THE REYNOLDS COMPANY
ELECTRICAL SUPPLY

User's Group

Automation Update

January 20, 2021

Our Guest Panelists

Brian Mikeska
Automation Specialist
Houston

David Nute
Automation Specialist
Houston

Wayne Welk
Automation Specialist
New Orleans

Joe Belaschky
Automation/Network Specialist
Houston

Mike Masterson
Automation Specialist
Houston

2021 Online Events - Register to receive a calendar invite

THE REYNOLDS COMPANY
ELECTRICAL SUPPLY

- **Tech Talks**
- **App Brief – Remote Assistance with RealWear**

  January 27th @ 10 AM
- **MicroLogix to Micro 800 Migration Solutions**

  February 10th @ 10 AM
- **Fiber Optic Cable Selection**

  February 24th @ 10 AM
- **Building Faceplates in View ME/SE**

  March 10th @ 10 AM
- **HART and Highly Integrated HART**

  March 24th @ 10 AM

- **User Groups**
- **Networking Update with Panduit**

  February 17th @ 10 AM
- **Scalable OEE**

  March 17th @ 10 AM

reynoldsonline.com

Start Your Smart Machine Journey with Rockwell Automation

Smart Manufacturing is driving demand for connected machines and equipment. **As an OEM**, offer Smart Machines that seamlessly connect the plant floor with the enterprise. **As an End User**, unlock new values, reduce costs and optimize asset utilization.

This 5-part Workshop Interactive Webinar Series is for Implementers, Plant Engineering/Maintenance, OEM Sales / Service leaders.

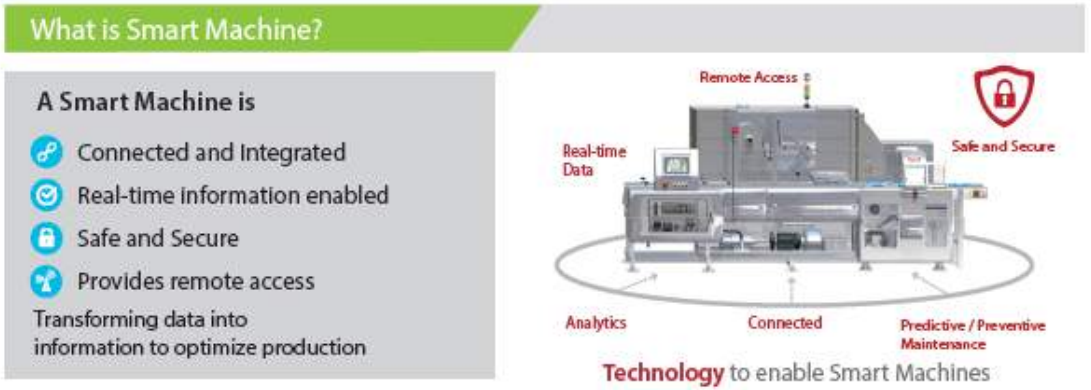
W1: How will a Smart Machine make me money?
Tuesday, February 11
10:00am – 11:00am CST

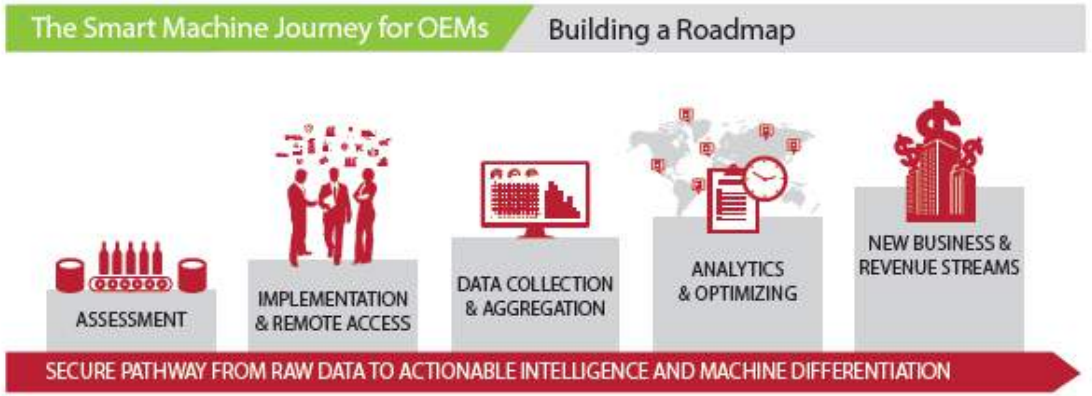
W2: Smart Tools to help you start your Smart Machine Journey
Tuesday, February 25
10:00am – 11:00am CST

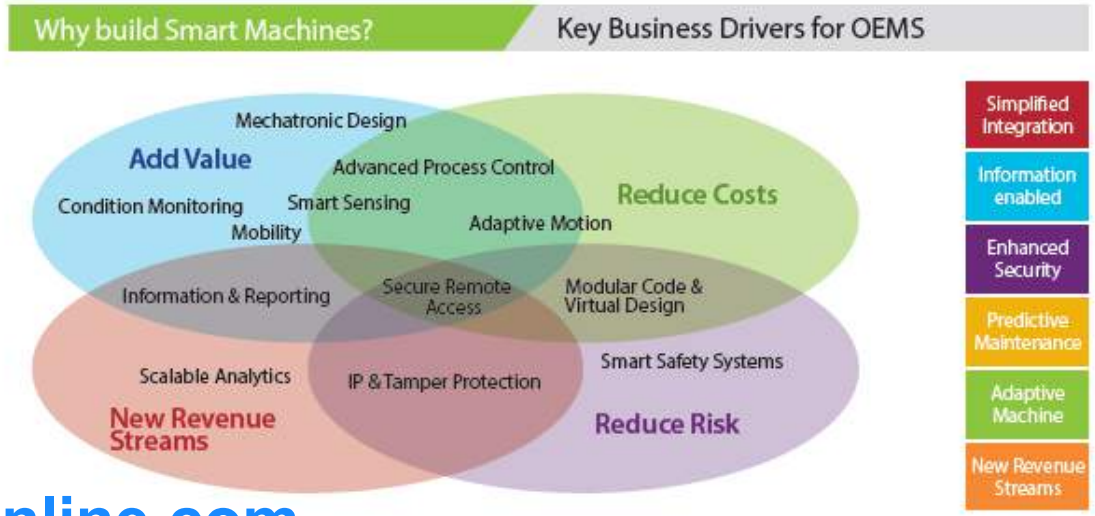
W3: You can't have a Smart Machine without Smart Information
Tuesday, March 11
10:00am – 11:00am CST

W4: A Smart Machine must be safe
Tuesday, March 25
10:00am – 11:00am CST

W5: Solving BIG problems with Smart Data
Tuesday, April 8
10:00am – 11:00am CST







https://www.reynoldsonline.com

Rockwell Automation

Automation Fair®

AT HOME

Now On Demand

Creating a new world-class experience for Automation Fair 2020 to showcase the power and value of our IT/OT expertise.

The Automation Fair At Home experience will feature the newest solutions and innovations, the opportunity to interact with technology experts and executives, participate in engaging hands-on labs, training sessions, industry focused forums, and keynote presentations, and network with leading professionals in the field.

MORE INFO

ControlLogix High Performance L8 Controllers

ControlLogix 5580 controllers

Key features

- 1 gigabit (Gb) embedded EtherNet/IP port
- Decreased scan times for runtime performance
- 45% increased application capacity
- up to 300 EtherNet/IP nodes
- Certified compliant with the IEC 62443-4-2 security standard

PUBLIC | Copyright ©2020 Rockwell Automation, Inc. 7

ControlLogix 5580 extreme temperature controllers

Next generation of the 1756-L73XT controller

NEW

Key features

- Operation from -25°C to + 70°C
- Convection cooled design
- No fans, no filters and no maintenance
- Maintains same product certifications as the standard product
- Tested to ANSI/ISA-S71.04-1985; Class G3 standards

Catalog
-K - ISA G3

PUBLIC | Copyright ©2020 Rockwell Automation, Inc. 8

ControlLogix 5580 process controller

Supporting PlantPAx® 5.0 release

NEW

Key features

- Extension of the Logix family
- No reduction in capability to standard controller
- Same properties as –XT and –K (coating, etc)
- Guardrails – control strategy loading
- Process tasking model
- Native process objects library
- Out-of-the-box process functionality
- Offline task loading estimation

Three catalogs:

L81EP – 3 MB

L83EP – 10 MB

L85EP – 40 MB

Rockwell Automation

PUBLIC | Copyright ©2020 Rockwell Automation, Inc. 9

GuardLogix® 5580 controller

Safety performance

High-Performance CPU

- Optimized for faster safety reaction time

Scalable Safety Level

- SIL CL2, up to PLd – Primary Controller
- SIL CL3, up to PLe – Primary Controller + Safety Partner

1-Gb Embedded Ethernet/IP Port

- Integrated Safety on EtherNet/IP, I/O and Safety Devices

IEC 61800-5-2 Safety Instructions

New drive safety Instructions with Kinetix® 5700 ERS4 drive

- Safe Feedback Scaling, Safe Stop 1, Safe Stop 2, Safe Operation Stop
- Safely-limited Speed, Safe Limited Position
- Safe Brake Control with external brake, Safe Direction

Increased Scalability

- 1756-L81ES: 3 MB standard memory /1.5 MB safety memory; 100 Nodes
- 1756-L82ES: 5 MB standard memory / 2.5 MB safety memory; 175 Nodes
- 1756-L83ES: 10 MB standard memory / 5 MB safety memory; 250 Nodes
- 1756-L84ES: 20 MB standard memory / 6 MB safety memory 250 Nodes

ControlLogix® 5580 controller quick look

		Network Support			I/O Support			Security		Process				High Availability
Controller catalog	Description	Ethernet	Use of embedded Ethernet port	ControlNet / DeviceNet / DHRIO	Existing I/O*	5069 I/O	5094 I/O	CIP security	62443-4-2 compliant	Embedded process objects	Phase Manager™ software	Sequence Manager™ software	Default Process Tasking model	Supports a redundancy configuration**
1756-L8xE	Standard controller	■	▲	▲	■	▲	■	▲	▲	●	■	●	●	■
1756-L8xE-NSE	No stored energy	■	▲	▲	■	▲	■	▲	▲	●	■	●	●	■
1756-L8xEK	Conformally coated	■	▲	▲	■	▲	■	▲	▲	●	■	●	●	■
1756-L8xEXT	Extreme temperature	■	▲	▲	■	▲	■	▲	▲	●	■	●	●	■
1756-L8xEP	Process controller	■	▲	▲	■	▲	■	▲	▲	■	■	●	■	■
1756-L8xES	Safety controller	■	■	■	■	■	■	●	●	●	■	●	●	●

■ Supported in all configurations
▲ Supported in standard (but not redundant) configuration
● Not Supported
* ControlLogix® 5580 controllers configured for redundancy will support the same I/O as a ControlLogix® 5570 redundant controller; for example, 1769 I/O isn't supported in a ControlLogix® 5570 redundant controller, so it's also not supported with ControlLogix® 5580 redundancy
** New functionality delivered through the Studio 5000 Logix Designer® application version 33 firmware and software; no new controller catalog number required to enable this feature

ControlLogix 5580 controller portfolio performance

Comparisons

Specifications	5570	5580
Overall performance	1x	5x - 20x
Memory	2 – 32 MB	3 – 40 MB
Axis per controller	100	256
Number of I/O (class 0 and 1) connections		**NODES**
Number of message (class 3) connections	512*	**256 in** **256 out**
Number of unconnected buffers	40	320
Cached message buffers	32	256
Simultaneous messages	16	256
Embedded Ethernet port	No*	1 GB
TCP connections	—	512
Ethernet I/O (class 0/1) packets/sec	—	128,000 without CIP Security 40,000 with integrity 20,000 with integrity and confidentiality
Ethernet messaging (class 3) MSG/sec	—	2000[1] without CIP Security 1500 with integrity 900 with integrity and confidentiality
Logix Designer application version	V20+	Version 28+[2]

SIMPLIFIED TO NODES

Controller	MEMORY	TOTAL # ETHERNET/IP NODES*
1756-L81E	3 MB	100
1756-L82E	5 MB	175
1756-L83E	10 MB	250
1756-L84E	20 MB	250
1756-L85E	40 MB	300

** Total includes any nodes connected using 1756-ENxT modules*

Product Features	5570	5580
PanelView 5000	X	✓ *
Kinematic 4-axis	X	✓ *
5069 I/0 Support	X	✓ *
5094 1/0 Support	X	✓
SIL2	✓ Application (v28)	✓ *
SIL 3 Fail Safe	✓ GuardLogix	✓ *
Redundancy	✓ (v24.052)	✓
Sequence Manager	✓	Future
Emulation	✓	Future

*** Not supported in redundancy**

- *Connection ≠ Node:* 1 or more 1756-ENxT modules required for EtherNet/IP connection

[1] Data size = 32 bits / 1-DINT

[2] *1756-L81E, -L82E, -L84E products version 29 or later*

Rev: 10.20.2020

Rockwell Automation

ControlLogix® 5580 redundant capability

Brian Widman

ControlLogix Redundancy Product Manager

ControlLogix 5570/5580 redundancy comparison

Groupings	Applications	ControlLogix 5570 Redundancy	ControlLogix 5580 Redundancy
Rack Specifications	Up to seven communication modules	•	•
	Two processors in rack	•	**Future**
	Transparent switchover	•	•
	Utilizes 1756-RM2 ControlLogix redundancy module	•	•
Process	PhaseManager™ software support	•	•
	SequenceManager™ software support	–	**Future**
	Sil2 process safety Solution with 1715 redundant I/O modules	•	–
	Process controller support (Embedded process objects)	–	•
Networks	Ethernet support	•	•
	ControlNet/DeviceNet support	•	–
	Legacy networks/processors (DH+™, RIO/PLC5, SLC™)	•	–
	Support for GbE	–	**Future**
	Embedded Ethernet port	–	**Future**
I/O and Devices	5094 FLEX 5000 I/O modules	–	•
	Existing I/O (1756, 1794, 1734, 1715, etc.)	•	•
	Drives (non-motion)	•	•
Security	CIP security support (IEC62443-4-2)	–	**Future**

