



# i-limb™ ultra revolution Clinician Manual



# i-limb<sup>tm</sup> ultra

revolution

This document provides instruction for prosthetists in the fitting and servicing of the i-limb ultra revolution and should be read in full prior to fitting. It is highly recommended that the use of this manual is made in conjunction with instruction from a clinician experienced in upper limb and myoelectric prostheses.



This symbol signifies important information and is used throughout the manual.

Refer to [www.touchbionics.com/downloads/document-library](http://www.touchbionics.com/downloads/document-library) to ensure you have the latest copy of this document.

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# 1.0 i-limb ultra revolution

## 1.1 Product Description

The i-limb ultra revolution is an externally powered, multi-articulating prosthetic hand which offers a range of features beyond the functions of the traditional prosthetic hand.

Individually motorized digits and thumb, stall detection and the unique biosim software used to control the i-limb ultra revolution result in one of the most versatile prosthetic hands currently available to the global market.

Users can choose from a wide selection of automated grips and gestures to help complete daily tasks. Grips and gestures can then be customized further for precise control.

The i-limb ultra revolution offers compliant grip through individually powered digits with stall out ability. A powered rotating thumb in conjunction with a pulsing, enhanced grip (vari-grip), an anti-drop safety feature (auto-grasp) and the wide range of automated grip patterns lead to broad functionality.



## 1.2 Intended Use

The i-limb ultra revolution is intended to be used by patients with upper limb loss or deficiency

## 1.3 Prosthesis Overview

The hand serial number is positioned proximal to the base of the thumb on the connection plate. The serial number should start with a "R" and be followed by four numbers.

For users with flexion wrist, hand serial number will be located at the base of the thumb.





## 2.0 Socket

### 2.1 Control Sites

One option for control of the i-limb ultra revolution is electrodes.

There are two electrode options available for use with the i-limb ultra revolution, compact electrodes (fig. 1) or remote electrodes (fig. 2). For information regarding the fitting of the Touch Bionics Electrode, review the manual provided with the electrode.

### Electrode Site Selection

The use of virtu-limb, the Touch Bionics' myotesting system, is recommended to determine the optimal placement of electrodes (fig. 3).



Do not rely on previous myoelectrical testing.

Consult Touch Bionics training materials for information on myotesting or download information on myotesting within the software or mobile apps manuals at [www.touchbionics.com/downloads/document-library](http://www.touchbionics.com/downloads/document-library).



Use anatomical sites where the electrode will maintain constant, even contact with the skin. Avoid placing electrodes near socket interface trim lines, bony areas, skin grafts or fatty tissue.

Figure 1. Electrode Options

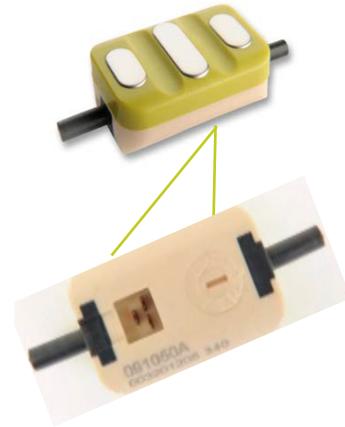
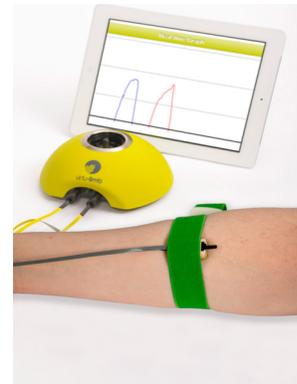


Figure 2. Remote Electrode



Figure 3. virtu-limb



## 2.2 Socket Fabrication

While fabricating the socket for the i-limb ultra revolution, special considerations will need to be given to:

1. Battery placement, size and configuration
2. Electrode position or other control method
3. Charge port placement
4. Socket length and the overall length of the prosthesis in comparison to the opposite side.

Clinicians should have prior experience with building externally powered prosthetic sockets before fitting the i-limb ultra revolution.

Touch Bionics' batteries, charger port and switch block components should always be used with the i-limb ultra revolution.



Prosthetist must ensure that the plastic screw provided is utilized and properly tightened on the coaxial plug (fig.4) where the battery and electrodes connect, to prevent loose connections.



We recommend that a rubber grommet or plastic cap is placed over any socket holes to protect the integrity of the electrode



During socket maintenance, ensure a check of the battery connector/co-axial plug interface is carried out

### Socket Material



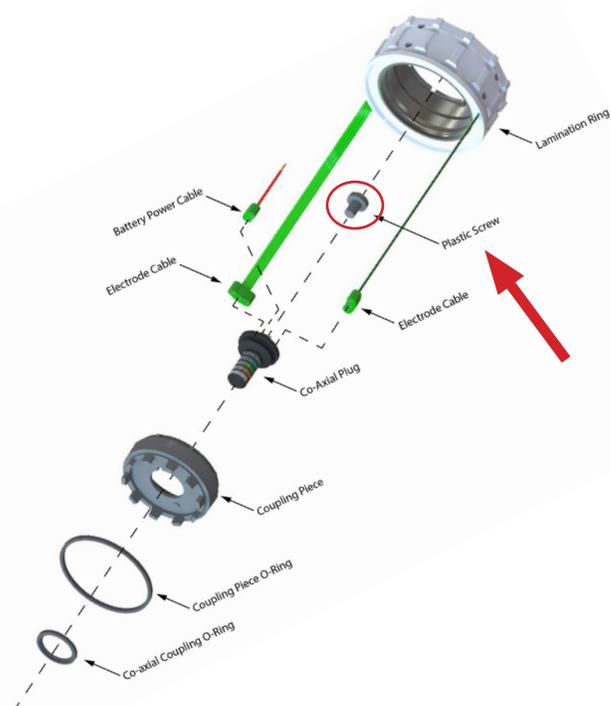
The use of Carbon fiber is not recommended due to electrical conductivity, if it is required to improve strength then the carbon fiber lamination must be grounded, if used directly adjacent to electrodes (see Page 6). Please contact Touch Bionics to order modified electrodes.

During socket fabrication, appropriate measures must be taken to prevent sweat entering into the battery connector within the lamination ring, which may result in a short circuit and compromise use of the device. Conventional sweat prevention methods include the use of drain holes and suction sealing electrodes. Alternatively, silicone may be used to seal the interface area between the battery connector and co-axial plug into the prosthetic socket

### Coupling Piece Assembly for QWD Wrist

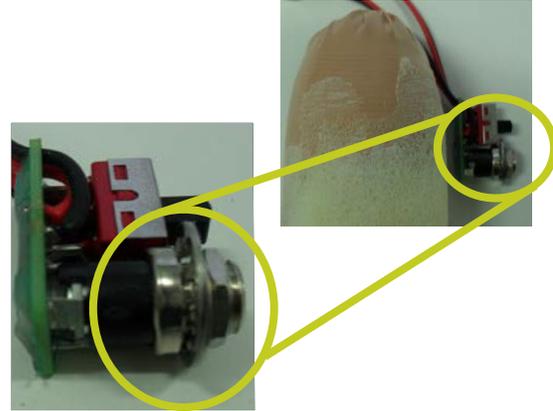
Insert the castellation ring (coupling piece) into the lamination ring and turn until seated. Insert retaining ring around the outside edge of the coupling piece and use QWD release tool to seat the retaining ring. The QWD release tool is available to order from Touch Bionics.

