
The new JNC-40M (CNC milling / engraving
machine control card) Ver 1.xx
(Standard handwheel interface)

Thank you for choosing this product!

This manual helps you become familiar with the company's products, understand the application and MACH3 software configuration and other information of the card before using the motion control card, please read this manual, which will help you make better use of it .

Due to hardware, software, constantly updated software and hardware that you receive may differ from the statement of the manual in some respects, hereby apologize.

Statement: The motion control cards are specifically for use in MACH3 CNC software, the standard is three-axis / four Axis interpolation, support for the latest version of Mach3 software, the card uses DSP / FPGA high speed interpolation operation, high speed and surface finish.

Mach3 CNC Software is a Canadian ArtSoft CNC Software products, excellent performance and ease of use. Mach3 CNC software copyright belongs to Canada ArtSoft company, specification information and pictures provided for illustration only and learn to use. ArtSoft Website: <http://www.machsupport.com/> 。

Note the following:

1. Non-hot plug connected to the computer's USB cable;
2. Wiring can not be charged with manipulating the control card;
3. Computer or engraving machine enclosure should be grounded wire to ensure safety and to prevent interference;
4. Please turn off the power when the machine is not working;
5. Unplug when not used for long;
6. Spindle motor bearing life is inversely proportional to its speed;
7. Very sharp chisel to prohibit touch operation, to prevent

injury. Do not use handkerchiefs, scarves contacts, to prevent harm or damage to the equipment involved.

Electrical Specifications:

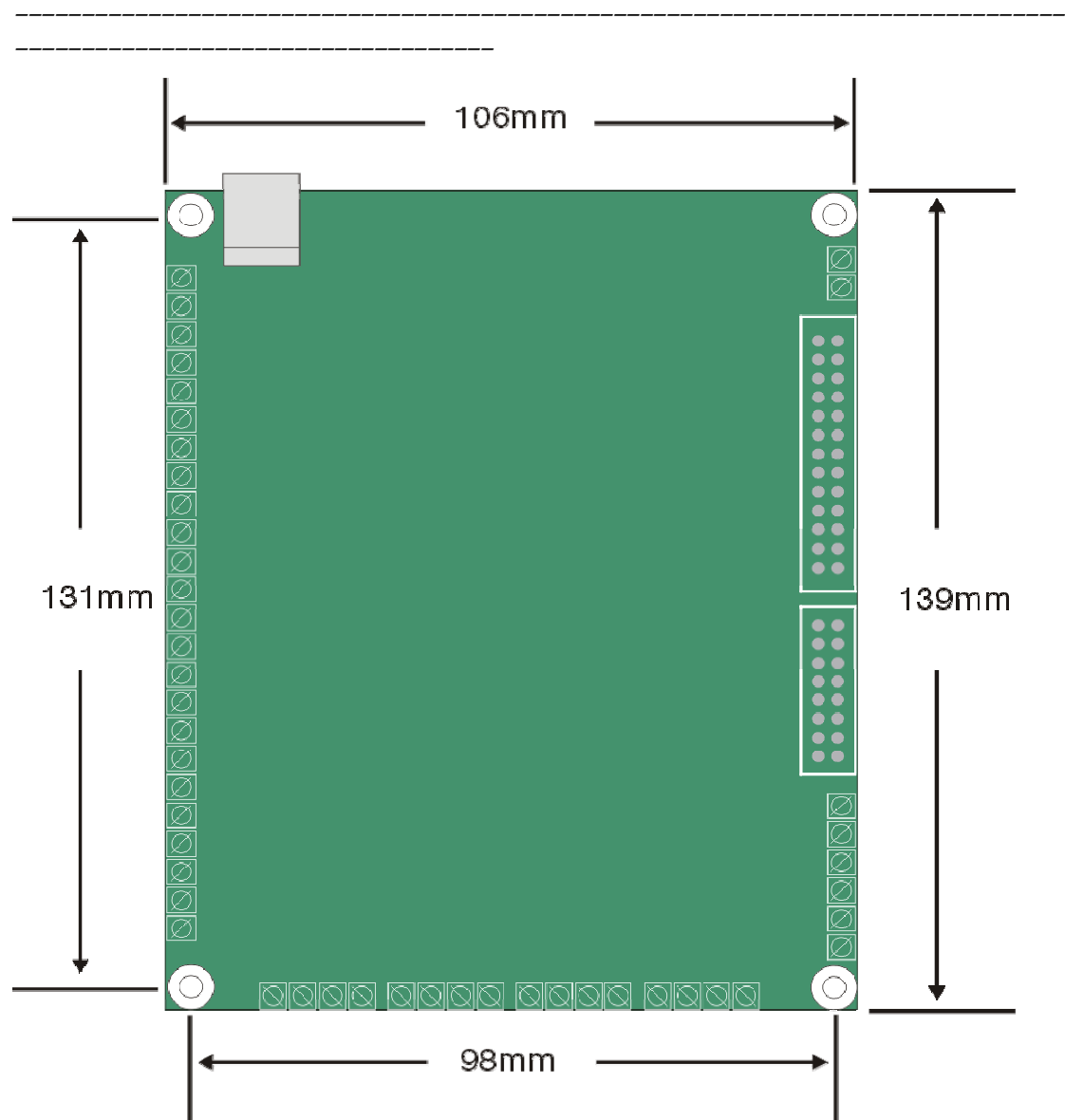
USB2.0 interface, reliable data transmission distance of up to 6 meters. Axis output signal using a differential circuit, twisted pair transmission over long distances, should be suitable for AC servo drive / stepper motor driver interface.

Control	Control shaft	Maximum four axes (press release distinction)
	Stepper motor system	Support
	AC servo system	Support, Panasonic Yasukawa, and other common servo
	Motion Control Chip	DSP/FPGA
	Mobile speed	24 m / min (400KHZ pulse frequency / S)
	USB Interface	USB 2.0 compatible with USB 1.1
	Compatible OS	Win98_2k_XP_ Win 7
	The maximum number of spindles	1
Spindle	Spindle speed signal	Or 0-10V analogue signal 0-5V
Drive	Position signal type	Pulse / Direction

interfa ce	Control signal type	Differential signal
	Pulse frequency	200K/400K
	Pulse Width	Speed is automatically adjusted according to
I/O Fu nction	Input Interface	32 independent inputs (EXP external panel or expansion I / 0)
	Output Interface	16 independent outputs (8 +24 V direct control relay convenient and practical, with the output EXP 10mA interface driver can drive the LED only)
Power supply		DC24V voltage input, current 3 A

DIMENSIONS:

Unit: mm



Software Download:

1. software before downloading make sure their computer configuration, Operating system WindowsXP Windows7, Window, 2000, etc, Minimum PC CPU minimum frequency P4-1.6G, The minimum memory 512M, high-speed machining Increase For computer configuration.

First enter ArtSoft company <http://www.machsupport.com> website to download mach3 software, as shown below:



Click on "Software & Downloads" tab, display the download page, select the Mach3 with the Mach3 Addons included in the download

Mach3

with the Mach3 Addons included

Mach3 R3.043.066

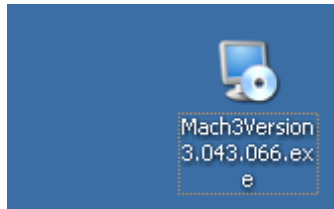


page

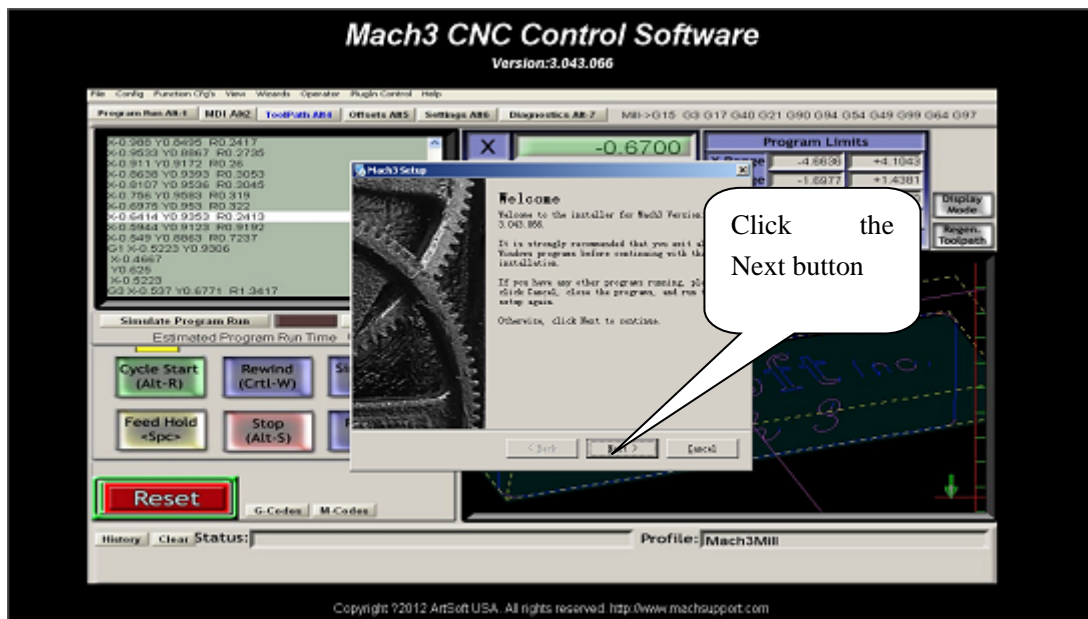
After downloading the software, we are the next step to install the software to their computers, the following brief

description of the installation procedure:

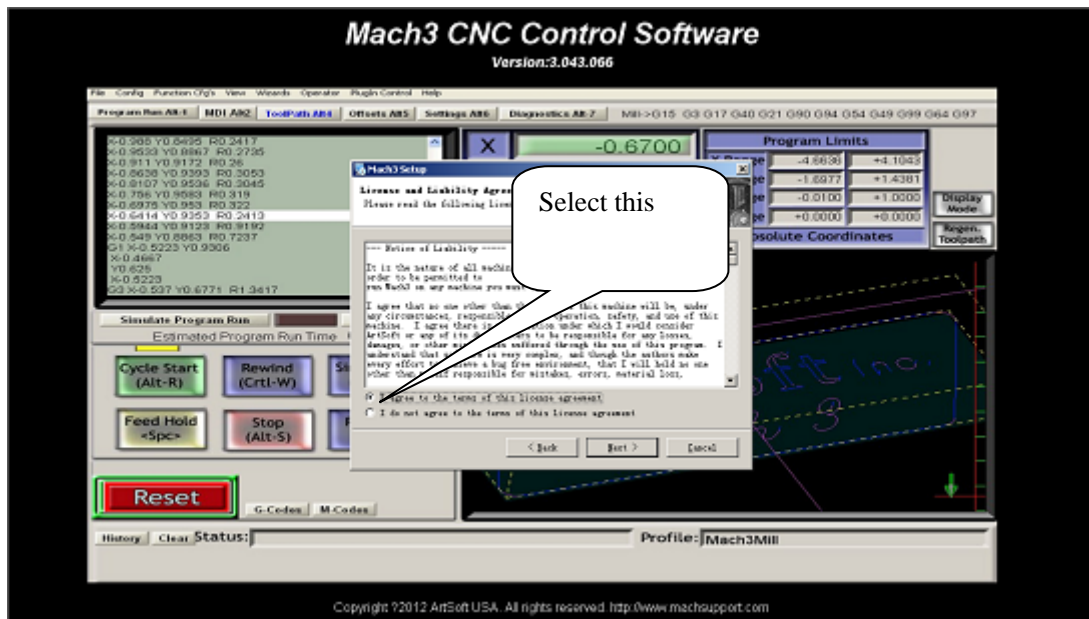
Double-click the mach3 software installation package icon, as shown below:



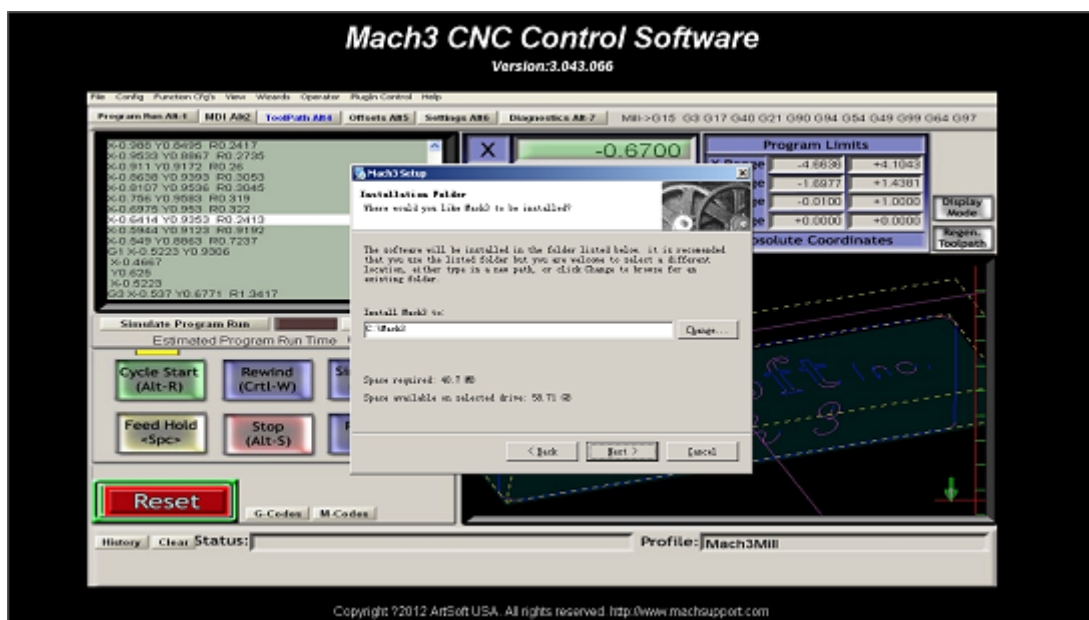
Out of the installation Welcome screen, click on the Next button to install.



Select "accept the software license agreement" click "Next" button.



According to the default installation path, or choose your own path, the general recommendations directly installed in C drive



Click Next, enter the installation the next screen, as shown below, when using a USB controller card, do not choose to install the printer parallel port driver.



Then all Click "Next" to complete the installation.

Driver Installation:

After installing the software Mach3, the first not to control the cartoon USB power. Driver installation and configuration files.

