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PlantPAx, - The Unified Portfolio of Rockwell Automation Systems and Solutions for Process Automation Excellence

The PlantPAx portfolio is Rockwell Automation's next step to help you achieve process automation excellence. PlantPAx represents Rockwell Automation's culmination of significant investment in automation technology in the process industry. PlantPAx unifies our core Integrated Architecture process automation capabilities and technologies with those of our market leading partners, such as OSIsoft and Endress+Hauser, and acquisitions like Incuity, Pavilion Technologies, ICS Triplex, Xi’An Hengsheng and ProsCon, under a common systems and solutions umbrella to provide you a scalable, open, and cost-effective process solution.

Continued progress in integrating the core systems and those of our partners and acquisitions is a testament to Rockwell Automation’s commitment to ongoing, value-add investments in our plantwide automation roadmap.

Rockwell Automation has been supporting process industries for many years, and PlantPAx demonstrates that our process offering has evolved into a complete process automation system, from control & information, to asset management, field device integration and critical process control and safety.

PlantPAx encompasses:

**Core System** – the core of PlantPAx consists of an Engineering development environment, system-wide visualization, and multi-disciplined process controller. The core can be easily sized for small single unit systems or scaled up for large highly distributed multi-area applications. Based on Integrated Architecture automation products, the core system can be extended through the addition of optional functions such as Batch, Historian, or Asset Management while providing the capability to meet critical process control, availability and safety requirements.

**Field Device Interface & Asset Management** – in addition to supporting the most extensive range of IO products in the industry, the core system provides integration to digital field devices such as HART, Foundation Fieldbus and Profibus PA for the process instrumentation and DeviceNet and Ethernet IP industrial control devices. These interfaces provide in-depth of integration when used with our device integration tools developed through our partnership with Endress+Hauser for process instrumentation and drives and motor controls from Rockwell Automation. Asset management capabilities include controller code change management, vibration monitoring of rotating equipment and both instrument and industrial device management with configuration and calibration records tracking.

**Batch Management & Control** – PlantPAx enables flexible production, equipment-independent recipe management, batch-independent equipment control, and supports regulatory compliance. Operation functions provide batch visualization, analysis, and web-based reporting. The scalable integrated solutions leverage industry standards to meet small, basic batch/sequencing needs as well as distributed, comprehensive batch/sequencing requirements. Improve yield, increase throughput, reduce costs, and improve quality with PlantPAx batch management & control.

**Process Information** – PlantPAx offers an integrated set of decision-making tools and dashboards that help provide real-time access to and analysis of process and production information throughout the enterprise. Produce web-based KPI dashboards and reports. Deliver timely information to appropriate personnel throughout manufacturing – derived from various manufacturing processes. A distributed historical data management strategy offers localized, chassis-based, high-speed data collection and recording, as well as site and enterprise solutions to meet the most demanding requirements. PlantPAx process information provides the right data at the right place at the right time.

**Process Safety and Critical Control** – PlantPAx delivers scalable solutions tailored to meet specific requirements for availability and safety. You can choose the levels of integration you want between the process control and safety system. ControlLogix delivers SIL 1 & SIL 2 capabilities, while the ICS Triplex Trusted controller with triple modular redundancy and the scalable AADvance controller with SIL 1, 2 & 3 capabilities in simplex, duplex or triplex configurations. All of the ICS Triplex solutions are CIP-enabled and part of the Rockwell Automation Integrated Architecture.

“Rockwell Automation announced its roadmap for process automation that includes bringing together its end-to-end suite with a new name – Rockwell Automation PlantPAx Process Automation System. PlantPAx systems and solutions are based on the significant investments the company has made in process automation.”

- Walt Boyes, Control Magazine
100 years in industry
Today, more than ever before, the industry faces unique process challenges. That’s why you need Rockwell Automation as your provider. Over the past century, we have developed the experience to help your company succeed, with solutions that have proved themselves time and again, in the most demanding environments. We have exceptional domain knowledge and industry expertise. We reduce your engineering and integration costs, through our unique technology, which improves productivity, quality and flexibility.

“Rockwell Automation provides users with a true business value proposition for automation.”
Larry O’Brien, (ARC Advisory Group)
The Right Technology for the Future
Rockwell Automation PlantPAx Process Automation System represents a real leap forward in enterprise-wide integration technology. Whether you want to migrate from an existing, but no longer supported, DCS solution, or gain the benefits of a single plant-wide platform for the first time, you’ll find that PlantPAx is the source to help you achieve your goals.