Figure 4. Coaxial Plug



## 2.3 Charge Port Placement Assembly

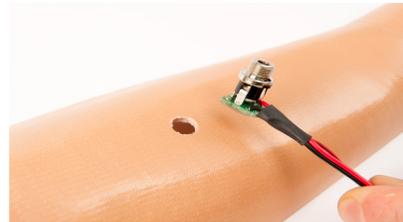
It is important to provide sufficient space for the charge port between the inner and outer sockets. The charge port should be positioned so that it is unaffected by forces running through the socket to prevent damage.



Create a drill hole of 8.0mm through the inner surface of the prosthetic frame. Ensure a flat surface has been created to accommodate the charge port mounting frame (if installing a switch block as an alternative to the charger port, create a drill hole to cater for the panel mount).



Smooth the edges of the drill hole and insert the threaded charge port. A minimum thread height of 3.2mm above the socket surface is required for full engagement of washers and locking nut.



Position the M8 Lock Washer and the M8 Flat Washer before hand tightening the the locking nut.



Use a 3/8" wrench to tighten the locking nut. Do not overtighten.



Do not use pliers on the charge port.



Position the M8 Lock Washer and M8 Flat Washer in place over the threaded shaft of the charger port. Engage the M8 locking nut with the threaded shaft and tighten firmly by hand.



The use of both the Lock Washer and Flat Washer is vital to ensure the charge port is not damaged by over tightening.



Do not overtighten!

## 2.4 Battery Options

Two battery options are available for the i-limb ultra revolution, both of which have been specifically designed to meet the power requirements of the hand. Battery selection should be based on available space within the socket fabrication, shape of the residual limb and the expected level of use. The corresponding DC socket and switch block will also be required.

		i-limb 1,300 mAh Battery	i-limb 2,000 mAh Battery
Capacity		1,300 mAh	2,000 mAh
Battery Dimensions	Length	70mm (2.76")	80mm (3.17")
	Width	35mm (1.39")	44mm (1.74")
	Height	6mm (0.24")	7.5mm (0.30")
Dummy Battery Dimensions	Length	69mm (2.77")	87mm (3.48")
	Width	35mm (1.39")	45mm (1.80")
	Height	10mm (0.39") Single cell 16mm (0.63") Dual cell	11mm (0.44") Single cell 19mm (0.76") Dual cell
Application		Moderate Use	Heavy Use

## 2.5 Battery Configuration

The images opposite show the 1,300 and 2,000mAh battery options with battery dummy. The battery with DC connector and battery with switch block connector are shown.



Only Touch Bionics batteries are approved for use with the i-limb ultra revolution. Use of alternative batteries will invalidate the warranty and compromise general safety of the device.

## 2.6 Battery Installation

The battery is designed to be mounted inside the socket interface. Ensure there is adequate space between the residual limb and the wrist (or elbow) to accommodate the battery, charger port and any other componentry. Use the battery dummy to fabricate a relief for the battery in the socket interface.

When planning battery location and dummy placement for fabrication, keep in mind a maximum distance of 135mm is possible between cells due to wire length.

Easier access to the on/off switch may be possible by installing a switch block; this allows the on/off switch to be positioned in a more proximal position on the forearm. The use of a switch block also provides an additional accessory switch for temporarily disabling an electric wrist rotator or other electrical device, when needed.

### Installing i-limb Power Pack

Utilize battery dummies on top and bottom of socket to create necessary space to accommodate battery housing.

Use standard fabrication processes and technique to create an opening in the socket to accommodate battery housing.

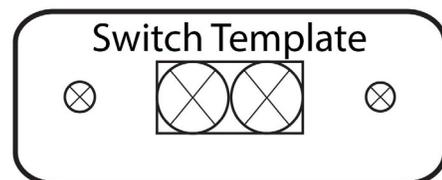
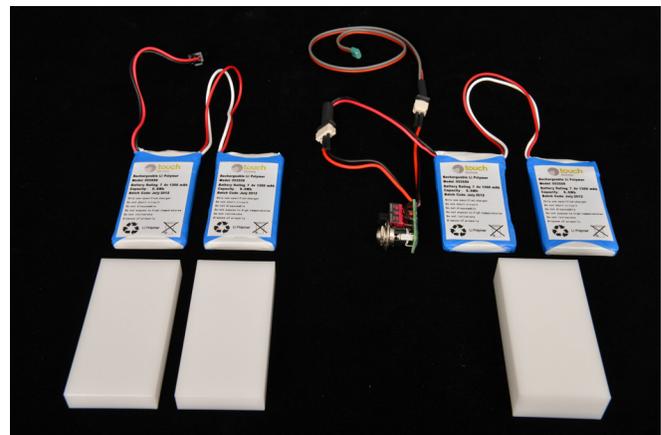
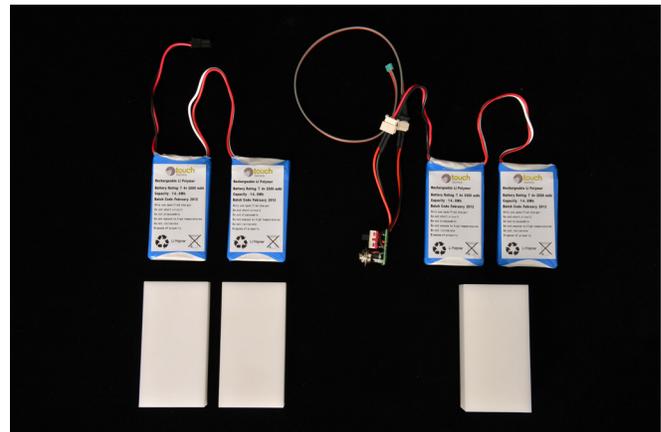
When using a switch block, it is recommended that you use the provided Switch Template to guide drill holes.