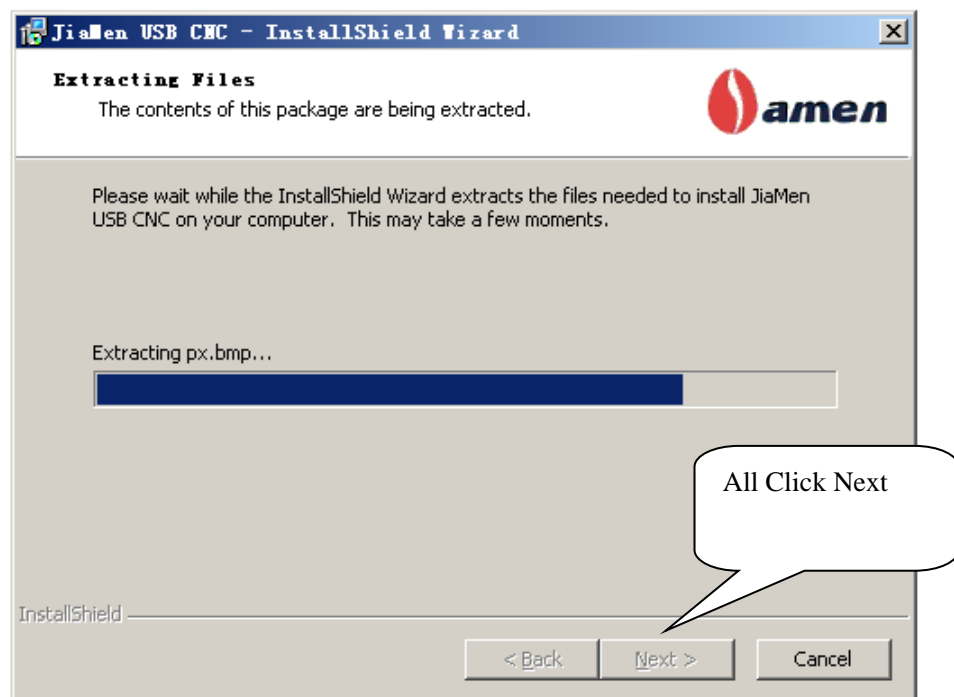
Click the CD "Jamen JNC-40M Vx.x" icon, performed with the card control software USB drive. (V1.42 upgrade with version numbers differ)



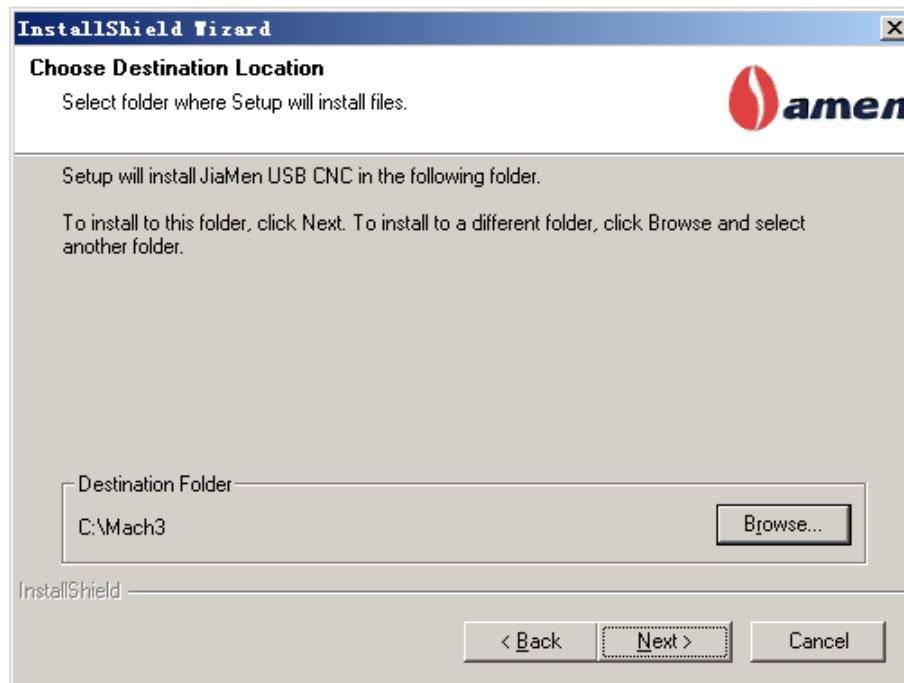
The driver installation contains the following:

USB drivers, parameter configuration file, plugin file, Chinese interface file, Brains files.

Double click the installer icon, click "Next" appears Software copyright notice, if you agree to accept the agreement, click "Next" to continue.



During the installation path selection dialog box, select the path to the right Mach3 software installed, otherwise the next is wrong. (Not complete control)



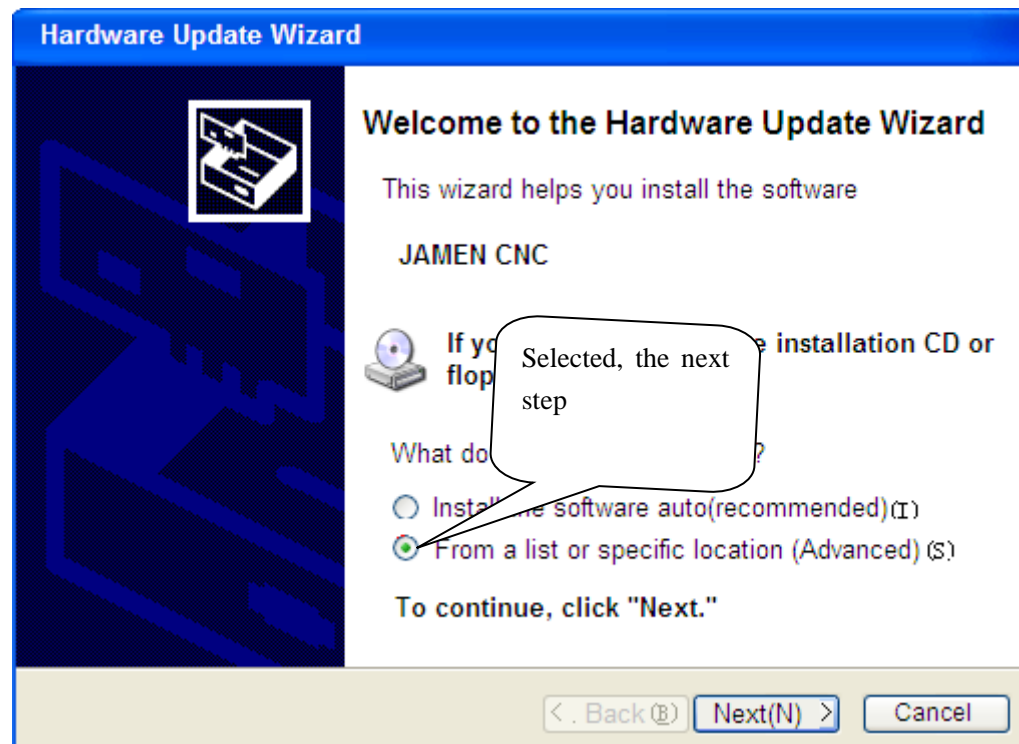
"Jamen JNC-40M Vx. x" after the driver installation package, then you can connect the power to the control card, normally after power, plug in the USB cable. Windows Found New Hardware prompt discovery. (The following illustration is the use of WINDOWS XP SP2 operating system)



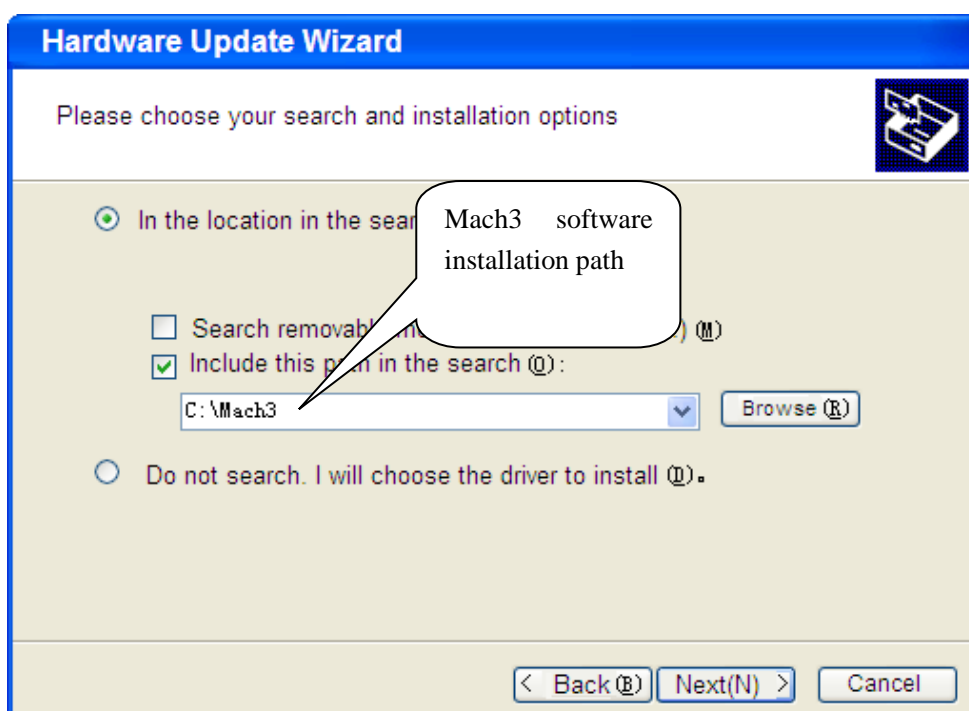
Found new hardware, it will automatically jump Hardware Update Wizard dialog box, as shown below:

Select "Install from a list of specific location (Advanced)"

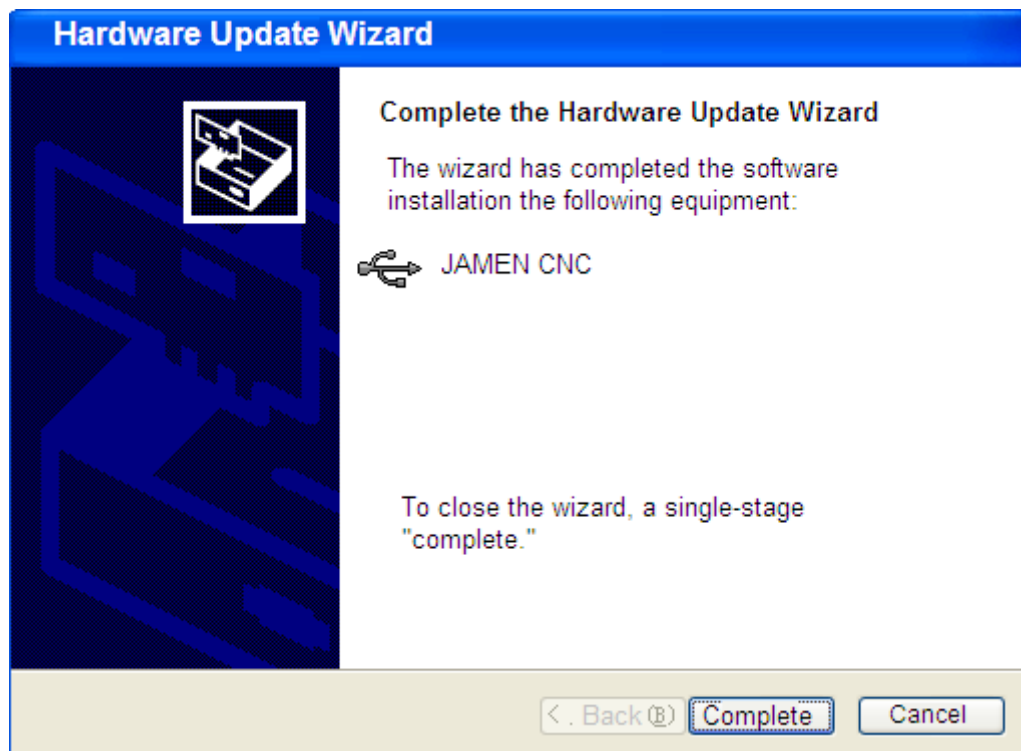
(s)" the next step. Can not choose "Install the software automatically" and only CD in the drive when you can.



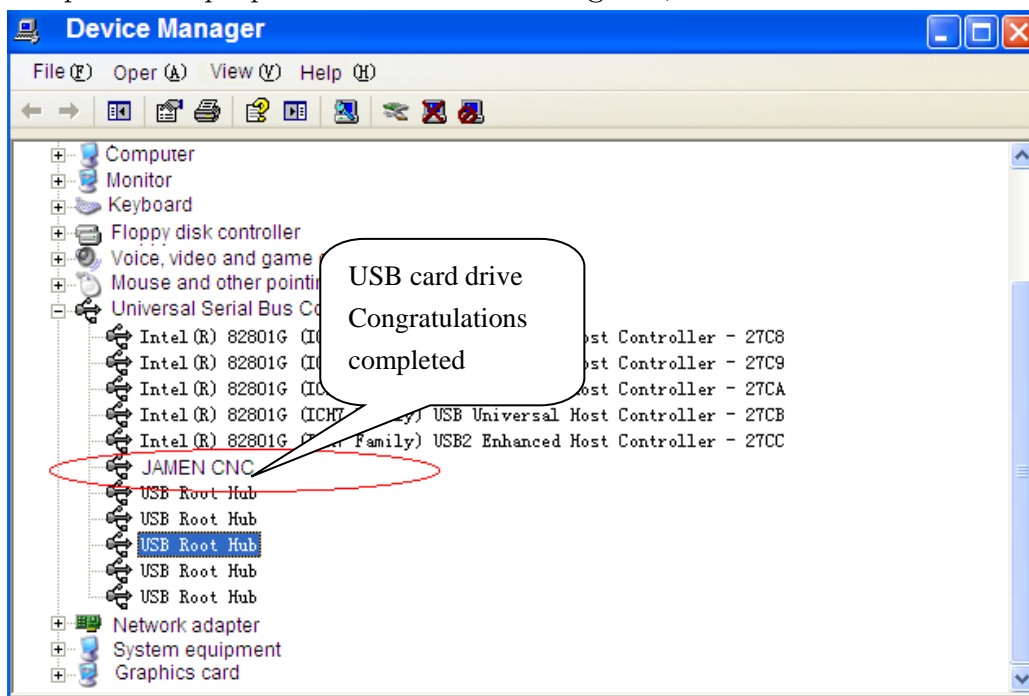
Click the "Browse" button in the next screen, select the Mach3 software installation path.



After the last step in the right path to choose Mach3 software installed, the next step. Until the completion of the installation.



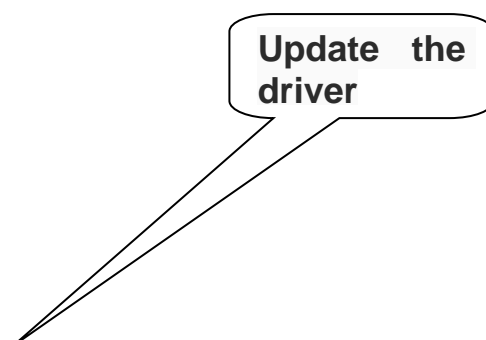
After installation is complete you can find the driver in the computer equipment "Device Manager", as shown below:

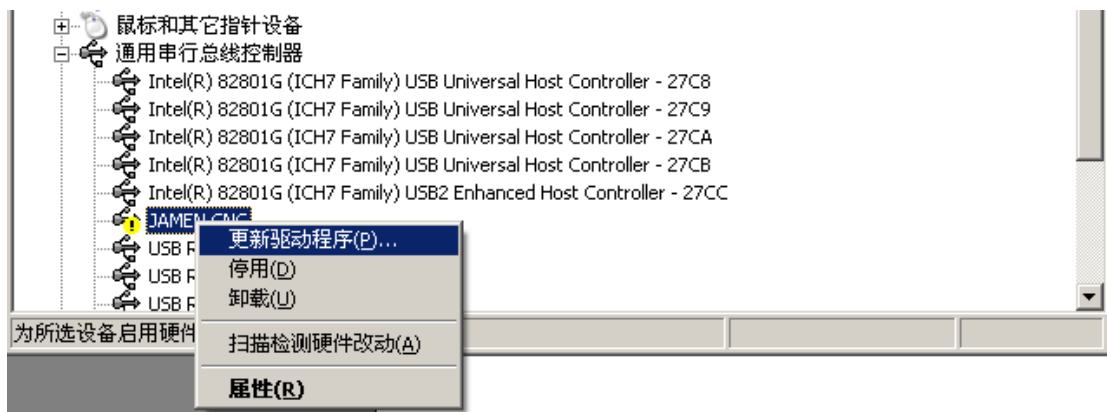


As the installation errors and other factors, USB card is not installed drivers, display a yellow exclamation mark before the current device icon, as shown below:



Then align the mouse icon, right-click, click "Update Driver." Below:



