Transportation and Storage

1.The products are not directly affected by severe bumps and rain and snow after transportation and packaging , and can be transported using normal transportation tools . It is not allowed to be placed with corrosive substances such as acids and alkalis during transportation.
2. Packaged products should be stored in a permanent warehouse with a temperature of 0-35 ° C and a relative humidity of no more than 80%. The warehouse should be free of acid, alkali, corrosive gases, strong mechanical vibrations and impacts, and strong magnetic fields.

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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HELTEC ENERGY **HT-SW02H**

Super Energy-Gathered Pulse Technology

Industrial Intelligent Energy Storage Spot Welder

Specially designed for welding copper Aluminum and nickel conversion

Spot welding+Resistance measurement
Dual function spot welding machine



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.Up to 7000A pulse welding current: Support welding pure copper sheet, pure nickel, nickel-aluminum conversion sheet, stainless steel.
6.Super energy-gathered pulse welding, solder joint concentrated and slender, deep penetration of melt pool, the soldered dot no blackening, no generate heat, no damage to the battery.
7.Dual-mode spot welding to achieve precise, fast and efficient welding, which is convenient for welding different weldments.
8.The unique real-time display of welding pulse current can monitor each welding current and avoid false welding of solder joints.
9.Supports optional removable professional welding pens with different functions and performances to realize welding work from ultra-thin to ultra-thick weldments.
10.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 .

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.
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

Maintenance of welding pen

Clean	Always check whether the welding pin head is oxidized and blackened. To prevent oxidation, fine sandpaper or a needle grinder can be used to polish and repair welding pins. In addition, a small amount of lubricating oil can also be applied as an anti-oxidation coating on the welding pin.
When not in use	A small amount of lubricating oil can be applied as an anti-oxidation coating on the welding pin. Try not to use lubricating oils containing EP additives as much as possible.
After use	To prevent oxidation, fine sandpaper or a needle grinder can be used to polish andrepair welding pins.
Welding pen electrode replacement	Use a wrench to secure the nut at the end of the handle and use Needle-nose pliers to clamp the electrode and turn it out anticlockwise, and then insert the new electrode and tighten it clockwise.

Reference table for spot welding of various metals:

HT-SW02H Spot welding machine(42KW) S-75A split spot welding pen (50mm²) MT mode

Material	Thickness	Voltage range	Energy grade	Remarks
Copper sheet→Copper	0.15mm	5.8V-6V	40t	With flux
Copper sheet→Copper	0.2mm	5.6V-6V	50t	With flux
Copper sheet→Copper	0.3mm	5.6V-6V	65t	With flux
Copper sheet→Copper	0.4mm	5.6V-6V	85t	With flux
Cooper sheet→stainless steel	0.15mm	5.6V-6V	30t	
Cooper sheet→stainless steel	0.2mm	5.6V-6V	35t	
Nickel plated copper sheet→ stainless steel	0.15mm	5.6V-6V	25t	
Nickel plated copper sheet→ stainless steel	0.2mm	5.6V-6V	35t	
Pure nickel→Aluminum	0.1mm	5.6V-6V	20t	
Pure nickel→Aluminum	0.15mm	5.6V-6V	30t	
Pure nickel→Aluminum	0.2mm	5.6V-6V	45t	
Pure nickel→Aluminum	0.3mm	5.6V-6V	65t	
Pure nickel→Aluminum	0.4mm	5.6V-6V	85t	
Red copper →Aluminum	0.1mm	5.6V-6V	55t	
Red copper →Aluminum	0.15mm	5.6V-6V	65t	
Red copper →Aluminum	0.2mm	5.6V-6V	85t	
Pure nickle→copper→ 18650 battery	0.15mm	5.6V-6V	30t	
Pure nickle→copper→ 18650 battery	0.2mm	5.6V-6V	45t	
Pure nickle→copper→ 18650 battery	0.3mm	5.6V-6V	65t	

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.

Parameters A:Main machine

Model	HT-SW02H	Charging Current	10~20A
Power Supply	AC 110V and 220V optional	Peak Welding Energy	840J
Pulse Power	42KW	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	7000A(Max)	Charging Time	About 18 min
Output Voltage	5.6~6.0V	Welding Thickness	0.1~0.4mm Copper(with flux) 0.1~0.6mm Pure nickel
Dimension	24(L)x14(W)x21(H)cm	Net Weight	6.5KG

