



INDUSTRIAL EQUIPMENTS PVT. LTD.

CBS10P

Pneumatic Battery Spot Welder

10 kVA | Dual-pulse energy welding | 0.02 - 0.3 mm nickel strip | Pneumatic welding head, foot-switch triggered



USER MANUAL

Read this manual carefully before installing and operating the machine. Keep it for future reference.

Cruxweld Industrial Equipments Pvt. Ltd.

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Overview

The Cruxweld **CBS10P** pneumatic spot welding machine is a precision pulse spot welder designed for the production and assembly of high-quality battery packs (nickel-cadmium, nickel-metal hydride and lithium-ion cells). The welding head is lowered by an air cylinder and the weld is triggered by a foot switch, so the operator has both hands free and every weld is made with the same electrode force. A single-chip microcomputer controls the welding energy, giving stable and repeatable results. Its main characteristics are:

1. Compact, attractive design; the head, transformer and control unit form one bench-top machine.
2. Clean, uniform weld spots with minimal sparks and no blackening; stable welding current and uniform weld size.
3. Overcomes the low-voltage and leakage problems that can follow poor spot welding of lithium-ion cells, making it an ideal machine for battery production and assembly.
4. All parameters are set digitally, so adjustment is intuitive and accurate.
5. Pneumatic head with adjustable air pressure and adjustable descending / ascending speed; the foot switch only triggers the cycle, so positioning is accurate and the pass rate is high even on small-capacity cells.
6. The pressure of the two welding electrodes can be adjusted independently and conveniently, ensuring stable and reliable welding pressure.
7. The welding trigger uses a photoelectric switch inside the welding head, eliminating the wear and replacement problems of mechanical contact switches.
8. Dual-pulse welding: a pre-pulse cleans the contact surface and the main pulse makes the weld, giving a firmer joint.

Main technical parameters

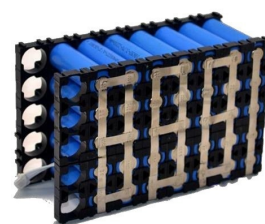
Model	CBS10P
Output power	10 kVA
Working voltage	AC 230 V $\pm$ 10 %
Frequency	50/60 Hz
Control mode	Pneumatic
Drive style	Pneumatic (air cylinder)
Welding trigger	Foot electric switch
Input air pressure	0.3 – 0.8 MPa
Welding method	Double pulse
Welding current	00 – 99 % adjustable

Maximum output current	3500 A
Welding thickness	0.02 – 0.3 mm
Welding material	Pure nickel or nickel alloy strip
Electrode diameter	Ø 3 mm
Electrode travel length	15 mm
Dimensions	300 x 600 x 550 mm
Weight	52 kg
Compressed air	Clean, dry air; 6 mm push-in connection
Power connection	Earthed 230 V socket, 16 A
Cooling	Natural air cooling

Scope of application

Series and parallel connection of 18650 and other cylindrical lithium cells for laptop, power-tool, e-bike and energy-storage packs; welding of nickel and nickel-plated strip to lithium-ion cell terminals; welding of protection plates and tabs; combination welding of nickel-metal hydride and nickel-cadmium cells; both mobile-phone battery and battery-pack welding.

Not suitable for welding copper, aluminium or steel sheet thicker than 0.3 mm.



18650 battery pack welded in series and parallel

Standard scope of supply

No.	Item	Qty	No.	Item	Qty
1	CBS10P pneumatic spot welder with control unit and worktable	1	4	Welding tips Ø3 mm (fitted) + spare pair	1 + 1
2	Foot switch with cable	1	5	Power cable with plug, spare fuses	1 set
3	Air filter-regulator with gauge, solenoid valve and speed valves (fitted)	1 set	6	Hexagon wrench set, small file, user manual, certificate and warranty card	1 set

Safety

▲ WARNING - read before use

- Connect the machine only to an earthed 230 V socket. Switch off, unplug and shut off the compressed air before opening the housing, changing electrodes or carrying out maintenance.
- The welding head descends with pneumatic force whenever the foot switch is pressed. Keep fingers away from the electrodes and the head; never reach under the head while your foot is on the switch. Only one person operates the machine.
- Lithium cells can short-circuit, overheat and catch fire. Never let the electrodes or a nickel strip bridge the two poles of a cell. Keep a Class D or CO₂ extinguisher at hand.
- Wear safety glasses; sparks and small hot particles may be thrown out. Keep flammable material away from the worktable.
- Never exceed 0.8 MPa air pressure. Persons with pacemakers must not operate or stand next to the machine while welding.

