

SF-HC25G Cutting torch height controller

The user manual V1.2



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1 introduction

Both flame cutting and plasma cut way, in the process of cutting torch between nozzle and the distance (height)of cutting board is very important to the stability, it will directly affect the cutting speed and the quality of the incision.

Main engine



Display setting panel



Separate voltage board



SF-HC25G Plasma cutting torch height controller

1. Purpose

SF-HC25G plasma cutting torch height controller is specially designed for portable plasma cutting machine cutting torch height automatic control module.

SF-HC25G plasma cutting torch height controller, simple operation, convenient debugging, affordable, adopts digital control, reliable performance. It is an ideal product of form a complete set of welding equipment manufacturers. Adopt the host and the panel split type structure, especially suitable for portable cutting machine.

1.2 Important statement

SF-HC25G plasma cutting torch height controller and the content of the manual may be there are some differences, please in kind prevail. After this product or its accessories have any changes, without prior notice. Need to refer to update content.

Please be sure to read the safety warnings and precautions, so as to avoid improper use lead to dangerous accidents.

Before install and use this product, must be strictly carried out in accordance with the details of the product system manual operation, in order to ensure the correct use of the product.

About SF-HC25G plasma cutting torch height controller and the contents of this manual, be carried out if any specific illegal use, do not represent the position of the company, and refused to acknowledge its legal liability, the consequences shall be borne by the users.

Safety warning is used to prevent the human body and property damage.

In the use of SF-HC25G cutting torch height controller, if there is any quality problem, consumers can contact our service center or authorized office, dealers, agents to get the corresponding products and services.

Without the explicit written permission to use any of this information may not be copied, reproduced or content, the offenders will be fully liable to damage.

1.3 Warning

To safe operation of this product, and achieve the design of the product control accuracy, to avoid damage to its, carefully read the related warning and strictly abide by it.

Installation person must be related industry or related experience of technical personnel.

You must be carefully read this manual before installation.

To confirm the selected power supply is consistent with his requirement specification.

You are strictly been prohibited under the conditions of electricity installation or plug or unplug.

Installation position should as far as possible away from heat source.

Controller enclosure must be good grounding, or influence the controller in work.

The be cutting steel plate must be in good grounding and keep good connection with controller shell, to ensure the accuracy of the height control.

Please careful carry away, and please do not intense collision, vibration, in order to avoid damage to the product.

Please don not do something without authorization to open cutting torch height controller or change its internal structure, to prevent the accident or failure.



Note: the controller casing and cut steel without good grounding, height control will not be able to work properly.

2.Overview

2.1 Technical features

SF-HC25G plasma cutting torch height controller is after many years of practice and several generations of related products into play.

This product adopts the 32-bit arm as the core, two groups of three digital tube display, adopts digital control mode. Do not contain linear adjustment device internal, greatly improving the stability.

Velocity parameters can be modified, according to the lifting mechanism with power supply and any modification.

Circuit adopts the technology of the patch. There is not internal adjustment device, full digital control technology to ensure that the product has high reliability.

Operation simple, two groups of digital tube display setting arc voltage and the arc pressure respectively, concise and straightforward. Setting parameters operating in total of three knobs.

Interface simply and control convenient, it suitable for all plasma cutting numerical control system, can also be used alone.

It adopts the proximity switch initial alignment method.

PWM output, speed adjustable of level 255, control of motor speed precise, several current setting, short circuit protection.

Cutting with the function of collision. When cut lips touch the steel plate, the controller can quickly cut raise a certain distance, effective protection of nozzle.

All input and output adopt photoelectric isolation, plasma voltage feedback using linear photoelectric isolated, independent power supply, can very good compatibility with the partial pressure of various brands of imported plasma power supply.

It is integration starting arc successful judgment function, and arc successful feedback function.

2.2 Main technical indicators

Power supply requirements: DC24V + / - 10% 3A

Suitable motor: 24V with DC motor

Drive mode: PWM

Output current: < power input current

Initial alignment method: proximity switch (normally open normally closed through the jumper cap set)

Highest accuracy: + / - 1V

Box body size: Host:145 x90x42

Panel: 120x55x40

Working environment temperature: - 10 ~ 60 °C

Weight: 0.6 Kg

Detection system: isolation of arc electric subsection platen (B2 type)

3. Installation

3.1 Installation

The related parts name of height controller, location components are as follows.



