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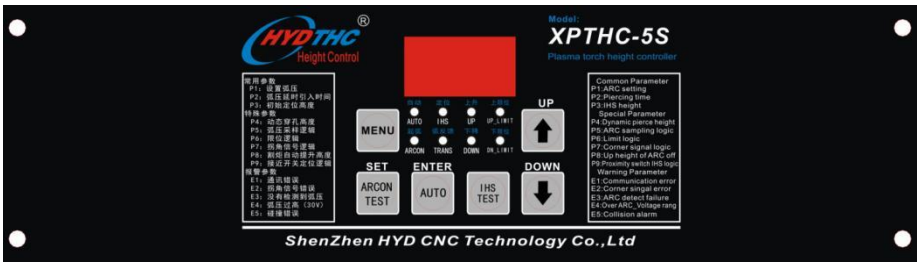
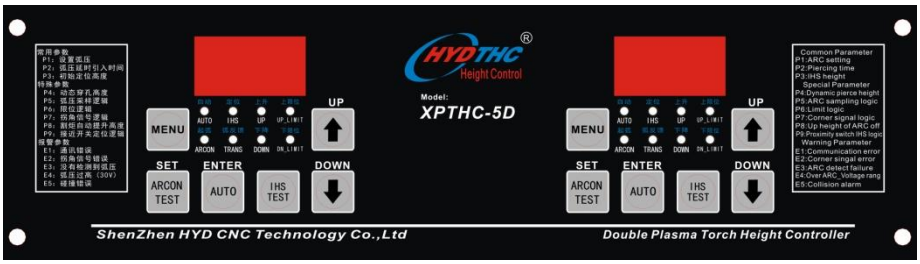
XPTHC-5

Arc Voltage Plasma Height Controller





ShenZhen HongYuDa CNC Technology CO.,LTD

Please read this manual fully before use

SAFETY：

- Please read this manual fully before use XPTHC-5
- DO NOT open cabinet of THC unless trained technician.
- DO NOT adjust the sealed resister.
- Turn off Powersupply if when THC is unused.
- DO NOT put liquid on THC.
- Attention Anti-dust work, DO NOT let metal dust into THC.

Installation Note：

- **Power supply: AC 24V or DC 24V**
- Please offer the enough power supply: usually, 25W motor, the current couldn't be less than 3A, the AC24V transformer couldn't be less than 50W.
  Power supply= 2*motor's power + 10W
- GND Must follow THC instruction, GND resister≤4Ω。
- UP/DOWN on THC must be same to Z-axis Lifter
- To avoid interference, follow cables please use shield cable(connection between CNC controller and THC, to motor, to voltage divider, to IHS card), especially the cable from THC to voltage divider, please use shield twisted pair cable, and shield net connected at THC side.
- Please don't install the THC near by heat source , the normally work temperature range is -10℃～60℃.
- The plasma raw arc couldn't connect to the THC directly, must connect to the voltage divider correctly.

To Customer：

- **We only supply to re-seller as CNC cutting machine manufacturer, engineering company… end-user please contact our local distributor for product supplying.**
- **We offer technical support to all distributors and users of our product.**

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IMPORTANT NOTE：

All our THCs have been tested on CNC cutting machine in our workshop before delivery, all commissioning work was done. Please DO NOT change the setting without informing your supplier.

ShenZhen HYD CNC Technology CO.,LTD

Table of Contents

1、Brief Info

1.1 、Product name and model

Arc voltage torch height controller (THC)

Model: XPTHC-5 (Include XPTHC-5S: Single plasma THC , XPTHC-5D : Double plasma THC)

1.2、Application

XPTHC-5 supports almost all plasma cutters on market like Hypertherm, Thermal Dynamics…

And it supports all CNC cutting controllers on market like Hypertherm, Burny industrial level controllers or Mach3 such DIY controllers, because XPTHC-5 can start Auto Height control with or without Auto enable signal from CNC. But with Auto enable/disable signal from CNC, THC would work better.

1.3 、Basic Parameter and Feature

Input Power：AC24V+10%，50Hz/60Hz or DC24V±20%;

Motor：DC24V DC motor;

Motor Drive：PWM;

Output current：0.34A-4A;

Load capacity：Max 100W；

Working temperature：-10∽60℃；

IHS：Switch IHS & Proximity switch IHS & Retaining cap IHS.

Work way: check the arc enable output, 200mA optical coupler OC door output

Voltage Divider ratio: 50:1 non-isolation on voltage divider; 1:1 isolation inside of THC, also can choose isolation on voltage divider.

Control accuracy ：<±1V，depends on the motor and lifter of user.

The speed of lifting：2000mm/min ∽ 6000mm/min(Contact the supplier if it exceeds the range of speed)；

Arc Voltage rang：50V∽250V，

Over protection：PWM adjusting, current feedback；

Special control method: Arc AGC control (Auto gain control)

Max speed test：24000mm/min（ it's related to the setting on the lifter's speed and motor's start voltage and sensitivity)

XPTHC-5 is the newest design THC, special for table type and gantry beam CNC cutting machine with 32 ARM processors, and analogous circuit height control together.

Feature:

1, installation: user could install the THC's operation panel on the work interface, or install it at the

convenient operation place. Install the main body at a suitable station.

2, height controller: could change the auto cutting height at any time

3. Raised by DC motor, use sampling arc volt mode can realize the straight groove cutting function.

4, two modes of the setting arc volt: can setting via P5.

A, Setting arc volt mode: set the setting arc volt on the operation panel, let the THC work on the setting arc volt status. It's the traditional work way.

B, sampling arc volt is the setting arc volt: when the THC control the torch finish the HIS and plasma start, and CNC controller open the AUTO signal to THC, and THC will test the arc value as the setting arc when at beginning the AUTO status. It's suitable for some small plasma .and the groove cutting.

5, High Sensitivity: use AGC control method, to realize the high precision control of DC motor,The accuracy is close to the control precision of the servo motor, and the arc voltage change 3V can reach the maximum output voltage.

6, Good stable: XPTHC-5 has 4 sets isolation power inside, to realize the I/O isolation; sampling arc volt isolation; drive isolation; and control isolation.

7.Auto double speed IHS : if user set arc interruption height more than 6 . During IHS, it will divided the speed to be fast and slow version ,and the low speed must be close to the location of the steel plate.

1.4、Components and installation

1.4.1 Components：XPTHC- includes the follow parts：

1.Control module, as figure 1-1

Figure1-1:control module size

Figure 1-2

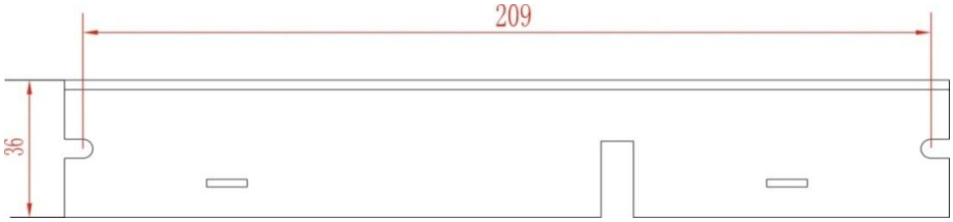


Figure 1-3

2、Operation panel and installation size as figure1-4 and 1-5, 1-4 is the single plasma operation panel , 1-5 is the double plasma operation panel, the size are same.