Strong investment delivering class-leading solutions
To help you stay ahead of your competition means we have to stay ahead of ours. That’s why we invest extensively in the development of new products and technologies. This allows us to deliver best-in-class process control solutions that are geared to your requirements, helping you to maximize productivity while reducing your costs. Our recent acquisition of companies such as ProsCon Holdings, Incuity offers proven solutions. Xi’an Hengsheng, is a leading process & solutions integrator for power, petrochemical, coal mining, and oil. Pavilion Technologies, a world-leader in model predictive and advanced process solutions, and ICS Triplex offering world-class safety and critical control solutions, plus our alliances with Endress+Hauser and development partner OSIsoft Inc., demonstrate the level of our commitment. From field devices through the control and supervisory layers all the way to business integration systems, Rockwell Automation and its associates provide a total plant solution. These acquisitions and relationships further increase our solutions delivery capability to process automation customers across the world, and improve our position as a world-leader in the process industry market.

Helping you to:
- Maximize productivity
- Improve quality and reliability
- Optimize flexibility and speed-to-market
- Reduce cost of implementation
- Minimize life cycle costs
- Meet regulatory compliance
PLANT-WIDE ENABLED

PlantPAx PROCESS SYSTEM ARCHITECTURE

ACCESS TO ALL THE INFORMATION YOU NEED TO CONFIGURE, CONTROL AND OPTIMIZE YOUR OPERATIONS

With constant pressure on costs, flexibility, quality and regulatory compliance, the need for real-time information is greater than ever. If your control disciplines are spread over different control platforms, it’s harder than ever. PlantPAx meets the needs of the entire enterprise with a single platform and development environment. Our system offers scalability for a wide range of process applications with seamless information flow between the plant floor and the rest of the enterprise.

Information and Control that Meets your Needs
PlantPAx encompasses – and surpasses – typical DCS functionality. This helps you meet all your systems, control and plant-wide information needs – from a globally distributed database. Our system allows you to reduce start-up times, lessen downtime and helps you access plant and production information.

Solution Scope
- Engineered solutions for your application
- Optimize operation with advanced process control and information
- High availability system for safety and critical control
- Predictive services for asset utilization and reliability
- Migration solutions for legacy DCS platforms

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Rockwell Automation was unique in offering us a common, unified control platform for batch, continuous and discrete manufacturing.

Todd Ray, Senior Process Engineer, Cabot Corporation
Common System Infrastructure

There are seven shared services used across our process system:

- **Security** – Identifies, authenticates, and authorizes user access
- **Data access** – Creates a publish and subscribe environment for real-time access to manufacturing information
- **Diagnostics** – Publishes activity, status, warning and system health messages generated throughout the system
- **Audit** – Monitors and records manufacturing system changes
- **Activation** – Provides a secure, convenient software-based license management system
- **Alarms and events** – Applications can subscribe to one common, consistent view of alarms and events published by controllers

Security Management

Our solutions are designed to help minimize the risk of downtime associated with cyber security breaches while allowing your authorized personnel to use the system efficiently. The security service is a centralized system for restricting access to resources, making it easier for you to establish and maintain secure systems.

I/O and Field Device Connectivity

PlantPAx has a wide range of local and distributed I/O and process network connectivity options to help improve design and installation flexibility. This leads to lower costs associated with installation and maintenance by reducing space and infrastructure requirements. Versatile and high performance I/O modules allow you to perform analog acquisition and control of traditional 4-20mA and devices while utilizing the digital dialogue when smart field instrumentation is used.
**PlantPAx**

Process Automation System

**SYSTEM SERVERS**

**CONDITION MONITORING**
● Integrate equipment Condition Monitoring and minimize shutdowns

**COMMUNICATIONS INCLUDE:**
● FOUNDATION™ Fieldbus
● HART
● Profibus-PA
● DeviceNet
● ControlNet
● EtherNet/IP

**BATCH MANAGEMENT**

**OPERATOR STATIONS**

**REMOTE I/O**

**REMOTE I/O**

**CONTROL CENTER**

Low Voltage MCC

**FOUNDATION**

**FIELDBUS**

**PROFIBUS PA**

**HART**

**ControlNet**

**ETHERNET/IP**

**REDUNDANT CONTROLLER**

**LINKING DEVICE**

**MOTOR**

**CONTROLLER**

**DRIVE**

**CONTROL CENTER**

**HART**

**PROFIBUS PA**

**CONDITION MONITORING**
● Integrate equipment Condition Monitoring and minimize shutdowns
SEAMLESS OEM INTEGRATION
● Easily integrate process skids in your plant control systems

PROCESS HISTORIAN
PLANT ASSET MANAGEMENT
ENGINEERING STATION

ETHERNET/IP

REMOTE I/O
DRIVE

CONTROL CENTER
Low Voltage MCC

MOTOR CONTROL CENTER
Low Voltage MCC

LINKING DEVICE
FOUNDATION FIELDBUS

HART
Local HMI

SEAMLESS OEM INTEGRATION
● Easily integrate process skids in your plant control systems
Connectivity to smart process instrument buses include HART, Foundation Fieldbus H1, and Profibus PA, and a variety of sensor, device and drive networks round out the field connectivity options.

