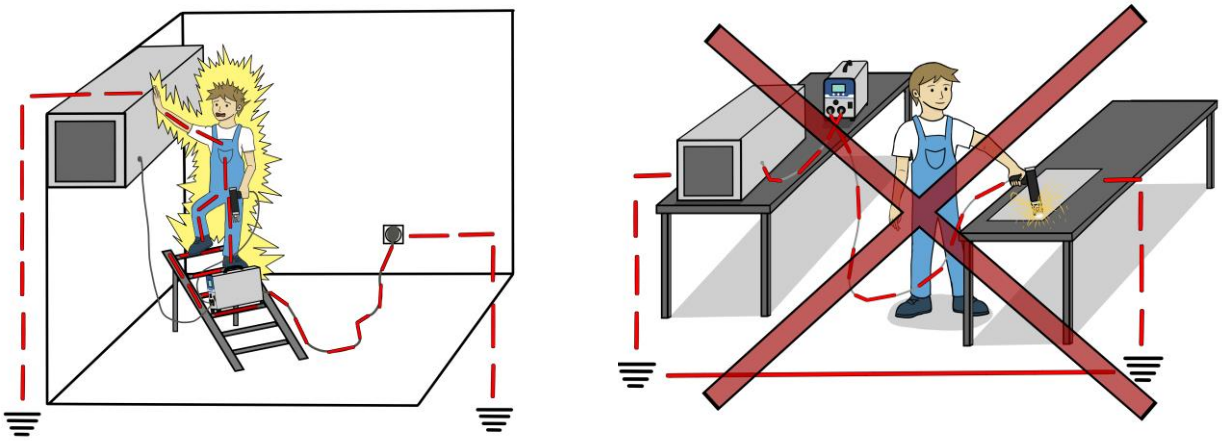
– While welding all tangible welding gun parts (studs, stud's chuck and all connected parts) as well as the connected metal sheet to be welded are under electrical current tension. Don't touch these parts and do not carry electric conducing jewelry like rings, watches, chains, etc.!

– Avoid all situations with heightened electrical danger. With heightened electrical danger means when working:

- in confined spaces with electrical conductive walls
- in humid, wet, extreme dry and hot spaces
- in spaces with low freedom to move on electrical conductive parts (metallic ladders, scaffold, blades, floor slabs, etc.)
- under cramped conditions either between, on or at electrical conductive parts.



Avoid situations in which you are in the welding circuit.



Avoid situations in which you are between two potentials or welding over the connection of the protective conductor.

2.10.2 Fire hazard

3 While stud welding a red hot electric arc and welding spatter are produced. Remove all inflammable materials out of the sphere of the welding place.

3.1.1 Risk arising from electromagnetic radiation

– Depending on the individual sensitiveness a health risk arising from electromagnetic fields could exist.

3.1.2 Risk of burns

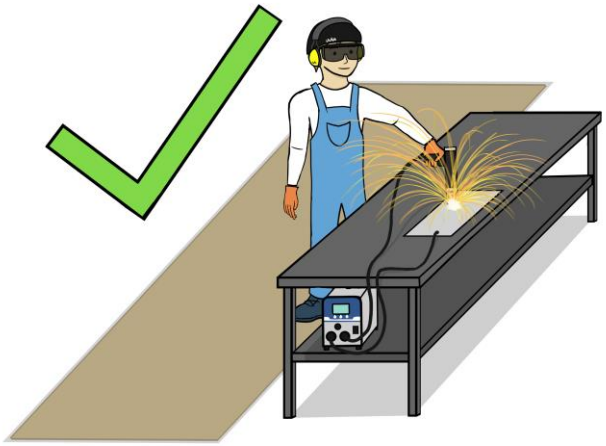
– While stud welding a red hot electric arc and welding spatter are produced. For your own safety: wear always protective clothing.

	Flame-retardant, whole body covering protective clothing
	Headguard
	Welding protective goggles

3.1.3 Risk arising from loud bang sounds

– Welding in capacitor discharge method emits loud bang with a volume to 107 dB (A). This acoustic pressure level can cause deafness. The operators and persons which stand around immediately near by the welding unit while welding. This group of people has to be protected with appropriate safety devices or protective measures.

	Ear protectors



3.1.4 Electrical risk arising from falls

- The stud welding unit c130 can be destroyed or important safety functions can be suspended. The stud welding unit c130 has to be installed putting emphasis to avoid falls by careless handling. In the case that the device falls is necessary to carry out a complete examination of all safety functions.

3.1.5 Electrical risk arising from condensation

If the devices have been located at an ambient temperature by -0 degrees C; through transport, storage or other reasons at the operation location, dew could have formed on the colder areas (depending on the difference of temperature and humidity). This can lead to a failure of important safety functions. Please wait for an appropriate time until the device has acclimatized and tempered before putting it into operation.

3.1.6 Threat for the stud welding unit c130 and devices placed nearby

- It is important that the weld and earth cables are placed without loops and keeping enough distance to other electrical welders units particularly while welding at building sites and special installations. The equipment usufructuary has to take the appropriated corrective precautionary measures.
- Electrical and electronic welders could be damaged or destroyed, magnetic memory media (Data storage) may lose their content, watches may be magnetized and damaged. The welding current cables also emit strong electromagnetic fields.
- The stud welding process produces red hot electric arc and welding spatter. Circumjacent objects may be destroyed.

4 Technical data

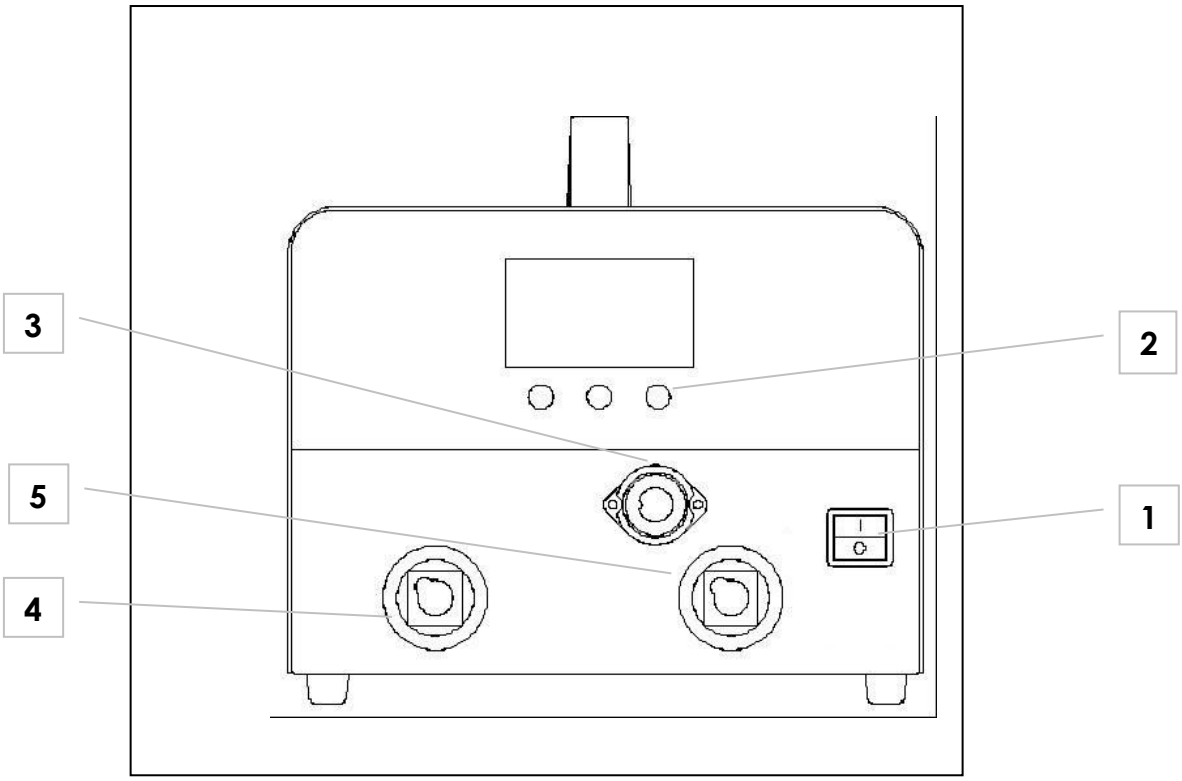
Welding current source Aluminium-electrolytic-capacitors battery	Power consumption < 5 VA, Idle state
Capacitance C66 66.000 µFarad C130 132.000 µFarad	Welding method Contact or gap method
Load voltage 40 to 200 Volt using contact gun 50 to 200 Volt using gap gun	Weldable materials Steel (alloyed and structural). Stainless steel, Aluminium, brass
Max. charging power C66 1320 Ws (Watt seconds) C130 2640 Ws (Watt seconds)	Welding range C66 Ø2 to Ø7,1/M8 C130 Ø5 to M12
Charging times Ø3 0,8 Seconds Ø4 1,8 Seconds Ø5 3,0 Seconds Ø6 3,5 Seconds Ø8 4,5 Seconds	Chassis/Protection class Stainless steel WS 1.4016 / IP 23
Environmental temperature Min. 5 C° - max. 40 C°	Dimensions 235x185x285 (LxWxH mm, without hilt) 235x215x285 (LxWxH mm, with hilt)
Control Micro controller with graphic display	Weight C130 9,6 kg
Main connection 95..120 or190..250 Volt / 50..60 Hertz Automatic changeover	Power consumption 5,6 Ampere max.

