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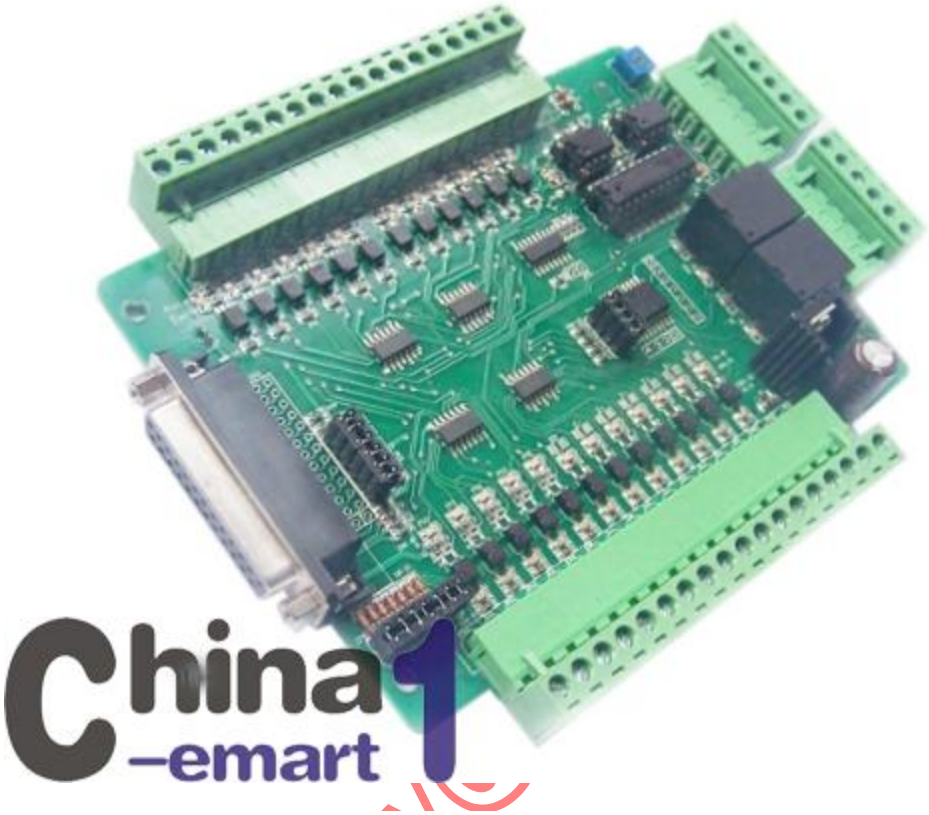
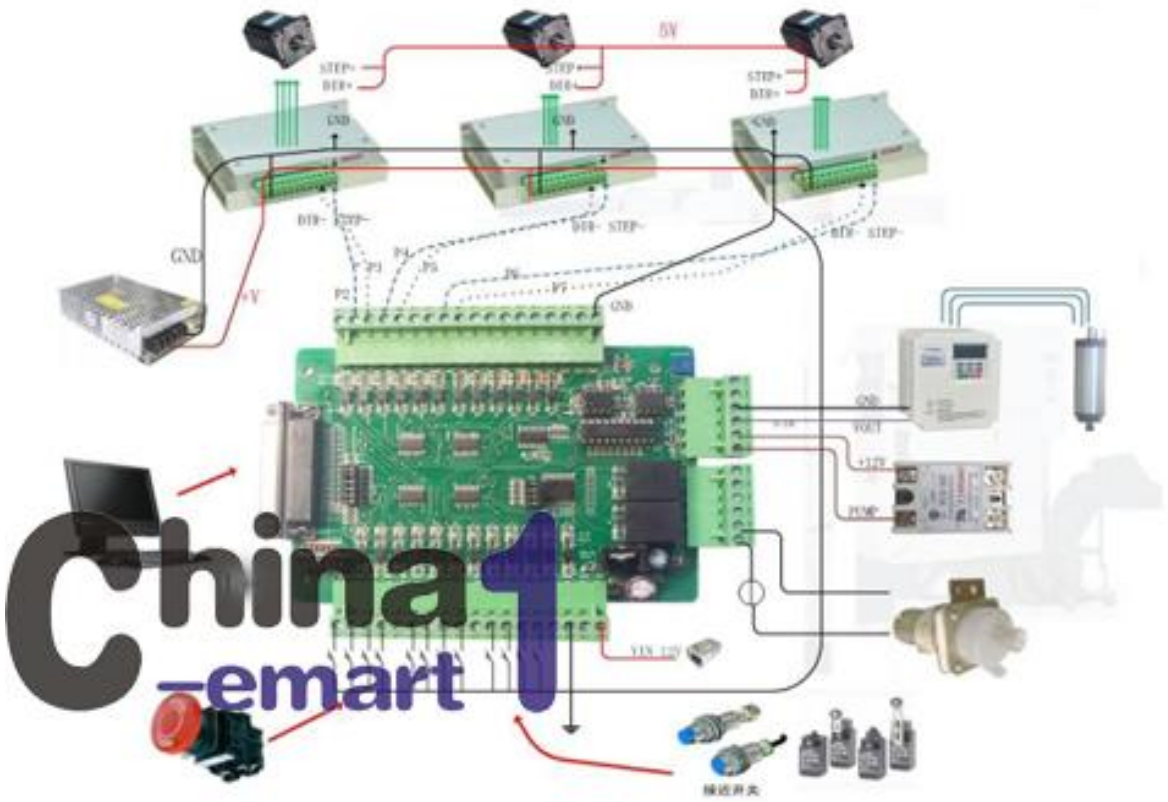
MACH_CNC INTERFACE BOARD II





