Focus on NC cutting height control field

HP105

Plasma Arc Voltage Torch Height Controller

Operation Manual

Vision：1705

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ATTN: Before Using HP105, read the Operation manual carefully.

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 us:

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.

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

1.5 Configuring the lifter mechanics

Proper configuration of the torch lifter 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 2000 mm/min (120 IPM). If higher accuracy is required, maximum suspension speed should be set to 1500 mm/min (60 IPM).

2. Brief Intro

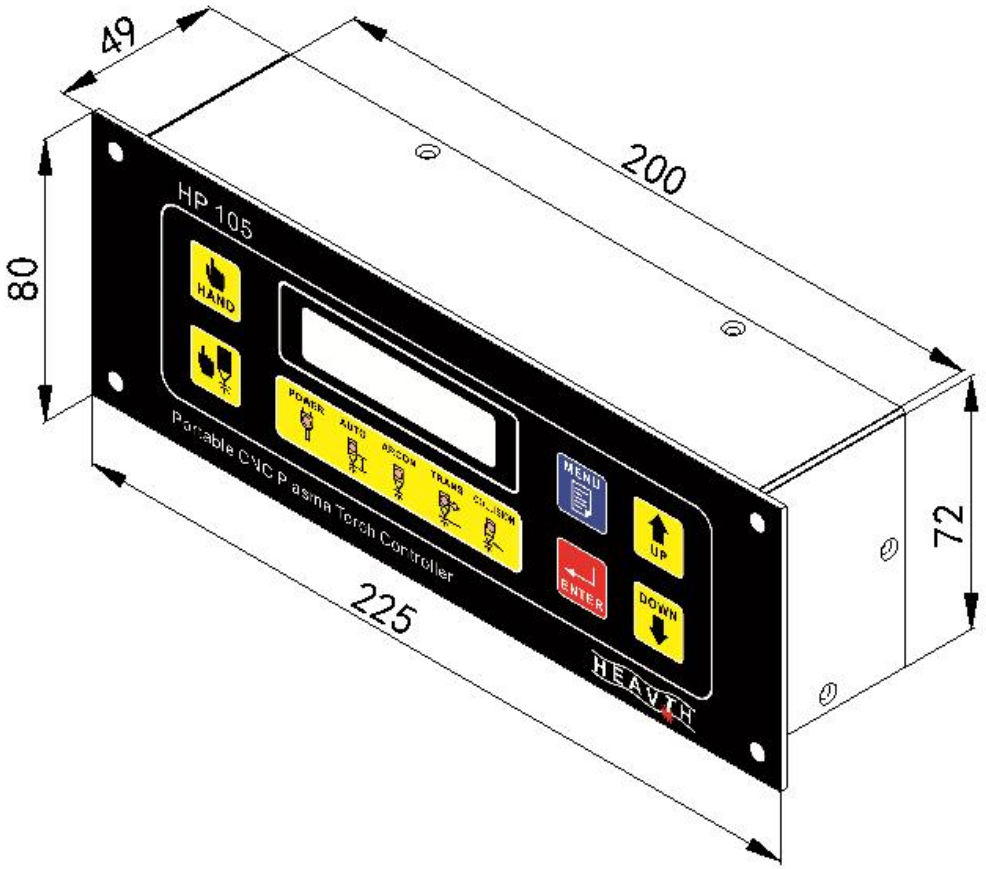
2.1 Summarize

HP105 torch height controller is equipped with constant current plasma. When the distance gets farther**,** the arc voltage increases; On opposite, the arc voltage will decrease. HP105 torch height controller will inspect the voltage change, then control the distance between cutting torch and material via the lift motor.

