



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

Operating Manual Welding Gun P05-K



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/R8

1	Important basic information	6
1.1	Scope of delivery	6
1.2	Conventions of representation	7
1.2.1	Symbols and Signal words.....	7
1.2.2	Technical terms / Denominations.....	8
1.2.3	Presentation.....	8
1.2.4	Position of objects in the workspace	8
1.3	Co-valid documents	9
1.4	Declaration of incorporation of partly completed Machinery.....	10
2	Safety.....	12
2.1	Conduct in case of emergency	12
2.2	Intended use	12
2.3	Reasonably foreseeable misuse	13
2.4	Safety measures at the end of work	13
2.5	Safety measures in case of malfunction.....	13
2.6	Personnel.....	14
2.7	Local requirements	15
2.8	Disposal.....	16
2.9	Operation manual content's observation.....	16
2.9.1	Legal hints to this operating manual	16
2.10	Residual danger and protective measures	16
2.10.1	Risk arising from electric shock.....	16
2.10.2	Fire hazard.....	17
2.10.3	Risk arising from electromagnetic radiation.....	17
2.10.4	Risk of burns.....	17
2.10.5	Risk arising from loud bang sounds.....	17
2.10.6	Electrical risk arising from falls.....	18
2.10.7	Threat for the welding gun P05-K and devices placed nearby.....	18
3	Technical Data	19
	Structure and function	20
3.1	Overview	20
3.2	Basic structure of a stud welding system.....	21
4	Delivery, in-house transport, unpacking.....	22
	Safety 22	
4.1	Delivery, in-house transport or carried out by a freight company	22
4.2	Unpacking.....	23
5	Storage	23

Safety	23
5.1	Conditions for storage23
5.2	Welding Gun P05-K temporary shutdown23
6	Installation.....24
Safety	24
6.1	Conditions for installation24
6.1.1	Ambient conditions.....24
6.1.2	Electric connection25
6.2	Installation Plan25
6.2.1	Earth cable’s connection at the off switched unit25
6.2.2	Welding gun’s connection at the off switched unit25
7	Assembly and Installation, Initial operation26
Safety	26
7.1	Installation27
Safety	27
7.1.1	Electric connection27
7.2	Initial operation28
7.2.1	Setting up, Equipment28
7.2.2	Each time before starting28
7.2.3	Switch the stud welding unit c44/c66 on.....28
8	Operation.....29
Safety	29
8.1	Each time before starting.....30
8.2	Each time before restarting30
8.3	Normal operation.....31
8.3.1	Reference values table31
8.3.2	Work’s ending by normal operation.....35
9	Fault finding36
Safety	36
9.1	Service address.....36
9.2	Trouble shooting and default clearance37
10	Maintenance40
Safety	40
10.1	Service and maintenance plan41
10.2	Maintenance works42
10.2.1	Exchange the chuck42
10.2.2	Change the gun’s legs.....42
10.2.3	Change the extension tube43
10.2.4	Fuse replacement.....43
10.2.5	Change the damaged earth cables.....43

10.2.6	Change the damaged welding gun	43
10.2.7	Change the mains cable	43
10.3	Spare parts, Parts subject to wear, consumables.....	44
11	Dismantling and Disposal	45
11.1	Final shutdown	45
11.2	Dismantling.....	45
11.3	Disposal	45
12	Drawings and other information	46
12.1	Drawings	46
12.2	Intended use of welding elements	47

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

Please read this operating manual carefully, so you obtain an overview of 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	Telefon: 062 771 83 05
Hauptstrasse 23	Fax: 062 771 84 54
5737 Menziken	E-Mail: info@iso-oerlikon.ch
	Web: www.iso-oerlikon.ch

1 Important basic information

1.1 Scope of delivery

The scope of delivery of our Welding Gun P05-K is composed by:

- A welding gun P05-K
- A Multifunctional tool with 5 stud chucks
- Original Operating Manual





1.2 Co-valid documents

This operating manual is composed of the following parts:

- Operating Manual P05-K in connections with either
- Operating Manual c66 or
- Operating Manual c80 or
- Operating Manual c99 or
- Operating Manual c130

Conventions of representation

1.2.1 Symbols and Signal words

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

1.2.2 Technical terms / Denominations

In this operating manual we make 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 arising 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 Co-valid documents

