F1628D

目录

1. Brief Intro

1.1 Product name and model

Arc voltage Torch height controller F1628D

1.2 Specification

- Power supply: DC24V±10%, 200W .
- Drive mode: PWM stepless speed regulation, H-bridge MOS drive
- Output Watt: 45W.
- Work temperature: 0-50℃
- Lifter speed: Decided by motor and mechanical design
- Set arc voltage range: 0V~600V, sampling accuracy 0.2V, control accuracy 0.5V.

1.3 Basic information

F1628D series digital plasma arc voltage height controller is a series of products developed by our company, which are easy to operate, stable in performance, complete in function and high in cost performance, based on the on-site usage of plasma power supply and absorbing the advantages of many arc voltage height controllers at home and abroad.

This series of equipment uses the basic constant current characteristic of plasma power supply to detect the change of plasma torch height by detecting the change of plasma arc voltage, so as to control the height between the torch and the work piece in real time.

It is suitable for height control of plasma power cutting torch with constant current characteristic or constant current characteristic within a certain voltage range. It is especially suitable for cutting torch height control of various cutting machines. This series of equipment is light and portable, easy to operate and to use.

All keys and knobs are designed with humanity, comfortable and convenient.

1.4 Chassis installation dimensions

Installation dimension drawing of operation panel and host.

