Focus on NC cutting height control field

HP105

Plasma Arc Voltage Torch Height Controller

Operation Manual

Vision：1404

HEAVTH SCIENCE&TECHNOLOGY

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1.IMPORTANT INFORMATION

1.1 SERVICE ASSISTANCE AND CONTACT INFORMATION

For service assistance, have the following information available:

• HP105 model, part and serial number located on a label

• Type of cutting application you are using

You can contact our at:

TEL: 086-0519-89182619

FOX: 086-0519-89183619

1.2 RECEIVING AND UNPACKING

After receiving the HP105 you should:

• Carefully, unpack and inspect the equipment.

• Compare the received shipment with the packing list.

• Report any damage to the carrier and your representative.

• Store equipment that will not be used in a clean, dry location.

• Take appropriate precautions to prevent moisture, dust and dirt from accumulating in storage and installation areas.

1.3 SAFETY CONSIDERATIONS

Safety practices should not be an after thought. Before installing or servicing the controller, review and follow applicable policies and procedures to ensure worker safety. Machinery must be in a safe state and you must be aware of any additional hazards that can arise.

1.4 PRE-INSTALLATION CONSIDERATIONS

Before installing the HP105:

• Check to be sure that you have all of the required parts.

• Familiarize yourself with the parts of the HP105.

• Check to be sure that the torch lifter motors you are using with the HP105 are within the acceptable range.

• Review the instructions for Configuring the Lifter Mechanics.

1.5 CONFIGURING THE LIFTER MECHANICS

Proper configuration of the torch lifter mechanism is an important factor for establishing the accuracy of your cutting system. Be sure that:

□ Gear reduction is selected on the torch lifter so that the maximum suspension speed does not exceed 3000 mm/min (120 IPM). If higher accuracy is required, maximum suspension speed should be set to 1500 mm/min (60 IPM).

□ Gears, racks and spindles have minimal backlash.

□ Oversizing is avoided. The mass of moving parts, including armature inertia must be as small as possible. Motors with low nominal RPM are preferred.

2. Brief Intro

2.1 Summarize

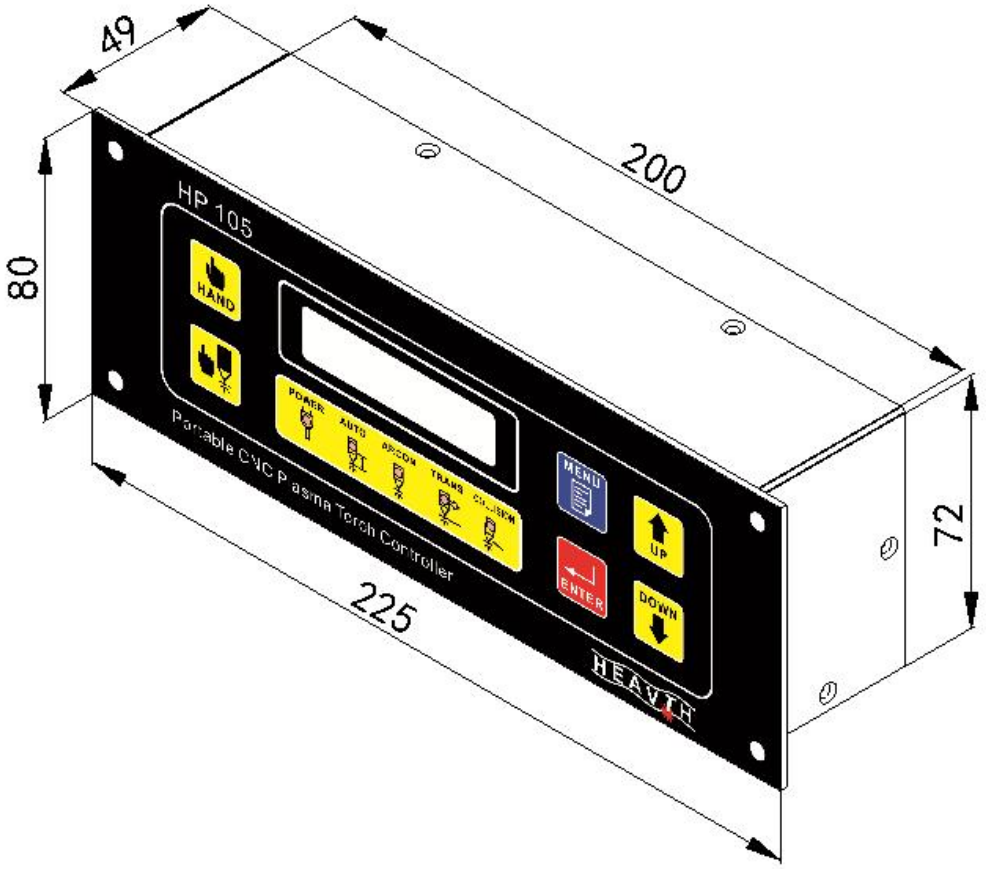
HP105 plasma arc voltage height controller is equipped with constant current plasma . During cutting course, the current

always equals the given current. And the cutting arc voltage will be changed with the fixed speed being the height of torch changing. When the distance gets farther, the arc voltage increases; On opposite, the arc voltage will decrease. HP105 plasma arc voltage height controller will inspect the voltage change, then control the distance between cutting torch and material via the lift motor. So that the arc voltage is fixed, the same is the height of cutting torch.

