XPTHC-4

Arc Voltage Plasma Height Controller

Please read this manual fully before use

SAFETY：

- ◆ Please read this manual fully before use XPTHC-4
- ◆ 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.
- ◆ 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.

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.

Contents

1 、Brief Info

1.1 、Product name and model

Arc voltage torch height controller (THC)

Model: XPTHC-4

1.2、Application

XPTHC-4 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-4 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：0.1A-1.8A;

◆ Load capacity：Max 20W；

◆ Working temperature：-10∽60℃；

◆ IHS：Switch IHS & Proximity switch IHS； Do Not support the retaining cap HIS

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

◆ Voltage Divide ratio: 50:1 non-isolation on voltage divider; 1:1 isolation inside of THC

◆ Control accuracy ：±1V∽±3V，depends on the motor and lifter of user.

◆ The speed of lifting: 1000mm/min ∽ 3000mm/min(Contact the supplier if it exceeds the range of speed)；

◆ Arc Voltage rang：50V∽250V，

◆ Over protection：PWM adjusting, current feedback；

◆ Max speed test：12000mm/min （ it's related to the setting on the lifter's speed and motor's start voltage and sensitivity)

XPTHC-4 is the newest design THC, special for portable CNC cutting machine and small bench type 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, two modes of the setting arc volt:

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.

4, High Sensitivity: adjusting the THC's sensitivity, could realize the arc volt change 1V, the arc voltage output will change 1.5V~4V, and don't occur the vibration. So the lifter's start voltage is closed related to the THC's sensitivity, Our lifter's start voltage is 1.5V ~2V.

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

XPTHC-4 is with full function of the Stand alone Arc Voltage Torch Height Controller. But as it's with small body, the motor of the lifter should be less than 20W on the portable CNC cutting machine, light gantry machine and small bench type machine etc.

1.4、 Components and installation

1.4.1 Components：XPTHC-4 includes the follow parts：

Fig 1-1：XPTHC-4 THC components

A、 XPTHC-4 control module

B、 Operation panel

C、 Voltage divider

D、 Cable(operation panel to control module)

E、 Proximity switch（DC12-24V，NPN model effective NO，test distance 2mm）。

F、 Arc divide and Arc start cables, 2PCS

1.4.2、Installation
A、XPTHC-4 control module installation size

Fig 1-2 XPTHC-4 Control module size

Fig 1-3

Fig 1-4

B、operation panel and installation size
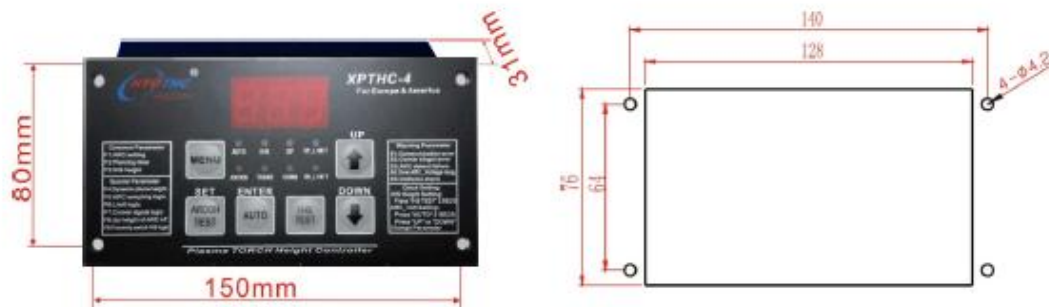

Fig 1-5

C、Arc Voltage divider installation size

Plasma Arc Voltage is divided by Arc Voltage Divider (offered with THC) on 50:1 via none isolate voltage divide, lead into THC after processed by Isolation Circuit. It can be installed inside of the plasma or cnc control cabinet. (**must use the shield cables**）.Follow the fig 1-6 shows.
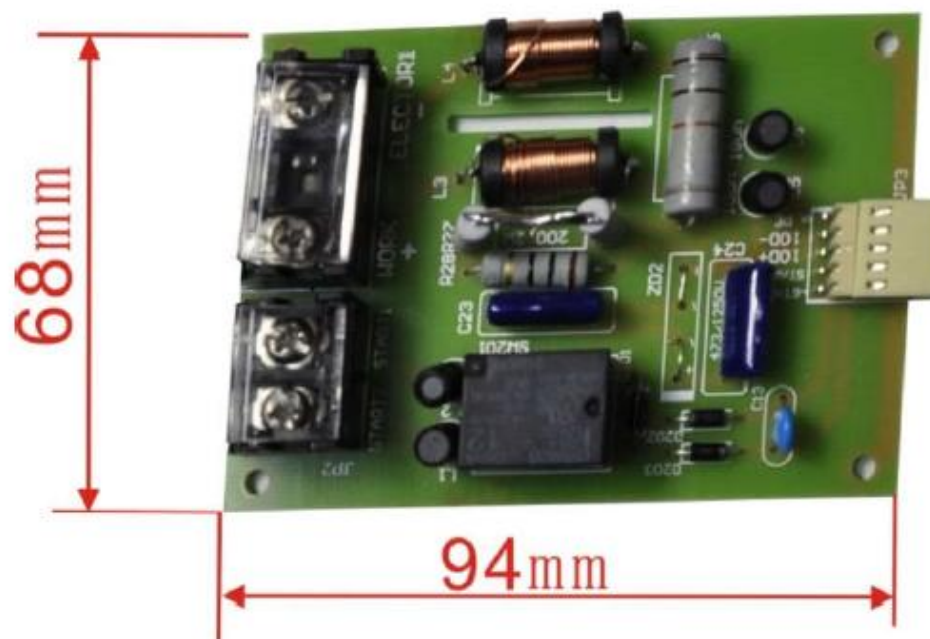

