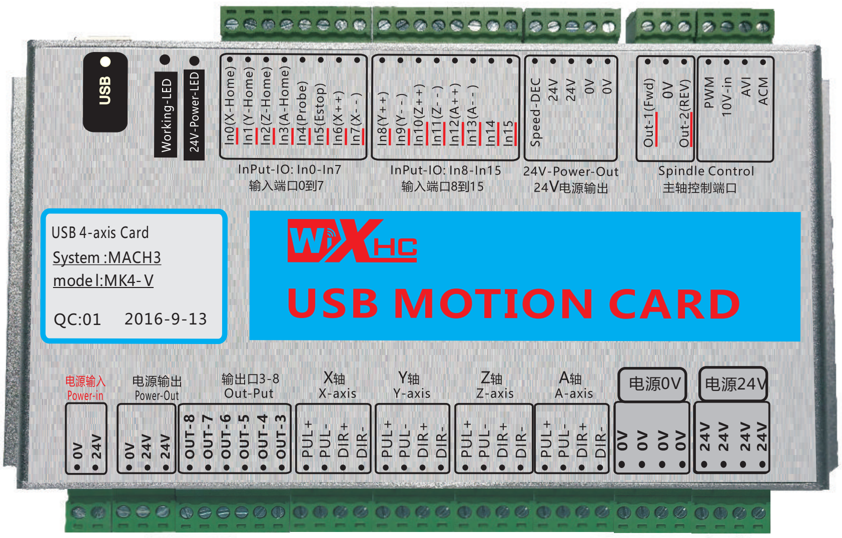
ChengDu XinHeCheng Technology Co.,Ltd

www.cdxhctech.com

SUPPORT CNC SYSTEM:
MACH3 Only

MACH3 Breakout Board

MKX-V Specification

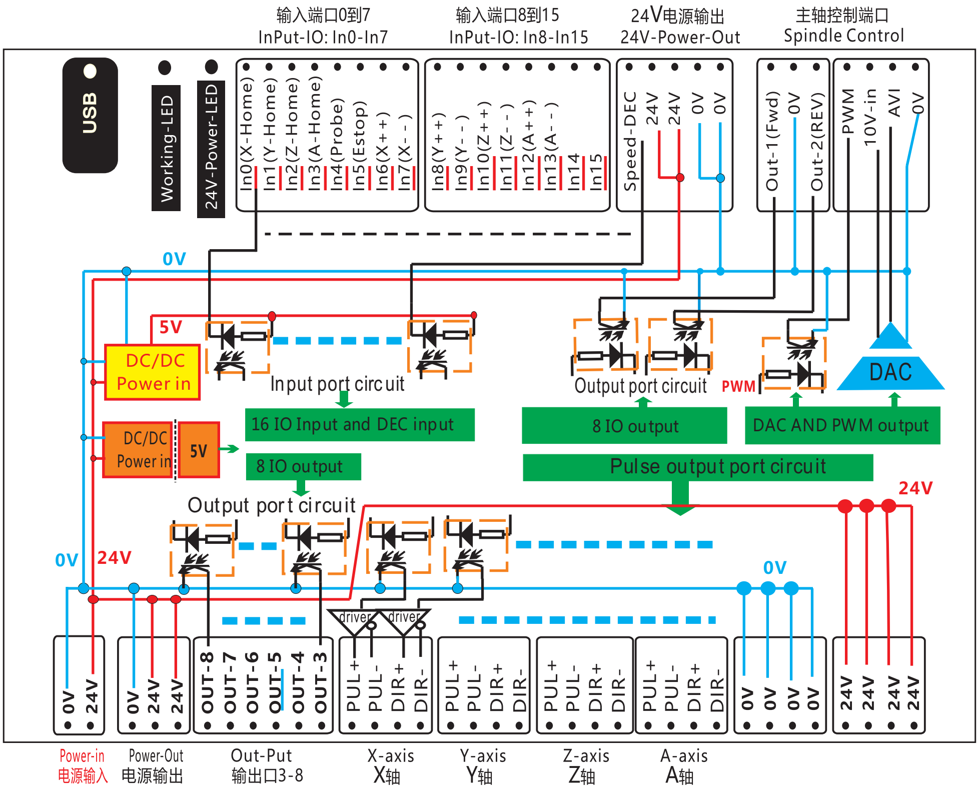

USB
Working-LED
24V-Power-LED
In0(X-Home)
In1(Y-Home)
In2(Z-Home)
In3(A-Home)
In4(Probe)
In5(Estop)
In6(X++)
In7(X--)
InPut-IO: In0-In7
输入端口0到7
In8(Y++)
In9(Y--)
In10(Z++)
In11(Z--)
In12(A++)
In13(A--)
In14
In15
InPut-IO: In8-In15
输入端口8到15
Speed-DEC
24V
24V
0V
0V
24V-Power-Out
24V电源输出
Out-1(Fwd)
0V
Out-2(REV)
PWM
10V-in
AVI
ACM
Spindle Control
主轴控制端口
USB 4-axis Card
System :MACH3
mode l:MK4- V
QC:01 2016-9-13
USB MOTION CARD
电源输入
Power-in
0V
24V
电源输出
Power-Out
0V
24V
24V
输出口3-8
Out-Put
OUT-8
OUT-7
OUT-6
OUT-5
OUT-4
OUT-3
X轴
X-axis
Y轴
Y-axis
Z轴
Z-axis
A轴
A-axis
PUL+
PUL-
DIR+
DIR-
电源0V
0V
0V
0V
0V
电源24V
24V
24V
24V
24V

Size:184x127x30mm

Model No.:
MK3-V: USB Cable, 3 Axis Breakout Board
MK4-V: USB Cable, 4 Axis Breakout Board
MK6-V: USB Cable, 6 Axis Breakout Board

