

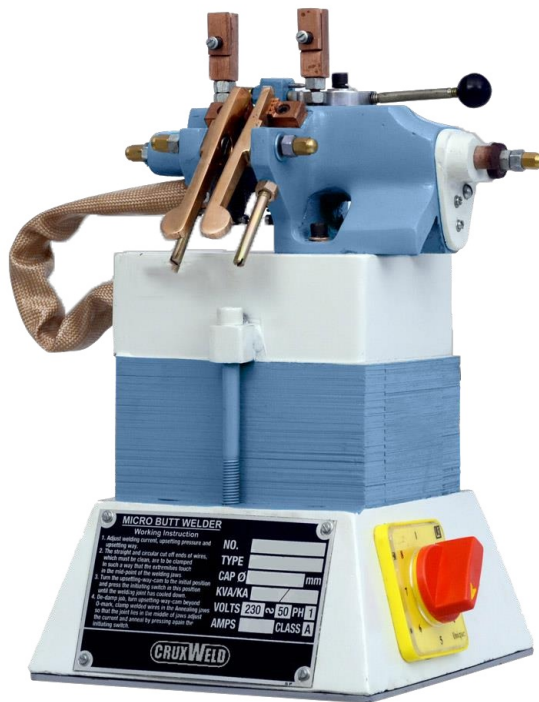


INDUSTRIAL EQUIPMENTS PVT. LTD.

CRB3K

Micro Butt Welder

Butt welding of ferrous and non-ferrous wires 0.4 - 3.0 mm | 3 kVA, 230 V | With annealing device



INSTRUCTION MANUAL

Please read this manual carefully before installing and using the machine.

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This manual contains the description, installation, operation, safety and maintenance instructions for the Cruxweld CRB3K micro butt welder.

Please read and understand this manual before installing and operating the machine, and keep it near the machine for future reference.

Cruxweld provides a warranty for this machine from the date of purchase, as stated in Chapter 10.

Cruxweld improves its products continuously. The contents of this manual may be revised without prior notice.

Signs used in this manual

▲ DANGER	A serious hazard which may cause death, serious injury or major damage if it is not observed.
▲ WARNING	A hazard which may cause injury or damage to property if it is not observed.
▲ ATTENTION	A risk which may cause a fault in, or damage to, the machine if it is not observed.
Note	Useful information for correct operation.

1 Safety precautions

The CRB3K works with a high welding current and produces sparks and hot metal during welding. Read this chapter before using the machine and make sure every operator follows it.

1.1 Electrical safety

- Connect the machine only to a 230 V single-phase socket with an efficient **earth**, through a double-pole switch with fuses.
- Use only good-quality plugs, sockets and fuses. Replace a damaged supply cable immediately.
- Do not use the machine in wet or damp places, and never operate it with wet hands.
- **Always switch off the mains switch before removing or changing any component** (jaws, electrodes, covers) of the machine.
- Electrical repairs must be carried out only by a qualified electrician.

1.2 Sparks, hot metal and burns

- During welding the wire ends flash and small particles of hot metal are expelled. Wear **safety glasses** and protective gloves.
- Keep your face away from the jaws during welding.
- The weld joint and the jaws stay hot after welding and annealing. Do not touch them with bare hands.
- Keep flammable materials away from the machine.

1.3 Mechanical hazards

- The movable jaw is pushed by a strong spring. Keep fingers away from the jaws when operating the upset lever and the clamps.
- Wire ends are sharp. Handle wires carefully and wear gloves.

1.4 Operator

- Only trained persons may operate the machine. Keep unauthorised persons away from the work area.
- Persons with a cardiac pacemaker must not operate the machine or stand close to it during welding.
- Do not modify the machine.

2 General description

The Cruxweld CRB3K micro butt welder is designed for butt welding of fine ferrous and non-ferrous wires from **0.4 to 3.0 mm** diameter. The welds withstand subsequent wire drawing. It is a compact table model, built for easy operation – even unskilled personnel can make a perfect weld.

The CRB3K is an **automatic upset butt welding machine**. The welding current and the initial upset gap are set according to the wire size, and the upsetting pressure is preset. The wire ends are clamped by quick-acting clamps which align them accurately. Pressing the push button starts the welding cycle, which is completed automatically by the built-in controls. The joint can then be annealed in the annealing device provided, giving consistent, precise results.