Figure the 3-1-1: host controller



Figure the 3-1-2: display setting panel

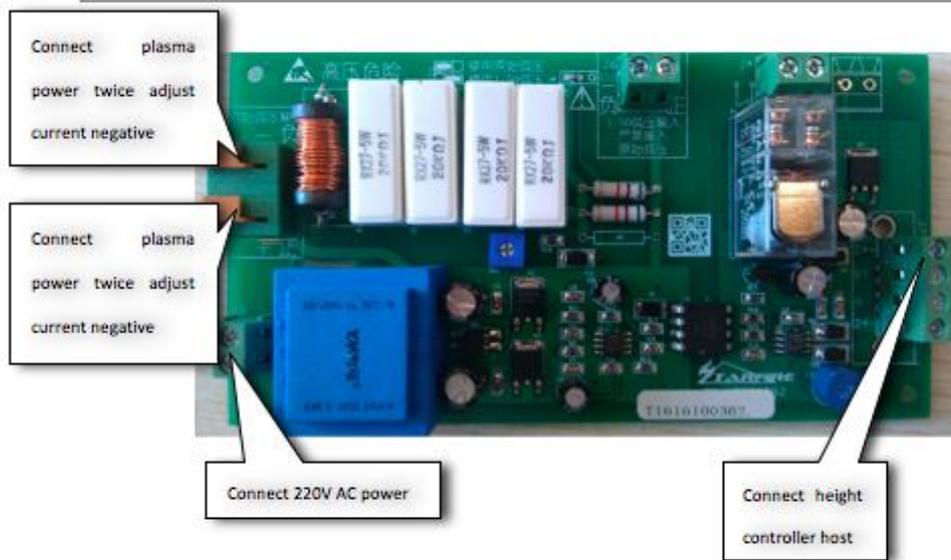


Figure 3-1-3 Separate voltage panel

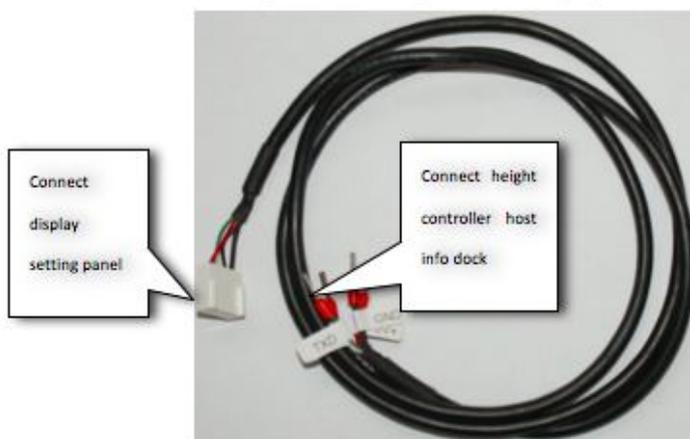


Figure 3-1-4: communication line

Bottom highly controller of the four M4 screw hole used for fixed box body onto the mounting plate. Its size is shown in figure 3-1-5. You can also use DZ47 type guide rail installation.

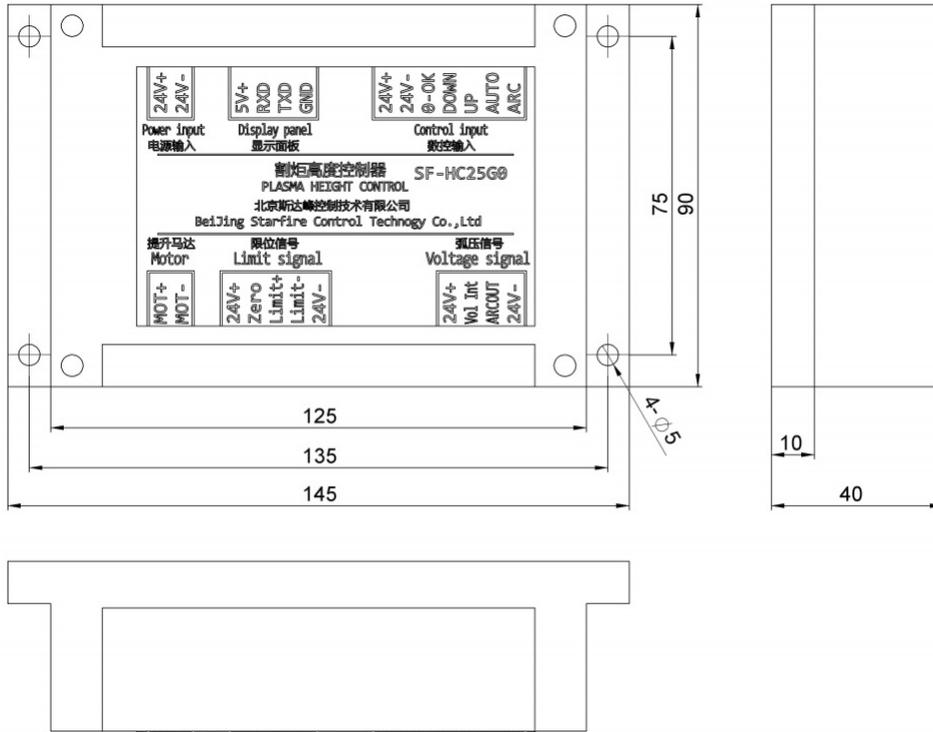


Figure 3-1-5

Display setting panel uses two M4 screw to install, installation dimensions such as figure 3-1-6.

