

WELDING UNIT N 5



FOREWORD

Your new Nowa Gruppe Sp. z o.o. Welding Unit stud welder is carefully constructed of the finest components and material available. Used properly, this equipment will give you years of efficient profitable service.

This manual has been specifically prepared for use in familiarizing personnel with the design, installation, operation, maintenance and trouble-shooting of this equipment. Careful consideration should be given to all the information presented to assure the proper performance of this equipment.

A careful study of this manual will enable you to understand how the welders operate to insure proper performance under all conditions.

All rights, errors and technical amendments reserved.

Installation servicing or troubleshooting must only be done by qualified personnel trained to work on this type of equipment.

The equipment must always be accompanied by the instructions of operation, instructions, safety, inspection and maintenance, applicable information relating to the devices and security instructions required at the place of uses of the machine. The security instructions concerning welding in general must also be well known and applied.

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1. Important Safety Notes

These operating instructions apply to the power unit type N 5 with its welding gun (PSN 5 or PGN 5).



These operating instructions are intended for qualified persons who in view of their technical training, knowhow, and experience knowledge of applicable regulations are able to access the work assigned to them and recognize potential danger.

Familiarise yourself with the contents of these operating instructions before starting the power unit. You will then achieve better welding results and work safely.

We reserve the right to make technical changes without prior notice.

In the event of difficulties or confusion please consult the after sales service of Nowa Gruppe Sp. z o.o., who will be pleased to help you.



Warning:

Please note that in your country additional standards and safety conditions (especially rules for accident prevention) may differ from the standards mentioned in this operating manual.

Also always comply with your national standards and be in accordance with relevant national and local regulations.

Field of application of the stud welding unit

The stud welding unit is designed for welding of welding elements on weldable workpiece surfaces by the capacitor discharge stud welding with tip ignition method. The device only works in combination with a suitable stud welding gun (PGN 5 or PSN 5).

Danger from incorrect use

Knowledge of the contents of these operating instructions is essential to ensure safe and trouble free operation of the stud welding unit.

Use the stud welding unit only for the purpose described in this manual.

Otherwise you may endanger yourself or damage the stud welding unit.

You endanger yourself and others if you operate the stud welding unit incorrectly or fail to observe the safety precautions and warnings. This can lead to serious injury or extensive material damage.



Warning:

Do not use this studs welding unit for pipe thawing.

Set-up personnel (operator)

Knowledge of welding is presupposed.

Set-up personnel need knowledge and experience in welding to

- assess the workplace,
- set up the equipment
- select the right welding element.

Knowledge in the handling of stud welding unit is also required.

This knowledge is taught either by TWS or trained set-up personnel.

Danger for unauthorised operating personnel, work with the stud welding unit only when:

- Persons are over 18 years of age.
- Never work with the stud welding unit when you are under the influence of Alcohol, Drugs or Medication.
- **You are appropriately trained, instructed and authorised to do so, and you have read and completely understood this operating manual.**

Protective measures at the workplace:

- Only weld in rooms that comply with national legal requirements and in accordance with the relevant standards.
- Ensure the ambient temperature is above +5° C.
- Set up the stud welding unit such that it is protected against shocks, vibrations and accidental falling over.
- Set up the workplace, so that personnel in the vicinity are protected against the harmful effects of optical radiation.
- Room barriers and protective screens must be set up such that reflections and permeability of radiation are largely avoided.
- This equipment, the gun and clamps are not suitable for use in rain or snow or in an environment with increased hazard of electric shock or in elevated working positions.
- Ensure adequate ventilation and lighting of the workplace.
- Welding of galvanised, leaded or cadmium plated parts or parts coated with lead paint can give rise to harmful vapours and gases. An extractor must be used in such cases.
- Do not weld in the vicinity of inflammable vapours. The weld or weld spatter could inadvertently cause an explosion.
- Only weld in rooms in which no dangers from explosions can arise
- Remove combustible or inflammable substances (e.g. paint and cleaning cloths) from a wide area around the welding area. Welding spatter could inadvertently cause a fire. If this is not possible, you must nevertheless ensure a fire cannot be caused by flying sparks (e.g. by covering).
- Ensure that there is a powder fire extinguisher available at the workplace.
- There is a potential danger of burns at all welded workpieces, even if they look "cold" and the welding point is further away. Protect all workpieces against touch, if they have a temperature higher than 50° C. Heated workpieces can also cause fires – through heat conduction.
- Remove all flammable materials and liquids from the vicinity of the work area before starting welding.
- Weld at a safe distance from flammable materials or liquids.
- Select a safety distance large enough to ensure that no danger can arise from weld spatter.
- Inform colleagues working in the immediate vicinity accordingly before starting work.
- Ensure that an approved fire extinguisher is available at the workplace.



Explosion risk

Warning:

The function of your welding device can be disrupted by the strong electromagnetic fields of other devices (e.g. MIG/MAG devices). Therefore you must arrange sufficient clearance to such devices.



There is an increased danger in hazardous areas as well as in or at containers containing hazardous substances or residues thereof. In these areas welding may only be carried out with the written authorisation of the works manager. The works manager must ensure compliance with all safety regulations.

Only weld in rooms resp. areas, in which no danger from fire, explosions, smoke, vapours or water can arise. In cases of doubt you must consult an authorised welding safety officer or a fire protection officer.

Welding generates strong electromagnetic fields. Therefore you must ensure that all people who can come into the vicinity of the stud welding unit are informed about the following points and - as well as yourself - observe them. These electromagnetic fields can:

- threaten the lives of persons with cardiac pacemakers.
- disrupt or damage electric and electronic equipment (e.g. in cars).
- delete irretrievably the contents of magnetic and electronic data media.
- magnetise and therefore damage clocks and watches.

The welding cables also irradiate strong electromagnetic fields. It must be ensured that the cables are laid without loops as far as possible and sufficiently far away from other electric equipment. This applies especially to welding at building sites and on special machines.

Consult the respective manufacturer in cases of doubt. The system operator must take suitable remedial measures.



Warning:

This stud welding unit must only be operated in an industrial environment.

Employer

The personnel must be instructed in accordance with the relevant standards. Untrained or unauthorised personnel may not use the power unit.

Life-threatening danger for wearers of implanted cardiac devices

⚠ Never operate the stud welding unit or remain in the vicinity, if you wear a heart pacemaker or implanted defibrillator.

⚠ Never operate the stud welding unit if persons with heart pacemakers or implanted defibrillators are in the vicinity.



Strong electromagnetic fields are produced in the vicinity of the stud welding unit during welding. These fields could impact the function of heart pacemakers or implanted defibrillators.



No access for people with implanted cardiac devices or pacemakers.

Magnetic fields can cause serious injury or death by interfering with medical devices like pacemakers, or can damage electronic devices (like defibrillators) and magnetic media.



Danger from fumes and airborne particulates

- Use the equipment only in a suitably ventilated area. If ventilation is inadequate, then appropriate fume extraction equipment must be used.
 - Ensure that the room is well ventilated.
 - Never weld in rooms with a ceiling height of less than 3 m.
 - Observe furthermore your working instructions and the accident prevention regulations.
- This will help to avoid health damage due to fumes and airborne particulates.



Danger from glowing weld spatter (fire danger)

- Glowing hot weld spatter and liquid splashes, flashes of light and a loud bang > 107 dB (A) must be anticipated during stud welding.
- Inform colleagues working in the immediate vicinity accordingly before starting work.
- Ensure that an approved fire extinguisher is available at the workplace.



Personnel training

Only trained personnel who have been instructed in the use of the machine may work with the machine.

Untrained or unauthorised personnel may not use the stud welding unit.

The responsibilities of the personnel for all tasks regarding start up, operation, maintenance and repair must be clearly defined.

Trainees may only work with the stud welding unit under the supervision of an experienced person.

The operating personnel of the stud welding unit must:

- have been instructed in the handling and use of welding equipment.
- know the contents of this operating manual.

Personal protective equipment:



Wear personal protective clothing, **covering the whole body**, including protective weld goggles with safety glass and ear protection (noise level of more than 107 dB(A) can occur), when working with the stud welding unit.



Therefore the following protective equipment must be worn:

- Fireproof protective clothing (Non-flammable clothing), covering the whole body
- Safety goggles with sight glass in compliance with the applicable standards and do not look directly into the light arc.
- Protective gloves in accordance with the relevant standard,
- A safety helmet when welding above your head,
- A protective apron over your clothing,
- Full-ear hearing protection in accordance with the relevant standard,
- Safety shoes,
- Do not weld when wearing working clothes soiled with flammable substances such as oil, grease, petroleum, etc.



Danger for unauthorised operating personnel:

Work with the stud welding unit only when you are appropriately trained, instructed, authorised to do so, and you have read and completely understood this operating manual.

Protection of the stud welding unit

Protect the stud welding unit against the ingress of foreign matter and liquid, like in example caused by cutting or grinding work in the vicinity of your work area.

2. Safety Symbols and Terms Used

Safety instructions and warnings serve your personal safety, the safety of others and the product safety. They are highlighted in these operating instructions by the following terms. These terms draw attention to potentially dangerous or dangerous situations.



Danger:

This additional term means that death, serious physical injury or considerable damage to property will occur, if suitable precautionary measures are not taken.



Warning:

This additional term means that death, serious physical injury or considerable damage to property may occur, if suitable precautionary measures are not taken.

Warns you of electromagnetic fields that can be generated during welding.

No access for people with active implanted cardiac devices

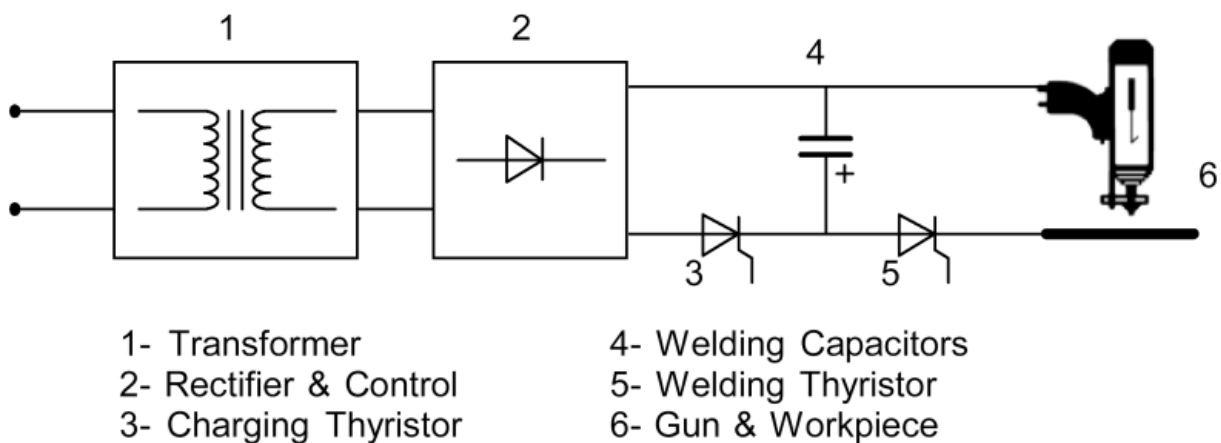


Note:

This additional term introduces important information on proper handling of the product or special information to which attention must be drawn.

