EMPOWERING FUTURE

DN-25C

FOOT-OPERATED SPOT WELDING MACHINE

EN SERIES

OPERATOR'S MANUAL

Dear User,

Thank you for choosing NGEN. This manual covers the installation, operation, maintenance and safety of the NGEN EN Series foot-operated spot welding machines. Please read it carefully before use and keep it for future reference.

To use the product correctly, installation, operation and maintenance of the machine must be carried out by a qualified welder.

WARRANTY NOTES

1. For safe and correct use, operate the machine below 80% of its rated current.
2. Working at 100% rated current for long periods, or using the wrong power supply, can overload the machine and damage the reactor coil (blackening of the coil). This is not covered by the warranty.
3. Repairs made without authorisation, or a removed or damaged "warranty void" seal, will void the warranty.
4. Accessories outside the machine body (welding arms, electrodes and other wearing parts) are not covered by the warranty.
5. The warranty requires proof of purchase showing the purchase date, dealer and buyer.

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1 Safety Instructions

Danger: to prevent serious accidents

1. This welding power supply is designed with safety in mind. Follow the precautions in this manual, otherwise serious accidents may occur.
2. For the input power construction, installation site selection, storage of workpieces and disposal of waste, follow the relevant regulations and your company's internal standards.
3. Keep non-essential personnel out of the welding area.
4. People with pacemakers must not approach the machine or the welding area without a doctor's permission. The magnetic field produced when the machine is on can affect a pacemaker.
5. Installation, maintenance and servicing must be carried out by qualified professionals.
6. Operators must understand this manual and have safe operating knowledge and skills.
7. Do not use this machine for any purpose other than welding.

Electric shock prevention

Contact with any live part other than the secondary electrode can cause a fatal electric shock or burns.

1. Do not touch live parts.
2. Have a qualified electrician connect the power supply and ground the base material according to regulations.
3. Switch off the distribution box before installation or maintenance.
4. Do not use cables of insufficient capacity or with damaged insulation that exposes the conductor.
5. Insulate all cable connection points properly.
6. Do not use the machine with the casing removed.
7. Wear dry insulating gloves.
8. Use safety nets when working at height.
9. Inspect and maintain the machine regularly. Repair any damaged parts before use.
10. Switch off all input power when the machine is not in use.

Fire prevention

Welding spatter and grinding dust entering the machine will degrade insulation and can cause a fire.

1. Keep the welding power supply separate from welding and grinding operations.
2. Inspect and maintain the machine regularly to prevent insulation damage from dust build-up.

3. If spatter or metal dust enters the machine, switch off the machine and the distribution switch, then blow it clean with dry air.

Handling and placement

1. On an inclined surface, secure the machine so it cannot tip over.
2. The enclosure rating is IP21S. Cover the machine when used in rain.
3. When lifting with a forklift, lift from the side to prevent tipping.
4. When lifting with a crane, tie the sling to the lifting ring. The angle between the sling and vertical must not exceed 15 degrees.

Further precautions

- **Grounding:** to prevent electric shock, have a qualified electrician ground the machine according to legal standards.
- **Overheating:** keep the machine at least 20cm from walls and at least 50cm from flammable materials.
- **Sparks:** keep sparks and spatter away from flammable materials and from the machine's air inlets and openings.
- **Falls:** when installing the machine on a platform, fix it with anchor bolts so it cannot fall.
- **Manual:** read this entire manual and use the machine as described.

2 Electromagnetic Interference Precautions

Additional precautions may be needed when the machine is used in certain areas. Before installing, assess possible electromagnetic problems in the surrounding area, including:

a. Power, control, signal and telephone cables above, below and next to the welding equipment;
b. Radio and television transmitters and receivers;
c. Computers and other control equipment;
d. Safety and monitoring equipment for industrial processes;
e. The health of people nearby, such as those using pacemakers or hearing aids;
f. Calibration and measuring equipment;
g. The immunity of other equipment in the area. Additional protective measures may be required;
h. The time of day when welding or other activities are carried out.