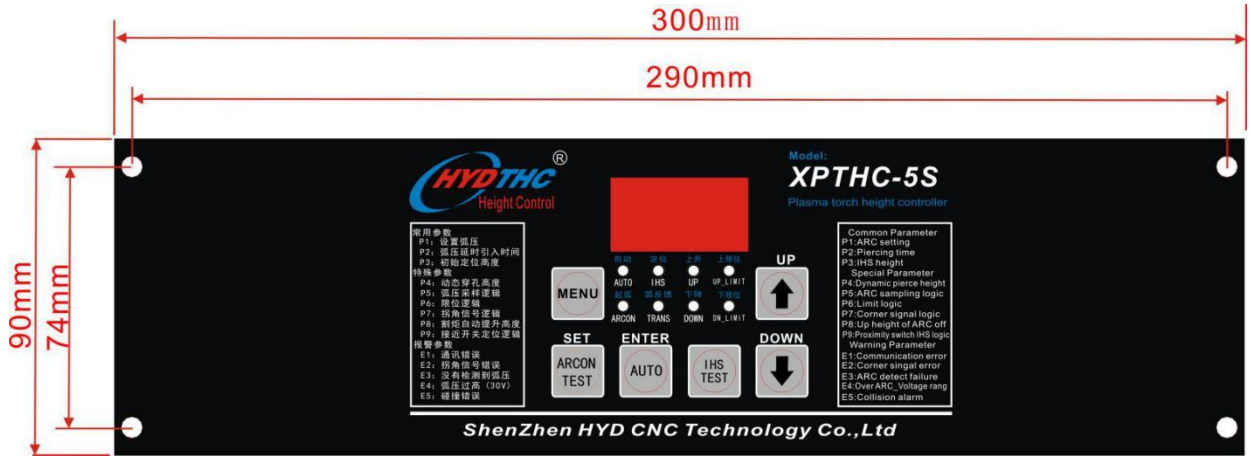


Figure 1-4：Single plasma operation panel

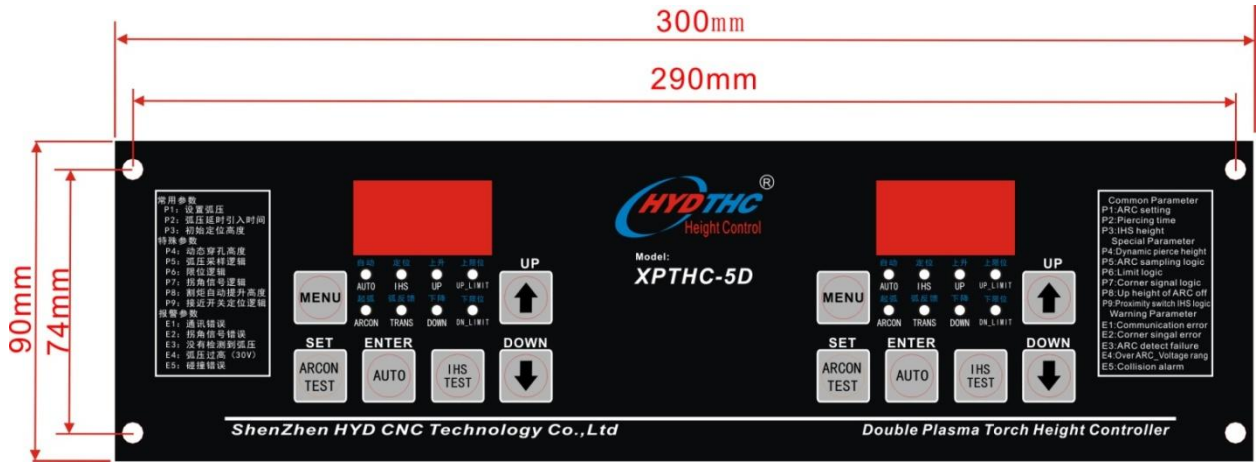


Figure 1-5：Double plasma operation pane

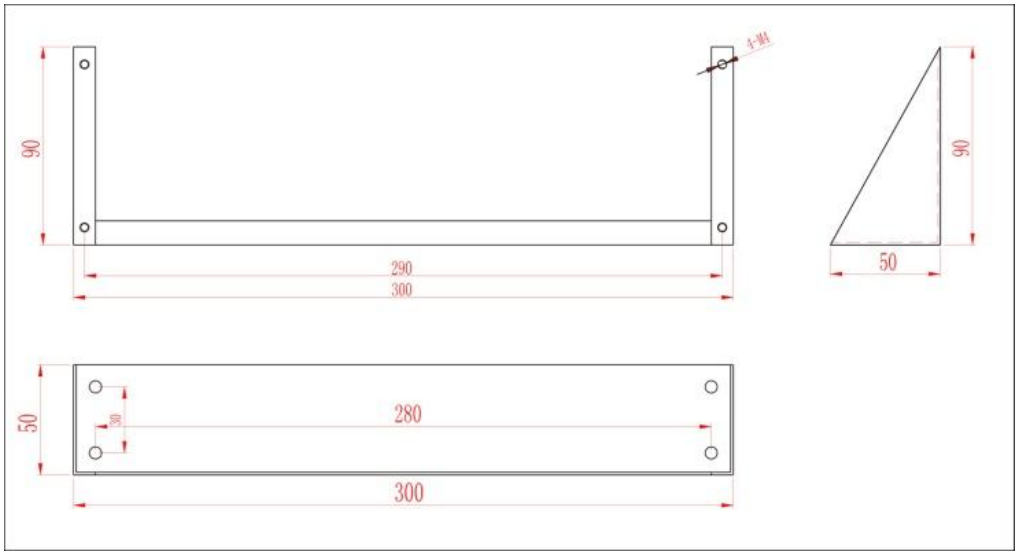


Figure 1-6：Installation size

3、Arc voltage divider：as figure1-6，voltage divider ratio:50:1,non-isolation on voltage divide, the isolation inside of the THC, Arc voltage divider could install in control system cabinet, the cable of it must be use shield cable , and can add the length accordingly.

Figure1-7：Arc voltage divider

4、Isolation IHS controller:as figure 1-8 it install in the top of the lifter , convienience to connect the touchedcontact IHS cable and proximity switch IHS cable.

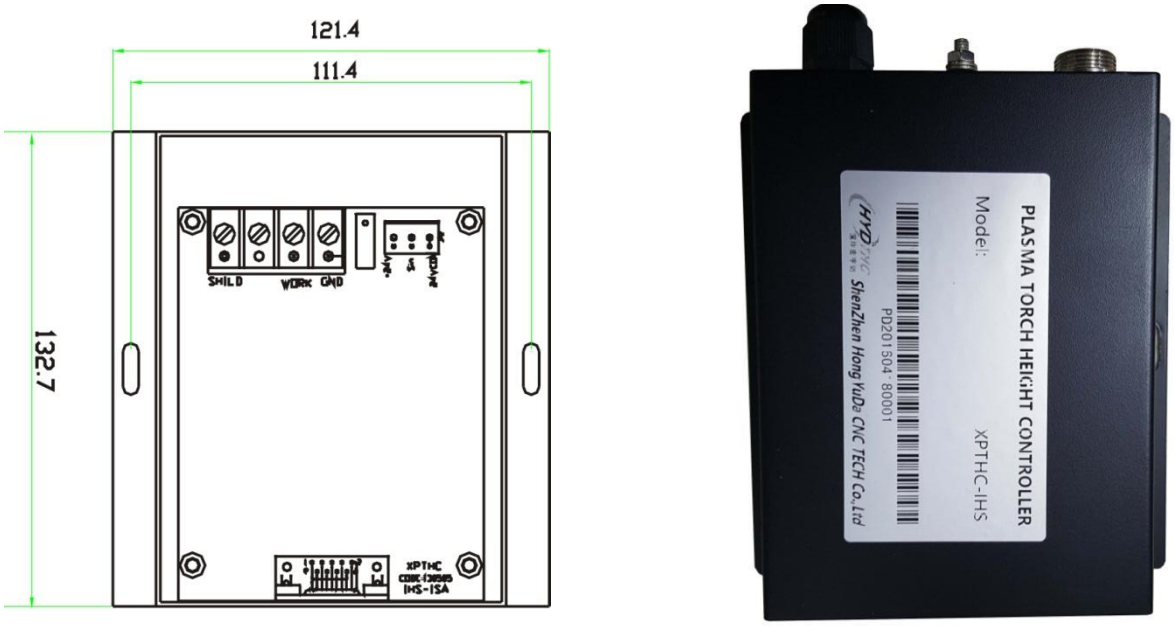


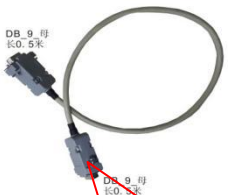
Figure 1-8：Isolation IHS controller

5、HV retaining cap cable：as 1-9：the red cable port connect with the retaining cap or nozzle of the torch , the black cable port Connect with the Isolation IHS controller ,
HV retaining cap cable can isolation 15KV high pressure.

Figure 1-9：HV retainincap cable

Accessories：as figure 1-9：

1.To isolation IHS controller,marked: **PTHC-IHS-** , Length:10m



2.To Arc voltage divider, mark:**PTHC-ARC-** Length :0.6m

3,From main moudle to operation panel mark : **PTHC-PAN**-length :6m,one port is B9(male),another port is DB9(Female)

4.To CNC control system Mark:**PTHC-CNC-** Length:5m

5.IHS proximity switch;**NPN** diameter is 16mm

Figure1-10：Standard cables for XPTHC-5

2、XPTHC-5 Function and Setting

◆ **Auto working process:**

CNC send arc start signal to THC---THC start IHS automatically----Arc start---THC find divided arcvoltage in THC-------Pierce time delay----Pierce completed---CNC received arc ok signalfrom THC ------ Plasma then start Motion----over 90% full speed, CNC enable THC's automode----Cycle ends and arc off, Torch lift up to programmed height.(Note：there is no dynamic pierce function under sample mode**)**

◆ **Auto initial height sensing(IHS)**

Touch Switch IHS and Proximity switch IHS.

Please note:XPTHC-4 it's not suitable for the touch retaining cap IHS .

A、Retaining cap IHS or nozzle IHS（Setting via P0 to choose retaining cap or nozzle ）

XPTHC-5 retaining cap IHS,During auto initial height sensing(IHS), it is activated when torch goes down to touch the work piece, and THC will let the lifter go up to the setting IHS height, then IHS finished.

B、Proximity switch

XPTHC-4 adopts NPN proximity switch IHS, Normally open or Normally closed could be set by P9 parameter.

During IHS, when torch goes down to touch the cutting material, the proximity switch takes off the proximity point, and send out the signal, then THC makes the torch go up to the IHS height(which is set by P3 parameter). When the proximity switch is always at the taking off status, the torch will go up with max speed to the Up limit position. In this way, it has the anti-collision function to protect the torch.

◆ **Setting arc volt and actual cutting volt display function**

Before plasma arc, it shows the setting arc volt; After arc start and detected the arc signal, and pierce delay, then it shows the actual cutting volt.

When during cutting, press the "MENU" button to check the setting arc volt.

◆ **Adjust the cutting height function**

A, Setting arc volt mode: set the setting arc volt on the operation panel, let the THC work on the setting arc volt status. It's the traditional work way.

B, sampling arc volt is the setting arc volt: when the THC control the torch finish the HIS and plasma start, and CNC controller open the AUTO signal to THC, and THC will test the arc value as the setting arc when at beginning the AUTO status. It's suitable for some small plasma .and the groove cutting.

◆ **Adjust the cutting height function**

During the auto work, pressing the "UP" and "DOWN" button on the operation panel to change the setting arc volt. Setting arc voltage changes 1V within 0.3 second button press; changes

5V over 0.5 second button press. Changing the setting arc voltage means changing the cutting height.

◆ **Torch lifter after cutting**

After finished the cutting, THC will control torch to go up, up height is set by P8 parameter.

◆ **Arc voltage enable output(piercing completed output)**

It delays the signal via setting the P2 parameter on operation panel. This signal is test by arc voltage signal. The arc enable signal is using 200mA optical coupler OC door output, it could connect to the CNC's ARC enable directly.

◆ **Arc voltage enable output(piercing completed output)**

It delays the signal via setting the P2 parameter on operation panel. This signal is test by arc voltage signal. The arc enable signal is using 200mA optical coupler OC door output, it could connect to the CNC's ARC enable directly.

◆ **Anti-collision function**

When THC stops work, it'll send the collision signal within 0.2 second if any material touches the torch and actives the proximity switch.

During auto work, except for IHS, it'll send the collision signal within 0.2 second if any material touches the torch and actives the micro switch or proximity switch. The collision signal is using 200mA optical coupler OC door output, it could connect to the CNC's collision input directly.

◆ **Offering E1 to E5 warnings**

E1：Communication error

E2：Corner signal logic setting error

E3：ARC detect failure

E4：Over-voltageprotection (actual arc voltage - setting arc voltage> 30V), it works at the setting arc volt mode, doesn't work at the sample arc volt mode.

E5：Collision warning

2.1、 XPTHC-5 operation panel and key button description

2.1.1、operation panel function

as Figure2-1 shows:

MENU）：

1、 Work in stop status:
Press and hold it 2s to setting common parameters; press and hold it 4s to setting special parameters.

2、 THC Auto work status: press and hold it to show the setting arc voltage.

