

PlantPAx Distributed Control System

The Modern DCS

PlantPAx[®]
Distributed Control System



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THINK.
SOLVE.®

Rockwell
Automation

The Connected Enterprise Helps Address Key Market Challenges

As technology continues to evolve, you will need to be more productive and drive inefficiencies out of your processes in order to stay competitive. You must be able to seamlessly integrate people, processes, and technology into a Connected Enterprise to better address the many challenges you face.

A Connected Enterprise helps you view real-time data on manufacturing processes, compare performance across plants, quickly scale production up or down, manage energy consumption and even troubleshoot and fix processes and plants remotely.

The PlantPAx® system—a modern DCS—is a key component of The Connected Enterprise. It helps you meet key market challenges through:

- Plant-wide control and optimization
- Scalable and modular architectures
- Open, information-enabled, and secure architectures
- Flexibility in delivery and support of the system

The PlantPAx system helps you make better, faster decisions. It enables you to respond more quickly to customers' demands and fast-changing specifications. It's time to rethink what a modern distributed control system can do for you.

PlantPAx
The Modern DCS



Plant-wide Control and Optimization

By implementing a single, plant-wide control system, you can increase efficiencies and productivity across all layers of your operations.

The PlantPAX system utilizes a common automation platform for seamless integration between critical process areas and the balance of your plant. It connects process, discrete, power, information, and safety control into one plant-wide infrastructure. This eliminates disparate control systems results, in significant optimization improvements, and reduces total cost of ownership (TCO).



Scalable and Modular Architecture

The PlantPAX modern DCS provides a wide range of architecture options for increased flexibility. The same platform can be used for single stations or large distributed architectures. It also offers scalable system capabilities—HMI, batch management and data collection that does not require a server or workstation—perfect for process skid equipment and rapid integration.



Open, Information-Enabled and Secure

The PlantPAX modern DCS is based on open communication standards leveraging EtherNet/IP as its backbone. As a result, real-time information is readily available throughout the enterprise for better business decisions.

A modern DCS helps improve productivity by delivering production intelligence and visibility into your enterprise level systems helping to drive efficiencies.

In addition, it allows the use of commercial off-the-shelf products and supports the adoption of the latest IT technology for improving productivity. It addresses industrial security from the individual device on the plant floor to the enterprise level.



Flexible Delivery and Support Network

The PlantPAX modern DCS allows you to select the optimal implementation and support team based on your needs. You can select Rockwell Automation to deliver the system and other world-class solutions or your local process system integrator with whom you've established a working relationship. The choice is yours.

Leverage Modern DCS Technology to Improve Performance



Design

- **Increase efficiency:** Leverage productivity tools that help shorten time and minimize human error
- **Reduce project risk:** Utilize characterized topologies and “best practice” utilities
- **Innovate and accelerate:** Easily adopt enabling technologies such as mobility, virtualization, and CISCO network tools



Operate

- **Effective:** Manage abnormal situations with easy navigations and reliable safety systems
- **Increase productivity:** Use intuitive graphics and multi-language support
- **Optimize production and throughput:** Get the most from the equipment with adaptable control strategies and advanced process control models



Maintain

- **Minimize unplanned downtime:** View relevant data in an easy-to-understand format
- **Maximize planned outages:** Benefit from easy device integration and replacement
- **Reduce overall operational costs:** Partner with Rockwell Automation for ongoing support and training



Manage

- **Reduce security risks:** Take advantage of “defense-in-depth” layers to secure manufacturing assets
- **Control costs and expenses:** Improve knowledge transfer, minimize training, and reduce spare parts inventory with one common plant-wide platform
- **Increase flexibility:** Achieve agility to meet changing customer demands or to shift production schedules with real-time information

System Architecture

Proven DCS Configurations to Enable The Connected Enterprise

Characterized Performance

- Defined system architectures, enabled by PlantPAx system sizing tools, allow you to design the DCS for your needs with minimal risk and proven system performance

Scalable and Flexible

- Same platform for single stand-alone station to a large distributed architecture