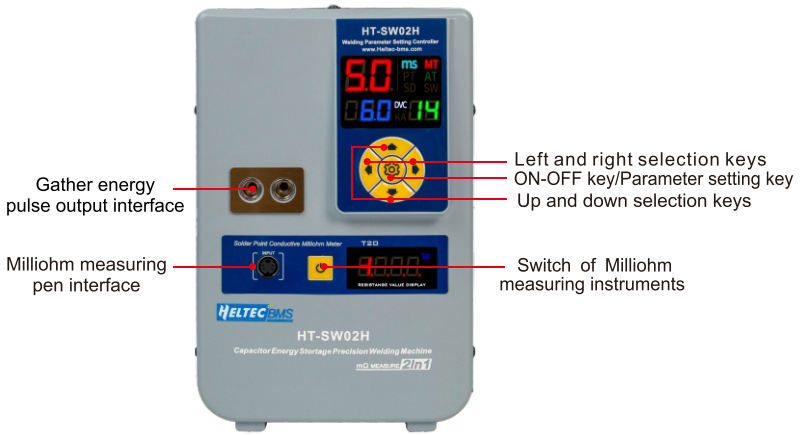
B:Welding tool

S-75A split spot welding pen

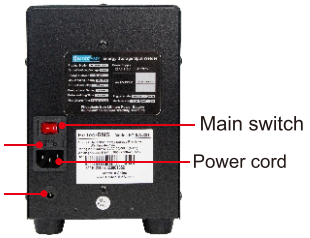
Model	S-75A (50mm²)	Total length	About 610mm
Cable cross-section	50mm²	Welding pin diameter	Φ2mmX15mm
The max carry current	3500A~7000A	Internal Resistance	≤0.30mΩ

Main Machine Diagram

A:Front view



B:Back view



C:Side View



Display screen interface

Digital welding instant display screen



Energy grade numerical value
For exanple:55

1. Indicates that the voltage value of the energy storage spot welding machine has reached 6V DC voltage (DVC)

2.Instantaneous output of welding current value during spot welding

20ms Pulse time (20ms)

Foot-operated spot welding

Automatic induction spot welding

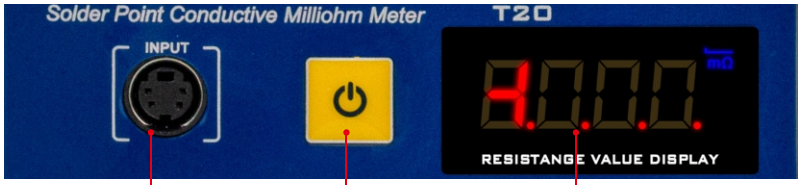
Welding pins short-circuit protection

Spot welding signal icon

Sleep indicator light

Display charging current

Milliohm Measuring instrument display screen



Measurement pen input interface

Power switch

Display area for measuring internal resistance of connecting solder pads

Maintenance of welding pin

① Check the welding needle head frequently to see if it is oxidized or blackened. If it is oxidized or blackened, use fine sandpaper to polish and trim the welding needle head in time to keep it bright and smooth.

② To prevent the welding needle head from oxidation, apply a small amount of lubricating oil on the welding needle as an anti-oxidation coating.

③ The original sodium oxide aluminum alloy welding needle must be used

④ Replace the 75B spot welding pen welding needle:



1.Use a spray gun to heat the electrode tip for 40-60 seconds to melt the solder paste inside the electrode tip.



2.Use needle-nosed pliers to pull out the welding needles after the solder paste melts.

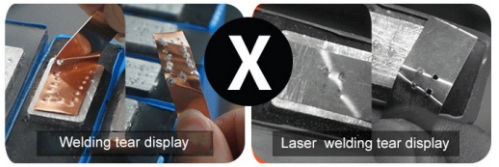


3.Use the torch to heat the electrode for 5-10 seconds, insert the new welding needle into the electrode, and use the torch to heat the electrode again for 5-10 seconds.

HT-SW02H 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

①Main machine ×1 pc ②Power cord ×1 pc

③Wire controlled foot switch ×1 pc

④ S-75B Low internal resistance split spot welding pen×1

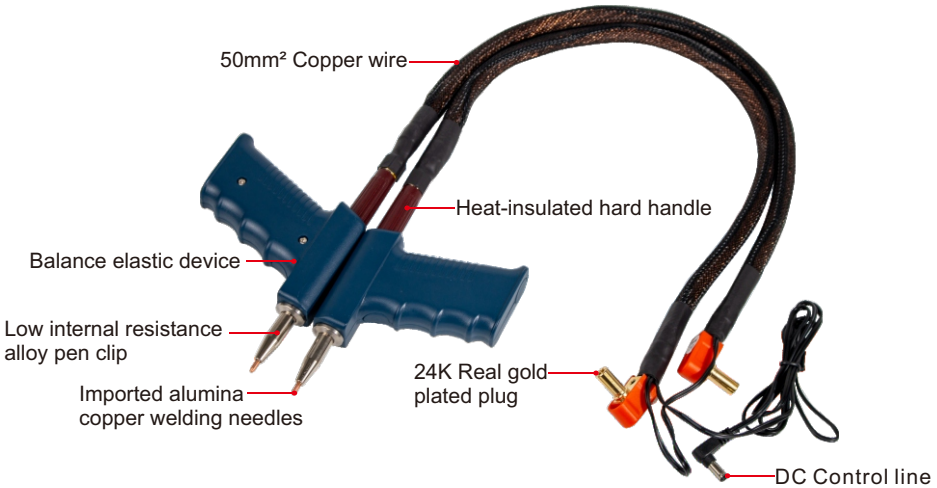
⑤ S-75B spot welding pen welding needles×1 pair

⑥ Welding point internal resistance milliohm measuring pen ×1

⑦ Manual & Warranty Card/Certificate ×1pc

Introduction to mobile spot welding pen

S-75B split spot welding pen



Precautions during spot welding operation

1.The pressure of the spot welding pen and welding pin on the welding workpiece at the same time should be consistent.Otherwise, uneven solder joints or sparks may occur.
2.Use different welding pressures for different thicknesses of weldments.Too little pressure can lead to False solder and breakdown of the weldment; It is recommended to choose MT pedal mode first when not proficient in use.After proficient use, you can choose the AT automatic induction spot welding mode, which is suitable for efficient operations.
3.During spot welding, be careful not to touch the two welding pins together, otherwise short circuits may occur and the machine may be damaged.

