Torch Height Controller (THC) SH-HC30 Manual

1. The cutting height between the torch and the plate is very important for the cutting speed and the cutting quality.
   The torch height controller (THC) SH-HC30 is specially designed for flame and plasma steel plate cutting. It mainly works with our CNC cutting controllers, such as models SH-2002AH, SH-2012AH, SH-2200H and CC series controllers.

2. Power: DC24V±2V 3A
   Control range: 3~30mm
   Precision: ±0.5mm
   Working temperature: -10~50℃
   Detecting type: capacitance for flame cutting, arc voltage for plasma cutting

3. THC components
   (1) Height controller
   (2) Torch clamp
   (3) Capacitive ring clamp (**only for flame cutting**)
   (4) Voltage divider box (**only for plasma cutting**)
   (5) High-frequency cable (**only for flame cutting**)
   (6) Plugs (9 pins and 15 pins)
   (7) Capacitive ring (**only for flame cutting**)
   (8) Capacitive ring anti-collision (**only for flame cutting**)


4. Installation & connection

   - The power must fit the THC.
   - When THC works, don't plug in/out.
   - THC shell and the metal plate must connect the ground very well.

   ### Connection of Capacitive Auto Height Adjustment for Flame Cutting

   a. Connect THC, clamp devices, capacitive ring, anti-collision device and high-frequency cable together.

15-pin port
high-frequency cable
back of CNC cutting
controller SH-2012AH
25-pin port
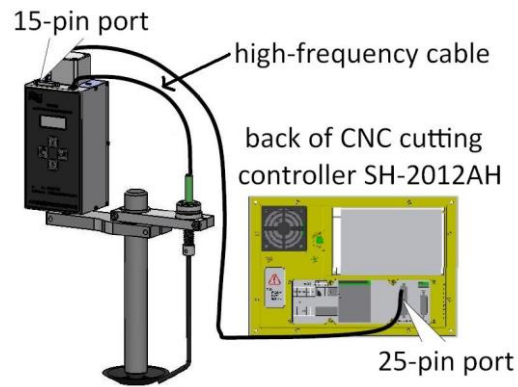
b. Connection of THC 15-pin port and CNC 25-pin port
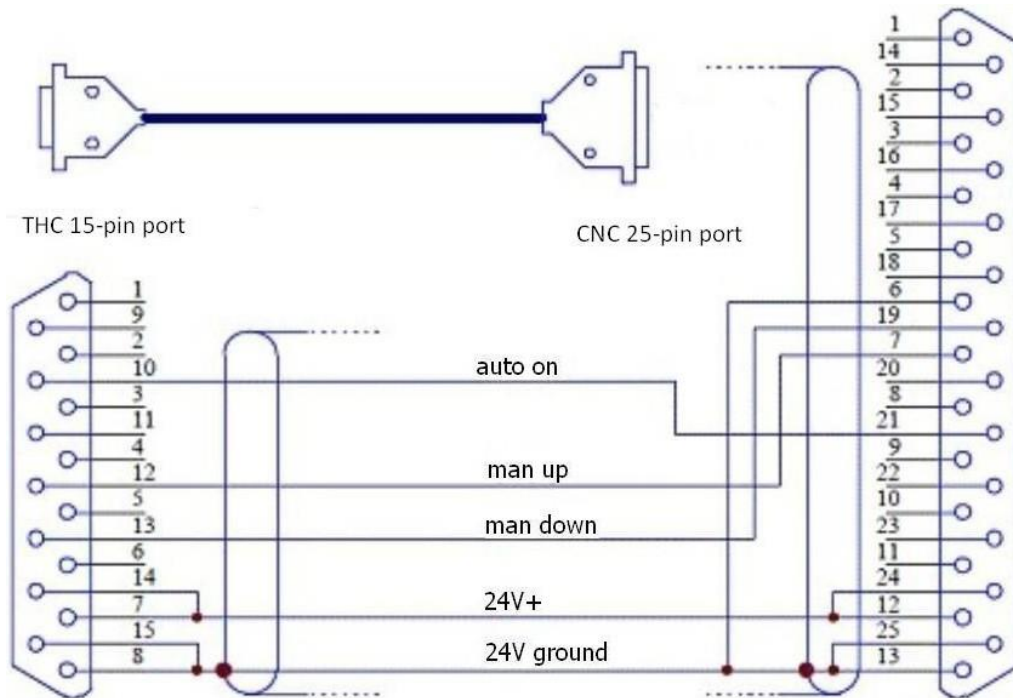
THC 15-pin port

CNC 25-pin port

auto on

man up

man down

24V+

24V ground

Note: 24V power cable and ground cable diameter should be bigger than 0.75 square millimeter.

