

## *CNC Control Pendant*



## **PREFACE**

Any machine tool, including computer controlled machine tool, is potentially dangerous. We 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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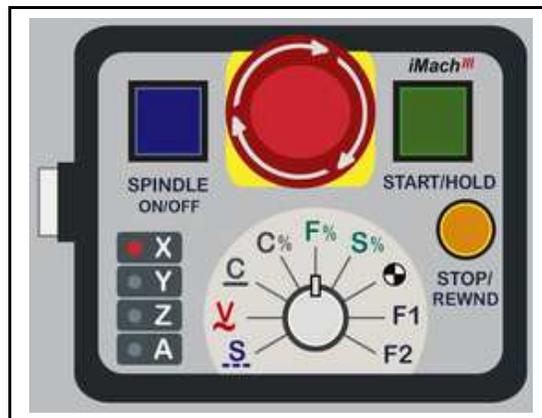
## **WARNING**

E-STOP switch button in 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.
- E-Stop button with flash LEDs indicator.
- Step, Velocity and Continuous mode jogging through MPG.
- Feed rate, Spindle speed, and Slow Jog rate change through MPG.
- Program Cycle Start and Feed Hold button with LED indicator.
- Spindle control button with LED indicator.
- 6 Axis selections.
- Axis Referencing and zeroing control.
- Quick step size selection.
- 2 custom control functions.
- Extended E-STOP functions. (P3-E model).



## PLUGIN

- Download the latest Plugin from [www.vistacnc.com](http://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 Pendant.
- Close Mach3 application and restart Mach3 application.

## FUNCTIONS and OPERATIONS

### 1. Axis selection

1.1 Click the side button  to select an axis to jog. Steady-on LED indicates the selected axis.

LED X and LED Y are ON at the same time when Axis B is selected. LED Z and LED A are ON at the same time when Axis C is selected.

1.2 Based on the settings in PlugIn configuration table, one of two axis selection modes can be used to select an axis. See Pendant PlugIn Configuration section for more information.

Mode 1: Single click the side button to select the next axis.

Mode 2: Single click the side button to select the next axis downwards and double click the side button to select the next axis upwards.

- ❖ **Single clicking a button requires pressing and releasing the button once within 0.5 to 1 second. The action is similar to single clicking a button on Mach3 screen.**
- ❖ **Double clicking a button requires pressing and releasing the button twice within 0.5 to 1 second. The action is similar to double clicking a button on Mach3 screen.**
- ❖ **Axis A, B, or C can be skipped during axis selection cycle if the axis A, B, or C skip mode is selected in PlugIn Configuration table.**

### 2. MPG (Manual Pulse Generator) mode selection and control button operation

- ❖ **Single clicking the stop button  in MPG mode opens or closes the TAB window.**

#### 2.1 STEP, STEP / VELOCITY, SINGLE STEP mode

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

**2.1.2** In STEP / VELOCITY mode, turning MPG at higher speed changes MPG mode from STEP mode to VELOCITY mode. STEP / VELOCITY mode can be enabled or disabled in the Plugin Configuration Table.

- ❖ **Use MPG cap to turn the MPG wheel to get lower speed for STEP mode. Use MPG handle to turn the MPG wheel to get higher speed for VELOCITY mode.**

**2.1.3** Pressing and holding the side button in STEP mode temporarily changes MPG mode to SINGLE STEP Mode or VELOCITY mode, based on the selection in Plugin Configuration Table.

- ❖ **In SINGLE STEP mode, the selected axis only moves 1 step for every continuous MPG movement.**

**2.1.4** A fixed MPG feed rate can be setup in PlugIn Configuration table. This feed rate is used only when MPG moves in Step mode.

- ❖ **It is recommended to use higher feed rate for smooth movement.**

**2.1.5** Quick step size selection. Double clicking the stop button  in Step mode cyclically selects the step size based on step size setup in PlugIn Configuration table.

## 2.2 VELOCITY mode

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

**2.2.2** Pressing and holding the side button temporarily slows down the axis movement.

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

## 2.3 CONTINUOUS, CONTINUOUS RATE mode

**2.3.1** In C mode, axis moves at constant speed with Slow Jog Rate. The axis movement is independent to the speed at which the MPG is turned.

**2.3.2** Pressing and holding the side button in CONTINUOUS mode temporarily changes MPG mode to CONTINUOUS RATE mode.

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

## 2.4 CONTINUOUS RATE mode

2.4.1 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..

## 2.5 FEED RATE mode

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.

## 2.6 SPINDLE SPEED mode

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.

