Fascinated with Michelangelo
Perfect use of precision technology
Few parts of the human body are as important and complex as the hand. Only the perfect interplay of nerves, tendons, a total of 27 bones, 39 muscles and 36 joints allows people to handle their everyday tasks.

The FDA-approved Michelangelo Hand is the most technologically advanced and functional prosthetic hand available. And as the heart of the new Axon-Bus prosthetic system, it offers unrivalled benefits and new freedom of movement for the user. This is our vision of innovation – technology for the benefit of people.
Using advanced technology
to help you reach your potential

This is our technology
We know the challenges faced by users on a daily basis – and how we can help with the latest technologies.

The Axon-Bus is a system for transradial fittings that constitutes optimized technology. Axon stands for Adaptive eXchange Of Neuroplacement data.

The Axon-Bus itself is a new Ottobock development for the field of exoprosthetics, derived from safety-related bus systems in the aviation and automobile industries – a true innovation for fittings in terms of process and results.

The greatest advantage is that it constitutes a self-contained data transmission system with perfectly harmonized components. The individual components “communicate” with each other perfectly, eliminating losses in data transmission, speed and functionality.

For users, this means a clear safety advantage and greater reliability: they benefit from considerably reduced sensitivity to external interference in comparison with conventional systems.

True added value for users
Combined with the enhanced function of the Michelangelo Hand, the Axon-Bus system offers more degrees of freedom than ever before.

The modular prosthetic system is suitable for transradial as well as transhumeral fittings, and can be expanded with additional components in the future. The adaptation of the DynamicArm® and ErgoArm®, additional hand sizes, electric rotation and flexion for the wrist joint, new electrodes and a new hook along with the realization of additional features are all in progress.

These components will be harmonized with the Axon-Bus system.

The Axon-Bus system comprises the following components:
- Michelangelo Hand
- AxonWrist
- AxonEnergy Integral
- AxonCharge Integral
- AxonSoft
- AxonMaster
- AxonSkin Natural (men)
- AxonSkin Natural (women)
- AxonSkin Visual
- AxonSkin Black
- AxonArm Hybrid
- AxonArm Ergo
The Michelangelo Hand:
Intelligently simple

**Easy for the user to operate**
The Michelangelo Hand is easy for the user to operate. It is turned on and off by pressing the charging receptacle of the AxonEnergy Integral on the socket surface.

**Easy for the practitioner to adjust**
Adjustments to the Michelangelo Hand are made using the AxonSoft software and Bluetooth® data transfer. In order to do so, a Bluetooth® wireless connection has to be established between the AxonMaster and the PC.

**Well supplied**
The power supply for the Michelangelo Hand is provided by the AxonEnergy Integral energy supply system integrated into the socket. When the battery capacity falls, integrated battery management automatically informs the user. In this case, the hand gets perceptibly slower and exerts less gripping force. When there is very little battery capacity remaining, the prosthetic hand switches off to protect the battery against harmful deep discharge.

**The big plus**
All new product features are identified with a red “plus” in the following sections.

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<table>
<thead>
<tr>
<th>Ordering Information</th>
<th>Technical Data</th>
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<td>Article Number</td>
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<td>Weight</td>
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<tr>
<td>Gripping force in Neutral Mode</td>
<td>approx. 15 N</td>
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**Michelangelo Hand**
The Michelangelo Hand features complex gripping kinematics, a natural, anatomical appearance and low weight. It is the heart of the new Ottobock prosthetic system.

**Main drive**
The main drive of the Michelangelo Hand is responsible for the gripping movements and gripping force. Actively driven elements are the thumb, index finger and middle finger while the ring finger and little finger passively follow the other fingers.

**Release buttons on both sides**
By simultaneously pressing the release buttons, the user can remove the Michelangelo Hand from the socket.

**Flat oval wrist joint**
The oval hand adapter looks very natural. Flexion and extension are based on the relaxed wrist (flexible mode). Pronation and supination can be passively performed by the user.

**Soft fingertips**
The fingers of the Michelangelo Hand are based on a natural hand down to the details. For a natural effect, they are made from a combination of softer and harder materials.

**Separately movable thumb**
The thumb drive permits electronic positioning. Rotating the thumb outward creates a wide open palm, so that additional movement options are possible.