4.1 Electrical connection

See *Chapter 7.2.2*

5 Structure and function

5.1 Overview



1	Device's on- or off- rocker switch
2	Three keys for controlling the displayed functions
3	Gun control line connection socket 6-pole
4	Earth cable connection socket 35/50mm²
5	Gun's welding current plug socket 35/50mm²

5.2 Basic structure of a stud welding system

A stud welding system is generally composed of at least three main components: the stud welding unit, the earth cables and a welding gun.

The C-series stud welding units function according to the principle of capacitor discharge welding with ignition tip and is conceived for joining metallic welding elements on an appropriated metallic workpiece. Depending on the workpiece and welding elements materials is recommend to weld applying either the contact or the gap method. The welding guns that go with the welders are optimal adjusted to the welding method.

The need welding power is generated into the stud welding unit by means of a capacitor battery and of a power thyristor which frees the welding current impulse. An electronic regulated power source loads the capacitors the required power. The welding current flows through the gun cables directly to the stud chuck – with the inserted welding element to be joined- and continues flowing across the workpiece and both mass clamps until the end of the mass cables closing the circuit by reflowing into the welding unit.

5.3 Stud welding in contact and gap methods

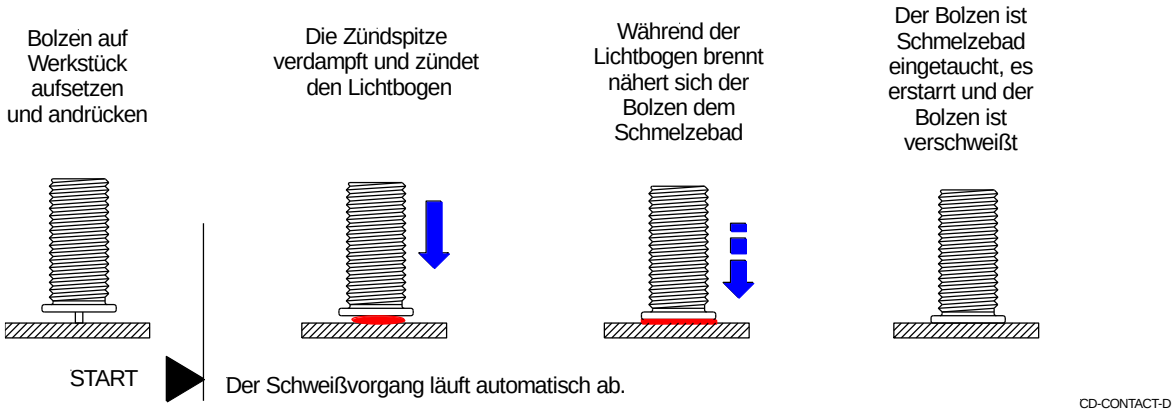
With the C-series stud welding units can be performed welding jobs applying the gap or contact welding methods by using a contact welding gun as well as a gap welding gun with lifting system.

The ***Contact method*** is a simply welding method and is preferentially used for joining welding elements of steel, stainless steel and brass.

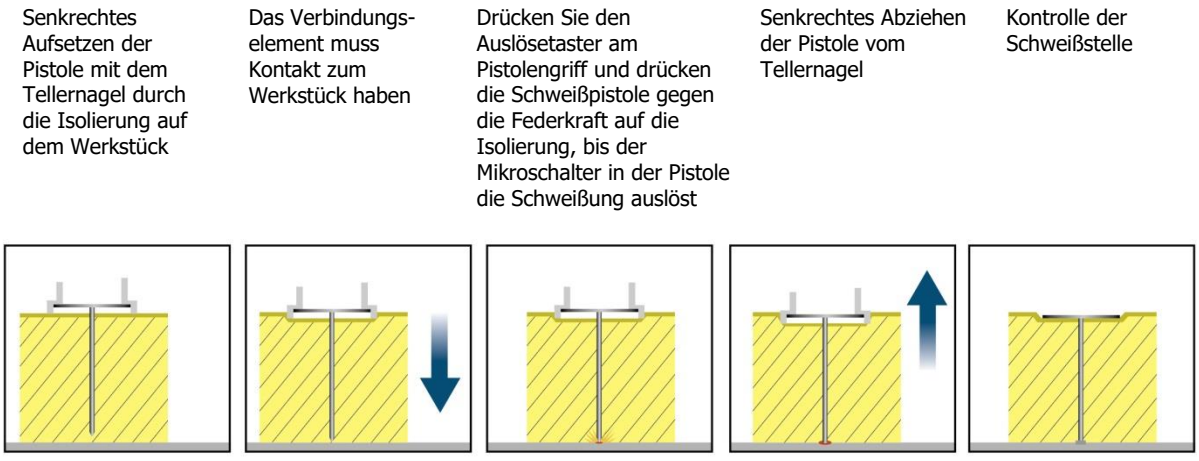
Here, a prestressed spring pressures the welding element with a specific pressure grade on the workpiece surface. The optimal pressures grade depends on the material combination between the welding on surface and the element. This value has to be found out by performing several test weldings.

The welding duration comes to approx. 1,2 to 3 ms (Millisecond) and produces a more abundant melt bath as when welding in the gap method. This fact makes enables to reach the best possible welds results on difficult surfaces such as e. g. rolling skin, oily surface or light flying rust.

Schematic sequence of events by welding a threaded stud in the contact method welding:



Schematic sequence of events by welding a cup head pin in the contact method:

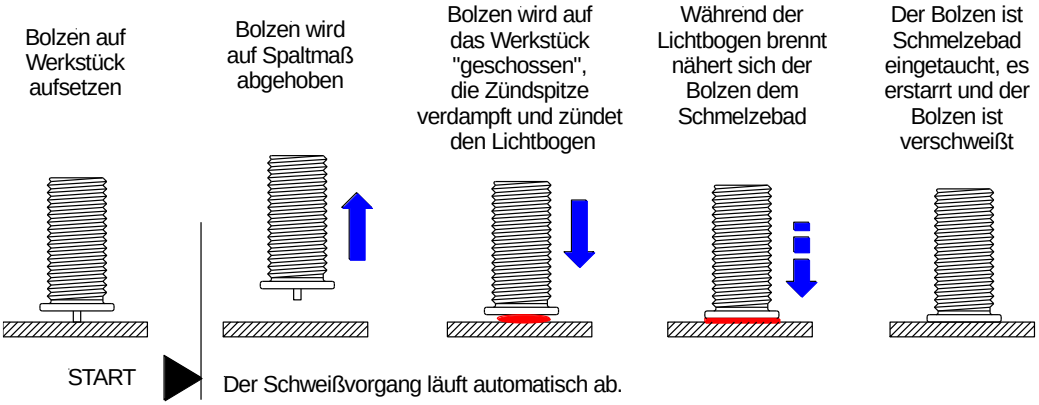


Welding in the ***gap method*** is possible to reach the best possible results when joining an aluminium welding element or when welding on very thin surfaces.

