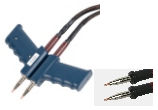
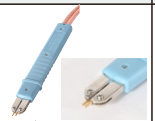
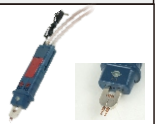
7 serial welding pen/optional

Model	S-75B (Standard)	HB-70BN	HB-71A	HB-71B	HB-73B
Illustration					
Welding method	Single pin split welding (Spring pressure balance)	Two pins flat welding	Two pins flat welding	Single point butt welding	Two pins flat welding
Structure Differences	Split spot welding pen	Welding pins distance 3~7 mm(adjustable)	Welding pins distance 1~7 mm(adjustable)	Single point butt welding	Adjustable welding pressure, welding pins distance 3~7 mm(adjustable), pulse signal.
Applications	18650, 21700,32650, Lithium iron phosphate battery resistance, etc.	18650, 21700, lithium-ion, iron, stainless steel, nickel Mu, brass, titanium, etc.	Nickel sheet, circuit, blue teeth device repair, etc.	Polymer battery, stainless steel, etc.	18650, 21700, lithium-ion, iron, stainless steel, nickel, Mu, brass, titanium, etc.
Recomm-endation	Phosphate iron lithium power battery aluminum to nickel welding	Lithium battery welding	Small hardware (similar with 70B's function)	Single-point butt welding	Normal battery pack welding

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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E-mail: echo@heltec-bms.com
Tel: 18123313360
Address: 64th ChengHong road, chenghua Section, Chengdu ,SiChuan ,China

HELTEC ENERGY **HT-SW01H**

Super Energy-Gathered Pulse Technology

Phosphate iron lithium power battery aluminum to nickel 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. HeltecBMS has the rights to upgrade the machine and modify the manual with no more notices, thanks for understanding.

Features Overview

1.The high-frequency inverter energy storage super capacitor discharge technology eliminates the interference to the AC power supply, no switch tripping situation.
2.The patented energy storage control and low-loss metal bus technology maximizes the burst energy output of pulses.
3.The energy-gathering pulse formation technology controlled by the microcomputer chip ensures the formation of reliable solder nuggets in milliseconds.
4.Automotive-grade large-capacity low-resistance super energy storage capacitors support the output of energy-gathering pulses up to 21KW.
5.Intelligent program combined with multi-function parameter display screen, the management of welding is clear at a glance and handy.
6.The "aluminum→nickel" welding selection mode is specially used for the aluminum electrode transfer welding pure nickel sheet of the iron-lithium power battery.
7.The maximum pulse welding current can reach 3500A, which supports nickel→nickel 0.4mm welding and aluminum→nickel 0.2mm welding.
8.High-energy polymerization pulse welding realizes concentrated and thin solder joints, deep penetration of the molten pool, no blackening of the solder joints, no heating of the welded parts, and no damage to the welded battery.
9.Dual-mode spot welding trigger, realize precise, fast and efficient welding, which is convenient for welding different parts.
10.The dual welding tool mode is convenient for wide welding range of batteries and metal parts flexibly.
11.The built-in safe self-discharge device for transportation or long-term storage can release the energy of the storage capacitor to zero.
12.Unique real-time display of welding pulse current, which can monitor each welding current and avoid virtual welding of solder joints.
13.Excellent structure technology, combined with multi-functional welding tool combination, one machine can be used for multiple purposes, and meet the low-cost logistics expenditure.
14.Professional welding pens with different optional functions realize welding work from ultra-thin to ultra-thick welding parts.
15.Ultra-low loss and high-efficiency electronic design, professional industrial-grade manufacturing process ensure that the machine does not get hot when used for a long time.

