

Intelligent knee

Intelligent Knee

One day, I got back from work and just noticed that I wasn't tired. This was after coming through the surge of commuters. It was as if my legs had grown wings. Soon, I was going to all kinds of campsites. I also started kayaking.

The microprocessor controlled swing enables adjustment of the knee swing speed to match actual walking speed. In this way, each step can be properly adjusted to minimize feelings of awkwardness and enable comfortable walking. This knee joint is a mature product that was first launched in 1993. All over the world, there are many thousands of satisfied users.



Intelligent Knee



Users can walk naturally without feeling awkward. The Intelligent Knee was the world's first computerized knee. At each step, the microprocessor monitors the user's walking speed, and automatically controls the swing speed of the knee joint.

Left
 Model no.: NI-C111t
 Max. flexion: 160°
 Weight limit: 100 kg / 220 lbs
 Battery life: 2 years (approx.)
 (Any of these specifications may change without prior notice)

Right
 Model no.: NI-C421
 Max. flexion: 160°
 Weight limit: 100 kg / 220 lbs
 Battery life: 2 years (approx.)
 (Any of these specifications may change without prior notice)

Single-axis Intelligent Knee with a weight-activated brake NI-C111t

1 Stance phase control

▼ Advanced weight-activated brake

When the prosthesis senses body weight loading, the brake system is automatically activated to prevent the knee from buckling. With most prosthetic knee braking systems, at toe off, the brake often sticks and interrupts swing initiation until the user shifts body weight off the prosthesis. In the new model this problem is much less likely to occur.



2 Swing phase control

▼ Microprocessor controlled swing Pneumatic cylinder

Microprocessor control works by monitoring walking speed and automatically adjusting the swing speed of the knee joint. This enables the user to freely change walking speed.

Four-bar Intelligent Knee NI-C411

1 Stance phase control

▼ Four-bar linkage mechanism

The four-bar linkage mechanism provides geometric stability and also enables a more anatomically natural motion, similar to the motion of an actual knee joint. And, when the user sits on a chair, because the knee does not stick out much, outward appearance is more natural.

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2 Swing phase control

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3 Topics

Microprocessor controlled swing: the benefits

Response to speed variation at each step; the user can alter walking speed at will.

Up to 10 levels of speed settings are programmable. Thanks to soft initiation of the swing phase and microprocessor control, users can walk comfortably and safely.

Redesign of the circuit board extended battery life to approximately 2 years (products made since 2005). No recharging is required

If the battery runs out, the microprocessor sets the system to normal walking speed, allowing the user to continue walking, as with an ordinary pneumatic cylinder system, at a fixed valve opening.

You save time at battery replacement because no reprogramming is required.



More information about microprocessor controlled swing

▼The knee action is programmed using the "teaching & playback" method. The knee joint is taught the relationship between the specific user's walking speed and the corresponding repulsive force, that is, how much power to apply with the pneumatic cylinder. When the prosthetic leg is first fitted, three baseline data sets are collected for the user's slow, normal, and fast walking speed. Then, using the baseline data, the knee joint is automatically programmed with up to 10 different speed settings. With this controllability, it becomes possible to walk without awkwardness in daily life. Moreover, the work load on the residual leg muscles is lessened; this relieves the burden of the user. In addition, combined operation with a pneumatic cylinder provides smooth and easy control. This enables the user to walk with a comfortable and more natural-looking gait.