iMach^{III} P4-S and P4-SE CNC Control Pendant

PREFACE

Any machine tool, including computer controlled machine tool, is potentially dangerous. VistaCNC LLC accepts no responsibility for any damage or injury caused by its use. It is your responsibility to insure that you understand the machine you are using and the procedures for safety operations.

If you are in any doubt you must seek guidance from a professionally qualified expert rather than risk injury to yourself or to others.

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WARNING

E-STOP switch button in iMach[III] P4-S CNC Control Pendant only provides Emergency STOP signal to Mach3 CNC application.

For further protection in CNC operation, other emergency protection methods may be needed.

FEATURES

- Plug n' Play USB connection and controls.
- 100 steps high precision MPG.
- LCD display with backlit.
- Large E-Stop button.
- Step, Velocity and Continuous mode jogging through MPG.
- Feed rate, Spindle speed, and Slow Jog rate change through MPG.
- Program Cycle Start and Spindle control buttons.
- Quick predefined step size, feed rate, spindle speed and slow jogging rate selection.
- 6 Axis selections.
- 3 custom control functions.
- Extended E-STOP functions. (P4-SE model).

PLUGIN

- Download the latest iMach3-P4-S **v3.x** Plugin from www.vistacnc.com download page.
- Move the plugin file into Mach3 Plugins directory.

CONNECTION and START

- ▪ Directly plug the USB cable into any USB port on the PC.
- ▪ Start Mach3 application.
- ▪ Click Config from menu, select Config Plugins, and enable iMach3-P4-S-Pendant.
- ▪ Close Mach3 application and restart Mach3 application.

FUNCTIONS and OPERATIONS

1. Axis selection

1.1 Press X/A, Y/B or Z/C axis selection button to select an axis to jog. X axis and A axis, Y axis and B axis, or Z axis and C axis share the same button. Press the button again to select A, B or C axis.

❖ ***A, B and C axis selection can be skipped based on the settings in PlugIn configuration table. See Pendant PlugIn Configuration section for more information***.

☐ Selected axis name. It flashes at ½ second rate.

☐ Current Work Offset Coordinate.

☐ Fixture number

2. MPG (Manual Pulse Generator) mode selection

❖ At any time, pressing and releasing SCR (SCReen) button ![STOP/SCR REW button] within 1 second will open or close the TAB window on Mach3 screen, and pressing and holding SCR button for more than 1 second and releasing the button will change Mach3 screens. Screen selection can be setup in PlugIn configuration table.

❖ In STEP/VELOCITY/CONTINUOUS mode, LCD displays axis DRO readings.

```
Y G57 F4          Y        Mac
 -0.8455           +219.205
```

```
Z        DtG
 +0.0000
```

☐ Mac: Machine coordinates; DtG: Distance to Go

Number of decimal digits to display can be setup in the Plugin Configuration Table:

```
Z G55 F2
       -0.84
```

☐ 2 decimal digits

2.1 STEP, STEP SIZE mode ![S icon]

<u>2.1.1</u>   In STEP mode, the selected axis moves 1 step at each MPG click (detent) with the step size currently in the system.

❖ *A fixed feed rate which is only used in Step mode can be setup in PlugIn Configuration table. Set 0 to use the feed rate currently in the system.*

<u>2.1.2</u>   While pressing and holding the Quick Selection Button ![icon], turn MPG few steps to select the predefined step size. Selected step size displays on Mach3 Screen. Different step sizes can be set up in PlugIn Configuration table. Other step size can be set directly on Mach3 screen.

```
Stepsize
   0.0010
```

2.2 VELOCITY mode ![icon]

<u>2.2.1</u>   In VELOCITY mode, axis moves at 0 to 100% of maximum axis speed based on how fast the MPG wheel is turned.

<u>2.2.2</u>   Pressing and holding the Quick Selection Button will temporally slow down the axis movement.

> ❖ *Speed change sensitivity can be setup in PlugIn Configuration table.*
> ❖ *Speed slow down ratio can be setup in PlugIn Configuration table.*

2.3 CONTINUOUS, CON'T / STEP mode ![icon]

<u>2.3.1</u>   In CONTINUOUS mode, axis moves at constant speed at Slow Jog Rate. The axis movement is independent to the speed at which the MPG is turned.