This operating manual is composed of the following parts:

- Operating Manual Welding Gun P05-K in connection with either
- Original Operating Manual c44/c66 or
- Original Operating Manual c99 or
- Original Operating Manual c130

1.4 Declaration of incorporation of partly completed Machinery

According to IEC 60204-1:2016 on machinery, (Original Declaration of Incorporation)

Herewith the producer: HRUSCHKA GmbH
Carl-Zeiss-Str. 8
D-85247 Schwabhausen
Tel.: 0049 8138 6694610

declares that the following product:

Machine	
particulars:	Welding Gun
Type:	P05-K
Serial number:	300000 - 308000
Construction year:	2024

is complying with all essential requirements of the Machinery directive above-named:

Annex 4.1, 4,2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 6.1, 6.2, 6.3, 7.1, 7.2, 7.4, 7.5, 10, 11, 16, 17

that the technical documentation was written according to annex VII part B of the directive above-named and will be convey to the national authorities on well-founded request.

that the technical documentation according to Annex VII Part B will be sent by e-mail in German language and file format.

that the partly completed machinery only can be put into service when is certain confirmed that the machine in which the partly completed machine will be built-in, fulfills the requirements contained in the above-named directive.

that this partly completed machine fulfills the respective requirements contained in the following EU-directives:

This device complies also with the EU-directives:

Applicable parts of the low voltage directive according
Machine Directive 10
Electromagnetic Compatibility Regulations 2016
(SI 2016/1091)

Person is authorized to compile the technical documentation:

Name: Michael Flemke	Address:	AuTech GmbH Viktoriastr. 2 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 outgoing from:

- electric shock and consequently danger of life and limb
- Cardiac arrest resulting of 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 case of emergency

Cut the Stud welding unit and the Welding Gun P05-K 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 Welding Gun P05-K is exclusively allowed to be used in commercial industrial but no in private sectors. Only technical personnel are allowed to install and operate this device.

The Welding Gun P05-K was conceived and is appropriated for welding the welding elements reproduced in *Chapter 13.2*.

The Welding Gun P05-K can be connected to the following stud welding units and can be operated with it: Stud welding unit c44/c66, Stud welding unit c99, Stud welding unit c130. In order to fulfill the Intended Use regulations is essential to obey also the contents of the stud welding unit's Operating Manual.

If is necessary to replace some welders parts, use only original-spare parts. Use only original spare parts and original parts subject to wear. By using parts of other producers we cannot 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 non-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 has 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.

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.
- Ensure that the required maintenances- and testing intervals be obeyed.

2.5 Safety measures in case of malfunction

- Switch the stud welding unit off and disconnect the mains plug.
- Make sure that the welding unit cannot be started-up and mark it.
- Make sure that the welding equipment cannot be started-up.

2.6 Personnel

- The welding gun P05-K 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 welding gun P05-K 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 welding gun P05-K.
- 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 to have at 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 an 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 welding gun P05-K only can be operated by technical personnel.



RISK

Risk arising from electromagnetic fields

- Risk of cardiac arrests!
The welding cables and the Welding Gun P05-K produce strong electromagnetic fields, which disturb the functions of cardiac pacemakers. Persons wearing an implanted cardiac pacemaker are not allowed in no case to operate the Welding Gun P05-K and have to keep the safety distance of minimum 12 meter around the Welding Gun and the cables. Make sure that all persons wearing a cardiac pacemaker obey the safety distance of minimum 12 meter away from the Welding Gun P05-K.

	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's finding, Fault elimination	x	x				
• Service	x	x				
• Maintenance	x					
• Repairs	x		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 cannot 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 device back to Hruschka GmbH.

2.9 Operation manual content's observation

This operating manual is intended for 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 welding gun P05-K 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 welding gun P05-K.
- If the Welding Gun P05-K 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

- All copyright of this documents are property of Hruschka GmbH.
- This document is intended for the use of the usufructuary person and his personnel. It is not allowed to make complete or partial copies, to distribute or further transmitted.
- Copies, also partial copies, can only be made for the own use.
Infringements will be adequately prosecuted.

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 conducting 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.

2.10.2 Fire hazard




- 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.

2.10.3 Risk arising from electromagnetic radiation

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


2.10.4 Risk of burns

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

	<p>Flame-retardant, whole body covering protective clothing</p>
	<p>Headguard</p>
	<p>Welding protective goggles</p>

2.10.5 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 has to be protected with appropriate safety devices or protective measures.