Hardware Instruction

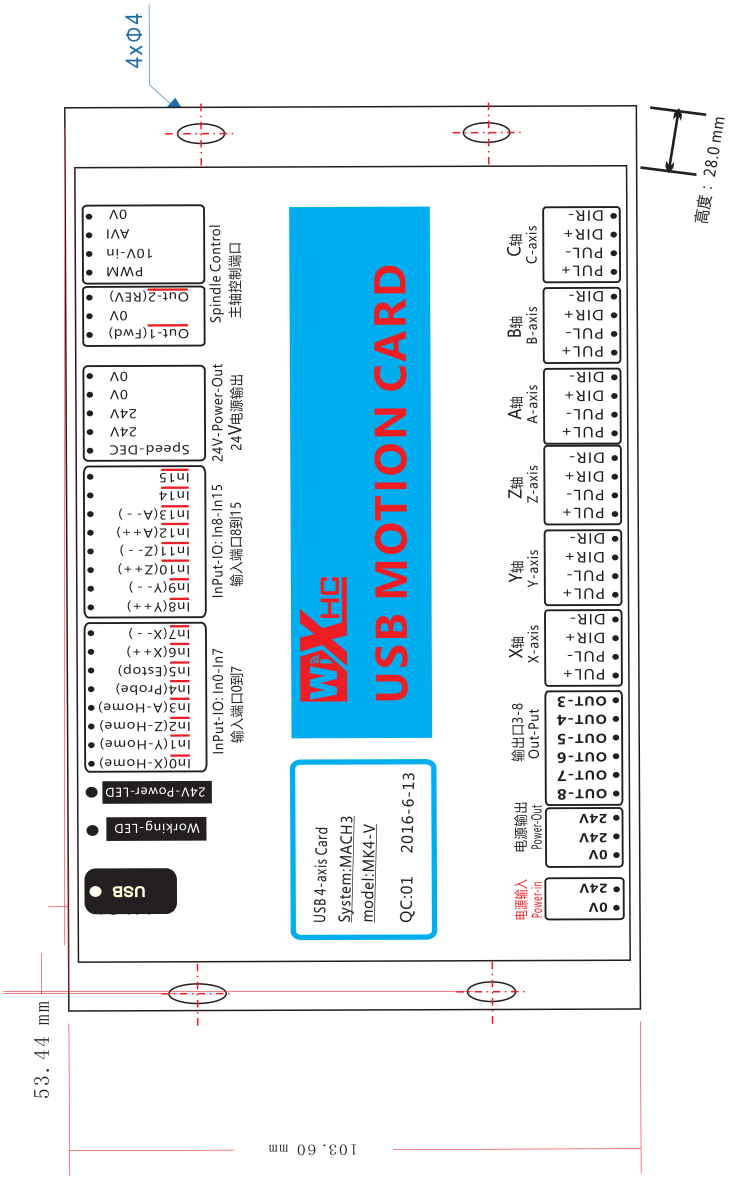
内部原理图


输入端口0到7
InPut-IO: In0-In7
输入端口8到15
InPut-IO: In8-In15
24V电源输出
24V-Power-Out
主轴控制端口
Spindle Control
USB
Working-LED
24V-Power-LED
In0(X-Home)
In1(Y-Home)
In2(Z-Home)
In3(A-Home)
In4(Probe)
In5(Estop)
In6(X++)
In7(X--)
In8(Y++)
In9(Y--)
In10(Z++)
In11(Z--)
In12(A++)
In13(A--)
In14
In15
Speed-DEC
24V
24V
0V
0V
Out-1(Fwd)
0V
Out-2(REV)
PWM
10V-in
AVI
0V
0V
5V
DC/DC
Power in
Input port circuit
16 IO Input and DEC input
Output port circuit
PWM
DAC
8 IO output
DAC AND PWM output
Pulse output port circuit
DC/DC
Power in
5V
8 IO output
Output port circuit
24V
0V
24V
0V
driver
driver
0V
24V
0V
24V
24V
OUT-8
OUT-7
OUT-6
OUT-5
OUT-4
OUT-3
PUL+
PUL-
DIR+
DIR-
PUL+
PUL-
DIR+
DIR-
PUL+
PUL-
DIR+
DIR-
PUL+
PUL-
DIR+
DIR-
0V
0V
0V
0V
24V
24V
24V
24V
Power-in
电源输入
Power-Out
电源输出
Out-Put
输出口3-8
X-axis
X轴
Y-axis
Y轴
Z-axis
Z轴
A-axis
A轴

schematic diagram
控制卡内部原理图

Hardware Instruction

External Dimension


4xΦ4
高度：28.0 mm
53.44 mm
103.60 mm
USB MOTION CARD
Spindle Control
主轴控制端口
PWM
10V-in
AVI
0V
Out-1(Fwd)
0V
Out-2(REV)
24V-Power-Out
24V电源输出
Speed-DEC
24V
24V
0V
0V
InPut-IO: In8-In15
输入端口8到15
In8(Y++)
In9(Y--)
In10(Z++)
In11(Z--)
In12(A++)
In13(A--)
In14
In15
InPut-IO: In0-In7
输入端口0到7
In0(X-Home)
In1(Y-Home)
In2(Z-Home)
In3(A-Home)
In4(Probe)
In5(Estop)
In6(X++)
In7(X--)
24V-Power-LED
Working-LED
USB
USB 4-axis Card
System:MACH3
model:MK4-V
QC:01
2016-6-13
C轴 C-axis
B轴 B-axis
A轴 A-axis
Z轴 Z-axis
Y轴 Y-axis
X轴 X-axis
PUL+
PUL-
DIR+
DIR-
输出口3-8
Out-Put
OUT-3
OUT-4
OUT-5
OUT-6
OUT-7
OUT-8
电源输出
Power-Out
24V
24V
0V
电源输入
Power-in
24V
0V

Hardware Instruction

Singal Instruction

Input signal

Offer 16pcs Input IO, All IO active low, input current 5mA, support 6-24V signal input.

