



INDUSTRIAL EQUIPMENTS PVT. LTD.

CBS175

Bandsaw Blade Butt Welder

For carbon steel and bimetal blades up to 75 mm | 25 kVA, 415 V | Welding with integrated annealing



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 CBS175 bandsaw blade 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 9.

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 or the blade if it is not observed.
Note	Useful information for correct operation.

1 Safety precautions

The CBS175 works with a high welding current and produces sparks and hot metal during butt welding. Read this chapter before using the machine and make sure every operator follows it.

1.1 Electrical safety

- The machine must be connected by a qualified electrician to a correctly **earthed** 415 V supply through a mains isolator.
- Do not use the machine in wet or damp places, and never operate it with wet hands.
- All high-voltage components are inside the housing. Switch off and isolate the supply before cleaning, adjusting the jaws or electrodes, or opening the housing.
- Electrical repairs must be carried out only by a qualified electrician. Replace damaged supply cables immediately.

1.2 Sparks, hot metal and burns

- During welding the blade ends melt and sparks are expelled. Always wear **safety glasses or a face shield**, leather gloves and protective clothing.
- Stand to the side of the jaws during welding, never directly in line with the joint.
- Keep flammable materials away from the machine and keep a fire extinguisher nearby.
- The weld joint, the electrodes and the blade stay hot after welding and annealing. Do not touch them with bare hands.

1.3 Crushing and cutting hazards

- Keep fingers away from the jaws while clamping and while operating the electrode spacing lever. The upset spring moves the platen with force.
- Bandsaw blades have sharp teeth. Handle blades with gloves and carry long blades coiled.
- Use the blade shear with care; keep fingers away from the cutting edge.

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.
- Lock the wheels of the trolley before working. Do not modify the machine.

2 General description

The Cruxweld CBS175 is a heavy-duty bandsaw blade butt welder for joining carbon steel and bimetal bandsaw blades and band steel up to **75 mm** wide and **2.5 mm** thick. It is used for repairing broken blades and for making blades of any length from coil material, for metal-cutting and wood-cutting bandsaws. The machine is mounted on a four-wheeled trolley stand, so it can easily be moved around the workshop, and the wheels can be locked.

Electric resistance butt welding is the modern way of joining bandsaw blades. The older method of overlapped brazing needed a high degree of skill, and the solder and flux left foreign material in the joint, giving a weak joint. Butt welding needs no solder or flux, is quick and automatic, eliminates human error and gives a joint strength about 25 % higher than that of the base metal. Correct **annealing** after welding softens the weld zone and relieves residual stress, so that the blade withstands the cutting loads.



Welded endless bandsaw blade (arrow: weld joint)

2.1 Features

- Joint strength about 25 % higher than the base metal; no solder or flux; no overlapped brazing.
- Blades are cut straight, exactly at right angles and free of burrs with the blade shear.
- Welding current, upset pressure and upset way are set according to the blade width; the blade ends are clamped rigidly by quick-acting jaws.
- Fast and simple welding operation – high quality and time saving.
- Joins bandsaws and band steel of different qualities.
- Upset force produced by a precisely adjustable spring mechanism.
- Pressure is released automatically during annealing.
- Annealing current freely adjustable; annealing time set from zero to the time required for the blade type.
- Adjustable jaw distance for welding and annealing.
- Robust design on a mobile trolley with four lockable wheels; can be dismantled into smaller parts for shipping.