Fig 1-6 Arc voltage divider installation size

2、 XPTHC-4 Function and Setting

2.1、XPTHC-4 Function

◆ **Auto work follow:**

CNC arc start signal to THC---THC start IHS first----Arc start---THC find divided arc voltage in THC-------Pierce time delay----Pierce completed---CNC receives arc ok signal from THC or Plasma then start Motion----over 90% full speed, CNC enable THC's auto mode----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 that it's not suitable for the touch retaining cap IHS for this THC(XPTHC-4).

A、Touch switch IHS：（adopts to install a micro switch in the lifter, please refer to wiring diagram）

The micro switch is usually at Normally Open status. During IHS, it is activated when torch goes down to touch the cutting material, and THC will let the lifter go up to the setting IHS height, the 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**

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 finishing 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.

◆ **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-voltage protection (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

2.2、 XPTHC-4 operation panel and key button description

2.1.1、 operation panel function

See Figure2-1 shows:

（MENU）:

1、 Stop work status:
Press and hold it 2s to set common parameters; press and hold it 4s to set special parameters.

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

3、 Setting status: Press it to save the setting parameters.

display:

1、 Stop work status: shows the setting arc voltage

2、 Auto work status: shows the actual arc voltage

3、 Setting status: shows setting parameters

4、 Alarm status: shows the alarm code

UP&DOWN:

1、 Stop work status: control the torch to go up and go down

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

3、 Setting status: change the parameter number and value

Parameter code and alarm code

8 function LED lights

ARCON test:

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

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

AUTO:

1、 stop work and auto work status: press it open the auto or off the auto

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

IHS TEST:

1、 Stop work status: for IHS test
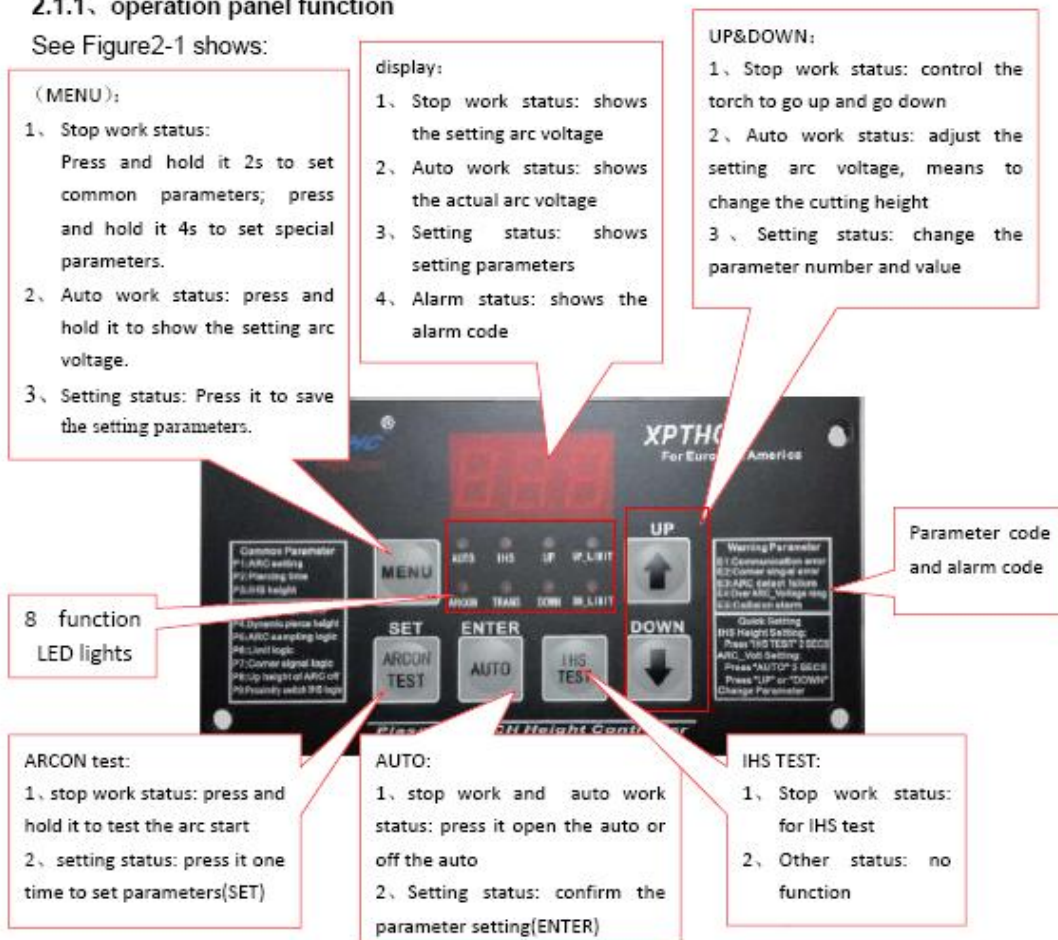
2、 Other status: no function

Fig 2-1 operation panel instruction

2.2.2、 Key button and LED light indictors

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

P1   P2.   P3.

