

# Above Elbow - Axon-Bus Prosthetic System (APS) Reimbursement Reference Guide

Michelangelo, AxonArm Ergo, Axon Hook, AxonRotation



Quality for life

## Axon-Bus Prosthetic System – Above Elbow

### Features and Benefits

#### **Michelangelo Hand Articulating Fingers:**

Michelangelo has four compliant fingers with anatomically correct alignment of the metacarpophalangeal joints (MCP) joints.

- Each finger has its own axis (MCP flexion/extension). Due to the mechanical design of the finger axes, the fingers abduct, spreading apart when the hand opens and they move together (adduct) as the hand closes.
- Using nature as a model, the fingers were replicated in great detail.

#### **Michelangelo Hand Active Thumb:**

Michelangelo has a fully-electronic multi-positional thumb.

- The sweeping motion of the thumb drive allows Opposition and Lateral grip patterns.
- Rotating the thumb outward creates a palm so that additional movement options are possible.

#### **Michelangelo Hand Functions:**

Michelangelo® has complex gripping kinematics with 7 functional grip types:

- Lateral Power Grip allows for secure grasping and handling of objects
- Lateral Pinch allows one to easily hold thin objects such as credit cards.
- Open Palm allows a flat hand position is achieved for holding plates and bowls.
- Tripod Pinch allows precise grasping of small objects.
- Power Grip for grasping large objects
- Neutral Position allows a natural position at rest. Hand will not open while walking and the thumb is tucked in like a natural hand. The hand automatically positions itself in neutral. The user does not need to think about the hand position.
- Finger Adduction and Abduction allows fingers to spread out as hand opens.

#### **AxonWrist: Oval Integrated Wrist Joint on the Michelangelo Hand and Axon Hook**

- AxonWrist is comprised of two components; the AxonFlexion adapter and the AxonRotation adapter.
- The AxonFlexion adapter is integrated into the hand and it provides flexion (75°) and extension (45°); movement is progressively dampened with 8 ratchet positions.
- The AxonRotation adapter provides unlimited pronation and supination (360°) with 24 ratchet positions.
- The flexion and rotation adaptors include a quick disconnect mechanism for the hand and socket. Together they provide a multi-axial movement pattern which helps avoid unnatural compensatory movements and thereby promotes a healthy, natural body posture.

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#### AxonHook

- Slim compact design allows user greater visibility of the handled object
- High degree of fine proportional control
- AxonWrist functionality is included, which allows for reduced compensatory movements.
- Light weight with heavy duty titanium fingers
- Durable polyurethane (rubber like) coating supports user in grasping small and complex shaped objects.
- Automatically returns to Neutral Position when signal is relaxed. This function also can be used for soft gentle grasping of fragile objects.
- Hook tips can be replaced by the practitioner if broken
- Fully digital communication with prosthesis

#### AxonRotation

- Automatic Neutral Positioning – hand starts from same position and doesn't have to remember in which position the hand was in.
- Faster Rotation Speed allowing for smooth, precise and delicate motions
- Proportional Control

#### AxonArm Ergo and Hybrid:

- **Automatic Forearm Balance (AFB)** assists elbow flexion and extension. The AFB is an internal mechanism built into both the AxonArm Ergo and AxonArm Hybrid that provides a spring assist to lifting the elbow. When the arm is extended (hanging down) the user can use shoulder motion to swing the elbow forward, which will then initiate the AFB, raising the elbow to a level position. AFB also compensates for weight of the forearm. It is easily adjusted by the user.
- **Electronic Ratchetless lock (AxonArm Ergo only):** Locking and unlocking the elbow joint is realized with myoelectric signals picked up by the electrodes. The electronic lock is programmable and controlled by a microprocessor.
- **Internal and External Humeral Rotation:** AxonArm Ergo has a feature that allows the wearer to manually rotate the arm. The friction rotation can be easily adjusted.
- **Forearm** can be shortened

**Specialized User Training** is recommended for this product. See Ottobock Brochure “Using the Michelangelo Hand in Practice Therapy and Rehabilitation: Using Therapy May be Beneficial” at: <https://professionals.ottobockus.com/media/pdf/646D593-EN-03-1503-k.pdf>

## Axon-Bus Prosthetic System – Above Elbow

### Features and Benefits

#### **APS Microprocessor Communication System:**

- Axon-bus is derived from safety-related bus systems in the aviation and automobile industries.
- The AxonMaster control unit is mounted inside the socket and it contains the main microprocessor control feature. It controls the Axon-Bus communication process. This includes receiving and processing myoelectric signals from the electrodes and managing communication between the components.
- There are 5 microprocessors in addition to the AxonMaster Microprocessor Control, including 2 in the Michelangelo hand, 1 in the AxonArm Ergo, and 1 each in the AxonMaster and AxonEnergy Integral. The APS is programmed via integrated Bluetooth Module
- APS evaluates muscle signals and optimum electrode adjustment and documents all recorded user data.

#### **APS Programming:**

Adjustments to the prosthesis components can be performed through Bluetooth® data transfer using the AxonSoft program. The Bluetooth® module is in the control unit. Four control options and five switching modes are offered. This allows for multiple fitting options, such as:

- Proportional control (opening and closing speed as well as grip force is proportional to the muscle contraction),
- Digital control (constant speed, gripping force is proportional to the duration of the signal,
- One or two electrodes, or three switch options (short and long co-contraction, impulse switching, and long open signal).

#### **APS Battery**

- Two AxonEnergy Integral (battery) options are available; an 11.1 Volt, 1500 mAh system and a smaller 11.1 Volt, 1150 mAh system. Both systems consist of a charging receptacle, Li-Ion battery, and the Axon-Bus® cable. The components are fabricated into the socket and permanently connected to each other.

#### **APS Charger**

- The AxonCharge Integral magnetically connects to the charging port which is integrated into the socket.

#### **Michelangelo PVC Glove**

- The AxonSkin gloves come in six different color variations. In addition to a physiological appearance, the new gloves feature excellent durability.

## Axon-Bus® Prosthetic System Michelangelo

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