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## Highly Effective Hybrid Support for Manual Assembling Tasks

### Focus Sectors

- Industrial Assembly
- MFG
- Robotics
- MedTech

### Key Words

- Precision Mechanics
- Manual Assembly Support
- Automatisierung
- Hybrid Robotics
- Industrial Robotics
- Workflow Optimization
- Exoskeletons

### Development Status

- Prototype I *passive support*
- Prototype II *active support*

### Patent Procedure Status

- DE Patent filed
- EP Patent filed

### Chances for Cooperation

- Licensing
- Patent Sale
- R&D Cooperation

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### Innovation and Customer Benefit

The Technology has the explicit goal to actively and/or passively support and ease work movement.

This is achieved through a sensor-equipped supporting structure for the upper extremities that can be equipped to different tasks such as following a given workflow or easing a high precision movement.

The main benefits of this hybrid system are:

- High Workflow & Assembly Precision
- Optimized Use of Human Sensors
- Optimized Production
- Reduced Mental & Physical Stress
- Process Securization (i.e. by Poke-Yoke mechanisms)
- Yield Improvement
- High Customization level

### Possible Applications

The Technology offers a wide range of applications, ranging from Assembly Optimization in all sectors where manual assembly at a high level of precision or under repetitive physical stress is needed up to possible applications in medical rehabilitation.

It is also possible to equip the device with sensors to either measure or activate forces and thus optimize assembling tasks by limiting variances.

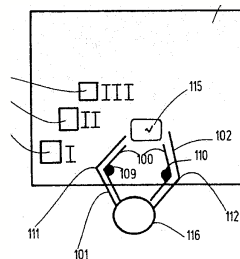


Fig 1: Set-Up: Schematic Top View

### Technical Description

The basic version of the technology is a sleeve combining biological and technical kinematic modules, to be fitted on the user's arm in order to simulate a kinematic sequence of modular joints. Ergonomics and user driven specifications are a must in this context.

The set-up presents a high variance as to provide the user with maximum flexibility. Each module can be activated separately or in conjunction, as needed.

The device works in direct feedback with a computer or a humanoid robot at the other end. Both lifting and assembling tasks can be actively supported by reinforcing the acting forces or offering a secure rest and directing the workflow. Optical controls or mechanical tools can be added to improve effectiveness.

Movements can be recognized at their very beginning and thus corrected or directed according to need. It is possible to achieve a high level of customization reflecting production needs but also the personal needs of the user.

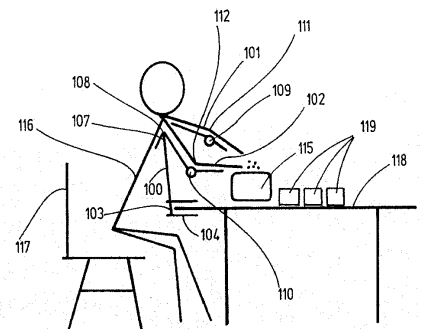


Fig 2: Set-Up: Schematic Side View