



PlantPAx Distributed Control System

System Release 5.50



Allen-Bradley

by ROCKWELL AUTOMATION

Selection Guide

The PlantPax® system provides a modern approach to distributed control. The system shares common technology (Integrated Architecture® system) with all other automation disciplines in the plant. This approach creates a seamless information flow across the plant for optimization opportunities and enables a Connected Enterprise®. Our scalable platform provides you with the flexibility to implement a system appropriate for your application.

What's Inside

Topic	Page
Select a PlantPax System	3
System Infrastructure	13
Servers and Workstations	21
Controllers, Field Networks, and I/O	37
Process Safety Systems	53

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
PlantPax Distributed Control System Configuration and Implementation User Manual, publication PROCES-UM100	Provides procedures to configure infrastructure components for your PlantPax system.
PlantPax Display and Library Guidelines, publication PROCES-RM200	Provides information on how to use the Process library, including the PlantPax Instructions and display elements.
FLEXHA 5000 I/O System User Manual, publication 5015-UM001	Provides information on how to use FLEXHA 5000™ I/O
Process Automation System Training, Course Catalog .	Describes the courses that are available for a better understanding of the PlantPax system. Filter on Process Control Courses.
https://www.rockwellautomation.com	Provides general information about Rockwell Automation process capabilities. From the menu bar, select Products> Distributed Control Systems.
https://www.rockwellautomation.com/en-us/capabilities/process-solutions/process-systems/distributed-control-system-migration.html	Features prerecorded webinars on the DCS migration program and capabilities for process customers.
Product Compatibility and Download Center at https://compatibility.rockwellautomation.com/Pages/home.aspx	Website helps you find product-related compatibility and downloads including firmware, release notes, associated software, drivers, tools, and utilities.
Infrastructure	
Stratix Ethernet Device Specifications Technical Data, publication 1783-TD002	Contains product specifications, certifications, and catalog numbers for Ethernet switch devices.
Converged Plantwide Ethernet (CPwE) Design and Implementation Guide, publication ENET-TD001	Provides information on Ethernet security and firewalls.
Field Device Integration	
Rockwell Automation Intelligent Electronic Devices Toolkit, publication PROCES-RM211	This manual describes how to configure the Add-On Instructions and visualization objects to integrate intelligent electronic protection devices by using IEC 61850 or EtherNet/IP™ connectivity within the PlantPax® System.
Integrate E+H Instruments in a PlantPax System Integration Document, publication PROCES-SG003	Provides pre-engineered, pre-tested, supported, and maintained integrated solutions for plant-wide diagnostics and lifecycle management.
https://www.endress.com/	Products from Endress+Hauser.
Business partners	Provides a comprehensive listing of searchable Rockwell Automation Business Partners.

PlantPax System Estimator

Rockwell Automation offers the PlantPax System Estimator tool as part of the Integrated Architecture Builder software. The System Estimator tool lets you define your PlantPax system and verifies that your architecture and system elements are sized properly.

The screenshot shows the PlantPax System Estimator tool interface. At the top, the title bar reads "PlantPax". Below it, the "System Name" is "PlantPax_SS.1". The "Controllers" count is 1, "PASS Servers" is 1, and "OWS Clients" is 1. There are also fields for "Digital Inputs" (0), "Digital Outputs" (0), "Analog Inputs" (0), "Analog Outputs" (0), and "Alarms" (0). The "PlantPax Distributed Control System" logo is in the top right. On the left, a tree view shows the system hierarchy: "PlantPax_SS.1" contains "PASS_001", which contains "Subsystem_001", which contains "Controller_001", which contains "Location_001". Below the tree, there are checkboxes for "HMI Server", "Data and Alarm Server", "Dual Data Server", "Redundant Server", and "Consolidated PASS (PASS-C)". The "PASS Licensed for" dropdown is set to "Unlimited". Below these, there are fields for "% of Potential Alarms Used" (30), "Historian Update Rate" (2 sec), "Alarm Tag Update Rate" (2 sec), "Additional Tag Load" (0 tags), and "Additional Alarms on Server" (0 alarms). On the right, the "Server Summary" section shows: "Number of OWS Clients" (1), "Potential Tags in Memory" (0), "Active Tags on Scan / Sec" (2011), and "Total Tags on Scan" (1021). Below this, the "Server I/O Summary" table shows: "Number of Digital Inputs" (0), "Number of Digital Outputs" (0), "Number of Analog Inputs" (0), and "Number of Analog Outputs" (0). The "MCC/MCD" column shows 0 for all. At the bottom right, there is a checkbox "Generate Bill of Material upon Finish" and buttons for "Finish", "Cancel", and "Help".

The System Estimator tool helps you select system elements and size the system. The sizing guidelines are based on the rules and recommendations from PlantPax system characterization to achieve known performance and reliability.

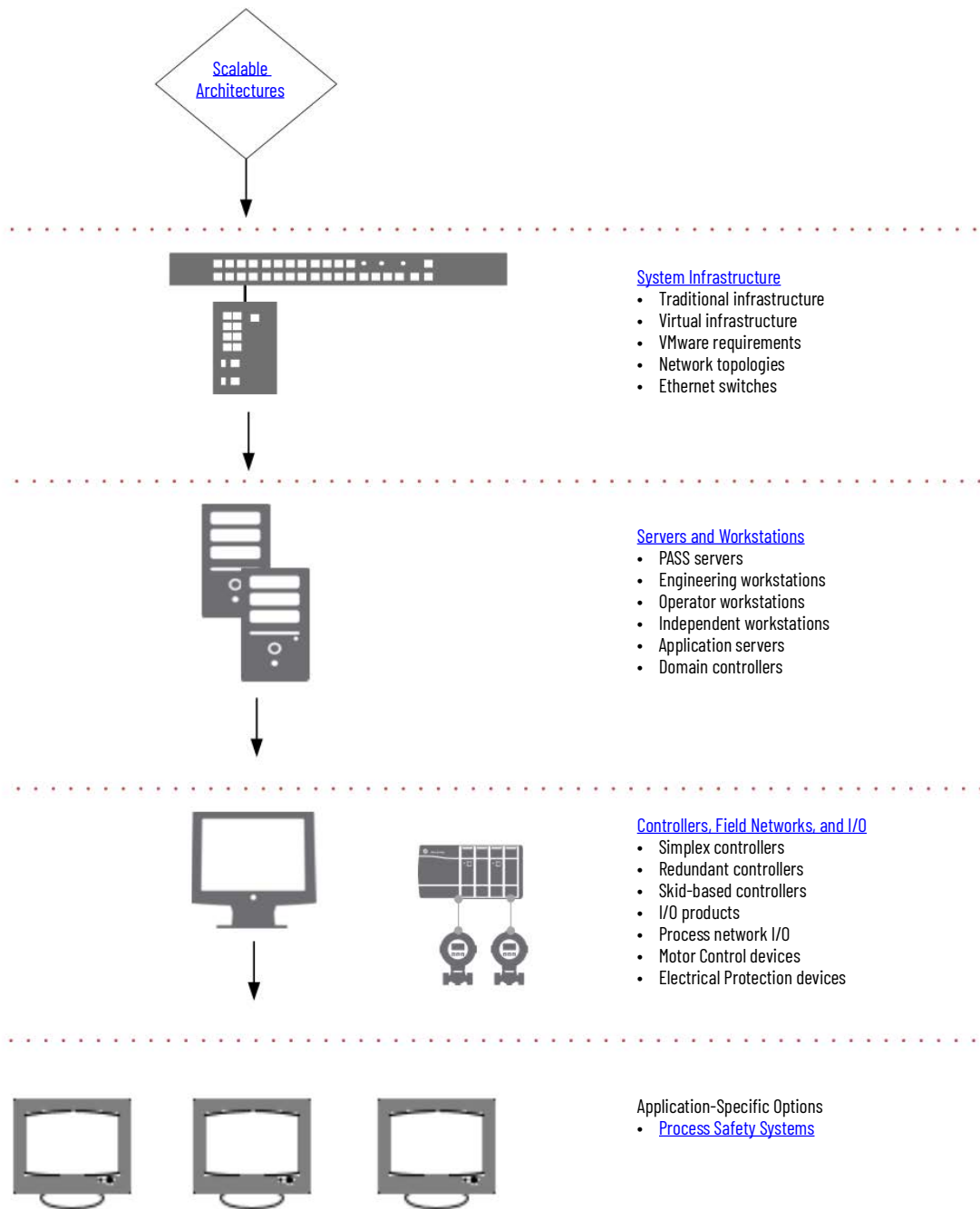
The following items are created based on your inputs:

- Supervisory Ethernet network with all servers, operator, and engineering workstations and controller chassis
- List of required software catalog numbers
- List of network components per subsystem
- List of controllers, I/O, and process devices

After selecting the system elements as defined in this guide, use the PlantPax System Estimator tool to modify their properties. You can then create a bill of materials (BOM) with the Integrated Architecture Builder software. The BOM includes controllers, I/O, networks, drives, devices, and software products that comprise your Distributed Control System.

To access the Integrated Architecture Builder software to use the PlantPax System Estimator tool, download the [Product Selection Toolbox™](#).

For FactoryTalk Optix sizing, See [Panels \(For use with FactoryTalk Optix\) on page 28](#)



A PlantPax system consists of these system elements.

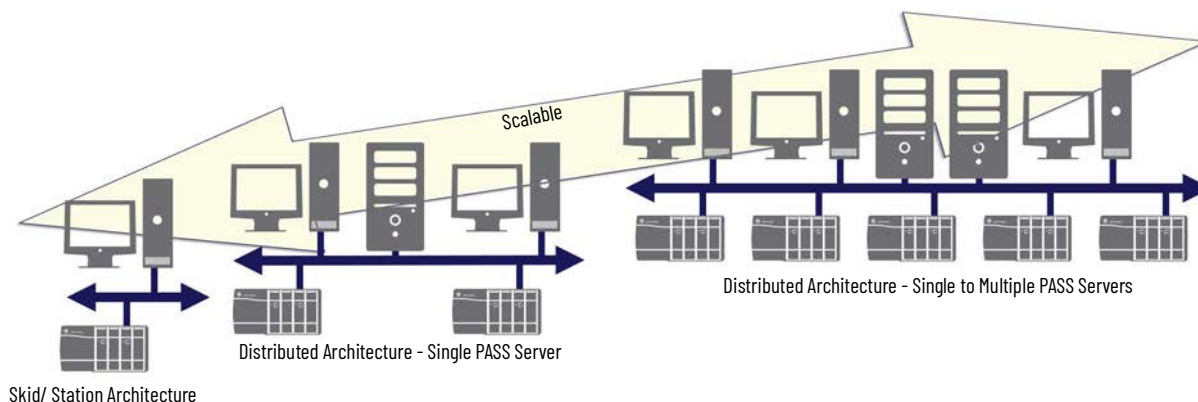
Table 1 - System Element Descriptions

System Element	Description
Process Automation System Server (PASS)	The PASS is a required system element that can host displays, alarms, and data connections to controllers. Multiple PASS servers can be used to provide additional system capacity or to create logical segregation of application content that is based on the process. For smaller systems, the PASS - C (consolidated PASS server) supports functions that otherwise would be hosted on application servers.
Operator workstation (OWS) and Application server (AppServ-OWS)	The OWS and AppServ-OWS provides an interactive graphical interface to monitor and control the process. The AppServ-OWS uses Microsoft® Remote Desktop Services (RDS) technology to serve multiple instances of the OWS as thin clients from one server. The technology provides for FactoryTalk® View SE thin clients that run applications and process data on a remote computer.
Engineering workstation (EWS) and Application server (AppServ-EWS)	The EWS and AppServ-EWS provides a central location for configuring the system and monitoring/maintaining system operation. The AppServ-EWS uses Microsoft Remote Desktop Services (RDS) technology to serve multiple instances of the EWS as thin clients from one server. The technology provides for FactoryTalk View SE thin clients that run applications and process data on a remote computer.
AppServ-Asset management	The asset management server acts as a centralized tool for managing automation-related asset information (both Rockwell Automation and third-party assets). The asset management application server includes capabilities for asset inventory, source control, audits, change notifications, reporting, and security.
AppServ-Batch	The batch application server provides comprehensive batch management, including unit supervision, recipe management, process management, and material management. The batch application server can be linked with visualization elements on the OWS and configuration clients on the EWS.
AppServ-Info	Data management storage can include a Historian or Microsoft SQL server. There are two different types of AppServ-Info servers depending on the function that is being provided: FactoryTalk® Historian software and the Microsoft SQL server.
Controllers	The ControlLogix® and CompactLogix™ controllers support continuous process and batch applications. These controllers also support discrete and motion applications.
Independent workstation (IndWS)	The independent workstation acts as a PASS, EWS, and OWS for single-station systems (independent class).
Domain controller	A domain controller is a server that manages security authentication requests within the Windows® server domain. PlantPax uses a domain controller to store user account information, authenticate users, and enforce security policies.

Scalable Architectures

Rockwell Automation characterizes the PlantPax system that is based on its size or architecture class. A 'characterized' (system-tested) classification yields system performance data and recommended hardware and software configurations. The classes of PlantPax architecture offer system scalability while organizing Integrated Architecture products consistent with process industry expectations.

The architecture classes include the following:



Consideration	Skid Station Architecture (FactoryTalk SE Station) (small <2000 I/O)	Distributed Architecture (single PASS (consolidated)) (small <2000 I/O)	Distributed Architecture (single to multiple PASS servers) (medium= 2,000...10,000 I/O)	Distributed Architecture (single to multiple PASS servers) (large = 10,000+ I/O)
FactoryTalk Directory	The FactoryTalk directory does not require to be placed on a standalone server.	The FactoryTalk directory does not require to be placed on a standalone server.	PlantPax recommends that the FactoryTalk Directory is placed on a standalone server.	PlantPax recommends that the FactoryTalk Directory is placed on a standalone server.
FactoryTalk Activation Server	-	PlantPax recommends that the FactoryTalk Activation server is placed on the FactoryTalk Directory server.	PlantPax recommends that the FactoryTalk Activation server is placed on the FactoryTalk Directory server.	PlantPax recommends that the FactoryTalk Activation server is placed on the FactoryTalk Directory server.
Process Automation System Server (PASS) Note: If redundancy is required, a secondary PASS is needed.	Single SE Station serves as PASS and OWS in an independent workstation. Note: PanelView™ products require PlantPax 5.20 Library or earlier.	For smaller systems, one PASS-C is required that typically includes the following: <ul style="list-style-type: none"> • FactoryTalk Directory server • HMI server • Data server • Alarm and Event server • EWS / OWS The PASS-C supports functions that would otherwise be hosted on separate application servers. The PASS-C single computer also includes the following in a single workstation: <ul style="list-style-type: none"> • FactoryTalk Historian • FactoryTalk AssetCentre • Microsoft SQL Server • FactoryTalk Batch IMPORTANT: An additional PASS-C is required for redundancy. Note: Licensing per application is separate from the PASS-C template.	One PASS required that typically includes the following: <ul style="list-style-type: none"> • HMI server • Data server (Up to 2 Data services per PASS) • Alarm and Event service Note: Optional redundancy is available. Note: Additional PASS Servers can be deployed to accommodate additional data and alarm requirements (as many as 10 servers or redundant pairs). No additional FactoryTalk licensing is required.	
Engineering Workstation (EWS)	1 EWS required. Provided separately	EWS functionality included as part of software installed on PASS-C.	1 EWS required.	1 EWS required. Can have as many as 5 active and in use EWSs AppServ-EWS as needed
Operator Workstation OWS (Clients)	Provided separately via independent workstation or thin client. FactoryTalk View SE Station license can transition to FactoryTalk View SE Client for DCS integration. Note: PanelView™ products require PlantPax 5.20 Library or earlier.	Max 10 OWS clients Note: PASS-C requires additional machines outside of PASS-C image.	Can have as many as 120 OWS clients. AppServ-OWS as needed.	
Controllers	1...5 Compact or ControlLogix	1...5 Compact or ControlLogix	ControlLogix Architecture Actual count varies depending on application requirements. There's no hard limit to the number of controllers. The number of controllers that can be supported per PASS (data server) depends on controller selection, controller loading, and number of OWS.	
Application Server - FactoryTalk AssetCentre	Not applicable. If attached to PlantPax DCS, confirm FactoryTalk AssetCentre can access the skid's asset details.	Included within the PASS-C image	AppServ-Asset (FactoryTalk AssetCentre) is a required component for the PlantPax DCS.	
Application servers	Not applicable. In chassis historian and in controller batch capabilities are available. Can be also integrated with a distributed architecture.	Included within the PASS-C image	AppServ-Batch as needed. AppServ-Information Management (FactoryTalk Historian or AppServ-Information Management	AppServ-Batch as needed. AppServ-Information Management (FactoryTalk Historian) as needed.

Consideration	Skid Station Architecture (FactoryTalk SE Station) (small <2000 I/O)	Distributed Architecture (single PASS (consolidated)) (small <2000 I/O)	Distributed Architecture (single to multiple PASS servers) (medium= 2,000...10,000 I/O)	Distributed Architecture (single to multiple PASS servers) (large = 10,000+ I/O)
Application Servers Info - SQL	Not applicable. If attached to PlantPAx DCS, confirm that FactoryTalk AssetCentre can access.	Included within PASS-C image	It's recommended that AppServ-Info (SQL) is placed on its own server.	It's recommended that AppServ-Info (SQL) is placed on its own server.
Recommended Reference Architecture	Simplex / DLR	Simplex / DLR (Mix)	Simplex / DLR / PRP (Mix)	Simplex / DLR / PRP (Mix)

Software and Library Release Information

Performance guidelines are based on the use of the software versions listed. For new PlantPAx systems, we recommend that you use these versions of software.

- Studio 5000 Logix Designer® application, version 38
- Studio 5000® Application Code Manager, version 5
- FactoryTalk® View software, version 16
- FactoryTalk® Batch software, version 18
- FactoryTalk AssetCentre software, version 16
- FactoryTalk Historian software, version 12

The following Rockwell Automation Libraries are supported with this release:

- Process Library 5.30
- Process Library 5.20
- Process Library 4.10
- Graphic Framework 1.00
- Intelligent Electronic Devices Toolkit 1.00

For the latest compatible software information, see the [Product Compatibility and Download Center](#).

Antivirus

PlantPAx recommends the installation of antivirus software on servers and workstations running industrial automation software. Although all FactoryTalk software is expected to be compatible with the antivirus protections on the market, PlantPAx has been tested with Microsoft Defender Antivirus and Crowdstrike antivirus packages. These antivirus packages had no adverse effect on the performance of the PlantPAx Distributed Control System when used with the default configurations.

