



**THE REYNOLDS  
COMPANY**  
ELECTRICAL SUPPLY

# **CIP Safety over Ethernet**

**May 12, 2021**

# Our Guest Panelists

David Aldrich  
Automation Specialist – Components  
The Reynolds Company-Dallas

Mark McGinnis  
Automation Specialist  
The Reynolds Company-Ft. Worth

# 2021 Online Events

Register to receive a calendar invite



## Tech Talks

- **PowerFlex® Integration with Fisher ROC**  
Wed, May 26, 2021 @ 10am
- **Stratix® 5800 / Networks Update**  
Wed, June 9, 2021 @ 10am
- **Rockwell Automation Integrated Service Agreement**  
Wed, June 23, 2021 @ 10am

## User Groups

- **Machine Safety vs Process Safety - SIL vs PLe**  
Wed, May 19, 2021 @ 10am
- **System Redundancy Best Practices**  
Wed, June 16, 2021 @ 10am

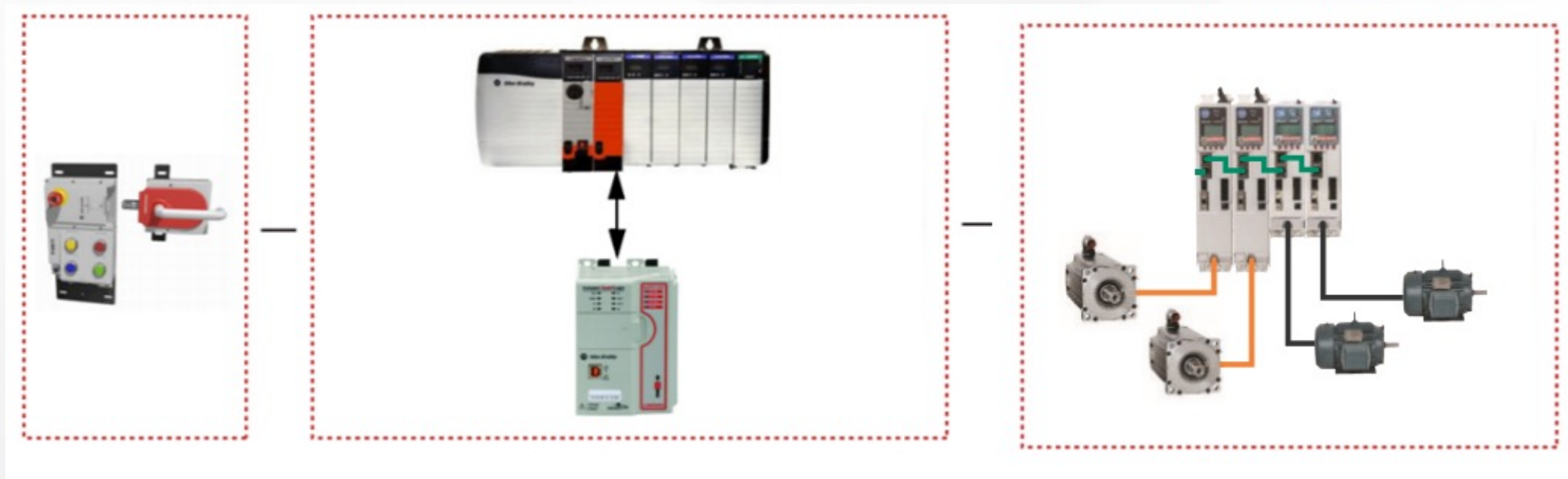
[reynoldsonline.com](https://reynoldsonline.com)

# Agenda – Topics for Discussion

- CIP Safety Protocol – what is it / how is it “Safe” ?
- Products & Technologies supporting examples
- GuardLink™ Overview

