

# Body-Powered upper limb prostheses

Fitting solutions for everyday challenges



Quality for life

# The benefits of a Body-Powered prosthesis

Users have many options when it comes to a prosthetic device. Different requirements can be met with various system solutions, and we recommend discussing these in detail in advance.

In addition to passive or myoelectrically controlled prostheses, the Body-Powered prosthesis is a particularly significant option.

## **The benefits of a Body-Powered prosthesis:**

- 1 Simplicity:** The user controls the entire prosthesis using the shoulder girdle and torso.
- 2 Low weight:** This prosthesis is lighter than a myoelectric fitting solution.
- 3 Sensory feedback:** The user obtains direct feedback on the grasped object and positioning of the prosthesis.
- 4 Stability and robustness:** This prosthesis is particularly suitable for manual tasks that require robustness as well as resistance to dust, water and heat.<sup>1</sup> It also has clear advantages for activities requiring a precise touch.
- 5 Independence:** No external power supply such as a battery is required for this fitting solution.<sup>1,2,3</sup>

## **Body-Powered as a second prosthesis**

Studies recommend a combination of one myoelectrically controlled and one Body-Powered prosthesis.<sup>3</sup> Together, these two systems enable the user to undertake almost all activities in everyday life.

While a user is ideally equipped for office tasks with the myoelectrically controlled prosthesis, the more robust and easily controlled Body-Powered prosthesis can be used for more rugged tasks. These include, for example, sports and leisure activities, manual tasks and gardening.

Users can focus fully on the respective activity as a Body-Powered prosthesis is easy to clean. It therefore serves as a solid and reliable complement to a more complex myoelectric prosthesis.

## \*References:

1. Jones LE, Davidson J. A review of the management of upper-limb amputees. *Critical Reviews in Physical Rehabilitation Medicine*. 1996;8(4):297–322.
2. Datta D, Kingston J, Ronald J. Myoelectric prostheses for below-elbow amputees: the Trent experience. *Int Disabil Stud*. 1989 Oct-Dec;11(4):167–70.
3. Millstein SG, Heger H, Hunter GA. Prosthetic use in adult upper limb amputees: a comparison of the body powered and electrically powered prostheses. *Prosthet Orthot Int*. 1986 Apr;10(1):27–34.

Holger enjoys going hiking and wears the robust Body-Powered upper limb prosthesis on these trips. Together with Axel, a survival trainer, he recently went on a trekking tour that included kayaking, fishing, setting up camp, practising woodcarving and making a fire.

Body-Powered prostheses are flexible and easy to handle. Moving the shoulder forwards allows the hook to open; moving it back closes the fingers.

Holger packs various terminal devices in his backpack, which he can easily change to fit the activity. For carving, he uses a hook that allows him to grasp more firmly, for kayaking he uses one that enables him to paddle smoothly and in the evening, he uses the prosthetic hand for reading.

“The Body-Powered prosthesis is simply perfect for our trip out here,” enthuses the 51-year-old. “The upper limb prosthesis is indispensable for tough tasks and I complete practically any task ‘unplugged’.”



# Body-Powered hands

## Functionality in everyday life.

The Body-Powered prostheses or “active prehensile arms” include our 8K22 and 8K23 voluntary opening hands and the 8K26 and 8K27 voluntary closing hands. They are controlled by the 21A35 and 21A36 body harnesses. Users can actively open the voluntary opening hand by pulling the cable. The hand closes automatically and locks simultaneously.

The user closes and locks the voluntary closing hand by pulling the cable. A subsequent adjustment pull increases the gripping force as it closes. After pulling again, the hand is unlocked and opens automatically. These system hands are suitable for all Body-Powered prostheses.

The inner hand is considered to be a component of a hand; it conceals the mechanism and is a shaping element for the prosthetic glove. There are two versions of our robust glove: a PVC standard prosthetic glove and a Skin Natural prosthetic glove. Both are available in various colours.



8K22/8K23  
Voluntary opening hand

8K26/8K27  
Voluntary closing hand

### Versions and technical data

	8K22	8K23	8K26	8K27
Type	Voluntary opening hand		Voluntary closing hand	
Cable material	Perlon	Steel	Perlon	Steel
Threaded connector	Metric (M12x1.5)	Inch (½"-20)	Metric (M12x1.5)	Inch (½"-20)
Sizes	6 ¾, 7 ¼, 7 ¾, 8		7 ¼, 7 ¾, 8	
Weight	215 – 340 g		340 – 380 g	
Hand length	125 – 157 mm		152 – 157 mm	
Thumb length	105 – 137 mm		132 – 137 mm	

# MovoWrist Flex

## Extra flexibility.

The wrist joint is suitable for Body-Powered or passive terminal devices. It permits flexion and extension in five increments from  $-15^{\circ}$  to  $+45^{\circ}$  as well as  $360^{\circ}$  rotation with 20 different positions.

The 10A30 adapter permits different terminal devices to be changed quickly and easily.

**i** For bilateral users, we recommend the use of the 10V40 MyoWrist 2Act wrist joint in combination with the 9S266 chassis.



10V39 Wrist joint

10A30 Adapter

### Versions and technical data

	10V39=45	10V39=50
Lamination ring diameter	45 mm	50 mm
Height	33 mm (12 mm of which are visible at the distal end)	
Weight	110 g	130 g
Increments of extension/flexion	5 ( $-15^{\circ}$ , $0^{\circ}$ , $15^{\circ}$ , $30^{\circ}$ , $45^{\circ}$ )	
Increments of rotation	20 increments (every $18^{\circ}$ )	
10A30 Threaded connector	Metric (M12X1.5) or inch ( $\frac{1}{2}''-20$ )	

# ErgoArm line

## Living easily.

The 12K42 ErgoArm plus is suitable for both passive and Body-Powered prostheses. The mechanical elbow offers maximum comfort thanks to numerous features.

