MyConfig Set

CLINICAL GUIDE

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MYCONFIG

MyConfig is a software application developed for using the MyoPro. It is pre-installed on the Myomo laptop, or available for download via the clinical resource center on Myomo.com. MyConfig is used to determine what the user's muscles are doing and how the MyoPro is interpreting them. The MyoPro, when used with MyConfig, is one of the most sensitive EMG-detection devices available- capable of detecting faint muscle activity. It is important to become competent with the tools and concepts herein. As the user becomes more consistent in their presentation and their ability to don and operate the MyoPro, the use of MyConfig may become less frequent but it will always be a good resource for troubleshooting issues with arm and/or hand movement.

VERSIONS

Note: The MyConfig software for the MyoPro is available in two versions:

MyConfig Set is intended for O&P clinicians & Therapists (OTs, PTs).

MyConfig Set has the following functions:

- Optimizing the settings for a current MyoPro user
  - Observing user's EMG capability
  - Adjusting device behavior and access to features
  - Documenting user activity, compliance, and settings over time
  - Allowing remote adjustment of the MyoPro
  - Setting up parameters for MyoGames
- Evaluating a MyoPro candidate
  - Observing and documenting candidate's EMG capability
  - Using candidate's EMG signals to help set plan for rehab with the MyoPro

MyConfig View* is intended for MyoPro users (view only)

MyConfig View has the following functions:

- At-home visualization of EMG signals (bio-feedback)
- Trouble-shoot behavior issues in the MyoPro
- Changing *Start Mode(s)*

*May not be installed if computer is for clinical use only.

CONNECTING MYOPRO TO MYCONFIG SET

GETTING STARTED

Step 1: Turn on the MyoPro

Press the power button on the MyoPro control panel.

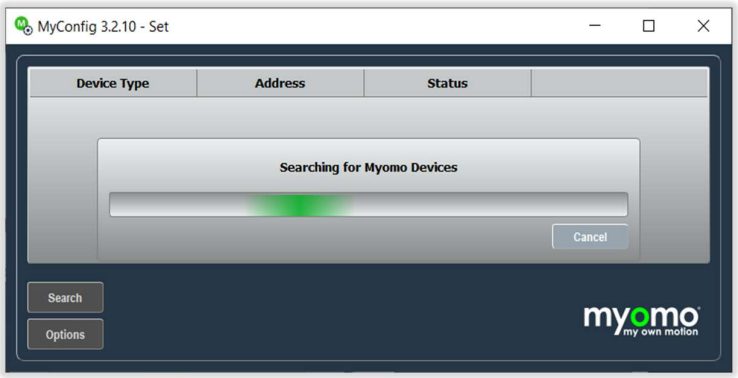
Step 2: Locate and Launch MyConfig Set

MyConfig Set is located on the Myomo laptop desktop.
Double click the MyConfig Set icon to launch the application.

The first screen you see should look like this:

MyConfig is searching for the MyoPro via a wireless Bluetooth connection.

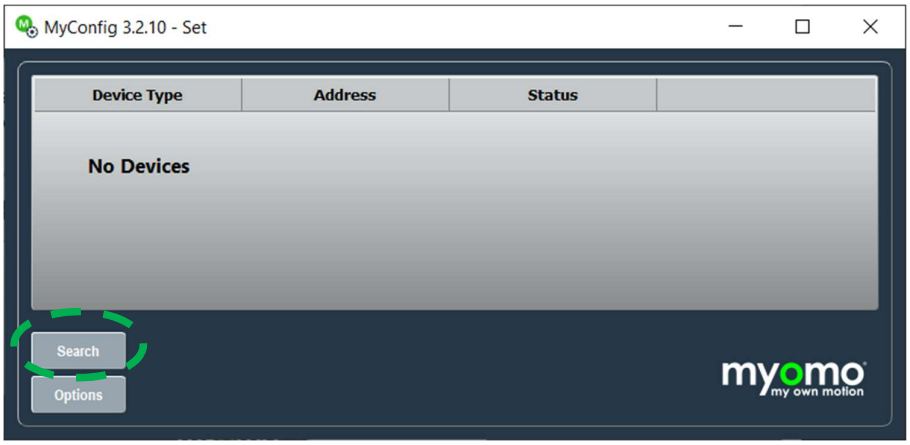
Note: if the search bar doesn't appear, it is likely that the Bluetooth radio has been turned off in the laptop settings. You can enable Bluetooth in the Windows Settings.



MYOPRO SEARCH

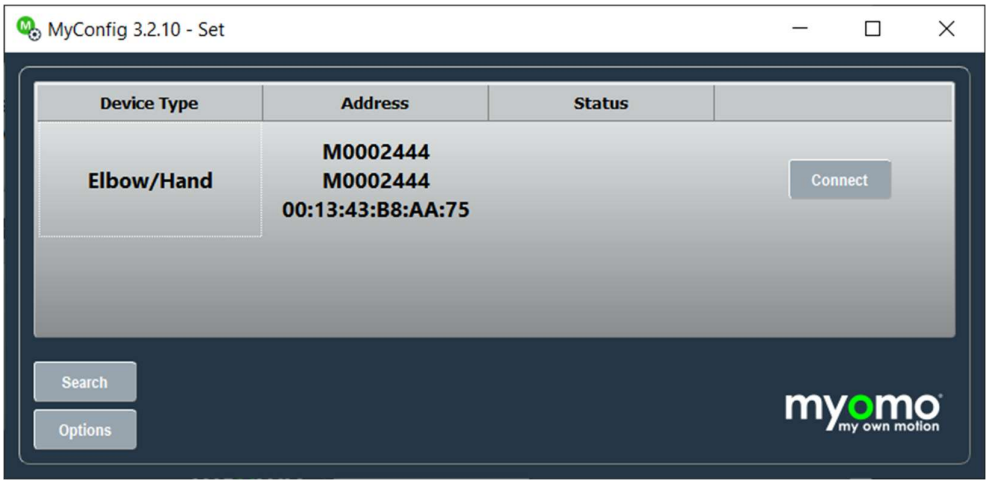
The MyoPro is always Bluetooth connection ready. When you launch MyConfig, the search for nearby devices will begin automatically. If powered on, the MyoPro will automatically connect once detected by MyConfig.

If MyConfig fails to detect the MyoPro and does not connect, click the *Search* button to initiate a new search. This may occur if MyConfig is started before the MyoPro is powered on or if the signal is interrupted during transmission. Moving the MyoPro closer to the Myomo laptop resolves this issue.



MYOPRO FOUND

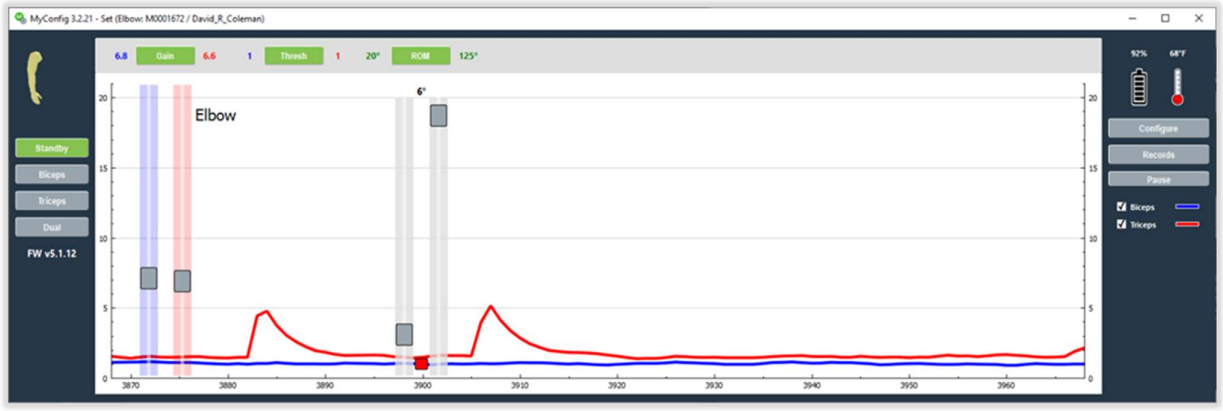
Click *Connect* for the desired MyoPro. If multiple MyoPros are powered on, you will see multiple serial numbers listed.