c. THC 15-pin port definition

No.	Definition	Instrument
7, 14	Power	24V+
8, 15	Power	24V ground
10	Input	Man/auto signal
12	Input	Man up signal
13	Input	Man down signal

d. CNC 25-pin port definition

No.	Definition	Instrument
7	Output	Man up signal
12, 24	power	24V+
6, 13, 25	power	24V ground
19	Output	Man down signal
21	Output	Auto/man signal

d. If you use CNC cutting controllers SH-2002AH and SH-2012AH, you need to connect "COM", "<+" and ">-" as below
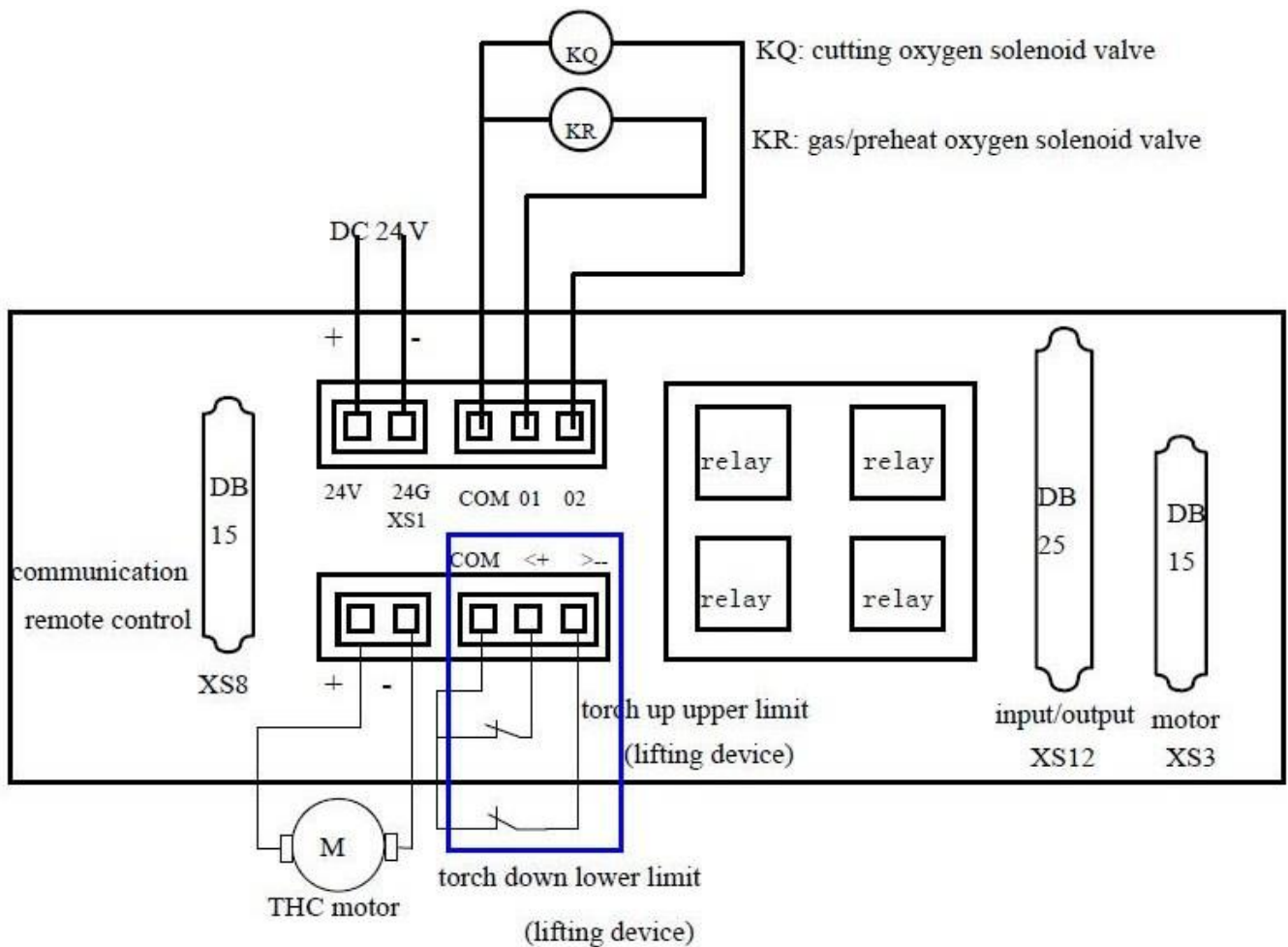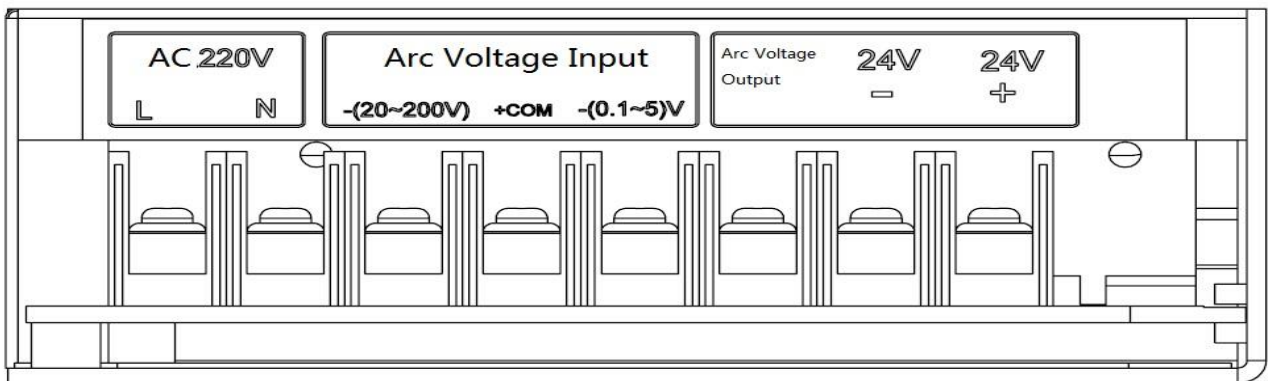