Proper configuration, management, and updating of antivirus software is required. Any antivirus protection can impact operation if the configuration of firewalls, network threat protections, and access controls is too restrictive.

CIP Security

PlantPAx recommends the use of CIP Security within the reference architectures for class 3 communications. Use the PlantPAx System Estimator to properly size a system with CIP Security. PlantPAx tests found that CIP Security has minimal impact on system performance while using Integrity protection for Class 3 communication between the plant servers and controllers.

PlantPAx also recommends using the Trusted Slot setting with the controller properties. Communication from the controller to other devices, such as remote I/O modules and other controllers, are not impacted by using the Trusted Slot setting. When using the Trusted Slot setting, configuration changes to the controller can only be made through selected networks (EN4TR with CIP security).

PlantPax System ID

The PlantPax System ID is a unique identifier that helps simplify the management of your system over its lifecycle. The System ID creates a record of the installed products in your system and provides a dashboard that shows the hardware lifecycle status, notifications of updates and patches, and compatibility information. Use this information to:

- Plan spare and replacement parts to better size inventory
- Define the boundaries of the system
- Plan when and where to implement system upgrades

Your system integrator uses the Asset Inventory Agent within a FactoryTalk AssetCentre project to generate a system inventory file. Before delivering your system, your system integrator registers your System ID with Rockwell Automation and provides you directions on how to access your MyEquipment portal.

The System ID is **only** available if you purchase a PlantPax PASS Bundle. The PlantPax PASS Activation serial number is the System ID.

PlantPax Bundles

PlantPax PASS Large 25 Client

This software bundle provides everything that you need to run a PlantPax DCS system with 25 HMI client stations. Included in the bundle is an HMI server with unlimited displays, 25 client stations, and unlimited browser-based HTML client connections. Core asset management and a PlantPax System ID are integrated into the bundle. Additional assets can be added under recommended products.

Support / License Options	Catalog Number
8 x 5 Support / Subscription License	9528C-PASS25T11
8 x 5 Support / Perpetual License	9528M-PASS25T11
24 x 7 Support / Subscription License	9528C-PASS25T12
24 x 7 Support / Perpetual License	9528M-PASS25T12



The catalog numbers in the previous table are for Electronic Software Delivery. To order software in media format, append the catalog number with "M".

For example: 9528C-PASS25T11M

Included in the Bundle

Description	Subscription License	Perpetual License
FactoryTalk View SE Large Bundle: Unlimited Display Server™ with 25 Clients	9701-VWSVBDL25T1T	9701-VWSVBDL25T1TPE
FactoryTalk View SE Large Bundle: Unlimited Display Server with 25 Clients Update	9701U-VWSVBDL25T1T	9701MU-VWSVBDL25T1T
FactoryTalk View SE Large Bundle: Unlimited Display Server with 25 Clients Support	RSSPN-VWSVBDL25T11 (8 x 5 Support) RSSPN-VWSVBDL25T12 (24 x 7 Support)	RSSPM-VWSVBDL25T11 (8 x 5 Support) RSSPM-VWSVBDL25T11 (24 x 7 Support)
FactoryTalk AssetCentre Base	9515-FTACT2T	9515-FTACBASEPE
FactoryTalk AssetCentre Base Update	9515U-FTACT2T	9515MU-FTACT2T
FactoryTalk AssetCentre Base Support	RSSPN-FTACT21 (8 x 5 Support) RSSPN-FTACT22 (24 x 7 Support)	RSSPM-FTACT21 (8 x 5 Support) RSSPM-FTACT22 (24 x 7 Support)
FactoryTalk AssetCentre Inventory Agent	9515-FTACTIAENT	9515-FTACTIAENTP
FactoryTalk AssetCentre Inventory Agent Update	9515U-FTACT7T	9515MU-FTACT7T
FactoryTalk AssetCentre Inventory Agent Support	RSSPN-FTACT71 (8 x 5 Support) RSSPN-FTACT72 (24 x 7 Support)	RSSPM-FTACT71 (8 x 5 Support) RSSPM-FTACT72 (24 x 7 Support)
My Equipment Portal Subscription	9300-MYEQUIP	
Activation	9528-PAXPASSCLI	9528-PAXPASSCLIP

PlantPax PASS Medium 10 Client

This software bundle provides everything that you need to run a PlantPax DCS system with 10 HMI client stations. Included in the bundle is an HMI server with unlimited displays, 10 client stations, and unlimited browser-based HTML client connections. Core asset management and a PlantPax System ID are integrated into the bundle. Additional assets can be added under recommended products.

Support / License Options	Catalog Number
8 x 5 Support / Subscription License	9528C-PASS10T21
8 x 5 Support / Perpetual License	9528M-PASS10T21
24 x 7 Support / Subscription License	9528C-PASS10T22
24 x 7 Support / Perpetual License	9528M-PASS10T22



The catalog numbers in the previous table are for Electronic Software Delivery. To order software in media format, append the catalog number with "M".

For example: 9528C-PASS10T21M

Included in the Bundle

Description	Subscription License	Perpetual License
FactoryTalk View SE Medium Bundle: Unlimited Display Server with 10 Clients	9701-VWSVBDL10T2T	9701-VWSVBDL10T2TPE
FactoryTalk View SE Medium Bundle: Unlimited Display Server with 10 Clients Update	9701U-VWSVBDL10T2T	9701MU-VWSVBDL10T21
FactoryTalk View SE Medium Bundle: Unlimited Display Server with 10 Clients Support	RSSPN-VWSVBDL10T21 (8 x 5 Support) RSSPN-VWSVBDL10T22 (24 x 7 Support)	RSSPM-VWSVBDL10T21 (8 x 5 Support) RSSPM-VWSVBDL10T22 (24 x 7 Support)
FactoryTalk AssetCentre Base	9515-FTACT2T	9515-FTACBASEPE
FactoryTalk AssetCentre Base Update	9515U-FTACT2T	9515MU-FTACT2T
FactoryTalk AssetCentre Base Support	RSSPN-FTACT21 (8 x 5 Support) RSSPN-FTACT22 (24 x 7 Support)	RSSPM-FTACT21 (8 x 5 Support) RSSPM-FTACT22 (24 x 7 Support)
FactoryTalk AssetCentre Inventory Agent	9515-FTACTIAENT	9515-FTACTIAENTP
FactoryTalk AssetCentre Inventory Agent Update	9515U-FTACRT7T	9515MU-FTACRT7I
FactoryTalk AssetCentre Inventory Agent Support	RSSPN-FTACRT71 (8 x 5 Support) RSSPN-FTACRT72 (24 x 7 Support)	RSSPM-FTACRT71 (8 x 5 Support) RSSPM-FTACRT72 (24 x 7 Support)
My Equipment Portal Subscription	9300-MYEQUIP	
Activation	9528-PAXPASSCLI	9528-PAXPASSCLIFE

PlantPax PASS Small 5 Client

This software bundle provides everything that you need to run a PlantPax DCS system with five HMI client stations. Included in the bundle is an HMI server with unlimited displays, five client stations, and unlimited browser-based HTML client connections. Core asset management and a PlantPax System ID are integrated into the bundle. Additional assets can be added under recommended products.

Support / License Options	Catalog Number
8 x 5 Support / Subscription License	9528C-PASS05T31
8 x 5 Support / Perpetual License	9528M-PASS05T31
24 x 7 Support / Subscription License	9528C-PASS05T32
24 x 7 Support / Perpetual License	9528M-PASS05T32



The catalog numbers in the previous table are for Electronic Software Delivery. To order software in media format, append the catalog number with "M".

For example: 9528C-PASS05T31M

Included in the Bundle

Description	Subscription License	Perpetual License
FactoryTalk View SE Small Bundle: Unlimited Display Server with 5 Clients	9701-VWSVBDL05T3T	9701-VWSVBDL05T3TPE
FactoryTalk View SE Small Bundle: Unlimited Display Server with 5 Clients Update	9701U-VWSVBDL05T3T	99701MU-VWSVBDL05T31
FactoryTalk View SE Small Bundle: Unlimited Display Server with 5 Clients Support	RSSPN-VWSVBDL05T31 (8 x 5 Support) RSSPN-VWSVBDL05T32 (24 x 7Support)	RSSPM-VWSVBDL05T31 (8 x 5 Support) RSSPM-VWSVBDL05T32 (24 x 7Support)
FactoryTalk AssetCentre Base	9515-FTACT2T	9515-FTACBASEPE
FactoryTalk AssetCentre Base Update	9515U-FTACT2T	9515MU-FTACT2T
FactoryTalk AssetCentre Base Support	RSSPN-FTACT21 (8 x 5 Support) RSSPN-FTACT22 (24 x 7Support)	RSSPM-FTACT21 (8 x 5 Support) RSSPM-FTACT22 (24 x 7Support)
FactoryTalk AssetCentre Inventory Agent	9515-FTACTIAENT	9515-FTACTIAENTP
FactoryTalk AssetCentre Inventory Agent Update	9515U-FTACRT7T	9515MU-FTACRT7I
FactoryTalk AssetCentre Inventory Agent Support	RSSPN-FTACRT71 (8 x 5 Support) RSSPN-FTACRT72 (24 x 7 Support)	RSSPM-FTACRT71 (8 x 5 Support) RSSPM-FTACRT72 (24 x 7 Support)
My Equipment Portal Subscription	9300-MYEQUIP	
Activation	9528-PAXPASSCLI	9528-PAXPASSCLIE

PlantPax PASS Upgrade

This software bundle provides a pathway for existing customers to get a PlantPax System ID when modernizing their existing PlantPax systems. The PlantPax System ID is integrated into this bundle with the same lifecycle management available in the standard PASS bundles. Additionally, it provides a subscription to asset management software.

Support Options	Catalog Number
8 x 5 Support	9528C-PAXUPGT11
24 x 7 Support	9528C-PAXUPGT12



The catalog numbers in the previous table are for Electronic Software Delivery. To order software in media format, append the catalog number with "M".

For example: 9528C-PAXUPGT11M

Included in the Bundle

Description	Subscription License
FactoryTalk AssetCentre Base	9515-FTACT2T
FactoryTalk AssetCentre Base Update	9515U-FTACT2T
FactoryTalk AssetCentre Base Support	RSSPN-FTACT21 (8 x 5 Support) RSSPN-FTACT22 (24 x 7Support)
FactoryTalk AssetCentre Inventory Agent	9515-FTACTIAENT
FactoryTalk AssetCentre Inventory Agent Update	9515U-FTACRT7T
FactoryTalk AssetCentre Inventory Agent Support	RSSPN-FTACRT71 (8 x 5 Support) RSSPN-FTACRT72 (24 x 7Support)
My Equipment Portal Subscription	9300-MYEQUIP
Activation	9528-PAXPASSUPGE

Notes:

Virtual Infrastructure

The necessary server elements in a PlantPAX installation are typically deployed as virtual machines. There are a range of means to deploy and manage a virtual machine infrastructure. This section provides guidance on requirements when deploying a VMware vCenter or Nutanix AHV environment for a PlantPAX system.

If you're considering virtualization, we suggest that you visit the [Pre-Engineered Network Solutions](#) website.

Component Requirements

The VMware vCenter server provides a centralized platform for managing your VMware vSphere environments. The virtual desktop and virtual server require resources from the physical infrastructure to operate. When you purchase hardware, consider future expansion plans by adding an additional 20...30% of resources. VMware makes it simple to scale the system size upward by adding servers in the future to provide additional resources.

Remember to divide the total system requirements by the minimum number of servers that are required to run the system at any given time. For example, with a three-server system that uses VMware fault tolerance or high availability, you divide by two. This type of calculation makes sure that the system can continue to run with two servers if one server fails.

PlantPAX characterization testing is used to assure performance and sizing and is executed on virtual machine infrastructures. While VMware has been extensively tested with PlantPAX over many releases, Nutanix AHV is now also used for characterization testing. You have a choice between VMware and Nutanix when considering a supported hypervisor environment.

Hypervisor Sizing

Virtual Machines are limited by the CPU megahertz of the physical core. A common misconception is that a VM can use as much CPU megahertz as needed from the combined total available. One vCPU VM never uses more megahertz than the maximum of one CPU/core. If a VM has two vCPUs, it never uses more megahertz than the maximum of each CPU/core.

Table 2 - CPU and PlantPax Resource Requirements

Server and Workstation Type	vCPU	vRAM (GB)	vHardDisk (GB)
Process Automation Domain Controller (PADC)	2	4	40
Process Automation System Server (PASS)	8	16	60
Process Automation System Server - Consolidated (PASS-C)	16	32	120
Operator Workstation (OWS)	4	8	40
Engineering Workstation (EWS)	4	8	100
Operator Workstation Application Server (AppServ-OWS)	8	16	60
Engineering Workstation Application Server (AppServ-EWS)	8	16	100
Information Management Application Server Historian (AppServ-Info Historian)	8	8	120
Information Management Application Server SQL (AppServ-Info SQL)	8	16	120
Asset Management Server (AppServ-Asset)	4	16	60
Batch Management Server (AppServ-Batch)	8	16	10
VMware vCenter Server ⁽¹⁾	2	14	600
Nutanix Controller Virtual Machine (One per physical server) ⁽²⁾	8	32	50

(1) These requirements are for vCenter version 8.0. Depending on the version of vCenter used, these requirements may change. Verify the requirements with VMWare.

(2) These requirements are for Nutanix AHV. Each physical server hosting Nutanix AHV will require a Controller Virtual Machine (CVM).

Reference Network Topologies

PlantPax reference topologies take advantage of converged architectures, that support:

- Access to device webpages throughout the architecture
- Access to the data in smart process devices from outside the local network

These reference topologies include:

- [Example 1: Redundant PRP Topology](#)
- [Example 2: Resilient DLR Topology](#)
- [Example 3: Simplex - Star Topology](#)
- [Example 4 A: PRP Skid and MCC Lineup](#)
- [Example 4 B: DLR Skid and MCC Lineup](#)
- [Example 4C: Simplex Skid and MCC Lineup](#)

Example 1: Redundant PRP Topology

Redundant PRP topology is used for critical operations, and includes infrastructure duplication, multiple fault tolerance capability, zero recovery time within the PRP zone, and minimal recovery time for traffic leaving the PRP zone. Redundant PRP recommendations include:

- 10 controllers per topology (pair of redundant Redboxes)
- In a redundant Redbox configuration, do not connect anything other PRP and uplink ports
- Ports in the PRP channel group can't be configured for other resiliency protocol, such as DLR or Resilient Ethernet Protocol (REP).

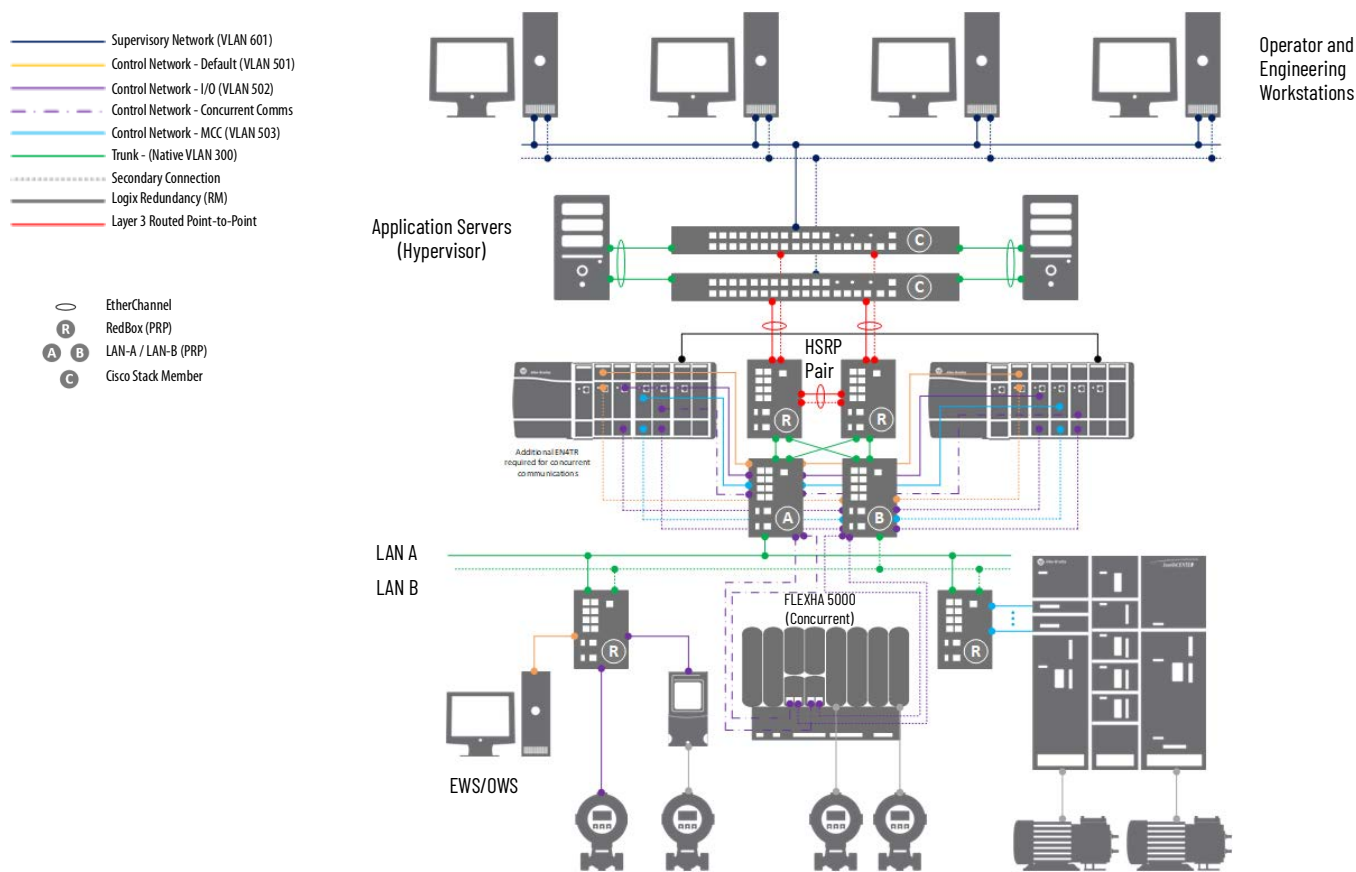


Table 3 - Properties of Example 1 Architecture

Redundant PRP Topology	
Why would I select this architecture?	Most robust option for operations that require high availability. PRP requires double the cabling and components to establish no single point of failure. For a true no single point of failure capabilities, PlantPax recommends redundant power sources along with separate physical paths for media.
What protocols does it use?	<ul style="list-style-type: none">• Implementation of EtherChannel for hardware redundancy between servers and workstations• EIGRP (Enhanced Interior Gateway Routing Protocol) provides Layer 3 routing capabilities• HSRP provides redundant PRP 'RedBox' functionality• PRP provides dual connectivity between two devices• RedBox (redundancy box) is a switch with PRP technology that connects devices without PRP technology to both LAN A and LAN B
What components do I need?	<ul style="list-style-type: none">• Cisco® Catalyst® 9300 switch• Redundant application servers via physical or virtualized environments• Pair of Layer 3 PRP enabled Stratix® switches:<ul style="list-style-type: none">- Stratix 5800• Duplicate LAN A/B Layer 2 infrastructure switches:<ul style="list-style-type: none">- Stratix 5800- Stratix 5200• 1756, 5015 and 5094 I/O families support PRP

