User Manual
XHC Wireless Pendant

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Document History

Version	Date	Author	Comment
1	16-3-1016	Bert Eding	Initial version
1.01	12-9-2016	Bert Eding	Add example of usage of macro button
1.02	18-12-2016	Bert Eding	Added zero axis function for GOTO ZERO button if axis selected.
1.03	12-12-2019	Jan Hummel	Updated instructions for activating the pendant.

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1 Introduction and intended use

The MPG is useful for positioning and zeroing and other functions on the machine, it is not really suited for milling because there is no feel of the force, the milling bit will break easily. The moment may not be entirely smooth. The pendant is easy to use, and of course wireless.

It operates with batteries, according to the supplier (XHC) the batteries will last several months in normal operation.

Due to the resolution of the Pendant MPG, 100 pulses/revolution lower acceleration must be used to get smooth movement. The movement with the wired Pendant can so smooth motion with higher acceleration. The wired Pendant has 400 pulses/revolution.

2 Operating instructions

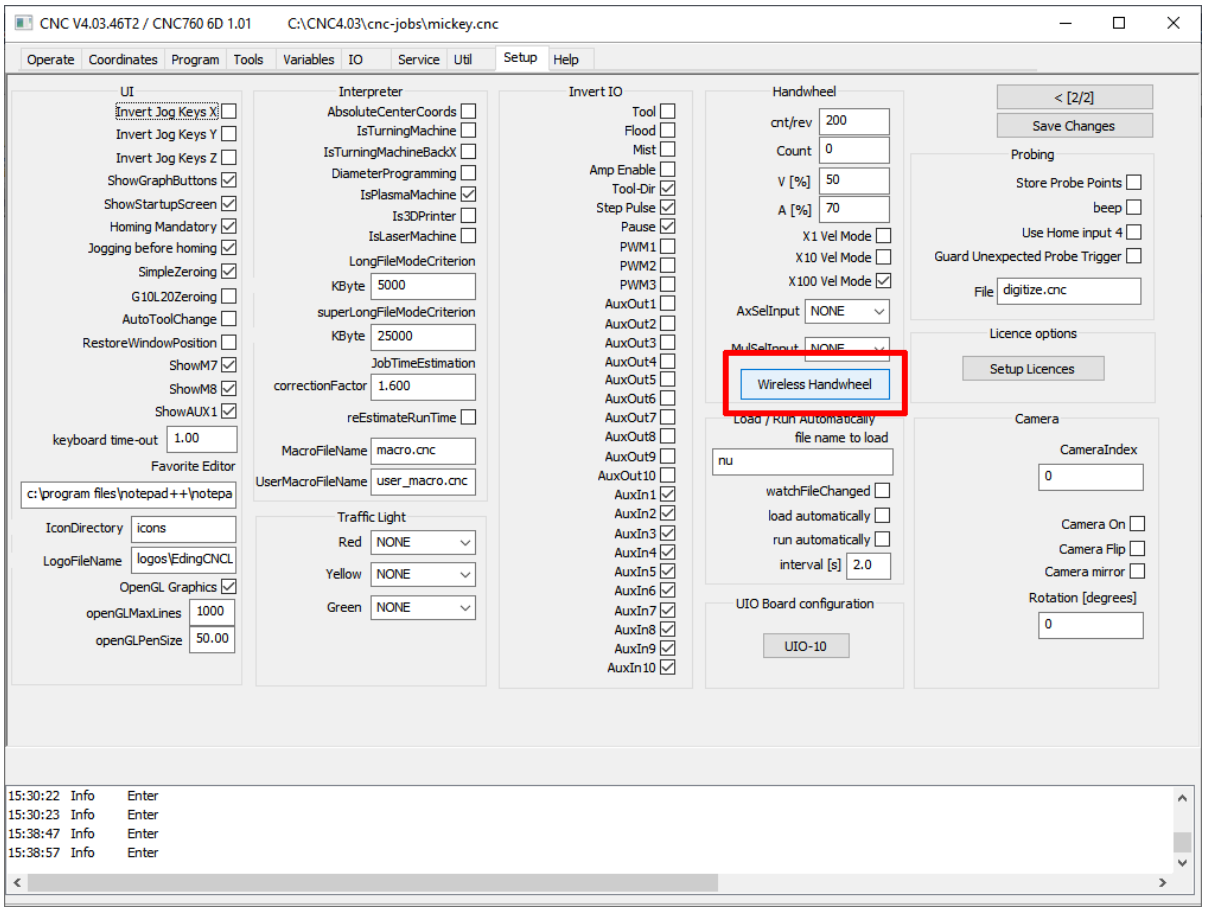
2.1 INSTALLING THE PENDANT

1. Put 2 AA batteries in the Pendant.

2. Connect USB RECEIVER to USB port of PC. The USB receiver must have more or less free sight to the pendant. This means, it will not work well if the USB receiver is built into a metal cabinet and the pendant is outside