High Availability

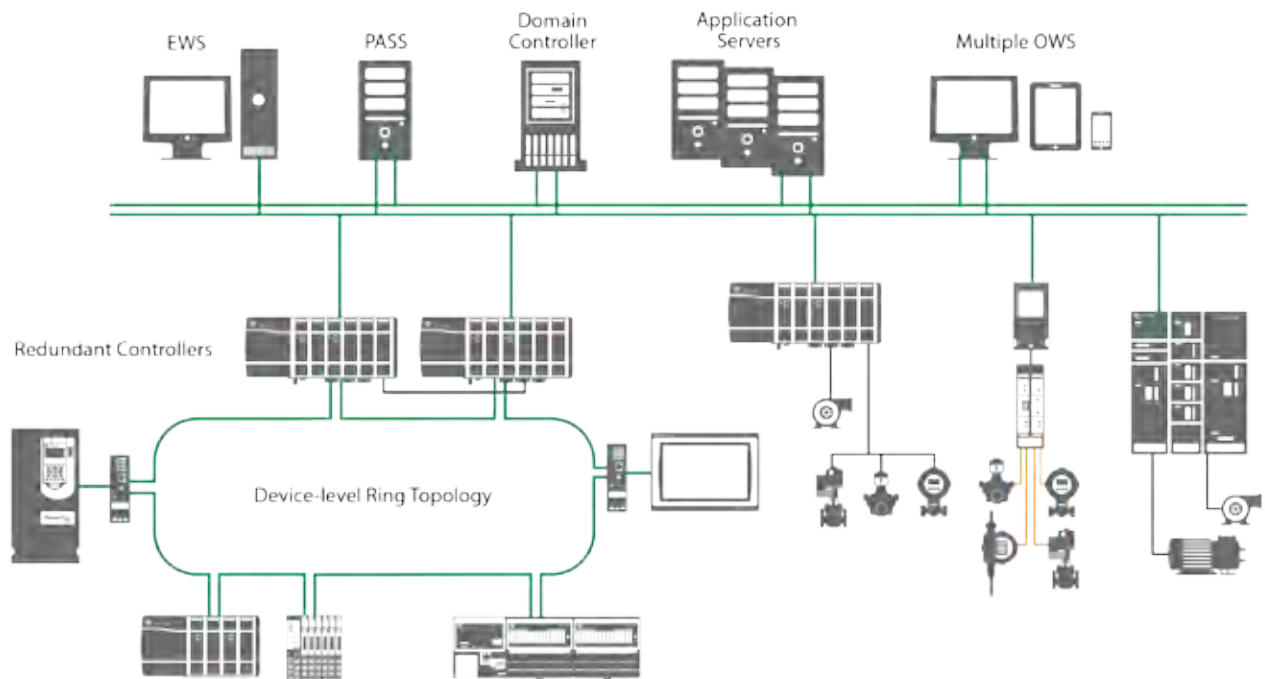
- Redundancy built-in at all levels; supported technologies from the I/O to controllers, networks, and servers

Virtualization Technology

- Industry-first virtual image templates for system servers and workstations

Broad Control and I/O Portfolio

- Range of chassis-based I/O to small distributed I/O
- Small footprint reduces wiring costs and maintenance
- Redundancy options provide fault tolerance without having to pay for unnecessary components
- Integration of networked drives and field devices for easier information retrieval



Design and Configuration Environments

Develop and Deploy Quickly and Consistently

Common Development Platform

- Same configuration tools across all plant-floor applications minimize development time and human errors
- Defined initial setup and virtual templates allow engineers to focus on application specific code

Modular Library

- Predefined logic and HMI objects provide rich operator experience and shorten development time
- Prebuilt control strategies of common asset configurations in a plant deliver consistency

Configure with Confidence

- Streamline workflows and facilitate efficient projects with comprehensive deployment guidance
- Leverage common references for network configurations or features such as disaster recovery and field device integration
- Vendor supported tools simplify the bulk management of code, historization of tags, and configuration of system attributes
- Confirm the PlantPAx system design yields optimal performance and functionality through the use of system sizing and verification tools