Features

1. provide the 12-wires OC output（Open collector NPN）, P2-P7 6-wires high speed optical isolated coupling, the output port can drive the solide state relay directly

2. 12-wires optical isolated common signal input

3. all the input and output have the signal alarm

4. single power supply 12VDC

5. all the input signals of the PC parallel port are modified by the Schmitt Trigger and increase the anti-jamming capacity of the transmission of the digital signal

6. Using Mach 2, 3 as the controlling software, makes the application of the PC as the industrial control possible

7. as the lack of the IO of the PC parallel port, we add 3 axis 6bit independent Limit switch of the IO input

8. compatible with all the pusle and direction signal of the Stepper or Servo driver , can control the lathe and milling machine to work

9. the input part can connect to the mechanical switch , groove optocoupler, proximity switch , tool presetter etc.

10. the interface board P1-P17 port correspond to the pin1-17 of the PC parallel port , the parallel port pin 18-25 is the GND.

11. control the 2-wires electromagnetic relay output by the parallel P1 and P16 , this can control the cooling pump and lubricating oil pumpof the lathe

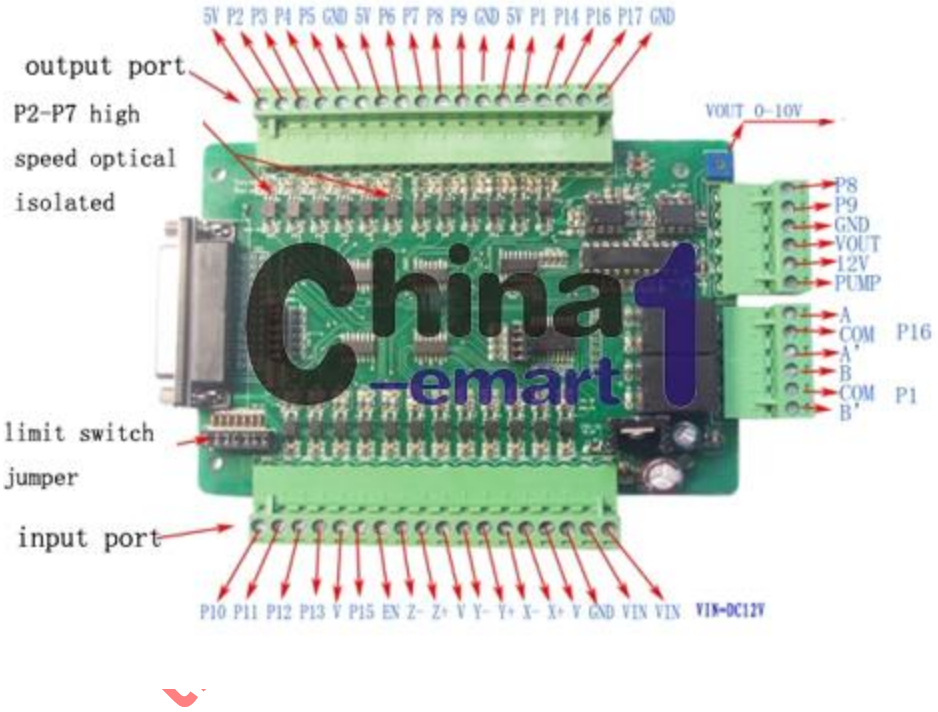
12. the setup of the P17 in the Mach 3 for the charge pump can control the solide state relay output to increase the safety of the lathe

