

PSYONIC

MOBILE APP SETUP

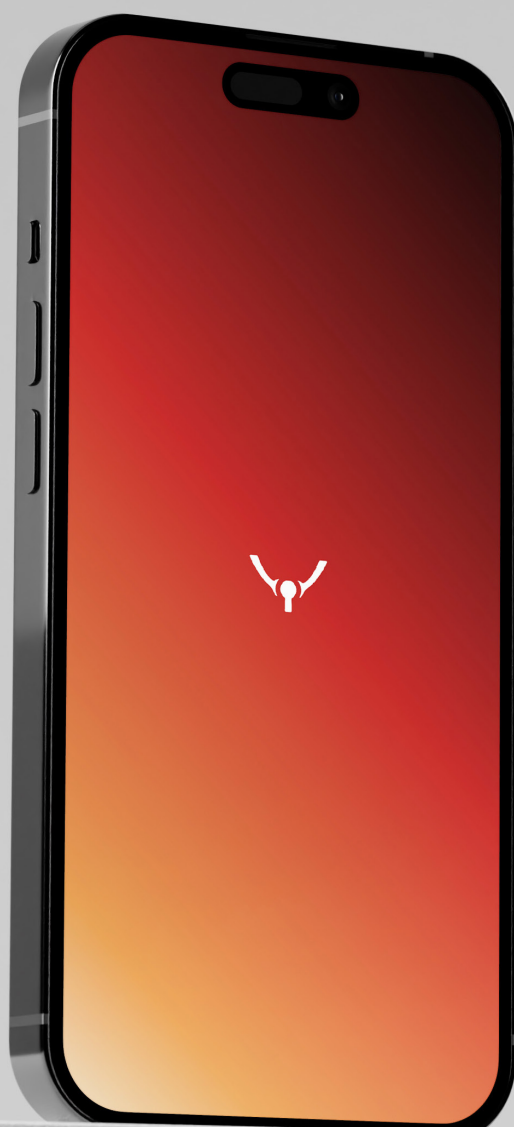
Version 1.4

App Version 2.9.63

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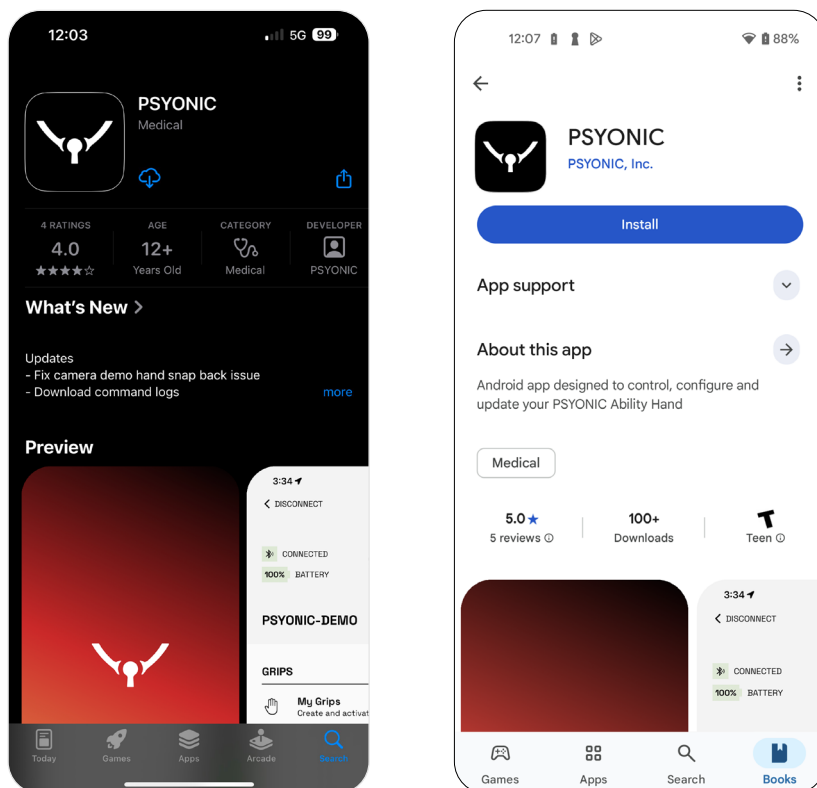


1. Introduction

The Ability Hand™ is an affordable, durable, and accessible bionic hand operated by muscle signals. Powered by long-lasting batteries, the Ability Hand™ provides users with unique bionic abilities and superior technology. Using sensors embedded in the fingertips, the Ability Hand™ provides users with sensory or touch feedback. All of these features are offered at a price point that makes advanced activity accessible by almost anyone. We are excited to provide you with an exceptional bionic hand and truly redefine “human”.

This document contains information on the usage of the mobile application correlated with the Ability Hand™. This mobile application set-up guide should be fully reviewed before fitting the Ability Hand™.

2. Installation



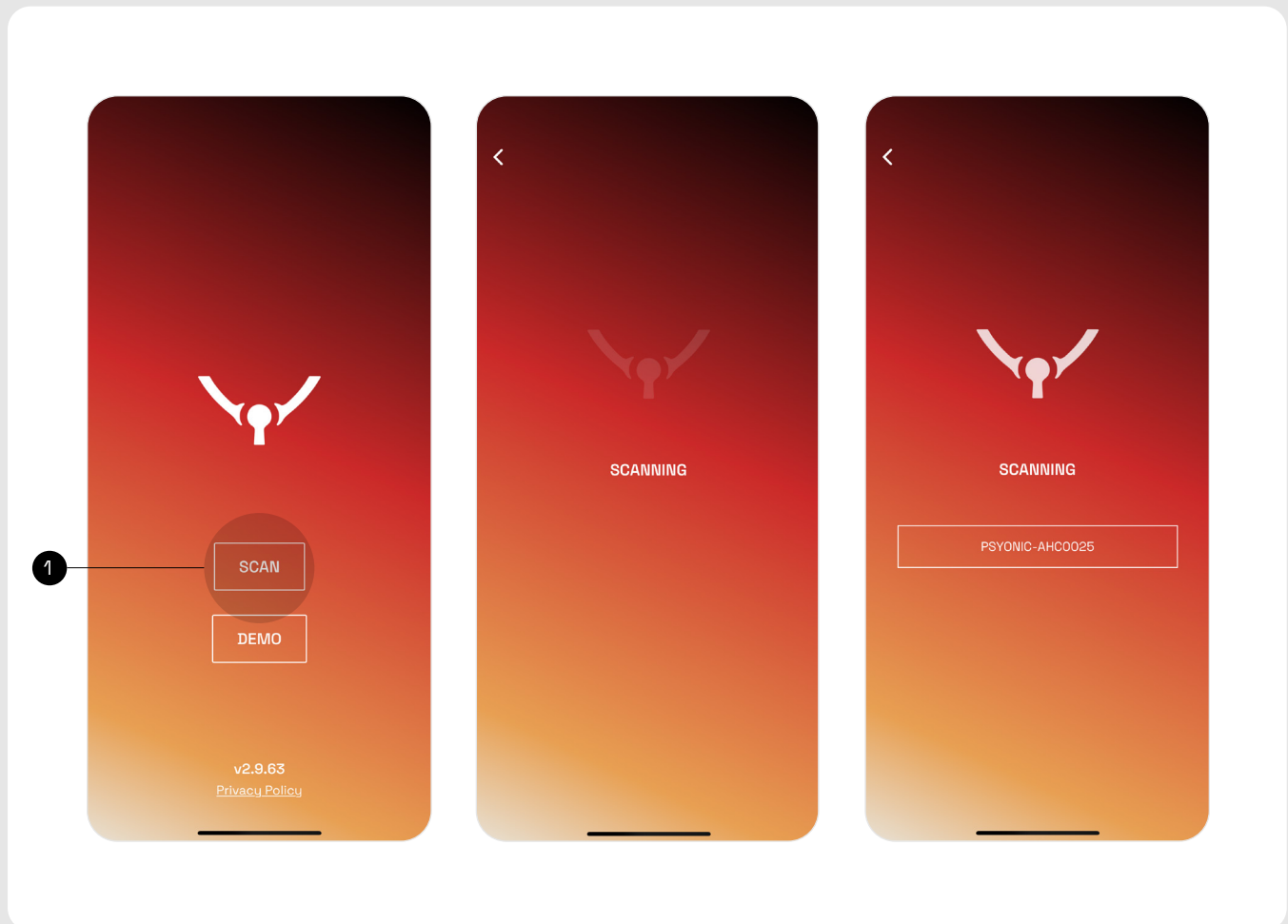
The PSYONIC Ability Hand app is available on both iPhone and Android stores. Install the app on an appropriate phone.



Note:

The app will request the user to turn their bluetooth and location on. Please enable bluetooth.