**Multidiscipline Controllers**
Our controllers are high-performance and designed to address all the control requirements of today’s plant applications. These controllers offer the processing power to control many loops with advanced process control strategies and are also capable of performing coordinated sub-millisecond multi-axis control in demanding discrete applications. Every controller features its own tag-based, real-time database that integrates seamlessly with all software applications.

**System Networks**
The system supports a hierarchy of networks to deliver the best performance for your application: EtherNet/IP, ControlNet and DeviceNet all speak a common language – the Common Industrial Protocol (CIP) – and share a universal set of communication services, allowing for transparent flow of information. This connects all components in the automation system, from devices such as drives and motor controllers to business systems.

**Engineering Workstations**
Our design and configuration suite provides the environment for creating and modeling production processes, configuring control strategies and visualizations, as well as tools to configure & calibrate process devices. This streamlines the overall planning, development and deployment processes resulting in faster, lower-cost implementations.

**Virtual Database Technology**
A leap ahead of traditional process systems we offer a more flexible, next-generation approach by using a virtual tag database made up of all the tag definitions that reside in projects and/or controllers. The virtual database allows engineers to develop control projects individually and merge them into the system by establishing a communications link to the controller(s) or their associated project files.

**Asset Management**
Our asset management streamlines diagnostic information from process instrumentation and other connected automation assets such as drives and motor control centers, based on the FDT/DTM open industry standard.

**Production Management**
Our scalable batch solutions address order sequencing, execution, tracking, genealogy and interactive manufacturing process control. The scalability covers a wide range of product procedures, recipes and formulations.

**Data Management and ERP Connectivity**
The data management suite allows integration and workflow across disparate systems, as well as storage of master data, events, process and production information. It organizes, synchronizes, archives and aggregates data collected by automated or manual systems.

**Solutions Begin with Data**
It is key to retrieve, review and analyze mission-critical information from sources ranging from your plant floor to the Internet – as it happens. With today’s complex and advanced production systems we aim to deliver increases in productivity.

- Maximize productivity
- Improve quality
- Optimize flexibility
- Reduce implementation cost
- Minimize life cycle costs
- Reduce total operational cost
Development Environment
As process automation systems grow in capability, they also grow in complexity. You need tools to help you manage not just your automation system, but the entire plant automation architecture. PlantPAx offers you tools for:

- Configuring the system as a whole
- Managing hardware configurations
- Managing all controller project files from a single location
- Communication and networks management
- Organizing and documenting relationships among all your control units

Integrated Solutions for:
- Regulatory control strategies
- Advanced control strategies
- Process information
- Device management
- Process graphics
System Engineering Integration and Navigation
Our system engineering software suite brings you all the tools you need to manage a small operator panel to a large multi-workstation system application. It provides an integrated environment for creating and modeling production processes, programming automation controls, as well as tools to set-up equipment and product definitions. Allowing for collaborative engineering, auto-documentation and offering an extended help capability, this integrated approach streamlines the overall planning, development and deployment processes, resulting in faster, lower-cost implementations and is available in many languages.

Standardization of Code and Development Efficiency
A single, plant-wide control system will help you to reduce engineering and integration costs. By increasing the integration and availability of critical data, and simplifying the engineering process, you are taking a major step towards improving plant control and productivity, while improving quality and reducing time-to-market and Total Cost of Ownership (TCO).

“We selected Rockwell Automation for its ability to help us reduce engineering time.”
Willie Lotz, Senior Process Control Engineer, South African Breweries
Continuous Control
The easy – object oriented – explorer based – drag and drop configuration allows you to build complex process functions. Faceplates associated with every instruction help you set-up, tune and control the element with a minimum of effort. Additions and modifications can be performed online, while your process keeps running. Furthermore, the software allows you to mix and match IEC61131-3 compliant programming languages. All supported programming languages share the same development environment, tag database and user interface, resulting in reduced training and higher productivity.

Batch Control
We embed a state machine in the controllers. This follows the ISA-88.01 phase state model for batch control and PackML machine control model. It also provides a framework for entering phase state logic. For simple batch procedures, phase state transitions are managed by the controller. In addition, it’s designed to provide tight integration with batch management software.

Advanced Process Control
The platform provides you with optional function blocks for advanced regulatory control. These address the hard to control applications with multiple interacting inputs/outputs or with long deadtimes. This control capability includes:

- Internal model control
- Coordinated (1 x 3) control
- Multivariable (2 x 3) control
- Fuzzy logic
optimization, scenario analysis, and multiple model management are well else available on the market today.”

Alison Smith, AMR Research

Our fuzzy logic design environment allows you to create custom algorithms for use in our controllers. It also contains tools to allow optimization of your process. This advanced regulatory control is ideal for loop optimization at the controller.

