The next generation of *bebionic* multi-articulating myo-electric hands, now available in *Medium* and *Large* sizes.
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Combining ease of control with elegance of design, the *bebionic* hand has been created with the principles of durability, performance and simplicity firmly in mind. The naturally compliant fingers and thumb provide a secure platform to perform everyday tasks using common grip patterns.

Now available in medium and large sizes with improvements to speed, accuracy, grip and durability in addition to new grip patterns and software features. The next generation of *bebionic* multi-articulating hands are better than ever!

New features include upgraded individual motors for significantly higher operating speeds. Additional grip patterns have been introduced including a Precision Grip, improved Tripod Grip, Mouse Grip and Trigger Grip.

To optimise the convenience of wireless programming, the radio frequency board had been redesigned and integrated within the hand and *bebalance* software has been simplified. Soft finger pads and a wider thumb profile increase the gripping surface and enhance the gripping abilities for each digit.

Fourteen functional hand positions are provided, with ten factory set and a further four selectable through the *bebalance* software, allowing users to perform everyday activities such as eating, drinking, writing, typing, turning a key in a lock, using an ATM and picking up small objects. Fully proportional, speed control allows the user to master delicate tasks such as manipulating an egg or holding a filled polystyrene cup, as easily as crushing an empty soda can.
There are two manually selectable thumb positions; opposed and non-opposed. A built-in position sensor detects the chosen position allowing the on-board computer to achieve the desired grip pattern.

With a life-like, anatomical design, the fingers move together (finger adduction) as the hand closes so that objects such as a fork or piece of paper can be gripped naturally between the fingers.

On-board microprocessors constantly monitor the position of the digits to ensure that grip sequences are accurate every time, with no loss of control or need to reset. By placing the motors in the palm of the hand, weight distribution in the prosthesis has been optimised.

Electronics within the hand include a selectable Auto Grip feature that sense if a gripped item is slipping and automatically provide additional power to maintain a secure and safe hold. An audible or sensory indicator is now included so that when activated it can confirm to the user if hand features have been activated or deactivated.

Foldaway finger links allow the fingers to flex freely providing natural motion and allowing the user to push up to 90kg through the hand chassis to aid in standing from a seated position, a feature especially useful for the bilateral amputee.

The fingers are of an extremely robust construction utilising high impact thermoplastic, with the joint connections secured with titanium pins. These materials provide reduced weight whilst maintaining strength and durability.

A soft palm area provides significant benefits in assisting with object grasp and protecting the internal mechanisms against impacts. The compliant material also suppresses motor noise, which is further reduced when the silicone cosmetic glove is fitted.
Grip Patterns

Each articulated digit is driven by an individual actuator allowing movement and grip in a natural and coordinated way. This also provides compliant and conformable grips around complex shapes.

**Tripod Grip**

When the thumb is opposed, the hand closes into Tripod Grip with index and middle fingers meeting the thumb. Ring and little fingers continue to close until they meet resistance or the close signal ceases. This type of grip allows users to pick up, hold and manipulate a variety of everyday objects such as car keys, coins, jar lids and pens.

**Pinch Grip**

To achieve this grip it is necessary for the thumb to be manually repositioned by the practitioner/technician so that the thumb only contacts the index finger. When the thumb is opposed, the hand closes into Pinch Grip with index finger meeting the thumb. The other fingers continue to close until they meet resistance or the close signal ceases. This type of grip allows users to pick up, hold and manipulate a variety of everyday objects such as car keys, coins, jar lids and pens.

**Precision Open Grip**

To achieve this grip it is necessary for the thumb to be manually repositioned by the practitioner/technician so that the thumb only contacts the index finger. With the thumb opposed, the index finger meets the static thumb allowing the user to pick up and manipulate small objects. When this grip is selected and a close signal is applied, the thumb closes to the midpoint of its range and pauses. The index is then active and under user control. The middle, ring and little fingers remain extended.