3. Functional principle of the stud welding unit

Stud welding unit are used to weld welding element's according to ISO 13918 (e.g. threaded studs) on to weldable metal workpiece surfaces. Capacitor discharge stud welding with tip ignition is a form of welding in which the energy required for the welding process is derived from a bank of charged capacitors. The electric circuit is closed. Arc is generated by a high-current discharge (activated by a welding SCR) from a capacitor bank, between stud and workpiece. This stored energy is discharged across the gap between the two surfaces to be welded (stud and workpiece) as they are propelled towards each other. The arc produced heats the two surfaces, melting a thin film of metal on each surface and the propelling force closes the gap between the two faces, thus forming a weld.



Mains alternating voltage is galvanically isolated by the transformer (1) and converted in direct voltage by the rectifier (2).

Welding capacitors (4) are charged to the setting voltage by the charging thyristor (3) and the control board (2).

Welding capacitors store electrical energy required for the welding process.

Welding thyristor (5) releases electrical energy stored in the welding capacitors (4) through the stud located in the gun and the working plate. The welding process is starting.

Usually, the negative pole is connected to the welding gun and the positive pole is connected to the working plate.

4. Guarantee

The electrical and mechanical components of your Welding Unit N 5 studs welder are thoroughly performance inspected prior to assembly in the welder. The assembled welder is completely performance checked. The welder is delivered to you in functional electro-mechanical condition. All parts used in the assembly of the welder and its accessories are fully warranted for a period of one (1) year from the date of delivery.

Under this warranty, the manufacturer reserves the right to repair or replace in its plant in Nowa Gruppe Sp. z o.o., at its option, defective parts which fail during the warrantee period. Notice of any claim for warranty repair or replacement must be furnished to the manufacturer by the purchaser within five (5) days after the defect is first discovered. The manufacturer does not assume any liability for paying shipping costs or for any labour or material furnished where such costs are not expressly authorized in writing.

We do not warrant Welding Unit N 5 stud welders, parts, or accessories against failures resulting from misuse, abuse, improper installation, maladjustment or use not in accordance to the operating instructions furnished by the manufacturer.

The warranty is valid only to nails / pins / pins purchased from sources approved by the manufacturer of the welding unit.

Installation servicing or troubleshooting must only be done by qualified personnel trained to work on this type of equipment.

Guarantee and liability claims for personal injury or damage to property are excluded if they can be attributed to one or more of the following causes:

- improper use of the stud welding unit.
- improper use of the stud welding gun.
- non-adherence to the work and safety instructions and information in these operating instructions.
- non-adherence to the operating instructions of the stud welding unit and the stud welding gun.
- incorrect start-up, operation and maintenance of the welding unit.
- use of the welding unit in residential rooms or offices.
- use in damp, inflammable or explosive environment.
- Transport damage

Warranty entitlement shall no longer be valid if modifications, changes or service and repair work are carried out by unauthorised persons.

Invalidation of warranty entitlement shall also render the declaration of conformity invalid. The CE marking shall be declared invalid by the manufacturer.

5. Declarations

5.1. EU declaration of Conformity

We,
Nowa Gruppe Sp z o. o.
Rokitno 5, 05-870 Błonie, Polska,



declare that the products

Stud welding power units welding nails GZON/GZONI/ pins/ insulations pins
Nowa Gruppe
Welding Unit N 5

mentioned in this declaration,

complies with the following harmonized standards

EN 60947-1:2012

Arc welding equipment - Part 1: Welding power sources

EN 60947-10:2014 + A1:2015 Class A

Arc welding equipment - Part 10: Electromagnetic Compatibility Requirements

And thus declare that the mentioned products comply with the essential requirements of the following Union harmonization legislation:

Low Voltage Directive (LVD) 2014/30/EU
EMC Directive 2014/35/EU

Authorized signatory:

Błonie, Rokitno 5, 20/04/2018
Place & data

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GRUPPE**
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Nowa Gruppe Sp. z o.o.

5.2. Declaration of product identity

DECLARATION OF PRODUCT IDENTITY

1) MANUFACTURER / SUPPLIER

Nowagruppe
Rokitno 5, 05-870 Bionic, Woj. Mazowieckie

2) DISTRIBUTOR

Link Industries S.p.a.
Molo Ponte Morosini 49/1
IT-16126 Genova, Italy

3) NAME OF PRODUCT(S)

TRADENAME OF THE PRODUCT(S) BY THE DISTRIBUTOR

Name Nowa Gruppe	Name Link
Gun PGN 5 with the cable	Pistola PGN 5 a testa magnetica
Insulation PINS GZON St37 overlay Cu + Galvanized Clip 30mm	LINK GZ PINS Cu + CLIP Zn Arpioni in acciaio ramato con rondella incorporata zincata
Insulation PINS GZONI2 St37 overlay Cu + Galvanized Clip 30mm with red insulation	LINK GZ 2 PINS Cu + CLIP Zn Arpioni in acciaio ramato con rondella incorporata e isolante
Insulation PINS GZONI2 St37 overlay Cu + Galvanized Clip 30mm with red + paper insulation	LINK GZ 2 PINS Cu + CLIP Zn + Paper Arpioni in acciaio ramato con rondella incorporata e isolante + carta
Gun PSN 5 with the cable	Pistola PSN 5
Insulation PINS VBS Al pad overlay Zn	LINK VBS/BIMETAL PINS Arpioni in bimetallo alluminio/acciaio zincato
Insulation PINS CD St37 overlay Cu	LINK CD PINS Cu Head for UNIT N5 Arpioni in acciaio ramato con testa piatta
Insulation PINS IS-N St37 overlay Cu	LINK IS-N PINS Cu Arpioni in acciaio ramato
Fixing pins with perforated base plate GPN base Zn pin Zn	LINK GPN PINS Zn PERFORATED Arpioni in acciaio zincato con base forata
Fixing pins GSN base Zn pin Zn	LINK GSN PINS Zn ADHESIVE Arpioni in acciaio zincato con base adesiva
Fixing pins with perforated base plate GPN	LINK BF PINS AL
Decorative clips Zn WN white cap fi 3mm	LINK WN WASHER Zn + CLIP Rondella in acciaio zincato con coprirondella in LDPE
Rolled Wire Galvanized 100 gr (26 r.m.) per 1 roll	LINK ROLLED WIRE Zn Filo in acciaio zincato laminato, per il fissaggio di materiale isolante
Rolled Wire Stainless Steel 100 gr (26 r.m.) per 1 roll	LINK ROLLED WIRE SS Filo in acciaio inox laminato, per il fissaggio di materiale isolante

**4) REFERENCE NUMBER OF DOP/documents for CE
(MANUFACTURER / SUPPLIER)**

Operating Manual-Welding Unit N5

**REFERENCE NUMBER OF documents for CE
(DISTRIBUTOR)**

Istruzioni d'uso/ fascicolo tecnico Saldatrice N5

5) Technical documentation(s) are conform with requirements of EN regulations (in particular EN 60947-1:2012, EN 60947-10:2014+A1:2015 Classes A and 2014/30/UE). Distributor is relieved of any responsibility for the conformity and operation of the machinery, because the manufacturer is the responsibility and owner of CE marking.

The product(s) supplied by the manufacturer / supplier Nowa Gruppe. is/are delivered by Link Industries S.p.a. under own tradename (listed under 3.). The technical properties of the product(s) is/are in accordance with the content of the relevant certificate(s) / declaration of performance(s) / technical documentation(s) (listed under 4 and 5.).

This declaration is valid until modification or withdrawal.

2024.04.30.

Katarzyna Dunajewska
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Responsible of NowaGruppe CEO)

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6. Installation



Danger for unauthorised operating personnel:

Work with the stud welding unit only when you are appropriately trained, instructed, authorised to do so, and you have read and completely understood this operating manual.

Receiving inspection

The stud welding unit was checked for functional capability before dispatch. It must be checked on delivery for damage and completeness of the parts contained in the extent of delivery.

Inspect the shipment for visible damage and completeness immediately on receipt.

Report any transport damage or missing components immediately to the delivering shipping agent or the dealer.

Scope of Supply

The stud welding unit consists of a **power unit** (type N 5), a **welding gun** (type PGN 5 or PSN 5), **Ground cable** (single or double), **Operating manual** and **chuck(s)**



Fig. 6.1 Example of a Stud welding unit

Storage

If the stud welding unit is not put into operation directly after delivery, it must be stored in a secure place. The complete stud welding unit must be protected adequately against dust and dampness. To preserve the lifetime of the capacitors, the stud welding unit must be switched on for about an hour every six weeks, with the charging voltage being raised gradually from 1 to 10. Then turn the charging voltage regulator back to position 1.

Transport

The mass of the welding controller is 12 kg dependant on the model purchased and as such is suitable to be manhandled.

To avoid damaging the stud welding unit, it should be transported using the carry handle.

Place of use

Use of the stud welding unit is restricted to industrial areas.

Positioning the unit

Place the stud welding unit on a horizontal, vibration-free and non-slip surface. The bearing strength of the surface should be at least twice the weight of the stud welding unit. Due to the design and power of the stud welding unit, thermal stresses occur in the housing. Make sure the air inlet is always kept free. To keep the temperature on a low level the ventilator starts working when the device reaches a certain temperature. To ensure unhindered heat exchange with the surroundings, the stud welding unit must be kept at least 1 m away from other sources of heat.

Mains connection

The mains cable with plug is located at the back of the unit. Check the serial plate before plugging into the correct supply.

The control voltage for all welding gun functions is supplied by the stud welding unit.



Warning:

Please note the following safety measures before connecting the stud welding unit with the power supply:

- Only use mains power sockets with tested protective conductor function.
This test must be performed by an electrician.
- Compare the indications on the rating plate with the values of the mains power supply.
If they do not correspond consult an electrician to take appropriate steps.