A key addition to the advanced control suite of offerings is process optimization capability from Pavilion Technologies, a Rockwell Automation company. This features inferential measurements, supervisory control and real-time technologies including:

- Model Predictive Control
- Dynamic Simulation and Modeling
- Neural Network Technology
- Sustainability and Environmental Compliance
- Uses a reference model of the process to analyze the current process behavior and to predict future process behavior
- Allows the controller to determine the best way to adjust the process input variables to drive process output variables to their optimum targets

These Supervisory Control and Real-time Optimization controls optimize major process unit(s) as a system, rather than optimizing loops independently. Combining Rockwell Automation’s unparalleled Logix platform and control software (Advanced Regulatory Control) with Pavilion’s proven MPC applications (Inferential Measurements, Supervisory Control and Real-time Optimization) provide the most innovative and value-added manufacturing package in the industry.

**Add-on Instructions**

Add-On Instructions allow you to create custom instructions that augment the built-in functions. They may be created using the Function Block Diagrams, Structured Text or Ladder languages or a mix of these.

**Process Libraries**

Create your own library of process control and visualization objects that augment the robust set of standard built-in capabilities already present, leading you to:

- **Increased time savings** – Encapsulate your most commonly used control strategies as a set of reusable instructions to save time
- **Increased consistency** – Reuse your instructions to promote consistency and reduce errors
- **Improved troubleshooting** – Simplify troubleshooting with context views that help you ‘visualize’ the logic for a specific instance of use
- **Improved protection** – Limit access to the instructions to stop unwanted changes with ‘view only’ or ‘no access’ status
- **Reduced development time** – Automatically generated online help reduces documentation development time

Optimized tuning parameters are shown in a separate window, so you can check them before activation in the controller.
The Right Information in the Right Place at the Right Time
To simplify your day-to-day operations, it is critical to have real-time access to data. Real-time visualization plays a critical role in allowing key personnel to track process status, as well as providing other services in the enterprise with accurate and real-time information from the production layer.

Control your point of view
View information from any and all servers.

Maximize availability
Provide a high level of continuous uptime.

Secure your operation
Limit system access to only those who have a legitimate need to use it.
“There are massive benefits in [Rockwell Automation] control and monitoring.”

Philip Reid, Systems Manager, Dickinson Autocon (SI)

Operator Work Station
A user-friendly interface provides the operator with all the tools required to operate the plant through high-resolution graphic displays tailored to your specific needs.

- Single or multiple-monitor display
- Consistent display with navigation buttons and alarm banners
- One-click access to alarm summaries
- Easy access to real-time and historical trending
- Multiple language support
- User-based security

Alarm Management
Our Alarms and Events management approach helps you use alarms in the most efficient manner in diagnosing issues that may occur.

- Real-time alarm management
- Controller based alarm stamping
- Alarm suppression
- Presented to operators based upon location and roles
- Operator flexibility in display preferences

Equipment Control
All equipment, from pumps and valves to instrumentation, can be controlled and managed using standard faceplate objects. Users can:

- Control individual equipment
- Trace all events related to equipment
- Tune control loops

Furthermore, using global objects technology, you can create your own reusable library using standard visualization objects. This allows you to control unique pieces of equipment, trace all events related to your equipment, and manually or automatically tune the control loop. You can easily add more powerful functionality, such as access to all documentation associated with the equipment. The use of global objects offers many benefits, including reduced commissioning and development time and improved consistency among applications.
PRODUCTION MANAGEMENT
ENSURE MAXIMUM FLEXIBILITY AND PRODUCTIVITY

Better Decision Making and Business Performance
PlantPAx provides comprehensive integrated Manufacturing Execution Systems (MES) capabilities that allow real-time production management. Tracking and traceability, quality management, work order and workflow management functionality is provided.

- **Operational improvement** – Provides visibility on the plant-floor or the top floor to monitor inventory levels, repairs, returns and work in progress
- **Business risk management** – Allowing backward and forward traceability of a given product or batch
- **Quality assurance** – Allowing of output to desired quality while helping assure that products are built with the right materials using the right processes

Easy Install and Configuration
- Auto discover controllers and tags
- Auto configure known tag types
- Time-series optimized database

Production Scheduling
By generating finite-capacity schedules that provide an accurate view of the future, production schedulers can identify and act on late orders, manage constraints on capacity, labour or material, and expedite orders for total resource management. Our scheduling solution can integrate with higher level ERP and MRP systems and integrate with plant-floor control systems, so that information can flow into the database, allowing you to accurately observe plant-floor status and events.

Data Management and Historian
Our system fully integrates world-class historian technology. This capability allows high speed, real-time and data collection with advanced analysis. The data management infrastructure is designed for blending production and event data. This is a core element of our system that is scaleable across a distributed architecture. Some key features include:

- Performance equations
- Totalizers that archive
- Using an advanced calculation engine and recalculation capabilities
- Batch subsystem for analysis
- Data Access Server (ODBC/OLE/OPC)
- Redundant historian servers for high availability

Portal
This gives you a high-level management window into your manufacturing process. Allowing you to:

- Improve productivity through personalised and collaborative access to information, applications, processes, and people
- Deliver information where it’s needed

Portal provides core portal services such as role-based access to applications and content, search, personalization and security. Portal can integrate with collaboration, security, and extended search systems from other vendors, while providing a reliable point of access to your manufacturing information, applications, and people.