1、 Setting status: Press it to 。

Display：

1、 Work in stop status: showthe setting arc voltage

2、 THC Auto work status: show the actual arc voltage

3、 Setting status: show setting parameters

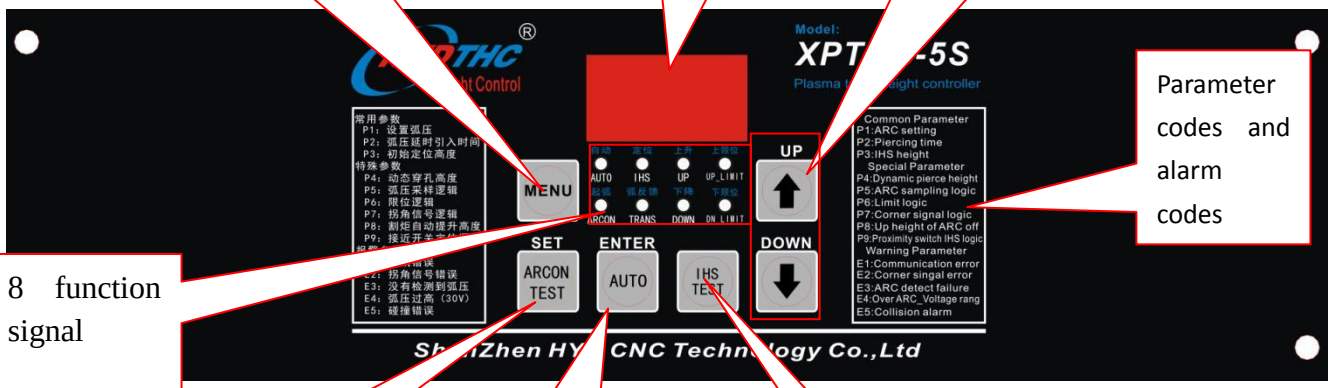
1、 Alarm status: show thealarm code

UP&DOWN：

1、In work stop status: control the torch goes up and go down

2、THC Auto work status: adjust the setting arc voltage, means to change the cutting height

3 、 Setting status: change the parameter numbers and values



Parameter codes and alarm codes

8 function signal

ARCON test:

1、In work stop status: press and hold it use to test the arc start

2、setting status: press it use

AUTO:

1、In work stoporworking status: press it ON the auto or OFF the auto

2、Setting status: confirm the parameter setting(ENTER)

3、Press 2 second for fast arc setting, change the arc value via UP&DOWN

IHS TEST:

1、 In work stop status: for IHS test

2.Press 2 second for fast IHS height setting, change the time of IHS height value via UP&DOWN

2.1.2、Key button and LED lights indicate

MENU：press and hold it with 2s to setting the common parameters

Press and hold it over 4s to setting the special parameters

THC Auto work status: press and hold it to show the setting arc voltage. Checking the difference of the setting arc volt and the actual arc volt.

When at the “P” status, press the “MENU” to save all the setting parameters.

- **(ARCON TEST)&SET:**

  1、In work stop status: press and hold it to test the arc start, press it until the plasma arc start, loose it plasma arc stop.

  2、setting status: press it one time to set parameters(SET).

- **UP/DOWN：**

  In work stop status: control the torch to go up and go down;

  THC Auto work status: adjust the setting arc voltage, means to change the cutting height;

  Setting status: change the parameter number and value

- **AUTO:**

  In work stop and THC auto work status: press it ON the auto or OFF the auto function. When stop status, “AUTO” light is blink, means THC is allowed on auto status, if press “AUTO”, then the “AUTO” light is off, then means the THC is on manual status.

  Setting status: confirm the parameter setting(ENTER), will show “P” status on it.

  In work stop status, press and hold 2 secs enter into Arc volt quickly set . Use UP and DOWN change the value.

- **IHS TEST:**

  In work stop status: for IHS test; press it, begin the IHS, after the IHS finished, automatically recover, or press this button or “UP” button to recover it.

  Other status: no valid

- **8 Function LED indictors:**

  - UP/DOWN: LED light turn on when torch go up/ go down.
  - ARCON: LED lightturn on when THC has detected the arc start signal. If arc start with IHS enable, this LED light is turn off until IHS completed.
  - AUTO: LED light turn on means THC is on AUTO mode. 4 conditions must be satisfied:
    1. In work stop status, “AUTO” LED light is blink, means THC panel allows it at the AUTO status;
    2. CNC send the arc start signal；
    3. CNC Auto Height Control(THC) enables;
    4. THC finds the divided arc volt from CNC(Trans turns on); Actual Arc Voltage is not higher than setting Arc Voltage over 30V.
  - TRANS：LED light turn on when THC find divided arc get into THC, and send out the pierce

complete signal to CNC.

- IHS: LED light turn on when do IHS.
- UP_Limit：LED light turn on when torch go to uplimit.
- DN_Limit: LED light turn on when torch go to downlimit.

Note: Press “UP” and ”DOWN” buttons When THC in work stop status, can be let the torch go up and down.

When finished ARC start, press “MENU” use to monitor the setting arc voltage, and in this status if press “UP”or “DOWN”, then to change the setting Arc Voltage or Sampling Arc Voltage. When at stop status, it’s for set the parameters.

During THC power on and setting parameter, some LED lights will be blink , that’s according to the different setting status.It’s use for remind the setting parameter’s meaning.

2.1.3、XPTHC-5 Prompt braking adjusting and sensitivity adjusting

DO NOT ADJUST THE RED SEALED!

XPTHC-5’s logic control is controled by the SCM, it can be setting on the operation panel, and in order to raise up the high performance’s request, it uses the artificial circuit to control the drive parts, so it can be adjusted the “R6012”(Brake-ADJ) and “R501”(SEN-ADJ) for the motor’s prompt braking and sensitivity. (Reference Fig2-3)

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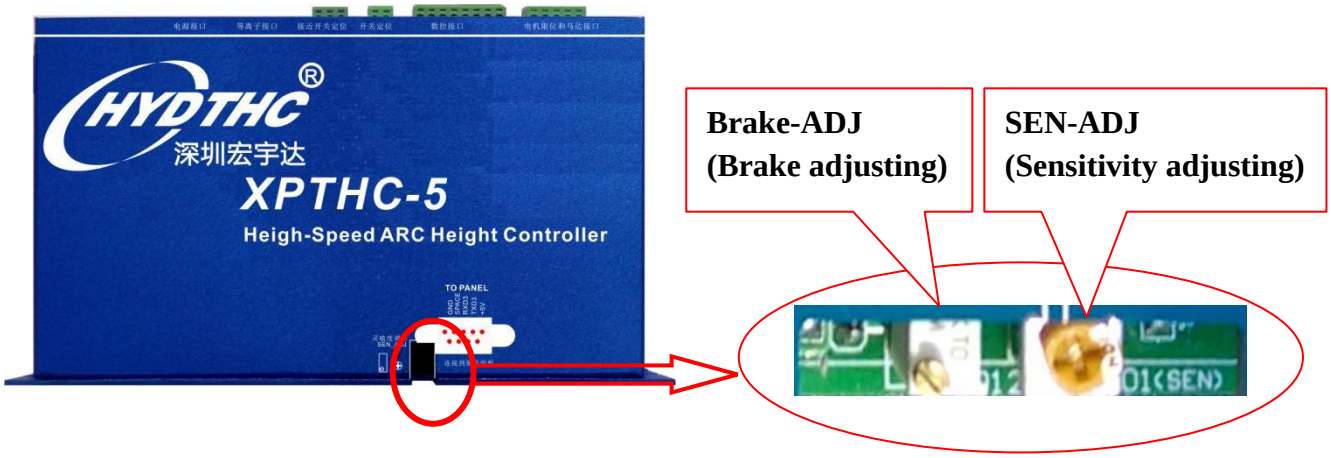


Fig 2-3 Prompt braking and sensitivity adjusting

1、Motor prompt braking adjusting is use to achieve fast braking when operate the THC manually, then it can avoid the up/down distance due to the inertia, and improve the up/down heightaccuracy.

This THC(XPTHC-5) is achieve to prompt braking by Plug-Braking. It can be set via adjusting the Resister “R6012(Brake-ADJ)”. While It has been adjusted well before ex-factory, don’t need to adjust by user.Unless longtime use/component aging etc. If user adopts the motor control voltage to control the limit instead of using our THC’s limit switch, the promopt braking function is unuseful, please choose the proper limit method.

2、Sensitivity of THC decides the cutting accuracy.

THC sensitivity setting:

Sensitive increases on anti-clockwise, decrease on clockwise in XPTHC-4.

Note:If sensitivity is too high, the torch would be shake, please test it carefully.

XPTHC-5 is tested on the 2800mm/min with lifter, **so for 1000mm/min—3000mm/min speed with lifter, user no need to adjust it. If user need the speed over 3000mm/min, then need to decrease the sensitivity a little, according to the cutting situation(If it shake during cutting, please decrease the sensitivity).**

Sensitivity matters to the quality of lifter. If the lifter can lift torch up/down on with DC motor Power Supply below 3V, it is qualify lifter for XPTHC-5.

