Attention

- All contents of this product are related to safety. Please be sure to follow them carefully. Failure to do so may result in danger.
- To ensure proper usage of this product, please read the following precautions carefully. Detailed information on the potential dangers and harms associated with this product has been provided. Failure to comply with regulations may result in damage to your belongings, property, and even pose a risk to your personal safety.

1.Before using the product, please read this manual carefully and keep it properly for future reference.
2.Do not use other accessories that have not been approved by the manufacturer. Non professional maintenance personnel are prohibited from disassembling, repairing, and renovating, otherwise accidents such as fire, electric shock, and injury may occur.
3.Please inspect the product for damage after unpacking, check if the accessories are safe, and pay close attention to ensuring that the plugs and power cords are intact and undamaged to avoid the risk of electric shock.
4.To ensure the safety of children and disabled individuals safety, please place this product outside their contact area. Please pay attention to safety when using this product under the supervision of your caregiver.
5.If a malfunction occurs, the power plug should be immediately unplugged, and defective products should not be used in a working state.
6.When using this product, please ensure that the power supply voltage meets the label's requirements to avoid any potential hazards.
7.It is essential to utilize a single-phase, fixed three-level socket with a secure ground connection, and it is strictly forbidden to move the socket using flexible cords or share it with other electrical devices.
8.It is a common occurrence to witness sparks when the spot welding needle makes contact with the metal workpiece. Operators are advised to wear protective goggles and maintain a safe working distance.
9.Please cut off the power to ensure safety when not using this product.
10.Please avoid using this product in environments with heavy fog or high risk of flammability and explosives.
11.Avoid keeping the power cord close to a heat source.

Manufacturer:Chengdu Heltec Energy Technology Co.,Ltd
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Chengdu,SiChuan,China.

HELTEC ENERGY

HT-SW33A
HT-SW33A++

Intelligent Pneumatic Energy Storage Welding Machine



User Manual

Thanks for choosing **HELTEC** series produces . It will bring you convenience and efficiency for spot welding work. For optimal user experience, please read the manual carefully before using and store it properly for future reference.

HELTEC has the right to upgrade the machine and modify the manual without prior notice. Thanks for understanding!

Summarizes and features

1. The pneumatic spot welding head is designed with buffering technology. It is convenient to adjust the pressure of the two welding needles and the speed of resetting and pressing-downward the pneumatic welding heads separately.
2. The laser red dot alignment function can quickly and accurately locate, reducing error rates and improving work efficiency.
3. The LED welding needle lighting device can effectively offer ample visual assistance during nighttime operations.
4. The digital LED display screen can provide real-time monitoring of voltage and current during spot welding, thus assisting in assessing the welding quality.
5. The first time to propose and implement a welding calibration function with zero current output to simulate the welding process and minimize the cost of errors in production.
6. Semi-automated technology is a type of original creation that can be applied in continuous spot welding processes, with the number of times ranging from 1 to 9 or N times.
7. The design of the front barometer and air pressure adjustment knob is conducive to monitoring and efficient adjustment.
8. This product is controlled by a Microcomputer. Thanks to its intelligent cooling system, it is capable of adapting to long-term batch operations.
9. Adjustable output welding energy level (00-99), suitable for adjusting the welding range of various material thicknesses.
10. The welder can be moved left or right, and its height can be adjusted to suit welding different types of lithium battery packs.
11. The gantry frame is made of 304 stainless steel. It is hard, steady, and durable. The packaging is small in size and light in weight, making it easy to transport and reducing transportation costs.