Operator Effectiveness

Standards-based Approach for Effective Management of Plant Operations

Intuitive Visualization

- Intuitive displays, objects and faceplates with integrated diagnostics help streamline navigations
- Comprehensive HMI toolkit for effective display design delivers a consistent experience

Procedural Control

- PlantPAx Sequencer automates procedures for continuous processes and helps minimize the need for custom coded configurations
- Intuitive, user-friendly interface provides flexibility for operators to build and configure procedures

Standards-based Alarming

- Systems, tools and partnerships to help deliver effective management of your critical alarms

Maintaining the Standard for Automation

ANSI/ISA-101.01-2015

ANSI/ISA-18.2-2009

ISA-TR106.00.01-2013



Power and Field Device Integration

Easy Access to Critical Information Improves Operations and Maintenance of Assets

Premier Integration

Reduce the time to program and commission instrumentation, control elements, drives, and motor control centers with library objects and integrated configuration tools. Harness the benefits from network protocols such as: EtherNet/IP, FOUNDATION Fieldbus, HART, Profibus-PA, Modbus and more.

Reliable Operations

Execute comprehensive management of instrumentation and control elements using industry standards to keep critical assets available and performing optimally.

Improve Uptime

Leverage diagnostics from intelligent devices to make decisions appropriately. Configure and monitor assets from anywhere and leverage the tools to quickly replace failed devices.

Deliver Results

Monitor your key assets for energy, torque, and other variables to enable energy and predictive maintenance initiatives. Enable optimization by providing pertinent information to those who need it.