Here the welding element is drawn by a specific measure (= gap) over workpiece due to a lift system. Due to the force of the prestressed spring the welding element is „shot"on the metal sheet. At the moment at the ignition tip get in touch with the workpiece's surface, starts the real welding cycle. From this moment on the process goes trough the same steps like in the contact method – but within a substantial shorter time.

The lift's height, that is, the gap's size, is the deetrminating factor of the duration of the real welding cicle. The shortes welding time is reached adjusting the lift's length at the highest value.

Schematic sequence of events while welding a threaded welding stud in the gap method:



6 Delivery, in-house transport, unpack

Safety

WARNING

Risk of serious health-damage through life threatening injuries caused from potentially occurring electric shock.

– Important, security-related welder's functions may be faulty or entirely failed after being improper transported. An improper freight is tantamount to a device's fall and may put in danger life and limb. After an improper freight control the state of all security-related welder's functions!

– Transporting the unit with wrong or damaged (e. g. wet, crack, dented) packing does not offer adequate protection for the welder. This fact may cause the entirely failure of security-related welder's functions. The stud welding unit c130 will be sent to the customer packed in an especially conceived packing. Please, transport the welder using only this packing. Conserve the packing for possible future returns. If you have to transport the welder but you are not more in possession of the original packing, do not hesitate to contact us asking for a new one.

6.1 Delivery, in-house transport or made by a freight company

The scope of delivery is sent and unloaded on the customer's site.

– Unloaded scope of delivery must be immediately inspected. Document all damages occurred while the freight (damaged packing, obvious damages, humid or wet carton box).
In the case that the scope of delivery shows damages:
  - Document all damages and report them to the freight company.
  - Report immediately in writing all damages to Hruschka GmbH.

– Transportation of the delivery's scope to its installation place.
  - Ensure that the transport runs smoothly avoiding falls, bumps, hits or humidity at the scope of delivery.
  - Take care that when the scope of delivery has arrived to its installation place it is not exposed to a fall raising by careless, bumps, smut, hits or humidity.

6.2 Unpack

– Be careful while unpacking the scope of delivery.

– Control that the unpacked scope of delivery is not damaged.
If the scope of delivery shows damages:

- Document all damages and report them to the freight company.
- Report immediately in writing all damages to Hruschka GmbH.

– Control that the scope of delivery contains all corresponding parts.
See 1.1 Scope of delivery

7 Storage

Safety

WARNING

Risk of serious health-damage through life threatening injuries caused from potentially occurring electric shock. An improper storage may cause short circuits on the stud welding unit and so to default of security-related welder's functions.

Please, store the stud welding unit c130 well packed and in clean and dry conditions at ambient temperature.

7.1 Conditions for storage

The storage place of the stud welding unit c130 must be a place proven against humidity, dust and metallic impureness.

Storage temperature: -5 °C to +50°C
Relative air humidity: 0%-50% by 40°C
0%-90% by 20°C

After storage in cold temperature the device must be tempered for an appropriate time before putting it into operation.

7.2 Stud welding unit c130 temporary shutdown

– Switch the welder off and disconnect it from the mains electricity

– Unplug all welding and control cables out of the welder.

– Make sure that the welder cannot be brought into service unintentionally

– Store the welder well protected against humidity and smut. See 6.1

8 Installation

Safety

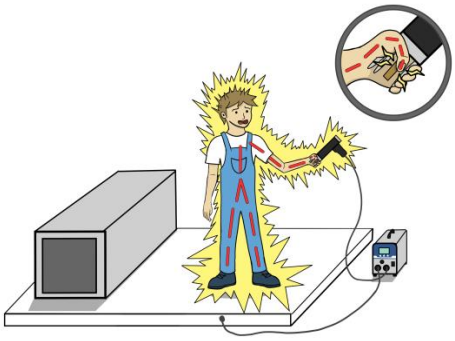
WARNING

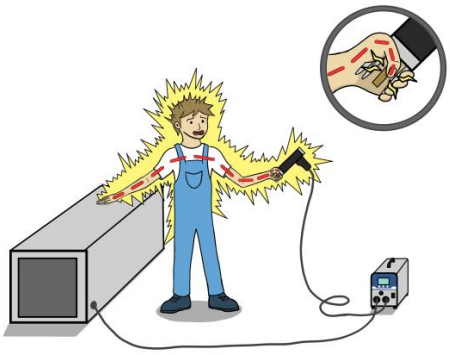
Risk of serious health-damage through life threatening injuries caused from potentially occurring electric shock.

– All that places where a lot of dust kicks up, metal chips fly round, water splashes or rain exposed places are not adequate for installing the device because short circuits at the welder may happen and conduce to failure of security-related functions. Make sure that stud welding unit c130 does not be installed at improper places.

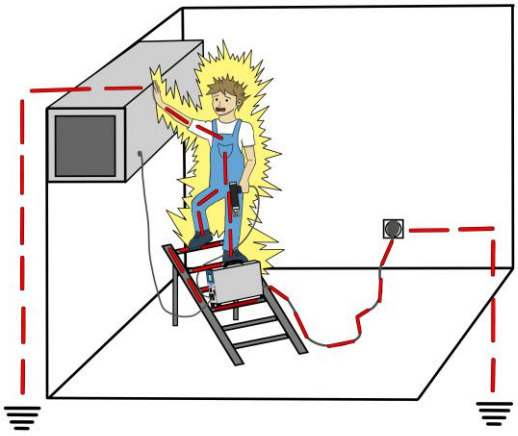
– All installation places where there are the dangers of tipping over or falling for stud welding unit c130, are improper places for installation. Tipping over or falling may conduce to failure of security-related functions. Make sure that stud welding unit c130 does not be installed at improper places. The workplace must be clean, the welder must be protected on a plain mat.

– Switch the welder off at all times before connecting the earth cable, weld and control cables or the mains cable. Do so also when the welding gun is changed while operating.





Avoid situations in which you are in the welding circuit.



Avoid situations in which you are between two potentials or welding over the connection of the protective conductor.

WARNING

Risk of serious health damage through to life-threatening injuries from slip and tripping hazard but also through electrical hazards if the cables and hose lines laid improperly.

- Lay the cables and hose lines out of walk or drive ways.
- Make sure that cables cannot be overran, squeezed, drag or damaged through similar actions.
- If necessary lay a step and/or overrun protection.
- Avoid transverse loading on the connection points.
- Magnetic fields produced while welding are strong enough to move the mass and welding gun cables. Please, lay these cables and fix them in the intention of avoid their movements and prevent damages at the cables or that the welding unit c130 can fall.

Be aware of potential hazards when setting up the appliance!

WARNUNG

Risk of serious damage to health, including life-threatening injuries caused by fire, burns, smoke poisoning

- Plug connections between the welding cable plug and socket must be tightened firmly. Loose connections can lead to sparking

8.1 Conditions for installation

8.1.1 Ambient conditions

Following ambient conditions are required for putting the stud welding unit c130 into service:

- Ambient temperature between 5°C and 40°C
- In spaces where dust kicks off, metal chips flies around, water splashes or rain can seep is not allowed to install the stud welding unit c130
- The stud welding unit c130 has to be installed on a clean and even surface.
- Do not perform welding jobs in spaces exposed to explosion endanger and do not put the welder there.
- If the device is moved from a cold to a warm location, it must be tempered for an appropriate time before starting it.
- It must not be set up if other welding equipment is being used on the component at the same time. This applies in particular to welding devices with high-voltage ignition (TIG welding devices). If the device is positioned in such a way that it is in the beam of grinding or cutting machines and the metal dust is blown into the housing.

