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 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.
Fascinated. With Michelangelo® – Perfect use of precision technology
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 them 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 in terms of the process and the results.

The 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 terms of 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 Michelangelo® Hand, the Axon-Bus® system offers more degrees of freedom than ever before – users benefit from enhanced hand functionality.

While the modular prosthetic system is currently suitable for transradial fittings, it 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 8K500=* Axon-Bus® system comprises the following components:

- Michelangelo® Hand
- AxonWrist
- AxonEnergy Integral
- AxonCharge Integral
- AxonSoft
- AxonMaster
- AxonSkin Natural/Visual

Ordering Information

<table>
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<th>Article Number</th>
<th>8K500=*</th>
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<tr>
<td>Size</td>
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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 you 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 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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**Technical Data**

<table>
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<tr>
<th>Parameter</th>
<th>Value</th>
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<td>Gripping force in Lateral Mode</td>
<td>approx. 60 N</td>
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<tr>
<td>Gripping force in Neutral Mode</td>
<td>approx. 15 N</td>
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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 (bending and stretching) are based on the relaxed wrist (flexible mode). Pronation and supination (inward and outward rotation) 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.

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.
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**

**Neutral Position**
Natural, physiological appearance in the rest position.
Great freedom: AxonWrist

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 passive. 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 at 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 unlock button is lightly pressed, the AxonWrist can be moved to the desired position. When the unlock button is released, the wrist joint engages at the next available position.

**Technical Data**

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<th>Specification</th>
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<td>Rotation</td>
<td>360° in 24 ratchet positions</td>
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<td>Flexion</td>
<td>75° in 4 ratchet positions</td>
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<td>Extension</td>
<td>45° in 3 ratchet positions</td>
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<td>Weight</td>
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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 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

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, e.g. for paying parties

**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**

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<tr>
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<tr>
<td>Operating voltage</td>
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<td>Weight</td>
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**Ordering Information**

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<th>Product</th>
<th>Part Number</th>
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| AxonSoft     | 560 X 500=  
| BionicLink   | 60 X 5     |

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10  Fascinated. With Michelangelo® – Perfect use of precision technology
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 component**: press the button for approx. 1 second; switching on is confirmed by two short audible signals (2 × beep) and the LED display lights up briefly
- **Turning off**: press the button again to switch the prosthesis off (1 × beep)
- **Activating the Bluetooth® function**: push and hold the button for 4 seconds
- **Emergency prosthesis opening**: push and hold the button for 7 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.

Bluetooth® function
When the prosthesis is turned off and the charging receptacle button is pushed for more than 4 seconds, the Bluetooth® function of the prosthesis will be activated and the LED display will flash blue.

**Technical Data**

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Easy and efficient charging: AxonCharge Integral

The AxonCharge Integral charges the AxonEnergy Integral integrated into the socket. 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 easily. LEDs indicate the status of the charger and the current battery capacity.

In summary, 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>
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<tr>
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<th>LED 3</th>
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<tr>
<td>100 %</td>
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* LED illuminated  • LED flashes
The Michelangelo® Hand is worn with the AxonSkin prosthetic glove: for an attractive, natural appearance and to protect the prosthesis (mechanism) 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 the closest possible matching of the glove to the skin colour of the user. The colouring 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 is generally sufficient for daily cleaning; while the glove cleaner (with matching pump sprayer) is recommended for extremely dirty gloves.

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

Ordering Information

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<th>Product Description</th>
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<tr>
<td>AxonSkin Natural for women (skin colour)</td>
<td>8S502</td>
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<tr>
<td>AxonSkin Visual prosthetic glove, translucent</td>
<td>8S500</td>
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<tr>
<td>Glove cleaner</td>
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<td>Pump sprayer</td>
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<td>Color selection</td>
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Visible result:
Combining technology and benefits

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

- 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 physiologically 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