Clamping the wire



Welding a wire joint

2.1 Working principle

When the push button is pressed, the welding current flows through the wire ends and intense heat is produced at the point where they touch. As soon as the ends become soft, the movable jaw moves towards the fixed jaw under spring tension and forges the ends together. The movement of the jaw cuts off the welding current automatically when it passes the '0' mark, while the forging force continues for a moment as the metal cools – the weld is complete.

Annealing then normalises the weld zone and the area next to it. A larger length of wire is heated in the separate annealing jaws by pressing the push button.

2.2 Advantages

- **Precision:** automated upset butt welding gives precise, consistent and uniform welds of high tensile strength.
- **Versatility:** welds mild steel, stainless steel, copper, brass, aluminium, titanium and nickel alloy wires from 0.4 to 3.0 mm.
- **Efficiency:** preset welding current, initial upset gap and upsetting pressure make the process fast.
- **Easy to operate:** built-in controls and quick-acting clamps, even for operators with limited welding experience.
- **Cost-effective:** compact table model; no large work space needed.
- **Post-weld treatment:** annealing device supplied with the machine for strong, durable joints.

2.3 Construction

Body	Aluminium casting housing the welding transformer, the fixed and movable platens, the current selector switch, the annealing device and the weld initiating / cut-off switch.
Upset travel	The movable platen travels on two precision parallel guides for accurate, almost frictionless travel and perfect alignment of the weld.
Upset pressure	Precision spring acting on the movable platen, preset at the works; adjustable with the pressure adjusting nut.
Clamps and electrodes	Quick-acting clamps and wear-resistant copper-alloy electrodes with precision V-grooves for fast, accurate alignment of the wires.
Welding current	8-position rotary switch on the front.
Initial upset gap	Set by a calibrated cam on the fixed platen acting on a stop on the movable platen (upset lever).
Current initiation / cut-off	Manual push button; current cut off automatically according to the preset upset distance.
Annealing	Separate annealing electrodes for the welded wire.
Options	Wire shearing attachment; illuminated magnifying glass and lamp; wheeled trolley with foot pedal clamping.

3 Technical specifications

Specification	CRB3K
Rating	3 kVA
Power supply	230 V AC $\pm 15\%$
Frequency	50 / 60 Hz
Phase	Single
Fuse rating	14 A
Current selector steps	8
Welding wire diameter	0.4 to 3.0 mm
Weldable materials	Mild steel, stainless steel, copper, brass, aluminium, titanium, nickel alloys
Welding process	Automatic upset butt welding
Upset pressure	Precision spring, preset
Annealing	Separate annealing jaws
Cooling	Air
Dimensions (L x W x H)	240 x 280 x 450 mm
Weight	26 kg

Specifications may change without notice as a result of continuous improvement.

3.1 Optional accessories

- Wire shearing attachment – prepares clean, square wire ends in the welding range.
- Illuminated magnifying glass and lamp – mounted on a post at the rear; can be moved up and down and swivelled to check the spacing and overhang of the wire ends.
- Wheeled trolley with foot pedal clamping – leaves both hands free for handling the wires.