13. the P14 can provide the accurate 0-10V analog voltage for the main axis speed control signal , this can make the frenquency of the speed of the spindle

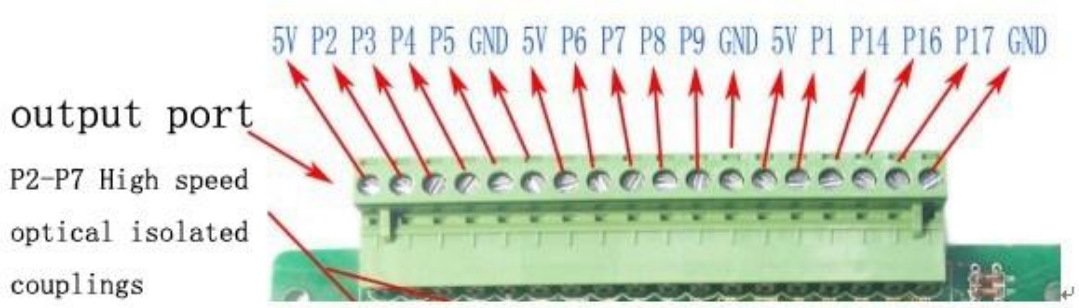
14. dimension:140mm*100mm

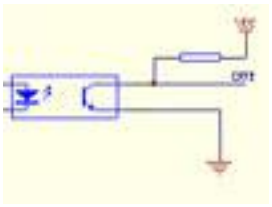
15. locating hole:122mm*82mm

Definition of the Pin:



Output port:





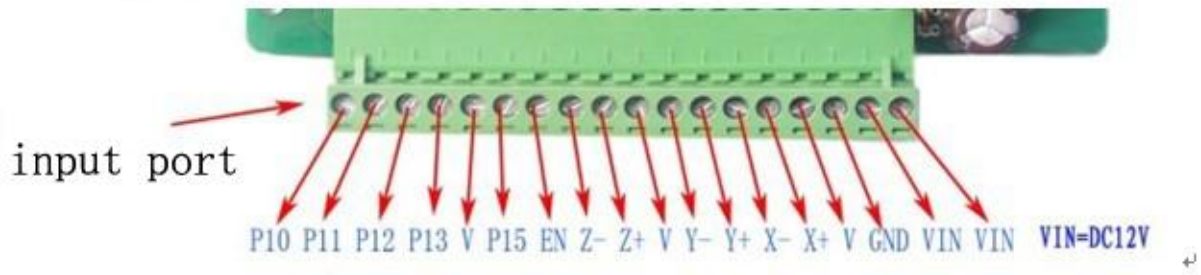
Internal circuit

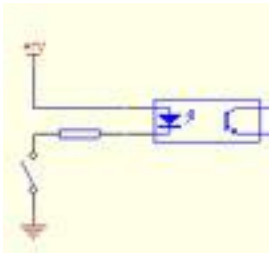
5V P2 P3 P4 P5 GND 5V P6 P7 P8 P9 GND 5V P1 P14 P16 P17 GND

1、3 DC5V is the output voltage port

2、P2 P3 P4 P5 P6 P7 P8 P9 P1 P14 P16 P17 are the 12 pins of the paralle output, in the MACH, P2/P3/P4/P5/P6/P7, these 6 IO ports used as the X,Y,Z axis pulse and direction control