Controls and indicators



Front: pressure knobs, pulse display, current keys, pilot lamp, power switch



Side: air filter-regulator with gauge, solenoid valve and cylinder speed valves

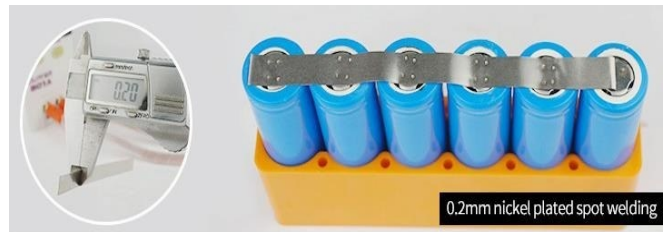
Relationship between welding current and welding time

The welding current is set by the user; the welding time is calculated automatically by the program from the set current. Generally the welding current is kept below 60 and the resulting welding time is about 1 – 3 ms.

Control / indicator	Function
Power switch	Switches the machine on and off; illuminated when on.
Pilot lamp (operation indicator)	Flashes continuously in normal stand-by; stays on during the weld. If it does not light, or lights without flashing, switch off and on again.
Welding current setting (▲ / ▼ keys)	In normal welding mode press ▲ or ▼ to set the welding current 00 – 99 on the digital display. A setting around 38 is a good starting point for 0.1 mm nickel strip.
Welding switch	Two photoelectric switches inside the welding head, connected in series. When the welding tips press on the workpiece and both switches close, the machine discharges and welds.
Welding pressure adjustment knobs	One knob per electrode. Clockwise increases, counter-clockwise decreases the electrode pressure.
Air pressure regulator and gauge	Sets the cylinder pressure (working value 0.4 MPa, range 0.3 – 0.8 MPa). Pull the knob up to unlock, turn, push down to lock.
Cylinder speed valves	Two throttle valves on the cylinder: input valve = descending speed, output valve = ascending speed of the welding head.
Foot switch	Starts the cycle: the head descends, the electrodes press on the workpiece, the weld fires and the head returns when the switch is released.

Operation steps

- Adjustment of welding tip height:** loosen the welding-tip height adjustment screw with a wrench. Adjust (or replace) the welding tip so that about 20 mm of tip projects below the electrode holder; a tip that projects too far is prone to bending. Tighten the screw.
- Adjustment of electrode (welding tip) width:** loosen the welding-tip width adjustment screw with a wrench. Set the two electrodes to the distance required by the weld pattern (typically 2 – 4 mm for 18650 cells). Tighten the screw.
- Adjustment of worktable height:** loosen the worktable locking screw with a wrench. Adjust the height so that the distance between the battery to be welded and the welding tips is about 4 mm (recommended), then tighten the screw.
- Adjustment of welding pressure:** turn the welding-pressure adjustment knobs by hand. Clockwise increases, counter-clockwise decreases the pressure. Set both electrodes to the same, suitable pressure for the strip thickness.
- Adjustment of input air pressure:** connect clean, dry compressed air. Pull the regulator knob up, turn clockwise to increase or counter-clockwise to decrease the pressure while reading the gauge, set **0.4 MPa** and push the knob down to lock it. Drain the water separator if water has collected.
- Adjustment of cylinder input speed:** turn the cylinder input speed valve by hand. Counter-clockwise increases the air flow and the welding head descends faster; clockwise makes it descend slower. Set a smooth, controlled descent.
- Adjustment of cylinder output speed:** turn the cylinder output speed valve. Counter-clockwise makes the welding head rise faster; clockwise makes it rise slower.
- Power connection:** plug the machine into an earthed 230 V socket rated for the machine (do not use light-duty extension leads). Switch on the power switch. The pilot lamp flashing continuously indicates normal operation. If the lamp does not light, or lights without flashing, switch off and switch on again.
- Test welding:** place a nickel strip on a test cell or on scrap of the same material. Press the foot switch; the welding head descends. When the welding tips press on the workpiece both welding switches close and the discharge weld is made. Adjust the welding current, tip pressure and air pressure according to the result until the optimum weld is achieved: the strip must not tear off by hand and the spots must show no burn-through or discolouration.
- Production:** keep the same settings for the whole batch. Check a sample weld by peeling at the start of every shift and whenever the electrodes have been dressed or replaced.
- Electrode care:** to ensure good welding quality the welding tips must be dressed regularly. Use a small fine file to file the end face of each tip flat and smooth, then re-check the tip height and width settings.