	<p>Ear protectors</p>
---	-----------------------

2.10.6 Electrical risk arising from falls

- When the welding gun P05-K falls, it can be destroyed or important safety functions may fail. The Welding Gun P05-K 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.

2.10.7 Threat for the welding gun P05-K 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.

3 Technical Data

Welding method Contact	Weldable materials Steel, VA Steel, Aluminium
Welding range Ø2 – M8 Length min.: 6 mm Length max.:40 mm (Standard)	Welding method Contact
Welding cable length 4 Meter	Chassis material Synthetic material
Colour Black	Dimensions LxWxH 180x130x40
Stem Foot ring with legs	Weight 0,8 kg without cables

Structure and function

3.1 Overview



1	Start switch trigger for initiating the welding process
2	Foot ring with 3 legs
3	Spring pressure gauge
4	Spring force adjustment
5	Stud's chuck entry and union nut
6	Grip
7	Locking screw for the Foot ring

3.2 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 work piece. Depending on the work piece 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 work piece and both mass clamps until the end of the mass cables closing the circuit by reflowing into the welding unit.

4 Delivery, in-house transport, unpacking

Safety



WARNING

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

- Important, security-related gun's functions may be faulty or entirely failed after being improperly 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 welding gun. This fact may cause the entirely failure of security-related functions. The Welding Gun P05-K will be sent to the customer packed in an especially conceived packing 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.

4.1 Delivery, in-house transport or carried out 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 installations place it is not exposed to a fall raising by careless, bumps, smut, hits or humidity.

4.2 Unpacking

- 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

5 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 welding gun P05-K and so to default of security-related functions.

Please, store the welding gun P05-K well packed and in clean and dry conditions at ambient temperature.

5.1 Conditions for storage

The storage place of the welding gun P05-K 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

5.2 Welding Gun P05-K 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 welding gun cannot be brought into service unintentionally
- Store the welding gun protected against humidity and smut. See 5.1

6 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 welding gun P05-i does not be installed at improper places.
- All installation places where there are the dangers of tipping over or falling for the welding gun P05-K are improper places for installation. Tipping over or falling may conduce to failure of security-related functions. Make sure that welding gun P05-K does not be installed at improper places. The workplace must be clean, the welding gun 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.



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 c44/c66 can fall.

6.1 Conditions for installation

6.1.1 Ambient conditions

Following ambient conditions are required for putting the welding gun P05-K connected to a c-series stud welding unit ambient conditions:

- Ambient temperature between 0°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 welding gun P05-K.
- The welding gun P05-K 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 device there.

6.1.2 Electric 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 drum extension if its cable is not completely extended. The welder may be damaged through the produced induced voltage.

6.2 Installation Plan

6.2.1 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 work piece.
- Use only the earth cables produced by Hruschka GmbH. Do not modify them. Too short or too long earth cables may cause damages and influence negatively the results.
- Do not roll the welding cables up. Up rolled cables influence negatively the welding results.

6.2.2 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.

7 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.
- 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 perform welding jobs 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 risk through welding spatter, magnetic fields, vapours, electric shock or non-fixed cables.

7.1 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.
- If the wrong fuse is built-in important security-related functions may fail. The correct fuses have a nominal voltage of 6A and inert reaction.
- 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.

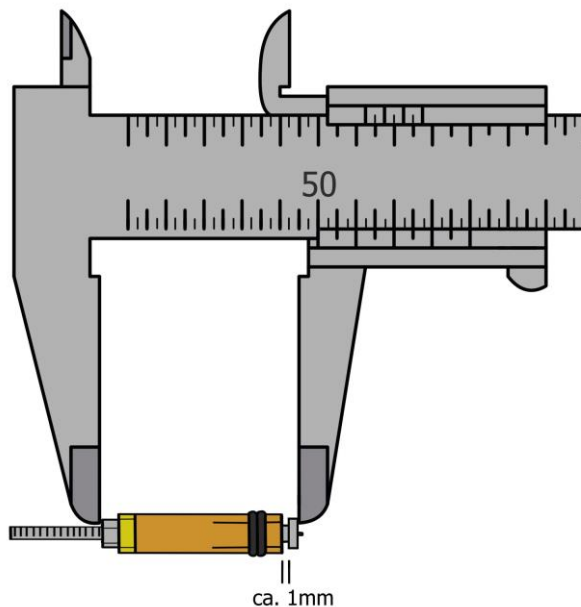
7.1.1 Electric connection

- (1) Connect one end of the delivered IEC plug into a mains socket authorized from an electrician and the other end into the IEC socket at the stud welding unit. Obey the in the stud welder's operating manual content instructions.
- (2) Fasten the IEC connections with the safety rail against accidental release.