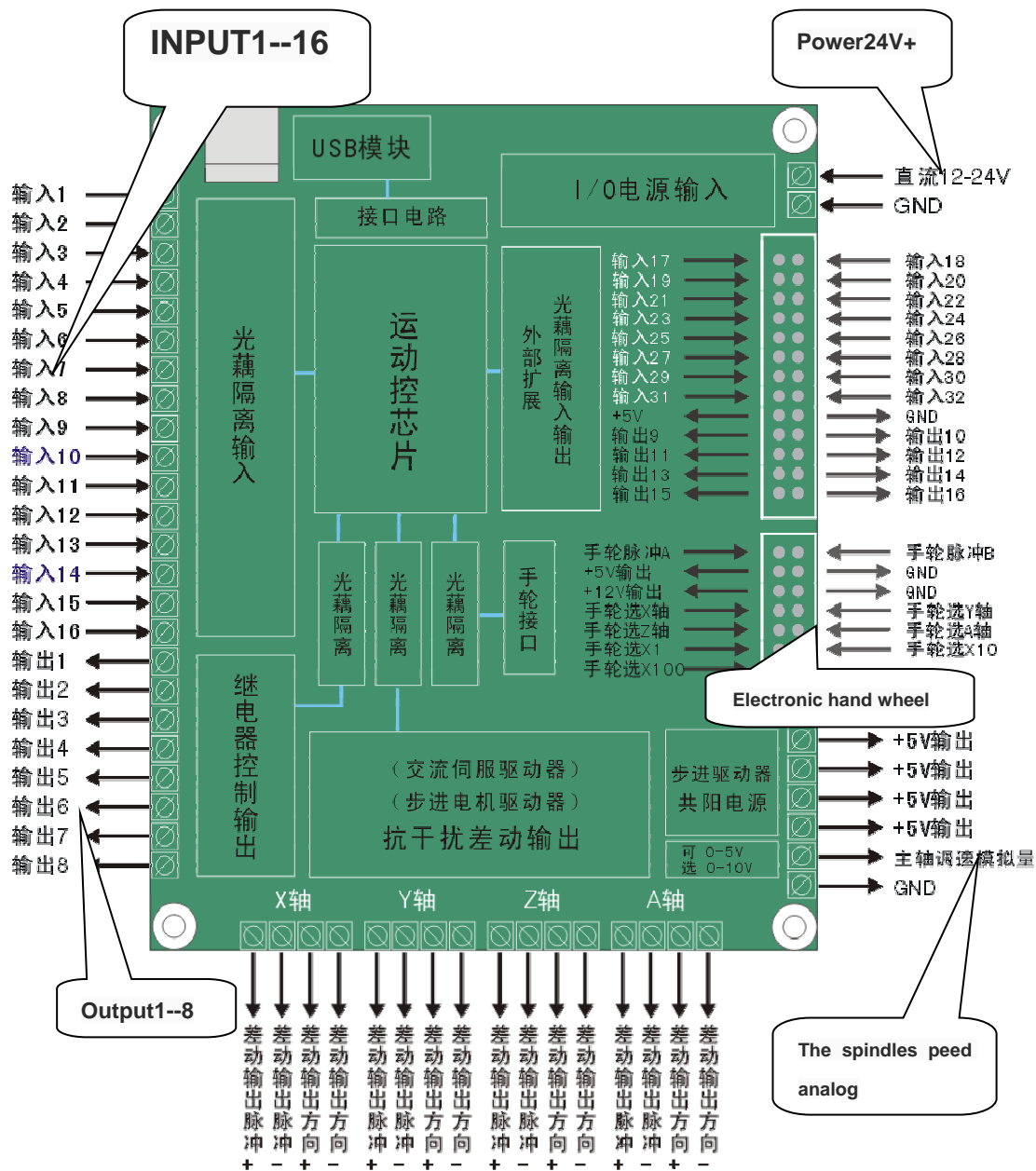


According to the above method to re-install the driver.
After the driver and control software installed, you can run
the software Mach3.

Control Card I / O Interface Schematic

Power input DC 12-24V can be input and output ports are all
using opto-isolated, The basic eight-port single output drive
capability of 500mA, Can push DC24V relay, EXP is an extension
of input and output interfaces, output drive capability 10mA.
EXP output interface can not directly drive relays, the
following can drive 10mA LED lights。

Wrong polarity power input protection and over-current
protection, When not connected to the control card Make sure
your power supply, Does not meet the specifications of the power
supply may burn the board。



About interference power connection

Start and stop operation of a wide variety of industrial site processing machinery and power equipment, Such as welding and electrical discharge machining, thyristor voltage, frequency equipment, etc., are the source of interference. Both of these sources of interference in the electromagnetic field is applied

to the way a computer system, and can cause interference through the power into a computer system. Interference caused by power supply is the most direct, even destructive, accounting for the vast proportion of industrial control machine tampering. Therefore, to improve the anti-jamming performance of industrial control systems, we must first work hard on the power.

Power Filter

Mains interference filter is indispensable components, In the high-frequency and low-frequency interference rejection performance has beneficial. The following chart (Two-stage power filter)



Caution should be used when there is:

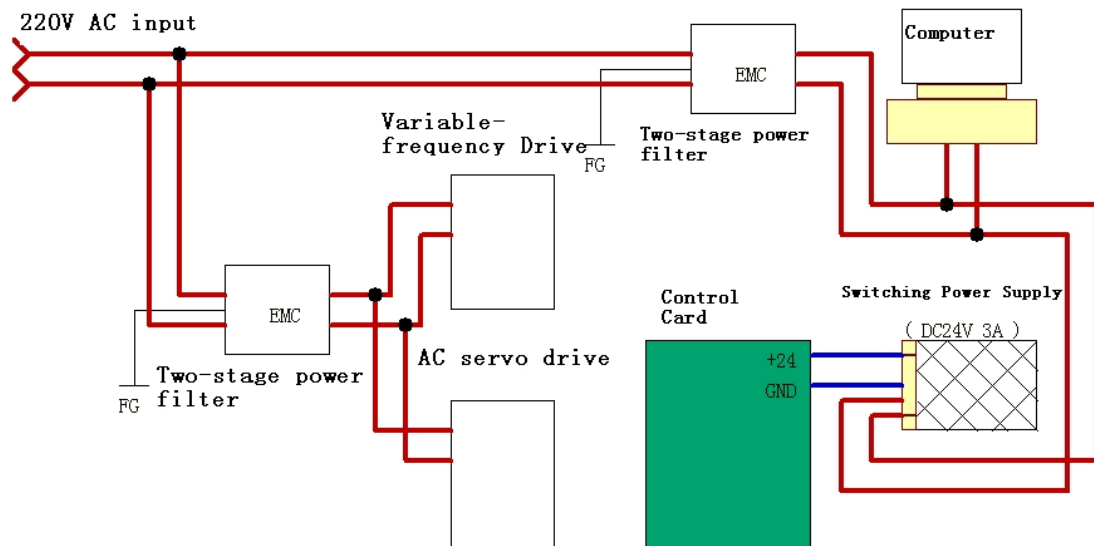
A、Filters should be installed on a conductive metal surface, or connected by braided ground strap and ground point;

B、Mount the filter should be as close to the power line at the entrance;

C、Input and output filter preferably shielded or twisted;

D、To avoid and output lines are coupled to each other, the absolute prohibition of input and output lines bundled together using。

Power filter wiring scheme:



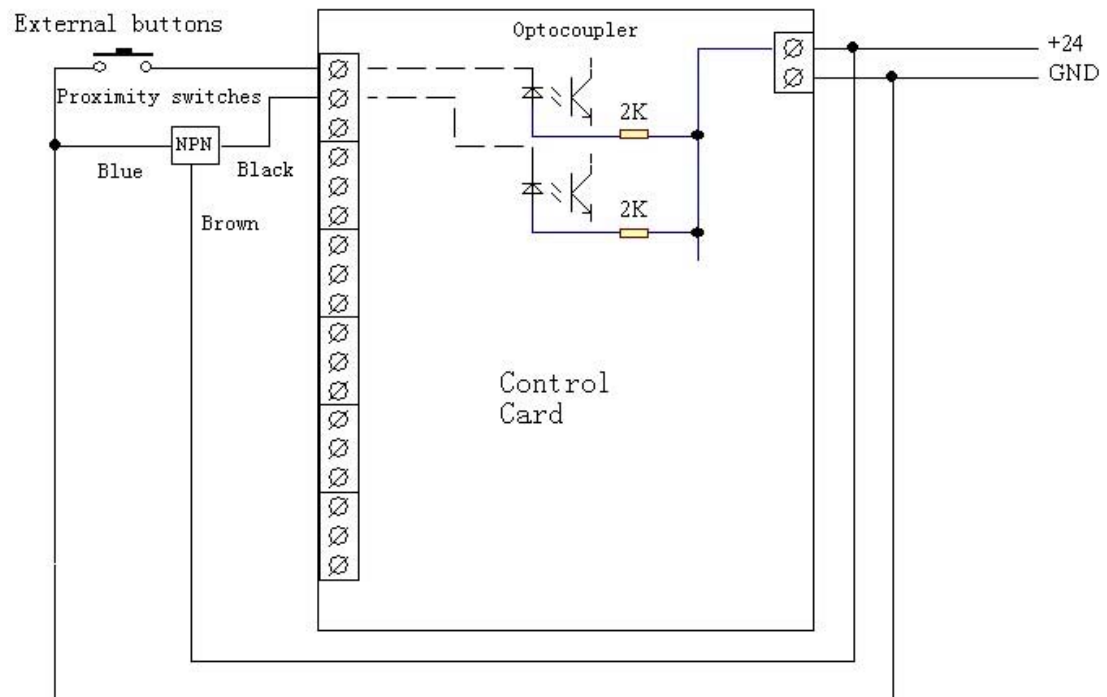
If the power supply control card after isolation transformer rectifier buck, it is the best. Using multiple power supply, no loops between them, in principle, is to cut off the source of interference.

Business computers are most vulnerable to interference device, connected to a filter in the power supply of the computer, there is an unexpected effect. USB cable plugged into the front of the computer and plug in the back of the computer, the effect is not the same, Back of the computer's USB port leads directly to the motherboard, and the computer is from the front USB port on the motherboard via a few simple lines drawn.

Input pin wiring and setting

Enter through the board above the chip optical isolation (PC817), through an internal current limiting resistor 2K, conduction signal to the main controller, Active low external input. Can be used to connect external stroke limit switches, command buttons, or NPN proximity switch.

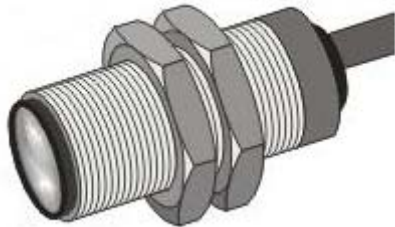
Input	connection	diagram	:
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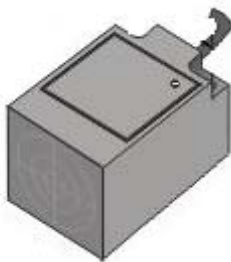
Homing switch connection:

In order to ensure the establishment of mechanical origin of accuracy, it is important homing switch, the switch will have a direct impact on the accuracy of mechanical origin, Recommends using high-sensitivity NPN inductive proximity switches, photoelectric switch on the radio or.

Common proximity switches as shown:

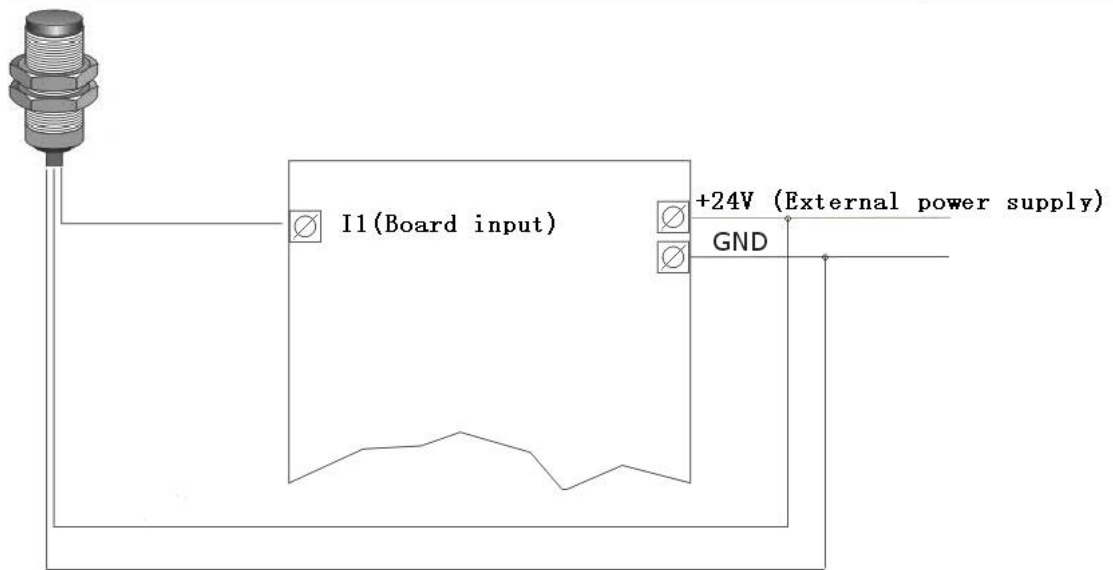


Cylindrical inductive proximity switches



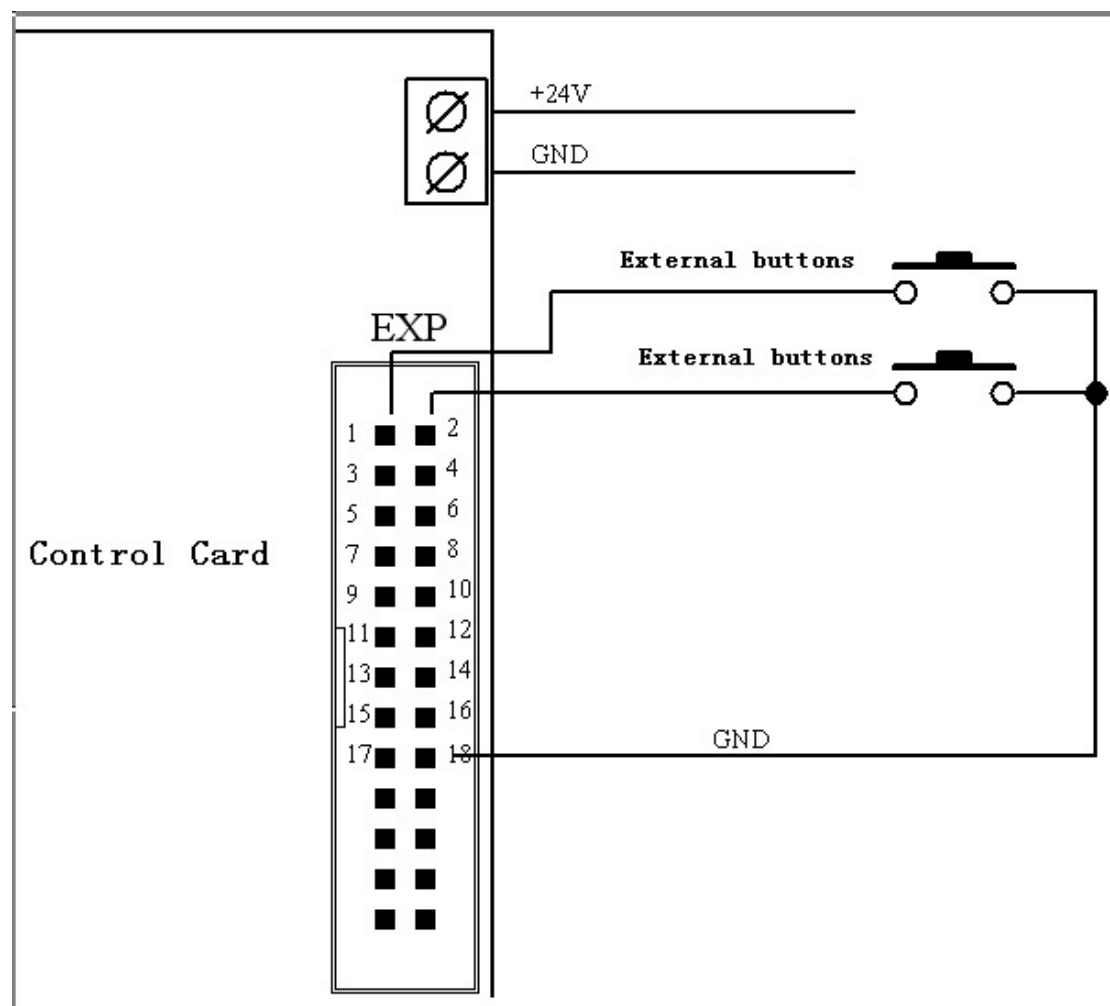
Rectangular Inductive proximity switches

