HELTEC BMS **HT-SW02A**

Super Energy-Gathered Pulse Technology

Industrial Intelligent Spot Welder

Specially designed for welding copper Aluminum and nickel conversion

User Manual



Thank you for choosing **HELTEC** series products, it will bring you convenience and efficiency for spot welding work. For optimal user experience, please read the manual carefully before using and keep it for future reference.**HELTEC** has the rights to upgrade the machine and modify the manual with no more notices, thanks for understanding.

Features Overview

1、High-frequency inverter super energy storage capacitor discharge technology eliminates interference to AC power supply, and avoid switch tripping situation.
2、The China's patented energy storage control and low-loss metal bus technology maximizes the burst energy output.
3、The energy-concentrated pulse formation technology controlled by the microcomputer chip operation ensures the formation of reliable solder joints in milliseconds.
4、Intelligent program combined with multi-function parameter display screen, the management of welding is clear at a glance, with high proficiency.
5、With up to 36KW output power , which can meet the needs of power battery welding.
6、With an intelligent display control panel, the output level can be flexibly adjusted according to the thickness of different weldments.
7、The up to 6000A pulse welding current can weld 0.3mm pure copper sheet to the copper electrode (with flux).
8、Dual-mode spot welding to achieve precise,fast and efficient welding, which is convenient for welding different weldments.
9、The first dual welding tool mode combination is convenient for users weld a wide range of workpieces flexibly, such as batteries and metal parts.
10、The unique real-time display of welding pulse current can monitor each welding current and avoid false welding of solder joints.
11、Supports optional removable professional welding pens with different functions and performances to realize welding work from ultra-thin to ultra-thick weldments.
12、Ultra-low loss, high-efficiency performance design, professional industrial-grade manufacturing process, to ensure the machine for a long time use without getting hot.

Widely Application

Widely used for welding of large single battery pack and other materials:
1.Repair and rapid welding of lithium iron phosphate battery packs or ternary lithium battery packs used in electric vehicles , unmanned aircraft , power tools, electric appliances, robots and other equipment.
2. Rapid welding of copper/aluminum poles for various power large single cells.
3. Welding of battery connection sheets (nickel-plated/pure nickel/pure copper/ nickel-plated copper sheet), hardware parts, wires, etc.
4.Rapid welding of stainless steel, iron sheet , brass , titanium, molybdenum and other materials.
5.This manual only introduces the welding of lithium batteries . Please contact our company for other aspects of metal welding .

Parameters

A:Main machine

Model	**HT-SW02A**	Charging Current	10~20A
Power Supply	AC 110V and 220V optional	Peak Welding Energy	720J
Pulse Power	36KW(Peak)	Welding Mode	MT:Foot control mode AT:Automatic welding mode
Energy Grade	0-99T(0.2ms/T)	Welding Tool	75A Split spot welding pen
Pulse Time	0~20ms	AT Preloading Delay	300ms
Output Current	6000A(Peak)	Charging Time	About 18 min
Output Voltage	5.6~6.0V	Welding Thickness	0.1~0.3mm Copper(with flux) 0.1~0.5mm Pure nickel
Dimension	24(L)x14(W)x21(H)cm	Net Weight	6.5KG

Welding tool

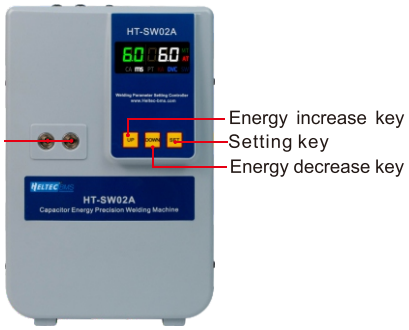
S-75A split spot welding pen

Model	S-75A (35mm²)	Total length	About 610mm
Cable cross-section	35mm²	Welding pin diameter	Φ2mmX15mm
The max carry current	3500A~6000A	Internal Resistance	＜0.35mΩ