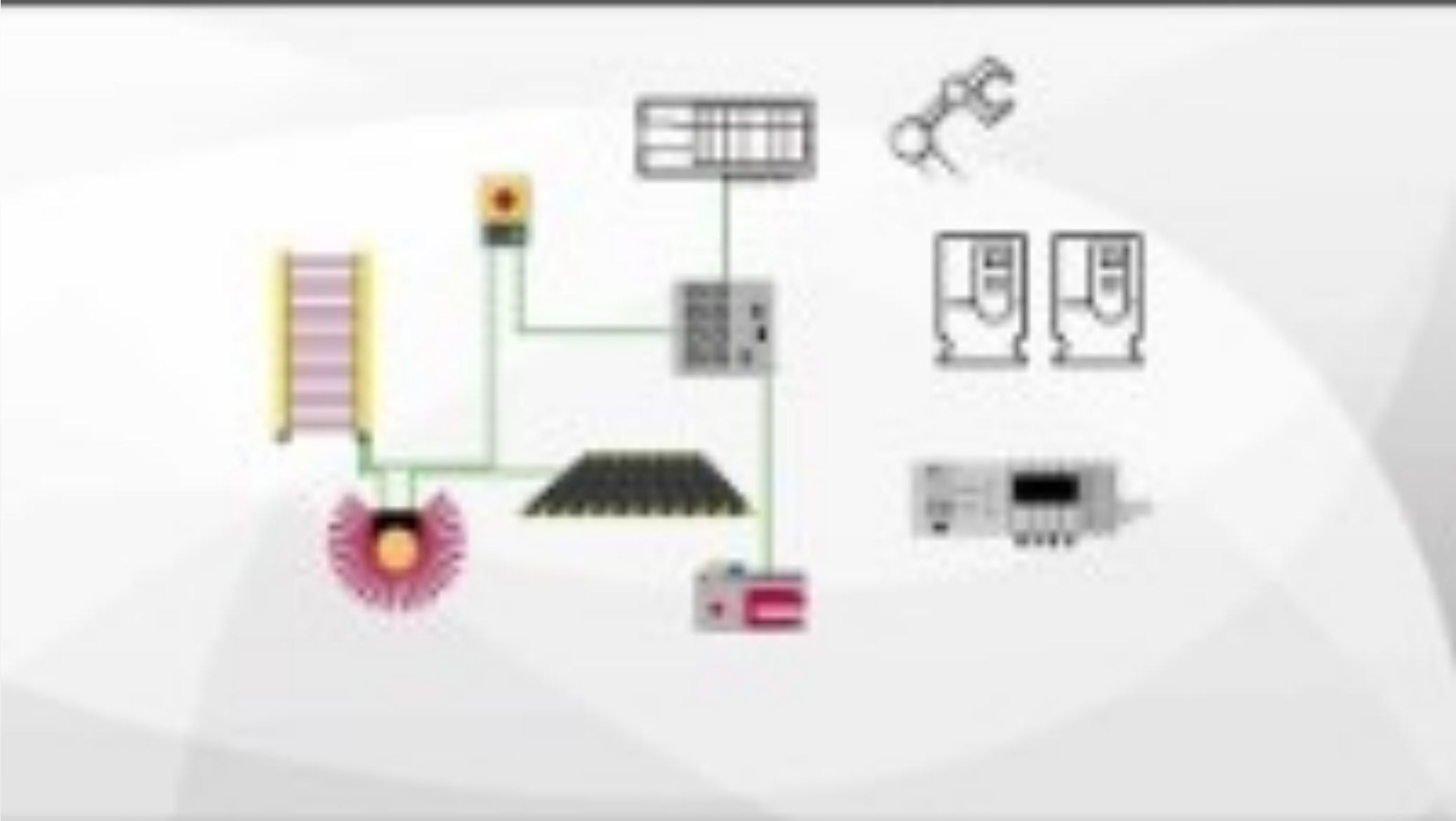
# What is “CIP Safety” & What makes it “Safe” ?

CIP Safety Exists in the standard EtherNet/IP architecture, with additional protocol to assure safety