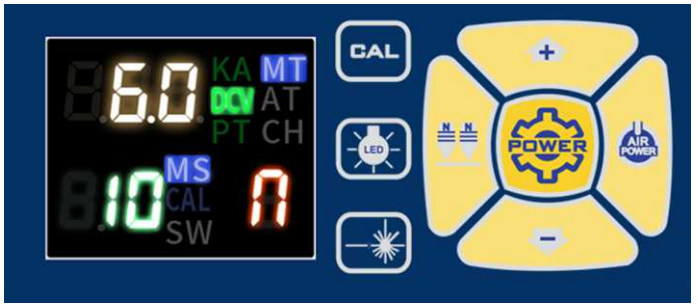
Parameter

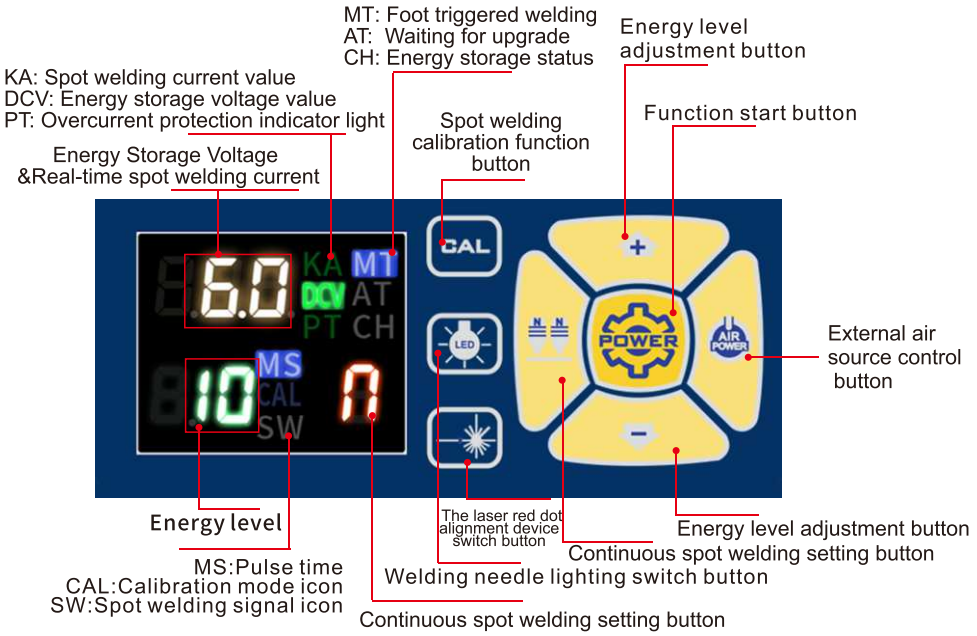
Model	HT-SW33A/ HT-SW33A^{++}	Max welding thickness	0.5mm (Pure nickel)
Pluse power	27KW / 42KW	Max pneumatic stroke of electrode	20mm
Output maximum current	7000A	Adjustable height range of gantry	15.5-19.5cm
Power frequency	50Hz / 60Hz	Times of consecutive spot welding	1-9times/ N(Unlimited times)
Welding voltage	DC 6V(Max.)	Gantry weight	10KG
Power supply	AC 110V/220V	Gantry frame size	60x26x18.5cm
Max input power	150W	Dimensions	50x19x34cm
Electrode pressure	6KG	Weight	9.26KG

Application

1.Assembling and welding $LiFePO_4$ battery pack, ternary lithium battery pack, etc.
2.Welding materials such as copper, aluminum, nickel aluminum composite, pure nickel, nickel plating, stainless steel, iron, molybdenum, titanium, etc.
3.Batch production in factories.
4.Repairing and welding the battery pack of the new energy vehicle.