2.2、XPTHC-5 Parameter setting and Alarm diagnose

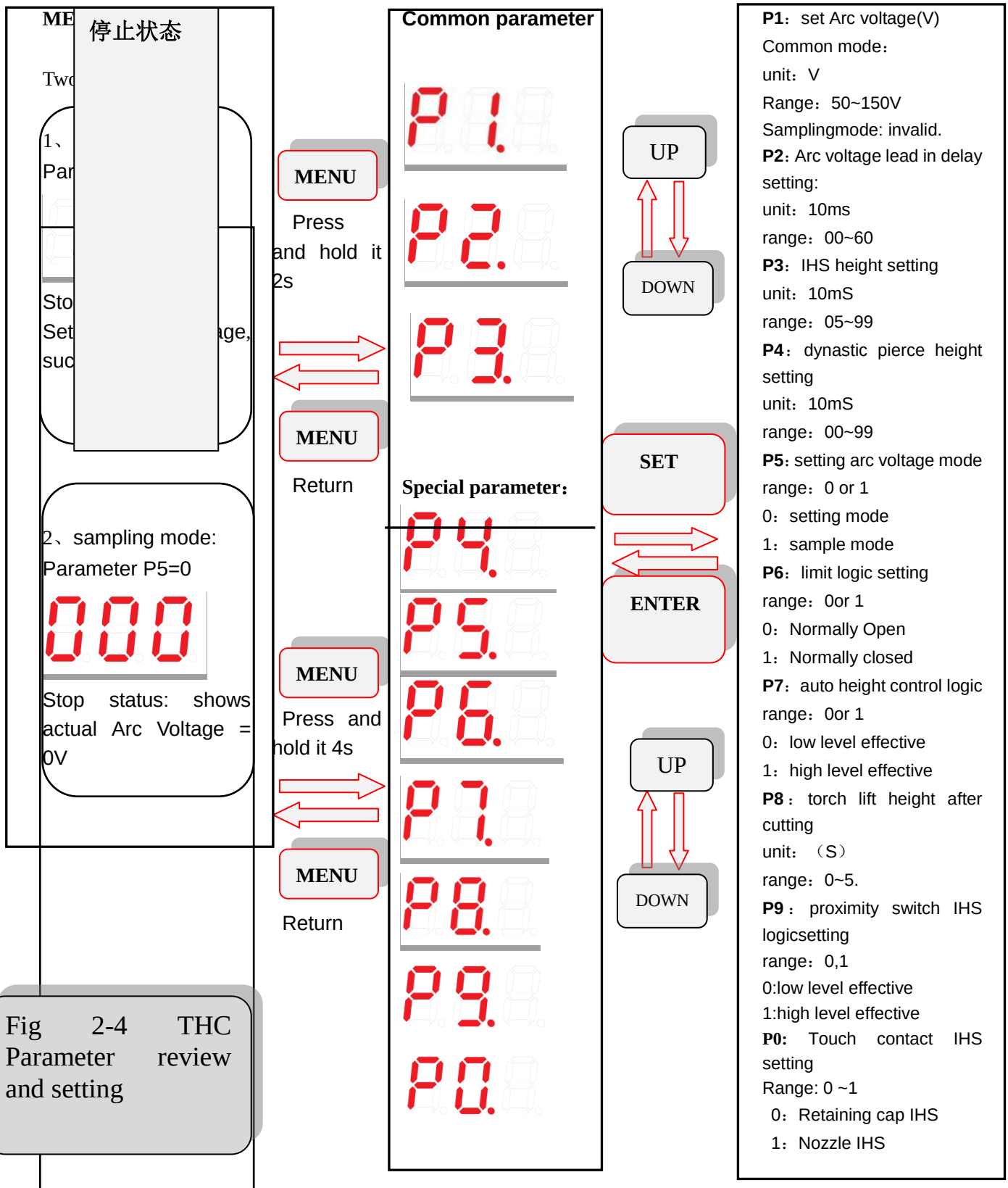


Fig 2-4 THC Parameter review and setting

P1：set Arc voltage(V)
Common mode：
unit：V
Range：50~150V
Samplingmode: invalid.
P2：Arc voltage lead in delay setting:
unit：10ms
range：00~60
P3：IHS height setting
unit：10mS
range：05~99
P4：dynastic pierce height setting
unit：10mS
range：00~99
P5：setting arc voltage mode
range：0 or 1
0：setting mode
1：sample mode
P6：limit logic setting
range：0or 1
0：Normally Open
1：Normally closed
P7：auto height control logic
range：0or 1
0：low level effective
1：high level effective
P8：torch lift height after cutting
unit：（S）
range：0~5.
P9：proximity switch IHS logicsetting
range：0,1
0:low level effective
1:high level effective
P0: Touch contact IHS setting
Range: 0 ~1
0：Retaining cap IHS
1：Nozzle IHS

2.2.1、 Parameters details

Common parameters					
Parameter No	Parameter Name	Default value	Unit	Range	Function and Description
	ARC setting	130	V	50~250	Setting arc voltage mode effective. Set an initialarc voltage before cutting, it can be adjusted by “UP” or “DOWN”to change the initial arc voltage during cutting.
	Piercing time	1	10mS	00~60	When THC sends the arc start signal to plasma, then will delay the lead in arc voltage to THC, thus itis helpful of anti-interference function to THC. This parameter is also for dynastic pierce setting. It’s set via the time of the Arc start to Arc ok. Such as if it needs 3s for the Arc start process, then it should be set to 30.
	IHS height	0.4	10mS	05~99	The IHS height can be got from “IHS test”on the operation panel. It relates to the speed of the torch lifter.
Special parameter					
	dynamic pierce height	0	10mS	00~99	This height is for the plasma arc piercing height, to protect the torch consumables.
	ARC sampling logic	0		0，1	1、When set value = “0”, setting arc voltage by “P1” as an arc voltage , it’s set for Arc auto height control. 2、when set value = “1”, via the CNC’s corner signal, when the THC is opened the AUTO function, and take the actual arc voltage as the cutting arc voltage during auto work. In this mode, it’s required the CNC with high speed up to the setting speed to open the auto mode, this is the at the IHS height during cutting, it can be used for bevel cutting. During the cutting, it could be adjust the “UP” and “DOWN” to change the raw arc voltage, the cutting height won’t be changed during the whole cutting work until to break arc start signal.
	Limit logic	0		0，1	**0：Limit Normally open；1： Limit Normally closed.** When the connection is not match with “P6” parameter’s setting, then the UP_limit and Down_limit LED light will be turn on.
	Corner signal logic	0		0，1	**0：Corner logic close auto; 1: Corner logic open auto**

					Note：This signal need to be match with CNC setting
P8	Up height of ARC off	1	S	0~5	**torch lift height after cutting** **Range：0~5s**
P9	proximity switch IHS logic	0		0，1	**0**：low level effective，**1:** high level effective**.** **If using the NPN(NO) proximity switch, the "P9" value should be "1";** **If using the NPN(NC) proximity switch, the "P9" value should be "0"** (NO: normally open; NC: normally closed.)
P0	Touch contacted IHS	0		0, 1	**0: retaining cap IHS, When plasma use retaining cap IHS , the value should be "0"** **1: nozzle IHS , when use nozzle IHS, the value should be "1"**

2.2.2、Alarm codes details

Alarm code instruction			
Alarm code	Description	Alarm reason	Solution
E1	Communication error	Wrong connection in cables between operation panel and THC control module .	1、Connect the cables well again, checking whether there has a poor connection or wrong connection; 2、Circuit board fault; Will be solved after correct connection.
E2	Corner signal abnormal	If the connection or setting of Corner signal is wrong, it will be with "E2" alarm when arc start or IHS	1. Change the CNC auto/corner signal logic. 2. If can't change the auto/corner signal from CNC, then please change "P7" parameter in THC. It'll be solved when set correct at the Stop work status.
E3	ARC detect failure	Don't detect the arc voltage signal from voltage divider during cutting.	1、Check the connection from voltage divider to Plasma 2、Check the connection fromvoltage divider to THC **3、When appear E3 alarm after 3S, the torch will goes to the setting height, and disconnect the arc**

			start automatically. It'll be solved when the signal is correct at the stop-work status.
E4	Over ARC-voltage range	The actual arc voltage is over 30V than the setting arc voltage during cutting	1、Setting arc voltage is too low 2、The Dynastic pierce height is too high, please decrease "P4" parameter value 3、The auto signal is send from CNC to THC too early 4、Plasma problem, plasma consumables etc. 5、It'll be solved after the arc voltage is normal. It doesn't affect the cutting, but it'll turn off the AUTO status.
E5	Collision alarm	If the proximity switch is touched before cutting or during cutting, it means there's collision, if over 0.2s will have the E5 alarm. Meanwhile send out the collision signal to CNC.	1、Checking the Micro switch and it's connection; 2、Proximity switch problem, change a new one **3、It must press the "MENU" button to cancel the "E5"alarm after all are checked ok.**

3、XPTHC-5 Connection

Fig 3-1 is XPTHC-5 sockets introductions
Fig 3-2 is XPTHC-5connection introductions

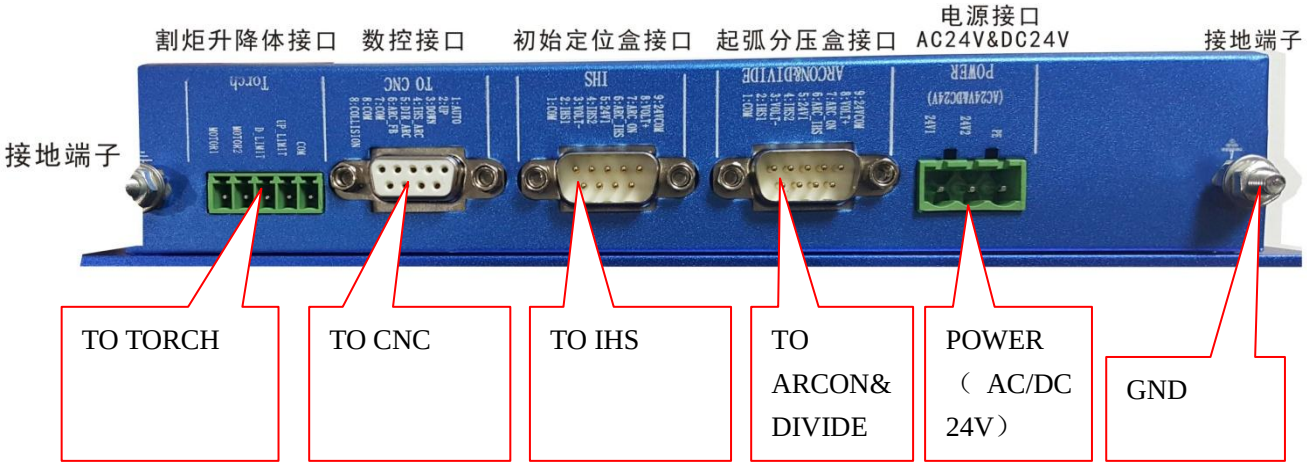
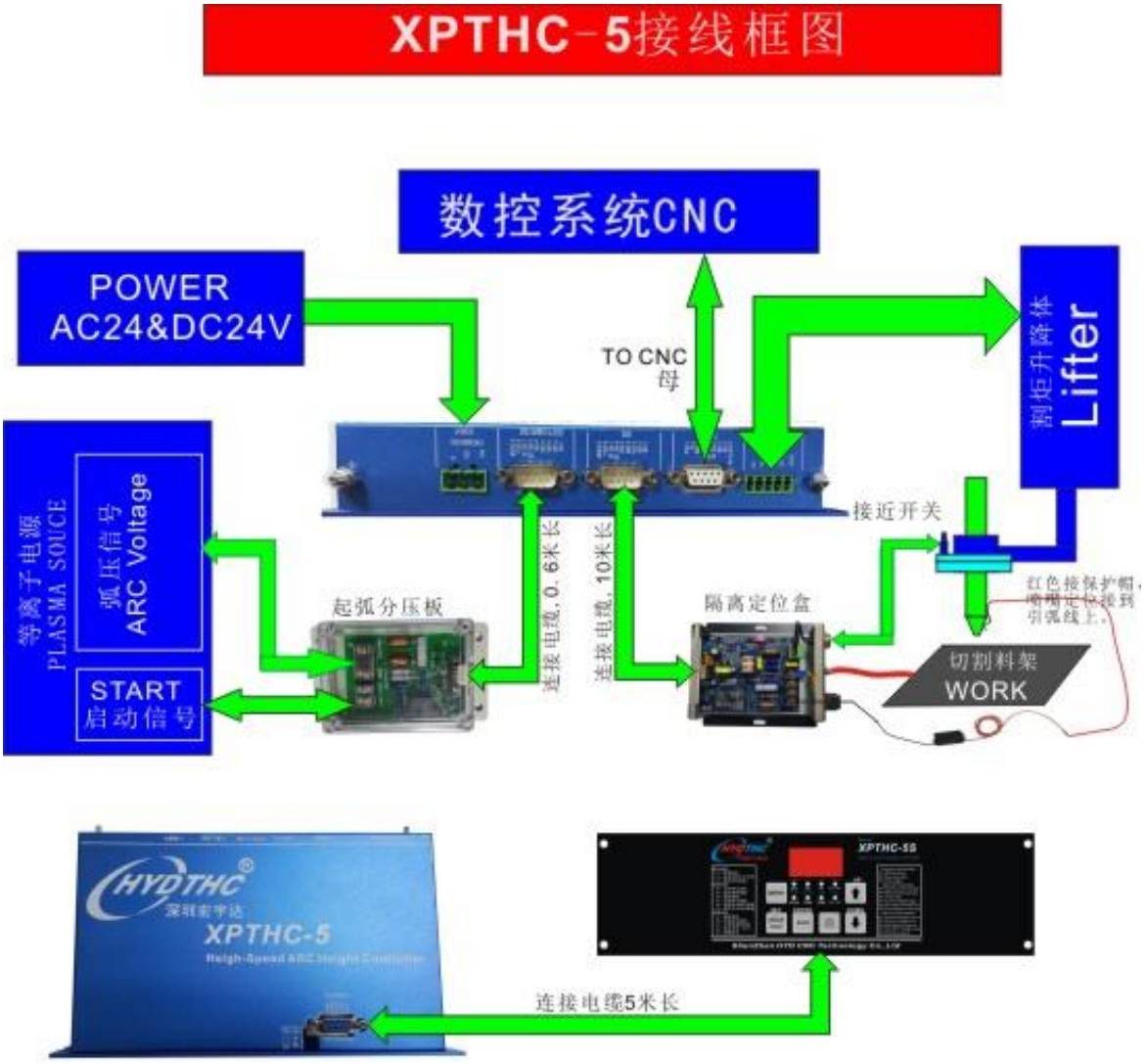


