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Open Source Leg (OSL)

The Open Source Leg (OSL) is an untethered robotic prosthetic leg designed by the Open-Source Bionic Leg Project, based out of the University of Michigan. The fully open-source device is a low cost, high performance robotic knee and ankle system designed to facilitate comparison between control strategies and to streamline the field towards highly functional robotic prosthetic legs. Humotech has partnered with the OSL project to increase the accessibility and ease-of-use of the device in the research market by manufacturing the device and providing support services to researchers. The Humotech OSL is based on the University of Michigan's OSL v2.0.

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OSL v2 Tech Specs*

PROPERTY	SPECIFICATION	
Active Degree of Freedom	Ankle and knee joint control with onboard, geared electric motors	
Force / Torque Sensors (with Loadcell Kit purchase)	1x 6-axis load cell below the knee, also both motors give current feedback	
Angle Sensors	1x hall effect encoder at each joint (14bit resolution)	
Range of Motion (Ankle)	Plantarflexion: 30 degrees Dorsiflexion: 30 degrees	
Range of Motion (Knee)	120 degrees (0 degrees is a straight leg)	
Torque (Ankle) Rated / Peak (with Motors and Batteries Kit purchase)	19.92 Nm / 99.63 Nm	
Torque (Knee) Rated / Peak (with Motors and Batteries Kit purchase)	19.92 Nm / 99.63 Nm	
Peak Joint Speed (no load, with Motors and Batteries Kit purchase)	7.29 (rad/s) (at 33.3 VDC)	
Battery Life (normal walking on level ground, with Motors and Batteries Kit purchase)	Approximately 2 hrs	
Device Weight (with Loadcell Kit and Motors and Batteries Kit purchase)	Approximately 5.7 kg	
Device Dimensions	Length Width Total Height	~26 cm ~12 cm ~58.6 cm
Usage Limits (with Motors and Batteries Kit purchase)	Maximum body weight at 2.5 mph walking speed	100 kg
Battery Pack Voltage (with Motors and Batteries Kit purchase)	33.3 VDC	

*This information is provided by the University of Michigan Neurobionics Lab based on their recommended components. Humotech supplies the system "as is" and makes no guarantees regarding performance, suitability, or specific outcomes.

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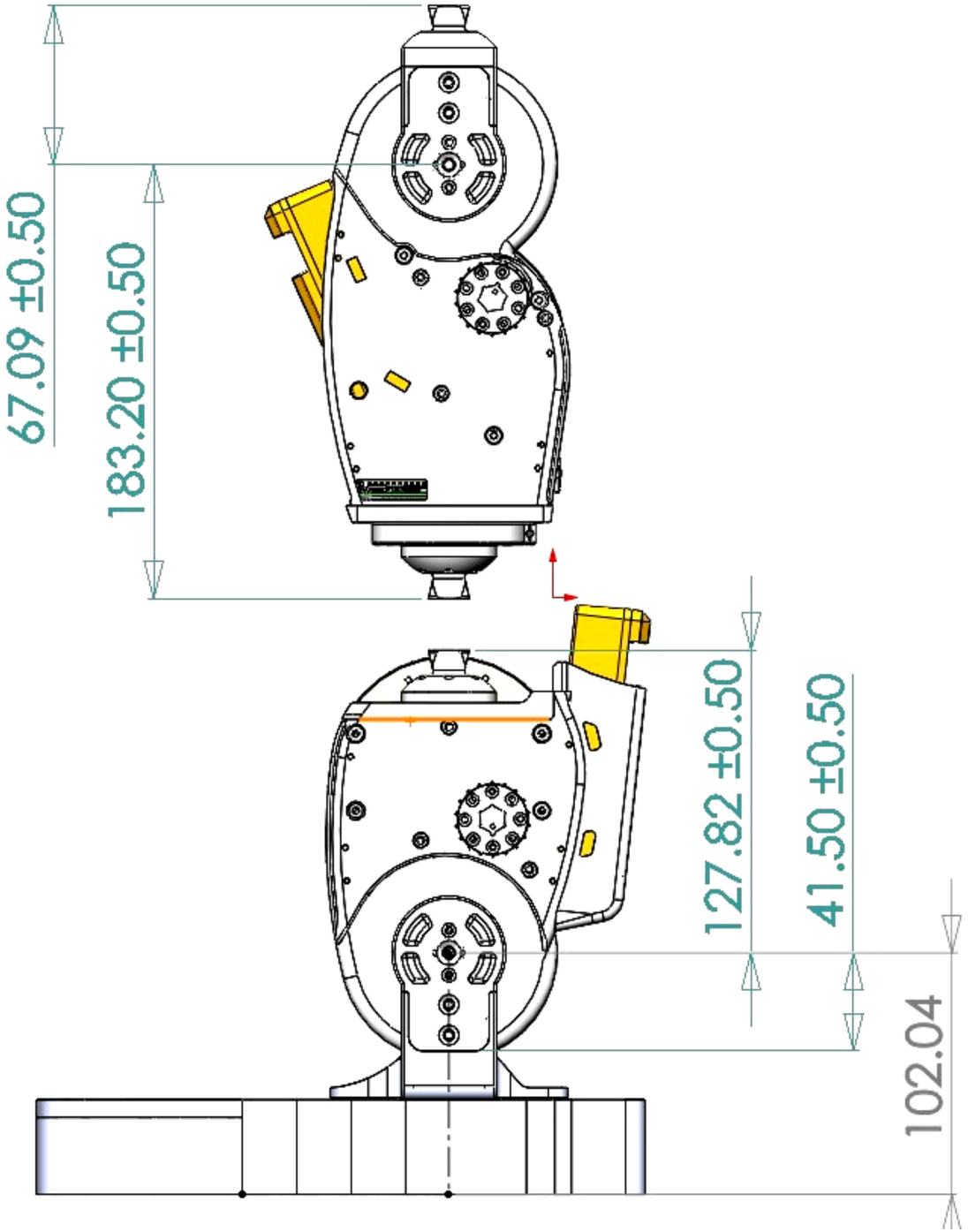