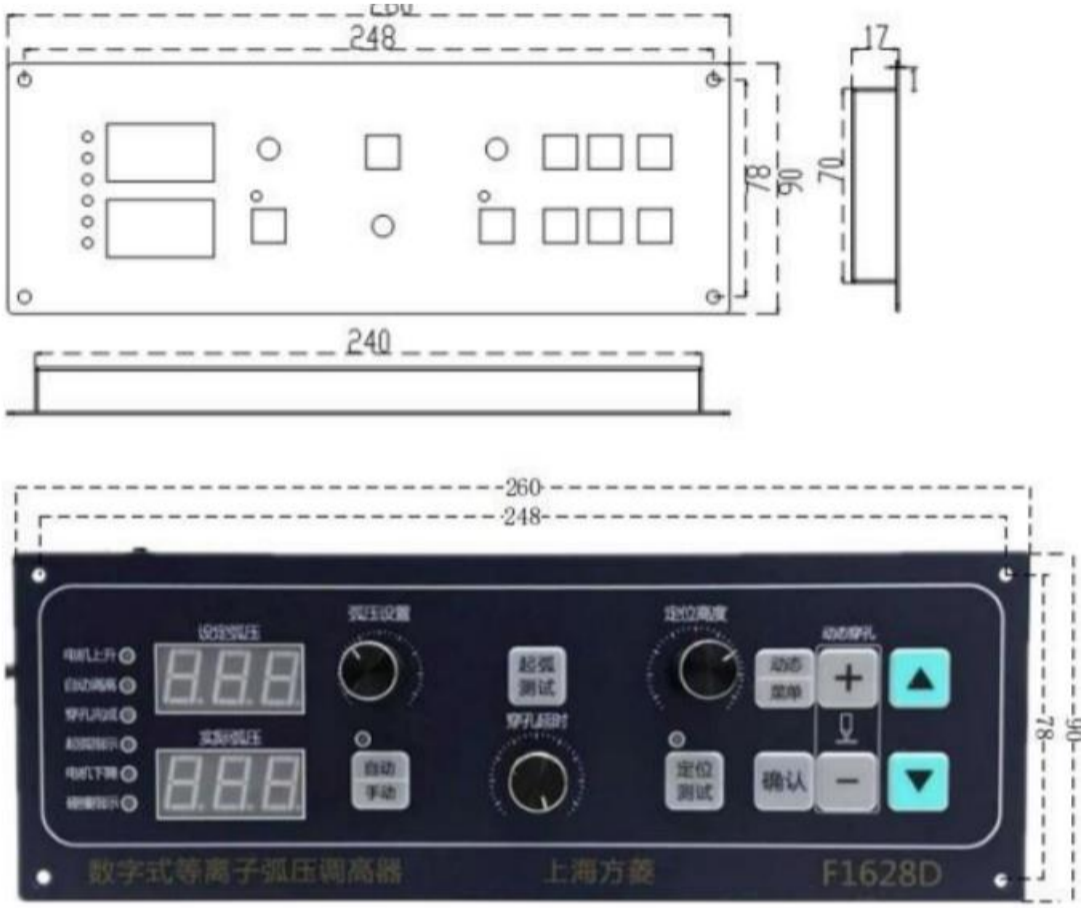


Figure 1. 4 F1628 Series Panel Installation Dimensions

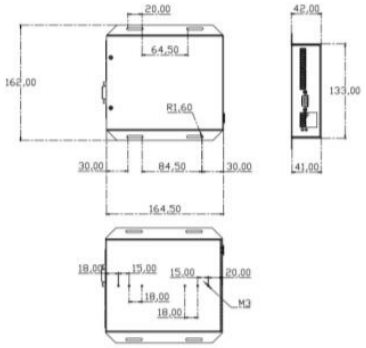


Figure 1. 5 F1628 Series Host Installation Dimensions

Installation dimension drawing of voltage divider

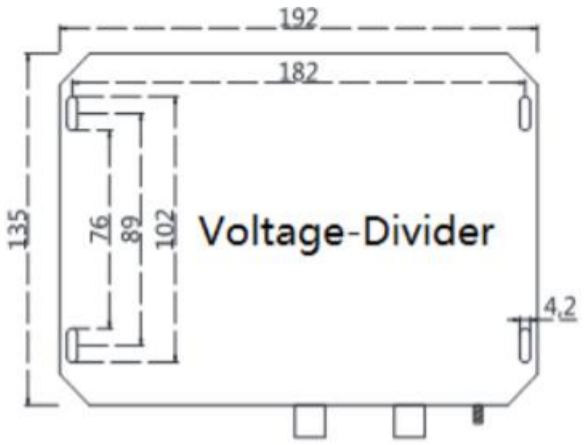


Figure 1.6 Installation dimension diagram of voltage divider

2. System Operation

2.1 F1628D series menu operation

This series of height controllers are equipped with concise menus, which can set many parameters and flexibly adapt to various working conditions. The menu operation uses four keys, namely【Menu】,【Confirm】,【+】and【-】. The parameters are displayed by double-row digital tubes, the Parameter No. is displayed by up-row digital tubes, and the parameter value is displayed by down-row digital tubes. When used on site, the Parameter No. and its meaning can be referred to the concise parameter table printed on the top of the chassis.

Press the【+】【-】directly under the arc voltage setting interface, the up row of green digital tubes will display "PIR" and the down row of red digital tubes will display the perforation height value. The perforation height is set by delay in seconds. The perforation height is the height from the steel plate in millimeters (mm). Press the 【Menu】 to enter the menu operation mode in the non-cutting state and without arcing test and initial positioning test. After entering the menu mode, the keys【Positioning Test】【Arcing Test】etc. do not work, only the【▲】,【▼】and THC_UP and THC_DN signals from numerical control can work. In menu mode, test operation and cutting cannot be performed.

2.1.1 Menu mode conversion

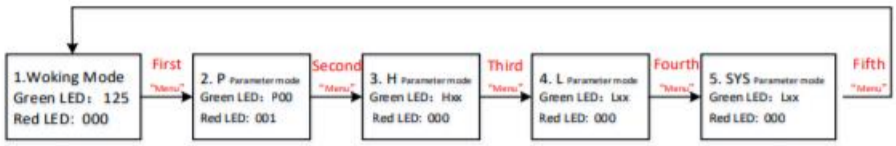


Figure 2.5 Menu Mode Conversion Process

The height controller has four submenus, namely “Pxx” “Hxx” “Lxx” “SYS”, plus a nonmenu mode, with five states. In the non-cutting mode, press the 【Menu】 to cycle through the five states. Note: In the non-menu mode, if the test operation is in progress or the automatic adjustment is in progress, you cannot enter the menu mode or modify the parameters. Similarly, if you have entered the menu mode, you cannot perform the test operation or the Automatic adjustment. The two are interlocked. Please note that users must remember to exit the menu mode in time after modifying the parameters.