Parameters

A:Main machine

Model	HT-SW01H	Charging Current	6A
Adapter Parameter	15V3A(MAX)	Peak Welding Energy	420J(Peak)
Pulse Power	21KW (MAX)	Welding Mode	Push down spot welding Mobile pen spot welding
Energy Grade	0-99T(0.2ms/T)	Welding Tool	Downward welding head 75A split spot welding pen
Pulse Time	0~20mS(100 grade)	Preload Delay	100/200/300/400/500ms
Output Current	3500A(Peak)	Charging Time	About 18 min
Energy Storage Voltage	5.2~6.0V	Welding Thickness	0.05~0.5mm
Dimension	67(L)x176(W)x126(H)mm	Net Weight	2KG

Packing List

①Main machine×1pc
②Power adapter×1pc
③Foot pedal×1pc
④75Bmm² welding pen×1pair
⑤Welding arm(73SA)×1pc
⑥Hexagon spanner×1pc
⑦Base×1pc
⑧Welding pin on the welding arm(73SA)×2pairs
⑨Welding pin on the welding pen (HB-75B)×1pair
⑩Manual & Warranty Card×1pc

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

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



Show the charging voltage of the spot welder is 5.5V.
(Start aluminum to nickel dedicated mode, can be charged to 6V,better welding effect)



The output welding current is 2.8KA.
The SW will light up during welding instantly.



This means the energy release is (25t).
The release energy grade for AT mode can be adjusted from 00 to 99.



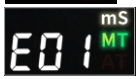
LO MI SS Flickering show the signal of pre-pressing delay of 100ms.



SS Display show
pre-pressing delay of 100ms.



MI Display show
pre-pressing delay of 300ms.



E01 show fault prompt



LO Display show
pre-pressing delay of 400ms.



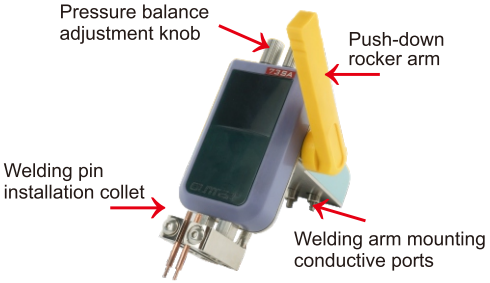
LO MI SS
Display show
pre-pressing delay of 500ms.



E02 show foot switch fault prompt

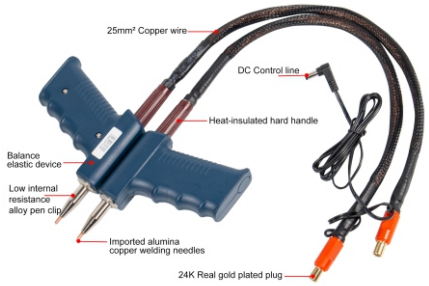
B:Welding tool

Fixed rocker arm push-down welding tool



Suitable for the weld of single batteries and thick nickel sheets, and that consistency of weld positions is good.

S-75B split spot welding pen



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

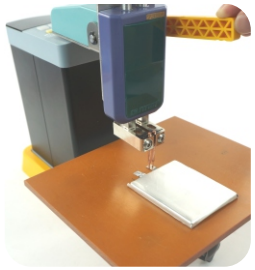
C:Base



Special fixed base designed for vertical use with the host.



Spot welder for use with base
Mobile welding pen is more convenient.



Base with vertical installation.
Use of fixed rocker arm press-down welding set

AT mode

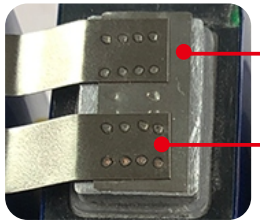
Automatic welding(no foot pedal control, suitable for welding a large number of batteries for a long time)



1.Select the AT induction mode and set the preload delay parameters according to the proficiency.
(Refer to the introduction on the home page)



2.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.



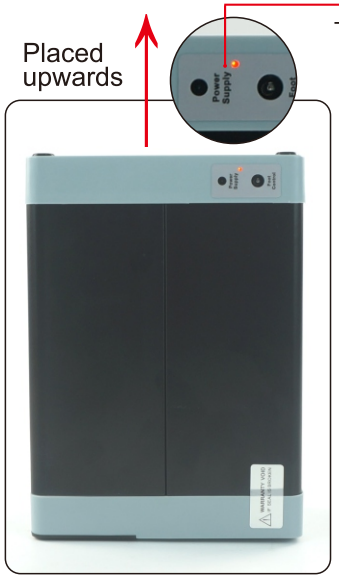
3.Check the spots' reliability.
Finish spot welding.

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.