Connection of Arc-voltage Auto Height Adjustment for Plasma Cutting

a. Connect THC, torch clamp device, voltage divider board, CNC and plasma power source together.

THC

voltage divider board

plasma power source

back of CNC SH-2012AH

b. **Voltage divider box**

AC 220V		Arc Voltage Input			Arc Voltage Output	24V	24V
L	N	−(20~200V)	+COM	−(0.1~5)V		−	+
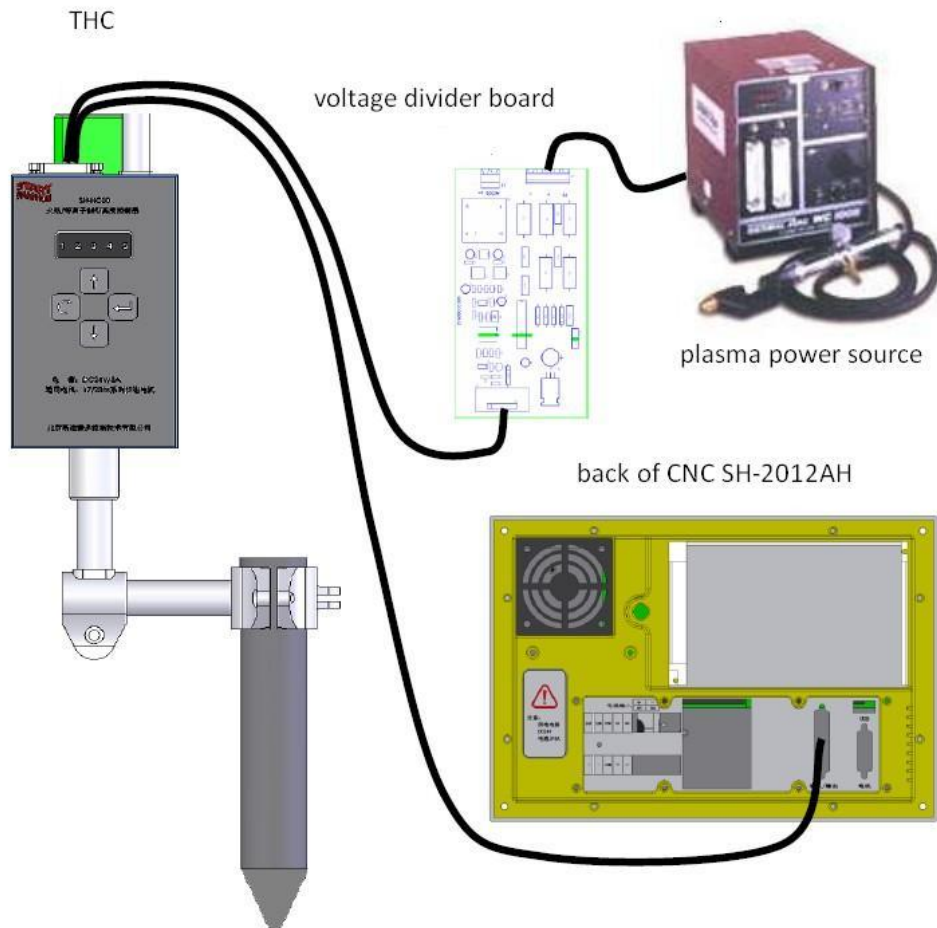
Connect AC220V.
Connect −(20~200)V & +COM with 1:1 of plasma power source, such as Hypertherm J27 & J28.