Electrical connection diagram:



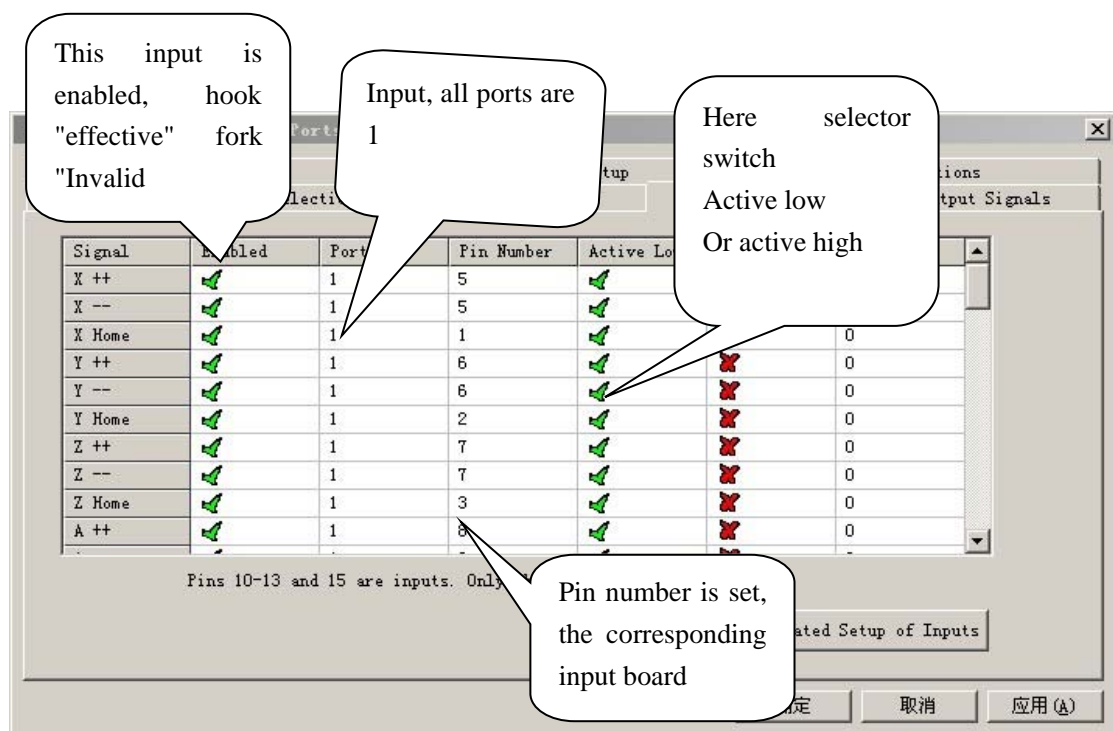
EXP extended input:

EXP expansion input by the light lotus chips (PC817), through an internal current limiting resistor 2K, conduction signal to the main controller, Active low external input.



Software input pin settings:

All I / O input pin, the Mach3 software port is set to 1.
IN1 on the board in the Mach3 software is the first one to set
foot, IN8 is 8 feet. Below:



Board factory-defined input function:

Input terminals defined:

MACH3 pin number	Terminal board	Function
1	I 1	X axis homing (can not be used as another useful)
2	I 2	Y axis homing (can not be used as

		another useful)
3	I 3	Z axis homing (can not be used as another useful)
4	I 4	A axis homing (can not be used as another useful)
5	I 5	X-axis travel of positive and negative hardware limit (can be customized)
6	I 6	Y-axis travel of positive and negative hardware limit (can be customized)
7	I 7	Z-axis travel of positive and negative hardware limit (can be customized)
8	I 8	A-axis travel of positive and negative hardware limit (can be customized)
9	I 9	Knife signal input (not available as other useful)
10	I 10	(Custom)
11	I 11	Emergency stop (can be customized)
12	I 12	(Custom)
13	I 13	(Custom)
14	I 14	(Custom)
15	I 15	(Custom)
16	I 16	(Custom)

EXP expansion socket input definition:

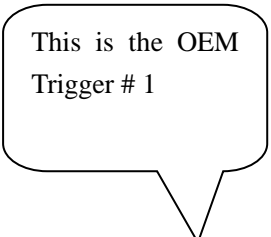
MACH3 pin number	EXP pin number	Function
17	1	Cycle start (can be customized)
18	2	Processing pause (can be customized)
19	3	Incremental magnification selection (can be customized)
20	4	Manually move the mode selector (can be customized)
21	5	Feed rate + (can be customized)
22	6	Feed rate - (can be customized)
23	7	Jog speed + (can be customized)
24	8	Jog Speed - (can be customized)
25	9	+ X axis jog buttons (can be customized)
26	10	- X axis jog buttons (can be customized)
27	11	+ Y axis jog buttons (can be customized)
28	12	- Y axis jog buttons (can be

		customized)
29	13	+ Z axis jog buttons (can be customized)
30	14	- Z axis jog buttons (can be customized)
31	15	+ A axis jog buttons (can be customized)
32	16	- A axis jog buttons (can be customized)

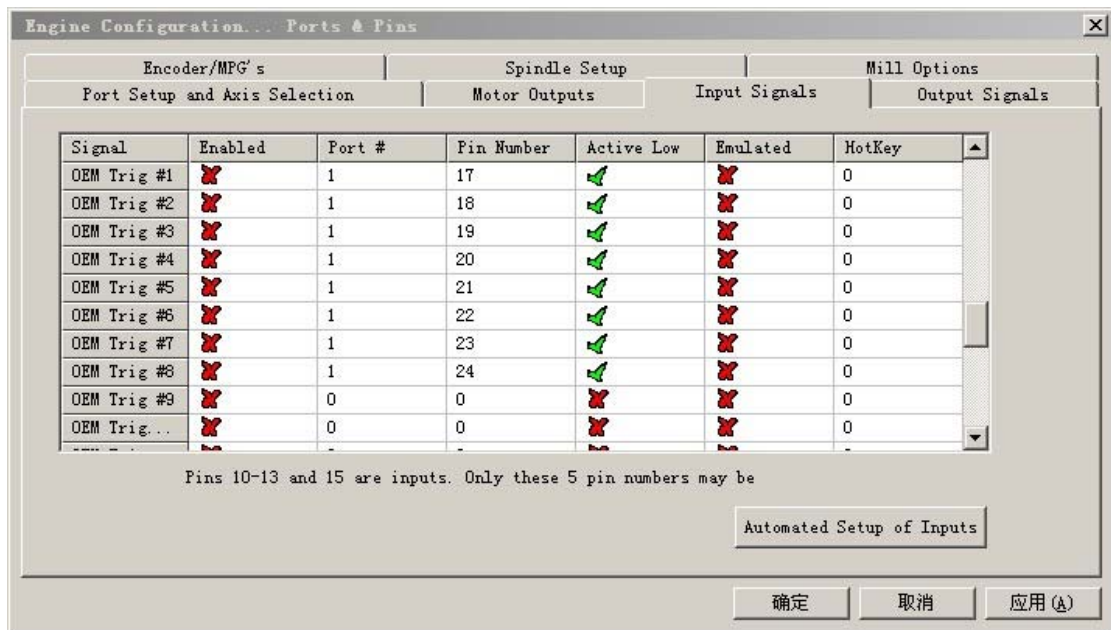
OEM trigger input function setting:

“The program runs, "" Emergency, "" one-step ". " Origin ", " clear ", etc., mach3 software can define these functions in an external button, the button is triggering OEM.

First step: First set input pin number, In the software menu to open "Ports and Pins" dialog, In the "Input Signals" tab, Press Figure Set:



This is the OEM
Trigger # 1



Input port (Port #) is 1, No. You need to figure foot function is defined on the board which input pin. For example, the following definitions we put a foot in the OEM EXP extended input trigger button, mach3 software distribution EXP expansion input pin 17 is 1 foot, and so on.

After setting the input pin, In the software menu to open "System Hotkeys" dialog. OEM trigger button functions defined in the input box for each input function. Below:

OEM buttons
trigger
functions (OEM
button code)

System HotKeys Setup

Jog Hotkeys

Button	ScanCode
X++	999
Y++	999
Z++	999
A / U ++	999
B / V ++	999
C / W ++	999
Y--	999
Z--	999
A / U --	999
B / V --	999
C / W --	999

System Hotkeys

Button	ScanCode
DRO Select	999
MDI Select	999
Load G-Code	999

External Buttons - OEM Codes

Trigger #	OEM Code
1	1000
2	1001
3	171
4	245
5	108
6	109
7	111
8	112
9	-1
10	-1
11	-1
12	-1
13	-1
14	-1
15	-1

OK

Common OEM button function table number sign:

Function Digital	Description	Function Digital	Description
1000	Cycle begins	1029	Soft limit switch
1001	Pause	1008	X is cleared
1002	Rewind	1009	Y is cleared
1003	Stop	1010	Z is cleared
1004	Single execution	163	Spindle speed override +
1006	Edit the file	164	Spindle speed override -
1016	Start here	110	Spindle Forward
1021	Reset	108	Feedrate override +
113	Coolant on	109	Feedrate override -
245	Select the manual mode	171	Incremental / grade

169	Close the current file	111	Jog speed +
112	Jog speed -		

Please refer to other code "Mach3 OEM menu" Manual

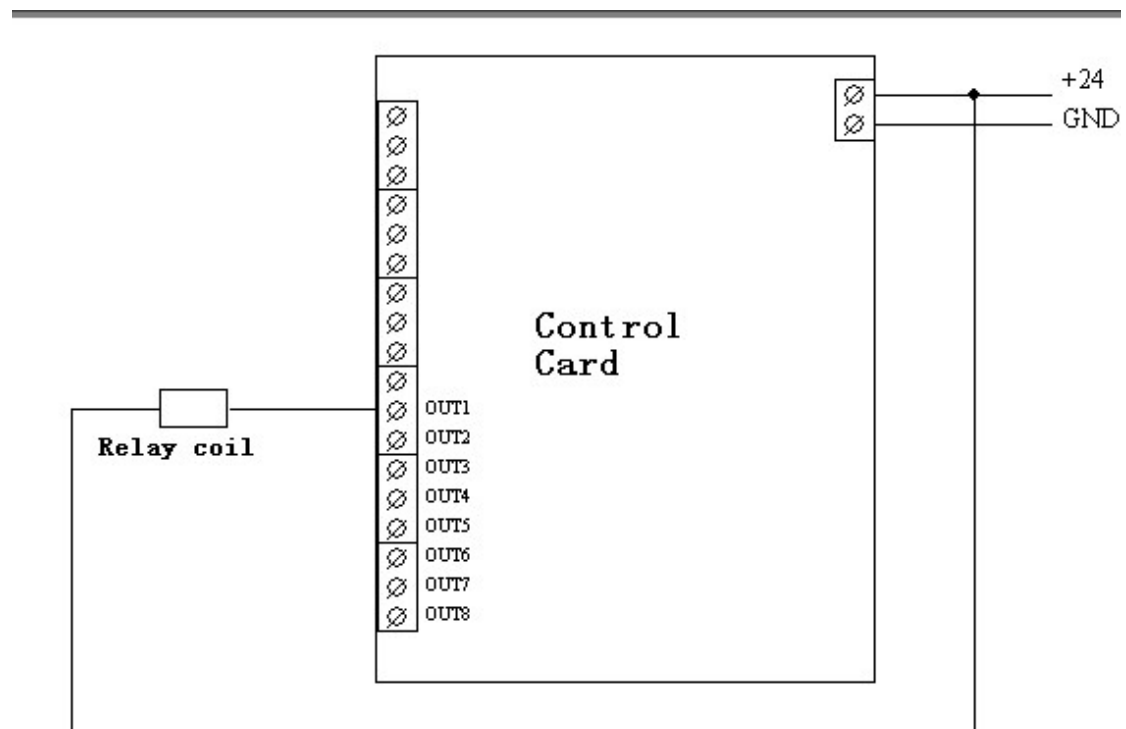
Output pin wiring and setting

The output terminal using a large current drive, eight output pins on the board, drive capability of up to 500mA (ULN2803A), You can drive DC 24V relay output is active low, When output port is low, usually high or high impedance.

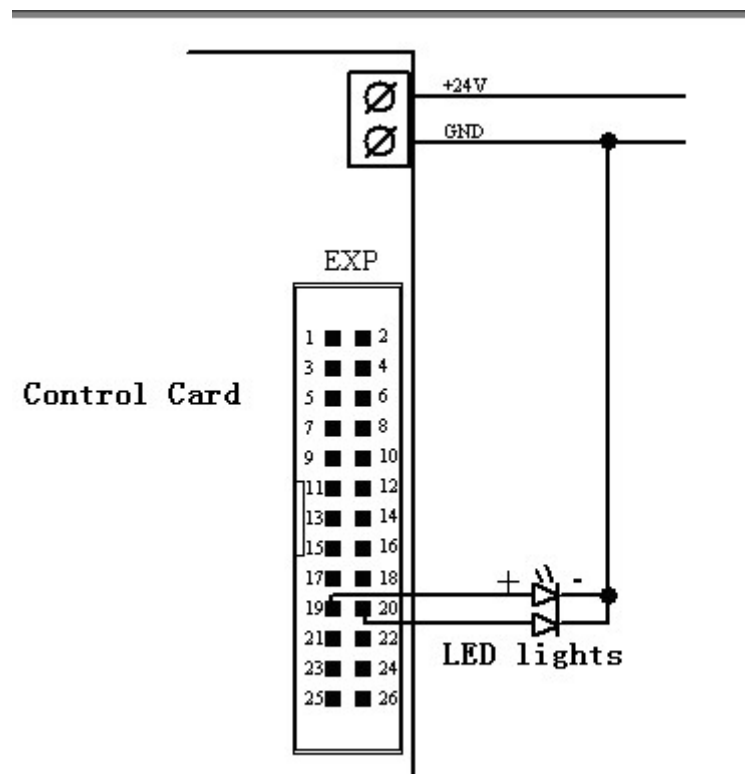
EXP output is only 10mA, can not directly drive relays, only

drive LED diodes, or other amplifying circuit. EXP output pin high output, is that there is a high output pin. Internal 500 ohm current limiting resistor, the other end of the load connected to the power supply GND please.

