

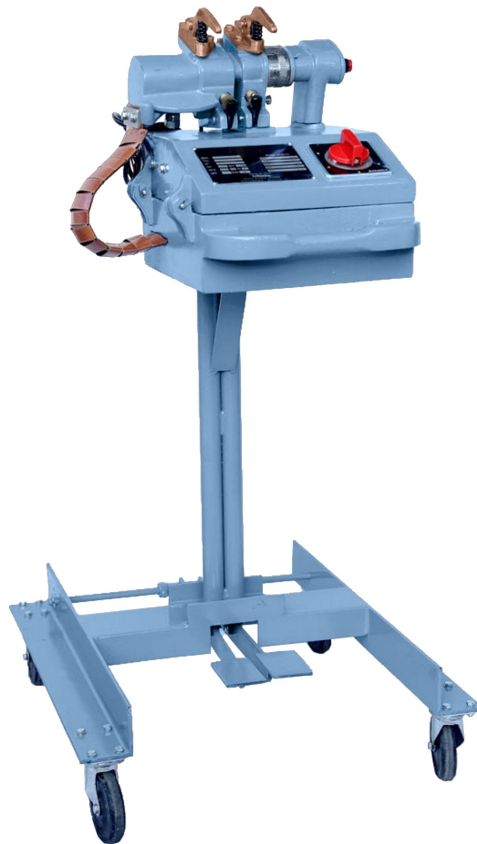


INDUSTRIAL EQUIPMENTS PVT. LTD.

FLEXIWELD 6K

Wire Butt Welder

6 kVA | Wire 2 – 8 mm (steel) | Foot pedal clamping | 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 and maintenance instructions for the Cruxweld FLEXIWELD 6K wire 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. 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 FLEXIWELD 6K works with a high welding current and produces sparks and hot metal during flash butt welding. Read this chapter before using the machine and make sure every operator follows it.

1.1 Electrical safety

- Connect the machine only through a good-quality plug and socket with an efficient **earth** connection (green lead to earth).
- Do not use the machine in wet or damp places, and never operate it with wet hands.
- Disconnect the supply before cleaning, changing the electrode jaws or opening the machine.
- Electrical repairs must be carried out only by qualified service personnel.

1.2 Sparks, hot metal and burns

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

1.3 Mechanical hazards

- The movable platen is pushed by a strong spring and the clamps close with spring force when the foot pedals are released. Keep your fingers away from the jaws.
- Wire ends are sharp and long wires can spring back. Handle wires carefully and wear gloves.

1.4 Do not do this

- Do not cut wires on the butt welder by burning them through in the jaws.
- Do not light cigarettes or bidis by heating a wire piece in the jaws.
- Do not use the welding jaws as a vice for filing, cutting or deburring the welded wires.
- Do not allow pieces of wire or burr to enter the gaps of the moving slide.
- Do not neglect the cleanliness of the machine.

1.5 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.

2 General description

The Cruxweld FLEXIWELD 6K is a wire butt welding machine with annealing device for joining the ends of steel, stainless steel, aluminium and copper wires and rods. It is easy to use for professionals and newcomers alike: the settings for electrode spacing and upsetting pressure are calibrated directly for the wire size being welded, giving precise and accurate welds every time.

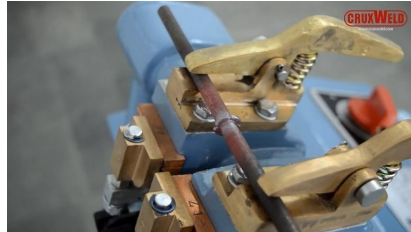
The welder is mounted on a mobile stand with castor wheels and foot pedals which open the spring-loaded clamps, so both hands are free to handle the wire. The main body, which houses the welding transformer and the fixed and movable platens, is made of lightweight alloy.

2.1 How it works

The wire ends are clamped in copper-alloy electrodes with precision V-grooves, which align them accurately. When the push button is pressed, the welding current heats the wire ends until they soften; the spring-loaded movable platen then pushes them together and forges the weld. The current is cut off automatically when the electrodes close, and the weld is complete. Separate annealing electrodes allow the weld to be annealed afterwards to improve its ductility and toughness.



Clamp the wires



Apply pressure



Weld

2.2 Features

- Lever for adjusting the electrode spacing and dial (barrel) for adjusting the upsetting pressure, both calibrated for the wire diameter.
- 6-step rotary switch for the welding current, from 50 % to 100 %.
- Precision copper-alloy electrodes with V-grooves; interchangeable for different wire diameters and materials.
- Spring-loaded clamping devices for the wire ends, operated by foot pedals; uniform pressure without slipping.
- Automatic current initiation and cut-off through a built-in magnetic contactor; manual push button on the side of the fixed platen.
- Separate annealing electrodes for annealing after welding.
- Automatic voltage compensation, overload and overheat protection.
- Compact and robust design for industrial use in a variety of applications.