Example 2: Resilient DLR Topology

Resilient DLR topology helps prevent communication loss between devices if a fault occurs. Multiport devices (embedded EtherNet/IP™ ports) equipped with DLR technology connect directly to neighboring nodes and form a ring topology at the end devices. If a break in the network is detected, the network provides an alternate forwarding path for the data to help recover the network. DLR recommendations include:

- 10 controllers per topology
- In a dual gateway configuration, do not connect anything other DLR and uplink ports
- Maximum of 50 switch nodes per ring
- Single VLAN per ring
- PlantPAx does not recommend DLR trunking or DLR DHCP
- Place at least 1 meter of cable between each DLR device
- Additional EN4TR required for concurrent communications

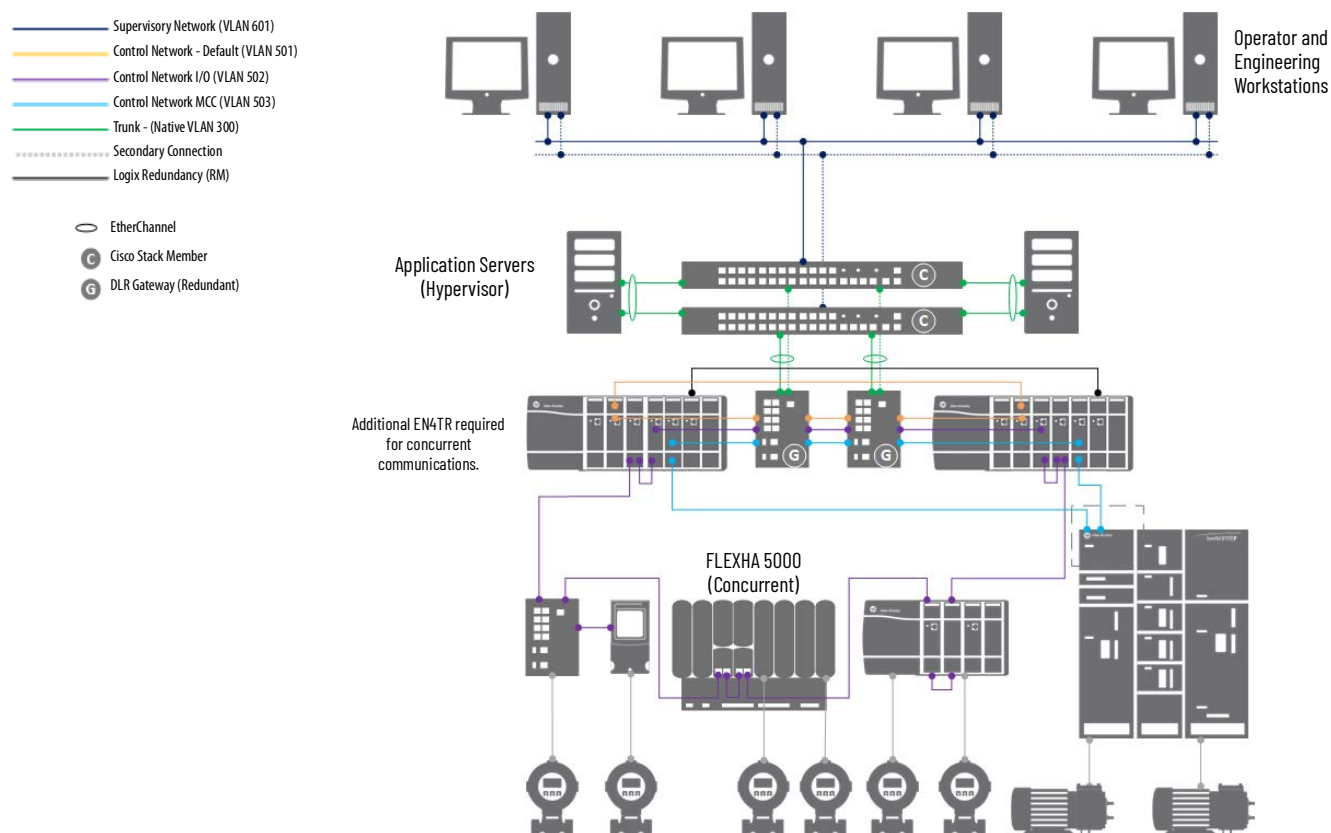


Table 4 - Properties of Example 2 Architecture

Resilient DLR Topology	
Why would I select this architecture?	This architecture provides a means to detect, monitor, manage, and recover from one fault ring-based network. You can use redundant gateways to provide DLR network resiliency to the rest of the network.
What protocols does it use?	<ul style="list-style-type: none"> • Implementation of EtherChannel for hardware redundancy between servers and workstations • EIGRP (Enhanced Interior Gateway Routing Protocol) provides Layer 3 routing capabilities; this protocol is used within the Cisco® Catalyst® switches • DLR is a ring topology that recovers after one point of failure (3 msec or less)
What components do I need?	<ul style="list-style-type: none"> • Cisco Catalyst 9300 switch • Redundant application servers via physical or virtualized environments • DLR gateway capable switches • DLR capable Stratix switches • DLR capable Ethernet modules <p>Check I/O device specifications to verify DLR support.</p>

Example 3: Simplex - Star Topology

Simplex - Star topology features single network connections throughout the topology. There's no redundancy so connected nodes can't communicate on the network if there's a network failure.

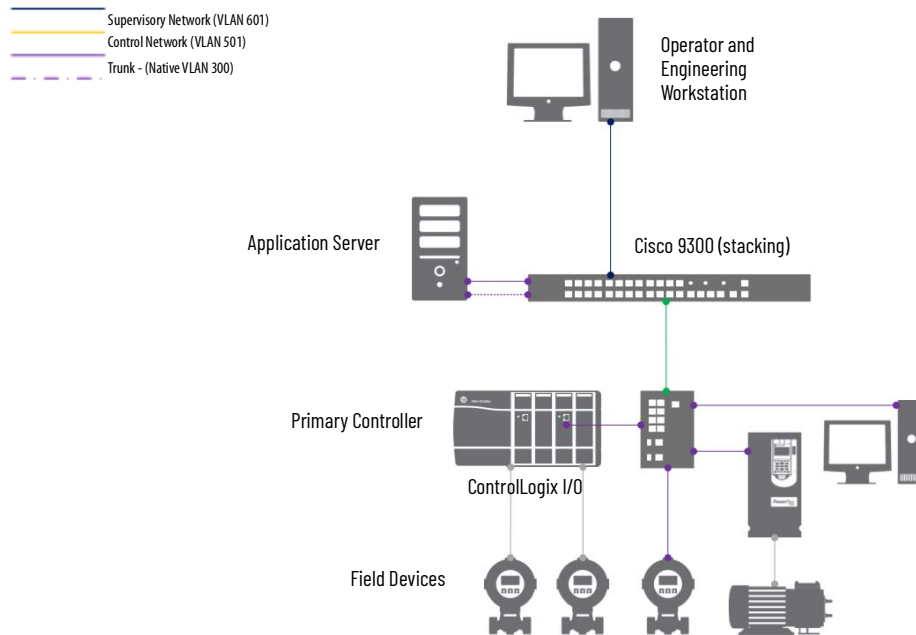
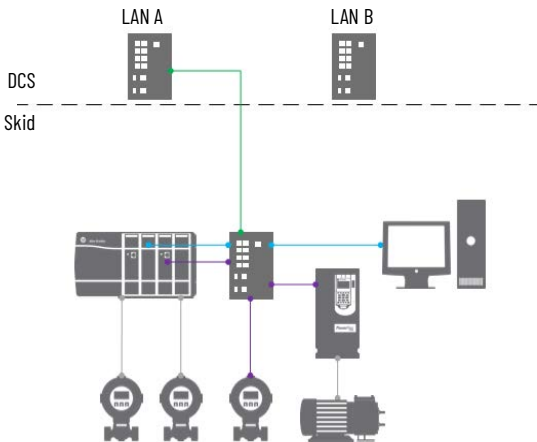


Table 5 - Properties of Example 3 Architecture

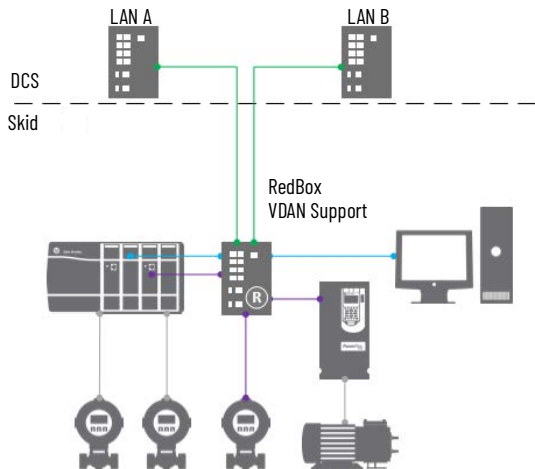
Simplex - Star Topology	
Why would I select this architecture?	This architecture provides a basic network configuration. You can monitor and control non-critical equipment. However, there's no ability to recover from an architectural fault.
What protocols does it use?	<ul style="list-style-type: none"> • EtherNet/IP™ backbone between devices in a star topology • EtherChannel is optional • NIC teaming is optional.
What components do I need?	<ul style="list-style-type: none"> • Layer 2 Stratix switches • Ethernet capable devices

Example 4 A: PRP Skid and MCC Lineup

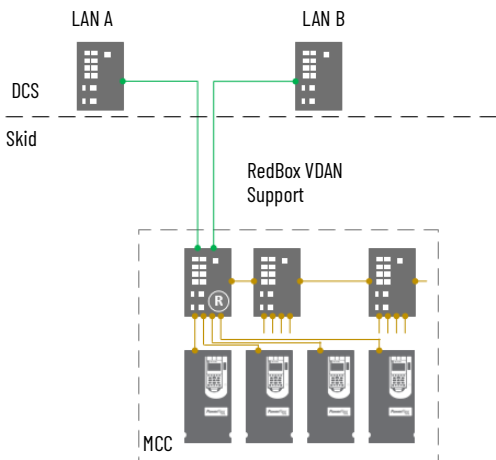
PRP Simplex Connection to Either LAN A/B



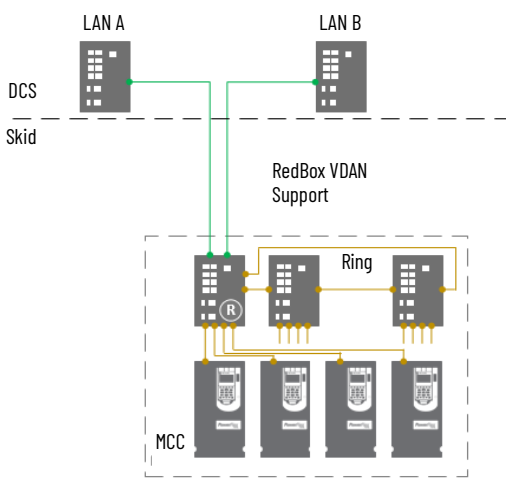
PRP DCS LAN A/B Infrastructure



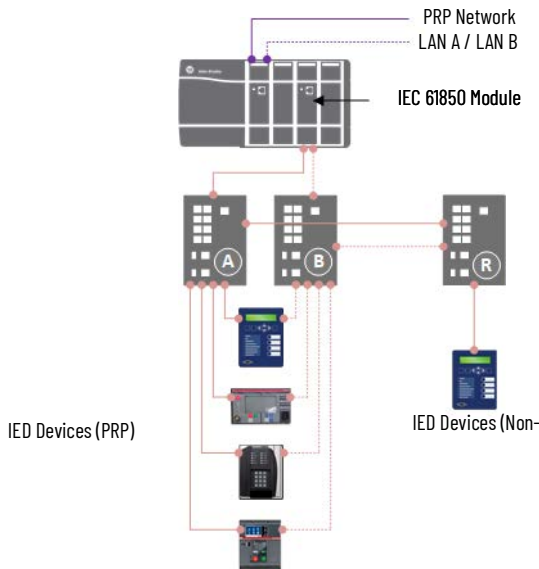
PRP MCC RedBox Connected to LAN A and LAN B



PRP MCC Connected to LAN A/B with DLR Ring

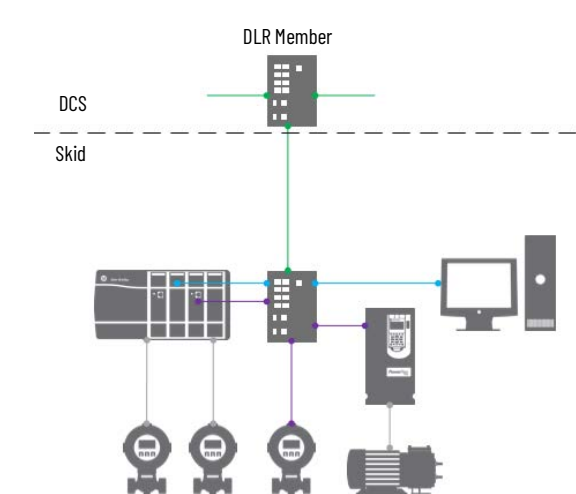


Redundant-PRP IEC 61850

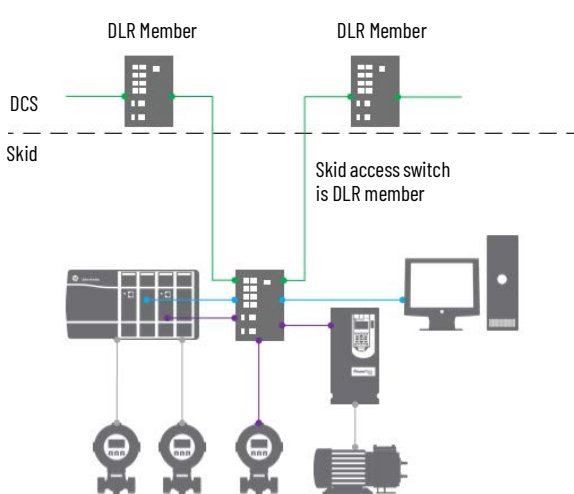


Example 4 B: DLR Skid and MCC Lineup

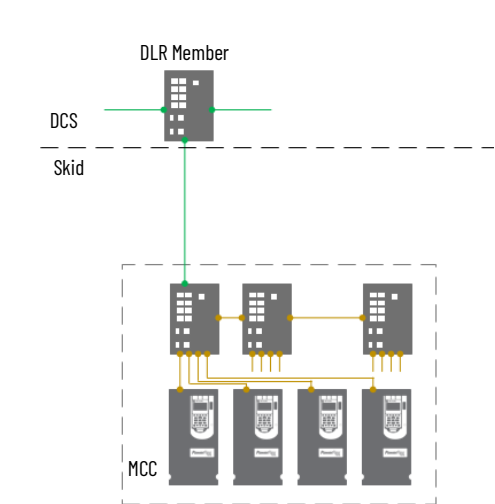
DLR Simplex Connection to Either LAN A/B



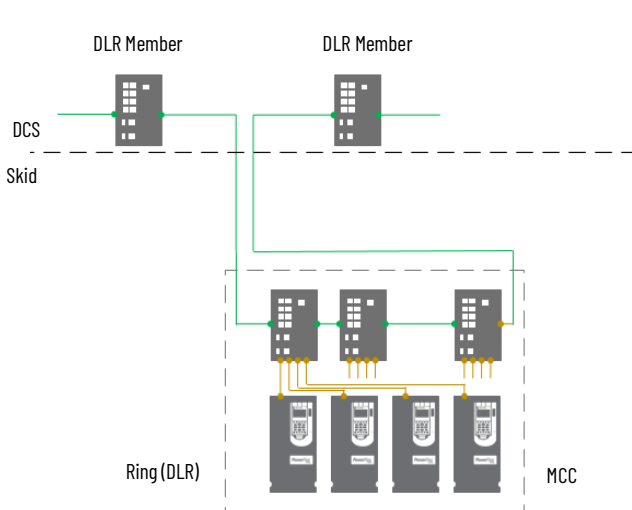
DLR DCS Integration



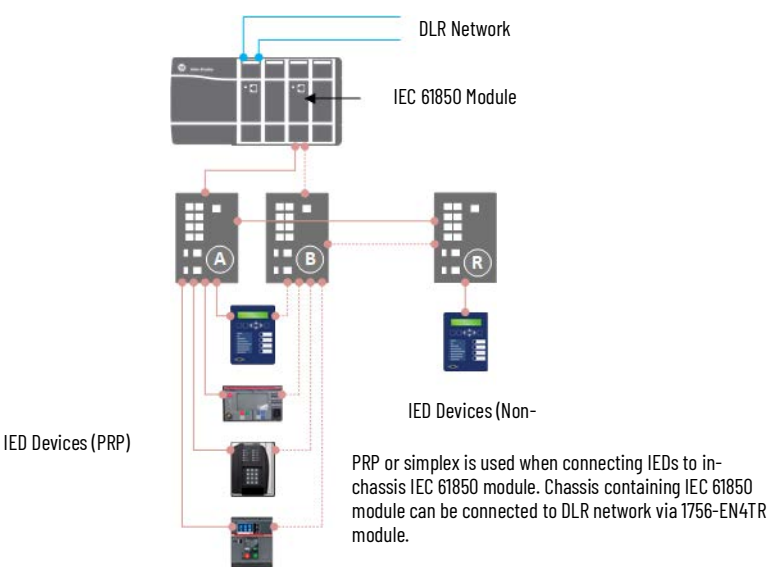
DLR Simplex/MCC Connection to DLR Ring Switch



DLR MCC Lineup as part of the DCS DLR Ring

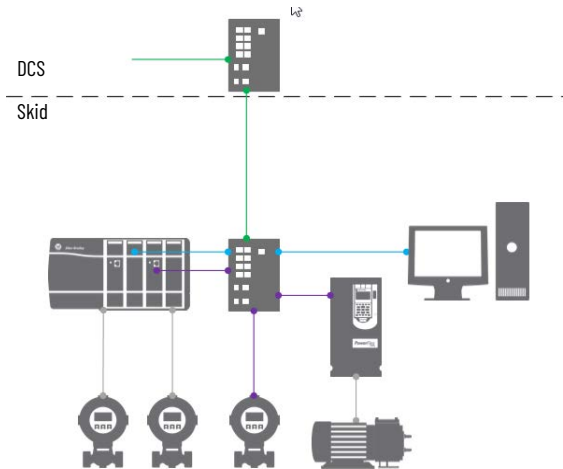


Resilient-DLR IEC 61850

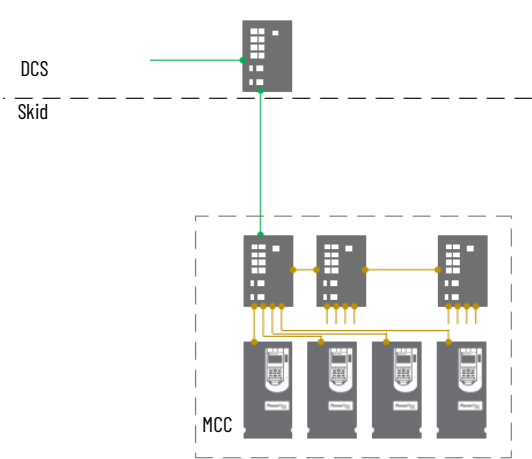


Example 4C: Simplex Skid and MCC Lineup

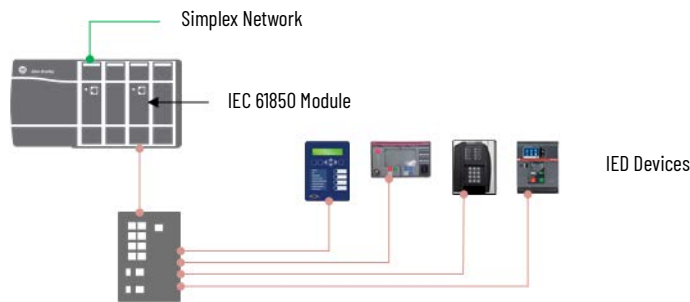
Simplex Connection to Simplex DCS



Simplex MCC Connection to Simplex DCS



Simplex IEC 61850



The supervisory layer of the PlantPAx system can include several servers and workstations. This section explains the server and workstation system elements to help you define a bill of materials.