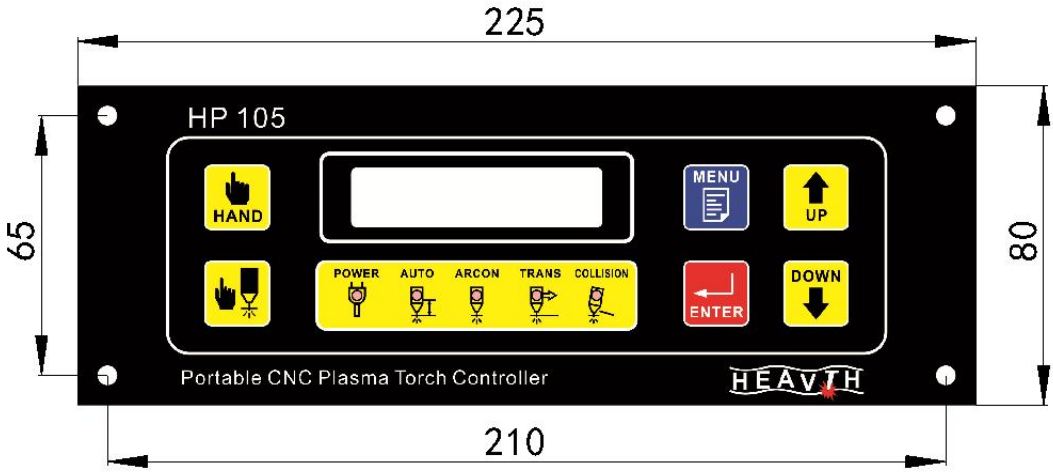
Generally, the instruction will list all the cutting parameters for some type of plasma . The user can refer to these parameters. Adjust the voltage in arc voltage height controller to match the selected current. The torch height will keep constant under regular speed.In fact,the user should set the arc voltage according to the height of the cutting torch.

In the status of automation ,the arc voltage more high,then the height of the cutting torch more high

2.2 Dimensions*:*



Mounting Hole Size:



2.2 Technical parameter

- Working voltage: DC24±10%，50Hz/60Hz， Please prepare a isolated power, do not shared with others such as electronic valve . Especial Pay more attention the DC 24V
- Lift motor: DC24V DC motor
- Drive mode: PWM
- Output current：1A-4A.
- Working temperature: Height controller -10∽60℃
- IHS style: Switch inspecting IHS (suitable for all plasma both above-water and under-water cutting)， Plasma Shield Protector IHS (suitable for above-water cutting's touch leading arc voltage plasma)
- Running transfer: Alternative Arc transfer and pierce transfer
- Divided voltage ratio:100:1
- Accuracy: ±1V∽±5V，adjustable
- Outer Dimension: Length X Width X Height: 225mmX50mmX80mm

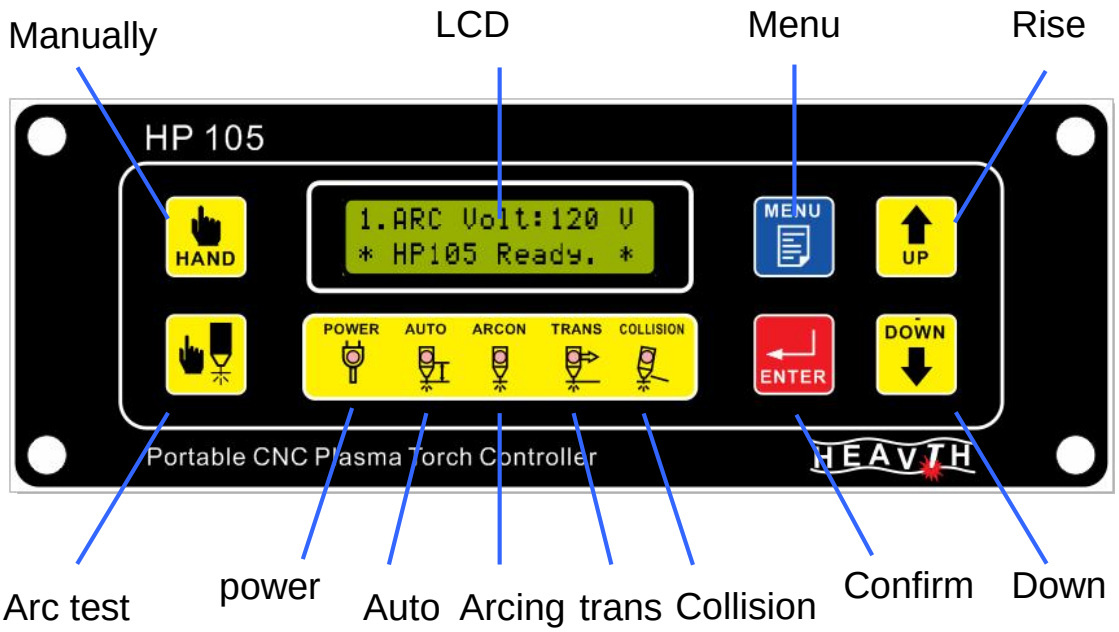
Weight： 0.8kg

Protection class: IP64, to prevent dust from entering.

Installation connector: 2-pin, 4-pin, 5-pin, DB-9 core

Installation position: Keep away from heat, air convection good place.