System-wide high availability

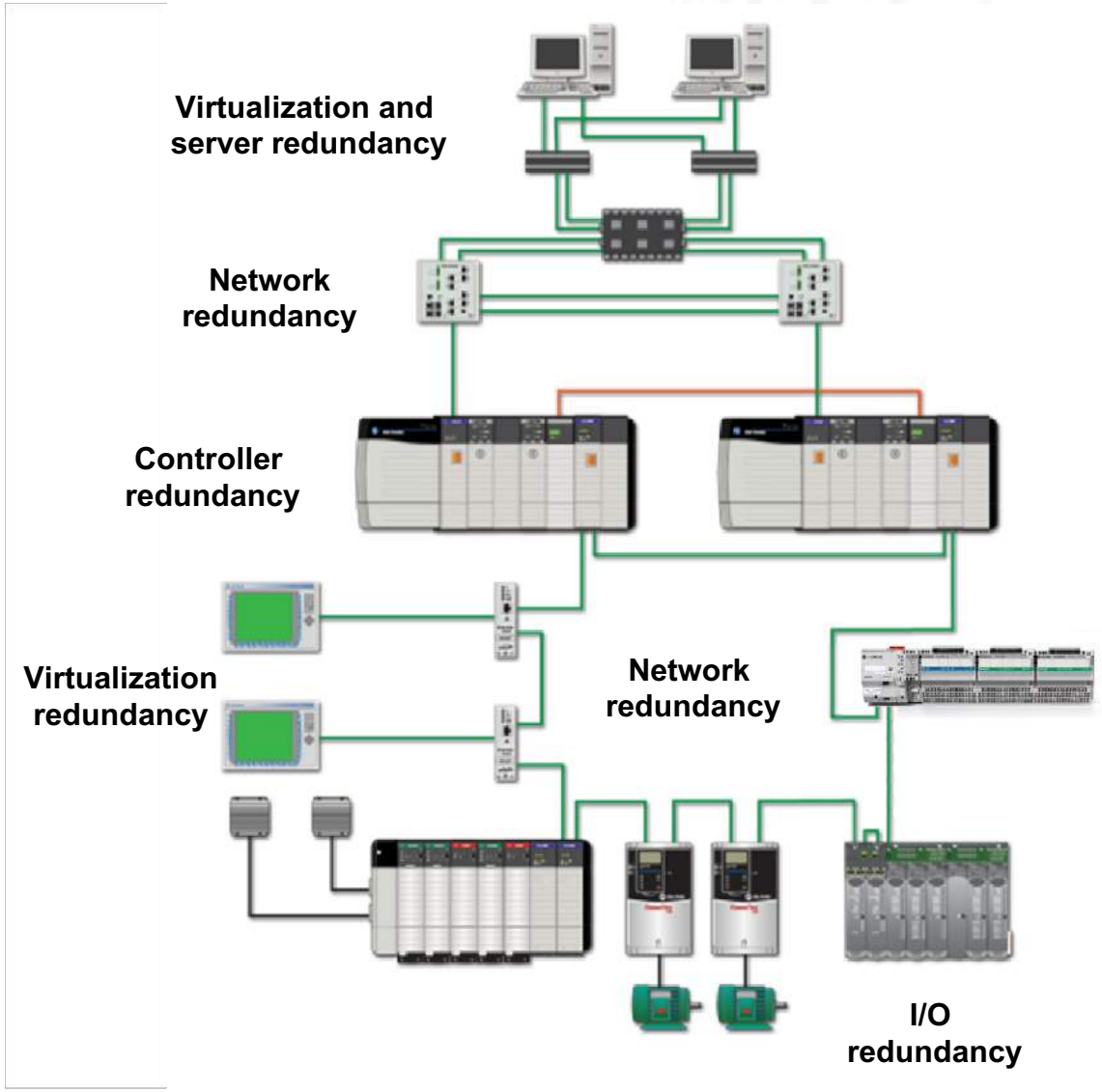
Rockwell Automation high availability offerings scaled to your needs

For **operators needing constant access,** HMI server redundancy and the virtualization of HMI clients allow for the constant monitoring of the production floor.

To **help avoid the loss of historical information,** Historian servers are deployed redundantly for consistent trending and predictive modeling control. Utilize redundant interface nodes to store and access information if there is a loss of connection.

Achieve **production floor reliability and maintainability** with controller redundancy; this level of redundancy helps ensure the highest uptime for critical processes and allows for seamless updates to firmware.

Make informed decisions by ensuring you have **consistent access to instrumentation and sensors.** IO redundancy helps prevent loss of connection to instrumentation.



CompactLogix High Performance Controllers

CompactLogix™ 5480 controller

Multiple disciplines

- Integrated Motion on EtherNet/IP™ up to 150 axes
- Enables high-speed I/O, motion control
- Builds upon the same high-performance architecture first introduced with the ControlLogix® 5580 and CompactLogix™ 5380 controllers

Enhanced productivity with Logix

- Includes three GbE EtherNet/IP™ ports supporting both dual IP and Linear or Device Level Ring topologies up to 250 nodes
- Provides a Logix based real-time controller that runs in parallel to an instance of Windows 10 IoT Enterprise
- Supports up to 31 local Compact 5000™ I/O modules
- Offers simplified architectures with built-in communications, peripheral connectivity,
- Integrated DisplayPort and multiple high-speed Gigabit Ethernet ports

Security capabilities

- Enhanced security features
- Offers embedded Logix security with FactoryTalk® Security user authentication and authorization

CompactLogix™ 5480 Controller

Catalog Comparison

CompactLogix 5480 Catalog Numbers	Logix Memory	Node Count	I/O Expansion	Motion Physical Axis
5069-L430ERMW	3 MB	60	31	16
5069-L450ERMW	5 MB	120	31	24
5069-L4100ERMW	10 MB	180	31	32
5069-L4200ERMW *(formerly 5069-L46ERMW)*	20 MB	250+	31	150

CompactLogix™ 5380 controller

High performance

- Dual one Gb Ethernet port enables high-performance I/O and Integrated Motion on EtherNet/IP™ up to 32 axes
- Controller firmware is optimized for maximum performance

Enhanced productivity with Logix

- Two Ethernet ports for dual IP or support for Linear and Device Level Ring topologies for up to 180 nodes
- Supports up to 31 local I/O modules and memory from 0.6 … 10 MB
- Onboard display allows for enhanced diagnostics and troubleshooting
- USB port supports local programming, troubleshooting and firmware updates

Security capabilities

- Digitally signed and encrypted controller firmware
- Controller-based change detection and logging
- Role-based access control to routines and Add-On Instructions
- Ability to enable and disable all embedded ports

CompactLogix™ 5380 standard controllers

Catalog Number	Application Memory	I/O Expansion	Ethernet Nodes	Motion Axes
5069-L306ER	0.6 MB	8	16	0
5069-L310ER	1 MB	8	24	0
5069-L320ER	2 MB	16	40	0
5069-L330ER	3 MB	31	60	0
5069-L340ER	4 MB	31	90	0
5069-L310ER-NSE	1 MB	8	24	0
5069-L306ERM	0.6 MB	8	16	2
5069-L310ERM	1 MB	8	24	4
5069-L320ERM	2 MB	16	40	8
5069-L330ERM	3 MB	31	60	16
5069-L340ERM	4 MB	31	90	20
5069-L350ERM	5 MB	31	120	24
5069-L380ERM	8 MB	31	150	28
5069-L3100ERM	10 MB	31	180	32

CompactLogix™ 5380 Process controller

Process-focused

- Process-built controller with automatic diagnostics functionality
  - Simplify lifecycle management
- Conformal coating options
  - Add a layer of protection against harsh and corrosive environments
- Native Process instructions
  - Ease workflow and reduce the need to import Add-On Instructions with PlantPAx® 5.0 system integration

What's new for Compact GuardLogix® 5380 safety controller

High-performance CPU

- Optimized for faster safety reaction time

Scalable safety level

- Up to SIL 2/PLd – 1oo1
- **Up to SIL 3/PLe – 1oo2**

1 gigabit (Gb) embedded EtherNet/IP port

- Integrated safety on EtherNet/IP, I/O and safety devices

IEC 61800-5-2 safety instructions

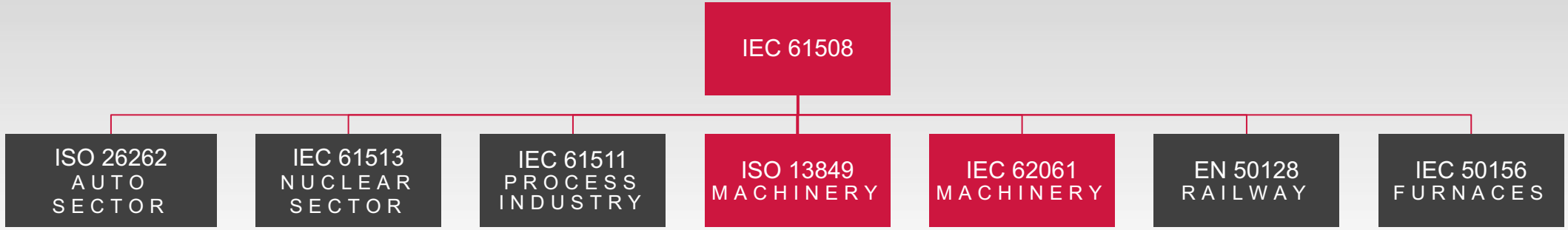
- New drive safety instructions with Kinetix® 5700 ERS4 drive
  - Safe Feedback Scaling, Safe Stop 1, Safe Stop 2 and Safe Operation Stop
  - Safely-limited Speed and Safely-limited Position
  - Safe Brake Control with external brake and Safe Direction

Increased scalability

- Standard memory options ranging from 0.6...10 MB
- Safety memory options ranging from 0.3...5 MB
- Support for up to 180 EtherNet/IP nodes per controller
- Motion support for up to 32 axes per controller

Machine Safety

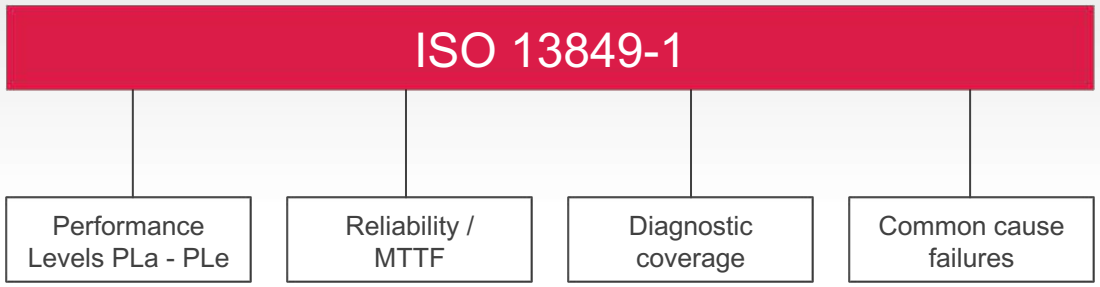
Functional Safety Standards

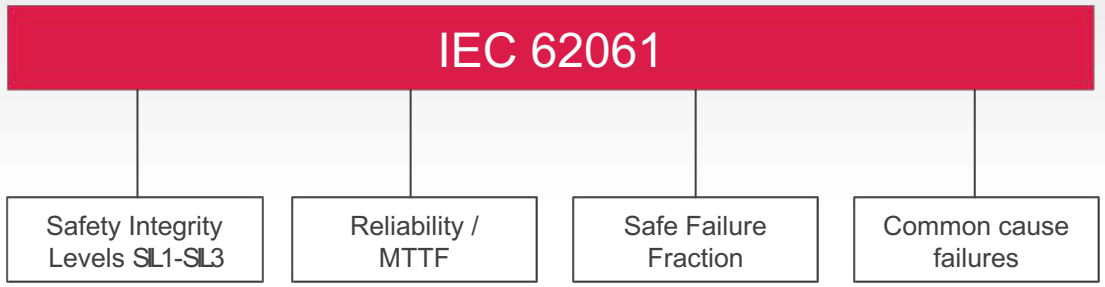


IEC 61508 Functional Safety of Electrical / Electronic / Programmable Electronic safety-related systems

- The base functional safety standard applicable to all kinds of industries
- ISO 13849: Safety of machinery – Safety related parts of control systems
- IEC 62061: Safety of machinery – functional safety of safety related electrical, electronic and programmable electronic control systems

