



Applied SmartFactory® Equipment Automation

An automation design and control framework providing equipment integration and logic sequence orchestration through run-time execution of automation services.

INDUSTRIES

- Front-end semiconductor wafer manufacturing
- Semiconductor packaging and test
- Display manufacturing

FEATURES

- Integrated with SmartFactory portfolio
- Graphical flow editor for automation scenario design & visualization
- Run-time monitor for development, diagnostics, and troubleshooting
- Industry standard WinSECS foundation
- Common call library with 150+ functions
- Pre-defined automation templates
- Deployment and management interface

BENEFITS

- Faster time to deploy automation program
- Enables semi-auto and full-auto processing
- Provides a flexible design environment to customize automation control logic
- Human readable logic flows for development and change control
- Configurable verbosity of event / message log
- Reduces human error with run-time recipe management
- Improves productivity with automated run-time decisions
- Easily scalable with factory growth

CHALLENGES

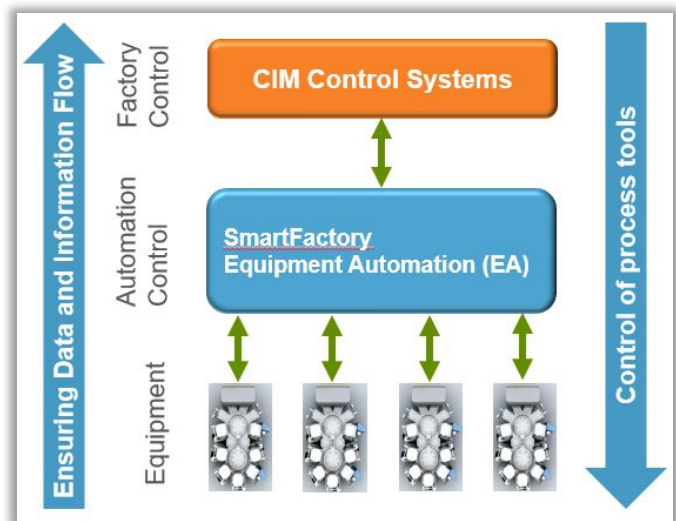
Factories continuously seek out opportunities to increase productivity, reduce errors and scrap losses, and reduce costs. Automation levels continue to increase in both deployment scale and complexity to optimize these factors. SmartFactory™ Equipment Automation enables logical execution of expert defined sequences to address key challenges:

- Managing utilization of assets and maximizing output
- Validating the process sequence and determining recipes
- Accurate data collection for engineering and quality records
- Minimizing human variability and production interrupts
- Containment of scrap events based on early indicators

PRODUCT DESCRIPTION

SmartFactory Equipment Automation (EA) is an automation control framework, providing equipment integration, automation scenario design, and run-time orchestration of independent manufacturing tools. Steps and functions included in the automation flow can be customized to support manufacturing facilities current and future automation requirements. EA is easily scalable, utilizing an Automation Control Engine (ACE) distributed architecture.

Simplified Architecture Diagram



EA Control Layer Interface Between Tools & CIM Systems

Increase Productivity and Reduce Errors with Equipment Automation

| | | |
|---|--|---|
| ✓ | Asset Productivity Optimization | Logical execution of run-time automation scenarios keeps equipment assets utilized and moves material efficiently through the line. In conjunction with the SmartFactory FullAuto solution, material is transported, loaded, processed, and unloaded without requiring operator intervention. |
| ✓ | Human Variability Reduction | Quality Control pre-checks validate the correct material is matched with the appropriate sequence and recipe for material processing. Quality and engineering data requirements are met consistently, accurately, and automatically based on Equipment Data Collection (EDC) spec configurations. |
| ✓ | Integrated Data Capability | Equipment Automation integrates the largest source of data in manufacturing, the equipment. Data collection records are compiled and distributed to the appropriate applications for controls, reporting, and analytics. Analysis of equipment state performance and tool internal timing, can identify hidden cycle time losses. |

Data enabled Capability with automation

CUSTOMER RESULTS

Measurable and public reported results enabled with Equipment Automation implementations include:

- **10%-15%** increase in wafer output per day with automated dispatching
- **10%** increase in tool utilization with automated dispatching
- **97%+** reduction in data recording time

PACKAGE CONTENTS

Equipment Automation includes EA Core components to enable automation flow design, transaction and sequence testing, run-time troubleshooting and diagnostics, and user maintenance of the automation framework.

SOFTWARE

- SmartFactory Equipment Automation Core:
 - ACE Flow Editor
 - ACE Monitor
 - ACE APIs (common call library)

SERVICES, TRAINING AND SUPPORT

- Onsite deployment
- Automation scenario design and customization
- User workshops and training