Ⅳ Display Interface Settings Function Introduction

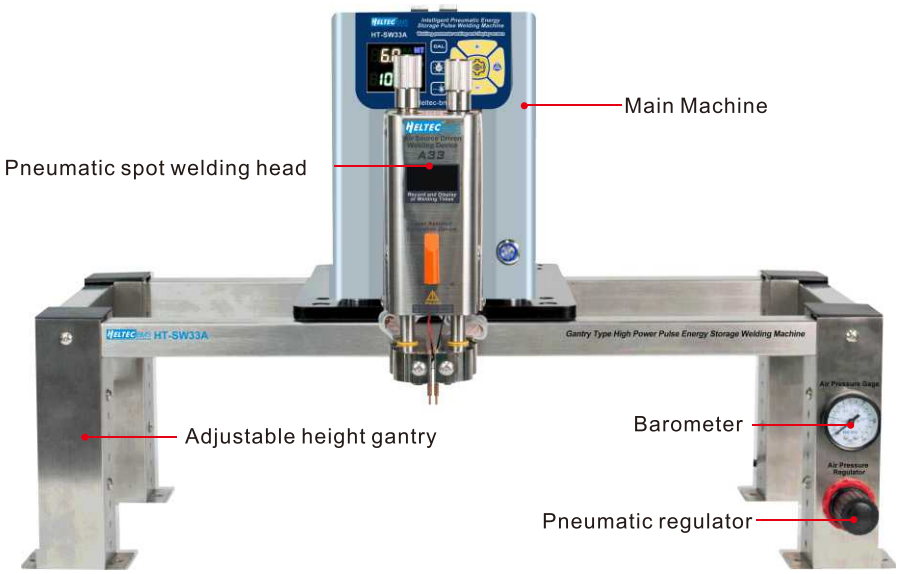




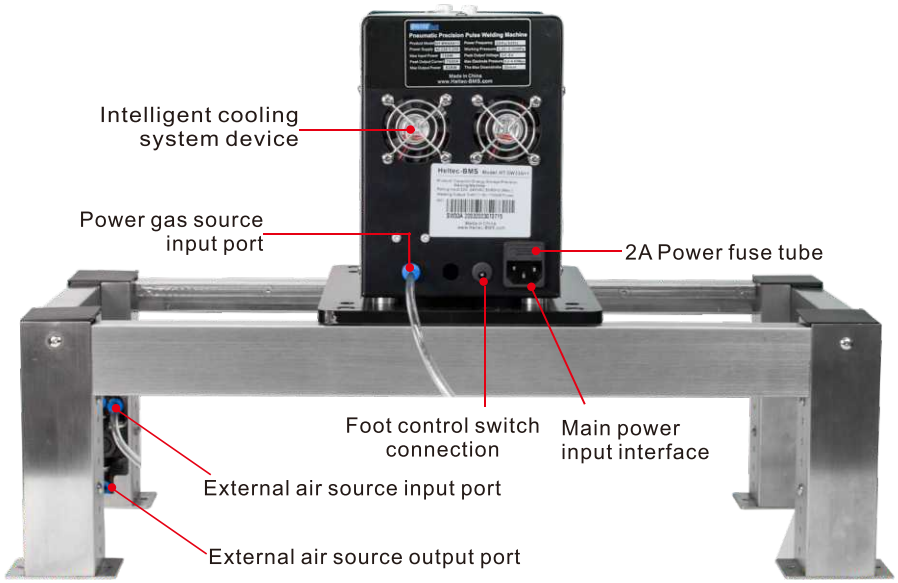
The operation and setting interface conforms to the ergonomic design of the system.
The front design of the operation panel makes operation easier, and all parameters are clearly displayed.