> ❖ *To avoid accidentally moving MPG and axis, steps to delay the start of axis movement can be set in plugin configuration table.*

<u>2.3.2</u>   Pressing and holding the Quick Selection Button ![icon] will temporally turn CONTINUOUS mode to STEP mode. A matched feed rate as in CONTINUOUS mode will be used in STEP mode.

2.4 CONTINUOUS RATE mode ![icon]

<u>2.4.1</u>   In C% mode, turning MPG changes the speed used in CONTINUOUS mode. The rate displays in Slow Jog Rate DRO (Digital Read Outs) on Mach3 Screen.

```
CON'T
      6.2%
```

2.4.2 While pressing and holding the Quick Selection Button ⬤, turn MPG few steps to select the predefined Continuous Rate. Different Continuous Rate can be set up in PlugIn Configuration table.

2.5 FEED RATE mode F%

2.5.1 In F% mode, turning MPG changes feed rate overridden (FRO) rate from 1% to 250 %. FRO rate can be changed when axes are moving.

```
FRO 100%
    150.00
```
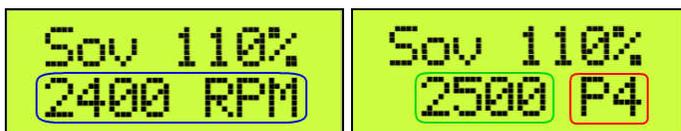
☐ Feed Rate Override percentage.

☐ Feed Rate Override, Unit/Min.

2.5.2 While pressing and holding the Quick Selection Button ⬤, turn MPG few steps to select the predefined Feed Rate Overridden (FRO) or Feed Rate. Selection to use FRO or Feed rate, and different Feed Rate Overridden (FRO) or Feed Rate can be set up in PlugIn Configuration table.

❖ *Quick Selection is disabled when program is running or axes are moving.*

2.6 SPINDLE SPEED mode S%

2.6.1 In S% mode, turning MPG changes spindle speed overridden rate from 1% to 250 %. Spindle speed can be changed when the spindle is running.

```
Sov 110%      Sov 110%
2400 RPM      2500 P4
```

□ Spindle Speed RPM.

□ Spindle Speed Override.

Checking "Display Spindle Speed RPM" in Plugin Configuration Table to display Spindle RPM.

□ Current pulley number.

2.6.2   While pressing and holding the Quick Selection Button , turn MPG few steps to select the predefined Spindle speed Rate Overridden (SRO) or Spindle Speed. Selection to use SRO or Spindle Speed, and different Spindle speed Rate Overridden (SRO) or Spindle Speed can be set up in PlugIn Configuration table.

❖ *Quick Selection is disabled when Spindle is on, program is running or axes are moving.*

3.   Button Jog and Function Buttons

3.1 Button Jogging

3.1.1   Press and release one or more buttons to enable button jogging first, then press and hold the same buttons to start jogging. Slow Jogging Rate is used in jogging.

❖ When X axis is selected, X,Y Jog button will move X axis, and when Y axis is selected,

X,Y Jog button will move Y axis.

3.2 ZERO and F1 button

3.2.1   While pressing and holding the Enable Button **EN** , press and release the Zero Button to zero the currently selected axis.

❖ *Zeroing the currently selected axis sets the current position of the axis to zero by changing the axis offset in current Work Coordinate.*

3.2.2   If F1 is not set to NONE in Plugin Configuration Table, action in 3.2.1 will execute predefined Mach3 OEM button, Custom Button, or Custom Macro.

3.3   GOTOZ and F2 button

3.3.1   While pressing and holding the Enable Button **EN** , press and release the GOTOZ button to move all axes to zero in current work coordinate.

3.3.2   If F2 is not set to NONE in Plugin Configuration Table, action in 3.3.1 will execute predefined Mach3 OEM button, Custom Button, or Custom Macro.

predefined Mach3 OEM button, Custom Button, or Custom Macro.

3.6 COORD and F3 button

3.6.1   While pressing and holding the Enable Button **EN** , press and release the COORD button to select different coordinate or fixture. Selection sequence is G54 (fixture 1), G55 (fixture 2), G56 (fixture 3), G57 (fixture 4), Machine Coordinate, and Distance to Go.