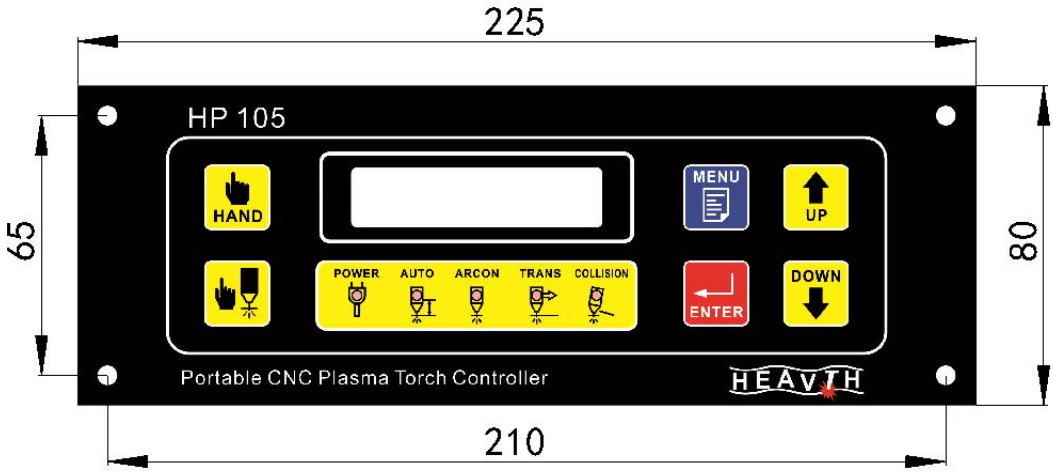
Generally, the instruction will list all the cutting parameters for some type of plasma. The user can refer to these parameters. Adjust the voltage in controller to match the selected current. The

torch height will keep constant under regular speed.

2.2 Dimensions：



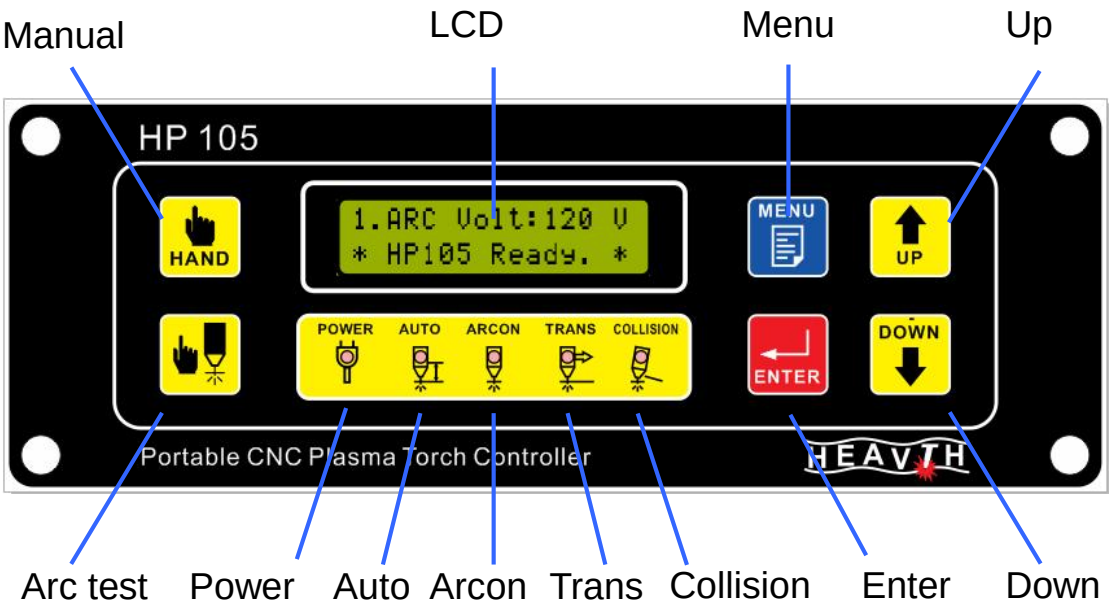
Mounting Hole Size：



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-2A.
- Working temperature: Height controller -10∽60℃
- IHS style: Switch inspecting IHS (suitable for all plasma both above-water and under-water cutting)
- Running transfer: Alternative Arc transfer and pierce transfer
- Input arc voltage:1:1 or 50:1
- Accuracy: ±1V∽±5V，adjustable
- Outer Dimension: Length, Width, 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.

Arc test: Arc test key is used for testing the plasma arc on.

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

When the parameter setting, Press to return to standby.

Enter: Parameter setting mode, confirm that the set parameters.

Up/Down: In standby mode, manual lifting torch.

When parameter setting, Increase or decrease parameter values.