Powermax105/125

Fils du transformateur

Le fil n° 1 se branche à la borne (J28) du fil de l'électrode (−)

Le fil n° 2 se branche à la borne (J27) du câble de retour (+)

Le câble passe dans l'ouverture sous le panneau central
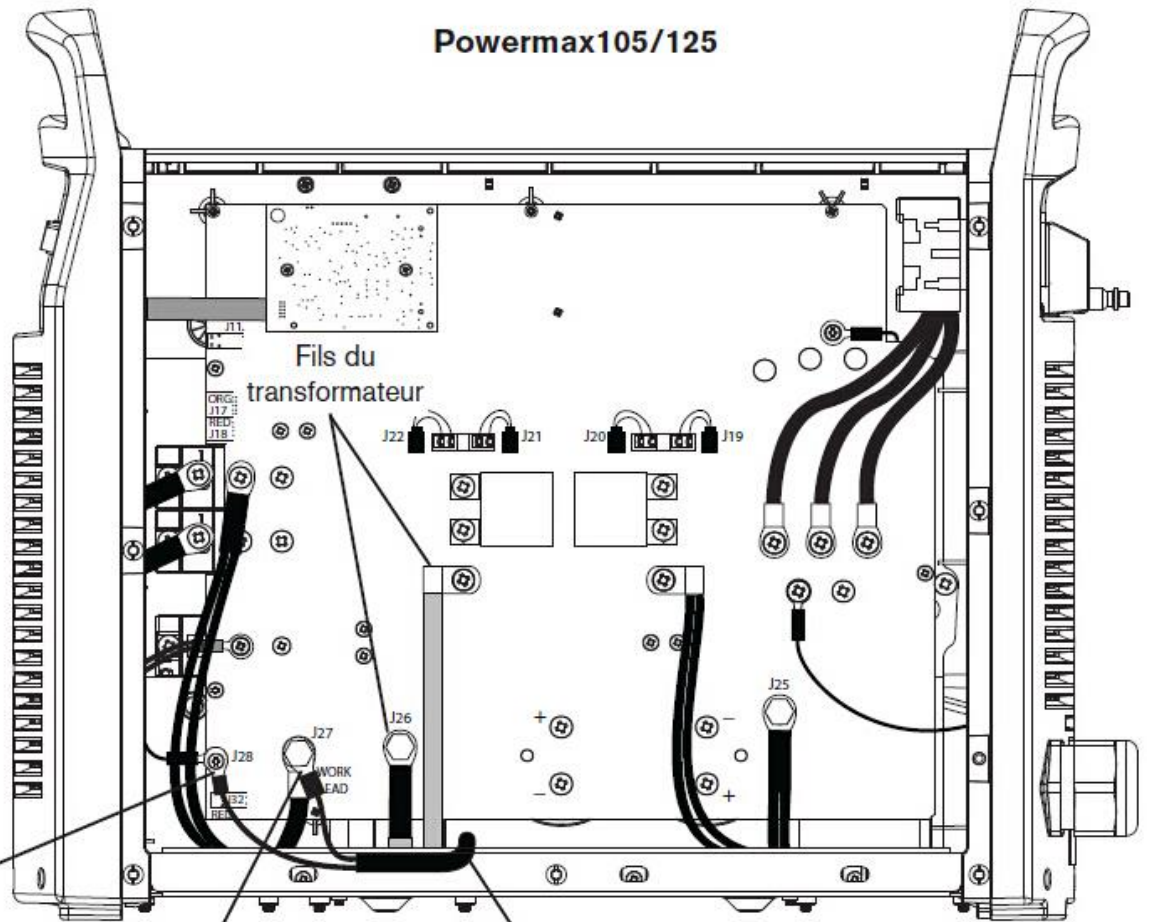
Note: the default connection is –(20~200)V.

If you are not sure where is 1:1 of plasma power source, you can connect –(0.1~5)V & +COM with 50:1 of plasma power source. But need to change the jump wire inside the divider box. Open it, break JP2 and connect JP1.

Connect "Arc voltage output" with pin 4 of SH-HC30.
Connect DC24V+/-.