3. Connecting



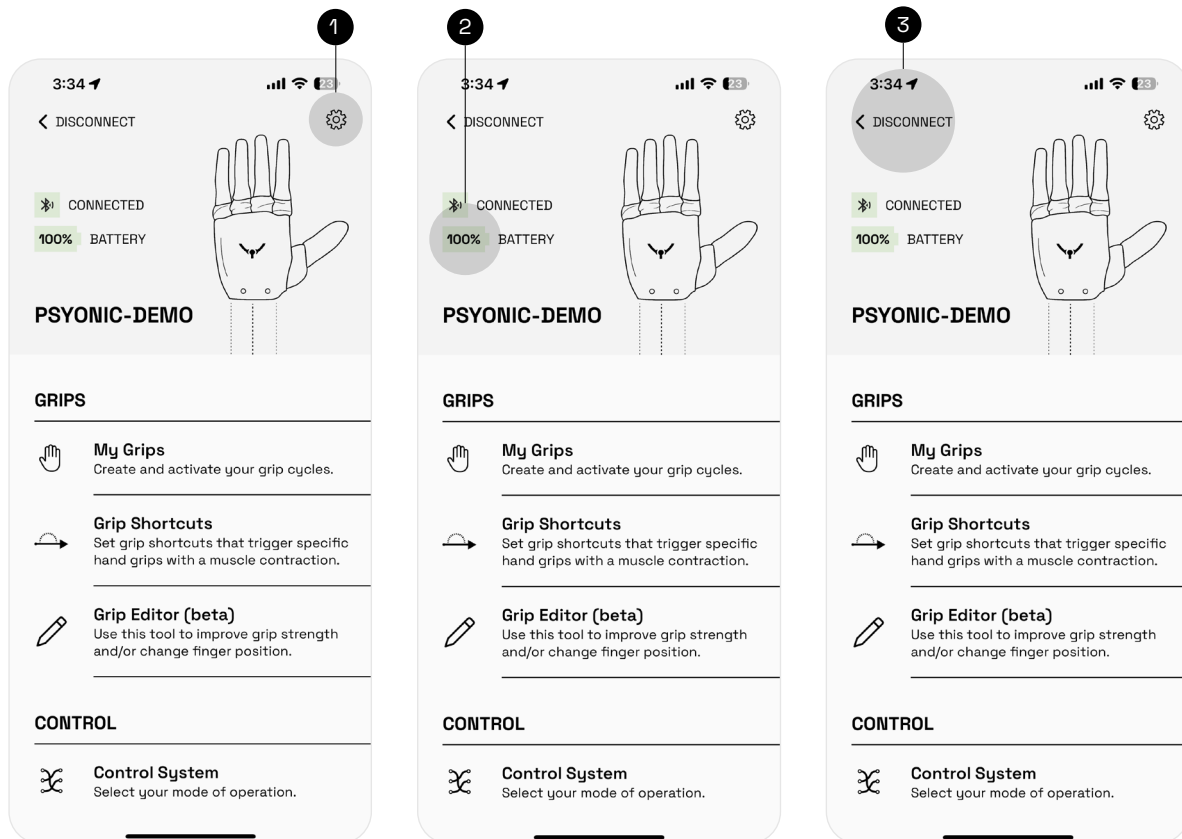
1

Open the PSYONIC App and press “Scan”. Tap on your Ability Hand serial number. The “connecting” screen will appear as your hand is connecting.

**Note:**

- Only one device can be connected to the hand via Bluetooth at one time.
- The Ability Hand must be on and in range to connect via the app.

4. Main Menu



The main menu has all of the pages listed out.

1

In the upper right corner, there is a settings icon.

2

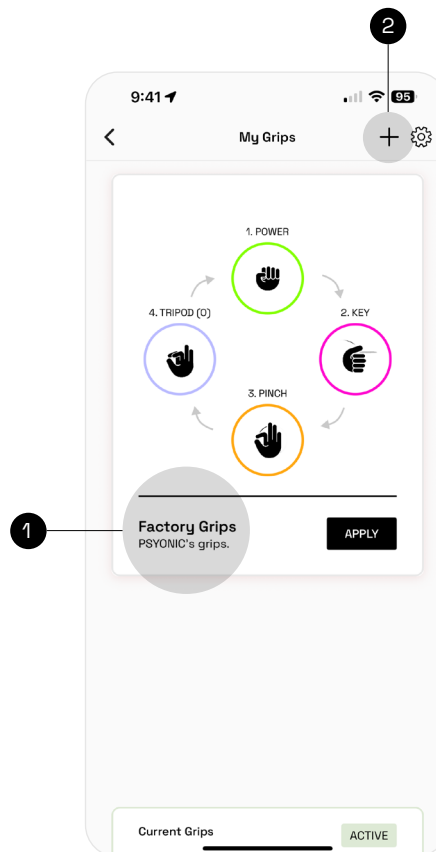
Battery percentage is also listed.

3

The “disconnect” icon can be used to disconnect from the Ability Hand.

5. My Grips

5.1 Default Grips



“My Grips” is where an Ability Hand user will navigate the grips they’d like to use on a consistent basis. Each grip is visible with an icon depicting the general position of the hand enclosed in a colored circle. The color of the grip correlates to the color of the LED indicator on the PSYONIC Power Switch or Button fabricated onto the socket.

1

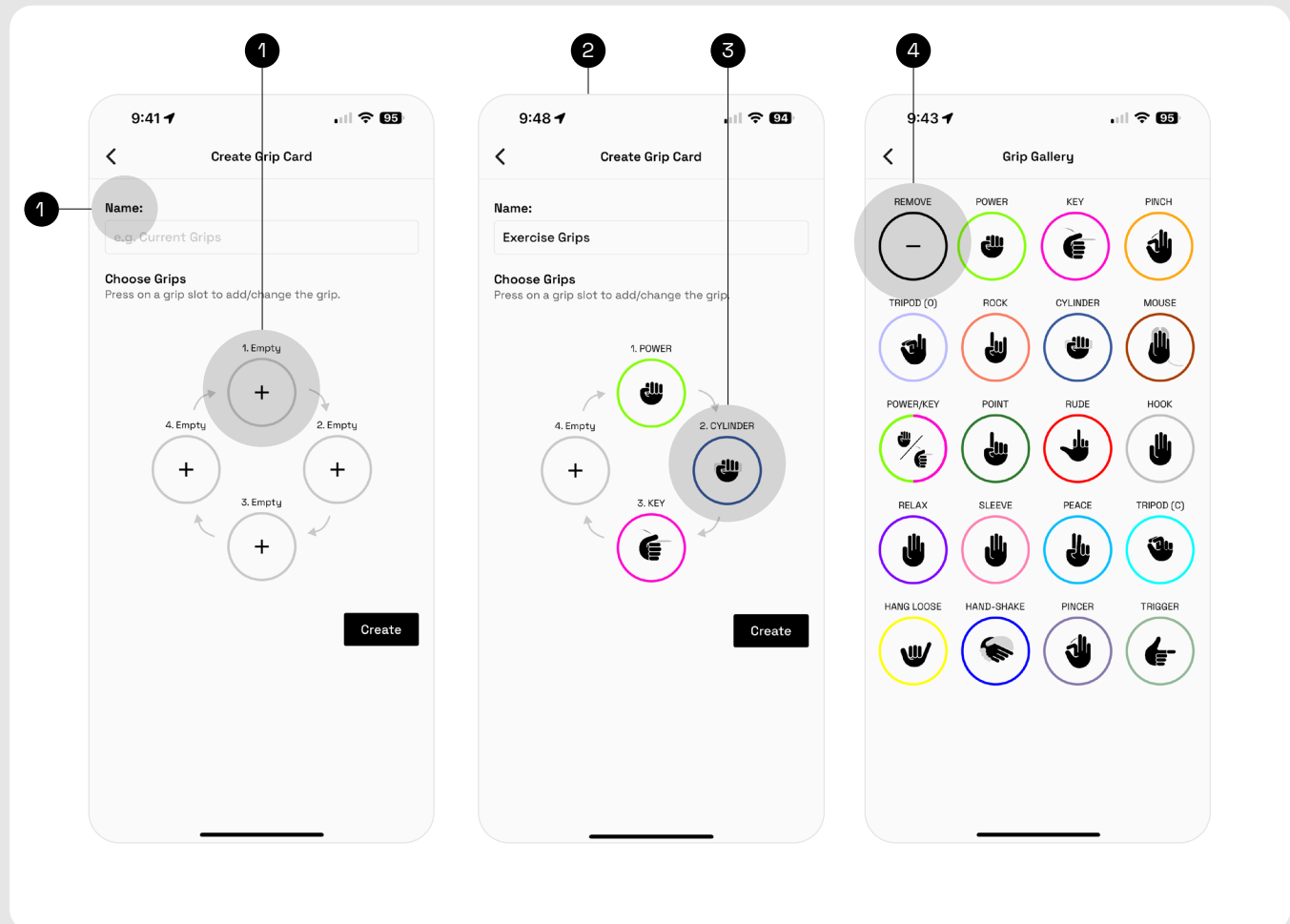
Each Ability Hand is programmed with a ‘Factory Grips’ Card, serving as a basic starting point for new users. The Factory Grips card is unique in that the grips within that cycle cannot be changed.

2

Multiple Grip Cards can be created, enabling you to switch grip cycles to suit different situations and activities. **To create a new Grip Card,** click on the ‘+’ icon in the upper right corner.

5. My Grips

5.1 Grip Cards



1

You will be prompted to name the Grip Card and choose your desired grips. To populate a grip within the cycle, click on one of the '+' icons and select a grip from the gallery.

2

Continue this process until all four grips are chosen. If less than four grips are desired within a cycle, simply leave the grip slot(s) empty.

3

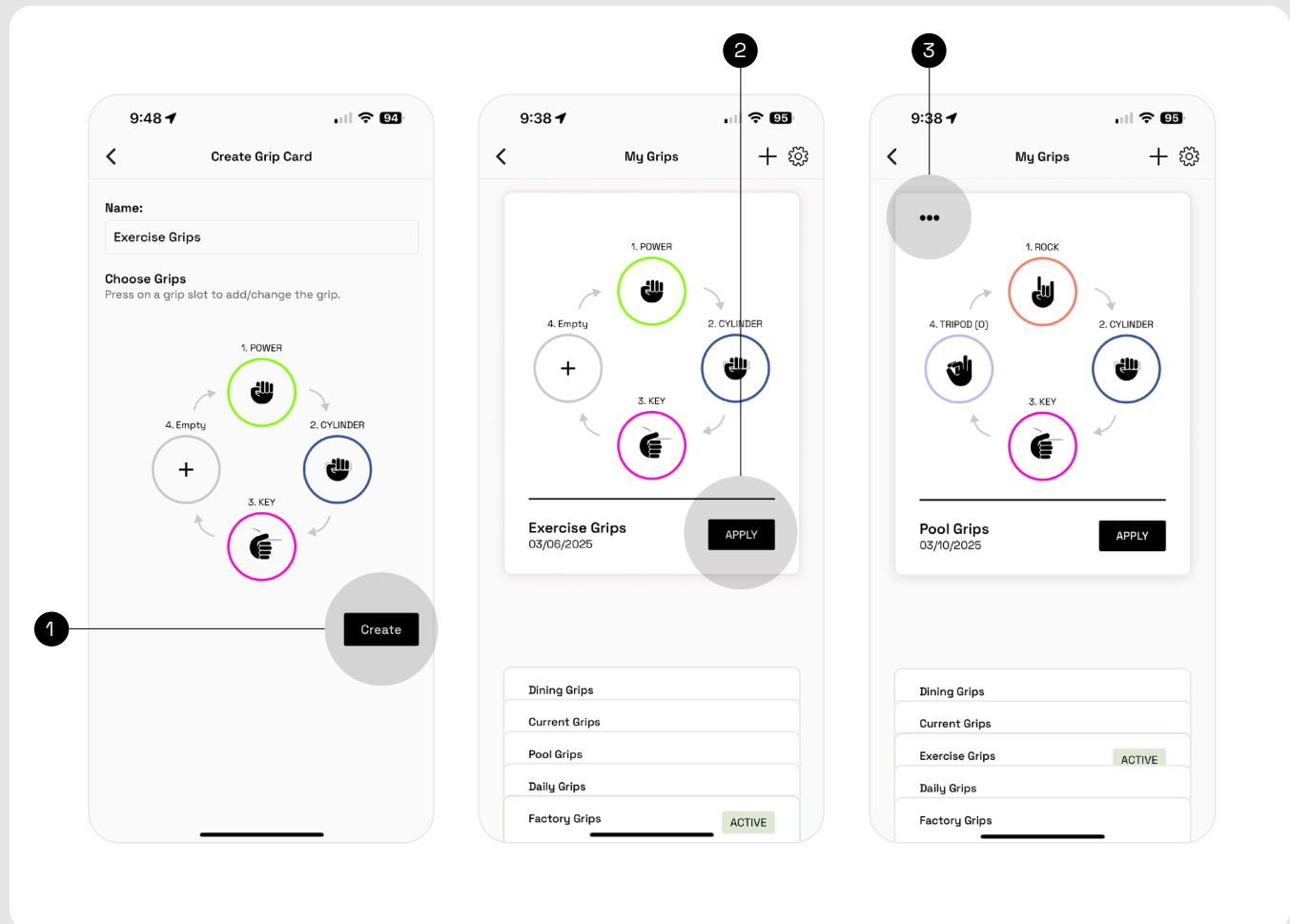
To replace a grip within a cycle, click on the grip you no longer wish to have in that card, and replace it by choosing a different grip from the gallery.