Input port:





Internal circuit

1、 EN controls the P2 P4 P6 ports' singnal

2、 P10 P11 P12 P13 P15 are inpurt pins

P10 in MACH is the Estop

P11、P12、P13、P15 can be used as X,Y,Z limit input or setup for other uses like the external switch OEM etc by the limit switch

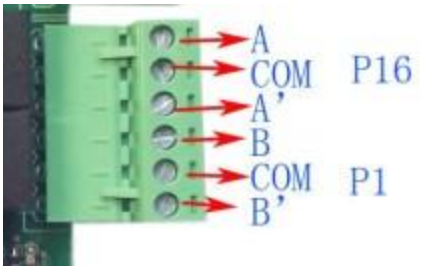
3、 VIN on the board is the input power supply port, uses the 12VDC, if the current is larger than 2A, can use 12V switching power supply.

According to the input port, this interface board can connect to different sensors and switches and setup software can realize different functions.

The connection of the mechanical switch


The connection of the proximity switch and receive sensor and optical sensor

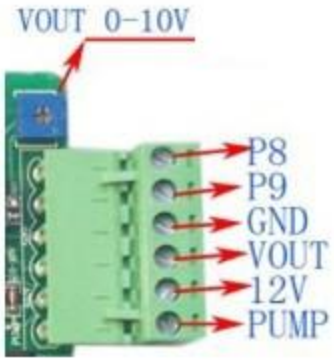

Relay port:



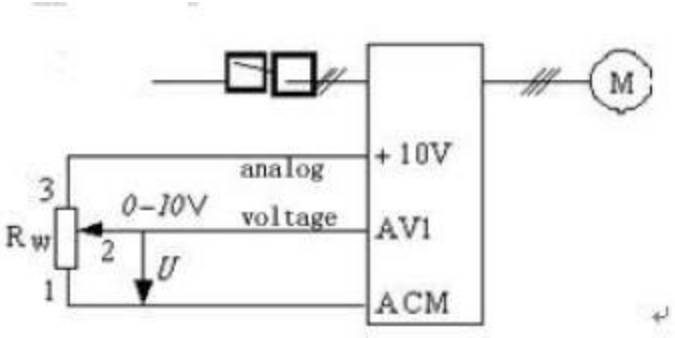
A′ COM A B′ COM B

COM is the relay shared port, AA' B B' are the open and closed port of the relay, controlled by the P1(A relay) and P16(B relay).

Spindle control port



1、GND VOUT 0-10V spindle analog control , controlled by P14.