3.6.2   If F3 is not set to NONE in Plugin Configuration Table, action in 3.6.1 will execute predefined Mach3 OEM button, Custom Button, or Custom Macro.

❖ *When pressing and holding a function button, user defined function name will display on LCD. Maximun16 characters can be used to name a function in Plugin Configuration Table*.

`MY TOOL CHANGE 1`

4. Operation Controls

4.1 START / HOLD button :

- While pressing and holding the Enable Button **EN**, press and release START/HOLD button to cycle start the program if the program is not running or is in Feed Hold, or feed hold the program if the program is running.

- When program enters Cycle Start state, 6 axis selection LEDs flash one by one clockwise.
- When program enters Feed Hold state, X axis LEDs flash twice in the first half second and stop flashing in the next half second.

3.3 STOP / REW button :

- While pressing and holding the Enable Button **EN**, press and release STOP/REW button to stop the program if the program is running, or rewind the program if the line of the program is not zero, or stops any axis movement.

-

4.2 SPINDLE ON / OFF button :

- While pressing and holding the Enable Button **EN**, press and release SPINDLE ON/OFF button to turn on the Spindle if the Spindle is off, or turn off the Spindle if the Spindle is on.

5. E-Stop switch button

4.1   E-Stop switch button in P4-S model

- Press E-STOP switch button to send out E-Stop signal to Mach3 application and activate Emergency Mode in Mach3 application.
- When the button is pressed, the switch is locked down. Twist the button to reset it on.

4.2   E-Stop switch button in P4-SE model

- Press E-STOP switch button to send out E-Stop signal to Mach3 application and activate Emergency Mode in Mach3 application. The same E-stop signal is simultaneously sent out through two separate wires to control a relay or to work with other E-stop buttons.
- When the button is pressed, the switch is locked down. The two wires are disconnected.
- Twist the button to reset the switch on, and the two wires are connected and form a closed loop.
- ❖ When the button is pressed and locked, "E-STOP" on LCD flashes at 1/2 second rate.
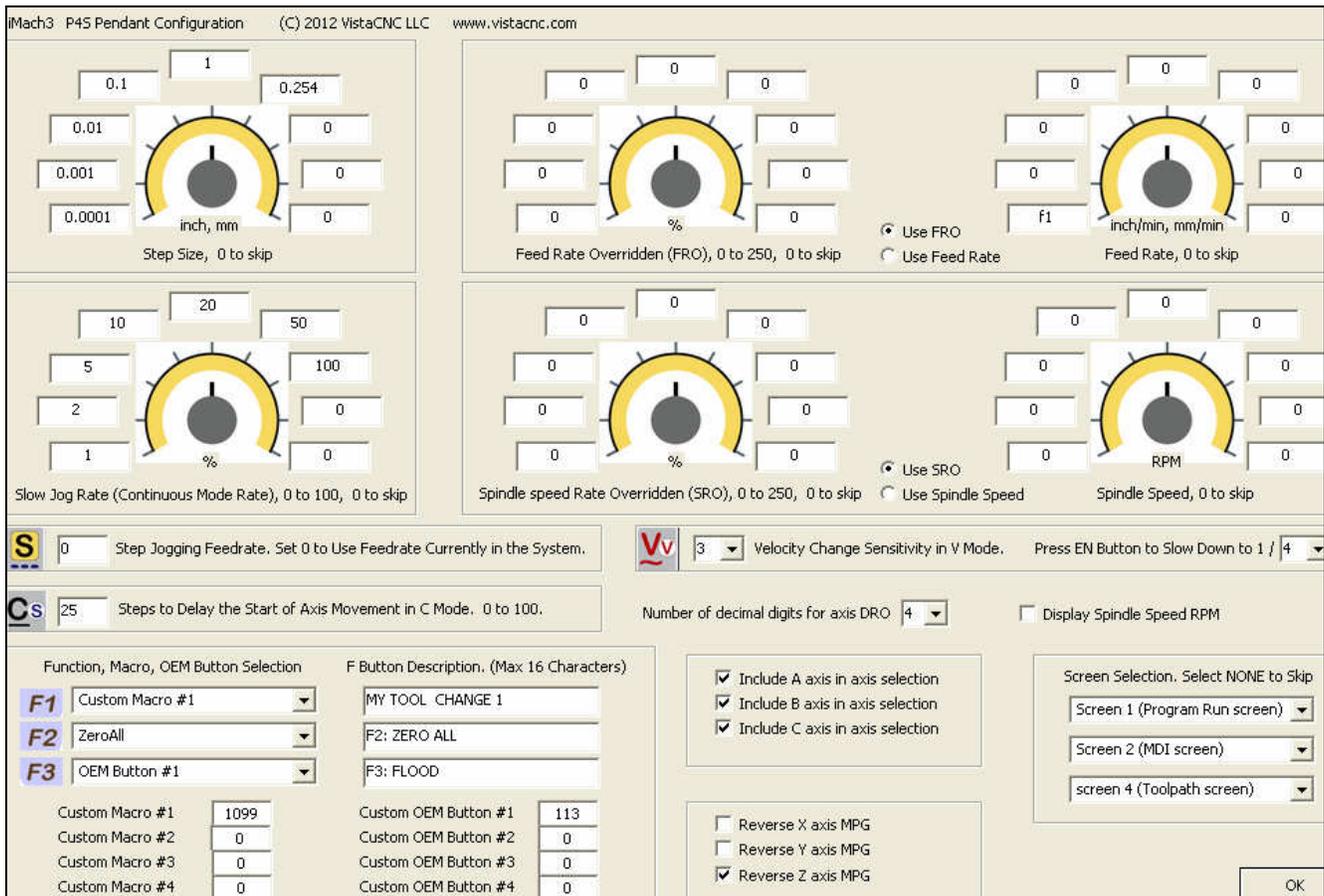