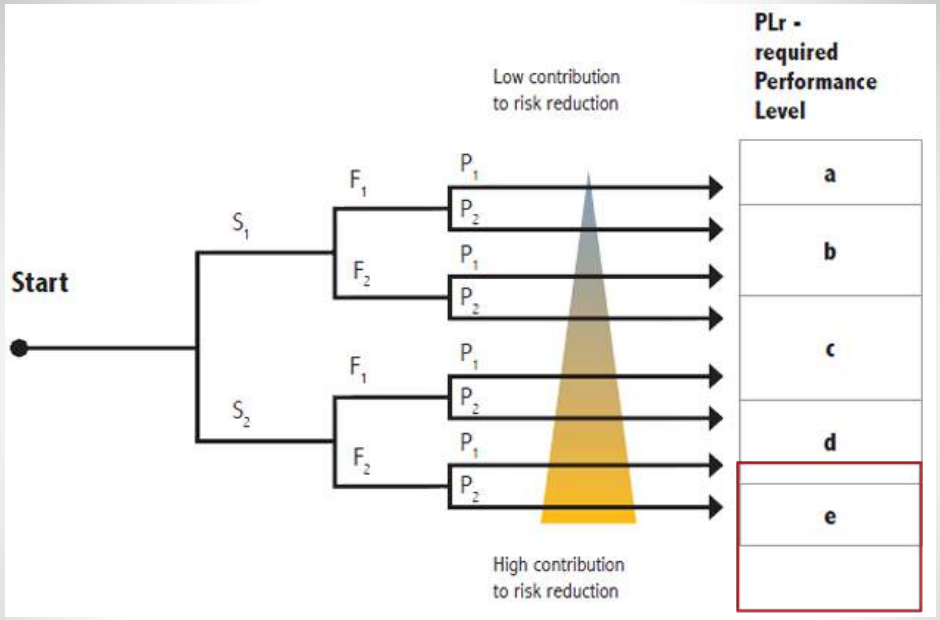
Functional Safety Standards





ISO 13849 is the most commonly followed international machine safety design standard

Scalable Safety Level



Risk = Severity of Harm + Probability of Occurrence of that harm (frequency + avoidability)

Risk or Hazard Assessment (ISO 13849-1)

SCALABLE

Safety is the freedom from unacceptable risk

S - severity of injury
- S1 reversible
- S2 irreversible

F - frequency/time exposure to hazard
- F1 rare/short
- F2 continuous/prolonged

P - avoidable risk or limitation of damage
- P1 avoidable within given conditions
- P2 almost unavoidable

Scalable Safety Level

Up to PLd (Cat. 3)
SIL CL2
1oo1 Architecture

Up to Ple (Cat. 4)
SIL CL3
1oo2 Architecture

SCALABLE

First in scalable Safety Performance Levels (PLs) and Safety Integrity Levels (SILs) for machine safety

- The risk assessment is the key to defining the safety requirements
- Right Sizing" can create compliant designs
  - Optimized for cost and performance
  - Help achieve the safety, cost and timing targets for each project
- Just the right amount of safety for your unique application.

Compact GuardLogix® 5380 safety controllers

Capabilities of CompactLogix™ 5380 controller

+

Integrated with safety

=

1oo1

Compact GuardLogix® 5380 SIL 2 controller

1oo2

Compact GuardLogix® 5380 SIL 3 controller

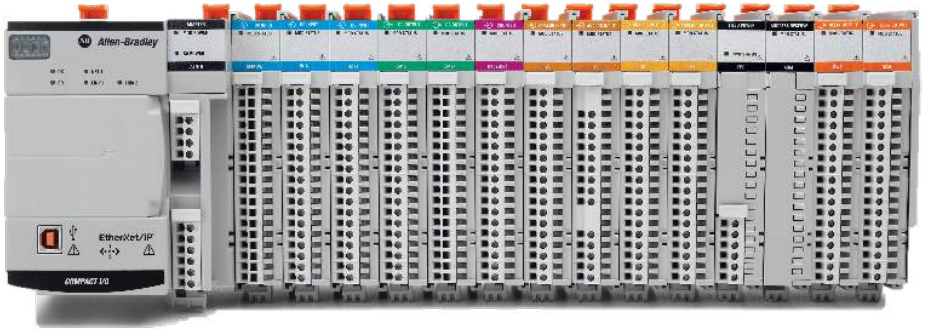
Compact 5000™ I/O system technical presentation

Compact 5000™ I/O system

THE REYNOLDS COMPANY
ELECTRICAL SUPPLY

The Compact 5000™ I/O system expands the performance of the CompactLogix™ I/O family.

- It is the ideal distributed I/O system for the ControlLogix® 5580, CompactLogix™ 5380 and CompactLogix™ 5480 controllers. For a local I/O system, it is ideal for the CompactLogix™ 5380 and 5480 controllers.
- The safety capability expands to support local safety I/O control in the Compact GuardLogix® 5380 controller and is designed for users with high processing standards and safety requirements.



Compact 5000™ I/O system benefits

High performance, small form factor, better diagnostics

- Provides high I/O backplane performance capability
- Supports 1-Gb embedded switch technology for Device Level Ring, Linear and Star topologies
- Provides design flexibility via various configurations to meet discrete and analog I/O needs
- Provides better accuracy and time stamping of inputs and scheduled outputs
- Supports the Logix platform high-performance I/O as local I/O to CompactLogix™ 5380 & CompactLogix™ 5480 controllers
- Supports distributed I/O over EtherNet/IP via the 5069 Ethernet adapter to the CompactLogix™ 5380, CompactLogix™ 5480 and ControlLogix® 5580 controllers
- Supports local safety I/O for Compact GuardLogix® 5380 controllers
- Provides quick reference to the I/O status with improved alignment of status indicators
- Power benefits include:
    - Separate system power for better isolation
    - Built-in power input with field power to I/O modules

Compact 5000™ safety I/O module benefits

- Faster safety reaction time
  - 6 ms for input
  - 4.5 ms for output
- Better diagnostics
  - Short circuits, no load, overload
  - Higher output density, configurable
  - 8 channels and output type selectable:
    - Sourcing - Single channel PLe, dual channel PLe
    - Bipolar - PLe

5069-SERIAL

Module supporting Generic ASCII, Modbus RTU/ASCII, DF1 and DH-485 protocols. Provides a simple solution for modernizing legacy embedded serial solutions using these protocols.

Generic ASCII

Provide generic serial communication capability for user to connect to any kind of serial device.

Modbus RTU/ASCII

Provide communication to Modbus devices both as a Master or Slave.

Supports up to 50 master commands, disable command function, reset diagnostics.

DF1

Supports all DF1 protocol; DF1 point-to-point, DF1 Master, DF1 Slave and DF1 Radio Modem in both RS232C, RS422 and RS-485 to support legacy migration from existing legacy systems SLC™, 1769-L3xE, 1768-L4x.

Reuses existing MSG instruction and predefined messages in Logix.

DH-485

Supports legacy migration from existing legacy systems SLC™, 1769-L3x, 1768-L4x.

Reuses existing MSG instruction and predefined messages in Logix.

Compact 5000™ I/O Serial module

- What is needed for configuration?
  - Studio 5000® application environment V31 onwards
- Compatibility matrix:
  - 5069-SERIAL R2 FW will only work with CompactLogix™ 5380 and 5480 controllers when using DF1 & DH-485 on local chassis
  - 5069-SERIAL R2 FW will only work with ControlLogix® 5580 L8, CompactLogix™ 5380 and 5480 controllers when not using DF1 & DH-485 on remote chassis
  - It does not work with other legacy controllers
    - L2x, L3x, L4x, CompactLogix 5370 L1, L2, L3, ControlLogix® L6x, L7
- Restrictions:
  - DF1 & DH-485 supported only on the Channel 1 serial port
  - DF1 & DH-485 only able to initiate and respond to message (MSG) instructions of PLC-2®, PLC-3®, PLC-5® and SLC™ message types
  - DF1 & DH-485 not able to route to/from other networks
  - DF1 & DH-485 not able to upload/download/go online with a CompactLogix™ 5380 or 5480 controller from a PC connected on the DH-485 or DF1 network

Flex 5000 Remote I/O

FLEX 5000™ I/O

Next generation 5000 series I/O platform technology

THE REYNOLDS COMPANY
ELECTRICAL SUPPLY

Rugged design

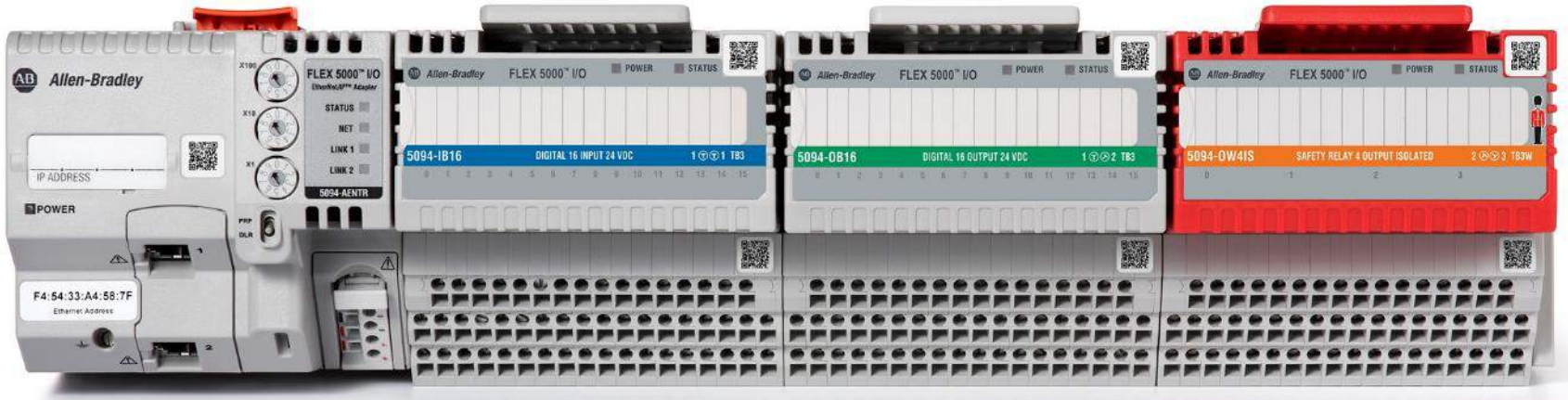
Operating temperature:
-40…+70 °C
(-40...+158 °F)

Hazardous environments:
Class I, Div. 2
Zone 2 Groups
A, B, C, D

Performance
1 gigabit (Gb) EtherNet/IP
1 gigabit (Gb) backplane speed

Standard I/O
16-channel digital in/out
8-channel analog in/out

Safety I/O (SIL 3, PLe, Cat. 4)
16-channel digital in/out
4-channel analog in/out



Network media and topologies
2 copper/2 fiber ports
Supports Device Level Ring (DLR), Star, Linear, Parallel Redundancy Protocol (PRP)

Easy snap-on installation
Removal and Insertion Under Power (RIUP)

Consistent I/O wiring
Direct termination of 2-, 3- and 4-wire devices

Distributed I/O for ControlLogix® 5580 controller, GuardLogix® 5580 safety controller
Distributed I/O for CompactLogix™ 5380 controller, CompactLogix™ 5480 controller, Compact GuardLogix® 5380 safety controller

FLEX 5000™ I/O

Flexibility in design and maintenance

Simplified system design and maintenance

One-to-one TB mapping

TB3, TB3I, TB3W, TB3T, TB3AC, TB32, TB32C, TB32V

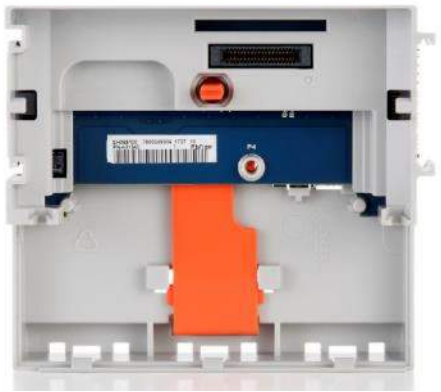
Per channel Cold junction compensation (CJC), remote CJC support

TB options: screw and spring/push-in

Removable terminal block (RTB)

Simple plug-in shielding TB

Z-Axis removal



Easy terminal base selection

Online addition* and RIUP

Current sourcing - analog

**Online addition for standard modules only*

FLEX 5000™ I/O

EtherNet/IP adapter highlights

RJ45 adapter

SFP adapter

Stratix® SFP transceiver (sold separately)

Tested for compatibility with Stratix® SFP transceiver

Functionality and performance

- 1 Gb, Device Level Ring (DLR), Linear and Parallel Redundancy Protocol (PRP)
- Secured embedded web server
- Implicit and explicit protection

Flexible installation

- RJ45 and SFP versions
- 8 or 16 I/O module support
- Intermix copper and fiber SFP

Ease of maintenance

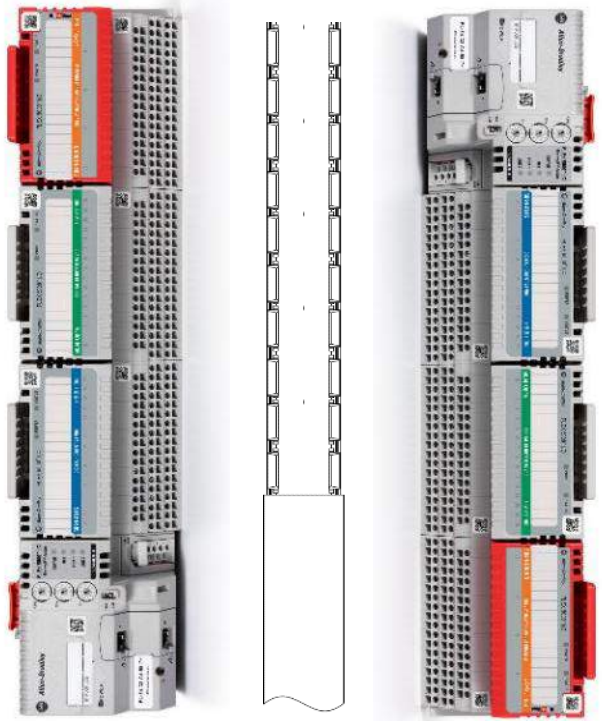
- Easy access ports
- Input power and temperature diagnostics
- Removable terminal block (RTB) for power terminals