7.2 Initial operation

7.2.1 Setting up, Equipment

Insert the selected welding element into the chuck. Take care that the flange doesn't lie on the chuck. Using the adjusting screw placed at the chuck the distance between the flange and the chuck can be exactly adjusted. When the required adjustment has been found, ensure the junction using the lock nut at the chuck. Now, put the chuck into the gun's entry up to stop and screw the union nut tight. Check if the union nut is mechanically sure.



7.2.2 Each time before starting

- Verify the cables for integrity, defective cables have to be swap over immediately.
- Check if the chuck holds the welding element firmly and how high is its degree of wear. If necessary, replace it.
- Verify that the welding line plug is tightly connected. If necessary screw it down or replace immediately burnt plugs.
- Control for a tight union between the brass adapter and the on it screwed Piston.
- Before you start to work make sure that all protective devices are properly installed.

7.2.3 Switch the stud welding unit c44/c66 on.

Obey all for this purpose in the stud welder's operating manual content instructions.

(Chapter 4.1 Overview – Number 1)

8 Operation

Safety



RISK

Risk of cardiac arrests!

The welding Gun 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 Welding Gun. Make sure that all persons wearing a cardiac pacemaker observe strictly this safety distance of keeping 12 meter away from the welding gun.



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 work piece 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 the 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.

8.1 Each time before starting

- Check the cables for damage, replace flawed cables immediately.
- Be sure that the chuck holds the welding element firmly and check its level of deterioration. Replace it if necessary.
- Check the tight fit of the welding cable's connection. If it is necessary screw it tighter. Replace burnt plugs immediately.
- Verify the tight fit of the brass adapter, which is screwed on the piston.
- Before you start to work make sure that all protective devices are properly installed.

8.2 Each time before restarting

After each storage phase or a shutdown with duration of more than 6 months, always before putting the welding gun P05-K into service again, following steps have to be performed the therefore listed jobs in addition to the works described in 7.1 and that, following the order as indicated.

- (1) Control the level of dirty. If it is necessary, clean the gun.
- (2) Verify that the gun's trigger operates smoothly. If it is necessary, clean it
- (3) 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.

8.3 Normal operation

- (1) Insert the selected welding element into the chuck. Take care that the flange doesn't lie on the chuck. Using the adjusting screw placed at the chuck the distance between the flange and the chuck can be exactly adjusted. When the required adjustment is been found, ensure the junction using the lock nut at the chuck. Now, put the chuck into the gun's entry up to stop and screw the union nut tight. Check if the union nut is mechanically sure.
- (2) At the beginning adjust the spring force and the charging voltage values according to the reference values both at the welding gun P05-K and at the stud welding unit.

8.3.1 Reference values table

Setting values for the Contact Welding Gun P05-K when connected to the Stud welding unit C66

	<i>Steel</i>		<i>Stainless Steel</i>		<i>AlMg3*</i>	
	<i>Volt</i>	<i>Spring</i>	<i>Volt</i>	<i>Spring</i>	<i>Volt</i>	<i>Spring</i>
M3	60	3 to 3,5	60	3 to 3,5	65	3-4
M4	70	3,5 to 4	70	3 to 3,5	80	3-4,5
M5	95	4 to 4,5	100	3,5 to 4	105	4-5
M6	115	4 to 5,5	120	3 to 3,5	125	4-6
M8	185	4 to 6	185	4 to 4,5	---	---

The setting values contain on the table are reference values!

The spring force is indicated in full turns starting from the minimum value

* Welding on AlMg3 using the contact gun is only possible in a limited extent.

For adjusting the minimum value twist the arrow counterclockwise up to stop.