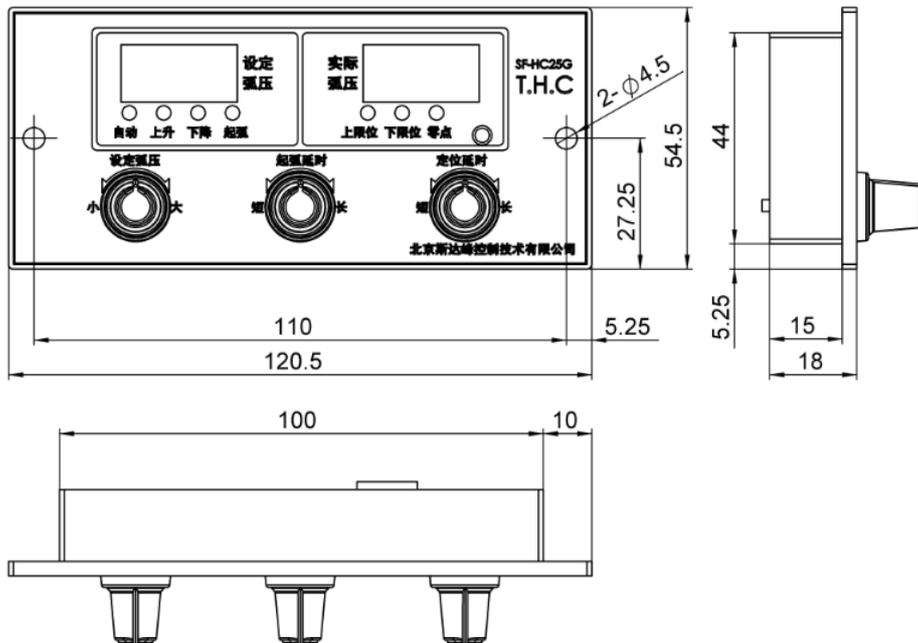


Figure 3-1-6

Partial pressure board uses four M3 screw to install, installation dimensions as shown in figure 3-1-7. H is not less than 10MM about installation requirements.