Output terminal board:

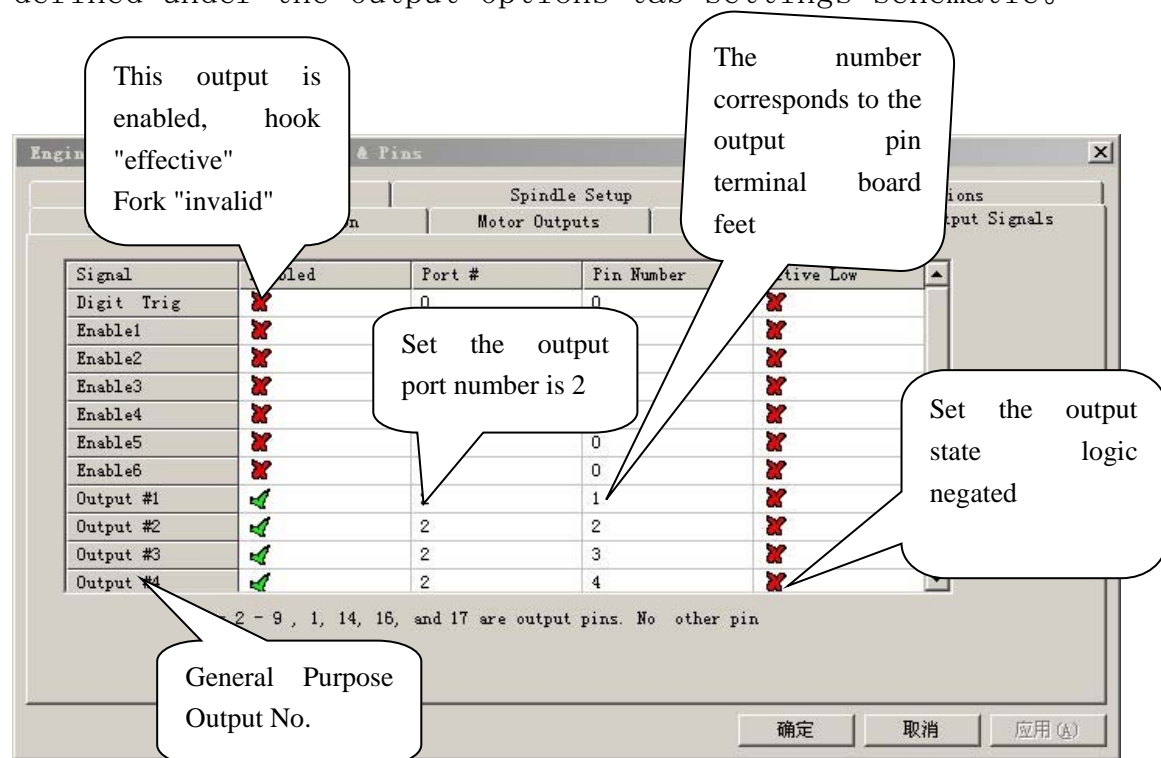


Board EXP jack output:



Software output pin set:

Mach3 software port settings, press the map output is defined under the Output Options tab settings schematic.



Factory output terminal board predefined functions:

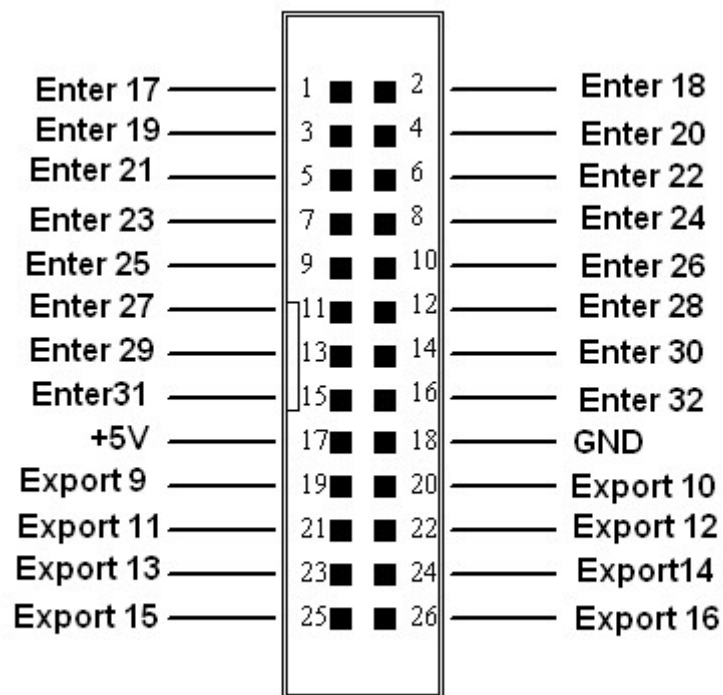
MACH3 set foot No.	Output terminals	Function
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1	OUT1	Spindle forward Enable
2	OUT 2	Spindle reverse enabled
3	OUT 3	Coolant (M08)
4	OUT 4	Cooling gas (M07)
5	OUT 5	Undefined
6	OUT 6	Undefined
7	OUT 7	Undefined
8	OUT 8	Undefined

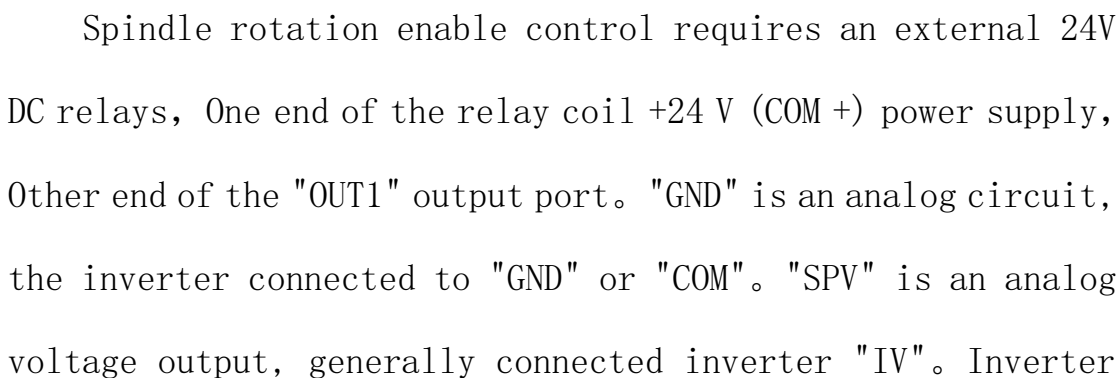
EXP expansion socket factory output predefined functions:

MACH3 pin number	EXP pin number	Function
9	19	Cycle Indicator
10	20	Incremental magnification X1 Light
11	21	Incremental magnification X10 Light
12	22	Incremental magnification X100 Light
13	23	Incremental magnification X1000 Light
14	24	Jog Continuous mode lights
15	25	Incremental mode lights
16	26	MPG handwheel mode lights

EXP expansion connector pin assignment:



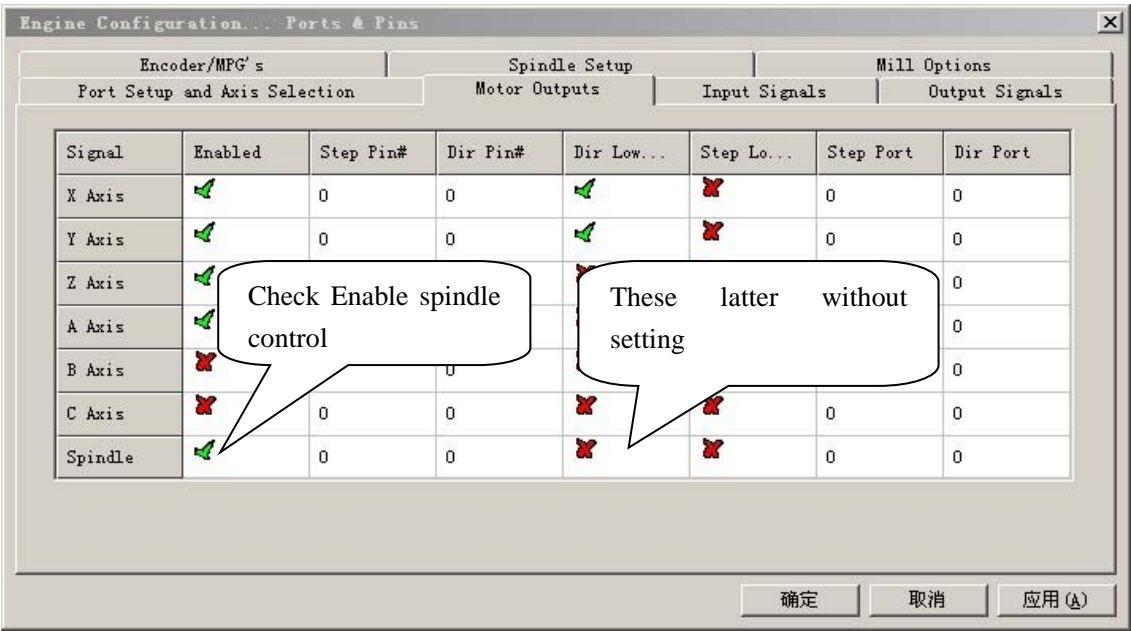
Spindle analog output control (0V-10V output or 0-5V, the heir to the board by jumping choice), As the voltage is changed your S command. Stepless. Wiring diagram below:



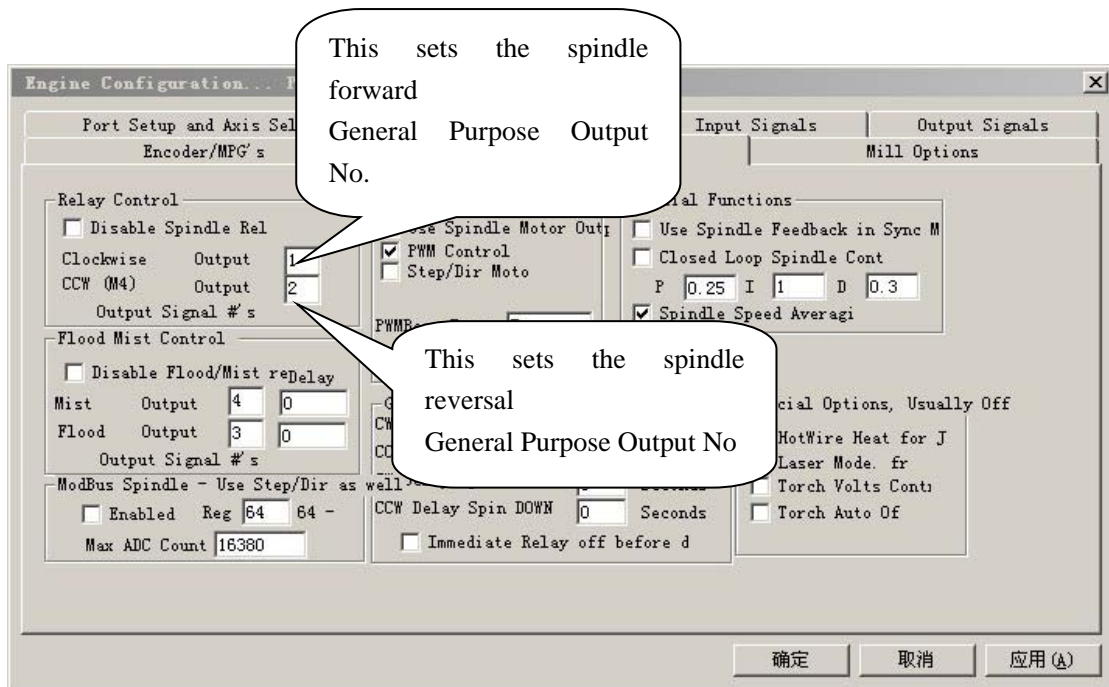
"FRD", then the normally open relay contacts. Normally open contact the other end, the common point is generally connected to the inverter "COM".

Mach3 software settings are as follows:

First in the "Motor Outputs" tab, enable the spindle control output.



Also in the "Spindle Settings" tab, select the user Spindle motor output (Use Spindle Motor Out) and PWM output (PWM Control), the other not set.

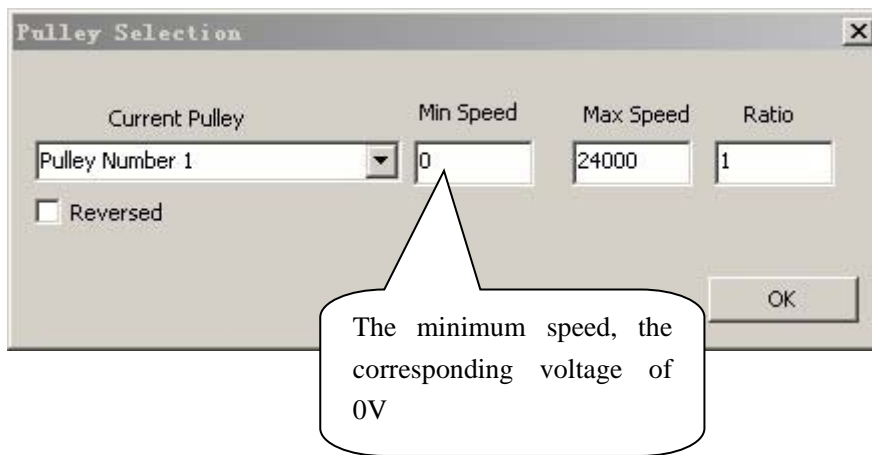


Reversible control spindle is output to an external signal to control external relay, relay control reversing and then enable the inverter, etc.。

Stalls and minimum speed spindle speed and maximum speed settings, In mach3 software "Config" menu "Spindle Pulleys.." dialog settings, as shown:

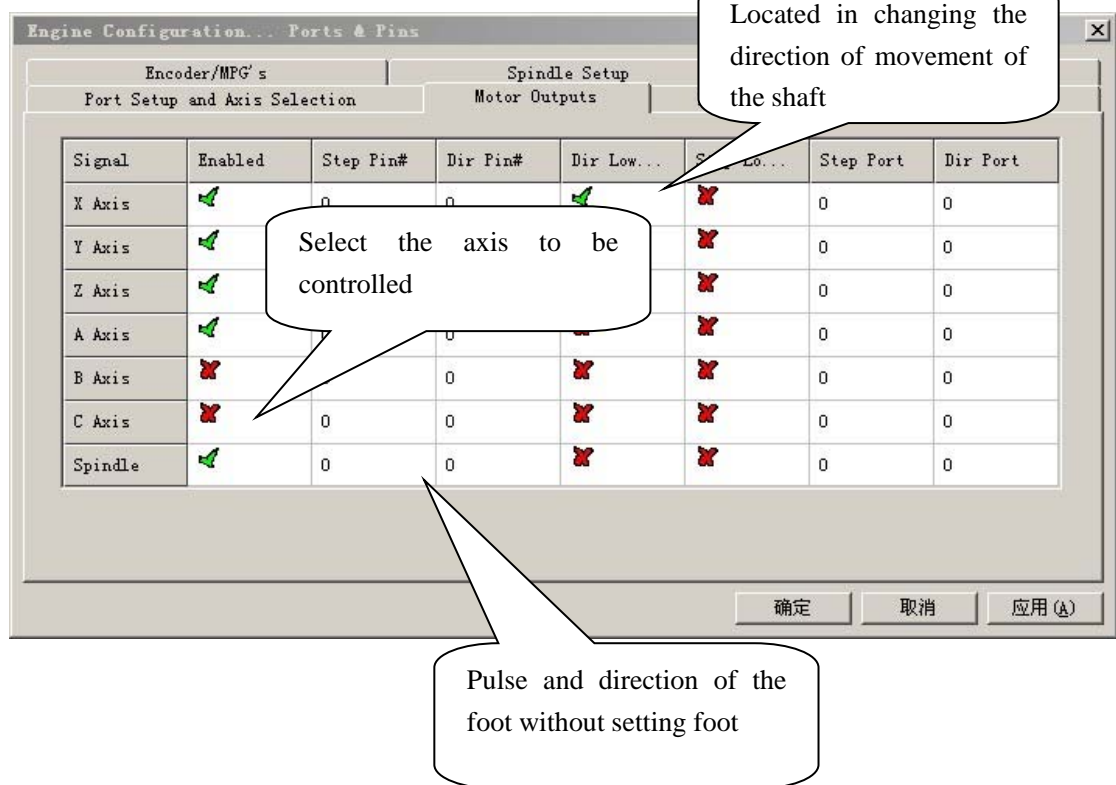
Said spindle shaft pulley or gear, the general election on the 1st

Maximum speed, corresponding to the maximum voltage, 10V or 5V, according to the board output voltages。