**Setting values for the Contact Welding Gun P05-K
when connected to the Stud welding unit C80**

	<i>Steel</i>		<i>Stainless Steel</i>		<i>AlMg3*</i>	
	<i>Volt</i>	<i>Spring</i>	<i>Volt</i>	<i>Spring</i>	<i>Volt</i>	<i>Spring</i>
M3	55	3 to 3,5	60	3 to 3,5	65	3-4
M4	70	3,5 to 4	70	3 to 3,5	80	3-4,5
M5	90	4 to 4,5	95	3,5 to 4	105	4-5
M6	110	4 to 5,5	115	3 to 3,5	125	4-6
M8	150	4 to 6	150	4 to 4,5	---	---

The setting values contain on the table are reference values!

The spring force is indicated in full turns starting from the minimum value

* Welding on AlMg3 using the contact gun is only possible in a limited extent.

For adjusting the minimum value twist the arrow counterclockwise up to stop.



**Setting values for the contact welding gun P05-K
when connected to the Stud welding unit C99**

	<i>Steel</i>		<i>Stainless steel</i>		<i>AlMg3*</i>	
	<i>Volt</i>	<i>Spring</i>	<i>Volt</i>	<i>Spring</i>	<i>Volt</i>	<i>Spring</i>
M3	50	3 to 3,5	55	3 to 4	60	3 to 4
M4	65	3,5 to 4	70	3 to 4	80	3 to 5
M5	85	4 to 4,5	90	4 to 4,5	100	4 to 6
M6	105	4 to 5	110	4 to 5	120	4 to 6
M8	135	4 to 6	140	4 to 6	---	---
M10	180	4 to 6	175	4 to 6	---	---

The setting values contain on the table are reference values!

The spring force is indicated in full turns starting from the minimum value

* Welding on AlMg3 using the contact gun is only possible in a limited extent.

For adjusting the minimum value twist the arrow counterclockwise up to stop.



**Setting values for contact welding gun P05-K
when connected to the Stud welding unit C130**

	<i>Steel</i>		<i>Stainless steel</i>		<i>AlMg3*</i>	
	<i>Volt</i>	<i>Spring</i>	<i>Volt</i>	<i>Spring</i>	<i>Volt</i>	<i>Spring</i>
M4	60	3 to 3,5	65	3,5 to 4	70	4,5
M5	75	3 to 3,5	80	3,5 to 4	80	4,5
M6	85	3,5 to 4	90	4	90	5
M8	115	4 to 4,5	120	4,5	---	---
M10	135	4 to 5,5	140	5	---	---

The setting values contain on the table are reference values!

The spring force is indicated in full turns starting from the minimum value

* Welding on AlMg3 using the contact gun is only possible in a limited extent.

For adjusting the minimum value twist the arrow counterclockwise up to stop.



- (3) Clamp the earth cables at the work piece. Obey the instruction given at chapter 6.2.1
- (4) Switch the stud welding unit on. Observe the content of the Stud Welding Unit Original Operating Manual.
- (5) Adjust the charging voltage
 - The required welding power, it means, the charging voltage of the capacitor battery, has to be individually set regarding the requirements of the weld to be performed and the welding gun to be used.
 - For adjusting the Charging voltage please observe the content of the Stud Welding Unit Original Operating Manual.
- (6) Press the welding element upon the point, where the joint will be placed. Now, press counter the spring force perpendicularly to the work piece until all 3 legs lay on the metal sheet.
- (7) When the welding element get contact with the work piece release the gun's trigger.
- (8) Retire the gun from the welded element in perpendicular axis
- (9) Verify the result for a well, firm joint.

8.3.2 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*

9 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.

9.1 Service address

Hruschka GmbH

Carl-Zeiss-Str. 8

D-85247 Schwabhausen

Telephone: 0049 8138 6694610

Telefax: 0049 8138 6694611

info@bolzen.net

9.2 Trouble shooting and default clearance

NOTE:

In the case of occurring a fault the first step is to check if all fundamental requirements for the operation of the Welding Gun P05-K, are fulfilled, not until then other measures can be taken.