2.4 Operation Panel Features



Function Description:

LCD: display the working status and parameters.

Manual: Auto / Manual mode selection increase, alternating work.

Arc test: standby press, arcing into the test mode.

When arcing test, press to return to standby mode.

Menu: In standby mode press to enter the parameter setting mode.

When the parameter setting Press to return to standby.

Confirmation: parameter setting mode, confirm that the set parameters.

Rise / fall: In standby mode, manual lifting torch.

When parameter setting, subtraction parameter values.

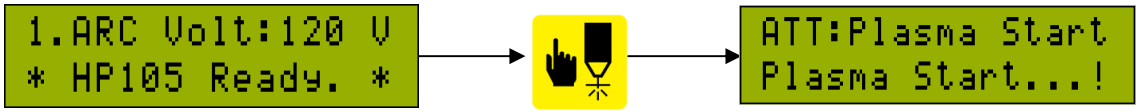
2.5 parameter settings

Automatic standby state, the LCD second planetary number flashing, and cycles through the following parameters:

1.Setting arc voltage 2. When initial positioning 3. When arcing perforation

Standby mode, press the manual key to enter the manual mode, then you must manually control the cutting height:

Standby mode, press arcing test, arcing into the test mode:

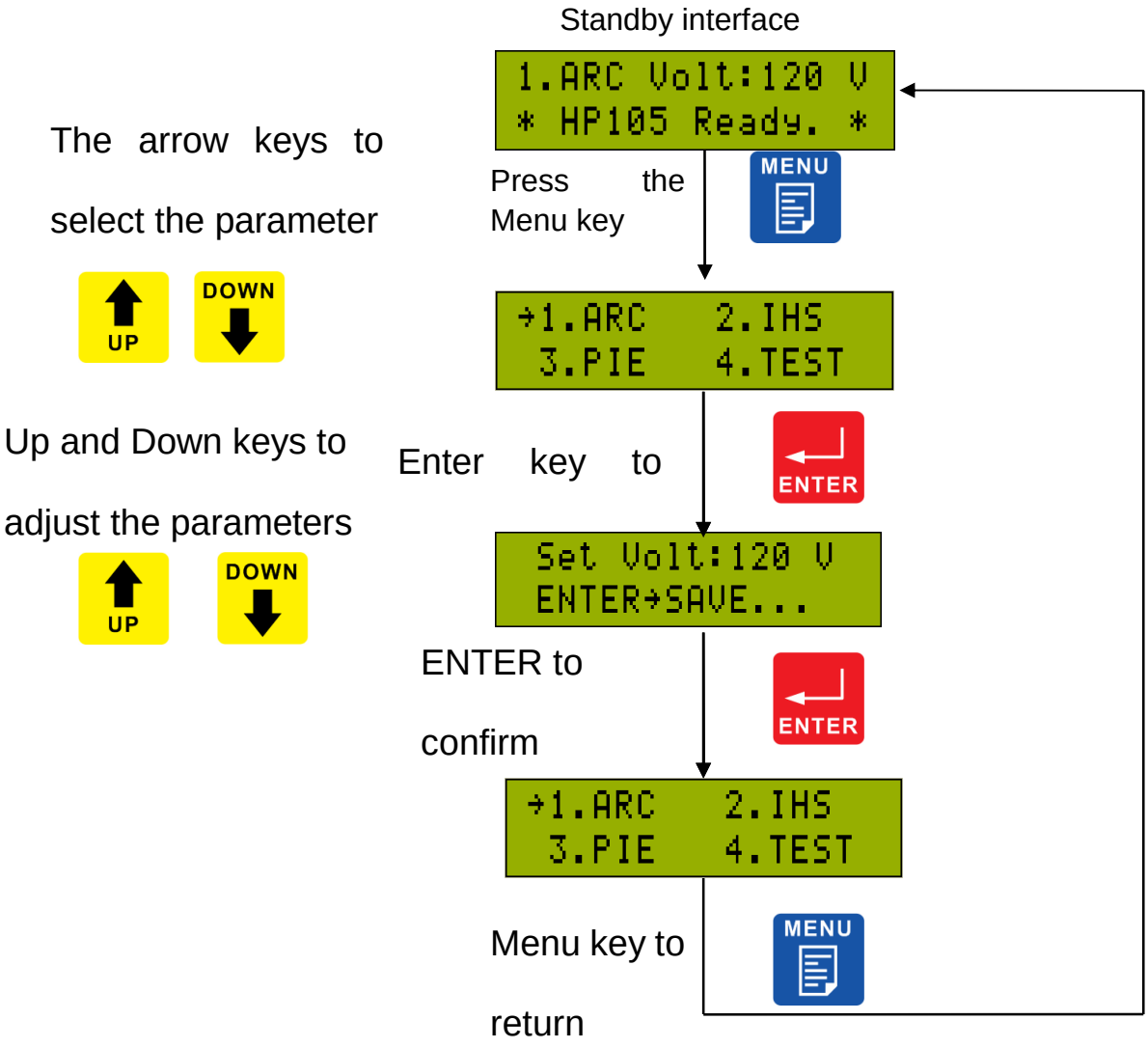


Standby mode, press the Menu key, select 4, press the Enter key to enter the positioning test mode:

Set Arc Voltage:

This parameter is set automatically track ions and other torch height.