EtherNet/IP™



HART
COMMUNICATION PROTOCOL

PROFIBUS



Industrial Automation Security

Properly Deployed Security Technology, Policies and Procedures Help Manage Risk

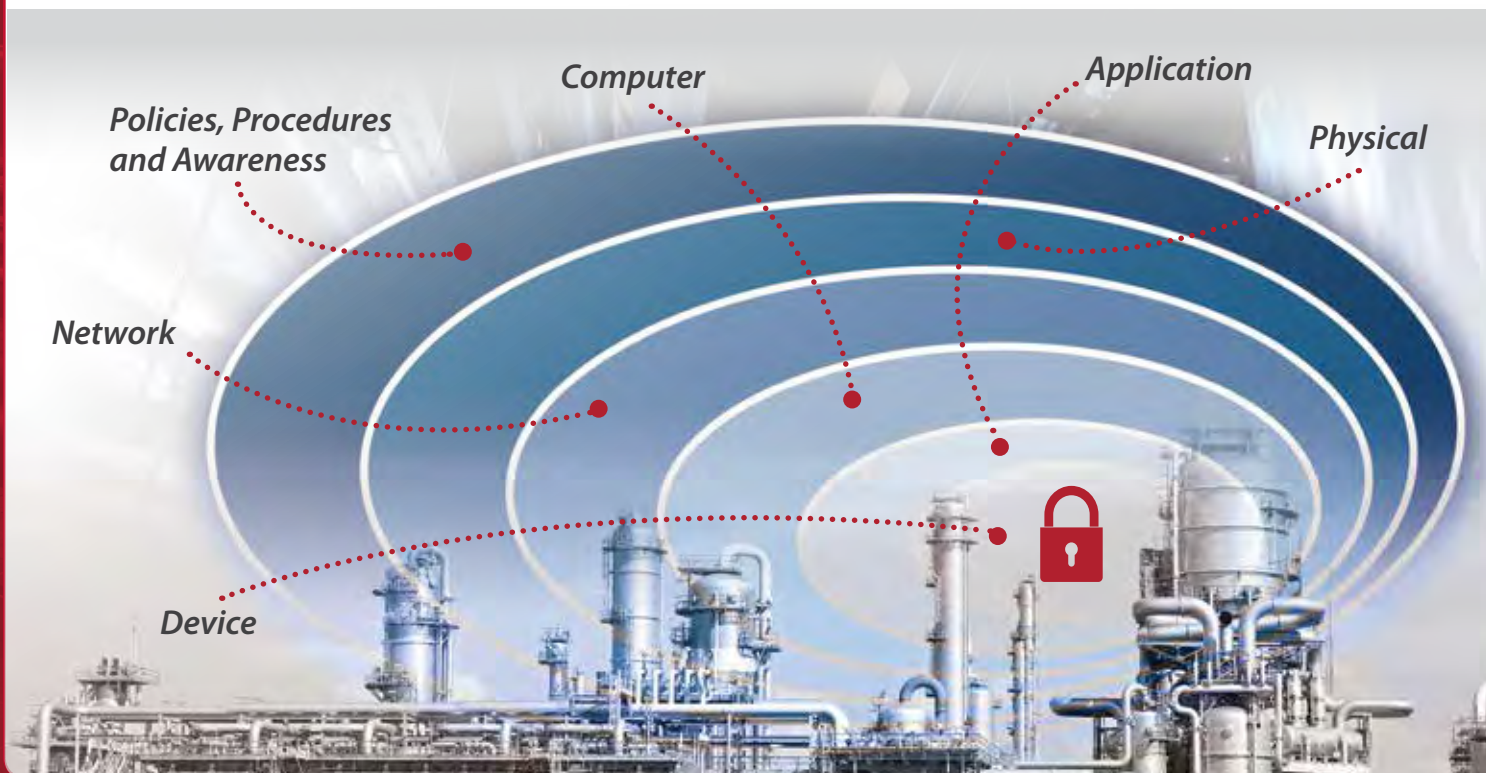
Security Framework

- Infrastructure security applied through a combination of products and technology
- Defense-in-depth layered security model helps reduce the risk of internal and external security threats
- Allows authorized personnel to use the system efficiently and in the intended manner
- Broad approach from tamper and content detection through application access control and physical port security

Security Services

- Industrial automation and IT experts are available to assess, implement and support plant-wide network infrastructures
- Team has a breadth of industry standard committee participation

Our *defense-in-depth* approach to security



Batch Management and Control

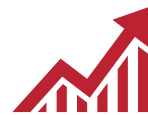
Scalable and Distributed Batch Systems to Meet Your Production Needs

Rockwell Automation provides batch solutions that deliver the core capabilities expected from S88 based sequential control while providing:

- A system that is **scalable**
- **Faster** and more **reliable** control
- **Intuitive** experiences for deployment and operations
- **Secured** information enabled for enterprise systems
- **Flexible** equipment utilization



These solutions help address common operational challenges such as:



Production Performance



Improved Yields



Quality and Safety Concerns



Regulatory Compliance and Traceability



Fast and Efficient Product Changeover



Scalable and Distributed Batch

Our scalable offering of solutions result in more productive operations and reduce the overall total cost of ownership by lowering the engineering and maintenance costs, particularly when compared to batch systems found in traditional DCS systems.

Integration of the batch management system with local skids and controllers utilizing a distributed S88 model results in a more responsive and reliable system focused on improving operator effectiveness and higher throughput.

Intuitive Operations

Modern interfaces, workflows, and accessibility features enable operators to focus on production needs instead of managing systems navigation and interventions.

Flexible yet secured access to the system allows for adoption of a batch system in applications that require manual additions, material tracking and tracing, and version control of recipes.

Compliance for Regulated Industries

The security capabilities within batch were designed with input from major pharmaceutical industry users and tightly integrate with standard, system-wide security functions. This includes configurable electronic signature templates that represent a signature and its associated data, such as sign off level, comments, security requirements, date and time stamps. Up to three signatures can be required for verification of runtime batch events. All signatures are stored in the event journal supporting 21 CFR Part 11 compliance.