“Rockwell Automation clearly recognizes the value of unbounded access to information in making decisions quickly.”

Pat Kennedy, CEO OSIsoft
**Reporting**

Allows the collection, storage, analysis and visualization of production data using powerful data capture and storage engines, which can be used within process, discrete and hybrid environments. It also uses a variety of reporting tools such as time-series trends, bar charts, pie charts and tabular trends to allow an easier method for generating reports. Historian can be used as a basis for various analytical activities throughout the plant to support continuous improvement by improving the efficiency of data collection and reporting.

**Quality Control and Regulatory Compliances**

The modular and scaleable architecture of production management provides the basis for a number of key MES industry-specific capabilities such as Integrated Quality Assurance, Supplier Management, Electronic Device History Record (EDHR), Corrective And Preventive Action (CAPA), Complaint Handling, and Return Material Authorization (RMA).

As production management functions interact with batch control, our batch solution provides custom security levels to meet the most demanding U.S. Food and Drug Administration (FDA) Good Manufacturing Practice (GMP) regulations.
A Full Spectrum of Batch Solutions
PlantPAx supports a complete batch automation environment: integration of smart instruments and devices, equipment arbitration to manage effective assignment of batches to process equipment, and material transfer across a facility, production history, material tracking and reporting. PlantPAx addresses scalability and flexibility to meet the broadest suite of batch applications, all built upon the ISA-88 standard and integrated within the architecture.

- Fixed procedure with fixed formula
- Multiple products with same procedure
- Multiple products with multiple procedures
- Multiple units with equipment arbitration

The availability of smaller, yet fully-functioned, systems means greater productivity and lower cost of ownership. Our system helps lower Total Cost of Ownership by reducing engineering and maintenance cost, particularly when compared to costs of traditional DCS batch solutions.

Batch Management
PlantPAx allows you to develop batch control strategies by supporting flexible production capability, equipment-independent recipes and batch-independent control.

- Create and manage recipes
- Integrate manual procedure steps with automated steps, including required operator confirmations and verifications
- Reduce the hours needed for validating and commissioning
- Configure physical and procedural models
- Create and manage product campaigns, consisting of multiple batches
- Integrate with a wide variety of complementary software applications
- Collect detailed electronic batch data to generate detailed reports for compliance or process improvement
- Integrate and exchange batch and recipe information with corporate information systems
- Simulate your entire batch process
- Supports redundant storage

Operator Access
The interface to batch production is through standard functions in the operator workstation. With batch visualization functions, you can initiate recipes, control actions and access batch server functions and all other batch information.

Segment 4
Multi-Pathway Processing

Segment 3
Multiple Products, Multiple Procedures

Segment 2
Multiple Products, Same Procedure

Segment 1
Fixed Sequencing

A full spectrum of batch solutions for every production scenario.
Integration Within System Controllers
Batch control and management capabilities seamlessly integrate with the controllers utilizing Phase Management technology, which embeds an S88-compliant phase state model directly in the controller.

- Integration of batch system with controllers
- Configuration and maintenance of your batch automation system
- Helps reduce the effort required to develop the phase logic

Historian and Reports
PlantPAx provides batch history and production tracking data for batch applications. The batch history function monitors production operations, collects relevant data, and constructs a historical representation of automated and manual operations which occurred during batch production.

Material Tracking and Tracing
Material tracking and tracing provides real-time material management and traceability in batch execution systems, improving corporate inventory solutions and allowing more effective management of materials and recipes.

- Complements ERP-level resource management by collecting the detailed material and equipment tracking information needed for optimizing your supply chain
- Tracks the use of materials, vessels, containers, pallets and permanent or transient storage
- Supports recipe execution by determining which equipment must be used to meet a request

Regulatory Compliance
The security capabilities within batch were designed with input from major pharmaceutical industry users and now tightly integrates with standard, system-wide security functions.

Batch 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 and are non-editable, fully supporting 21 CFR Part 11 compliance.

“Rockwell Automation’s batch solution is giving us the ability and flexibility to meet our very aggressive schedules.”

Jim Hasler, Silica Treatment Development Centre Leader, Cabot Corporation
“With the acquisition of ICS Triplex, Rockwell Automation will significantly improve in the fast-growing high availability and process safety systems and services market.”

Asish Ghosh, Vice President, ARC Advisory Group
Fault Tolerant Architecture
For process automation, system availability indicates the system’s ability to tolerate certain failures and thus maintain continuity in operations. Our solution encompasses this with fault tolerant architectures capable of maintaining control of critical operations when needed.
PlantPAx delivers high availability systems to maintain continuity in operations. Our system allows repairs, replacements, online changes and additions, while continuing with your operation.