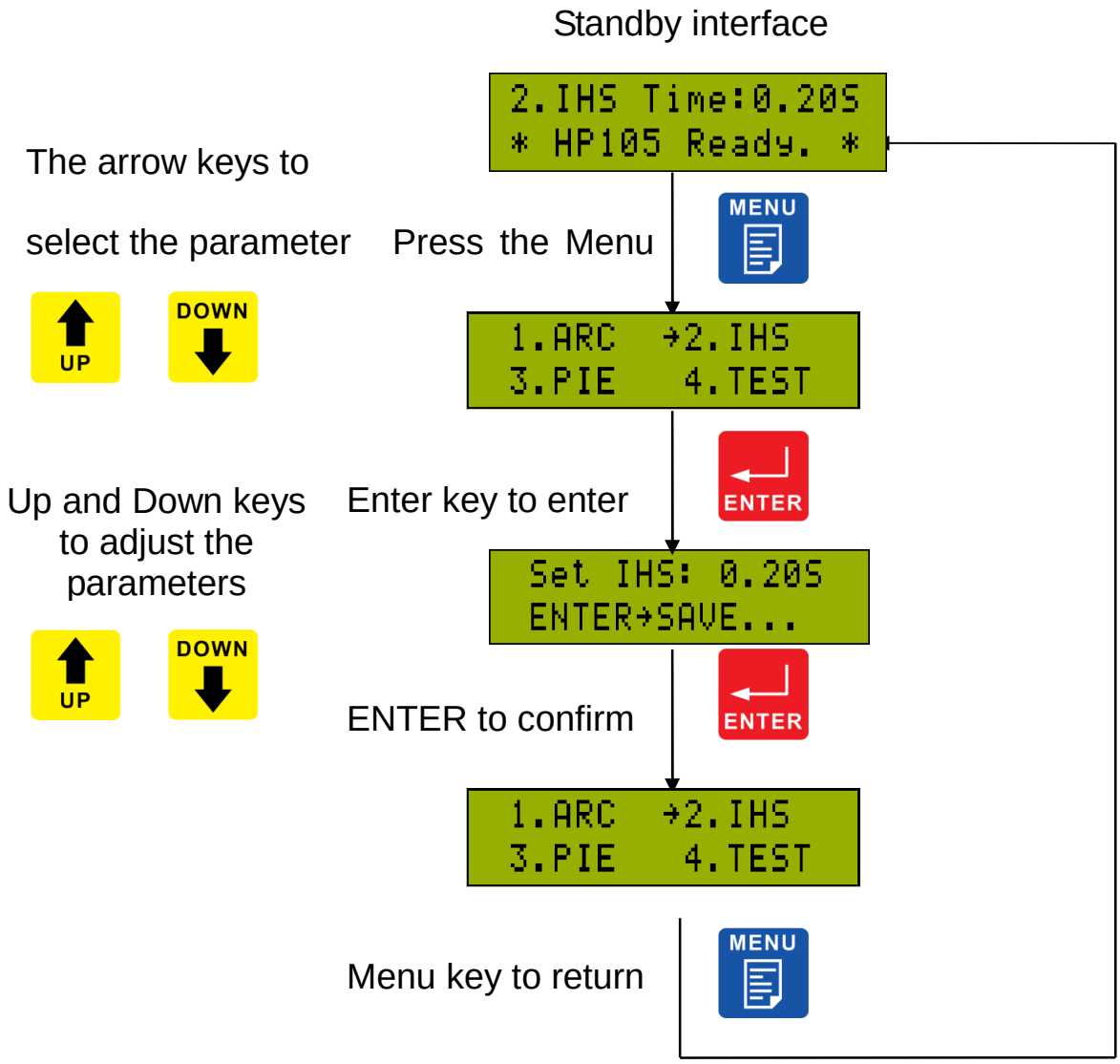
Arc voltage value, the higher the torch distance. Arc voltage value, the lower the torch distance.



Set the initial positioning time:

This parameter sets the arc height, before and after start cutting torch fell across the workpiece, elevation time.

