

VHC-300

Arc voltage height controller operation manual



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1、 Introduction

1.1 Type : VHC-300

1.2 Name: Arc voltage height controller

1.3 Application: CNC cutting machine, has a constant characteristic of the plasma torch of the automatic height control for the vast majority of plasma.

1.4 How it works:

The arc voltage height control principle is to use the power of the basic constant of plasma characteristics, by detecting changes in plasma arc voltage to detect the process of plasma cutting torch height changes, to achieve the plasma cutting torch height control. The process is as follows: CNC system send a start signal to the controller box--> the box first produce a IHS signal--> when the IHS signal finish-->lift up the torch to a piercing height automatically-->control the plasma ignite-->if the arc exist-->the controller box send move signal to machine-->The CNC systems start cutting.

1.5 Basic functions:

A: Manual operation: the operator can operate up, down, IHS test, arc on and more on the panel.

B: Display setting arc voltage and actual arc voltage function : display settings arc voltage before arc on, display the actual arc voltage after arc on.

C: IHS positioning function .

D: fully Automatic cutting operation .

E: Automatic height control: automatically adjusts the distance between the torch and and steel plate when cutting .

F: Automatic lift control: when finish cutting a piece, the controller box automatically lifts up the torch 2 seconds. If disconnect the jumper JP1 on main control board, the function is disabled. If the customer don't need this function, you can disconnect the jumper JP1.

G: igniting Successful output : is the machine moves signal, the operator set the Pierce Delay potentiometer on panel , can delay output this signal, the output signal is

normally open dry contact signals to control the machine movement.

2、 Technical parameters

Input voltage: AC24V \pm 10%, 50/60Hz.

Lift motor: DC24V permanent magnet DC motor

Drive Mode: PWM pulse width modulation

Output Current:1-4A

Output power: 100W

Operating temperature: -10 \sim 60 $^{\circ}$ C

Initial positioning: protective cap contact positioning /proximity sensors positioning

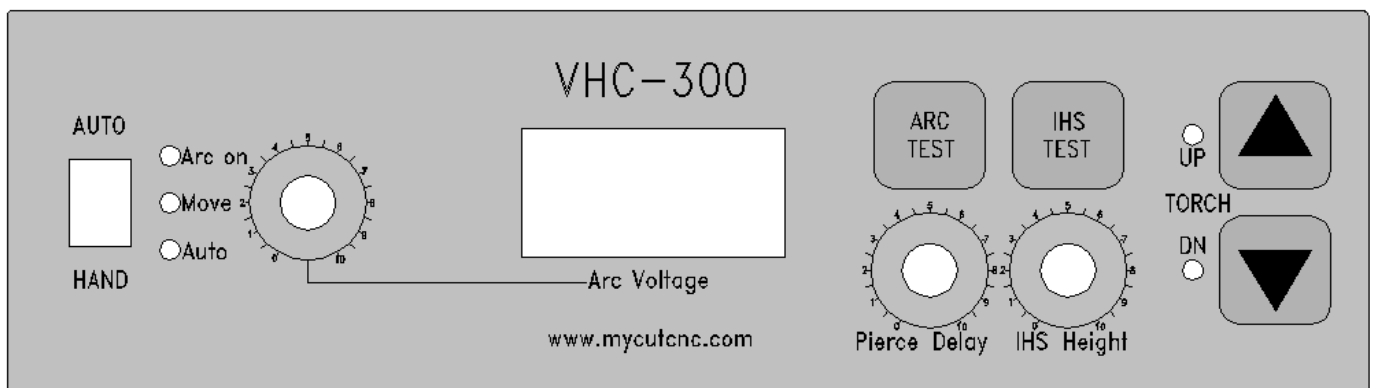
Run transmission: arc successful output

Control accuracy: \pm 1V arc voltage

Dimensions: Length X Width X Height: 200mm X 160mm X 60mm

Set arc voltage range: 60V-250V

3、 Features control panel, see below:



Auto / Manual switch (Auto / Hand): If the switch in manual position, the box will not generate an auto height control signal. Usually in auto position.

Arc on indicator (Arc on): if on means the box has send a ignite signal to the plasma .

Igniting successful (Move): if on means the box indicating that the preset delay time has gone, then if

there has actual arc voltage , the box will send a igniting successful signal to CNC system , the machine can move and start cutting.

Auto indicator (Auto): if on means the box already been on 'auto' status . to make the box be 'auto' status, the following three conditions must be met: the operation panel Auto / Manual switch is at auto position; CNC system send a auto signal to the box; controller box detect the actually arc voltage input .