Advanced Process Control

Scalable Model Predictive Control to Help Achieve Optimal Operations

Greater Model Accuracy

- Hybrid modeling based on empirical data, first principles equations, operator knowledge or any combination
- Soft Sensor® models integrate with MPC providing timely in-process measurements to enable closed loop quality control of lab results
- Patented, Extrapolated Gain Constrained Neural Networks (EGCNN) to deliver model accuracy beyond the normal operating range
- Expedites deployment by using all available information to create accurate models
- Minimizes need to adjust models as process range is extended
- Improves product quality through faster response to target changes or large process disturbances

Tighter Control Over a Wider Operating Range

- Incorporates changing process dynamics (dead-time, time constants and gains) over wide process operating ranges
- Parametric model representation provides compact, computationally efficient controller model without sacrificing accuracy
- Improves product quality and flexibility for new grade and product development

- Increases transition efficiency with less off-spec product
- Tightens control over a wider operating range

Maintain Controller Performance at Higher Levels

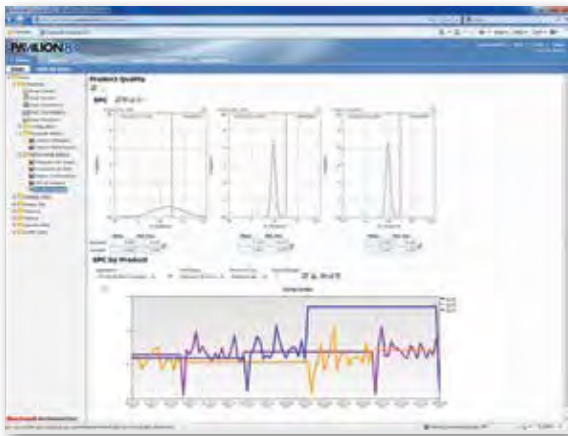
- Controller replay capability maintains a contextual history of control actions and controller trajectories
- Embedded controller performance metrics measure utilization, time at constraints and error from targets
- Allows quick identification and resolution of model mismatch or tuning parameter errors for improved controller performance
- Assesses historical controller performance
- Achieves predictable, sustainable performance through continuous controller monitoring





PAVILION8®

Built-in controller KPIs provide easy to understand views of control utilization, time at constraints, model error, and other key metrics to determine effectiveness of the control



Additional metrics for production, quality, energy usage, and other factors can be easily configured to provide continuous measurements of the benefits derived from the application

The Pavilion8® browser-based user interface provides easy access to monitor all aspects of the MPC solution

PlantPAX® MPC





Process Safety Solutions

Increasing Safety and Productivity While Reducing Downtime, Nuisance Trips and Lifecycle Costs

Hazards and risks are an inevitable feature of any industrial application and process safety is a major concern to anyone who works in the process industries. The protection of personnel, processes, and the surrounding environment remains a significant part of any automation strategy.

Scalable Process Safety

- Options designed and packaged for harsh environments requiring SIL2 and SIL3 including subsea use
- Products validated to ISO13628-6

Dedicated Process Safety Resources

- Expertise to design, implement and deploy process safety systems using functional certified safety engineers
- Engineering practices adhere to IEC61511 standards

Scalable process safety solutions that support fail-safe, fault tolerant and Triple Modular Redundancy for SIL1 – SIL 3 requirements

Certifications

- IEC 61508: Functional safety of electrical/ electronic programmable safety-related systems
- IEC 61511: Functional safety - Safety instrumented systems for the process industry sector
- NFPA 72: National fire alarm and signaling code
- NFPA 85: Boiler and combustion systems hazard code
- NFPA 86: Standards for ovens and furnaces
- EN54: Fire alarm control panels
- EN298: Automatic gas burner control systems for gas burners and gas burning appliances with or without fans
- EN50156: Electrical equipment for furnaces and ancillary equipment - Requirements for application design and installation
- UL 508: Industrial control equipment

Rockwell Automation technology is used in critical control applications:

- ⚠ Emergency shutdown
- ⚠ Fire and gas
- ⚠ Spill prevention
- ⚠ HIPPS
- ⚠ Burner management
- ⚠ Compressor control
- ⚠ Turbine control