**Flexible wrist joint**
With the lock button, the user can make adjustments to the wrist joint mode: flexible or rigid mode can be selected as desired.
New possibilities in gripping kinematics for unique functionality

Thanks to four movable fingers and a thumb that can be separately positioned using muscle signals, the Michelangelo Hand offers innovative, never-before-seen gripping kinematics.

Two drives create a natural hand movement pattern. The main drive is responsible for gripping movements and gripping force while the thumb drive allows the thumb to be electronically positioned in an additional axis of movement. This results in seven different hand positions. Actively driven elements are the thumb, index finger and middle finger while the ring finger and little finger passively follow the movements of the other fingers.

**Lateral Mode**

- **Lateral Pinch**
  The thumb moves lateral to the index fingers so that the user can grip flat items from the side.

- **Lateral Power Grip**
  The thumb moves laterally towards the index finger. This allows the user to grasp objects of medium size from the side.

**Lateral + Opposition Mode**

- **Finger Abduction/Adduction**
  Finger adduction takes place when closing the hand. This allows the user to grasp flat items between the fingers. Abduction takes place automatically when opening the hand.

**Opposition Mode**

- **Tripod Pinch**
  The thumb, middle finger and index finger form a three-point support – so the user can hold small objects securely.

- **Opposition Power Grip**
  The greater opening width allows the user to hold items with a large diameter.

**Neutral Mode**

- **Open Palm**
  In the open palm position, the thumb is at a far palmar location: the user achieves a flat hand position.

- **Neutral Position**
  Natural, physiological appearance in the rest position.
The AxonWrist mechanical wrist joint offers new freedom for users of the Michelangelo Hand. It consists of two connected modules that support flexion and extension as well as pronation and supination – functions that permit greater freedom of movement for the user. The multi-axial movement pattern minimizes unnatural compensating movements and promotes a healthy, natural body posture. This helps to avoid unnecessary tension in the shoulder girdle, for example. The oval hand adapter which supports a more physiological appearance is also new.

### Numerous functions

Pronation and supination are operated manually. The module can be rotated 360°, with ratchet positions at 24 points in 15° increments. By simultaneously pushing both release buttons, the Michelangelo Hand can be separated from the rest of the prosthesis. A practical feature: the new release mechanism prevents over-rotation and accidental disconnection. Another module permits individual, passive flexion and extension.

#### 1 Flexible Mode

Flexible Mode simulates the natural movement characteristics of a relaxed wrist joint – this is entirely new. This flexibility closely approximates the physical movement characteristics of the natural hand and wrist. To adjust flexible mode, the lock button is pressed until it engages. Now the joint can be moved freely without engaging the ratchet positions.

#### 2 Rigid Mode

Various everyday situations faced by users require individually-adjustable flexion and extension of the gripping prosthesis in Rigid Mode. When the lock button is lightly pressed, the AxonWrist can be moved to the desired position. When the lock button is released, the wrist joint engages at the next available position.

### Technical Data

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<th>Flexion</th>
<th>Extension</th>
<th>Weight</th>
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<td>360°</td>
<td>75°</td>
<td>45°</td>
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<td>integrated in the 8E500 Michelangelo Hand</td>
<td>in 4 ratchet positions</td>
<td>in 3 ratchet positions</td>
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Central control: the AxonMaster

The AxonMaster is the central control unit of the Axon-Bus system. It receives control signals from the user and transmits them to the respective prosthesis components. This allows the user to control the hand movements and switch between the prosthesis components. The AxonMaster also controls the data communication process of the Axon-Bus system. The supply of power to the unit is provided centrally by the AxonEnergy Integral energy supply system via the Axon-Bus.

Adjustments to the prosthesis components can be performed through Bluetooth® data transfer using the AxonSoft software. The Bluetooth® module is integrated into the AxonMaster. You select the right program for the respective user situation from among five standard programs.

- Program 1: MultiGrip
- Program 2: DMC LowInput
- Program 3: Digital
- Program 4: VarioControl
- Program 5: DoubleChannel

Individual adjustment: AxonSoft

In order to establish individual user settings for the prosthesis components, the myo-signal must be evaluated. This is done using the 560X500 AxonSoft adjustment software, which is integrated into the Ottobock Data Station.