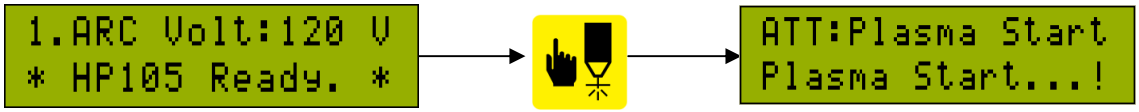
2.5 parameter settings

Automatic standby state, the LCD display stars are flashing, and cycles display the following parameters:

1. Arc voltage 2. IHS Time 3. Pierce Delay

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

Standby mode, press arc test, Start Plasma test:

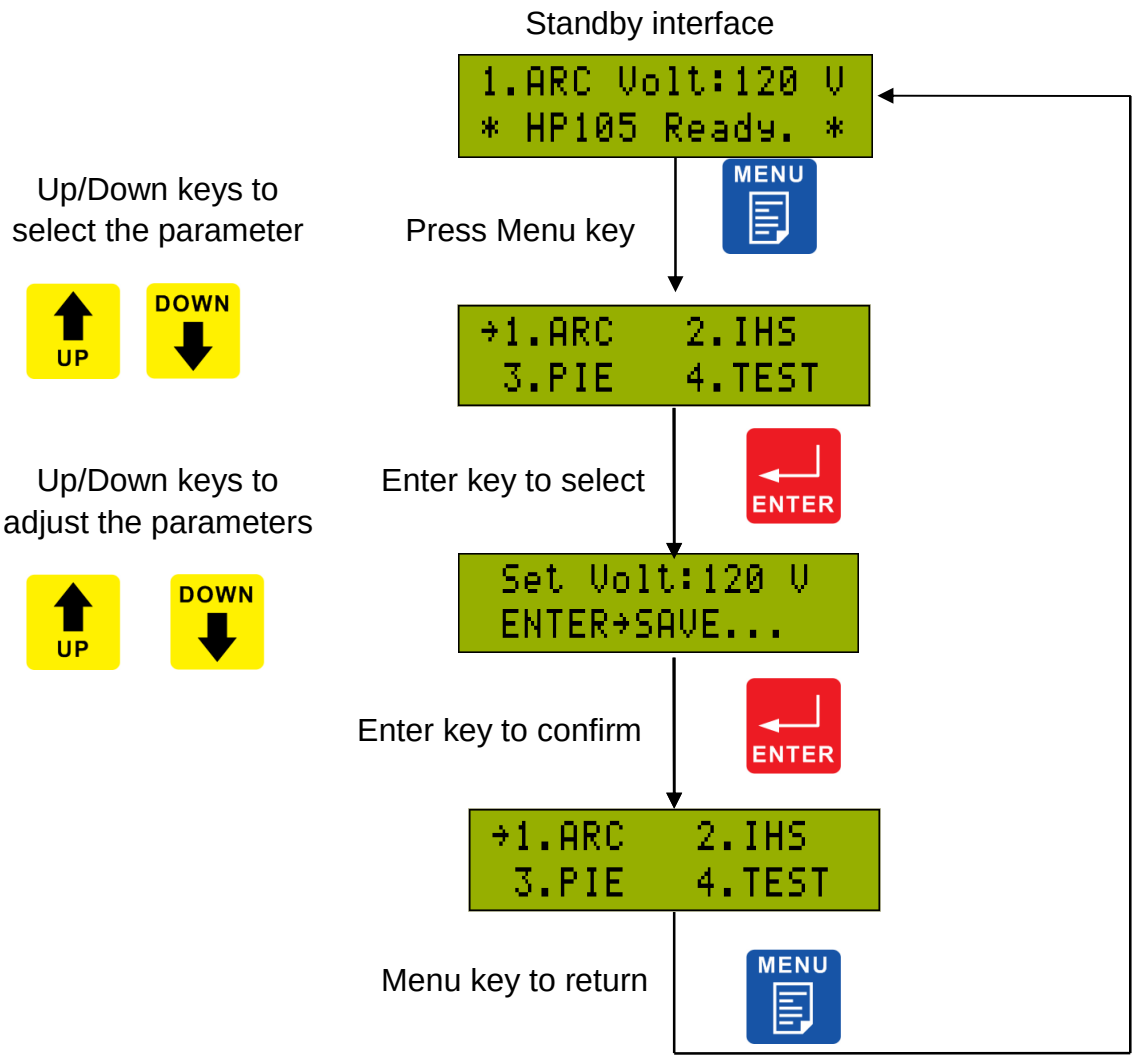


Standby mode, press the Menu key, select 4, press the Enter key to enter the HIS height test mode:

Set Arc Voltage:

This parameter is set the height of plasma torch in automatically cutting.