Axis control wiring and setting

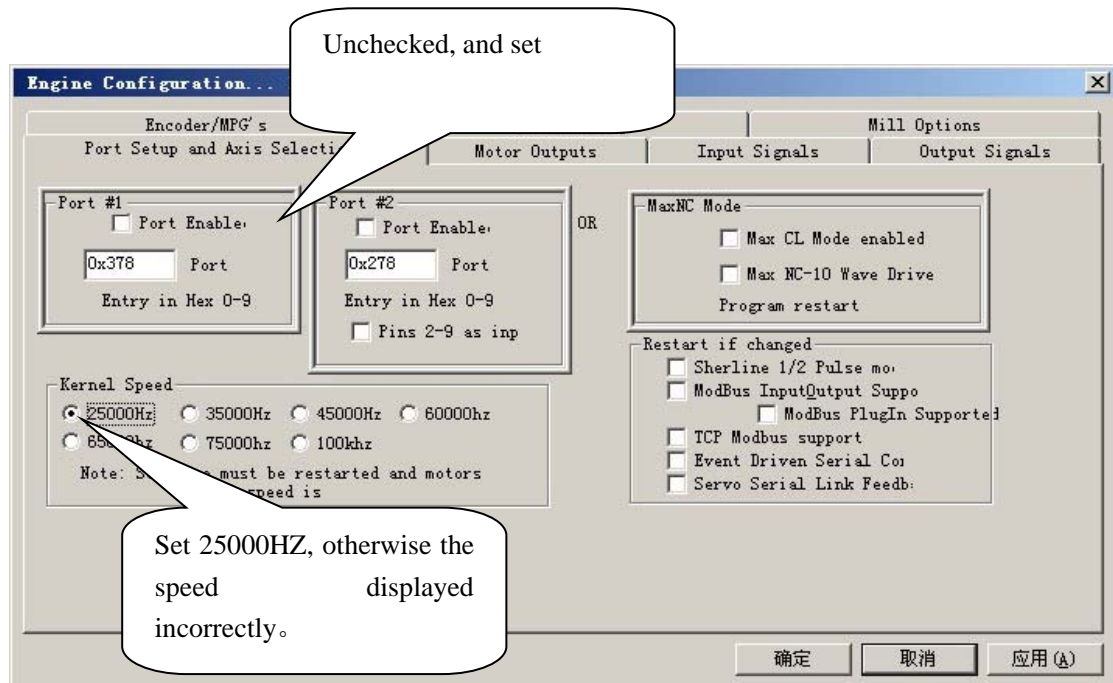
The motion control card to control stepper drives and AC servo drive, When connected stepper motor drive connection with the use of sun. In Mach3 software menu "Config" under "Ports and Pins". Dialog "Motor outputs" tab, set the following diagram:



Parallel choose Mach3 software, motion control card output because it is no longer using the parallel port driver, the two ports are not enabled.

No need to set core frequency according to the lowest 25000HZ settings, set up the other core frequency, only the incorrect speed value. Open the "Config" dialog box, in the "Port Setup

and Axis Selection" tab, press the map set:

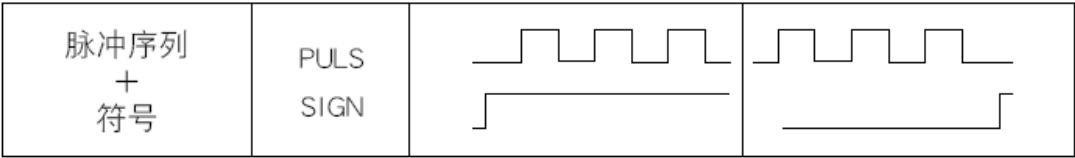


Board-axis control signal descriptions:

Identity card	Signal Description
XP	X-axis pulse output differential signal +
XP/	X-axis pulse output differential signal -
XD	X-axis direction signal output differential signal +
XD/	X-axis direction signal output differential signal -

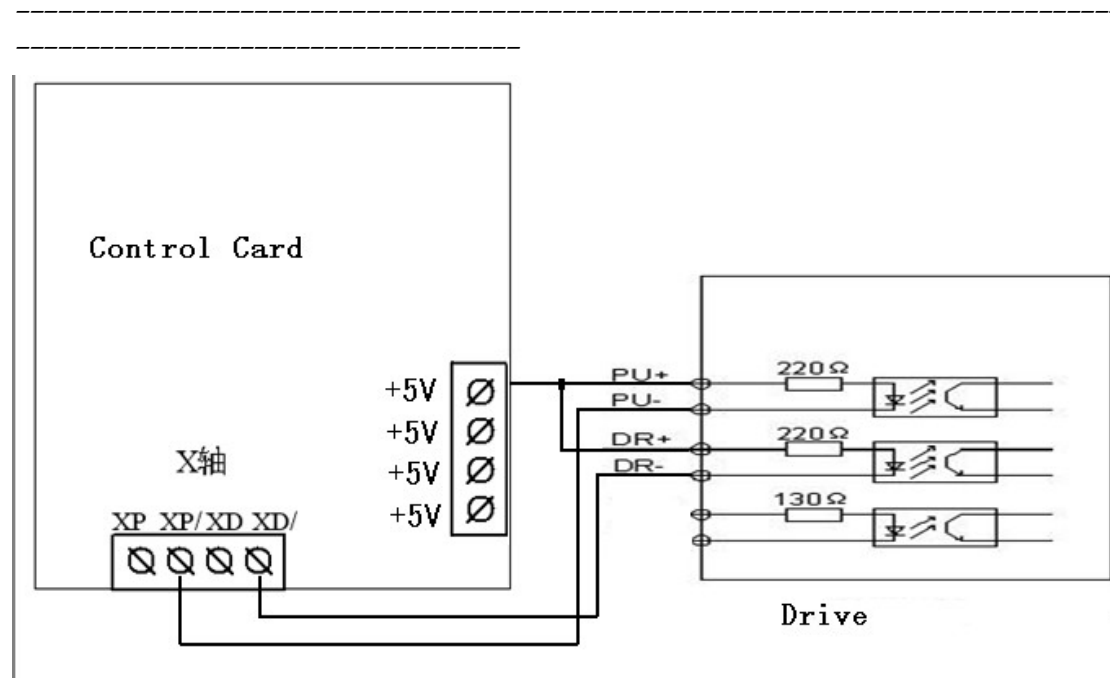
YP	Y-axis pulse output differential signal +
YP/	Y-axis pulse output differential signal -
YD	Y-axis direction signal output differential signal +
YD/	Y-axis direction signal output differential signal -
ZP	Z-axis pulse output differential signal +
ZP/	Z-axis pulse output differential signal -
ZD	Z-axis direction signal output differential signal +
ZD/	Z-axis direction signal output differential signal -
AP	A axis pulse output differential signal +
AP/	A axis pulse output differential signal -
AD	A-axis direction signal output differential signal +
AD/	A-axis direction signal output differential signal -

The axis motion control card control output signal mode:



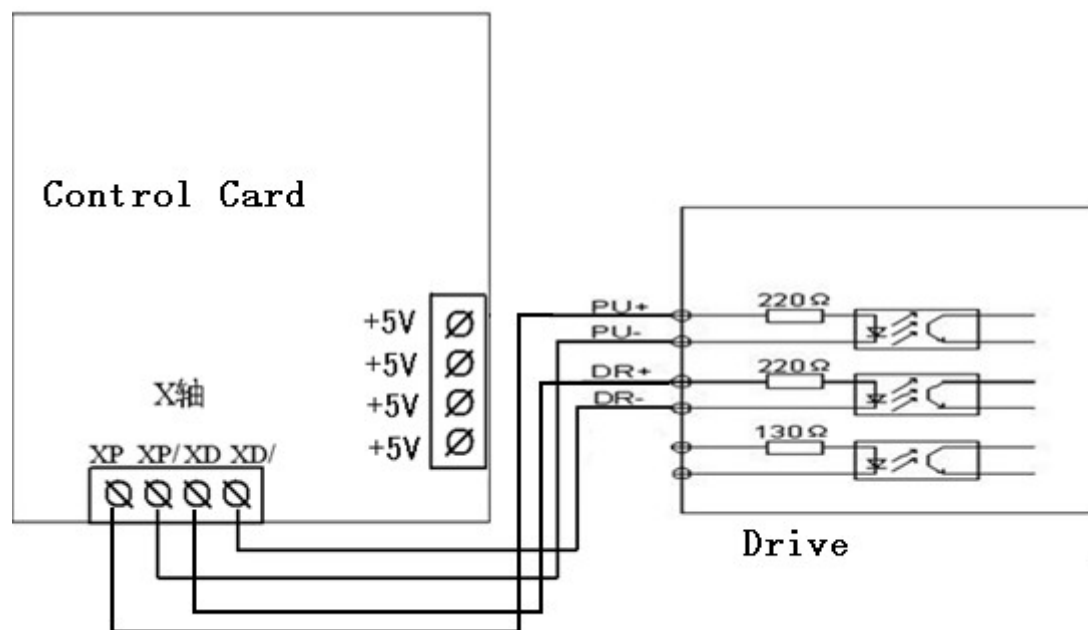
Differential output signal, which is the differential output, differential output better than collector output signals farther, higher frequency, stronger anti-interference ability。

Typical stepper motor drive common anode connection:



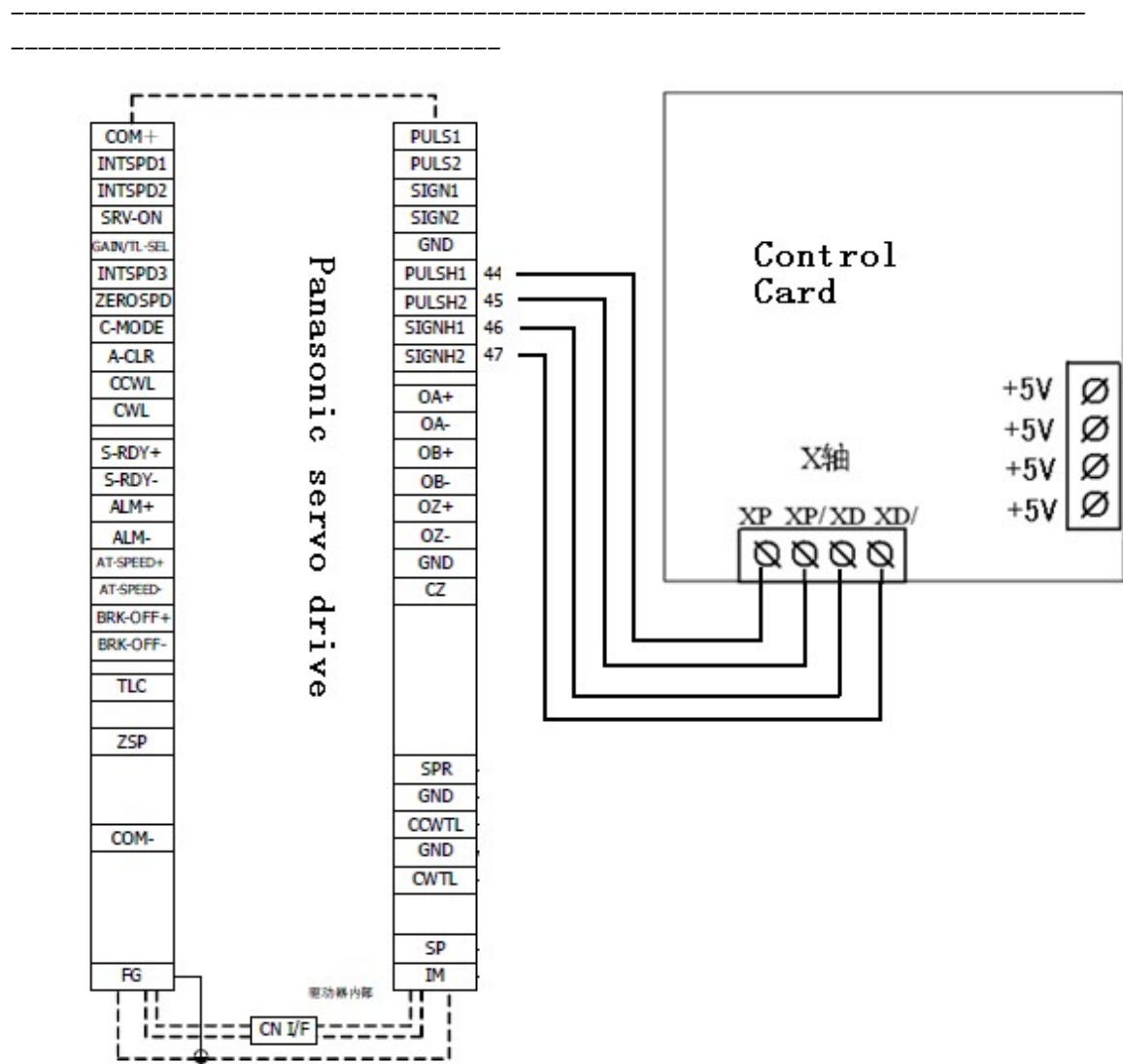
Typical stepper motor drive differential mode connection:

(Make sure this wiring stepper drive is receiving a differential signal control)



Typical wiring diagram AC servo drive:

All AC servo drives generally support differential signals, wiring by differential mode. Icon is the X-axis indicate the other shaft connection in this way.



When used in AC servo drives, AC servo drive control mode is set to form a pulse + direction. (Some instructions, also known as the "symbol + direction")

AC servo drives in general but also external control "Servo enable" signal, and some can directly through parameter settings without external control.

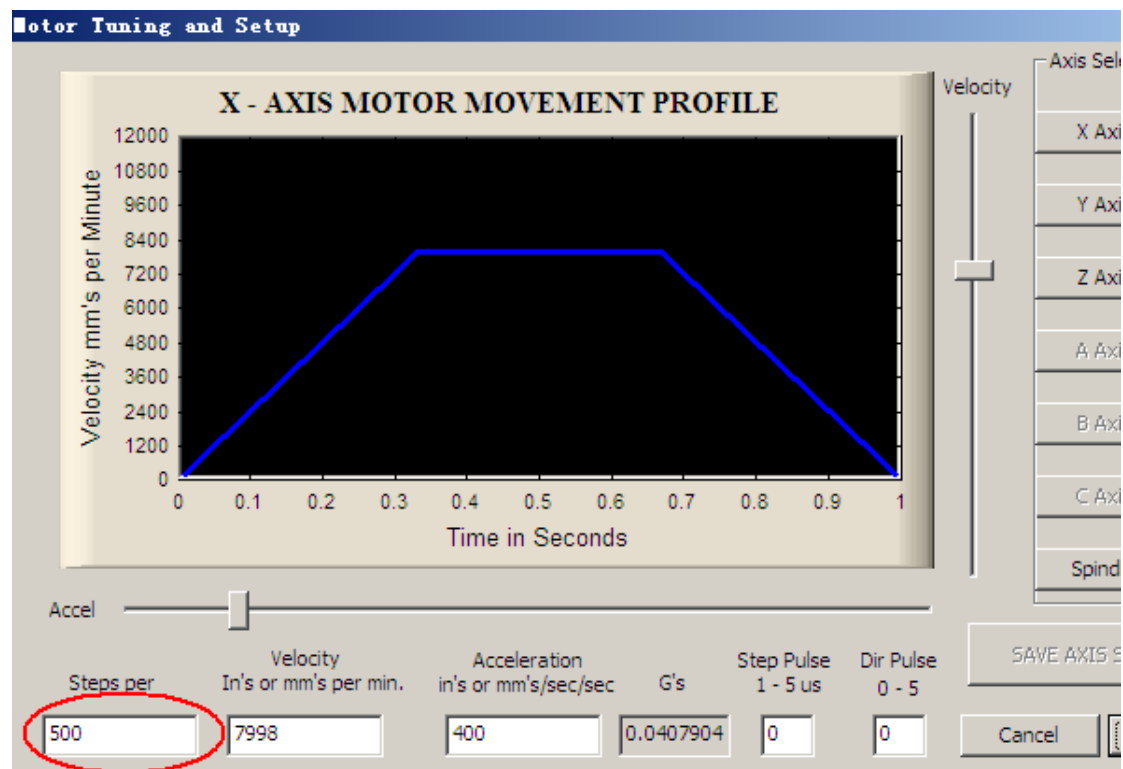
All lines connected, the drive parameters set with the drive connected to the power supply, the motor should be locked state, if they can easily twist the motor shaft by hand, indicating

that the motor not enabled, please check your wiring and drive parameters set up.