Consumer Industries

Improve Quality, Safety, Compliance and Speed to Market with the Modern DCS

Plant-wide Control

Provides operational value and lowers the total cost of ownership

- Common approach to automation across process, utilities and packaging areas leveraging Ethernet/IP from the plant floor to the enterprise level
- Intuitive operator workflows enabled for a changing workforce throughout the plant
- Batch management supports flexible production capabilities and simplifies compliance demands
- Reduce energy consumption with the integrated control and optimization of motors and utility equipment

Modular Systems

Deliver faster time to market by leveraging a modular approach to plant design

- Common tools support multi-vendor design, development, and deployment
- Reduce integration costs and increase visibility into vendor provided skids and field devices
- Lifecycle driven approach allows for easy expansion of small systems as production needs change

Open and Secured Access to Information

Easy integration into critical business systems

- Leverage real-time data to drive productivity improvement
- Sustain connectivity to production and MES platforms for analytical reports and supply chain management
- Propel continuous improvement and productivity programs with easy access to production and batch data and reporting tools

Flexible Delivery and Support

Global support with local resources to achieve uptime

- Engage preferred support teams to maintain the uptime of the plant
- Leverage integrator or vendor managed teams to reduce the delivery risk of projects
- Realize savings with a common platform that streamlines training and reduces the spare parts inventory



Resource Industries

Optimize Production, Safety, and Uptime with the Modern DCS

Improved Productivity

Real-time information that is actionable

- Integrated control of process, safety and motor control assets provide information to the right people at the right time
- Harness process data into robust models that provide tighter control and reduce product variability
- Improve critical asset utilization while achieving top capacity with maximum product yield
- Manage flexible production schedules and capabilities with simplified workflows and quick changeovers

Secured Environment

Technology that mitigates enterprise risk and helps protect intellectual property

- Leverage standard system capabilities to help secure proprietary information
- Adopt a layered, defense-in-depth approach to prevent unauthorized access
- Use industry leading technology to help effectively mitigate security threats

Available, Reliable, and Safe Systems

Avoid costly downtime while helping to protect your most critical assets

- High availability and redundant control throughout the DCS architecture for demanding 24x7 applications
- Achieve a quick restoration from failures with built in fault-tolerance and disaster recovery features
- Predict and help prevent failures on rotating machinery that lead to costly downtime with integrated condition monitoring
- Scalable safety solutions from SIL1 to SIL3, including TMR
- Ease management and extend the lifecycle of servers and workstations with virtualization

Operational Excellence

Effectively manage assets to drive out costs

- Connectivity with rotating equipment allows for measurement and control, leading to reduced energy consumption
- Quickly provide diagnostic device information to operators to ensure a minimal MTTR
- Minimize the impact of technology obsolescence with a lifecycle approach to the installed base
- Realize savings with a common platform that streamlines training and reduces spare parts inventories



Services and Solutions

A World of Experience

DCS Migrations

When you need to migrate to a modern DCS, Rockwell Automation can help you expertly and quickly migrate to newer technologies while minimizing downtime and maximizing operational success.

These migration solutions are provided for many legacy DCS systems including ease-of-migration tools such as I/O scanners, cables, database conversion tools, and more.

A Valued Partner

Across industries and processes, companies can leverage our global experience and the resources within our PartnerNetwork to tailor solutions and services capabilities to meet their needs.

Rockwell Automation understands that a profitable, safe and sustainable operation is a primary goal for companies. We offer industry and technology-specific expertise to address unique production challenges.

Our commitment is to help reduce project risk and provide solutions specific to the companies we support – executed globally and supported locally.

Protect Your Investment

By leveraging our global infrastructure of support centers and subject matter experts, we're here to help protect our customers' automation investment. Beyond providing peace of mind, as we help keep plants running, we'll assess entire operations and recommend the right mix of services to help maximize productivity, optimize plant assets and improve the overall financial performance.

For more information about our modern DCS solutions, please visit:

www.rockwellautomation.com/go/process



 **Connect with us.**

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www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846