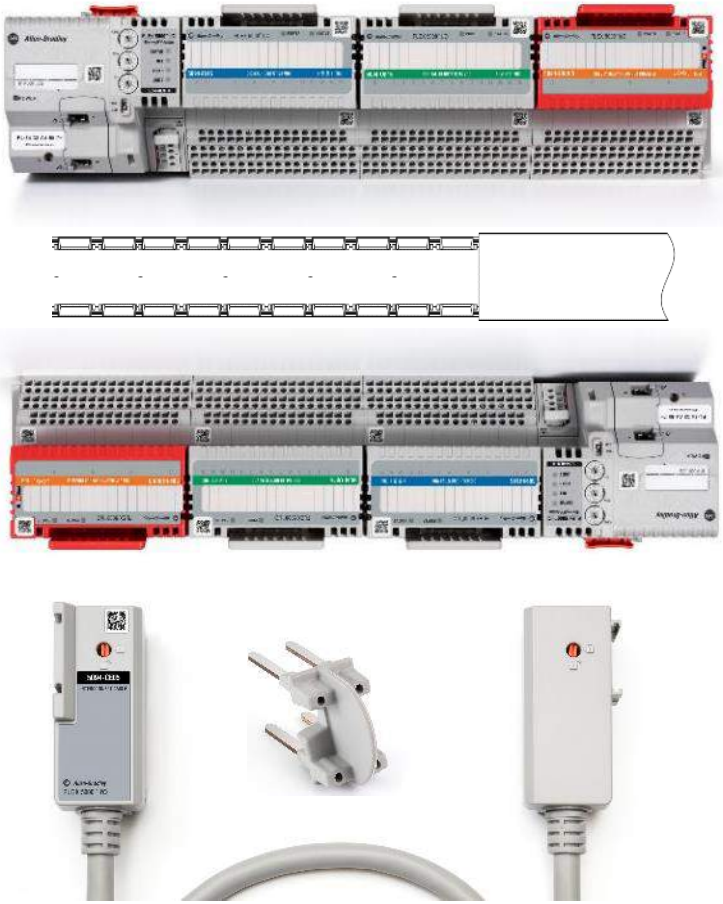
FLEX 5000™ I/O

Flexible installation options

THE REYNOLDS COMPANY
ELECTRICAL SUPPLY

Mount the I/O to meet application requirements





Extreme environment (XT) for G3

-40…+70 °C (-40...+158 °F) standard

-1000…+2000 m altitude

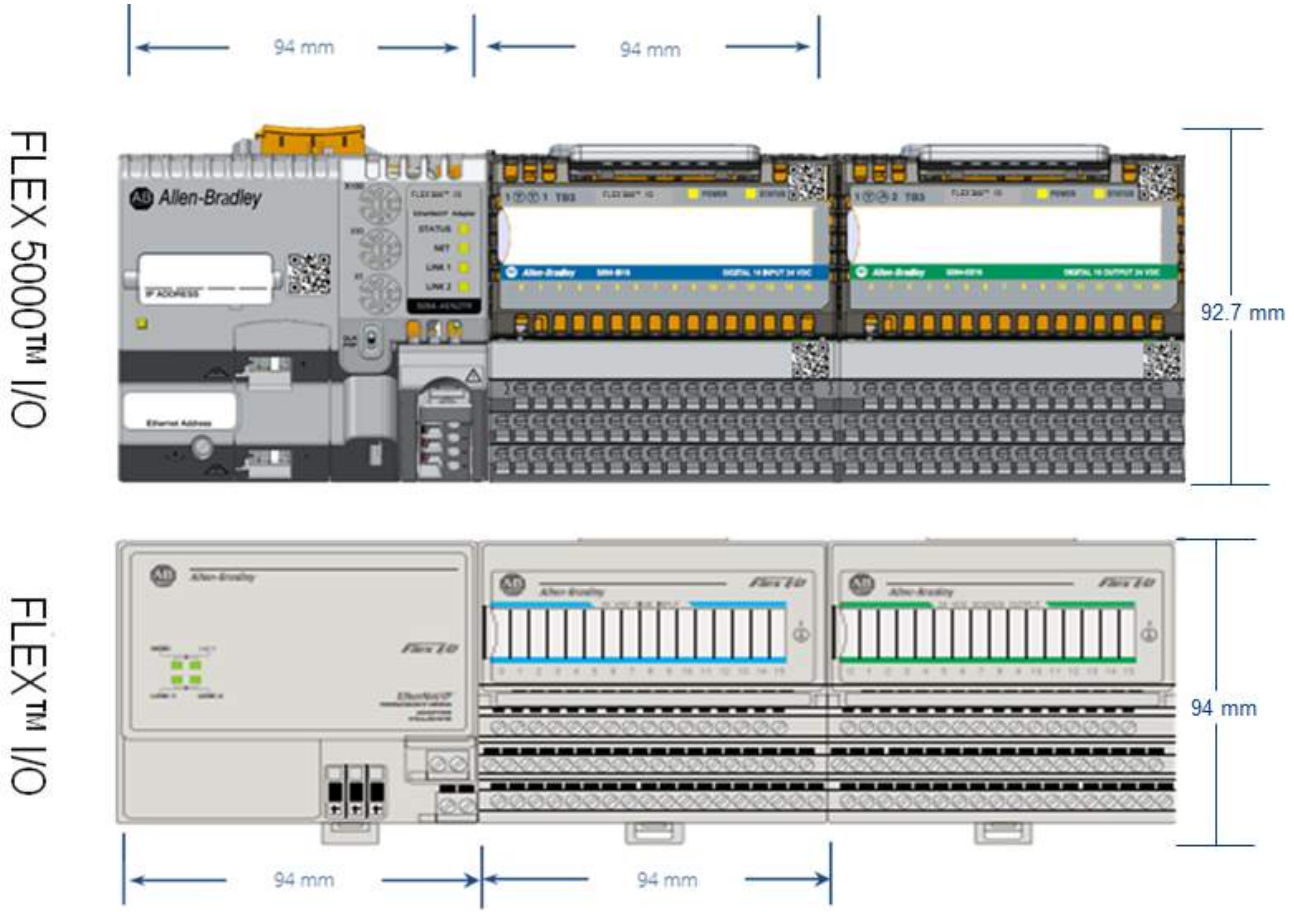
Horizontal or vertical

Certifications available at release

Rockwell Automation

FLEX 5000™ I/O

Comparison to FLEX™ I/O



See FLEX 5000™ modules technical data (5094-TD001) for dimensions

Same DIN rail footprint as FLEX™ I/O

Maximum wiring consistency

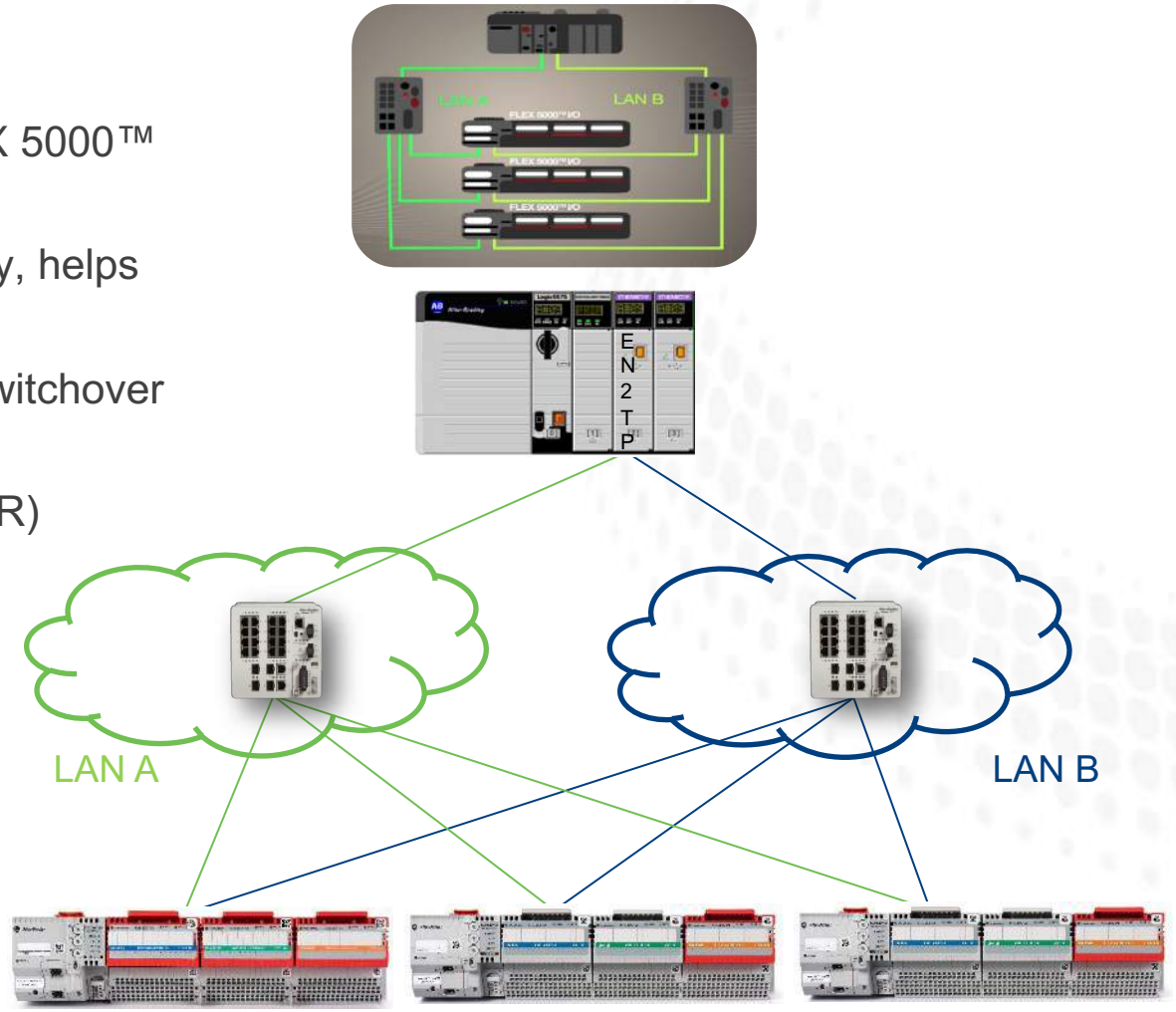
Increased capacity and system performance

FLEX 5000™ I/O

Parallel Redundancy Protocol (PRP)

Features and benefits

- Parallel Redundancy Protocol (PRP) feature added to all FLEX 5000™ EtherNet/IP adapters with firmware revision 4.011 update
- Provides a redundant network infrastructure for high availability, helps to mitigate the risk of downtime
- Same packets sent out of both ports to help reduce network switchover time
- PPS performance 50K versus 100K for Device Level Ring (DLR)
- IEC 62439-3 compliant



Applications

- Process applications where a customer requires redundant network infrastructure
- ControlNet media redundancy migrations
- For customers who require redundancy beyond a ring topology

FLEX 5000™ I/O

Integrated control and safety

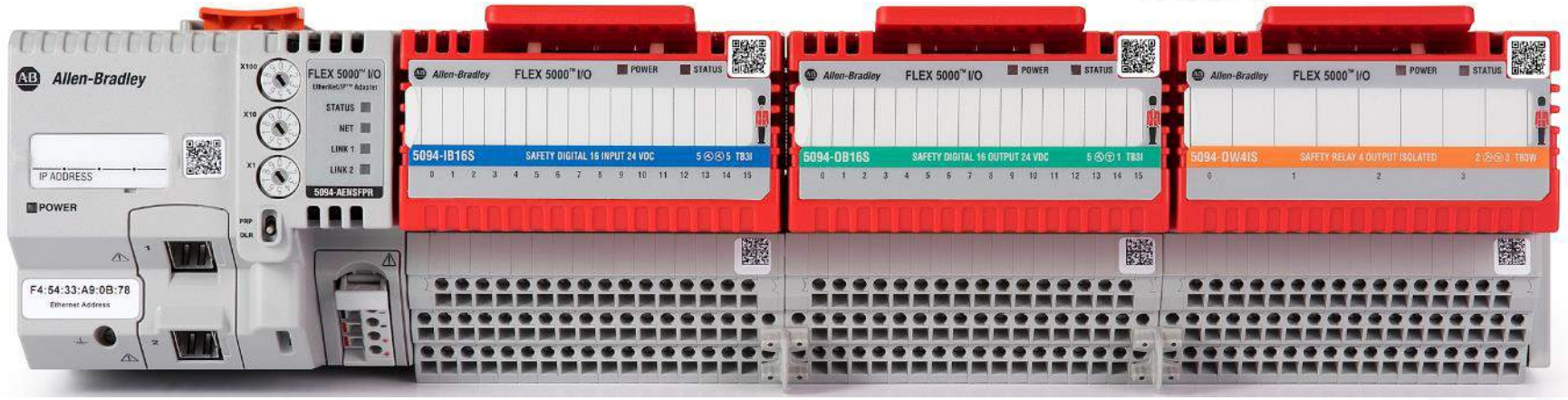
Safety integrity level

SIL 3, PLe, Cat. 4
Single channel

Safety digital 16 output

Safety digital 16 input

Safety relay 4 output



Distributed safety application
Remote fault reset
Configurable fault state

Extensive diagnostics
Open wire detection ON and OFF
Temperature detection

Fail-safe application
High, low and continuous demand

FLEX 5000™ I/O

Integrated control and safety for the Process industry

Safety digital 16 input

- SIL 3, PLe, Cat. 4 single channel#
- 6 ms safety reaction time*
- 8 test output: pre-assigned
- Test output rating: 0.2 A
- Overload detection with test output

Safety digital 16 output

- SIL 3, PLe, Cat. 4 single channel#
- 4.5 ms safety reaction time*
- Output rating: 0.5 A
- 1.8 A surge current for 150 ms*
- Safety mode, safety pulse mode