Signal explanation as follow:

X-HOME：X Axis home signal input, corresponding MACH3 input IO is：P1. 0

Y-HOME：Y axis home signal input, corresponding MACH3 input IO is：P1. 1

Z-HOME：Z Axis home signal input, corresponding MACH3 input IO is：P1. 2

A-HOME：AAxis home signal input, corresponding MACH3 input IO is：P1. 3

PROBE: Tool setting signal input, corresponding MACH3 input IO is：P1. 4

IN5-IN15：Input IO，MACH3 Input IO are：P1. 5-P1.15

Inverter

MKX support spindle speed adjustment, support inverter port or PWM port.

MKX spindle port speed adjustment output, support 2 types：0-10V analog voltage output or 0-5V analog voltage output or 5V PWM signal output

When you are using analog voltage output for speed adjustment, you need to offer DC voltage to our breakout board, DC voltage value related to max analog voltage output value. For example, DC voltage output:10V, and analog voltage output will be between 0-10V.

Hardware Instruction

Specification

Power Supply

Before make it work, you need to offer DC24V power to our Breakout board.

Output

MKX-V offer 8pcs expandable Output IO, all IO active low;

Drive current 50mA,Support max 24V signal.

Spindle forward:OUT1：Corresponding MACH3output configuration is P1. 0

Spindle reverse：OUT2 : Corresponding MACH3 Output configuration is P1. 1

Expandable Output IO 3–8：OUT3-8：Corresponding MACH3 Output configuration are：P1. 2-P1.7

Axis drive port

MKX offer max support 6 axis drive,MK3-V support 3 Axis, MK4-V support 4 Axis, MK6-V support 6 Axis. 。

MKX support Stepper/Servo drive, support pulse+Direction output and differential Output, support max frequency of pulse output is 2000KHZ

Drive current is 20mA

Main function and advantages

Features:

★ Fully supporting all Mach3 versions

★ Support save data when power off

★ Support spindle speed feedback

★ Support 3 meters USB cable

★ Supports Up 6-axis

★ Maximum step-pulse frequency is 2000KHz

★ Status indicator LED can be useful to show the USB connection, and working status by flashing.

★ 16 general-purpose input,8 output

★ has speed function, the spindle actual speed Mach3 interface in real-time display

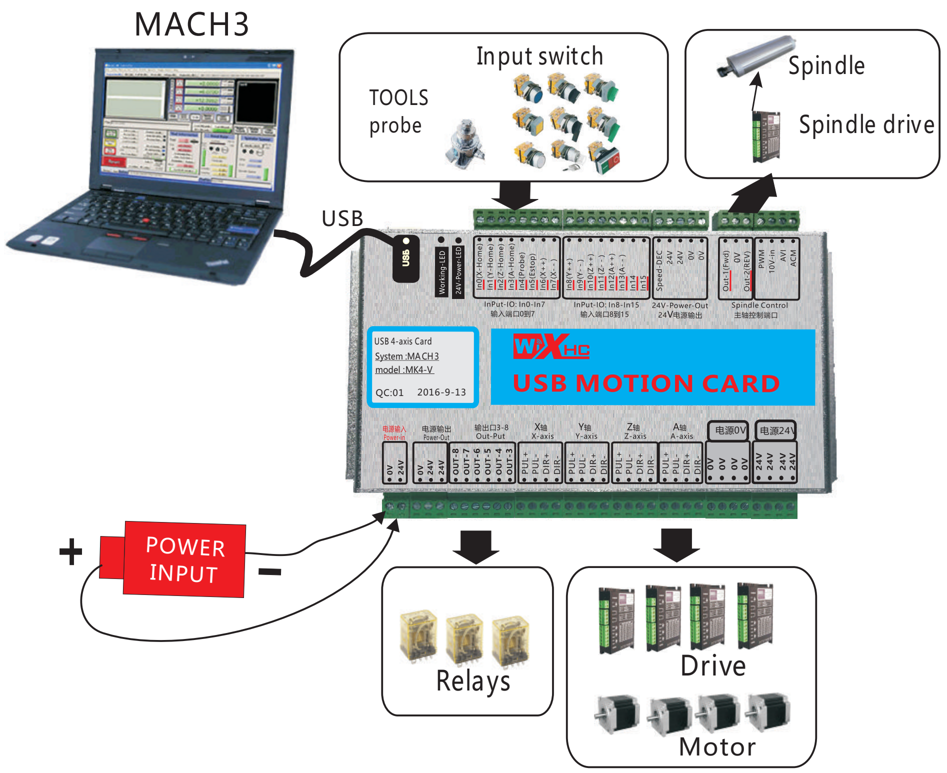
★ all IO-port isolation, interference, stable performance

★ Full support for USB hot-swappable, the card is Monitoring USB connection status at any time.