2.2 Construction

Housing	Sturdy light-alloy housing; all high-voltage components are inside the body. Mounted on a four-wheeled trolley stand.
Upset travel	The movable platen travels on precision parallel guides, giving accurate, frictionless travel and perfect alignment of the weld.
Upset pressure	Provided by a precision spring acting on the movable platen, finely adjustable by a knob; the setting is read on a scale.
Clamps	Lever-operated, adjustable “floating” steel clamps of quick-acting design give a firm preset clamping pressure; release is quick and easy.
Electrodes	Wear-resistant copper-alloy electrodes for fast and accurate alignment of the blade.
Welding current	Rotary tap switch on the left-hand side, adjusting the current from 50 % to 100 %.
Electrode spacing	Set by a lever against an indexing plate, in steps between minimum and maximum.
Weld initiation	Returning the spacing lever to the WELD position after clamping starts the automatic welding cycle.
Current cut-off	Adjustable over a wide range by a fine-adjustment screw read on a graduated scale.
Annealing	Separate annealing electrodes with screw clamps for quick annealing, giving a flexible zone on both sides of the weld.

3 Technical specifications

Specification	Unit	CBS175
Nominal capacity (50 % duty cycle)	kVA	25
Input supply	V	AC 415 $\pm$ 15 %
Phase	No.	2 (two lines)
Frequency	Hz	50 / 60
Input current	A	40
Duty cycle	%	50
Welding range - bandsaw blade width	mm	37 to 75
Bimetal blades (width)	mm	35 - 50
Carbon steel blades (width)	mm	50 - 75
Clamping width	mm	75
Clamping thickness range	mm	0.4 - 2.5
Secondary voltage (welding current steps)	steps	6 (50 - 100 %)
Upset pressure	N	200
Upset mechanism	-	Adjustable precision spring
Annealing	-	Separate annealing clamps, adjustable
Mounting	-	Trolley stand with 4 lockable wheels
Dimensions (L x W x H)	mm	785 x 525 x 1050
Gross weight	kg	110

Specifications may change without notice as a result of continuous improvement. Machines can be customised to the customer's supply before shipping; machines above 75 mm blade width (up to 150 mm) are available on request.

3.1 Duty cycle

The nominal capacity of 25 kVA is rated at a 50 % duty cycle. After several welds in quick succession, allow the machine to cool so that the transformer does not overheat.