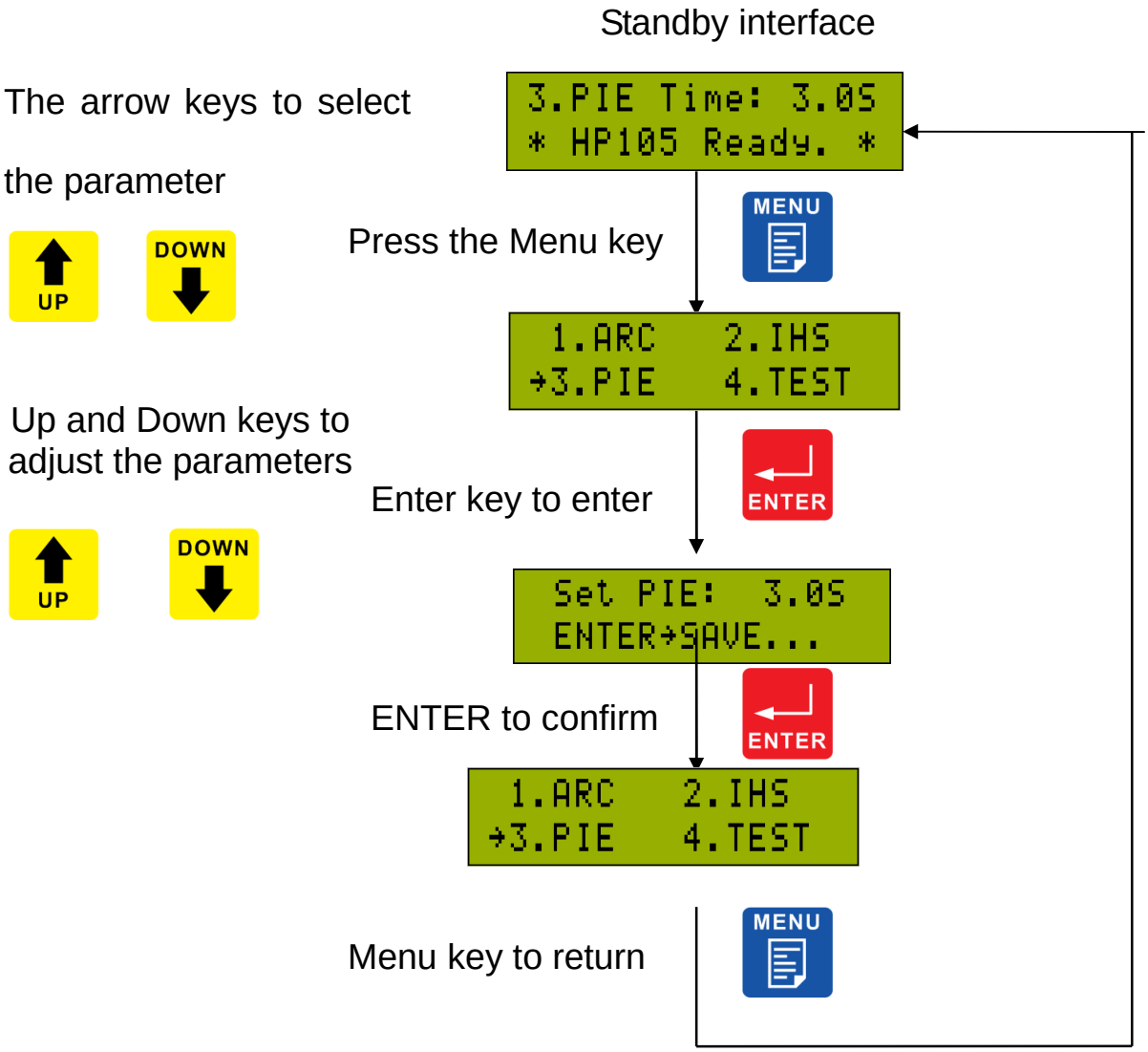
Positioning higher the value, the higher the arc height. Positioning the smaller the value, the lower the arc starting height.



Set perforation time:

When this parameter is set arc torch perforation time, according to the workpiece thickness is set.

Perforation higher the value, the longer the piercing time. Perforated smaller the value, the smaller the perforation time.



3. installation and commissioning

3.1 Work process:

When CNC system's output arc signal to the HP105's interface J2-4, the height controller should process the IHS firstly; Secondly

auto-control the Arc-on, the height controller will send the signal of arc transfer and pierce transfer to the NC system after producing the transfer arc. At the mean time, the controller delay time to put the arc voltage into the single chip system. If “Auto Permitted is available in height controller and NC system has sent out AUTO height adjusted signal, the controller is on status of “Height Auto adjusted”

ATTN: When the cNC system that you use can not receive the signal of arc-on and pierce, please delay the time to control the NC system’s running. It just means that the cNC system send arc-on signal to the height controller, delay time to run the cNC system.

3.2 INSTALLATION CONTROLER：

The following section provides you with the procedure to follow when installing the HP105 Some of the steps direct you to other sections in this manual that provide you with more detailed instruction.

1. Determine a mounting location for the HP105. Keep the following points in mind:

To avoid overheating and potential damage to the control box from cutting process fumes, DO NOT choose a mounting location directly above the torch.Find a mounting location away from the torch lifter unit.

2. Attach the wires from the CNC,the plasma,the lifter motor and lifter limit switches to a connector and then to the control box at the receptacle. To reduce noise emission, 20 AWG (0.5 mm2) shielded cable is recommended. Filters consisting of a resistor and capacitor can be connected only directly to the motor.

3. Connect a 12 AWG (2.5 mm2) ground wire to the ground screw located on the control box and then, to the machine ground rail of your cutting system.

3.3 Divided voltage board

Controlling the arc voltage must inspect the changing of plasma arc voltage. The plasma arc voltage equals the voltage that is between the pole and ground. The anticathode which put out the plasma power is connected to the ground. The Cathode connects to the pole which is in the cutting gun. So the voltage in the electrode is negative. When process the cutting, the arc voltage absolute value is usually higher than 100V. If so, the voltage must be divided in order to process the control in the controlling circuit.

ATTN: the voltage that put into the height controller is negative. If the polarity is connected in reverse, the Height Auto-adjusted is not available.

