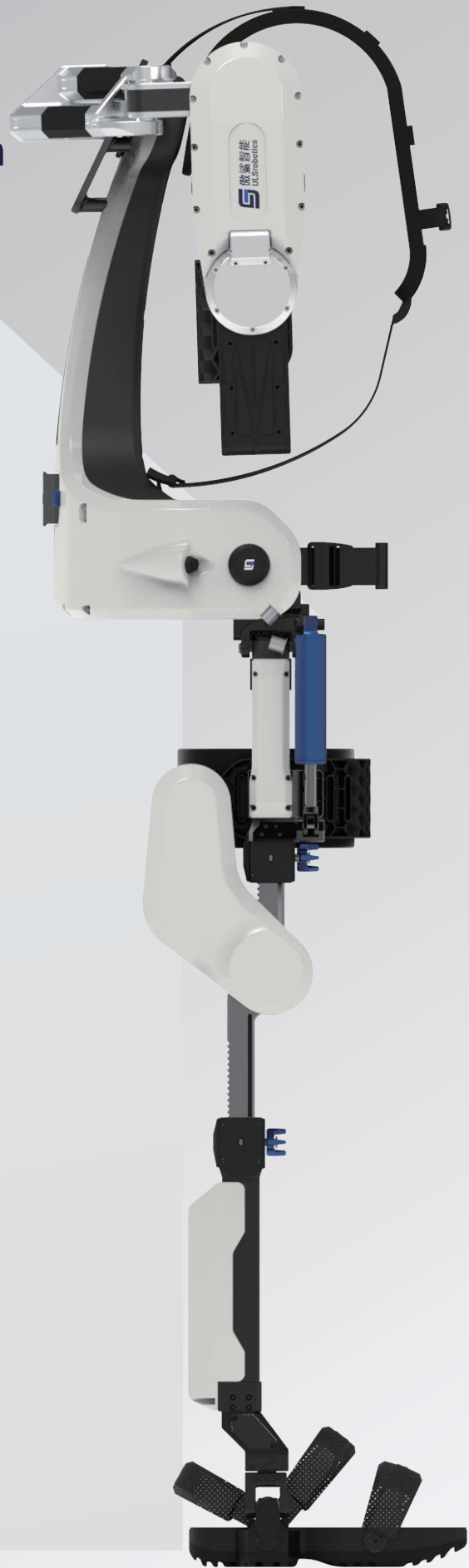


ULS ROBOTICS

BES-Ultra

Whole-body drive exoskeleton robot



BES-Ultra

Whole-body drive exoskeleton robot

Product introduction

The Belt-drive Exoskeleton System (BES-Ultra) is a whole-body exoskeleton derived from ULSrobotics' professional products. It is designed to enable universities, R&D institutions and medical research centers to conduct further development and research.

The BES-Ultra utilizes ULSrobotics' independently developed intelligent digital drives, integrated modular deceleration system, and adaptive motion control. Combined with ULSrobotics' proprietary software impedance, self-learning gait, and AI motion algorithms and pattern recognition, it achieves high performance. The product features a lightweight and modular design that is interchangeable with lumbar exoskeletons. It also includes a flexible 32-channel plantar pressure sensor array, independent hip and knee joint position sensors of at least 16 bit, and visualized leg length adjustment. The BES-Ultra provides developers with a high-performance, cutting-edge exoskeleton solution.