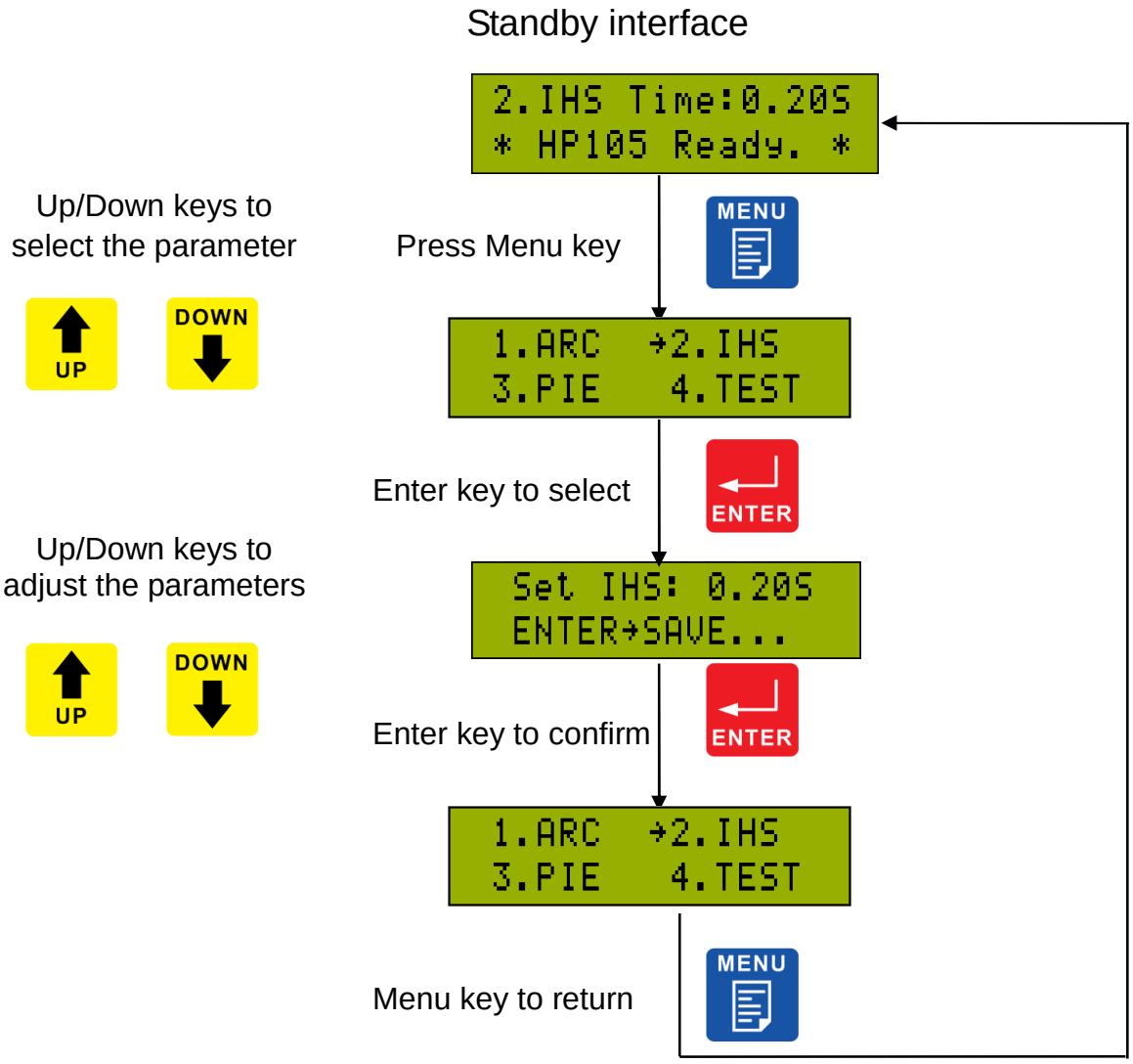
Set larger arc voltage value, Torch height becomes higher. Set small arc voltage value, Torch height becomes lower.