Press and hold it over 4 second to set the special parameters

P4   P5.   P6.   P7.   P8.   P9.

When 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、stop work 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：**

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

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

Setting status: change the parameter number and value

➢ **AUTO:**

Stop work and auto work status: press it open the auto or close 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.

➢ **IHS TEST**

Stop work 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: Turn on when torch go up/ go down.

● ARCON: Turn on when THC has detected the arc start signal. If arc start with IHS enable, this indicator is off until IHS completed.

● AUTO: Turn on means THC is on AUTO mode. 4 conditions must be satisfied:

1. Stop status, "AUTO" 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：Turn on WHEN THC finds divided arc get into THC, and send out the pierce complete signal to CNC.

● IHS: Turn on when IHS.

● UP_Limit：Turn on when torch go to up limit.

● DN_Limit: Turn on when torch go to down limit.

Note: Only When at Stop status: press "up" and "down" button, then it can let the torch go up and go down.

When ARC OK, press "MENU" to monitor the setting arc voltage, and 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 status.

When power on and setting parameter, some LED indictors will be blink according to the different setting status, it's to remind the setting parameter's meaning.

2.3、 XPTHC-4 Brake adjusting and sensitivity adjusting
DO NOT ADJUST THE RED SEALED!

XPTHC-4's logic control is controlled by the SCM, it can be set on the operation panel, and 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 brake and sensitivity. See Fig2-3 shows:
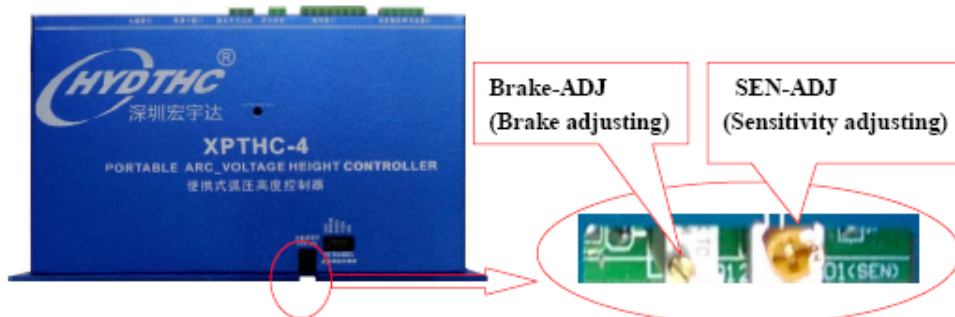

Brake-ADJ
(Brake adjusting)

SEN-ADJ
(Sensitivity adjusting)

Fig 2-3 Brake and Sensitivity adjusting

1、To brake adjusting of the motor is to achieve fast braking when operate the THC manually, then it can avoid the up/down distance due to the inertia, and makes the up/down height more accuracy.

This THC (XPTHC-4) is to achieve the fast braking by Plug-Braking. It can be set via adjusting the Resister "R6012(Brake-ADJ)". While It has been adjusted well before ex-factory, doesn't need to adjust by user, unless longtime use/component aging etc. When user adopts the motor control voltage to control the limit instead of using the THC's limit switch, it's no effective of the fast braking function, please choose the proper limit method.