8.1.2 Electrical connection

The feeder has to be ensured with a back-up fuse for 10/16A inert. Please, compare the local mains voltage with the data on the identification plate. The Identification plate is placed at the device's rear side.

NOTE:

Do not connect the stud welding unit at a cable drumm extension, if its cable is not completely extended. The welder may be damaged through the produced induced voltage.

8.2 Installation plan

8.2.1 Earth cable's connection at the off switched unit

- Plug the masse cable connector into the socket marked with  .
- Fasten the masse cable connection with a forceful clockwise turn.
- Before you start to work, verify that the connection be stuck. Loose connections could destroy the connector/socket.
- Fix the mass clamps in parallel distance to the point where the welding joint should be performed. Acting so the lateral arc deflection (magnetic blowing effect) will be counteracted.
- The welding joint has to be located between both mass clamps.
- Never let the earth cables lay on the workpiece.
- Use only the earth cables produced by Hruschka GmbH. Do not modify them. Too short or too long earth cables may cause damages and influences negatively the results.
- Do not roll the welding cables up. Up rolled cables influence negatively the welding results.

8.2.2 Welding gun's connection at the off switched unit

- Connect the welding cable into the socket marked with  .
- Fasten the welding cable connector with a forceful clockwise turn.
- Before you start to work, verify that the connection be stuck. Loose connections could destroy the connector/socket.
- Insert the control cable's connector into the corresponding connector's socket.
- Fasten the control cable's connector by screwing the locking ring.
- Strong magnetic fields can cause that the welding cables begin to beating. While these movements the connection could release or move the welder to the table's edge. Please, fix the cables.

9 Assembly and installation, initial operation

Safety

WARNING

Risk of serious health-damage through life threatening injuries caused from potentially occurring electric shock, magnetic fields arising, burns or intoxication.

- Switch the welder off at all times before connecting the earth cable, weld and control cables or the mains cable. Make so also when the welding gun is changed while operating.
- Stud welding jobs could produce health detrimental vapours. Take care while working on materials which surface has been treated. Attend to sufficient ventilation, welding gas extraction and observe the directives and stipulations valid for the spaces where you are working.
- While stud welding electric arc and red hot welding spatter are produced, this may light flammable materials located around. That's why all inflammable objects and liquids have to be taken away in sufficient circumference before one can start to weld.
- Stud welding produces red hot welding spatter and strong magnetic fields which may destroy or disturb other welding machines. Do not work with the c130 nearby devices, equipment, data storage media or other installations which could be sensitive to the influences of welding spatter or magnetic fields.
- Adapt your mode of work so that the welder is protected against falling by careless, that all cables, supply cords and the welding gun are protected against damages, that nobody runs risks through welding spatter, magnetic fields, vapours, electric shock or non-fixed cables.

9.1 Installation

Safety

WARNING

Risk of serious health-damage through life threatening injuries caused from potentially occurring electric shock.

- If the protective earth connection is not available the supply voltage lays on the welders chassis. An electrically-qualified employee has to check the functionality of the earth connection at the electrical outlet and of the mains cable according to the interval regulations.
- The frontally placed mains switch has to be off.

PRECAUTION

Take the welding unit in service, connect it to the mains electricity and switch it on only if the safety measures are entirely fulfilled.

9.1.1 Electrical connection

(1) Connect one end of the delivered IEC plug into a from an electrician authorized mains socket and the other end into the IEC socket at the stud welding unit c130 (*Chapter 4.1 Overview – Number 3*)

(2) Fasten the IEC connections with the safety rail against accidental release.

9.2 Initial operation

9.2.1 Setting up, equipment

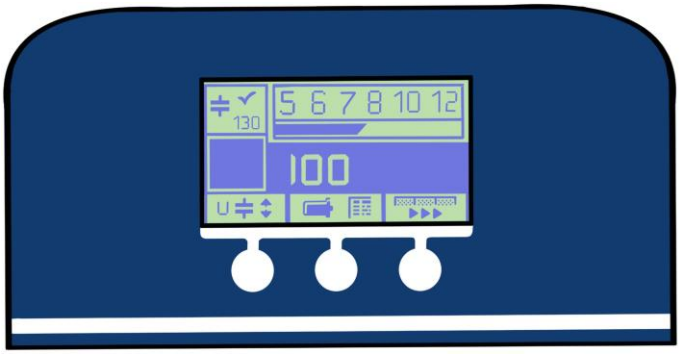
Insert the for the job suitable stud's chuck into the welding gun. Introduce a welding element into the chuck. Observe the indications content in the welding gun's operating manual.

9.2.2 Each time before starting up

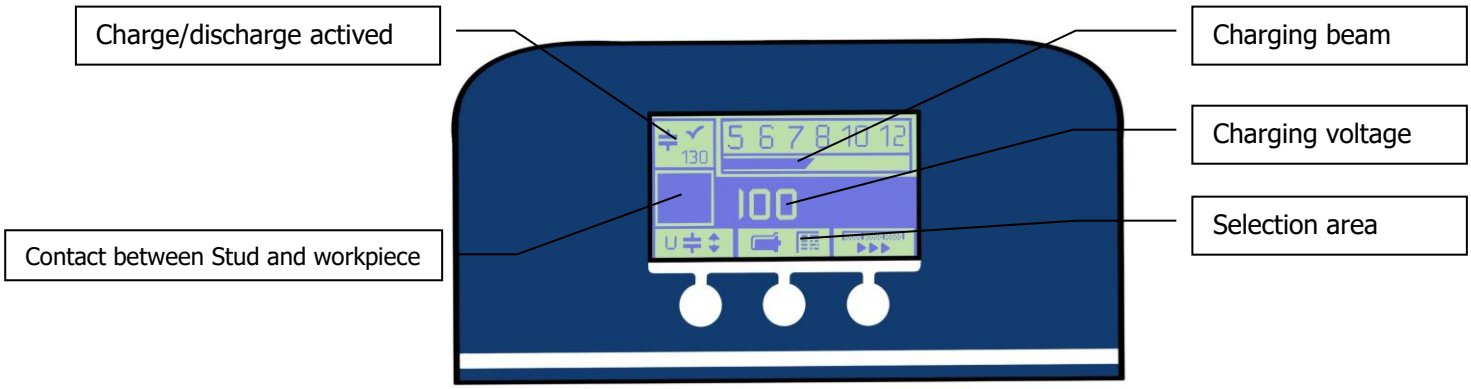
- Examine all cables for damages. Replace immediately all defective cables.
- Be sure that the chuck holds firmly the welding element and check its level of deterioration. If it's necessary, replace it.
- Check the tight fit of the welding cable's connection. If it's necessary screw it tighter. Replace immediately burnt plugs.
- Check the tight fit if the union nut, which stresses the chuck.
- Before you start to work make sure that all protective devices are properly installed.
- Check whether the work environment is suitable for stud welding.

9.2.3 Switch the stud welding unit c130 on. (*Chapter 4.1 Overview – Number 1*)

After switching the welding unit appears during approx. 3 seconds the splash screen together with the welder's denomination c130.



The display shows now to the main menu divided in three areas:



- the big display's area. Right beside the selected charging voltage with a reference charging beam.
- Left beside two status indicators:

on the top: „Charge/discharge active" (either dark colored symbol with a beam while the charging – discharging process
or a bright colored symbol with an OK-checkmark meaning „ready to weld"
on the bottom: „Contact between welding stud-workpiece yes/no" (No symbol appearing means no contact
Or symbol appearing means contact)

- In the bottom of the display an area showing the key's function appears.