Set IHS time:

This parameter sets the Initial height of starting arc.

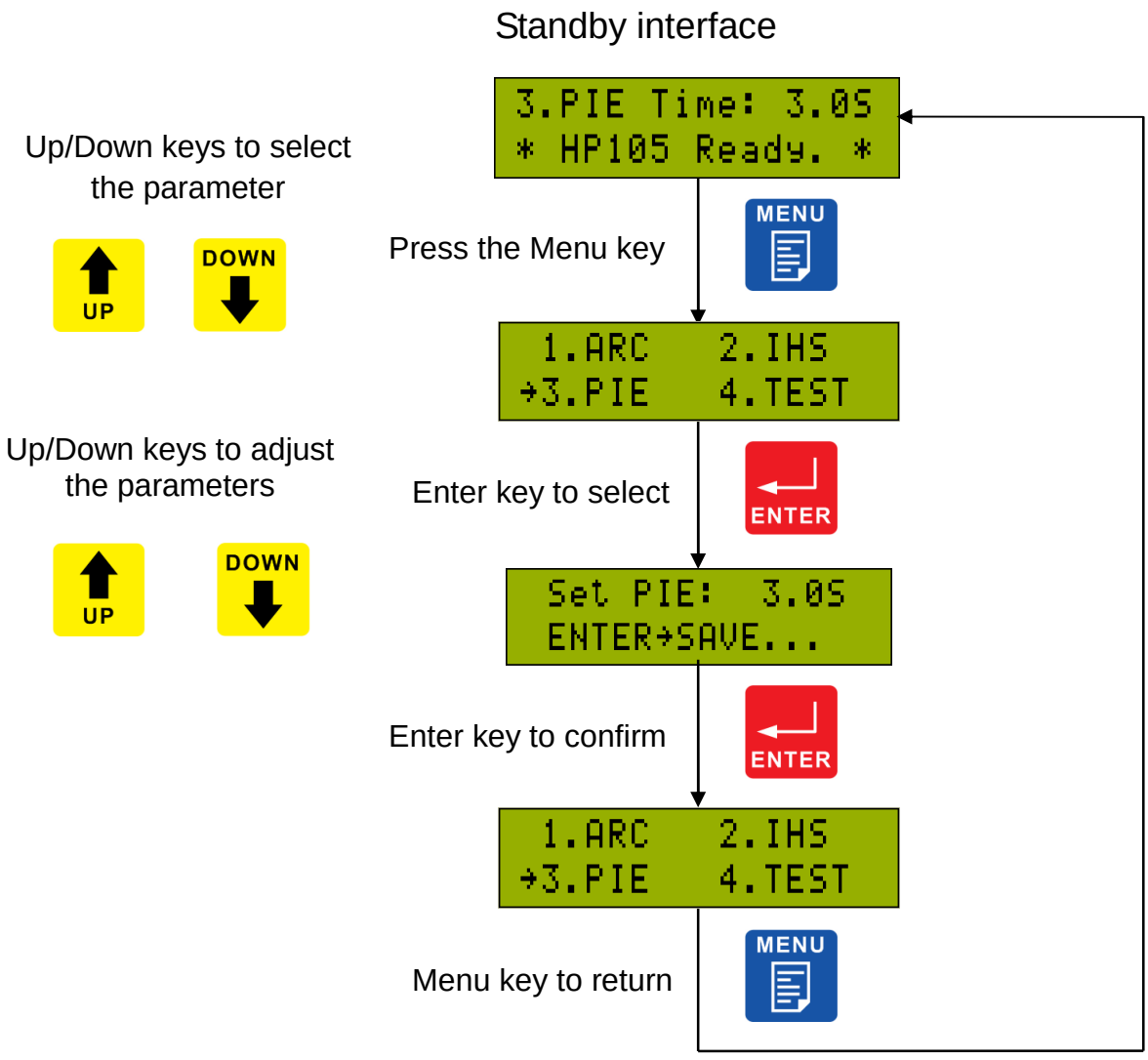
Set larger IHS time, the initial height of starting arc is higher. Set smaller IHS time, the initial height of starting arc is lower.