Fig 2-5 XPTHC-5GY sockets introductions

NOTE：To IHS sockets and to ARCON&DIVIDE sockets can be interchangeable!



3.1、To Power

XPTHC-5 use DC24V or AC24V. The power supply depends on the motor in Lifter

Transformer ≥ 2 x Motor + 10W

Please using a separate power supply to the XPTHC-4, and need a wellGround connected to THC's metal shell

XPTHC-4 Voltage supply is as follow：

When the power supply voltage is DC24V：DC18V~DC36V，the voltage of Motor: 15V~31V. The DC power and the output power: Vout（Max output）=（Vin (input)-1.4V）*90%.

When the power supply voltage is AC24V：AC15V~AC27V，50Hz. The output voltage to Motor：15V~31V。

If you want to speed up your lifter, then you should increase the power supply properly.

3.2、To PTHC-IHS controller

3.2.1、PTHC-IHS function

PTHC-IHS controller is specially design for XPTHC-5 and PTHC-200DC. To improve THC's anti-interference performance .This controller keeps the interference source like plasma arc voltage, arc start signal far away from THC module, and it is isolated connection between IHS controller and PTHC . Meanwhile, it shorten the distance from torch to PTHC-IHS , effectivelyavoid plasma's interference to THC and CNC.

3.2.2 、PTHC-IHS interface

PTHC-200DCIHS controller has Proximity switch IHS and Retaining cap IHS. As Fig 3-1.

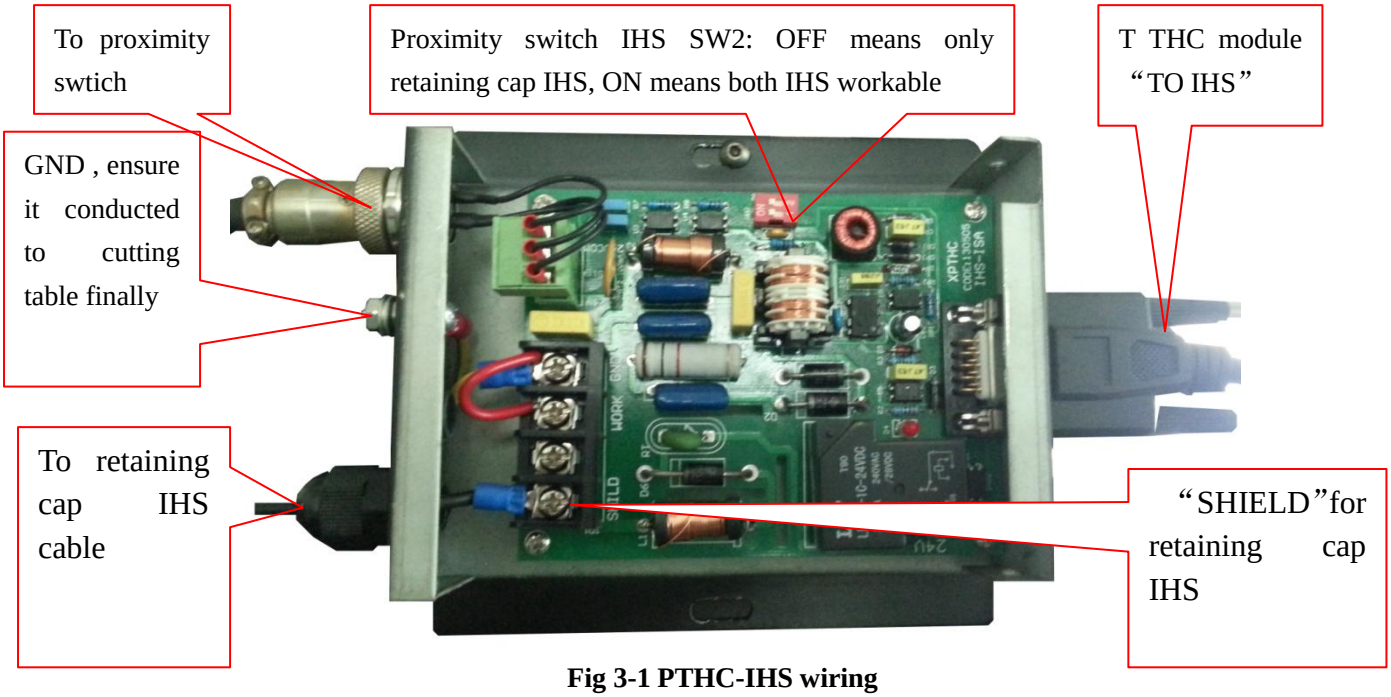


Fig 3-1 PTHC-IHS wiring

SW2 ON means both retaining cap IHS and proximity switch IHS workable, anyone of it can complete IHS process.

If SW2 ON , but proximity switch not connected , the torch would be keep lifting up , so SW2 it should be turn OFF or short the IHS controller's SIGNAL and COM ports.

Pin(s)	Signal	Description & Ratings
1	COM	Proximity switch power negative
2	Signal	Proximity switch signal
3	+24V	Proximity switch power positive

We suggest NPN proximity switches connected as follow, any one of them effective , THC can be receive this signal.

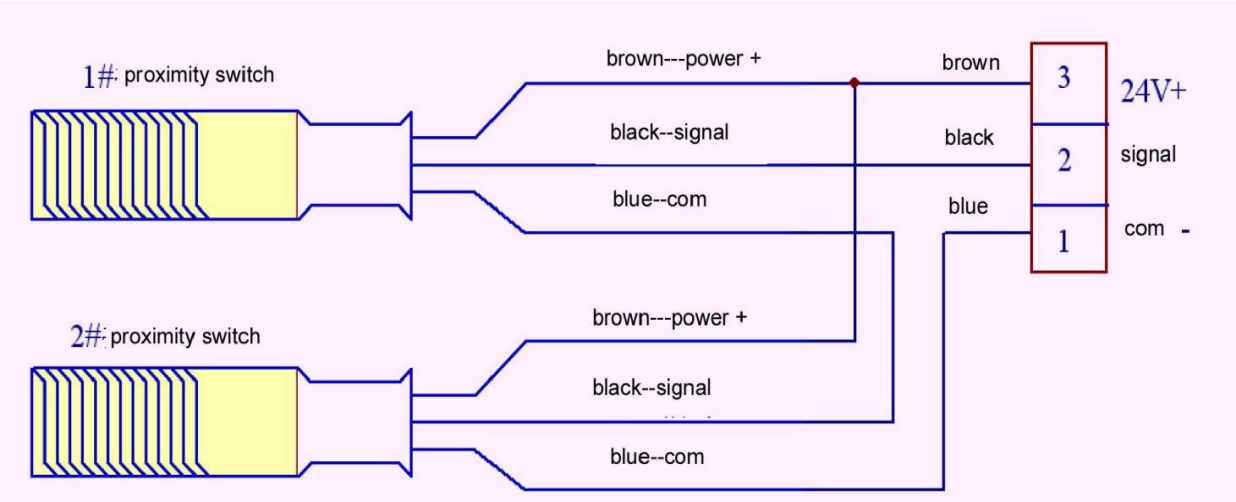


Fig 3-2

Work process: Once THC receive Arc start signal from CNC, torch moves down , when it reaches workpiece, proximity switch leaves proximity position, THC receives this signal , lifts torch to the set height , (proximity switch recovers during lifting). After IHS , THC drives plasma start arc.

3.2.3、IHS controller installation. As Fig 3-3.