3 Technical specifications

Specification	FLEXIWELD 6K
Power	6 kVA
Voltage	220 V or 415 V AC
Frequency	50 / 60 Hz
Welding range – mild steel and stainless steel	2 – 8 mm wire diameter
Welding range – aluminium	3 – 5 mm wire diameter
Welding range – copper	2 – 4 mm wire diameter
Welding time	Adjustable from 0.01 to 0.99 s
Fuse rating	10 A
Upset pressure	170 N
Welding method	Resistance (flash) butt welding
Control	Foot pedal clamping, push-button weld start
Output current selection	6 steps (50 – 100 %)
Automatic voltage compensation	Yes
Overload protection	Yes
Overheat protection	Yes
Annealing	Separate annealing electrodes
Dimensions (L x W x H)	910 x 700 x 1180 mm
Weight	64 kg

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

4 Machine overview and controls

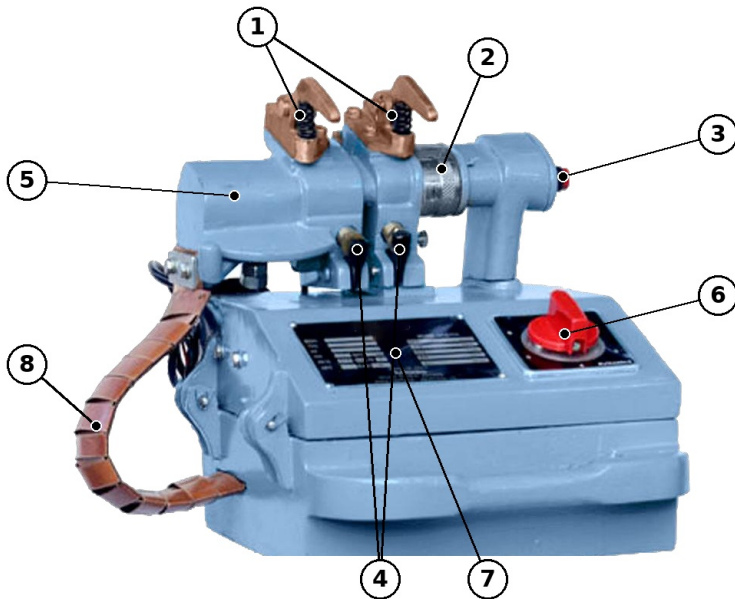


Fig. 4.1 Welding head

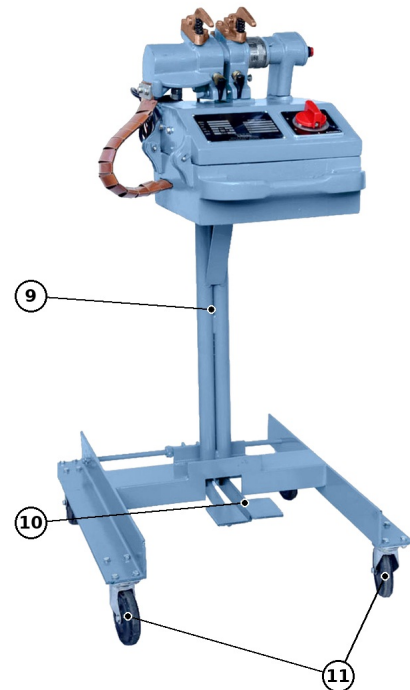


Fig. 4.2 Machine on stand

1	Welding electrodes (jaws) with spring clamps	7	Rating plate
2	Pressure barrel – upsetting pressure setting	8	Flexible secondary connection
3	Push button (weld / anneal)	9	Stand column
4	Clamp and spacing levers	10	Foot pedals (open the clamps)
5	Fixed and movable platens	11	Castor wheels
6	Welding current switch (6 steps)		

4.1 Controls

Control	Function
Welding current switch	Selects the transformer tap. Step 1 is the lowest and step 6 the highest. Thin wires are welded on the lower steps, thick wires on the higher steps.
Pressure barrel	Marked with numbers for the wire diameter in mm. Set the number of the wire size to the notch to get the correct spring (upsetting) pressure.
Spacing (upset) lever	Sets the distance between the electrodes according to the wire diameter; pushed back to the left for welding.
Foot pedals	Press to open the clamps; release to clamp the wires.
Push button	Starts the welding (or annealing) current. The current is cut off automatically when the weld is complete.
Indicator lamp	Lights when the machine is connected to the supply.
Annealing jaws	Separate electrodes for annealing the welded wire.