Product Diagram

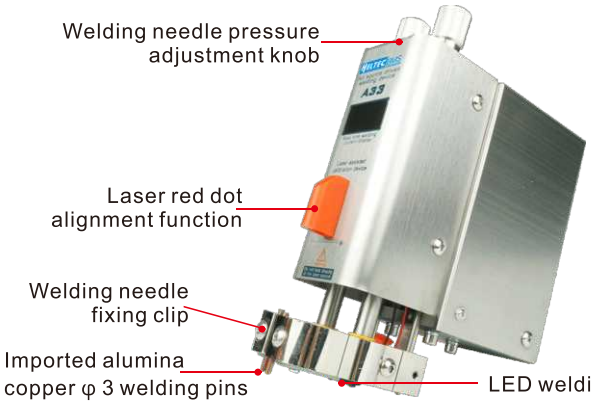
Front View

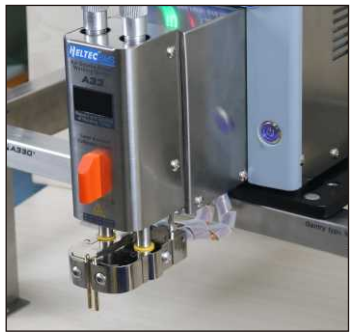


Rear View



Welding machine structure and button functions





This machine is made of all aluminum alloy, with high precision, light weight, long service life, and buffering design. The welding needle pressure can be adjusted to achieve more efficient and reliable welding.



Barometer and Pneumatic regulator

Pneumatic pressure gauge: Pull out the pneumatic regulator, observe the pressure gauge, rotate clockwise or counterclockwise, set the pressure pointer to 0.4MPa (megapascals), and press the knob to lock the setting value.



①External air source control button

Connect the power supply and the external air compressor,set the appropriate pressure, press the "AIR POWER" button, and start charging to the set pressure. When the external power source is not controlled, this step can be omitted.



②Start the power supply of the welding machine system

Press the "POWER" button to start the parameter setting function.



Right—
Adjusting the pressing speed



Left—
Adjusting the resetting speed

Welding speed adjustment device

Adjust the speed of resetting and pressing down the welding heads according to the working status.



Welding needle fixing head

Because the spot welding is triggered by photoelectric sensors, it will not be triggered when the distance between the welding needle and the welded part is too high.At this point, the height of the welded workpiece and welding needle should be adjusted to a suitable range (5-8mm), and then the foot switch should be pressed to complete the spot welding.



Left welding needle adjustment



Rightwelding needle adjustment

Reduce the pressure by rotating counterclockwise, and increase the pressure by rotating clockwise.

Welding needle pressure adjustment knob

There are pressure regulators above the pneumatic spot welding head, and the pressure of each welding needle is independently adjustable. It can adjust the pressure between the welding needle and the workpiece according to the thickness of the workpiece being welded. When welding thinner materials, the adjustment knob should be turned counterclockwise; When welding thicker materials, the adjustment knob should be turned clockwise. Observe the solder joints after each adjustment of the pressure, and it is best to achieve precision welding when the two solder joints have smaller dents, smaller solder joint diameters, and the solder joints are firm and reliable.

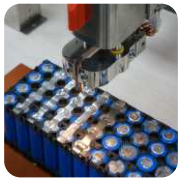




Energy level adjustment button

Press the“ + ”“ − ”buttons to adjust the output welding energy level of the spot welding machine. The setting range is from 00 to 99.





Lighting switch button

Press the 'LED' button ,the laser red dot is illuminated in the center of the area where the two welding pins are poised to be welded.





The laser red dot alignment button

Press the“ ”button ,the laser red dot is illuminated in the center of the area where the two welding pins are poised to be welded.





Setting continuous spot welding times

1-9 represents continuous spot welding for 1-9 times. For example, if set to 3 and step on the foot switch, the spot welding head will be pressed down for 3 consecutive spot welding times.
N represents that if set to N and step on the foot switch, the spot welding head will be pressed down for an infinite number of times.





Simulation welding Calibration mode

Click the "CAL" button before welding to start calibration mode. In this mode, the spot welding head outputs no current and simulate the action of pressing down during welding. It is feasible to ascertain whether the distance between the weldment and the spot welding needle falls within the appropriate operating range (5-8mm), as well as the pressing speeds of both left and right needles, press down speed and return speed of pneumatic welding heads are within optimal conditions.