c. Connection of voltage divider box, THC and CNC SH-2012AH
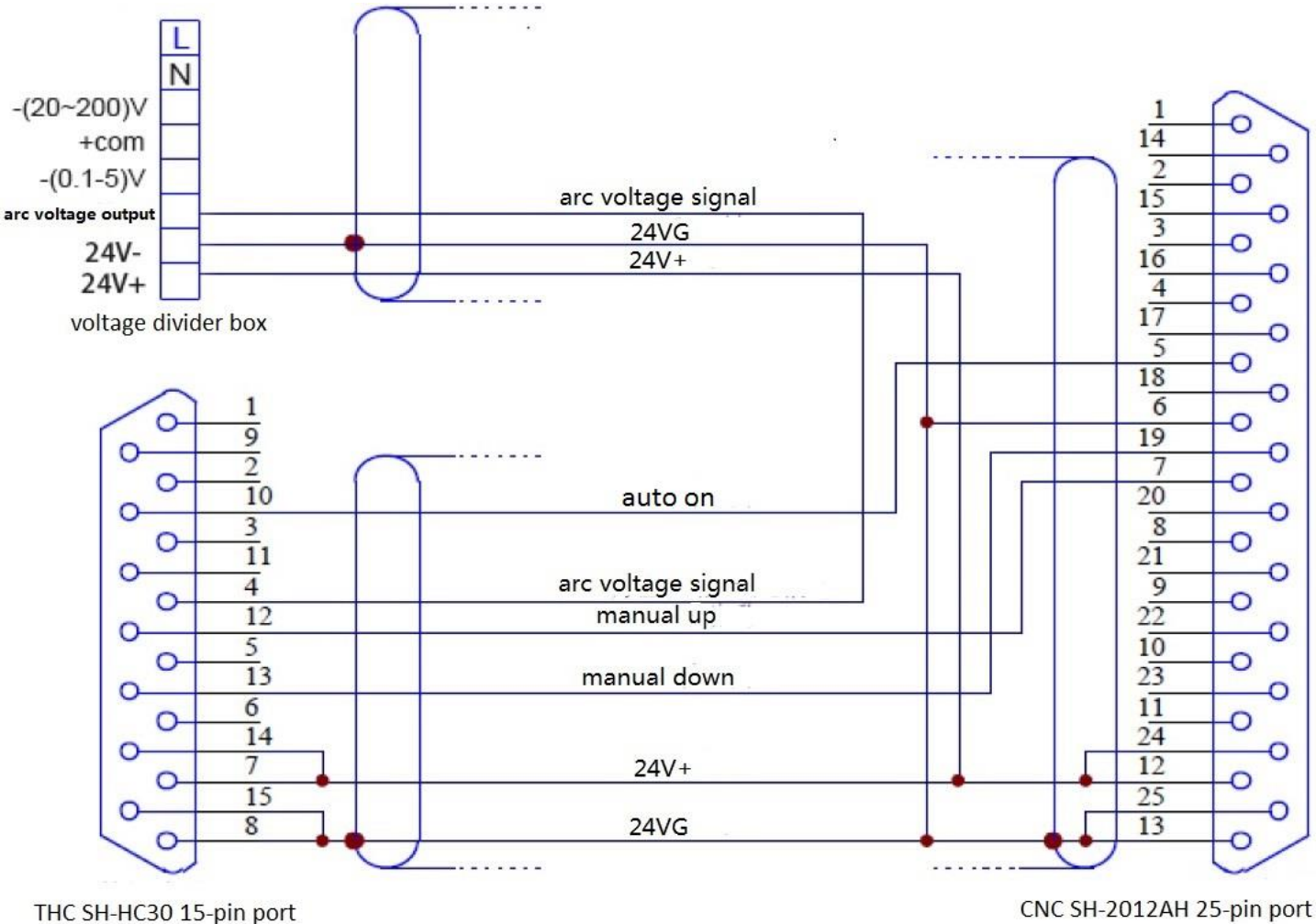
THC SH-HC30 15-pin port   CNC SH-2012AH 25-pin port

Note: 24V power cable and ground cable diameter should be bigger than 0.75 square millimeter.

d. THC 15-pin port definition

No.	Definition	Instrument
4	Input	Arc voltage (torch height) signal
7, 14	Power	24V+
8, 15	Power	24V ground
10	Input	Man/auto signal
12	Input	Man up signal
13	Input	Man down signal

e. CNC 25-pin port definition

No.	Definition	Instrument
5	Output	Man/auto signal
7	Output	Man up signal
12, 24	power	24V+
6, 13, 25	power	24V ground
19	Output	Man down signal

f. If you use CNC cutting controllers SH-2002AH and SH-2012AH, you need to connect "COM", "<+" and ">-" as below,
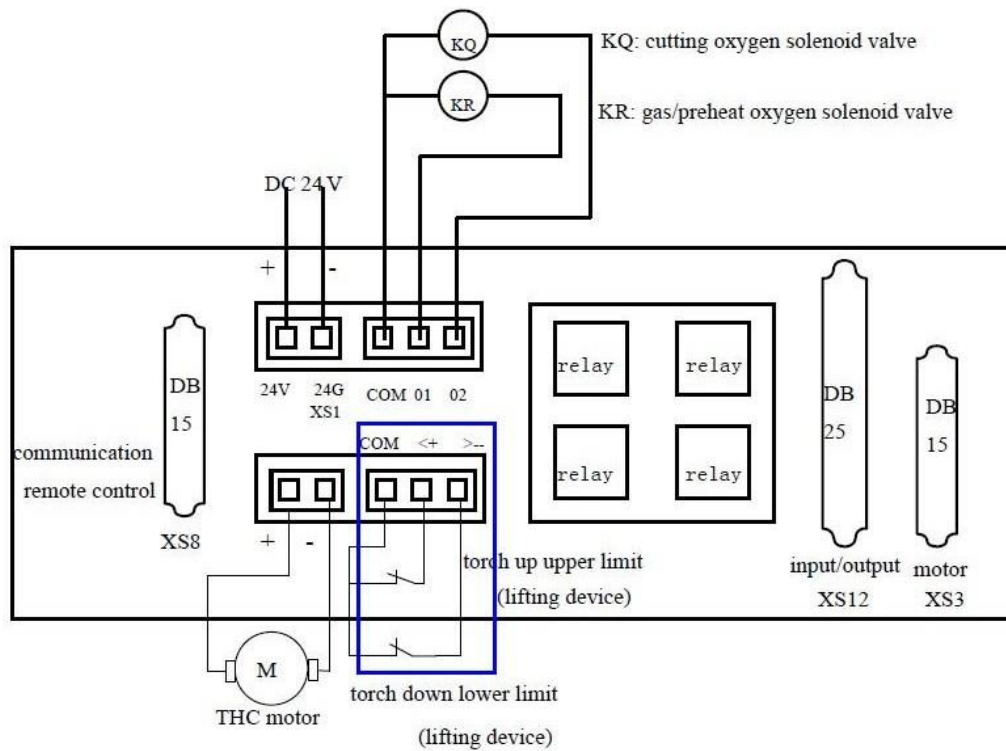
g. Pin6 and Pin18 of CNC 25-pin port need connect the start signal of plasma power source.