Ensure there is no contact between the battery housing and inner socket

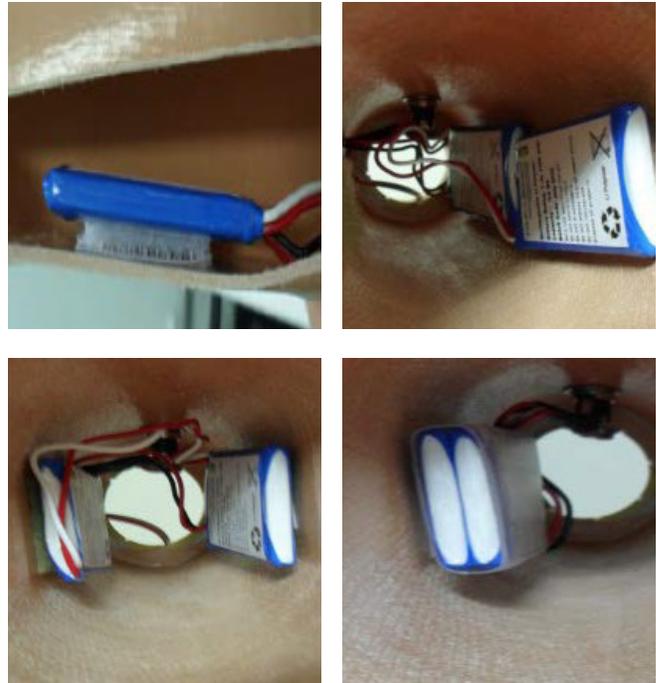
DC Connector

Switch Block Connector



## Battery Placement

Use Velcro™ to position the batteries on the pre-prepared flat surfaces to prevent distortion.



## Battery Placement for a Long Residual Limb

Consideration of battery placement is particularly important in longer sockets. The shape of the inner socket must also be considered.

If the residual limb is long, wrist disarticulation or bulbous, the position of the battery dummies and charge port are best placed midway up the arm along the inner socket ensuring they will not impact the ability to don/doff the prosthesis and that the position will not result in pressure from the residual limb that could distort the battery.

Placement of batteries should allow for removal of the inner socket.

If the socket has a bulbous distal end, do not position batteries or charger port around the narrow region of the prosthesis.



When the switch block is used in combination with a wrist rotator the switch block will simultaneously turn off the i-limb ultra revolution and the electronic wrist rotator.

 Do not apply excessive force to the charger socket interface during assembly.

A minimum of 2mm of free space should be provided around the charger port or switch block.

A flat surface is needed to secure the charger port or switch block to the socket interface frame. This may require additional shaping of the frame section above the dummy battery. Use the Velcro® strip supplied to attach the battery to the inside of the socket interface.

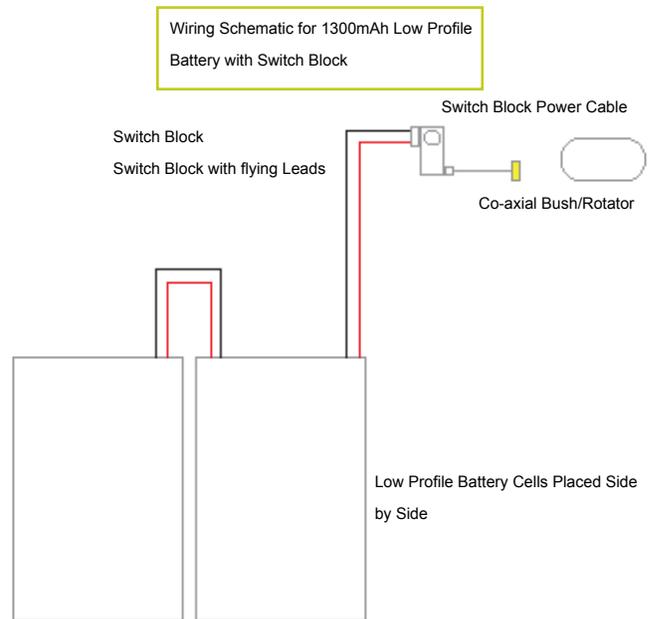
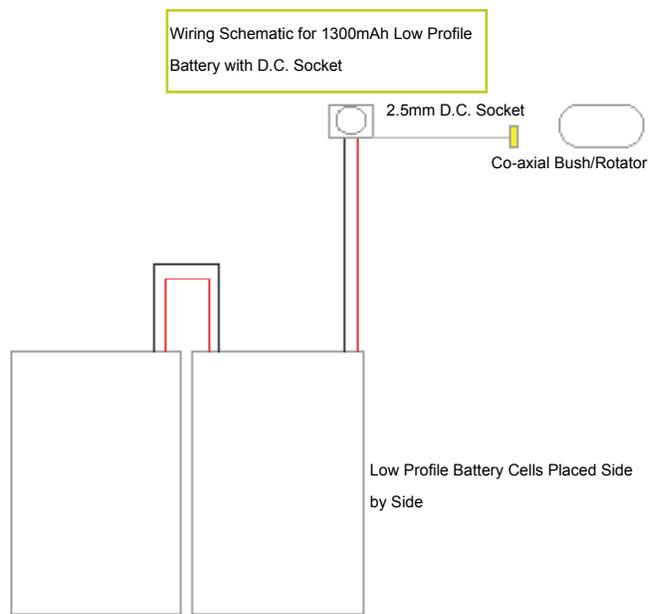
If the area between the residual limb and the lamination ring is insufficient to house the battery, you will need to position the battery between the socket interface and the frame. This will be necessary when:

- the residual limb is longer than 60% of the humeral or forearm section of the prosthesis
- the residual limb is a wrist or elbow disarticulation
- the battery is too large for the space available in the socket interface frame

 Cutting or modifying the battery wires in any way will invalidate the warranty and compromise device safety.

 Do not bend or shape the battery in any way.

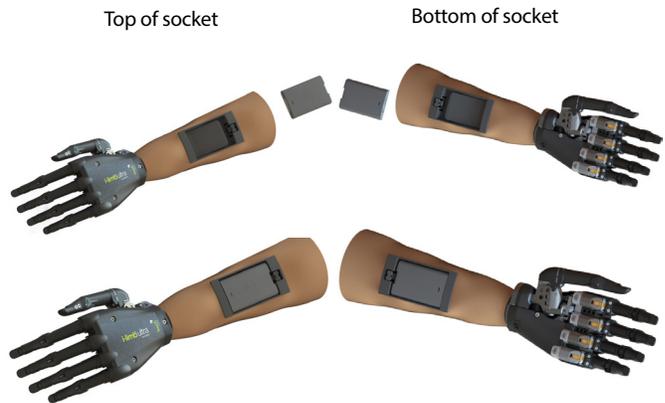
 Ensure the battery is not subject to continued pressure once fitted.



## 2.7 i-limb Power Pack

i-limb Power Pack (ordered separately) are for users who want the ability to easily replace batteries.

Battery housing is fabricated on top and bottom of socket, allowing for easy access.