Product Diagram

A.Main machine

Front view



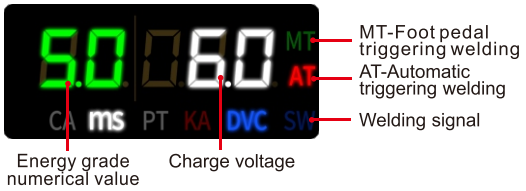
Side View



24(L)x14(W)x21(H)cm

Control panel sketch map

Setting parameters diagram



Welding instant display interface





This means the energy release is (50t).
The release energy grade for AT mode can be adjusted from 00 to 99.
Pulse time is 0~20ms，50t actual pulse time is 10ms.



Show the charging voltage of the spot welder is 6V.
(Start aluminum to nickel dedicated mode, can be charged to 6V, better welding effect)



The output welding current is 4.71KA.
The SW will light up during welding instantly.Easy to observe the spot welding situation in real time and adjust the output energy level according to the welding effect.



E01 show fault prompt
Check if the spot welding electrodes are touching together
If the solder pin is oxidized, use our grinding machine to clear the oxide.



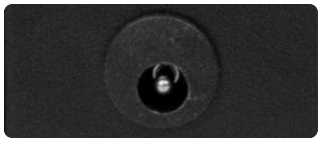
E02 show foot switch fault prompt
1.Avoid stepping on the trigger foot switch in rapid succession within 0.5 seconds.
2.The spring of the foot switch falls off or the foot switch is blocked by other objects and fails to reset normally.
3.Replace the foot switch cable or the micro switch in the foot switch.



Sefuse
Overload or short circuit occurs, the current exceeds the fuse fusing current, the fuse will fuse,cutting off the circuit and protect the spot welder.



Spot welding power grade adjustment
Keyboard type output power grade adjustment, more fine than the knob type adjustment output energy.01-99 steps precision adjustment, can spot weld more and thicker materials.



Foot pedal control switch
Foot spot welding fast loading and unloading interface, plug and play,fast and convenient.

Before use preparation of spot welder

1.Power supply and mobile welding pen installation



① Plug the adapter into an AC 110 or 220 volt wall socket to charge the machine.



② Turn on the power supply



③ Insert the mobile welding pen and make sure the connection is solid.

*Power inside the capacitor is released for safe transportation before leaving the factory. When you receive the machine, please turn it on, charge it for 18~20 minutes, and wait for the voltage to rise between 5.2~6V before spot welding.



1.Power on-Press and hold the " SET " key for 2~3 seconds,turn on the welding machine.The buzzer sounds for 2 seconds.The LED will show " CH " flicker and the real-time voltage value of the internal capacitor.The spot welder is being charged.



2.When the voltage is charge to 6V, the spot welding power is maximum.The higher the voltage, the higher the spot welding current.



3.Set energy grade—
To set the energy grade, you need to press the " SET " key when the machine is on. The current number will flash, you can adjust the number through " UP / DOWN " keys.Until the display value do not blink, the setting is complete.



4.AT/MT mode switch-Press the " SET " key and the " UP / DOWN " keys to change the spot welding mode.

"AT" Mode - Automatic welding mode.
"MT" Mode - Foot pedal switch controlling mode.



5.Power off - Press and hold the " SET " key for 2~3 seconds to turn off the spot welding machine. Please unplug the power adapter from the socket when not in use for a long time.

Spot welding operation introduction

MT mode **Control with foot pedal(Convenient for parameter adjustment and welding debugging to achieve the best spot welding effect).**



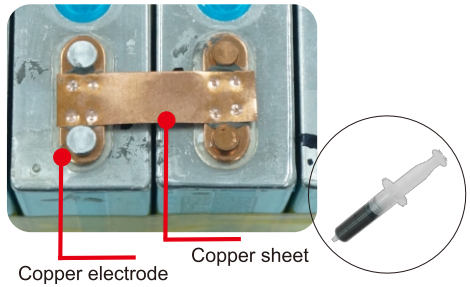
1.Select the appropriate energy level and MT pedal mode



2.Access wire-controlled foot switch

3.Hold the spot welding pen and press the welding needle tightly, step on the wire-controlled foot switch to trigger spot welding, and observe and check that the real-time welding current on the display should be within the range of 3.5~5.5KA (with flux).