10 Operation

Safety

RISK

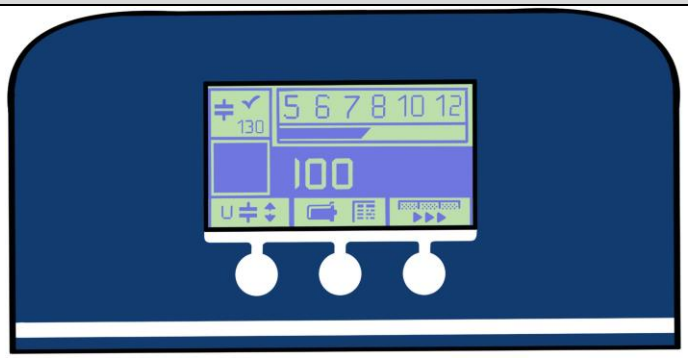
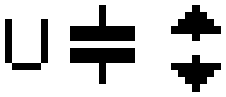
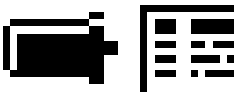
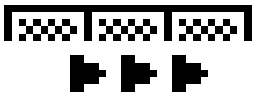
RISK of cardiac arrests!
The welder unit produces strong electromagnetic fields, which may disturb the function of cardiac pacemakers.
Persons wearing a cardiac pacemaker are not allowed to operate under any circumstances and have to keep the safety distance of minimum 12 meter around the welder. Make sure that all persons wearing a cardiac pacemaker observe strictly this safety distance of keeping 12 meter away from the stud welding unit.

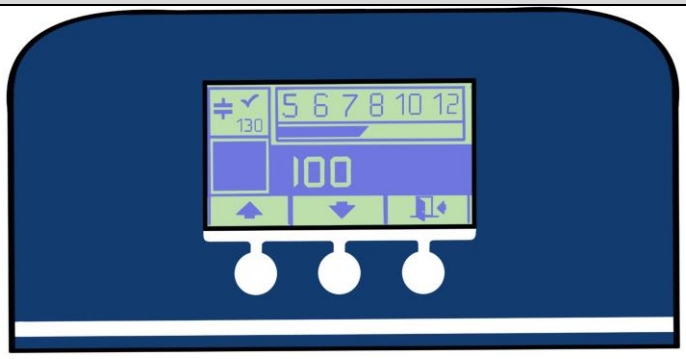
WARNING

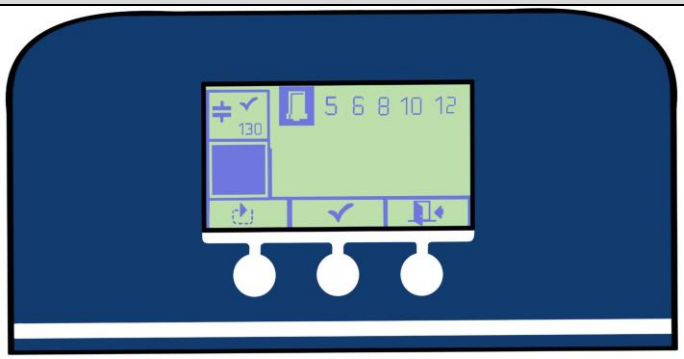
- Electric shock risk. While welding, all tangible guns parts (such as welding stud, chuck and all other parts in direct contact) and parts in contact with the workpiece conduce current and are under tension. That's the reason why, these are not allowed to be touched. While welding do not use any kind of conducting jewelry like rings, watches, chains, etc.!
- Burn risk from flying sparks and electric arc. Verify the functionality of protective clothing and protective goggles and use them.
- Deafness risk or threat for the auditory canals due to loud bang sounds. Verify the functionality of ear protectors and use them.
- Intoxication risk. Stud welding on treated surfaces may produce toxic vapours, specially originated from varnishes. Retire the surface's coating from the point of welding before start to work.
- Destruction risk for magnetic sensitive objects such as bank cards, watches, memory media, etc. Do not store magnetic sensitive objects nearby either welding or earth cables, because while welding strong electromagnetic fields are produced, so that these objects can be damaged or destroyed.

10.1 Menu overview

Description of the key's use in each menu:

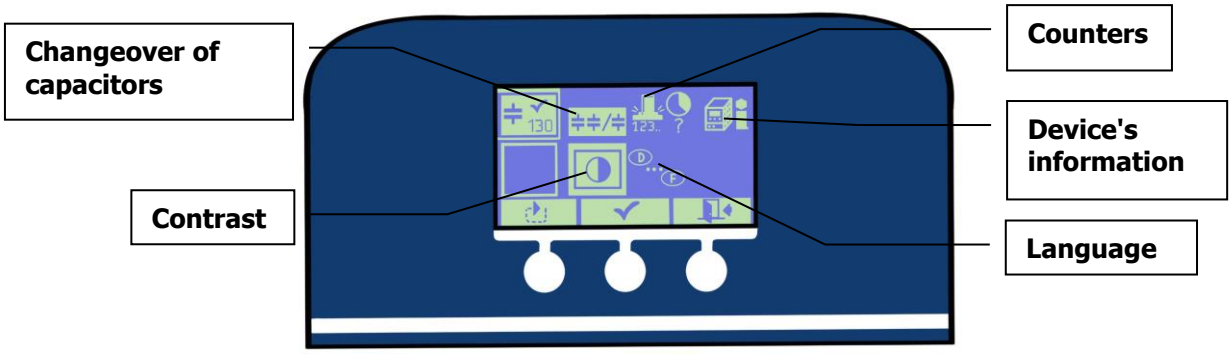
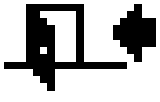
Main menu		
		
		
Charging voltage setting	Call the setting table/ Change-over of capacitors	Call additional functions

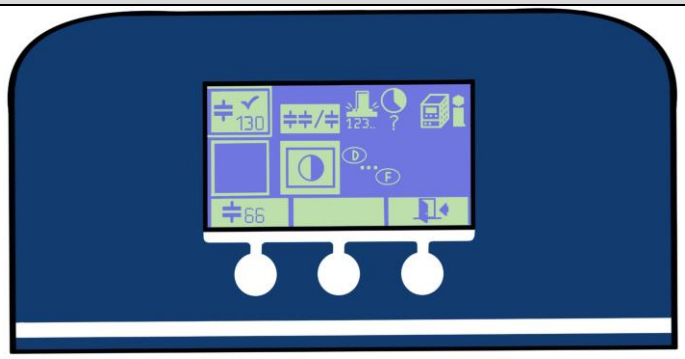
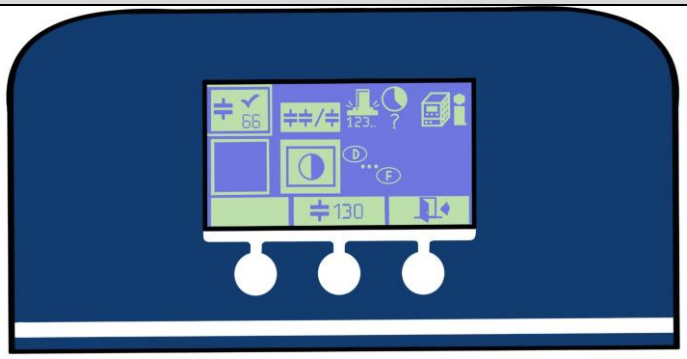
Setting charging voltage		
		
		
Increment the charging voltage	Reduce the charging voltage	Confirms the selected value and closes the open window
Adjustment in 1 Volt-steps press and hold the key for quick adjustment		