5 Installation

5.1 Location

- Place the machine on its stand on a firm, level floor in a dry, well-ventilated place. Lock the castor wheels if they are lockable.
- Leave enough free space on both sides for handling long wires and coils.
- Protect the machine from water, dust and corrosive gases.

5.2 Electrical connection

1. Check that the voltage and frequency of the mains supply correspond to the rating plate on the machine: **220 V single phase** or **415 V two lines** (as stated on the rating plate), 50 / 60 Hz. The machine operates satisfactorily with voltage and frequency variations of up to $\pm 10\%$.
2. The machine is supplied with a 3-core cable. Connect it to a **30 A, 3-pin, non-interchangeable plug**, with the **green lead to the earth terminal**. Use a socket protected by suitable fuses.
3. When the machine is connected to the supply, the indicator lamp lights.

▲ WARNING

Never operate the machine without a correct earth connection. Use only good-quality plugs, sockets and fuses.

6 Operation

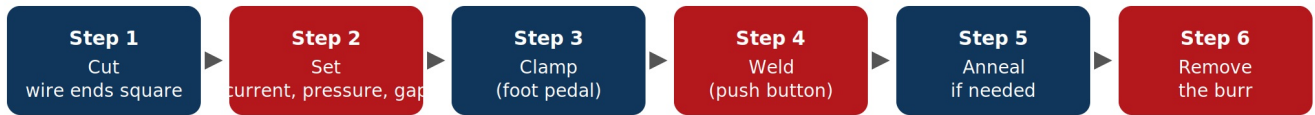


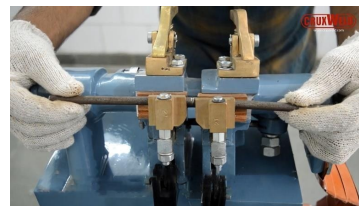
Fig. 6.1 Working sequence

6.1 Welding

1. **Prepare the wires:** the wires must be straight, free from burrs and cut at right angles. Ordinary nippers are sufficient for steel wire; aluminium wire must be cut square. Remove oil, rust and dirt from the ends to ensure sound welds.
2. **Set the welding current** with the current switch according to the wire diameter: low steps for thin wire, high steps for thick wire.
3. **Set the upsetting pressure:** turn the pressure barrel so that the number of the wire size (mm) is at the notch. Change this setting only when the wire size changes.
4. **Set the electrode spacing:** place the spacing lever at the figure corresponding to the wire diameter. This spacing allows enough material to be flashed off to remove bad or uneven ends. If the wire ends are square (essential for aluminium), the spacing may be reduced to give a smaller weld burr.
5. **Clamp the wires:** press the foot pedals – the electrodes open. Insert the wire ends in the appropriate V-groove so that they meet **midway between the electrodes**. Release the pedals – the wires are clamped securely.
6. Push the spacing lever right back to the left.
7. **Weld:** press and hold the push button. When the wire ends reach welding temperature, the electrodes close together, the current is cut off automatically and the weld is complete. Release the push button only now.
8. Press the pedals to open the clamps and remove the welded wire. For wire thicker than 8 SWG (about 4 mm), open the right-hand die first and turn the spacing lever to the right, then press both pedals together.
9. **Remove the burr:** on mild steel wire the burr is thin and feathery if pressure and current are set correctly; remove it with burr-removing pliers or a file.



Wire ends meeting in the middle



Welded wire

6.2 Settings for different materials

- The settings above are a general guide. When welding **carbon steel**, set the spring pressure (barrel) lower than for mild steel and the welding current (tap switch) higher.
- A **smooth** weld appearance shows correct settings. **Dry and powdery** welds show too much spring pressure and too little welding current.
- Every machine is tested before dispatch, and sample welds made on the machine may be attached to it. For special alloys, the spring pressure and electrode spacing may need to be changed – the best settings must be found by trial welds.
- Use the correct electrode V-groove for the wire diameter. Change the electrodes for different wire sizes or materials if necessary.

Material	Welding range	Remarks
Mild steel, stainless steel	2 – 8 mm	Standard settings from the barrel and lever scales
Carbon steel, alloy steel	2 – 8 mm	Lower pressure, higher current; anneal after welding
Aluminium	3 – 5 mm	Wire ends must be cut square; smaller spacing
Copper	2 – 4 mm	Clean ends; confirm settings by trial

6.3 Duty

Allow the machine to cool between welds when welding thick wires continuously. The overload and overheat protection switch the machine off if it is overloaded; wait until it has cooled down.

7 Annealing

Carbon steels and hard-drawn materials become brittle through welding and must be annealed. Annealing improves the ductility and toughness of the joint and prevents brittleness.