Simple connection description

Application Connection Diagram

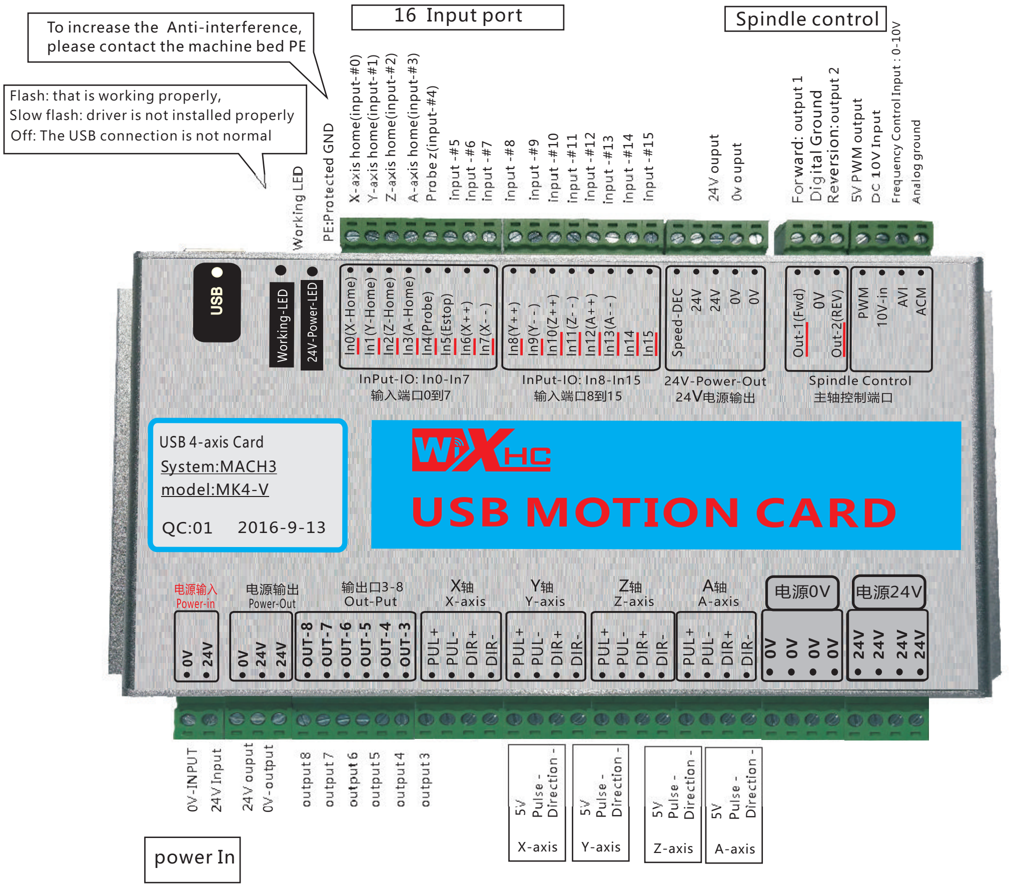
USB Motion Control Card Application


MACH3
USB
Input switch
TOOLS
probe
Spindle
Spindle drive
USB 4-axis Card
System :MACH3
model :MK4-V
QC:01 2016-9-13
USB MOTION CARD
+
POWER
INPUT
−
Relays
Drive
Motor

Support: 3-axis or 4-axis, or 6-axis

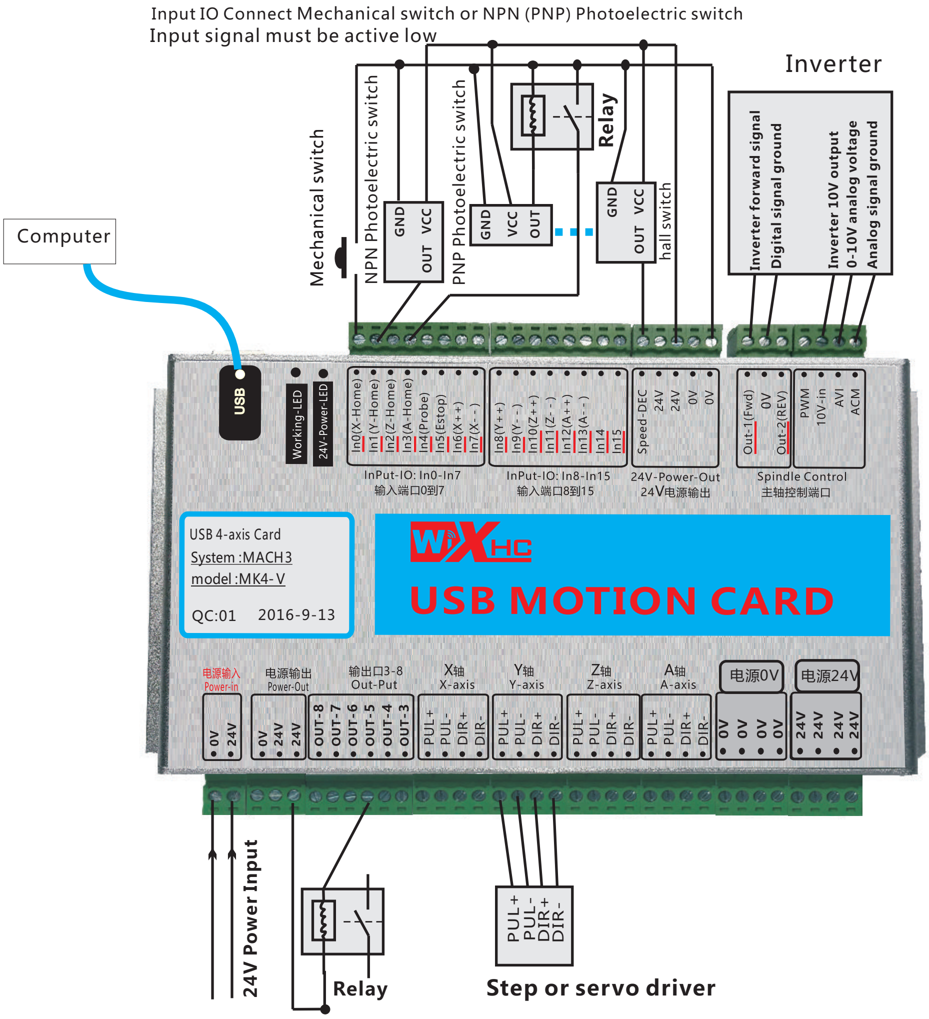
Mk3-V: 3-axis; Mk4-V: 4-axis: Mk6-V: 6-axis