2.1.2 Submenu browsing and modification

When switching to the corresponding menu interface according to the menu mode shown in Figure 2.4, it will be in the viewing mode by default, displaying the first parameter of the submenu. for example, the first parameter of the first submenu in the p parameter mode is "restore factory parameters", the top green LED will display "P00", and the bottom red LED will display "1" (i.e., the value of P00). In the view mode of the submenu, press the 【+】 to switch to the next parameter of the submenu at the same level. For example, it is currently "P00". Press the 【+】 to switch to “P01”. The top green LED displays “P01”, the bottom red LED displays the value of P01. Press the 【+】 again to switch to "P02", and so on. Similarly, you can press the 【-】 to return to the previous parameter in turn. In the view mode of the submenu, press the 【Confirm】 to enter the modification mode of the current parameter. At this time, the red LED starts flashing, indicating that the parameter is waiting for modification. At this time, press the 【+】【-】 to increase or down the value. The red LED is displayed as the modified value. After the parameter is changed, press the【Confirm】 to confirm the save and press the【Menu】to cancel the save.Press the【Confirm】to confirm the save, and the red LED will stop blinking and display the modified value. If the parameter is changed, but the save is cancelled by pressing the 【Menu】 key, the red LED stops flashing and the parameter value before modification is displayed. The

submenu “Pxx” has two tables. Table 5 is applicable to F1620, F1621, F1627D and F1628D "P00" to "P21" with a total of 22 parameter values. Table 6 is only applicable to F1627S, F1628S "P00" to "P27" with a total of 26 parameter values, all of which contain various quantitative parameters. All parameters under this submenu can be modified. The submenu "Hxx" contains a total of 9 parameter values "H01" to "H09" to check whether the input port signal is high or low. The parameters under this submenu can only be viewed and cannot be modified. Note: During cutting, press the【Menu】 k to view the level status of the input port. The submenu "Lxx" contains a total of 9 parameter values “L01” ~ “L09”, which are used to set whether the input port signal is active at low level or high level. All parameters under this submenu can be modified. The submenu "SYS" is used to display the current program Version No.

2.1.3 P Parameter list

Table 5P Parameter List

Parameter No.	Setting range	Adjust step size	Initial parameter	Green LED	Red LED	Note	Detailed description
P00	0-1	1	1	P00	1	Restore Factory Parameters/Modify Parameter Interval	If P00 is changed to 0 and saved, various parameters of the equipment will be restored to factory parameters. When P00 is viewed after exiting, P00 will still be displayed as 1.
P01	0-50	1	50	P01	50	Manual up speed. 0 is the smallest and 50 is the largest. CNC_THC_UP also uses this speed.	
P02	0-50	1	50	P02	50 50	Manual descent speed. 0 is the smallest and 50 is the largest. CNC_THC_DN also uses this speed.	

P03	0-50	1	50	P03	50	Automatic up speed. 0 is the smallest and 50 is the largest.	
P04	0-50	1	50	P04	50	Automatic descent speed. 0 is the smallest and 50 is the largest.	
P05	10-100	1	30	P05	30	Over-arc voltage protection value. Unit: volts (v). Prevent the arc voltage from suddenly increasing too much to cause the cutting torch to drop rapidly.	In the plasma cutting process, if the cutting gun passes through the cutting seam (e.g. lead-in wire) or cuts out the steel plate, the arc voltage will up instantaneously. If there is no arc voltage protection, the cutting gun will drop rapidly. In the most serious case, the cutting gun will quickly hit the workpiece and damage the cutting torch. After setting this parameter, the cutting torch can be effectively protected.

P06	1-10	1	1	P06	1	Accuracy of arc voltage adjustment. Unit: volts (v).	When the difference between arc voltage and actual arc voltage is set within this value range, the torch height will not be adjusted. For example P06=3, if the arc voltage and actual arc voltage down value are less than 3V, the torch height will not be adjusted.
P07	1-50	1	6	P07	6	Sensitivity coefficient. The greater the coefficient, the higher the sensitivity. Too high sensitivity will easily cause the cutting torch to vibrate at the equilibrium position.	The larger the value is, the faster the cutting torch is adjusted. However, if the parameter is too large, the cutting torch will easily vibrate at the equilibrium position. If the parameter is too small, the cutting torch may not be able to track the change of the plate.