**Precision Closed Grip**

To achieve this grip it is necessary for the thumb to be manually repositioned by the practitioner/technician so that the thumb only contacts the index finger. This grip can be used in situations similar to the Precision Open Grip but where extended fingers would be obstructive, when working at a desk for instance. Initially the middle, ring and little fingers close into the palm. The thumb moves to the midpoint of its range and pauses. The index is then active and under user control.
Finger Adduction

The fingers of the bebionic hand move together naturally as the fingers close. This allows the user to securely grip thin objects, such as cutlery or a toothbrush, between the fingers to achieve function in a different plane. Finger Adduction Grip is most functional with the hand in Power Grip but can also be achieved with the hand in Key Grip and Tripod Grip.

Power Grip

With the thumb opposed, all four fingers close into the palm until they meet resistance or the close signal ceases. When fingers are approaching a fully closed position, the thumb drives in to cover the fingers for additional grip security. This pattern allows round objects such as a ball or a piece of fruit to be held securely without exerting excessive force. This grip can also provide a handshake. Cylindrical shaped objects such as bottles, home & garden utensil handles are also held easily.

Hook Grip

In a partially closed Power Grip position, the Hook Grip is achieved. This is ideal for carrying a shopping bag or briefcase.
Grip Patterns

Finger Point

With the thumb in the non-opposed setting, the user can automatically move to a Finger Point position. The middle, ring, and little fingers are closed against the palm and the thumb is driven against the middle finger. With this position selected, typing on a keyboard or input pad, pressing a bell or a button can be achieved.

Column Grip

This grip moves the thumb into the palm from a non-opposed position. The fingers are then rolled down over the thumb to provide a fixed column point can be used to press a button. This grip pattern is the recommended position for dressing.

Trigger Grip

With the thumb opposed the Trigger Grip will grasp the handle of an object with the middle, ring and little fingers and secure the grip with the thumb. The index finger will then close – this will be positioned over the trigger of the device held such as a hand held mist spray. To exit Trigger Grip, an open signal will fully open the index finger before the other fingers and thumb release their grip. Trigger Grip is only intended for use with household items such as cleaning sprays and hairdryers, etc.

⚠️ The bebionic hand must not be used with firearms
Grip Patterns

Key Grip

In the non-opposed thumb position, the four fingers partially close. The thumb then closes onto the side of the index finger. The thumb position may be raised and lowered without moving the other four fingers allowing for release, capture or reposition of the object being gripped. This pattern is ideal for carrying paper or letters, using a spoon and for holding a thin flat object such as a plate, a credit card or a key.

Mouse Grip

With the thumb non-opposed the thumb and little finger close to hold the side of the mouse, with the middle and ring fingers providing stability. The index finger closes onto the mouse button and then backs off to provide the button press. Each close signal will give a button press whilst an open signal will release the mouse. To take full advantage of this grip RSLSteeper recommends using a Trust Laser Mouse - Carbon Edition MI-6970C, or similar.

Open Palm

With the thumb in the non-opposed position the hand may be fully opened to provide a flat palm suitable for carrying a tray or a plate etc.

Relaxed Hand Position

The thumb is set to the non-opposed position and partially driven in toward the palm. All the fingers are driven to a slightly flexed position.
A multi layered blended silicone has been specially developed to achieve the optimum balance of durability and flexibility whilst maintaining a soft feel to the material.

To maximise tear and puncture resistance, the bebionic glove features a full length and seamless integral strengthening matrix. This highly flexible mesh allows the glove to move freely over the hand, significantly reducing friction during operation, which greatly improves hand performance and battery life. The matrix also means that no lubrication is required when donning the glove. This also provides increased efficiency and therefore reduces power consumption during finger movements.

Additional highlights such as palm, knuckle and joint detailing are provided as standard further enhancing the natural appearance.
Custom Glove

A custom silicone glove is now available for bebionic hands. Each glove is individually sculpted by hand to meet each user’s requirements resulting in a very realistic appearance and feel.

Spectromatch™, our unique colour matching system, electronically measures skin tone to ensure a near perfect match to your individual skin shade. Our Spectromatch™ process offers far superior colour matching compared to traditional colour swatches. The colour matching process can be completed in a manner of minutes, providing near perfect results regardless of lighting conditions.

