

Hybrid Knee

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Climbing mountains brings great satisfaction. And it's great to be in beautiful scenery. At work, I can play a full role, even where there are stairs.

And at a wedding I could get around in a dress. Now, I can join the flow of people.

This high-performance knee joint has two great functions. Microprocessor swing phase control automatically matches each step to the actual walking speed. Even when descending stairs or slopes, the high-precision yielding function prevents the knee from sudden buckling, and enables a natural gait.



hybrid Knee



A highly accurate yielding function is embodied in our new Intelligent Knee. To the controlled power of the hydraulic system we have added soft pneumatic control. This fusion of microprocessor controlled technologies gives you a hybrid system that prevents unnerving buckling at the knee, and enables easier walking in greater comfort.

Model no.: NI-C311
 Max. flexion: 140°
 Weigh limit : 125 kg / 275 lbs
 Battery life: 2 years(approx.)
 (Any of these specifications may change without prior notice)

Note: left photo is new version of the Hybrid Knee, which will be introduced in August 2010.

1 Stance phase control

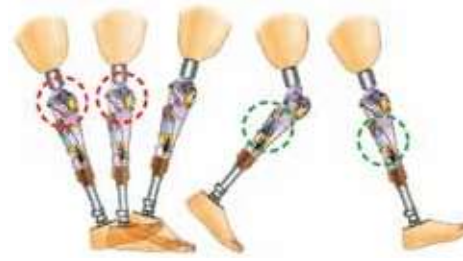
The hydraulic damper and MRS system provide a highly precise yielding function. Together they prevent knee from bending unexpectedly. They also play a role in natural stair and slope descent.



▼ Yielding function

Because hydraulic resistance supports the user's body weight, the knee bends gradually. This helps the user to walk step-over-step down stairs or slopes.

To prevent sudden buckling while walking, hydraulic resistance is effectively activated at the knee joint when the prosthetic heel makes contact with the ground. Naturally, users can walk on flat floors, but hydraulic control also enables walking over lawns and other uneven ground.



Stance phase control
Yielding function

Swing phase control
Microprocessor controlled swing

▼ MRS system

In the MRS system, along the bottom of the foot, a mechanical sensor senses where pressure occurs. The system controls yielding depending on the current location of the ground reaction force.

Controlled by the MRS system, when the heel contacts the ground, the hydraulic system is triggered to ensure user safety. Then, when force is detected at the toe end, the hydraulic resistance is released for smooth transition to the swing phase.

The MRS system harmonizes the characteristics of the stance and swing phases, enabling a more natural walking rhythm.

Since electricity is needed only for stance phase control, instead of the daily charging that other systems require, you only have to replace the batteries every couple of years.

2 Swing phase control

The pneumatic cylinder, coupled with microprocessor control of the swing, makes it possible to easily walk at various walking speeds.



▼ Microprocessor controlled swing

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.

More details at pp.9 and 10

▼ Pneumatic cylinder

The benefit of pneumatic control is a soft and light motion from the time when the knee initiates the swing. This allows the residual leg to work much less. Having to swing the leg less strongly, the user performs less work and suffers less fatigue.

3 Topics

▼ What the yielding function can do for you (According to activity level)

● For users who want to walk safely K2-K3 level

Settings are made to give priority to prevent unwanted knee bending. Even if the knee is slightly bent, when the heel is on the ground, hydraulic resistance is applied to prevent the knee from bending.

● For users who want to descend stairs K3-K4 level

On stairs, placement of the foot is important. Place the middle of the prosthetic foot on the edge at each step. When practicing, be sure to use the handrail.



▼ Note

The Hybrid Knee assists user capabilities. Without practice, no one can smoothly manage alternating foot descent. Before use, be sure to develop proficiency through adequate practice.