Focus on CNC cutting height control field

HP130P

Portable Arc Voltage Torch Height Controller

Operation Manual

Vision：1903



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ATTN: Before using HP130P, Please read the operation manual carefully.

1. Important information

1.1 Service assistance and contact information

For service assistance, have the following information available:

• HP130P model, part and serial number located on a label

• Type of cutting application you are using

You can contact us:

Tel: 086-0519-89182619

Fax: 086-0519-89183619

1.2 Receiving and unpacking

After receiving the HP130P 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 HP130P:

• 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 HP130P 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

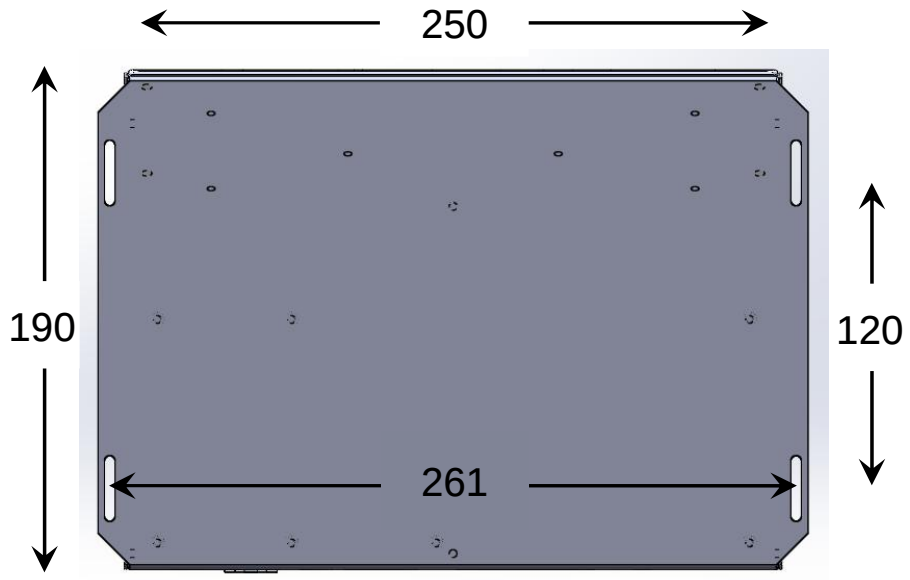
2.1 Summarize

HP130P torch height controller is equipped with constant current plasma source. When the distance gets farther**,** the arc voltage increases; On opposite, the arc voltage will decrease. 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

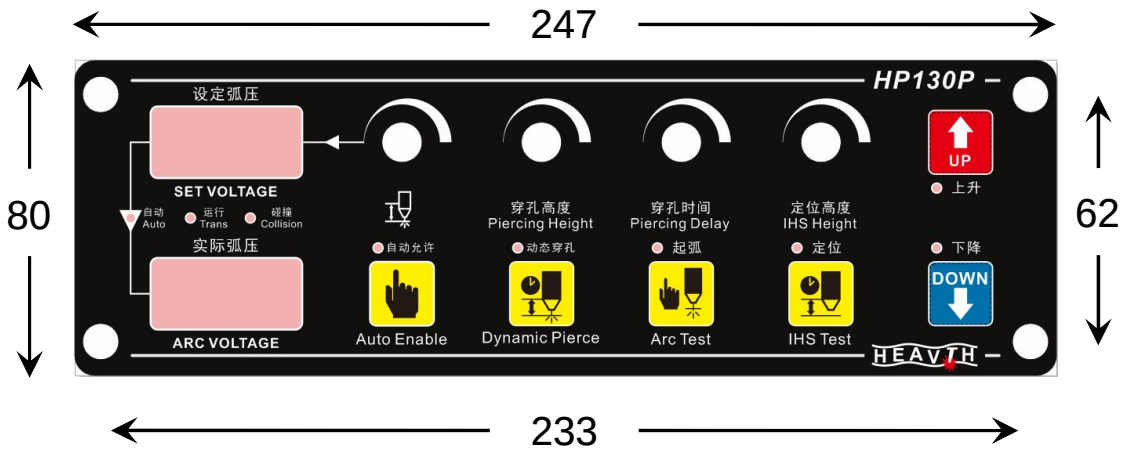
torch height will keep constant under regular speed.