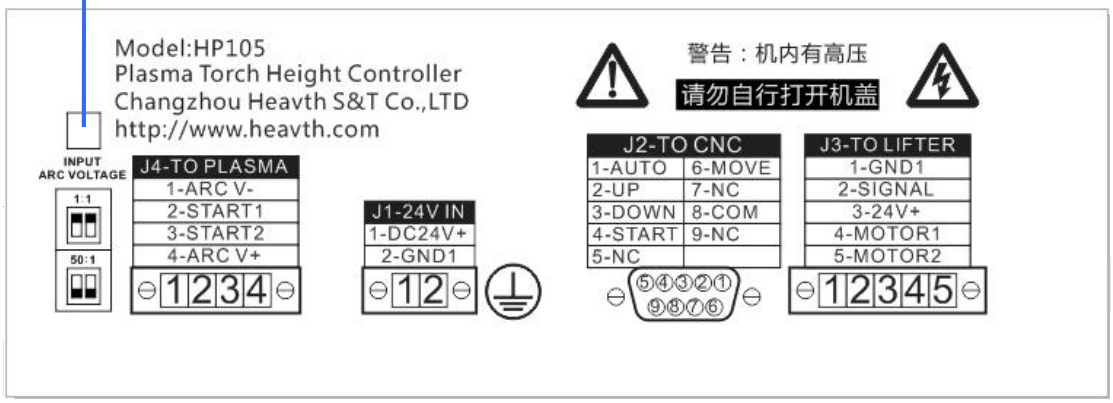
The controller built-in isolation stars platen default input 1:1 Actual arc voltage (when the partial pressure ratio of 100: 1) 1. For some comes with 50: 1 non-isolated sub-plate plasma can set the input of 50: 1 low pressure (in this case the partial pressure ratio of 2: 1).

Enter the arc voltage is set by DIP switch on the back of the controller to set:

DIP switch to on: Input 1: 1 actual arc voltage.

DIP switch to the next: Enter 50: 1 arc voltage dividing.

Set the input voltage arc



3.4 IHS introduction

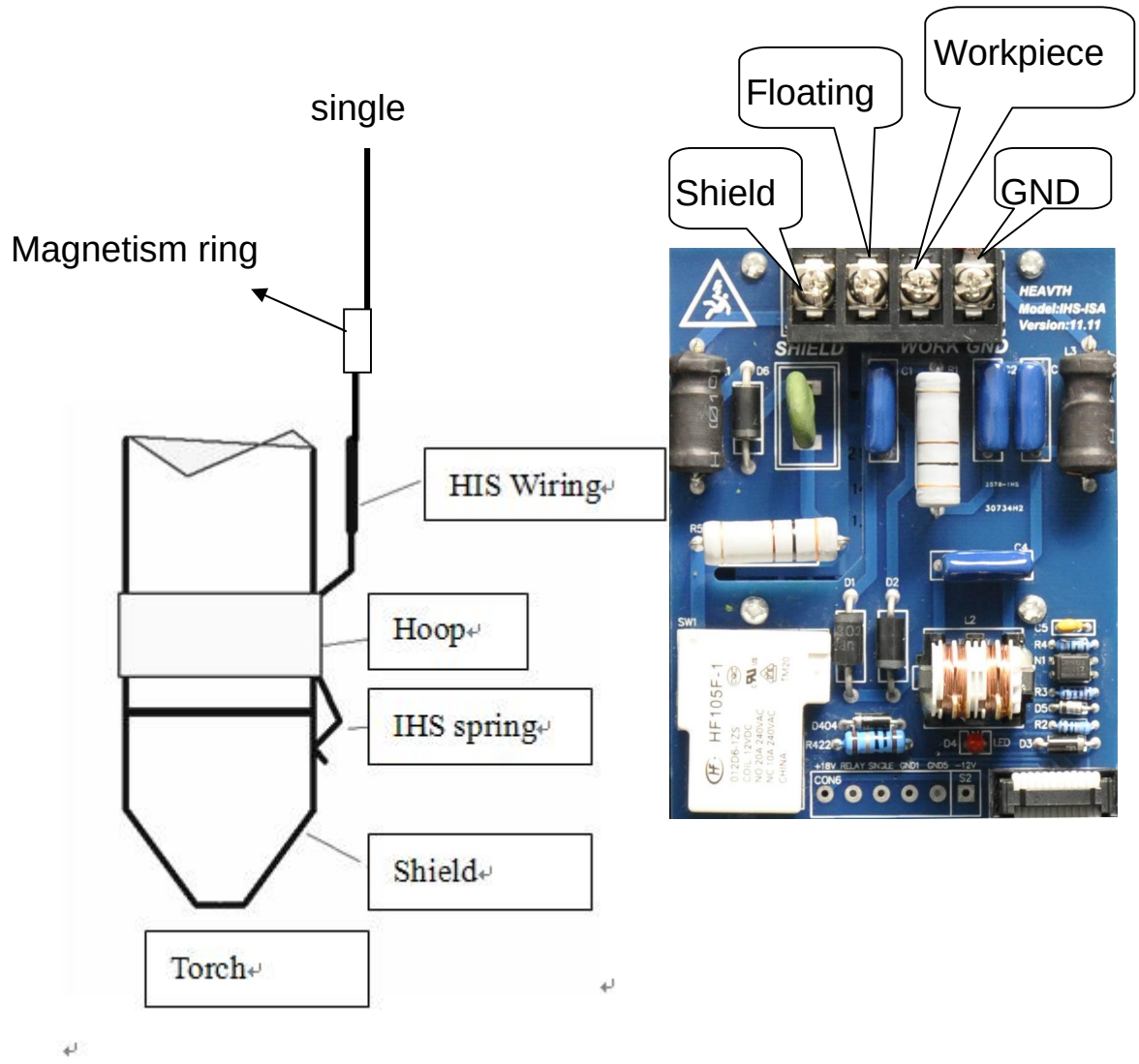
Two types of IHS style of height controller

1. Plasma Shield protector IHS inspecting style

The material of the protector should be metallic. They can transmit each other when it gets to the material.