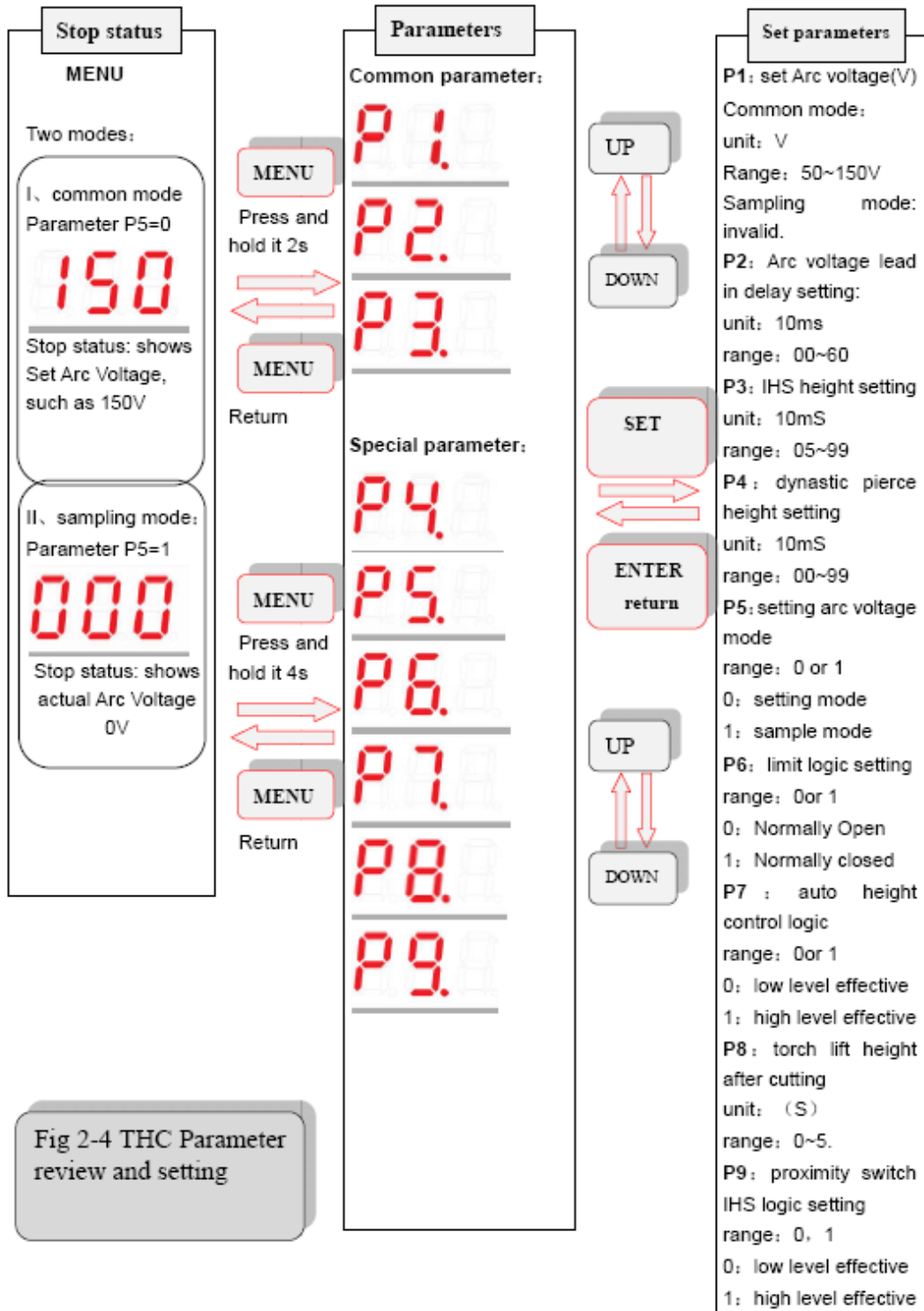2、Sensitivity of THC decides the cutting accuracy.

THC sensitivity setting:

Sensitive increases on anti-clockwise, decrease on clockwise

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

XPTHC-4 is tested on the 2800mm/min lifter, so for 1000mm/min—3000mm/min speed lifter, user no need to commission it. If user need the speed over 3000mm/min, then could decrease the sensitivity a little lower 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-4.

2.4、XPTHC-4 Parameter setting and Alarm diagnose

Stop status

MENU

Two modes:

I、common mode
Parameter P5=0

150

Stop status: shows Set Arc Voltage, such as 150V

II、sampling mode:
Parameter P5=1

000

Stop status: shows actual Arc Voltage 0V

MENU — Press and hold it 2s →

← MENU — Return

MENU — Press and hold it 4s →

← MENU — Return

Fig 2-4 THC Parameter review and setting

Parameters

Common parameter:

P1.

P2.

P3.

Special parameter:

P4.

P5.

P6.

P7.

P8.

P9.

UP / DOWN

SET →
← ENTER return

UP / DOWN

Set parameters

P1：set Arc voltage(V)
Common mode：
unit：V
Range：50~150V
Sampling mode: 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 logic setting
range：0、1
0：low level effective
1：high level effective

2.4.1、 Parameters details

Parameter No	Parameter Name	Default value	Unit	Range	Function and Description
Common parameters					
P1	ARC setting	130	V	50~250	Setting arc voltage mode effective. Set the setting arc voltage before cutting, it can be adjusted by "UP" or "DOWN"to change the setting arc voltage during cutting.
P2.	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 it will has the 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.
P3.	IHS height	0.4	10mS	05~99	This IHS height can be got from the IHS test on the operation panel. It relates to the speed of the torch lifter.
Special parameter					
P4	dynamic pierce height	0	10mS	00~99	This height is for the plasma arc piercing height, to protect the torch consumables.
P5.	ARC sampling logic	0		0、1	1、 When set "0", the setting arc voltage by "P1" set as for the cutting height during auto work. 2、 when set "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 arc voltage sample, the cutting height won't be changed during the whole cutting work until loose Arc.
P6.	Limit logic	0		0、1	0：limit Normally open；1： limit Normally closed. When the connection is not match to the "P6" parameter's setting, then the UP_limit and Down_limit LED light will be turned on.
P7.	Corner signal logic	0		0、1	0：corner logic close auto; 1: corner logic open auto Note：This signal needs to be matched 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" should be "1"; If using the NPN(NC) proximity switch, the "P9" should be "0" (NO: normally open; NC: normally closed.)