2.2 Dimensions：



Size: 250mm×190mm×71mm

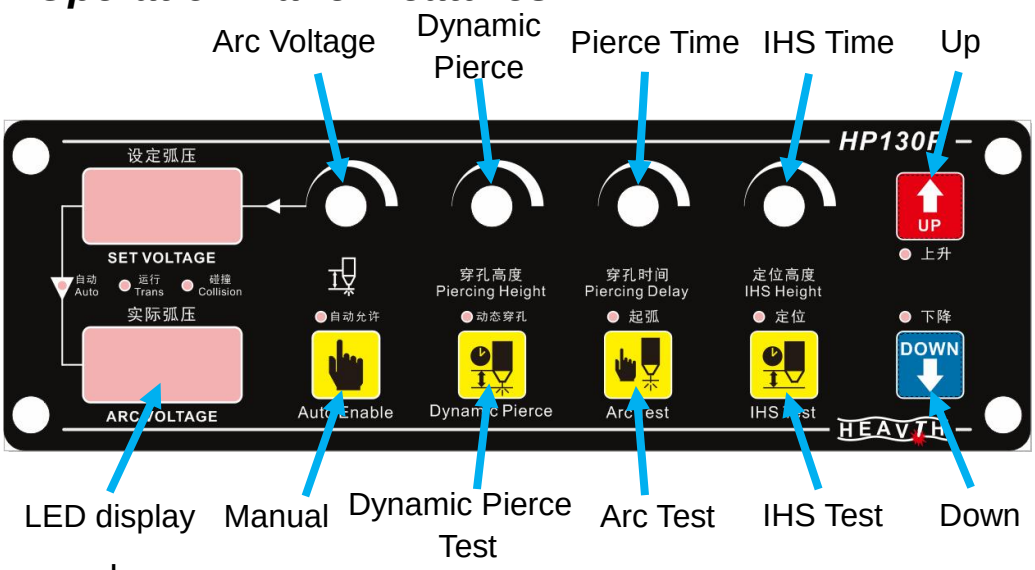
Panel Size：



2.2 Technical parameter

- Working Voltage: DC24±10%，Please prepare a isolated power, do not shared with others such as electronic valve .
- Lifter motor: DC24V DC motor
- Drive mode: PWM H-bridge
- Output current：2.5A
- Working temperature: -10∽60℃
- IHS style: Switch inspecting IHS
- Running transfer: Alternative Arc transfer and pierce transfer
- Divide board Input arc voltage:1:1 or 50:1
- Accuracy: ±1V∽±5V，adjustable
- Dimension: Length, Width, Height: 250mmX190mmX71mm
- Weight：1.8kg
- Protection class: IP64, to prevent dust entering.
- Installation connector: 5-pin, 7-pin, 10-pin
- Installation position: Keep away from heat, air convection good place.

2.4 Operation Panel Features



Error code：

E01：Communication error between panel and main board
E02：CNC corner signal error. This logic can be change by P12
E03：Input arc voltage too small. Arc voltage<30V
E04：Input arc voltage too big. Arc voltage>300V
E05：Over arc voltage protection. Arc V – Set V > P16(Arc V Err)
E06：Up limit switch trigger. This logic can be change by P13
E07：Down limit switch trigger. This logic can be change by P13
E08：Up/down limit switch trigger

Manual: Auto / Manual mode selection.

Dynamic Pierce Test: Testing the Dynamic pierce height

Arc Test: Testing the plasma arc on.

IHS Test: Testing the torch arc start height.