Signal Description


To increase the Anti-interference, please contact the machine bed PE
Flash: that is working properly,
Slow flash: driver is not installed properly
Off: The USB connection is not normal
16 Input port
Spindle control
Working LED
PE:Protected GND
X-axis home(input-#0)
Y-axis home(input-#1)
Z-axis home(input-#2)
A-axis home(input-#3)
Probe z(input-#4)
input -#5
input -#6
input -#7
input -#8
input -#9
input -#10
input -#11
input -#12
input -#13
input -#14
input -#15
24V ouput
0v ouput
Forward: output 1
Digital Ground
Reversion:output 2
5V PWM output
DC 10V Input
Frequency Control Input : 0-10V
Analog ground
USB
Working-LED
24V-Power-LED
In0(X-Home)
In1(Y-Home)
In2(Z-Home)
In3(A-Home)
In4(Probe)
In5(Estop)
In6(X++)
In7(X--)
In8(Y++)
In9(Y--)
In10(Z++)
In11(Z--)
In12(A++)
In13(A--)
In14
In15
Speed-DEC
24V
24V
0V
0V
Out-1(Fwd)
0V
Out-2(REV)
PWM
10V-in
AVI
ACM
InPut-IO: In0-In7
输入端口0到7
InPut-IO: In8-In15
输入端口8到15
24V-Power-Out
24V电源输出
Spindle Control
主轴控制端口
USB 4-axis Card
System:MACH3
model:MK4-V
QC:01 2016-9-13
USB MOTION CARD
电源输入
Power-in
电源输出
Power-Out
输出口3-8
Out-Put
X轴
X-axis
Y轴
Y-axis
Z轴
Z-axis
A轴
A-axis
电源0V
电源24V
0V
24V
0V
24V
24V
OUT-8
OUT-7
OUT-6
OUT-5
OUT-4
OUT-3
PUL+
PUL-
DIR+
DIR-
0V
0V
0V
0V
24V
24V
24V
24V
0V-INPUT
24V Input
24V ouput
0V-output
output 8
output 7
output 6
output 5
output 4
output 3
5V
Pulse -
Direction -
X-axis
Y-axis
Z-axis
A-axis
power In

Wiring diagram shows

NOTE: If the inverter is turned on, the control card is not working properly because of interference caused by the inverter; Replace inverter.


Input IO Connect Mechanical switch or NPN (PNP) Photoelectric switch
Input signal must be active low
Inverter
Computer
Mechanical switch
NPN Photoelectric switch
GND
VCC
OUT
PNP Photoelectric switch
GND
VCC
OUT
Relay
GND
VCC
OUT
hall switch
Inverter forward signal
Digital signal ground
Inverter 10V output
0-10V analog voltage
Analog signal ground
USB
Working-LED
24V-Power-LED
In0(X-Home)
In1(Y-Home)
In2(Z-Home)
In3(A-Home)
In4(Probe)
In5(Estop)
In6(X++)
In7(X--)
In8(Y++)
In9(Y--)
In10(Z++)
In11(Z--)
In12(A++)
In13(A--)
In14
In15
Speed-DEC
24V
24V
0V
0V
Out-1(Fwd)
0V
Out-2(REV)
PWM
10V-in
AVI
ACM
InPut-IO: In0-In7
输入端口0到7
InPut-IO: In8-In15
输入端口8到15
24V-Power-Out
24V电源输出
Spindle Control
主轴控制端口
USB 4-axis Card
System :MACH3
model :MK4-V
QC:01 2016-9-13
USB MOTION CARD
电源输入
Power-in
电源输出
Power-Out
输出口3-8
Out-Put
X轴
X-axis
Y轴
Y-axis
Z轴
Z-axis
A轴
A-axis
电源0V
电源24V
0V
24V
0V
24V
24V
OUT-8
OUT-7
OUT-6
OUT-5
OUT-4
OUT-3
PUL+
PUL-
DIR+
DIR-
0V
0V
0V
0V
24V
24V
24V
24V
24V Power Input
Relay
PUL+
PUL-
DIR+
DIR-
Step or servo driver

Electrical Characteristics

	Parameter Description	
axis output control:	Drive Current	Isolated open collector output; 5V, 20mA
	Drive	Pulse + direction output
	Output frequency	2000KHZ
	axes	MK3-V:3-axis;MK4-V:4-axis;MK6-V:6-axis
	Isolation Voltage	3.5KV
Spindle inverter output: 3 types of output modes	Analog voltage output	0—10V
	PWM output	5V,1KHZ, Duty;0-100%
	Pulse+direction output	5V,15HZ to 4KHZ
8 IO output	Drive Current	Isolation:50mA, 25V
	Isolation Voltage	3.5KV
16 IO intput	Input Current	Isolated inputs, 5 mA, maximum voltage 25V
	Isolation Voltage	3.5KV
USB interface	Complies with USB2.0 standard	

- Install your mach3 software to PC which you control your CNC Machine.

- Connect our usb cable between our card and your PC, wait a few minutes Until usb driver finish installation automatically.

- Copy our configuration and driver files to mach3 folder we required.

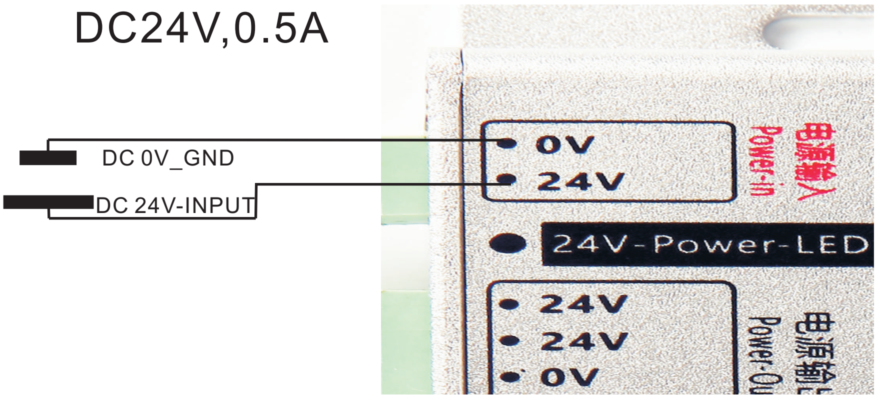
- Check our wiring file on the manual or specification, connect our card to your stepper/ Servo motor driver correctly. If you have problem about wiring, please contact us for More details.