Safety relay 4 output

- SIL 3, PLe, Cat. 4 single channel#
- 20 ms safety reaction time*
- Output rating:
  - 2 A – 4 channel 24V DC/120-240AC
  - 4 A – 2 channel only – 24V DC
- 100K cycles @ 2 A resistive load
- Safety mode

#Module SIL Capability. See FLEX 5000™ modules technical data (5094-TD001) for more details.
**Conditions apply*

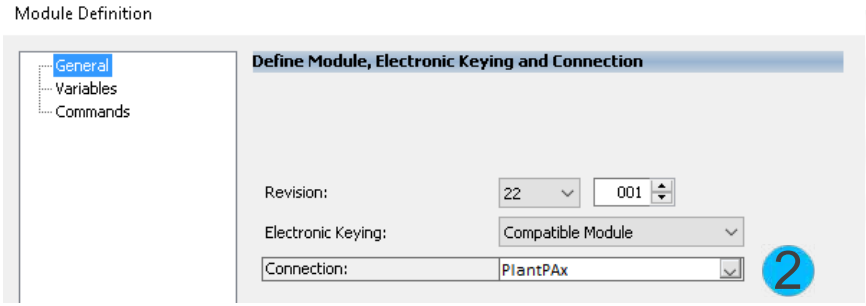
Highly Integrated HART

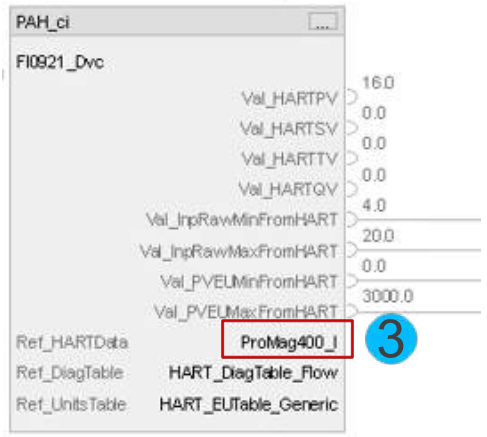
Features

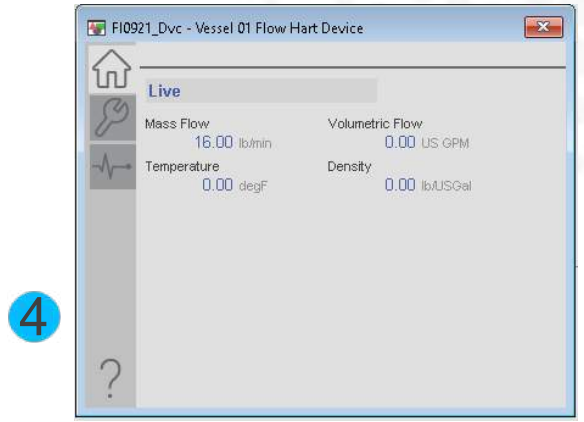
- Add and replace HART devices online
- HART signals & connection status indicated Logix Designer I/O tree
- Integrated device diagnostics via profile
- PlantPAx® connection type selection

Benefits

- Intuitive Integration
  - Visible access to HART reference name
  - PlantPAx data type (connection) pre-defined for PAH (HART interface) instruction
- Device diagnostics included in PlantPAx data type connection
- Out of the box Faceplate renders HART content







FLEX 5000™ HART I/O modules

Isolated HART analog input and output modules

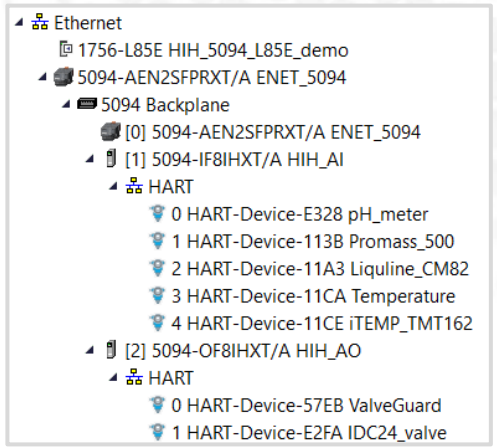
Features and benefits

- 8-channel to channel isolated input and output modules
- Each channel can be configured as current, voltage or HART individually
- HART V7, V6 and V5 support
- Current sourcing of isolated loop power
- Readback functionality for outputs
- Per channel diagnostics with time stamp and protection
- New Logix feature – highly integrated HART (HIH)*
  - Visible access to HART devices
  - HART bus in Studio 5000 Logix Designer® application I/O configuration tree
  - Device connection fault status representation in I/O tree
  - Add and replace HART devices online
  - Integrated device information view
- Works with Studio 5000 Logix Designer® application, version 32 or later
- Documentation in Literature Library and Add-on Profile (AOP) in Product Compatibility and Download Center (PCDC)

See FLEX 5000™ modules technical data (5094-TD001) for more details.
**Learn more about HART I/O at FLEX 5000™ Analog Isolated Current/Voltage/HART Input and Output Modules (5094-UM007).*

Catalog 5094-IF8IH
Catalog 5094-IF8IHXT

Catalog 5094-OF8IH
Catalog 5094-OF8IHXT



FLEX 5000™ I/O

Availability

Distributed I/O for

- ControlLogix® 5580 controller
- CompactLogix™ 5380 controller
- CompactLogix™ 5480 controller
- GuardLogix® 5580 controller
- Compact GuardLogix® 5380 controller

Available

Standard release 1	
Catalog	**Description**
5094-AENTR	EtherNet/IP adapter RJ45 8 I/O
5094-AEN2TR	EtherNet/IP adapter RJ45 16 I/O
5094-AENSFPR	EtherNet/IP adapter SFP 8 I/O
5094-AEN2SFPR	EtherNet/IP adapter SFP 16 I/O
5094-IB16	16-point digital input
5094-OB16	16-point digital output
5094-OW8I	8-channel relay output isolated
5094-IF8	8-channel analog input
5094-IY8	8-channel universal analog input
5094-OF8	8-channel analog output
5094-HSC	2-channel high-speed counter

Standard release 2 and HART	
Catalog	**Description**
5094-IA16	16-point AC input, 120V AC
5094-OA16	16-point AC output, 120/240V AC
5094-OB8	8-point digital output 2 amp
5094-IB32	32-point digital input
5094-OB32	32-point digital output
5094-IM8	8-point digital input 240V AC
5094-IF8IH	8-channel analog input isolated HART
5094-OF8IH	8-channel analog output isolated HART
SIL 3 safety – digital	
5094-IB16S	16-point digital input safety
5094-OB16S	16-point digital output safety
5094-OW4IS	4-point relay output safety

Serial and accessories	
Catalog	**Description**
5094-SERIAL	2-channel serial interface
5094-CE05	Interconnect cable 0.5 meters
5094-CE10	Interconnect cable 1 meter
5094-CE30	Interconnect cable 3 meters

Catalogs available in two variants (except cables)

- *Standard version with operating temperature at* -40…+70 °C (-40...+158 °F)
- *Extreme environment (XT) variant with operating temperature at* -40…+70 °C (-40...+158 °F) *and conformal coating for G3 compliance*

FLEX 5000™ I/O

Future release schedule

Safety release 2

SIL 3 safety - analog	
Catalog	**Description**
5094-IF4IHS	4-channel analog input isolated HART safety
5094-OF4IHS	4-channel analog output isolated HART safety
5094-IRT8S	8-channel RTD/thermocouple safety
5094-IJ2IS	2-channel isolated frequency safety

Specific dates to be advised

Catalogs available in two variants

- *Standard version with operating temperature at* -40…+70 °C (-40...+158 °F)
- *Extreme environment (XT) variant with operating temperature at* -40…+70 °C (-40...+158 °F) *and conformal coating for G3 compliance*

Rockwell Automation

expanding human possibility™

Stratix® 5800 switch

High performance managed switch

PUBLIC

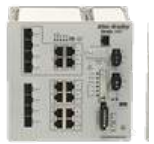
Network switch product overview

Stratix® 2000 switch

Stratix® 2500 switch

Stratix® 5700/ ArmorStratix™ 5700 switches

Stratix® 8000/8300 switch



Stratix® 5400 switch

Stratix® 5800 switch

Stratix® 5410 switch

UNMANAGED

LIGHTLY MANAGED

FULLY MANAGED

HIGH PERF MANAGED

100M/1G

100M

100M/1G

1G/10G

Stratix® 5800 switch

The Stratix® 5800 managed switch supports layer 2 switching and layer 3 routing on an all gigabit platform. The design includes both standalone and modular switches. The platform supports up to 26 ports with a variety of copper, PoE, and fiber SFP options providing flexibility for high performance network applications.

Stratix® 5800 switch

Features and Benefits

- All gig switch platform for high-performance network support
- Fixed and modular options up to 26 ports providing flexibility and scalability
- Wide variety of copper, fiber, and PoE choices to support a diverse set of applications
- Supports layer 2 access switching and layer 3 routing for use in multiple layers of the architecture
- Supports both IT and OT configuration and management tools allowing users to leverage the expertise of both teams
- Default configurations for industrial applications providing easy setup and optimized performance

Optimized Integration

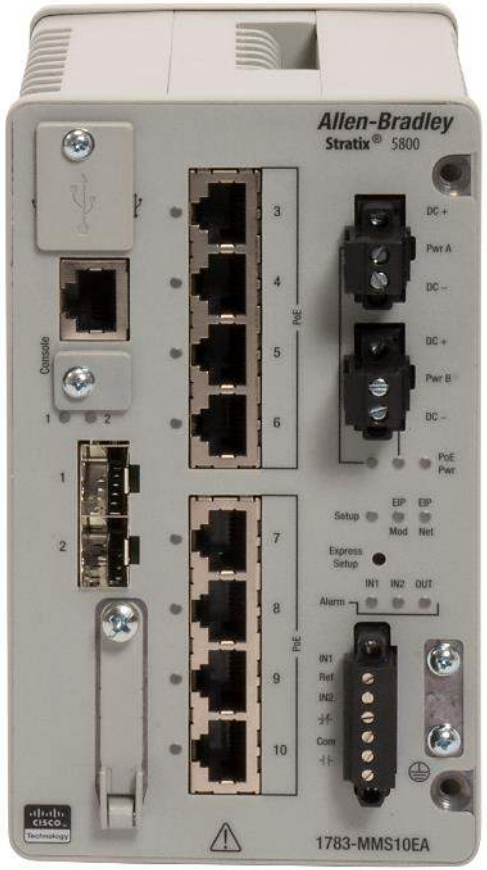
- Studio 5000® Add-on Profiles (AOPs) enable premier integration into the Rockwell Automation® Integrated Architecture® system
- Predefined named Logix tags for monitoring and port control
- FactoryTalk® View faceplates help to enable status monitoring and alarming
- Embedded Cisco® technology, including IOS-XE operating system, helps enable integration with the enterprise network

Stratix® 5800 switch hardware

- Fixed or modular base switch
  - 10 all gigabit ports
    - 8 copper ports or PoE ports (optional)
    - 2 SFP slots (supports copper and fiber SFPs)
- Single expansion module (on modular switch base)
  - 8-port or 16-port module
  - Combinations of copper, PoE, and SFP slots
- Separate hardware switch and expansion modules to support “advanced” features (optional)
- Secure Digital (SD) flash card (optional)
- Dual power inputs
- 2 alarm inputs and 1 output
- RJ45 or mini-USB console port
- 2 USB ports

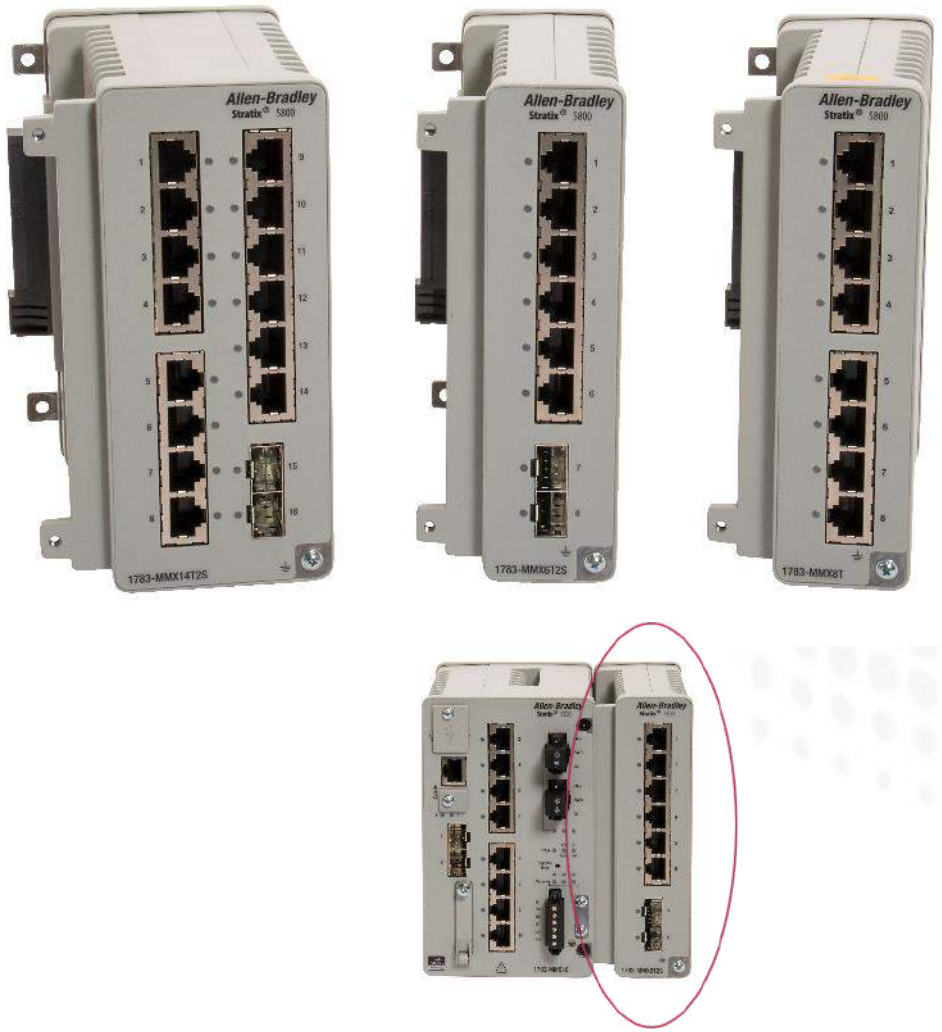
Base switch hardware options

- Fixed 10 port all gig layer 2 switch
  - 10-port (8 Copper + 2 SFP slots)
  - 10 PoE ports (8 PoE + 2 SFP slots)
- Modular 10 port all gig layer 2 switch
  - 10-port (8 Copper + 2 SFP slots)
  - 10 PoE ports (8 PoE + 2 SFP slots)
  - 10 PoE ports (8 PoE + 2 SFP slots) with advanced feature support
- Modular 10 port all gig layer 3 switch
  - 10-port (8 Copper + 2 SFP slots)
  - 10 PoE ports (8 PoE + 2 SFP slots)
  - 10 PoE ports (8 PoE + 2 SFP slots) with advanced feature support