4 Machine overview and controls

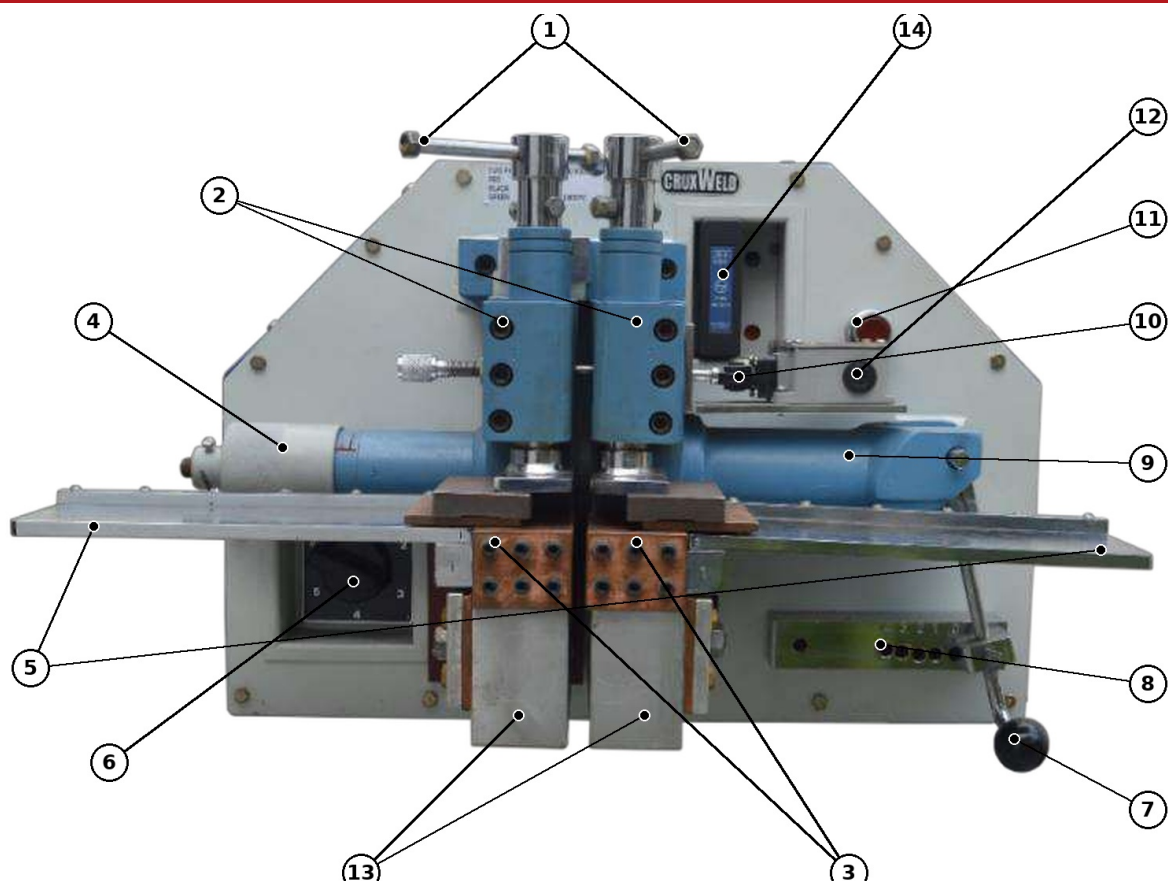


Fig. 4.1 Welding head of the CBS175 (front view)

1	Clamping levers	8	Indexing plate (electrode spacing)
2	Quick-acting clamps (fixed and movable)	9	Movable platen / upset slide
3	Copper-alloy welding electrodes (jaws)	10	Current cut-off (limit) switch
4	Upset pressure knob with scale	11	Indicator lamp
5	Blade support tables	12	Annealing push button
6	Welding current switch (rotary)	13	Annealing electrodes with screw clamps
7	Electrode spacing lever	14	Timer / control unit

4.1 Controls and settings

Four settings are made according to the blade width and material before welding:

Setting	How to adjust
1. Welding current	Rotary switch on the left-hand side of the machine, from 50 % to 100 %. Wider and thicker blades need a higher step.
2. Upset pressure	Knob with scale at the left end of the upset slide. It adjusts the precision spring which pushes the movable platen. Read the setting on the scale.
3. Electrode spacing (upset way)	Spacing lever on the right, set against the indexing plate. The spacing between the electrodes determines how far the blade ends travel during upsetting.
4. Current cut-off	Fine-adjustment screw of the cut-off switch, read on the graduated scale. It sets the point in the upset travel at which the welding current is switched off automatically.

4.2 Other controls

Control	Function
Clamping levers	Open and close the quick-acting clamps which hold the blade on the electrodes.
Spacing lever - WELD position	Returning the lever to WELD after clamping starts the automatic welding cycle.
Spacing lever - position 2 or 3	Used for annealing: the pressure is released and the jaws are held apart.
Annealing push button	Switches on the annealing current while it is held down.
Annealing clamps	Separate electrodes with screw clamps below the welding jaws, used to hold the blade during annealing.
Indicator lamp	Shows that the machine is connected to the supply.

5 Installation

5.1 Location

- Check the machine for transport damage. Report any damage to the transporter and to Cruxweld immediately.
- Place the machine on its trolley on a firm, level floor in a dry, well-ventilated place and **lock the wheels**.
- Leave enough free space on both sides of the jaws for long blades and coils, and around the machine for cooling air.
- Protect the machine from water, dust and corrosive gases.

5.2 Electrical connection

▲ DANGER

The electrical connection must be made by a qualified electrician with the supply switched off.

1. The standard machine is supplied for **415 V AC, 2 lines (two phases), 50 / 60 Hz**. Check the rating plate before connecting.
2. Install a mains isolator with fuses or a circuit breaker suitable for the input current of 40 A (recommended 63 A slow-acting) near the machine.
3. Connect the two supply lines to the input terminals and the earth conductor to the earth terminal of the machine, using a copper cable of at least 10 mm².
4. Switch on the isolator. The indicator lamp lights.