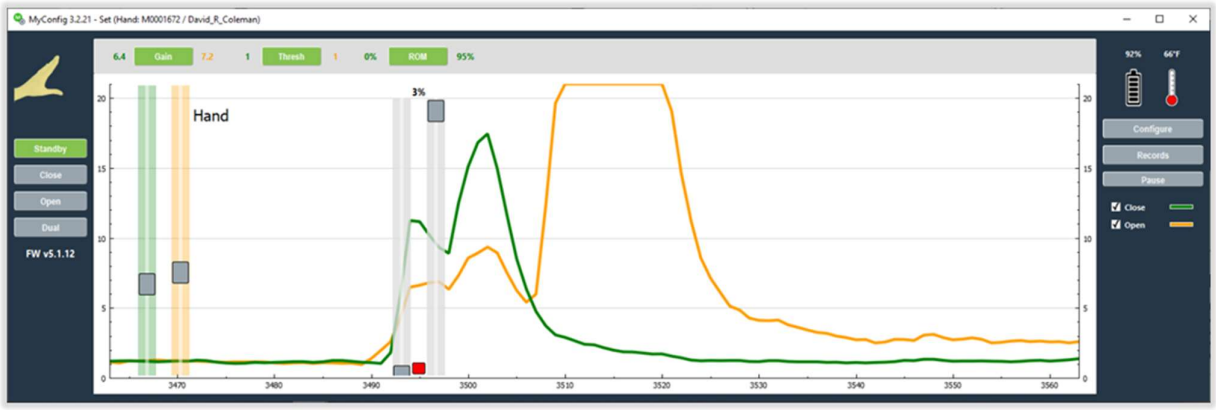
MYOPRO CONNECTION

After a brief search, a window will appear for each MyoPro joint:

Elbow



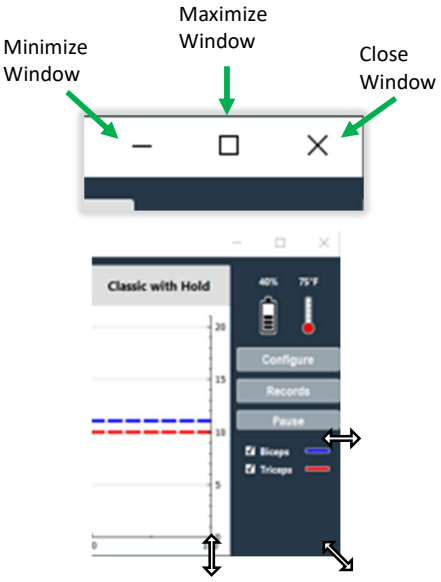
Hand



The MyoPro is now connected to MyConfig Set.

VISUALIZATION

RESIZE WINDOWS



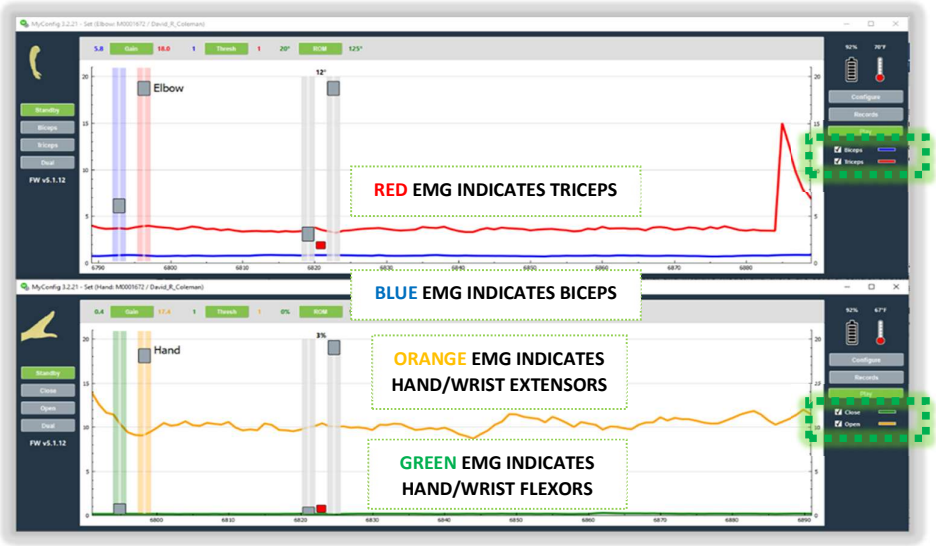
Quickly minimize, maximize, or close windows by using the icons in the upper right window corner, respectively.

Alternatively, while hovering the mouse cursor over the window edge, left-click and hold with one finger, while using a second finger on the trackpad to resize the window.

EMG GRAPH

The EMG signals are the lines of the graph to watch because they inform us of what the client's muscles are currently doing, how that may differ from what they are trying to do, and if the MyoPro is being suitably responsive. EMG signals are color coordinated to match the color of the MyoPro sensors. When the box is checked beside the EMG signal the EMG will be visible on the screen in the coordinating color. (e.g. if biceps is checked, a blue EMG line will be visible).

The MyoPro Motion G elbow and hand both feature four operating modes, with dual mode having an additional 4 modes. With these modes, the MyoPro may be configured to the unique abilities of each user, allowing them to select an appropriate setup for their current level of ability as they become more proficient with their MyoPro.



JOINT MODES

ELBOW

Elbow (all MyoPros)

1. ***Standby*** mode – motors are inactive

In *Standby* mode the motor is on, but it will not assist motion. It will actually offer more resistance to motion than if the MyoPro were powered off. The sensors are still reading the EMG signals and will be visible on the MyConfig graph. *Standby* mode is useful for establishing EMG signal response before moving to a mode where motion is elicited. It will also allow you to approximate correct settings before switching to other modes.

2. ***Biceps*** mode – single-site control, biceps only
   - When biceps relax the elbow motor extends.
   - When biceps contract the elbow motor flexes.
3. ***Triceps*** mode – single-site control, triceps only
   - When triceps relax the elbow motor flexes.
   - When triceps contract the elbow motor extends.
4. ***Dual*** mode – dual-site control (biceps/triceps)

In *Dual* mode, the MyoPro responds to both elbow flexor and extensor EMG signals. It is the most functional and intuitive mode, and there are several control strategies that determine how the MyoPro will behave: Classic with Hold, and 3 advanced modes. The ability to produce visibly different EMG patterns during flexion and extension is required for dual mode use, and can be a tool in teaching users muscle isolation. Advanced dual mode behaviors can be explored as the client's need for functional motion increases with consistency. Advanced dual modes utilize a different control strategy than the other modes, but all dual modes utilize the *elbow hold* feature.

- Simultaneous relaxation of both EMG signals activates the *elbow hold* feature.
- Elbow flexor activity causes elbow motor flexion.
- Elbow extensor activity causes elbow motor extension.