Set pierce time:

This parameter is set torch pierce time, set according to the thickness of the work piece.

Set larger pierce time, the delay of start cutting is longer. Set smaller pierce time, the delay of start cutting is shorter.



3. Installation and commissioning

3.1 Work process:

When CNC system's output cut signal to the HP105's interface J2-4, the height controller should process the IHS firstly; Then auto-control the plasma Arc-on, the height controller will send the signal of arc transfer or pierce transfer to the CNC 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 CNC system has sent out AUTO height adjusted signal, the controller is on status of "Height Auto adjusted"

3.2 Installation controller:

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.

2. Attach the wires from the CNC, the plasma, the lifter motor 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.

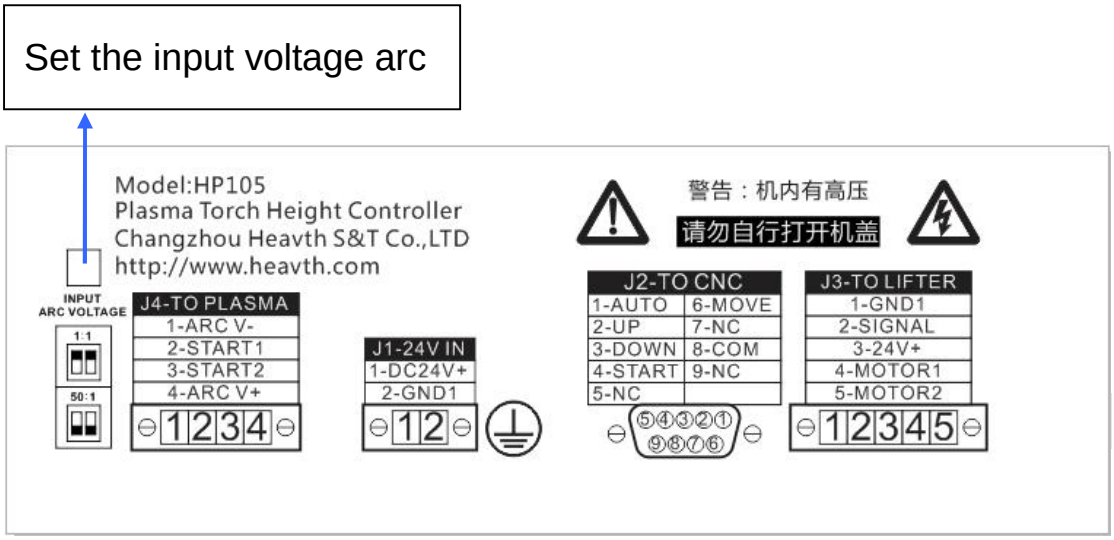
3. Connect a 12 AWG (2.5 mm2) ground wire to the ground

screw located on the control box and then, to the machine ground rail of your cutting system.

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.

The controller built-in isolation divide circuit default input 1:1 arc voltage (The divide ratio is 100: 1) If some plasma included 50: 1 non-isolated circuit can set the controller input of 50: 1 (The divide ratio is 2: 1).



IHS introduction

Proximity switch IHS style(switch model: NPN, 2mm, outer diameter Φ12)

When this style is adopted, All the plasma IHS, whatever over-water cutting and under-water cutting, can adopt this IHS style. Please adopt the Proximity switch IHS style if you use the high frequency arc plasma and under-water cutting.