Set Arc Voltage: Set the tracking arc voltage, press 3s to enter the hide parameter setting mode.

Up/Down: In standby mode, manual lifting torch. When parameter setting, Increase or decrease parameter values.

2.5 Parameter settings

At standby state, the LED display set voltage.

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

Set Arc Voltage: 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 Dynamic Pierce: Set torch pierce height, set according to the thickness of the work piece. Set larger, the height of torch pierce is higher. Set smaller, the height of torch pierce is lower.

Set IHS time: 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: Set torch pierce time, set according to the thickness of the work piece. Set larger, the delay of start cutting is longer. Set smaller, the delay of start cutting is shorter.

Set hide parameter: Standby mode, press Arc Voltage knob 3s, enter the hide parameter set model, press up/down key to choose the parameter, press IHS test to enter the parameter. press up/down key Increase or decrease parameter values

3. Installation and commissioning

3.1 Work process:

When CNC system's output cut signal to the HP130P's interface J1-4, 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 meantime, the controller delay time to put the arc voltage into the MCU chip. 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 HP130P some of the steps direct you to other sections in this manual that provide you with more detailed instruction.

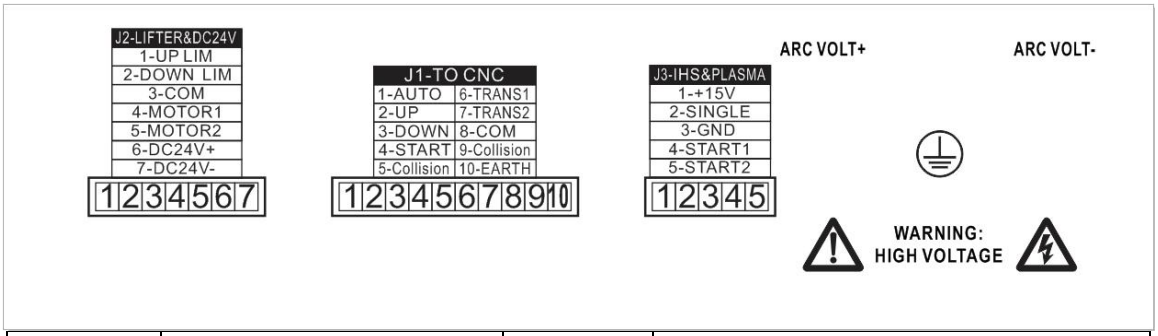
1. Determine a mounting location for the HP130P.