Reliability
ControlLogix, which is a core element of PlantPAx has been certified by TÜV as a SIL 2 rated system.
- Mean-Time-Between-Failures (MTBF) is well over 100 years
- High Availability
- Low PFD

Maintainability
Our system offers maintainability advantages such as:
- Diagnostics and reporting of faults
- Ease of replacement or repair while still under power
- Ability to add or make system changes online

For many process applications, the need for redundancy is minimized when the system is modular and repairs are easier to implement.

Platform Redundancy
The system provides for redundancy at all levels, including:
- Power supplies with UPS
- Processors
- Network connectivity
- HMI
- Servers and databases
- I/O
- Sensors and Actuators

The system has been designed to allow:
- Automatic synchronization
- Automatic fault detection
- Bumpless and transparent switchover after failure
- Failed component replacement without interrupting operation
SAFETY & CRITICAL CONTROL
TÜV CERTIFIED FROM SIL1 TO SIL3
Leader in Process Safety
With ICS Triplex, a Rockwell Automation company, we have expanded our process safety offerings that provide some of the highest levels of availability in the industry. ICS Triplex has over 40 years of experience in providing process safety solutions and services to heavy industries such as oil and gas. The combination of Rockwell Automation and ICS Triplex extends the broadest range of technologies and services covering diverse process safety applications including ESD, F&G, Turbine and Compressor, HIPPS, Combustion Control and CPC. These offerings provide a high degree of protection for your assets including people, equipment and the environment.

Broad Portfolio
Rockwell Automation has a broad portfolio of safety offerings. You can select from a range of scaleable solutions to satisfy cost, safety integrity level, performance, integration, and availability requirements:

- Broad range of TÜV certified SIS and critical control solutions
- Scalable solutions meet SIL 1, 2 and 3 requirements with both fail-safe and fault tolerant offerings
- Diverse or common components
- Separate or completely integrated

A mainstay of the process safety and critical control offerings has been ControlLogix. ControlLogix is a multidisciplined controller that integrates sequential, process, batch, drive and safety into a single platform. The Logix controller has been certified by the TUV SIL 1 and SIL 2 per IEC 61508 and is available in simplex and fault tolerant configurations including I/O. Dozens of I/O modules are available to meet your most demanding requirements. New features include Add-On Instructions to help reduce engineering costs and make Logix very easy to use in SIL 2 applications. PlantPAx customers can reduce maintenance costs through the use of ControlLogix as a common or separate platform for both BPCS and SIS.

The flagship ICS Triplex product, Trusted Controller, is based on Triple Modular Redundancy (TMR) technology. It is certified by TUV and is NFPA 72, 85 and 86 as well as IEC 61508 compliant. This extends Rockwell Automation’s process safety offering to SIL 3 level. Additionally, the Trusted controller offers some of the highest fault tolerance available with its 3-3-2-0 fault tolerance.

The new AADvance solution is a truly scalable modular architecture which allows you to configure the level of safety and fault tolerance that you require for SIL 2 and SIL 3 applications. You can configure the system for simplex, duplex, or triplex.

Both the Trusted TMR and AADvance systems have been integrated into the PlantPAx solution. A variety of integration levels are available from OPC to CIP to make the PlantPAx safety and critical control solutions unmatched in the industry.

“We were able to develop both the standard and safety control system code concurrently. This was a real time saver.”

Chris Hilton, Engineering Manager, Amcor
FIELD DEVICE CONNECTIVITY AND ENTERPRISE-WIDE STRATEGIC FOCUS

Allow Innovation and Enterprise Integration
To allow easy access to information at the operations or business level, PlantPAx provides for seamless information flow from field devices to business integration systems. PlantPAx helps process industry users further their business goals including maximizing productivity, optimizing plant assets and reducing costs.

- Reduced total cost of ownership
  - Automatic client-side configuration
  - Reduced infrastructure requirements
  - Field-extensible solution
- Increased capabilities
  - ‘Smart’ clients, auto-load and update
  - Scaleable design, allows for easy growth
  - Improved notification
- Broad asset coverage
  - Process oriented devices
  - Motor control centers
  - Drives
  - Multi-vendor control assets

Traditional Process Networks Supported
PlantPAx offers connectivity to the leading process device networks – HART, Foundation Fieldbus and ProfibusPA. Primarily, the levels of connectivity include:

- Data flow from the device to the controller
- Data visualization on the operator work station
- Data access by our asset management software

At the operator level, faceplates allow the visualization of instrument status, device-specific diagnostics, and process variables. Our asset management solution communicates through the architecture to allow commissioning and maintenance of the process devices.

HART Connectivity
The largest installed base of process instrumentation applies the HART protocol. It provides the value of digital instrumentation with diagnostic coverage, but without the loss of analog data and with a low training requirement for plant personnel. HART field devices are connected to analog I/O modules that are HART enabled. The modules do not require separate HART multiplexers and offer powerful functionality such as scaling and alarming. HART modules can be:

- Chassis-based solution
- Distributed I/O solution with HART communication
- Distributed I/O with HART solution for intrinsically safe applications

“This process has given us the data to examine business utilisation, planned downtime and unplanned downtime.” Frank Meegan, Senior VP, Operations, Kraft Foods North America
FOUNDATION Fieldbus Connectivity

Connectivity is achieved via our FOUNDATION Fieldbus Linking Devices. Both devices offer distributed control with the flexibility of remote mounting close to the field.