⬟ Check our mach3 setting parameters and step per manual in the packing box and set your own parameters in right way.

Power supply wiring

Wiring

NO.1 : Offer Power suppl y to card


DC24V,0.5A
DC 0V_GND
DC 24V-INPUT
0V
24V
电源输入
Power-in
24V-Power-LED
24V
24V
0V
电源输
Power-Ou

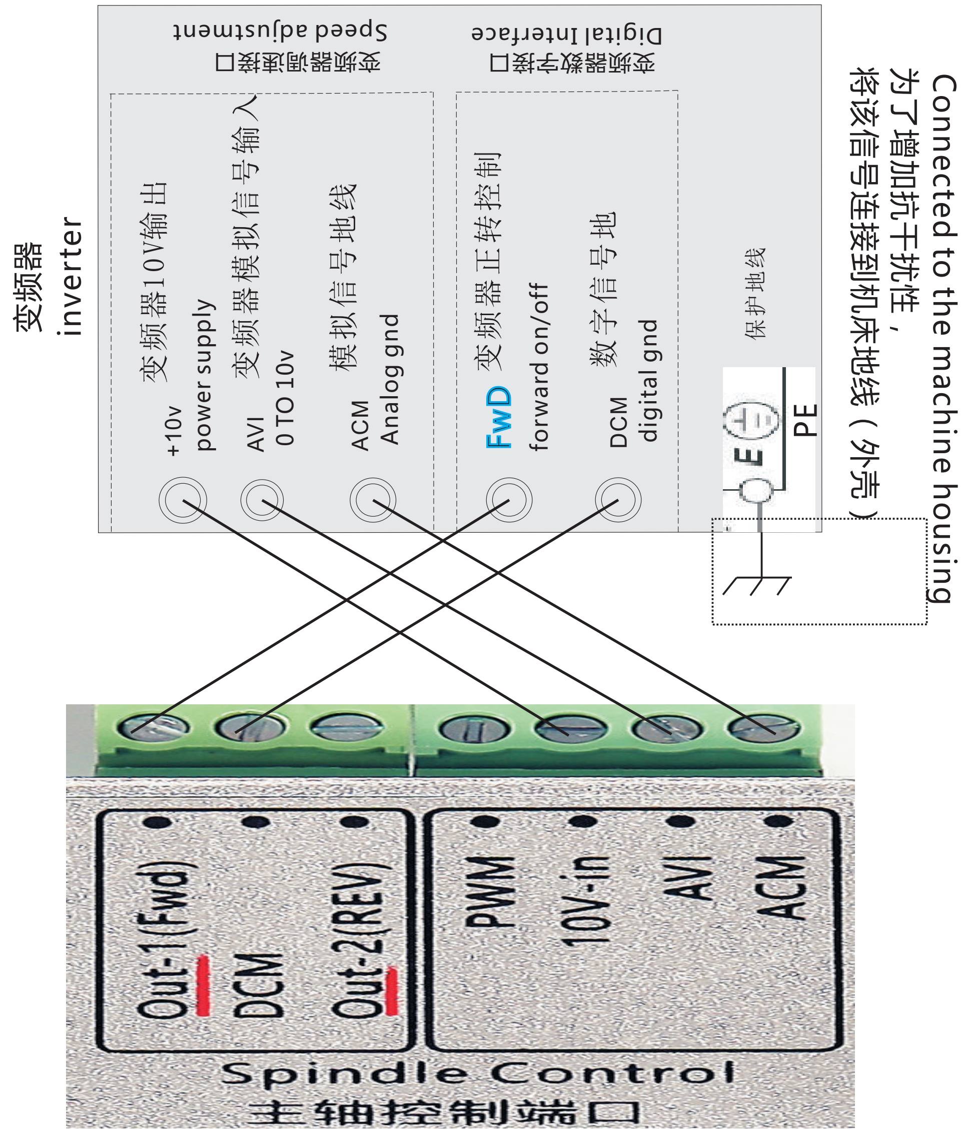
Before using our breakout board, please offer

DC24V power supply to make it works,

Current 0.5A

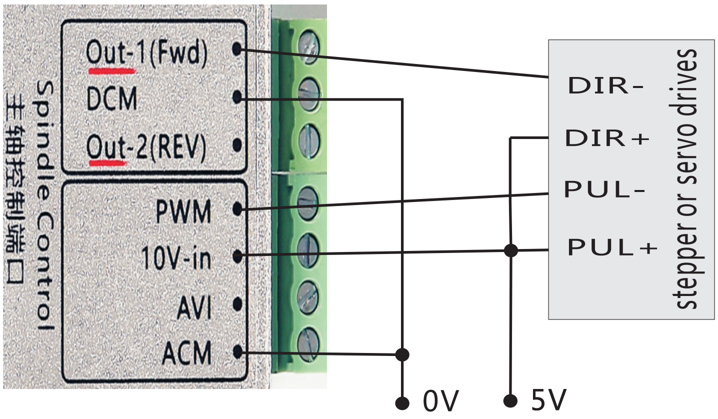
NO.2 : Drive wiring: Support Stepper/Servo drive,Differential output signal

NO.3 : Spindle control-Inverter connection


变频器
inverter
变频器调速接口
Speed adjustment
变频器数字接口
Digital Interface
+10v
power supply
变频器10V输出
AVI
0 TO 10v
变频器模拟信号输入
ACM
Analog gnd
模拟信号地线
FwD
forward on/off
变频器正转控制
DCM
digital gnd
数字信号地
保护地线
E
PE
Connected to the machine housing
为了增加抗干扰性，
将该信号连接到机床地线（外壳）
Out-1(Fwd)
DCM
Out-2(REV)
PWM
10V-in
AVI
ACM
Spindle Control
主轴控制端口

