SF-HC25C3 Cutting torch height controller

The user manual V1.0

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Directory

1 introduction

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

SF-HC25C3 Plasma cutting torch height controller

1.1 Purpose

SF-HC25C3 plasma cutting torch height controller is specially designed for portable plasma cutting machine cutting torch height automatic control module.

SF-HC25C3 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-HC25C3 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-HC25C3 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-HC25C3 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.

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-HC25C3 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 Functional features

Automatic initial positioning

real-time arc voltage feedback.

input logic level can be set freely.

two-speed initial alignment.

manual, automatic, positioning of the up and down speed can be set respectively.

Grade 255 l Pwm output, adjustable speed, precise control of motor speed, several current setting, short circuit protection.

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.

integration and arc successful judgment function, and arc successful feedback function.

L set elements linking piece, without special shielding box.Plasma power supply on the back of the terminal control all meet in this controller, convenient connection.

all interfaces using pluggable terminal, don't need welding.

built-in software calibration pressure ratio.

self-learning function, use the fool, convenient debugging and use.

2.3 Main technical indicators

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

Suitable motor: 24V with DC motor

Drive mode: PWM

Output current: < 2A

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

Highest accuracy: + / - 1V

Box body size: 271X221X70.5

Working environment temperature: - 10 ~ 60 ℃

Weight: 2.5 Kg

Detection system: Built-in electric subsection platen (special edition)

3. Installation

3.1 Installation

Highly controller bottom four M4 screw hole for fixed box body onto the mounting plate.Its size is shown in figure 3-1-1。