Applications

1.Widely used in large lithium iron phosphate battery welding and other material welding.
2.Apply to maintenance and rapid welding of lithium iron phosphate batteries or ternary lithium batteries.Electric Bicycle,Ybike,Twist car,Power tools, Household electrical appliances,Robot battery and so on.That used in equipment.
3. Spot welding leaders to different metal projects, such as iron, stainless steel, brass, nickel, molybdenum and titanium.

Operation of built-in safety discharge device



The safety discharge device activates the indicator light

Unplug the power supply and foot control line

Place the spot welding machine display upside down (as shown in the figure), the internal position switch of the machine will be automatically closed.at this time, the red indicator light next to the power input port of the adapter will light up, and the built-in safety discharge device starts to discharge the stored power of the spot welding machine. It takes about 20 to 24 hours from the full energy of the capacitor to the discharge to zero. When the discharge is almost completed, the indicator light will go out.

Note:

1. When the spot welding machine moves or shakes, there will be a slight abnormal sound inside. This is the sound of the position switch inside the inverted discharge switch of the spot welding machine, which is a normal phenomenon.
2. The built-in discharge device is a 0.2A constant current mode, and the body will not become hot under this current discharge, which is a safe discharge, please rest assured.

Precautions for spot welding operations

1. The pressure of the welding needle of the spot welding pen on the welding workpiece should be consistent at the same time, otherwise there will be uneven welding spots or sparks;
2. Use different welding pressures according to different thicknesses of the weldment (too light pressure will lead to the breakdown of the weldment by virtual welding; when welding in the AL→NI mode, it is necessary to apply enough welding pressure to the nickel sheet, otherwise there will be sparks and It is recommended to choose the MT pedal mode first if you are not skilled in welding.) After you have mastered the strength, you can choose the AT automatic induction spot welding mode. The AT mode is suitable for efficient operation.
3. When spot welding, be careful not to touch the two welding pins together, otherwise there will be a short circuit and the machine will be easily damaged.

Maintenance of welding pin

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 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.

B:Welding tool

S-75A split spot welding pen

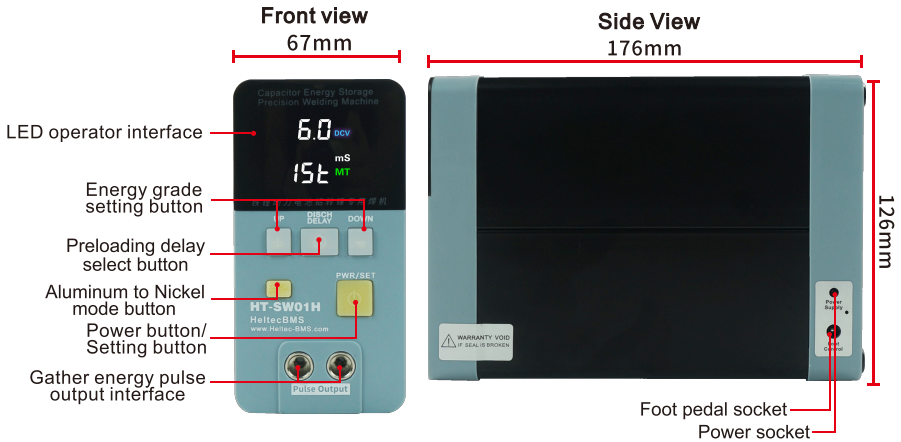
Model	S-75A (25mm²)
Total length	About 590mm
Cable cross-section	25mm²
Welding pin diameter	Φ3mmX15mm
The max carry current	3300A~3500A

Welding head parameter(73SA)

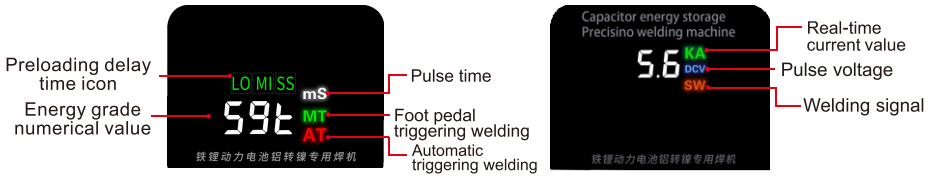
Handle Torque	950g	Handle Operation Angle	0-50°
Welding Arm Operating Distance	15mm	Pressure Adjustment Range	1~9.5N
Peak Welding Energy	238J	Welding Arm Width	44mm
Welding pin diameter	3mm	The max carry current	4000~4500A