4 Machine overview and controls

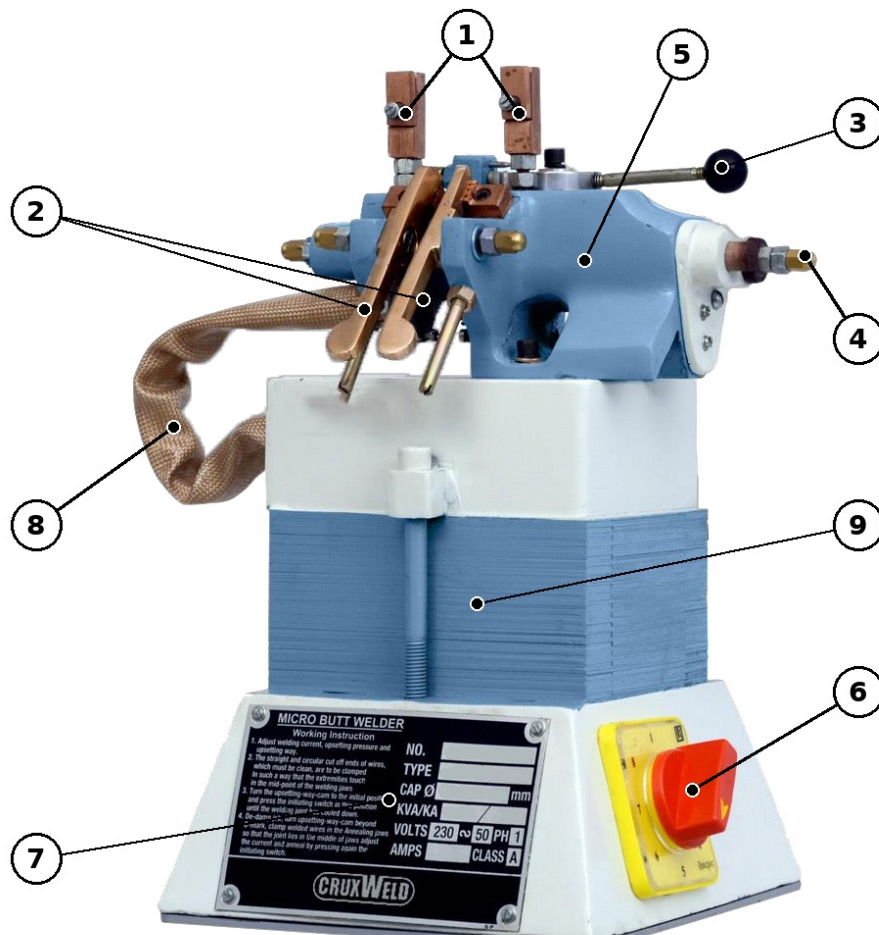


Fig. 4.1 Main parts of the CRB3K

1	Welding jaws (copper-alloy electrodes with V-grooves)	6	Current selector switch (8 steps)
2	Welding jaw clamps (quick-acting clamp levers)	7	Rating plate with working instructions
3	Upset lever (gap adjusting cam)	8	Flexible secondary connection
4	Pressure adjusting nut	9	Welding transformer
5	Movable platen (upset slide)		

4.1 Controls

Control	Function
Current selector switch	Selects the welding current in 8 steps. Step 1 is the lowest, for thin wires; step 8 is the highest, for thick wires.
Upset lever (gap cam)	Sets the initial gap (spacing) between the electrodes according to the wire size. Extreme right = welding; extreme left = annealing.
Welding push button	Starts the welding current (and the annealing current). The current is cut off automatically at the end of the upset travel.
Welding jaw clamps	Press to open the jaws, release to clamp the wire (hand levers; foot pedal on the trolley model).
Pressure adjusting nut	Adjusts the spring tension (upset pressure) on the pressure rod. Preset at the works.

5 Installation

5.1 Location

- The machine needs no special foundation. Place it on a firm, level bench or table at a convenient working height, in a dry, well-ventilated place. On the optional trolley it is portable.
- Leave enough free space on both sides for handling the wires.
- Protect the machine from water, dust and corrosive gases.

5.2 Electrical supply

1. The machine requires **230 V single-phase, 50 / 60 Hz**. It works satisfactorily within ± 10 % variation of the supply. Check the rating plate before connecting.
2. A 3-core supply cable is provided with the machine. Provide a good-quality **15 A 3-pin socket** and a double-pole switch with fuses (14 A) within easy reach of the operator.
3. Connect the earth pin of the socket to an efficient earth with at least 14 SWG (2 mm) bare copper wire.
4. Insert the plug and switch on.

▲ WARNING

Use only good-quality plugs, sockets and fuses. Always switch off the supply before removing any component of the machine.