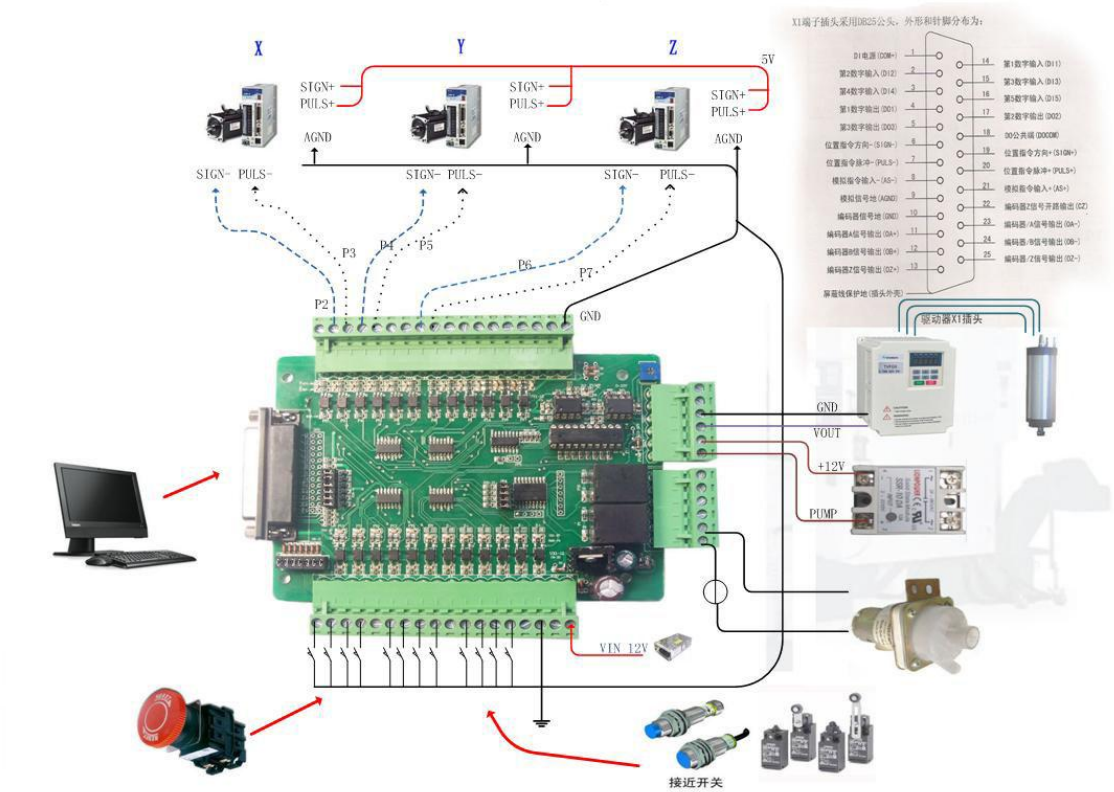
ACM connects to GND, AV1 connects to 0-10V, the speed control of the tranducer should setup as the external analog voltage control

2、PUMP uses as the watchdog, controlled by P17 charge pump-pulse signal monitor

between the 12V and the Pump ports, can connect a 12V solide state relay or electromagnetic relay

3、the transistor output signal of the P8,P9 ports can control the on/off of the relay

Wiring diagram:

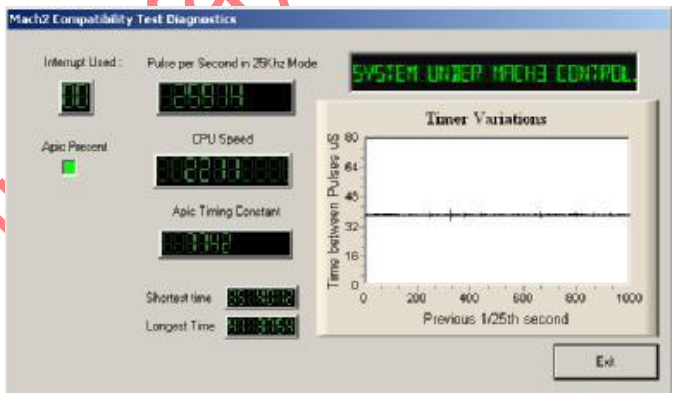


Configuration of MACH3

The setup of Mach 3 (Mach 3 REV1.84), for other versions Mach, the configuration will be a little different.

When you install the software, please do not connect to the lathe.

Setup Finished--Initialise System--Finish，after that, you need to restart the PC



After installation of the software, you can test the system, there is a Driver Test Program.

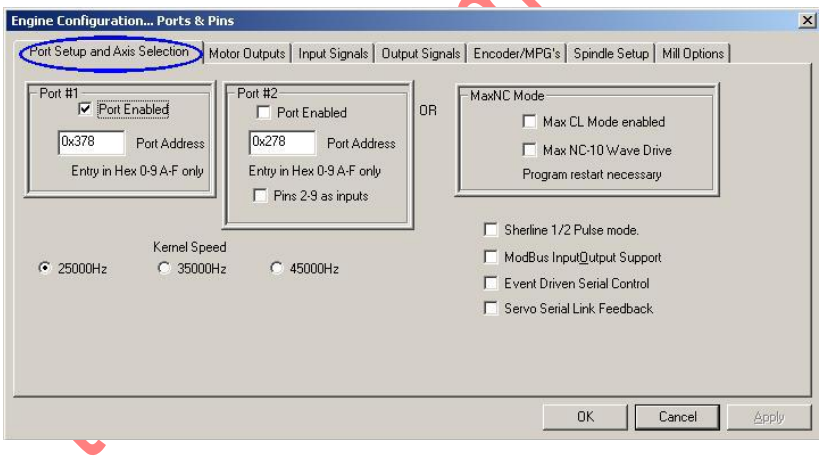
1. setup the unit of the lathe

config-setup units--- you can choose the first (mm) or the second choice

(inch)