- 1757-FFLD FOUNDATION Fieldbus Linking Device bridges HSE/EtherNet/IP and ControlNet to FF H1 device networks
- Offers connection flexibility to all controllers
- Includes an HSE OPC server
- 1757-FFLDC for ControlNet Linking Device allows systems with redundant ControlLogix controllers and redundant ControlNet media to communicate with FF H1 process instrumentation

Profibus PA Connectivity

Our system offers a unique solution for Profibus-PA device connectivity. The Profibus-PA linking device offers flexibility in remotely mounting close to the field. This bridges EtherNet/IP to Profibus-PA device networks without the need for separate couplers.

Interoperability and Preferred Integration

To set up systems faster, reduce integration costs, and protect your investment, Rockwell Automation assures interoperability with all third party devices. Together with premier instrumentation associates, we create device integration tools for preferred integration of field devices to PlantPAx:

- Integration documents provide step-by-step guidance on installation, configuration, startup and operation
- For faster troubleshooting and more informed decision making, Add-On Instructions and faceplates harness the intelligence of digital instrumentation and display device specific diagnostic information on and operator work station.

Plant Asset Management Solution

With a fully scaleable design, our asset management solution provides you with a set of asset-centric focused tools for securely and centrally managing your factory and process automation production environments. It secures access to the control system, tracks users’ actions, managing asset configuration files, configuring process instruments, and provides backup and recovery of operating asset configurations.

- Change management – Management of security, configuration and archiving of control assets
- Process Device management – Calibration and configuration – for process instrumentation
- Disaster recovery – For all assets and devices

Open Standards Based

Our asset management is based on industry-leading FDT/DTM technology. It is a common environment and launch application for Device Type Manager (DTM). An expanding library of Device DTMs and an array of Communication DTMs are supported.
Condition Monitoring
Rockwell Automation has a powerful Condition Monitoring solution. A Condition-based Maintenance (CbM) program gives you the critical information you need to optimize scheduling of downtime, labor and materials – helping you to increase productivity while reducing costs.

Integration is the Key
The key to a successful CbM program is a well-integrated solution. You will be able to benefit by implementing the appropriate strategies. Integration also helps you to reduce total cost of ownership by making the best possible use of existing plant information.

Maximize Your Return on Net Assets
A well-designed program can impact a variety of key performance indicators by reducing downtime due to component failures.

- Reduce downtime
- Fewer component failures
- Reduce spare parts
- Defer scheduled maintenance
- Boost availability, capacity and throughput
- Reduce unplanned downtime and planned downtime duration
- Reduce mean time to repair
- Help improve safety and quality

“\textit{The Rockwell Automation solution suits CACT. It saves a great deal of manpower and expense. We can monitor equipment hundreds of kilometres away from our office.}” \textit{Guo Jinwen, Maintenance Supervisor, CACT}
**Predictive Maintenance Strategy**

This concept is based on the actual condition of an asset rather than on some preset schedule, and allows you to make necessary changes before a catastrophic equipment failure occurs. Though predictive strategies require an investment, the actual cost is much lower than the lost production resulting from failure. Success also is greatly improved by having an integrated, information-enabled control architecture with intelligent devices capable of collecting the required data. Some of these predictive services include:

- Calibration
- Instrument management and repair
- Remote monitoring solutions
- Onsite support services
- Customized technical support
- Process training curriculum
- MRO process management
Integration Expertise for any Industry

When you need a complete automation solution, there’s no company better qualified than Rockwell Automation. For over forty years, along with our associates, we have been delivering world-class process engineering solutions for customers across the spectrum of industries. On each and every project, our global teams of Process consultants combine with local specialists so that we can help you with your system integration requirements.

- Global certified solution providers
- Global system integrators

Conceptual Design and Front-End Engineering Design (FEED)

Whether it’s a large, complex project or just adding a few upgrades, PlantPAx offers a multi-disciplinary approach which combines industry specialists and unrivalled experience with a real commitment to operational excellence.

- Project management
- Process automation engineering
- Instrumentation and electrical systems design
- Safety system engineering
- Power engineering
- Process engineering

“ControlLogix does everything, from end to end.”  
Paul Brennan, Engineer, AutoBake

To find out more visit us at: www.rockwellautomation.com
Project Scope
For your projects, Rockwell Automation and our associates engage in an interactive process with you. From complete project management to simple punctual assistance, our extended range of services assist you through all the typical steps of your system development.

Functional Specification
Describes system functionality for each module, based upon the selected hardware and software architecture.

Detail Design Specification
Includes software module design and system construction details as well as HMI design documentation.