4

To remove a grip from a cycle, click on the grip you no longer wish to have in that card, and click the '-' icon labeled "Remove" in the gallery.

5. My Grips

5.1 My Grips



1

Once the Grip Card is finished, click 'Create' to save.

As more Cards are created, they will stack on the bottom of the My Grips page. The green highlighted Grip Card is the grip cycle that is currently active on the Ability Hand.

2

To activate a different Card, click or swipe up on the desired card in the stack and click 'Apply'.

3

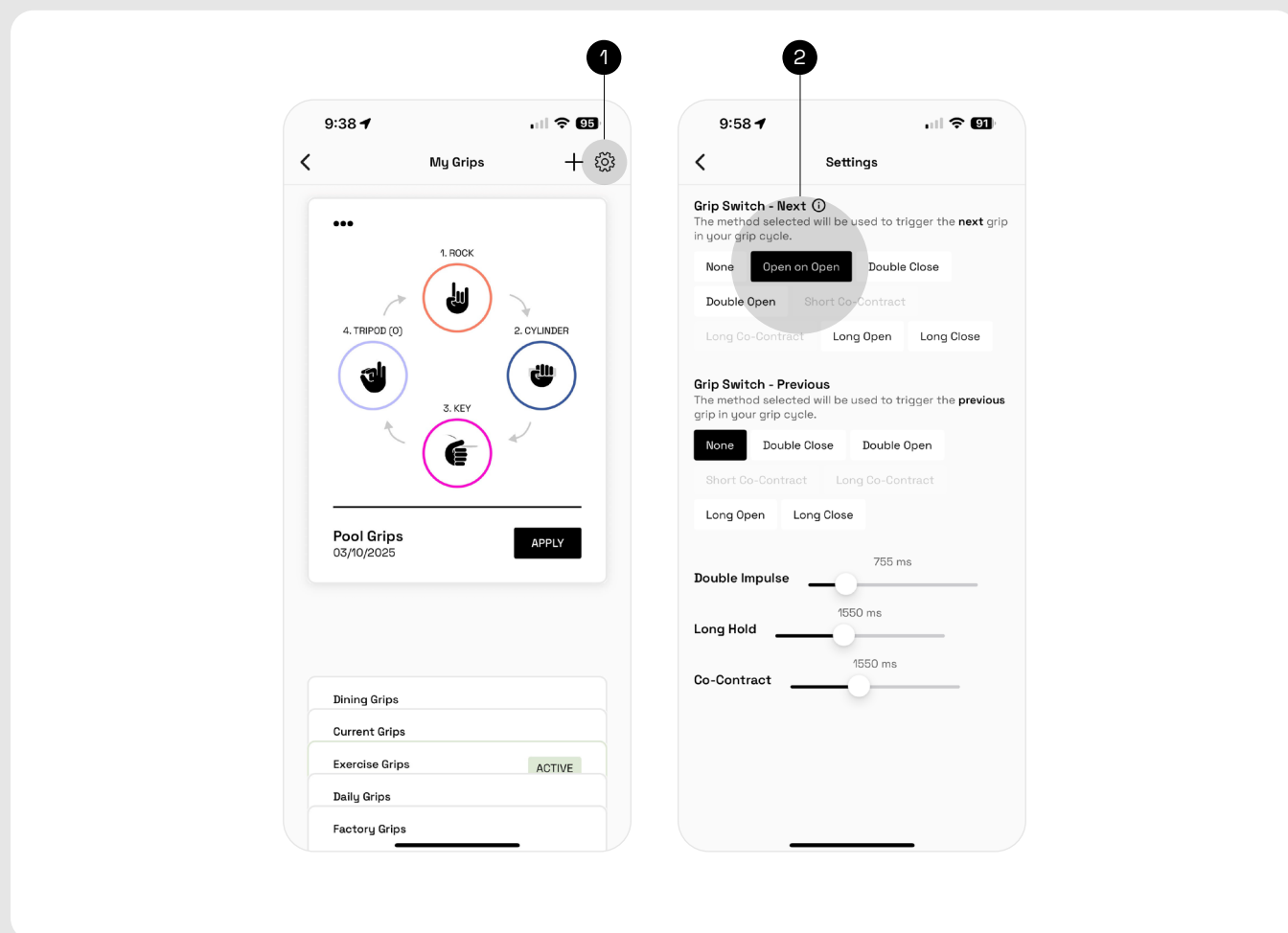
To delete a Grip Card, click the '...' in the upper left corner of the Grip Card and click delete.

Note:

- A preview of the grip can be seen by pressing and holding on a grip icon, which makes it fully open, and then sending a close signal.
- A max of 5 Grip Cards, in addition to the Factory Grip Card, can be created.

5. My Grips

5.2 Grip Switching



1 Click the settings icon from the My Grips page to select a desired grip switching method.

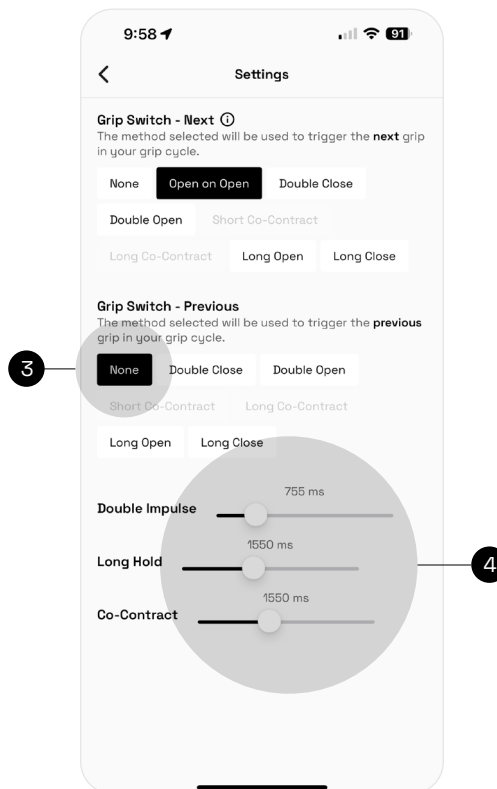
2 Users can select which muscle contraction you want to use to move to the next, or previous, grip in the cycle.

The default setting for Grip Switching is **“Open on Open”**. This means that the hand will switch grips if an open signal is sent while the hand is open.

Descriptions for each are detailed in the grips shortcut page.

5. My Grips

5.2 Grip Switching



3 If you want to switch grips using only the PSYONIC Power Switch or Button, select “None” as the grip switching method.

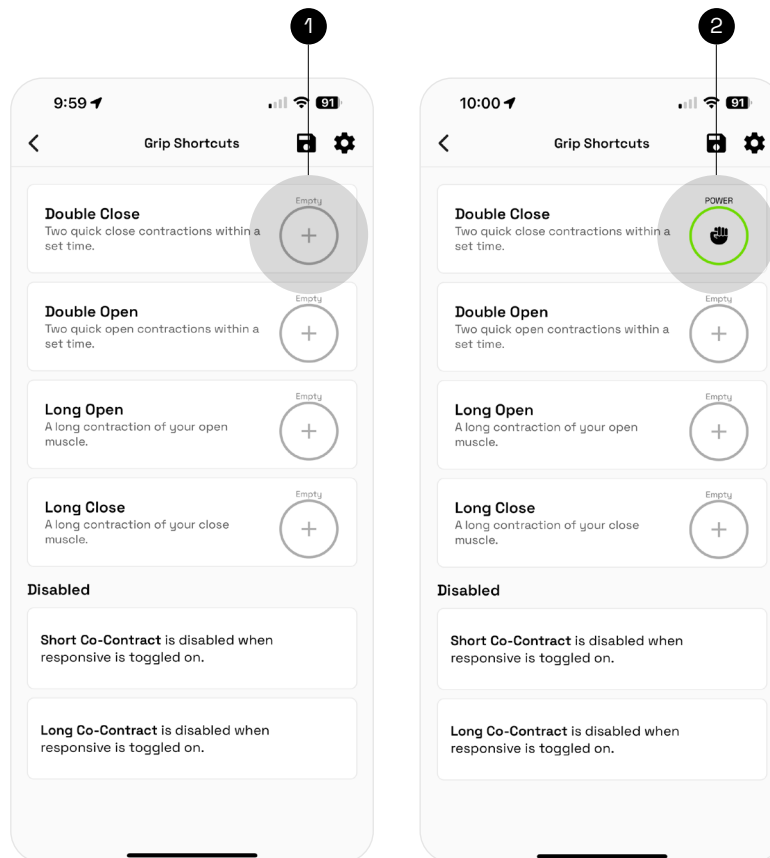
4 Users can also adjust the time parameters for the Grip Switching method--see section 5.2 “How to edit a contraction time window” for instructions.