2.2 ENABLING THE PENDANT

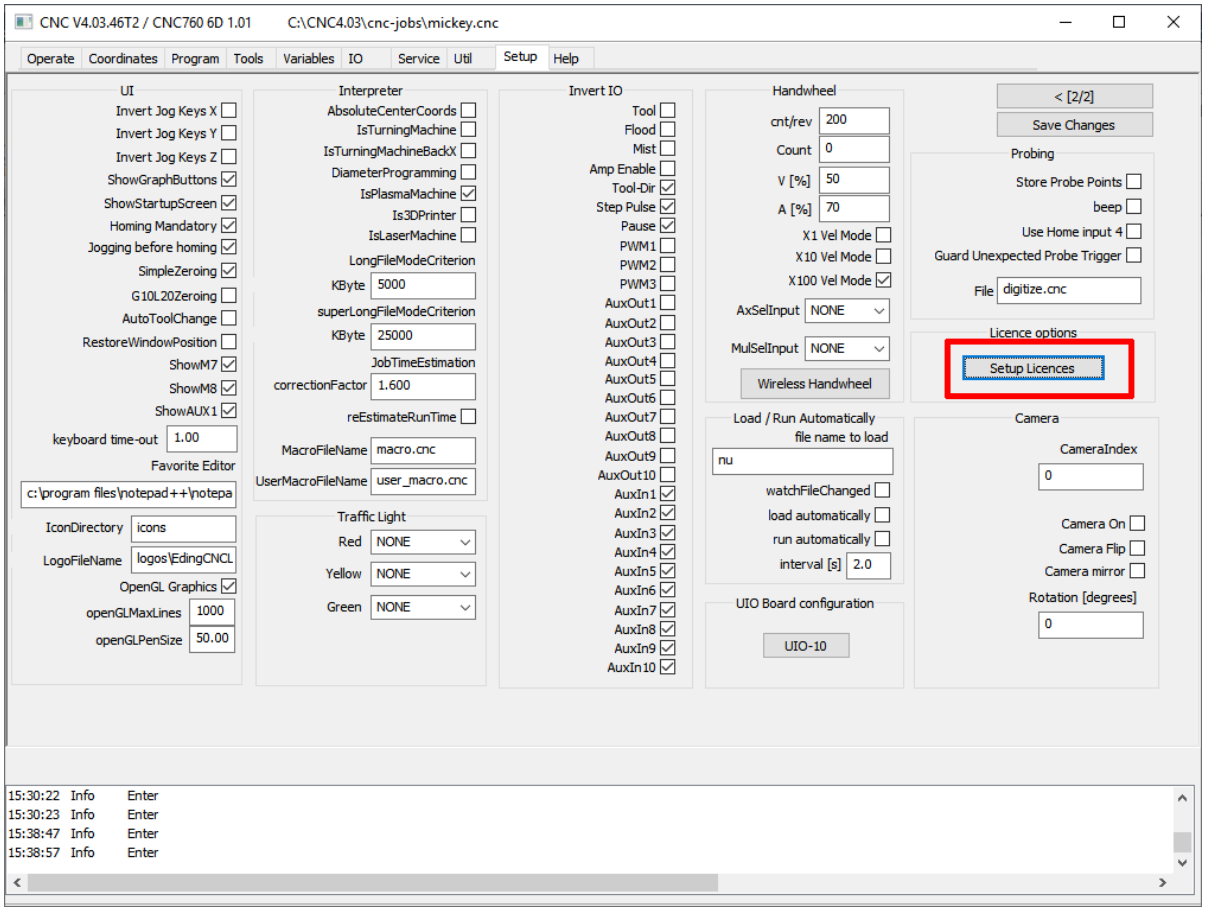
In Setup 2/2, you can find the button for setting up the pendant.