Expansion module options

- Variety of expansion modules supporting combinations of copper, PoE, SFPs, and advanced feature support
  - 8-port copper
  - 8-port PoE
  - 8-port PoE, advanced feature support
  - 8-port SFP slots
  - 8-port SFP slots, advanced feature support
  - 6-port copper, plus 2 SFP slots
  - 16-port copper
  - 16-port PoE
  - 14-port copper, plus 2 SFP slots



Stratix® 5800 catalog options

Stratix 5800 Catalog Structure							
Switches	Total ports	RJ45 ports	PoE/PoE+ ports	SFP slots	Modular	Features	Firmware Type
1783-MMS10B	10	8 GE		2 GE	-	Standard	Layer 2
1783-MMS10BE	10		8 GE	2 GE	-	Standard	Layer 2
1783-MMS10	10	8 GE		2 GE	Yes	Standard	Layer 2
1783-MMS10E	10		8 GE	2 GE	Yes	Standard	Layer 2
1783-MMS10EA	10		8 GE	2 GE	Yes	Advanced	Layer 2
1783-MMS10R	10	8 GE		2 GE	Yes	Standard	Layer 3
1783-MMS10ER	10		8 GE	2 GE	Yes	Standard	Layer 3
1783-MMS10EAR	10		8 GE	2 GE	Yes	Advanced	Layer 3
Expansion Modules							
1783-MMX8T	8	8 GE			NA	Standard	NA
1783-MMX8E	8		8 GE		NA	Standard	NA
1783-MMX8EA	8		8 GE		NA	Advanced	NA
1783-MMX8S	8			8 GE	NA	Standard	NA
1783-MMX8SA	8			8 GE	NA	Advanced	NA
1783-MMX6T2S	8	6 GE		2 GE	NA	Standard	NA
1783-MMX16T	16	16 GE			NA	Standard	NA
1783-MMX16E	16		16 GE		NA	Standard	NA
1783-MMX14T2S	16	14 GE		2 GE	NA	Standard	NA

Stratix® 5800 firmware

- Layer 2 switching or layer 3 routing firmware options
  - Crypto image only
- New Cisco® IOS-XE operating system
- New user configuration interface – WEBUI
- Automation Global Macro and Smartports
- Premier integration into the Integrated Architecture® system
  - Custom AOP
  - Pre-defined named Logix tags
  - Faceplates – View designer, ME and SE

Advanced firmware features

- Advanced features (optional – requires “advanced” hardware)
  - Parallel Redundancy Protocol (PRP)
  - Device Level Ring (DLR)*
  - TrustSec – layer 3 version only
  - High Availability Seamless Redundancy (HSR)*

* Available in future firmware update

LISTEN. THINK. SOLVE.®

1756-EN2TP Parallel Redundancy Protocol Module

Network Redundancy

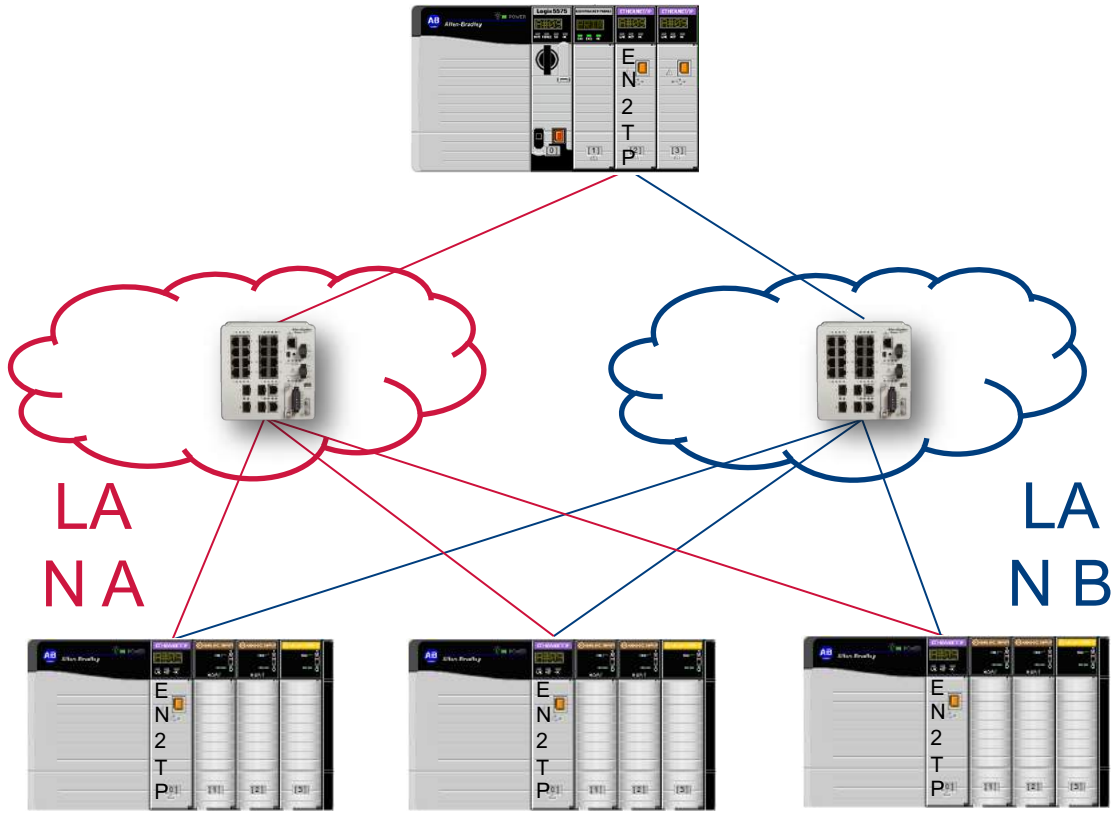
PUBLIC

Allen-Bradley • Rockwell Software

Rockwell Automation

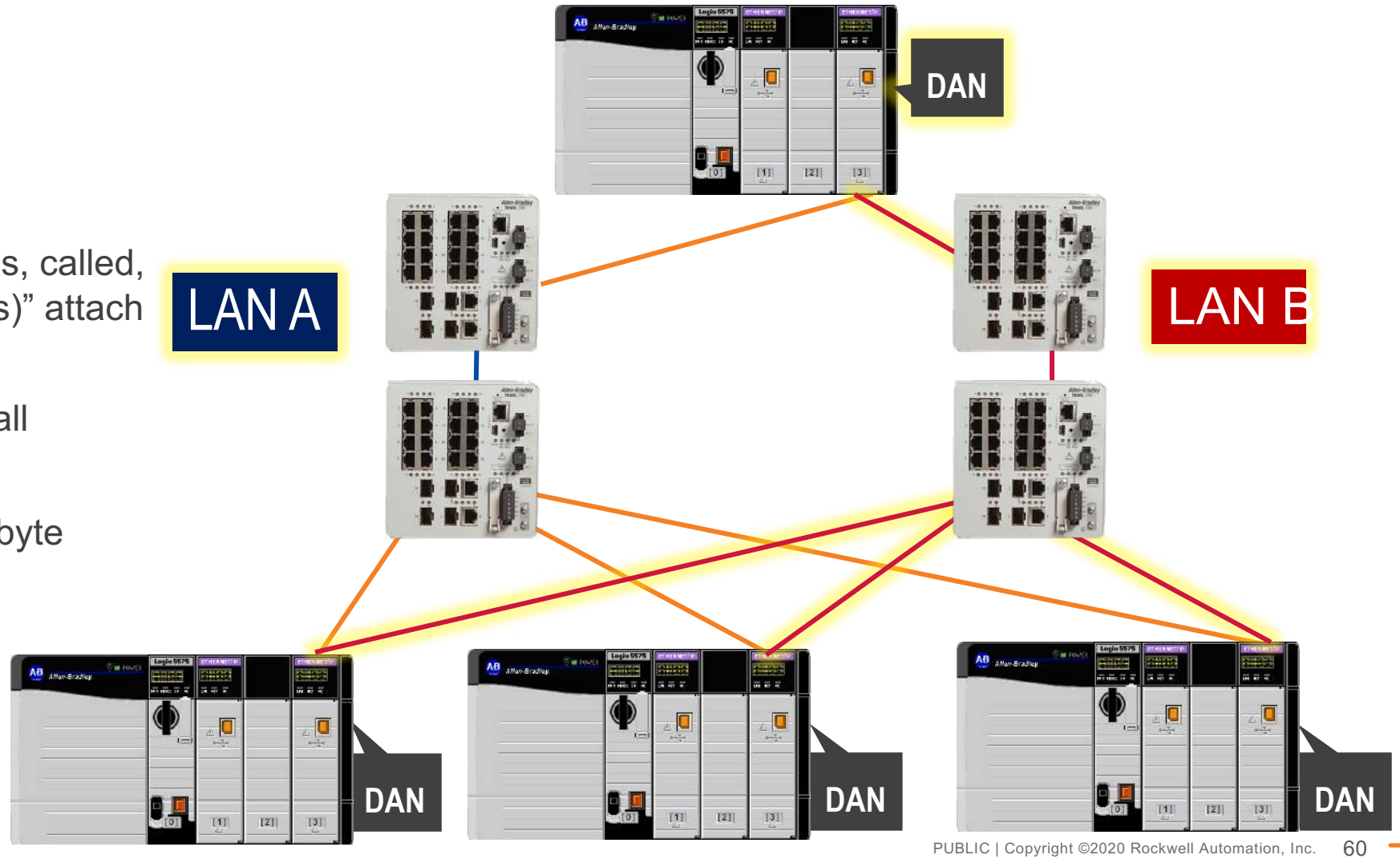
1756-EN2TP Parallel Redundancy Protocol Module
Features and Benefits

- Provides a redundant network infrastructure for high availability, helping minimize the risk of downtime
- IEC 62439-3 compliant
  - Same packets sent out of both ports to eliminate network switchover time
  - PRP is a different protocol than DLR
- Acts as I/O scanner in controller chassis or I/O adapter in remote chassis
- Supports HMI communications
- Provides same performance and capacity as 1756-EN2TR



Building a PRP Network
Adding Redundant Media and ControlLogix PRP Modules

- Redundant Ethernet Networks
  - Independent LANs
  - Independent Paths
- Switches are not PRP aware
- Redundancy is in the end nodes, called, “Doubly Attached Nodes (DANs)” attach to both LANs
- The DANs in this example are all 1756-EN2TP PRP modules
- Any switch that supports 1506 byte frames can be used
  - Stratix 5700 switches shown in example

