



INDUSTRIAL EQUIPMENTS PVT. LTD.

CBS040

Bandsaw Blade Butt Welder

For carbon steel and bimetal blades | 5 kVA, 1 phase 220 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 CBS040 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 CBS040 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

- Connect the machine only to a correctly **earthed** single-phase supply socket of the rated voltage.
- Do not use the machine in wet or damp places, and never operate it with wet hands.
- Disconnect the supply plug before cleaning, adjusting the jaws, changing the pressure dies 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 copper jaws 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 upsetting lever and switches.
- Bandsaw blades have sharp teeth. Handle blades with gloves and carry long blades coiled.
- Use the blade shear (optional) with care; keep fingers away from the cutting edge.

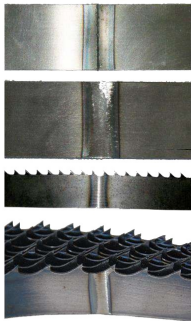
1.4 Operator

- 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.
- Do not modify the machine.

2 General description

The Cruxweld CBS040 is a compact bench-type butt welding machine for joining the ends of bandsaw blades, band knives and steel strip into endless loops. It welds carbon steel and bimetal blades from 6 to 37 mm wide. The robust design and simple operation make it suitable for industrial use in wood- and metal-working shops, and also for mobile repair work.

The CBS040 replaces the outdated method of brazing overlapped blades. Butt welding needs no solder or flux and leaves no foreign material in the joint. The process is quick and automatic and produces a strong, perfectly aligned weld – the joint strength can be about 25 % higher than that of the parent material. The integrated annealing function then heat-treats the weld to give it high strength and elasticity.



Butt-welded joints



Endless bandsaw blade



Welded blades

2.1 Salient features

- Sturdy design with precise guidance of the welding jaws; weld joints without misalignment.
- Precise switching of the welding current on and off by a thyristor contactor.
- Manual clamping devices producing high clamping forces; adjustable and easily interchangeable pressure dies.
- Fast and simple welding operation – high quality and time saving.
- Joins bandsaws and band steel of different qualities; high strength and elasticity of the weld seam.
- No additional solder or flux required; fast preparation of the strip ends.
- Adjustable jaw distance for welding and for annealing.
- Robust design – long lasting and reliable.
- Optional blade shear for burr-free, distortion-free, square cutting of the strip, and optional grinding attachment.

3 Technical specifications

Specification	Unit	CBS040
Nominal capacity (50 % duty cycle)	kVA	5
Input supply	V	AC 220 ±15 %
Phase	No.	1
Frequency	Hz	50 / 60
Input current	A	18
Duty cycle	%	50
Welding range - bandsaw blade width	mm	6 to 37
Clamping thickness range	mm	0.4 - 2.5
Clamping width	mm	40
Welding current selection	steps	Tap switch (see 4.1)
Upset pressure	N	200
Upsetting way	mm	max. 4, continuously adjustable
Max. distance between clamps for annealing	mm	14
Current switching	-	Thyristor contactor
Cooling	-	Air cooled
Suitable blade material	-	Carbon steel, bimetal, band steel
Dimensions (L x W x H)	mm	285 x 255 x 230
Gross weight	kg	38
Optional accessories	-	Blade shear (cutting attachment), grinding attachment

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

3.1 Duty cycle

The nominal capacity of 5 kVA is rated at a 50 % duty cycle. After several welds in quick succession, allow the machine to cool so that the transformer and the thyristor contactor do not overheat.