Fault / Error message	Possible cause(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 work piece?	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“	<ul style="list-style-type: none"> ▪ Stud welding unit is not connected ▪ Mains cable is defective ▪ Mains switch is defective ▪ Fuses are defective ▪ Display is defective 	<ul style="list-style-type: none"> ▪ Check the mains cable ▪ Verify the fuses and if necessary replace them ▪ To contact Hruschka GmbH if necessary 	<ul style="list-style-type: none"> ▪ Electrician ▪ Electrician
Capacitors do not get charged	<ul style="list-style-type: none"> ▪ Short-circuit within the capacitor battery ▪ Short-circuit within the cable harness ▪ Fault within the welders control unit 	<ul style="list-style-type: none"> ▪ Please, contact Hruschka GmbH 	
Load process slower than other times	<ul style="list-style-type: none"> ▪ Welder is working in reduced mode, in the intention to avoid overheating 	<ul style="list-style-type: none"> ▪ Do not cover the ventilations gaps ▪ Protect the device against external warmth and heating sources 	<ul style="list-style-type: none"> ▪ Technical personnel ▪ Technical personnel
The reading „Contact“ does not appear although the welding element has contact with the work piece	<ul style="list-style-type: none"> ▪ Earth cable has not contact with the work piece or is not connected ▪ Gun cables are not connected ▪ Cable fault ▪ Gun or welder fault 	<ul style="list-style-type: none"> ▪ Make sure that the earth cable has contact with the work piece ▪ Verify that the welding cable plug is stuck tightly ▪ Please, contact Hruschka GmbH 	<ul style="list-style-type: none"> ▪ Technical personnel ▪ Technical personnel
Welding process does not start	<ul style="list-style-type: none"> ▪ Defective gun's starting trigger ▪ Defective gun's control line ▪ Defective stud welding unit 	<ul style="list-style-type: none"> ▪ Check the welding circuit ▪ Please, notify Hruschka GmbH 	<ul style="list-style-type: none"> ▪ Technical personnel
Readings can be seen, but it is not possible to make selections	<ul style="list-style-type: none"> ▪ Defective keys/keyboard 	<ul style="list-style-type: none"> ▪ Please, contact Hruschka GmbH 	

Fault / Error Message	Possible cause(s)	Corrective actions	Carrying out Personnel
Error message E3 is showed on the display	<ul style="list-style-type: none"> ▪ 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. 	<ul style="list-style-type: none"> ▪ Make sure that the ground clamps are stuck tightly joined with the work piece. If necessary readjust the joint. ▪ Take care that the union is stuck tightly, steady and constant at the ground material. If it is necessary change the position of the ground clamps ▪ Ensure a good contact between the chuck and the welding element. Replace the chuck if necessary. 	<ul style="list-style-type: none"> ▪ Technical personnel
The welding element shows stewing points	<ul style="list-style-type: none"> ▪ Stud chuck is too worn 	<ul style="list-style-type: none"> ▪ Replace the chuck 	<ul style="list-style-type: none"> ▪ Technical personnel
Uneven or changeable weld results	<ul style="list-style-type: none"> ▪ Rough-running piston, Retainer not or bad adjusted 	<ul style="list-style-type: none"> ▪ Please, contact Hruschka GmbH 	
Welding elements do not stand straight on the work piece	Gun was not placed at right angles to the work piece	Obey a correct positioning of the gun	<ul style="list-style-type: none"> ▪ Technical personnel
Uneven weld seam	<ul style="list-style-type: none"> ▪ Electromagnetic diversion/Blowing effect 	<ul style="list-style-type: none"> ▪ Relocate the welding cables ▪ Change the position of the grounding clamps ▪ Fix some additional compensation clamps 	<ul style="list-style-type: none"> ▪ Technical personnel ▪ Technical personnel ▪ Technical personnel
<p>Poor welding results:</p> <p>a) Too „cold“</p> <p>b) Too „hot“</p> <p>c) Only „sticked on“</p>	<ul style="list-style-type: none"> ▪ Rough-running piston, too short welding time. ▪ Too long welding time ▪ Too strong burn-off 	<ul style="list-style-type: none"> ▪ Reduce the spring force; possibly increase the charging voltage ▪ Increase the spring force; possibly reduce the charging voltage ▪ Increase the spring force 	<ul style="list-style-type: none"> ▪ Technical personnel ▪ Technical personnel ▪ Technical personnel

10 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 not described 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 according to the directions given in the instructions only should be performed from Hruschka GmbH.
- Carry out all maintenance works carefully and within the prescribed periods.
- Perform only the maintenance works described 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 welding gun P05-K 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.