2.4.2、Alarm codes details

Alarm code instruction			
Alarm code	Description	Alarm reason	Solution
_E1_	Communication error	The cables between the operation panel and the THC control module are with connection problem	1、Connect the cables well again, checking the if it's poor contact or not; 2、Checking the wiring connection if correct or not; 3、Circuit board fault; 4、Will be solved after correct connection.
_E2._	Corner signal error	Check the connection and set of Corner signal if correct or not. If incorrect, it will be with "E2" alarm when arc start or IHS	Change the CNC auto/corner signal logic. If it couldn't be changed from CNC, then please change the "P7" parameter on 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 between the voltage divider to Plasma 2、Check the connection between the Voltage divider to THC 3、**When E3 alarm after 3S, the torch will lift to the setting height, and cut off the arc start automatically.** 4、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 actived 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 its 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-4 Connection
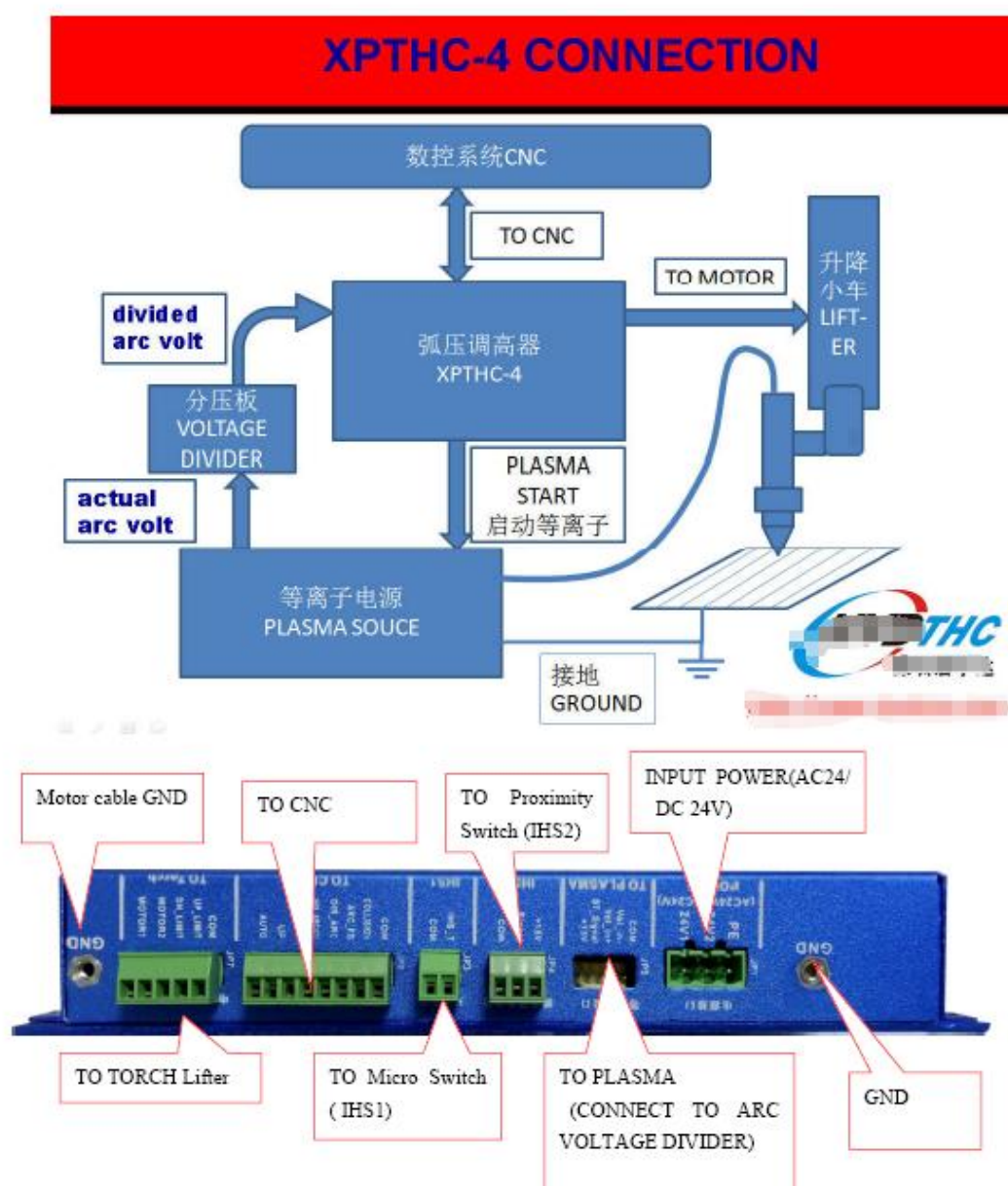
Fig 3-1 XPTHC-4 connection

3.1、 To POWER

XPTHC-4 uses 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 well Ground connected the THC's metal shell.

XPTHC-4 Voltage supply is as follow：

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

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

3.2 、TO Micro Switch(IHS1)

Micro switch IHS is with a special structure in Lifter. There's a micro switch in it, usually it's in "OPEN" status, when the IHS, the torch touch the cutting material, then it'll let the micro switch closed, and the THC will let the torch go up to the IHS height. The IHS1 connect is suitable for external isolation IHS's input signal.
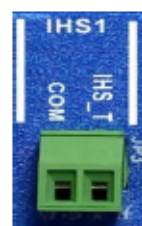
Installation of the micro switch see the Fig3-3shows.

Note：the lifter and fixture is not included in the THC (Optional to customers)

3.3、To Proximity switch（IHS2）

When XPTHC-4 is using the proximity switch HIS, should set the P9 parameter,
If there's mistake on P9 parameter setting, then will have the E5 error alarm.