PASS Servers

The Process Automation System Server (PASS) is a required system element that hosts essential software components to run the system. The essential software components include the data server, HMI server, and alarm server.

You must determine how many PASS servers are needed for your architecture. If your system requires multiple servers, acquaint yourself with the following descriptions of the data, HMI, and alarm servers.

Table 6 - PASS Server Software Components

Software Components	Description
FactoryTalk® Directory (FTD) server ⁽¹⁾	Secures information from multiple Rockwell Automation software components across multiple computers and allows central administration throughout the PlantPAx system. Application components, such as display and security settings, can be stored in their original environments and made available to the entire PlantPAx system without the need for duplication.
FactoryTalk Activation server ⁽¹⁾	The FactoryTalk Activation server is part of the FactoryTalk® Services Platform. The server is used for FactoryTalk-enabled software products to be activated via files generated by Rockwell Automation over the Internet. This server essentially manages the files that are required to license Rockwell Automation products on the PlantPAx system.
FactoryTalk View HMI server	The human machine interface (HMI) server is configured within your FactoryTalk View SE application. The HMI server stores HMI project components, such as graphic displays, and serves these components to OWSs upon request. The HMI server can also manage tag databases and log historical data. Multiple HMI servers can exist on the PlantPAx system. Each HMI server must be on a separate PASS. The HMI server includes DataLogPro Edge Historian that can store up to 50,000 tag values.
FactoryTalk View Data server (FactoryTalk Linx)	The Data server component provides access to information from the process controllers to servers and workstations on the PlantPAx system. The Data server that is mentioned in PlantPAx documentation generally refers to the Rockwell Automation Device servers. Data servers are configured within your FactoryTalk View SE application. A single PASS can host up to 2 instances of FactoryTalk Linx.
FactoryTalk View Data server (OPC UA connector)	The OPC UA connector provides access to data and alarms from OPC UA servers and devices. The OPC UA connector is configured within your FactoryTalk View SE application. No additional licensing is required to use the OPC UA data connector. PlantPAx recommends hosting the OPC UA connector on a dedicated PASS with no more than 50,000 OPC UA tags and 5,000 OPC UA alarms and conditions.
FactoryTalk View Alarm and Event server	<p>The Alarm and Event server publishes information from controllers and servers available to all subscribing OWSs. Alarm and Event servers are configured within your FactoryTalk View SE application. You can install only one Alarm and Event server on a PASS.</p> <ul style="list-style-type: none"> PlantPAx System Release 5. supports Logix tag-based alarms. These device level, tag-based alarms monitor a tag value to determine the alarm condition. Tag-based alarms aren't part of the logic program and do not increase the scan time for a project. The controller caches information, such as time stamps, alarm states, and associated tag values in a buffer. The controller transmits the information to subscribing FactoryTalk Alarm & Event servers. For server tag-based alarms a FactoryTalk® Alarms and Events server monitors controllers for alarm conditions through data servers and publishes event information that can be displayed and logged.
FactoryTalk Historian Live Data Interface	If there is a FactoryTalk Historian in the system, the FactoryTalk Historian Live Data Interface is recommended to be installed on data servers to facilitate data collection. For more information, refer to Verify the FactoryTalk Historian Live Data Local Interface in the FactoryTalk Historian SE Installation and Configuration Guide .
Optional	
FactoryTalk Batch client software	If a Batch Application server is being used on the system, FactoryTalk Batch client components are required to support replication of batch-related objects on the displays to the OWS.

(1) In redundant PASS configurations, this component is included on the primary PASS only.

Determine the Number of PASS Servers

Table 7 - PASS Server Options

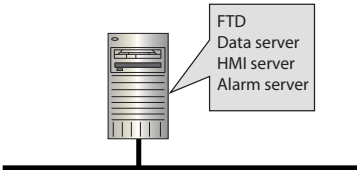
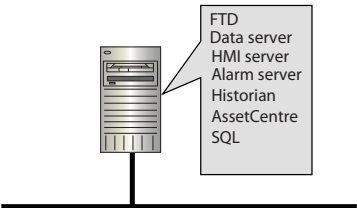
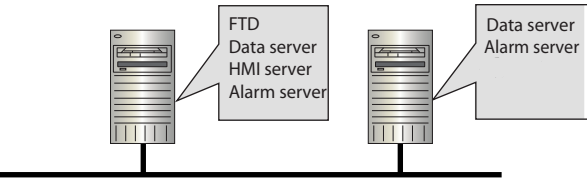
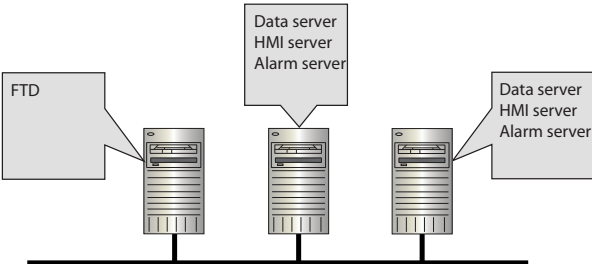
Server Options	Description
<p>Option 1 - One PASS System Server</p> 	<p>This option has all essential software components that are housed in one PASS server. The components are FTD, Data server, HMI server, and alarm and event server. There are additional system elements, such as batch management, asset management, and FactoryTalk Historian. You can deploy these elements on separate servers or you can deploy elements on the same server as detailed in Option 2.</p> <p>One HMI server license is required.</p>
<p>Option 2 - One PASS Consolidated Server (small systems)</p> 	<p>The PASS - C option is for valid small systems with fewer than 2000 I/O points. With this option, you can locate multiple system elements on the same virtual machine.</p> <p>One HMI server license is required.</p>
<p>Option 3 - Multiple PASS Servers (additional data capacity)</p> 	<p>This option contains all software components in one server as shown in Option 1. Option 3 also adds another server for extra data and alarm capacity without adding another HMI server.</p> <p>If the PASS server is being used as a data server, and additional capacity is needed, you can add more PASS servers. Use the PSE to determine if more PASS servers are needed. We recommend that you have an HMI server on the PASS if you're segregating the application into individual operational areas. See Option 4.</p> <p>One HMI server license is required.</p>
<p>Option 4 - Multiple PASS Servers (logically segregated plant)</p> 	<p>Place the FTD on its own server to manage applications that exist on multiple client servers. If an area must be shut down, the other separate areas aren't affected because the FTD is on its own server. For example, you can perform maintenance on one area without affecting another operational area of the plant. FTD can be a workstation class machine.</p> <p>An HMI server license is required for each PASS that contains an HMI server.</p> <p>The benefits of placing the FactoryTalk Directory on a dedicated server include:</p> <ul style="list-style-type: none">• System Startup: It's best if the FTD is the first component to start and the last to stop. Because most FactoryTalk software products rely on the various services that are provided by the FTD, the lowest risk scenario is to have it available as these products are initializing.• Compatibility: While all versions are generally compatible, the FTD is occasionally required to be at the highest version of FTSP installed in the system. This requirement can interfere with another FactoryTalk component if the FTD is co-located with another product.• Patching/Upgrading: Patching an FTD hosted on a dedicated computer translates to minimum system downtime, as it isn't affecting the operation of other FactoryTalk components while rebooting.• Redundancy: In redundant systems (for example, FactoryTalk View SE, FactoryTalk® Linx, FactoryTalk Alarms and Events), it's best if the FTD remains available during any failover scenarios. While the redundant server pair can function without the presence of the FTD, the lowest risk scenario is keeping it available.

Table 8 - PASS Requirements

Category	Requirement ⁽¹⁾
Virtual	vCPU: 8 @ 2.4 GHz minimum vRAM: 16 GB minimum vHardDisk: 60 GB minimum
Physical (Non-Virtual)	CPU: 4 cores/8 threads @ 2.4 GHz minimum RAM: 16 GB minimum HardDisk: 60 GB minimum
Operating system	Windows® server 2022 operating system, 64 bit

(1) All numbers and figures are referenced for initial sizing only. If needed, adjust these values for system performance.

Table 9 - PASS-C Requirements

Category	Requirement
Virtual	vCPU: 16 @ 2.4 GHz minimum vRAM: 32 GB minimum vHardDisk: 120 GB minimum
Physical (Non-Virtual)	CPU: 8 cores/16 threads @ 2.4 GHz minimum RAM: 32 GB minimum HardDisk: 120 GB minimum
Operating system	Windows server 2022 operating system, 64 bit

The PASS requires that you purchase an HMI server license. If the PASS server isn't being used as an HMI server, then no license purchase is required. Make sure to account for process displays, faceplates, and navigation devices in your display count. All displays of the Rockwell Automation Library of Process Objects count against your display count license.

Whether you deploy a PASS system element in a traditional or virtual architecture, you must purchase the proper activations.

Table 10 - PASS Software and Licenses

Category	Cat. No.
Rockwell Automation software licenses	Select the following for the first/main PASS in your system when the PASS is used as an HMI server: ⁽¹⁾⁽²⁾ <ul style="list-style-type: none"> 9528x-PASS05T3y (PlantPAx PASS Small 5-Client) 9528x-PASS10T2y (PlantPAx PASS Medium 10-Client) 9528x-PASS25T1y (PlantPAx PASS Large 25-Client)
	Select the following for a PASS that will be a redundant/secondary HMI Server: <ul style="list-style-type: none"> 9701x-VWRSVRT3y (Redundant Server Unlimited Display)
Rockwell Automation software licenses (for PASS-C) ⁽³⁾	Select one copy per project of the following: ⁽¹⁾⁽²⁾ <ul style="list-style-type: none"> 9528x-PASS05T3y (PlantPAx PASS Small 5-Client) 9528x-PASS10T2y (PlantPAx PASS Medium 10-Client) Select any quantity of the following up to 60,000 tags total: ⁽³⁾ <ul style="list-style-type: none"> 9518x-HSTT1y (FactoryTalk Historian SE 1,000 Tags) 9518x-HST5KT4y (FactoryTalk Historian SE 5,000 Tags) 9518x-HST10KT5y (FactoryTalk Historian SE 10,000 Tags) 9518x-HST20KT6y (FactoryTalk Historian SE 20,000 Tags) 9518x-HST50KT7y (FactoryTalk Historian SE 50,000 Tags) FactoryTalk Batch when required: <ul style="list-style-type: none"> 9358x-FTBT1y (FactoryTalk Batch Server - 1 Unit) 9358x-FTBT5y (FactoryTalk Batch Server - 3 Units) 9358x-FTBT2y (FactoryTalk Batch Server - 10 Units) 9358x-FTBT6y (FactoryTalk Batch Server - 30 Units) 9358x-FTBT3y (FactoryTalk Batch Server - 60 Units)

(1) When your system has two or more PASS servers that are HMI servers, purchase the FactoryTalk View SE software licenses.

(2) Where: x = M (perpetual use license) or C (subscription license) and y = 1 (8x5 support) or 2 (24x7 support)

(3) If necessary, the end user is responsible for acquiring the Microsoft SQL Server license.

Engineering Workstation (EWS)

The engineering workstation (EWS) supports system configuration, application development, and maintenance functions. The EWS is the central location for monitoring and maintaining the systems operation. The recommended limit is five EWS per system.

Table 11 - EWS Requirements

Category	Requirement ⁽¹⁾
Virtual	vCPU: 4 @ 2.4 GHz minimum vRAM: 8 GB minimum vHardDisk: 100 GB minimum
Physical (Non-Virtual)	CPU: 2 cores/4 threads @ 2.4 GHz minimum RAM: 8 GB minimum HardDisk: 100 GB minimum
Operating system	Windows 10 or 11 operating system, 64 bit

(1) All numbers and figures are referenced for initial sizing only. If needed, adjust these values for system performance.

Whether you deploy an EWS system element in a traditional or virtual architecture, you must purchase the proper activations.

Table 12 - EWS Software License

Category	Cat. No.
Rockwell Automation software license	The following licenses enable the software tools that are deployed on the EWS: ^{(1) (2)} <ul style="list-style-type: none"> 9324x-RLDT3y 9701x-VWSSPT3y 9701x-VWSDRT1y

(1) Where: x = M (perpetual use license) or C (subscription license)

(2) Where: y = 1 (8x5 support), y = 2 (24x7 support)

Engineering Workstation Application Server (AppServ-EWS)

The AppServ-EWS uses ThinManager® or Microsoft Remote Desktop Services (RDS) technology to serve multiple instances of the EWS as thin clients from one server. Thin clients can run applications and process data on a remote computer. The recommended limit is five active and connected RDS client connections per AppServ-EWS. The application server can host up to 10 clients, but only five are to be actively configuring the system at one time.

Table 13 - AppServ-EWS Requirements

Category	Requirement ⁽¹⁾
Virtual	vCPU: 8 @ 2.4 GHz minimum vRAM: 16 GB minimum vHardDisk: 100 GB minimum
Physical (Non-Virtual)	CPU: 4 cores/8 threads @ 2.4 GHz minimum RAM: 16 GB minimum HardDisk: 100 GB minimum
Thin client	We recommend a maximum of five active and connected FactoryTalk View SE clients per application server.
Operating system	Windows Server 2022 operating system, 64 bit

(1) All numbers and figures are referenced for initial sizing only. If needed, adjust these values for system performance.

Whether you deploy an AppServ-EWS system element in a traditional or virtual architecture, you must purchase the proper activations.

Table 14 - AppServ-EWS Automation System Software and License

Category	Cat. No.
Rockwell Automation software license IMPORTANT: The identified set of Rockwell Automation licenses must be purchased for each client that is connected to the AppServ-EWS.	The following licenses enable the software tools that are deployed on an EWS client: ^{(1) (2)} <ul style="list-style-type: none">• 9324x-RLDT3y• 9701x-VWSSPT3y• 9701x-VWSDRT1y

(1) Where: x = M (perpetual use license) or C (subscription license)

(2) Where: y = 1 (8x5 support), y = 2 (24x7 support)

Operator Workstations (OWS)

The operator workstation (OWS) provides the graphical view and interface into the process. The OWS supports operator interaction and isn't meant to support development or maintenance activities, although these activities are possible if desired.

Table 15 - OWS Requirements

Category	Requirement ⁽¹⁾
Virtual	vCPU: 4 @ 2.4 GHz minimum vRAM: 8 GB minimum vHardDisk: 40 GB minimum
Physical (Non-Virtual)	CPU: 1 core/2 threads @ 2.4 GHz minimum RAM: 4 GB minimum HardDisk: 40 GB minimum
Operating system	Windows 10 or 11 operating system, 64 bit

(1) All numbers and figures are referenced for initial sizing only. If needed, adjust these values for system performance.

Whether you deploy an OWS system element in a traditional or virtual architecture, you must purchase proper activations.

Table 16 - OWS Software License

Category	Cat. No.
Rockwell Automation software license	For each OWS: ^{(1) (2)} <ul style="list-style-type: none">• 9701x-VWSDRT1y

(1) Where: x = M (perpetual use license) or C (subscription license)

(2) Where: y = 1 (8x5 support), y = 2 (24x7 support)

Operator Workstation Application Servers (AppServ-OWS)

The AppServ-OWS uses Microsoft Remote Desktop Services (RDS) technology to serve multiple instances of the OWS as thin clients from one server. Thin clients can run applications and process data on a remote computer to minimize the amount of information on a network. The AppServ-OWS is only configured to run FactoryTalk View SE clients and the recommended limit is 10 clients per application server.

Table 17 - AppServ-OWS Requirements

Category	Requirement ⁽¹⁾
Virtual	vCPU: 8 @ 2.4 GHz minimum vRAM: 16 GB minimum vHardDisk: 60 GB minimum
Physical (Non-Virtual)	CPU: 4 cores/8 threads @ 2.4 GHz minimum RAM: 16 GB minimum HardDisk: 60 GB minimum
Operating system	Windows server 2022 operating system, 64 bit
Thin client	We recommend a maximum of 10 FactoryTalk View SE clients per application server.
Additional third-party software	Antivirus software

(1) All numbers and figures are referenced for initial sizing only. If needed, adjust these values for system performance.