Electric shock hazard

- Have an electrician check whether the plug socket to which you intended to connect the stud welding unit is correctly earthed.
- Connect the stud welding unit only to a mains supply with the same mains voltage as that indicated on the type plate.
- Compare the current consumption indicated on the type plate with the fuse of your mains power supply.
- Check that the stud welding unit is switched off.
- When the above precautions have been taken, the stud welding unit can be connected to the mains power supply.



Warning:

The stud welding unit may only be opened by an electrician. Before the unit is opened for some reason, it has to be switched off and the power cable has to be disconnected from the mains power supply.

Start check:

- The **main switch** and the **Welding Voltage Digital display** must light up when the power unit has been switched on.

Note:

- The LED for connection of a gun with hoisting magnet has no function when a Contact gun is being used.
- Hold the gun with stud against the workpiece: the contact LED must light up (when ground cable – on both sides – and welding cable connected).
- Hold the gun in the air and press the start button: the start LED must light up.
- Otherwise no further LEDs should light up.

Troubleshooting

See Troubleshooting chapter.

Other descriptions

Ignitions tip. The power unit welding unit N 5 and connected stud welding gun work by the capacitor discharge stud welding with tip ignition welding method.

In order to ignite an arc and therefore to generate a weld pool, every stud must have an ignition tip.

Fan To avoid unnecessary soiling, the fan is only switched on when a certain temperature is reached.

Welding elements (studs)

Depending on how the welding gun is equipped, threaded studs, internally threaded pads and pins (in accordance with ISO 13918) of various sizes and materials can be welded.

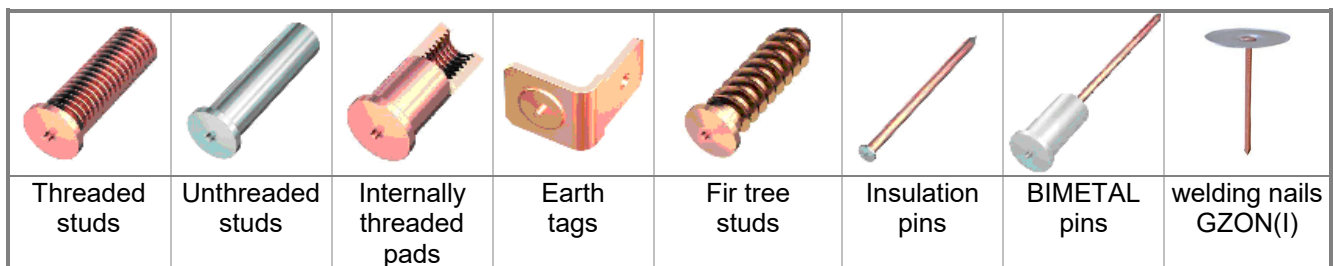


Fig. 6.2 Examples of different types of welding elements

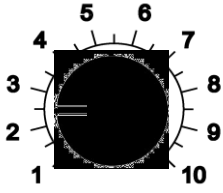
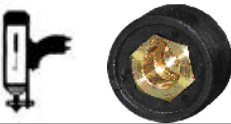
The following conditions must be observed:

- The diameter of the welding element must be ≤ 8 (10) mm.
- Length of welding studs: 6 to 40 mm with standard components.
For studs longer than 40 mm, additional accessories must be used.
- Length of welding pins: 6 to 100 mm with standard components.
- A suitable chuck must be selected for every welding element.

Note:

If in any doubt regarding different chuck type and size, please seek the advice of your local technical representative.

7. Indicators and operating elements

<u>Symbol</u>	<u>Name/Description</u>	<u>Function</u>
	ON/OFF Switch (on back panel)	To switch the welder ON/OFF
	Welding Voltage selector knob	To select the welding voltage
	Welding Voltage Digital display	Display capacitors voltage or error codes in case of troubles
	Capacitors bank selector	Available only for N 5 S : select 66.000 µF or 132.000 µF capacitors bank
	“READY” Green LED ON	Indicates that the capacitor bank is charged to the preselected value. Ready to weld
	Green LED OFF	Indicates that the unit is in the process of charging the capacitors.
	“OVERHEAT” Yellow LED	Indicates that the unit thermal circuit has tripped.
	“DEFAULT” Red LED	Indicates that the unit safety circuit has tripped.
	“CONTACT” Yellow LED	Stud to workpiece contact indicator
	“TRIGGER” Green LED	Welding gun trigger actuated indicator
	Welding plug	Welding gun panel connection
	Control coupling	Welding gun control connection socket
	Welding plug	Welding ground clamps panel connection

8. Weldability of typical combinations of stud and parent materials

Stud material	Parent material				
	ISO/TR 15608 material groups 1 to 6, 11.1	ISO/TR 15608 material groups 1 to 6, 11.1 and galvanized and metal coated steel sheet, max. thickness 25 µm of coating	ISO/TR 15608 material group 8	Copper and lead free copper alloys, e.g. CuZn37 (CW508L)	ISO/TR 15608 material groups 21 and 22
S235 4.8 (weldable	highly weldable for any application ^a	weldable within limits ^b	highly weldable for any application ^a	weldable within limits ^b	not weldable
1.4301 1.4303	highly weldable for any application ^a	weldable within limits ^b	highly weldable for any application ^a	weldable within limits ^b	not weldable
CuZn37 (no ISO standard available)	weldable within limits ^b	weldable within limits ^b	weldable within limits ^b	highly weldable for any application ^a	not weldable
EN AW-Al99,5	not weldable	not weldable	not weldable	not weldable	weldable within limits ^b
EN AW-AlMg3	not weldable	not weldable	not weldable	not weldable	highly weldable for any application ^a
^a For example, for force transfer. ^b For force transfer					

Tab: 8.1 — Weldability of typical combinations of stud and parent materials for capacitor discharge stud welding with tip ignition

Note:

In the case of material combinations not listed in this table, please seek the advice of your local technical representative.

9. Welding processes (Contact – Gap)

The two techniques for capacitor discharge stud welding with tip ignition are with contact or with gap.

Method	Characteristic							Typical application
	Welding process ^a	Welding diameter d_w mm	Peak current $\approx$ I A	Welding time $\approx$ ms	Spring force $\approx$ N	Plunging speed $\approx$ m/s	Ignition	
Contact method	786	0,8 to 10	10 000	2 to 10	60 to 100 depending on piston mass	0,5 to 0,7	Always correct	Welding of (unalloyed and alloyed) steel, galvanized or oily surfaces
Gap method	786	0,8 to 10 (aluminium up to 6)	15 000	0,5 to 3	40 to 60	0,5 to 1, aluminium 1 up to 1,5	Mostly correct, advanced ignition possible	Welding of aluminium and brass
^a In accordance with ISO 4063.								

Table 9.1 – characteristics for capacitor discharge stud welding with tip ignition

10. Preparing Workplace and Welding Process



Danger for unauthorised operating personnel:

Work with the stud welding unit only when you are appropriately trained, instructed, authorised to do so, and you have read and completely understood this operating manual.



Warning: Protect yourself and others!

Use of the equipment must be limited to authorised personnel only who must be suitably trained and must have read and understood this manual. This manual must be made available to all operators at all times. Measures must be taken to prevent the use of this equipment by unauthorised personnel

All connection sockets and operating elements are freely accessible on the front panel of the stud welding unit. The mains power plug is located at the back of the unit.

Connections of the stud welding unit

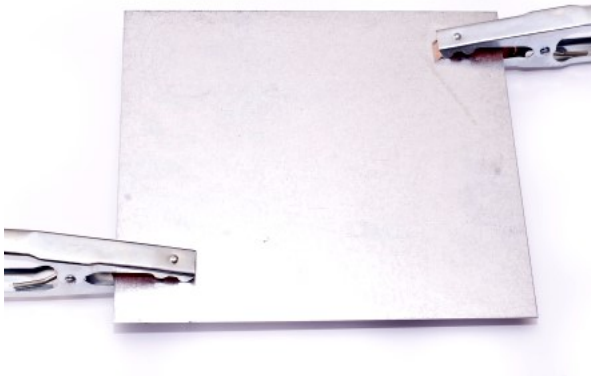
Please notice that the stud welding unit is designed exclusively for connection of the welding guns type PGN 5 and PSN 5.

Connections of the power unit



Warning: The stud welding unit must be switched off before carrying out any connection work. The main switch has to be in the position "0". All cables have to be laid in a way that no trip hazards occur for people.

Connecting the ground cable



- Connect the ground clamps approximately 180° to each other, directly to the workpiece. The welding location must lie directly between the two ground clamps, this will help to prevent "Arc blow" when welding takes place.
- Do not place neither the two ground clamps too close to the welding point (for preventing Arc Blow)
- Prior to fitting the clamps, ensure that the contact area of the work piece is free from rust, paint, grease, etc. As this will result in a poor welding connection and poor results.



Caution:

- Steel structures, pipes, etc. may not be used as current conductor if they are not themselves the workpiece that is to be welded.
- The welding current circuit may not be earthed. Exception: the workpiece itself is earthed by necessity (steel structure, shipbuilding, pipes, etc.).
- The surface of the parent material should be cleaned. Layers of paint, rust, grease, etc. should be removed from the weld location. The surface preparation shall be specified in the WPS. **As welding times are short (< 15 ms), the surface should be cleaned with particular care.**



- Plug the ground cable plug into the connection socket. Secure the connectors with a clockwise turn until they lock. Failure to do this will result in damage to the connectors during welding.

Connecting the welding gun

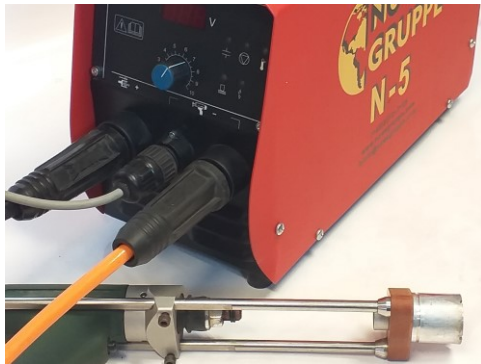
The power unit is designed for exclusively connection of the welding gun PSN 5 or PGN 5.



Caution: No guarantee concerning safety and functionality of the stud welding unit is accepted when welding guns of other manufacturers are connected. Nowa Gruppe Sp. z o.o. is not liable for damage arising from operation of the stud welding unit with welding guns of other manufacturers.