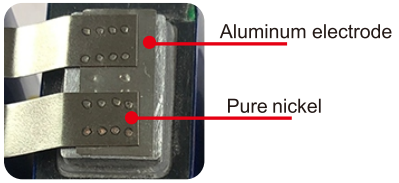


AT mode **Automatic welding(no foot pedal control, suitable for welding a large number of batteries for a long time)**

Select the AT induction mode.Hold the spot welding pen and press the welding needle tightly, and the welding machine will automatically trigger the spot welding after the set preload time.



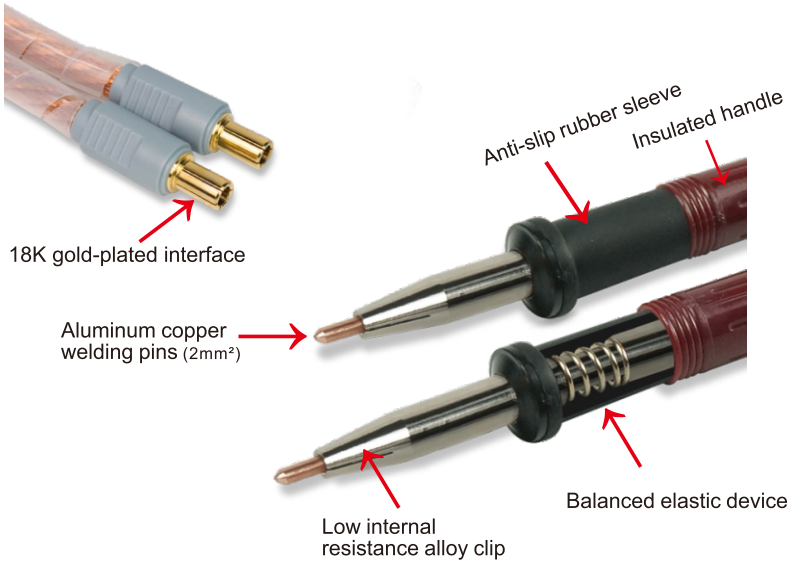




Note:
In AT mode, it is more convenient and efficient to weld than MT, but because of rapid welding, it is necessary to check the process and quality of solder joints frequently to avoid false welding.

Introduction to mobile spot welding pen

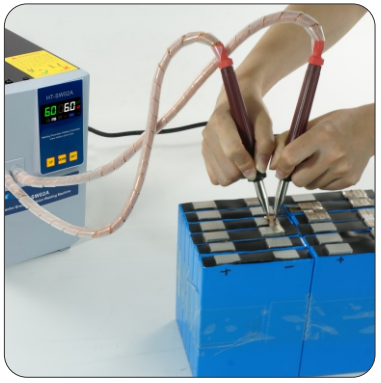
A:S-75A split spot welding pen



Suitable for welding a battery pack or a large-size battery, High flexibility.



① 0.3MM copper welding to the battery copper electrode with flux can be welded easily and firmly.



② 0.2mm pure nickel sheet welding to the aluminum pole of the battery directly.