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.

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 Wait for the voltage to rise above 5.6V before use.



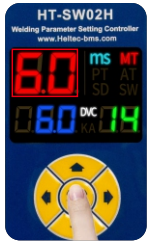
④Remove the silicone protective cover, insert the 50mm² spot welding pen gold-plated plug into the pulse output interface. Insert it to the end and make sure the connection is solid.



⑤ Tighten the screws and secure the spot welding pen

In order to establish energy storage voltage, it is necessary to supply normal power to the spot welding machine. And wait for the voltage to rise between 5.6-6v before spot welding.(To achieve better spot welding results, it is recommended to increase the voltage to 6V. The higher the voltage, the greater the spot welding current.)

2.Panel button settings



① Set the energy level ——Press the "⚙" key, the energy level value flashes and enters the setting state. Press the "⬆⬇➡⬅" keys to set the welding energy level.It can be adjusted within 0-99. The higher the energy level, the greater the output current.



② AT/MT (Automatic Induction Spot Welding/ Foot Spot Welding)modes switch——The setting steps are the same as the above, press the "⚙" and "⬆⬇➡⬅" keys to set. Finally, press the "⚙" button, the setting is completed. The energy level and spot welding mode values will no longer flash.(Note that if the value ashes, spot welding is not allowed)

Spot welding operation introduction

MT mode Control with foot pedal(Convenient for precise debugging and use of welding parameters and processes



MT mode : control with foot pedal

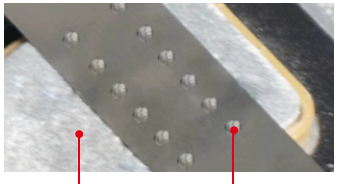


1.Select the appropriate energy level and MT pedal mode

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 welding, and observe and check the real-time welding current on the display.



Aluminum electrode nickel plated copper sheet

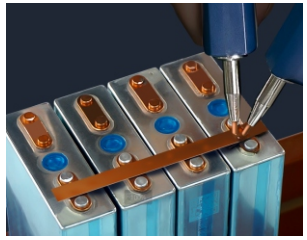
4.Check the firmness of the solder joints.

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

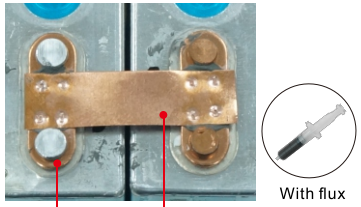


AT induction spot welding mode

1.Select the AT induction mode and set the pre compression delay parameters based on proficiency level.



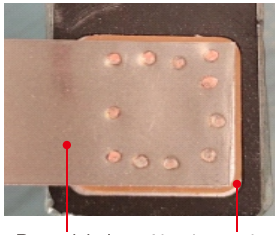
2.Hold the spot welding pen and press the welding pin tightly. The welding machine will automatically trigger the spot welding in 0.5s.



With flux

Copper electrode Copper sheet

3.Aluminum electrode tab welding pure copper sheet



Pure nickel Aluminum electrode

4.Aluminum electrode tab welding pure nickle sheet

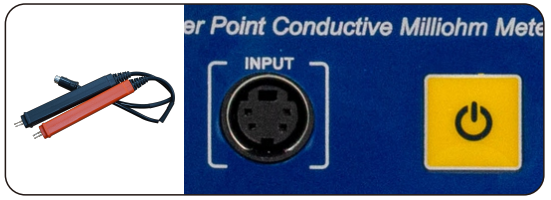
Note:

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. When a large spark appears at the moment of discharge, it indicates that the welding pressure on the workpiece is insufficient or the operation is too slow to pass the squeeze time.

Operation and measurement of milliohm measuring instrument



Press the "⏻"key,enable internal resistance measurement function.



① Insert the five core plug into the five core socket of the HT-SW02H spot welding machine.



② Actual picture after connecting the measuring pen to the spot welding machine.



③Press the power switch of the measuring instrument, and the digital display screen will display the characters shown in the above figure.

Note:Cannot test charged object (such as battery internal resistance)



④The actual picture of the milliohm measuring pen and battery connection piece ,and measure the resistance value of the connecting piece.
(In the figure, we can see that the on-resistance between the connecting solder pads and the monthly solder joints is 0.91mΩ.)

⚠ Cannot test charged object (such as battery internal resistance)

The on-resistance between the connecting solder pad and the solder joint is 0.91mΩ.

(The smaller the resistance,the better the conductivity, and the better the performance of the battery pack.)