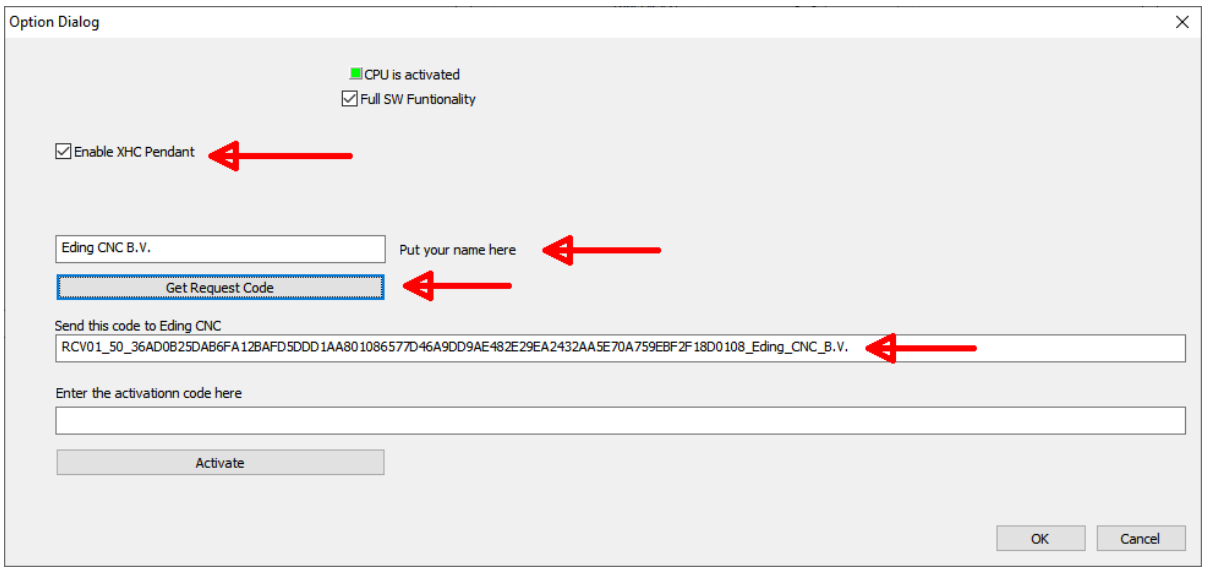
After clicking, you will see an overview of the supported pendant models. Select the correct model.

2.2.1 Obtaining the activation code (Model 1 only)

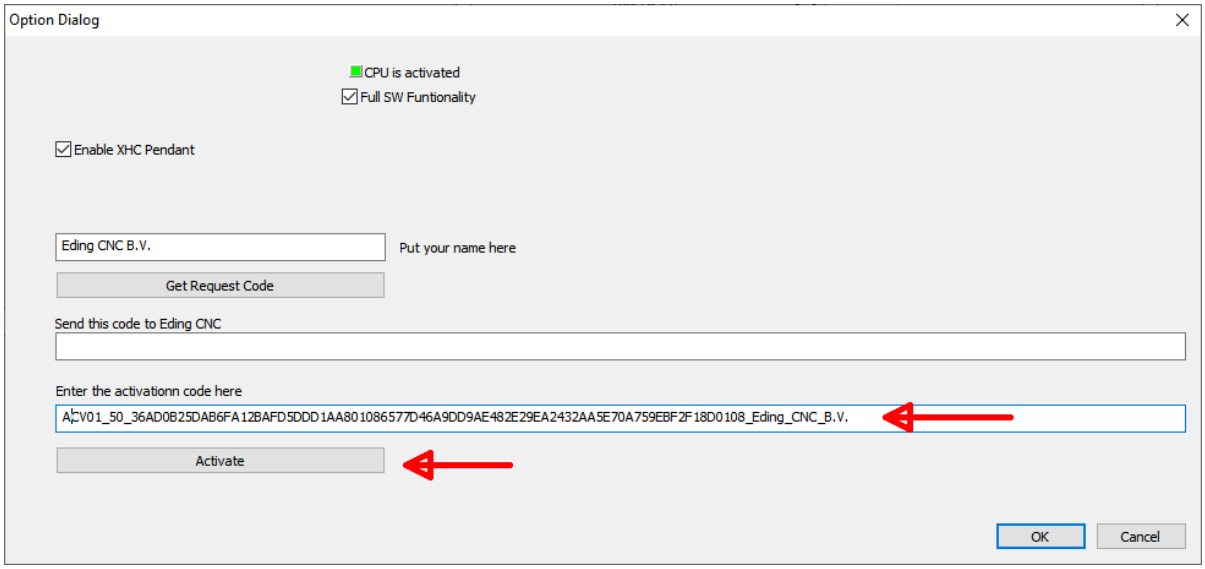
To enable you CPU for the pendant you must obtain an activation code to be able to use it. This works as follows, press the Setup Licences button on the 2nd setup screen:



In the next screen, enable the XHC Pendant, put your name, press "Get request Code" button. Send the code to EdingCNC to obtain the activation code.



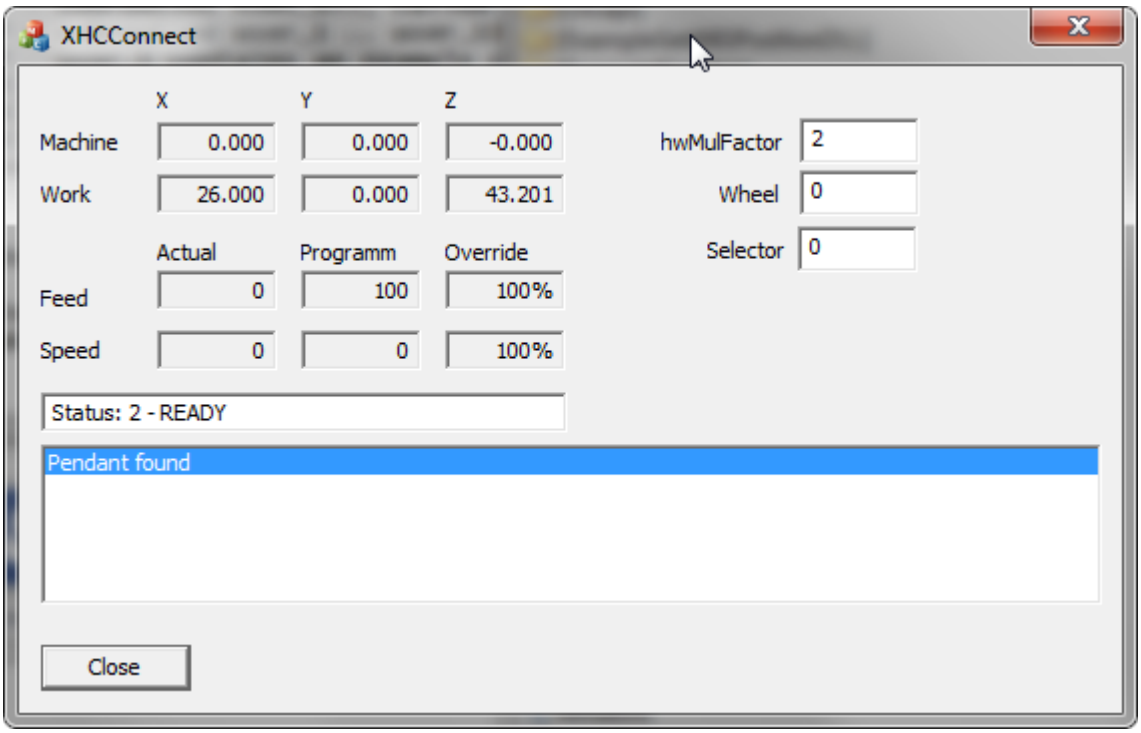
You will receive an activation code by email. Put this code in the lower text box and press “Activate”. You can now use the XHC Wireless Pendant



The activation code is free for Pendant’s that are obtained from EdingCNC. For externally bought Pendants there is a Fee to be paid. Ask EdingCNC for the price.

2.3 USING THE PENDANT

Start the software as normally. An additional program that communicates to the pendant is also started, it looks lik this and shows some info from the Pendant:



It shows Pendant found if everything is OK.
You can leave this running on the background; it will perform the Pendant functionality for EdingCNC.