P08	0.1-9.9	0.01	2	P08	2.0	Time of emergency gun up in collision. Unit: seconds (s). Emergency gun up time when cutting torch encounters steel plate during non-cutting process.	In the non-cutting process, when the cutting torch touches the steel plate, the gun shall be up up at the fastest speed for emergency time.
P09	3-20	1	5	P09	5	Intelligent adjustment value of arc voltage. Unit: volts (v). If the steel plate is continuously touched in the cutting process, the arc voltage setting value will Automatically increase the parameter value. This function is only enabled when P10=1 and P11>=2.	When there are two consecutive collisions in the cutting process, the height controller automatically increases the set arc voltage by P09. This function can make up for the inaccurate arc voltage caused by the aging of cutting nozzle or motor, and can ensure the continuous operation of cutting.
P10	0 or1		0	P10	0	Enable intelligent adjustment of arc voltage. Set to 1 to allow intelligent adjustment of arc voltage.	
P11	0-5	1	0	P11	0	Number of collisions allowed during cutting. Set to 0 to indicate that once collision is detected during cutting, a collision stop signal will be sent	For example, if this parameter is set to 1, the height controller will not send a collision signal to CNC during the first collision in the cutting process,
						to CNC immediately.	and CNC will continue cutting, but the height controller will Automatically raise the cutting torch to an initial positioning height. If the collision occurs for the second time, the height controller will send a collision signal to the CNC, and CNC will immediately stop cutting after receiving this signal. The output port of the height controller for sending collision signals to CNC is TO CNC COLLISION.

P12	0or1	-	1	P12	1	The motor is switched between forward and reverse rotation. Changing this parameter can change the rotation direction of the motor.	For example, P12 is currently set to 1, if the motor is downed by pressing the up key, P12 is changed to 0, and the motor is raised by pressing the up key; or vice versa, Dallas to the auditorium
P13	0or1	-	1	P13	1	Proximity switch collision detection enabled. Set to 1 to allow proximity switch collision detection. Set to 0 is not allowed.	Set to 1, proximity switch collision detection is used; set to 0, proximity switch collision detection is not used. When it is set to 1, it is necessary to connect the proximity switch and ensure that the proximity switch is not disengaged, otherwise the lifting motor will always up due to continuous receiving of collision signals.
P14	1-50	1	50	P14	50	Brake acceleration. Set to 50, the braking speed is the fastest.	This parameter sets the speed of deceleration when parking. The larger the set value, the faster the deceleration and the shorter the parking time. The default maximum value is 50.
P15	1-100	1	100	P15	100	Reverse acceleration. The larger the value, the smaller the inversion transition time.	Speed adjustment step size when the motor reverses. When the motor speed changes or changes from positive to negative, the larger the parameter, the shorter the

							transition time during speed adjustment. The user can adjust it according to the specific situation when using it, and the default is the maximum value of 100.

P16	0.1-2	0.01	0.2	P16	0.2	Introduction time during arc calendaring. Unit: seconds (s).	After the Arcing command is issued, the arc voltage value is sampled after the delay of the time. This time is used to avoid the interference of high-frequency arc voltage at the moment of arcing.
P17	0-10	0.1	1	P17	1.0	Startup up time. Unit: seconds (s).	The time when the cutting torch will automatically up after the height controller is powered on. This parameter can ensure that the cutting torch is far away from the steel plate after power-on, thus avoiding collision caused by moving the cutting torch upon power-on.
P18	0.1-10	0.1	2	P18	2.0	Time for gun up after cutting is completed. Unit: seconds (s).	Used to up the cutting torch to a height after cutting is completed. During the arcing test, release the 【Arcing Test】 and the torch will also up for this time.
P19	0-9.9	0.01	0	P19	0	Dynamic perforation height. Unit: seconds (s).	When the perforation delay is not 0, this parameter can be used to issue an arcing command to raise the cutting torch while starting the arc. Before the perforation is completed, the cutting torch will be downed to its original height. When piercing, the cutting torch is up a little, which can effectively prevent slag splashing onto the cutting gun during piercing. If this parameter is set to 0, the cutting torch will not be up
							during arcing.