Note:

- Co-contraction grip switching methods are disabled when the ‘Responsive’ setting is toggled on.
- Grip switching method cannot also be used as a Grip Shortcut.

5. My Grips

5.3 Grip Shortcuts



The “Grip Shortcuts” page allows users to activate shortcuts that trigger specific grips when a certain muscle contraction is performed. When a muscle contraction is detected, the hand will move into the grip’s open position.

To understand how each muscle contraction works, refer to the description under each contraction label. For example, “Long Co-Contract” means a long contraction of both the close and open muscles at the same time.

1

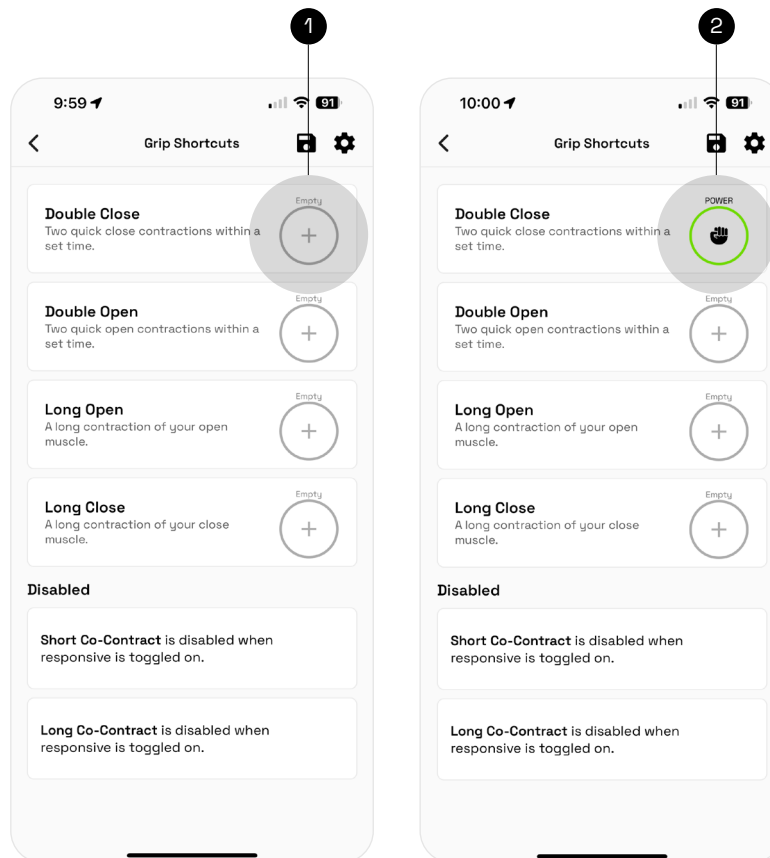
To add a grip shortcut, click the ‘+’ icon next to the desired muscle contraction and select a grip from the gallery.

2

The chosen grip will populate in the Grip Shortcut and is ready to use. **To remove or deactivate a Grip Shortcut**, click the grip icon in the Grip Shortcut and click the ‘-’ icon labeled “Remove”.

5. My Grips

5.3 Grip Shortcuts

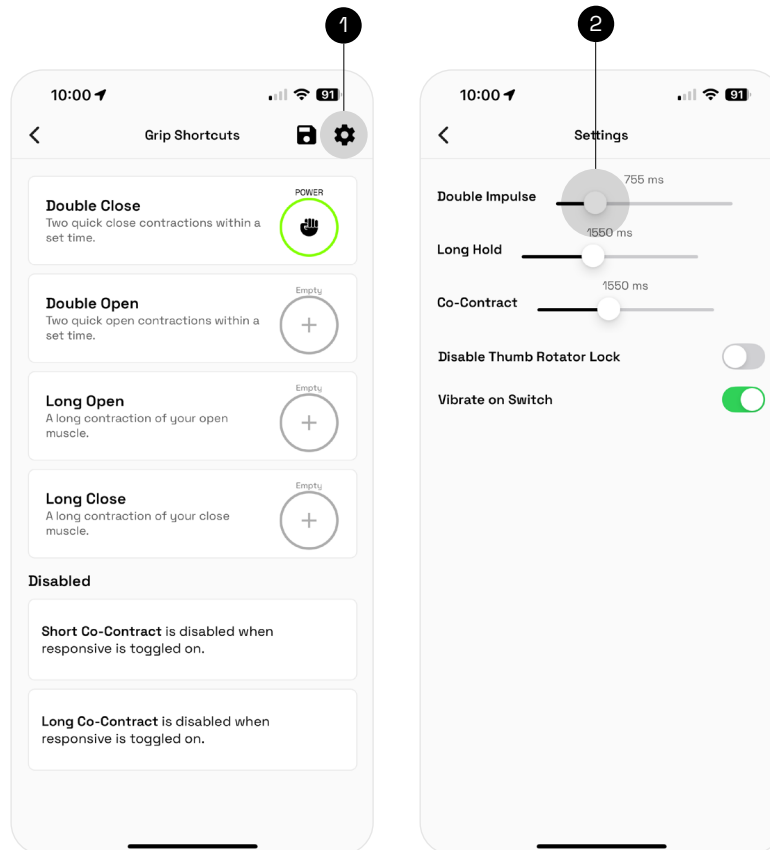


Note:

- Grip Shortcut muscle contractions cannot also be used as a Grip Switching Method.
- Co-contract Shortcuts are unavailable when “Responsive” setting is toggled on.
- If Open on Open is used as the Grip Switching method, Double Open will not be available as a Grip Shortcut option.

5. My Grips

5.3 Grip Shortcuts



Within the Grip Shortcuts page, users can adjust the time parameters associated with their specific muscle contractions. Changes will apply to all grip switching methods

1

To adjust, click the gear icon in the top right corner of the Grip Shortcuts page.

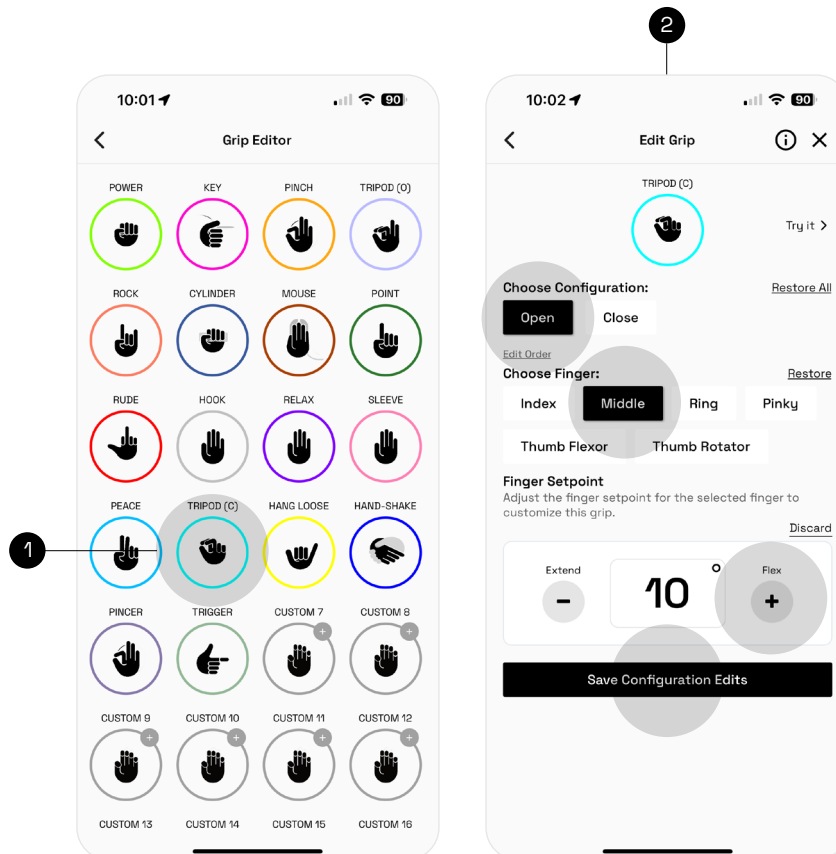
- Double Impulse refers to both Double Open and Double Close contractions.
- Long Hold refers to Long Open, Long Close and Long Co-Contract contractions.
- Co-Contract refers to the Short Co-Contract contraction only.

2

The sliders indicate a time window in which the contraction must be performed to achieve the desired output. Shifting the slider to the right will increase the time window and shifting the slider to the left will decrease the time window.

5. My Grips

5.4 Grip Editor (Beta)



The Grip Editor page allows users to edit a grip's finger position, color and finger order within any grip.

1

To begin, click on the grip you wish to edit from the gallery.

You will be prompted to change the color of the grip, if desired. This color will be reflected on the LED indicator on the PSYONIC Power Switch or Button. Skip or save and continue to the next page.