Whether you deploy an AppServ-OWS system element in a traditional or virtual architecture, you must purchase the proper activations.

Table 18 - AppServ-OWS Software License

Category	Cat. No.
Rockwell Automation software license IMPORTANT: The identified set of Rockwell Automation licenses must be purchased for each client that is connected to the AppServ-OWS.	Purchase a license for each client that the AppServ-OWS servers: ⁽¹⁾ ⁽²⁾ <ul style="list-style-type: none">• 9701x-VWSDRT1y

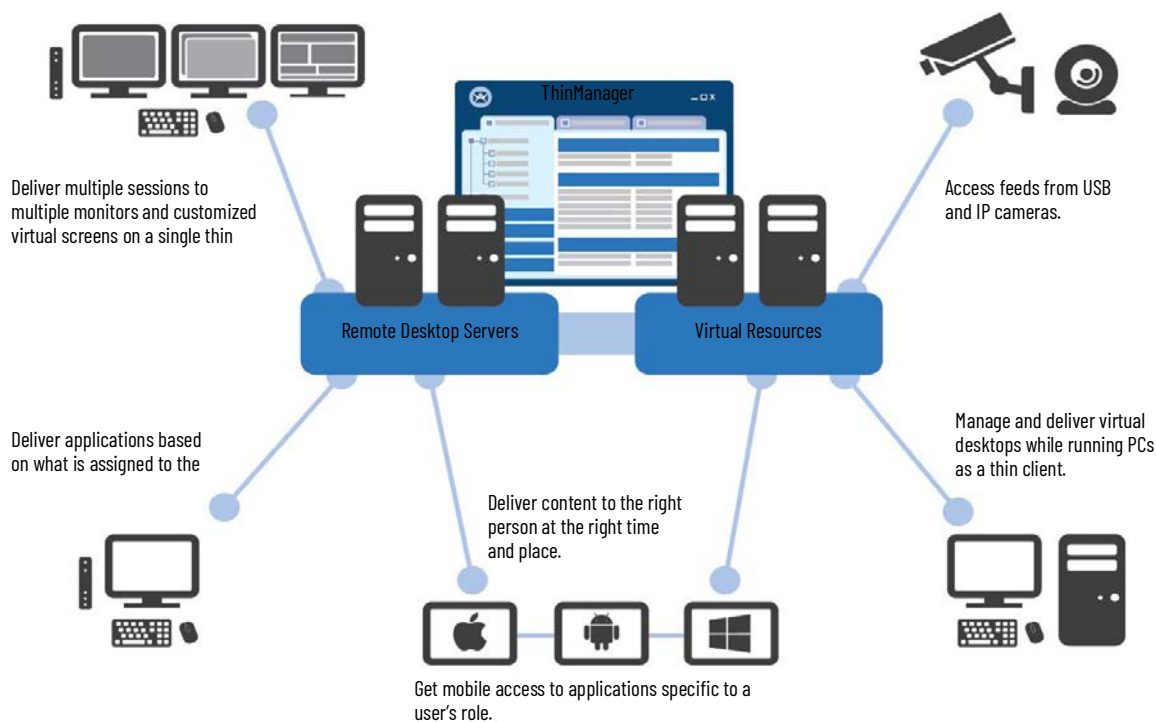
(1) Where: x = M (perpetual use license) or C (subscription license)

(2) Where: y = 1 (8x5 support), y = 2 (24x7 support)

ThinManager Server Options

The AppServ-OWS or AppServ-EWS can be configured as your ThinManager Server and deploy up to 10 OWS/EWS sessions to simplify the management of all devices and users. Only one instance of ThinManager is required within a PlantPAx system.

ThinManager increases your productivity, visualization, mobility, and security from a centralized, and scalable management platform.



Safely and securely deliver your content to any combination of device, user, and location with the following features:

- Boost productivity by reducing the time that is spent in managing computers
- Enhance visualization by delivering your content to where you need it and the way you want it to be shown
- Extend security through encrypted communications, Active Directory, and secure thin clients
- Smart mobility where QR Codes, Bluetooth, Wi-Fi, and GPS make sure that devices receive content in authorized areas

For more information, see [Thin Client Management Software](#).

Independent Workstations (IndWS)

The independent workstation (IndWS) combines the roles of the PASS, EWS, and OWS in one computer. This workstation can be used as a backup control system for emergency purposes.

Table 19 - IndWS Requirements

Category	Requirement
Physical	CPU: 4 cores/8 threads @ 2.4 GHz minimum RAM: 16 GB minimum HardDisk: 100 GB minimum
Operating system	Windows 10, 11, or server 2022 operating system, 64 bit

If you deploy an IndWS system element, you must purchase the proper activations.

Table 20 - IndWS Software Licenses

Category	Cat. No. ^{(1) (2)}
Rockwell Automation software licenses	One per IndWS if being used as EWS: <ul style="list-style-type: none">• 9324x-RLDT3y (Studio 5000 Professional Edition Design Environment Software) Select one of the following: <ul style="list-style-type: none">• - 9701x-VWSTNBDLT4y (FactoryTalk View SE Station Bundle: Unlimited Displays)

(1) Where: x = M (perpetual use license) or C (subscription license)

(2) Where: y = 1 (8x5 support), y = 2 (24x7 support)

Panels (For use with FactoryTalk Optix)

For some systems, there is a need for operator panels in the field. While these panels are not deployed at the supervisory layer, the options are documented in this section given the operations nature of the capability.

Various panel offerings have previously been used with PlantPAx. PlantPAx now has a preferred offering based on the FactoryTalk Optix® platform. The software can be deployed on a suitably sized OptixPanel™ Standard graphic terminal or an ASEM™ 6300P Panel PC. For more details on the FactoryTalk Optix offering, see FactoryTalk Optix Solutions, publication [OPTIX-AT001](#). For more details of the FactoryTalk Optix content provided in the Library of Process Objects, see PlantPAx Display and Library Guidelines, publication [PROCES-RM200](#). Note that specific PlantPAx testing of this panel support has been on a single panel communicating with a single Process Controller.

To select a properly sized panel, start by logging into [FactoryTalk Hub](#).



If you don't have a FactoryTalk Hub login, visit [Try FactoryTalk Optix Software At No Cost](#) to obtain an account.

IMPORTANT Process Libraries v5.20 and 5.30 have Objects and Faceplates for FactoryTalk Optix, see the Process Library release notes for more details. Process Library v4.10 does not have content for FactoryTalk Optix.

Open the FactoryTalk Optix card when logged into the FactoryTalk Hub and select Device Sizing from the top menu. Enter the data for your application on each of the pages to be presented with a recommended device/panel. Typical selections for a PlantPax application will be as follows:

Item	Quantity	PlantPax references
Tags	0-200	Number of non-Process Library Object tags that you want to use in the FactoryTalk Optix Project. These are Booleans, Reals, Integers, Strings, etc. For example: 10 [3 Integers, 5 Strings, 2 Booleans].
Structured Tags	0-500	Number of Process Library Objects that you want to use in the FactoryTalk Optix Project. For example: 12 [3 PMTR, 5 PAI, 3 PVLV, 1 raP_Opr_Seq]. Note: When using an OptixPanel Standard, testing indicates that projects with more than approximately 200 structured tags will not download to the panel. When using the PlantPax Process Library objects, the OptixPanel Standard graphic terminal should only be chosen for small projects.
Structured Tag Items	115	Number of Parameters within the Process Library objects that you want to use in the FactoryTalk Optix Project. For example: 115 [Average across all Structured Tags / Process Objects] Note: PlantPax system testing scanned all parameters for the Process Library Objects. Performance and capacity can be increased by selecting only the parameters tags necessary for the FactoryTalk Optix Project.
Alarms	0-800	Logix tag-based alarms from Process Library Objects.
Data Logger	0	Capacities not tested for use with PlantPax.
Variables Logged	0	
Event Logger	0	Capacities not tested for use with PlantPax.
Events Logged	0	
Recipes	0	Capacities not tested for use with PlantPax.
Recipe Variables	0	
Web Clients	0	Capacities not tested for use with PlantPax.
OPC-UA Clients	0	Capacities not tested for use with PlantPax.
Low density screens	Application specific	Expected for typical PlantPax style process displays. Minor impact on capacity and performance.
Medium density screens	Application specific	Less expected. Minor impact on capacity and performance.
High density screens	Application specific	Less expected. Minor impact on capacity and performance.

To properly size the FactoryTalk Optix software, select Runtime Sizing from the top menu. Enter the data for your application on each of the pages to then be presented with a calculation for the number of tokens to purchase. Note that OptixPanel Standard includes a quantity of tokens that may meet your application needs to avoid ordering additional tokens.

Item	Selection	PlantPax references
Native HMI Client	Yes	Testing has been limited to 1.
Web HMI Client	No	PlantPax has not performed specific testing with this feature.
Alarms	Yes	
Recipe	No	PlantPax has not performed specific testing with this feature.
Active directory authentication	No	Future support in the Process Library
Basic reporting	No	PlantPax has not performed specific testing with this feature.
Audit signature capture	No	Future support in the Process Library
Runtime retentivity	No	PlantPax has not performed specific testing with this feature.
Event logger	No	PlantPax has not performed specific testing with this feature.
Data logger	No	PlantPax has not performed specific testing with this feature.
Store and Forward	No	PlantPax has not performed specific testing with this feature.
Database	No	PlantPax has not performed specific testing with this feature.
Embedded	No	
ODBC Connections	No	
InfluxDB	No	PlantPax has not performed specific testing with this feature.
Embedded	No	
Remote Connections	No	
Rockwell Ethernet/IP	Yes	Additional controller connections have not been tested, and the library content only supports Process Controllers.
Single connection	Yes	Testing has been limited to 1.
Multiple connections	No	Testing has been limited to 1.

Item	Selection	PlantPAx references
Rockwell Hardware	Yes	Library support is limited to Process Controllers.
Runtime tag upload	Yes	Not required but may be desirable.
Interoperability selections	No	OPC UA client/server and MQTT client/broker have not been tested with PlantPAx.

Information Management Application Servers (AppServ-Info)

Information management application servers (AppServ-Info) represent a broad category of servers and software that provides value to the PlantPAx system by offering data management and decision support functionalities. Except where specifically noted, all options that are listed must be installed on their own servers to maximize performance.

Table 21 - Data Management Options

Category	Requirement	Option
Time series	<ul style="list-style-type: none"> High-speed, on-machine data collection < 2500 tags 	Information Management server is optional because you can use an embedded historian module for the ControlLogix chassis (FactoryTalk Historian ME). If the FactoryTalk Historian ME module is collecting 2500 points per second, the duration of history that is stored is approximately 14 hours. <ul style="list-style-type: none"> 1756-HIST2G (2 GB)
	<ul style="list-style-type: none"> Longer term data storage > 2500 tags 	An Information Management server is required with FactoryTalk Historian SE software for up to 60,000 tags. Additionally, the DataLogPro Edge Historian included as part of the HMI server can be used for up to 50,000 tags.
Event based	Relational database	An additional AppServ-Info server can be considered for the storage of transactional data. You can select a Microsoft SQL server database to act as the central collection point for event-based data: <ul style="list-style-type: none"> FactoryTalk Alarm and Event data FactoryTalk Batch data This database can be installed on an Information Management server or another server on your system.

AppServ-Info (Historian)

One of the ways to configure the AppServ-Info is as a historian to collect data. Follow these guidelines if you're adding a Historian server to your PlantPAx system.

Table 22 - AppServ-Info (Historian) Requirements

Category	Requirement ⁽¹⁾
Virtual	vCPU: 8 @ 2.4 GHz minimum vRAM: 8 GB minimum vHardDisk: 120 GB minimum
Physical (Non-Virtual)	CPU: 4 cores/8 threads @ 2.4 GHz minimum RAM: 8 GB minimum HardDisk: 120 GB minimum
Operating system	Windows server 2022 operating system, 64 bit

(1) All numbers and figures are referenced for initial sizing only. If needed, adjust these values for system performance.

Whether you deploy a Historian system element in a traditional or virtual architecture, you must purchase the proper activations.

Table 23 - FactoryTalk Historian Software and Licenses

Category	Cat. No. ^{(1)(2) (3)}
Rockwell Automation software license ⁽⁴⁾	Select one of the licenses: <ul style="list-style-type: none"> • 9518x-HSTT1y (FactoryTalk Historian SE - 1,000 tags) • 9518x-HSTS5KT4y (FactoryTalk Historian SE - 5,000 tags) • 9518x-HST10KT51y (FactoryTalk Historian SE - 10,000 tags) • 9518x-HST20KT6y (FactoryTalk Historian SE - 20,000 tags) • 9518x-HST50KT7y (FactoryTalk Historian SE - 50,000 tags) Note: order these in quantities to meet your need not to exceed a total of 60,000 tags.
FactoryTalk PI Vision Client	Select for each client that is using FactoryTalk Historian Vision Client: <ul style="list-style-type: none"> • 9518x-HSTRT4y (FactoryTalk Historian Vision Client - Single User)
Excel® Add-in	<ul style="list-style-type: none"> • 9518x-HSTRT3y (Historian SE, DataLink Client, 5 Users)

(1) If you plan to use redundant Historian for high availability, you must license an equivalent number of tags for the redundant Historian.

(2) Where: x = M (perpetual use license) or C (subscription license)

(3) Where: y = 1 (8x5 support), y = 2 (24x7 support)

(4) Additional FactoryTalk Historian software licenses can be found on the [Rockwell Automation commerce portal](#).

AppServ-Info (SQL)

Another way to configure AppServ-Info is as a Microsoft SQL Server relational database. Software such as FactoryTalk AssetCentre, and FactoryTalk Batch use a SQL Server database to store and access process data. The FactoryTalk Alarm and Event server uses a SQL Server database to store information.

The process library includes standard reports that support basic and advanced alarm and event reports along with per process object reporting.

Table 24 - AppServ-Info (SQL) Requirements

Category	Requirement ⁽¹⁾
Virtual	vCPU: 8 @ 2.4 GHz minimum vRAM: 16 GB minimum vHardDisk: 120 GB minimum
Physical (Non-Virtual)	CPU: 1 core/2 threads @ 2.4 GHz minimum RAM: 4 GB minimum HardDisk: 120 GB minimum
Operating system	Windows server 2022 operating system, 64 bit

(1) All numbers and figures are referenced for initial sizing only. If needed, adjust these values for system performance.

Microsoft SQL Server is licensed in one of two ways: Server + CAL or Per Core. 'CAL' is an abbreviation for client access license. Server+CAL licensing is recommended for fewer clients. Every additional client requires a CAL license. Per Core licensing provides unlimited number of CALs.

Whether you deploy a Microsoft SQL Server system element in a traditional or virtual architecture, you must purchase the proper licensing. The End User is responsible for acquiring the appropriate Microsoft SQL Server licensing.

Asset Management Servers (AppServ-Asset)

An asset management server (AppServ-Asset) is an extension to the PlantPAx system that adds maintenance and plant operations to the system with FactoryTalk AssetCentre software. This server provides controller data backup for disaster recovery, diagnostics, and real-time monitoring. The server also audits assets and monitors network health to improve overall resource availability.

The asset management server provides centralized system management for Rockwell Automation and third-party field assets.

Table 25 - AppServ-Asset Requirements

Category	Requirement ⁽¹⁾
Virtual	vCPU: 4 @ 2.4 GHz minimum vRAM: 16 GB minimum vHardDisk: 60 GB minimum
Physical (Non-Virtual)	CPU: 2 cores/4 threads @ 2.4 GHz minimum RAM: 16 GB minimum HardDisk: 60 GB minimum
Operating system	Windows server 2022 operating system, 64 bit

(1) All numbers and figures are referenced for initial sizing only. If needed, adjust these values for system performance.

Whether you deploy an AppServ-Asset system element in a traditional or virtual architecture, you must purchase the proper activations.

Table 26 - AppServ-Asset Software and Licenses

Category	Cat. No. ⁽¹⁾ (2)
Rockwell Automation software license	<ul style="list-style-type: none">9515x-FTACT2y (FactoryTalk AssetCentre Base) A license for AssetCentre Base isn't required when the system included a PASS licensed using a SystemID bundle as it is already included.
Asset licenses	Select one or more of the following so that the sum of licenses is equal to or greater than the number of assets that is to be managed by the Asset Management server: ⁽³⁾ <ul style="list-style-type: none">9515x-FTACRT9y (FactoryTalk AssetCentre 25 Assets)9515x-FTACRT1y (FactoryTalk AssetCentre 100 Assets)
Virtual server disaster recovery licenses	If disaster recovery is to be used, select from the following: <ul style="list-style-type: none">9515x-FTACRT10y (Disaster recovery for Rockwell Automation)9515x-FTACRT2y (Disaster recovery for remote computers)

(1) Where: x = M (perpetual use license) or C (subscription license)

(2) Where: y = 1 (8x5 support), y = 2 (24x7 support)

(3) The server license, included with the System ID bundle, includes 10 assets.

Batch Management Servers (AppServ-Batch)

PlantPAx systems support scalable options for batch management that are based on ISA88 standards:

Feature	Logix Batch & Sequence Manager	SequenceManager™	FactoryTalk® Batch
Deployment	Logix controller code	Firmware-based controller feature	Server-based application (AppServ-Batch)
Supported controllers	ControlLogix 5570 ControlLogix 5580 ControlLogix 5590 CompactLogix 5370 CompactLogix 5380	ControlLogix 5570 ControlLogix 5580 ⁽¹⁾ ControlLogix 5590 ⁽¹⁾ CompactLogix 5370 CompactLogix 5380	ControlLogix 5570 ControlLogix 5580 ControlLogix 5590 CompactLogix 5370 CompactLogix 5380
Units	Single unit recipes	Single unit recipes	Multiple unit recipes
Phase construction	PhaseManager™ programs	PhaseManager programs	PhaseManager programs
Phase interface	Phase and bit logic	Pull-down menu	Pull-down menu
Max recipes/steps/phases	32	Limited by memory or resources	Limited by memory or resources
Max input/report parameters	4	No max	No max
Parameter expressions	No	Yes	Yes
Parameter data types	BOOL REAL	BOOL INT, INT, DINT REAL	BOOL SINT, INT, DINT REAL
Procedural structure	Sequential Concurrent	Sequential Concurrent Divergent Recurrent	Sequential Concurrent Divergent Recurrent
Recipe design	Tabular HMI configured	SFC like	SFC like
Recipe editing	Runtime via HMI	Import only at runtime	Runtime editing via Recipe Editor
HMI integration	Faceplates	3 Active X	4 Active X API
Batch reporting	Queue controller services	Event client and archive services	Event client and archive services
FactoryTalk Batch integration	No	Yes	Na
Dynamic unit binding	No	No	Yes
Unit arbitration	No	No	Yes

(1) Only available in the Process Controller versions of ControlLogix 5580 and ControlLogix 5590.