P20	0-20	0.1	6	P20	6.0	High speed drop time for dual speed positioning. Unit: seconds (s). In the process of double-speed positioning, the time of high-speed descent.	In two-speed positioning, the motor first descends at the highest speed for this time, then descends at the low speed until collision, with the low speed being 1/4 of the high speed. If set to 0, the motor will directly drop at 1/4 of the high speed.
P21	0-1	1	1	P21	1	Protective cap collision detection enabled. Set to 1 to allow the use of protective cap collision detection, set to 0 is not allowed.	If it is set to 1, the protective cap collision detection is used, and if it is set to 0, the protective cap is not used to detect collision. If you do not use a protective cap to detect collisions, set this parameter to 0.

2.1.4 H status list

The red LED shows the high and low level state of the input port, with 0 representing the input low level and 1 representing the input high level.

Table 7 H Status List

Parameter No.	Parameter range	Green LED	Red LED	Remarks
H01	0or1	H01	0	CNC _ Auto/Manual signal level status.
H02	0or1	H02	0	CNC up (CNC_THC_UP) signal level state.
H03	0or1	H03	0	CNC down (CNC_THC_DN) signal level state.
H04	0or1	H04	0	The state of the signal level of the starting arc (CNC_IHSAON) of the CNC belt with initial IHS
H05	0or1	H05	0	CNC arcing without initial IHS (CNC_EXAON) signal level state.
H06	0or1	H06	0	Motor up limit (UP_LIMIT) signal level state.
H07	0or1	H07	0	Motor down limit (DN_LIMIT) signal level status.
H08	0or1	H08	0	Protective cap collision detection signal level status.
H09	0or1	H09	0	Proximity switch collision detection signal level state.

2.1.5 L Parameter lis

The red LED shows whether the input port signal is active low or active high. 0 means the input port is active at low level and 1 means the input port is active at high level. When the low level is active, if the current actual level of the input signal is 0, it indicates that the signal has occurred. For example, when "L05" is set to 0, it is found that "H04" is 0, which indicates that the signal is valid now, i.e. the arcing signal with initial positioning sent by the numerical control system is valid. If "H04" is 1, it indicates that the current numerical control system has not sent the arcing signal with initial positioning. The system default input is active low. Users can adjust according to actual usage.

Table 8 L Parameter List

Parameter No.	Parameter range	Default parameter	Green LED	Red LED	Remarks
L01	0or1	0	L01	0	CNC Automatic (CNC_ Auto/Manual) active level.
L02	0or1	0	L02	0	CNC up (CNC_THC_UP) active level.
L03	0or1	0	L03	0	CNC down (CNC_THC_UP) active level.
L04	0or1	0	L04	0	Effective level of （CNC_IHSAON） signal with initial positioning.
L05	0or1	0	L05	0	CNC Arcing (CNC_EXAON) Signal Effective Level Without Initial Positioning.
L06	0or1	1	L06	1	Active level of motor up limit (UP_LIMIT) signal.
L07	0or1	1	L07	1	Effective level of motor down limit (DN_LIMIT) signal.
L08	0or1	0	L08	0	Effective level of protective cap collision detection signal.
L 09	0or1	0	L09	0	The proximity switch detects the effective level of the signal.