Multi-functional display interface

- 6.0 Energy storage voltage/ real-time welding current
- 10 Displayenergylevel
- A Continuous spot welding times
- KA Spot welding current value
- DCV Energy storage voltage value
- PT Overcurrent protection indicator light
- SW Spot welding signal
- CAL Calibration mode icon
- MS Pulse time icon
- CH Energy storage status
- AT Waiting for upgrade
- MT Foot triggered welding

Packing List

① Main machine×1pc
② Gantry installation kit×1set
③ Pneumatic spot welding head×1set
④ Wire controlled foot switch×1pc
⑤ Welding needle×4pc
⑥ High-pressure trachea ×2（1m)
⑦ Pulley base plate×1set
⑧ 20A fuse tube×2pc
⑨ Hexagonal wrench×1pc
⑩ Manual&Warranty Card×1pc

Ⅷ Installation and operation instruction

A:Installation of Gantry Frame



① Left front load-bearing pillar	② Left rear load-bearing pillar	③ Right front load-bearing pillar	④ Right rear load-bearing column
⑤ Left crossbar bracket	⑥ Right crossbar bracket	⑦ Rear crossbeam of gantry	⑧ Front crossbeam of gantry
⑨ Slide rail support motherboard	⑩ High-pressure trachea	⑪ L-shaped pulley bracket	⑫ Screw accessory kit
⑬ Anti-collision guard corner			

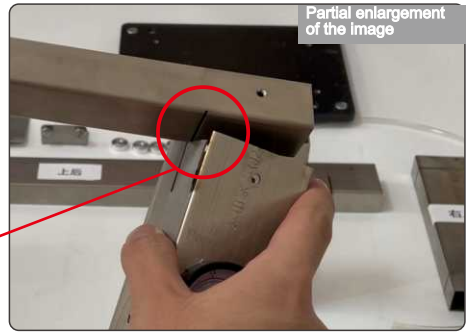
List of screw hardware accessories

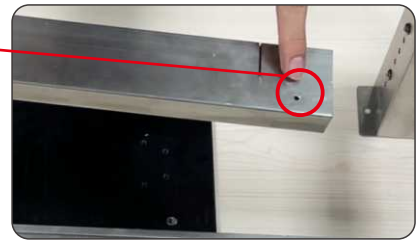
Figure1	Figure2	Figure3	Figure4
			
PN4×20 White zinc screw ×4pc	4×12Self-tapping screw×8pc	4×6Nickel Plated Machine Screw×10pc	4×12White zinc battery gasket×4pc

Installation Step 1

Place the ① ② ③ ④bearing column according to the position, and there are slots under the cross bar ⑤ ⑥ ⑦ ⑧, which can be connected with the slots on the columns. (The side with screw holes facing outward)





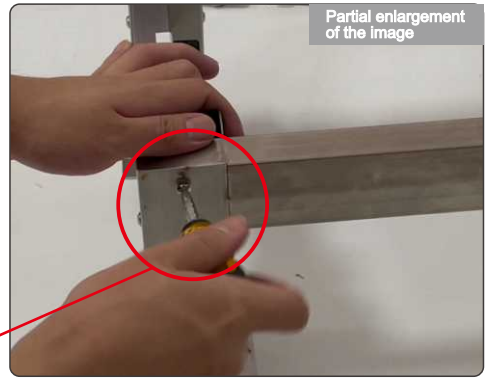


Note: If you need a video of gantry installation, please contact customer care.

Installation Step 2

At the connection between the load-bearing column and the crossbar frame, tighten the screws in Figure 3 into the holes and fix the frame. Then attach ⑬Anti-collision guard corner at the top of the four corners in sequence.