If the E5 error alarm happens, then could press the "MENU" key button to recover it;

If the alarm is still existed, then meaning the proximity switch with mistake connection or operation.

Proximity switch could use NO(normally open) proximity switch,
or NC(normally close) proximity switch.

The proximity switch we offered is NPN and NO proximity switch.

Don't use the proximity switch, the P9 parameter should be "0"; When use the proximity switch, then P9 should be "1".
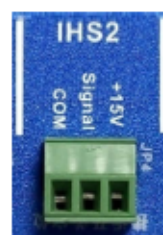
Pin(s)	Signal	Description & Ratings
1	COM	Proximity switch power, negative
2	Signal	Proximity switch signal
3	+15V	Proximity switch power, positive

Fig 3-1 proximity switch pin definition

Follow is the connection of the NPN proximity switch(NO). See Fig 3-2 shows

Fig 3-2 NPN proximity switch connection

The work process of the proximity switch: When THC gets the arc start signal from the CNC controller, the torch goes down to touch the cutting material, then the proximity switch takes off the proximity point, and send out the touch signal, after the THC gets this signal, then let the torch goes up to the IHS height(the proximity switch will auto return to original position during torch goes up). After the IHS is finished, then THC will control the plasma arc on.

In this way, it's suitable for any plasma's IHS.
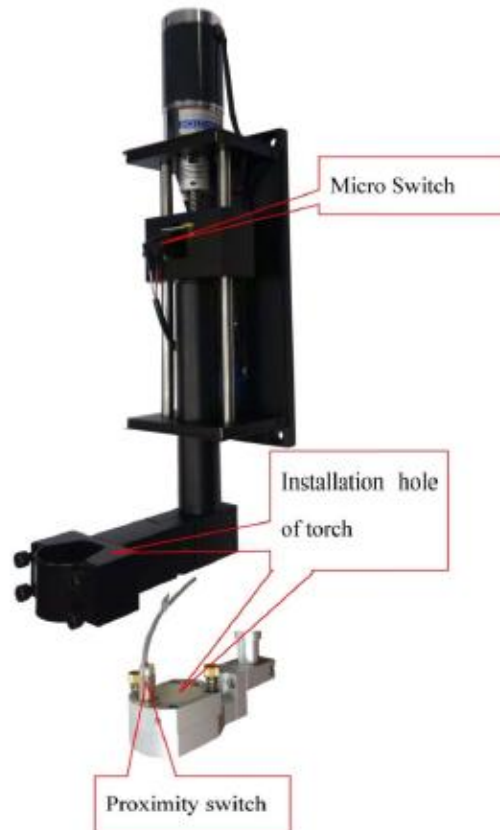
Fig 3-3 XPTHC-4 Proximity switch
and micro switch

3.4 、TO CNC

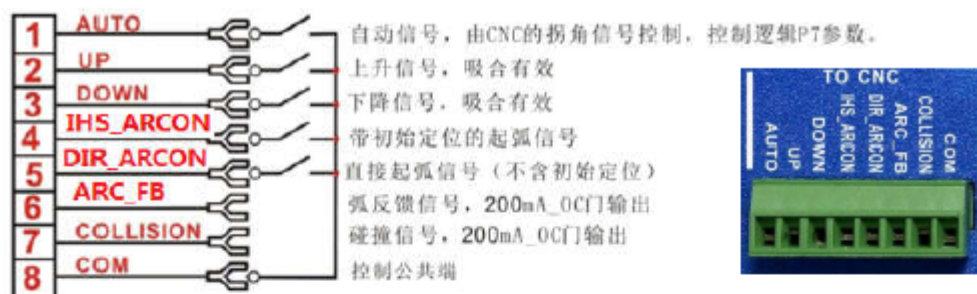Connection and pin definition see Fig 3-4 shows:

Fig 3-4 XPTHC-4 TO CNC connection

Note：

A、 ALL to CNC controller's signals use optical isolation, original set is low-level effective.

B、 Arc OK signal（arc feedback 1、arc feedback 2）is a switch signal.

C、 Arc feedback signal adopts the 200mA NPN OC door output, it could connect to the input of the CNC's arc enable directly, also could connect to the 24V/100mA Relay.

TO CNC pin definition as follow:

Pin(s)	Signal	Description & Ratings
1	EXAUTO	Auto Signal，Control level depends on P7 parameter setting, 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 IHS (IHS_ARCON)	Arc start with IHS, low-level effective Pin8 is control Com
5	EX ARC ON	Arc start without IHS, low-level effective Pin8 is control Com
6	ARC Feedback	Arc feedback output，connect to CNC's Arc enable input, via P2 parameter relay output Optical Isolation NPN OC door output，Max:200mA
7	COLLISION output	Optical Isolation NPN OC door output，Max:200mA
8	Control COM	Isolation Control COM

Table 3-2 TO CNC Pin definition

3.5 、TO TORCH

XPTHC-4 supports the DC24V motor, according to the motor Voltage, to choose the right power supply, can control the 12V~30V DC motor.
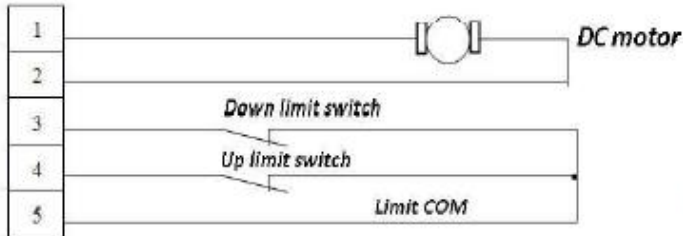

TO TORCH connection as follow Fig 3-5：

Fig 3-5 TO TORCH connection

Limit com can be revised by setting P6 parameter.