Product Diagram

A:Main machine



Control panel sketch map



Setting Parameters Diagram

Energy Output Diagram

Reference table for spot welding of various metals ①NI-NI;②AL-NI

S-75B Split spot welding pen MT mode

Material	Thickness	Voltage range	Energy Grade	Battery type	Material to be welding
Aluminum-nickel composite slice	0.2mm	5.6V-6V	40t-50t	Lithium iron phosphate battery	Aluminum electrode
Aluminum-nickel composite slice	0.15mm	5.6V-6V	30t-40t	Lithium iron phosphate battery	Aluminum electrode
Pure nickel	0.2mm	5.6V-6V	45t-55t	Lithium iron phosphate battery	Aluminum electrode
Pure nickel	0.15mm	5.6V-6V	40t-45t	Lithium iron phosphate battery	Aluminum electrode
Pure nickel	0.1mm	5.0V-5.6V	06t-08t	18650 battery	Nickel/ Stainless steel
Pure nickel	0.15mm	5.0V-5.6V	10t-15t	18650 battery	Nickel/ Stainless steel
Pure nickel	0.2mm	5.0V-5.6V	15t-20t	18650 battery	Nickel/ Stainless steel
Nickelage	0.1mm	5.0V-5.6V	05t-08t	18650 battery	Nickel/ Stainless steel
	0.15mm	5.0V-5.6V	05t-10t	18650 battery	Nickel/ Stainless steel
	0.2mm	5.0V-5.6V	10t-15t	18650 battery	Nickel/ Stainless steel

PS:Please choose the proper energy grade and pulse current according to different object materials and thicknesses.

Spot welding operation introduction

(Take aluminum nickel welding mode with mobile welding pen as an example)
Power on and set the appropriate welding parameters, select "AL/NI" mode, and wait for the energy storage voltage to rise to 6.0V.

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



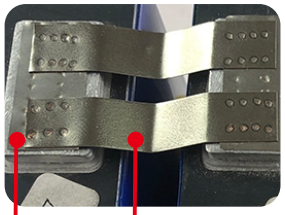
1.Select the appropriate energy level and MT pedal mode



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 2.8~3.3KA (2800~3300A).



4.Check the spots' reliability. Finish spot welding.

Annotation of unit symbols on the Control panel

KA:1 KA equals to 1000 amps
SW:Welding signal
MT:Foot pedal triggering welding
SS.MI.LO:Preloading delay signal Indicator light
DCV:Energy-storage capacitor direct voltage
ms: Millisecond
AT: Automatic welding method
MT: Foot pedal control welding method

Before use preparation of spot welder

1.Power supply and mobile welding pen installation



①Plug the adapter into an AC 100-240 volt wall socket to charge the machine.



②Plug the power output plug into 801H spot welder power connection port.



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 20~30 minutes, and wait for the voltage to rise between 5.2~5.8V before spot welding.

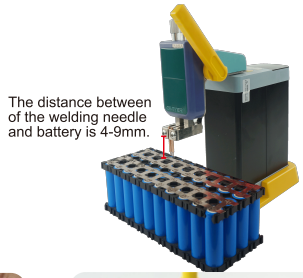
Installation diagram of handle controlled welding head

Standard with 73SA downward welding head



- Pressure adjustment
- Downward spot welding
- Easy to operate

☑ Spot welding is very solid
☑ Improve the welding quality and efficiency





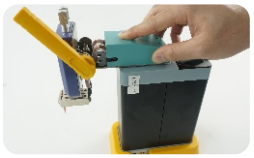
1.Insert the welding head into the corresponding socket.



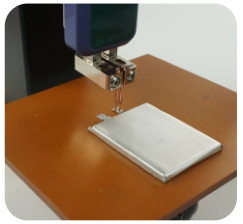
2.Remove the lid.



3.Tighten the screws. (Keep copper wires separate)



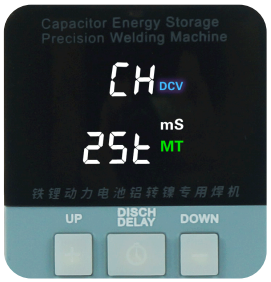
4.Close the lid.



