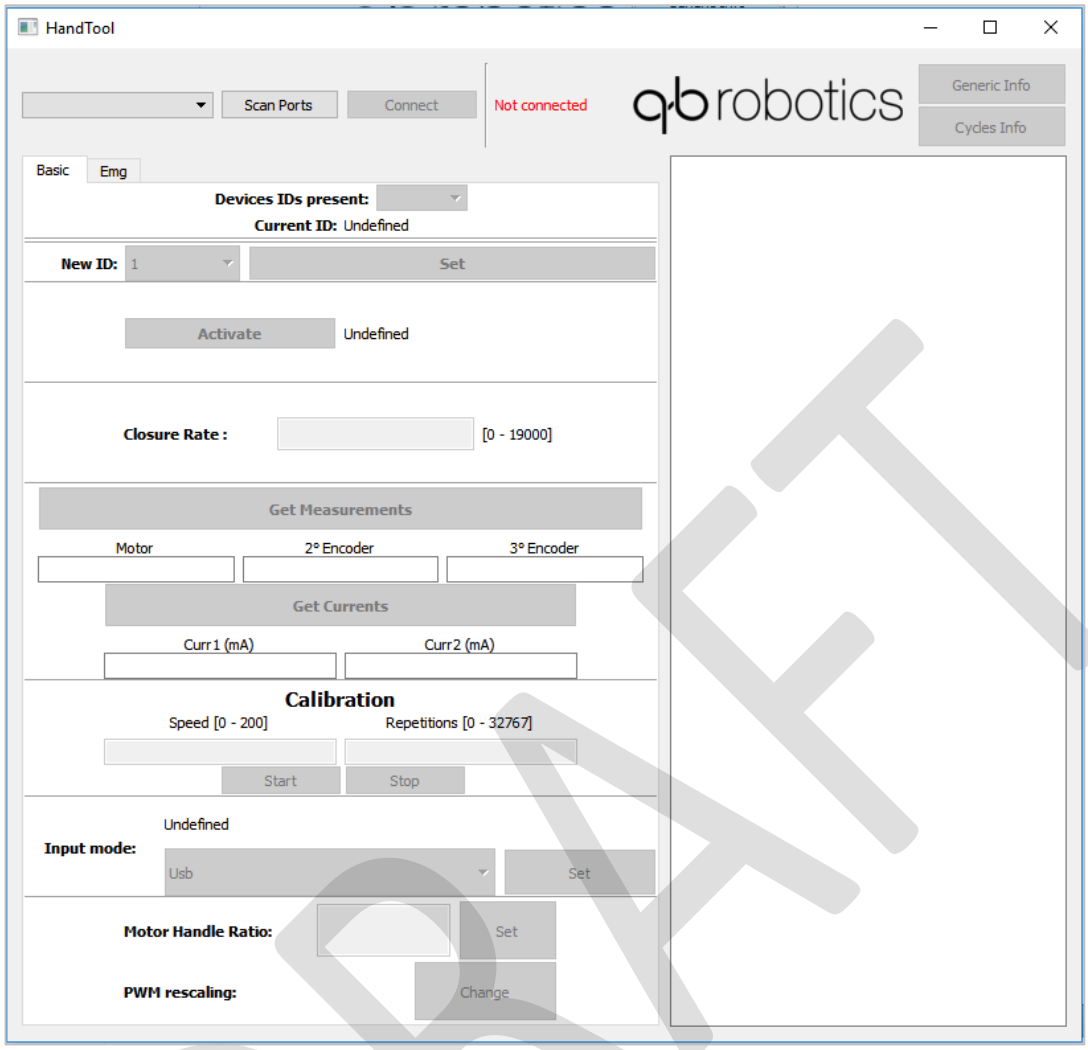

qbrobotics

qbhand GUI

USER MANUAL

www.qbrobotics.com

Summary

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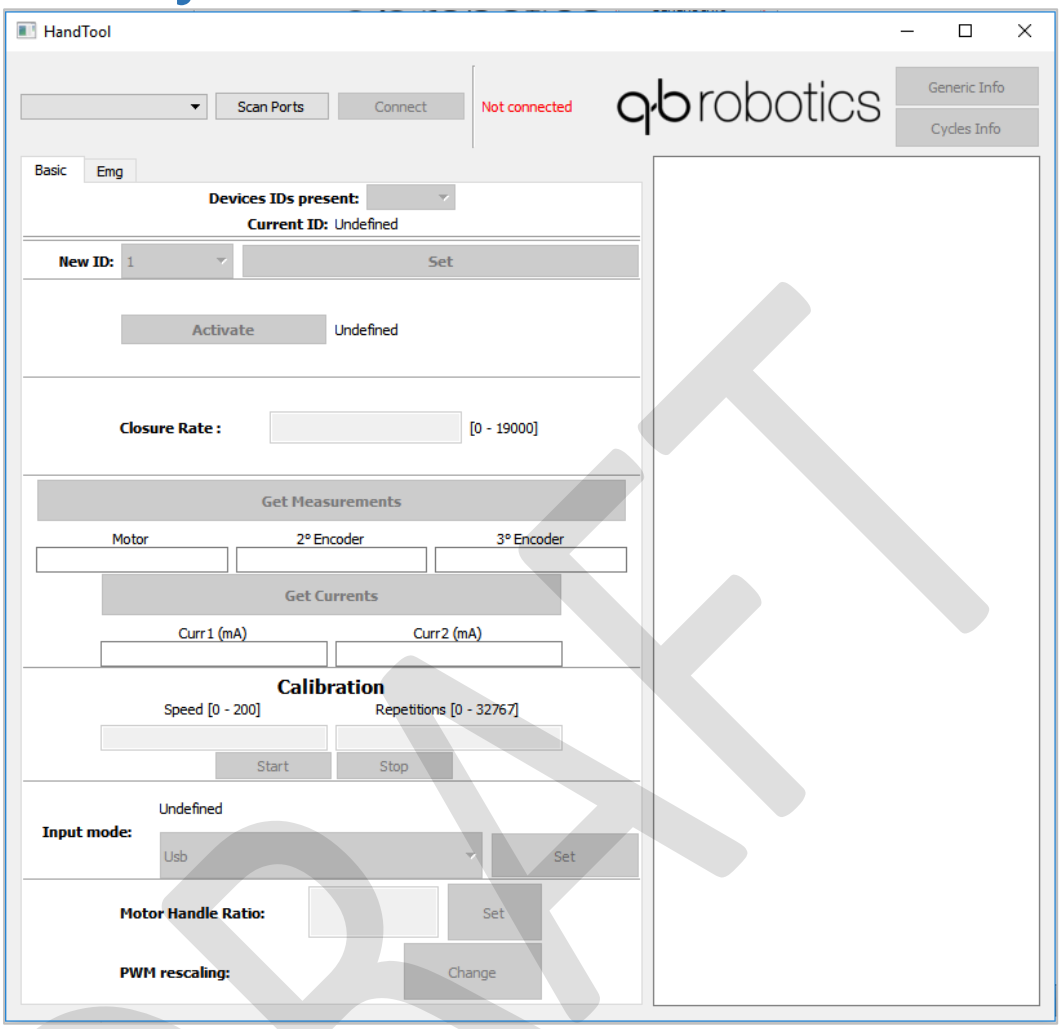
Installation procedure

- **Mac:**
  If not already installed, it is necessary to install the FTDI serial drivers to make possible the device is seen as a serial port.
  Double click on the App and use it. There is also a .dmg package. You can open it and move the application to your dock or the Application folder.

- **Windows:**
  If not already installed, it is necessary to install the FTDI serial drivers to make possible the device is seen as a serial port. If the serial port is not seen on the GUI main window, it is possible that the system has recognized the COM port with a high COM number. The supported serial ports are from COM1 to COM9. To change the port number, go under Control Panel > Hardware and Sound > Device Manager.
  Open the Ports (COM & LPT) drop down menu, right click on the COM port and select Proprieties.
  Select the Port Settings tab and then click on Advanced. Once in Advanced menu select from the drop down menu a COM number between COM1 and COM9 and click on OK.
