

# Reference

Material transport in cleanrooms: How PohlCon increases the efficiency of Fabmatics' high-tech robots with its WCPS contactless charging infrastructure



The Dresden-based company Fabmatics specializes in the automation of handling, transport and storage processes in semiconductor factories. Everything revolves around the safe, precise and particle-free handling of high-value wafers, the silicon wafers on which microchips are manufactured. To implement this challenging transport task, Fabmatics has developed, among other things, the HERO@FAB mobile robot.

## Target requirement for production logistics in a clean room

Energy supply is a special challenge for mobile robots, since the systems must be operated 24 hours a day, 7 days a week. To fully exploit the potential of automated and flexibly plannable material flows in cleanrooms, an intelligently planned and process-safe power supply strategy for mobile robots is required.

## Current challenge

Since production structures in older semiconductor factories have grown historically and were designed for manual material transport, the charging stations for mobile robots often have to be relocated to separate loading zones due to a lack of space. This is inefficient because recharging occurs outside the robots' direct work areas.

The often contact-based charging processes mean both time lost due to unnecessary walking to and from the charging station and downtime during the charging process itself. Rail-mounted charging solutions, directly at the equipment itself, do not offer operational flexibility, with higher charging infrastructure costs at the same time.

The goals of maximizing the operational readiness of autonomous helpers and their flexible availability are thus not achieved.

The consequence: a lower work cycle and thus less material movement.

Other issues such as occupational health and safety, electrical safety, loading process safety and protection of the cleanroom from contamination make the selection of the loading system a factor to be actively considered in fleet management and space planning (lack of space, layout of equipment, work orders, etc.).

#### **Achieving targets via the right charging infrastructure**

In order to turn the disadvantages of the current mostly contact-based energy supply in cleanrooms into advantages for material handling, the loading process must be inconspicuously integrated into the work processes and be subordinate to them. The technology suitable for this is inductive energy transmission with the matching and easy-to-implement charging infrastructure - the WCPS system from PohlCon.

**"The continuous operational readiness of the robots without interruption and spatial restrictions is the goal of a smart energy supply, which is succeeds with WCPS."**

**Dennis Thiele, Team Leader Competence Center New Business, PohlCon**

## About

Fabmatics is one of the leading suppliers of automation solutions in the semiconductor industry. The product portfolio includes solutions for handling, transport and storage of wafers and photomasks as well as systems for real-time identification and localization of products. Fabmatics also supplies handling products to well-known equipment manufacturers for use in semiconductor fabs.

Founded in 1991, the company has been successfully implementing automation projects in the semiconductor industry for more than 30 years. This has resulted in a strong market position, especially in the modernization of 200-millimeter semiconductor fabs worldwide.

The HERO@FAB combines an established, clean and safe robot system with an innovative drive unit.

It was developed to load and unload process equipment fully automatically and enables fast transport between production facilities as well as various intermediate storage areas in the clean room.

All common material carriers such as open cassettes, SMIF and RSP pods as well as FOUPs containing the precious wafers can be transported. Special solutions have also been implemented, such as the wet transport of wafers in a 60-liter basin.

With the WCPS raised floor system and the integrated contactless charging technology from Wiferion, it is now possible to realize an uninterrupted and safe energy supply for mobile robots in cleanrooms within the work process.

The WCPS raised floor unit is flexibly integrated into existing cleanroom raised floor systems. In both room and power supply planning, completely new degrees of freedom are now available to focus once again on the interaction between production systems, material flow planning and robots. With the WCPS system, it is now possible to non-value-added secondary processes such as robot loading can be disregarded, since the WCPS raised floor unit can be installed anywhere in the cleanroom.

Due to the in-floor power supply by means of raised floor, the loading takes place "on-the-fly", i.e. during the handling of the robot. With no restrictions on productivity, traffic and work paths, or process reliability. The combination of inductive energy transfer and the WCPS raised floor system makes it possible to make ideal use of the HERO@FAB's flexibility. In addition, the contactless energy transfer prevents contamination of the clean room through material wear.

In addition to the indispensable object safety, the HERO@FAB also fulfills far-reaching safety requirements that exist when man and machine interact in the same work area. Thanks to the omnidirectional kinematics, it can be moved completely freely in space - without a rail or cable connection. This means that even narrow and angled areas of a semiconductor factory can be reached.

Under the **PUK brand**, PohlCon designs, develops and produces high-quality cable management solutions. The latest innovation is a robust, efficient, reliable and unobtrusive wireless charging infrastructure in the ground. It supports the special requirements of contactless electrification and protects charging equipment in modern production and logistics facilities where autonomous robot fleets are deployed. PohlCon's WCPS raised floor system meets the stringent requirements for ISO 3 cleanrooms.

In cooperation with Wiferion and using the highly efficient etaLINK 3000, PohlCon offers a comprehensive in-floor loading solution for fleet operators, AGV manufacturers and automation planners, for which the process determines the loading location and not vice versa.