6 Operation

6.1 Working sequence

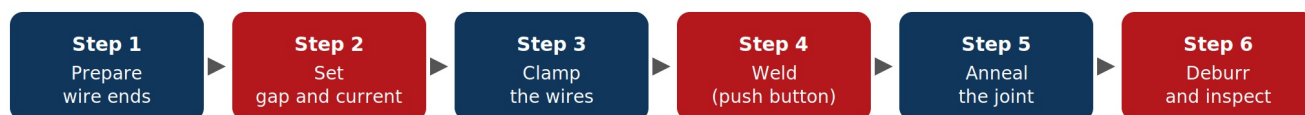


Fig. 6.1 Working sequence of the CRB3K

6.2 Welding

1. Check that the supply voltage and frequency correspond to the rating plate, insert the plug and switch on the machine.
2. **Prepare the wire ends:** cut them square (with the optional shearing attachment if available). The wires must be **clean - free from dirt, dust, grease and oxide**.
3. **Set the electrode spacing** by turning the upset lever to the mark corresponding to the wire size (SWG / diameter). The spacing allows enough material to be flashed off to remove bad or uneven ends; it may be reduced for wires with square-cut ends.
4. Press the clamp levers (or the foot pedal) and insert the wires in the appropriate V-groove.
5. Release the levers to clamp the wires securely. **Make sure that the wire ends butt midway between the electrodes.**
6. **Select the welding current** with the current selector switch according to the wire size and material: step 1 for thin wires up to step 8 for thick wires.
7. Move the upset lever to the **extreme right** and **press the welding push button**.
8. Release the push button only when the electrodes have closed together. The current is cut off automatically and the weld is complete.
9. Open the clamps and take out the welded wire.

Settings: the pressure and welding current must suit the material and size of the wire. Carbon steel and other hard-drawn metals need a higher current than mild steel. The best settings must be found by trial welds – note them for future use.

Wire diameter (mm)	0.4 - 0.8	0.8 - 1.2	1.2 - 1.8	1.8 - 2.4	2.4 - 3.0
Starting current step	1 - 2	2 - 3	3 - 5	5 - 6	7 - 8

Table 6.1 Starting values for mild steel wire (confirm by trial)

6.3 Annealing

Annealing normalises the weld zone and the area next to it, so that the joint is not brittle and can be drawn or bent.

1. Move the upset lever to the **extreme left**.
2. Place the welded wire in the **annealing jaws** so that the weld is midway between the jaws.
3. Press the push button to pass the current. Keep it pressed until the weld is sufficiently heated (dull red for steel).
4. For some materials a longer period is needed even though the temperature must not be high. In that case press and release the push button several times until the desired result is achieved.
5. Take out the welded joint, remove the burr and use it.

▲ ATTENTION

Do not overheat the joint during annealing. Anneal at low current for a longer time rather than at high current for a short time.

6.4 Checking the weld

- The joint must be in line with the wire, without steps, holes or a powdery surface.
- After deburring, the joint should have the same diameter as the wire.
- Bend the wire at the joint – it must not break. For wire to be drawn, make a trial draw.

7 Maintenance

▲ DANGER

Switch off the machine and remove the plug before any cleaning or maintenance.

- Switch off the welder when it is not in use.
- Keep the electrode jaws clean and periodically check the V-grooves for alignment and size. The copper jaws are subject to the most wear – **replace the jaws before they are worn out**, so that the welder performs at its best.
- Check the contact surfaces between the electrode jaws and the aluminium platens periodically. Keep them in close contact by occasionally cleaning away corrosion with fine emery cloth. Neglected corrosion demands a higher current and overloads the transformer.
- Keep the contacts of the initiating switch clean; remove carbon deposits with fine emery paper.
- Keep the platen guides clean and lightly oiled; no oil may reach the jaws.
- Check the supply cable and earth connection regularly.

8 Troubleshooting

Problem	Cause	Remedy
Weld does not take place	a) Supply not available. b) Wires not properly cleaned.	a) Check the input supply. b) Make sure the wires are clean – free from dirt, dust, grease and oxide.
Wire joint not proper	a) Wire ends not touching properly. b) Gap between the jaws insufficient. c) Current insufficient. d) Pressure too high or too low. e) Annealing insufficient. f) Welding jaws damaged.	a) Check and correct. b) Increase the gap with the cam (see label). c) Increase the current with the rotary switch. d) Loosen or tighten the nut on the pressure rod with a spanner. e) Anneal properly after welding. f) Clean or change the jaws.
Machine not starting	a) Supply not proper. b) Carbon deposits on the initiating switch contacts. c) Mains cable damaged. d) Cam not set to the proper gap. e) Current selector damaged.	a) Check the input supply. b) Clean the contacts with emery paper. c) Change the cable. d) Adjust the cam / gap for the wire diameter. e) Change the current selector.
Weld not in line	Welding jaw grooves not in line.	Align the grooves with a V-grooved file.
Weld powdery	Welding current or pressure too high.	Reduce the current; reduce the pressure.
Weld breaks	Annealing improper.	Anneal properly at low current for a longer time.