To reduce interference:

a. Connect the welding equipment to the mains supply as recommended by the manufacturer;
b. Maintain the welding equipment regularly;
c. Keep welding cables as short as possible and lay them close together, on or near the ground;

d. Check the safety of all metal parts in and around the welding setup;

e. Ground the workpiece properly;

f. Shield other cables and equipment where needed. In special cases, the whole welding installation can be shielded.

The user is responsible for any interference caused by welding.

3 Overview

Spot welding needs no welding rods or flux. A strong current fuses the contact points of the workpieces together. It is widely used for welding metal sheets, metal frames and wire mesh, and has increasingly replaced soldering.

NGEN EN Series spot welders weld low carbon steel, stainless steel and some aluminium and brass alloys. They can also join different materials and thicknesses, and weld ultra-thin workpieces down to 0.1mm. Weld points are firm and reliable.

Pressure is applied with a foot pedal and the structure is simple. When the pedal is not pressed, the main coil receives no power, which saves electricity. Timing control cuts the current off on schedule even if the workpiece is still pressed, reducing operator variation and making weld quality more consistent. Weld time is set steplessly by an electronic controller from 0.02 to 2 seconds (most workpieces need under 0.5 seconds) and can be repeated precisely.

4 Installation Site and Power Supply

Installation site

- Install indoors, away from direct sunlight, in a dry place with little dust. Ambient temperature: -10°C to 40°C.
- Do not allow metal objects to enter the machine.
- Keep the machine at least 20cm from walls. When placing machines side by side, keep them at least 30cm apart.
- Relative humidity: below 80%.
- Altitude: not more than 1000m.

Water

This machine is for indoor use. If it gets wet from rain or water enters the machine, inspect it and wipe off the water before use.

Power supply requirements

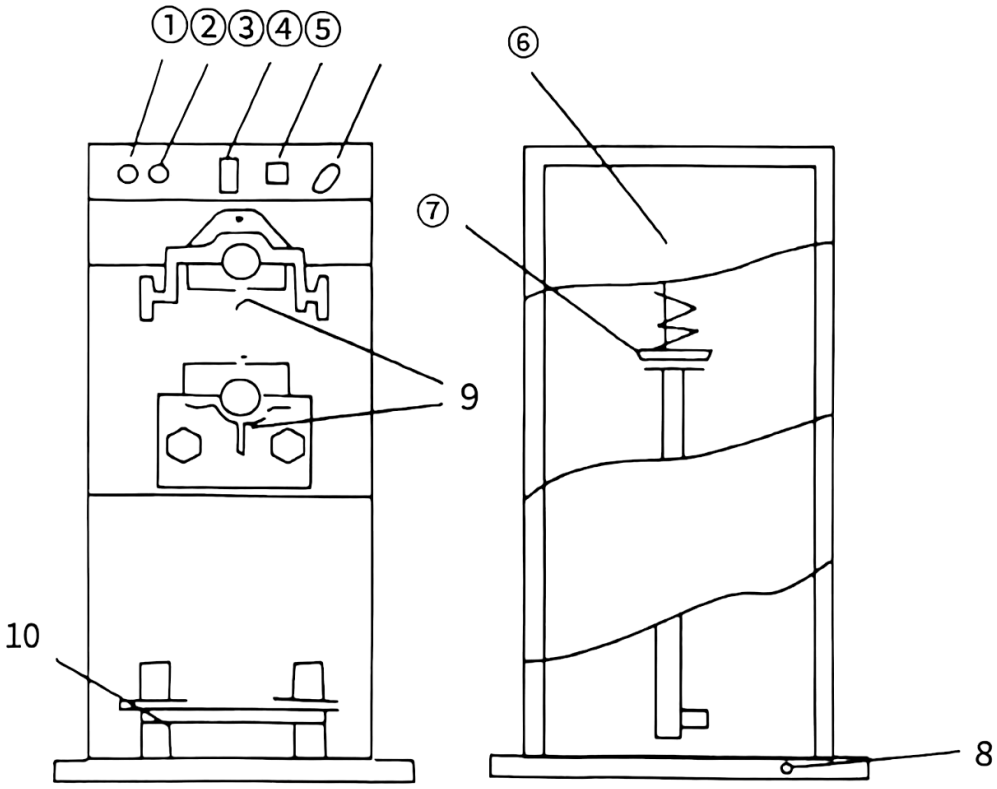
Item	DN-16B	DN-25B / DN-25C	DN-40B
Power supply	AC 3 phase 380V, 50/60Hz		
Mains capacity	50kVA	50kVA	50kVA
Engine generator	More than twice 7.6kVA	More than twice 7.6kVA	More than twice 18.1kVA
Input protection (circuit breaker or earth leakage device)	20A	20A	63A
Input cable cross section	2.5mm² and above	4mm² and above	6mm² and above
Ground wire	14mm²	14mm²	14mm²