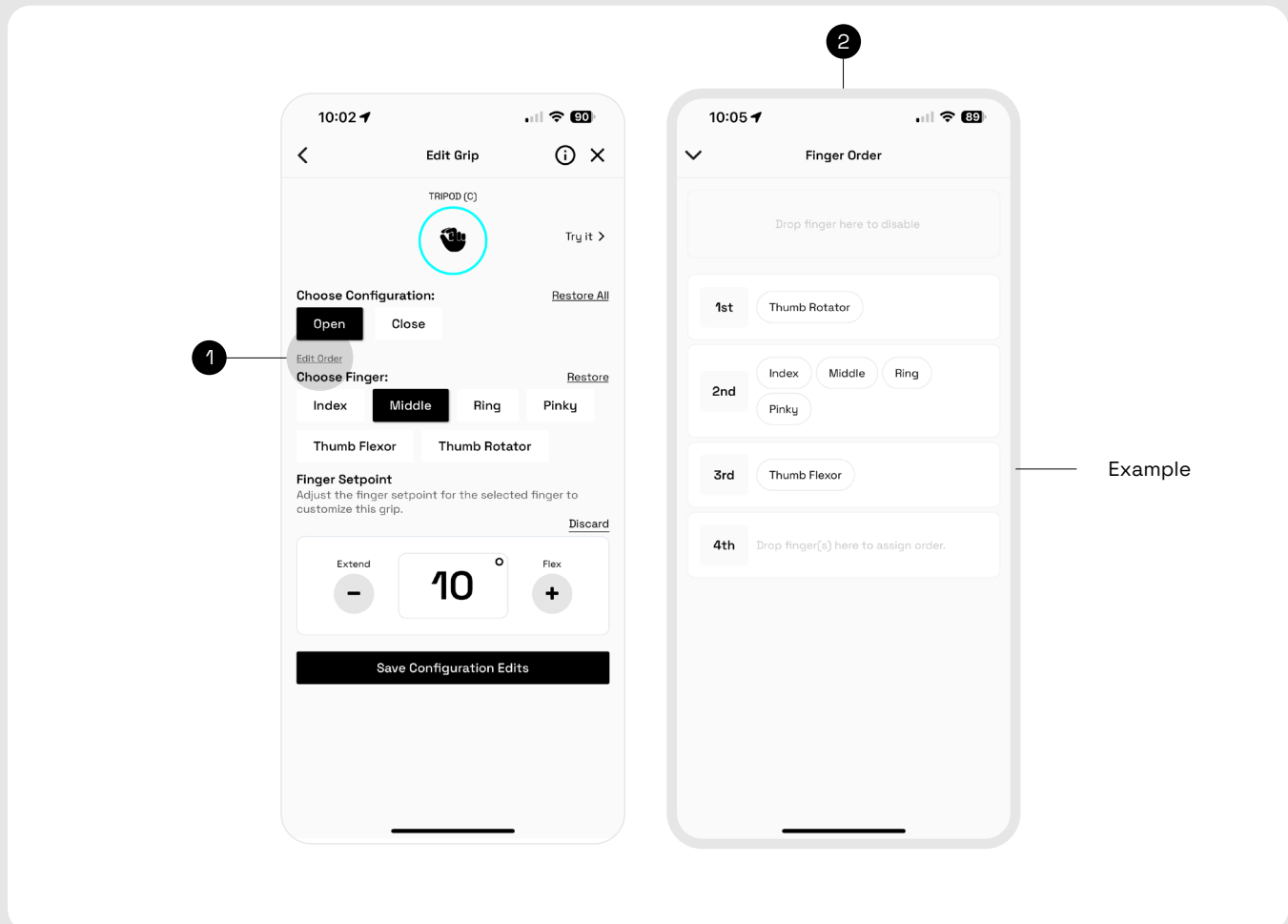
2

To edit the open or closed position of the grip, click the 'Open' or 'Close' Configuration and the finger you would like to edit.

Click the '+' or '-' to adjust the Finger Setpoint, which will be reflected on the hand in real-time. Once desired changes are made, click 'Save Configuration Edits'.

5. My Grips

5.4 Grip Editor (Beta)



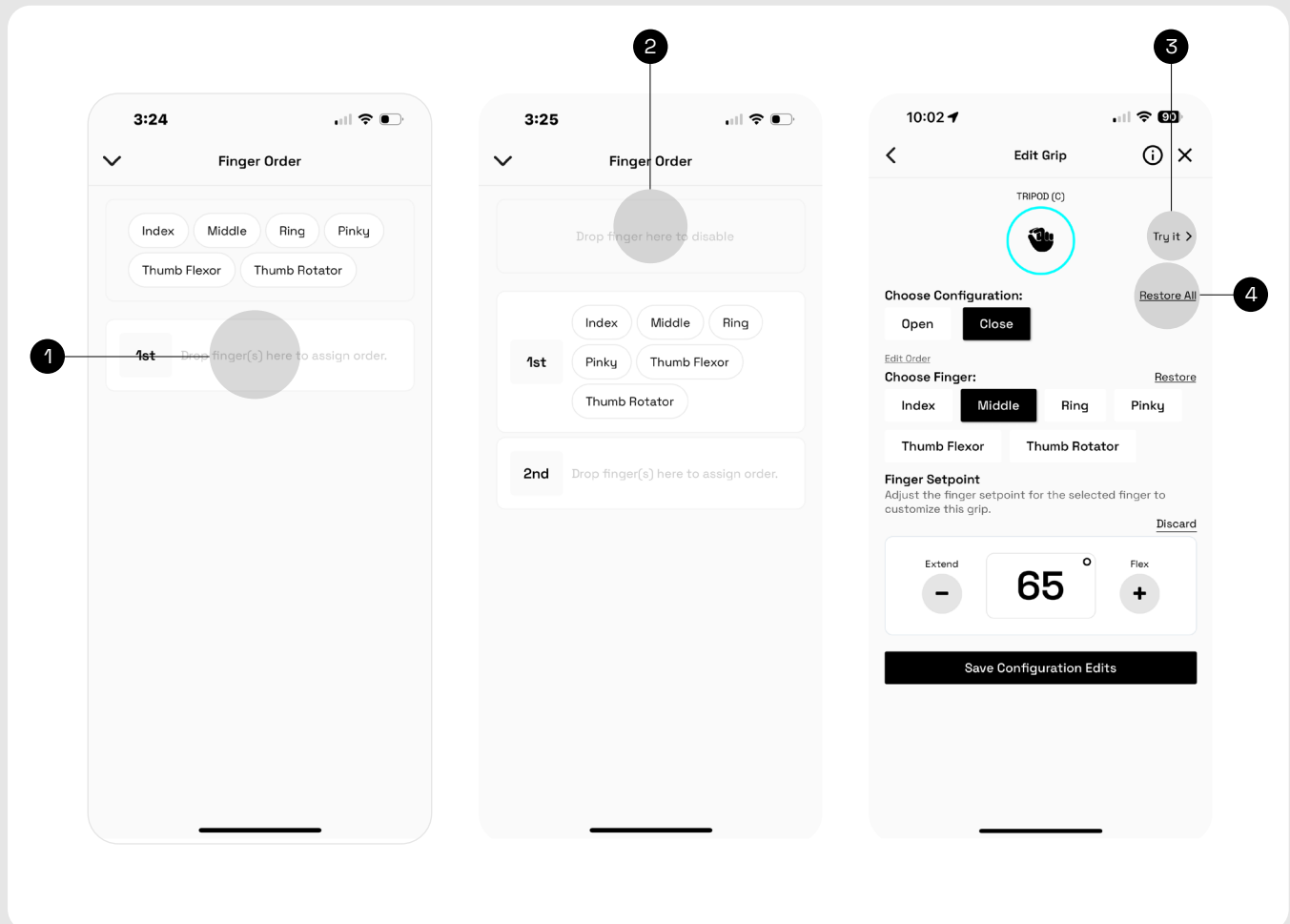
- 1 Finger Order refers to the sequence in which the fingers move into a certain position.
- To change the Finger Order of a grip**, click 'Edit Order' above 'Choose Finger'. Here, you can manipulate the order in which the fingers move into the closed configuration of the grip.

Example: In Power Grip, the thumb rotator moves into position first, followed by the index, middle, ring and pinky fingers all flexing to the palm, and lastly, the thumb flexes to meet the other four fingers. In this example, the Finger Order is -

1. Thumb Rotator
2. Index, Middle, Ring, Pinky
3. Thumb Flexor

5. My Grips

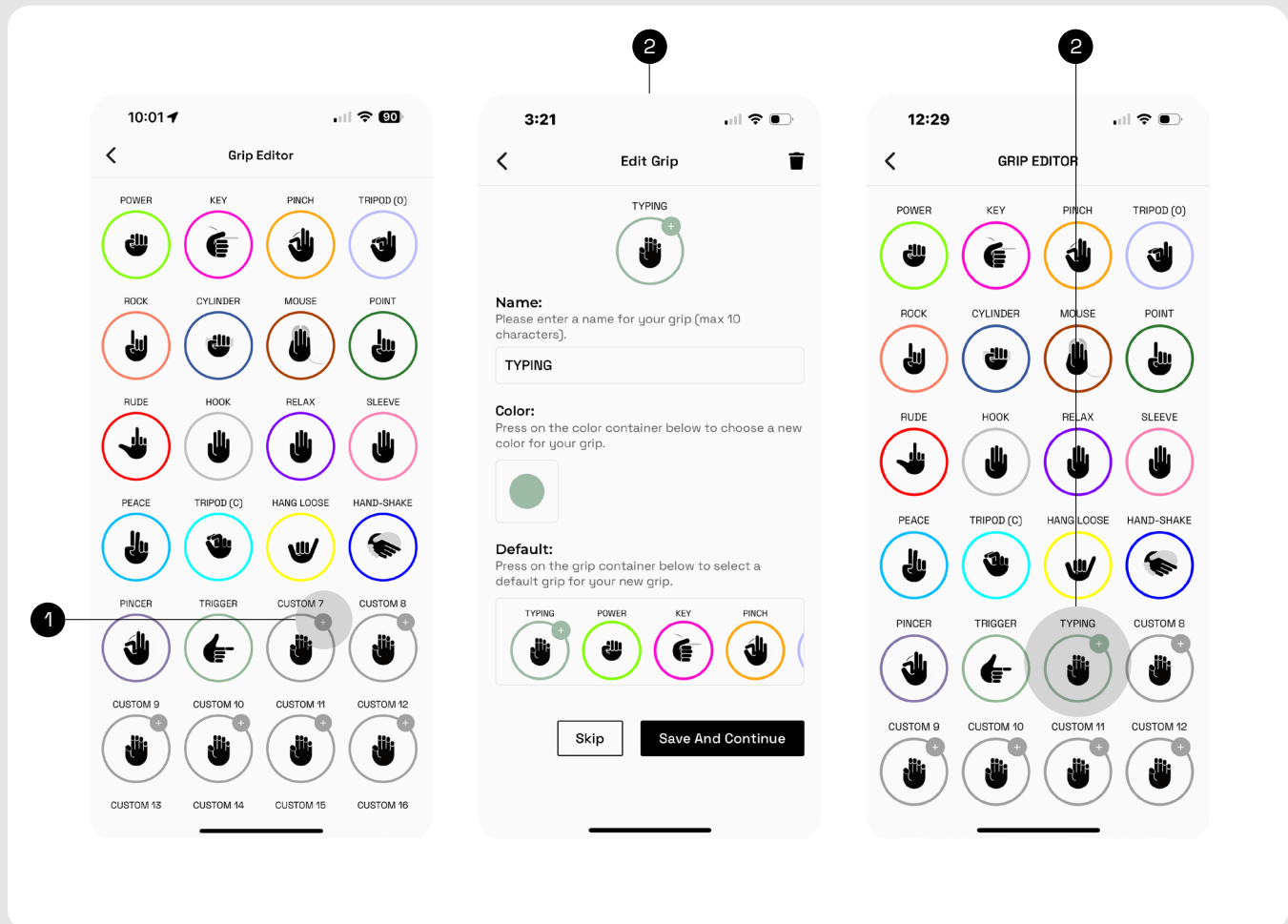
5.4 Grip Editor (Beta)



- 1 To change the Finger Order, drag and drop the desired finger(s) into their place.
- 2 To disable movement on a finger(s), drag and drop it into the top box.
- 3 To test the edited grip in action, click 'Try It' and use the joystick to open and close the Ability Hand in real time.
- 4 To restore all edits or erase any changes, click 'Restore All' next to 'Choose Configuration'

5. My Grips

5.3 Grip Editor (Beta)



Ability Hand users also have the opportunity to create custom grips, which can be used in any Grip Card or Grip Shortcut.