4 Machine overview and controls

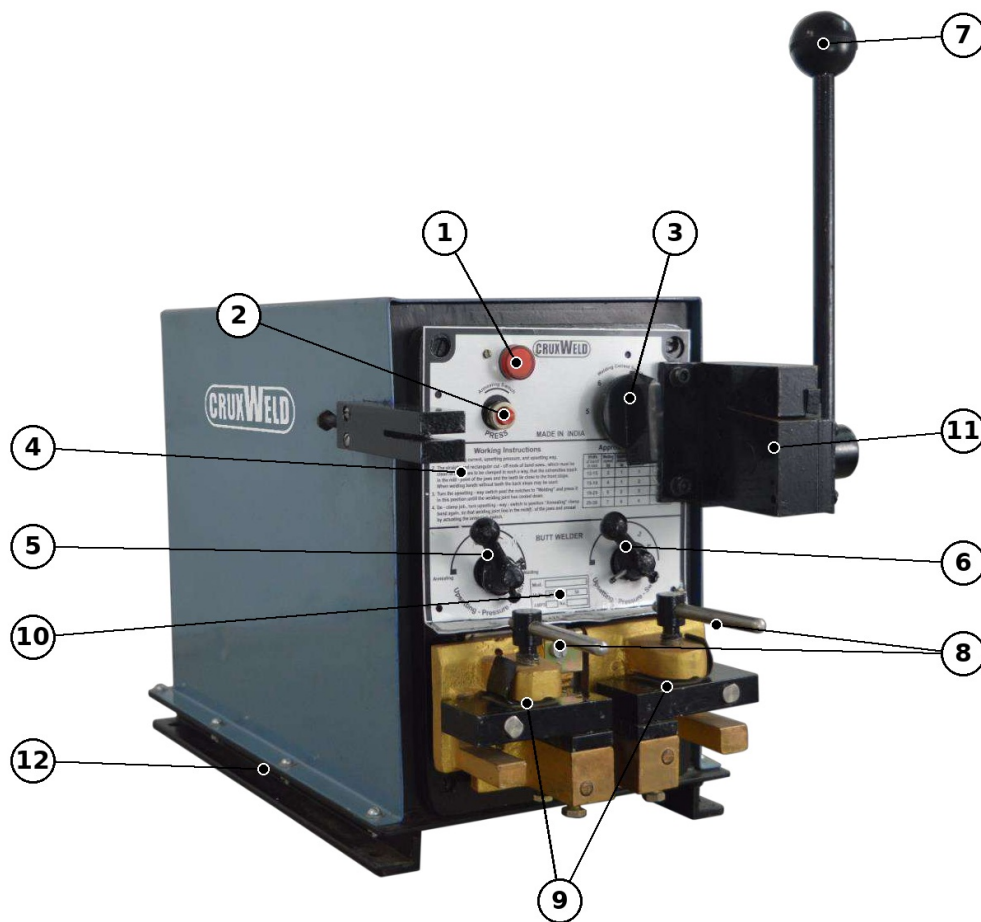


Fig. 4.1 Main parts of the CBS040

1	Power indicator lamp	7	Upsetting lever
2	ANNEALING switch (PRESS button)	8	Clamping handles
3	Welding current switch (rotary tap switch)	9	Copper welding jaws with pressure dies
4	Working instructions and parameter chart	10	Rating plate
5	Upsetting-way switch (ANNEALING / WELDING)	11	Upsetting slide housing
6	Upsetting pressure switch (1 - 4)	12	Base frame

4.1 Controls

Control	Function
Power indicator lamp	Lights when the machine is connected to the supply.
Welding current switch	Rotary tap switch which selects the welding current. Set it according to the blade width and material (Table 6.1).
Upsetting pressure switch	Selects the upset pressure, positions 1 to 4. Wider and thicker blades need a higher pressure.
Upsetting lever	Sets the upsetting way (the distance the moving jaw travels during welding, max. 4 mm). Moving the lever pushes the moving slide away from the fixed slide; the greater the distance set before clamping, the greater the pressure during fusion when the lever returns to the '0' position.
Upsetting-way switch	WELDING position: turning the switch past the notches to "Welding" and pressing it starts the weld. ANNEALING position: moves the jaws apart (max. 14 mm) so that the weld joint can be clamped in the middle for annealing.
ANNEALING switch	Push button (PRESS) which switches on the annealing current to heat the weld joint.
Clamping handles	Screw clamps for the blade. To open, turn the left clamp clockwise and the right clamp anti-clockwise; turn in the opposite direction to clamp.
Front and back stops	Guide the blade in the jaws. The teeth of the blade lie close to the front stops; for bands without teeth, the back stops may be used.