Key functions of the adjustment software

- Evaluation of muscle signals and optimum electrode adjustment.
- Configuration of the prosthesis parameters based on user indications.
- Documentation of all recorded user data and printouts.

Data transfer between the AxonMaster and the PC

Michelangelo Hand settings are made with the AxonSoft adjustment software via Bluetooth® data transfer. In order to do this, you connect the 60X5 BionicLink PC and establish a wireless connection between the AxonMaster and your PC.

Technical Data

<table>
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<th>Feature</th>
<th>Specification</th>
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Ordering Information

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<td>BionicLink</td>
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With full energy: AxonEnergy Integral

The AxonEnergy Integral is an integrated energy supply system consisting of a charging receptacle, battery and the Axon-Bus cable. The components are permanently connected to each other.

Charging receptacle
The charging receptacle with integrated button, LED and beeper has the following functions:

- Contacts for **battery charging**.
- LED display for **current battery capacity**: press the charging receptacle button for less than 1 second; the LED display lights up and shows the current battery capacity by color.
- **Turning on the prosthesis**: press the button for approx. 1 second; switching on is confirmed by two short audible signals (2 x beep) and the LED display lights up briefly.
- **Turning off**: press the button again to switch the prosthesis off (1 x beep).
- **Activating the Bluetooth® function**: First power down the prosthesis. Then push and hold the charging receptacle button for 4 seconds.
- **Emergency prosthesis opening**: push and hold the button for 3 seconds, until the hand opens and the prosthesis switches off.
- Audible signals (beeps) provide feedback on operating states.

The battery
The battery consists of 3 Li-Ion cells. The integrated electronics protect the battery against short circuits, overvoltage, undervoltage and charging outside the allowable temperature range. In order to charge the battery, connect the charging plug to the charging receptacle and allow it to snap into place. When the beeper beeps, it signals that the prosthesis will be deactivated and that the charging process will begin.

The Axon-Bus cable
The Axon-Bus cable with the three-pin receptacle is used to exchange data and connects the respective prosthesis components to the battery.

<table>
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<tbody>
<tr>
<td>AxonEnergy Integral</td>
<td>757B501</td>
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</table>
The AxonCharge Integral charges the AxonEnergy Integral integrated into the socket. It makes charging a snap: the charging plug is connected to the charging receptacle with the help of an integrated magnet. The special contour of the receptacle and plug ensures that the two components are aligned quickly and correctly. LEDs indicate the status of the charger and the current battery capacity.

Using the AxonCharge Integral is straightforward and highly intuitive.

**The LED functions**

- LED 1 is not illuminated: there are no problems and service is not required.
- LED 1 flashes red: there is a general system error (battery, prosthesis components, etc.). Please contact Ottobock Myo-Service.
- LED 1 is illuminated in yellow: the hand components should be brought to Ottobock Myo-Service for maintenance service.
- LED 6 flashes red: the charger is defective. Send the product in to the Ottobock Myo-Service.

<table>
<thead>
<tr>
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<th>LED 3</th>
<th>LED 4</th>
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<td>75 %</td>
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<tr>
<td>100 %</td>
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* LED illuminated  • LED flashes
Close-fitting: AxonSkin

The Michelangelo Hand is worn with the AxonSkin prosthetic glove: for an attractive, natural appearance and to protect the prosthesis against environmental influences such as moisture, dirt and dust. Multi-layer PVC gloves in six different color options and with a special surface treatment were developed for the Axon-Bus System.

As natural as possible

The six skin tones permit a close matching of the glove to the skin color of the user. The coloring is handmade and simulates the structures of blood vessels and knuckles. The fingernails are naturally colored, and conventional nail polish can also be applied (remove only with acetone-free nail polish remover).

In addition to the natural appearance, the glove features the highest material quality, great durability and is easy to care for. Water and soap are generally sufficient for daily cleaning; while the glove cleaner (with matching pump sprayer) is recommended for extremely dirty gloves.

In addition to the skin color variations, there will be a translucent prosthetic glove to highlight the unusual design of the Michelangelo Hand.