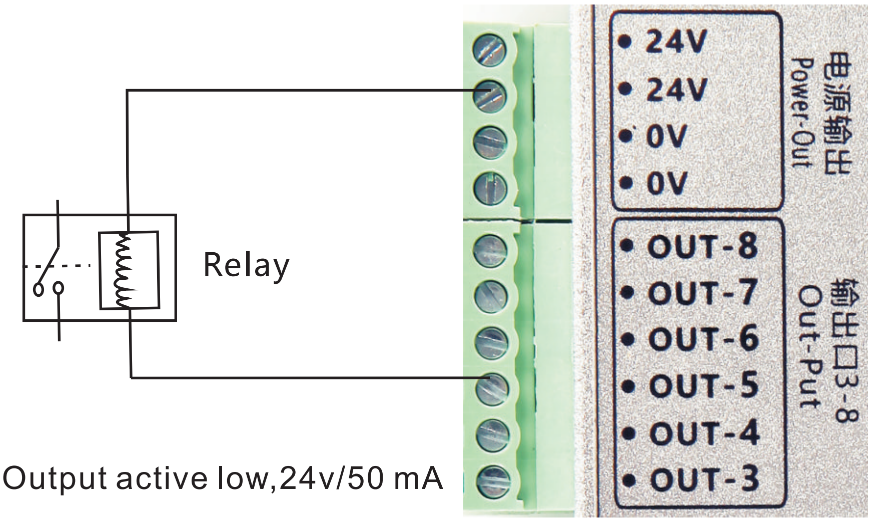
Wiring

Spindle Control: Stepper/Servo Drive


Out-1(Fwd)
DCM
Out-2(REV)
PWM
10V-in
AVI
ACM
Spindle Control
主轴控制端口
DIR-
DIR+
PUL-
PUL+
stepper or servo drives
0V
5V

5V and 0V please connect to our breakout board 5V and 0V

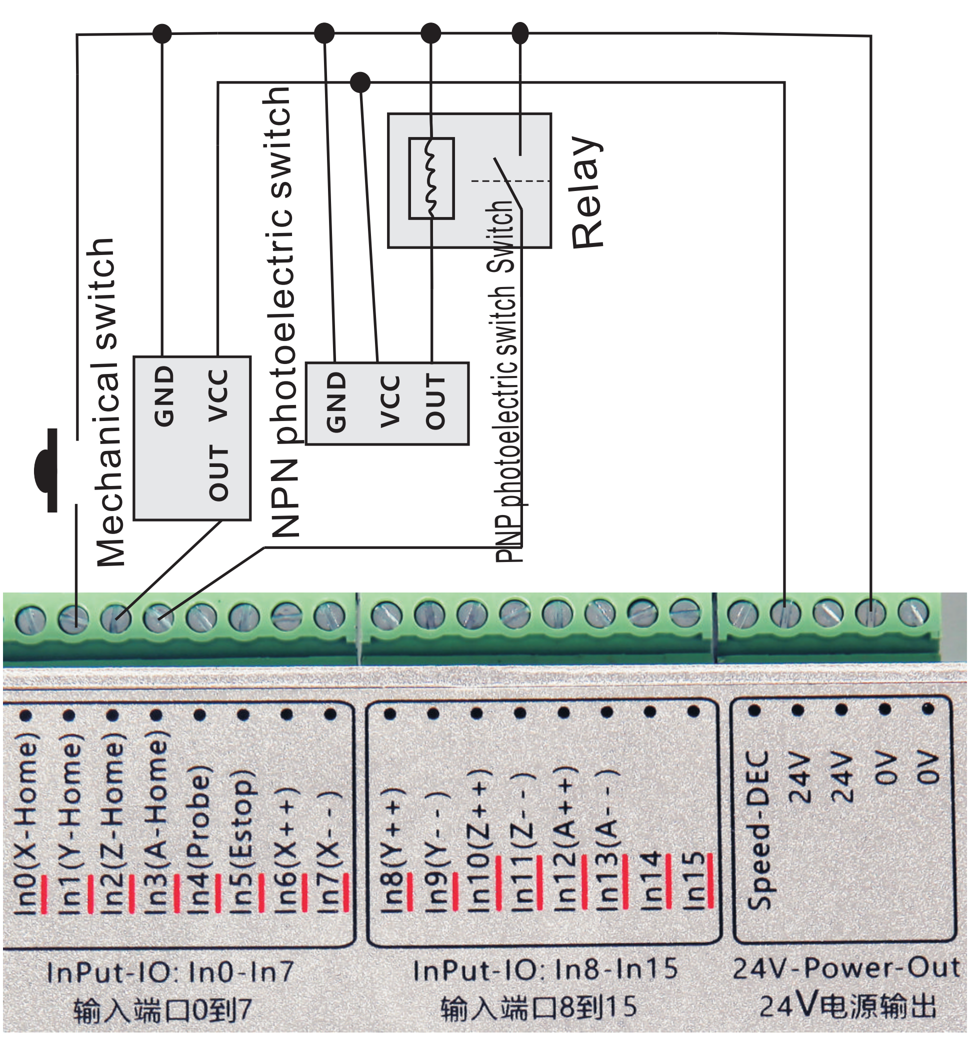
NO.4 : Output Relay Interface : OUT3 to OUT8 Relay Interface


Relay
24V
24V
0V
0V
OUT-8
OUT-7
OUT-6
OUT-5
OUT-4
OUT-3
电源输出
Power-Out
输出口3-8
Out-Put