- Plug the welding cable plug into the connection socket marked.
- Fasten the welding cable plug firmly in place by turning it strongly clockwise. Failure to do this will result in damage to the connectors during welding.



- Plug the control cable plug into the corresponding connection socket and lock it in place.
- The cable end plug and panel mounting socket are keyed to prevent incorrect fitting. Push the plug firmly home and twist the locking ring clockwise to secure the plug in position.

11. Setting of welding guns

11.1 Settings of Welding guns PSN 5

Field of application of PSN 5

The PSN 5 gun is a contact welding gun for welding studs by capacitor discharge with tip ignition.

The welding elements should preferably be made of **steel** and **stainless steel**.

Brass or Aluminium studs can also be welded with limitations.

Due to the longer welding time (compared to gap welding) and deeper penetration, the PSN 5 gun is especially suitable for lightly galvanised steel.



Fig. 11.1 Contact welding gun PSN 5

Contact stud welding sequence

In welding with contact, the stud is inserted into the stud holder of the gun [see Figure 11.1] and positioned with its ignition tip directly on the surface of the work piece [see Figure 11.2]. A spring in the welding gun presses the stud against the metal. Once the capacitor power has been switched on, the ignition tip abruptly explodes and vaporizes partially, and the arc is generated [see Figure A.2 c)]. The stud is advanced still further towards the parent metal and finally remains in the solidified melt. The welding time is ≤ 3 ms.

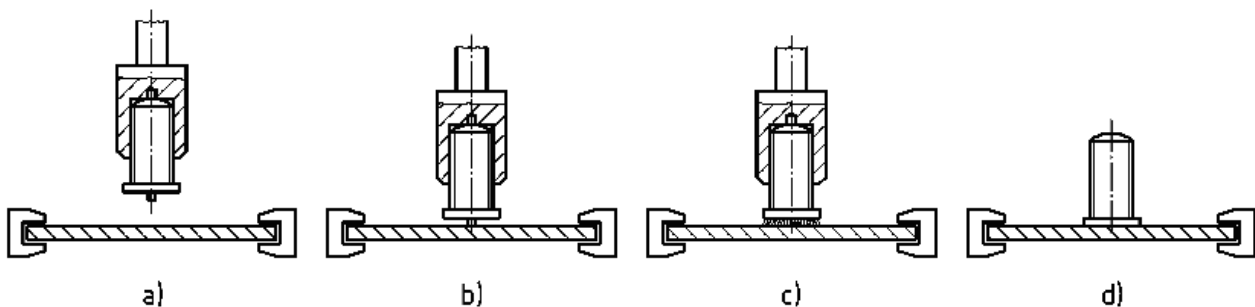


Fig. 11.2 Contact stud welding sequence

Notes:

- A threaded stud was chosen as welding element in the figure above.
- The recommended parent metal thickness should be $\geq 0,1 d$ but not less than approximately 0,5 mm.



Chuck preparation



Stud ≤ 20 mm



20 mm $\leq$ Stud $\leq$ 40 mm



The chuck is selected depending on the welding element (welding stud). The suitable chuck has to be adjusted to the length of the stud welding element.

Note: Chucks are wearing parts and should therefore always be kept in stock and ordered on time.

Procedure

1. Select a Chuck fitting the diameter and form of the welding element.

2. Depending on the length of the welding element, fit the Chuck **backstop** the as follows:

a) Welding elements up to **20 mm** in length:

The unthreaded part of the backstop is located *inside* the chuck.

b) Welding elements from **20 to 40 mm** in length:

The unthreaded part of the backstop is located *outside* the chuck.

3. Insert the stud to be welded into the chuck.

4. Turn the chuck backstop until the distance between locknut and stud is:

when using the PSN 5: **51 mm (to max. 53 mm)**

Securely tighten the chuck backstop locking nut to maintain the required setting.

5. Warning: Switch off the power unit before inserting the Chuck.

6. Loosen the chuck locking nut (if it is tight) by turning 90° with the socket spanner.

7. Insert the chuck into the gun spindle and push firmly home until it comes to a rest.

8. Tighten the chuck locking nut with the box spanner provided. "Hand tight" is all that is required.

Over tightening may result in damage to your gun.

Caution:

- The chuck locking nut may not be tightened when there is no Chuck in the welding gun.
- Make sure that the bellow is positioned correctly on the chuck nut.

Adjusting the PSN 5 gun

The electrical and mechanical welding parameters are set at the power unit and on the welding gun.

Welding time

The welding time depends on the **stud speed**. It is adjusted **via the gun spring pre-load**.

Higher plunging speed leads to shortened arc time and consequently to lower welding energy with identical voltage setting.



Set the gun spring pre-load to the appropriate setting for the stud/material to be welded by adjusting the gun back knob (for PSG 5 gun, you do not need tools, just turn with your hand the metallic ring at the back of the gun,) :

Turning clockwise:

The spring pre-load is increased, thereby **reducing** the welding time.

Turning anticlockwise:

The spring pre-load is reduced, thereby **increasing** the welding time.



Note: To prevent damage to the adjusting mechanism, never use force to turn the adjusting knob to its end position.

Procedure

- Find your material combination and the diameter of the welding element in the following table.
- Turn the gun adjusting knob until the indicator window on the side of the welding gun indicates the value from the table.

<u>Workpiece</u> (suitable for welding)	Coppered 4.8 Steel					A2-50					Almg3*				
	M3	M4	M5	M6	M8	M3	M4	M5	M6	M8	M3	M4	M5	M6	M8
Mild steel	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	-	-	-	-	-
Alloyed steel	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	-	-	-	-	-
Aluminium	-	-	-	-	-	-	-	-	-	-	4-6	4-6	4-6	4-6	4-6

Tab: 11.3 Recommended **spring force** [mm] for contact stud welding gun **PSN 5**

Determining the Charge Voltage

The welding current strength is regulated via the **Welding Voltage selector knob** of the power unit. To set the charge voltage, turn the Welding Voltage selector knob until the digital display shows the voltage value required.

<u>Workpiece</u> (suitable for welding)	Coppered 4.8 Steel					A2-50					Almg3*				
	M3	M4	M5	M6	M8	M3	M4	M5	M6	M8	M3	M4	M5	M6	M8
Mild steel	65	75	95	130	160	65	75	95	130	160	-	-	-	-	-
Mild steel (<25 µm Galva)	80	100	130	160	200	80	100	130	160	200	-	-	-	-	-
Alloyed steel	60	70	85	120	150	60	70	85	120	150	-	-	-	-	-
Aluminium	-	-	-	-	-	-	-	-	-	-	65	75	95	120	-

Tab: 11.4 Recommended **charge voltage** [V] in the power unit **N 5**

* Aluminium joints can only be welded with the contact welding gun with limits.

Note: The figures in these tables are indicative values and must be checked by means of a test welding on the original material with the same properties as the original workpiece.



Work procedure for PSN 5 gun



Work procedure:

1. If not already done, insert a welding element in the chuck. Position the welding gun on the welding spot vertically. The contact LED lights up.
2. Press the welding gun vertically (90°) against the workpiece surface with both hands.
3. Hold the welding gun steady and press the start button. The welding process is started. At the same time the gun trigger LED lights up.
4. After welding, always draw the gun off vertically from the welded stud. Failure to do this will strain the chuck and reduce the working life of the chuck.

The LED "contact" turns OFF and the power unit charges the capacitors for the next welding operation.

Warning: Risk of burns

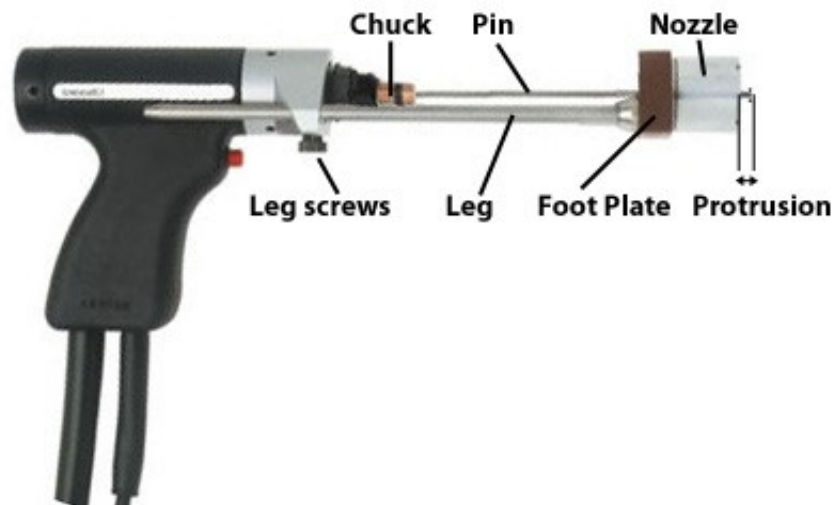
The gun head becomes very hot during the welding process. The same applies to the welded element and the workpiece.

5. Check the welding result in accordance with relevant norms. If the welding result is not satisfactory, the settings must be optimised.

Warning: After completing welding work or in the case of longer breaks in welding work disconnect the machine from the mains power supply and secure it against unauthorised use.



11.2 Setting of PSN 5 welding gun with ISO Kit (For long Insulation pins)



1. Adjust Chuck back stop screw.
There is a depth stop inside of the chuck (Chuck back stop screw)
The depth stop should be adjusted so that you are retaining a good portion of the stud you are setting up to weld. Typically, this is 10 – 15 mm of the pins you are welding.
2. Seat weld pin firmly against chuck back stop Screw.
3. Loosen the legs screws.
4. To adjust the protrusion (plunge), loosen the leg set screws in the gun body. Move the foot towards the gun or away from the gun to increase or decrease plunge. The plunge measurements are from the end of the stud and do not include the welding tip.
Slide the Leg / Foot assembly until weld pin flange extends 2 to 5 mm beyond foot nozzle (spark shield).
5. Retighten Legs screws.

11.3 Cup Head Pins welding gun PGN 5

The PGN 5 gun is a special stud welding gun (welding method: capacitor discharge stud welding (contact)) to weld cupped head pins. Cupped head pins (isolated nails with clip) are used to fix isolated mats. The cupped head pins should preferably be of steel or stainless steel. Owing to the longer welding time and deeper penetration, the PGN 5 gun is especially suitable for oily, rough and difficult surfaces like rolling skin, forging scale and zinc.



Note:

For cupped head pins with a stainless steel clip, chucks with a clamp mechanism are used instead of magnetic chucks. Please seek the advice of your local technical representative.