TO TORCH PIN Definition as follow：

Pin(s)	Signal	Description & Ratings
1 , 2	DC Motor Drive （Output）	DC motor drive output Drive DC24V motor directly Max 20W, PWM
3	Down LIMIT （Input）	Down limit input （Optical ISOLATED） Limit switch NC(normally Closed) Can revised via setting P6 parameter
4	Up LIMIT （Input）	Up limit input （Optical ISOLATED） Limit switch NC(normally Closed) Can revised via setting P6 parameter
5	LIMIT COM	COM

Table 3-3 TO TORCH PIN definition

3.6、TO PLASMA (Connect to the Arc Voltage divider)

XPTHC-4 has a none isolation voltage divider with arc on function.

See Fig3-6 shows：

Connection between XPTHC-4---Voltage divider---Plasma.
Please install the Voltage divider in plasma cabinet, or separate box, far away from the CNC controller circuit over 100mm distance.

Arc volt -

Arc volt +

Plasma start 1; start2

Fig 3-6： Connection between XPTHC-4 and voltage divider

3.6.1、 Voltage Divide info

Arc voltage THC must monitor the plasma's arc voltage change. Usually the arc voltage is higher than 100V during cutting, and it has strong interference when arc start, so it must use the voltage divider with 50:1... before leading into THC.

XPTHC-4 is with none Isolation voltage divider, inside the THC with 1:1 isolation.

Voltage divider see Fig 3-7 shows.

Fig 3-7, None Isolation voltage divider
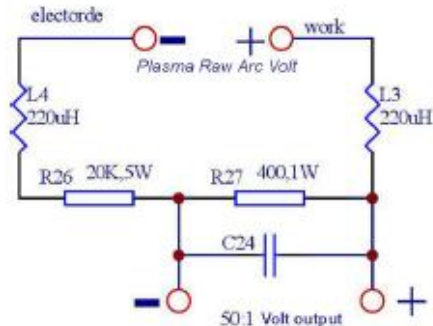
As None Isolation Voltage Divide is directly connected with Plasma Power Supply, to enable THC escape from interference caused by the HF during Plasma Arc Start, the Divided Arc Voltage guided into THC is Time-Delayed. It just needs to prolong the time of lead Arc Voltage into THC, this interference can be avoid effectively

On XPTHC-4, the delay lead in arc volt into THC is set by P2 parameter on the operation panel.

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

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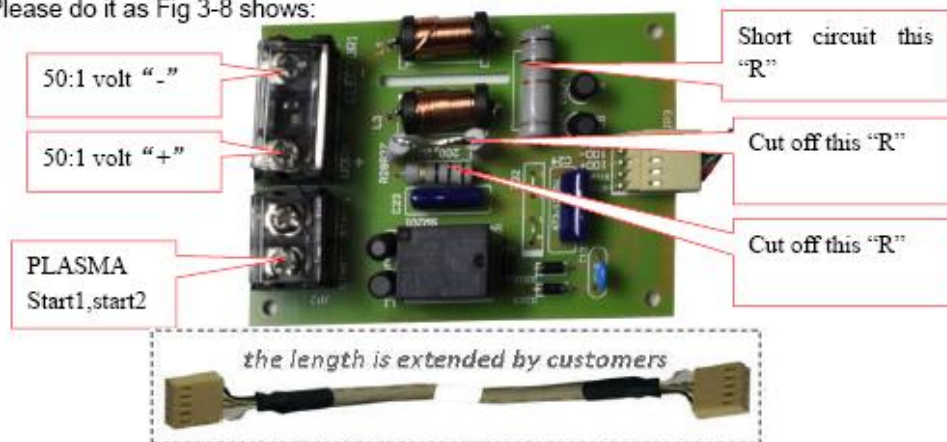
Please do it as Fig 3-8 shows:

Fig 3-8: Using the Plasma's 50:1 voltage divider solution

According to Fig 3-8 shows, only need to do with these three Resistors then could use the plasma's own voltage divider output.