### i-limb Power Pack kit

i-limb Power Pack includes the following items:

- 1 dual battery housing unit (fig. 5).
- 4 Removable 800 mAh batteries (fig. 6) with low battery LED indicator. Battery LED will glow RED when batteries are below 10% charge.
- 2 Battery housing dummies (fig. 7).
- Dual battery charger base unit (fig. 8).
- Wall charging unit (fig. 9).
- Switch Assembly. Switch Block is typically used in conjunction with a wrist rotator or for patients who would like a power off control on the socket) (fig. 10).
- Switch template Switch Assembly (if Switch Assembly is ordered) (fig. 11). This template is to be applied to the desired position on the socket to help guide drill holes.
- 2 Battery Pull cords (fig. 12). Beneficial for bi-lateral patients, the battery pull cord provides a simple solution for removing the battery in your socket.
- Country specific charger plugs.
- Car charger.

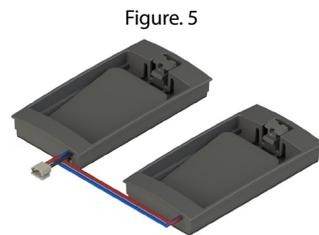


Figure. 5



Figure. 6

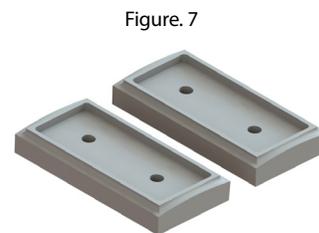


Figure. 7



Figure. 8

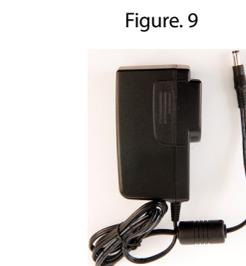


Figure. 9

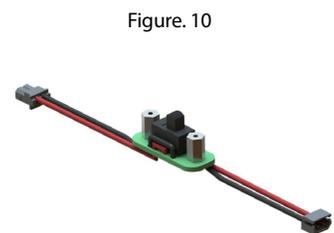


Figure. 10

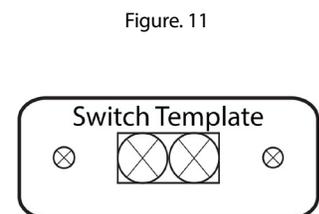


Figure. 11



Figure. 12

## 2.8 Battery Charging

Please review the below Instructions for proper internal battery charging.



Only use supplied Touch Bionics charger to charge battery. Depending on your location, you will receive one of the below chargers (fig. 14, or fig. 15)

The patient will need to remove the socket from their arm and turn the i-limb device off. The on/off switch is pictured in fig 13. i-limb device is off when switch is in left position.

Insert the charger (fig. 14 or fig. 15) into the power outlet. The charger will need to be inserted into the power outlet prior to connecting to the charge port. To charge, insert the charger lead connector into the charge port. A “click” should be heard on connection. If the green light is on when you first plug in the device, ensure the switch block is off.

Charging time is approximately:

1,300 mAh battery- 90 minutes

2,000 mAh battery- 180 minutes

The light display for fig. 14 is:

- Solid Red – charging
- Solid Green – fully charged or idle
- Continuous flashing red – fault condition
- Rapid flashing amber – Threshold state between charging and fully charged ( should only last for 1-2 seconds)
- Continuous flashing red or green – Connection Error. Remove charger lead connector from the charge port. Ensure charger is plugged in and switched on at the mains. Re-insert the charger lead connector into the charge port.

The light display for fig. 15 is:

- Solid Amber – on standby
- Slow flashing amber – pre-charge mode
- Rapid flashing amber – Error
- Slow flashing green – maintenance charge
- Rapid flashing green – rapid charge
- Solid green – fully charged

To remove the charger lead connector from the i-limb ultra revolution, grip the connector and pull directly away from the port. Consult Warnings and Precautions for additional information.

If the patient intends to travel outside of their home country, they will need to ensure they have a Touch Bionics charger that will work in the country to which they are traveling. Additional chargers are available from Touch Bionics.

As an alternative to your patients charging directly from domestic power, a car charger (fig. 16) is provided with the i-limb ultra revolution.



To ensure the i-limb ultra revolution is continually functional, charge at the end of each day.



Replace the battery annually for optimal performance.



Do not pull cable to remove the lead.



Switch the hand OFF to preserve battery power when not in use.

Figure 13



On/Off Switch

Figure 14



Figure 15



Figure 16



## i-limb Power Pack Charger

i-limb Power Pack batteries for i-limb ultra revolution should only be charged using the Touch Bionics battery charger (fig. 17) supplied. Place the batteries in the charger as illustrated. Insert the charger lead from the battery powerpack into the charge port. Insert the charger into the power outlet.

Charging time from full discharge is approximately 2 hours.

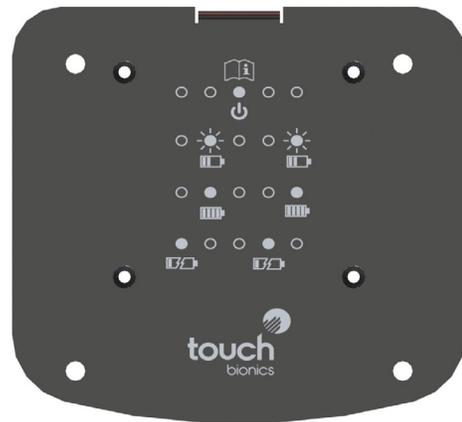
Figure. 17



On the base plate of the charger (fig. 18) you will see the various light sequences:

- Middle light on: Charger is plugged in
- 2nd and 5th lights blinking Green: Batteries are charging
- 2nd and 5th lights solid Green: Batteries are charged
- 1st and 4th Red lights on: Battery fault, unplug and try again. If lights continue to illuminate, contact Touch Bionics Customer Support.

Figure. 18



Only use the plug to disconnect the charger, never pull the cable to remove the lead.

## 3.0 Wrist

### 3.1 Wrist Connection Options

The following wrist connection options are available for the i-limb ultra revolution:

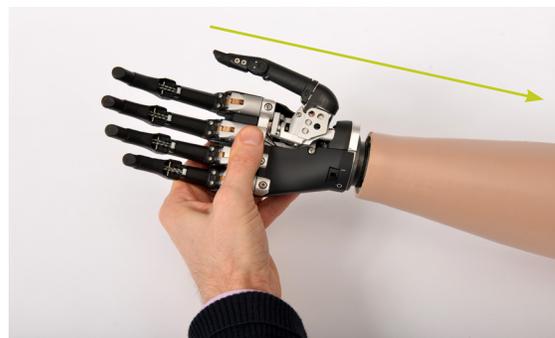
- 1 Quick Wrist Disconnect (QWD)
- 2 Wrist Disarticulation
- 3 flexion wrist

### 3.2 Quick Wrist Disconnect (QWD)

The QWD is supplied by Touch Bionics.