Fig. 11.5 PGN 5 Welding gun ()*

(*) An optional PGN 5 ISOL kit is available for PGN 5 welding gun. This option is requested for aluminium faced insulation.

Contact stud welding sequence

In welding with contact, the stud is inserted into the stud holder of the machine [see Figure 11.8 & 11.9] and positioned with its ignition tip directly on the surface of the component [see Figure 11.10]. A spring in the welding gun presses the stud against the metal. Once the capacitor power has been switched on, the ignition tip abruptly explodes and vaporizes partially, and the arc is generated. The stud is advanced still further towards the parent metal and finally remains in the solidified melt. The welding time is ≤ 10 ms.

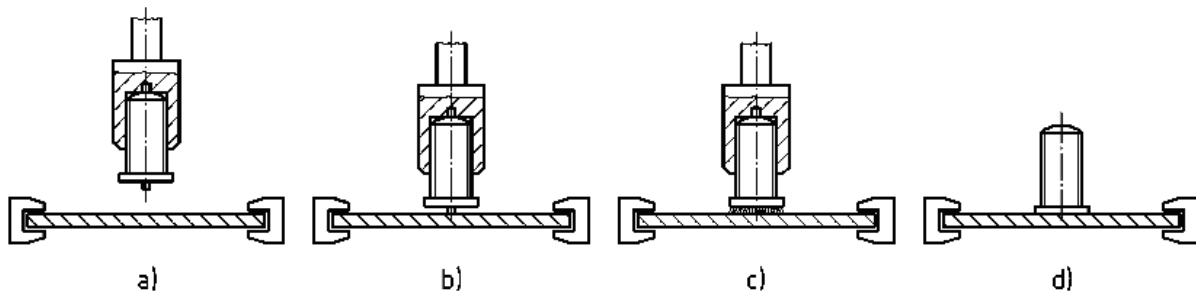


Fig. 11.6 Contact stud welding sequence

Notes:

- A threaded stud was chosen as welding element in the figure above.
- The recommended parent metal thickness should be $\geq 0,1 d$ but not less than approximately 0,5 mm.



Chuck preparation for welding gun PGN 5



The chuck is selected depending on size and material.

Note: Chucks are wearing parts and should therefore always be kept in stock and ordered on time.

Procedure

1. Select a Chuck fitting the CHP material and size

Caution: The chuck locking nut may not be tightened when there is no Chuck in the welding gun.



2. Loosen the chuck locking nut (if it is tight) by turning 90° with an Open Ended Spanner SW17.



3. Insert the chuck into the gun spindle and push firmly home until it comes to a rest.

4. Tighten the chuck locking nut with an Open Ended Spanner SW17. "Hand tight" is all that is required. Over tightening may result in damage to your gun.

Caution: Make sure that the bellow is positioned correctly on the chuck nut.



Adjusting the Cup Head pin

The electrical and mechanical welding parameters are set at the stud welding unit and on the welding gun.

Welding time

The welding time depends on the stud speed. It is adjusted indirectly **via the gun spring pre-load**. Higher plunging speed leads to shortened arc time and consequently to lower welding energy with identical voltage setting. Set the gun spring pre-load to the appropriate setting for the stud/material to be welded by adjusting the gun back knob.



Set the gun spring pre-load to the appropriate setting for the stud/material to be welded by adjusting the gun back knob. (for CHP, use a coin or a screwdriver for this):

Turning clockwise:

The spring pre-load is increased, thereby **reducing** the welding time.

Turning anticlockwise:

The spring pre-load is reduced, thereby **increasing** the welding time.



Note: To prevent damage to the adjusting mechanism, never use force to turn the adjusting knob to its end position.

Procedure

Find your material combination and the diameter of the welding element in the following table. Turn the adjusting knob until the spring force indicator on the welding gun shows the value from the below table.

<u>Workpiece</u> <i>(suitable for welding)</i>	CHP in St 37-3			CHP in CrNi-steel (1.4301)		
	Ø 2	Ø 2,7	Ø 3	Ø 2	Ø 2,7	Ø 3
Mild steel	1-2	1-2	1-2			
Galvan. Steel(<25 µm)	1-2	1-2	1-2	1-2	1-2	1-2
1.4301				1-2	1-2	1-2

Tab: 11.7 Recommended **spring force** [mm] for Cup Head Pin welding gun PGN 5 to CHP

Determining the Charge Voltage

The welding current strength is regulated via the **Welding Voltage selector knob** of the power unit. To set the charge voltage, turn the Welding Voltage selector knob until the digital display shows the voltage value required.

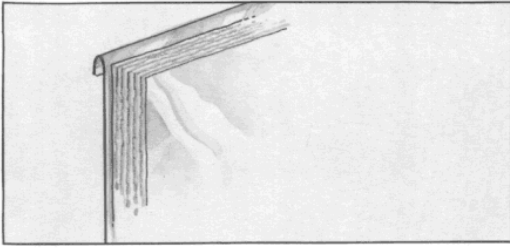
<u>Workpiece</u> <i>(suitable for welding)</i>	CHP in St 37-3			CHP in 1.4301		
	Ø 2	Ø 2,7	Ø 3	Ø 2	Ø 2,7	Ø 3
Mild steel	90	110	115			
Galvan. Steel(<25 µm)	95	115	120	95	115	120
1.4301	95	115	120	90	110	115

Tab: 11.8 Recommended **charge voltage of Welding Unit N 5**

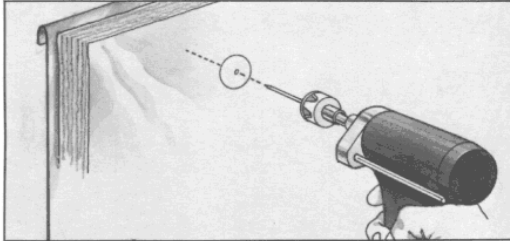


Note: The figures in these tables are indicative values and must be checked by means of a test welding on the original material with the same properties as the original workpiece.

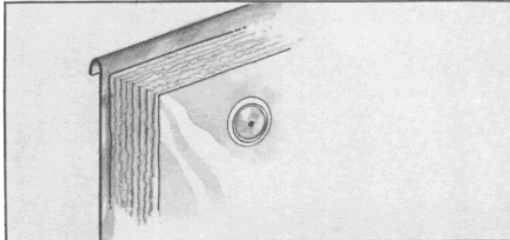
Work procedure for PGN 5 gun



1. LOCATE INSULATION.



2. PRESS CUP HEAD PIN THROUGH INSULATION.
NOTE — AN INSULATING PAPER WASHER IS REQUIRED
HERE WHEN WELDING THROUGH FOIL FACED INSULATION.



3. WELD IN PLACE TO COMPLETE INSTALLATION.



Work procedure:

1. If not already done, insert a CHP on the chuck. Push the pin through the insulation until contact is done with the workpiece. The contact LED lights up.

2. Apply firm and vertically with both hands, even pressure to the gun (compress the gun spring of about 1.5 to 3 mm).

3. Hold the welding gun steady and pull the gun trigger button. The welding process is started. As the weld takes place, the spring in the gun will force the pin forwards.

A trigger block prevents the welded welding element from being welded again. The power unit remains discharged.

4. After welding, always pull the welding gun straight back perpendicularly away from the workpiece.

The LED "contact" turns OFF and the power unit charges the capacitors for the next welding operation.

Notes:

- Some burning of the magnetic chuck is normal; however a badly burnt or misshapen chuck may result in poor or inconsistency welds and should be replaced.
- When welding trough foil faced insulation use only insulated CHP (ISOL and/or PAP CHP) to prevent arcing between pin/clips and foil facing.

Warning: Risk of burns

The gun head becomes very hot during the welding process. The same applies to the welded element and the workpiece.

5. Check the welding result in accordance with relevant norms. If the welding result is not satisfactory, the settings must be optimised.

Warning:

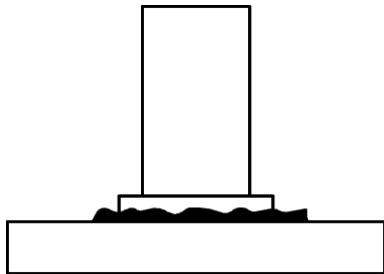
After completing welding work or in the case of longer breaks in welding work disconnect the machine from the mains power supply and secure it against unauthorised use.

12. Checking the Weld Quality

Weld assessment and recommended corrective actions for capacitor discharge stud welding with tip ignition

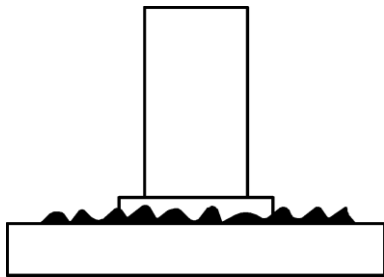
4.7.1 Visual inspection

Every welded welding element must be checked visually. Besides assessing the **weld collar** for form, size and appearance, you should also check the **nominal length** of the welded stud.



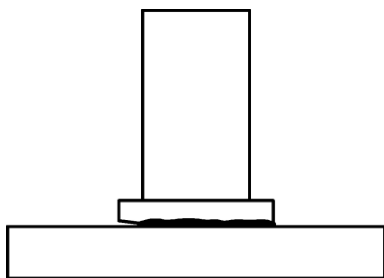
1. Acceptable weld:

Small weld spatter around joint. Regular collar.
No visual defects.



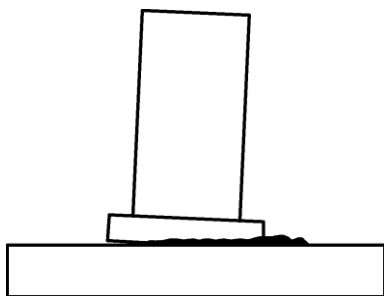
2. Hot Weld:

Considerable spatter around weld.
Weld power too high and/or insufficient plunging speed.
—► Reduce weld power / Increase plunging speed / Increase gun lift



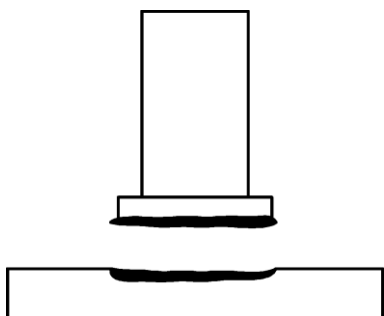
3. Cold Weld:

Gap between flange and parent material.
The form and height of the weld bead are irregular
Weld power too low. Plunging speed too high.
Insufficient support of parent material.
—► Increase weld power / Decrease plunging speed / Decrease gun lift.