1

To create a custom grip, tap on the black '+' icon associated with any of the grips named 'Custom #' in the Grip Editor gallery.

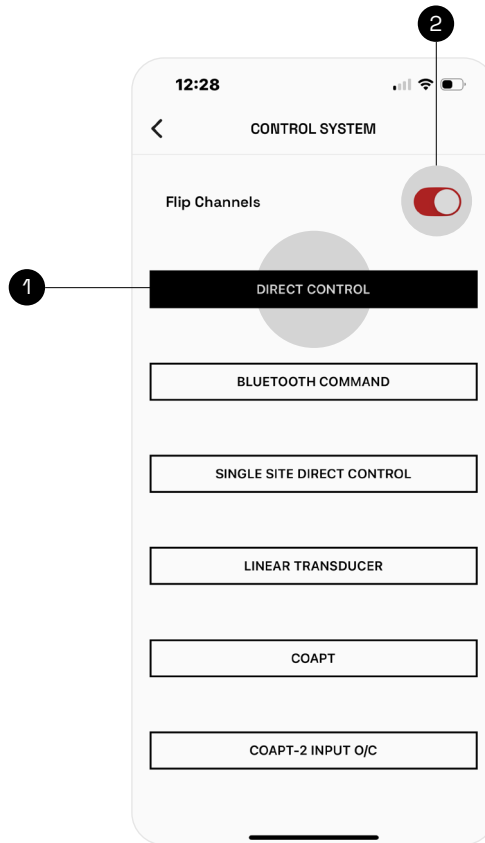
From here, you can name the grip, choose the color, and determine whether you'd like to start from "scratch" or use an existing grip as the starting point. Click 'Next' and follow the directions on the screen.

2

Custom grips will appear in the gallery marked with a pencil icon.

To restore all edits or erase any changes, click 'Restore All' next to 'Choose Configuration'

6. Control System



1

The Control System page is used to decide which input system operates the hand. When selected, the mode will be colored black.

2

The “Flip Channels” toggle at the top of the screen is used for the Direct Control mode. If the user is attempting to close and the hand opens, reverse the toggle.

6. Control System

Direct Control

Used for dual-site control where 2 electrodes are used.

Bluetooth Command

Allows the user to override all EMG signals or other input systems. This mode can be used for troubleshooting purposes to ensure the hand works properly.

Single Site Direct Control

Used for single-site control where only 1 electrode is used. Only the “close” signal will appear in Control Signals page.

Linear Transducer

A system with a sensor that converts linear displacement, such as shoulder or arm movements, into electrical signals to control a prosthetic hand or elbow. It is often used with harness systems, allowing users to achieve precise control.

Coapt

Coapt is used in two ways:

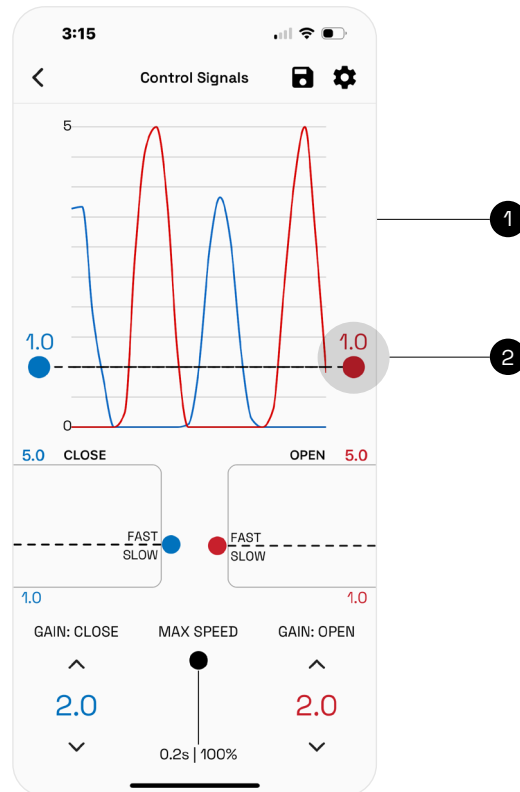
1. Pattern recognition for a specific grip

- a. The user can program up to 6 grips including Open, Power, Key, Pinch, Chuck, Point.
- b. To train the software, the user is prompted to reproduce a specific grip. The pattern of muscle firing is then recognized for that grip.
- c. Note: “COAPT” must be selected in the PSYONIC app and “PSYONIC Hand” must be selected in the Coapt app. The user **will not** be able to see EMG signals in the PSYONIC app in the Control Signals page.

2. 2 input O/C (“O/C” stands for Open/Close)

1. The user can only program Open and Close and will be prompted to train the software by reproducing Open and Close grips.
2. In this mode, the user will be able to access more than the aforementioned 6 grips allowed.
3. The user will be able to program and control the hand in the same way a dual site user would.
4. Note: “COAPT-2 INPUT O/C” must be selected in the PSYONIC app and “2 input o/c” must be selected in the Coapt app. The user will be able to see EMG signals in the PSYONIC app in the Control Signals page.

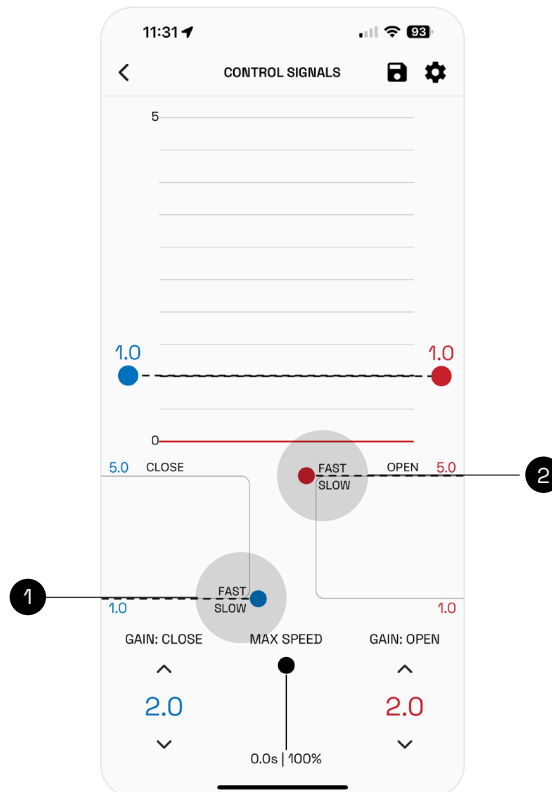
7. Control Signals



The control signals page is used to visualize and adjust the signals from the electrodes.

- 1 The plot at the top of the screen refers to the EMG signal thresholds. The threshold is the point at which the EMG signal must cross for the hand to perform the desired action.
- 2 To adjust the thresholds, click and drag the red or blue dot on the sides of the graph up and down. Blue refers to close and red refers to open.

7. Control Signals



The 2 plots containing the “Fast/Slow” thresholds are the “break away plots”. These plots represent the area of the graph above the threshold set for open or close. When a signal has been produced, the boxes fill with the color red or blue depending on the signal input. When the color surpasses the “Fast/Slow” line, the hand moves faster.

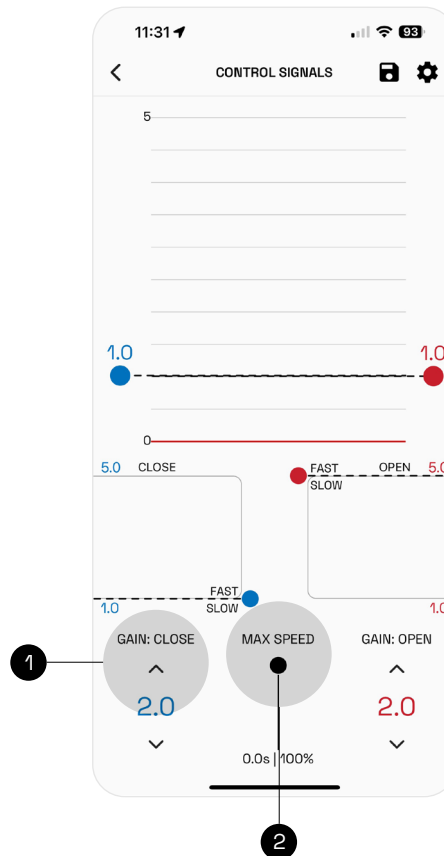
1

The line can be adjusted by dragging it up and down. If the line is at the bottom of the box, the hand **will always move fast**.

2

If the line is at the top of the box, the hand **will always move slow**.

7. Control Signals



The gains are listed in the bottom left and right corners of the screen. Gains are increased or decreased in order to change the magnitude of the user's signals.