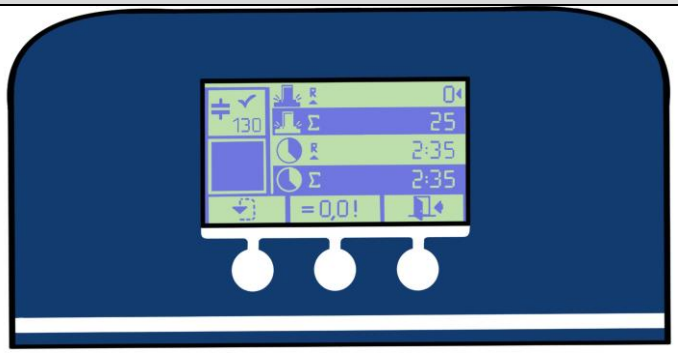
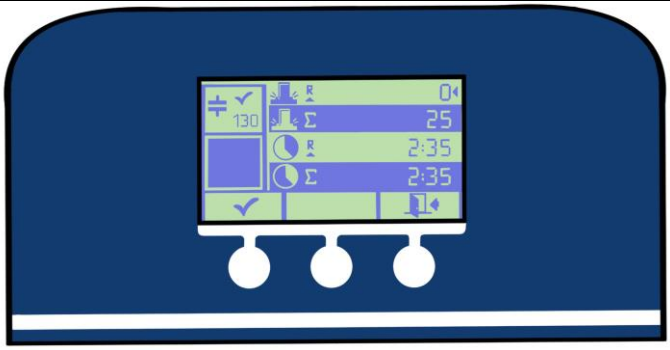
Setting tables		
		
		
Moves the marking (the marked field's background is inverse depicted) Here the weld element diameter can be selected.	***Selection of the marked fields***	Back to ***Main menu***

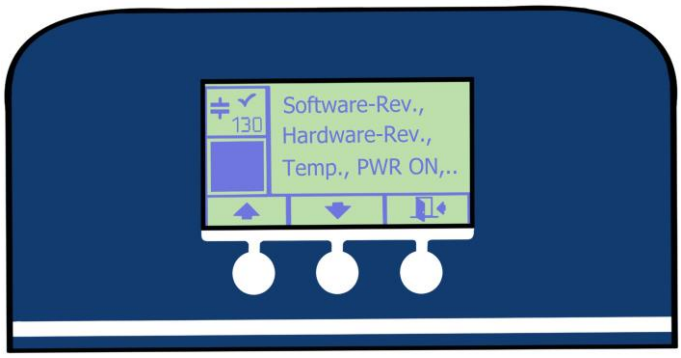
The factory-preset values are just reference values!

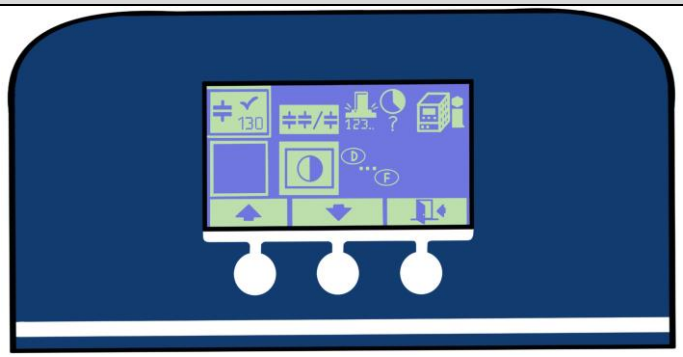
Test welding jobs still necessary!

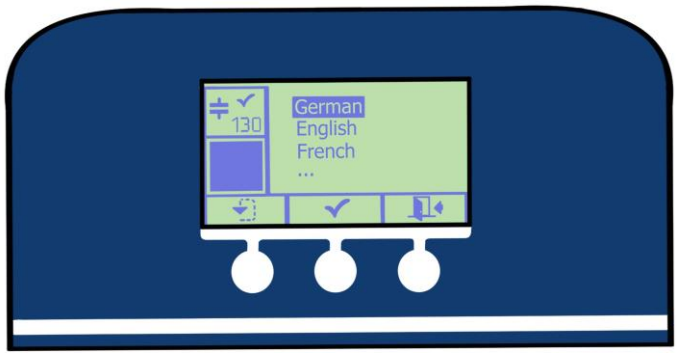
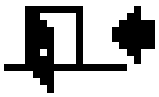
Additional functions		
		
		
Moves the marking (the Marked field's background is inverse depicted)	Selection of the marked fields	Back to ***Main menu***

Changeover of capacitors from 132 to 66.000 µF		
		
≠66		
Changeover to 2 capacitors with 66.000 µF		Back to ***Main menu***
Changeover of capacitors from 66 to 132.000 µF		
		
	≠ 130	
	Changeover to 4 capacitors with 132.000 µF	Back to ***Main menu***

Counters		
		
	= 0,0 !	
Moves the marking (from number of welding cycles to operating time)	Zeroize counter reading	Back to Additional functions
		
		
After confirm the selection by pressing on this symbol the counter is zeroized in the fact		Back to Additional functions

Welder's information		
		
		
Moves the list upward	Moves the list downward	Back to Additional functions

Contrast		
		
		
Increments the contrast. Changes are visible immediately	Reduces the contrast, Changes are visible immediately	Confirms the selection, back to ***Additional functions***

Language		
		
		
Moves the marking (the marked field's background is inverse depicted)	Confirms the selection and at the same time closes the submenu assumes the selected language	Back to Additional functions

Information

If a submenu selection is not confirmed within 15 seconds, the display will automatically go back to ***Main menu*** and every selected but not confirmed settings or changes will be rejected.

The rejection is conceived to avoid unintentional adjustments.

10.2 Each time before starting up

- Examine all cables for damages. Replace immediately all defective cables.
- Be sure that the chuck holds firmly the welding element and check its level of deterioration. If it's necessary, replace it.
- Check the tight fit of the welding cable's connection. If it's necessary screw it tighter. Replace burnt plugs immediately.
- Check the tight fit if the union nut, which stresses the chuck.
- Before you start to work make sure that all protective devices are properly installed.
- Check whether the work environment is suitable for stud welding.

10.3 Each time before restaring

After each storage phase or a shutdown with duration of more than 6 months, always before putting the welder into service again, following steps have to be performed the therefore listed jobs in addition to the works described in 9.2 and that, following the order as indicated.

(1) Control the level of dirty. If it is necessary, clean the unit.

(2) Verify that the gun's trigger operates smoothly. If it is necessary, clean it.

(3) Make sure that all numbers, marks descripted in the *Chapter 1.3* and the identification plate still entirely legible and are left. If necessary replace them.

(4) After having a long stud welding pause get familiarized again with all safety indications. Please, read the complete operating manual conscientious, so you comprehend all contents totally.

10.4 Normal operation

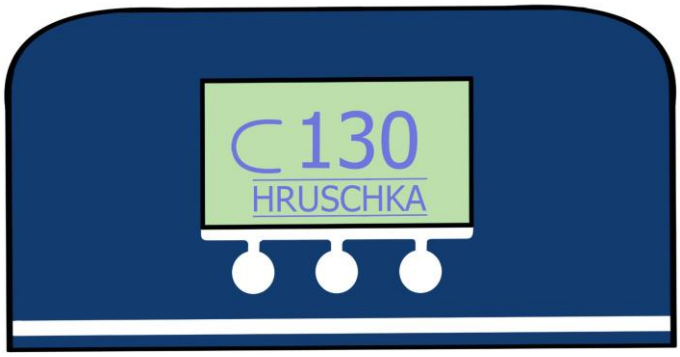
(1) Setting up, equipment and adjusting the stud holding chuck and the welding gun

Insert the for the job suitable stud's chuck into the welding gun. Introduce a welding element into the chuck. Set the gap or the spring's stress value at the welding gun. Observe the indications content in the welding gun's operating manual.

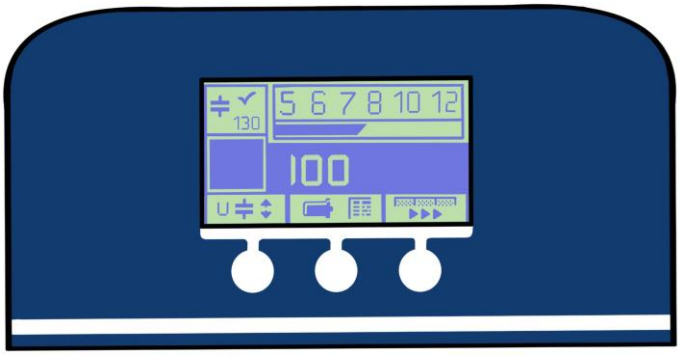
(2) Connect the earth cable at the workpiece. Observe the indication in *Chapter 7.3.1*

(3) Switch the stud welding unit's c130 on. (*Chapter 4.1 Overview – Number 1*)

When switching the welding unit during approx. 3 seconds the splash screen appears together with the welder's denomination c130.