OSL v2 Assembly Schematic*

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Menu Item	Description	Contains
Baseline OSL	This is the foundational platform of the OSL. All other options require this as a starting point. If you only need the mechanical components and plan to source your own motors, batteries, and force sensors, this is the right choice. All other menu items also assume this selection.	Mechanical components (housings, pulleys, bearings, belts, fasteners, flat feet, etc.) Electrical components (Raspberry Pi, an SD card, joint encoders, BA30 connectors, etc.)
Loadcell Kit	A 6-axis loadcell to collect data and/or use in your control loop. This is custom designed by the Neurobionics Lab and is assumed to be used in the publicly available software.	1 below knee 6-axis loadcell selected by Neurobionics Lab. 1 strain gauge amplifier designed by Neurobionics Lab. Mounting hardware and electrical connectors
Motors and Batteries Kit	A motor and battery set for both the knee and ankle. These are the recommended components from the Neurobionics Lab, around which the rest of the OSL was designed. They are also assumed to be used in the publicly available software. If you don't want to modify parts or handle motor and battery selection, this is the option for you.	2 motors selected by Neurobionics Lab. 2 Batteries selected by Neurobionics Lab. 1 Smart Dock for Batteries. Mounting hardware and electrical connectors. Basic setup of the ActPack firmware as recommened by the Neurobionics Lab.
VariFlex Foot Kit	A prosthetic foot for use with your OSL! This is the recommended foot from the Neurobionics Lab. It allows you to fine-tune the performance of the OSL through shoe size and stiffness selection.	1 foot with your choice of size and stiffness category. 1 left and 1 right foot shell, with your choice of color and mounting hardware.
Carrying Case	1 hard shell carrying case large enough for your OSL.	1 hard shell carrying case with custom foam.
Extra Battery	An extra battery for your Motors and Batteries Kit so you don't have to wait for them to charge.	1 Battery selected by the Neurobionics Lab.
Extra Smart Dock	An extra Smart Dock for your Motors and Batteries Kit so you can charge 2 batteries at once.	1 Smart Dock selected by the Neurobionics Lab.
Bent Knee Adapter	An adapter that allows use by individuals without an amputation. It is intended for testing your work before an end user wears it.	1 Bent Knee Adapter.
Lift Shoe	A shoe designed to pair with your Bent Knee Adapter and help maintain a natural gait.	1 lift shoe in the size of your choice.

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OSL v2 Menu

All system components will be sourced by Humotech and are warrantied against manufacturing defects, except the Dephy motors, batteries, and battery chargers, as well as the Neurobionics Lab strain gauge amplifier, which are provided without warranty. All electromechanical components will be tested and verified to be fully functional in isolation; however, full system testing (e.g., walking) with Open Source Leg controllers is the customer's responsibility.

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