Note: A low or unstable supply voltage causes weak welds. Supply the machine from a dedicated line if possible.

6 Operation

6.1 Working sequence

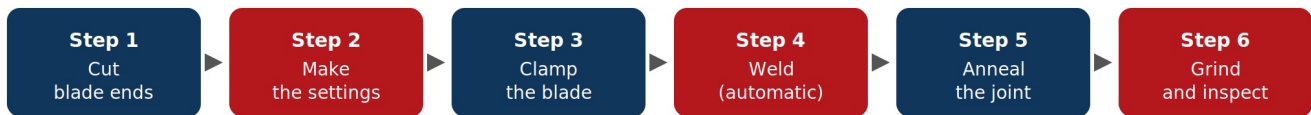


Fig. 6.1 Working sequence of the CBS175

6.2 Preparing the blade

1. Cut both ends of the blade with the blade shear **straight, exactly at right angles and free of burrs**, so that the tooth pitch continues correctly across the joint.
2. The ends and the clamping areas must be clean of burrs, paint, oil and rust.

6.3 Welding

1. **Make the four settings** (4.1) for the blade width and material: welding current, upset pressure, electrode spacing and current cut-off.
2. Move the spacing lever away from WELD to open the electrode spacing.
3. Place the blade ends on the electrodes so that they **butt together end to end** in the middle of the gap, with the back of the blade against the stops.
4. Clamp both ends firmly with the clamping levers.
5. **Return the spacing lever to the WELD position.** The welding cycle takes place automatically: the current flows, the ends are heated and pushed together by the upset spring, and the current is switched off by the cut-off switch.
6. Wait a few seconds, then unclamp the blade.

▲ WARNING

Sparks and hot metal are expelled during welding. Wear eye protection and keep your face away from the jaws.

Settings: the correct settings depend on the blade width, thickness and material. Start with a middle setting, make a trial weld on an offcut of the same blade and adjust: increase the current or pressure if the joint is weak; reduce them if the ends burn away or a heavy burr forms. Note the best settings for each blade type for future use.

6.4 Annealing

Annealing is essential. It softens the weld zone and relieves the residual stress in the weld. A joint that is not annealed correctly is hard and brittle and will break when the blade runs.

1. Set the spacing lever to **position 2 or 3**. The upset pressure is released.
2. Clamp the blade **centrally** in the annealing clamps, so that the weld joint lies in the middle between them.
3. **Hold down the annealing button** until the annealing temperature is reached – the joint turns dark red to brown. For better control, press the button in short pulses near the end.
4. Release the button and let the joint cool slowly in air. Do not quench it in water or oil.

Colour of the joint	Result
Dark red / brown	Correct - stop annealing
Cherry red	Too hot – the joint becomes hard again
Bright red	Far too hot – let the blade cool completely before annealing again

6.5 Finishing and inspection

- Grind off the weld burr on both sides and on the back of the blade until the joint has the same thickness as the blade. Do not grind the teeth and do not let the joint turn blue.
- The joint must be straight, in line with the blade, and without cracks or holes.
- Bend the blade gently around the joint – it must bend evenly without cracking.

6.6 Summary

Weld: make the 4 settings → clamp the job end to end → return the spacing lever to WELD → the weld takes place automatically → unclamp.

Anneal: spacing lever to position 2 or 3 → clamp the job centrally in the annealing clamps → hold down the annealing button until the annealing temperature is reached.

7 Maintenance

▲ DANGER

Switch off and isolate the supply before any cleaning or maintenance.

7.1 After every weld / daily

- Remove all scale, burr and metal splashes from the electrodes, clamps and support tables.
- Keep the copper electrodes and annealing clamps clean and smooth. Dirty electrodes cause poor contact, burn marks and weak welds.
- Check that the clamps, the spacing lever and the upset slide move freely.