1. Move the spacing lever to the right, so that the current can be switched on while the welding electrodes are together.
2. Place the welded wire in the **annealing jaws** with the weld midway between them.
3. Press the push button to pass the current. Keep it pressed until the weld is sufficiently heated (dull red for steel).
4. For materials that need a longer annealing time at a low temperature, press and release the button several times.
5. Let the joint cool in air, then trim any excess material and clean it with a wire brush or other suitable tool.

▲ ATTENTION

Do not overheat the joint during annealing – anneal at a moderate heat for a longer time rather than at a high heat for a short time.

8 Maintenance

▲ DANGER

Disconnect the supply before any cleaning or maintenance.

- Keep the machine clean and oil the working parts carefully with thin oil. No other special servicing is required.
- If the machine is treated properly and cleaned periodically, and the copper electrode jaws (which are subject to normal wear) are replaced when necessary, it will give good service for many years without repair.

8.1 Electrode contact surfaces

If, after a long time, the welder becomes less efficient – so that a higher current step is needed for a given wire diameter, or heavy wires need longer weld times – the fault is almost always at the **contact surface between the copper electrode jaws and the milled aluminium surfaces** to which they are screwed, or a contact surface burnt by bad contact.

1. Remove the copper jaws.
2. Clean the contact areas of the electrodes and the aluminium surfaces with fine emery cloth; if necessary, level them with a flat file.
3. Apply a thin film of Vaseline (petroleum jelly) before screwing the jaws on again.
4. Tighten the screws firmly. As soon as the screws become loose, corrosion starts immediately.

Treat the annealing electrodes in the same way when needed (corrosion there is rare). At long intervals, also clean the contact surface between the transformer secondary lead and the movable aluminium platen.

8.2 Service

Whenever required, contact Cruxweld service – our technical staff will be glad to help. Never attempt major repairs or allow unqualified persons to work on the delicate parts of the machine; this can lead to costly replacements. The warranty ceases if the machine is repaired by unauthorised persons.

9 Troubleshooting

Problem	Possible cause	Remedy
Lamp does not light	No supply; fuse blown; cable or plug faulty.	Check the supply, fuse, plug and cable.
No welding current when the button is pressed	Wire ends not touching; dirty ends or electrodes; spacing lever not in the weld position; protection tripped.	Clamp the wires correctly; clean; set the lever to the left; let the machine cool.
Dry, powdery weld	Too much spring pressure; too little current.	Reduce the pressure setting; increase the current step.
Heavy, thick burr	Spacing too large; pressure too high.	Reduce the spacing (square ends); reduce pressure.
Wire ends burn off / holes	Current too high; pressure too low.	Reduce the current step; increase the pressure.
Weld not in line	Wrong V-groove; worn electrodes; wire ends not straight.	Use the correct groove; replace electrodes; straighten the wire.
Weld breaks	Not annealed (carbon steel); wrong settings.	Anneal the joint; adjust current and pressure by trials.
Higher current needed than before	Corroded contact between copper jaws and aluminium platens.	Clean and grease the contact surfaces (8.1).

If a fault cannot be corrected, contact Cruxweld service.

10 Warranty

Cruxweld warrants the FLEXIWELD 6K against defects in material and workmanship for the period stated in the sales contract, from the date of invoice. The warranty does not cover copper electrode jaws, fuses and other wear parts, or damage caused by incorrect supply voltage, missing earth, moisture, overload, lack of maintenance, misuse or repair by unauthorised persons.

Model	FLEXIWELD 6K
Serial number	
Invoice no. / date	
Customer	
Dealer stamp	

For service, spare parts and electrodes please contact:

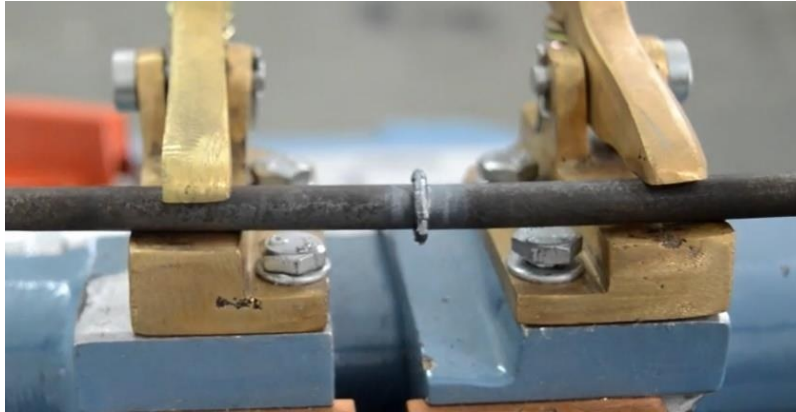
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