ATTN： The cutting torch protector IHS inspecting style is

suitable for abover-water cutting only.



Working process: After the height controller receives the arc-on signal which is sent out from NC system, the cutting torch will fall down immediately. When the protector get to the material, the height controller will receive this signal, and then control the cutting torch to rise to the given Height of IHS. The height controller will control the plasma to arc on after IHS.

2. inductive proximity switch IHS style(switch mode: NPN Mode, 2mm, outer diameterΦ12, the distance of screw

thread:1.0mm)

When this style is adopted, the client should design the tongs according the IHS cutting torch tongs sketch map which is provided by our company. All the plasma IHS, whatever over-water cutting and under-water cutting, can adopt this IHS style. Please adopt the approach switch IHS style if you use the high frequency input arc plasma and under-water cutting.

The tongs sketch map: Please see the appendix

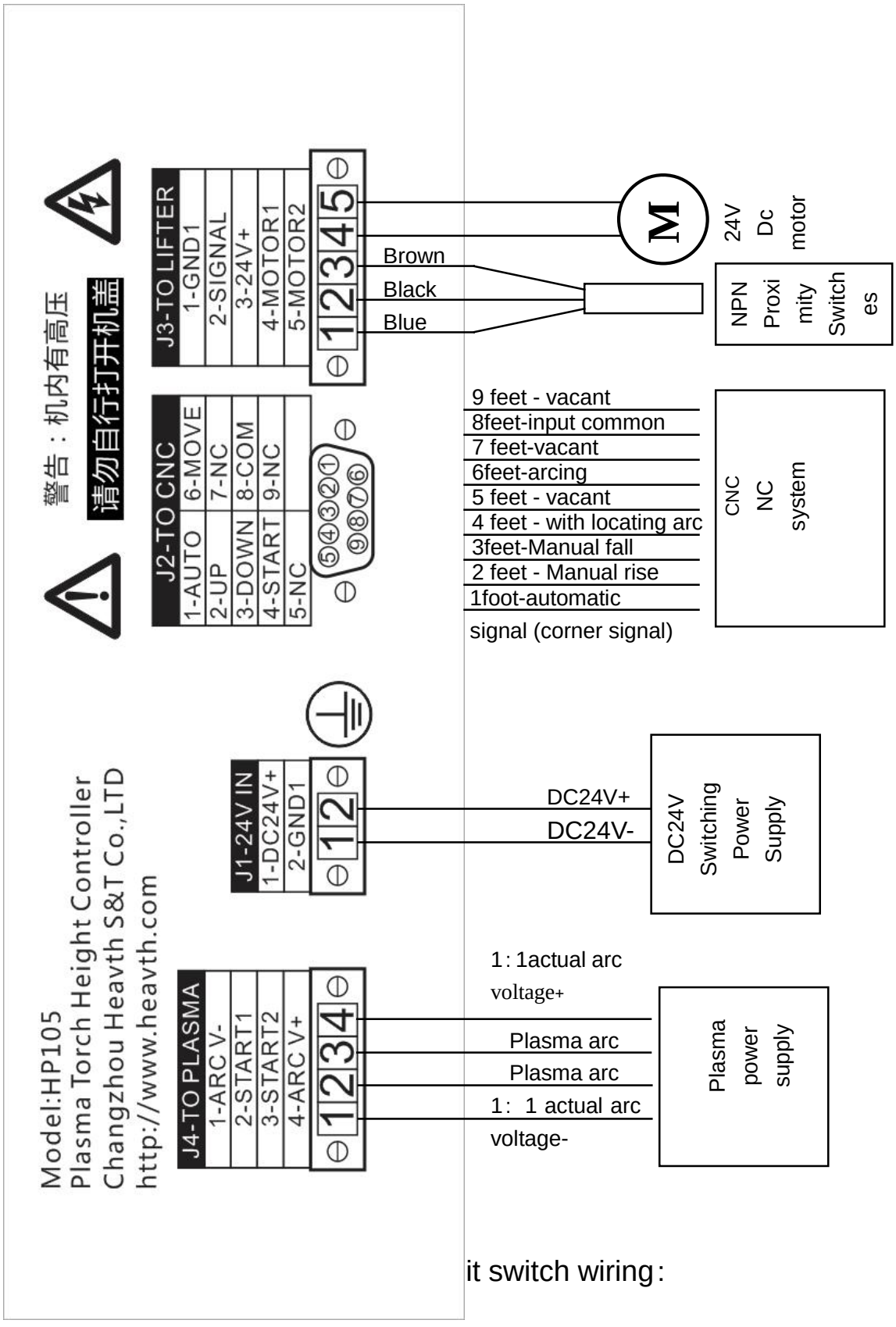
Before IHS, the approach switch is on approaching status. The cutting torch will rise once the switch is broken away.

Working process: After the height controller receives the arc-on signal which is sent out from NC system, the cutting torch will fall down immediately. When the cutting torch gets to the material, the approach switch will break away from the approaching spot. The height controller receives this signal, and then controls the cutting torch to rise to the given Height of IHS (the approach switch will reposition automatically during the rising). The height controller will control the plasma to arc on automatically after IHS. This IHS style is suitable for all plasma IHS.