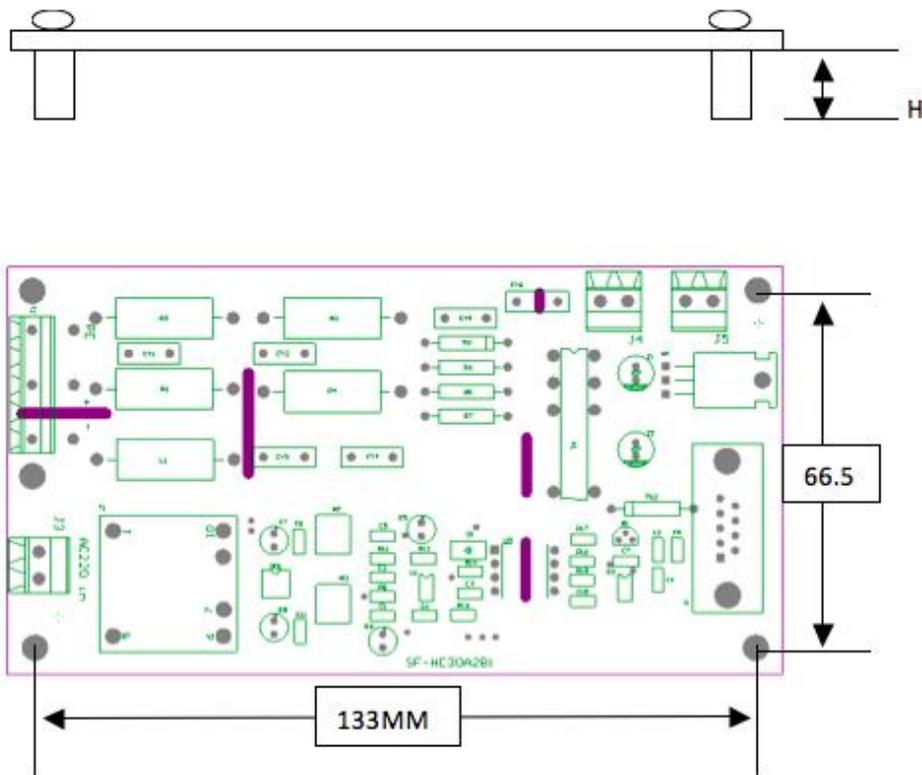


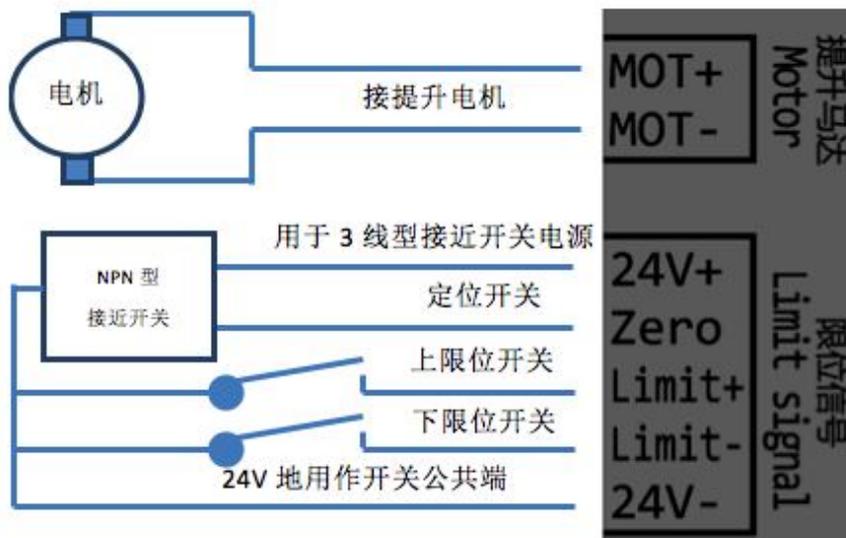
Figure 3-1-7

3.2 Electrical installation and connect

3.2.1 interface definition description

Table 3-2-1 connect lifting mechanism

No.	Character	Illustration	Remark
MOT+	Output	Lifting motor +	
MOT-	Output	Lifting motor -	
24V+	Output	For 3 lines close to the switch	No use for others
Zero	Input	Initial location input - proximity switch	
Limit+	Input	Up limited location	
Limit-	Input	Down limited location	
COM	Public port	Positioning, the public port of the limit switch	



The limit switch is recommended to use normally open type.
 The initial position switch is recommended to use type NPN normally open.
 (See appendix wiring method, 23 pages)
 The initial position switches can also use the protective cap + relay mode.

Table3-2-2 Connect NC System

No.	Character	Illustration	Remark
24V+	Input	Connect NC system power positive of output connection	Supply by NC connection
24V-	Input	Connect NC system power negative of output connection	
0-OK	Output	After start arc to feedback signal	Output as 0V
DOW	Input	Manual decline signal-connect NC decline output signal	Low effective
UP	Input	Manual rising signal- connect NC rising output signal	Low effective
AUTO	Input	Manual and automatic switch(M38, turn corner signal)	Low effective
ARC	Input	Start arc input-connect CNC start arc output signal	Low effective

Note: when using STARFIRE NC system, this table all wiring is direct numerical control input/output interface, don't need to relay equipment transformation. It is best to use shielded cable.

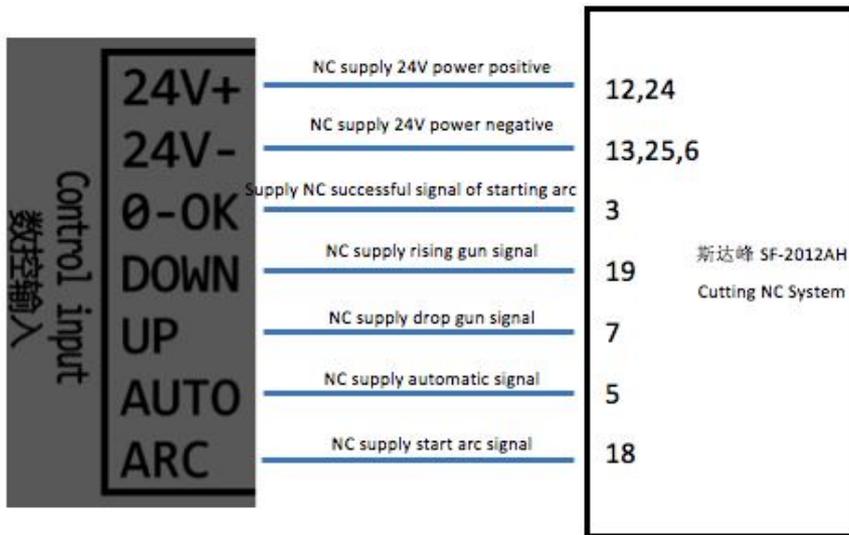
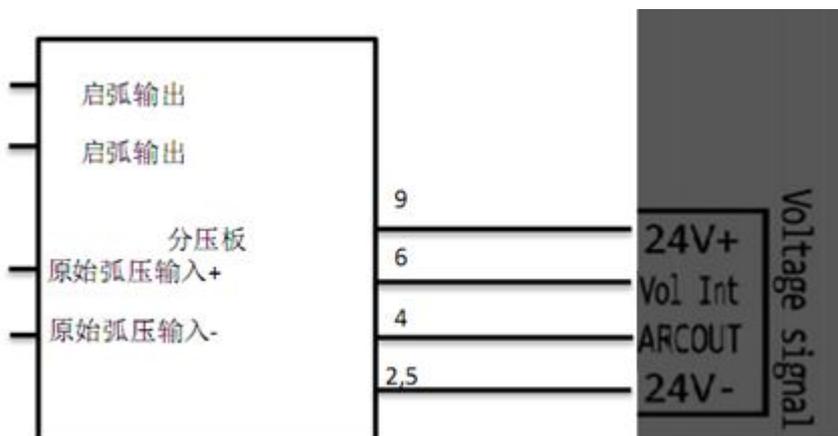