The display changes to the main menu divided in three areas:



(4) Charging voltage setting

- The required welding power, it means, the capacitor's charging voltage, has to be selected according the welding job to be performed and the connected gun.
- The charging voltage can be set means by the function „*Setting Charging voltage*" or the function „*Setting tables*".

  Depending on whether the power demand for your welding job is higher (e.g. larger diameters or more difficult surfaces) or must be lower (e.g. smaller diameters or studs without flange) you select either setting 130 (for more power) or 66 (for less power) with changeover of capacitors.

  The factory-preset values are just reference values and change with changeover of capacitors. Depending on the results obtained of the test welding the preset charging voltage values have to be adequated to the upcoming welding jobs and material combination means to the function „*Setting Charging voltage*". This individual setting has an especial relevance while welding aluminium alloys. Reference values about the proper the charging voltage height's can be found in the welding gun's operating manual.

(5) Position the gun vertically on the workpiece, that means, either all three feet or the complete positioning tube must rest on the workpiece. The welding element must get in touch with the workpiece. The contact can be seen at the display.

(6) Initiate the welding cycle pulling the trigger at the gun

(7) Take the gun away form the welded stud always vertically

(8) Check the weld results

10.4.1 Work's ending by normal operation

- Switch the welder off and cut it off from the mains electricity
- Disconnect all weld and control plugs of the welder.
- Make sure that the welder cannot be brought into service unintentionally
- Storage the welder protected against humidity and smut. Observe *Chapter 6.2*

11 Fault finding

Safety

WARNING

Risk of serious health-damage through life threatening injuries caused from potentially occurring electric shock or burns.

Therefore:

Do not perform jobs, which attending to the directions given in the tables appearing further down only should be performed from Hruschka GmbH.

During clearance of faults and repairs the welder has to be switched off and disconnected from the mains electricity.

11.1 Service address

Hruschka GmbH

Carl-Zeiss-Str. 8

D-85247 Schwabhausen

Telephone: 0049 08138 6694610

Telefax: 0049 8138 6694611

info@bolzen.net

11.2 Trouble shooting and fault clearance

NOTE:
In the case of occurring a fault the first step is to check if all fundamental requirements for the operation of the stud welding unit c130 are fulfilled, not until then other measures can be taken.

Fault / Error message	Possible causes(s)
Does the current supply flow?	Push the rocker switch on. Verify that the mains supply plug is stuck tightly. Connect the mains supply plug.
Are the ground clamps having a good connection with the workpiece?	Remove all non-conductive coats as e. g. varnish from the area where the ground clamps are fixed.
Is the welding joint sheer and clean?	Clean the welding joint before beginning to weld.

Fault / Error message	Possible cause(s)	Corrective actions	Carrying out personnel
Display shows not anything, although mains switch is on „I"	▪ Stud welding unit is not connected ▪ Mains cable is defective ▪ Display is defective	▪ Check the mains cable ▪ To contact Hruschka GmbH if necessary.	▪ Electrician ▪ Electrician
The display flickers or the device restarts frequently for no reason	▪ Other devices in the area, e.g. welding machines with high-voltage ignition or defective devices, impair the function. ▪ Vibrations caused contact problems inside the device	▪ Remove power and ground cables. Check the work environment. ▪ If necessary, contact Hruschka GmbH	▪ Technical personnel
Capacitors do not get charged	▪ Short-circuit within the capacitor battery ▪ Short-circuit within the cable harness ▪ Fault within the welders control unit	▪ Please, contact Hruschka GmbH	
Load process slower than other times	▪ Welder is working in reduced mode, in the intention to avoid overheating	▪ Do not cover the ventilations gaps ▪ Protect the device against external warmth and heating sources	▪ Technical personnel ▪ Technical personnel
An oily liquid is leaking from the device.	▪ A defective welding capacitor loses its electrolyte	▪ Contact Hruschka GmbH	
The reading „Contact" does not appear although the welding element has contact with the workpiece	▪ Earth cable has not contact with the workpiece or is not connected ▪ Gun cables are not connected ▪ Cable fault ▪ Gun or welder fault	▪ Make sure that the earth cable has contact with the workpiece ▪ Verify that the welding cable plug is stuck tightly ▪ Please, contact Hruschka GmbH	▪ Technical personnel ▪ Technical personnel
Welding process does not start	▪ Defective gun's starting trigger ▪ Defective gun's control line ▪ Defective stud welding unit	▪ Check the welding circuit ▪ Notify Hruschka GmbH	▪ Technical personnel

Fault / Error message	Possible cause(s)	Corrective actions	Carrying out personnel
Error message E1 is showed on the display	▪ Powerline voltage out of allowed range!	▪ Proof voltage of your power supply	▪ Electrician
Error message E2 is showed on the display	▪ Safety discharge resistor is faulty! Please call service.	▪ Please, contact Hruschka GmbH	
Error message E3 is showed on the display	▪ Safety discharge. While putting the gun's trigger in action, the welding element has get contact with the melted metal. This contact was interrupted in the middle of the welding proceed.	▪ Make sure that the ground clamps are stuck tightly joined with the workpiece. If necessary readjust the joint. ▪ Take care that the clamps have a tightly, steady and constant connection with the ground material. If it is necessary change the place of the ground clamps ▪ It is important that copper disc has good contact to the cup head pin. If necessary replace the copper disc. ▪ Exert enough pressure on the cup head pin. If necessary raise the spring pressure or enlarge the retainer's protrusion.	▪ Technical personnel
Error message E4 is showed on the display	▪ Unit overheated! Wait until unit cools down.	▪ Weld in an area with a lower ambient temperature ▪ Make a longer pause between the welding cycles	
Error message E5 is showed on the display	▪ Welding capacitors are not being charged.	▪ Please, contact Hruschka GmbH	
Error message E6 is showed on the display	▪ Short circuit in lift solenoid or cable. Check gun!	▪ Please, contact Hruschka GmbH	
Error message E7 is showed on the display	▪ Malfunction in capacitorblock #2. Call service!	▪ Please, contact Hruschka GmbH	
Error message E9 is showed on the display	▪ Short circuit in Emergency discharge switch! Call service!	▪ Please, contact Hruschka GmbH	
Error message E10 is showed on the display	▪ Error in emergency discharge switch! Call service!	▪ Please, contact Hruschka GmbH	
Readings can be seen, but it is not possible to make selections	▪ defective keys/keyboard	▪ Please, contact Hruschka GmbH	

Fault / Error message	Possible cause(s)	Corrective actions	Carrying out personnel
Welding element shows stewing points	▪ Stud chuck is expanded or worn	▪ Retense the stud's chuck or replace it	▪ Technical personnel
Uneven or changeable weld results	▪ Stud chuck/Piston reaction into the gun is very slow	▪ Please, contact Hruschka GmbH	
Welded stud is not straightly joined	▪ Gun was not placed at right angles to the workpiece. ▪ Gun's feet are bent or unevenly worn ▪ Defective support- or positioning tube	▪ Obey a correct positioning of the gun ▪ Replace the gun's feet ▪ Replace the support-/Positioning tube	▪ Technical personnel ▪ Technical personnel ▪ Technical personnel
Uneven weld seam	▪ Electromagnetic diversion/Blowing effect	▪ Extend the gun's welding cable ▪ Change the position of the grounding clamps ▪ Fix some additional compensation clamps	▪ Technical personnel ▪ Technical personnel ▪ Technical personnel
Poor welding results: a) Too „cold" b) Too „hot" c) Only „sticked on"	▪ Rough-running piston, too short welding time. ▪ Too long welding time ▪ No lift, too strong burn-off	▪ Reduce the spring pressure or lift measure; possibly increase the charging voltage ▪ Increase the spring pressure or lift measure; possibly reduce the charging voltage ▪ Increase the spring pressure or lift measure	▪ Technical personnel ▪ Technical personnel ▪ Technical personnel

12 Maintenance

Safety

WARNING

Risk of serious health-damage through life threatening injuries caused from potentially occurring electric shock or burns.