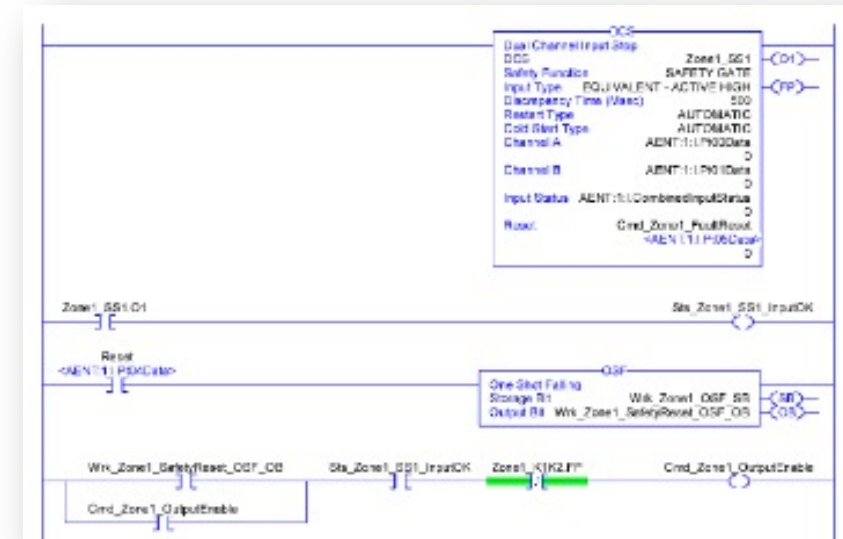
*“Safety” is built into the devices and the communications protocol; not special networks or switches, media, etc. ...*

# Understanding CIP Safety over Ethernet/IP



# Some Advantages of Using Networked Safety

- Reduced system cost with reduction in wiring of safety circuit.
- More & Better Diagnostics & Status – Enables communication of diagnostics and status information to Logix systems.
- Increased flexibility and functionality of system design and safety zoning.
- Maximize productivity and uptime.
- Program with Studio 5000 to configure safety devices.
- Reduced troubleshooting time with enhanced diagnostics.
- Decrease system validation time.





# CIP Safety over Ethernet Safety Input Devices

- 442G Multifunction Access Box (MAB)
- 450L Safety Light Curtains with 450L-ENETR module
- 442L SafeZone 3 Laser Scanner
- 843ES CIP Safety over Ethernet/IP Encoders



Right-hand Multifunctional Access Box  
with EtherNet/IP interface





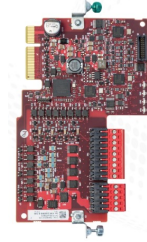
# CIP Safety over Ethernet Safety Logic Devices

- GuardLogix 5570 and 5580
- Compact GuardLogix 5370 and 5380



# CIP Safety over Ethernet Safety Output Devices

- PowerFlex 527 AC Drives
- PowerFlex 755 with Network Safe Torque Off module
- Kinetix 5500 & 5700 Servo Drives
- ArmorStart ST