The batch management server (AppServ-Batch) offers equipment-independent recipe management, batch-independent equipment control, and regulatory compliance.

Table 27 - AppServ-Batch Requirements

Category	Requirement ⁽¹⁾
Virtual	vCPU: 8 @ 2.4 GHz minimum vRAM: 16 GB minimum vHardDisk: 10 GB minimum
Physical (Non-Virtual)	CPU: 1 core/2 threads @ 2.4 GHz minimum RAM: 8 GB minimum HardDisk: 10 GB minimum
Operating system	Windows server 2022 operating system, 64 bit

(1) All numbers and figures are referenced for initial sizing only. If needed, adjust these values for system performance.

Whether you deploy an AppServ-Batch in a traditional or virtual architecture, you must purchase the proper activations.

Table 28 - AppServ-Batch Software and Licenses

Category	Cat. No. ⁽¹⁾ (2)
Batch unit software licenses	<p>Purchase multiple licenses to obtain the desired number of batch units.</p> <ul style="list-style-type: none"> • 9358x-FTBT1y (FactoryTalk Batch Server - 1 Unit) • 9358x-FTBT5y (FactoryTalk Batch Server - 3 Units) • 9358x-FTBT2y (FactoryTalk Batch Server - 10 Units) • 9358x-FTBT6y (FactoryTalk Batch Server - 30 Units) • 9358x-FTBT3y (FactoryTalk Batch Server - 60 Units)
Batch backup software licenses	<p>If a back-up server is required, obtain the equivalent number of units of back-up keys.</p> <ul style="list-style-type: none"> • 9358x-FTBRT1y (FactoryTalk Batch Back-up Key - 1 Unit) • 9358x-FTBRT4y (FactoryTalk Batch Back-up Key - 3 Units) • 9358x-FTBRT2y (FactoryTalk Batch Back-up Key - 10 Units) • 9358x-FTBRT5y (FactoryTalk Batch Back-up Key - 30 Units) • 9358x-FTBRT3y (FactoryTalk Batch Back-up Key - 60 Units)
eProcedure® software licenses	<p>eProcedure is included with Batch licenses that are listed. These catalog numbers are to order software separately.</p> <ul style="list-style-type: none"> • 9358x-FTBEPT1y (FactoryTalk Batch eProcedure- 3 Units) • 9358x-FTBEPT2y (FactoryTalk Batch eProcedure- 10 Units) • 9358x-FTBEPT3y (FactoryTalk Batch eProcedure- 30 Units) • 9358x-FTBEPT4y (FactoryTalk Batch eProcedure- 60 Units)
eProcedure backup software licenses	<p>eProcedure is included with Batch licenses that are listed. These catalog numbers are to order software separately.</p> <ul style="list-style-type: none"> • 9358x-FTBEPT1y (FactoryTalk Batch eProcedure Back-up Key - 3 Units) • 9358x-FTBEPT2y (FactoryTalk Batch eProcedure Back-up Key - 10 Units) • 9358x-FTBEPT3y (FactoryTalk Batch eProcedure Back-up Key - 30 Units) • 9358x-FTBEPT4y (FactoryTalk Batch eProcedure Back-up Key - 60 Units)
Batch View Clients	<p>Each license enables one concurrent user to access FactoryTalk Batch from a remote browser.</p> <ul style="list-style-type: none"> • 9358x-FTBT4y (FactoryTalk Batch View Standard)

(1) Where: x = M (perpetual use license) or C (subscription license)

(2) Where: y = 1 (8x5 support), y = 2 (24x7 support)

Batch high availability options depend on the hardware and software options in the system:

- For the application server in a system where a bump in the process cannot be tolerated, FactoryTalk Batch software helps support a real-time, uninterrupted high availability option. This option leverages hypervisor failover features.
- Standard FactoryTalk Batch software supports a variety of restart options.
 - A cold restart in a new instance with no restored data from previous sessions.
 - A warm restart will restore batch in Manual execution mode with active transitions in a Held state.
 - Warm All restart will not restart if one or more batches on the batch list are unable to be restored.
 - Hot restart will automatically restore batches to their last known state, including transition states and recipe modes without operator interaction.
- A redundant ControlLogix system with PhaseManager software provides protection so that the control platform continues to execute during a hardware failure.

Domain Controllers

PlantPAx uses a domain controller to store user account information, authenticate users, and enforce security policies. Follow these guidelines for the domain controller:

- A domain controller is required if there are 10 or more workstations or servers.
- A domain controller is a separate computer. Do not load any application software on a domain controller. Load all system application software on the other computers, such as the PASS, application server, OWS, and EWS.
- The domain controller must be local to the system workstations and servers (within the local firewall) and not remote to the system.
- The domain controller must be a standard domain controller that can read from and write to the Active Directory database (RWDC). It must not be a Read-Only Domain Controller (RODC) that holds a read-only copy of Active Directory as this arrangement causes known issues for operator workstation performance.

Table 29 - Domain Requirements

Category	Requirement ⁽¹⁾
Virtual	vCPU: 2 @ 2.4 GHz minimum vRAM: 4 GB minimum vHardDisk: 40 GB minimum
Physical (Non-Virtual)	CPU: 1 core/1 thread @ 2.4 GHz minimum RAM: 4 GB minimum HardDisk: 40 GB minimum
Operating system	Windows server 2022 operating system, 64 bit

(1) All numbers and figures are referenced for initial sizing only. If needed, adjust these values for system performance.

Notes:

The optimal number of controllers for the PlantPAx system depends on the size of your application, physical layout of your plant, and the design of your process. Consider segregating non-related process equipment into separate controllers so that maintenance activities in one area do not impact the operation of another area.

PlantPAx system release 5.0 adds process controllers to the Logix 5000® family of controllers. The process controller is an extension of the Logix 5000 controller family that focuses on plant-wide process control. The process controller is preconfigured with a default process tasking model and dedicated PlantPAx process instructions that are optimized for process applications to improve design and deployment efforts.

Regardless of which type of controller that you use, controllers are capacity limited. This capacity can be roughly estimated based on I/O count, but is also greatly impacted by the design of your application. These limitations can include the amount of automation code that is required, the amount of information being read by supervisory applications, and the number of alarms configured in your system.

Table 30 - Process and Standard Controller Hardware

Category	Cat. No.
Process controllers	<ul style="list-style-type: none"> ControlLogix 1756-L81EP, 1756-L81EPXT, 1756-L83EP, 1756-L83EPXT, 1756-L85EP, 1756-L85EPXT, 1756-L905TPSXT, 1756-L915TPSXT, 1756-L950TPSXT, 1756-L980TPSXT CompactLogix 5069-L320ERP, 5069-L340ERP
Standard controllers	<ul style="list-style-type: none"> ControlLogix 1756-L71, 1756-L72, 1756-L73, 1756-L74, 1756-L75, 1756-L81E, 1756-L82E, 1756-L83E, 1756-L84E, 1756-L85E CompactLogix 1769-L24ER-Q, 1769-L33ER, 1769-L36ERM, 1769-L37ERM, 1769-L38ERM
Standard Ethernet interfaces (ControlLogix)	<ul style="list-style-type: none"> For direct PRP connection: 1756-EN4TR, 1756-EN2TP For direct DLR connection: 1756-EN4TR, 1756-EN2TR

Simplex Controllers

Non-redundant controllers are referred to as simplex controllers.

Table 31 - Simplex - Process Controllers

Category ⁽¹⁾	1756-L81EP, 1756-L81EPXT	1756-L83EP, 1756-L83EPXT	1756-L85EP, 1756-L85EPXT	1756-L905TPSXT	1756-L915TPSXT	1756-L950TPSXT	1756-L980TPSXT
User memory	3 MB	10 MB	40 MB	5MB	15MB	50MB	80MB
PID loop control strategies @ 100 ms max	185	570		310	950	1340	
PID loop control strategies @ 250 ms max			1425				3350
PID loop control strategies @ 500 ms max		625	2000			3190	5100
PID loop control strategies @ 1000 ms max							
Tags/sec delivered to data server max	50,000						
Logix tag based alarms max	7,500			15,000			

(1) These values are recommended maximum limits and are not intended for detailed system design or proposals. Limits can vary depending on the overall design of a system. For more detailed sizing, please use the PlantPAx System Estimator included in the Integrated Architecture Builder software.

Table 32 - Simplex - Standard Controllers

Category ⁽¹⁾	1756-L71	1756-L72	1756-L73	1756-L74	1756-L75	1756-L81E 1756-L81EXT	1756-L82E 1756-L82EXT	1756-L83E 1756-L83EXT	1756-L84E 1756-L84EXT	1756-L85E 1756-L85EXT
User memory	2 MB	4 MB	8 MB	16 MB	32 MB	3 MB	5 MB	10 MB	20 MB	40 MB
PID loop control strategies @ 100 ms max	75	85				235	425	500		
PID loop control strategies @ 250 ms max		175	215					910	1250	
PID loop control strategies @ 500 ms max			380	430					1875	2000
PID loop control strategies @ 1000 ms max				800	860					
Tags/sec delivered to data server max	10,000	20,000				50,000				

(1) These values are recommended maximum limits and are not intended for detailed system design or proposals. Limits can vary depending on the overall design of a system. For more detailed sizing, please use the PlantPAx System Estimator included in the Integrated Architecture Builder software.

Redundant Controllers

ControlLogix controllers support redundancy on EtherNet/IP networks. For a PlantPAx system, you need these components:

Table 33 - Redundant Process and Standard Controller Hardware

Category	Cat. No.
Process redundant controllers	ControlLogix 1756-L81EP, 1756-L81EPXT, 1756-L83EP, 1756-L83EPXT, 1756-L85EP, 1756-L85EPXT, 1756-L905TPSXT, 1756-L915TPSXT, 1756-L950TPSXT, 1756-L980TPSXT ⁽¹⁾
Standard redundant controllers	<ul style="list-style-type: none"> ControlLogix 1756-L73, 1756-L74, 1756-L75⁽²⁾ ControlLogix 1756-L81E, 1756-L82E, 1756-L83E, 1756-L84E, 1756-L85E
Redundancy module	1756-RM3 ⁽³⁾
Standard Ethernet interfaces	<ul style="list-style-type: none"> For direct PRP connection: 1756-EN4TR, 1756-EN2TP For direct DLR connection: 1756-EN4TR, 1756-EN2TR <p>PlantPAx recommends a dedicated Ethernet module for Supervisory communications (Non-Swapping IP addresses) and one or more Ethernet modules for I/O / MCC communications (Swapping IP addresses).</p> <p>For more information, see the Redundancy Systems user manual, publication 1756-UM015.</p>

(1) Capacity specifications assumes redundancy is configured to use front port cross-loading. The 1756-RM3 module is required for all redundancy configurations.

(2) ControlLogix 1756-L71 and 1756-L72 controllers are not recommended for PlantPAx systems due to memory constraints.

(3) The PlantPAx system recommendation is to use only one redundant controller in a chassis with a 1756-RM3 redundancy module.

Table 34 - Redundant - Process Controllers

Category ⁽¹⁾	1756-L81EP 1756-L81EPXT	1756-L83EP 1756-L83EPXT	1756-L85EP 1756-L85EPXT	1756-L905TPSXT	1756-L915TPSXT	1756-L950TPSXT	1756-L980TPSXT
User memory	3 MB	10 MB	40 MB	5MB	15MB	50MB	80MB
PID loop control strategies @ 100 ms max	125			310	500		
PID loop control strategies @ 250 ms max	190	325	325		950	1260	
PID loop control strategies @ 500 ms max		625	650			2530	
PID loop control strategies @ 1000 ms max			1300			3190	5060
Tags/sec delivered to data server max	50,000						
Logix alarms max	7500			15,000			

(1) These values are recommended maximum limits and are not intended for detailed system design or proposals. Limits can vary depending on the overall design of a system. For more detailed sizing, please use the PlantPax System Estimator included in the Integrated Architecture Builder software.

Table 35 - Redundant - Standard Controllers

Category ⁽¹⁾	1756-L73	1756-L74	1756-L75	1756-L81E 1756-L81EXT	1756-L82E 1756-L82EXT	1756-L83E 1756-L83EXT	1756-L84E 1756-L84EXT	1756-L85E 1756-L85EXT
User memory	8 MB	16 MB	32 MB	3 MB	5 MB	10 MB	20 MB	40 MB
PID loop control strategies @ 100 ms max	40			65				
PID loop control strategies @ 250 ms max	100			155				
PID loop control strategies @ 500 ms max	150	195		240	315			
PID loop control strategies @ 1000 ms max		315	400		430	625		
Tags/sec delivered to data server max	10,000	20,000		50,000				

(1) These values are recommended maximum limits and are not intended for detailed system design or proposals. Limits can vary depending on the overall design of a system. For more detailed sizing, please use the PlantPax System Estimator included in the Integrated Architecture Builder software.

Controllers for Skid-based Equipment

The CompactLogix controller platform offers a solution for skid-based equipment to be part of the overall PlantPax system if the application requires the following:

- Control of multiple loops for temperature, pressure, flow, or level
- Operating as a subsystem with sequencing and automation
- Controlled as part of the overall process, accepting reference inputs and delivering process variables to a supervisory controller

Table 36 - Skid-based Controllers

Category ⁽¹⁾	CompactLogix 1769-L24ER-Q	CompactLogix 1769-L33ER	CompactLogix 1769-L36ERM	CompactLogix 1769-L37ERM	CompactLogix 1769-L38ERM	CompactLogix 5069-L320ERP (Process Controller)	CompactLogix 5069-L340ERP (Process Controller)
User memory	0.75 MB	2 MB	3 MB	4 MB	5 MB	2 MB	4 MB
PID Loop Control Strategies @ 100 ms max	12	35	50	65	65	125	250
PID Loop Control Strategies @ 250 ms max					80		
PID Loop Control Strategies @ 500 ms max							
PID Loop Control Strategies @ 1000 ms max							
Tags/sec delivered to data server max	3000					50,000	
Logix alarms max	—					7500	

(1) These values are recommended maximum limits and are not intended for detailed system design or proposals. Limits can vary depending on the overall design of a system. For more detailed sizing, please use the PlantPAx System Estimator included in the Integrated Architecture Builder software.

Logix Embedded OPC UA

Logix 5380, 5580, and 5590 simplex controllers now support OPC UA natively via the embedded Ethernet ports. The controller can act as either an OPC UA server or client. For more information on controllers, see OPC UA in 5590, 5580, and 5380 Logix Controllers user manual, publication [1756-UM023](#).

PlantPax recommends no more than 50,000 nodes/sec of OPC UA data when a controller is acting as an OPC UA server. PlantPax also recommends that only OPC UA data should utilize the embedded port on 5580 controllers. All other data (HMI,I/O) should use an in-chassis communication module such as the 1756-EN4TR.

Process Controller Emulation

FactoryTalk Logix Echo (FTLE) is a controller emulation software platform that emulates ControlLogix 5580 and 5590 controllers. The platform also provides workflows designed to make emulation and program testing more accessible and flexible.

FactoryTalk Logix Echo is available as a subscription on the Rockwell Automation Software Portal. The license is a single node license.

I/O Products

Field networks and I/O components connect process instrumentation and field devices to the PlantPax system for real-time data acquisition and control. The PlantPax system supports several families of I/O.

Table 37 - I/O Communication Interfaces

Chassis-based I/O modules	1756 ControlLogix I/O	<ul style="list-style-type: none">1756-EN2T, 1756-EN2TP, 1756-EN2TR, 1756-EN3TR, 1756-EN2F, 1756-EN2TXT For more information, see the ControlLogix System Selection Guide, publication 1756-SG001 .
	5069 Compact 5000™ I/O	<ul style="list-style-type: none">5069-AENTR dual-port EtherNet/IP adapter5069-AENTRK dual-port EtherNet/IP adapter, conformal coated5069-AEN2TR dual-port EtherNet/IP adapter with display diagnostics, integrated USB port, and SD card For more information, see Compact 5000 I/O Modules and EtherNet/IP Adapters Specifications Technical Data, publication 5069-TD001
	1769 Compact I/O™	<ul style="list-style-type: none">1769-AENTR For more information, see the CompactLogix Communication Modules Specifications Technical Data, publication 1769-TD007 .
Distributed I/O, low-channel density	1734 POINT I/O™	<ul style="list-style-type: none">1734-AENT, 1734-AENTR EtherNet/IP adapters1734-ADN, 1734-ADNX, 1734-PDN DeviceNet® adapters For more information, see the POINT I/O Modules Selection Guide, publication 1734-SG001 .
Distributed I/O, high-channel density	5094 FLEX 5000™ I/O	<ul style="list-style-type: none">5094-AENTR, 5094-AENTRXT5094-AEN2TR, 5094-AEN2TRXT5094-AENSFPR, 5094-AENSFPRXT5094-AEN2SFPR, 5094-AEN2SFPRXT For more information, FLEX 5000 Modules Specifications Technical Data, see publication 5094-TD001
	1794 FLEX™ I/O	<ul style="list-style-type: none">1794-AENT, 1794-AENTR, 1794-AENTRXT EtherNet/IP adapters1794-ADN, 1794-ADNK DeviceNet adapters For more information, see the FLEX I/O, FLEX I/O-XT, and FLEX Ex Selection Guide, publication 1794-SG002 .
Distributed I/O, no cabinet enclosure	1738 ArmorPOINT® I/O	<ul style="list-style-type: none">1738-AENT, 1738-AENTR EtherNet/IP adapters1738-ADN12, 1738-ADN18, 1738-ADN18P, 1738-ADNX DeviceNet adapters For more information, see the ArmorPoint I/O Selection Guide, publication 1738-SG001 .
Condition monitoring module	1444 Dynamix™ I/O	Built-in Ethernet connectivity with 1444-DYN04-01RA module For more information, see the Dynamix -1444 Series Monitoring System User Manual, publication 1444-UM001 .

Table 37 - I/O Communication Interfaces

Redundant I/O	5015 FLEXHA 5000™ I/O	5015-AENFTXT Redundant EtherNet/IP adapter. For more information, see the FLEXHA 5000 I/O System Specifications Technical Data, publication 5015-TD001 .
	1715 Redundant I/O	1715-AENTR Redundant EtherNet/IP adapter For more information, see the 1715 Redundant I/O System Specifications Technical Data, publication 1715-TD001 .
Intrinsically Safe I/O	1719 Class 1, Div 2 I/O	1719-AENTR Intrinsically safe EtherNet/IP adapter For more information, see the 1719 Ex I/O Technical Data, publication 1719-TD001 .

