

1 VINCENT expedites the development of PLC and robot programs.

INTEGRATED DEVELOPMENT OF PLC AND ROBOT PROGRAMS

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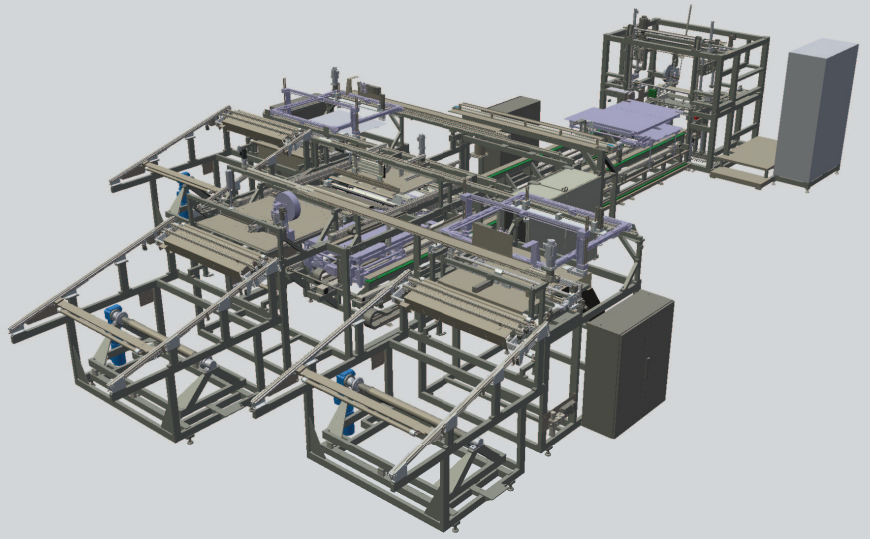
Different Systems, Different Planning and Simulation Tools

Complex automated manufacturing cells usually consist of a combination of different work stations such as assembly stations, interlinking systems and robots. The first are controlled by one or more PLC. Robots have their own controllers. A wide variety of actions between them have to be synchronized but the programs are developed in separate systems, making combined testing difficult. Whereas offline robot programming is state-of-the-art, PLC programs are normally not written and tested until the system is finished or has been developed in a complex model. Errors that go unnoticed until the system has been built incur significant resultant costs. Development, testing and virtual commissioning of every component before manufacturing commences cuts development risk dramatically, shortens development

and commissioning times, and provides manufacturing with qualitatively validated design engineering. The VINCENT system developed by the Fraunhofer Institute for Factory Operation and Automation IFF in Magdeburg does exactly this.

Standard Programming for Robots and Peripherals

VINCENT seamlessly integrates PLC and robot program development. Both PLC-controlled axes, including sensors, and several robots from different manufacturers are collectively taught and tested in one integrated environment. The system layout is loaded in VINCENT from the CAD system and a virtual function model is created automatically. Robot movements are taught on the virtual model using all of the capabilities of advanced offline programming systems. Any



common motion command (PTP, LIN, CIRC, approximate positioning, etc.) can be generated in any coordinate system. Logical elements of robot programs such as loops and conditions are entered in a graphics editor quickly and easily.

All of the peripherals' operations controlled by PLCs are also programmed in the same development environment by performing them in the virtual model.

Importing Manufacturing Programs from CAM Systems

Robot programs created on the basis of part geometry in CAM systems can be imported directly into VINCENT. An import module specific to the robot reads the robot program generated by the CAM system and converts it into the internal VINCENT representation. The program can be simulated in VINCENT immediately.

Offline Verification of the Function of the Entire Manufacturing Line

When the movements of robot and PLC-controlled axes are taught by performing them in the virtual model, individual modules as well as the entire manufacturing cell can be simulated and displayed in 3D. An integrated collision detector reveals errors in the process immediately.

A material flow simulation integrated in VINCENT represents non-varying and shape-varying parts.

The combined discrete event simulation of every axis of the robot and peripherals precisely ascertains execution times. Time-sensitive sub-processes are thus detected at an early stage and can be optimized.

Vendor-Neutral PLC and Robot Program Generation

Every operation is functionally planned, simulated and optimized in VINCENT independent of the hardware and subsequently converted into the target system's concrete control code. VINCENT users do not need indepth knowledge of robot and PLC languages to plan processes or special knowledge to create simulations. The generated control code already includes every mechanism that connects a PLC and robots needed for the target systems.

Your Benefits from VINCENT

- Integrated and combined planning and programming of all of a manufacturing cell's operations
- Parallelization of development, program generation and virtual commissioning
- Early detection of errors and vulnerabilities
- Testing and optimization of every operation before the system starts being built
- Elimination of subsequent modifications on the real system.

Technology Partner for SMEs

VINCENT's functions, usability and price are tailored to the needs and capabilities of small and medium-sized custom machine and equipment manufacturers.

We use our experience with digital engineering and the VINCENT software system developed by us to help you with integrated and thus effective and efficient development of complex manufacturing cells.

2 *Integrated controller development with VIN-CENT validates engineering.*