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

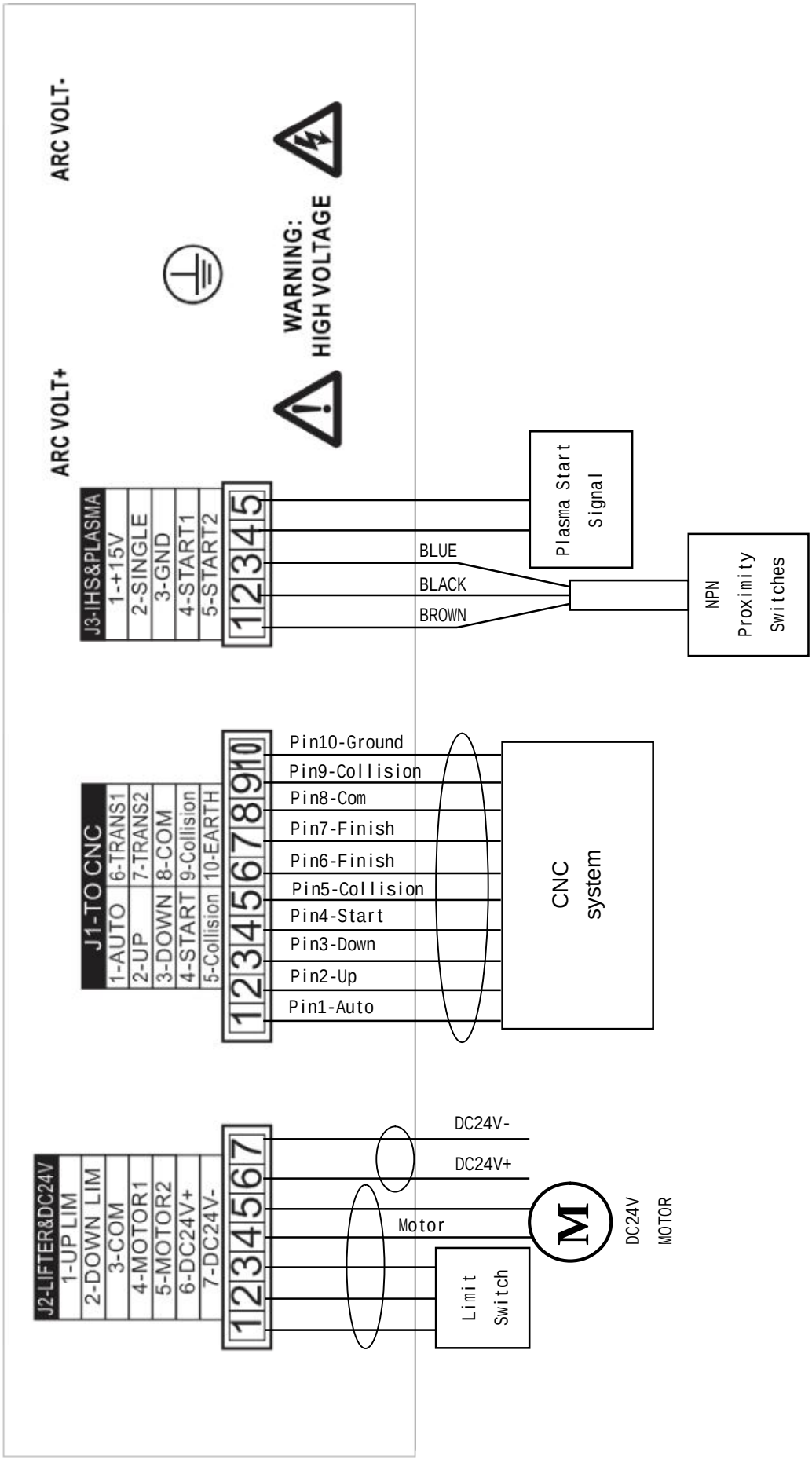
screw located on the control box and then to the machine ground rail of your cutting system.

3.3 Interface circuit:



Interface		Signal	Input/ Output	Function
J1	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	Crash signal	Output	When torch collision, this pin connect to com (Max50mA)
	6	Arc transfer / pierce transfer	Output	After pierce complete, 6-7 pin connected (Max2A)
	7	Arc transfer / pierce transfer	Output	After pierce complete, 6-7 pin connected (Max2A)
	8	Signal com	Com	J1 port signal common
	9	Crash signal	Input	Same as Pin5
	10	Ground	Ground	Controller Ground
J2	1	Up limit switch	Input	Torch UP limit (connected to com)
	2	Down limit switch	Input	Torch Down limit (connected to com)
	3	Signal com	Com	J2 port signal common

	4	Motor1	Output	Connect to lifter DC motor (Max:100W)
	5	Motor2	Output	
	6	DC 24V +	Input	Power supply.
	7	DC 24V -	Input	
J3	1	Proximity Switch +24V	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 GND	Output	
	4	Start plasma	Output	Plasma start signal.
	5	Start plasma	Output	