4、XPTHC-4 Diagram Wiring

4.1、Complete THC wiring

See Fig4-1 shows:

Fig 4-1:THC Complete Wiring

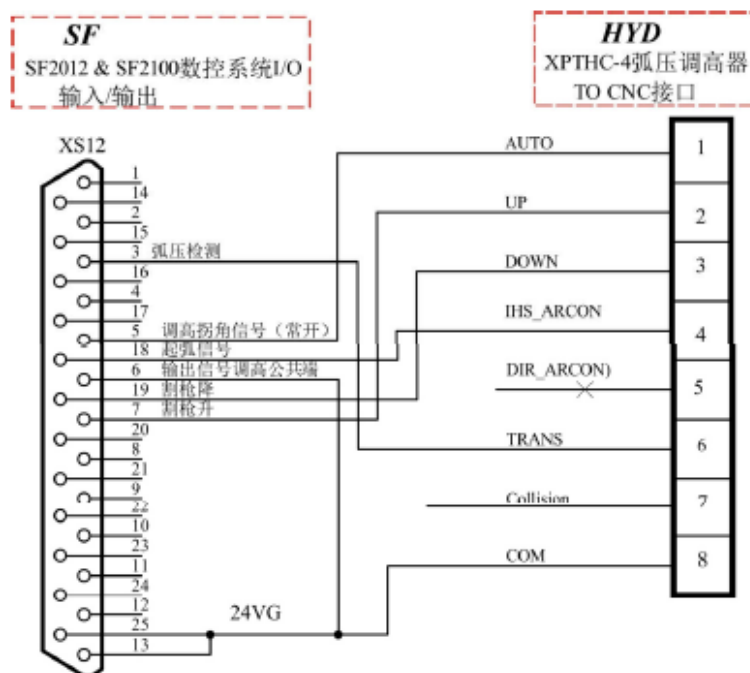## 4.2、The connection between XPTHC-4 and SF2012/SF2100 wiring

See Fig 4-2 shows :

Fig 4-2：XPTHC-4 to CNC Connection

Note：

1、 This is the direct connection to SF2012/SF2100；
2、 This CNC controller is without collision input, if you need the stop function when collision, please according to SF instruction Fig 4-3 shows:
3、 If use the PIN5 corner signal, please set the "P7" to "0" on THC
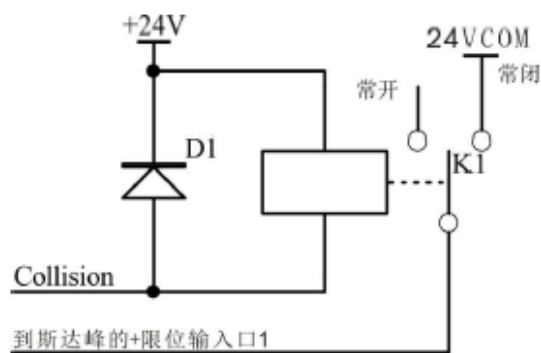4、 If for other SF CNC controller, please refer to its instruction's I/O definition.

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

4.3、The connection between XPTHC-4 and HYD2000 series wiring

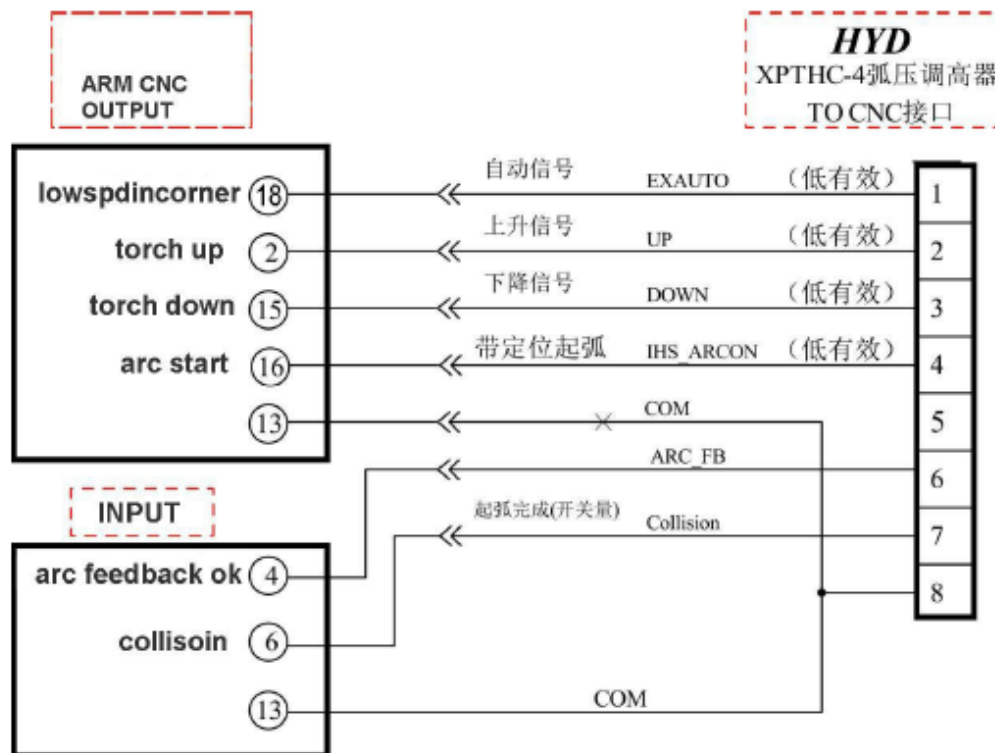XPTHC-4 to HYD2100、HYD2200、HYD2300、HYD2500 see Fig 4-4 shows:

Fig 4-4 ：XPTHC-4 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、Important：

1、XPTHC-4 is a new and smart THC with full function, while it's designed for small motor(<25W), so please don't use it for the lifter which motor is more than 30W, in avoid to any damaged.

2、XPTHC-4 performance is no relationship with plasma's current

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