Therefore:

Do not perform jobs non-descripted in this chapter.

During clearance of faults and repairs the welder has to be switched off and disconnected from the mains electricity.

Do not perform jobs, which attending to the directions given in the instructions only should be performed from Hruschka GmbH.

- Carry out all maintenance works carefully and with in the prescribed periods.
- Perform only the maintenance works descripted in this manual. Other maintenance works only should be carried out by Hruschka GmbH.
- For other kind of jobs, please contact with Hruschka GmbH.
- Make sure that during the execution of maintenance works at the stud welding unit c130 any third person can access to the work place, especially if you have to go leave the workplace for a short or a long time.
- Remove all protective devices only if their taking off is imperative while carrying out the maintenance works.
- After maintenance works ending install again all protective devices in accordance with the regulations and make sure that their serviceability remains preserved.

12.1 Service and maintenance plan

s = pre-shift and each time at work's beginning, m = monthly , Q = one time at quarter hj = half-yearly

Job	s	m	Q	hj	Personnel
Check the safety markings at the stud welding unit and swap them over if necessary. Check the safety marks for:					
▪ Availability	**x**				Technical personnel
▪ Integrity		**x**			Technical personnel
▪ Legibility		**x**			Technical personnel
▪ Completness, see *Chapter 1.3*	**x**				Technical personnel
Check the separating safeguard for availability and integrity. Replace all no available or damaged separating safeguard parts.					
▪ Fan guards				**x**	Technical personnel
Check the safety devices for availability and functionality According to EN 60974-4. Applies when welding in workshops with a fix, constant workplace.				**X**	e. g. by Hruschka GmbH
Check the safety devices for availability and functionality according to EN 60974-4. Applies when welding either in building sites or installation jobs at often changing workplaces.			**x**		e. g. by Hruschka GmbH
Compare the ambient conditions at the current location unit's with the described technical data on this manual.	**X**				Technical personnel
Check the heat dissipation of the stud welding unit c130 for obstruction through dust or smut. If necessary removes dust or smut.		**X**			Technical personnel
Verify all visible mechanical and electrical unions for tight fit and damages. If necessary draw-in the mechanical unions. Replace all damaged earth cable. See *Chapter 11.2*	**x**				Technical personnel Technical personnel

12.2 Maintenance works

12.2.1 Swap damaged earth cables over

(1) Disconnect the welder from the mains supply.

(2) Remove the welding cable's connector of the mass from welder.

(3) Verify the new earth cables for integrity.

(4) Connect the welding cable's connector of the mass in the welding cable socket at the stud welding unit c130. Now, twist the connector tight clockwise.

(5) Clamp the new earth cable at the workpiece. Observe the notes in *Chapter 7*

12.2.2 Swap a damaged welding gun over

(1) Disconnect the welder from mains supply.

(2) Remove the weld and control cable's connector of the defective welding gun from the welder.

(3) Verify the new welding gun for integrity.

(4) Insert the welding cable's connector and the control cable's connector at the stud welding unit c130 as described in *Chapter 7*.

12.3 Spare parts, parts subject to wear, consumables

Item	Order number
Earth cable 2x3 meter	90-29-015
Earth cable 1x6 meter	90-29-016
Welding gun P05-K	90-19-010
Welding gun P05-S	90-29-020
Welding gun P05-i	90-29-030

13 Uninstallation and Disposal

13.1 Final shutdown

Before bringing the stud welding unit c130 to disposal, cut the mains plug in the intention to avoid a non-authorized putting into service.

13.2 Dismantling

WARNING

The still loaded capacitors hold the risk of electric shock.

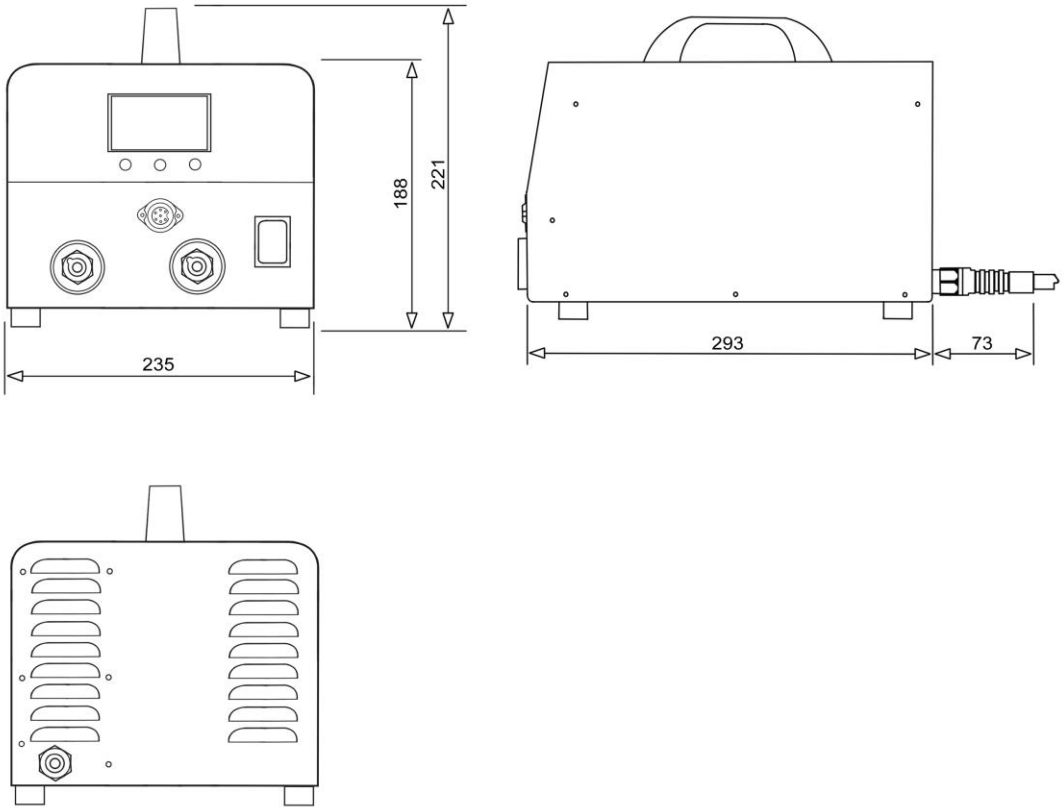
If the welder is dismantled cause of defectiveness, it one has to reckon with the possible fact that the contained capacitor is energized. The dismantling jobs only can be carried out by specialist for professional waste management or by the firm Hruschka GmbH.

13.3 Disposal

The disposal must be depolluted by the producer or a specialist for professional disposal management. Please, send back the shut-down welder to us.

- Electric and electronic welders have to be depolluted in the FRG according to the Electrical and Electronic Equipment Act (ElektroG):
- Electric and electronic welders out of the FRG have to be depolluted according to the national regulations.
- Gaskets must be depolluted as hazardous waste.

14 Plans and other information

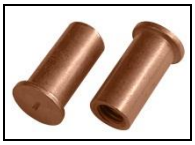


14.1 Intended use of welding elements

Following welding elements are appropriated for their intended use with the stud welding unit's c130:

Welding stud according to EN ISO 13918-PT

Welding pin according to EN ISO 13918-UT



Inner threaded welding stud according to EN ISO 13918-IT

Insulating nail with flange and ignition tip

Fir tree stud with flange and ignition tip

Connector tab with flange and ignition tip

Cup head pin

Clear up with Hruschka GmbH if other welding elements can be considered as intended use fulfilling.