2. define the port

if you just need to use the one paralle port and at the same time, this port is the parallel port of the mainboard of the PC, the port address is the default address 0X378



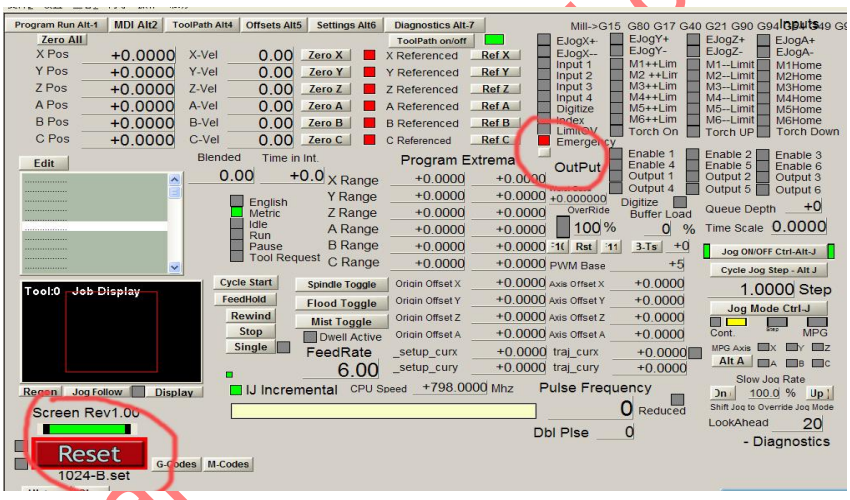
3.define the frequency of the driver

Mach3 driver programme can work in the frequency of 25000Hz、35000HZ、45000Hz

If you are using the stepper motor, 25000Hz is the most convenient and stable frequency. The standard 1.8° stepper motor with 1/8 resolution can reach the rotation of 935RPM.

4. Estop setup

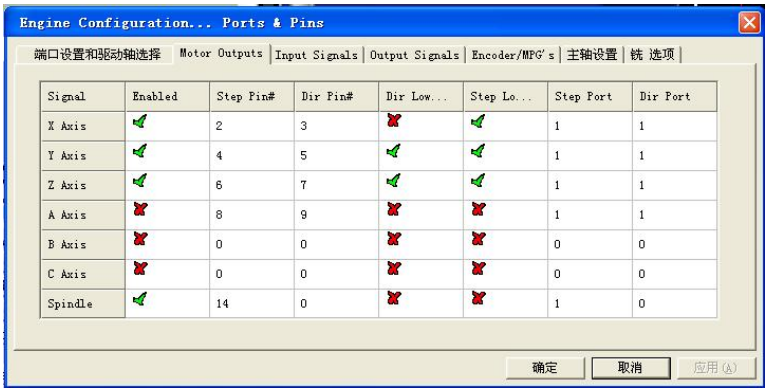
When the setup is fine, click the reset button, then the LED will turn green.



There is a switch between the P10 and the GND on the interface board, press the button, then you will see a red LED in the Diagnostics ALT-7 file.

5. X,Y,Z axis ouput signal setup

Motor outputs----X axis pulse signal P2, X axis direction signal P3; Y axis pulse signal P4, Y axis direction signal P5; Z axis pulse signal P6, Z axis direction signal P7; spindle control output P14 , then reserve the setup.



Signal	Enabled	Step Pin#	Dir Pin#	Dir Low...	Step Lo...	Step Port	Dir Port
X Axis	✓	2	3	✗	✓	1	1
Y Axis	✓	4	5	✓	✓	1	1
Z Axis	✓	6	7	✓	✓	1	1
A Axis	✗	8	9	✗	✗	1	1
B Axis	✗	0	0	✗	✗	0	0
C Axis	✗	0	0	✗	✗	0	0
Spindle	✓	14	0	✗	✗	1	0

6. Spdinle control

Mach 3 can control the spindle in 3 ways, you can also use the manual control.