Reference table for spot welding of various metals:

Aluminum to Nickel / Copper to Battery copper electrode

S-75A split spot welding pen(35²) MT mode

Material	Thickness	Voltage range	Energy grade	Remarks
Pure nickel→Aluminum	0.1mm	5.6V-6V	20t	
Pure nickel→Aluminum	0.15mm	5.6V-6V	35t	
Pure nickel→Aluminum	0.2mm	5.6V-6V	55t	
Aluminum-nickel composite slice→Aluminum	0.25mm	5.6V-6V	40t	
Aluminum-nickel composite slice→Aluminum	0.3mm	5.6V-6V	60t	
Copper sheet→Aluminum	0.1mm	5.6V-6V	55t	
Copper sheet→Aluminum	0.15mm	5.6V-6V	65t	
Copper sheet→Copper	0.15mm	5.6V-6V	10t	With flux
Copper sheet→Copper	0.2mm	5.6V-6V	30t	With flux
Copper sheet→Copper	0.3mm	5.6V-6V	70t	With flux

PS:Please choose the proper energy grade and pulse current according to different object materials and thicknesses.Battery aluminum and copper electrodes maintain a flat surface.

Note for 75A welding pen



After connect the welder,the welding pen pins strictly prohibit touch together.Otherwise,the equipment will be damaged.



It is strictly prohibit the welding pen spot weld the positive and negative electrodes of the battery at the same time

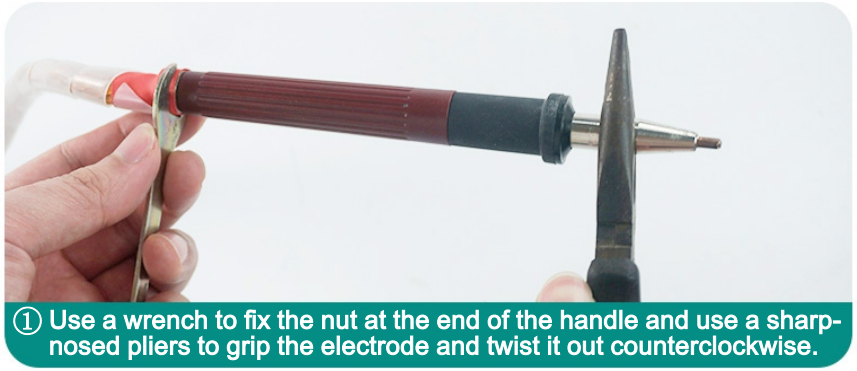


Correct demonstration
Welding pins must touch the same electrode.

Maintenance of welding pen

To ensure welding efficiency and quality, the following are required when using welding tools:

① Always check whether the welding pin head is oxidized and blackened. If it is oxidized or blackened, it should be polished with fine abrasive cloth in time. keep it bright and smooth.
② To prevent oxidation of the welding pin, a small amount of lubricating oil can be applied as an anti-oxidation coating on the welding pin.
③ The original oxide aluminum alloy welding pin must be used.
④ After the new welding needle is installed into the welding needle clamp, solder shall be added to weld the welding needle firmly on the welding needle clamp. If the welding needle is not in close contact with the welding pen, the welding effect will be affected.
⑤ Welding electrode head replacement:Use a wrench to fix the nut at the end of the handle, use a sharp nose pliers to grip the electrode and twist it out counterclockwise, replace the new electrode then twist clockwise to tighten.



① Use a wrench to fix the nut at the end of the handle and use a sharp-nosed pliers to grip the electrode and twist it out counterclockwise.



② Just insert the new electrode and twist it clockwise.

Maintenance of welding pin

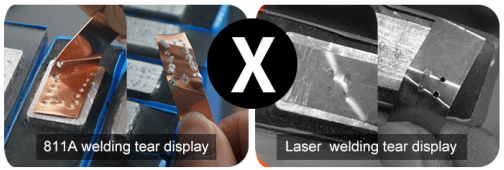
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① Always check whether the welding pin head is oxidized and blackened. If it is oxidized or blackened, it should be polished with fine abrasive cloth in time. keep it bright and smooth.
② To prevent oxidation of the welding pin, a small amount of lubricating oil can be applied as an anti-oxidation coating on the welding pin.
③ The original nano-oxide aluminum alloy welding pin must be used.
④ If the loss of welding needle is too short, the welding needle cannot be pulled out from the welding pen and replaced with a new welding needle. If the loss of welding needle is serious, at least 2mm needle shall be reserved so that the flat jaw pliers can clamp the welding needle and pull it out of the needle seat for replacement.
⑤ After the new welding needle is installed into the welding needle clamp, solder shall be added to weld the welding needle firmly on the welding needle clamp. If the welding needle is not in close contact with the welding pen, the welding effect will be affected.