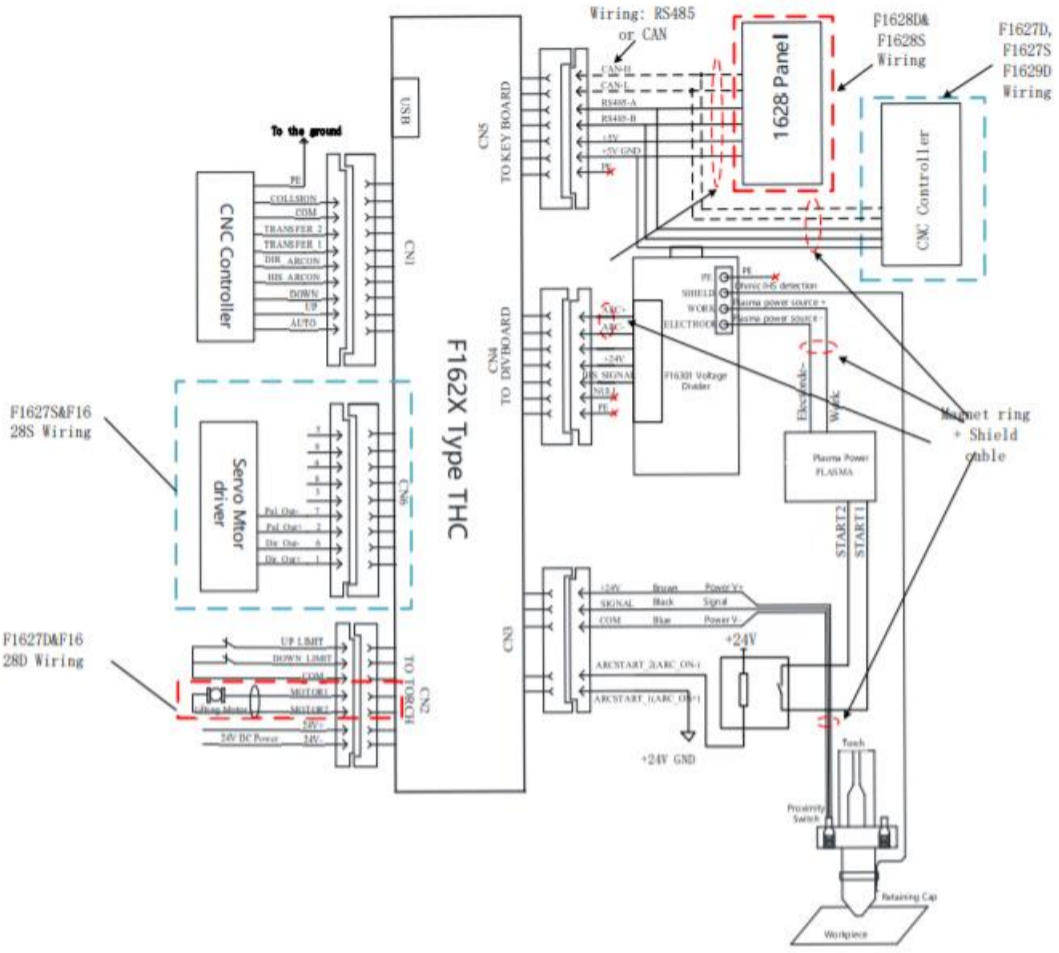
Note: The default motor limit L06 and L07 are set to 1, that is, the motor limit switch should be connected in the form of a normally closed contact. Users can adjust according to the actual situation. If the lifting motor does not have a limit switch, it can be disconnected, but L06 and L07 need to be set to 0.

3. Interface Connection

3.1 F1628 Dwiring diagram

Figure 3. 12 F1628D chassis and voltage divider view

3.2 General Wiring Diagram



3.3 Lifting motor, limit switch and power supply

This series of height controllers use DC 24V power supply, with the maximum power supply range of 24V±10%. The power of DC 24V depends on the motor power, and the DC power supply power should be > motor power * 2. The power interface uses the same set of plugs as the motor and the motor limit interface. Socket wiring is defined as follows:

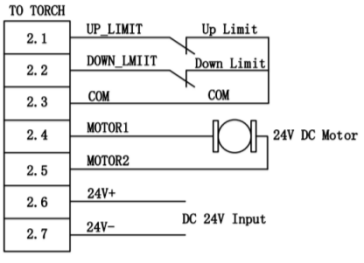


Figure 3.5 Power supply, motor and limit port

Normally, the motor limit switch adopts normally closed contact. The default limit switch of the height controller is normally closed, so parameters L06 and L07 should be set to 1. If normally open contacts are used, parameters L06 and L07 shall be set to 0. Table 10 TO TORCH Interface 7-Core Socket Pin Description