### Ratchetless lock

The ratchetless lock of the ErgoArm is positioned on the inside of the elbow. Users can lock and unlock the elbow joint in any desired position using the locking cable.

### Slip-stop function

The slip-stop function permits controlled lowering of the forearm. By pulling lightly on the cable, the user can unlock the joint until they loosen the cable again.

### Automatic Forearm Balance (AFB)

The AFB (Automatic Forearm Balance) flexion aid stores energy that is released when the arm is extended and subsequently uses it to support flexion. This makes it easier for the user to lift the forearm and swing the arm more smoothly when walking.



● 12K42 ErgoArm plus, available colours

### Additional features

- Upper arm rotation joint (humeral rotation feature)
- Adjustable friction
- Forearm can be shortened

### Versions and technical data

	12K42=45	12K42=50
Lamination ring diameter	45 mm	50 mm
Weight	570 g	610 g
Length	305 mm	
Circumference	250 mm	
Shades	4, 11, 15	



“The Robo-Wrist gives me flexibility and freedom in my daily routine and free time.”

Cameron is a sales specialist for prostheses and an active recreational athlete. He uses a Body-Powered prosthesis combined with the Robo-Wrist. “I find that the Robo-Wrist and a hook give me the best grip for all my activities,” says Cameron.

For example, a locked Robo-Wrist enables the 22-year-old to tie a tie, put on his shirt or hold a fishing rod on his own. An unlocked wrist joint gives the keen golfer a full range when winding up for a swing. It also permits smooth paddling movements for kayaking. The flexible and robust Body-Powered prosthesis is a perfect fit for independent Cameron.

# Ottobock hooks

## Precise, powerful gripping.

### 10A71/10A81 MovoHook 2Grip

The two hooks feature a clear shape, a robust design with springs and an adjustable grip strength with two modes – low grip strength for effortless work and higher grip strength for moderate loads. A special coating on the hook fingers ensures a more secure grip for smooth objects such as paper or glass, but the hook glides smoothly over fabric as the adhesive friction does not act there. Users can also grip small objects precisely with the MovoHook 2Grip.

### 10A12 All-purpose hook

The 10A12 is a robust all-purpose hook whose function is enhanced by its shape in particular. The branches come together to form a hook. The teeth on the inner side ensure that objects are fixed more securely and prevent them from slipping. The inner opening of the hook allows a rod-like object such as a broomstick to be held.

### Connection to the body harness

Special 21A13 connectors are available for connecting the hooks to the body harness. They allow users to change the terminal devices for greater flexibility. In addition, the connectors allow the length of the cable to be optimally adjusted to the respective terminal device.



10A71  
MovoHook 2Grip

10A81  
MovoHook 2Grip

10A12  
All-purpose hook

### Versions and technical data

	10A71	10A81	10A12
Material	Aluminium	Stainless steel	Stainless steel
Sides		Left (L), right (R)	
Threaded connector		Metric (M12x1.5), inch (½"-20)	
Weight	130 g	270 g	290 g
Gripping force 1	20 N	20 N	13 N
Gripping force 2	40 N	40 N	–
Length	125 mm	125 mm	130 mm
Opening width	100 mm	100 mm	80 mm



# Robo-Wrist

## Ultimate flexibility.

Thanks to its ratchetless locking function, the Robo-Wrist 3D flexion wrist offers users a broad range of applications. The wrist joint can rotate the terminal device by 360° and simultaneously flex it at any angle up to 43°. Rotation and flexion are locked simultaneously by pressing the pushbutton. This allows the user to quickly and precisely adjust the wrist joint for the desired purpose at any time.

The sophisticated combination of titanium, steel and high-strength aluminium results in a robust design and moderate weight. The ball joint is suitable for highly functional Body-Powered prostheses, for instance for our 10A71/10A81 MovoHook 2Grip or 10A12 all-purpose hook.

The 10A31 adapter allows fast and easy changes between different terminal devices.

**i** Due to the special lamination ring, it is not compatible with the Ottobock elbow joints (e.g. ErgoArm).



10V41 Wrist joint

10A31 Adapter

### Versions and technical data

	<b>10V41</b>
Lamination ring diameter	43,5 mm
Wrist joint height	41 mm (21 mm of which are visible)
Weight	165 g
Extension/flexion	Max. 43° each (ratchetless)
Rotation	360° (ratchetless)
Threaded adapter (10A31)	Inch (½"-20)

# Body harnesses

## Combining control, feedback and comfort.

Our triple-control above-elbow harness and below-elbow harness control the function of the hand or hook and the elbow using active movements of the torso and shoulder girdle. Both of the body harnesses can transmit sensory feedback to the user.

The harnesses are optionally equipped with a perlon or a steel wire. Any necessary fittings and fine adjustments are simplified by the practical adjustment strap without an irritating neck strap or complicated strapping. The fitting process requires no sewing.

The removable foam underarm pads provide better hygiene. They can also be optionally replaced by the 21A29 silicone underarm protection, which is easy to clean and enhances wearer comfort.



21A35  
Above-elbow harness

21A36  
Below-elbow harness

### Versions and technical data

	21A35	21A36
Fitting level	Upper arm (transhumeral)	Forearm (transradial)
Functions	Triple control	Single control
Side		Uni
Wire material	Perlon (= 1) or steel with plastic coating (=2)	
Colour	White	



Instructions for fitting and adjusting the harnesses can also be found at [videoguides.ottobock.com/fitting-Body-Powered](https://videoguides.ottobock.com/fitting-Body-Powered).



**Please contact us if you have any  
further questions or would like more information.**