  The device should now be recognized properly.

- **Unix:**
  Before using the GUI it is mandatory to add the user to the dialout group. In order to do so you have to put the following command on a terminal.
  sudo adduser user_name dialout
  where user_name is the username under which the GUI is used.
  Once this command is executed, it is necessary to log out and back in, for the changes to take effect.

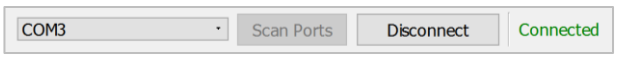
Main Layout



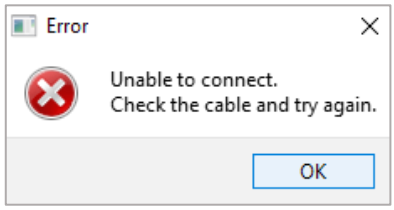
The application is structured into two tabs

- **Basic:** Basic commands. ID setting, activation of the board, measurements and currents reading, position input, calibration test, Input mode selection, Handle ratio, PWM rescaling, password input
- **Emg:** Electromyographic sensors related parameters and measurements;

In order to use the qbHand with this application you have to click on *"Scan Ports"*. If the qbHand is properly connected, you'll see the serial port in the little window on the left. Once the serial port is seen you could connect the device clicking on the Connect button. This operation, if successful, enables all of the buttons and you should see a green *"Connected"* text near the Connect button.