Implementation
Includes development of the processor, batch, HMI and reporting code for the system.

Software Module Testing
The module, its accompanying HMI, and batch code (if applicable) are tested to validate that the module functions as specified in the detail design specification.

Software Integration Testing
The system is tested as a whole for proper functionality as specified in the functional specification document.

Customer Witness Test
The customer confirms functionality of the system in a lab environment.

Commissioning and Start-up
Rockwell Automation can assist the customer in performing loop checks, equipment checks, start-up, and production support for the system.

Training and Support
Rockwell Automation offers its customers many training and support options tailored to their individual needs.
## Capability PlantPAx

### Plantwide Control Disciplines
- Discrete ✓
- Motion ✓
- Process & Machine Safety ✓
- Continuous Process ✓
- Batch ✓
- Drives ✓

### Control System Features
- Controller Redundancy ✓
- Remote I/O ✓
- System Scaleability with Single Platform/Control Engine (Single Machine to Large Plant) ✓
- Hot Swappable I/O ✓
- Broad I/O Capability (Rack mounted, field based distributed I/O and Hazardous Form Factors) ✓
- Full Digital Integration with Drives and MCC ✓
- No Loop or Point Licensing ✓

### Configuration and Programming
- Object Oriented ✓
- All IEC-61131 Programming Languages ✓
- Online Edit/Configuration ✓
- Tag-Based Addressing & Programming ✓

### Visualisation
- Fully Integrated Client/Server HMI with Redundancy ✓
- Panel-Based HMI ✓
- Web-Based HMI Interface ✓
- Historical Data Collection (SOE, Events, Trending, Reports) ✓
- Controller-based Historian ✓
- Alarms and Events ✓

### System Communication and Fieldbuses
- EtherNet I/P ✓
- Standard Ethernet Infrastructure (Cisco alliance) ✓
- ControlNet ✓
- DeviceNet ✓
- Modbus ✓
- AS-I ✓

### Process Control
- Regulatory ✓
- Logic Function Block ✓
- Sequence ✓
- Batch ✓
- Controller based ISA-588 Phase Support ✓

### Advanced Control
- Fuzzy Logic ✓
- Auto-Tune Technology ✓
- Model Predictive Control ✓

### Process Fieldbuses
- Foundation Fieldbus ✓
- Profinet-PA ✓
- HSE ✓
- HART ✓

### Process Safety
- Scalable Process Safety ✓
- Integrated Process Safety ✓

### Service and Support
- Project Engineering and Solution Provider Network ✓
- 24x7 Technical Support – Worldwide ✓
- Configuration Services ✓
- Hardware Maintenance Services ✓
- Installation Services ✓
- Software Support and Upgrade Support ✓
- Training ✓
- Single Source Supplier ✓

### Other Capabilities
- Global Namespace Across Multiple Applications ✓
- DCS – PLC Integration ✓
“Our commercial people were over the moon – the ROI on this upgrade was an economic winner!”

Paul Brodie, Team manager, Plant Support, Carlton & United Breweries
Process facilities today
Most production facilities use multiple control disciplines in their plant, such as process, motion, discrete, safety and batch control. Each of these systems are separate – relying on different control platforms, methodologies and staff. With constant pressure on costs, flexibility, quality and regulatory compliance, the need for real-time information for decision-making has increased. All the while a need to be flexible across your operation and supply chain is critical to maintaining your competitive advantage.

Limitations of conventional systems
In the past, custom-coded systems, DCSs and PLCs were pieced together using expensive gateways, linking devices, custom interfaces and wired connections. Migration and support of these disparate systems was difficult and a constant burden to integrate and maintain. What is needed is a plant-wide control and information system, using a single control platform, that spans from receiving to shipping and shares information from device to desk top.

The Rockwell Automation difference
Rockwell Automation is delivering PlantPAx - the next generation of plant-wide control and information systems that meet the needs of the entire manufacturing enterprise with a single platform. Rockwell Automation delivers a scalable system for all plant automation applications, including discrete, process, batch, motion, drives and safety, as well as seamless information flow between the plant floor and the rest of the manufacturing enterprise. PlantPAx is composed of both automation and information segments defined as the Logix Control Platform and the FactoryTalk Integrated Production and Performance Suite.

PlantPAx: Information and control that meets your needs
The advantages of our solution are easy to see. We simplify the design, development and implementation of a production control and information system. Our open solutions and process expertise enable manufacturers to reuse engineering designs and practices to reduce development time and cost, and to respond more quickly to market demands. We also enable you to reduce start up and down times, maintenance efforts and help you easily gain access to plant and production information and sharing it with business systems for better management, decision-making and agility. In the end, you get your best products out the door faster. Whether you are an OEM or an end-user, we offer a millennium of combined man years in custom engineered services, as well as complex integration, installation and application support that mitigates your risk and maximizes your reward.

Solution Scope: From Devices To Applications To Enterprise Systems