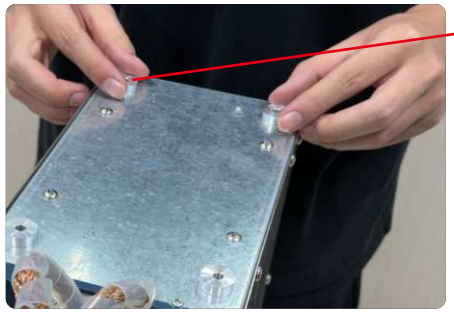


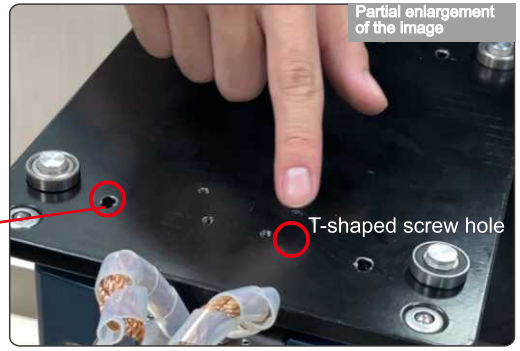




Installation Step 3

Put the machine upside down,place the gasket in Figure 4 directly above the screw hole, place the⑨ Slide rail support motherboard on the gasket,align the screw holes on the motherboard with the lower gasket holes and the fix welding head nut holes. Fix with the screws in Figure 1.
(T-hole face towards the spot welding head)

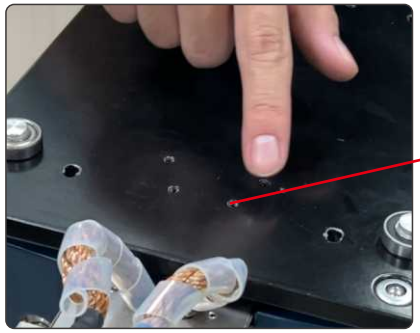






Installation Step 4

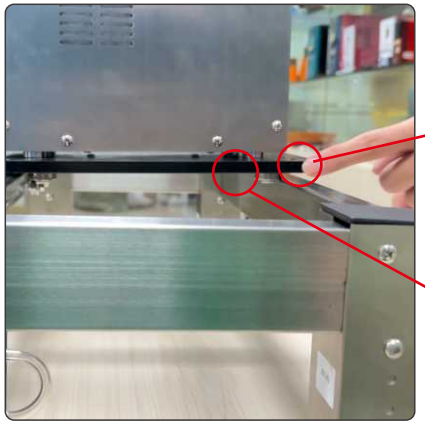
At the T-shaped screw holes on the sliding rail support main board, install the ⑪L-shaped pulley bracket and fix it with the screws in Figure 3.

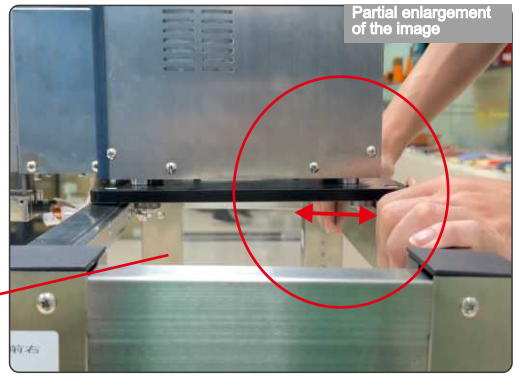




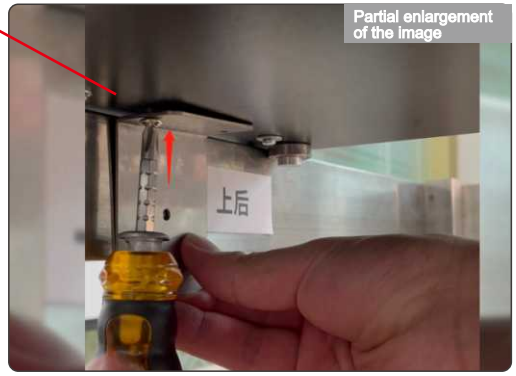
Installation Step 5

Place the HT-SW33A host directly on the crossbar bracket. Hold the crossbar and press the slide rail motherboard forward with both thumbs, embedding the A330H host into the rail. Then fix the ⑪ L-shaped pulley bracket with screws as shown in Figure 3 at the bottom of the motherboard.