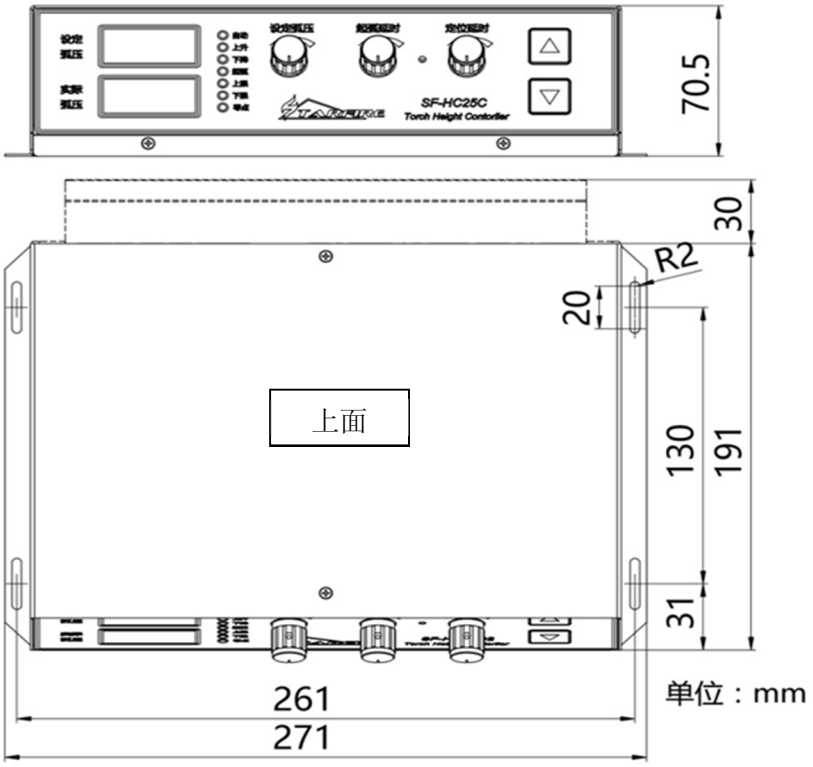


Figure the 3-1-1: host controller

3.2 the electrical installation

3.2.1 The interface definition

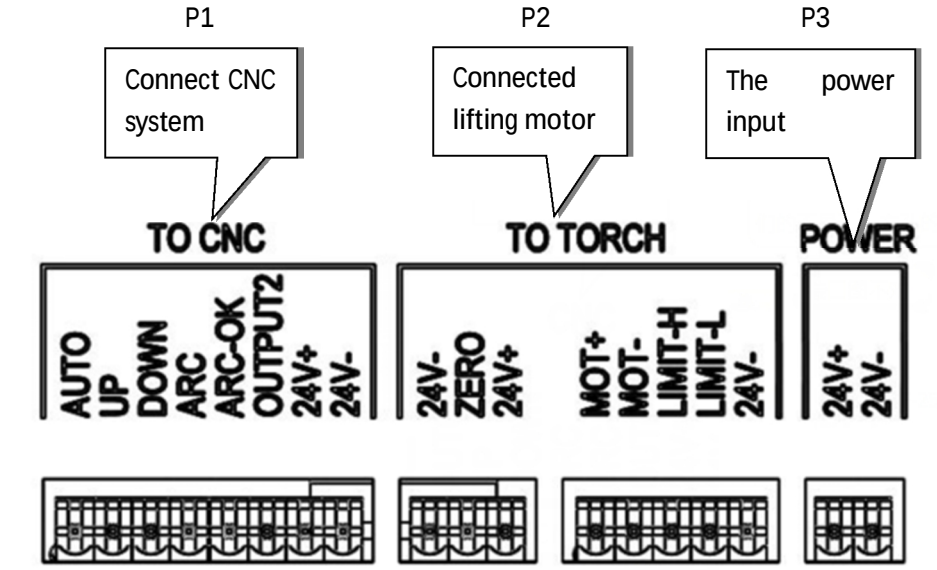


figure 3-2-1

table 3-2-1

label	attribute	explain	note
P1	Control input	CNC system control input: automatically, lift, rev arc and success feedback, this interface on the 24 v power supply is isolated and P1, provided by the CNC.	figure 3-2-2
P2	Input/output	Improve motor and collision signal and limit signals.	figure 3-2-3
P3	The power input	24 v power supply, its power consumption, improve the motor power, impact signals and limit the interfaces provide electricity.	figure 3-2-4

figure 3-2-2 Connect CNC system

label	attribute	explain	note
automatic	input	CNC output Automatic signal (M38)	
rising	input	CNC output rising signal (M14)	
falling	input	CNC output falling signal (M16)	
Rev arc	input	CNC output Rev arc Signal (M12)	
Successful feedback	output	Rev arc successful feedback	
+24V	power	IO power supply is provided by the CNC	
24VG	power	IO power supply provided by the CNC	

figure 3-2-3 Connecting the lifting mechanism

label	attribute	explain	note
24V-	POWER	Offer 3 lines close to the switch power supply	Cannot be used for other equipment
ZERO	INPUT	The initial input and proximity -switch positioning way	
24V+	POWER	Offer 3 lines close to the switch power supply	Cannot be used for other equipment
M+	OUTPUT	Lifting motor +	
M-	OUTPUT	Lifting motor -	
UP limit	INPUT	UP limit	
DOWM limit	INPUT	DOWM limit	

24VG	COM	the public end of the limit switch ,Positioning	

Of the limit switch is recommended to use normally open type.

The initial position switches is recommended to use type NPN normally open.(see appendix wiring methods, 23 pages)

Initial position switches can also use the protective cap + relay mode.

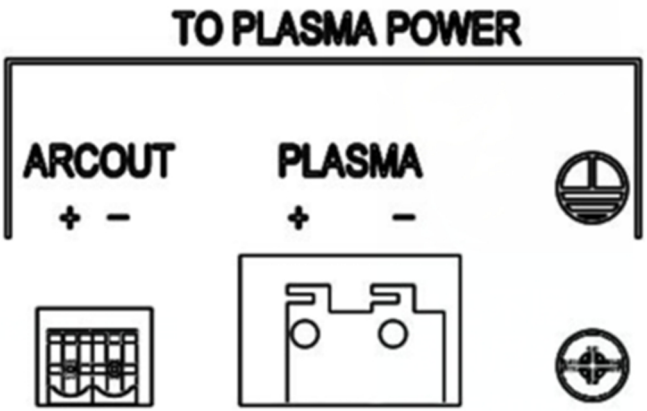
figure 3-2-4 POWER SUPPLY

label	attribute	explain	note
24VG	input	Switch power supply output negative side	By the switch power supply provide
24V+	input	The anode switch power supply output	

Requirements: switching power supply capacity is greater than 3.5 A above.