ARC VOLT-
ARC VOLT+
WARNING:
HIGH VOLTAGE
J3-IHS&PLASMA
1-+15V
2-SINGLE
3-GND
4-START1
5-START2
1 2 3 4 5
Plasma Start Signal
BLUE
BLACK
BROWN
NPN Proximity Switches
J1-TO CNC
1-AUTO
2-UP
3-DOWN
4-START
5-Collision
6-TRANS1
7-TRANS2
8-COM
9-Collision
10-EARTH
1 2 3 4 5 6 7 8 9 10
Pin10-Ground
Pin9-Collision
Pin8-Com
Pin7-Finish
Pin6-Finish
Pin5-Collision
Pin4-Start
Pin3-Down
Pin2-Up
Pin1-Auto
CNC system
J2-LIFTER&DC24V
1-UP LIM
2-DOWN LIM
3-COM
4-MOTOR1
5-MOTOR2
6-DC24V+
7-DC24V-
1 2 3 4 5 6 7
DC24V-
DC24V+
Motor
M
DC24V MOTOR
Limit Switch

Isolation 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. 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

Inductive proximity switch IHS style(switch mode: NPN Mode, 2mm, diameter Φ12, 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.

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 CNC 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.

The approach switch is connected to the height controller via the SWITCH-IHS aviation socket.

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	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	Crash signal	output	When torch collision, this pin connect to com (Max500mA)
	6	Arc transfer / pierce transfer	output	After pierce complete, this pin connect to Pin7 (Max2A)
	7	Arc transfer / pierce transfer	output	After pierce complete, this pin connect to Pin6 (Max2A)
	8	Signal com	Com	J1 port signal common
	9	Crash signal	output	When torch collision, this pin connect to com (Max500mA)
	10	Erath	Erath	
J2	1	Up limit switch	input	Torch UP limit (connected to com)
	2	Down limit switch	input	Torch Down limit (connected to com)
	3	Signal com	com	J2 port signal common
	4	Motor1	output	Connect to lifter DC motor (Max:60W)
	5	Motor2	output	
	6	DC 24V +	input	Power supply.
	7	DC 24V -	input	
J3	1	Proximity Switch +24V	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 GND	output	
	4	Start plasma	output	Plasma start signal.
	5	Start plasma	output	

In standby state, press arc voltage knob 3 seconds, enter hide parameter setting, press up/down choose parameter, press IHS test key to enter parameter. Then press up/down adjust parameter.

NO.	Parameter name	Parameter meaning	Factory Settings	Range
P01	MAX_PWM	Maximum pulse width (%)	95	5~95
P02	MIN_PWM	Minimum pulse width (%)	10	5~95
P03	IHS_UP	Torch IHS up speed (%)	70	50~95
P04	IHS_DOWN	Torch IHS down speed (%)	80	30~95
P05	HAND_PWM	Manual up/down speed (%)	90	5~95
P06	ARCV_ERR	Arc voltage overrun protact (V)	50	5~100
P07	PWM_AMP	Automatic sensitivity	05	1~10
P08	ADJ_RANGE	Arc voltage intelligent adjusting range(V)	15	5~30
P09	ADJ_STEP	The step of arc voltage intelligent adjustment(V)	00	0~5
P10	ARC_ACC	Arc voltage accuracy(V)	01	1~5
P11	AUTO_UP	After the cutting torch lifting 0.1S	10	0~50
P12	0/1CORNER	Corner signal logic 1/0 1-Normal close, 0-Normal open	00	0/1
P13	0/1Limit switch	Limit switch logic 1/0 1-Normal close, 0-Normal open	00	0/1
P14	Delay_Input	Pierce height 0.1s	00	0~45
P15	Pierce_delay	Dynamic Pierce delay 0.1s	02	0~20
P16	Reset	Reset all hide parameter	00	0/8

Press arc voltage knob 3 seconds to return to standby state.

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 mode: The torch Collision work piece	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.	

Packing List

HP130P Portable Arc Voltage Height Controller

No.	Name	Number	Detail
1	HP130P Controller box	1	
2	Plugs	3	2 Pin 7 Pin 10 Pin
3	Operation Manual	1	
4	DC motor lifter		Option
5	Anti-Collision Clamp		Option
6	Proximity switch		Option

- 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.

Packer：_____ Inspector：_____ Date：_____