Install an electric shock protection device when working in humid areas or on steel plates or frames.

ATTENTION

- Allowable supply voltage fluctuation: ±10% of rated input voltage.
- When using an engine generator, use one with a compensation winding rated at more than twice the machine's input capacity.
- Fit each welding power supply with its own automatic switch or circuit breaker (or earth leakage device) of the specified capacity.
- Choose the breaker type according to the application (welding power supply, motor or transformer use).

5 Names and Functions of Each Part



① Power indicator light	⑦ Pressure regulating nut
② Work indicator light	⑧ Grounding screw
③ Power switch	⑨ Output electrodes
④ Automatic timing adjustment switch	⑩ Foot pedal
⑤ Current adjustment switch	⑥ Rear cover plate

6 Connection and Grounding

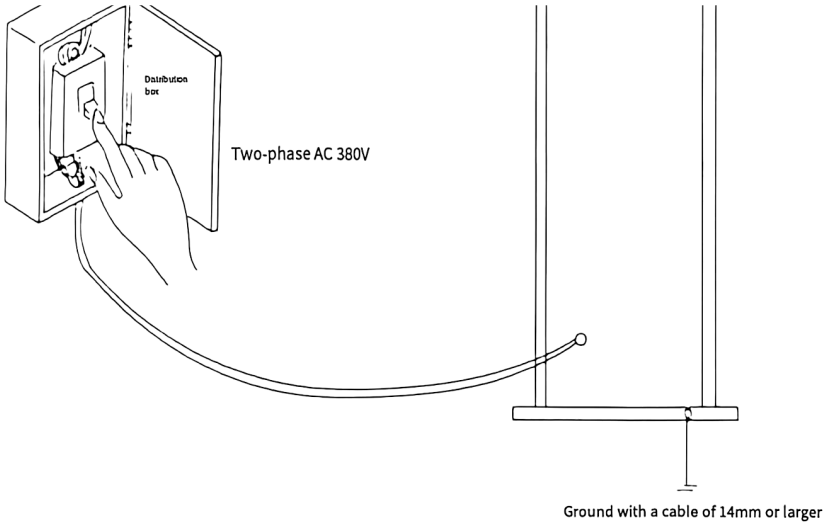
Safety warning

To prevent electric shock and burns:

- Make all electrical connections only after switching off the distribution box.
- Do not touch with wet hands.

Welding power supply and distribution box

Connect the input cables to the distribution box (AC 380V). Use an automatic switch in the box without a fuse, or fit the specified fuse (or earth leakage device). Ground the machine with a cable of 14mm² or larger.



ATTENTION

To prevent fire from overheated cables, machine damage and unstable welding:

- Use cables larger than the specified size (see Power supply requirements).
- Do not place heavy objects on the cable or let it touch the welding area.
- Crimp all cable connection points securely.

7 Welding Operation

Refer to the part numbers in section 5.