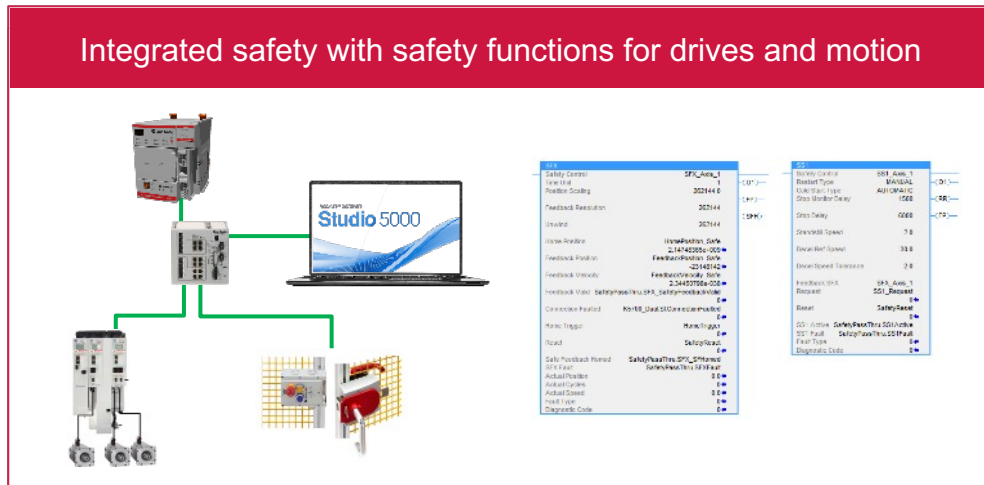


# CIP Safety over Ethernet/IP System Example



Safety functions for drives and motion are becoming increasingly integrated

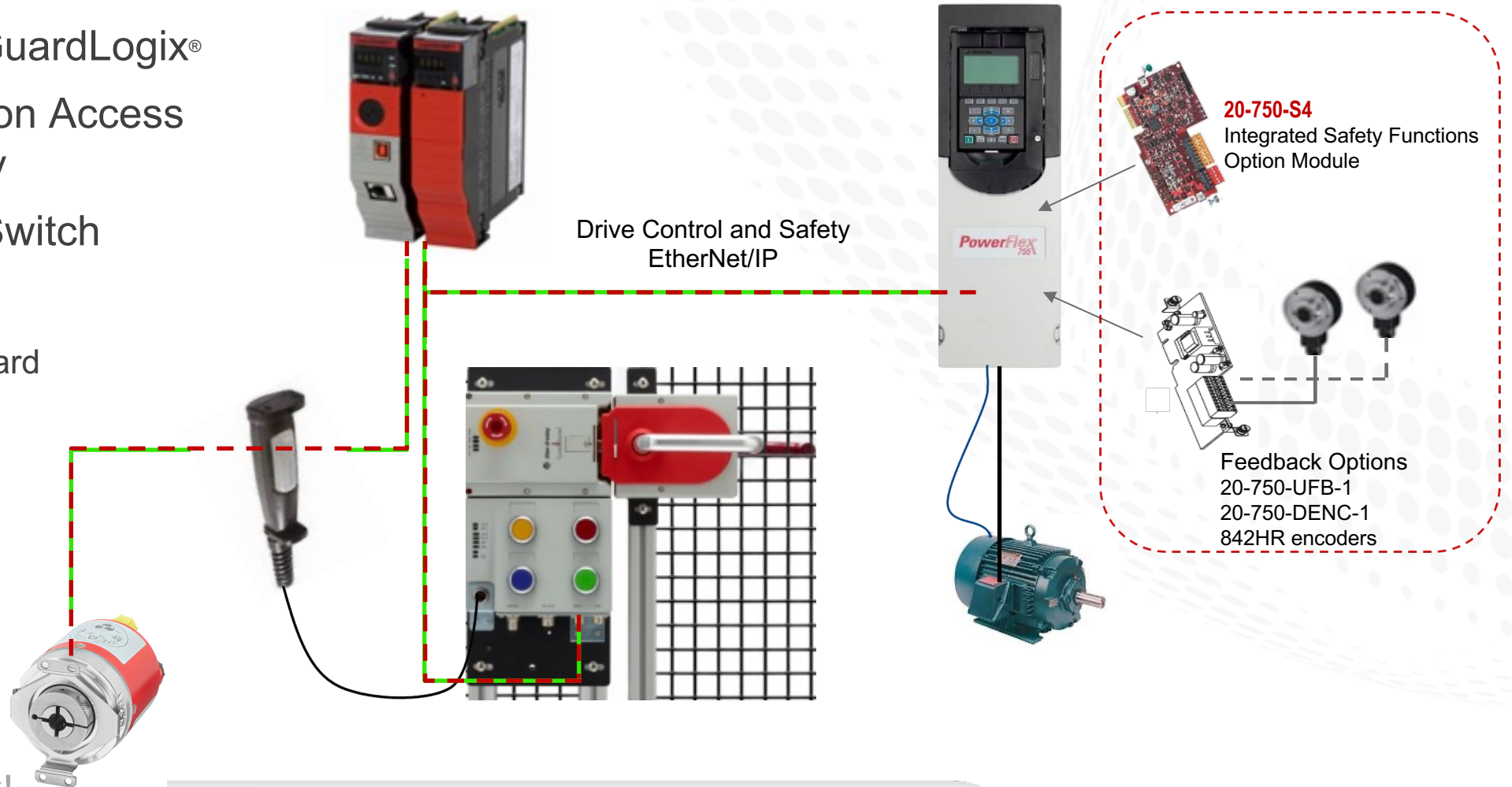
Using drives with controller safety functions can mean that we can omit electromechanical components and their associated wiring, which was required previously. Even safety-relevant signals can be transmitted via CIP Safety, reducing the complexity and expense of wiring.