Unlike many similar products, our fabrication techniques involve colouring the silicone material itself prior to sculpting, as opposed to surface painting. This process allows the layering of different shades of silicone to give a natural translucent finish, similar to real human skin tissue. Skin pigmentation, freckles, and veins can be incorporated to ensure an authentic finish.
In order to maximise the benefits of the *bebionic* system, a control software package, *bebalance*, has been developed to allow the practitioner to customise the functions of the hand to suit individual user needs.

This extremely versatile system enables wireless programming and monitoring of the *bebionic* hand, giving flexibility in system set up and management.

6 pre programmed control strategies are currently available – a training mode, 3 single site and 2 double site options.
These modes provide the user with the opportunity to test numerous hand functions. Once the most suitable control strategy, electrode setting and performance criteria are agreed, the information is wirelessly downloaded to the hand. The data is saved within the system and can be retrieved at a later date for modification if required.

Through the software, the following elements may be simply controlled and adjusted as required:

- Active grips and priority
- Threshold of hand operation
- Control strategy (mode of operation)
- Grip selection
- Speed
- Open / close electrode
- Electrode protocol
- Grip strength / battery life
- Mode change and data storage
- System upgrades
A comprehensive range of system components is available from RSLSteeper to complete the *bebionic* limb build.

Three internal battery options are available, a 2200mAh single cell can be chosen or a 2200mAh or 1300mAh in split cell configurations. The split cell batteries may be used in long stump / wrist disarticulation applications where there is limited space with the forearm. These high performance lithium polymer cells supply the necessary power requirements for optimum performance of the *bebionic* system.

*bebionic* hands are supplied with four wrist options including an electric quick disconnect wrist, a standard friction wrist, studded hand plates in $\frac{1}{2} \times 20$ and M12 threads and a short friction wrist to accommodate long stump / wrist disarticulation applications.

RSLSteeper electrodes provide both 50Hz and 60Hz filtering and are supplied with lamination and thermoforming fabrication blanks. Electrode cables are available in 300mm, 600mm and 1000mm lengths. In addition to standard control options such as electrodes, switches or Force Sensitive Resistors (FSR’s) may also be used.

Above elbow components are also available from RSLSteeper. Please contact us for your copy of our upper limb prosthetics components catalogue - also available to download at [www.rslsteeper.com/prosthetics/upper-limb-products](http://www.rslsteeper.com/prosthetics/upper-limb-products)
In the Box

- Hand with wrist type as ordered
- Technical Manual
- CD ROM loaded with bebalance programming software 2.0 and the appropriate drivers
- USB dongle (wireless transmitter / receiver module)
- Tool Kit
- Car Charger
## Principal Dimensions

<table>
<thead>
<tr>
<th></th>
<th>Large</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>A  Middle Finger Tip to Hand Base</td>
<td>200mm</td>
<td>190mm</td>
</tr>
<tr>
<td>B  Thumb Tip to Hand Base</td>
<td>125mm</td>
<td>121mm</td>
</tr>
<tr>
<td>C  Max Chassis Width (no glove)</td>
<td>92mm</td>
<td>84mm</td>
</tr>
<tr>
<td>D  Diameter of Chassis at Wrist</td>
<td>50mm</td>
<td>50mm</td>
</tr>
<tr>
<td></td>
<td>220mm</td>
<td>204mm</td>
</tr>
<tr>
<td>Palm Circumference (no glove)</td>
<td>105mm with glove</td>
<td>105mm with glove</td>
</tr>
<tr>
<td>Maximum Opening width Tripod Grip</td>
<td>68°</td>
<td>68°</td>
</tr>
<tr>
<td>X  EQD only</td>
<td>5mm</td>
<td>5mm</td>
</tr>
</tbody>
</table>
## Performance Specification