Servo power unit



Force impedance control technology



Force control integration drive unit



ULSrobotics's integrated TBG (Twist Belt Gear) deceleration system



Flexible plantar pressure sensing array with two feet and 32 channels



Long-term lithium battery management system



Exoskeleton IoT motion data platform



HMI highly matched adjustable mechanism and visual rapid height adjustment module

Cutting-edge system architecture for exoskeleton software





Supports applications in human augmentation, assisted walking and medical research.

| Embedded system architecture | | | | | | | | | | |
|------------------------------|-------------------------|-------------------------------------|--|---|---|---------------------|-------------------------------|--|-------------------------|--|
| API SDK Function package | Customizable gait curve | Non-gait curve | Adaptive force following gait | Force impedance control assistance software package | Position mode control | Torque mode control | Continuous PVT motion control | adjustment of motor controller for hip and knee joints | Phase calibration, etc. | |
| Software language | Unity (C#) | | VS (C#, JAVA) | | | MicroPython | | MATLAB | | |
| Communication system | CAN (CANOPEN) | Ethernet | TCP/UDP | WIFI | UART | USB | | 4G IoT | | |
| Hardware bottom layer | Support EMG | | | Support OpenBCI | | | Support Leap Motion | | | |
| | Support scalable RTOS | | | ARM-based hardware driver Lib | | | BSP | | | |
| | Motor drive system | Flexible force sensing array system | Double coding position feedback system | | Digital man-machine interaction interface | | Scalable CAN LAN | | | |

NEW

WHOLE-BODY DRIVE EXOSKELETON ROBOT

ULS ROBOTICS – BES-Ultra

-  Burden alleviation
-  Assistance
-  Walking assistance
-  Data IoT

Battery life 3-4h

32 channels for plantar pressure

Equipment weight <25kg

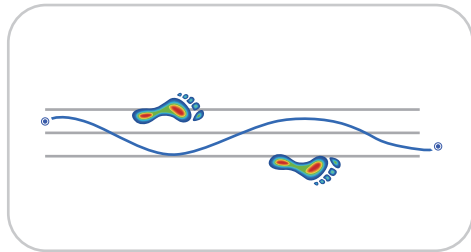
16 degrees of freedom



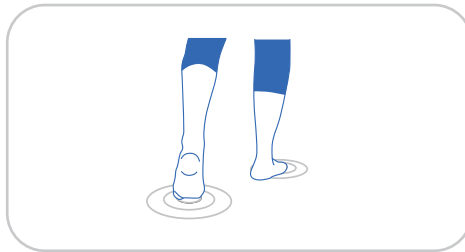
Supports diverse applications and development functions

ULSrobotics's unique mechanical impedance software algorithm, self-learning adaptive standard gait, non-standard gait and AI-based motion control algorithm and pattern recognition

Development function



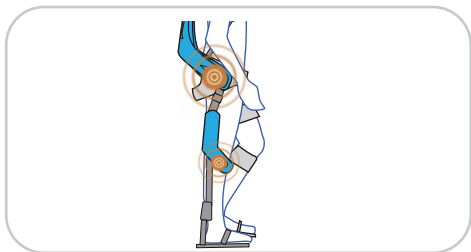
Customizable gait curve



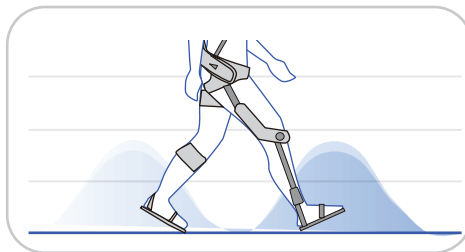
Adaptive force following gait



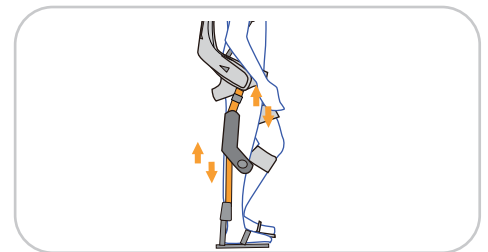
Force impedance control assistance software package