If a fault cannot be corrected, contact Cruxweld service.

9 Wiring diagram

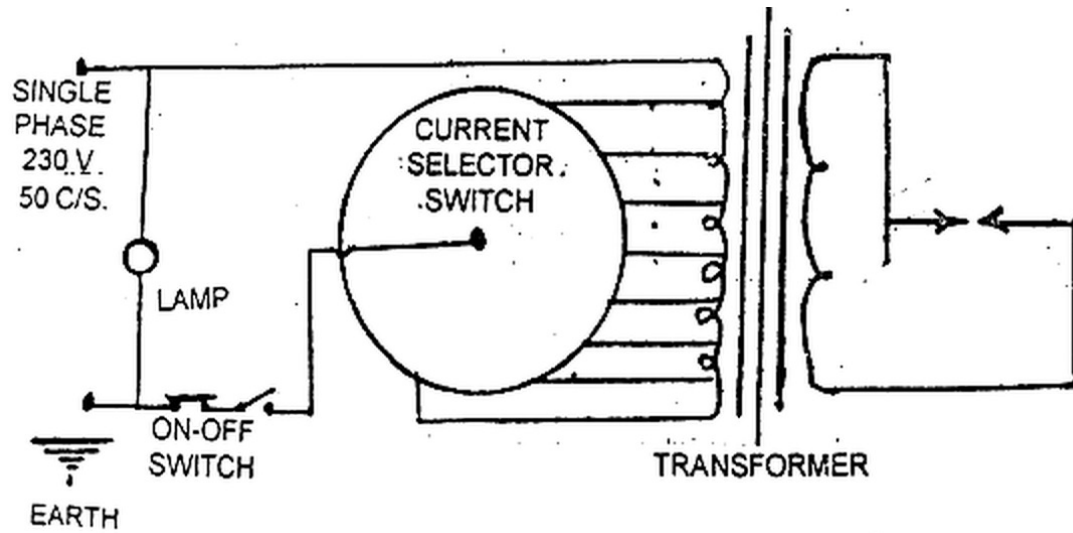


Fig. 9.1 Wiring diagram of the CRB3K

Item	Description
Supply	Single phase, 230 V, 50 Hz, with earth
ON-OFF switch	Welding push button (initiating switch) with automatic cut-off contact
Lamp	Indicator lamp
Current selector switch	8-position tap switch on the transformer primary
Transformer	Welding transformer; the secondary feeds the welding and annealing jaws

▲ DANGER

Only qualified personnel may open the machine and work on the electrical circuit, after removing the plug.

10 Warranty

Cruxweld warrants the CRB3K against defects in material and workmanship for the period stated in the sales contract, from the date of invoice. The warranty does not cover wear parts (copper jaws, electrodes, fuses) or damage caused by incorrect supply voltage, missing earth, moisture, overload, lack of maintenance, misuse or repair by unauthorised persons.

Model	CRB3K
Serial number	
Invoice no. / date	
Customer	
Dealer stamp	

For service, spare parts and accessories please contact:

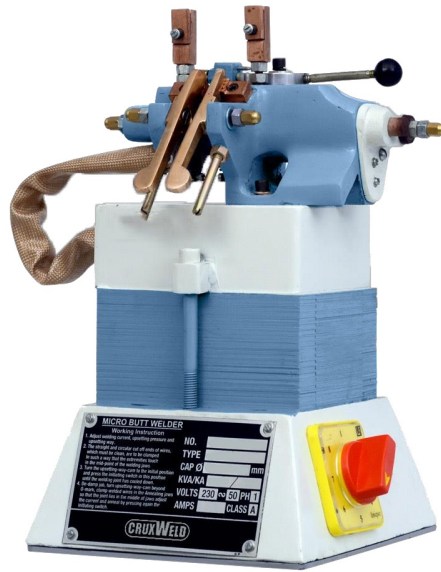
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