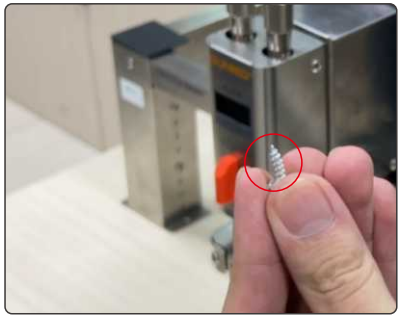
Hold the crossbar and press the slide rail motherboard forward with both thumbs.

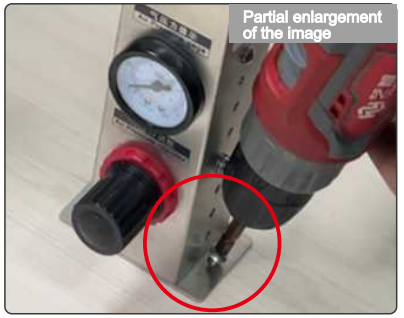


Fix the ⑪ L-shaped pulley bracket at the bottom of the motherboard.

Installation Step 6

Use the screws shown in Figure 2 to secure the gantry frame to the table.







B. Connect the air compressor (external air source)

1.Air compressor valve is connected to A air source interface.
2.The host air source interface is connected to B air source interface.





C.Solder needle installation and adjustment





1.Loosen the welding needle clamp with the hexagonal wrench, place the welding needle into the slot hole of the welding needle clamp,and then tighten the hexagonal screw.
2.Adjust the distance between the welding needles by fine-tuning the pitch of the two welding needles, that is, slightly loosen the inner hexagonal screw to adjust the needle pitch.
3.The height adjustment of the welding needle is the same as the above process. The height of the welding needles at the two poles of the pneumatic spot welding head should be consistent to avoid the phenomenon of explosion caused by unbalanced welding pressure.
4.Please note that the two welding needles should not collide during installation and adjustment, otherwise the spot welding cannot be carried out normally.
5.The welding needle must be locked tightly on the needle seat with an internal hexagonal wrench. Otherwise, poor contact can lead to the formation of an oxide layer between the welding needle and the needle base, resulting bad welding.

D. Starting up and welding

1.Connect to the power supply and charge for 18 minutes at the first time. The LED display screen flashes "CH" until the voltage is charged to 5.8V~6V, and the spot welding operation can begin.



Power switch



Panel control power



Energy storage charging



Charged to 6V,the machine start to work.

2.Set air pressure: Pull out the pressure adjustment knob on the right side of the gantry, rotate it clockwise or counterclockwise, and adjust the pointer of the upper pressure gauge to 0.4MPa (megapascals). Default factory parameters. After setting the parameters, repress the knob to lock it. Press the "AIR POWER" button to start charging and automatically stop after reaching the set air pressure value.



Barometer



Pneumatic regulator



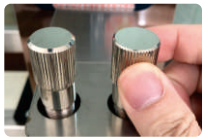
"AIR SUPPLY"key

3.Connect the foot switch and control the pneumatic spot welding head to press down for spot welding.

4.Press the "CAL" button to enter the simulated welding calibration mode, adjust the spot welding pressure and the speed of resetting and pressing down the spot welder head according to the material and thickness of the welding object. In this mode, there is no current output for spot welding.Press "CAL" again to close the calibration mode after testing.



Enter the simulated welding calibration mode



Adjusting the welding needle pressure



Adjust the speed of resetting and pressing down the welding heads

5.Turn on the welding needle lighting function and laser red dot alignment function, set the energy level according to the material and thickness of the welding object, and irradiate the laser red dot in the middle of the position where the two welding needles are about to be welded. Adjust the height between the welded part and the welding needle, and the optimal height range is 5-8mm.





The laser red dot

6. Set the spot welding times according to the work situation. Press and hold the foot switch for a long time, and the spot welding head will press down to trigger spot welding. According to the set value, continuously press down the set number of spot welding times.





1-9:Continuous spot welding for 1-9 times.
N: Step on the foot switch, the spot welding head will be pressed down for unlimited times.