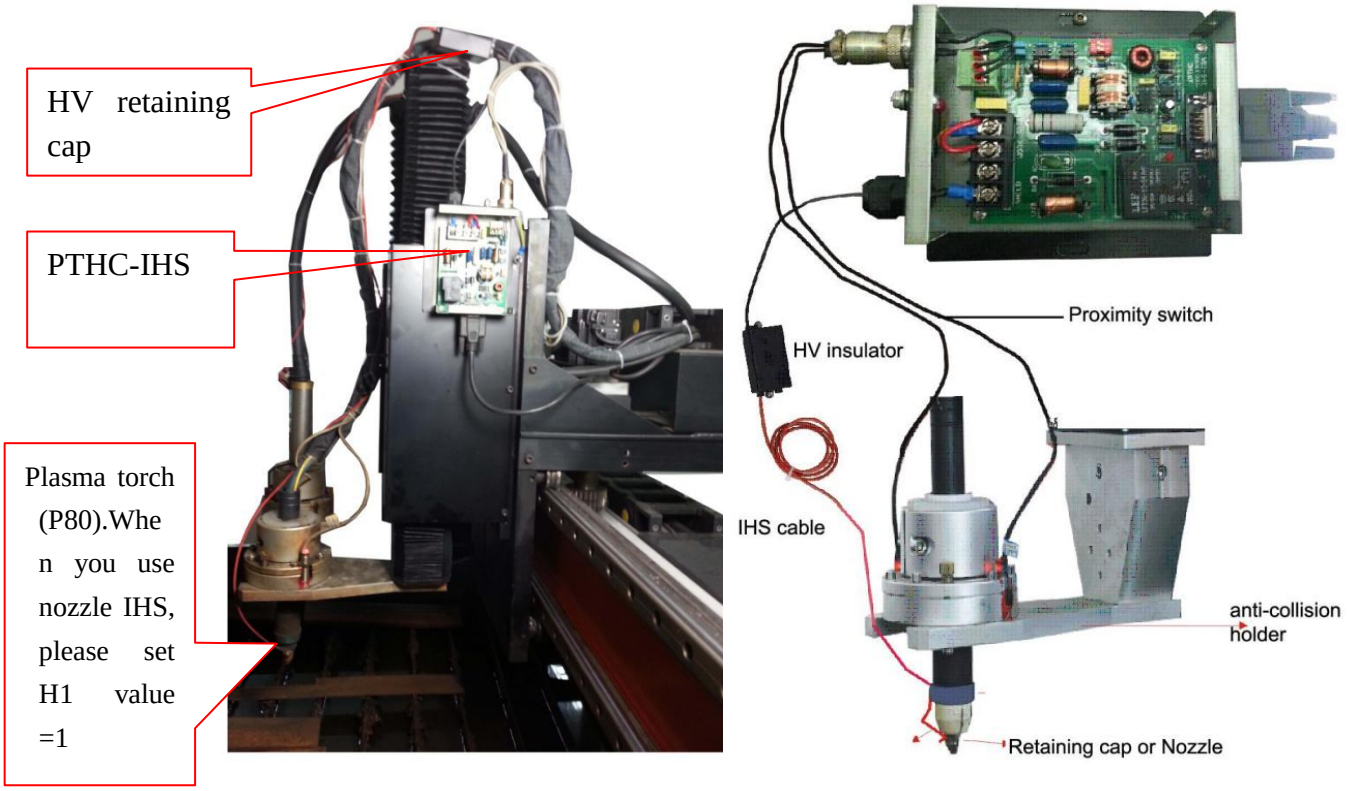


Fig 3-3

NOTE：

A、 Support both 1 pcs proximity switch and 2 pcs proximity switch. When use 2 pcs proximity swtichs, support both parallel connection and series connection. Suggest use series connection.

B、 Use retaining cap IHS, please choose correct retaining cap from this plasma factory.

C、 Use nozzle IHS, please connect the red cable in HV isolator to nozzle cable in torch. Also can be fix HV isolator cable on nozzle.

D、 Use retaining cap IHS and nozzle IHS, require must connect HV isolator.

E、 Use retaining cap IHS or Nozzle IHS , must OFF proximity switch IHS setting.

F、 Use collision output function, must use proximity switch IHS or both IHS workable.

G、 The GND must be grounded and the cable cross-setion ＞ 4mm² .

H、 Use Nozzle IHS , please set H1 vale = 1 (Default = 0)

I、 Use retaining cap IHS, if has regulus in retaining cap and nozzle, the torch will lift up and can't start Arc.

J、 Use Nozzle IHS , if has regulus in nozzle and electrode, the torch will lift up and can't start Arc.

3.2.4、XPTHC-5 to PTHC-HIS:

Figure 3-4：The cable is five cores shield cable, number PTHC-IHS-10, standard length is 10m.

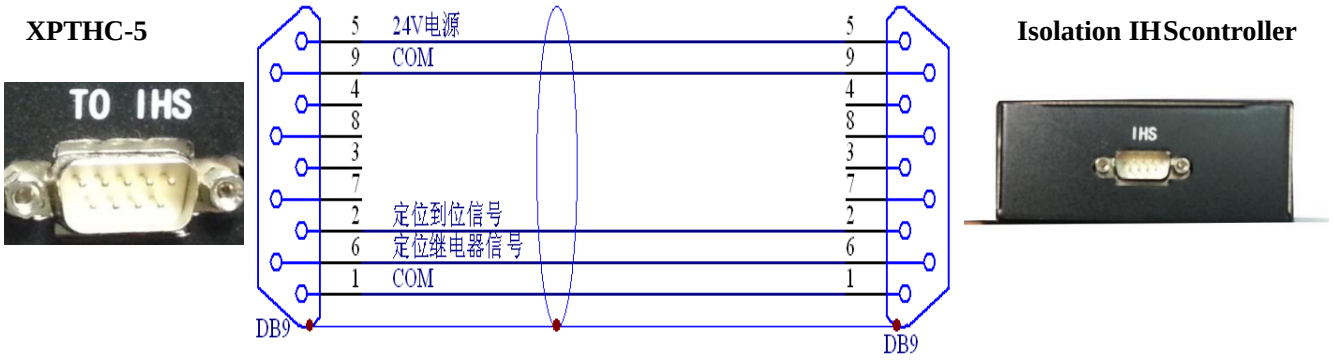


Figure 3-4： cable for XPTHC-5 to PTHC-IHS

3.3 connect to isolation IHS controller

3.3.1、voltage divide

Arc voltage THC must monitor the plasma's arc voltage change. The arc voltage is usually higher than 100V during cutting, and it has stronginterference during arc start, thus it must be divided before lead intoTHC.

XPTHC-5 adopts the external none isolation voltage divide, inside the THC with 1:1 isolation.

Voltage divider as below figure.

The sample type of voltage divider as figure 3-5, it can change component parameter accordingly.

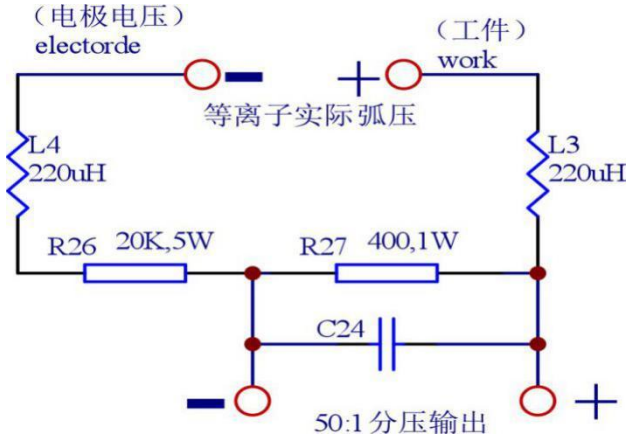


Figure 3-5 ： None Isolation voltage divider

Due to None Isolation Voltage Divide is directly connected with Plasma Power Supply, to enable THC escape from interference caused by the HF during Plasma Arc Start, so it will have strong interference to THC circuit.

In the practical work, the Divided Arc Voltage guided into THC is Time-Delayed, so little effect on practical work . Contacted arc plasma, has no effect to THC when use none isolation voltage divide. High frequency arc plasma, just needs to prolong the time of lead Arc Voltage into THC, this interference can be

avoid effectively.

On XPTHC-5, the delay lead in arc volt into THC is setting by P2 parameter on the operation panel.

3.3.2、Using the Plasma's 50:1 voltage divider solution:

Many plasma has its own 50:1 etc. voltage divider. We provide the 50:1 volt divide's method only. Please do it as Fig 3-8 :

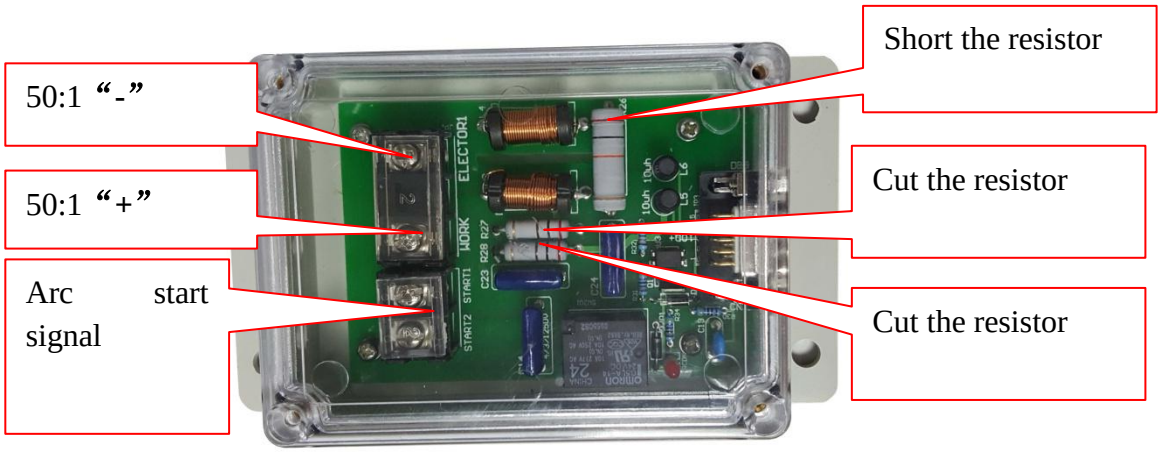


Figure 3-6:Using the Plasma's 50:1 voltage divider solution

According to Fig 3-6, only need to do with these three Resistors. After that then could use plasma's own voltage divider output.

3.3.3、using isolation voltage divide

XPTHC-5 chooses PTHC-DIV50 isolation voltage divide

Plasma Arc Voltage is divided by Voltage Divideron 50:1 vianone isolate voltage divide, lead into THC after processed by Isolation Circuit. Arc voltage. We install a none isolation arc voltage divide inside XPTHC-5 to isolate, and users could also choose PTHC-50DIV for double isolation, connection as Figure 3-7.

Usually isolate voltage divide can install inside of CNC cabinet, or inside of plasma power source.