Dual mode allows greater ability to stop or pause motion mid-range

Advanced Dual modes – Use a different control strategy for increased control

- ***Constant Speed –*** one set speed into flexion and extension
- ***Proportional-*** motor speed is directly related to measured effort
- ***Ramp-*** rate of motor speed increases with effort (exponential)

Hand (Motion G only)

1. ***Standby*** mode – motors are inactive
2. ***Close*** mode – single-site control; hand/wrist flexors only
   - When flexors relax the hand motor opens.
   - When flexors contract the hand motor closes.
3. ***Open*** mode – single-site control; hand/wrist extensors only
   - When extensors relax the hand motor closes.
   - When extensors contract the hand motor opens.
4. ***Dual*** mode – dual-site control; (flexors/extensors)

In *Dual* mode, the MyoPro responds to both wrist/hand flexor and extensor EMG signals. It is the most functional and intuitive mode, and there are several control strategies that determine how the MyoPro will behave: Classic with Hold, and 3 advanced modes. The ability to produce visibly different EMG patterns during flexion and extension is required for dual mode use and can be a tool in teaching users muscle isolation. Advanced dual mode behaviors can be explored as the client's need for functional motion increases with consistency. Advanced dual modes utilize a different control strategy than the other modes, but all dual modes utilize the *grasp hold* feature. It is not uncommon for a user to be able to utilize elbow dual mode before they are ready for hand dual mode.

- Simultaneous relaxation of both EMG signals activates the *grasp hold* feature.
- Flexor activity causes hand motor closing
- Extensor activity causes hand motor opening.
- Dual mode allows greater ability to stop or pause motion mid-range

Advanced Dual modes – Use a different control strategy for increased control

- ***Constant Velocity –*** one set speed into flexion and extension
- ***Proportional-*** motor speed is directly related to measured effort
- ***Ramp-*** rate of motor speed increases with effort (exponential)

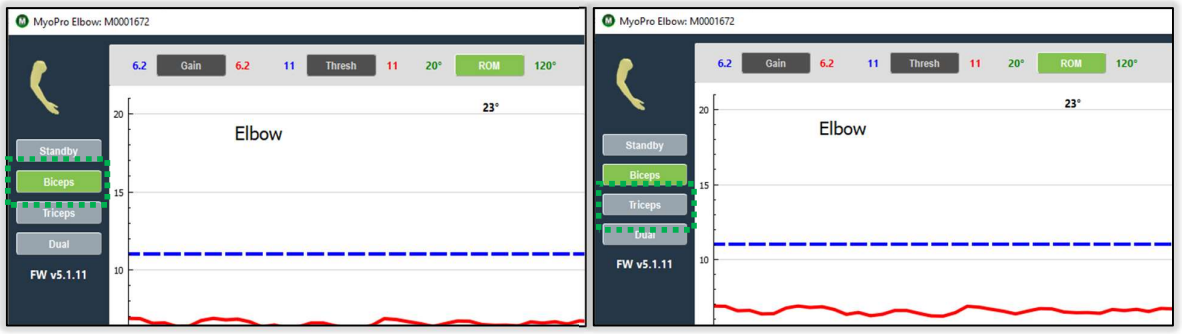
CHANGING MODES

Modes for both the elbow and the hand can be changed by clicking the gray button with the name of the desired mode in the corresponding hand/elbow window.

The selected button appears green, displaying the current mode.

Clicking the button of the desired mode will instantly change which muscle signals the MyoPro is responding to.

Note: Elbow and hand modes may also be changed on the MyoPro control panel.

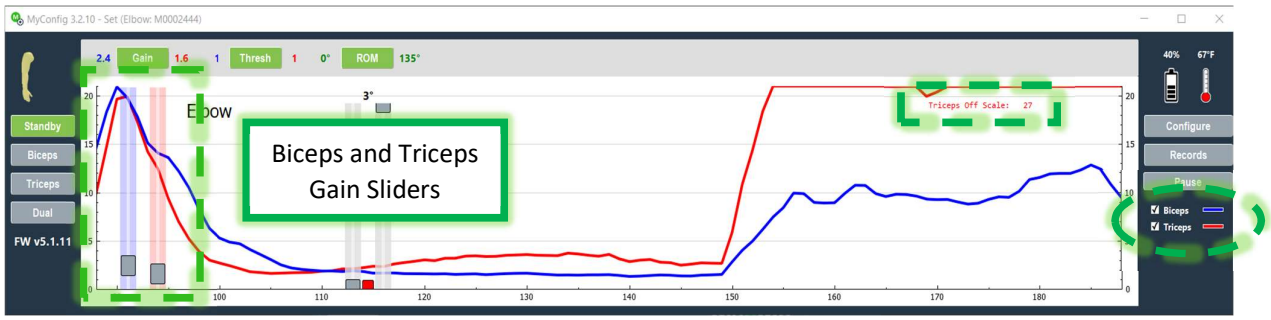


MYCONFIG SETTINGS

GAIN

Gain refers to amplification of EMG signal that takes place through the sensor hardware. In the case of the MyoPro, the EMG gain is amplified via software as well to create a large degree of adjustment. Changes to the gain value occur at 0.2 intervals. With a maximum value is 20.0, there are 100 available values for each *gain* slider, offering a great degree of fine-tuning.

EMG value changes are proportional to the EMG line changes. I.E, doubling the gain value will double the values seen on the EMG screen. The higher the gain, the more amplified the user's EMG signal will be. It's generally desirable that while at rest the client's EMG is at the bottom ¼ of the screen, while a maximal effort motion doesn't allow their signal to significantly exceed the top of the screen. A client with significant tone may already have an elevated resting signal and a stronger (more detectable) signal. When the EMG signal has left the screen, a text box will indicate the current value instead.



The *gain s*lider and value are color-coded to indicate which EMG they are relevant to.

The EMG screens have an upper-limit of "20", after which the EMG line won't be visible. The Triceps EMG in this picture currently reads "27", which is an indication that either the electrode is picking up abnormal activity, or the gain setting is too high.

Any changes made to the *gain* values will save in real-time. It is important to write your values down prior to changing them if you want to revert back to them. Another way to retrieve your settings is by Configuration Report *prior* to changing your settings.

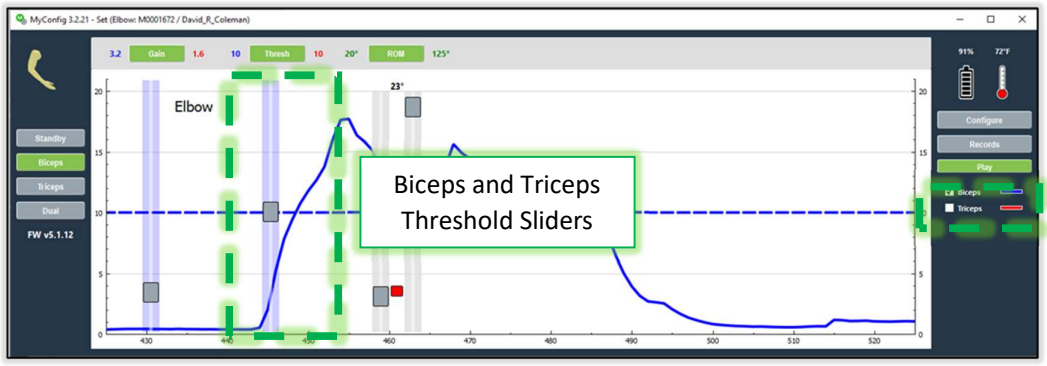
How to save records and run Configuration Reports can be found on page 22 and 23.

THRESHOLD

Threshold (Thresh) refers to the value that the EMG signal must exceed to initiate the motor (in response to either an active muscle signal or a relaxing muscle signal). Once in an active mode (anything other than *Standby* mode), click the *Thresh* button to make the adjustment sliders appear.

Ideally, we want the user to be able to move the MyoPro in either direction with relative ease. The placement of the threshold line will take into account what mode is being used, the clinician and user's goals (e.g. tone management vs strengthening vs functional training) and the user's response. Generally, once the *threshold* is set between 8-12, then all future adjustments can be done at the *gain* in an effort to minimize variables.