0.2 mm nickel-plated strip spot-welded on 18650 cells

Setting guide (reference values, pure nickel strip)

Strip thickness	Current setting	Air pressure	Electrode gap	Result to expect
0.05 mm	20 – 30	0.3 MPa	2 mm	Two small bright spots, no discolouration
0.10 mm	35 – 45	0.4 MPa	2 – 3 mm	Strip tears around the spot when peeled
0.15 mm	45 – 60	0.4 – 0.5 MPa	3 mm	Firm weld, slight grey ring acceptable
0.20 – 0.30 mm	60 – 85	0.5 – 0.6 MPa	3 – 4 mm	Use two spot pairs per tab; check for burn-through

Values are starting points only. Increase the current in steps of 3 – 5 and test after each change. Too much current or too little pressure causes sparks and burnt strip; too little current gives a weak weld that peels off.

General troubleshooting

No.	Fault phenomenon	Cause of failure	Remedy
1	No power indication when switched on	1. Fuse blown. 2. Input power failure.	1. Replace the fuse with one of the same specification. 2. Repair the power line / socket.
2	Power indication present, but the pilot lamp stays on without flashing	1. Control board loose or not seated.	1. Switch off; insert the control board fully in the correct direction.
3	Power indication present, no welding spark	1. Air pressure too low. 2. Welding current set too low. 3. Distance between the lower end face of the welding tip and the battery too large. 4. Welding switch connection wire disconnected. 5. Photoelectric switch damaged. 6. Pilot lamp not on or flickering, mainly caused by mains interference.	1. Increase the air pressure (0.4 MPa). 2. Increase the welding current value. 3. Adjust the distance between battery and tip end face to about 3 – 4 mm. 4. Re-connect the wire to the welding switch terminals. 5. Replace the photoelectric switch. 6. Switch the power off and on again; use a separate, well-earthed supply.
4	Welding sometimes firm, sometimes not	1. Welding tip not tightened. 2. Looseness at a joint in the welding circuit. 3. Connection between control board and thyristor not tight. 4. Water or oil in the compressed air; pressure fluctuating.	1. Tighten all connections. 2. Dress the tips and re-set tip height. 3. Drain the filter bowl; fit a dryer if necessary.
5	Excessive sparking during welding, even burning the battery casing	1. Welding tip pressure too small. 2. Foreign matter on the lower end face of the welding tip. 3. Incorrect welding material (not nickel / nickel alloy).	1. Increase the welding pressure / air pressure. 2. File the tip end face flat and smooth with a small file. 3. Select suitable welding material; reduce current.
6	Head does not descend or returns slowly	1. No air supply; solenoid valve not switching. 2. Speed valves closed too far. 3. Foot switch cable damaged.	1. Check air supply and solenoid valve connection. 2. Open the input / output speed valves. 3. Repair or replace the foot switch.

Maintenance

- Switch off, unplug and shut off the air before any maintenance.
- Dress the welding tips daily; replace them when they can no longer be filed to a flat Ø3 mm face.
- Drain the water separator of the filter-regulator daily; keep the supplied air clean and dry.
- Keep the worktable and electrode area free of nickel off-cuts and dust; blow out the welding head weekly.
- Check the tightness of the electrode holders, the secondary copper connections and the air fittings monthly; lubricate the cylinder rod guide lightly.
- Have the electrical system inspected by a qualified technician once a year.

Certificate of Conformity

Product name Pneumatic Battery Spot Welder

Product model CBS10P

Serial number

Production date

Inspector

This product has been inspected and tested and conforms to the Cruxweld specification for the CBS10P.

Warranty Card

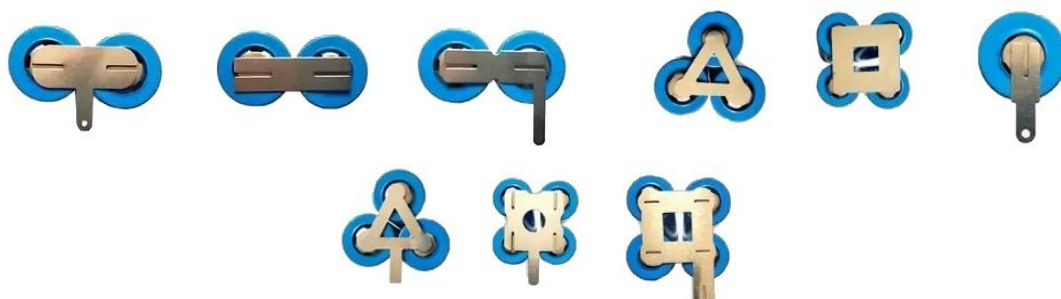
Customer

Invoice no. / date

Serial number

Dealer stamp

Warranty as per the sales contract from the date of invoice. Consumables (welding tips, fuses, air filter element) and damage from misuse, wrong supply voltage, wet or oily air or unauthorised repair are excluded. For service contact support@cruxweld.com.



Samples welded in series and parallel connection of battery cells



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Cruxweld improves its products continuously. The technical and hardware data in this manual may change without notice.