4. Irregular Weld:

The weld collar is asymmetrical (as a result of magnetic arc blowing action) and the stud edge is undercut on one side.
(Possibly change ground clamps positions.)

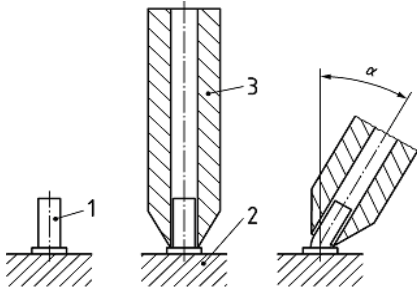


5. Fracture in weld:

Weld power too low. Plunging speed too low. Combination stud/parent material unsuitable.
—► Increase weld power. Increase plunging speed. Select suitable material.

Bending test

The impact bending test is one of the most common test methods to check welding parameters and to identify defective welds.



The test serves as a simple bench test for approximate checking of the chosen welding data. In the test, the weld is subjected to bending in an undefined manner. If arc blow or another visible imperfection is suspected, the stud shall be bent in a manner such that the area to be examined is in the tension zone.

This can be done by one of the two following methods.

- a) The studs are bent by 60° using drawn arc stud welding with ceramic ferrule or shielding gas and applications $\leq 100^\circ\text{C}$, or short-cycle drawn arc stud welding, by 30° using capacitor discharge stud welding with tip ignition or drawn arc stud welding with ceramic ferrule or shielding gas and applications $> 100^\circ\text{C}$ (see Figure 2).

If a weld joint is thought to be defective or the fusion length of the stud is too short, the impact bending test must be carried out as follows:

Bend the welding element (1) by $\alpha = 60^\circ$ with a hammer or bending device (3). This stresses the weld joint in tension, pressure and bending by an undefined amount. (2 = Base plate)

- The impact bending test is deemed as passed if there are no cracks to be seen in the welding zone.
- If the welding element is torn out of the base metal (a recess is formed in the workpiece), the weldability of the materials is deemed proven.
- If the welding element breaks off in the welding zone, you must check whether:

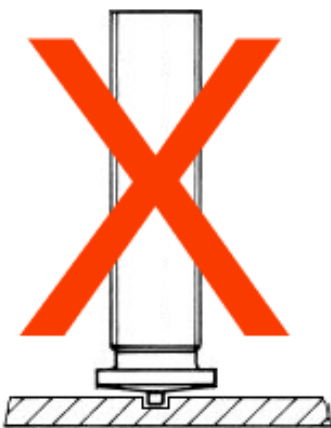
- both materials are weldable,
- the material combinations are weldable,
- the ignition tip is in order,
- the settings on the welding gun and power unit are correct and the welding gun or power unit is defective.

If these requirements are not met, an impact bending test must also be carried out on the three previous and three next welds.



Warning:

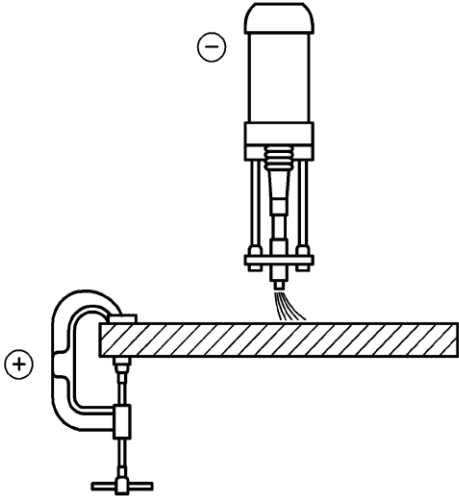
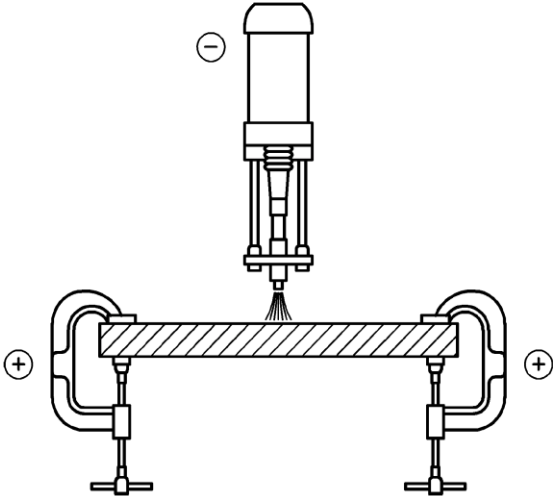
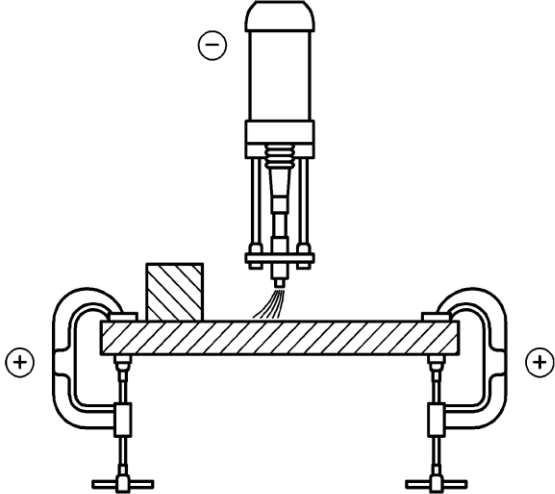
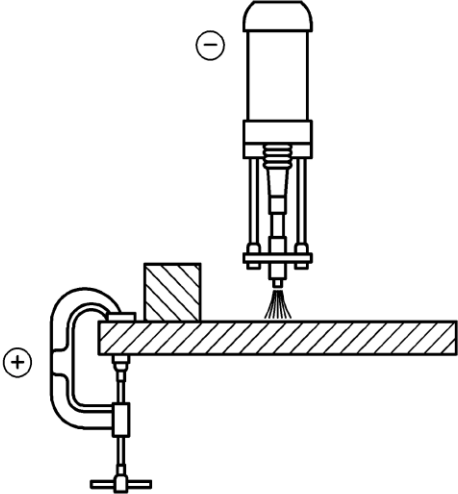
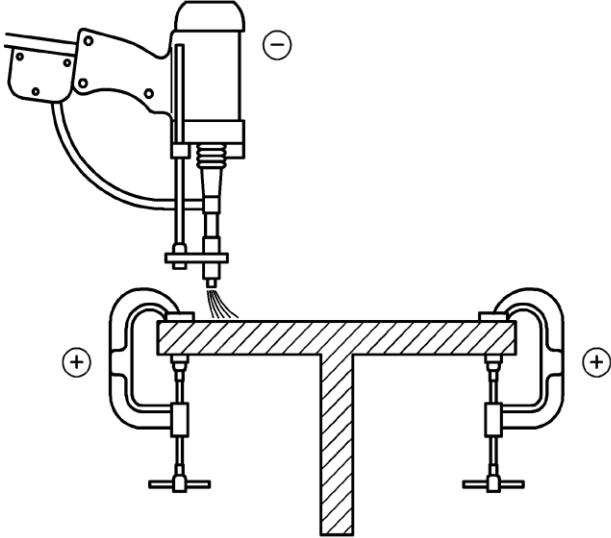
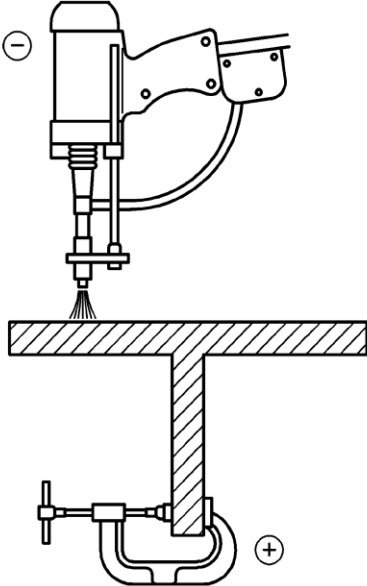
Welding work may only be continued when satisfactory test results are obtained.



- Manual centre punch indentations must NOT be used for stud location as this will have the same effect as shortening the pip on the weld stud, could adversely affect the weld quality and will damage the studs welding unit (welding SCR)
- If practical considerations compel the use of indentations, then we would suggest the use of either an automatic centre punch or a punch press set only to produce the shallowest of indents consistent with the ease of stud location.
- The setting chart parameters may have to be altered.

If in any doubt, please seek the advice of your local technical representative.

13. Effect of arc blow and some possible remedies

No.	Cause	Remedy
A		
B		
C		

NOTE Arc blow is proportional to current intensity and can be influenced by symmetrically attaching mass clamps and compensating masses, or (in the case of hand welding guns with an external welding cable) by turning the welding gun around the vertical axis. Arc blow generates one-sided melting and can increase the number of pores in the welded materials, but it can be reduced by suitable application of different remedies.

14. Troubleshooting



Danger from insufficiently qualified operating personnel

- Carry out only the work described here on your stud welding unit or stud welding gun.
- Repairs may only be carried out by appropriately qualified personnel.

Fault		Possible Cause	Fault Remedy
Main switch does not light up although it is switched on		• Main fuse defective • Primary outlet defective. • Power cable defective	• Check Fuse • Check Primary outlet • Check Power cable
	READY Led does not light up	• Indicates that the unit is in the process of charging the capacitors. • Charging module defect.	• No action is required • Contact your local Nowa Gruppe Sp. z .o.o. after sales service.
	TRIGGER Led does not light up	• Gun is not connected or defect • Welding gun trigger is defective	• Check Gun and cable • Check Gun trigger switch
	CONTACT Led does not light up	• Gun not connected or defect • Ground not connected or defect	• Check Gun and cable • Check Ground clamps and cable • Ensure that the contact area of the work piece is free from rust, paint, etc.
	OVERHEAT Led does light up	• Welding unit temperature too high	• Let switched on the welding unit N 5 for 1 hour, for unit cooling down. Then switch off the stud welding unit and after some seconds switch it on.
	DEFAULT Led does light up	• Malfunction • Fault in power unit	• Switch N 5 off, then after some seconds switch on; if the stud welder is still locked, switch off the stud welding unit and inform your local Nowa Gruppe systems after sales service

Tab: 14.1 Troubleshooting using LED indicators

Error List

Error (*)	Possible Cause	Fault Remedy
E 1	Gun trigger pressed when machine is switched ON	Check welding gun trigger
E57	Gap Module Capacitors Malfunction	Contact your local Nowa Gruppe Sp. z .o.o. after sales service.
E71	Weld SCR defect	Contact your local Nowa Gruppe Sp. z .o.o. after sales service.
E72	Capacitors are not charging	Check fuse or overheat of the machine
E73	Capacitors are still charged when unit is switched ON	Contact your local Nowa Gruppe Sp. z .o.o. after sales service.
E74	Main relay defect	Contact your local Nowa Gruppe Sp. z .o.o. after sales service.
E75	Charging SCR defect	Contact your local Nowa Gruppe Polska Sp. z .o.o. after sales service.
E76	Capacitors are not charging during the test when unit is switched ON	Check fuse or overheat of the machine
E77	Capacitors are discharging too fast.	Contact your local Nowa Gruppe Sp. z .o.o. after sales service.
E78	No weld (no discharge)	- Weld SCR defect. - Control Board defect - Bad electrical contact in the welding circuit (gun/plate)
E79	Capacitors voltage is too high (> 210 v)	Contact your Nowa Gruppe Sp. z .o.o. after sales service.
E82	PCB Main Relay ctrl command Malfunction	Contact your local Gruppe Polska Sp. z .o.o. after sales service.