7.2 Weekly

- Lightly oil the parallel guides of the movable platen and the clamp pivots. Wipe off excess oil – no oil may reach the electrodes.
- Check the electrodes for wear; dress or replace them when worn.
- Check the operation of the current cut-off switch.

7.3 Monthly

- With the supply isolated, remove the covers and blow out dust with dry, low-pressure compressed air.
- Check that all electrical connections and the secondary (copper) connections are tight.
- Check the supply cable, the earth connection and the trolley wheels and brakes.

7.4 Wear parts

Replace the electrodes and clamp pads when they are worn or no longer hold the blade straight. Use only original Cruxweld spare parts; an additional set of spares and consumables can be supplied with the machine.

8 Troubleshooting

Problem	Possible cause	Remedy
Indicator lamp off	No supply; isolator off; fuse blown.	Check the supply, the isolator and the fuses.
No welding current when the lever is returned to WELD	Blade ends not touching. Dirty electrodes or blade ends. Cut-off switch set wrongly or faulty.	Bring the ends into contact. Clean electrodes and blade. Adjust or check the cut-off switch.
Blade ends burn away; holes in the weld	Current too high. Upset pressure too low. Current cut off too late.	Reduce the current step. Increase the upset pressure. Adjust the cut-off earlier.
Weak joint, breaks on bending	Current too low. Upset way or pressure too low. Current cut off too early. Not annealed or over-annealed.	Increase the current. Increase spacing / pressure. Adjust the cut-off later. Anneal to dark red / brown only.
Heavy burr, joint pushed up	Upset way or pressure too high.	Reduce spacing / pressure.
Joint stepped or not straight	Ends not cut square. Blade not against the stops or slipping. Worn electrodes.	Cut the ends square. Clamp correctly and firmly. Replace the electrodes.
Burn marks on the blade at the electrodes	Dirty electrodes or blade; clamps loose.	Clean electrodes and blade; tighten the clamps.
Joint turns bright red during annealing	Annealing button held too long.	Let the blade cool completely; anneal again in short pulses.
Machine overheats	Duty cycle exceeded.	Allow the machine to cool between welds.

If a fault cannot be corrected, contact Cruxweld service.

9 Warranty

Cruxweld warrants the CBS175 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 (electrodes, clamp pads, fuses) or damage caused by incorrect supply voltage, missing earth, moisture, overload, lack of maintenance, misuse or repair by unauthorised persons.

Model	CBS175
Serial number	
Invoice no. / date	
Customer	
Dealer stamp	

For service, spare parts and accessories please contact:

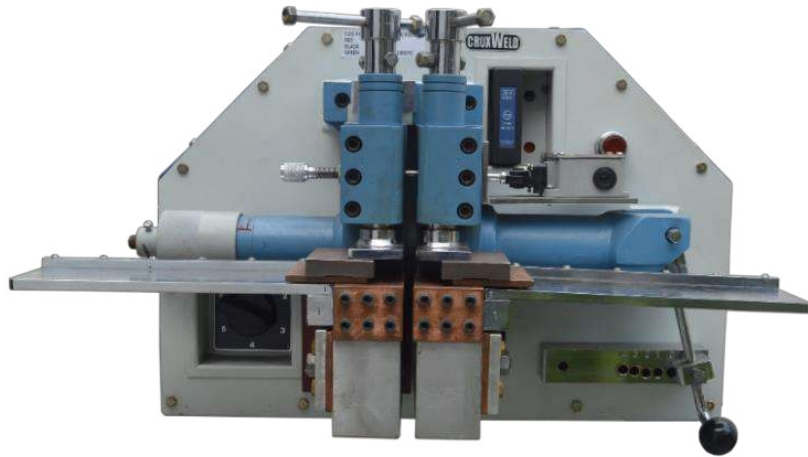
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