A. Use the relay and contactor to contrl the start or stop of the motor (clockwise or inverse hour)

B. Use the step or direct pulse to control the motor (it is a servo motor)

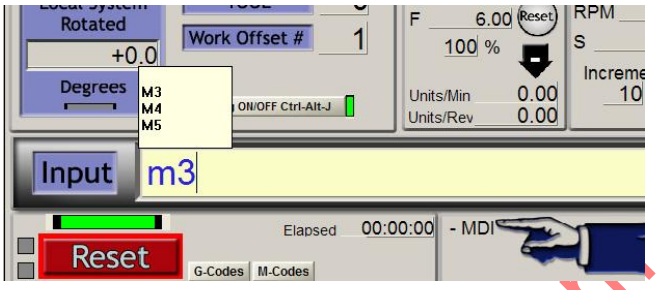
C. Use the pulse PMW (pulse-width modulation) signal to control the motor

We control the spindle , normally use the second method , by the pulse frequency to control the 0-10V analog voltage in order to control the spindle speed.

Define 5 output ports，P8--Output #1、P9--Output #2、 P16--Output #3、P1--Output #4、 P17--Charge Pump。

This step will forbid the spindle relay, cutting coolant fluid and the mist lubrication control (do not select the choice), and then choose the Motor

control—use spindle motor output and the Step/Dir Motor, the Output #1 , Output #2 as the positive and negative control of the spindle, the Output #3 as the mist lubrication control, the Output #4 as the cutting coolant fluid control.



Here , we can enter the M order, then the LED on the Mach-CNC interface board will turn on , the spindle control—M3,M4,M5

M3 can contrl the spindle as the setup speed clockwise running

M4 can control the spindle as the setup speed anticlockwise running

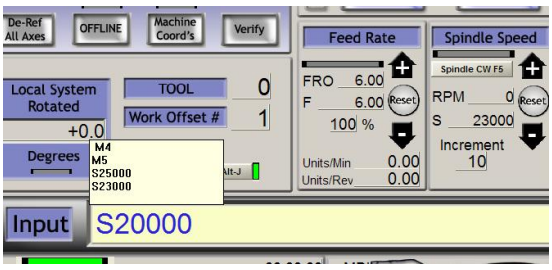
M5 can make the spindle stop running

Cooling and lubrication control---M7,M8,M9

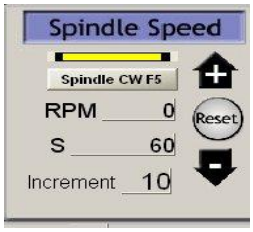
M7 can contrl the open of the lubrication relay

M8 can control the open of the cooling relay

M9 can control the close of the relay

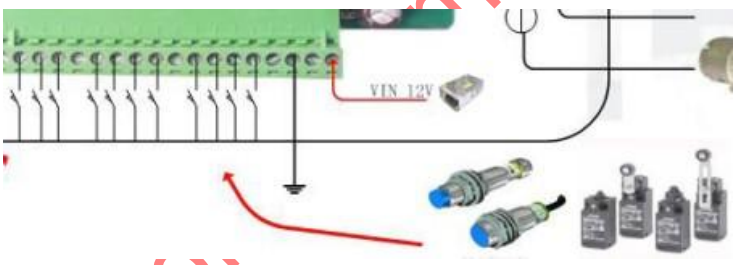


Here we can entere the S order to change the speed of the spindle.

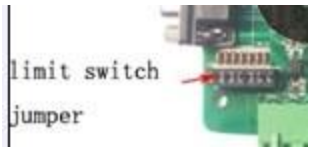


Here you can use the + and –of the manual control to change the speed of the spindle , press F5 will start the spindle (the LED will turn yellow),on the interface board, the 0-10V port will change the voltge as the change of the spindle speed.