The *threshold* slider and value are color-coded to the relevant EMG.



Since the device in the preceding photo is in *Biceps* mode, only the biceps EMG is being graphed. Additionally, only the biceps *threshold* is visible to indicate that the device is only responding to the biceps EMG in this mode.

The visible EMG lines can be customized for each mode. In the example above (*Biceps* mode), the triceps EMG can be added to the graph by checking the "Triceps" check box as indicated on the right side of the screen. Unless clearly indicated, it is generally better to have both EMGs information available instead of hidden, as it better informs of the condition of the arm.

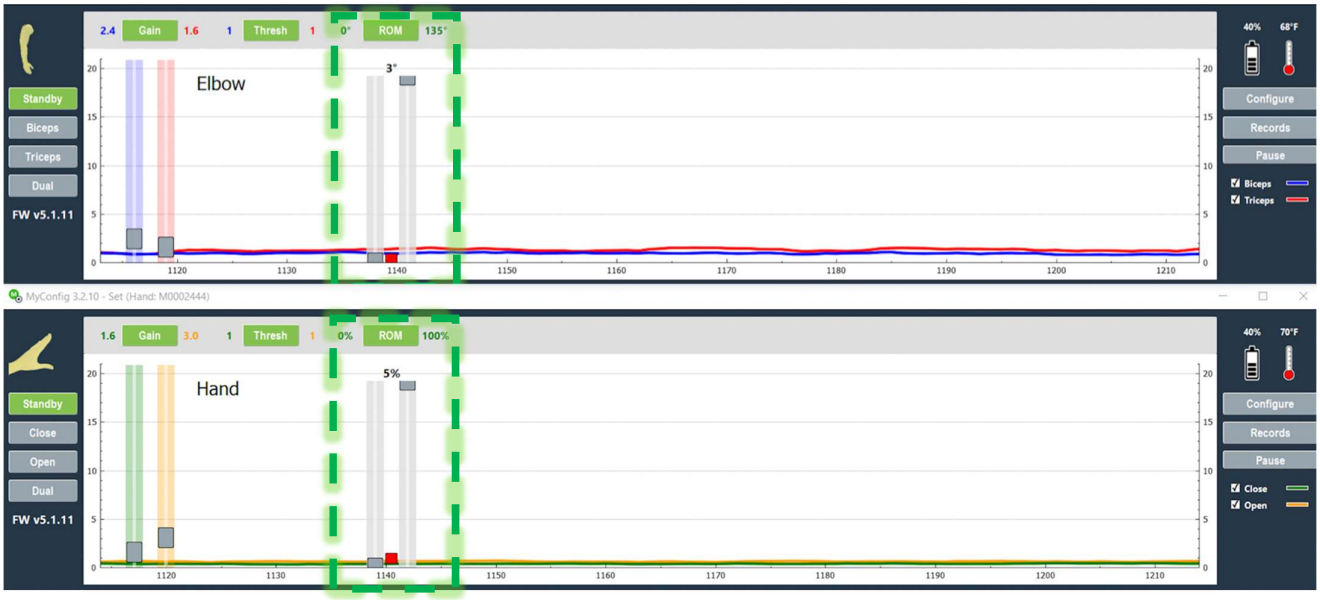
Just like the gain settings, all changes to the threshold settings are updated in real-time on the device and will save automatically. It is important to write your values down prior to changing them if you want to revert back to them. Another way to retrieve your settings is by Configuration Report *prior* to changing your settings.

RANGE OF MOTION (ROM)

The *Range of Motion* (ROM) for the motor is accessible on each joint window. For each joint, the left-column slider controls the extension end-range, while the right-column slider controls the flexion end-range. Appropriate device *ROM* will be determined primarily by the user's passive ROM, but other considerations include functional tasks, resting position, and mechanical advantage of different arm positions and finger-contact at the hand.

Elbow *ROM* is shown in degrees (0°=full extension, 135°=full flexion).

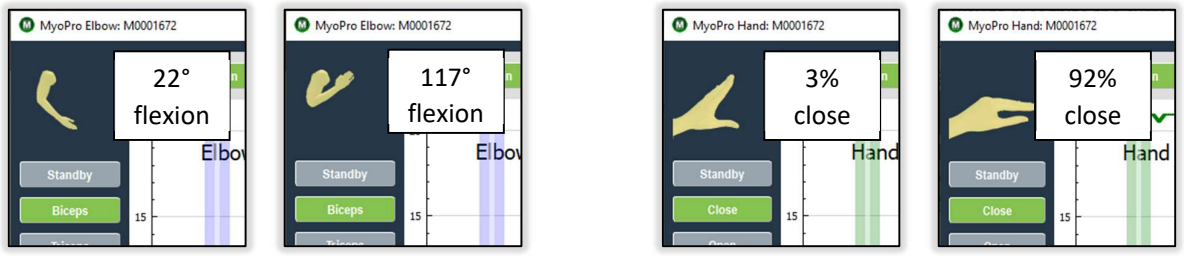
Hand *ROM* is shown in % (0%=open, 100%=closed).



The current ROM end-ranges are displayed numerically in green above the ROM sliders. In the preceding photos, the elbow ROM is set at 0 to 135° ROM while the hand ROM is set at 0%-100% of available ROM. The current joint position is indicated by the red square between the ROM sliders, which will move in real-time with elbow/hand position, with a black number current position value atop the ROM sliders. In the preceding photos, the elbow is currently at 3° ROM almost full extension) while the hand is currently at 5% closed (nearly fully open).

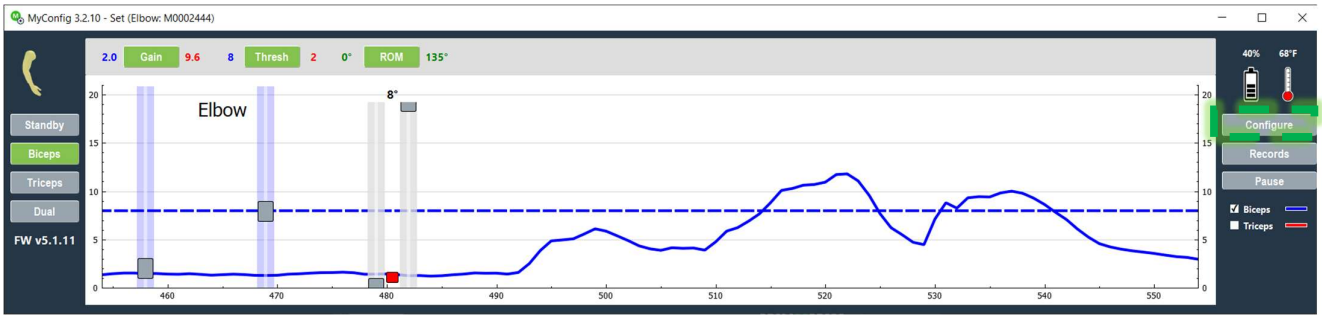
Any changes made to the *ROM settings* will remain in place as they are <u>automatically saved</u> when values are changed. It is important to write your values down prior to changing them if you want to revert back to them. Another way to retrieve your settings is by Configuration Report *prior to* changing your settings.

A graphical representation of the current joint position in the top-left corner of each window. This is a quick way to recognize the current joint position while looking at the computer screen without having to interpret the numbers.