<table>
<thead>
<tr>
<th></th>
<th>Large</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Power Grip</td>
<td>75N</td>
<td>75N</td>
</tr>
<tr>
<td>Maximum Tripod Grip</td>
<td>34N</td>
<td>34N</td>
</tr>
<tr>
<td>Maximum Key Grip (restricted)</td>
<td>15N</td>
<td>15N</td>
</tr>
<tr>
<td>Minimum Time to Open or Close - Tripod Grip</td>
<td>0.4 Seconds</td>
<td>0.4 Seconds</td>
</tr>
<tr>
<td>Minimum Time to Open or Close - Power Grip</td>
<td>0.9 Seconds</td>
<td>0.9 Seconds</td>
</tr>
<tr>
<td>Minimum Time to Open or Close - Key Grip</td>
<td>0.9 Seconds</td>
<td>0.9 Seconds</td>
</tr>
<tr>
<td>Maximum Static Load - Hook Grip</td>
<td>32kg</td>
<td>32kg</td>
</tr>
<tr>
<td>Maximum Load Individual Finger - Hook Grip</td>
<td>16kg</td>
<td>16kg</td>
</tr>
<tr>
<td>Finger Tip Extension Load</td>
<td>6kg</td>
<td>6kg</td>
</tr>
<tr>
<td>Maximum Safe Vertical Load Taken Through Knuckles</td>
<td>90kg</td>
<td>90kg</td>
</tr>
</tbody>
</table>

## Voltages and Current Limits †

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Voltage - Hand</td>
<td>7.4V</td>
<td>nominal</td>
</tr>
<tr>
<td>Voltage Range - Hand</td>
<td>6.0V – 8.4V</td>
<td></td>
</tr>
<tr>
<td>Maximum Current Supply</td>
<td>5.0A</td>
<td></td>
</tr>
</tbody>
</table>

† Batteries have been cyclically tested and as an example, give typically 2900 Tripod Grip cycles on the 1300mAh battery (BBI=1300S) and 5000 cycles on the larger 2200mAh batteries (BBI=2200S or BBI=2200). Alternative grips will have different energy usage.
# Physical Specification

<table>
<thead>
<tr>
<th>Part number</th>
<th>Build Height†</th>
<th>Weight</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBHLG*QD</td>
<td>125mm + 25mm</td>
<td>539g</td>
<td><em>bebionic v2 Large Hand with EQD Wrist</em></td>
</tr>
<tr>
<td>BBHLG*FW</td>
<td>125mm + 37mm</td>
<td>495g</td>
<td><em>bebionic v2 Large Hand with Friction Wrist Hand Plate</em></td>
</tr>
<tr>
<td>BBHLG*SW</td>
<td>125mm + 12mm</td>
<td>515g</td>
<td><em>bebionic v2 Large Hand with Short Wrist Plate</em></td>
</tr>
<tr>
<td>BBHLG*EU</td>
<td>125mm + 16mm</td>
<td>512g</td>
<td><em>bebionic v2 Large Hand with M12 thread stud</em></td>
</tr>
<tr>
<td>BBHLG*NA</td>
<td>125mm + 16mm</td>
<td>510g</td>
<td><em>bebionic v2 Large Hand with ½ x 20 UNF stud</em></td>
</tr>
<tr>
<td>BBHMD*QD</td>
<td>121mm + 25mm</td>
<td>532g</td>
<td><em>bebionic v2 Medium Hand with EQD Wrist</em></td>
</tr>
<tr>
<td>BBHMD*FW</td>
<td>121mm + 37mm</td>
<td>488g</td>
<td><em>bebionic v2 Medium Hand with Friction Wrist Hand Plate</em></td>
</tr>
<tr>
<td>BBHMD*SW</td>
<td>121mm + 12mm</td>
<td>508g</td>
<td><em>bebionic v2 Medium Hand with Short Wrist Plate</em></td>
</tr>
<tr>
<td>BBHMD*EU</td>
<td>121mm + 16mm</td>
<td>505g</td>
<td><em>bebionic v2 Medium Hand with M12 thread stud</em></td>
</tr>
<tr>
<td>BBHMD*NA</td>
<td>121mm + 16mm</td>
<td>503g</td>
<td><em>bebionic v2 Medium Hand with ½ x 20 UNF stud</em></td>
</tr>
</tbody>
</table>

†Build height comprises of thumb tip to base of hand measure, followed by the build height for each wrist option. The second number refers to the minimum allowance for the mating wrist unit.