Reference table for spot welding of various metals

Specialized for pure nickel welding to battery aluminum electrodes

Type of battery	Material	Thickness	Voltage range	Energy level
$LiFePO_4$	Nickel-aluminum composite sheet	0.5mm	5.8-6V	90t
$LiFePO_4$	Nickel-aluminum composite sheet	0.3mm	5.8-6V	25t
$LiFePO_4$	Pure nickel sheet	0.4mm	5.8-6V	90t
$LiFePO_4$	Pure nickel sheet	0.15mm	5.8-6V	40t
$LiFePO_4$	Pure nickel sheet	0.2mm	5.8-6V	80t

Set appropriate current according to different thicknesses of metal materials.

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.

Maintenance of welding needles

To ensure welding efficiency and quality, it is necessary to pay attention to the following when using welding tools:

1.Regularly check the welding needle for oxidation or discoloration. If there is oxidation or discoloration, the welding needle should be polished and trimmed with fine sandpaper in a timely manner to maintain a bright and smooth welding needle.
2.To prevent oxidation of the welding needle, a small amount of lubricating oil can be applied to the welding needle as an anti oxidation coating.
3.It is necessary to use the aluminum oxide alloy welding needles provided by the original manufacturer .

Precautions for moving the spot welding head

1.Do not place your hand between the moving point welding head and the welded part during spot welding to avoid damage to the workpiece.
2.The straight distance between the welding needle tip of the welding head and the flat surface of the welded part should be between 5-8 mm. Exceeding this distance will result in the normal operation of the moving point welding head but not spot welding.
3.The height of the welding needles at the two poles of the pneumatic spot welding head should be consistent to avoid the phenomenon of explosion caused by unbalanced welding pressure.
4.The welding needle must be locked tightly on the needle seat with an internal hexagonal wrench. Otherwise, poor contact can lead to the formation of an oxide layer between the welding needle and the needle base, resulting weak welding.

Simple handling of faults

Failure phenomena	Handling methods
The machine is not powered on	Check the power supply, power cord of the welding machine , and fuse tube at the back of the machine.
Poor welding effect	1. Check whether the wires of the power supply circuit exceeds 1.5 mm^2. 2. The storage voltage of the spot welder is too low. 3. Insufficient air pressure of spot welding machine. 4. The energy level parameters have not been adjusted to the appropriate state.
Bad welding	Check whether the welding needle seat and welding needle tip are oxidized, and adjust the welding needle pressure.
Not spot welding	Check if the straight distance between the welding needle tip of the welding head and the flat surface of the welded part is too large. Adjust the distance between the welded part and the welding needle tip to about 5 millimeters.

General precautions

1.This machine is specially designed for welding between iron nickel materials and stainless steel materials, suitable for but not limited to the welding of ternary batteries with iron nickel and pure nickel materials.
2.The two welding needles can only be pressed and welded to one of the battery's pole connections (nickel/aluminum/copper).Pressing and welding the two welding needle simultaneously to both metal connections of two poles of the battery is strictly prohibited. This action can lead to a short circuit in the battery. As a result, not only will the battery suffer damage, but also the welding machine.
3.To ensure proper welding, adjust the height of the soldered battery or workpiece such that the distance between the unpressed welding needle and the connecting workpiece is within 5-8mm. Once you have confirmed that the welding needle can be normally pressurized onto the workpiece, it may begin welding.
4.When starting to debug the welding process parameters of the workpiece, it is important to gradually adjust the pulse energy setting of the welding machine from small to large. This ensures that the appropriate welding points are firmly established without blackening or splashing. Excessive energy output will result in splashing and accelerated pin loss.
5.The red laser emitted by the laser scaler on the welding mechanism should not be directly observed.
6.There are high-voltage components inside the machine that may pose a risk to safety, so please do not attempt to dismantle the shell of the machine.
7.The machine must be operated in a well-ventilated area, and it is strictly forbidden to obstruct the heat dissipation window of the machine.
8.The air pressure input by the machine should not exceed 6 kg/cm^2 (0.6 MPa).