Torque mode control



Continuous PVT motion control



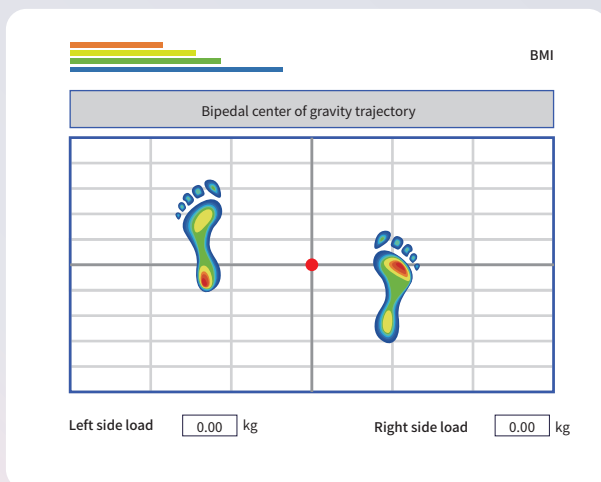
PID adjustment of motor controller for hip and knee joints

Open data and a rich suite of development APIs

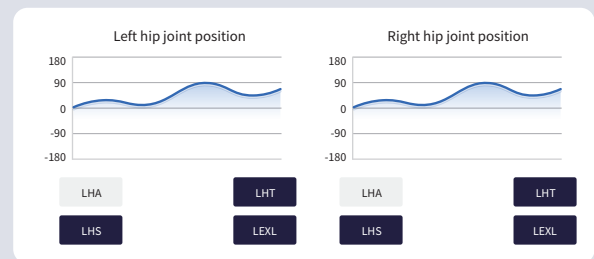
The exoskeleton communicates wirelessly to display posture and assistance data in real time, enabling customized data calibration.

Data function

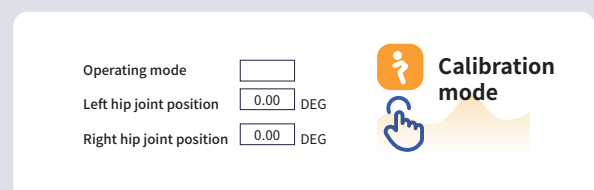
Plantar pressure data



Exoskeleton data curve



Individualized data calibration



Human-machine integration makes an optimal teaching aid for exoskeleton

Advantages



Excellent performance



Rich functions



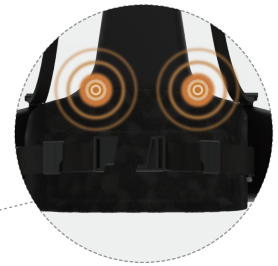
Open interface



Data support



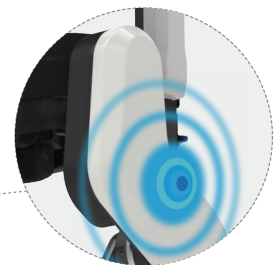
Adjustable upper limb assistance



Multiple APIs (support direct control of the position and torque)



Fast visual adjustment and locking of height and leg length



Torque mode control



Adaptive force following gait



Plantar pressure distribution



Application field



Powerful equipment technical parameters to meet your application requirements



Whole-body exoskeleton robots/**product specification**

ULS ROBOTICS **BES-Ultra**

| | |
|-------------------|---|
| Equipment weight | <25kg (including 1 power battery) |
| Working time | 3-4 h/battery |
| Battery type | Lithium battery 20~42v |
| Height range | 160~185cm (support height adjustment) |
| Standard software | Motion control software, embedded system software, real-time discrete bus system software |
| Plantar pressure | 32-channel plantar pressure data support |
| Degree of freedom | 16 Degrees of Freedom Ontology, 8 Active Degrees of Freedom, 8 Passive Degrees of Freedom |
| Driving unit | Drive and control integrated low-voltage torque servo motor system, integrated gearbox |