2.4 THE BUTTONS

Button	From upper left to lower right pendant button explanation
Reset	Same function as Reset (F1) in EdingCNC.
Stop	Pause running Job
M-Home	Home all sequence
W-Home	Move to work zero
Start/pause	Start/Pause Job
FN + Continuous	Toggle between machine and work coordinates
Continuous	Continuous mode
Step	Single Step mode
Probe-Z	Executes sub routine xhc_probe_z, you are free to implement this function inside marco.cnc or user_macro.cnc
S on/off	Switch Spindle ON/OFF
Feed +/-	Increase/decrease feed override
Spindle +/-	Increase/decrease spindle override
Safe-Z	Z to safe height
To Zero	If axis selector is off: G0 X0 Y0 If axis selector is on X, Y, Z, A, B, C, zero axis work position. Tool radius of actual tool in spindle is taken into account for X and Y. So if lower left corner of material is touched in X or Y, the position is set to –Tool Radius, the result is that the material corner will be 0 and that is what we need.
Macro-1	Executes xhc_macro_1, you are free to implement his function inside macro.cnc or user macro.cnc.
Macro-2	Executes xhc_macro_2, you are free to implement his function inside macro.cnc or user macro.cnc.
Macro-3	Executes xhc_macro_3, you are free to implement his function inside macro.cnc or user macro.cnc.
Macro-4	Executes xhc_macro_4, you are free to implement his function inside macro.cnc or user macro.cnc.
Macro-5	Executes xhc_macro_5, you are free to implement his function inside macro.cnc or user macro.cnc.
Macro-6	Executes xhc_macro_6, you are free to implement his function inside macro.cnc or user macro.cnc.
Macro-7	Executes xhc_macro_7, you are free to implement his function inside macro.cnc or user macro.cnc.
Macro-8	Executes xhc_macro_8, you are free to implement his function inside macro.cnc or user macro.cnc.
Macro-9	Executes xhc_macro_9, you are free to implement his function inside macro.cnc or user macro.cnc.
Macro-10	Executes xhc_macro_10, you are free to implement his function inside macro.cnc or user macro.cnc.
Step++	Increment multiplication factor for MPG
MPG Mode	Decrement multiplication factor for MPG

Axis Selector switch	OFF, X, Y, Z, A, B, C axis on MPG
Step size selector switch	0.001, 0.01, 0.1, 1 appUnits per step Spindle override on MPG Feed override on MPG OFF
MPG	Move the selected by MPG rotation

2.5 EXAMPLE OF HOW TO USE A MACRO BUTTON

Add a subroutine with the right name in the macro.cnc and execute what you want there:

```
Sub xhc_macro_1
    Msg "Hallo this is xhc macro 1 button is pressed"
    ;Add any EdingCNC compatible g-code you want here
EndSub
```

You can do this for all pendant macro buttons.

2.6 REBINDING

Binding is the process of pairing the USB receiver with the Pendant. Similar as with Bluetooth devices.

REBINDING RECEIVER, IN CASE CONNECTION IS NOT POSSIBLE	
1. Remove battery and disconnect receiver from computer. Then re-connect receiver to computer and put batteries into the Pendant.	
2. Press pendant Power button	The display shows numbers very shortly.
3. Press RESET and STEP++ at the same time until the LCD shows numbers.	Try this 3-5 times if needed
4. If the display shows numbers, it is OK.	If the display does not show numbers, change the receiver/pendant