Note: The welding current is switched off automatically by the thyristor contactor when the weld is complete.

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 a firm, level workbench in a dry, well-ventilated place. Fix the base to the bench if required.
- Leave enough free space on both sides of the jaws for long blades, and around the machine for cooling air.
- Protect the machine from water, dust and corrosive gases.

5.2 Electrical connection

1. The machine must be supplied with **single-phase 220 - 230 V AC, 50 / 60 Hz**.
2. Use an earthed 3-pin socket protected by a suitable fuse or circuit breaker (recommended 32 A) for the input current of 18 A.
3. Check that the socket is correctly earthed before connecting the machine.
4. Connect the supply plug. The power indicator lamp lights.

▲ **WARNING**

Never operate the machine without a correct earth connection. A low or unstable supply voltage causes weak welds – do not use long extension cables.

6 Operation

6.1 Working sequence

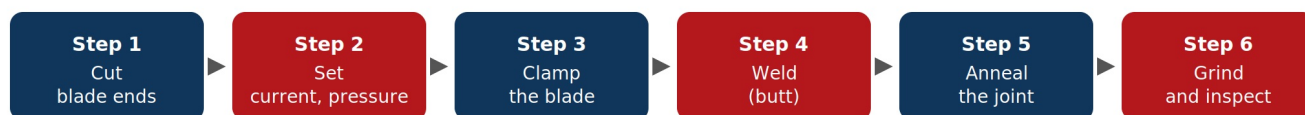


Fig. 6.1 Working sequence of the CBS040

6.2 Preparing the blade

1. Cut both ends of the blade **straight and square** (rectangular cut), so that the tooth pitch continues correctly across the joint. The optional blade shear gives a burr-free, square cut.
2. The ends must be clean of metal burrs, paint, oil and rust.

6.3 Setting the parameters

Blade width	Welding current switch	Upsetting position before clamping	Upsetting pressure
10 - 18 mm	2	1.5	1 or 2
18 - 27 mm	3	2	2 or 3
27 - 32 mm	4 or 5	3	3
32 - 37 mm	5 or 6	4	4

Table 6.1 Approximate parameters for the blade width

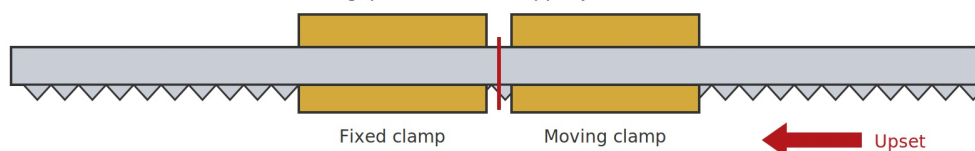
1. Set the **welding current switch** according to Table 6.1.
2. Set the **upsetting pressure switch** according to Table 6.1.
3. Set the **upsetting way** with the upsetting lever as per the blade width: a wider blade needs a bigger distance. Setting a greater distance before clamping gives greater pressure during fusion when the lever returns to '0'.

Note: These values are a guide only. Different materials have different melting temperatures and hardness, and may need a different current and upsetting setting even for the same dimensions. The operator will learn the best settings for each blade with practice – always make a trial weld on an offcut first.

6.4 Clamping the blade

A Welding position

Blade ends touch in the middle of the gap between the copper jaws.



B Annealing position

Upsetting-way switch at ANNEALING: jaws apart, weld joint in the middle.