Table 38 - Online Addition of Module and Connection Types

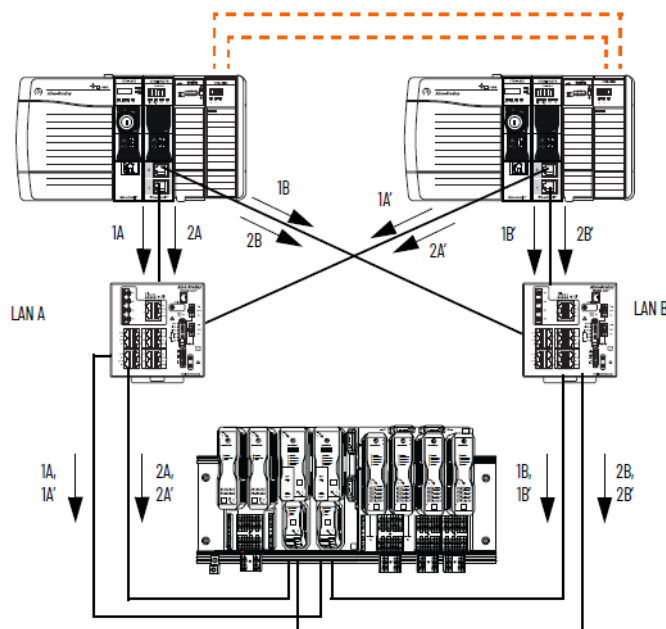
Module Type and Connection Method	In Local Chassis		Remote via an EtherNet/IP Network		Configure Hold Last Output State
	Offline	Runtime	Offline	Runtime	Offline only
Digital - direct	Yes	Yes	Yes	Yes	Yes - 1756 I/O digital output modules
Digital - rack-optimized	—	—	Yes	Yes	Yes - 1756 I/O digital output modules
Analog - direct	Yes	Yes	Yes	Yes	Yes
Generic third-party - direct	Yes	Yes	Yes	Yes	—
1715 Redundant I/O	—	—	Yes	Yes	—
1718/1719 I/O	—	—	Yes	Yes	Yes - Both analog and digital modules
1756-ENx - no connection	Yes	Yes	Yes	Yes	—
1756-ENx - rack-optimized	—	—	Yes	Yes	—
Generic EtherNet/IP third-party - direct	—	—	Yes	Yes	—
1794 FLEX I/O	—	—	Yes	—	Yes - Analog output modules only
1734 POINT I/O	—	—	Yes	—	Yes
1734 POINT Guard I/O™	Yes	—	Yes	—	—
5069 Compact 5000 I/O	Yes	—	Yes	Yes ⁽¹⁾	Yes
5069 Compact 5000 I/O Safety Modules	Yes	—	Yes	—	—
5094 FLEX 5000	—	—	Yes	Yes	Yes
5094 FLEX 5000 I/O Safety Modules	—	—	Yes	—	Yes
5015 FLEXHA 5000 I/O	—	—	Yes	Yes	—

(1) Only supported if adding an entire rack of Compact 5000 I/O modules.

Concurrent Communication

Concurrent communication provides for seamless failover for any redundant pair of hardware components.

With concurrent communication, data transmission between the ControlLogix 5580 or 5590 controllers and the FLEXHA 5000 I/O modules can be completely redundant at the logical and physical levels.



Remember the following:

- Each 1756-EN4TR EtherNet communication module in the redundant chassis pair sends duplicated data on each LAN at the same time.
- Data with the similar designations, for example, 1A and 1A', are the same but from different controllers with the only difference being a small identifier. In this case, it is the prime (') designation.
- All data transmission starts at the same time. The duplicated data that reaches the adapters first is what's used in the FLEXHA 5000 I/O system. The other data is disregarded.

Logical Level

Concurrent communication uses one logical CIP connection to transmit duplicate copies of I/O data to redundant devices. There is one I/O packet for each redundant device.

Via a 1756-EN4TR EtherNet/IP communication module, ControlLogix 5580 or 5590 controllers operate in parallel and open the concurrent communication path to the FLEXHA 5000 I/O modules.

Each duplicate is targeted for one of the FLEXHA 5000 I/O modules in the redundant pair. The paired I/O modules receive duplicate data, compare the data, and establish one signal value that is set on the terminal screws.

A similar pattern is followed for input data that is transmitted from the paired FLEXHA 5000 I/O modules to the redundant ControlLogix 5580 or 5590 controllers.

Physical Level

During transmission, the duplicated data passes along physical connections from the 1756-EN4TR EtherNet/IP communication modules and the FLEXHA 5000 EtherNet/IP adapter. Physical network redundancy is provided whether the system is operating in a PRP or DLR topology. Thus, the system has increased resiliency.

The physical network redundancy is achieved via redundant path between the 1756-EN4TR EtherNet/IP communication module and the FLEXHA 5000 EtherNet/IP adapter as follows:

- PRP network - Duplicated data at the physical level for each path.
- DLR network - Providing redundant paths.

Process Network Devices

PlantPAx leverages smart instrumentation to provide the right information to the right personnel at the right time. In a PlantPAx system, controllers are connected to field devices via field device components and communicate seamlessly through EtherNet/IP, DeviceNet, FOUNDATION Fieldbus, and PROFIBUS PA networks or by using HART protocol.

EtherNet/IP Devices

In a PlantPAx system, the EtherNet/IP™ network provides the communication backbone for the supervisory network for the workstations, servers, and the controllers. The EtherNet/IP network also supports controller downlinks and connections to remote I/O and field device interfaces.

The EtherNet/IP network technology is owned and managed by ODVA, a global association of member companies that advance open, interoperable information, and communication technologies in industrial automation.

Field instruments that support a direct connection to EtherNet/IP networks include the following:

- Endress+Hauser, Promass 83 and compact Promass 100 Coriolis flowmeters for liquid and gas flows
- Endress+Hauser, Promag 53 electromagnetic flowmeter for conductive liquids
- Endress+Hauser, Liquiline CM444 Multiparameter transmitter for monitoring and controlling processes
- Endress+Hauser, Proline Promag 100 Electromagnetic flowmeter for conductive liquids
- Endress+Hauser, Proline Promag L 400 Electromagnetic flowmeter for conductive liquids

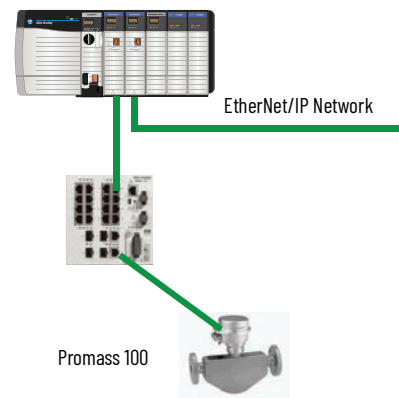


Table 39 - EtherNet/IP Interface

Category	Cat. No.	Description
ControlLogix EtherNet/IP interface	1756-EN2T, 1756-EN2TP, 1756-EN2TR, 1756-EN3TR, 1756-EN4TR, 1756-EN2F	ControlLogix EtherNet/IP bridge
Time Synchronization Ethernet Device	Aparian A-TSM/B	The Time Sync module provides Precision Time Protocol (PTP - Grand Master) and NTP Time services. This enables precision time synchronization for Logix Controllers and HMI systems. It can also provide GPS position data.

HART Devices

HART is an open communication protocol that is designed to connect analog devices to the controller and system.

The PlantPAx system interfaces with HART devices both directly and via remote I/O modules. The HART protocol creates one termination point to gather analog process variables and the additional HART digital data.

Highly-integrated HART provides a PlantPAx data type in the process controller for use with FLEX 5000 and FLEXHA 5000 modules:

- Configuration of devices within the I/O Configuration tree (no Add-On Instruction needed)
- Device diagnostics automatically propagate to the controller project

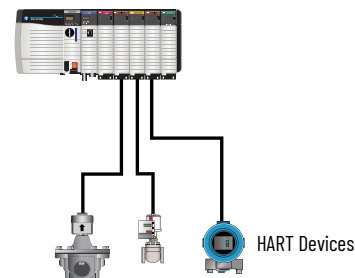


Table 40 - HART Interface

Category	Cat. No.	Description
Chassis-based I/O modules	1756-IF8H, 1756-IF16H, 1756-OF8H	Allen-Bradley® analog I/O with the following: <ul style="list-style-type: none"> • 8-channel HART analog input module • 16-channel HART analog input module • 8-channel HART analog output module
	1756-IF8IH, 1756-IF16IH, 1756-OF8IH	Allen-Bradley isolated analog I/O with the following: <ul style="list-style-type: none"> • 8-channel isolated HART analog input module • 16-channel isolated HART analog input module • 8-channel isolated HART analog output module
	5069-IF4IH, 5069-OF4IH	Allen-Bradley isolated analog Compact 5000 I/O modules with HART: <ul style="list-style-type: none"> • 4-channel isolated HART analog input module • 4-channel isolated HART analog output module
Distributed I/O, high-channel density	1794-IF8IH, 1794-OF8IH	Allen-Bradley FLEX isolated analog I/O modules with the following: <ul style="list-style-type: none"> • 8-channel isolated HART analog input module • 8-channel isolated HART analog output module
	1794-IF8IHNFXT	Allen-Bradley FLEX I/O module with the following: <ul style="list-style-type: none"> • Extended temperature, noise filtering 8-channel isolated HART analog input module
	5094-IF8IH, 5094-IF8IHXT 5094-OF8IH, 5094-OF8IHXT	Allen-Bradley HART I/O with the following: <ul style="list-style-type: none"> • 8-channel isolated HART • 8-channel isolated HART extreme temperature
Distributed I/O, low-channel density	1734sc-IE2CH, 1734sc-IE4CH	Spectrum Controls, analog input module for the POINT I/O system <ul style="list-style-type: none"> • 2-channel HART analog input module • 4-channel HART analog output module
	1734sc-OE2CIH	Spectrum Controls, isolated analog input module for the POINT I/O system <ul style="list-style-type: none"> • 2-channel isolated HART analog output module
	1769sc-IF4IH, 1769sc-OF4IH	Spectrum Controls, isolated analog Compact I/O modules with HART: <ul style="list-style-type: none"> • 4-channel isolated HART analog input module • 4-channel isolated HART analog output module See the Encompass website for Spectrum Controls for product offerings.
Distributed I/O, intrinsically safe	1718-CF4H, 1718-IF4HB 1719-CF4H, 1719-IF4HB	Allen-Bradley EX I/O chassis-based design for Zone 2 or Class I, Div 2., via EtherNet/IP: <ul style="list-style-type: none"> • 4-channel configurable HART analog module • 4-channel HART analog input module • 4-channel HART analog input-wide module

Table 40 - HART Interface

Category	Cat. No.	Description
Redundant I/O Modules	5015-UHIFTXT	Allen-Bradley redundant I/O with the following: <ul style="list-style-type: none">• 8-channel Universal I/O module
	1715-IF16 1715-OF8I	Allen-Bradley redundant I/O with the following: <ul style="list-style-type: none">• 16-channel HART analog input module• 8-channel isolated HART analog output module
Wireless HART	<ul style="list-style-type: none">• SWA70• SWG70• RSG4	Endress+Hauser wireless HART: <ul style="list-style-type: none">• WirelessHART adapter• WirelessHART fieldgate• Data manager
	<ul style="list-style-type: none">• WHA-ADP• WHA-BLT• WHA-GW	Pepperl+Fuchs wireless HART: <ul style="list-style-type: none">• WirelessHART adapter• WirelessHART bullet adapter• Wireless HART gateway

FOUNDATION Fieldbus Devices

The FOUNDATION Fieldbus network is a protocol that is designed for robust, distributed process application control. Devices that are connected by a FOUNDATION Fieldbus network can be used for sophisticated process control with seamless data distribution from the H1 device-level network. PlantPax systems communicate with FOUNDATION Fieldbus devices through EtherNet/IP linking devices as shown in the examples. Other configurations are available for simplex and redundant topologies.

The Aparian FF Link is a module that links FOUNDATION Fieldbus devices via an EtherNet/IP connection. This module combines an Ethernet/IP linking device with an internal isolated power conditioner and bus terminator.

The FF Link module supports redundancy by allowing two modules to be connected to the same H1 segment. The module has two Ethernet ports and natively supports Linear and Device Level Ring (DLR) topologies. Parallel Redundancy Protocol (PRP) is supported via a REDBOX.

Refer to the [Aparian website](#) for more information.

Basic Network Drawings

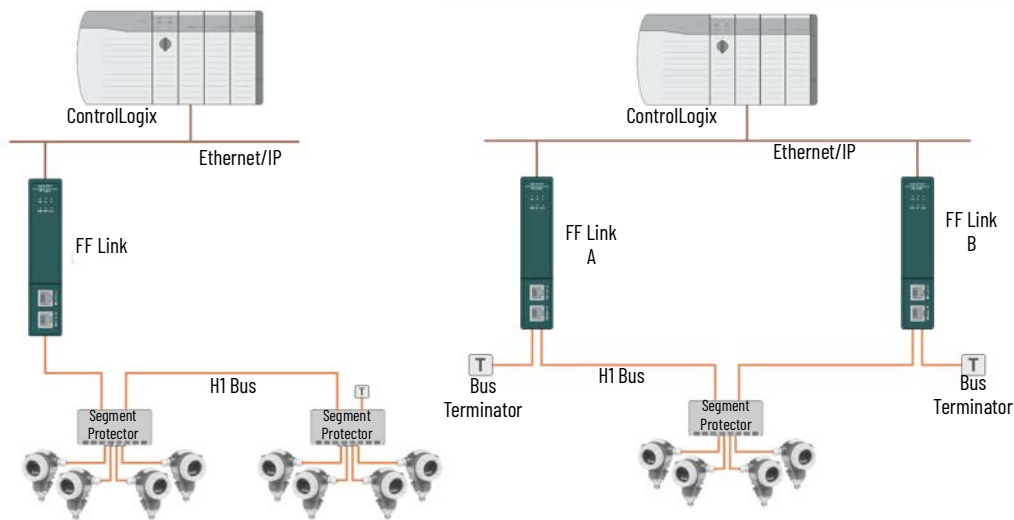


Table 41 - FOUNDATION Fieldbus Interface

Category	Cat. No.	Description
Ethernet/IP Linking Device	Aparian A-FFL/B	Aparian Foundation Fieldbus Link Module
Foundation Fieldbus network components	Segment Protection	Helps protect against device or line faults with short- and open-circuit protection. Pepperl+Fuchs, intrinsic safety components, such as isolated barrier systems, hazardous area enclosures, and equipment. See the Encompass™ website for Pepperl+Fuchs product offerings.
	Additional components	Pepperl+Fuchs, FOUNDATION Fieldbus components, such as valve couplers, surge protectors, and distributors. See the Encompass website for Pepperl+Fuchs product offerings

PROFIBUS PA Devices

The PROFIBUS PA network connects automation systems and process control systems with field devices such as flow, level, pressure, and temperature transmitters. PlantPax systems communicate with PROFIBUS PA fieldbus devices through EtherNet/IP linking devices. Other configurations are available for simplex and redundant topologies.

The Aparian PA Link is a module that links PROFIBUS PA devices via an EtherNet/IP connection. This module combines an Ethernet/IP linking device with an internal isolated power conditioner and bus terminator.

The PA Link module supports redundancy by allowing two modules to be connected to the same PROFIBUS PA segment. The module has two Ethernet ports and natively supports Linear and Device Level Ring (DLR) topologies. Parallel Redundancy Protocol (PRP) is supported via a REDBOX.

Refer to the [Aparian website](#) for more information.

Basic Network Drawings

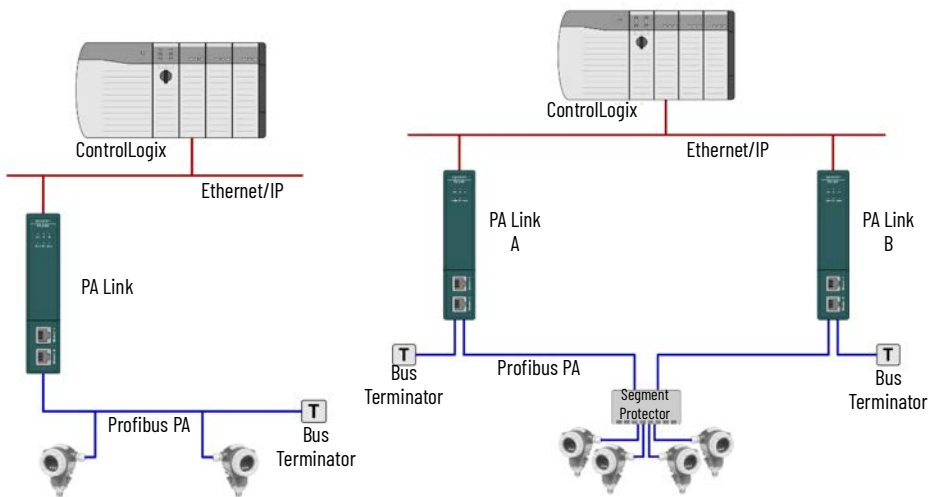


Table 42 - PROFIBUS PA Interface

Category	Cat. No.	Description
Ethernet/IP Linking Device	Aparian A-PAL/B	Aparian PROFIBUS PA Link Module
PROFIBUS network components	Segment Protection	Helps protect against device or line faults with short- and open-circuit protection. Pepperl+Fuchs, intrinsic safety components, such as isolated barrier systems, hazardous area enclosures, and equipment. See the Encompass website for Pepperl+Fuchs product offerings
	Additional components	Pepperl+Fuchs, PROFIBUS components, such as valve couplers, surge protectors, and distributors. See the Encompass website for Pepperl+Fuchs product offerings.

Motor Control Devices

Rockwell Automation offers a broad range of motor control solutions to complement various application requirements. The portfolio of motor control devices includes simplified programming and configuration along with safety features to help protect personnel and assets that help to reduce downtime.

Low Voltage Drives

PowerFlex® Low Voltage AC drives provide scalable motor control solutions and are designed to deliver more powerful performance and flexibility for process applications. As part of a PlantPax system, PowerFlex drives offer seamless integration into your process control system for simplified development, use, and maintenance.

