

- 1 Automated erection of solar power plants using a mobile cable robot.
- 2 Cable-driven parallel robot IPAnema.
- 3 Heat distribution of a winch.

## CABLE-DRIVEN PARALLEL ROBOT FOR AUTOMATED HANDLING OF COMPONENTS IN ALL DIMENSIONS

### Market Requirements

The use of robots for the erection and maintenance of large plants and facilities promises significant cost savings. Up to now big and/or heavy components are mostly handled using conventional cranes.

- Payloads of up to 40 kg
- Low energy consumption

Performance characteristics of cable robots like speed, payload and workspace can be tailored in a wide range for specific applications: workspaces of up to 100 m x 100 m x 30 m can be realized for specific applications. Payloads of up to several tons per cable are possible due to the outstanding power transmission of the cables.

### Concept and Application Scenarios

Cable-driven parallel robots are an innovative approach for handling tasks with extraordinary requirements. The cable-driven parallel robot demonstrator IPAnema at Fraunhofer IPA achieves performance characteristics beyond the capabilities of conventional industrial robots:

- A large workspace (4 m x 4 m x 3.5 m)
- High speeds of up to 2.5 m/s

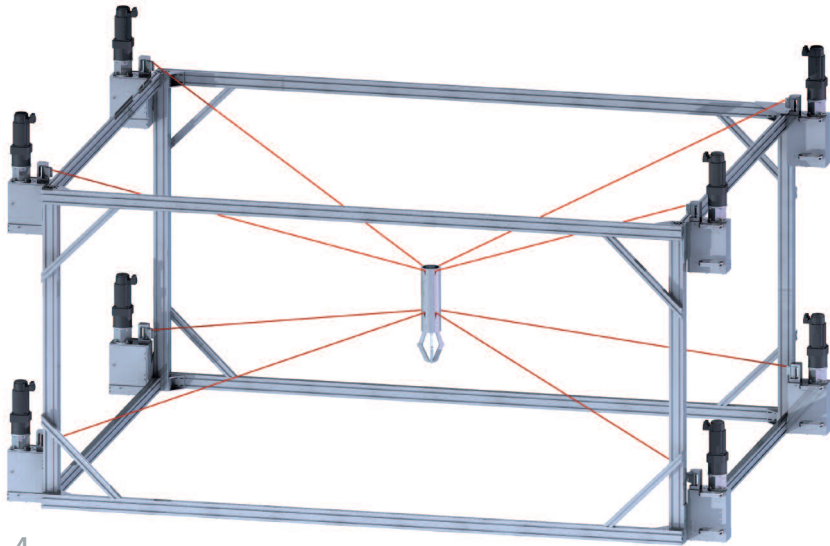
The cable-driven parallel robot IPAnema is controlled by an industrial proven, real-time NC-controller. The ability to program the parallel robot in G-Code (DIN 66025) ensures easy operation. Optionally, the integration of a programmable logic controller (PLC) is possible thus allowing easy integration into an existing production environment.

### Fraunhofer Institute for Manufacturing Engineering and Automation IPA

Nobelstrasse 12  
70569 Stuttgart | Germany

Contact  
Dr.-Ing. Andreas Pott  
Phone +49 711 970-1221  
andreas.pott@ipa.fraunhofer.de

[www.ipa.fraunhofer.de](http://www.ipa.fraunhofer.de)



4

Additional cables and winches can be added to increase the safety for lifting particularly heavy loads or sensitive goods or to enlarge the workspace of the parallel robot.

### **Cable-driven parallel robots can easily be integrated**

The main parts of the cable robot are compact winches that can be easily integrated into existing set-ups. The small footprints of the components of the cable robot thus allow automation of production and handling tasks even under tight spatial restrictions.

### **What We Offer**

- Feasibility studies using our cable-driven parallel robot demonstrator IPAnema
- Detailed analysis of your application scenario and design of a cable robot system tailored for your requirements
- Conceptual design and installation of cable robots
- Production and set-up of cable robots

### **Your Benefits**

Cable robots allow for accurate and quick handling of heavy components and goods over large workspaces. For the handling of small payloads extreme short cycle times are possible due to excellent dynamic properties. Cable robots allow the automation of production and handling tasks where conventional robots fail to supply technically or economically feasible solutions.

*4 Cable robot concept with eight cables. designed for handling tasks.*