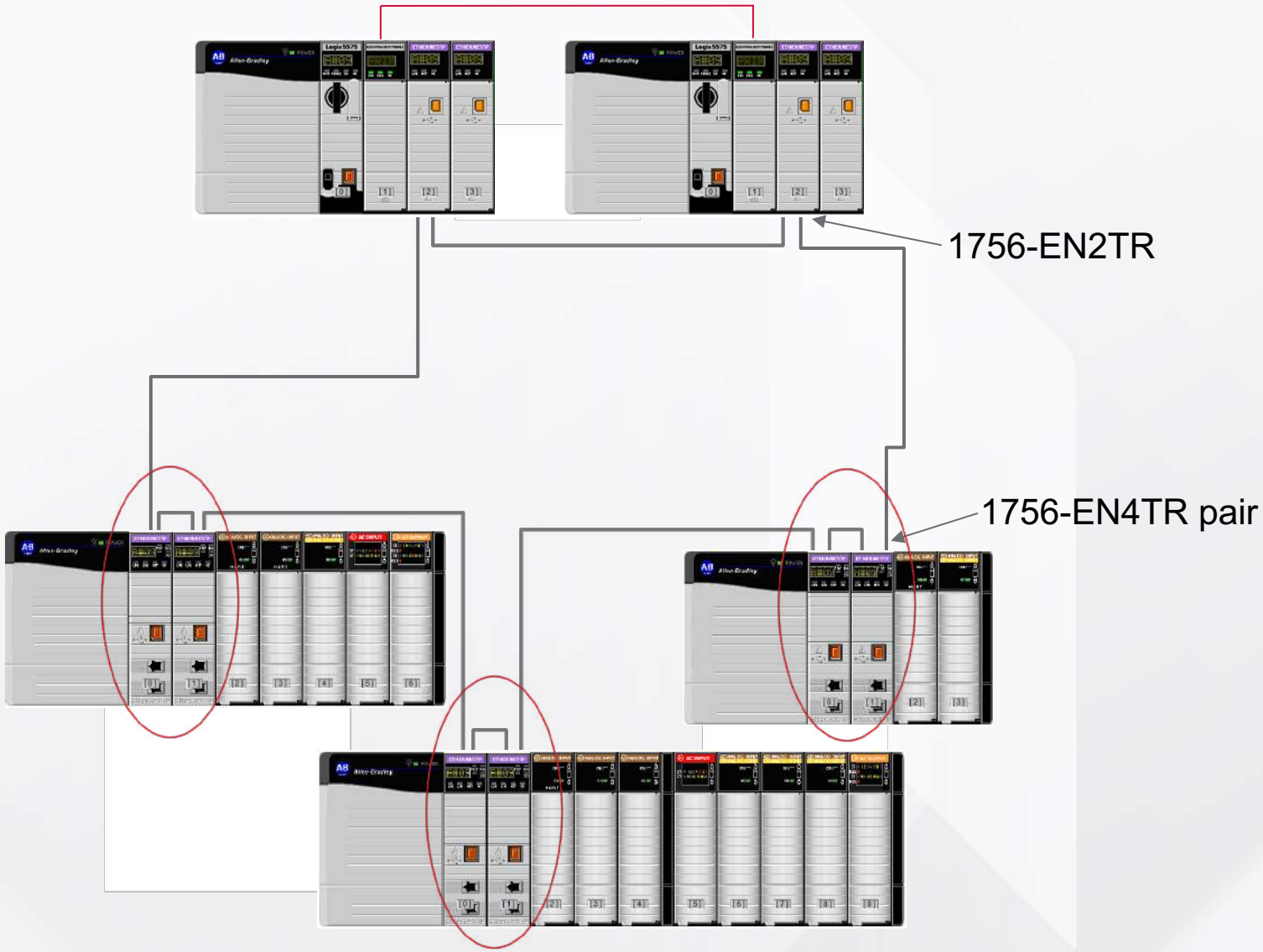


1756-EN4TR ControlLogix® Redundant Adapter Firmware Enhancement

Rockwell Automation

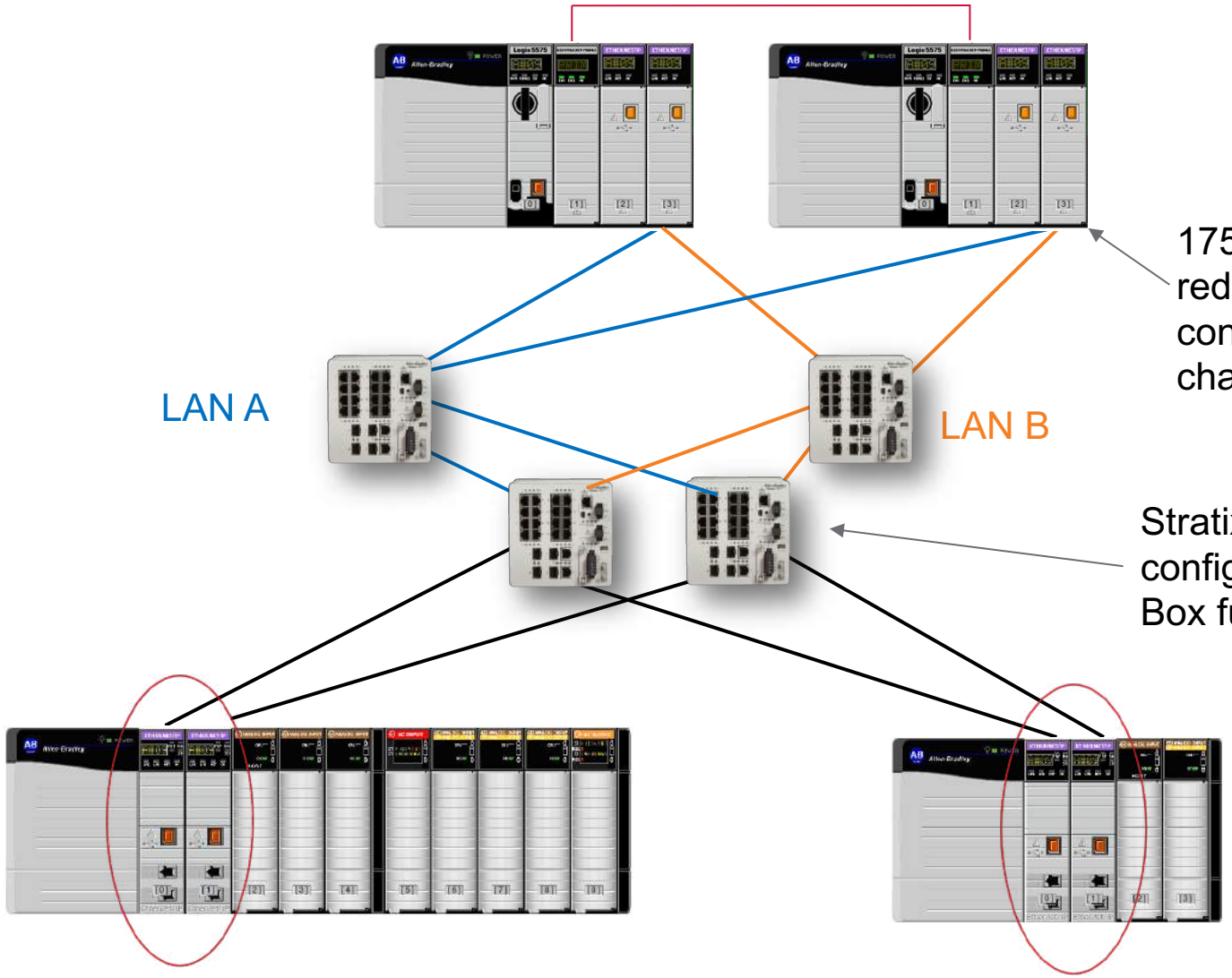
expanding **human possibility**™

1756-EN4TR Redundant Adapter Firmware Enhancement



- Device Level Ring (DLR) architecture available

1756-EN4TR Redundant Adapter Hybrid with PRP using Red Boxes



- PRP support with 1756-EN2TP module in redundant controller pair
- Stratix® 5400 switch provides RedBox to 1756-EN4TR Redundant Adapters
- PRP provides for fully redundant networks
- Convergence time is zero for PRP
- Scalable
- Future-proof: RedBoxes can be removed and PRP can be added directly to 1756-EN4TR firmware for added redundancy in the future

1756-EN4TR Redundant Adapter Firmware Enhancement

Details and Rules

- I/O modules only, no controllers or communication modules in the redundant adapter chassis
- Motion in redundant adapter chassis not supported
- Supported in future releases of 1756-EN4TR redundant adapter:
  - CIP Safety™ modules
  - Parallel Redundancy Protocol (PRP)
  - CIP Security™ protocol
- Redundant adapters reside in slots 0 and 1 only
- Rotary switch on the redundant 1756-EN4TR modules must be set to #7 for redundant adapter with Device Level Ring (DLR) or single-port
- The browsing experience will be improved with FactoryTalk® Linx 6.21 and RSLinx® Classic 4.21 software

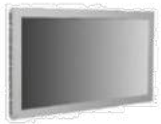
VersaView® 6300 Launch Update

Rockwell Automation

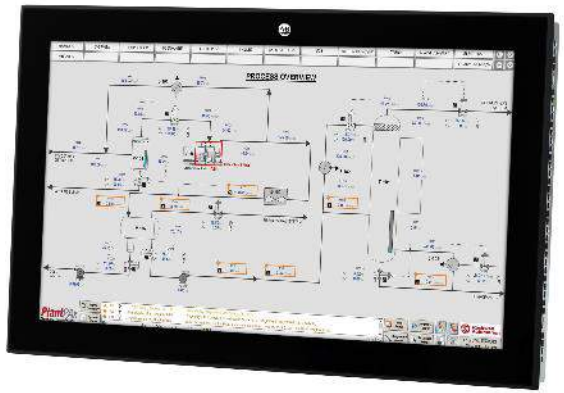
expanding human possibility™

Product release plan

Subject to change

	Phase 1: AFC July 2020 to Nov 2020	Phase 2: AFC Q1 CY 2021	Phase 3: AFC Q4 CY 2021
Monitors	 *VersaView 6300M*	  *VersaView 6300M* *VersaView 6300MA*	 *VersaView 6300M*
Box PCs	 *VersaView 6300B ThinManager Compatible*	 *VersaView 6300B ThinManager Compatible*	 *VersaView 6300B*
Panel PCs	 *VersaView 6300P ThinManager Compatible*	 *VersaView 6300P ThinManager Compatible*	  *VersaView 6300PA* *VersaView 6300P*
Thin Clients	 *VersaView 6300T*	   *VersaView 6300T*	 *VersaView 6300TA*

Phase II



VersaView® 6300M and 6300MA monitors with optional long-distance connectivity

Great match for VersaView 6300B industrial box PCs

- DisplayPort
- Optional long-distance connection to an industrial PC up to 100 meters away with a simple and Cat 5e SF/UTP cable
- On-Machine™ monitors
  - IP65 cast aluminum chassis, powder coated with anti-scratch treatment, combining robustness with ergonomics and aesthetics.
  - Available with 15.6", 18.5" and 21.5" in wide 16:9 aspect ratio 16 million color TFT LED backlight LCDs and aluminum True Flat with 5 wires resistive touch screen or aluminum True Flat with glass projected capacitive multitouch-screen front panels.

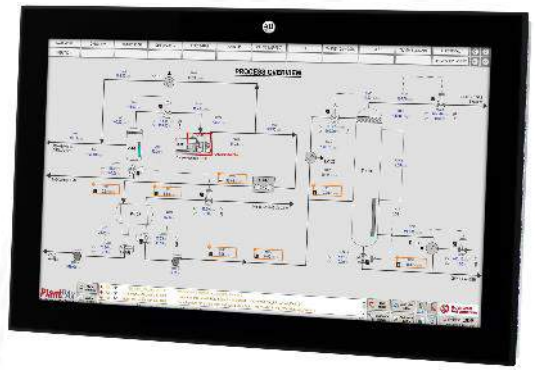
Phase II

VersaView® 6300B Intel Core i Class book mount box PCs

For applications that do not require additional expansion slots or Raid 0,1

- Book mounting fanless IPC based on seventh generation Intel Core i3, i5 and i7 dual core processors
- Windows 10 IoT Enterprise LTSC 2019
- The "all in one" motherboard provides, three Ethernet 10/100/1000Mbps ports that support **"Jumbo Frame"** and **"Wake on Lan"** functionalities, two USB 3.0 ports, one DVI-D video output or, as an alternative, a remote video link connector (RJ45) for the remote connection of video and USB signals up to 100 m
- Front USB 3.0 port, a SATA III CFast slot, a slot for the extractable system battery and signaling LEDs.
- Motherboard is equipped with mSATA connector for a 240 GB to 960 GB SSD, one SATA III connector for a 2.5" SSD, up to 16 GB RAM with one DDR4 SODIMM module and an internal connector for additional serial or USB interfaces.
- Isolated 24V DC power supply input and optionally an integrated UPS with external battery pack

Phase II

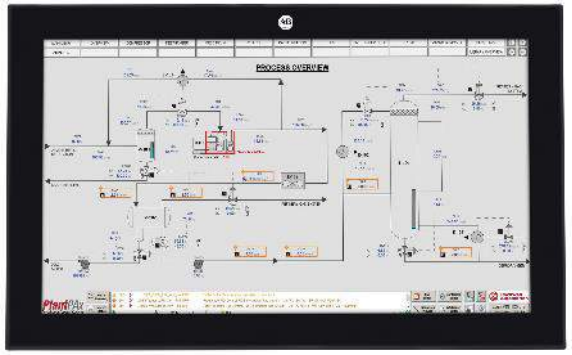


VersaView® 6300P Intel Core i Class industrial panel computers

Enclosure door mount high performance panel PCs for PlantPAx® applications

- 15.6” W to 24” HD touch screen aluminum and glass with IP66 rating
- Raid 0,1 fan cooled PC
- Compatible with Microsoft Windows 10 IoT Enterprise 2019 64-bit, 10 IoT Enterprise 2016 64-bit and Linux
- Available processors include
  - Intel Celeron G3930E, Intel Core i3-7101E, Intel Core i5-7500, Intel Core i7-7700
- Includes M.2 solid-state drive ensuring durable, robust mass storage for industrial applications up 1 TB
- Up to two 2.5” SSD (128 GB to 1 TB each) with 4 GB to 32 GB available RAM
- 24V DC isolated without UPS or 100V to 230V AC
- Available with a variety of PCIe expansion slot options
- Communication ports include variations with RS232/422/485, USB 2.0 and Ethernet 10/100/1000Mpbs, DVI-D
- Up to two remote video links for long-distance monitor connections up to 100 meters
- ThinManager® compatible design

Phase II



VersaView® 6300T Thin Client products in development

- 7” to 21.5” display thin clients
- Box thin clients with multiple display connections for use with up to 4K high-resolution monitors

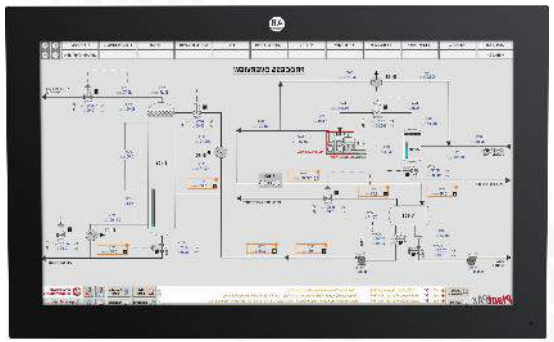
VersaView Accessories in development

- Long-Distance connectivity receivers and transmitters
  - Add on device that works with VersaView monitors and PCs / thin clients