Figure 3-2-2 Supporting STARFIRE SF-2012AH cutting machine CNC system wiring diagram.

Table 3-2-3 4 cores sub - plasma power supply

No.	Character	Illustration	Remark
24V+	Power	Points linking piece 24V power positive supply	Never to use others
VOL INT	Input	After points linking piece action, the voltage input	
ARCOUT	Output	Output to points linking piece of signal of the arc	
24V-	Power	Points linking piece 24V power supply ground	



Note: the arc output need to use an intermediate relay output, is included in the matching points on the pressure plate.

Table 3-2-45PIN Connector-connect panels

No.	Character	Illustration	Remark
5V+	Power	Panel 5V power supply	Never to use others
RXD	Input	Serial data input	
TXD	Output	Serial data output	
GND	Power	Panel power supply	
GND	Power	Used for shielding	

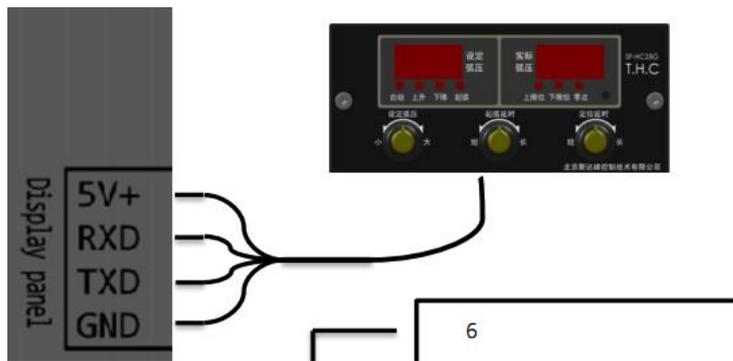


Figure 3-2-4

Here attachment random has been included in the accessories, length of 100 cm.

3.2.2 Points linking piece function introduced

Points linking piece is after the plasma cutting torch arcing voltage according to certain proportion is reduced, and according to the isolation of converted to reflect the cutting nozzle and the function modules of the low voltage signal of cutting plate height, is the height measurement and control of plasma cutting indispensable accessories. Points linking piece can choose according to need to install location, it is recommended that the installation within the plasma power supply and the platen each interface description as shown in figure 3-2-5.