Integration of Flame (capacitance) & Plasma (arc voltage) Cutting

THC SH-HC30 15-pin port

CNC SH-2012AH 25-pin port
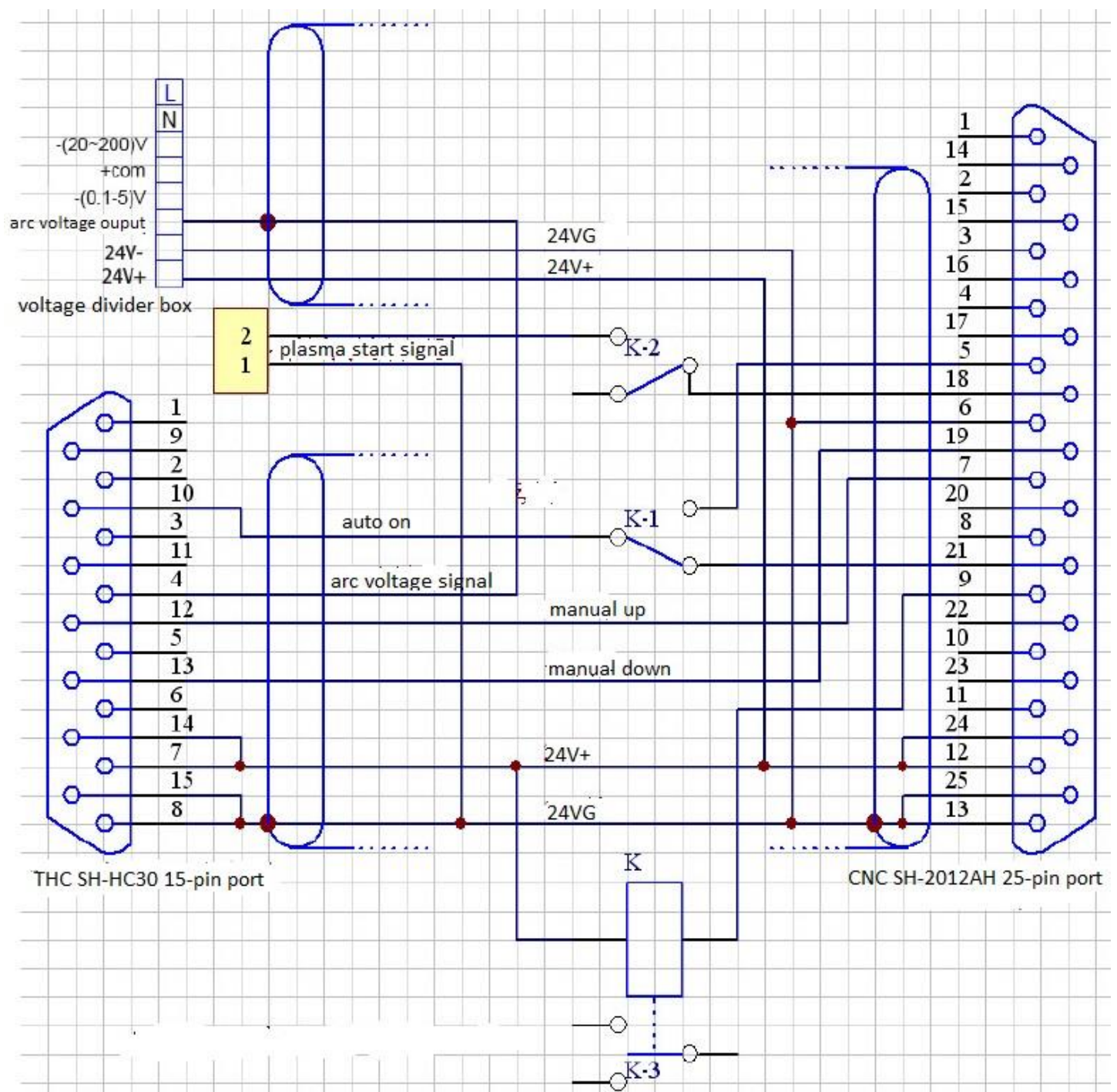
b. THC 15-pin port definition