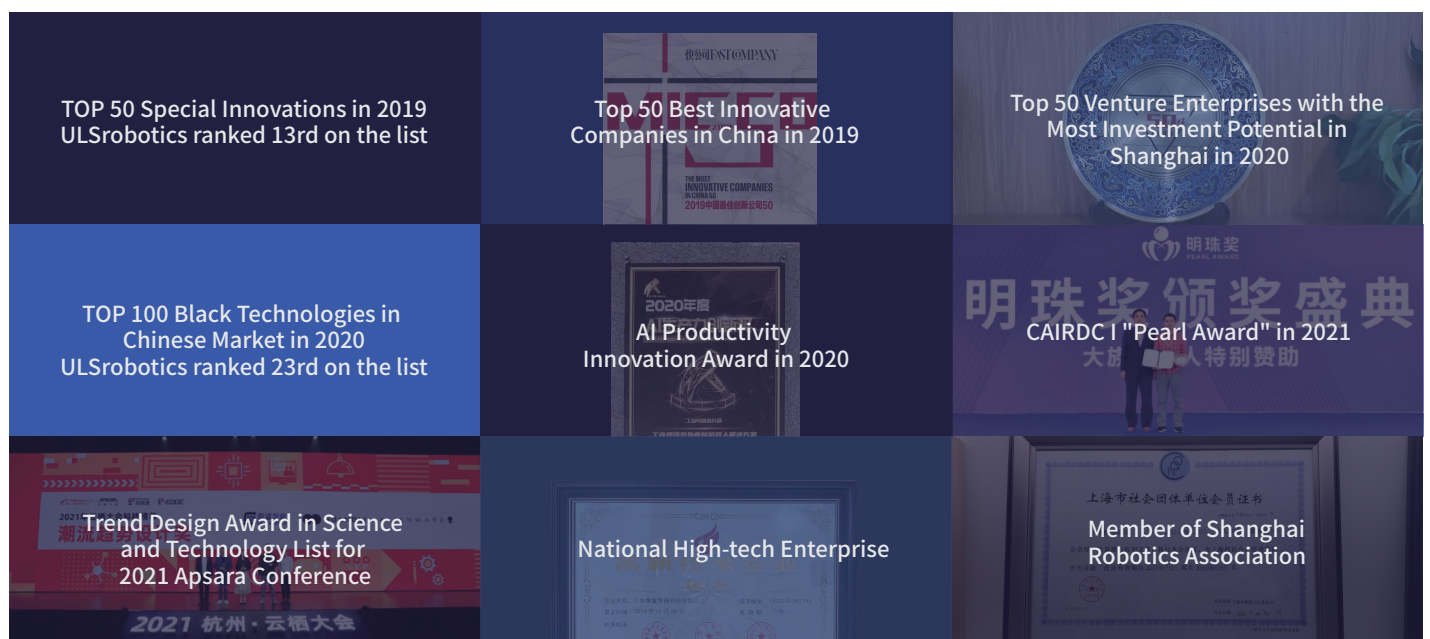


Company profile

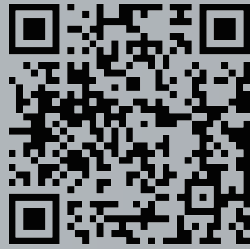
ULSrobotics, founded in 2018 and headquartered in Science Park of Shanghai University of Finance and Economics, Shanghai, China, is a high-tech company based on robotics exoskeleton technology platform. ULSrobotics is dedicated in developing, manufacturing and supporting solutions for industrial, medical and educational fields with exoskeleton robots.

ULSrobotics' core R&D team is one of the earliest companies in the world to engage in exoskeleton robotics research and development, with rich experience in designing and developing robot control systems, motion-control algorithms, multi-sensor data fusion, human-computer interaction and machine vision, etc. ULSrobotics' exoskeleton product line covers upper limb, waist, lower limb and whole body, etc. The products have obtained ISO9001 quality certification and CE safety certification. Till now, ULSrobotics has a wealth of application scenarios, such as automobile manufacturing, aviation ground services, electric power, mining and educational research.

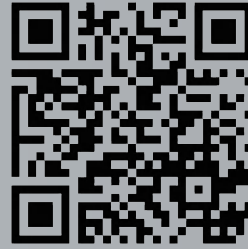
Enterprise honor



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EMPOWER HUMAN BEING INFINITE



021-80158675

For more information, please visit www.ulsrobotics.com.

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