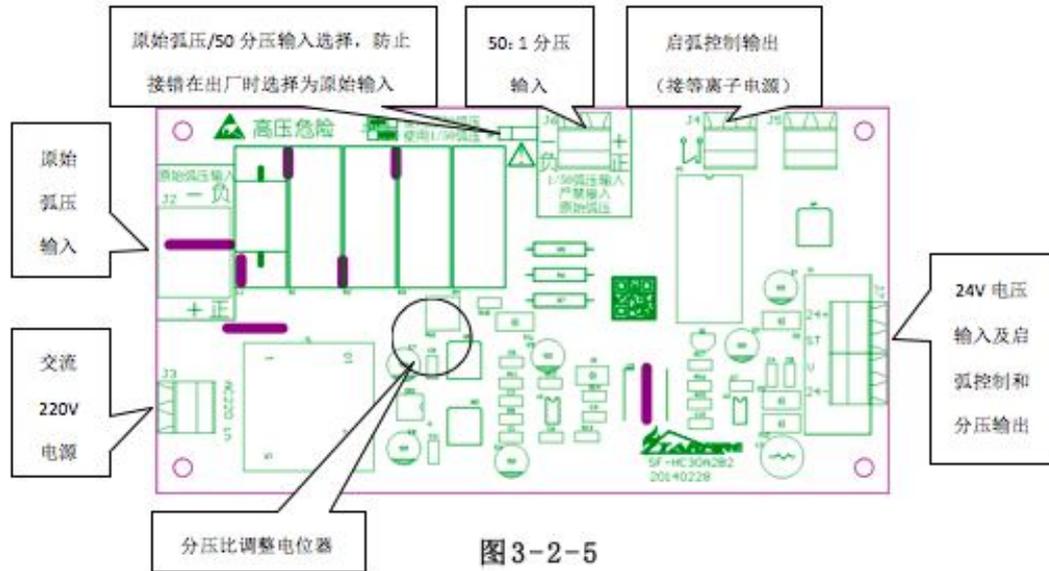


图3-2-5

Clockwise pressure ratio increases the score (about 110: 1), the output voltage become low, 100V input voltage, for example the partial pressure than to maximum (110:1), the display of 45V block.

Counterclockwise points pressure ratio (minimum about 40:1), namely the high output voltage and 100V input voltage, for example the partial pressure than to a minimum (bound), the block is shown as 125V.

Partial pressure ratio adjustment potentiometer factory of 50:1, try not to adjust.

Type	24V Positive	Start arc control	Partial pressure output	24V ground
9 core outlet	9	4	6	2,5
Screw terminal	24+	ST	V	24-

4. Parameters shows

There are three commonly used parameters and two debugging: 1. Set voltage. 2. Starting arc delay. 3. Locate latency. These parameters can be directly set corresponding knob on the panel to adjust adjustment.

1. Set voltage, this can at any time by the knob to adjust the "height", on the left side of the digital tube display voltage value set, the unit: (V), clockwise to increase the voltage, counterclockwise to reduce voltage. Automatic

cutting according to the parameters of the controller adjust the distance between the nozzle and the steel plate, make the arc voltage is always closer to set the voltage. This parameter can be directly as a set of highly. Specific set number according to the selected power supply manufacturers provide technical parameter settings.

2. Start arc latency, punch time should be used according to the actual perforated time settings, different thickness of steel plate and different current when the time is also different. Clockwise to lengthen the period of rev arc, counterclockwise to reduce arcing time.
3. Positioning delay, initial positioning time is the initial positioning, cut down to touch with steel plate, after ascending to the time required for setting height. The time required for different lifting mechanism to promote a certain distance is different too. It should be set according to the actual situation. Clockwise rotation for higher position height, counterclockwise to reduce positioning height.
4. The speed parameters, the parameters for debugging, available to open less than 3mm of a word or a cross screwdriver adjustment, to reduce the clockwise and counterclockwise to increase. Adjust the parameters affect the motor rotation speed and the response time of the whole. The knob position as shown in figure 4-1.
5. Set position limit switch logic, S1 jumper cap inserted between 1 and 2 for the low effective, suitable for use normally closed proximity switch. Inserted between 2 and 3 for the high effective suitable for open still proximity switch. The factory default for the low effective. Jumper on the panel position as shown in figure 4-2.
6. With or without positioning function setting, S2 jumper cap inserted in between 1 and 2 for positioning function. Inserted between 2 and 3 for no positioning function. Jumper on the panel position as shown in figure 4-2.



Figure 4-1

The speed and sensitivity

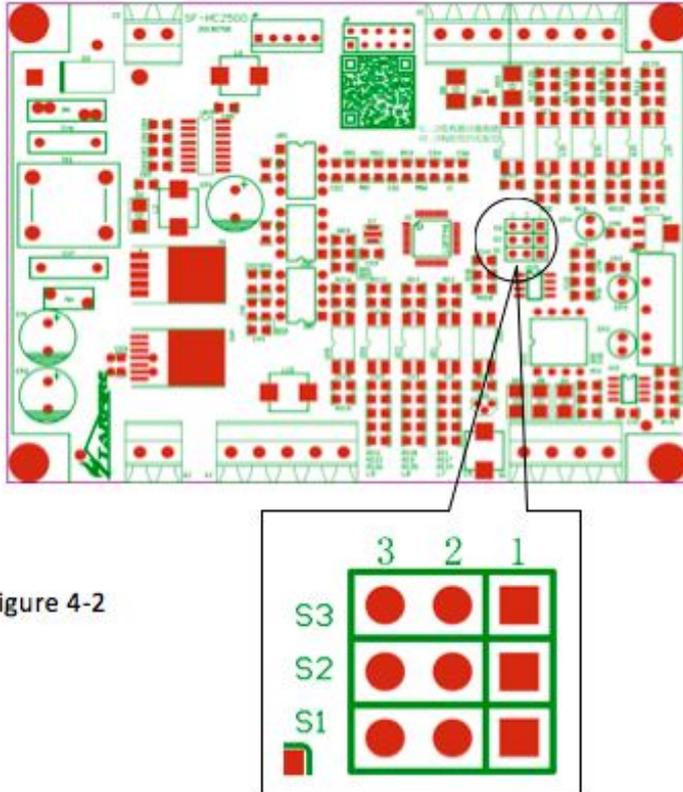


Figure 4-2

5. Tutorials

Noun explanation: control signal effectively, refers to the input signal with the corresponding public end (24V) through. Disconnect as invalid.