No.	Definition	Instrument
4	Input	Arc voltage (torch height) signal
7, 14	Power	24V+
8, 15	Power	24V ground
10	Input	Man/auto signal
12	Input	Man up signal
13	Input	Man down signal

c. CNC 25-pin port definition

No.	Definition	Instrument
5	Output	Man/auto signal
7	Output	Man up signal
9	Output	Flame/plasma switch

12, 24	power	24V+
13, 25	power	24V ground
19	Output	Man down signal
21	Output	Man/auto signal

d. If you use CNC cutting controllers SH-2002AH and SH-2012AH, you need to connect "COM", "<+" and ">-" as below,
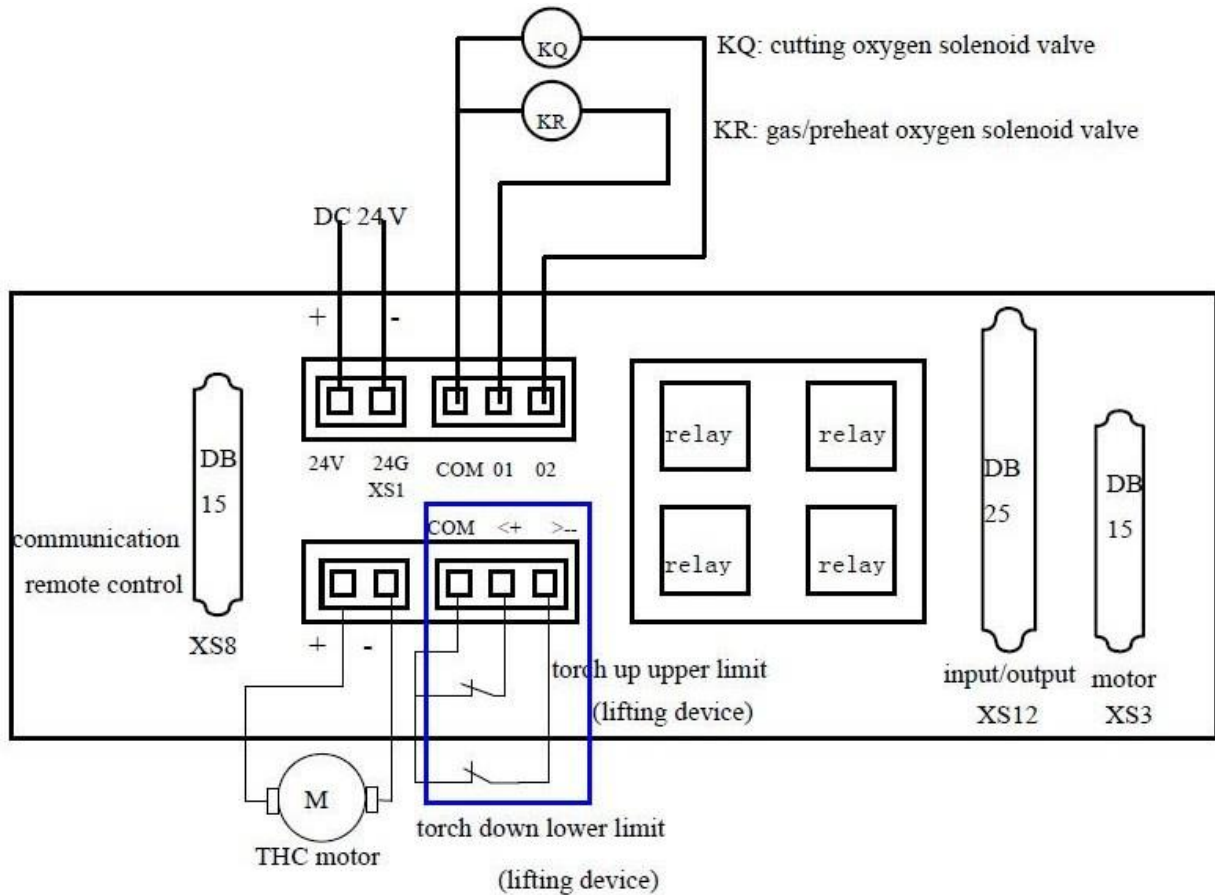
e. Pin6 and Pin18 of CNC 25-pin port need connect the start signal of plasma power source.