#### Connecting the i-limb ultra revolution using the QWD

- 1 Ensure the i-limb ultra revolution is switched off.
- 2 Align the QWD connection of the i-limb ultra revolution with the connection in the forearm socket.



- 3 Engage the coupling by pushing hand into the prosthesis.



- 4 Test the connection is fully engaged with a slight rotation.



### Disconnecting the i-limb ultra revolution using the QWD

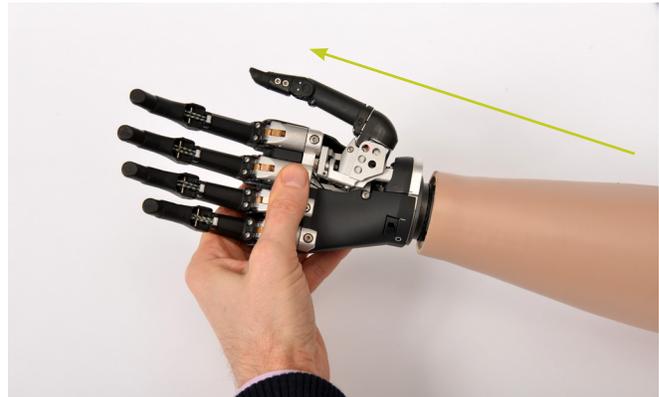
- 1 Ensure the i-limb ultra revolution is switched off.
- 2 Support the i-limb ultra revolution in the palm of the hand.



- 3 Rotate the i-limb ultra revolution through 360° in either direction until a click is heard



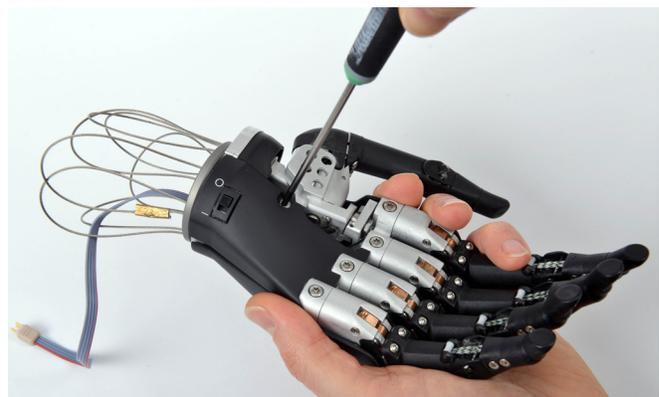
- 4 The i-limb ultra revolution will now disengage from the socket. Support the hand and withdraw away from the socket



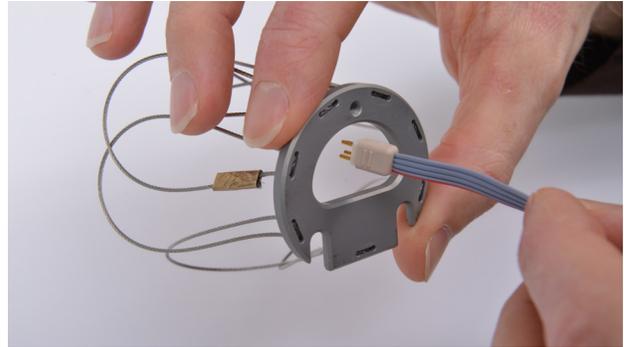
### 3.3 Wrist Disarticulation

The wrist disarticulation is fabricated directly into the socket frame and then attached to the i-limb ultra revolution by the following steps:

- 1 Disconnect the Palm Fairing from the i-limb ultra revolution chassis by unscrewing the screw in the palmar surface using a T10 Screwdriver (available for order).



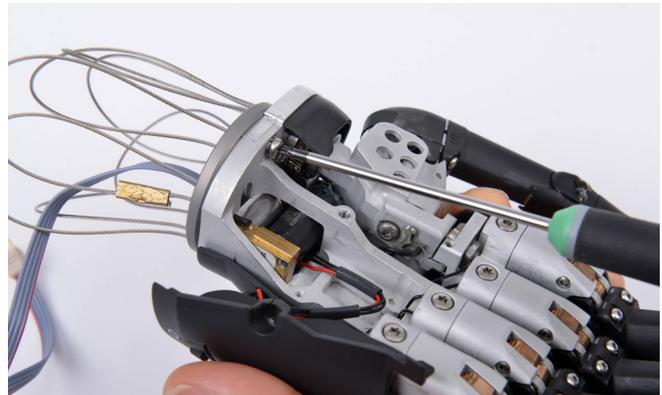
- 2 Remove the Wrist Disarticulation and feed the power cable through.



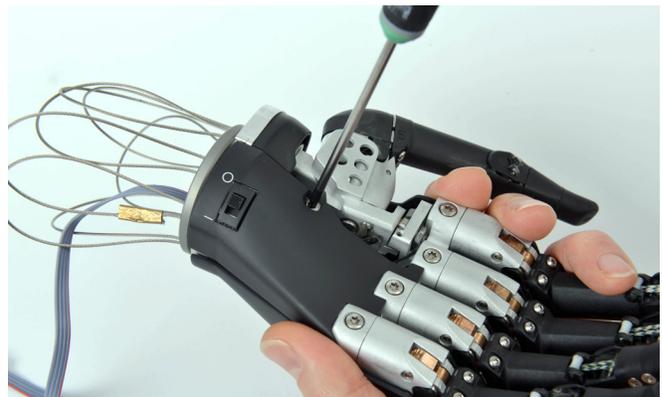
- 3 Align the slots and slide the Wrist Disarticulation plate onto the WD Lamination Plate at base of the i-limb ultra revolution ensuring it is firmly engaged.



- 4 Secure the Wrist Disarticulation plate to the WD Lamination Plate using a T10 screw and a T10 Screwdriver.



- 5 Replace the Palm Fairing onto the chassis by hand tightening the screw in the palmar surface using a T10 Screwdriver. Ensure that the Palm Fairing does not pinch the wiring.



- 6 Fabrication of the Wrist Disarticulation into the socket must allow for disengagement of the hand from the Wrist Disarticulation plate. Otherwise complete fabrication of the Wrist Disarticulation into the socket in the usual manner.

To disconnect the Wrist Disarticulation from the i-limb ultra revolution complete the above steps in reverse:

- 1 Disconnect the Palm Fairing from the Chassis. Be careful to not damage wiring when removing the Palm Fairing.
- 2 Loosen the WD Lamination Plate Screw from the Wrist Disarticulation plate.
- 3 Slide the Wrist Disarticulation off the base of the i-limb ultra revolution.
- 4 Separate the i-limb ultra revolution from the Wrist Disarticulation, drawing the Basket cable through the Wrist Disarticulation.