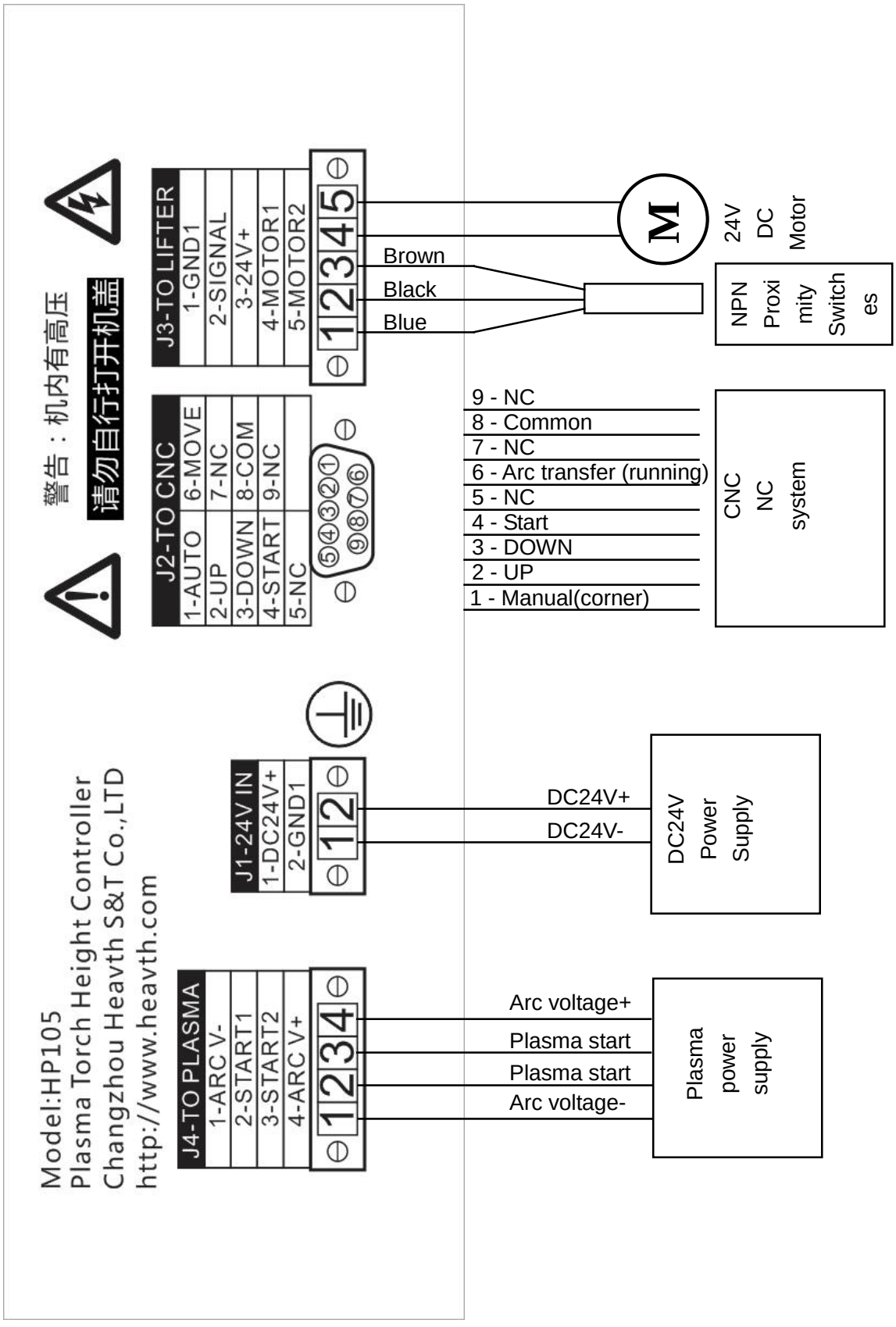
Before IHS, the Proximity switch is on approaching status. The cutting torch will rise once the switch is non approaching status.

Working process: After the height controller receives the arc-on signal which is sent out from NC system, the cutting torch will move down immediately. When the torch contacted 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	Function
J1	1	DC 24V +	input	Power supply.
	2	DC 24V -	input	
J2	1	Automatic signal (corner signal)	input	Switch Auto/manual (connected to com-manual) This logic can be change by parameter
	2	Manually UP	input	Torch UP (connected to com)
	3	Manually DOWN	input	Torch DOWN (connected to com)
	4	Start	input	Start IHS and cutting (connected to com)
	5	NC		
	6	Arc transfer / pierce transfer (machine running)	output	Control machine running
	7	NC		
	8	Signal com	Com	J2 port signal common
	9	NC		
J3	1	Proximity switch GND	output	Connected NPN type positioning proximity switches, 1-2 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 +24V	output	
	4	DC24V Motor	output	DC24V Motor, maximum 40W
	5	DC24V Motor	output	
J4	1	Arc voltage -	input	Plasma arc voltage -
	2	Start plasma	output	Plasma start signal.
	3	Start plasma	output	
	4	Arc voltage +	input	Plasma arc voltage +