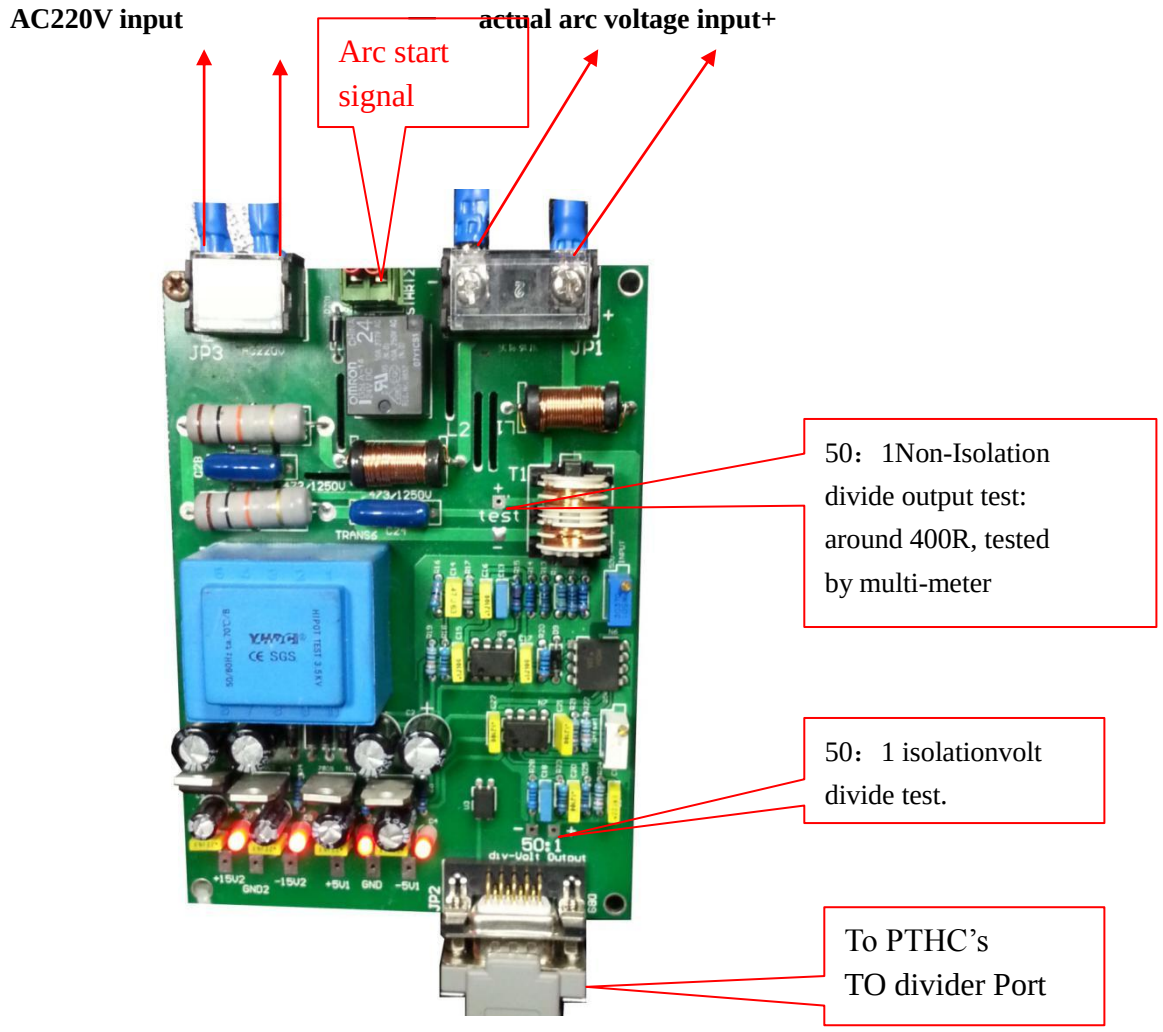


Figure 3-7 Isolation voltage divider wiring guide

Note：

1、If the raw arc volt input mis-connected, Isolation voltage divider has no output.

If the divided arc volt into THC mis-connected, THC would display max value.

2、We always suggest Isolation voltage divide, non-isolation volt divide is just abackup.

3.high frequency arc Plasma with high frequency box can use both none isolation and isolation voltage divide. plasma torch cable is beyond 25m, it can't use none isolation voltage divide

4. For China/India OEM plasma, the raw arc volt input should connected toplasma's rectifier output.Because there's very strong HF interferenceelectrode and work port during Arc start.

3.3.4、XPTHC-5 to voltage divider

Figure 3-8，6-pin twisted shield cable , PTHC-ARC-6meters
the interface of isolation voltage divider is same as arc voltage divider

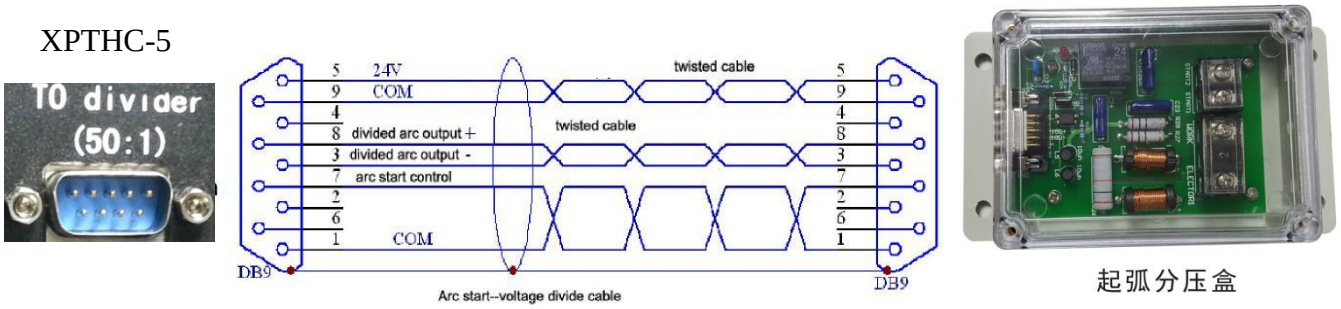


Figure 3-8　PTHC-ARC cable definition

3.4 To CNC

XPTHC-5 connects to CNC via DB9：TO CNC，cable： PTHC-CNC-05，05 means length is 5m.

Note:

A、All communication with CNC is isolated, original set is Low Level effective.

B. Arc OK signal（pin6）is OC door output, not switch signal.

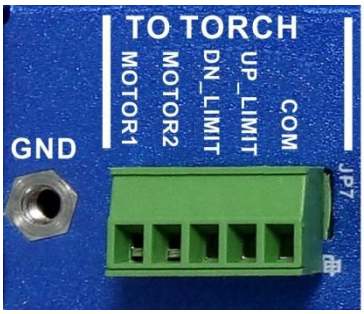
If you do not order the cable, plug DB9 / M is supplied in the spare part,you can make it according to the actual length of the drawing in Figure 2-6.

TO CNC Pin definition as follow:

Pin(s)	Signal	Description & Ratings
1	EXAUTO	Auto signal， low-level effective， control level is determined by parameter P7 Controlled by CNC’s corner signal or THC enable signal, pin8 is control Com
2	UP	Up signal，low-level effective pin8 is control Com
3	DOWN	Down signal，low-level effective pin8 is control Com
4	ARC ON with HIS (IHS_ARCON)	Arc start with IHS，low-level effective pin8 is control Com
5	(DIR_ARCON)	Arc start without IHS，low-level effective pin8 is control Com
6	(ARC_FB)	Connect to CNC’s arc feedback signal input Relay output by parameter P2, Optical isolation, OC door output, max current 200mA
7	COM	control signal COM
8	COM	control signal COM
9	(COLLISION)	OC door output， Max :200mA

Figure 3-2 :TO CNC pins definition

3.5、TO TORCH



Torch connector uses 5-pin 3.81mm terminal to connect with motor, showed as follow, XPTHC-5 supports DC24V motor, DC motor voltage 12V-30V can be chose accordingly

TO TORCH pins definition as Figure3-5：

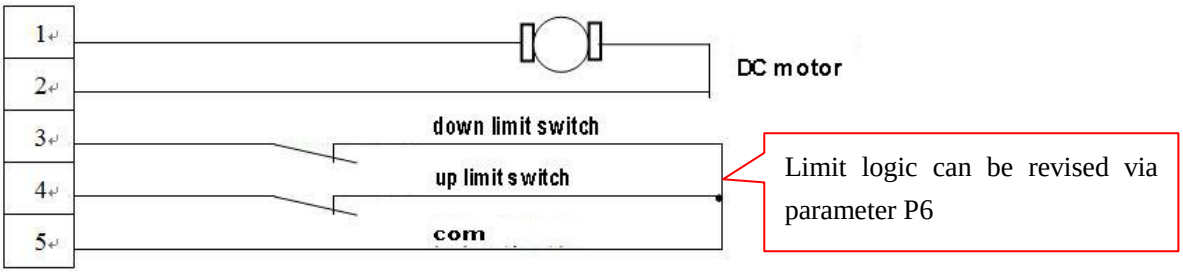


Figure 3-5 TO TORCH interface

TO TORCH：

Pin(s)	Signal	Description & Ratings
1， 2	**DC Motor Drive（Output）**	DC motor drive output Drive DC24Vmotor directly Max 100W PWM
3	**Down LIMIT（Input）**	Down limit input（optical ISOLATED） Limit switch normally closed, change by P6
4	**Up LIMIT（Input）**	Up limit input（optical ISOLATED） Limit switch normally closed, change by P6
5	**LIMIT COM**	COM

Figure 3-3: TO TORCH pin definition

Note：There is a pin GND beside TO TORCH interface, please use shield cable, connect the shield net to GND