For guidance on fabrication consult section 2.2 Socket Fabrication.

### 3.4 flexion wrist

The flexion wrist is connected directly to a QWD and can be used in either passive or locked mode.

Passive mode allows spring-loaded flexion range of 40° to -40°. flexion wrist can be locked into 40°, 20°, 0°, -20° and -40° positions. The magnetic control switch for locking is located on the medial/lateral portion of the wrist. Refer to flexion wrist data sheet for more information on the Touch Bionics website: [www.touchbionics.com/downloads/document-library/](http://www.touchbionics.com/downloads/document-library/).

Note: When unlocking you must disengage the spring by putting pressure against the i-limb device in the direction the hand was locked.



# 4.0 Adjustments

## 4.1 Digit Configuration

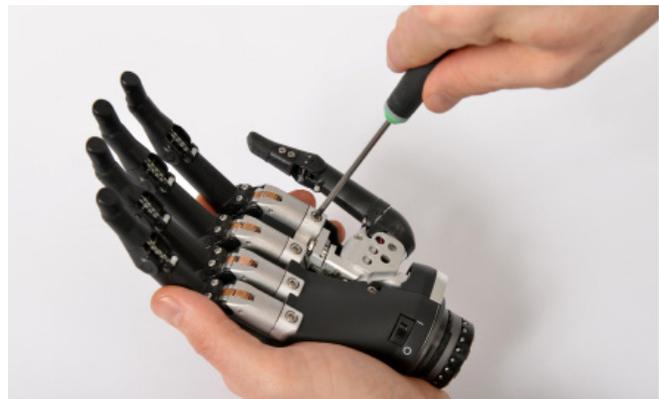
Individual digits for the i-limb ultra revolution are manufactured as sizes 2, 3, 5 and 6. Sizes 2 and 3 contain a small motor, while sizes 5 and 6 contain a larger motor. The standard digit configuration of the small and medium sized i-limb ultra revolution is outlined in the table.

Digit	i-limb ultra revolution size	
	Small	Medium
Thumb	5	6
Index	5	6
Middle	5	6
Ring	3	5
Little	2	2

## 4.2 Digit Installation

The i-limb ultra revolution is only compatible with Touch Bionics i-limb ultra revolution digits. To install a digit, ensure that the correct digit size is selected. Remove the digit by the following steps:

- 1 Ensure the i-limb ultra revolution is switched off.
- 2 Support the i-limb ultra revolution in the palm of the hand with the digits in the fully open position. Insert the T10 Screwdriver in the screw of the Knuckle block (available for order).
- 3 Loosen the Knuckle block screw while supporting the digit and remove the digit.
- 4 Select the appropriate sized replacement digit and follow the steps in reverse order to replace.





It is recommended that you discard the used screws as the anti-vibration pad on the screw shaft will be deformed during use. Digit screws should be replaced using the new screws provided.



Do not over tighten screws.



If there is resistance while tightening the screw check for cross threading by removing and re-inserting the screw.

### 4.3 Thumb Installation

The i-limb ultra revolution is only compatible with a Touch Bionics' i-limb ultra revolution thumb. To exchange a thumb ensure the correct size has been selected.

Instruments required: T10 Screwdriver (available for order).



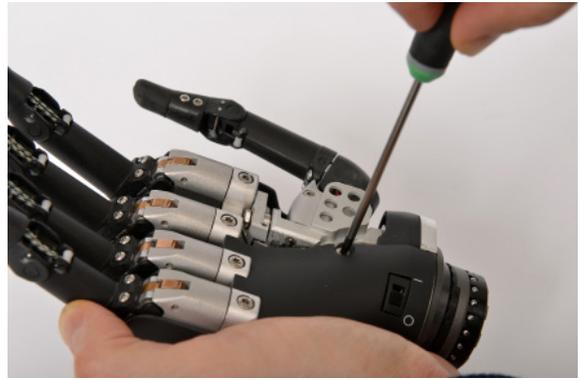
- 1 Support the i-limb ultra revolution.



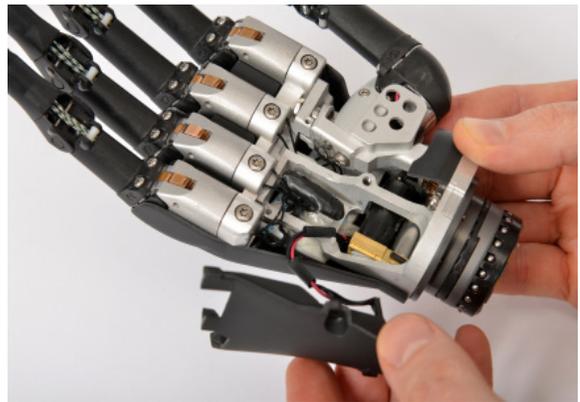
- 2 Fully abduct the rotating thumb.



- 3 Disconnect the palmar fairing using a T10 screwdriver to loosen the palmar T10 screw.



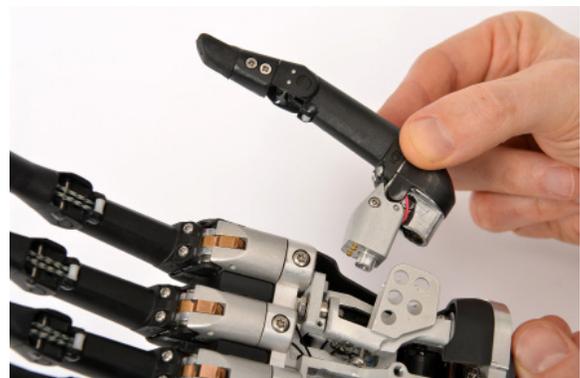
- 4 Gently move the palmar fairing to the ulnar side to allow access to the exposed T10 screw at the base of the thumb.



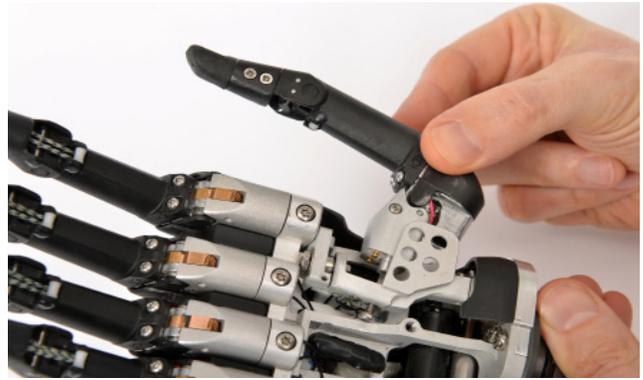
- 5 Using a T10 Screwdriver access the screw from the medial to lateral direction to loosen.



- 6 The thumb is now easily removed from the knuckle block.