Tab: 14.2 Troubleshooting using Voltmeter LED display

(*) Errors numbers displayed on the "Welding Voltage Digital display"

15. Maintenance and Care



Danger from insufficiently qualified operating personnel

- Carry out only the work described here on your stud welding unit or stud welding gun.
- Repairs may only be carried out by appropriately qualified personnel.



Warning

- Always switch off the stud welding unit and pull out the mains plug before starting maintenance and care work.

Cleaning Welding gun

- It must be ensured that the handle of the welding gun is always dry and clean. Clean the surface of the stud welding gun with a slightly damp cloth, when necessary.



Caution: Do not use aggressive agents or solvents for cleaning

- Weld spatters on legs and chucks must be removed.

Cleaning Studs welder

- Clean the surface of the stud welding unit with a slightly damp cloth, when necessary. The LED indicators must be clearly readable in operation.



Caution: Do not use aggressive agents or solvents for cleaning

Cleaning cables

- All connecting cables must be cleaned with a dry cloth, so damaged cables can be detected more easily.



Caution: Do not use aggressive agents or solvents for cleaning



Warning: The damaged cables must be replaced immediately

Inside the device

- It might also be necessary to clean the inside of the device if it is dirty.
- Dirt and contamination inside the power unit like metallic dust or conductive chips must be removed do not use compressed air.



Warning:

- Only authorised and appropriately qualified electricians may open the power unit and work inside the welder.
- The power unit must be switched off, disconnected from the mains power supply and secured before starting, so that it cannot be switched on again before opening.
- After the cleaning work the device must be restored to and handed over in orderly condition so that – when used properly in accordance with these instructions – it does not pose a danger to the user or the environment.

Fuse elements

- There is a fuse at the back of the N 5 unit.
- Check fuse value in the Technical specifications chapter



Warning:

Always replace defective fuses with fuses of identical ratings.

Maintenance intervals

- You can avoid malfunctions caused by inadequate maintenance by adhering to the following maintenance intervals.
- The maintenance intervals and instructions specified in the table below presuppose proper use under normal conditions.



Warning: Electric shock hazard

- Always switch off the stud welding unit before starting maintenance and care work. Pull out the mains plug.
- Maintenance work requiring the power unit N 5 to be opened may only be carried out by appropriately qualified electricians!
- Danger from insufficiently qualified operating personnel: Maintenance may only be carried out by appropriately qualified personnel.

Maintenance intervals	Maintenance instructions
Every 8 hours or daily	Before starting work : - Inspect the general and safe condition of the machine, gun, ground clamps. - Check the welding cable, earth cable, control cable and power cable for external damage – replace defective cables immediately. - Check the Chuck (wearing part) for adequate clamping force and wear - replace if necessary. - Check the welding cable plugs for tight connection; tighten if necessary – replace damaged plugs. - Check the gun chuck nut; tighten or replace if necessary. - Check the gun bellow for correct seating and adjust if necessary – replace if damaged. - Check the positioning feet; tighten if necessary – replace bent feet. - Check the gun spindle for ease of movement – clean with a brass brush. - Check whether the readings on the display and LED's of the stud welding unit are still legible before starting.
Every 35 hours or weekly	• Check connections and operating elements .
Every 800 hours or half-yearly	Power unit N 5 : Check for dirt and contamination inside the housing and clean if necessary according to "Maintenance and Care". Check all screw connections.
Every 2 years	• General inspection of the power unit by appropriately qualified electricians.

Tab: 15.1 Periodic maintenance intervals



Warning:

After the cleaning work the device must be restored to and handed over in orderly condition so that – when used properly in accordance with these instructions – it does not pose a danger to the user, other people or the environment

16. Technical specifications & Explosion view

16.1 Stud Welding unit : N 5

Welding method	Capacitor discharge stud welding with tip ignition according to current standards
Primary voltage / Frequency	N 5 230V(±10%) / 50Hz-60Hz
Mains fuse external	N 5 : T 6,3 A
Charge capacity max	N 5 : 66.000 µF
Charge voltage	50 to 200 V, (stepless voltage regulation)
Energy	N 5 : 1320 Ws
Welding rate	N 5 M8 = 3 studs/min. (Charging voltage 200 V)
Cooling	Fan (AF) (temperature controlled cooling fan)
Protective system	IP 23
Protection class	I (one)
Ambient temperature limits	0 °C to 40 °C
Dimension (l x w x h)	400 x 195 x 270 mm (315 mm with handle)
Weight	N 5 : 12,5 Kg
Power cable	length: 3 m line cross section: 3 x 2,5 mm ²
Ground cable	
- Recommended with PSN 5:	Twin ground clamp (1 plug and 2 clamps) length 2 x 2.5 m. cross section: 25 mm ² ; highly flexible
- Recommended with PGN 5:	Single ground clamp (1 plug and 1 clamp) length 1 x 5 m. cross section: 25 mm ² ; highly flexible

16.2 PSN 5 Gun

Technical specifications

Type	Contact stud welding gun C0
Welding range	M3 – M8 (M 10)
Weight	0,6 kg (without cable)
Noise level	> 107 dB(A) may occur during welding
Protection class	IP 20
Welding & control cable	length: 3 m Weld cable cross section: 25 mm2



Fig. 16.1 Dimensions PSN 5

 Front View	1 – 2	Not connected		
	3 - 4	Trigger		Micro-switch inside the gun
	5 - 6	Not connected		

Fig. 16.2 Control cable plug connection

For procurement of replacement parts for the power unit and gun, see the exploded views.



Warning:
Repair work may only be carried out by appropriately qualified electricians!

Explosion view of PSN 5 Gun

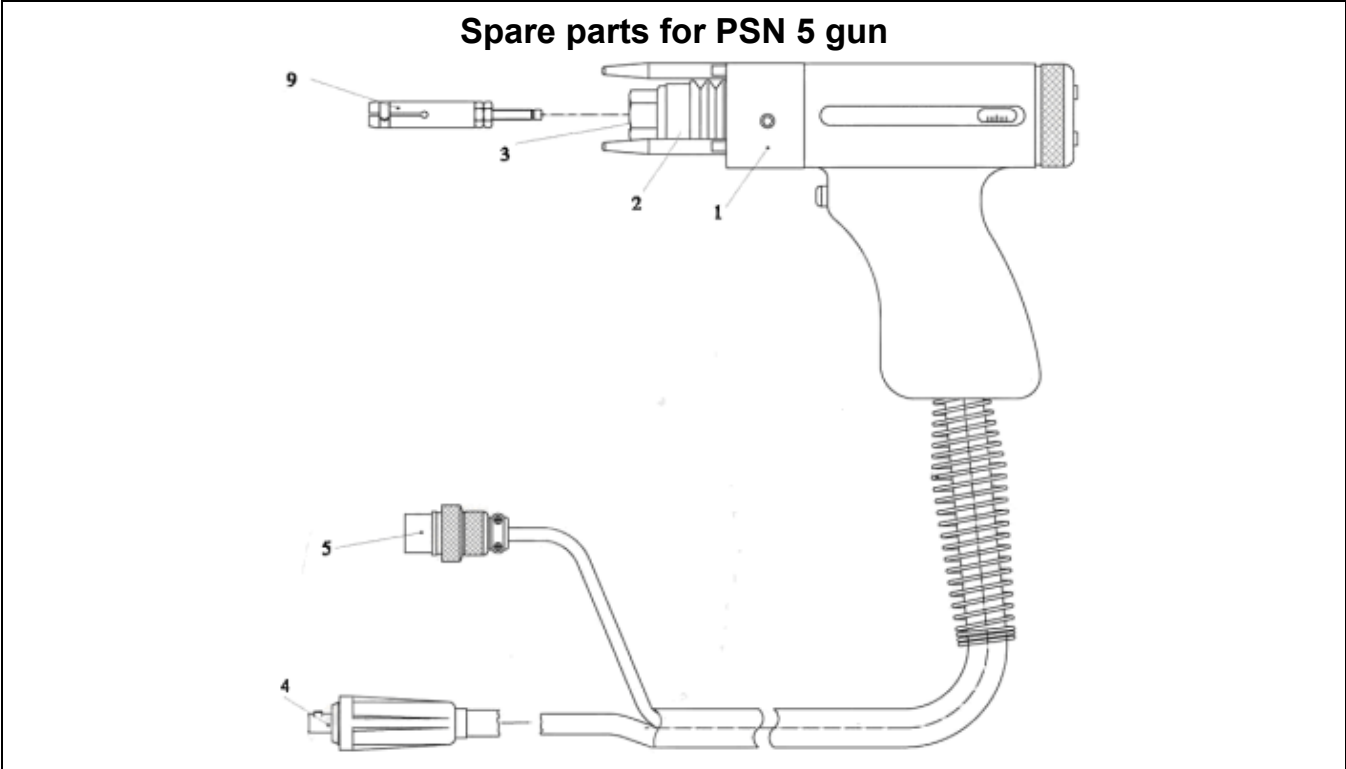


Fig. 16.3 PSN 5 Gun Explosion view

Your PSN 5 welding gun may differ in some details. This has no effect on the operation of the welding gun.