Commissioning and pulse motor equivalent set

First you must know that your screw pitch. Whether using a rack or screw, as long as we know how much the motor moves a transfer from the machine, you can calculate the pulse equivalent MACH3.

For example, the 10MM screw, then a transfer is definitely 10 mm, in MACH3 motor startup dialog, if we set the pulse equivalent to 500, as shown:



So 500×10 (Screw pitch or a given amount of feed revolution) = 5000, 5000 is required to turn the motor a pulse. Drive subdivision should be set at the position 5000.

This method is the first set MACH3 pulse equivalent, according to the breakdown of the drive pulse equivalent to set subdivision. But sometimes we do not drive so much broken down, in the above manner is not very good. Then we talk about a good first set segmentation, how to set the pulse equivalent MACH3.

If we set up the drive subdivided into 16, A transfer pulse (Two-phase stepper motor) $16 \times 200 = 3200$, 3200 is a turn of the pulse motor. When the screw pitch is 10MM, $3200/10 = 320$ (mach3 pulses), When the screw pitch is 5MM, $3200/5 = 640$ (mach3 pulses). 23mm motor moves a turn when the rack, $3200/23 = 139$ (mach3 pulses). So even if the pulse equivalent MACH3 software. The value entered into the input box on the map.

After the breakdown of the number of pulses equivalent stepper drives MACH3 software is set up, we can move the axes energized. Select incrementally moving the shaft, such as a walk jog every 5mm, the axis moved, we moved with precise measuring instrument measuring 5mm shaft. When an axis moving properly, we then set the other axes.

These are the pulse equivalent algorithm linear axis, when

the shaft is rotating axis, we calculated in the following manner.

A turn of pulses /360=mach3 stpes per

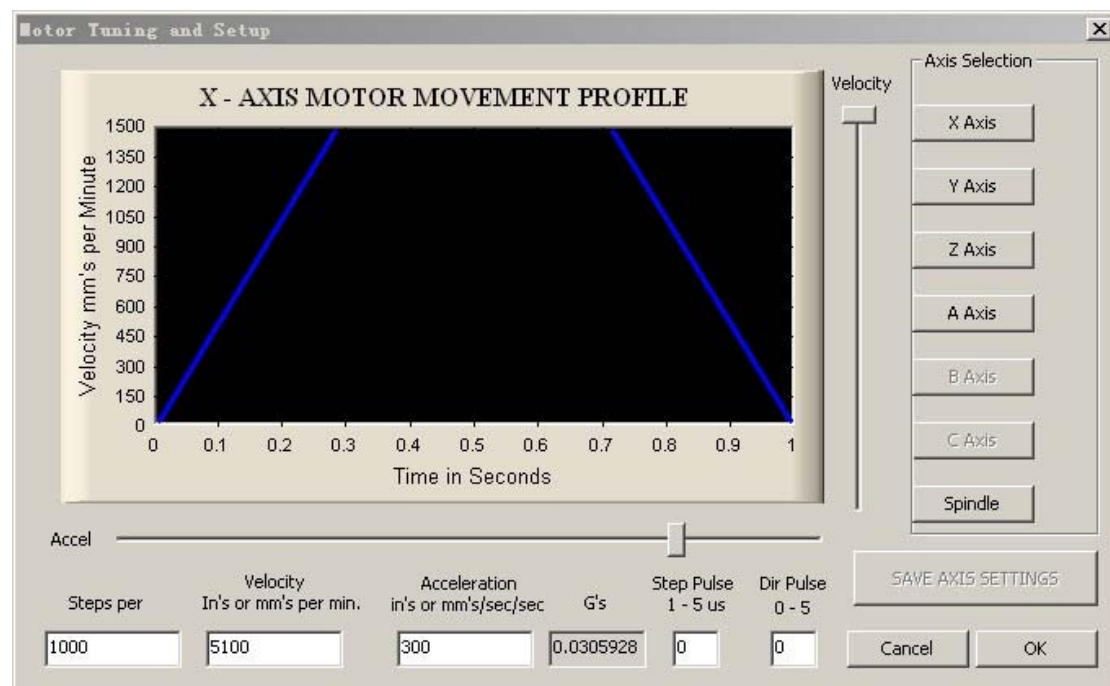
Such as motor control pulse is a turn 3600, so $3600/360=10$, mach3 stpes per is 10.

These are the direct output of the calculation of the motor, when the rotational shaft gear mechanism, the gear ratio is 1:10, for example, we calculate the following manner.

(A turn of pulses /360)*Reduction ratio =mach3 stpes per

Such as motor control pulse is a turn 3600 , so $(3600/360)*10=100$, mach3 stpes per100.

The following figure is an explanatory diagram motor debugging settings:



Steps per: Pulse output 1 unit MACH3。

Velocity In 's or mm 's per min : Jog with the maximum feed speed machining。

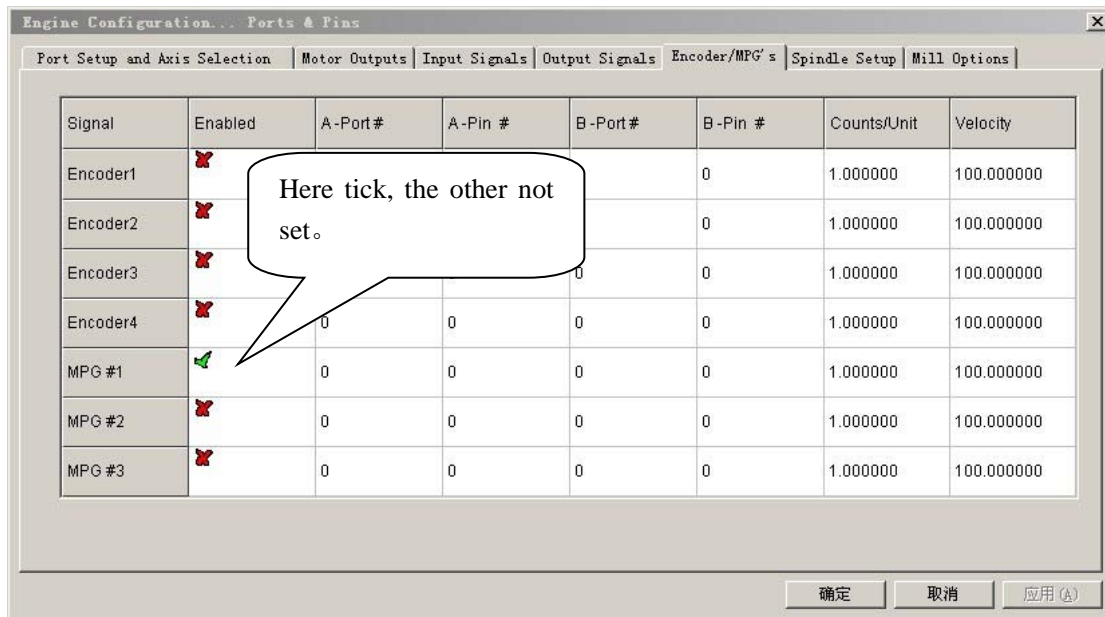
Acceleration in 's or mm 's/sec/sec: Motor start and stop time, the larger the set, the faster acceleration and deceleration, machine vibration, rigid, depending on your machine settings, general settings between 0.2S-0.3S。



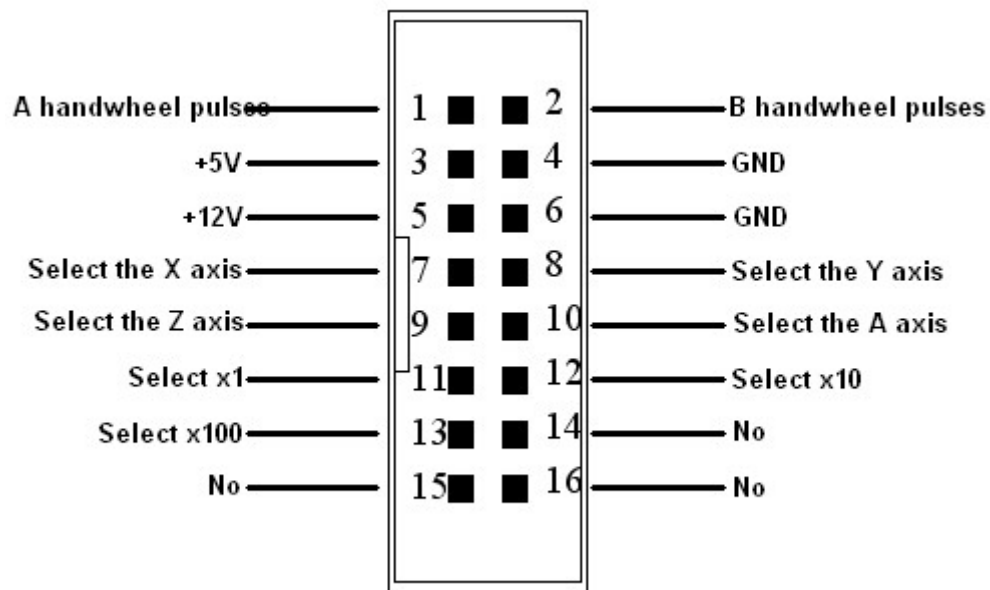
Handwheel pulse wiring and settings

When using a hand wheel, you can use a 12V DC power supply or DC 5V handwheel pulses, pulse selects a turn with a resolution of 100 pulses。

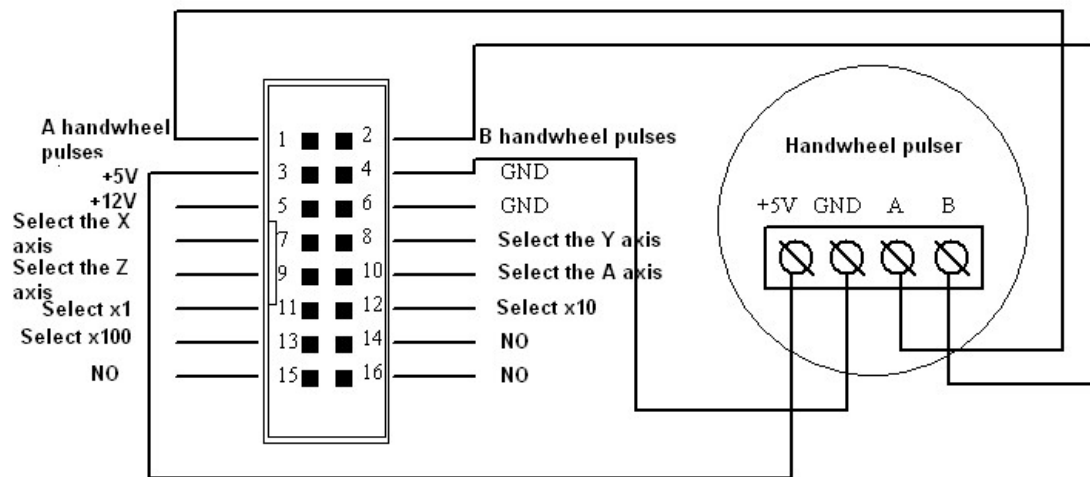
We MACH3 software configuration dialog box, select the first MPG enabled. Other items not selected. Below:



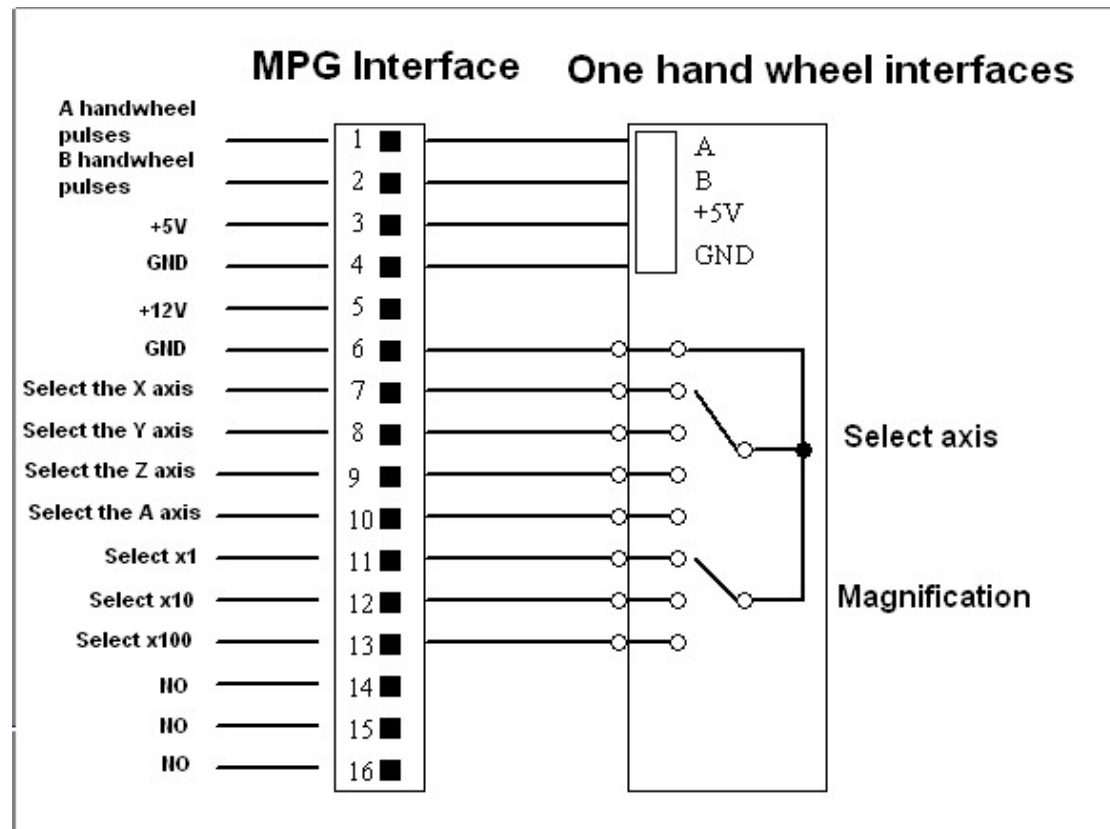
MPG handwheel socket Pin Description:



Monomer handwheel pulse wiring diagram:

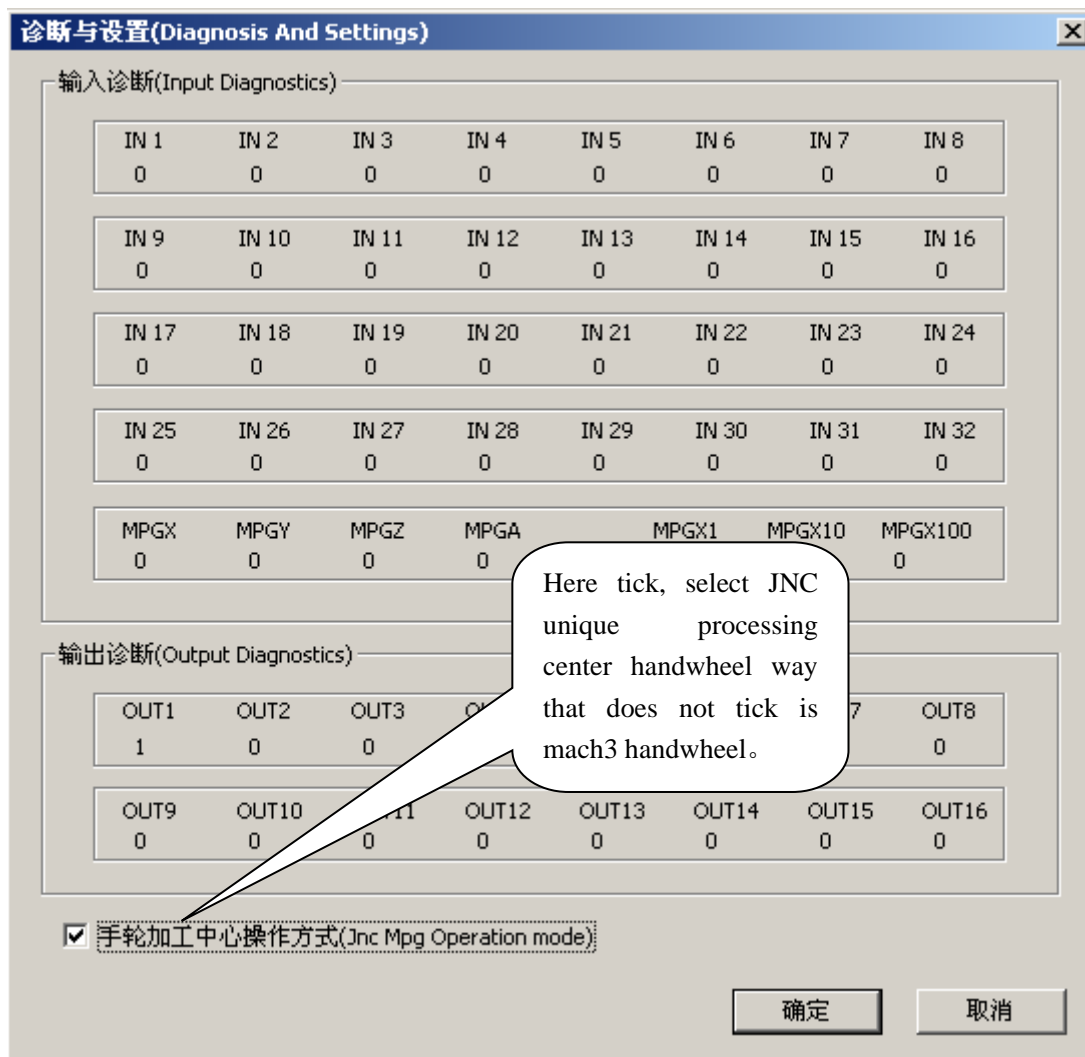


One hand wheel pulse wiring diagram:



Handwheel operation mode

The new card is added FANUC system similar machining centers handwheel moves pulser, Feature selection we mach3 software menu -> Plug-in Settings -> "(Diagnosis And Settings)", left-click the following dialog box.