## 2.7 REFERENCE, ZERO buttons

2.7.1 Double clicking the stop button zeroes the currently selected axis.

2.7.2 Pressing and holding the side button, and double clicking the stop button references the currently selected axis.

- ❖ ***Referencing currently selected axis sets the origin of the axis in Machine Coordinate. The action depends on how the home switch is defined and configured. See Mach3 manual for more information.***
- ❖ ***Zeroing the currently selected axis sets the current position of the axis to zero by changing the axis offset in current Work Coordinate.***

## 2.8 FUNCTION buttons

2.8.1 Single clicking the stop button executes predefined Mach3 OEM button, Custom Button, or Custom Macro. The operation can be setup in PlugIn Configuration Table.

2.8.2 While pressing and holding the side button, single clicking the stop button executes predefined Mach3 OEM button, Custom Button, or Custom Macro. The operation can be setup in PlugIn Configuration Table.

# 3. Control Operation



### 3.1 SPINDLE ON / OFF push button :

- While pressing and holding the side button, single clicking SPINDLE ON/OFF button turns on the Spindle if the Spindle is off, or turn off the Spindle if the Spindle is on.
- When Spindle is on, LED embedded in the Spindle button flashes at ½ second rate.

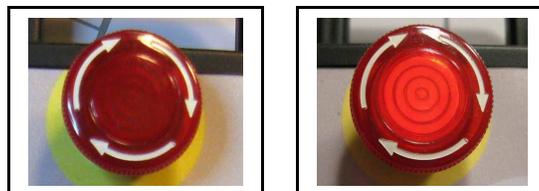
### 3.2 START / HOLD push button :

- While pressing and holding the side button, single clicking START/HOLD button cycle starts the program if the program is not running or is in Feed Hold, or feed holds the program if the program is running.
- When program enters Cycle Start state, LED embedded in the button flashes at ½ second rate.
- When program enters Feed Hold state, the LED, in every second, flashes twice in the first half second and stops flashing in the next half second.

### 3.3 STOP / REWIND push button :

- While pressing and holding the side button, single clicking STOP/REWIND button stops the program if the program is running, or rewinds the program if the line of the program is not zero, or stops any axis movement.

## 4. E-Stop switch button



- When the button is pressed and locked, the embedded LED flashes at ¼ second rate.

- When the button is released and Mach3 application is in Reset mode, the LED flashes at ½ second rate.

#### 4.1 E-Stop switch button in P3 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 P3-E 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.

### PENDANT PLUGIN CONFIGURATION

In Mach3 menu, select Config, then Config Plugins

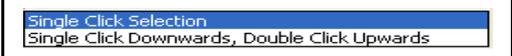


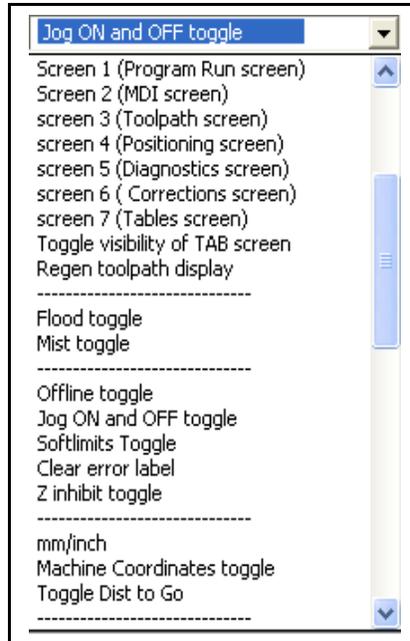
In PlugIns menu, click CONFIG

The screenshot shows the CONFIG menu with the following settings:

- S** Step Size Selection: 0.001, 0.0001, NONE. Description: Step Size Selection. Set NONE to Skip.
- Step Jogging Feed Rate: 100. Description: Step Jogging Feed Rate. Set 0 to Use Feed Rate Currently in the System.
- Press and Hold SIDE Button to:  Single MPG Mode,  Velocity MPG Mode.
- Step / Velocity Auto Mode. Single Click STOP Button to Open or Close TAB Screen.
- Step / Vel Mode Switch Sensitivity: 4. Speed Change Sensitivity in Step / Velocity Mode: 7.
- V** Speed Change Sensitivity in Velocity Mode: 4. Press SIDE Button to Slow Down to 1 / 3.
- C** Steps to Delay the Start of Axis Movement in Continuous Mode: 10. Description: Steps to Delay the Start of Axis Movement in Continuous Mode. 0 to 100.
- Axis Selection: X (Single Click Downwards, Double Click Upward), Y, Z. A (Include A Axis in Axis Selection), B (Include B Axis in Axis Selection), C (Include C Axis in Axis Selection).
- Custom OEM Button: 0, 0. Custom Macro: 0, 0.

- **Step Size Selection** sets predefined step size in each dropdown window. Select NONE to skip that window in cyclic step selection. Step size in the first window is used as the default step size.
- 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.
- Single click STOP button at any MPG mode opens or closes the TAB window.
- 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.

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- **F1** or **F2** 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 with 10' 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)