Description of panel display and key setting



1.Press the "⏻" button, Turn on the welding machine.



2.After the machine is powered on for the first time, the LED will show "CH" intermittently and the real-time voltage value of the internal capacitor. The spot welder is being charged.
(About 18 minutes for the first charge)



3.When the voltage is charge to 5.6V or 6V, the machine is ready for use.



4.Set energy grade——
To customize the energy grade, you need to press the power button when the machine is on. The current number will flash, you can adjust the number through "UP/DOWN" buttons.



5.Press the power and the "▲/▼" buttons to change your spot welding mode, such as AT/MT switch.



6.Set the aluminum-nickel mode - short press the AL/NI button, the button will be lit, wait for 5 minutes after the setting is completed.
(It can be charged to 5.6V in NI→NImode, and can be charged to 6V in AL→NI mode)



7.Set the pre-load delay spot welding mode - select AT mode after power on, then press AL/NI mode, the display "LO MI SS" is flashing, and then short press the "⏱" key to switch the required delay spot welding time. "For 500ms, press and hold "LO MI SS" until it stops flashing.
(Only AT mode has pre-load delay setting)



8.Double pulse in AL/NI mode - When setting 500ms delay welding, the double pulse discharge will be automatically turned on, and the real-time spot welding current,value will be displayed during spot welding.
(Only 500ms preload delay is 2 pulse)



9.Power off - press and hold the "⏻" key for 2 seconds to turn off the spot welding machine. Please unplug the power adapter from the socket when not in use for a long time.

Introduction to the selection of spot welder functions:

1.Trigger discharge welding mode selection

This machine is designed with two different trigger welding modes, namely "MT" foot trigger and "AT" induction automatic trigger, when initially using the welding machine or welding new weldments , because the welding parameters and processes need to be adjusted, such as current size, pulse width (time), welding needle pressure, welding needle angle and other parameters that cannot be determined, in this case, "MT" mode should be selected. When various parameters are determined, and the control is more proficient, in order to reduce the work intensity and improve the work efficiency, the "AT" mode can be selected.

2."Nickel→Nickel" and "Aluminum→Nickel" mode selection

This machine is specially designed with a special "AL→NI" for the direct welding of pure nickel connection pieces for the high-current single lithium iron phosphate battery. This mode can provide greater energy output, so that the pure nickel sheet can be firmly welded on the aluminum plate of the battery, avoiding the expensive cost of using aluminum composite sheets. This mode is suitable for all aluminum and nickel sheets. Reliable welding. In the case of welding ternary lithium batteries, if the "AL→NI" mode is used, the welding current is too large, so the corresponding selection mode should be "NI→NI".

3.Selection of welding pulse energy width (time)

801H is a professionally designed "shaped energy pulse" welding machine. Selecting an appropriate pulse width can realize the penetration of the welding point, and the nugget does not diffuse, heat and blacken. Therefore, the selection principle is to choose a smaller pulse time as far as possible under the condition of ensuring firm penetration.

4.Preload delay parameter selection in "AT" mode

In "AT" induction automatic trigger welding mode. Because the pedal control is omitted, in the original "MT" mode, the process of using the pedal after judging that the pressure of the welding needle and the weldment is stable by the welder is gone. When the "AT" mode is selected and the pressure is not stable, the machine automatic triggering will cause problems such as large sparks, deviation of solder joints, and poor welding. Therefore, by selecting different preload delays to match the operation of the welder, the occurrence of bad problems can be avoided. (In "MT" mode, there is a fixed preload delay parameter, which cannot be changed)

NI→NI and AL→NI Welding mode comparison

Parameters	NI→NI(Nickel to nickel)	AL→NI(Aluminum to nickel)
Welding voltage	5.6V(MAX)	6V(MAX)
Welding current	3.2KA(MAX)	3.5KA(MAX)
Preloading delay	Non-ajustable	Adjustable
Reinforce double pulse	—	Preloading delay 500 milliseconds idle state

AT induction spot welding preload delay diagram

Appropriate preload delay spot welding time could ensure the stability of the solder pin pressure and the reliability of the solder joints in AT mode.