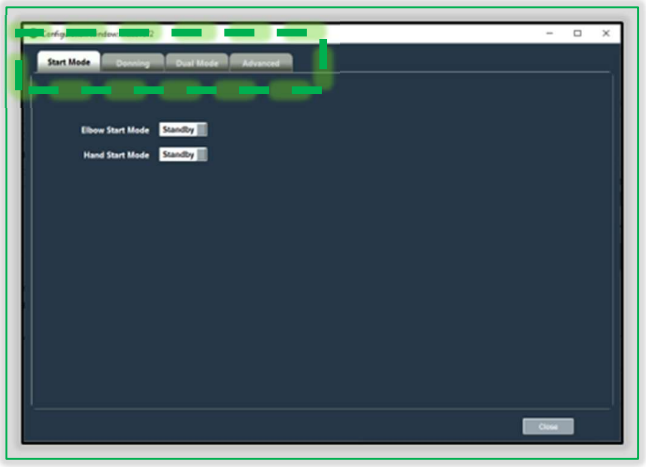
CONFIGURE

The *Configure menu button* is located on the right side of the hand or elbow EMG window. Clicking the button in either window will allow you to make and save changes to either joint.



The *Configure* screen contains 4 tabbed menus:

1) Start Mode
2) Donning Mode
3) Dual Mode
4) Advanced



START MODE

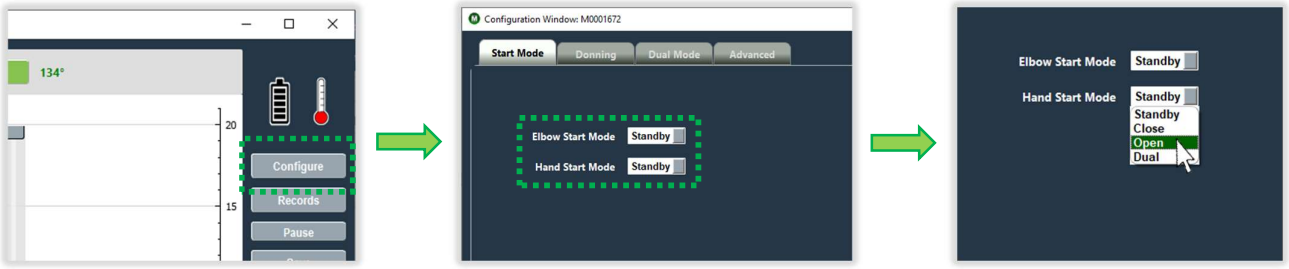
The motors are pre-set to be in *Standby* mode when the MyoPro is first powered on. However, you may prefer a different *Start Mode* for each MyoPro joint.

To change the *Start Mode*:

1. Select the *Configure* button on the right-hand side of either the hand or elbow window.

2. A new window with several tabs will pop up- the first of which is *Start Mode*. From the dropdown menu for the corresponding joint, select the desired *Start Mode*.

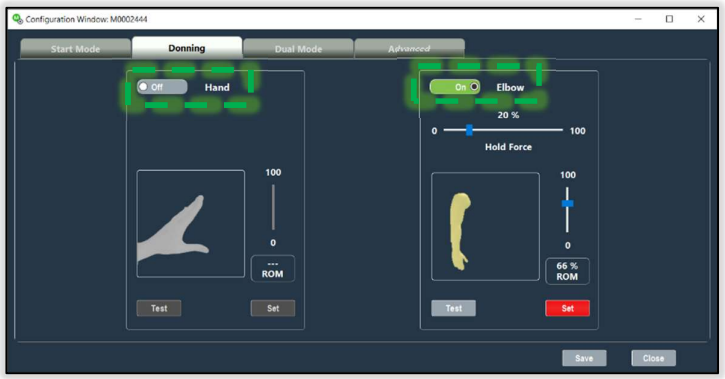
3. Select *Close*. The setting will be saved to the MyoPro for the next time you power it on and it will start in the saved *Start Mode* as a default.



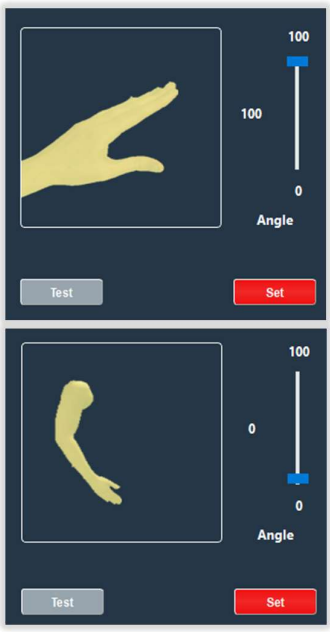
DONNING MODE

Donning Mode is a feature designed to assist the user in independently donning the device once it is activated. The behavior of donning mode is programmed through MyConfig Set but can only be initiated on the physical MyoPro.

Any combination of the joint motors can be involved in Donning Mode by sliding the slider at the top of the Donning Mode window.



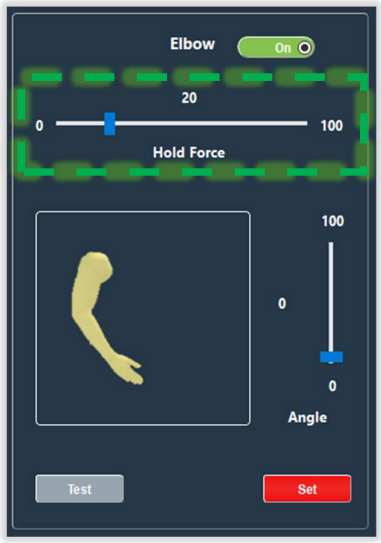
Like the EMG window, the graphic of the hand and elbow will approximate the MyoPro device position. This lets the user try different static positions of the elbow and hand to see which is most helpful for donning.



Select positions using the slider to the right of the graphic of the joint you are testing. All values are in "% of programmed ROM." For example, for the elbow, a value of 0 is full programmed extension, while a value of 100 is the programmed end-range of elbow flexion.

To try a position, click the "Test" button. The MyoPro and the graphic will move to the position specified by the slider. When a suitable position is decided, clicking "Set" will save that position to be used for Donning Mode.

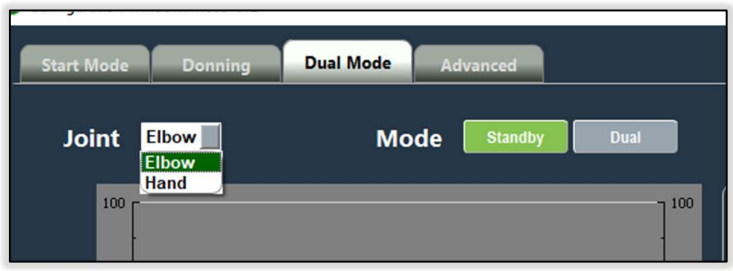
The elbow has an additional setting in Donning Mode that the hand motor does not. The *Hold Force* determines how much resistance to motion the elbow will provide after it moves to the set position during Donning Mode. A maximal value of 100 will make the elbow act very rigid, while a minimal value of 0 will allow the elbow to move freely after moving into position during Donning Mode. This setting cannot be tested here so the only way to experience the *Hold Force* is by initiating donning assist at the elbow on the MyoPro.



Please note: Donning mode does not support Hold Force when the value is less than 20.

Donning Mode parameters can be saved and retrieved through the "Records Management" window. See page 22.

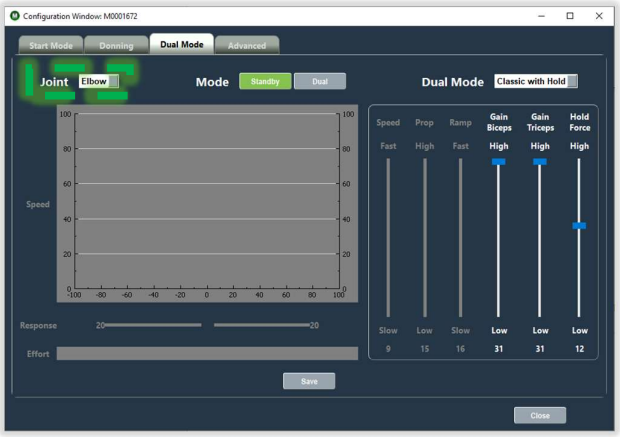
ADVANCED DUAL MODE



MyConfig software has four Dual Mode settings.