1. After the external power is connected, the power indicator light ① comes on. Place the workpiece between the two electrodes ⑨.
2. When using the machine for the first time, or when you are unsure of the current and time to use, set the current adjustment switch ⑤ and the timing switch ④ to the minimum position and make a test weld.
3. Press the foot pedal ⑩ smoothly (do not stamp on it) so the electrodes close on the workpiece. The work indicator light ② comes on while the electrodes are powered and welding is in progress. How long it stays on is set by the timing switch.
4. When the work indicator light ② goes out, release the foot pedal ⑩. The weld is complete. Each press of the pedal makes one weld.
5. Start from the lowest current and increase it gradually until the weld joint is firm but there are no flying sparks.

- The current adjustment switch ⑤ and timing switch ④ are on the front panel. A higher setting gives a higher output current or a longer weld time.
- Electrode pressure (the force clamping the workpiece while the electrodes are energised) is adjusted on the vertical pull rod inside the machine. Open the rear cover ⑥ and turn the pressure regulating nut ⑦. The tighter the spring, the greater the pressure.
- Weld quality depends on current, time and pressure. Too much current or too long a time will burn through the workpiece; too little and the joint will not hold. Generally, a higher current with a shorter time gives better weld quality.
- Once the current and time are set, the output stays constant.

OPERATING PRECAUTIONS

- Never let the upper and lower electrodes touch directly with no workpiece between them. Switch off the power, or place insulating material between the electrodes, before adjusting electrode extension or pressure.
- Do not turn the current adjustment switch while welding or while the coil is discharging. Change settings only after welding is complete.
- Keep the weld area of the workpiece free from rust and oil. Otherwise welds may not hold or may spatter, shortening electrode life.
- Use replacement electrodes of the same material as the original NGEN electrodes, otherwise weld quality will be affected.

8 Technical Data

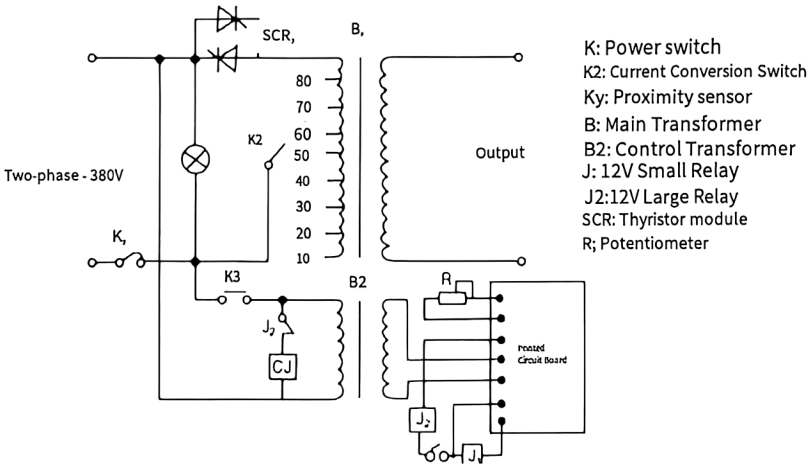
Model	DN-16B	DN-25B / DN-25C	DN-40B
Rated input power	AC 3 phase 380V		
Frequency	50/60Hz		
Rated capacity	16kVA	25kVA	40kVA
No-load voltage	1.1 to 2.9V	1.4 to 3.7V	1 to 7.6V
Rated duty cycle	20%	50%	20%
Welding capability (low carbon steel)	Max 2.5 + 2.5mm Min 0.2 + 0.2mm	Max 3.0 + 3.0mm Min 0.5 + 0.5mm	Max 4.0 + 4.0mm Min 0.5 + 0.5mm
Weld time	0.02 to 2 seconds, stepless electronic control		
Enclosure protection	IP21S		
Dimensions	710 × 365 x 1135mm	1020 × 450 x 1180mm	1020 × 450 x 1180mm

The DN-25C datasheet lists 25kVA, 20% rated duty cycle, 2.0 + 2.0mm welding ability, 500mm arm reach, 1100 × 460 × 1170mm and 150kg. NGEN reserves the right to change specifications without notice.