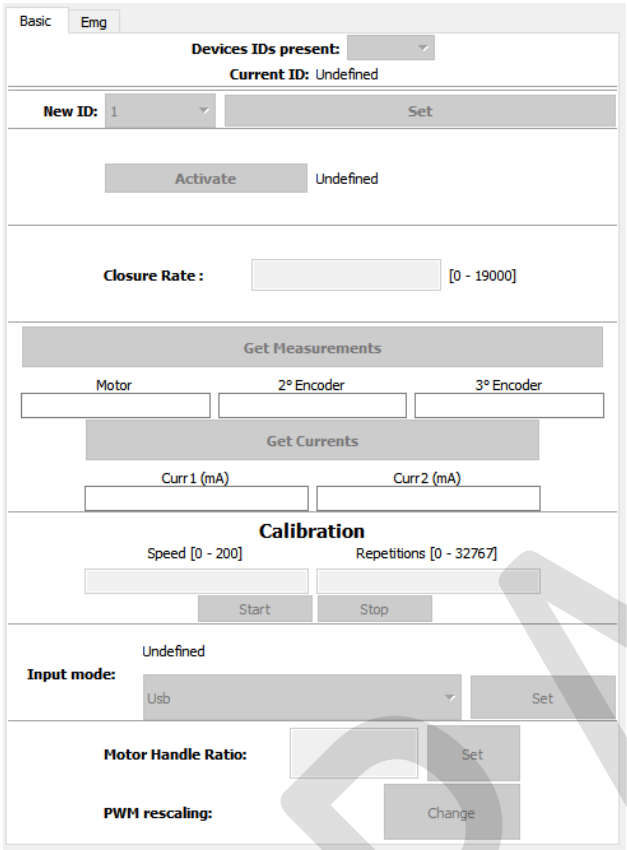
If some problem occurs while connecting to the hand (the cable disconnects, the communication bus is busy) an error popup window should appear



The *"Get Info"* button prints useful information about the qbHand and its control board in the blank window on the right side of the application, like: firmware version, parameters values and position measurements.

Basic Tab

The functions associated to the buttons of the basic tab are:



- **Devices IDs present:** Once the device, or devices (if connected in a chain), are connected clicking on *"Connect"*, the list of their IDs are going to be showed here. Selecting the desired ID from the drop-down menu will make the application connect to that device and the possibility to use that specific device;
- **New ID:** The default ID of the board is 1. Clicking on the drop-down menu will show a list of available IDs (1 to 127). Clicking on the "*Set"* button will set the ID equal to the New ID selected;
- **Activation:** In order to use the qbHand you first have to activate the qbHand driver. You can do this by clicking on *"Activate"*. The string next to the button will show the state of activation of the board;
- **Closure Rate:** The closure rate differs depending on which is the qbHand control modality. Showed are the position limits, in ticks.
- **Measurements and Currents:** Clicking on *"Get Measurements"* and *"Get Currents"* will show the encoder measurements for the first one and the current measurements, for the second one. The encoder measurements are shown in encoder ticks, the current in mA
- **Calibration:** Clicking on *"Start"* the hand will do a series of closures equal to repetitions. Clicking on *"Stop"* the series stops and the hand returns to its zero position (fully open).
- **Input Mode:** With this menu is possible to change the hand input modality. By default, the value is 'Usb'. The Handle modality must be selected if the hand is used with a Handle device. The emg modalities must be selected if the hand is used through Electromyographic sensors.
- **Motor Handle Ratio:** This parameter is used to multiply the value of the lever of the Handle device in order to use the lever to drive the hand. If you don't have a handle device don't consider this parameter.
- **PWM Rescaling:** If the hand must be powered with 12V and you have a source supply different from 12V and less than 24V this parameter must be activated. Otherwise must be deactivated.

Remember to power the qbHand, or the chain, before using it.

EMG Tab

The functions associated to the buttons of the emg tab are:

- **Get EMG measurements:** Clicking on this button will show the two EMG sensors measurements in the blank fields below;
- **EMG calibration on startup:** Setting this parameter to “YES” will make a calibration for users’ maximum values when the hand is powered.
- **User max values:** This parameter is used to manually set the users’ maximum values. These parameters are used to correctly set the measurements’ range to [0 - 1024] according to user’s strength.
- **EMG threshold:** Depending on the input mode, those parameters are used to close/open the hand.
- **EMG speed:** This parameter is used to speed up or slow down the hand opening/closing when controlled with the EMGs.
- **Start plotting:** This button will make the graph start plotting. In blue it will be shown the first measure. In red the second one. The darker blue and darker red lines are respectively the first and second threshold. If the user wants to save the data, the checkbox “**Save data?**” must be checked. The data will be saved in a .txt file in the same folder where the Handtool is.