HT-SW02A Welding pulling force test



Pulling force wrong test (X)



Because the aluminum electrode material is softer than pure copper. Test method is different from 18650 battery : When pulling the pure copper sheet from the side,only two welding spots arestressed,easy to pull off due to low bearing capacity.After pulling out, the residual welding spots of aluminum can be seen on the nickel sheet, which proves that the pure nickel has been firmly welded with the aluminum electrode.

Packing List

① Main machine x1pc
② 75A Split spot welding pen x1
③ Foot pedal x1pc
④ Power cord x1pc
⑤ Hexagon spanner x1pc
⑥ Welding pin on the welding pen (HB-75A) x1pair
⑦ Manual & Warranty Card x1pc

Troubleshooting

Error Types	Issues	Solutions
Weak welding	1.Whether the welding pin is polluted or oxidized 2.Ensure that the capillary pressure is uniform 3.If the welding pin is blunt	1.Clean oxide layer on welding pins 2.Apply different welding pressure according to the thickness of the workpiece 3.Grind the welding pins to a taper of 1 ~ 1.5mm at the tip
	Whether the thickness of the workpiece exceeds the welding thickness range	Select spot welders with different power according to the thickness of the material to be welded.
Panel display "E01"	Whether the spot welding electrodes touch each other	Avoid the touch of two welding pins or the copper wires of two welding pens.
	If the welding pin is oxidized	Use grinding machine to polish the welding pin to clean the oxide.
Panel display "E02"	1.Whether to step on the trigger foot switch continuously. 2.The foot switch does not bounce back after being pressed down. 3.Whether the foot switch is damaged.	1.Avoid stepping on the trigger foot switch in rapid succession within 0.5 seconds. 2.The spring of the foot switch falls off or the foot switch is blocked by other objects and fails to reset normally. 3.Replace the foot switch cable or the micro switch in the foot switch.
Panel display "PT"	1.Spot welding current output over 6000A 2.Whether the spot welding electrodes touch each other	1.Power off for 10 minutes, restart the spot welder. 2.Avoid the touch of two welding pins.
Spot welding is not firm	Whether the welder voltage is lower than 5.2V	It needs to be charged to 5.2~6.0V with a matching adapter, and the spot welding effect above 6V is better.
MT does not work	Whether the foot switch is bad	Replace or repair the foot switch.
AT does not work	1.Whether the parameters on the screen flashing and not confirmed. 2.Whether the welding material is conductive.	1.You can use the confirm button to confirm 2.Scrape off the surface coating for test spot welding.
Large spot welding spark	1.Whether the welding pin is polluted or oxidized 2.The pressure on the workpiece is not enough	1.Clean oxide layer on welding pins 2.Increase the welding pressure

***Please contact us if the above-mentioned inspection cannot be resolved.**

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Attentions

1.Power inside the capacitor has been released for safe transportation before leaving the factory. When you receive the machine, please turn it on, charge it for about 18 minutes, and wait for the voltage to rise between 5.6~6V before spot welding.
2.Use **HELTEC** adapter to work with the welding machine. An adapter from a third-party supplier will damage the device.
3.Please wear glasses and gloves during the welding process.
4.Removing the oxidation layer on welding pins is good for energy transfer.
5.Unplug the machine when it's not in use.
6.The welding current displayed instantaneously is pulse release, ordinary testing instruments cannot measure.
7.Welding materials should be cleaned before welding. Remove any oil stains or oxide layers on the surface to avoid poor welding.
8.Keep out of reach of children.
9.Unauthorized disassembly of the machine is not allowed and is unsafe.
10.Do not use the product in inflammable, explosive or water-spray environment.

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