# CIP Safety over Ethernet/IP System Example

GuardLogix® and PowerFlex® 755

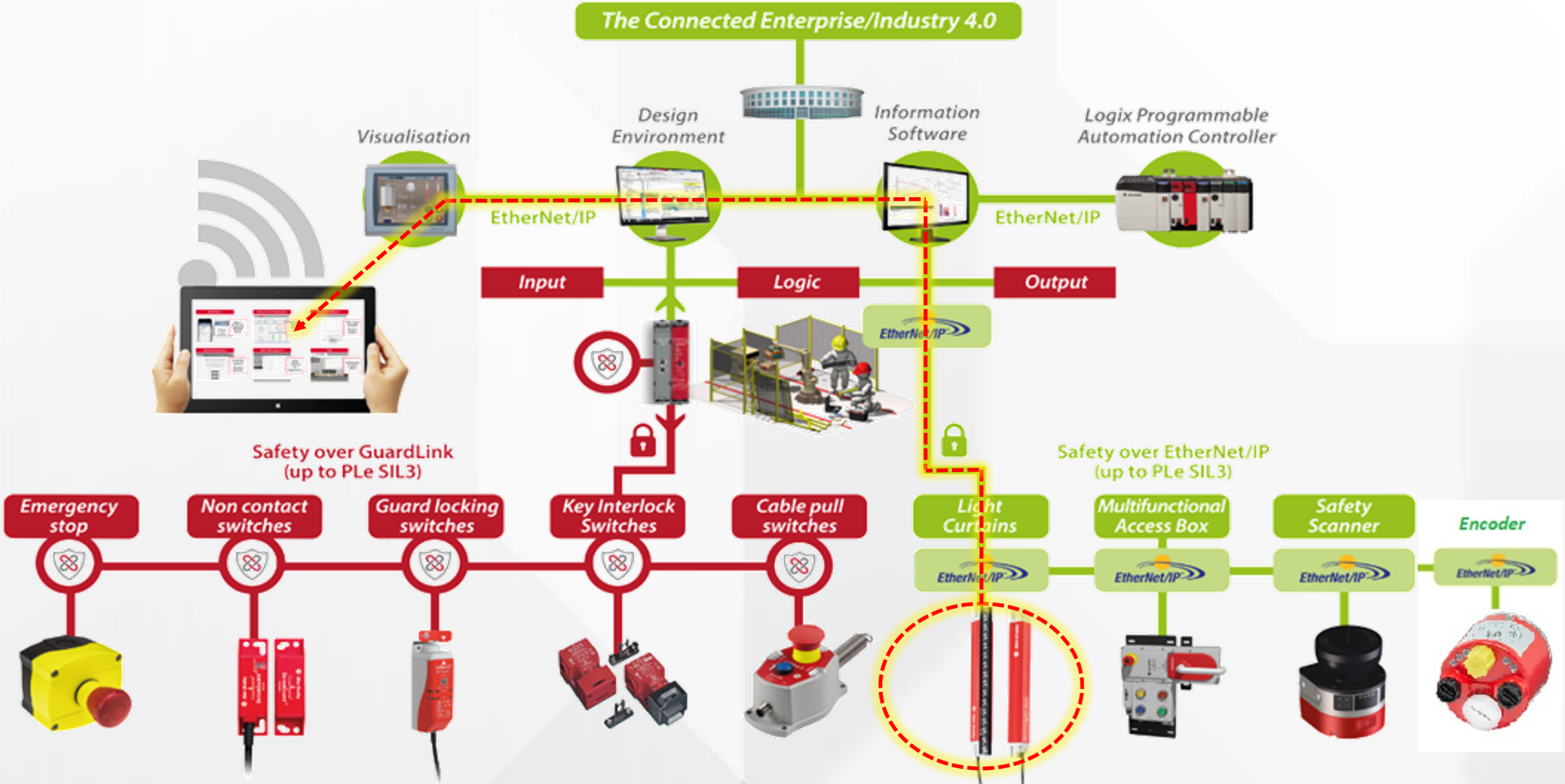
- 5380 Compact GuardLogix®
- 440G Multifunction Access Box – CIP Safety
- 440 J Enabling Switch
- PowerFlex® 755
  - 20-750-S4 Card



843ES  
Instead of wiring it back!