- Classic with Hold
- Constant Speed
- Proportional
- Ramped

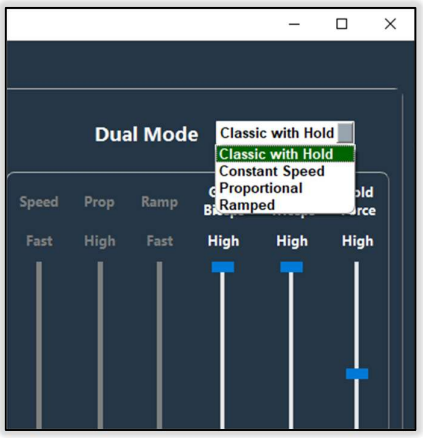
The *Dual Mode* menu allows the clinician to choose from the four available *Dual Mode* selections. All four *Dual* modes have settings that can only be accessed and programmed through this menu.



Select which joint to program by opening the drop-down menu in the top-left of the window.

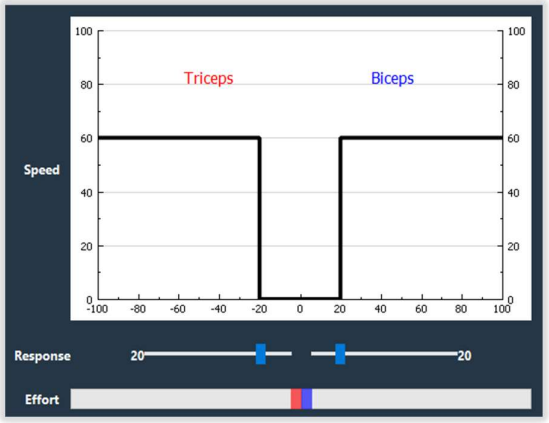
Note: Entering the *Configure* menu puts the MyoPro into *Standby* mode. No matter which mode is selected, the screen won't provide feedback until the Mode is switched from *Standby* to *Dual.*

The Dual Mode drop-down menu is used to select the desired Dual Mode. Because "Classic with Hold" mode isn't programmed in this menu, the graph on the left of the screen will remain grayed-out until another mode is selected.



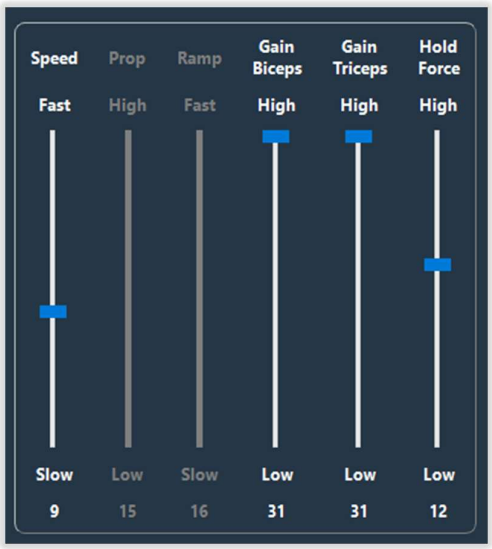
Attention: unlike the EMG screens, where all changes are pushed to the device immediately, in the Dual Mode tab, any changes will not take effect unless the red save button is pressed. If the save button is red, it's an indication that you have made changes to the settings that the MyoPro is not acting on.

The graphs in this Dual Mode tab are different than the EMG graph that is displayed for single modes or Classic Dual Mode. The two-tailed graph shows how the biceps, triceps, open, and close EMGs relate to each other. It communicates a lot of information in a small amount of space. MyoPro *Dual* mode behavior will be determined by the changes made to the two-tailed graph. The primary changes will come from the sliders on the right-side of the window.

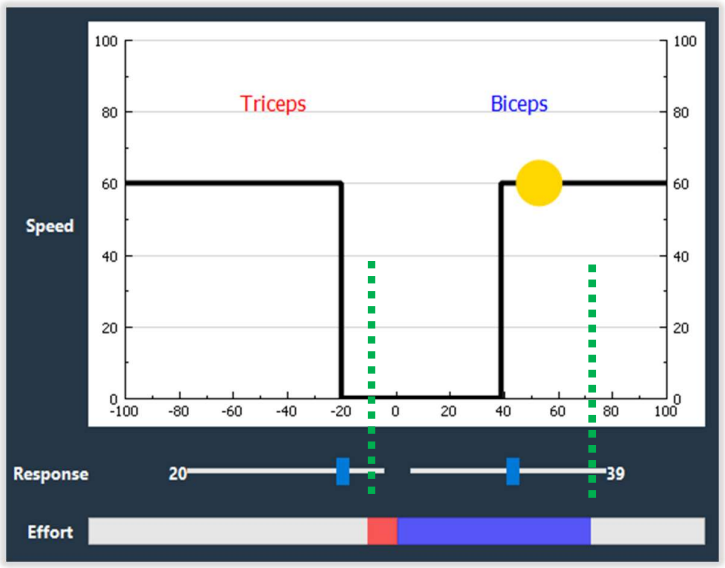


The sliders on the right side of the window are how adjustments to dual mode behavior are made. No mode utilizes every slider. In the following sections, the purpose of each slider will be defined, and then which sliders are applicable during which modes will be identified.

Speed defines motor speed during constant velocity mode.
Prop defines the increase in motor speed as it relates to *effort*.
Ramp defines the rate of motor speed increase as it relates to *effort*.
Gain Biceps/Close is the amount of biceps/close effort amplification (joint-dependent)
Gain Triceps/Open is the amount of triceps/open effort amplification (joint-dependent)
Hold Force indicates the amount of resistance to motion the joint will apply when the *Hold* feature is engaged.



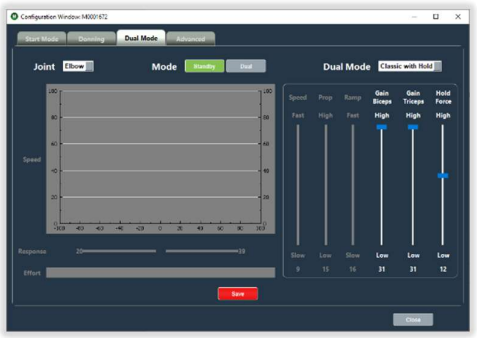
Effort is the conversion of each EMG signal into a bar visualization. This represents the user's current muscle exertion relative to their maximum ability. On this screen we aren't tracking the EMG signals over time, but we are able to visually estimate the difference between the flexor and extensor EMG signals. The right-side *effort* bar demonstrates the flexor activity, while the left-side *effort* bar demonstrates the current extensor EMG activity.



It is easy to see in the above graphic that the blue *effort* bar is around 70, while the red *effort* bar is around -10. The difference between the two effort bars determines the X-axis position of the Yellow ball. For the y-axis position, the yellow ball will travel the graph of the bold line. The shape of the bold line is determined by the *Response* slider, visible in the previous picture and the *Dual* mode that has been selected.

Response determines how much *effort* must be produced before the motor begins moving. It is very similar to the *threshold* in single-site or classic dual modes.

Classic with Hold



Classic with Hold is the most rudimentary *Dual* mode. It does not use the two-tailed graph, instead using the *threshold* of the EMG windows, which is why the graph is inactive in this window. The only setting to adjust in the Dual Mode tab for this mode is *hold force*.

