



KIT-EXO-1

The exoskeleton KIT-EXO-1 was developed with the aim to augment human capabilities or to use it in rehabilitation applications. It has two active DOF at the knee and ankle joint to support flexion/extension movement. The linear actuators consist of brushless DC-motors, coupled to planetary roller screws and an optional serial spring. They are equipped with absolute and relative position encoders as well as a force sensor and can be controlled via the ArmarX software framework (<https://armarx.humanoids.kit.edu>). Eight additional force sensors, which are distributed on the exoskeleton measure interaction forces between user and exoskeleton at thigh, shank and foot and can be used for research on intuitive exoskeleton control or to assess the kinematic compatibility of new joint mechanisms.



Key Features

- Lower limb exoskeleton with 2 DoF
- Linear actuators with force and position sensing
- Eight force sensors measure interaction forces between human and exoskeleton
- Position, velocity, current and force control on joint level
- CANopen and RS-232 (over USB) communication

Possible Applications

- Exoskeleton control based on actuator and interaction forces
- Assessment of the kinematic compatibility of new joint mechanisms
- Motion classification or prediction with a multi-modal sensor setup
- Tests of new joint mechanisms for knee and ankle joint

Access information

Corresponding infrastructure	Karlsruhe Institute of Technology Institute of Anthropomatics and Robotics - High Performance Humanoid Technologies Lab (IAR H2T)
Location	Adenauerring 2, 76131 Karlsruhe, Germany
Unit of access	Working day



Technical specifications

OS	Ubuntu Linux 16.04
Interface	CANopen / RS232 / USB
Power supply	48V, 10A peak
Total Weight	4 kg
Actuator force	3000 N
DoA	2
Actuator speed	100 mm/s
Software	ArmarX

Additional information

Additional Information available [here](#) and [here](#).