Raise the controller after power-on self-test, self-check project has panels and the host software version number display, and host communications, electrical circuit is normal. If the introspection through digital tube display not normal or up and down limit indicator lamp lights up at the same time and cannot perform any action. Self-checking by into working state and working state is divided into two kinds: manual and automatic state.

5.1 Manual operation

Manual rising signals (UP): When is effective, cutting torch rising.

Manual down signal (DOW): When is effective, torch down.

Manually drop signal (DOW): Long time effectively executed when positioning movements.

Start arc signal (ARC): If is effective, the positioning action first, and then control and arc plasma power.

5.2 Automatic operation

Reach to automatically adjustable requirement:

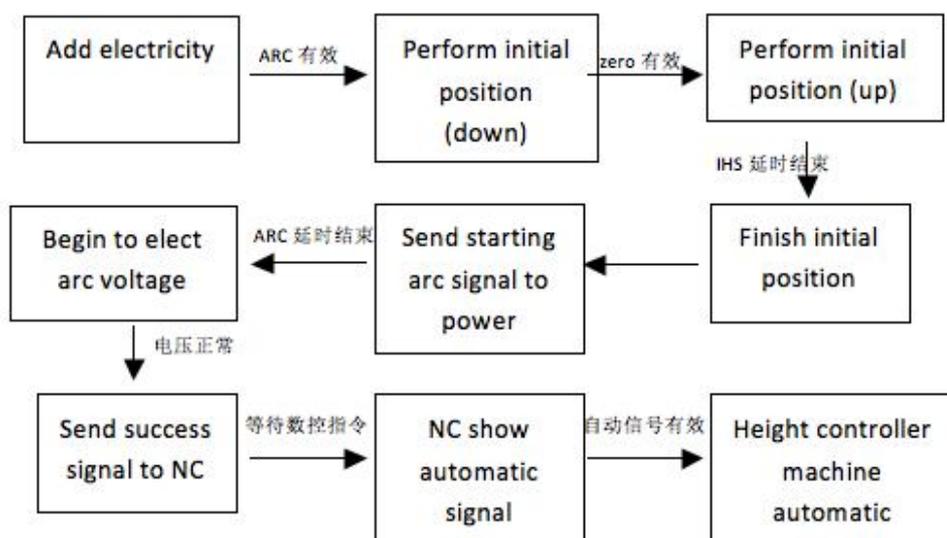
1. Start arc (ARC) signal effectively.
2. Automatic (AUTO) signal effectively.
3. Appropriate plasma cutting voltage ((set voltage-50) ~ (set voltage + 60)).

Initial positioning: the block after receives the start arc (ARC) block driving down hoisting mechanism, Zero point (Zero) signal is valid, said cutting device has met the steel plate, the tones to rise block driven lifting gear, rise time for "IHS time", "IHS time" to finish the initial alignment is complete.

Start arc output: after the completion of the initial positioning output and arc signal to the plasma power, such as waiting for a time after acquisition of arc voltage.

Start arc successful feedback: the arc voltage within a certain amount of time keeping within the normal range is rev arc (perforated) has been successful, the block signal success (0-OK) to the numerical control system.

Automatic tracking: in success (0-OK) signal was given and the numerical control system that start arc can be cut to walk successfully, at this time as long as the numerical control to the block signal automatic (AUTO) to the block, the block will enter into the state of automatic tracking.



Automatic function time figure

6. NC system associated with adjustable block M instructions

6.1 M function of NC system to control the output port directly

M12 / M13 start arc switch, M12 (open), M13 (close)

M14 / M15 cutting torch rises switch, M14 (open), M15 (close)

M16 / M17 cutting torch switch, M16 (open), M17 (close)

M38 / M39 adjustable block automatic/manual mode switch M38 (automatic)

M39 (manual)

6.2 M function fixed cycle

M07 perforation fixed cycle

Plasma cutting operation sequence is as follows:

M07:

1. The cutting torch fell (cutting torch down latency, see M71).
2. Open the arc switch.
3. If the parameter setting is in the arc pressure detection from 0 (no), there is no any arc pressure, delayed perforation delay (seconds).
4. If the parameter is set in the arc pressure detection choose 1 (testing) arc pressure measurement, waiting for the starting arc "success".
5. Delay "higher automatic delay".
6. Open the block (M38), began to run after the program.