Standard equipment

EN Series spot welding machine	1 unit
Operator's manual with warranty certificate	1 copy

Electrical schematic diagram



9 Spot Welding Process Guide

Low carbon steel

Low carbon steel has good spot welding properties and a wide range of usable parameters. In the common thickness range (0.5 to 3.0mm) no special measures are needed; a simple welding cycle gives good results.

- Cold rolled sheet needs no cleaning before welding. Hot rolled sheet must have scale, rust and oil (such as stamping oil) removed.
- Where machine capacity allows, use "hard" settings (higher current, shorter time) for better efficiency, productivity and less distortion. Use Cr-Cu or Cr-Zr-Cu electrodes.
- Where surface cleaning is poor or parts are stiff and poorly fitted, a gradually increasing current or a preheat pulse can reduce spatter.
- Above 3mm thickness, current and weld time increase; multi-pulse welding improves electrode working conditions.

Hardenable steel

Hardenable steels (carbon content above 0.3%, for example 45# and 50# carbon steel or alloy steels such as 30CrMnSi, 1Cr11Ni2W2MoV and 2Cr13) can form brittle martensite in the weld and heat affected zone. They spatter easily, and thick plates can crack or show porosity. Use a slow cooling or double pulse (weld pulse followed by a tempering pulse) process. Above 3mm, increase the forging force.

Galvanised steel

- Increase current by 30% to 50% compared with uncoated low carbon steel of the same thickness, and electrode pressure by 20% to 30%.
- Use Cr-Cu or Cr-Zr-Cu electrodes with good cooling (external water cooling where possible).

Stainless steel

- Austenitic and ferritic grades weld easily. Martensitic grades are hard and brittle after welding and need precise control and often post heat treatment.
- Austenitic stainless has 4 to 7 times the resistivity and 1/2 to 1/3 the thermal conductivity of low carbon steel, so use a lower current and a weld time 40% to 50% shorter.
- Its high temperature strength is much higher, so use a higher electrode force and hard, heat resistant electrodes to prevent spatter and shrinkage cavities.
- Thermal expansion is about 15% higher than carbon steel, so keep the weld nugget small (no more than 4 times plate thickness) and add more weld points if strength allows.

High temperature alloys

Higher resistivity, lower conductivity and higher hot strength than austenitic stainless. Use a lower current and higher electrode force than for low carbon steel of the same thickness. Reinforced Be-Co-Cu alloy electrodes are preferred.

Aluminium and aluminium alloys

- Low resistivity (about 1/4 to 1/2 of low carbon steel) and high thermal conductivity (about 2 to 4 times).
- Remove the oxide film before welding.
- Pure aluminium is usually welded with large capacitor discharge spot welders.
- Use low resistivity Cd-Cu spherical electrodes.

10 Maintenance

Regular maintenance and inspection keep the machine safe. Always switch off the distribution box (or circuit breaker) before inspecting internal or external terminals.

Daily checks

- Any abnormal vibration, noise or smell?
- Any overheating at cable connections?
- Any poor contact at the switches?
- Any broken cables?

Every 3 to 6 months

- **Electrical connections:** check input and output cable terminals for loose screws, rust or poor contact, and check insulation.
- **Grounding:** check that the machine casing is properly grounded.
- **Internal dust:** remove dust from inside the machine.

11 After-Sales Service

For assistance, contact your NGEN dealer or NGEN directly with:

- Your name, address and telephone number;
- Machine model;
- Manufacturing date and serial number from the machine label, and the purchase date;
- A detailed description of the fault.

NGEN Industries Incorporated
100 Matheson Boulevard East, Mississauga, Ontario, Canada
www.ngen-global.com | info@ngen-global.com