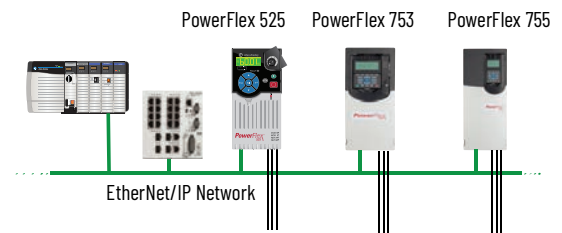


Table 43 - PowerFlex Drives and Communication Modules

Drive Cat. No. ⁽¹⁾	Description	Available Communication Modules ⁽¹⁾	
		Cat. No.	Description
25B-	PowerFlex 525 AC drive with an embedded EtherNet/IP port and an embedded Safe Torque Off (STO).	<ul style="list-style-type: none"> 25-COMM-E2P 25-COMM-D 	<ul style="list-style-type: none"> Dual-port EtherNet/IP, supports DLR functionality DeviceNet
20F-	PowerFlex 753 AC drive	<ul style="list-style-type: none"> 20-750-BNETIP 20-750-DNET 20-750-ENETR 20-750-PBUS 20-COMM-D 20-COMM-E 20-COMM-P 	<ul style="list-style-type: none"> BACnet/IP option modules DeviceNet option module Dual-port EtherNet/IP option module PROFIBUS DPV1 option module DeviceNet communication adapter EtherNet/IP communication adapter PROFIBUS DP communication adapter
20G-	PowerFlex 755 drive		
20G-	PowerFlex 755TL/755TR	<ul style="list-style-type: none"> 20-750-DNET 20-750-ENETR 20-750-PBUS 	<ul style="list-style-type: none"> DeviceNet option module Dual-port EtherNet/IP option module PROFIBUS DPV1 option module

(1) For a complete list of catalog numbers, see the PowerFlex Low Voltage AC Drives Selection Guide, publication [PFLEX-SG002](#).

Medium Voltage Drives and Relays

PowerFlex medium voltage AC drives and relays provide scalable motor control solutions and electrical protection. Standalone drives control speed, torque, direction, starting, and stopping of standard asynchronous or synchronous AC motors. As part of a PlantPax system, PowerFlex drives incorporate leading-edge technology, embedded communications, and significant commonality across multiple platforms, networks, operator interface programming and hardware. The benefits of this exceptional level of integration between the drives and Logix controllers provides distinctive time-saving features for the PowerFlex 6000 and 7000 drives.

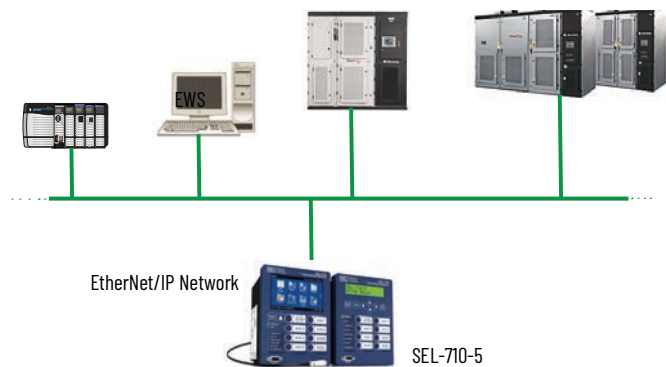


Table 44 - Medium Voltage Drives and Relays

Drive Cat. No. ⁽¹⁾	Description	Available Communication Modules ⁽¹⁾	
		Cat. No.	Description
PF-6000G	PowerFlex 6000	<ul style="list-style-type: none"> 13MLXE 13MLXP 13TMLXH, 13TMLXM, 13TMLXMP 	<ul style="list-style-type: none"> EtherNet/IP PROFIBUS RS-485 Modbus Communication Adapters

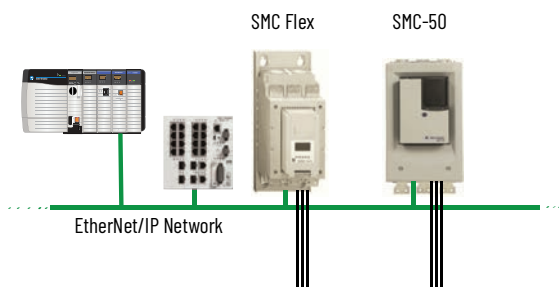
Table 44 - Medium Voltage Drives and Relays

Drive Cat. No. ⁽¹⁾	Description	Available Communication Modules ⁽¹⁾	
		Cat. No.	Description
PF-6000T	PowerFlex 6000	<ul style="list-style-type: none"> 13TCOMME 13TCOMMP 13TCOMMPN1, 13TCOMMPN2 13TMLXH, 13TMLXM, 13TMLXMP 	<ul style="list-style-type: none"> EtherNet/IP PROFIBUS DPV1 PROFINET Communication Adapters Modbus Communication Adapters
PF-7000 / PF-7000A / PF-7000L	PowerFlex 7000	<ul style="list-style-type: none"> 13COMMER 13COMME 13COMMP 13COMMH, 13COMMM 	<ul style="list-style-type: none"> Dual EtherNet/IP EtherNet/IP PROFIBUS Modbus Communication Adapters
SEL-710-5	Motor Protection Relay	See the SELwebsite or your Rockwell Automation representative or more information.	

(1) For a complete list of catalog numbers, see the PowerFlex Medium Voltage AC Drives Selection Guide, publication [PFLEX-SG003](#).

Soft Starters

SMC™ Soft Starters are designed to help minimize cost by reducing overall system power requirements and wear and tear on equipment. Our soft starters can be easily integrated into your process control system to offer higher productivity and shorter downtimes.

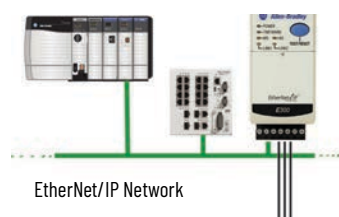

Table 45 - SMC Soft Starters and Communication Modules

Cat. No. ⁽¹⁾	Description	Available Communication Modules ⁽¹⁾	
		Cat. No.	Description
150-F	SMC™ Flex Smart Motor Controllers	<ul style="list-style-type: none"> 20-COMM-D 20-COMM-E 20-COMM-ER 	<ul style="list-style-type: none"> DeviceNet communication adapter EtherNet/IP communication adapter Dual-port EtherNet/IP communication adapter
150-S	SMC™-50 Solid-state Smart Motor Controllers	<ul style="list-style-type: none"> 20-COMM-D 20-COMM-E 20-COMM-ER 	<ul style="list-style-type: none"> DeviceNet communication adapter EtherNet/IP communication adapter Dual-port EtherNet/IP communication adapter

(1) For additional product information, see the Smart Motor Controllers – SMC™-3, SMC™ Flex, and SMC-50 Soft Starters Family Brochure, publication [150-BR144](#).

Across-the-line Starters

Our light industrial IEC starters are environmentally friendly, versatile, and flexible. Our heavy-duty NEMA starters are renowned for a more-rugged construction, more dependable performance, and longer electrical life. In addition, this portfolio offers Electronic Overload Relays that provide integration between the starters and Logix controllers. The diagnostic capabilities of the overload relays help maximize uptime for motor control in an automation system.


Table 46 - Electronic Overload Relays and Communication Modules

Cat. No. ⁽¹⁾	Description	Available Communication Modules ⁽¹⁾	
		Cat. No.	Description
193/592-E300	E300™ Electronic Overload Relays	193-ECM-ETR	EtherNet/IP communication module

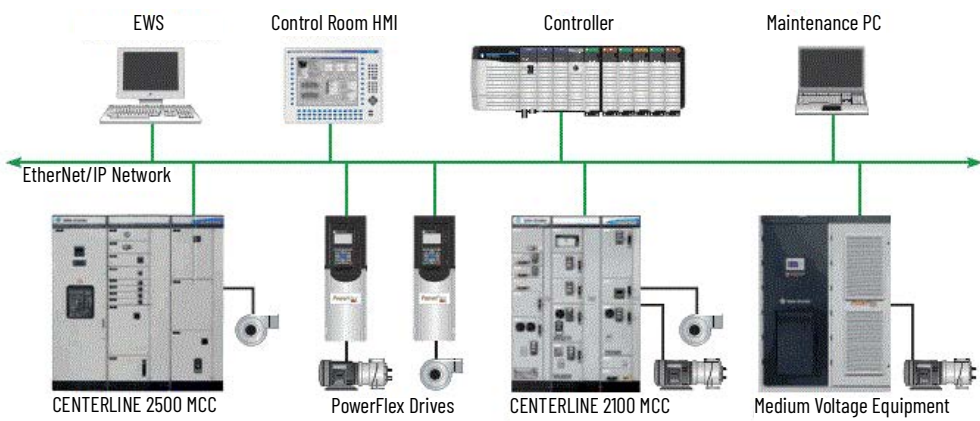
(1) For additional product information, see the Motor Protection Solutions Brochure, publication [193-BR029](#).

Motor Control Centers

As an alternative to wiring each device individually, Rockwell Automation offers low-voltage motor control centers (MCC). The MCCs feature a rugged, high-performance packaging solution for all your motor control needs that integrate control and power in one centralized location.

CENTERLINE® MCCs are available with safety options that help reduce exposure to electrical hazards and arc flash mitigation and containment.

Table 47 - Low Voltage Motor Control Centers



Category ⁽¹⁾	Cat. No.	Description
CENTERLINE 2100 MCC	2100	<ul style="list-style-type: none">• Designed to meet UL and NEMA standards• Allen-Bradley motor control devices: starters, soft-starters, and drives• Available with SecureConnect™ units• ArcShield™ arc-resistant enclosures available• EtherNet/IP and DeviceNet networking• IntelliCENTER® software
CENTERLINE 2500 MCC	2500	<ul style="list-style-type: none">• Designed to meet IEC standards• Allen-Bradley motor control devices: starters, soft-starters, and drives• ArcShield™ arc-resistant enclosures available• EtherNet/IP and DeviceNet networking• IntelliCENTER software

(1) For more information, see [Low Voltage Motor Control Centers](#).

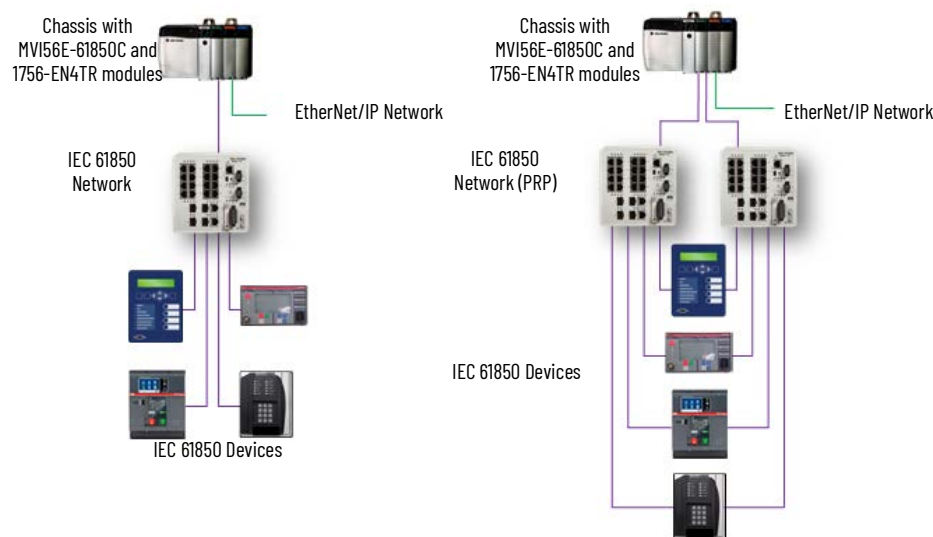
Electrical Protection Devices

The ProSoft MVI56E-61850C is an in-chassis communication module that connects Intelligent Electronic Devices (IEDs) communicating on IEC 61850 to the process automation equipment communicating on EtherNet/IP. The IEC 61850 communication module allows users to have complete control, visualization and reporting across their entire PlantPAx system.

Refer to the [ProSoft website](#) for more information.

Additionally, PlantPAx fully supports the Intelligent Electronic Devices Toolkit. The Intelligent Electronic Devices Toolkit includes vendors such as Schweitzer Engineering Lab, ABB, GE and Allen-Bradley Intelligent Electronic Devices. The toolkit contains Add-on Instructions, Global Objects and graphics that allows the user to easily integrate the control and visualization of IEDs into a power single line diagram.

Refer to Rockwell Automation Intelligent Electronic Devices Toolkit User Manual, publication [PROCES-RM211](#) for more information.











IEC 61850 Module

Category	Cat. No.	Description
IEC 61850 module	ProSoft MVI56E-61850C	Prosoft In-Chassis IEC 61850 Communication Module
IEC 61850 additional components	1756-EN4TR	In-Chassis Ethernet/IP Communication Module
	Stratix 5400/5800	Network switch for IEC 61850 protocol
	ControlLogix 5580 or 5590	Controller required for IEC 61850 module (v32 or greater)

A process automation solution often includes the requirement for an integrated safety system as part of the overall Safety Instrumented System (SIS) requirements for a process facility. The SIS logic solver is a separate but integrated technology that can use common or diverse technology to meet the safety integrity needs for any process application.

The SIS logic solver requirements can include fault tolerance, fail-safe, or a mix of architecture and Safety Integrity Level (SIL) requirements. Fault tolerance means that plant operation is maintained if a fault occurs, while fail-safe means that the SIS initiates a shutdown upon detecting a fault.

Process Safety Platform	Safety Application	Architecture	Typical SIL Range	Demand
 <p>Trusted</p> <p>AADvance</p> <p> Precisely Right.</p>	Emergency shutdown/SIS	Fault Tolerant	Up to SIL 3	Low/High
	Fire and gas		SIL 2	Low
	High integrity pressure system		SIL 3	
	Chemical processing		Up to SIL 3	High
	Refining			Low/High
Process Safety Platform	Safety Application	Architecture	Typical SIL Range	Demand
 <p>AADvance</p> <p> Precisely Right.</p>	Burner management (continuous process)	Fault Tolerant	Up to SIL 3	High
	Subsea ⁽¹⁾		SIL 2	Low
	Power generators			
Process Safety Platform	Safety Application	Architecture	Typical SIL Range	Demand
 <p>ControlLogix SIL2</p> <p> Precisely Right.</p>	Burner management (power and utilities)	Fail-safe	SIL 2	High ⁽²⁾
	Turbomachinery			Low
	Life sciences			
	Mining	Fault Tolerant	SIL 2	Low/High ⁽²⁾
	Power equipment			
	Specialty chemical			
	High Availability control systems			
Process Safety Platform	Safety Application	Architecture	Typical SIL Range	Demand
 <p>Logix SIS</p> <p> Precisely Right.</p>	Tunnels/transportation/baggage handling	Fail-safe	Up to SIL 3	High ⁽²⁾
	Entertainment			Low
	Hybris safety			
	Green hydrogen			
	General Process Safety			

(1) The AADvance solution is available in a Eurocard format, qualified for Subsea production applications under ISO13628-6.

(2) ControlLogix controllers are limited to a demand rate not to exceed 10 demands per year. While this is a high demand rate, this solution possibly could not be suitable for high-demand applications.

ControlLogix SIL 2 Systems

Manufacturers today require safe, reliable systems to safeguard people, property, the environment, and reputations. Safety integrity level (SIL) 2 certification of ControlLogix® products by TÜV makes it simpler, easier, and cost effective for manufacturers to meet growing standards requirements.

For more information, please go to: <https://www.rockwellautomation.com/en-us/capabilities/process-solutions/process-safety-systems/safety-instrumented-systems/controllogix-sil-2.html>.

LOGIX SIS

Logix SIS is a modern and integrated safety solution, offering both SIL2 and SIL3 certifications for process and hybrid safety. The system is engineered for high availability, providing robust protection against industrial hazards while reducing overall lifecycle costs.

For more information, please visit: <https://www.rockwellautomation.com/en-us/products/hardware/programmable-controllers/logix-sis.html>

AADvance and Trusted SIL 2, SIL 3, and TMR Systems

Whether you need SIL 1-3, fail-safe to fault-tolerant and triple modular redundant (TMR) architectures, we can support your SIS requirements. Our AADvance® fault tolerant control system is a truly distributed, scalable safety instrumented system.

For more information on AADvance, please go to: <https://www.rockwellautomation.com/en-us/capabilities/process-solutions/process-safety-systems/safety-instrumented-systems/aadvance-control-system.html>

Our Trusted® fault tolerant control system is designed to meet a wide range of safety requirements. This safety instrumented solution features a triple modular redundant (TMR) system that identifies the source of a fault. The system reacts immediately to contain system faults, helping to achieve your safety integrity requirements.

For more information on Trusted, please go to: <https://www.rockwellautomation.com/en-us/capabilities/process-solutions/process-safety-systems/safety-instrumented-systems/trusted.html>

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

Documentation Feedback

Your comments help us serve your documentation needs better. If you have any suggestions on how to improve our content, complete the form at rok.auto/docfeedback.

Allen-Bradley, ArcShield, ArmorPOINT, ASEM, CENTERLINE, Compact 5000, CompactLogix, ControlLogix, Dynamix, Encompass, E300, eProcedure, FactoryTalk, Display Server, FactoryTalk, FLEX I/O, FLEX 5000, FLEXHA 5000, Integrated Architecture, IntelliCENTER, Logix 5000, OptiSIS, Optix, OptixPanel, PanelView, Pavilion8, PhaseManager, PlantPAx, POINT Guard I/O, POINT I/O, PowerFlex, Product Selection Toolbox, SecureConnect, SequenceManager, SMC, Stratix, Studio 5000, Studio 5000 Logix Designer, ThinManager, and Trusted are trademarks of Rockwell Automation.

Catalyst and Cisco are trademarks of Cisco Systems, Inc.

Microsoft, Excel, and Windows are trademarks of Microsoft Corporation.

CIP, CIP Security, CIP Sync, ContoNet, DeviceNet, EtherNet/IP are trademarks of ODVA, Inc.

Trademarks not belonging to Rockwell Automation are property of their respective companies.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

Rockwell Otomasyon Ticaret A.Ş. Kar Plaza İş Merkezi E Blok Kat:6 34752, İçerenköy, İstanbul, Tel: +90 (216) 5698400 EEE Yönetmeliğine Uygundur

Connect with us.    

rockwellautomation.com — expanding human possibility®

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

Publication PROCES-SG001W-EN-P - April 2026

Supersedes Publication PROCES-SG001V-EN-P - November 2025

Copyright © 2026 Rockwell Automation, Inc. All rights reserved. Printed in the U.S.A.