Constant Speed

This mode allows the clinician to select and limit the motor speed. Otherwise, it behaves very similarly to *Classic with Hold* mode. The graph indicates that the motor has only one speed with which to move into extension or flexion, while it won't move at all between the two *response* sliders. This mode may be helpful for beginners and for those with spasticity, since the movement can be made slow and consistent.

Proportional

Proportional allows the user to control the speed of the motor in a way that reflects their level of muscle control. A small amount of *effort* will produce slower motion, while maximal *effort* can produce maximum speed. In this graphic the maximum extension speed is 60% of max motor speed at 100% triceps effort, while the 100% flexion speed can be achieved with 100% biceps *effort*.

Ramped

Ramped allows for quicker changes in motor speed related to *effort.* The *response* dead zone can nearly be eliminated because of the taper of the graph.

ADVANCED CONFIGURATION

The last tab of the *Configuration* menu has to do with advanced settings for the MyoPro.

The Advanced Configuration menu contains fields that are both useful to understand in rare circumstances, and **options that should never be touched unless instructed to by a Myomo engineer**.

The relevant settings will be described first, and are indicated in green, while the options that shouldn't be adjusted are in red.

Advanced Settings on the left side of the screen, the green settings below, must be set separately for the elbow and hand by choosing the drop down under "Advanced Settings".

Extension Effort/Flexion Effort or **Open Effort/Close Effort** describes the maximum value for the extension or flexion *effort bars,* respectively, in the dual mode tab. Raising this value decreases responsiveness for a user that too easily fills their *effort* bar), while reducing this value makes it easier for the user to achieve maximum *effort.*
Low/High ROM Threshold sets the ROM the selected joint has to be in for the *hold* force to activate. In this example screen above, the Hold feature at the elbow would be prohibited from engaging during the last 15% of ROM, e.g. the last 30 degrees of extension won't allow the elbow to lock. Similarly, the High ROM Threshold makes it so the elbow won't lock with the MyoPro in full flexion,
Curviness changes the default slope of the curve in *ramped* dual mode. Lower values are shallower while higher values are steeper. Default value is 2.
Alarm/Donning Melody Volume allows the user to change the volume of sound notifications during donning mode and other behaviors.

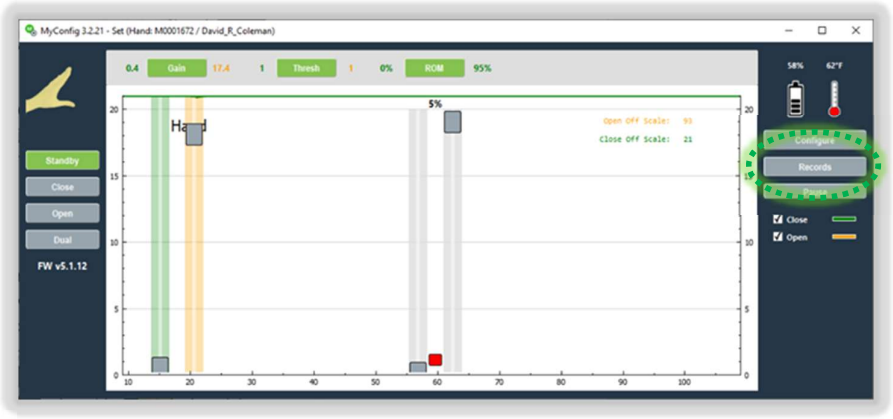
The values on the right side of the screen, the values indicated by red marquee, will update the settings automatically in the corresponding window for the hand and the elbow when the values are changed for either joint. These values are shared between hand and elbow.

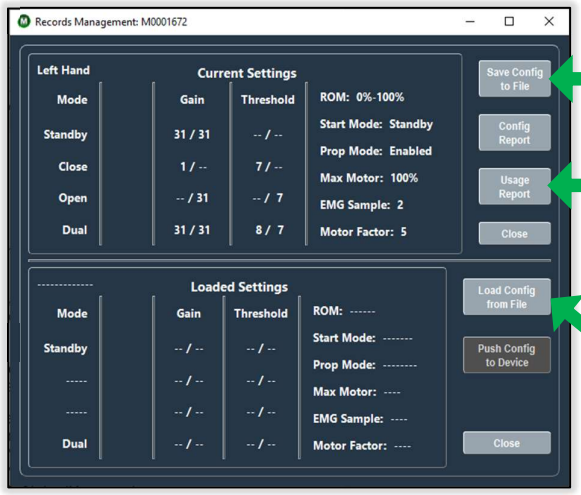
Overheat Prevention enables or disables a feature that protects the control circuit of the MyoPro during peak power demand. When overheat protection is enabled, the MyoPro will repeat a single-beep for the duration of the "Motor Cmd Timeout" value. Without this box checked the user will get no auditory warning that the motor is about to turn off. This is separate from the motor temperature indicators on the EMG screen. Effectively, when the MyoPro is working as hard as it possibly can, a beep will let you know that a timer has begun that will cause the device to deactivati in an effort to protect itself.
Motor Cmd Timeout sets the amount of time (and beeps) before the overheat prevention feature disables the device.
Battery Current Threshold limits the amperage discharge from the battery to protect the MyoPro components.
Alarm Volume and Donning Mode Volume maximum is 50, minimum is 0.

Clicking "Save" or hitting the "Enter" key will enact the changes made to the device. Otherwise, to continue without saving, click the "Close" button or return to another tab inside the *Configuration* menu.

MYCONFIG RECORDS

Click the *Records* button to open the *Records Management* window and features.





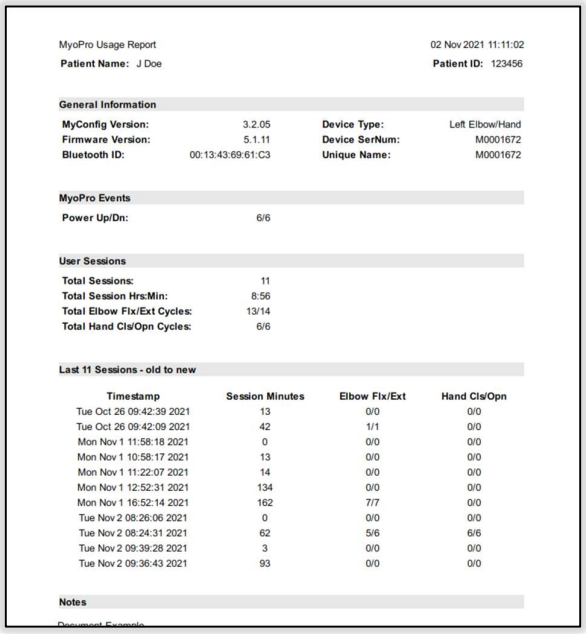
Save MyoPro settings to a file archive.

Select *Usage Report* to print or create a PDF of:

- Device Details
- Compliance
- Notes/Comments

Recover settings that were saved to a file archive and re-load them to a MyoPro.

The *Usage Report* is a powerful tool to document user compliance and device value. It can also inform the clinician about where the user is having difficulty with use. A usage report may also be requested when working with technical support to provide device details.