Note: when using starF CNC 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 3-2-5 **Connect the plasma power supply**



label	attribute	explain	note
arcout +	output	Connection points linking piece "rev arc control"	The output for relay normally open output output
arcout -	output	Connection points linking piece "rev arc control"	
plasma arc +	input	Connection points linking piece "partial pressure output" +	Points linking piece by default The partial pressure than 1:50
plasma arc -	input	Connection points linking piece "partial pressure output" -	

Plasma arc "+" connect the main loop of the plasma anode, Plasma arc "-" connect the primary loop of the output of the rectifier diode.

4. Parameters shows

4.1 Parameters set

There are three commonly used parameters and 30 enhanced parameters: 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**, can at any time by the knob"GIVEN VOLTAGE" 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, **rev 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. Set by the knob"ARC DELAY", 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 also, should be set according to the actual situation. Set by the knob"IHS DELAY",Clockwise rotation for higher position height, counterclockwise to reduce positioning height. The display

window above after the rotation shows that the value is about 3 seconds. After the timer is finished, the arc pressure is show.

4.2 Parameter specification

the knob"GIVEN VOLTAGE": In the working condition of parameter setting: when pressed, enter the menu cursor switch; When rotating, rotate counterclockwise and rotate clockwise.

Press (GIVEN VOLTAGE) button 3 seconds to enter the parameter menu without any action. The upper digital tube displays the parameter number and flashes, rotating the (GIVEN VOLTAGE) knob can change the parameter number. The number is 32 with P beginning, indicating P01~ P32. The digital tube below shows the value of the current parameter number, with a maximum of three digits. Click the (GIVEN VOLTAGE) button to switch to the display window below, and rotate the setting of the arc knob to change the parameter value. Save and exit the parameter menu at p00-001.

For example: modify manual ascent speed (P03) for 99.

1. Press (GIVEN VOLTAGE) button for 3 seconds and enter the parameter Settings. The display window displays P01 and flashes, and the next window shows 01.0.
2. Rotate (GIVEN VOLTAGE) knob to P03 and blink. The lower window shows 080 (default).
3. Click (GIVEN VOLTAGE) button to switch the cursor, the upper window is always bright, the next window is flashing.
4. Rotate (GIVEN VOLTAGE) knob to 099.
5. Click (GIVEN VOLTAGE) button to switch the cursor, the upper window flicker and the window is always bright.
6. Rotate (GIVEN VOLTAGE) knob to P00.
7. Click (GIVEN VOLTAGE) button to switch the cursor, the upper window is always bright, the next window is flashing.
8. Rotate (GIVEN VOLTAGE) knob to 001.
9. Press (GIVEN VOLTAGE) button to save and exit.

Modify multiple parameters to repeat 2, 3, 4, 5 steps and save them together.

When the input level setting error causes the failure to operate, press (GIVEN VOLTAGE) button to add electricity to enter the parameter menu.

Declaration: parameter P00 can flashing status indicator light on/off on behalf of the corresponding state of input signals, such as rose said the light tones to rise on the input terminal block behind the signal is low (connected with 24G).