M08 close cut fixed circulating

Plasma cutting operation sequence is as follows:

M08

1. Shut down the block (M39).
2. Close the arc pressure switch.
3. The cutting torch rises (M70).

6.3 CNC system recommended settings (STARFIRE of SF-2012AH system)
plasma mode

The initial position detection chooses: 0.

The initial position detection logic: 0.

Cutting positioning delay: 0.

Cutting up delay(M70): 1 second.

Cutting down delay (M71): 0 second.

Arc pressure detection: 1.

Perforated delay: 0.

The corner to close the height distance: 10 mm.

To break the arc end in advance distance: 2 mm.
 Raise the automatic signal delay: 3 seconds.

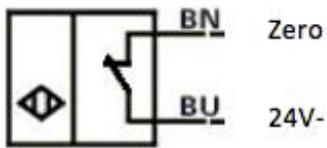
7. Troubleshooting

Trouble list

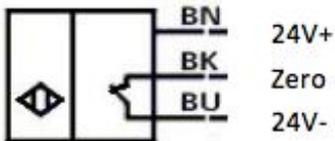
Fault not limit alarm lights unstable	Check the project	Corrective action
Motor does not turn	Whether connected to power	Connect the power
	If supply voltage is normal	Check power
	If motor locked-rotor	Reduce the load
No display	Check power	Power supply is connected
Only to display a certain	Check connection panel communication line	To reconnect or replace communication line
Above limit alarm lights	Running more than mechanical upper limit	Check the high limit switch
Lower limit alarm lights	Running more than mechanical lower limit	Check low limit switch
Up and down limit at the same time bright and do other operations	Motor open circuit, the positive and power positive short circuit, negative and power grounding short circuit	Check line motor
Signal swings	If steel is reliable grounding	Firmly grounded
Up and down swings	Sensitivity value is too small	Enhance sensitivity
Low accuracy	Sensitivity value is too big	Decrease sensitivity

8.Appendix

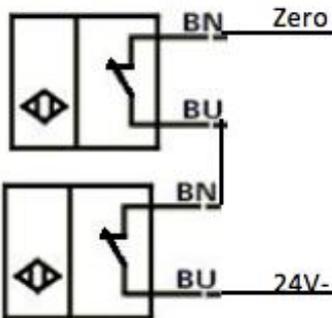
All kinds of connecting way of nearby switch



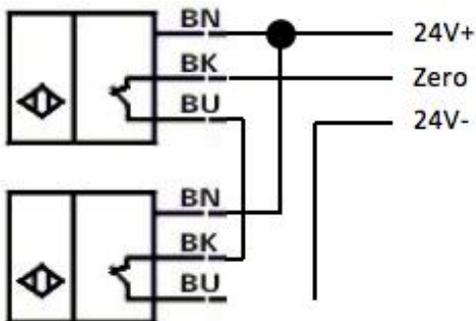
2 Line NPN normal shut



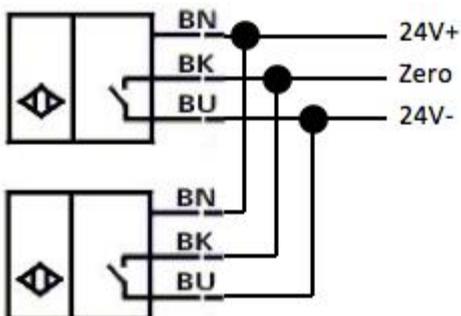
3 Line NPN normal shut



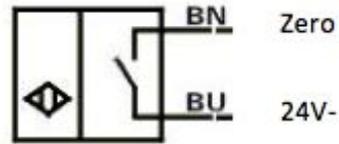
2LineNPN normal shut series connection method.



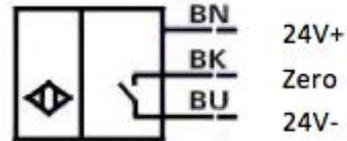
3LineNPN normal shut series connection method.



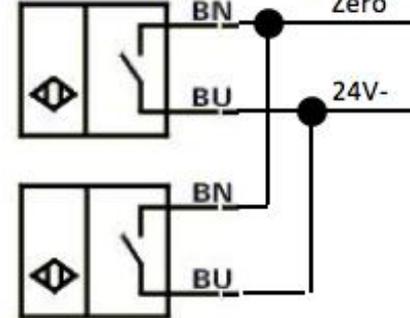
3 Line NPN normal open parallel methods



2 Line NPN normal open



3 Line NPN normal open



2 Line NPN normal open parallel methods

The lifting body size
Controller supporting institutions



Dimensions: 82 x187x57. 5mm
The shortest length: 338mm
Stroke: 100m

9. Contact us

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Version: 1.1 is suitable for the 1.1 version of the display panel and 4 later versions of the mainframe box.
September 9, 2013.