The sensitivity is also important, if the sensitivity is too low, the response to slow; If the sensitivity is too high, it maybe often hit the plate. the SW2 DIP switch on control board can set the sensitivity, if all four switches be set to the ON position, the lowest sensitivity; if all four switches is set to the OFF position, the highest sensitivity.

Setting arc voltage (Set Voltage): set the cutting arc voltage through this potentiometer . In the cutting process, if the torch height too high, reduce the arc voltage; If the torch height is low, increase the arc voltage.the setting range is from about 60-250.

Arc voltage display (Arc Voltage): there display setting arc voltage before arc on; there display actual arc voltage after arc on.

Arc Test (Arc Test): Press the 'arc test' button, plasma ignites, release the 'arc test' button, plasma extinguish.

Piercing time setting (Pierce Delay): This setting range is 0.2-4 seconds, this time need set be about the same with actual piercing time. The 'auto on' signal is also controlled by this time.

IHS test (IHS-Test): click this button, the controller box will do a IHS test, used to check the igniting height is satisfied or not. In the initial positioning, press up or down button can cancel this test.

IHS height settings (IHS Height): We can use this potentiometer to set the IHS height. Potentiometer clockwise rotation, height increase, counterclockwise rotation potentiometer, reduced height.

Up (Up): Manual 'up' button, any valid state. There is a indicator led nearby.

Down (Down): Manual 'down' button. There is a indicator led nearby.

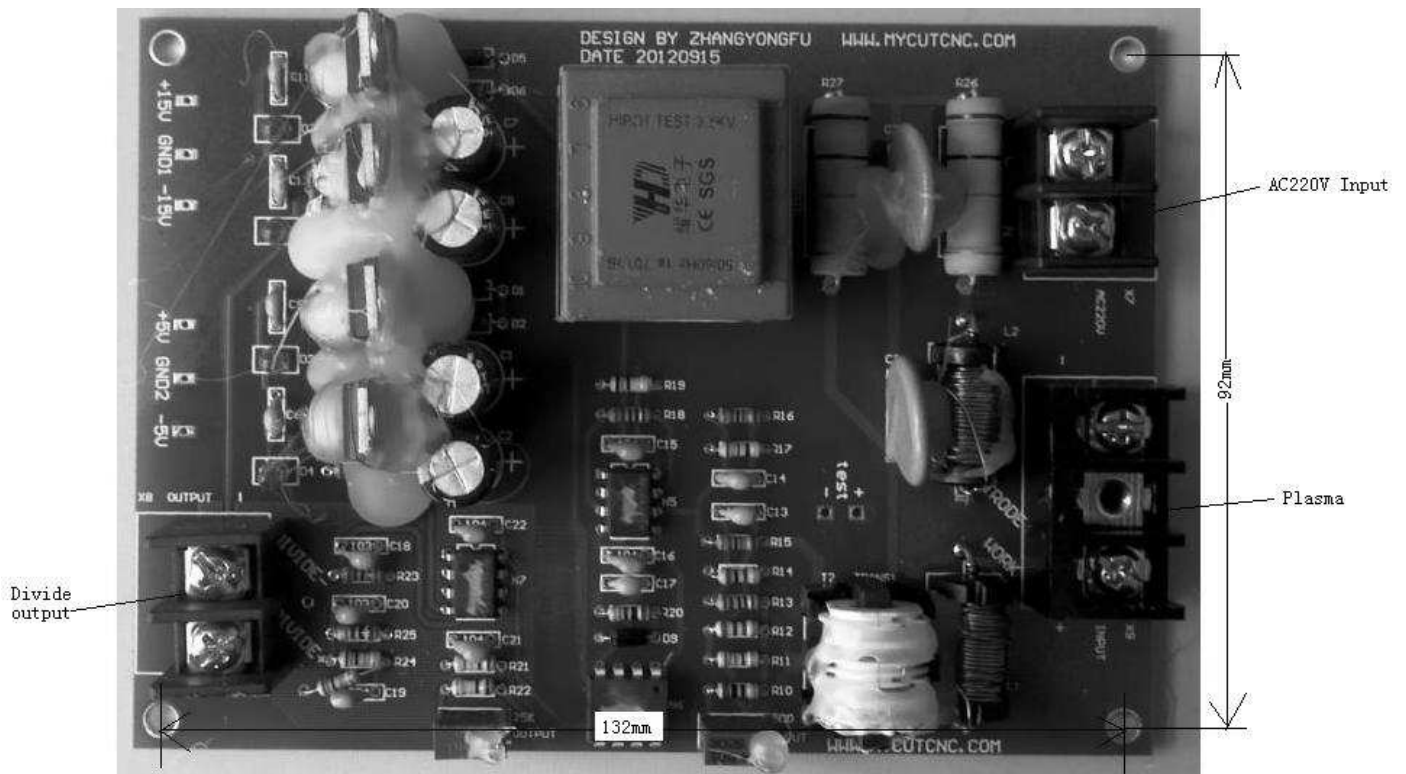
4、MPU Introduction

Main control board contains power supply part; the interface part, the logical part, the drive components, see

below.