Enhanced parameter list

Above LED	Below LED	Set the range	instruction
P00	0	0-4	0 do not save, 1 save, 2 restore user default, 3 restore factory default value, 4 save as user default value
P01	2.0	0.1-9.9	Unit: V. Accuracy of arc pressure adjustment.
P02	5	1-10	The sensitivity coefficient, the greater the coefficient, the higher the sensitivity.
P03	80	10-99	Manual (CNC) increase speed, 0 min, 99 Max.
P04	80	10-99	Manual (CNC) drop speed, 0 min, 99 Max.
P05	80	10-99	Automatic rising speed, 0 min, 99 Max.
P06	80	10-99	Automatic descent speed, 10 min, 99 Max.
P07	80	10-99	Location down speed, 10 min, 99 Max.
P08	80	10-99	Locate the uplift speed, 10 min, 99 Max.
P09	50	0-99	Unit: V (V), the arc feedback reference voltage
P10	0	0-9.9	Unit: second, double speed positioning speed drop time.
P11	255	0-255	Unit: volt (V), arc voltage protection voltage.
P15	0	0-1	Motor forward and reverse switching.
P16	0	0-20	Braking force.
P17	10	0-10	Unit: seconds, impact time, 0 do not use this

			function.
P18	5	0-2.0	Unit: second, time to introduce arc pressure delay.
P19	0	0-9.9	Unit: seconds, starting up time, 0 do not use this feature.
P20	0	0-9.9	Unit: seconds, turn off the arc time, 0 do not use this function.
P21	0	0-9.9	Unit: second, dynamic punch rise time, 0 do not use this feature.
P22	50	30-99	Dynamic piercing increases speed.
P23	1	0-1	Output 2 function definition.
P24	128	32-255	Partial pressure ratio calibration, setting range of 32~ 255.
P26	0	0-1	Upper and lower limit effective level, 0 is effective, 1 is effective.
P27	0	0-1	The positioning switch is effective level, low and effective, 1 high and effective.
P28	0	0-1	The rise drop is effective level, 0 is effective, 1 is effective.
P29	0	0-1	Corner signal effective level, 0 low and effective, 1 high efficiency.
P30	0	0-1	Arc signal effective level, 0 low and effective, 1 high and effective.
P31	1	0-1	The arc belt positioning movement, zero positioning movement, 1 positioning movement.

Detailed description:

P00:0 do not save, 1 save, 2 restore user default, 3 restore factory default value, 4 save as user default value. When entering, display 6. In this interface, you can also view the state of the input signal, and use 7 status indicators to represent the state of 7 inputs, indicating that the corresponding input signal is connected

to 24V when the light is on.

P01: arc pressure adjustment precision. Example: the arc pressure adjustment precision is set to 1V, and the arc pressure is set to be less than 1V under the actual arc pressure, so it is not necessary to have the automatic height adjustment, the unit: V (V), set the range of 0.1V~ 10V.

P02: the sensitivity coefficient, the greater the coefficient, the higher the sensitivity. The sensitivity is too high to cause the torch to vibrate in a balanced position. Default value 2, set range 1~ 10.

P03: manual (key and CNC control) increase speed, setting range 10~ 99.

P04: manual (key and CNC control) drop speed, set range 10~ 99.

P05: automatic rising speed, automatic tracking speed, setting range of 10~ 99.

P06: automatic descent speed, automatic tracking speed, setting range of 10~ 99.

P07: locate the speed of descent, the speed of decrease after the arc signal is effective, set the range of 10~ 99.

P08: positioning the rising speed and the rising speed of the arc signal, setting the range of 10~ 99.

P09: the arc success feedback reference voltage, actual arc pressure < (setting voltage + voltage) or actual arc pressure > (setting voltage - this voltage), unit: V (V), set range 0~ 99.

P10: two-speed positioning speed decrease time, arc signal then effective use P07 decline in a certain time after falling at the rate of half P07, until meet steel plate, the parameters suggest that less than the time of P20, set to zero without this feature, unit: second, setting range 0 ~ 9.9.

P11: arc voltage protection voltage. The voltage is added to the set voltage to prevent the arc pressure from increasing abruptly and the cutting torch is reduced, unit: V. Set range 0~ 255.

P12-- -p14 system reservation

P15: motor forward and backward switching, when the moment of moment of cutting and lifting is inconsistent, it can change the direction of operation of the motor by this parameter, setting a range of 0~ 1.