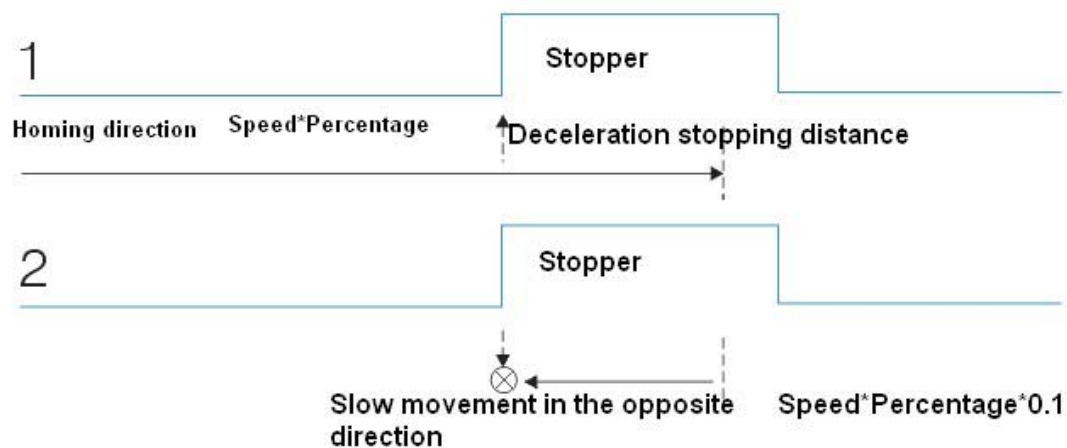


JNC handwheel mode, automatic switch mode "speed", "single step" in the. Incremental speed gear and move the selection by X1 X10 X100. Speed automatic transmission speed of hand shake.

Build the machine reference point (the origin)

The origin is a fixed point on the machine, it is not only to establish the reference point of the workpiece coordinate system on the machine, but also a reference point when the machine debugging and processing.

Back home after two states, as shown:



*1: Homing first axis rapid traverse rate percentage to the original point of the homing direction speed * parameter set to move, when the origin of the slowdown hit the block deceleration switch is depressed (rising), back to the origin of the axis decelerates to zero speed brake.*

2: And then moves in the opposite direction at low speed, hit the block when decelerating after the release origin proximity switch (falling), back to the zero axis in real time to stop,

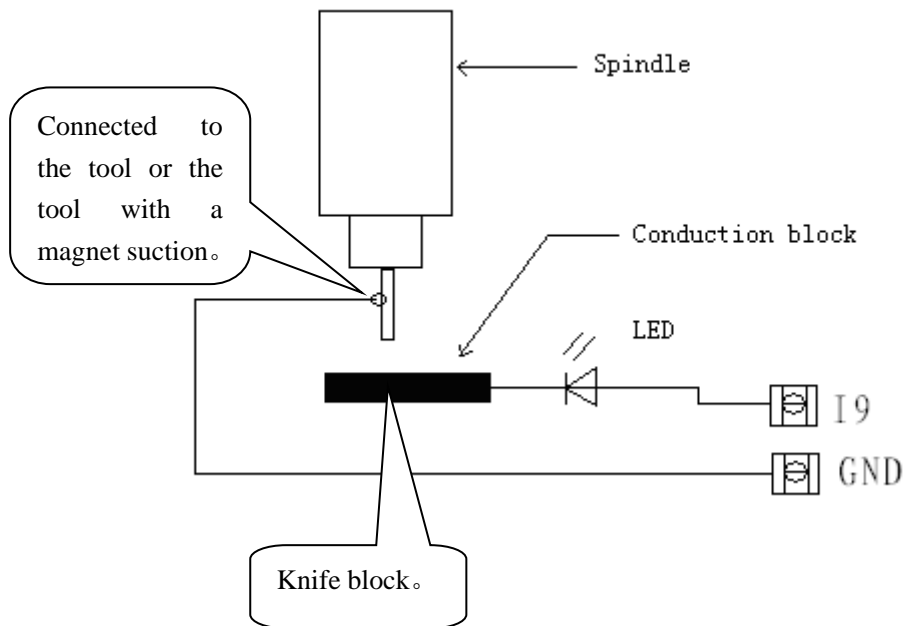
that is the point of origin of the machine.

Note: When the slowdown hit the block is too short, it will cause the axis homing in state 1, homing the axis decelerates to zero speed when the brake, hit the block has been exceeded. So that the origin proximity switch early release. Then execution state 2:00, early release due to the proximity switch, the system is directly detected low, but will result in state 2 is not executed, the current point will be set to zero. Then the origin location is wrong (accuracy can not be guaranteed)。

How to automatically measure the Z axis of the workpiece coordinate system

This feature can be highly accurate workpiece coordinate where the negative direction of the Z-axis measurement set, full automatically without manual intervention, with the most simplistic peripherals, you only need a gauge block or conductive metal plates, the wiring can be simple automatic measurement and set the Z axis of the workpiece coordinate system, Accuracy: $\pm 0.001\text{mm}$

Circuit wiring:



This way when the machine is fully insulated wiring, fully insulated refers machine itself does not form a loop and power, including the presence of the drain voltage. If you use a multimeter red pen then +24 V, the black pen then the body, then if there is no voltage display that is considered the machine is insulated. (Note the use of voltage profile) If the spindle has a case of leakage, this time by a 1/2 watt resistor (10 ohms), in series with the "GND" leads. (Resistance can not be omitted, directly to the "GND" connected to the drain of the device, and can cause damage to the circuit board instability).

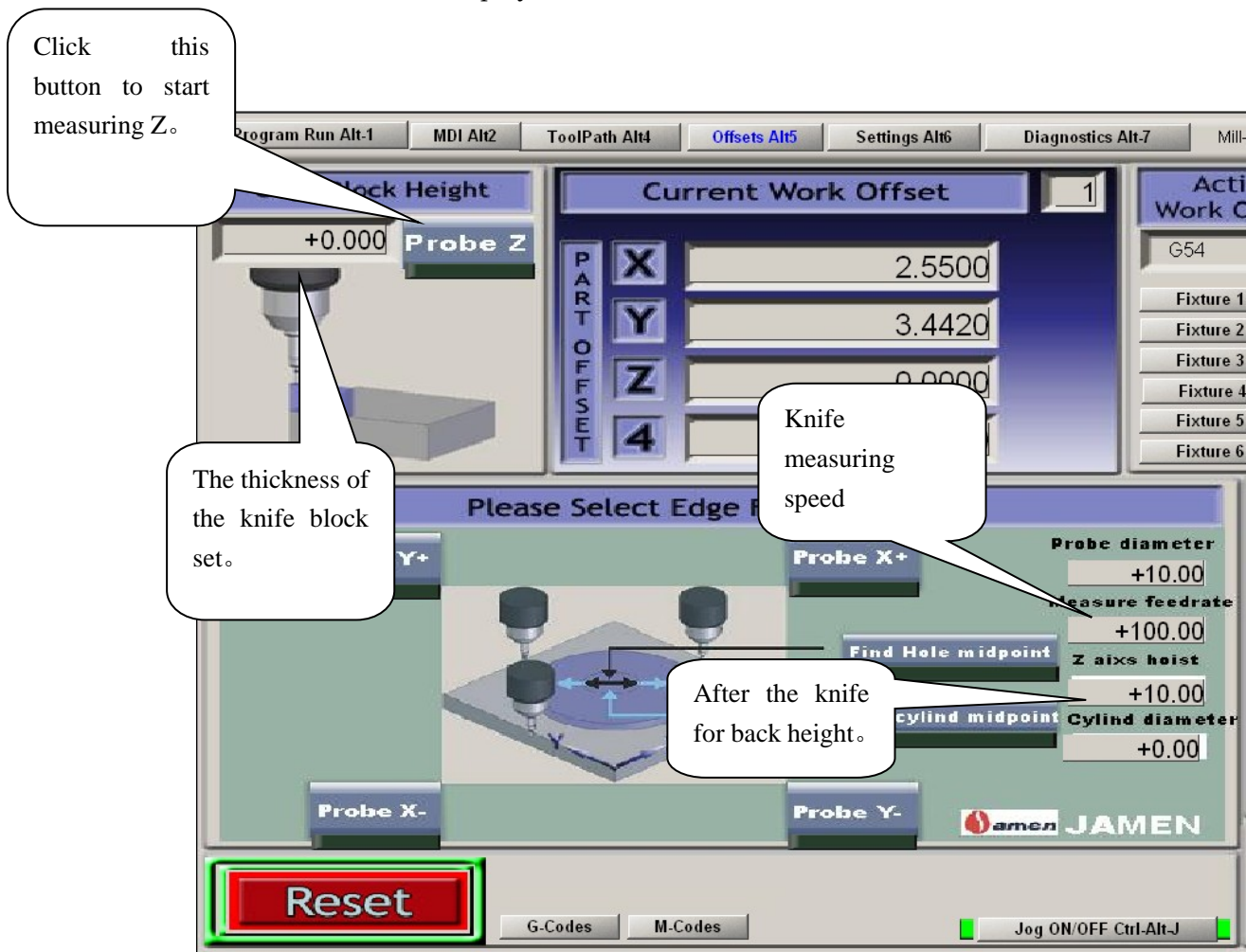
"IN9" input terminal is fixed to measure the signal input, and you will not be able to use it as the other. From "IN9" input

terminal lead you to pick a light-emitting diode, you can not answer, light-emitting diodes indicate the main role played.

(Note that the long-legged light-emitting diode (+ pole) then "IN9" side, short legs (- pole) to measure the conductive sheet through wire bonding)

Measurement operation:

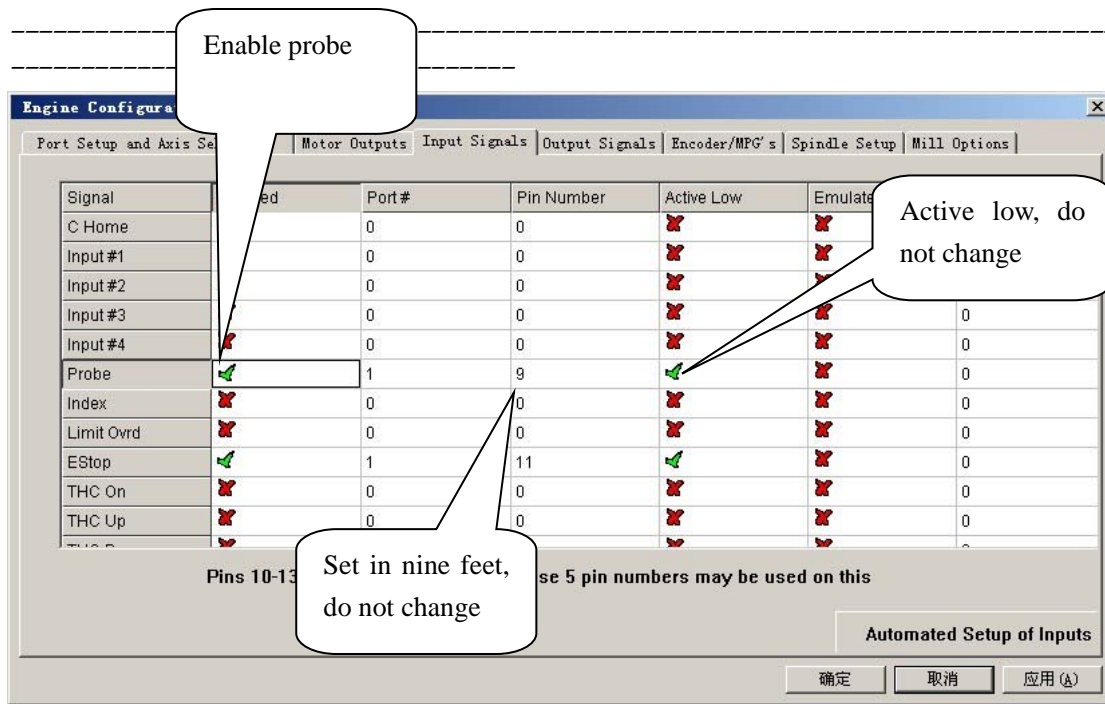
First, we in the MACH3 software "OFFSETS" screen in "GAEG BLOCK HEIGHT" Set up your measurement run data. Below:



Automatic workpiece measurement Z, Z-axis low negative direction when the block immediately stop measuring tool encounter (Note that the measurement block to be placed with the machine insulation), The current Z-axis workpiece coordinate digital sets, then Z axis retraction height automatically return to setting, Z-axis workpiece coordinate measurement is completed.

If not stopped encounter sinker back, mainly due to a bad contact or circuit block bad contact and measurement tool! After confirming good contact, then press the "reset" button to re-measure.

The above measurements need to "port and feet" input box, the "probe" input is enabled, as shown below:



Note: This card access on the knife / device, select "normally open" action normally closed inaccurate.

I/O 诊断

State of the input pin can be real reaction to the interface, if the LED lights off alone to determine the input state, sometimes not accurately reflect inputs such as optical coupling damage, etc.. Software I / O is a true reflection of the mach3 diagnostic software has been received, the output is the same, the state also has an output of mach3 software. We mach3 software menu "plug-Control" -> "Diagnosis and settings", left-click the following dialog box, as shown below:



Enter the above illustration is mach3 software is set to active low, the board normally open contact input buttons or switches. Is set according to the change of state from 0 to 1 and becomes the connection, or from 1 to 0. Click "OK" or "Cancel" button to exit the dialog diagnosis.

Thank you for your support and love the product, and the product description of the error is unknown, and your suggestions are a great help to us, we will be working hard to make every detail.