MyoPro Usage Report — 02 Nov 2021 11:11:02

Patient Name: J Doe — **Patient ID:** 123456

General Information

MyConfig Version:	3.2.05	**Device Type:**	Left Elbow/Hand
Firmware Version:	5.1.11	**Device SerNum:**	M0001672
Bluetooth ID:	00:13:43:69:61:C3	**Unique Name:**	M0001672

MyoPro Events

Power Up/Dn:	6/6

User Sessions

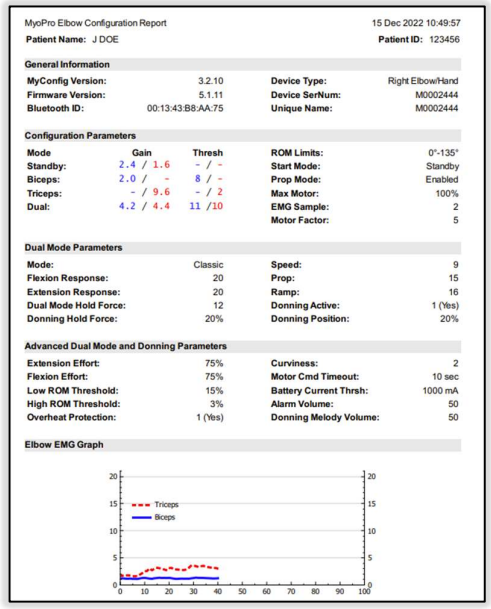
Total Sessions:	11
Total Session Hrs:Min:	8:56
Total Elbow Flx/Ext Cycles:	13/14
Total Hand Cls/Opn Cycles:	6/6

Last 11 Sessions - old to new

Timestamp	Session Minutes	Elbow Flx/Ext	Hand Cls/Opn
Tue Oct 26 09:42:39 2021	13	0/0	0/0
Tue Oct 26 09:42:09 2021	42	1/1	0/0
Mon Nov 1 11:58:18 2021	0	0/0	0/0
Mon Nov 1 10:58:17 2021	13	0/0	0/0
Mon Nov 1 11:22:07 2021	14	0/0	0/0
Mon Nov 1 12:52:31 2021	134	0/0	0/0
Mon Nov 1 16:52:14 2021	162	7/7	0/0
Tue Nov 2 08:26:06 2021	0	0/0	0/0
Tue Nov 2 08:24:31 2021	62	5/6	6/6
Tue Nov 2 09:39:28 2021	3	0/0	0/0
Tue Nov 2 09:36:43 2021	93	0/0	0/0

Notes

CONFIGURATION REPORT



The Configuration Report includes:

a. Configuration Parameters
b. Dual Mode Parameters
c. Advanced Dual Mode Parameters
d. Donning Parameters
e. EMG Graph

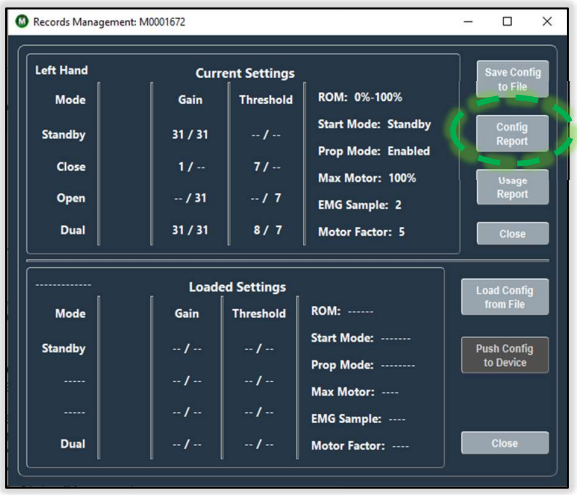
1. Select *Config Report* to launch the report form

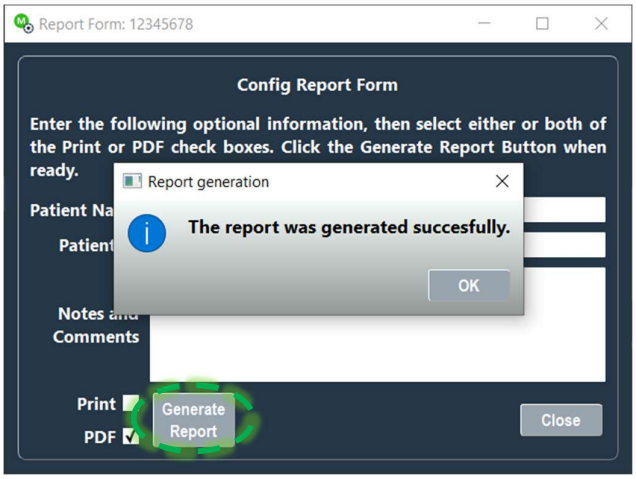
2. Input user's name, notes, and/or comments.

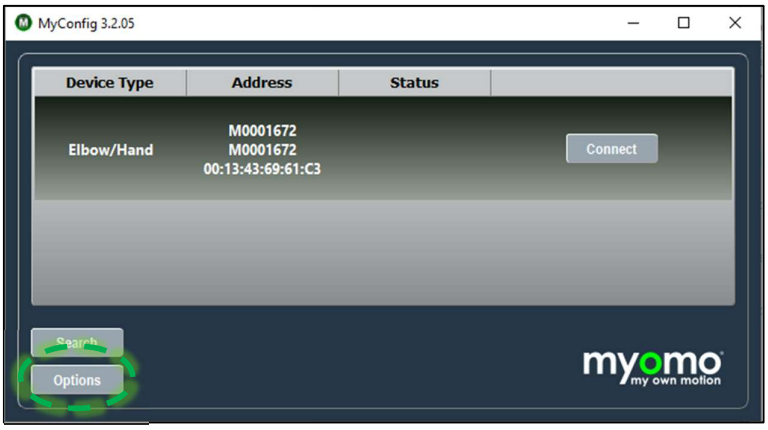
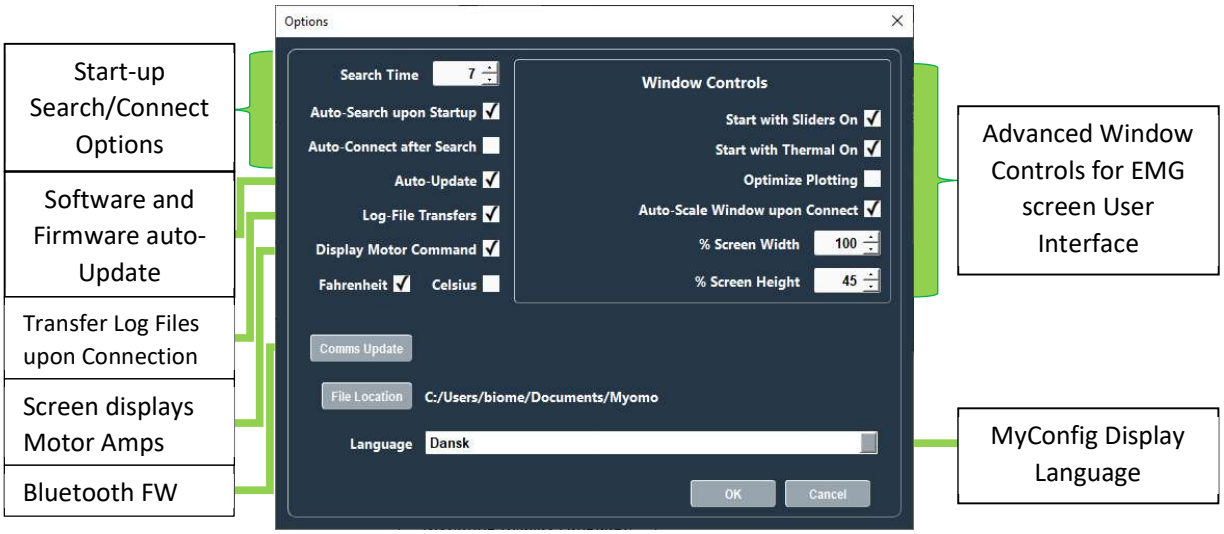
3. Select *Print* or *PDF*, or both.

4. Select *Generate Report*.

5. A confirmation of report generation will be displayed.





OPTIONS

To access additional options for MyConfig features select *Options* in the lower left of the launch window.