P16: brake, motor inertia big can set this parameter under the condition of proper braking, the default is 0, the larger the value of parking the nasty, this

parameter is careful, the Settings may cause shock, set the range 0 to 20.

P17: the time of the impact of the collision, the time of lifting after the stop state cutting moment impact plate, 0 does not use this function, the unit: seconds, the setting range is 0~ 10.

P18: arc rolling into time, when the block to the plasma power source signal and the arc after waiting for a period of time to detect arc pressure, to avoid the punch when unstable voltage, can be understood as rev arc delay, as part of the unit: second, setting the range of 0 ~ 10.

P19: start up time, prevent the pan from scraping to the cutting gun, when starting up, you can set a lift distance, 0 do not use this function, the unit: seconds, set range 0~ 10.

P20: the time of the arc raising gun, after cutting completion, raise a distance to prevent the scraping gun, 0 do not use this function, the unit: seconds, set the range of 0~ 10.

P21: dynamic perforation rise time, set this time can be cut moment in perforated while increasing a certain distance, then fell to the height of the original, can avoid the slag splashing up appropriately cut mouth adhesion. 0 do not use this function, the speed of P22 is used when lifting, and P04 speed is used when descending, unit: seconds, setting range 0~ 2.

P22: dynamic perforation is rising faster, use with P21 P21 is zero this parameter meaningless, because the motor for dc motor used this speed is greater than the appropriate P04 speed, set the range 0 to 120.

P23: output 2 function definition, set to 0, output 2 is defined as the initial location to complete the feedback signal, setting range 0~ 1.

P24: partial pressure ratio calibration, block and plasma display voltage difference from the actual voltage can adjust the parameters, the numerical increase the block shows the voltage increase, and vice, set range 32 ~ 255.

P26: upper and lower limit effective level, 0 low and effective, 1 high and effective, if not used please set to 0.

P27: location switch effectively level, 0 is effective, 1 is effective.

P28: rise down effective level, 0 low effective, 1 high effective.

P29: corner signal effective level, 0 low and effective, 1 high and effective.

P30: arc signal effective level, 0 low and effective, 1 high and effective.

P31: start the arc with positioning movement, 0 start arc not perform positioning action, 1 time perform positioning action.

5 Use guide

Noun explanation: control signal effectively, refers to the input signal with the corresponding public end (24 v).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.

Learning function: set the arc pressure, set up to 60 v block work in self learning mode.At this point, you just need to adjust positioning height.Do not use this function only sets the set of arc pressure to the 60 v.

5.1 Manual operation

manual up signal (up) Effective or press the button  , the cutting torch to rising

Manual drop signal (down) effective or press the button  , the cutting torch to falling.

press the button  key long to perform the positioning action.

Rev ARC signal (ARC) : effectively, the positioning action first, and then control and ARC plasma power.

5.2 Automatic operation

Reach to automatically adjustable requirement:

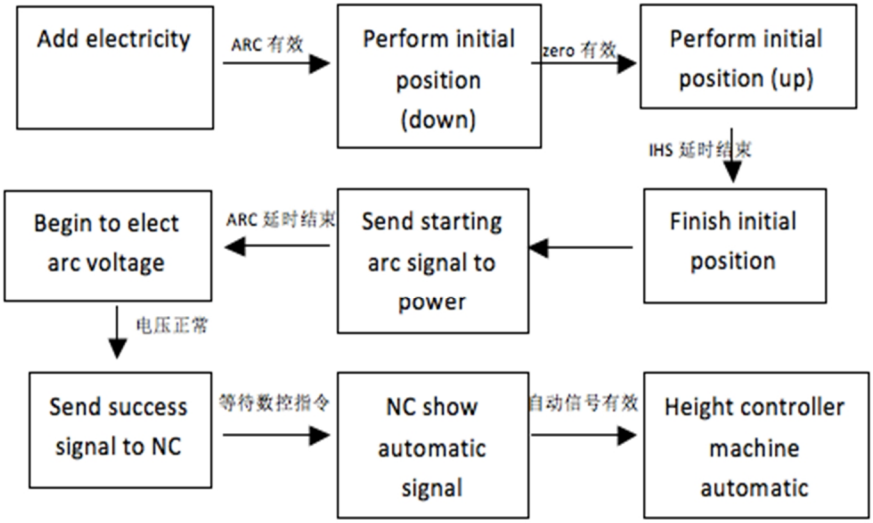
1. Start arc (ARC) signal effectively.
2. Automatic (AUTO) signal effectively.
3. Appropriate plasma cutting voltage ((set voltage-50) ~ (set voltage + 60)).