- 7 Position the replacement thumb in the knuckle block and follow the above steps in the reverse order to reconstruct the hand. When replacing the palmar fairing, ensure wires are not pinched between the palmar fairing and the chassis.



It is recommended that you discard the used screws as the anti-vibration pad on the screw shaft will be deformed during use. Digit screws should be replaced using the new screws provided.



Do not over tighten screws.



Do not re-use screws.



If there is resistance while tightening the screw check for cross threading by removing and re-inserting the screw.



Touch Bionics recommends T10 Screwdriver for use with all T10 screws in the i-limb ultra revolution.

# 5.0 Covers

## 5.1 Cover Options

Coverings are an important part of the appearance and durability of upper limb prostheses. The Touch Bionics i-limb products are the first prosthetic hands and fingers to imitate the individual digit articulation of the human hand, and we provide flexible coverings which enable that articulation. Our covering solutions include:

### i-limb skin active:

For users who prefer the robotic nature of the uncovered i-limb prosthesis, i-limb skin active is a thin layer of semi transparent or black material that has been designed to conform to every contour of the hand.



### i-limb skin active TS:

In addition to all the benefits of the i-limb skin active, the i-limb skin active TS allows users to use touchscreen devices such as smartphones or tablets with compatible i-limb prostheses.



### i-limb skin natural:

Providing the user a lifelike silicone covering, i-limb skin natural is available with 18 different skin shades.

Benefits include:

- Don or doff in under a minute without the assistance of a clinician
- Improved design optimizes hand power and precision pinch mode



### i-limb skin match:

For the most realistic covering option possible, this is a fully customized silicone covering that exactly matches the user's skin tone and features.



The cover of the i-limb ultra revolution is very important. The i-limb ultra revolution should not be used without an approved cover that is well maintained.

Please consult the Coverings Care Guide for donning and doffing instructions as well as tips on wear and care. Coverings Care Guide is available online at [www.touchbionics.com/downloads/document-library](http://www.touchbionics.com/downloads/document-library).

Please contact your clinician for ordering information.

# 6.0 Grip Review

The i-limb ultra revolution has 24 different Quick Grip options available. These Quick Grips can be accessed through biosim-pro and the biosim app. The following features catalogue will review the various available Quick Grips and provide a functional description of each.

For more information about biosim-pro or the biosim app, please consult their respective manuals at [www.touchbionics.com/downloads/document-library](http://www.touchbionics.com/downloads/document-library).

## 6.1 Features Catalogue

### Precision Pinch Grip Options

#### Standard Precision Pinch Opened

middle, ring and little finger remain fully opened and switch off. Index finger and thumb provide grip.



#### Standard Precision Pinch Closed

middle, ring and little finger automatically close and switch off. Index finger and thumb provide grip.



#### Thumb Precision Pinch Opened

middle, ring and little finger remain fully opened and switch off. Thumb automatically moves to a partially closed position. Index finger will move to provide grip against a fixed thumb.



#### Thumb Precision Pinch Closed

middle, ring and little finger automatically close and switch off. Thumb automatically moves to a partially closed position. Index finger will move to provide grip against a fixed thumb.



### Tripod Grip Options

#### Standard 3 Jaw Chuck (Tripod) Opened

ring and little finger remain fully opened and switch off. Thumb, index and middle fingers move to provide grip.



#### Standard 3 Jaw Chuck (Tripod) Closed

ring and little finger move to terminal close. Thumb, index and middle fingers move to provide grip.



#### Thumb 3 Jaw Chuck (Tripod) Opened

ring and little finger remain fully opened and switch off. Thumb automatically moves to a partially closed position. Index and middle fingers move to provide grip against a fixed thumb.



#### Thumb 3 Jaw Chuck (Tripod) Closed

ring and little finger move to terminal close. Thumb automatically moves to a partially closed position. Index and middle fingers move to provide grip against a fixed thumb.



## Additional Grip and Gesture Options

### Thumb Park Continuous

all four fingers remain open and switch off, only the thumb will move.



### Thumb Park Quick

all four fingers remain open and switch off, for 1.5 seconds the thumb will close and then automatically return to an open position.



### Lateral Grip

all four fingers fully close and switch off. only thumb will move.



### Index Point

thumb, little, ring and middle fingers close and switch off. Only the index finger will move.



### Custom Gesture

all fingers automatically move to a user defined fully opened or fully closed position and switch off.



### Custom Grip

all fingers automatically move to a user defined position. The user can choose to keep certain digits active and switch others off.



### Cylindrical

hand forms a shape appropriate for grasping a cylinder



### Open Palm

hand forms a shape appropriate with holding plate or saucer



### Don Doff

hand forms the proper shape for donning and doffing a cover



### One Finger Trigger

hand forms a shape appropriate for using a spray bottle with the index finger active



### Grasp

hand forms a shape appropriate for grasping an object. Fingers flex rapidly when any user signal is applied



### Thumb Trigger

hand forms shape appropriate for using an aerosol spray can with thumb active



### Handshake

hand forms a shape appropriate for shaking another persons hand



### Trigger Two Finger

hand forms a shape appropriate for using a spray bottle with the index and middle finger active



### Mouse

hand forms shape appropriate for using a computer mouse



### Rotate Thumb

thumb and all four fingers fully open and switch off. Only thumb will rotate



# 7.0 Support Information

## 7.1 Storage and Maintenance

Always turn off the hand when not in use.

Aim to charge the battery each day after use.

Replace the battery every 12 months.

Ensure i-limb ultra revolution is serviced every 12 months

## 7.2 Troubleshooting

Problem	Action
Hand does not operate	<ul style="list-style-type: none"> <li>Ensure the hand is switched on</li> <li>Ensure the battery is connected</li> <li>Ensure the battery is charged</li> <li>Ensure the hand is engaged at the wrist</li> <li>Check the electrodes have good contact</li> <li>Check that the electrode cable is installed correctly (grey side out)</li> </ul>
One digit does not operate	<ul style="list-style-type: none"> <li>Check if the digit operates correctly using the Hand Health Check in biosim</li> <li>Exchange with an alternative working digit from same or different i-limb ultra revolution and re-check. If replaced digit works, contact Touch Bionics Customer Support</li> </ul>
Hand stops halfway during an action	<ul style="list-style-type: none"> <li>Electrode settings may need to be adjusted</li> <li>Check the electrode cable is not damaged</li> <li>Check the battery cable is not damaged</li> <li>Check that the i-limb ultra revolution is connected correctly to the wrist</li> <li>Contact Touch Bionics</li> </ul>
User complains that the hand is difficult to operate	<ul style="list-style-type: none"> <li>Electrode settings may be too low</li> <li>Ensure the battery has good charge</li> <li>Ensure the electrodes maintain good contact</li> <li>Check electrode placement and wiring</li> <li>Contact Touch Bionics</li> </ul>
Battery charge does not last a full day	<ul style="list-style-type: none"> <li>Fully charge the battery overnight. Check the battery connection</li> <li>Ensure electrodes are not set above 5.5</li> <li>Check user is not holding a sustained signal to the hand</li> <li>Replace the battery</li> <li>Contact Touch Bionics</li> </ul>
The hand will open but not close	<ul style="list-style-type: none"> <li>Check the electrode cables are attached and are making good contact</li> <li>Check the hand is engaged at the wrist</li> <li>Check electrode operation by swapping the electrode connections at the lamination ring</li> <li>Contact Touch Bionics</li> </ul>
Hand opens when a close signal is provided	<ul style="list-style-type: none"> <li>Check box in biosim or switch the electrode connections on the lamination ring</li> </ul>
Battery is not working	<ul style="list-style-type: none"> <li>Check the battery is connected</li> <li>Check the battery is charged</li> <li>Check the wiring for signs of damage</li> <li>Ensure that the charging port is not compressed by the inner and outer socket interface</li> <li>Ensure the male connector from the charger is fully inserted into the charger port</li> <li>Ensure that the connection between charger lead and port is good</li> </ul>