4、THC wiring

4.1、universal wiring

Figure 4-1shows

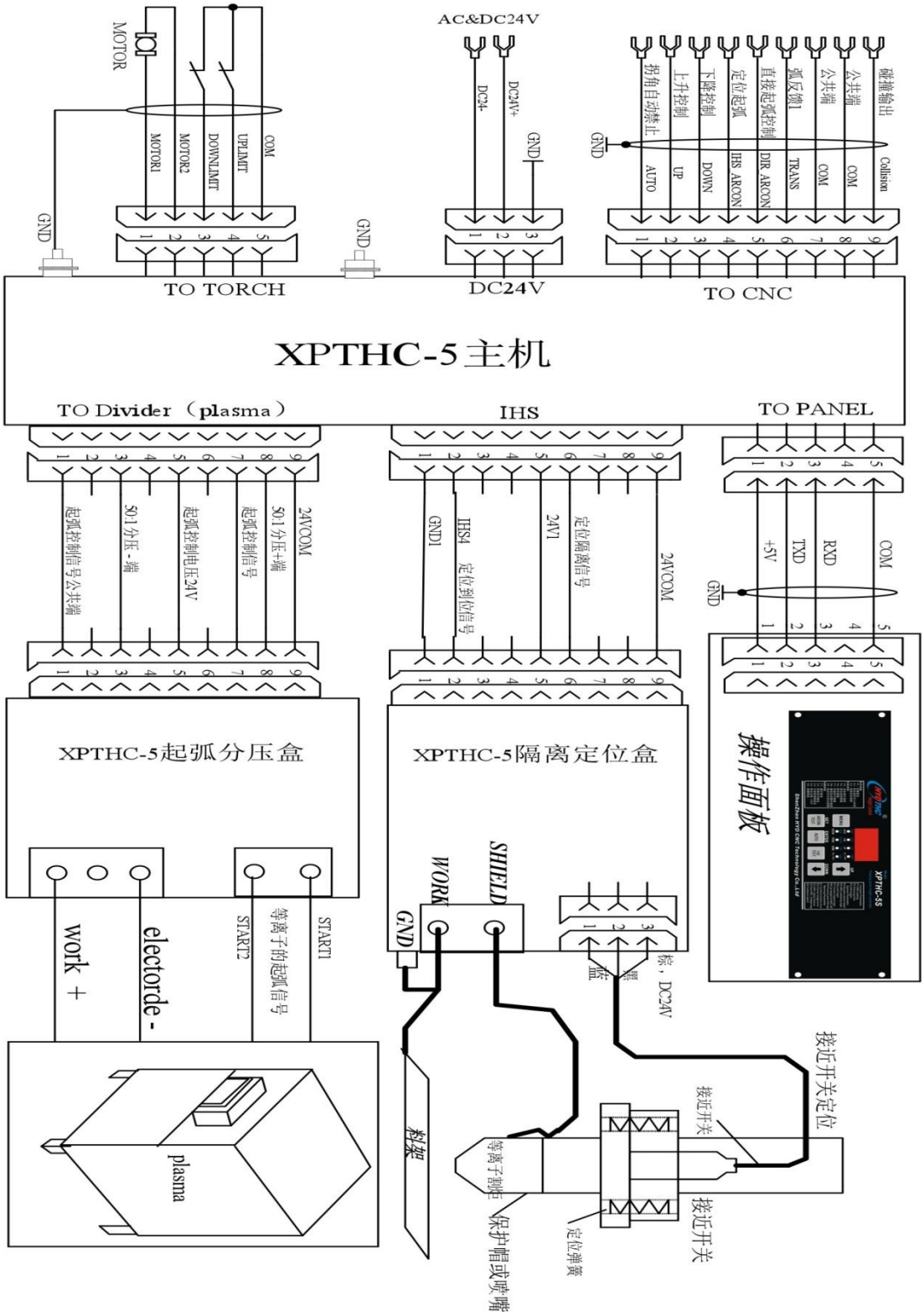


Figure 4-1：XPTHC-5wiring

4.2、The connection between XPTHC-5 and SF2012/SF2100 wiring

Figure 4-2:

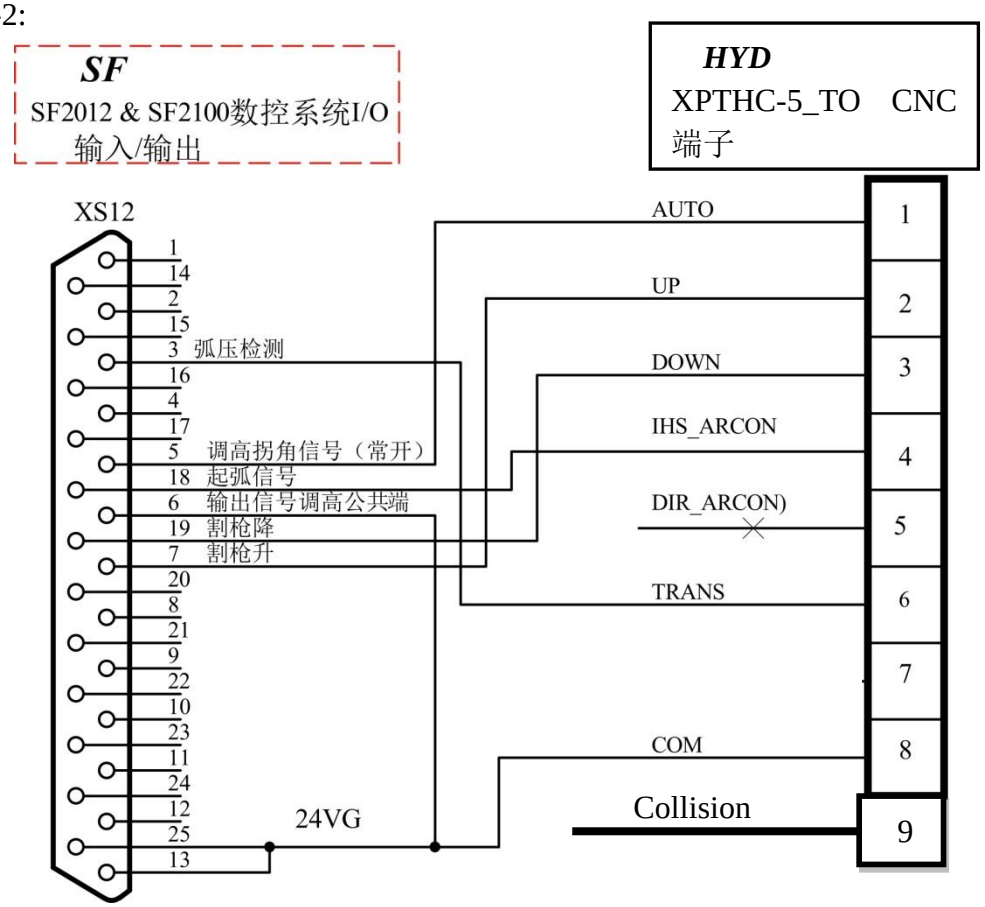


Figure 4-2：XPTHC-5 to CNC connection

Note：

1、 This is the direct connection to SF2012/SF2100；

2、 This CNC controller is without collision input port, if you need the stop function when collision, please reference SF instruction Fig 4-3 :

3、 If use the PIN5 corner signal, please setting the “P7” to “0” on THC

4、 If for other SF CNC controller, please refer to its instruction’s I/O definition.

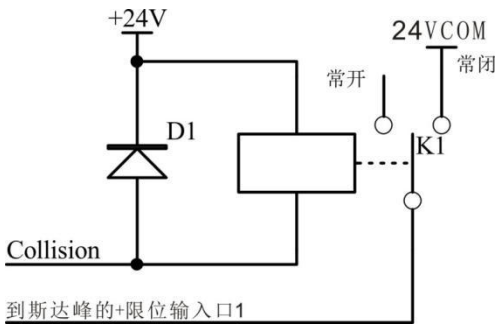


Figure 4-3:connection on the SF for the stop when collision

4.3、The connection between XPTHC-5 and HYD2000 series wiring

XPTHC-4 to HYD2100、HYD2200、HYD2300、HYD2500, reference Fig 4-4:

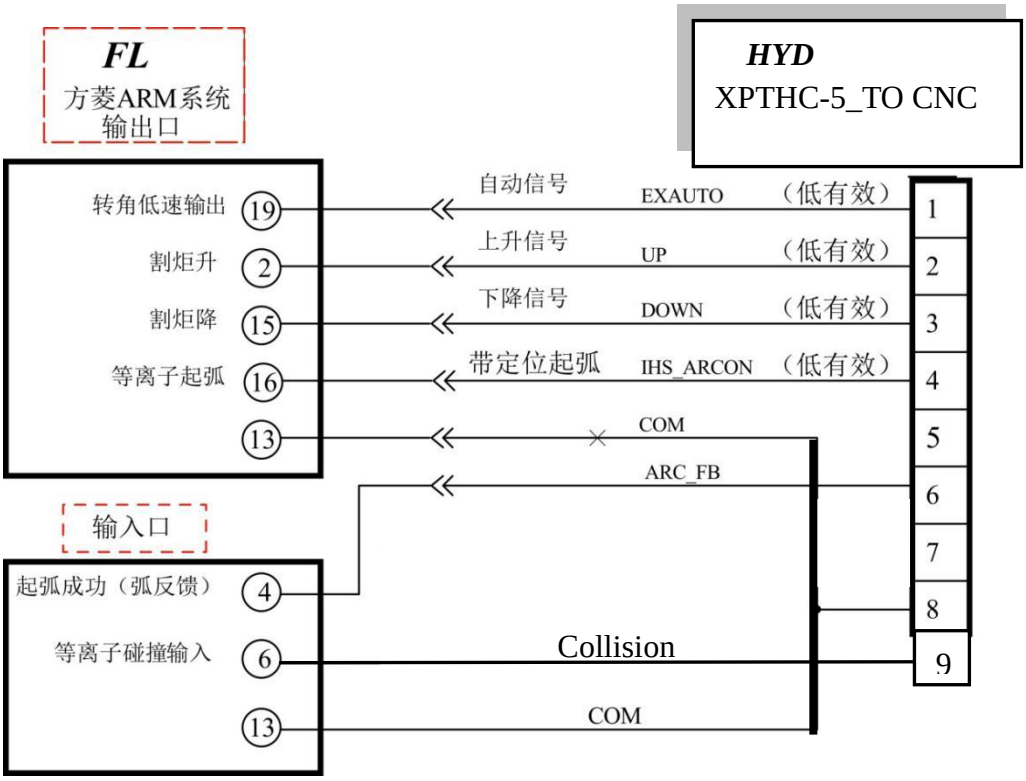


Figure 4-4 ： XPTHC-5 to ARM CNC controller connection

Note：

1、It's the direct connection.

2、It requires the CNC controller output signal is low-level effective.

3、If don't change the corner logic on CNC, then please set the "P7" to "0" on THC

5、notice:

1、XPTHC-5adopts to the same operation panel and parameter setting as XPTHC-4, but outer interfaces are different, can't exchange.

2. XPTHC-5 is a new and smart THC with full function, while it's designed for small motor(<25W), so please don't use it for a lifter which motor is more than 30W, avoid to any damaged.

3、XPTHC-5 performance is no relationship with plasma's current

4、Welcome to advise any suggestion and comment, it'll help our company design and develop good products to customers.

5. If appears XPTHC-4 somewhere, it means XPTHC-5 has same connection as XPTHC-4.

Important : must set parameter P0--cap retaining/nozzle IHS