By raising the J3-1,2,3 aviation plug is connected to the proximity switch.

3.3 Interface Circuit

Interface		Signal	input Output	Remark
J1	1	DC 24V +	input	Connect switching power supply.
	2	DC 24V -	input	
J2	1	Automatic signal (corner signal)	input	Raised manually (with the common ON)
	2	Manual rise	input	Manual rise (and the common terminal connected)
	3	Manually drop	input	Manually decrease (and common ON)
	4	With locating arcing	input	Start positioning arc (the common terminal connected)
	5	Floating		
	6	Arcing complete (machine running)	output	Control machine running
	7	Floating		
	8	Signal common	Common	J2 port signal common
	9	Floating		
J3	1	Proximity switch to	output	Connected NPN type positioning proximity switches, 1-2 foot signal NC. When using ordinary mechanical switch normally closed switch 1-2 pin connector pin 3 unconnected.
	2	Proximity switch signal	input	
	3	Proximity Switch Power	output	
	4	DC	output	Permanent magnet motor, maximum 40W
	5	DC	output	
J4	1	actual arc voltage negative	input	Plasma arc voltage actual negative
	2	Arcing signal	output	Plasma arc switching signal.
	3	Arcing signal	output	
	4	actual arc voltage positive	input	Plasma actual arc voltage positive



it switch wiring：

Arc Voltage input Note:

NO.	parameter name	Parameter meaning	Factory Settings

The controller built-in isolation stars platen default input 1: The actual arc voltage 1. For carrying part 50: a non-isolated sub-plate plasma can be input is set to 50: 1.

1. Do the actual arc voltage lines connected directly to the ground clip and the torch cable.

2. The arc voltage height controller to the motor cable should be shielded cable, shielding connected to the machine ground.

3. plasma power and arc voltage height control must be strictly grounded. Note Check before arcing torch height and ground clip.

4. Domestic plasma power: its arc voltage must be taken from the high-frequency arc-grade and reactor before. Plasma samples from the position of the rectifier output.

5. Any control cables and a plasma torch cable wiring should be as far away from (5cm above), to prevent the high-frequency signal is coupled to control, damage control and CNC systems.

Parameter setting screen, hold UP and DOWN at the same time more than three seconds, into the implicit parameter setting.

1	MAX_PWM	Maximum pulse width	120
2	MIN_PWM	minimum pulse width	30
3	IHS_UP	initial positioning pulse width	100
4	IHS_DOWN	initial position by pulse width	100
5	HAND_PWM	Up and down pulse width manually	120
6	ARCV_ERR	Arc voltage protection scope	020
7	EN_BREAK	brake can make	01
8	PWM_AMP	Automatic sensitivity	005
9	UP_BREAK	Increase reverse braking time	030
10	DN_BREAK	By reverse braking time	080
11	EMG_LIFT	Promotion time of emergency	020
12	EMG_ PWM	Emergency pulse width	120
13	ADJ_RANGE	Arc pressure intelligent adjusting range	015
14	ADJ_STEP	The size of arc voltage intelligent adjustment	002
15	ADJ_EN	Arc pressure intelligent effective adjustment	000
16	ARC_ACC	Arc pressure precision	01
17	PEI_EN	Perforation signal can make	01
18	AUTO_UP	Broken arc cutting torch when hoisting height	10
19	ERR_STOP	Arc pressure anomalies can stop making	00
20	DELAY_IN	When the arc rolling access	05
21	RESET(18)	Restore the factory value	00

5. Failure to maintain

No.	malfunction	reason	Solution

1	Motor does not turn or only operate in one direction	Blown fuse Motor output	Replace the fuse, while the need to check whether the lift motor malfunction or jammed.
		MOS which damaged one of the driving motor	MOS pipe replacement
2	Arc voltage control is unstable, shake torch	1, cutting the distance constant, the arc voltage is stable. 2, the sensitivity is set too high, tuning control sensitivity. 3, lifting the torch too fast.	
3	Arc cutting torch can not play	1. Confirm plasma power in working condition. 2, check the arc height is correct. 3, check the torch parts.	
4	After automatic torch decline	1, increase the "set arc voltage." 2, to extend the automatic control of time in numerical control.	
5	After automatic torch rise	1, the arc voltage is set too high. 2, no arc voltage or arc voltage positive and negative reversed.	

Packing List

HP105**Arc voltage height controller**

NO.	Name	Quantity	Remark
1	HP105 host	1	
2	Matching plugs	4	2 -pin 4-pin 5-pin 9-pin
3	System Manual	1	
4	Electric lift mechanism		Optional
5	Protective cap positioning device		Optional
6	Anti-collision positioning fixture		Optional
7	Proximity Switches		Optional

Note: Users receive the goods, please check the box. The case, check the number of items, if any problems promptly contact me.

Packing：_____ Test：_____

Date：_____

Product Warranty Description:

Thank you for choosing our products! With the serial number and the motherboard ID, Heavth Technology will provide you with a host-year service warranty and lifetime maintenance costs.

The following circumstances, not a range of free services:

Does not meet the warranty requirements, product number or label pasted damaged, missing,Or incompatible with the product.

Due to environmental factors, improper use and the damage caused by irresistible factors;

Without my permission, to repair damage or alteration.