		Part Number	
1.			PSN 5 Tripod and legs (see C0 welding accessories chapter)
2.		005.102.108	PSN 5 Bellow
3.		005.102.103	PSN 5 Chuck nut
4.		005.110.020	Weld male plug
5.		005.110.314	7 pins connector, cable end
9.			Chuck (see PSN 5 welding accessories chapter)

Others parts cannot be ordered separately

Spare gun			
		005.102.151	C0 Gun complete without cable
		005.102.150	C0 Gun complete with cable

Fig. 16.4 Explosion view standard contact welding gun PSN 5

16.3 Welding Gun PGN 5

Technical specifications

Type	Contact welding gun PGN 5
Welding range	CHP Ø 2 - 4 mm
Weight	0,9 kg (without cable)
Noise level	> 107 dB(A) may occur during welding
Protection class	IP 20
Welding cable	length: 8 m
Control cable	length: 8,20 m



Fig. 16.5 PGN 5 gun

 <i>Front View</i>	1 – 2	Not connected		
	3 - 4	Trigger		Micro-switch inside the gun
	5 - 6	Not connected		

Fig. 16.6 Control cable plug connection

For procurement of replacement parts for the power unit and gun, see the exploded views.



Warning:
Repair work may only be carried out by appropriately qualified electricians!

View of PGN 5 Gun

Spare parts for PGN 5 gun

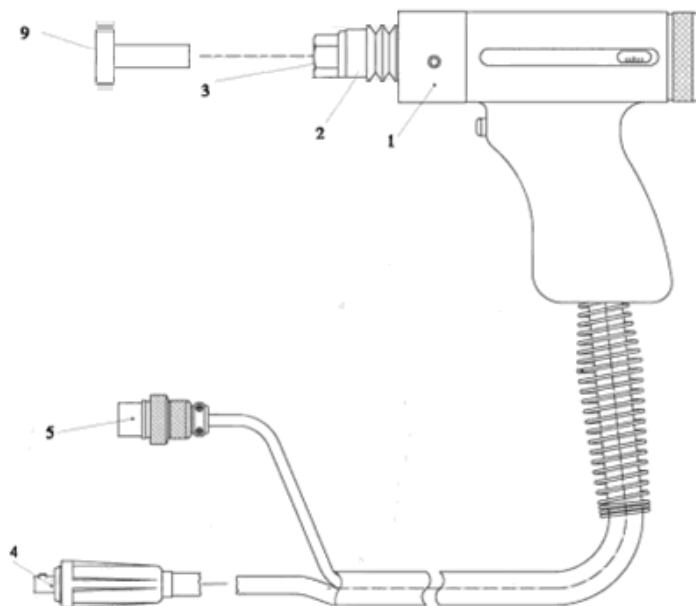


Fig. 16.7 PGN 5 Welding Gun view

Your PGN 5 welding gun may differ in some details. This has no effect on the operation of the welding gun.

		Part Number	
1.			PGN 5 Front face plate (see C0 welding accessories chapter)
2.		005.102.108	PGN 5 Bellow
3.		005.102.103	PGN 5 Chuck nut
4.		005.110.020	Weld male plug
5.		005.110.314	7 pins connector, cable end
9.			Magnetic Chuck (see PGN 5 welding accessories chapter)

Others parts cannot be ordered separately

Spare gun

		005.102.151	PGN 5 Gun without cable
		005.102.150	PGN 5 Gun with cable

17. CD Accessories

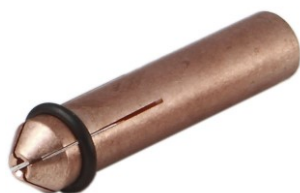
17.1 Accessories for PSN 5 / C1 / G1

1. CHUCK



005.190.100	Chuck CD Ø 2 mm
005.190.101	Chuck CD Ø 2.5mm
005.190.104	Chuck CD Ø 3 mm
005.190.108	Chuck CD Ø 4 mm
005.190.112	Chuck CD Ø 5 mm
005.190.116	Chuck CD Ø 6 mm
005.190.120	Chuck CD Ø 7,1mm
005.190.124	Chuck CD Ø 8 mm
005.190.128	Chuck CD Ø 10 mm (Depending on the stud length, additional parts could be requested)
005.190.140	Set of 5 chucks (M3, M4, M5, M6, M8)

2. CHUCK for Insulation pins



005.190.102	Chuck CFN Ø 2 mm
005.190.103	Chuck CFN Ø 3 mm
005.190.107	Chuck CFN Ø 4 mm
005.190.134	Chuck for BIMETAL Ø3

3. Long CD Chucks (L = 67,5 mm)



005.190.163	Long Chuck Ø 3 mm
005.190.164	Long Chuck Ø 4 mm
005.190.165	Long Chuck Ø 5 mm
005.190.166	Long Chuck Ø 6 mm
005.190.168	Long Chuck Ø 8 mm

4. CHUCK for Earth Tag CDL / CDLD



005.190.581	CDL 6,3 x 0,8 mm
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Tool Ø 30 mm for template



The support tube allows stud welding with templates and positioning on curved surfaces (L: 79 mm)

005.190.068 : PSN 5 Gun

Longer Support Tube tool (+11 mm) => (L: 90 mm)

005.190.009 : C1 / G1 Gun

005.190.069 : PSN 5 Gun

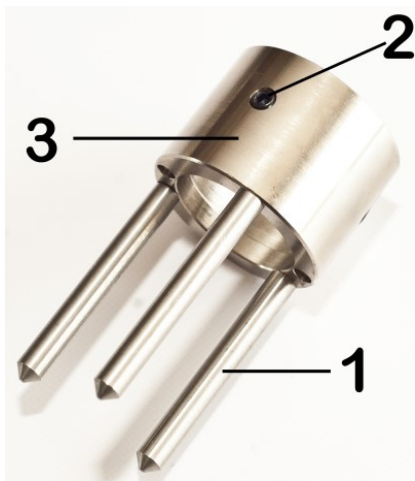
Tool for reducing noise (Ø 35 mm)



Reducing noise/spatter tool

005.190.066 : C0 Gun

Standard tripod leg assembly



Complete Assembly :

005.190.024 : PSN 5 Gun

	Complete Assembly consisting of :
005.190.002	1. Standard leg Ø 6 x 49 mm (Set of 3 is requested)
005.102.323	2. Screw (Set of 3 is requested)
005.102.110	3. Front end/Legs holder (PSN 5/PGN 5) (Supplied without leg, without screw)

Legs for tripod



Set of 3 is requested

005.190.002 Leg (Ø 6 x 49 mm)

005.190.004 Leg (Ø 6 x 76,5 mm)

005.190.005 Leg (Ø 6 x 89 mm)

005.190.003 Leg (Ø 6 x 116 mm)

Remark: Long legs can be used when welding longer studs or M10 studs.

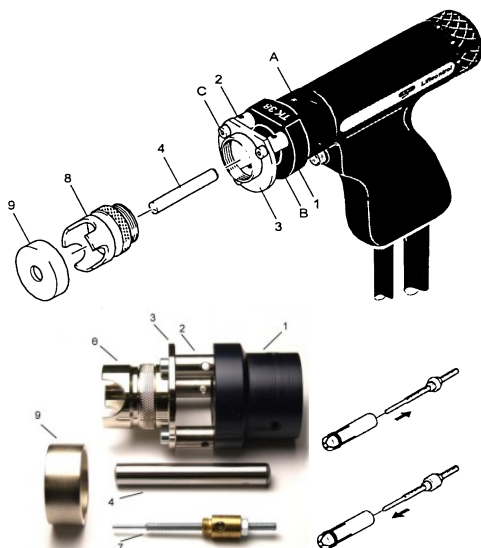
Socket spanner



005.190.295

Socket spanner SW 17

Screw-in nose cone assembly



C0

005.190.35x

Complete Assembly:

005.190.311

1. Face plate

005.190.315

2. Spacer (x 3)

005.190.320

3. Screw-in ring

005.190.325

4. Centring rod

005.190.045

7. Longer Back stop Chuck Screw

005.190.33x

8. Nose cone

005.190.34x

9. Centring cup

x = 1 for Ø 20 mm.

x = 5 for Ø 26 mm.

x = 7 for Ø 30 mm.

When using this assembly, chucks must be fitted with Longer backstop p/n 005.190.045.

Longer Chuck Back stop Screw



005.190.045

Chuck Back stop

Offset chuck attachment



005.190.012

Offset chuck attachment
The Angled Extension Arm allows the welding of studs into corners and against upstands

17.2 ISO Kit Accessories

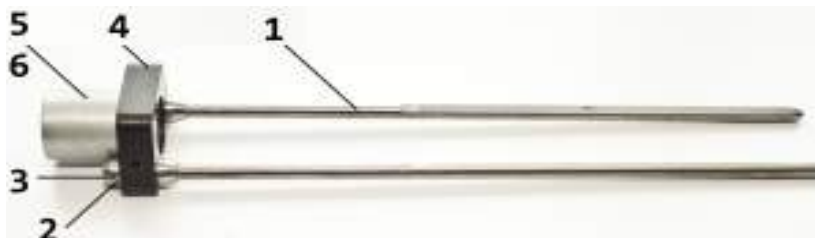


1. Chuck



005.190.100	Chuck CD Ø 2 mm
005.190.101	Chuck CD Ø 2,5 mm
005.190.104	Chuck CD Ø 3 mm
005.190.108	Chuck CD Ø 4 mm

2. Foot plate Assembly



1.
(*)

005.190.201	Leg : 170 mm
005.190.202	Leg : 220 mm
005.190.203	Leg : 300 mm
005.190.204	Leg : 400 mm
005.190.205	Leg : 500 mm

(*) Leg length $\geq$ CD pins length.

Sold individually. If you need a pair, be sure to order two



2.

005.190.210 Foot washer



3.

005.190.215 Foot screw



4.

005.190.240 Foot plate for Ø 35 mm nozzle



5.

005.190.241 Ø 35 mm Nozzle



6.

005.190.242 Nail guide (Teflon ring)

3. Gun face plate



Face Plate

005.102.157: PSN 5 Gun

17.3 CD Accessories for PGN 5 gun

Standard Magnetic chuck for CHP pins

	Chuck	for CHP pins (Ø 30 mm)
	005.190.162	Standard with 3 magnets

CHP Chuck magnetic head

	Chuck	for CHP pins (Ø 30 mm)
	005.190.573	For chuck 190.162 (with 3 magnets)

18. D Grounding clamps

Crocodile type

	005.102.165	Complete cable with Twin Ground clamp (By default, supplied with N 5 with PSN 5 gun)
	005.102.164	Complete cable with Single Ground clamp (Recommended for PGN 5 gun)
	005.102.160	Spare ground clamp