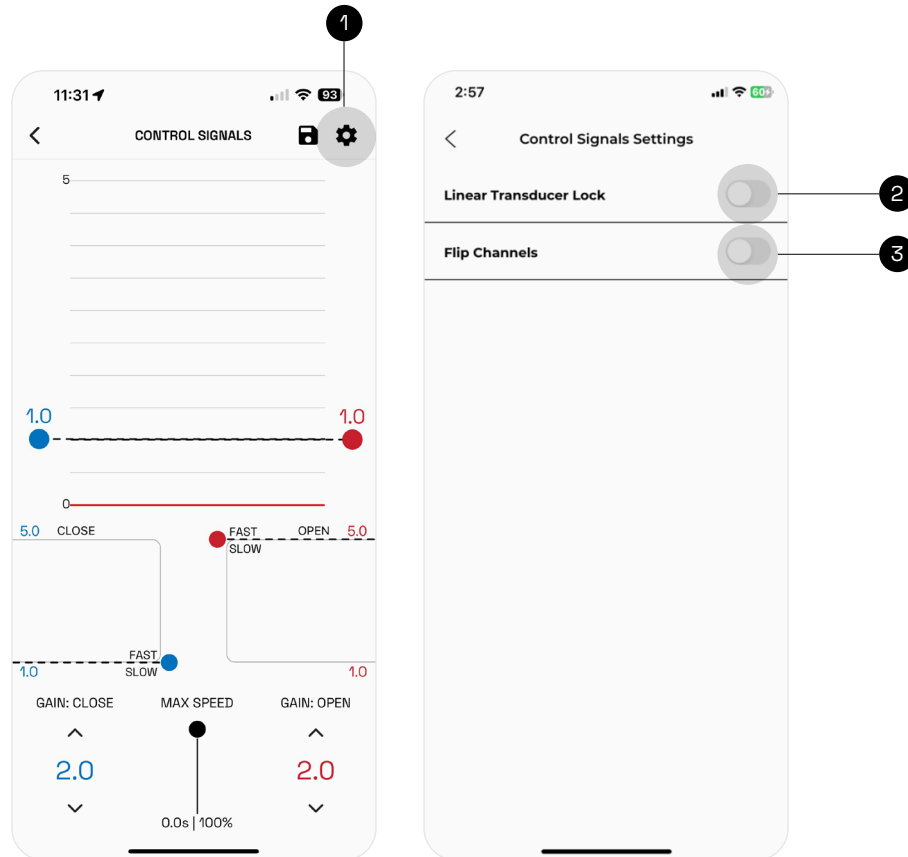
1

The gain can be changed via the up and down arrows.

2

The “max speed” slider in the bottom center is used to adjust the overall speed of the hand. If the slider is at the top, the fastest the hand will close is in 0.2 seconds or 100% speed. If the slider is at the bottom, the hand will close slower.

7. Control Signals



1

In the settings gear icon at the upper right-hand side of the graph, the app will take the user to the “Control Signals Settings” page.

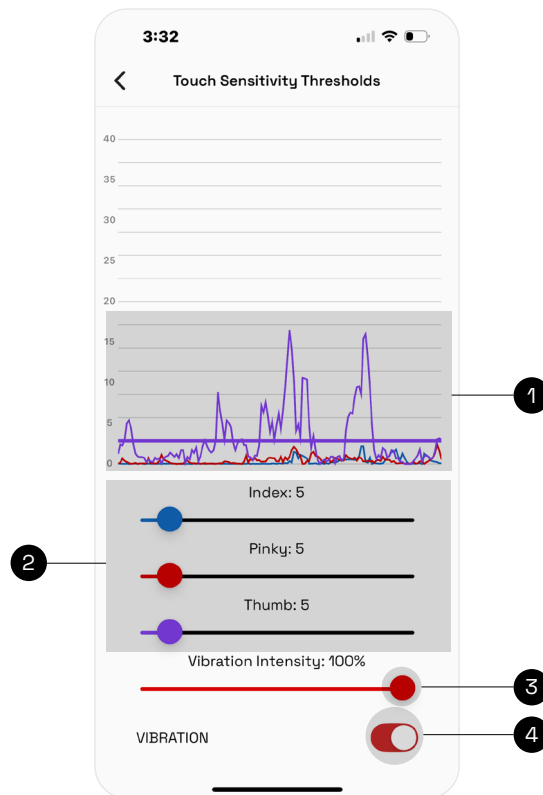
2

Here there is a toggle for the “Linear Transducer Lock”. This lock makes it so that after a few seconds with a prolonged open or closed input, the hand is locked in its current grip.

3

The user can also toggle on or off “Flip Channels” if the hand is opening when attempting to close and vice versa.

8. Touch Sensing



The Touch Sensing page is used to display the magnitude of feedback coming from the touch sensors on the fingers. The pinky, index, and thumb are sensorized.

1

The blue signal is the index, red is the pinky and purple is the thumb.

2

The sliders on the bottom half of the page can be moved to change the threshold that the touch sensing the touch sensing signal must pass to trigger vibration. The further the signal goes above the threshold, the greater magnitude of vibration from the red vibration motor.

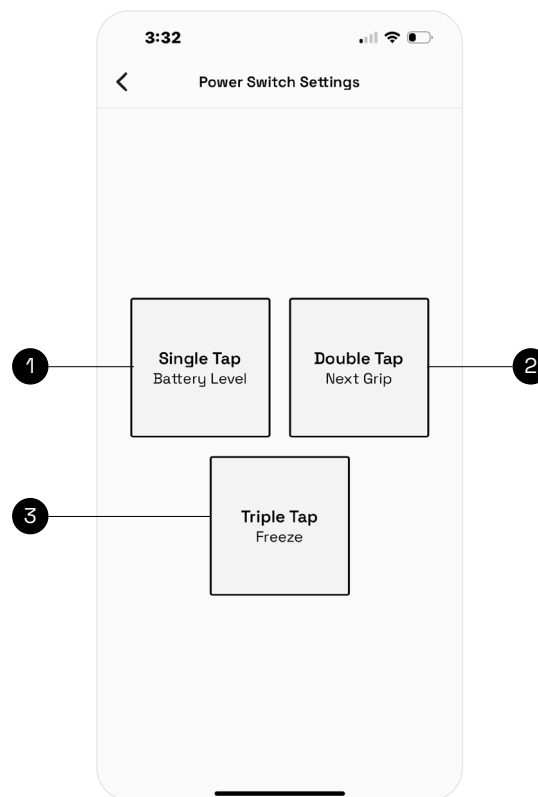
3

The “Vibration Intensity” slider can be changed to decrease or increase the magnitude of the vibration.

4

The vibration motor can also be turned off using the toggle at the bottom of the page (red means on, white means off).

8. Power Switch



The Power Switch Settings page is used to re-route the command from a single, double, or triple tap of the button on the PSYONIC Power Switch.

The Power Switch's default settings are:

1

The single tap = battery level. Battery level will fade out red (meaning low battery), orange/yellow (meaning medium battery), and green (meaning high battery).

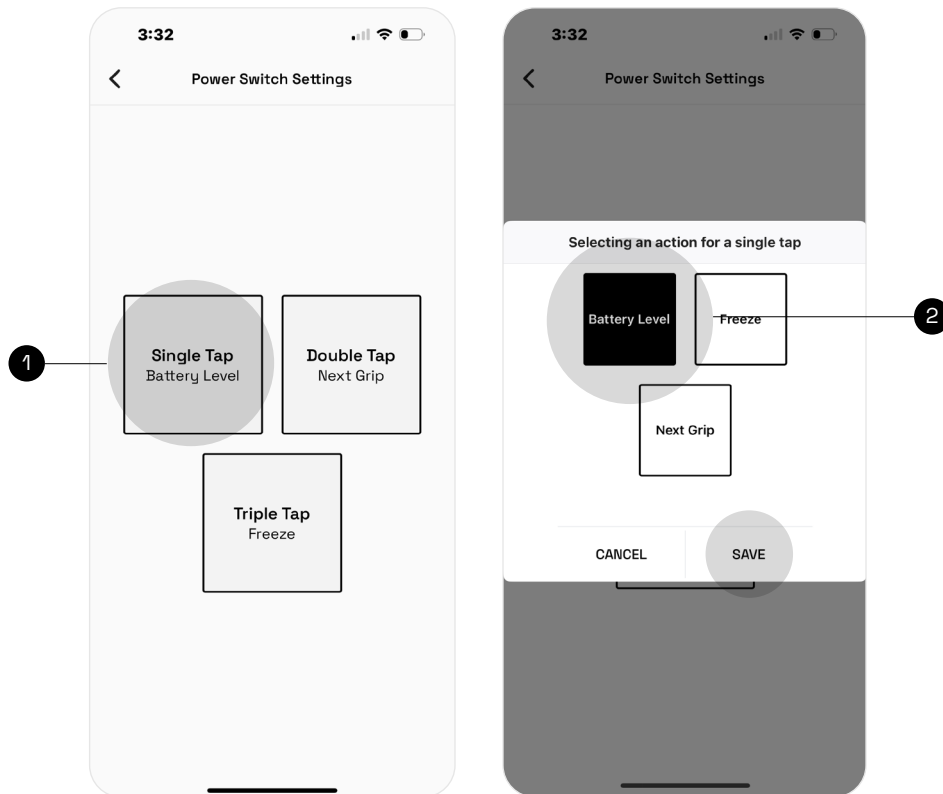
2

The double tap = next grip. By double tapping the button, you can switch to the next grip in your cycle

3

The triple tap (or more than 3 taps) = freeze. Freeze correlates to a flashing light on the Power Switch and causes the hand to be frozen in a grip where no signals can change its position. To turn off freeze, the user must triple tap the button again.

