Fraunhofer IPA

Fraunhofer Institute for Manufacturing Engineering and Automation IPA

The pitasc modular system

Many applications. One software solution.

The software toolbox for force-controlled assembly can be used, reused and transferred to a wide range of applications and robot systems.

Many assembly applications involve small batch sizes and high variant numbers. Added to this, part tolerances and process uncertainties often have to be dealt with. Up to now, there has therefore been no suitable economic automation solution for numerous assembly applications.

To overcome these challenges, automation solutions must be quick and easy to retool and reprogram, use sensors to detect the current state of the components and be able to react accordingly. Special-purpose machines for specific assembly applications or robot solutions with fixed programs are often unable to meet these requirements.

Modular and flexible
With the pitasc modular system, the experts at Fraunhofer IPA are developing a software solution which allows such demanding assembly processes to be programmed in a structured and modular manner. Prefabricated program modules make it possible to implement applications quickly and flexibly.

Reliable and robust processes
The pitasc software detects process forces via a robot's force-torque sensor system so that force-controlled search and joining strategies can be developed. Component and position tolerances are compensated for, thus ensuring optimal force distribution even in the case of small and delicate components.

High variant numbers
Pitasc describes program blocks from the point of view of the workpiece or tool and uses simple parameters to adapt them to the respective assembly process. In conventional robot programming, long lists of target positions generally have to be adapted for a new product variant. With pitasc, however, the assembly process can be executed easily and directly by simply updating variant parameters.

Parts can be gently inserted or snapped into place with great efficiency, e.g. such as when mounting components on top hat rails for a control cabinet.

Manufacturer-independent
Pitasc is compatible with most hardware brands and technologies and is already supporting several robot manufacturers such as Universal Robots, Kuka, Denso, and Franka Emika.

One software – many applications

Numerous applications, such as mounting components on top hat rails in a control cabinet or plugging in plastic components, demonstrate the versatility of the software solution. No single-purpose solutions have been developed. Instead, all applications use the same basic program blocks, which are combined as required.

Your advantages

The technology can be used to efficiently perform assembly tasks that were previously difficult to automate. Through being able to reuse the developed program modules, reference applications can serve directly as a basis for numerous other assembly tasks, many of which could not be automated cost-effectively up until now.

Are you a system integrator or an automation expert? Stand out from the competition and expand your capabilities by enabling your automation solutions to perform tasks that are not economically feasible using today's technologies. Reuse your solutions from one project to the next to further extend your lead.

Benefit from robot systems that can be programmed quickly and flexibly and seize the opportunity to solve challenging assembly tasks with Fraunhofer IPA in an economically viable way.

Are you an end user looking for new automated assembly solutions? We will gladly assist you all the way from conceptual design to the real cell. As manufacturer-independent experts, we work with the system integrators and component suppliers of your choice to jointly develop tailored automation solutions.

Our services

Fraunhofer IPA is your consultant, development partner and technology supplier for all aspects of assembly automation.

Contact us to discuss the best steps for your project in a personal meeting.

Our methodical approach typically involves the following steps:

- Initial workshop
- Analysis of automation potential
- Conceptual design
- Feasibility studies
- Implementation support
- Optimization of existing systems

We are looking forward to hearing from you.

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