5、 Introduction isolation board



Input :plasma arc voltage . Output: 50:1 isolated arc voltage.

6、 Initial positioning

6.1 Protection cap positioning

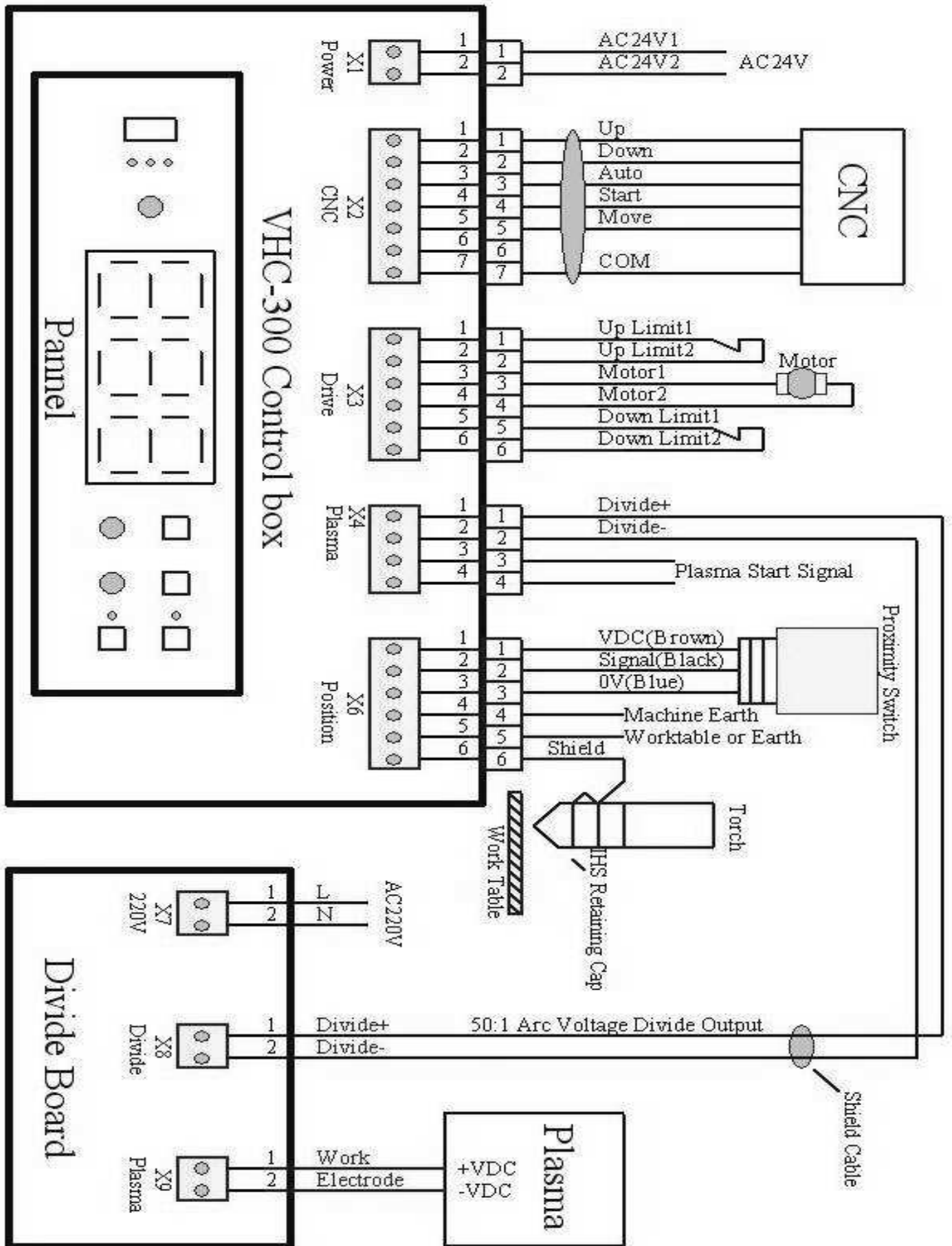
This positioning requires the protective cap on the gun must be metal structure, and insulate with the cutting gun. The function is fit for some plasmas which without HF igniting.

6.2 Proximity sensors positioning

This function is fit for all plasma. Usually the indicator led on the proximity sensor must be on, otherwise the torch will go up until the led extinguish.