PENDANT PLUGIN CONFIGURATION

In Mach3 menu, select Config, then Config PlugIns

In PlugIns menu, click CONFIG

- Number in **Step Jogging FeedRate** is the feed rate only used in MPG step jogging. When MPG wheel stops, the feed rate and FeedRate Overridden rate (FRO) automatically changes back to the number which was used before MPG moving. Set 0 to use current FeedRate and FRO rate in the system.

- Numbers in **Speed Change Sensitivity** is used to adjust the sensitivity of V mode. The smaller the number, the less turns are needed to reach maximum axis speed.

- **Steps to Delay Start** is used to set the number of steps to delay to start axis movement. In C mode, axis starts to move only after that many numbers of steps are turned from MPG wheel.

- **Velocity In's or mm's Per min.** is used to calculate feed rate used in STEP jogging in CON'T / STEP mode. The number can be copied from Mach3 -> Config -> Motor Tuning, and the number need to be refreshed each time motor turning is performed.

- F1 to F5 buttons each has 62 functions to select:
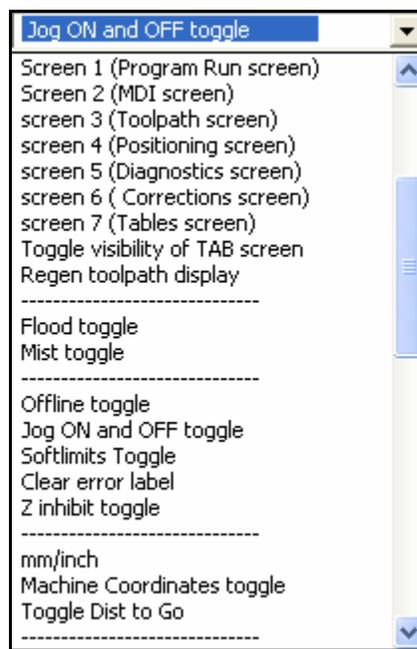
- Custom OEM button: Input any valid Mach3 OEM button number. See Mach3 manual for complete Mach3 OEM button number list.

- Custom Macro Number: Input any Custom Macro Number. See Mach3 manual for more information about Mach3 Macro.

SPECIFICATIONS

- Work with Mach3 R2.63 and above.

- 100 steps (clicks) per Rev MPG.

- MPG MTBF > 10000 hour.

- Shipped with10' High Speed USB cable. Extendable to 15' with extension cable, or to 45' with USB hub cables.

- Size (over all) 6.1"(L) x 3.1"(W) X 2.7"(H)