Ordering Information

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<td>AxonSkin Natural for women (skin color)</td>
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<td>AxonSkin Visual prosthetic glove, translucent</td>
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<td>AxonSkin Black prosthetic glove, black</td>
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<td>Glove cleaner</td>
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<td>Pump sprayer</td>
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Fascinated. With Michelangelo – Perfect use of precision technology
For upper arm fitting: AxonArm Ergo

The AxonArm Ergo is a manually powered elbow component with electronic lock that adapts the proven strengths of the familiar 12K50 ErgoArm to the new Axon-Bus system. It is intended exclusively for use with the Michelangelo Hand. Thanks to the electronic lock, unlocking and locking the elbow joint is realised with myoelectric signals picked up by electrodes.

Now all the advantages of the Michelangelo Hand (extraordinary functionality, natural design and trendsetting technology) are now also available to transhumeral amputees.

**Features**
- Easy Plug (electronic through connection)
- Automatic Forearm Balance (AFB)
- Electronic ratchetless lock
- Humeral rotation joint (humeral rotation feature)
- Adjustable friction
- Elbow ball made of skin-colored synthetic material
- Forearm can be shortened

**Technical Data**

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<td>8E500=L-M</td>
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For upper arm fitting:
AxonArm Hybrid

As an alternative to the AxonArm Ergo, the AxonArm Hybrid can be used in combination with the Axon-Bus prosthetic system. The elbow component is recommended in particular for use in hybrid prostheses, where the Michelangelo Hand is controlled by myosignals and the elbow joint is locked using a body harness.

A small, powerful, integrated battery supplies the required voltage. The electrode cables for the AxonMaster are connected in the elbow ball, so that all cables are concealed inside the prosthesis. The risk of defects caused by broken cables is reduced and the appearance enhanced. Electric signals are transmitted to the hand inside the elbow joint via flex cables.

Additional features
• Easy Plug (electronic through connection)
• Automatic Forearm Balance (AFB)
• Ratchetless lock
• Humeral rotation joint (humeral rotation feature)
• Adjustable friction
• Elbow ball made of skin-colored synthetic material
• Forearm can be shortened

Technical Data

<table>
<thead>
<tr>
<th>Weight (without battery)</th>
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<td>Power supply</td>
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<td>Battery charger</td>
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Ordering Information

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<td>8E500=L-M 8E500=R-M</td>
<td>10S500=M</td>
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Visible results:
Combining technology and benefits

The innovation
As a system provider, Ottobock is offering a completely new prosthetic system that ensures fast and secure data transmission thanks to digital data transfer technology. The intelligent Axon-Bus system also allows the system to be expanded.

- Optimized, harmonized system
- Very high gripping force and speed
- Expandable thanks to the modular structure

The technology
The flexible wrist joint permits flexion, extension and rotation. Another new feature is the ability to separately position the thumb using muscle signals. This makes entirely new hand positions possible.

- Active thumb positioning with two movement axes
- Wrist joint with flexion, extension and rotation
- Significantly more degrees of freedom
- Individual choice of controls

The design
The Michelangelo Hand features a highly natural design with various hard and soft structures which model bones, joints, muscles and tendons.

The oval wrist adapter also looks much more natural than a conventional prosthetic wrist.

A fitting with the Michelangelo Hand offers new movement possibilities for the user. It makes many everyday situations easier to handle, so that the Michelangelo user can participate in life more actively and naturally.

Would you like to find out more?
For more information on test fittings, questions related to certification and Ottobock contact persons, please visit the Michelangelo microsite:

www.living-with-michelangelo.com
The 3D experience:  
a look at the Michelangelo Hand

The augmented reality app

Would you like to experience the Michelangelo Hand up close? Try our augmented reality app – a new, three-dimensional, interactive application. In this new app, you’ll see the product from all perspectives as though it was right in front of you.

The free app is available to both Apple and Android users (in their respective store) and can be found by entering the search term “Ottobock”. Another way to get the app is with the QR code below, which you can scan with your QR reader. After downloading and installing the app, move your mobile device or tablet over the image below.

Observe what appears on the display: you can see the product in three dimensions as though it were in a showcase. Move your mobile device or tablet to look at the Michelangelo Hand from all sides. Discover the product by moving closer to the image. Under the Hotspots menu item, you will find more details about the individual product components.

Let us surprise you!

1 Scan the QR code for the app  
2 Start the app  
3 Move the mobile device/tablet over the motif, right  
Enter the virtual showroom