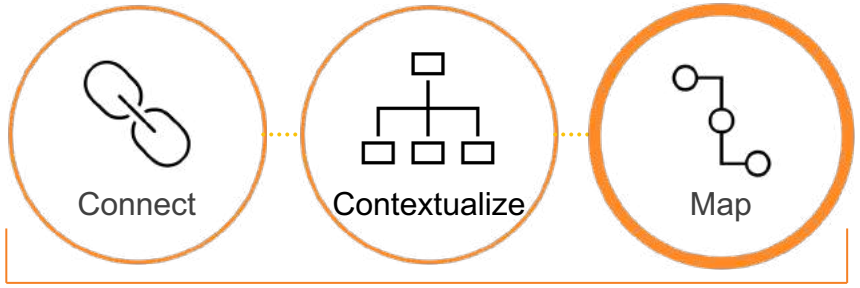
Phase III

Huge expansion of available options for previously released products

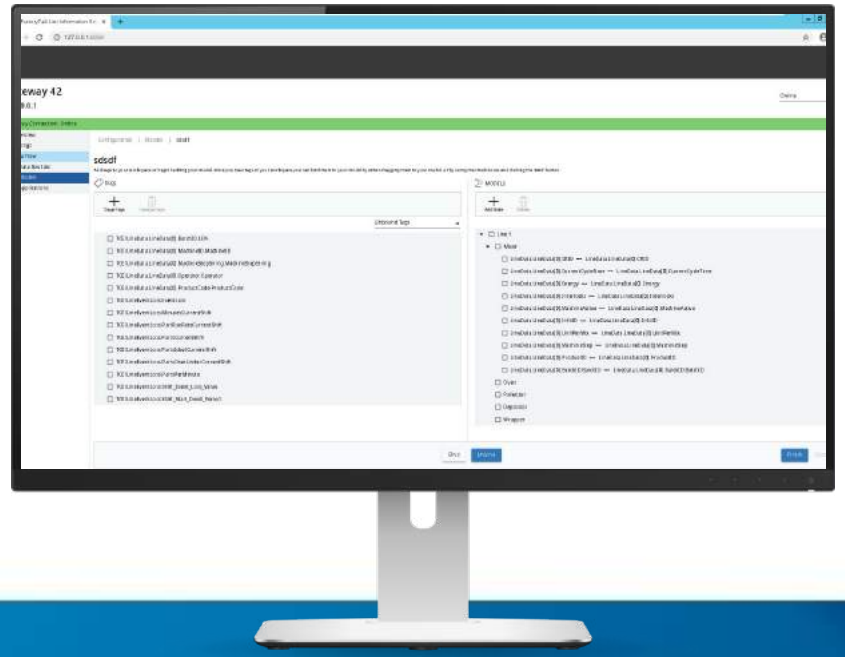
- Light custom products – **Over 100,000+ Combinations**
  - Ability to select from a long list of options and to meet custom requirements
  - Available number of combinations expands exponentially
- Expanded certifications including hazardous locations
- High performance graphics cards
- On-Machine™ PCs and thin clients
- Custom branding



FT Edge Gateway™



EMPOWERS CONTROLS ENGINEERS TO CREATE INFORMATION MODELS WITHOUT TRADITIONAL IT SKILLS



Connect disparate data sources

- FactoryTalk Smart Object Information Models and Data
- Ethernet/IP
- FactoryTalk Live Data
- OPC DA
- KEPServer Enterprise

Apply application context

- Contextualize data sets for big data analysis projects
- Allow OT engineers to organize data in context as it pertains to the OT assets
- Increase engineering efficiency for project deployment
- Simplify maintenance and updates

Enable contextual data delivery

- MSSQL
- Azure IoT Hub/Edge
- ThingWorx (future)
- Store and Forward

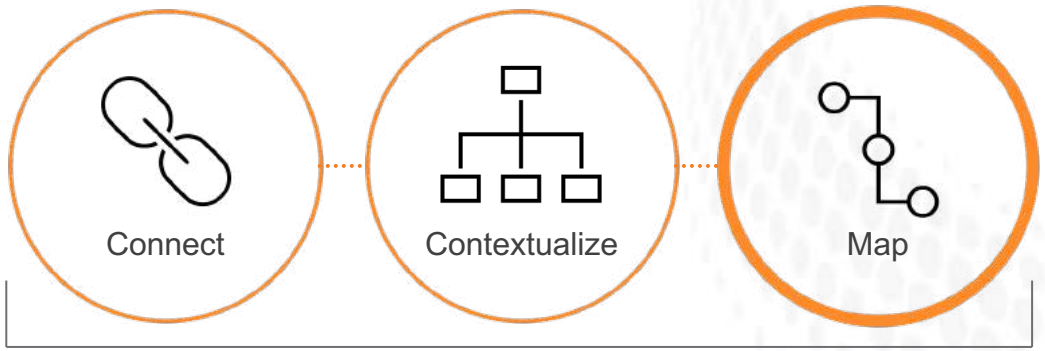
Supports OT / IT collaboration by empowering control engineers to identify the most appropriate data sets and send information directly to the IT layer

FactoryTalk Edge Gateway

Driving industrial connectivity

FT Edge Gateway™

Supports OT / IT collaboration by empowering control engineers to identify the most appropriate data sets and send information directly to the IT layer



EMPOWERS CONTROLS ENGINEERS TO CREATE
INFORMATION MODELS WITHOUT TRADITIONAL IT SKILLS

Connect to data sources (ingress drivers)

EtherNet/IP

- Drive & IMC
- Logix v16+
- FactoryTalk Smart Object Information Models and data

  (Requires Logix v28+)

FactoryTalk Linx

- RSLinx Enterprise

  (PLC-5, SLC-5, MicroLogix, Logix, etc.)
- OPC UA

- FactoryTalk Live Data

kepware

OPC FOUNDATION

- Kepware for 3rd Party Data
- Generic OPC DA

- OPC DA for 3rd party connectivity to Kepware

Example use case: Rockwell Automation contactor line

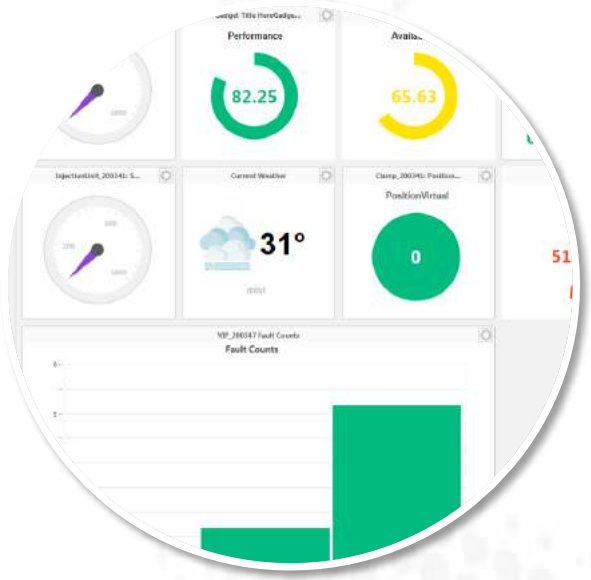
1

- FactoryTalk Smart Object Information Models were used to define parent/child relationship of data
- Trigger-logic collected data on machine state change, creating real-time **transaction management**

2

- Smart Object Information Models were **discovered automatically** and synchronized with Edge Gateway Information Model
- Data was **stored and forwarded** to information applications

3

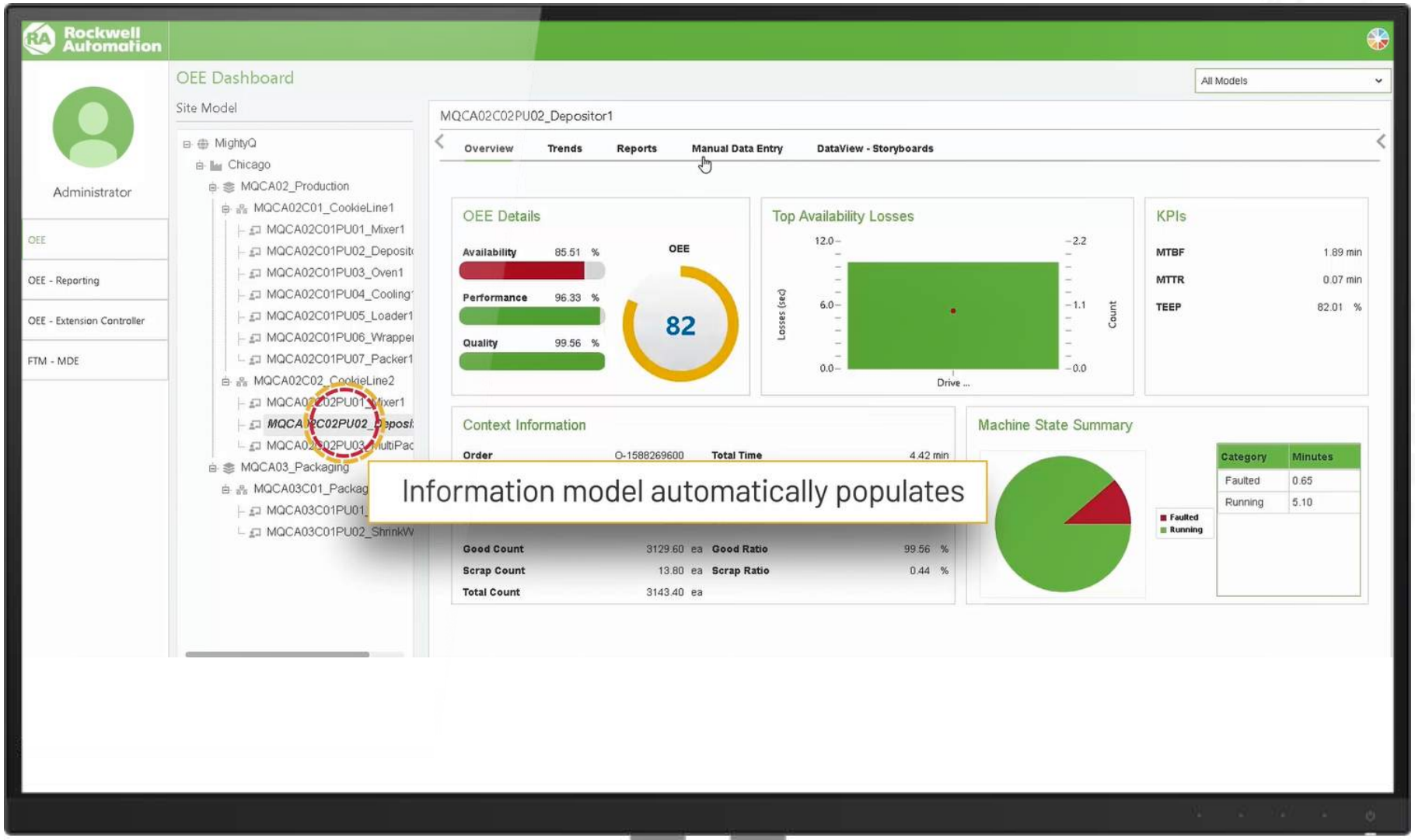


- Smart Object Information Models and streaming data were set up for automatic population of ThingWorx
- Data Visualization was configured using pre-built templates

thingworx®

Destination use case example

The information model automatically populates ThingWorx templates for additional calculations, like enterprise wide OEE



Map data to applications (egress)

Azure IoT Hub

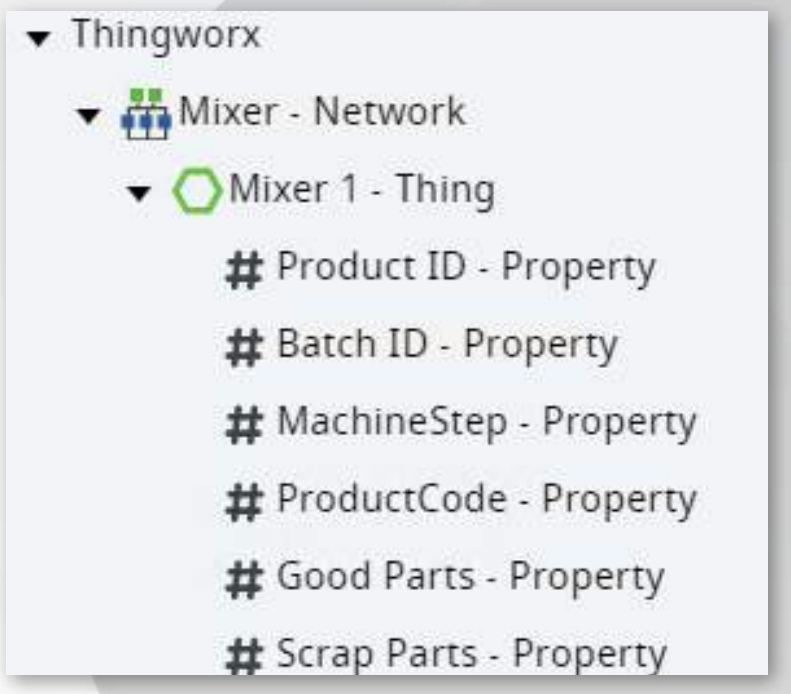
- Supports Azure IoT Hub and Azure IoT Edge
- Streams time-series data along with Information Model context

MSSQL

- Creates SQL table needed to store data
- Streams time-series data into SQL along with Information Model context

thingworx

- Creates objects in ThingWorx to replicate the gateway information model
- Streams data into ThingWorx model
- Available in future release



Infrastructure – FactoryTalk® Edge Gateway™

Reference architecture