7. Limit switch setup



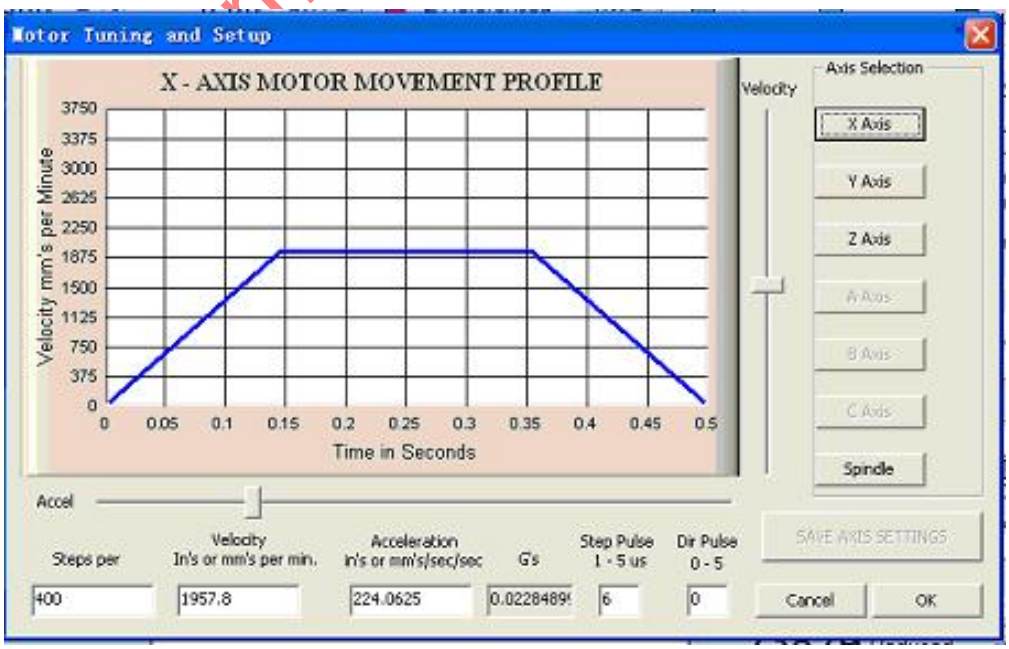
The interface board has 6 limit switch port, you can install the mechanical switch , proximity switch etc. as the lathe's limit switch.



Can enter the limit switch signal into the Mach by setting the limit switch jumper

Here you can setup the input of the limit signal, P11 X axis , P12 Y axis , P13 Z axis , when the status is ON, the external limit switch signal will enter the input to the PC, when it is off, the limit signal will not enter to the PC. P11,P12,P13 input ports can be setted up for other functions.

8. The working data of the motor



Setup the data of the X,Y,Z aixs

(a)step per unit, calculate the pulse of the cutter or the station that need to move a driver

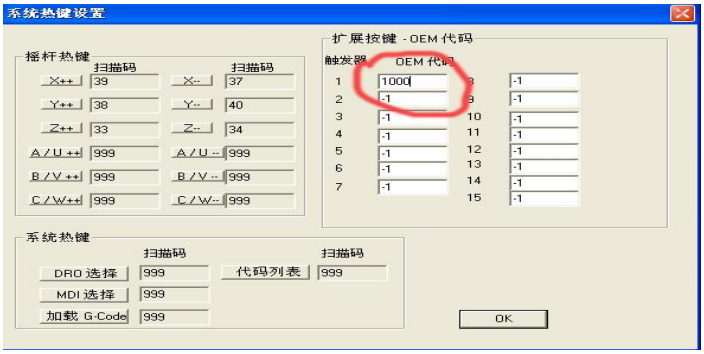
(b) setup the maximum speed of the motor

(c) setup the acceleration rate

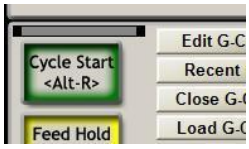
MACH 3 OEM external switch setup

If you want to realize the control by button of the lathe, you have to activate and setup the OEM Trigger (start 1000, zero clear 105, speed +108,speed-109)

Setup the P15 as the OEM Trig#1



Enter the start system OEM code 1000



Then you can install a switch on the P15 to realize the start and stop of the system, it is the same as the cycle start of the PC.