Pin No.	Signal	Content
2.1	UP_LIMIT	Up limit input of DC motor. For normally closed contacts, pin 2.1 and pin 2.3 are shorted when the limit switch is not activated. When the motor encounters the limit switch, the limit switch is activated and pin 2.1 is dis-connected from pin 2.3.
2.2	DOWN_LIMIT	Down limit input of DC motor. For normally closed contacts, pin 2.2 and pin 2.3 are shorted when the limit switch is not activated. When the motor encounters the limit switch, the limit switch is activated and pin 3 is dis-connected from pin 5.
2.3	COM	Pin 2.3, Limit Common COM
2.4,2.5	MOTOR1，MOTOR2	The DC motor drive output is connected to the positive and negative poles of 24V DC motor, and
		the maximum power of the motor is 100W. If you want to change the rotation direction of the DC motor, you can do it by exchanging the wiring of MOTOR1 and MOTOR2, or by invert-ing the parameter P12.
2.6	Power supply interface (24V+)	DC 24V Positive Input
2.7	Power Interface (24V-)	DC 24V Negative Input

4 ．FAQ

In the process of use, the possible failure phenomena and solutions are as follows:

No.	Fault phenomena	Reason	Solution
1	Display is not working	Power supply is down	1. Check the connection of Power supply

2	Motor is not working	Limit signal may lock it down	1. Check the up/down limit signal 2. Over-current protection may Lock the motor chips down.
3	Motor is working but get blocked again	Motor chips have over-Current protection	1. Check the mechanical structure Is locked down or not.
4	After THC is on, the motor keep rising	The collision signal cause that	1. Check the connection of proximity switch, check the parameter P13, L08 or L09 is set correctly or not. If the setting all correct, please make sure the red light on the proximity switch is on before it goes off. 2. Check the condition of proximity switch. 3. Check the connection between retaining cap. When the torch is not touching plate, the collision signal should not be there.
5	Arc-Voltage Control is not stable		1. Check the grounding. 2. Check the plasma power, the cooling liquid is leaking or not.
6	The arcing activate before the IHS is done	It usually happened when under the control of the direct arcing signal	1. Extend the IHS time of CNC
7	The arcing cannot start after its IHS	The plasma power ssource doesn't work, or the arcing relay doesn't close.	1. Disconnect the wiring between THC and arcing relay, then short-circuit the arcing wiring on the a pow See your power source can arcing normal or not. 2. If your plasma power source is in good condition, check the arcing relay on your THC.
8	The torch can't light up		1. Check the plasma power source working condition 2. Check the IHS Height is too high or too low. 3. Check the cutting consumable. 4. When using the retaining cap, the slug may spurt to the torch cause the short circuit.
9	When the CNC start cutting, the torch falls to the plate	The arc voltage is too high	1. Increase the setting arc voltage. 2. Increase the auto THC time on CNC. 3. Check the corner signal on CNC or auto signal. The auto THC signal should not be sent on the beginning of the cutting
10	The arcing is off as soon as the piercing moves to the next hole		1. The delay time is too long. (Before the CNC moves, the arc will be off easily if your torch stay at the position of pierce too long).
11	Auto IHS, the torch won't lift up after it hit the plate	The collision signal wasn't sent or IHS height	1. Check the collision signal works normally or not (Check the working status of proximity switch or retaining cap). 2. Check the IHS height time setting is too small.
12	The torch easily hit the plate during the cutting.	The setting voltage is too small.	1. Increase the setting arc voltage.
13	The torch shaking during the height control.	Sensitivity is too high	1. Lower the parameter P07 Sensitivity.
14	On the steep bevel, the cutting voltage is hard to be track.	Sensitivity is too low. The speed of lifting motor is too slow	1. Increase the parameter P07 Sensitivity. 2. Switch to a faster speed lifting motor.
15	The CNC doesn't pause when the arc	After arc break alarm, the voltage did not	1.The CNC could get the arcing signal feedback from the plasma itself.