7、 Interface circuit

Controller box has 6 interfaces: X1-Power、 X2-CNC、 X3-Torch、 X4-Plasma、 X5-Panel、 X6-Position. Divide board has 3 interfaces : X7、 X8、 X9. See the next form for details :



7.1 X1-POWER:Power input, AC24V.

PIN#	NAME	I/O	DESCRIPTION
1	AC24V1	input	Power>100W。
2	AC24V2	input	

7.2 X2-CNC, CNC Interface, through the 7-pin socket to connect to the main control board.

PIN#	NAME名称	I/O	DESCRIPTION描述
1	UP	input	Up signal, when connect to pin7, torch moves up.
2	DOWN	input	down signal, when connect to pin7, torch moves down.
3	AUTO	input	auto signal, when connect to pin7, the external 'auto' signal add in.
4	START	input	Start cutting signal, when connect to pin7, the controller do a cutting cycle.
5	MOVE	output	Machine move signal. when arc success, this pin connect to pin7.
6			No connect.
7	COM	com	Control com.

7.3 X3-Drive interface, connect to the torch:

PIN#	NAME	I/O	DESCRIPTION
1	UP LIMIT1	input	Connect to up limitation, NC contact.
2	UP LIMIT2	input	
3	MOTOR1	output	Connect to DC motor.
4	MOTOR2	output	
5	DOWN LIMIT1	input	Connect to down limitation, NC contact.
6	DOWN LIMIT2	input	

7.4 X4:plasma connect to the divide board and plasma:

PIN#	NAME	I/O	DESCRIPTION
1	Divide+	input	Connect to the divide board, 50:1 divide arc voltage input, the '+' '-' must be correctly.
2	Divide-	input	
3	ARC1	output	Arc on output ,connect to plasma.
4	ARC2	output	

7.5 X5-Panel, the 20-pin strip connect the main control board and panel board.

7.6 X6-position (IHS), connect to proximity sensors.

PIN#	NAME	I/O	DESCRIPTION
1	VDC	output	Connect to proximity sensors, brown to VDC, black to SIGNAL, blue to 0V. The sensors must induce the mental, otherwise the torch will moves up continously.
2	SIGNAL	input	
3	0V	com	
4	EARTH	input	Connect to Machine earth.
5	WORK	input	Connect plasma anode.
6	SHIELD	input	Connect to the gun protective cap. If don't use protective cap position, the ' work ' and ' shield ' terminal need not connect.

7.7 X7-220V, the AC220V power for divide board.

PIN#	NAME	I/O	DESCRIPTION
1	L	input	AC220V Power input.
2	N	input	

7.8 X8-divide: connect to controller box, 50:1 arc voltage divide output.

PIN#	NAME	I/O	DESCRIPTION
1	Divide+	output	50:1 arc voltage divider output, notice: the '+'and'-' must be connected correctly.
2	Divide-	output	

7.9 X9-plasma, connect to plasma.

PIN#	NAME	I/O	DESCRIPTION
1	Work	input	Connect to plasma work(anode) +
2	Electrode	input	Connect plasma electrode(cathode) -

8、 Controller box set:

8.1 Auto lift up setting: JP1 jumper set lift up 2 seconds after each arc off, see page 4.

8.2 The sensitivity settings: DIP switch SW2 can set the sensitivity at auto status,

see page 5.

8.3 Adjust the brake function: if the brake function is no good ,you can adjust the potentiometer RP3 to get good brake fuction. Note: if not necessary, do not adjust the potentiometer.

9、Maintaince

The table below for some common faults and Solutions:

num	fault	reason	solve
1.	No display	+5V power fault	Check the +5V
2.	motor does not rotate or in only one direction.	1、 IC IR2110 damage 2、 motor damage 3、 limitation damage	1 change IR2110 2 check motor 3 check limitation
3.	The torch always moves up after power on	1 the proximity sensor is not in position	Check the proximity sensor
		2、 the proximity sensor damage	Change the proximity sensor
4.	The plasma arc voltage is not stable	1、 check the work cable 2、 check if there is coolant leakage	
5.	Plasma cannot arc on	1、 check plasma power 2、 check the IHS height。 3、 check cut gun	
6.	No transfer arc	1、 check the work cable 2、 check the cut gun	
7.	The machine start cut but the plasma is still piercing	The delay time is too short	
8.	The plasma arc extinguish before machine moves	The delay time is too long	
9.	When start cutting ,the torch move to the plate but do not lift up and there is no arc on signal output.	1、 IHS Height setting is too low。 2、 bad connect	1、 the protected cap cable is not connected to cap 2、 the proximity sensor is damaged 3、 The work cable is not connected to the earth
10.	The torch is not stable at auto cutting status 。	1、 the sensitivity is too high, set SW2 switch to reduce. 2、 the controller box is bad.	