*Denotes side of hand, i.e. insert L for a left hand, or R for a right hand.
bebionic Hand with Quick Disconnect Wrist - 1 or 2 Site Electrodes

bebionic Hand with EOD
R
LG
BBHLGRQD
MD
BBHMDRQD
L
BBHLGLQD
BBHMDLQD

Quick Disconnect Wrist Assembly
QDAWA=50
Comprising:
QDACP Coupling piece
QDACO Co-axial plug
QDALR=50 50mm Lamination ring

Power option 1
Single Cell 2200mAh
BBI=2200
Battery Charger
BBCBI

Power option 2
Split Cell 2200mAh
BBI=2200S
Battery Charger
BBCBI

Power option 3
Split Cell 1300mAh
BBI=1300S
Battery Charger
BBCBI

Optional Extended Warranty Plan
Year 2 BBW0002
Year 2+3 BBW0003

bebionic Glove
LG/
MD
Left/
Right
Skin Shade (E0 - E18)
Colour Swatch - E24658
Custom Glove - ASC27

Client information
Facility Name:
Facility Address:
Email Address:
Contact Name:
Order Number:
Shipping Instructions:

Tel: +44 (0)870 240 4133  Fax: +44 (0)870 240 4779  Email: bebionic@rslsteeper.com  Web: www.rslsteeper.com
**bebionic Hand - Short Wrist & Friction Wrist - 1 or 2 Site Electrodes**

**Power option 1**
- Single Cell 2200mAh
  - BBI=2200
- Connection Cable
  - CBBHA72
- Battery Charger
  - BBCBI

**Power option 2**
- Split Cell 2200mAh
  - BBI=2200S
- Connection Cable
  - CBBHA72
- Battery Charger
  - BBCBI

**Power option 3**
- Split Cell 1300mAh
  - BBI=1300S
- Connection Cable
  - CBBHA72
- Battery Charger
  - BBCBI

**Optional Extended Warranty Plan**
- Year 2 BBW0002
- Year 2+3 BBW0003

**bebionic Glove**
- LG/MD
- Left/Right
- Skin Shade (E0 - E18)
- Colour Swatch - E24658
- Custom Glove - ASC27

**Client information**

- Facility Name:
- Facility Address:
- Email Address:
- Contact Name:
- Order Number:

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**Prescription Guide/Order Form**

**bebionic** Hand with Threaded Stud - 1 or 2 Site Electrodes

**bebionic Hand with Threaded Stud**

<table>
<thead>
<tr>
<th>R</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG</td>
<td>BBHLGREU</td>
</tr>
<tr>
<td>MD</td>
<td>BBHMDREU</td>
</tr>
<tr>
<td>LG</td>
<td>BBHLGRNA</td>
</tr>
<tr>
<td>MD</td>
<td>BBHMDRNA</td>
</tr>
</tbody>
</table>

**Friction Wrist Housing 50mm**

- 1/2” x 20 TPI - NHD55110
- M12 - NHD55110-M12

**Power option 1**

- Single Cell 2200mAh
  - BBI=2200
- Connection Cable
  - CBBHA72
- Battery Charger
  - BBCBI

**Power option 2**

- Split Cell 2200mAh
  - BBI=2200S
- Connection Cable
  - CBBHA72
- Battery Charger
  - BBCBI

**Power option 3**

- Split Cell 1300mAh
  - BBI=1300S
- Connection Cable
  - CBBHA72
- Battery Charger
  - BBCBI

**Optional Extended Warranty Plan**

- Year 2 BBW0002
- Year 2+3 BBW0003

**bebionic Glove**

- LG/MD Left/Right
- Skin Shade (E0 - E18)
- Colour Swatch - E24658
- Custom Glove - ASC27

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**Client information**

- Facility Name: 
- Facility Address: 
- Email Address: 
- Contact Name: 
- Order Number: 
- Shipping Instructions: 

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Tel: +44 (0)870 240 4133   Fax: +44 (0)870 240 4779   Email: bebionic@rslsteeper.com   Web: www.rslsteeper.com
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