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 CNC) 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.

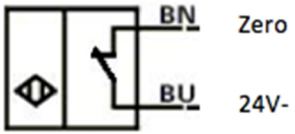
7.Troubleshooting

Trouble list

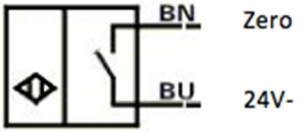
Fault not limit alarm lights unstable	Check the project	Corrective action
Motor does not turn	Whether connected to power	Connect the power
	If supply voltage is normal	Check power
	If motor locked-rotor	Reduce the load
No display	Check power	Power supply is connected
Only to display a certain	Check connection 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

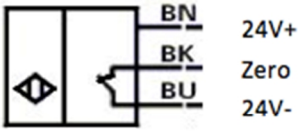
All kinds of connecting way of nearby switch

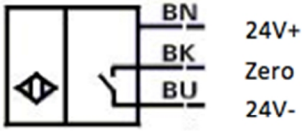


2 Line NPN normal shut



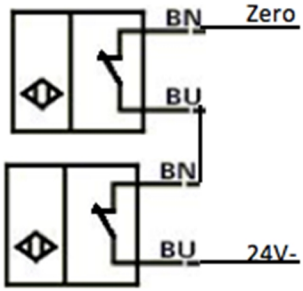
2 Line NPN normal open

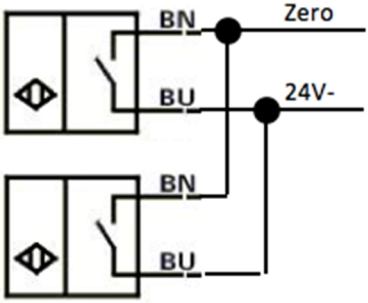




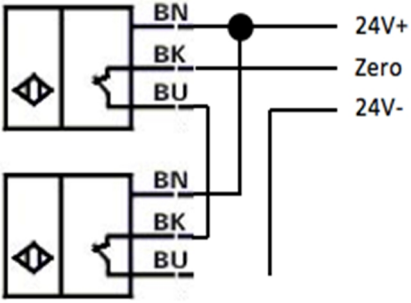
3 Line NPN normal shut

3 Line NPN normal open

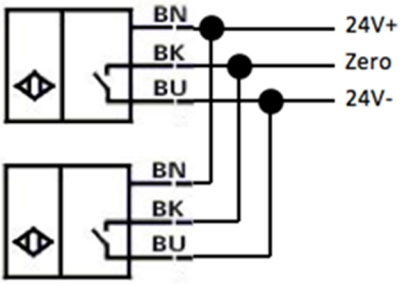




2 Line NPN normal shut series connection method.



2 Line NPN normal open parallel methods



3 Line NPN normal shut series connection method.

3 Line NPN normal open parallel methods

Controller supporting institutions

SF-LM02

Dimensions: 82 x187x57. 5mm
Stroke: 100m
Weight: 1.8kg

9. Contact us

Beijing STARFIRE control technology co., LTD.
Address: HAITE garden, 204, 44 floors, Shi Jing Shan district, Beijing city.
Zip code: 100041
Sales: 010-88909875 QQ:1908817881
Technical support: 010-88797100
Website: http://www.starfcnc.com
E-mail: houmaokai@163.com