# PRELIMINARY DATA SHEET

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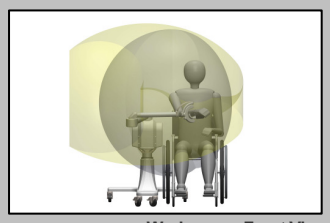
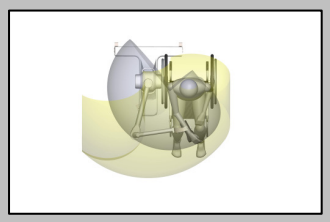
***Proficio*** *{prō·fis′·ē·ō};*
***1.*** *To make progress, push forward, advance.* ***2.*** *To be of use, assist, help.*

Bimanual Force-Feedback



Workspace: Front View

Workspace: Side View



Workspace: Top View
Dark area: Human reach
Light area: Robot reach

## *APPLICATIONS*

- Neurorehabilition research
- Haptically-enabled control
- Workspace scaling
- Force scaling
- Process engineering
- Human-machine interaction
- Teleoperation

# Proficio™

**Research Edition – Not for clinical use**

## *Robot-assisted Rehabilitation Large-workspace Haptics*

**3D Force Control, Big Workspace, Compact Form**

With a workspace nearly overlapping the full range-of-motion of an adult's arm, Proficio was designed to be the haptic device of choice for those who desire high-fidelity force feedback throughout a human-sized work volume.

**In the Clinic**

Help patients regain functionality after a stroke using proven, established techniques for rehabilitation. Proficio's streamlined, easy-to-use therapist interface offers the ability to create and manage patient-specific rehabilitation profiles. Choose engaging games that address the patient's unique needs, then customize the game parameters to provide an appropriate level of challenge, and track patient progress over time.

**In the Lab**

Explore new modalities for upper extremity rehabilitation. Develop and assess robot-assisted therapies using the latest neurorehabilitation theories such as error augmentation, deficit fields, negative viscosity, active impedance, and intention remediation. Use Proficio's high-resolution force and position datalogging capabilities to help analyze motor functions from a data-driven perspective. Proficio's wiring was designed to support custom endpoint attachments with your own actuators and/or sensor signals.

**Easy as P-I-E**

- **Portable**: Proficio's low weight and compact size allows it to be moved and installed wherever it is needed.

- **Intuitive**: It is quickly and easily adaptable to different body types, and for right or left-handed operation.

- **Effective**: With transparent dynamics, low inertia, and high fidelity, Proficio is designed to be unobtrusive while giving center-stage to your force-enabled task.

**Safety and Reliability**

Built on over 25 years of proven technology, Proficio's gearless drives operate with the safety of natural backdrivability that comes from using pure *impedance control*. Proficio's low-power actuators are able to apply sufficient forces without the dangers of high-powered ball screws, geared drives, and delicately-calibrated sensors found in *admittance control* devices. Plus, a robust and intelligent safety system continuously monitors force and velocity. If any safety limits are exceeded, Proficio shuts down gracefully and allows full freedom of movement.

**Two is better than one**

Use two Proficios to create a bimanual system with force-coupled overlapping workspaces unlike anything else on the market.

**Open source, Open mind**

Proficio's control library runs on Linux, and it is completely open source. You have direct access to everything from low-level motor torques in realtime to high-level motion and force control with C++ and Python bindings. You can use ROS to leverage a huge library of robot code from path planning to vision and beyond. Set your mind free to develop your own revolutionary force-enabled applications!

## *SPECIFICATIONS*

| | | | |
|---|---|---|---|
| **Power Requirements** | Single-phase 110/220V 50-60Hz | | |
| **Reach** | | 1.05 | m |
| **Workspace** | | 960 | liters |
| **Total System Mass** | | 11.5 | kg |
| **Max force** | Safety-limited | 45 | N |
| **Max velocity** | Safety-limited | 1.5 | m/s |
| **Mechanical stiffness** | | 5000 | N/m |
| **Control stiffness** | | 2500 | N/m |
| **Position resolution** | | 200 | µm |
| **Force resolution** | | 5.6E-3 | N |
| **Operating temperature** | Min | 0 | ºC |
| | Max | 85 | ºC |

*TECHNICAL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE*

*Revision: 2015-03-20*