10.1 Service and maintenance plan

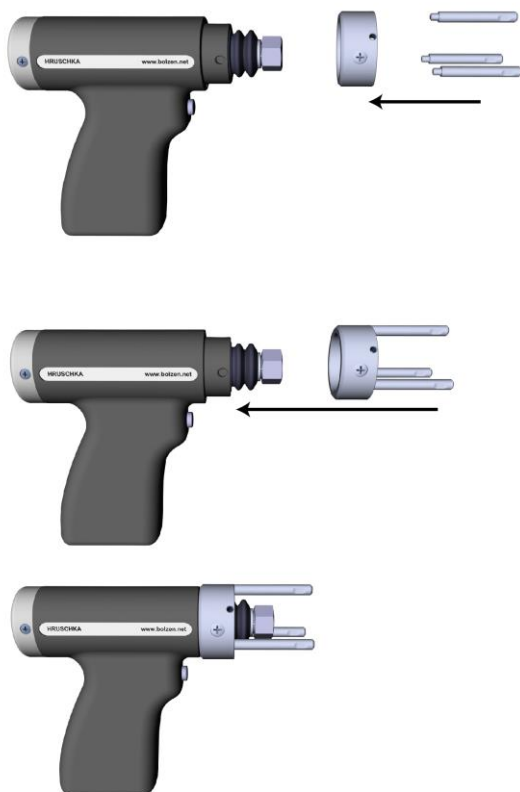
s = pre-shift and each time at work's beginning, m = monthly , Q = one time at quarter hj = half-yearly

Job	s	m	Q	hj	Personnell
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
▪ Completeness , <i>see chapter 1.3</i>	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 with the described technical data requirements on this manual.	X				Technical personnel
Check the health dissipation of the stud welding unit 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 damages earth cable. <i>See Chapter 10.2</i>	x				Technical personnel Technical personnel

10.2 Maintenance works

10.2.1 Exchange the chuck

- (1) Disconnect the device from the mains electricity.
- (2) Remove the grounding cables' welding plug out of the device.
- (3) Unscrew the union nut and remove the chuck out of the gun.
- (4) Take care that the flange doesn't lie on the chuck. Using the adjusting screw placed at the chuck the distance between the flange and the chuck can be exactly adjusted. When the required adjustment has been found, ensure the junction using the lock nut at the chuck. Now, put the chuck into the gun's entry up to stop and screw the union nut tight. Check if the union nut is mechanically sure. Obey the content of chapter 8.3



10.2.2 Change the gun's legs

- (5) Disconnect the device from the mains electricity.
- (1) Remove the grounding cables' welding plug out of the device.
- (2) Using the multifunctional tool remove the legs out of the Foot ring
- (3) Using the multifunctional tool screw tightly the new legs to the Foot ring. Verify that the connection be stuck!

10.2.3 Change the extension tube

- (1) Disconnect the device from the mains electricity.
- (2) Remove the grounding cables' welding plug out of the device.
- (3) Using the multifunctional tool remove the legs out of the Foot ring
- (4) Insert the new extension tube up to stop into the Foot ring. Fasten it with the hexagon socket screws.

10.2.4 Fuse replacement

- (1) Disconnect the welder from the mains electricity.
- (2) Screw the protective cap out of the fuse holder making a half-turn counter clockwise.
- (3) Remove the defective fuse and replace it with a new one.
- (4) Put the protective cap again on the fuse holder and screw the protective cap again making a half-turn counter clockwise. In doing so a light pressure has to be exerted on the cap's spring and the fuse holder has to be additionally held.

10.2.5 Change the damaged earth cables

- (1) Disconnect the welder from the mains electricity.
- (2) Remove the welding cable's connector of the mass from welder.
- (3) Verify the new earth cable for integrity.
- (4) Connect the welding cable's connector of the mass in the welding cable socket at the stud welding unit c44/c66 and now twist the connector tight clockwise.
- (5) Clamp the new earth cable at the work piece. Observe the notes in *Chapter 7*

10.2.6 Change the damaged welding gun

- (1) Disconnect the welder from the mains electricity.
- (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 c44/c66 as described in *Chapter 7*.

10.2.7 Change the mains cable

- (1) Disconnect the welder from the mains electricity.
- (2) Remove the defective mains cable from the welder.
- (3) Verify the new mains cable for integrity.
- (4) Connect the mains cable as described in *Chapter 7*.