8. Power Switch



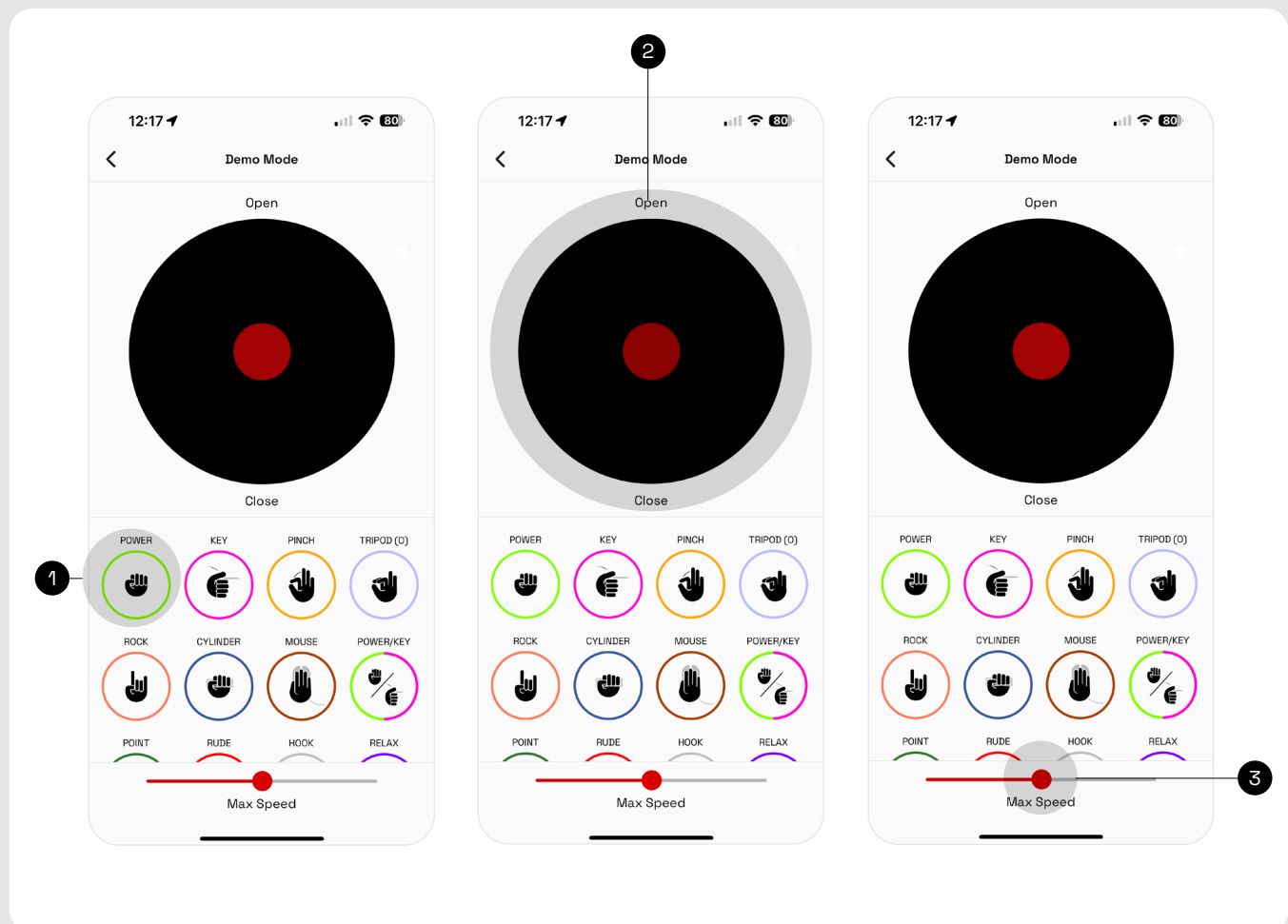
1 The user can modify the configuration of the number of taps associated with each action. To change the configuration, the user can click on the number of taps desired to be modified. A menu will appear.

2 The user can then choose the action to be associated with the selected number of taps and click "SAVE".

Note:

- When using a wrist rotator, the user may still be able to move the wrist even when the hand is frozen.
- Tapping the button must be done quickly. In order to trigger a double or triple tap, do not let go of the button in between taps. The user must place their finger on the button and rapidly press the button.

8. Demo Mode



1

The Demo Mode page can be used when demonstrating individual grips. Similar to the **My Grips** page, when a grip is tapped on, the hand moves to the closed position of that specific grip.

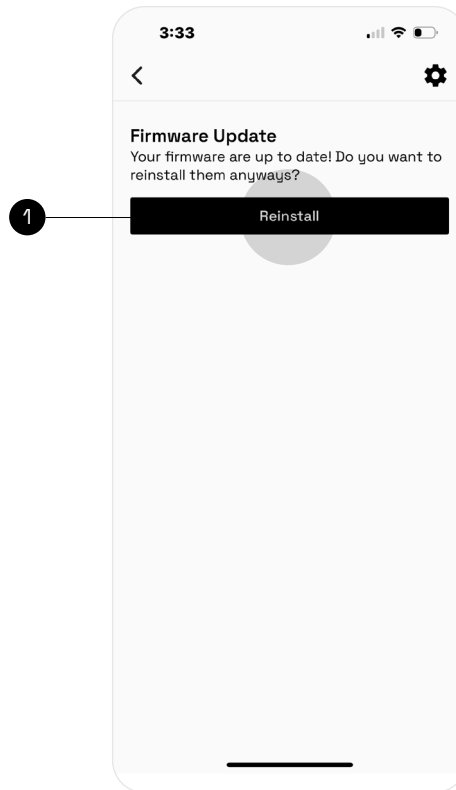
2

By dragging the joystick (red circle in the center of the black circle; acts like a joystick) up and down the user can open and close the grip, respectively.

3

On this page the user can also adjust the “max speed” of the hand during the demo with the red slider and turn off and on vibration from touch sensing with the toggle at the bottom of the page.

8. Firmware Update



The Software Update page is where the user goes to update the hand. The page displays the “Hand Board Version”, “Motor Board Version”, and the “IO Board Version”.

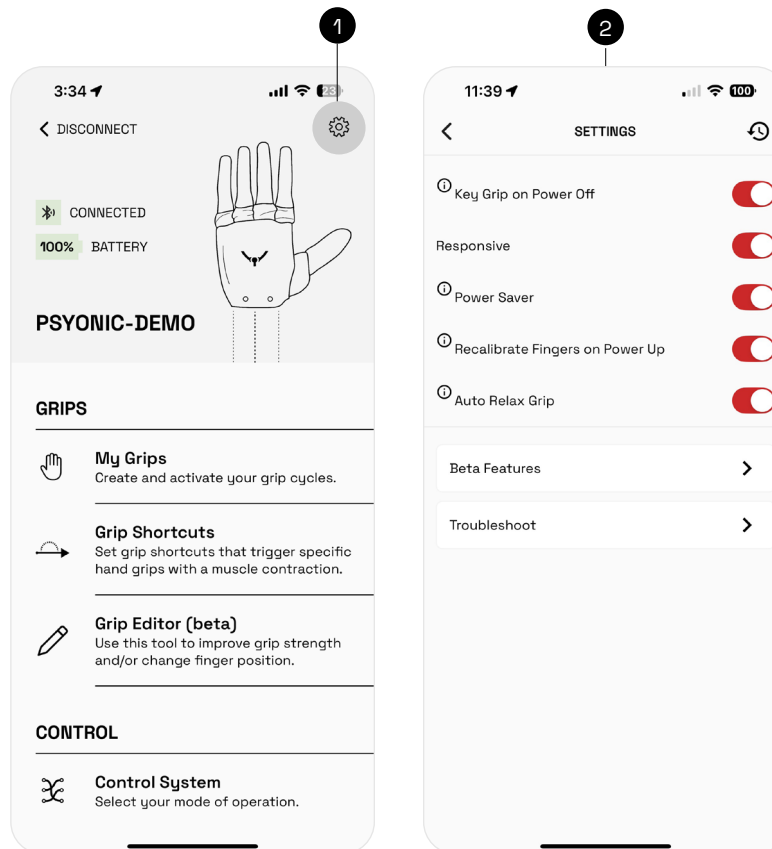
1

To begin updating the hand press “Check for PSYONIC Ability Hand Updates” (the “!” will be present if there is a new update to the hand).

2

The screen will state “Your hand is up to date!” if the hand does not need an update. If the hand needs to update, the screen will ask “Update PSYONIC Ability Hand?” Press “yes” to update the hand and “no” to not update the hand. The hand will play a tune when updating, then all of the fingers will move. To ensure a successful update, turn off and on the hand.

6. Settings



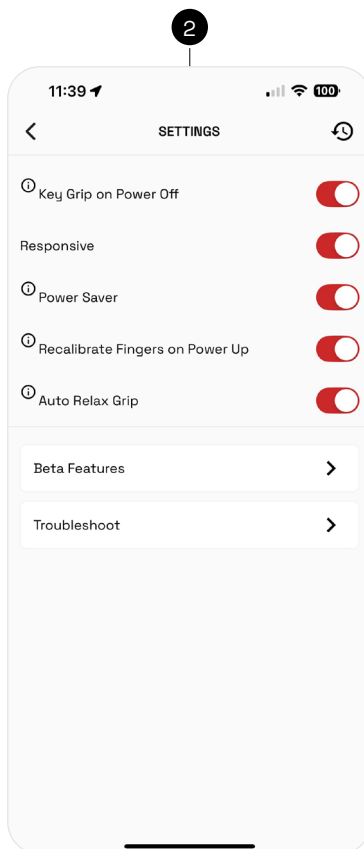
1 The setting page can be found after tapping the black gear icon in the top right of the main menu page.

2 The items on the Settings page are explained here:

Key grip on Power Off = This feature makes the hand close into a Key grip when the hand is powered off.

First Over Control = This feature makes the hand respond per the stronger signal if a co-contraction occurs.

6. Settings



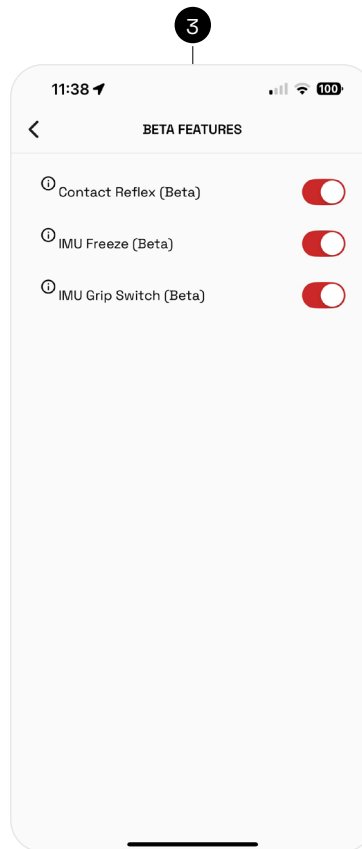
Power Saver = This feature makes the hand operate slower to save battery life.

Recalibrate Fingers on Power Up = This feature makes the hand recalibrate fingers when powering on the hand.

Relax Grip for 3 Seconds After Hand Open = This feature makes the hand go into the Relax grip after being idled for 3 seconds when fully opened.

*By default, only First Over Control is toggled on (green).

6. Settings



BETA | Contact Reflex = This allows the user to have more control when squeezing around an object to prevent inadvertent crushing of a delicate object. The hand will sense an object from the pressure sensors in the fingertips and stop closing, even if the user fires a close signal.

3

BETA | IMU (Inertial Measurement Unit) Freeze = By physically tapping on the hand the set number of times the Power Switch has been configured to for Freeze mode, the hand will go into Freeze mode. By default, this is set to 3 taps.

BETA | IMU Grip Switch = By physically tapping on the hand the set number of times the Power Switch has been configured to for Next Grip, the hand will

7. Additional Information

Please contact sales@psyonic.io or 773-888-3257 for any questions regarding app setup or app usage.

We deploy app updates often to ensure that the Ability Hand has its maximum capabilities. Please update your PSYONIC Ability Hand app whenever prompted by the app or play store (iPhone and Android respectively).