Output active low,24v/50 mA

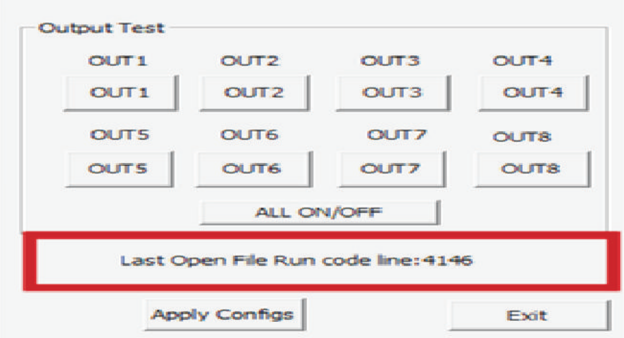
Wiring

NO.5 : input Interface : 16 input port;In0 to In15,limit switch.Active Low


Mechanical switch
GND
VCC
OUT
NPN photoelectric switch
GND
VCC
OUT
PNP photoelectric switch
Switch
Relay
In0(X-Home)
In1(Y-Home)
In2(Z-Home)
In3(A-Home)
In4(Probe)
In5(Estop)
In6(X++)
In7(X--)
In8(Y++)
In9(Y--)
In10(Z++)
In11(Z--)
In12(A++)
In13(A--)
In14
In15
Speed-DEC
24V
24V
0V
0V
InPut-IO: In0-In7
输入端口0到7
InPut-IO: In8-In15
输入端口8到15
24V-Power-Out
24V电源输出

New Function

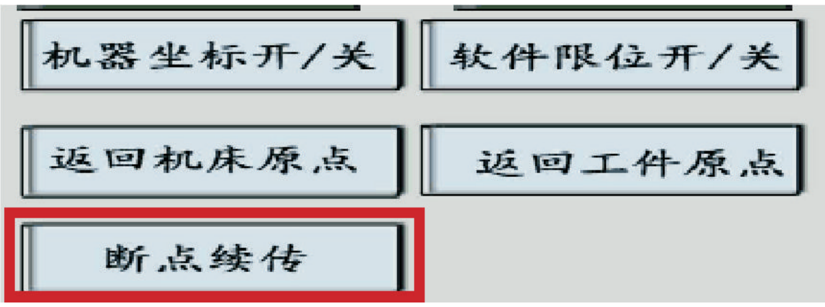
Break continue: when the control card suddenly power off, the control card chip automatically save the current G code line number. Control card plug-in will display saved the number of lines.


Output Test
OUT1
OUT1
OUT2
OUT2
OUT3
OUT3
OUT4
OUT4
OUT5
OUT5
OUT6
OUT6
OUT7
OUT7
OUT8
OUT8
ALL ON/OFF
Apply Configs
Exit

Last Open File Run code line:4146

。

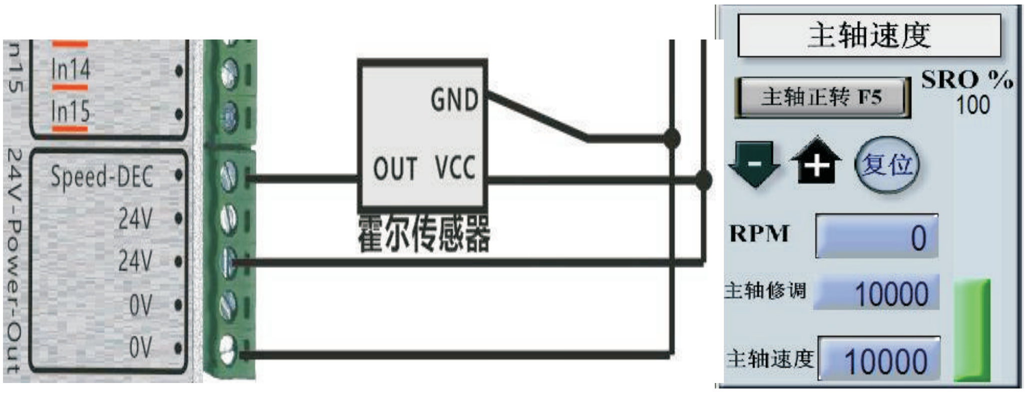
Waiting until the control card is connected to the power supply next, load the G code program, click the power to continue to the break continue button, Mach3 software automatically from the last save the number of lines to start running.


机器坐标开/关
软件限位开/关
返回机床原点
返回工件原点
断点续传

.

Spindle speed feedback

spindle speed feedback through the sensor feedback to Input port “Speed- DEC”, and then display the RPM speed on the Mach3 software. Maximum support feedback input Pulse frequency 20KHZ.


n15
In14
In15
Speed-DEC
24V
24V
0V
0V
24V-Power-Out
GND
OUT VCC
霍尔传感器
主轴速度
主轴正转 F5
SRO %
100
复位
RPM
0
主轴修调
10000
主轴速度
10000

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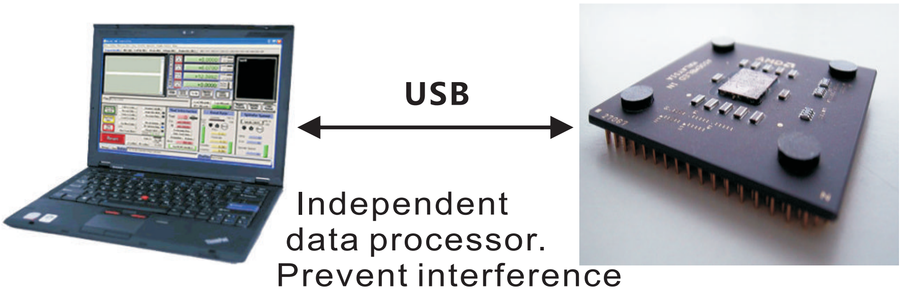
USB anti-interference ability: full new designed independent USB data processor, to prevent the interference to USB communication, more stable and reliable. Suitable for plasma cutting and automatic welding and so on.



Independent
data processor.
Prevent interference