警告：机内有高压
请勿自行打开机盖
Model:HP105
Plasma Torch Height Controller
Changzhou Heavth S&T Co.,LTD
http://www.heavth.com
J4-TO PLASMA
1-ARC V-
2-START1
3-START2
4-ARC V+
J1-24V IN
1-DC24V+
2-GND1
J2-TO CNC
1-AUTO
6-MOVE
2-UP
7-NC
3-DOWN
8-COM
4-START
9-NC
5-NC
J3-TO LIFTER
1-GND1
2-SIGNAL
3-24V+
4-MOTOR1
5-MOTOR2
Brown
Black
Blue
M
24V DC Motor
NPN Proximity Switches
9 - NC
8 - Common
7 - NC
6 - Arc transfer (running)
5 - NC
4 - Start
3 - DOWN
2 - UP
1 - Manual(corner)
CNC NC system
DC24V+
DC24V-
DC24V Power Supply
Arc voltage+
Plasma start
Plasma start
Arc voltage-
Plasma power supply

Arc voltage input attention:

The controller included isolation arc voltage divider board default input the actual arc voltage. For some plasma which included 50:1 non-isolated divider board can be set to 50: 1.

1. Do not connect to the ground clamp and the torch cable of plasma.

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

3. Plasma power and arc voltage height control must be strictly connected to ground. Check ground and torch height before start cutting.

4. High frequency arc plasma power: Its arc voltage must be taken from before the high-frequency circuit and inductor. Should be connect to the position of the rectifier output.

5. Any control cables should be as far away from torch cable wiring (5cm above).

In parameter setting screen, Hold UP and DOWN at the same time more than three seconds, into the hide parameter setting.

NO.	Parameter name	Parameter meaning	Factory Settings
1	MAX_PWM	Maximum pulse width	120
2	MIN_PWM	Minimum pulse width	30
3	IHS_UP	Torch IHS up speed	100
4	IHS_DOWN	Torch IHS down speed	100
5	HAND_PWM	Manual up/down speed	120
6	ARCV_ERR	Arc voltage overrun protact	020
7	EN_BREAK	Motor brake enable	01
8	PWM_AMP	Automatic sensitivity	005
9	UP_BREAK	Motor brake of up	030
10	DN_BREAK	Motor brake of down	080
11	EMG_LIFT	Emergency lift time	020
12	EMG_ PWM	Emergency lift speed	120
13	ADJ_RANGE	Arc voltage intelligent adjusting range	015
14	ADJ_STEP	The step of arc voltage intelligent adjustment	002
15	ADJ_EN	Arc voltage intelligent enable	000
16	ARC_ACC	Arc voltage accuracy	01
17	PEI_EN	Pierce time enable	01
18	AUTO_UP	After the cutting torch lifting	10
19	ERR_STOP	Stop cutting when arc voltage anomalies	00
20	DELAY_IN	Arc voltage input time	05
21	0/1CORNER	Corner signal 1/0	00
22	LANGUAGE	Chinese or English	00
23	RESET(18)	Adjust to 18 reset default parameters	00

5. Trouble shooting

No	Fault	Cause	Action
1	The motor does not run or run in one direction	The fuse of Motor output maybe damaged	Replace the fuse and check the DC motor and lifter.
		The MOS which damaged one of the driving motor	One of the IR640N maybe damaged
2	Plasma arc voltage tracking is unstable	1. Check the arc voltage from plasma. 2. The sensitivity maybe set too high. 3. Torch lifter’s speed is too fast.	
3	Can not start the plasma arc	1. Confirm plasma power in working condition. 2. Check the torch height is correct. 3. Check the torch parts.	
4	Auto model: The torch Collision workpiece	1. Increase the "Set arc voltage." 2. Check the corner signal form CNC.	
5	Auto model: The torch always lift	1. Set arc voltage is too high. 2, No arc voltage input or arc voltage input positive and negative reversed.	