10.3 Spare parts, Parts subject to wear, consumables

Article	Order number
Fuses	
Europe 5x20, 6,3A Medium blow fuses	81-09-5000-9
USA 6,3x32, 6,3A Medium blow fuses	81-09-5001-9
Grounding cable 2x3 Meter	90-29-015
Grounding 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
Cold devices feed line Germany	90-19-001
Cold devices feed line Switzerland	90-19-002
Foot ring P05-K	90-09-007
Legs	90-08-900
Extension tube	90-29-013
Multifunctional tool	90-09-014
Stud chuck M3/Ø3	80-28-003
Stud chuck M4/Ø4	80-28-004
Stud chuck M5/Ø5	80-28-005
Stud chuck M6/Ø6	80-28-006
Stud chuck Ø7,1	80-28-071
Stud chuck M8/Ø8	80-28-008
Stud chuck M10	80-28-010

11 Dismantling and Disposal

11.1 Final shutdown

Before bringing the welding gun P05-K to disposal, cut the mains plug in the intention to avoid a non-authorized putting into service.

11.2 Dismantling

The dismantling jobs only can be carried out by specialist for professional waste management or by the firm Hruschka GmbH.

11.3 Disposal

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

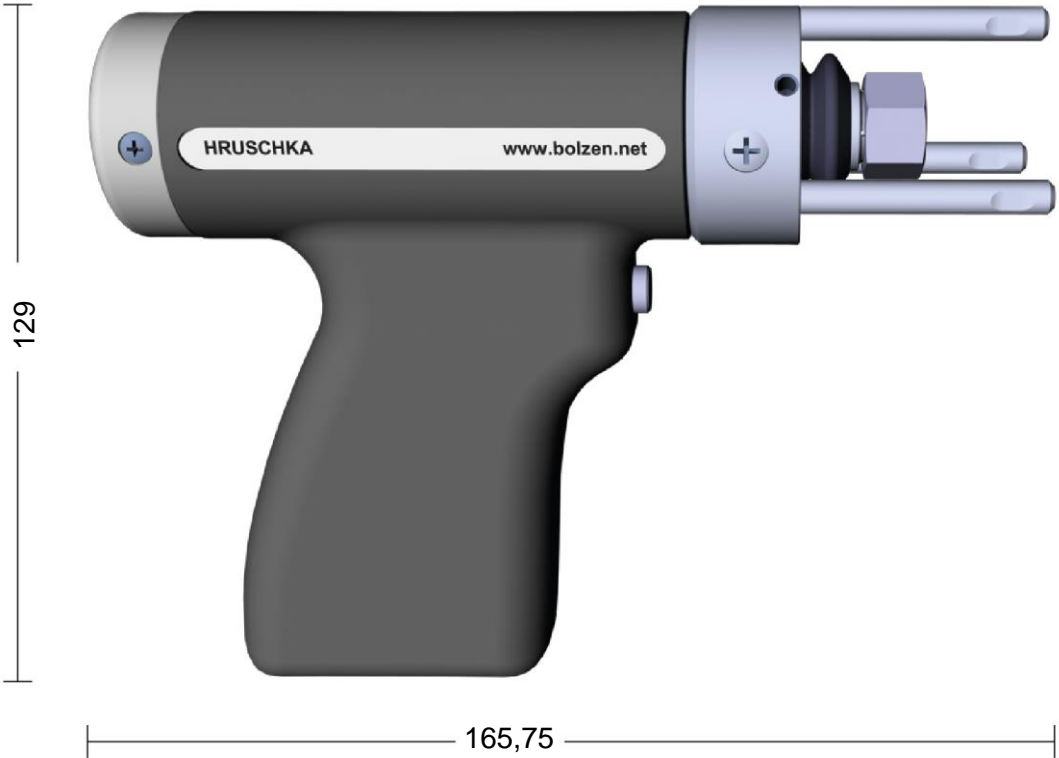
Electric and electronic welders have to be depolluted in the FRG according to the Electrical and Electronic Equipment Act (ElektroG):

Electric and electronic welders out of the FRG have to be depolluted according to the national regulations.

Gaskets must be depolluted as hazardous waste.

12 Drawings and other information

12.1 Drawings



12.2 Intended use of welding elements

Following welding elements are appropriated for their intended use with the welding gun P05-K:



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

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