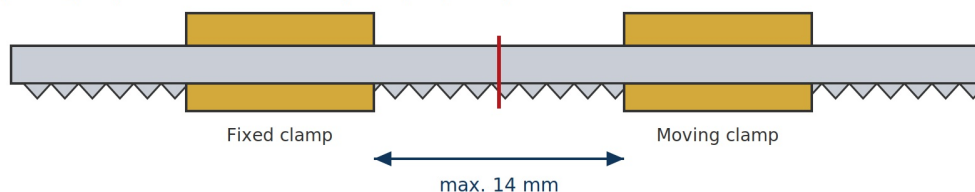


Fig. 6.2 Blade position in the jaws for welding (A) and annealing (B)

1. Open the clamps: turn the left clamp clockwise and the right clamp anti-clockwise.
2. Place the blade ends in the jaws so that they **touch in the middle** of the gap between the jaws, with the teeth close to the front stops (for bands without teeth, the back stops may be used).
3. Clamp the blade firmly by turning the clamps in the opposite direction.

6.5 Welding

1. Turn the **upsetting-way switch** past the notches to **“WELDING”** and **press and hold** it in this position.
2. The welding current flows, the blade ends heat up and are pushed together by the upset pressure. The current is switched off automatically when the weld is complete – **do not release the switch early**.
3. Keep the switch pressed until the weld joint has cooled down.
4. Unclamp the blade.

▲ WARNING

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

6.6 Annealing

Annealing (re-heating) the weld joint is essential. It removes the brittleness caused by welding. A joint that is not annealed will break when the blade runs.

1. Turn the upsetting-way switch to **“ANNEALING”**. The jaws move apart (max. 14 mm).
2. Clamp the blade again so that the **weld joint lies in the middle** between the jaws (Fig. 6.2 B).
3. Set the welding current switch to a suitable annealing setting (start low).
4. Press the **ANNEALING switch** in short pulses and watch the colour of the joint. Stop when the joint is **dark red to brown**.
5. 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

6.7 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 (optional grinding attachment). 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.

7 Maintenance

▲ DANGER

Disconnect the supply plug before any cleaning or maintenance.

7.1 After every weld / daily

- Remove all scale, burr and metal splashes from the jaws, pressure dies and stops.
- Keep the copper jaws and pressure dies clean and smooth. Dirty jaws cause poor contact, burn marks and weak welds.
- Check that the clamps, the upsetting lever and the switches move freely.

7.2 Weekly

- Lightly oil the slide guides and the clamping screws. Wipe off excess oil – no oil may reach the jaws.
- Check the pressure dies for wear; turn or replace them when worn.

7.3 Monthly

- With the plug disconnected, remove the cover 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 and the earth connection.

7.4 Wear parts

Replace the pressure dies and copper jaws when they are worn or no longer hold the blade straight. Use only original Cruxweld spare parts.

8 Troubleshooting

Problem	Possible cause	Remedy
Power lamp off	No supply; fuse or breaker off; plug or cable faulty.	Check the supply, the fuse and the cable.
No welding current	Blade ends not touching. Dirty jaws or blade ends. Switch released too early. Thyristor contactor faulty.	Bring the ends into contact. Clean jaws and blade. Hold the switch until the weld is complete. Contact Cruxweld service.
Blade ends burn away; holes in the weld	Current too high. Upsetting way or pressure too low.	Reduce the current setting. Increase upsetting way / pressure.
Weak joint, breaks on bending	Current too low. Upsetting way or pressure too low. Not annealed or over-annealed.	Increase the current. Increase upsetting way / pressure. Anneal to dark red / brown only.
Heavy burr, joint pushed up	Upsetting way or pressure too high.	Reduce the upsetting way / pressure.
Joint stepped or not straight	Ends not cut square. Blade not against the stops or slipping. Worn pressure dies.	Cut the ends square. Clamp correctly and firmly. Replace the dies.
Burn marks on the blade at the jaws	Dirty jaws or blade; clamps loose.	Clean jaws and blade; tighten the clamps.
Joint turns bright red during annealing	Annealing switch pressed too long or current too high.	Let the blade cool completely; anneal again in short pulses at a lower setting.
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 CBS040 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, pressure dies, fuses) or damage caused by incorrect supply voltage, missing earth, moisture, overload, lack of maintenance, misuse or repair by unauthorised persons.

Model	CBS040
Serial number	
Invoice no. / date	
Customer	
Dealer stamp	

For service, spare parts and accessories please contact:

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