For additional FAQ's please visit our website at: [www.touchbionics.com](http://www.touchbionics.com)

## 7.3 General Safety, Warnings and Precautions

### i-limb ultra revolution

Do not use without an approved cover.

Do not use under water.

Do not use to operate heavy / industrial machinery.

Do not use with machinery with moving parts that may cause personal injury or damage.

Users must comply with local regulations on the operation of automobiles, aircraft, sailing vessels of any kind and any other motorized vehicle or device.

Do not use for extreme activities that may cause injury to a natural hand.

Do not expose to excessive moisture, liquid, dust, vibration or shock.

Do not expose to high temperatures.

Do not expose to flames.

Do not use or expose to explosive atmospheres.

Do not disassemble componentry or modify in any way.

Maintenance, repairs and upgrades may only be performed by qualified Touch Bionics technicians and technical partners.

Do not use with a damaged cover.

Damaged covers must be replaced or repaired by a qualified Touch Bionics technician or technical partner.

Only approved Touch Bionics accessories and tooling may be used with the i-limb ultra revolution.

If utilizing a flexion wrist, the i-limb device should be locked if carrying an object.

Do not use an i-limb device to operate your mobile device whilst it is connected to a mains outlet, as this can affect EMG signal.

Failure to comply with the above guidelines will invalidate the warranty.

### Batteries

Do not bend or exert excessive pressure on the battery.

Do not pierce the battery.

Do not disassemble.

Do not expose to high temperatures.

Do not incinerate batteries.

Do not alter battery terminal wires.

Do not short circuit the battery.

Do not store batteries inside a vehicle.

Dispose of batteries in accordance with US, European or local regulations.

Only use the appropriate Touch Bionics charger to charge Touch Bionics batteries.

If the battery has visibly ballooned or swelled:

- discontinue the charging process immediately
- disconnect the battery
- remove to a safe area
- leave and observe for 15 minutes
- replace with new battery
- do not re-use
- dispose of any leaking batteries in an appropriate manner

Failure to comply with the above guidelines will invalidate the warranty.



If you experience technical problems with the i-limb ultra revolution contact Touch Bionics as follows:

North American Customers  
(Canada, Mexico & US)  
Tel: +1 855 MYiLIMB (694 5462)  
UK & Non-North American Customers  
Tel: +44 1506 438 556

# 8.0 User Information

## 8.1 User Details

Provision of the following information will enable easy identification of your patient's device, should it be returned to customer service. Please forward to Touch Bionics as per the contact information on the back page of this manual.

User Name:  
.....

Fitting Date:  
.....

Hand Purchase Date:  
.....

Hand Serial Number:  
.....

Prosthetist Name & Contact Information:  
.....

Therapist Name & Contact Information:  
.....

It is recommended that the above information is also included in the patient notes.

# 9.0 Appendix

## 9.1 Technical Information

i-limb ultra revolution	
Voltage	7.4 V (nominal)
Max. Current	5 A
Battery Capacity	Rechargeable lithium polymer 7.4 V (nominal); 2,000 mAh capacity; 1,300 mAh capacity
Max hand load limit (static limit)	90kg/198lbs
Finger Carry Load (static limit)	32kg/71lbs
Time from open position to full power grip	1.2 seconds
Device Weight	Weight with QWD 507g (small) and 515g (medium) Weight with WD unit 443g (small) and 451g (medium)

## 9.2 i-limb ultra revolution Information

Hazardous Area Classification	
The i-limb ultra revolution device is not intended for use outside the boundaries of the environments listed below. The customer or user of the i-limb ultra revolution device should assure that it is not used in such environments	
Condition	Level
Maximum temperature	+70°c
Minimum temperature	-40°c
Hazardous Area Classification	Non Hazardous

## 9.3 Component Compatibility

### 9.3.1 EMC and Electrical Information

Please refer to [www.touchbionics.com/downloads/document-library](http://www.touchbionics.com/downloads/document-library) for Electro Magnetic Compatibility (EMC) and Electrical Information for i-limb products.

## 9.4 Warranty

Refer to [www.touchbionics.com/downloads/document-library](http://www.touchbionics.com/downloads/document-library) to review warranty information.

	Consult instructions for use
	Class II equipment – provides double Isolation to protect against electric shock
<p data-bbox="448 558 500 583"><b>IP40</b></p>	<p data-bbox="805 453 1081 478">Degree of protection – IP40</p> <p data-bbox="805 558 1438 642">Protection against penetration by solid particles with diameters larger than 1 mm. No special protection against penetration by water</p>
	Serial Number
	<p data-bbox="805 940 1146 966">For i-limb ultra revolution devices:</p> <p data-bbox="805 1087 1463 1146">The unique serial number for i-limb ultra revolution devices is a “R” with a 4 digit alpha / numeric number.</p>
	WEEE Compliance
	Catalogue number
	Manufacturer/Date of Manufacture
	European Conformity

Customer Service/Contact Information:

Touch Bionics, Unit 3 Ashwood Court,  
Oakbank Park Way, Livingston EH53 0TH, UK  
Tel: Customer Service: +44 (0) 1506 438 556

Touch Bionics, 35 Hampden Road  
Mansfield MA 02048, USA  
Tel: +1 855 MY iLIMB (694 5462)  
[www.touchbionics.com](http://www.touchbionics.com)



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Unit 3, Ashwood Court  
Oakbank Park Way  
Livingston EH53 0TH  
Scotland

Tel: +44 1506 438 556

Email: [info@touchbionics.com](mailto:info@touchbionics.com)

For address details and further information  
please visit [www.touchbionics.com](http://www.touchbionics.com)

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