2.7 TIME OUT

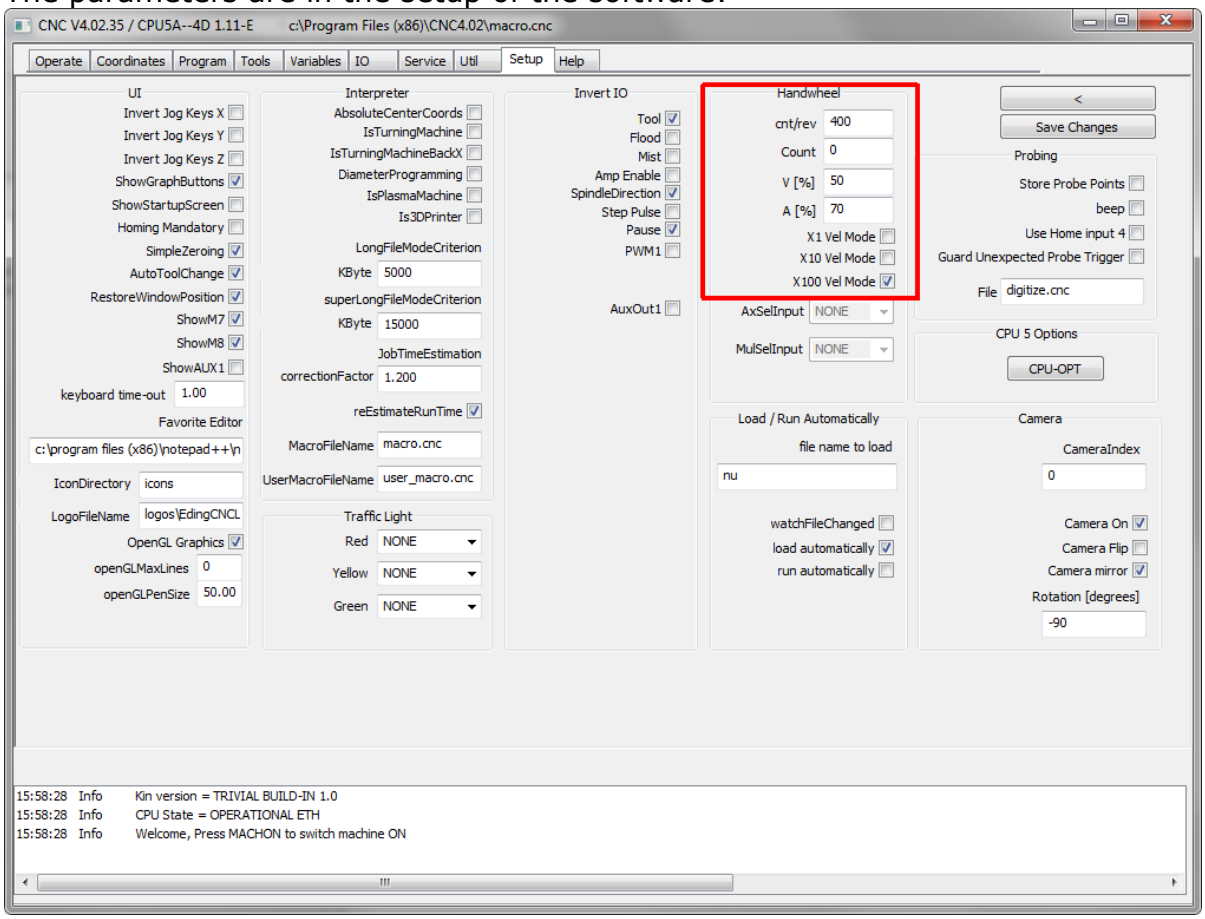
The Pendant itself has a timeout; this is to preserve the batteries. It is important to know that after a few seconds of not pressing a button or not rotating the MPG, that the Pendant goes to a sleep situation where there is no longer communication with the PC.

In sleep situation the positions on the display no longer match the actual machine position and the software goes automatically out of hand wheel operation. When a button is pressed or the MPG is rotated, it goes back to normal operation and the positions are updated.

2.8 SETUP AND BEHAVIOR OF THE MPG

The resolution of the MPG is 100 pulses per revolution. This is relatively low for an MPG, but in practice not a big issue. If you have a machine with high acceleration there may be noticed that the move is not smooth. This is because every count of the MPG gives a small displacement and if your machine has high acceleration the displacement is already done when the next count pulse is read. This can be smoothed out by setting the speed and acceleration percentage lower, such that the movement is smooth enough for normal MPG operation.

The parameters are in the setup of the software:



Cnt/Rev: The number of counts of the hand wheel for one revolution, usually 400 for most CNC hand wheels.

Count: Counter for wired hand wheel, not used for the XHC Pendant, normally 100 pulses/rev.

V[%]: Percentage of velocity from selected axis, this is the maximum **velocity** the axis will move when using the hand wheel.

A[%]: Percentage of acceleration from selected axis, this is the maximum **acceleration** the axis will move when using the hand wheel..

X1..X100 Vel Mode: In velocity mode the most important is that the movement stops immediately when the rotation of the hand wheel stops. The position of the hand wheel will not be maintained if velocity mode is on. The position of the handheld is maintained if velocity mode is off. This also means that the axis may not immediately stop if the hand wheel rotation stops. When turning beyond the limits of the axis, you have to turn back the hand wheel the same amount before the axis starts moving again.
My own experience is that it works best to use velocity mode at X100 only. Just play with it to experience the behavior and make your own choice.

These parameters allow you to tune the motion behavior such that it has acceptable smoothness and speed.