5. THC Panel
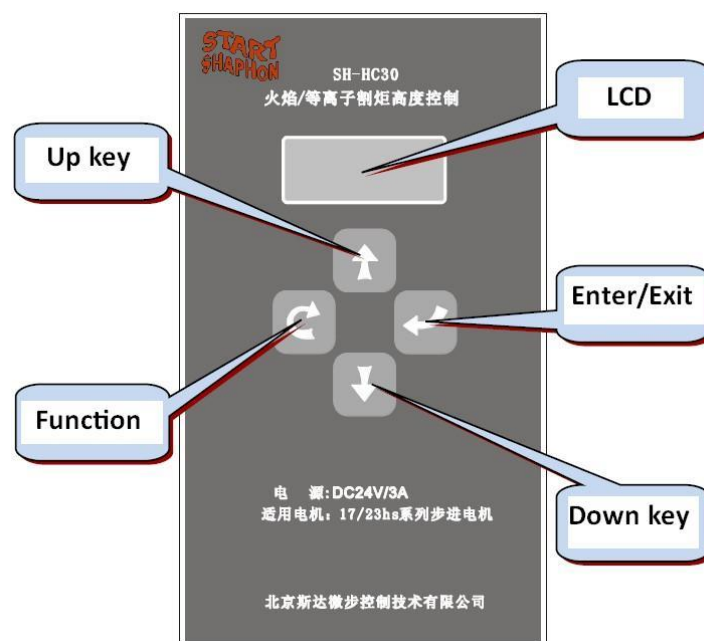
Enter/Exit: enter or exit the edit state, press the key longer time to enter the edit state.

Function: in the manual mode, it's for one-key calibration. In the edit state, it's to choose different parameters.

Up: in auto/manual mode, height value +1; in the edit state, the parameter value +1.

Down: in auto/manual mode, height value -1; in the edit state, the parameter value -1.

LCD: in manual mode, it shows detection type, operation state and height set value; in auto mode, it shows detect type, run state and current height value; in the edit state, it shows parameters and their values.

6. LCD display

In the manual mode, the first digit shows the detection type, the second digit shows the operation state, the last three digits shows the height set value.

The first digit: (C): capacitance detection type (flame cutting); (U): arc voltage detection type (plasma cutting).

The second digit: when no operation, and flash; when manually up, show ; when manually down, shows .

The last three digits: capacitance type, 1-digit number after decimal point, unit mm; arc voltage type, no decimals, unit V.

In the auto mode, the first digit shows the detection type (as above), the second digit shows run state, and the last three digits show the current height value.

The second digit: keep for torch up in high speed; flash for torch up in adjust speed; keep for torch down in high speed; flash for torch down in adjust speed; flash for torch in good position.

The last three digits: flash for high position alarm; flash for low position alarm.

The last four digits: for upper limit; for lower limit.

In the edit state: the first digit is parameter name, the second digit is = , the last three digits show parameter value.

The first digit:

(H): upper limit value, height is bigger than it, high position alarm, torch only moves down, can' up.

(L): lower limit value, height is smaller than it, low position alarm, torch only moves up, can't down.

(A): height (between the torch and the plate) you want.

(E): dead area value. When the actual height is A±E, the torch height doesn't adjust.

(d): adjust speed area value. A-E-d~A-E and A+E~A+E+d

(C): detection type. 0 is for arc voltage detection; 1 is for capacitive detection.

(b): For the capacitive detection, when the detecting height is bigger than b value, the torch doesn't move down; when the height is lower than b, automatic height control continues. For the arc voltage detection, manually move the torch down, touch the zero point signal, the torch moves up to b mm.

7. Parameter values

		H	L	A	E	d	C	b
Arc Voltage	Range(v)	100~300	10~40	20~200	0~20	0~100	0~1	0~50
	Default(v)	280	10	80	3	5	0	5
Capacitance	Range(v)	20.0~	3.0~10.0	6.0~25.0	0.0~4.0	0.0~4.0	0~1	2.0~30.0
	Default(v)	25.0	4.0	10.0	0.3	2.0	1	25.0

7. One-key calibration (capacitance type /flame cutting)
The capacitive ring detects the capacitance between the ring and the plate, and then adjusts the height (distance).

Usually the cutting situation (temperature, humidity, humidity, etc.) affects the accuracy of height detection. But we have a function of "one-key calibration" that can automatically adjust and set to have good height detection during 3-30mm.

One-key calibration
1) Keep parallel between the capacitive ring and the plate.
2) Turn on the THC.
3) Set THC to the capacitive mode.
4) Manually make the capacitive ring to touch the plate.
5) Press the "Function" key longer time, "one-key calibration " function automatically works as below, Torch rises to 30mm height by five steps, then fall to about 10mm height and stop.

The following situations need one-key calibration,
1) The first time to use the THC.
2) Working situation changes
3) When the actual height is different from the height value in LCD