# Smart Safety Devices

Device to Dashboard: Smart Safety Helps Customers Make Smart Decisions





# GuardLink System Overview

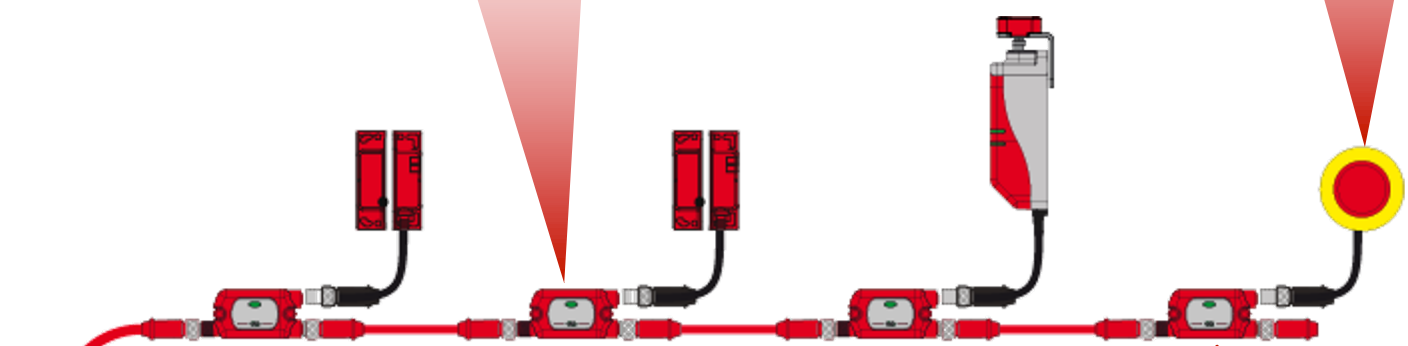
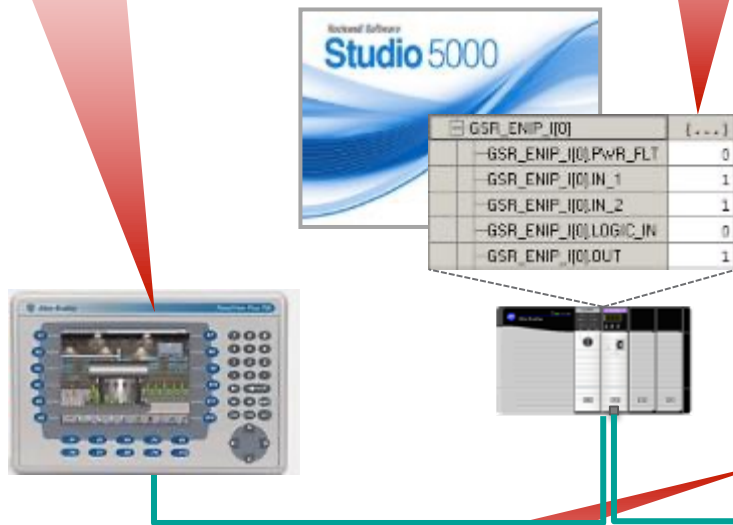
## GuardLink System Overview and Features

Diagnostics + remote reset and lock/unlock command over network

Add-on Profile in Studio 5000 Logix Designer

Up to 1000 m link distance  
max 30 m between devices and 10 m from the tap to the device

Traditional Safety Devices  
(electromechanical contacts solid-state output OSSD)



Up to 32 GuardLink active or passive connection taps

440R-ENETR EtherNet/IP™ interface Ethernet/IP

Guardmaster® Dual GuardLink (DG) safety relay  
Host GuardLink safety relay supporting two links

PLe / SIL 3



Trunk and drop topology  
Trunk: 4 wire connection  
Drop: 5 or 8 wire

# Rockwell Automation Safety Resources

- [Machinery Safebook 5](#)
- [GuardLogix Safety Systems Reference Manual](#)
- [Understanding CIP Safety Video](#)
- [Pre-engineered Safety Function Application documents from RA](#)
- [Rockwell Automation Safety Services](#)
- [Rockwell Automation White Paper – CIP Safety: Safety Networking for Today and Beyond](#)



Further information on CIP Safety can be found at:

<https://www.odva.org/technology-standards/distinct-cip-services/cip-safety/>

[https://www.odva.org/wp-content/uploads/2020/11/PUB00110R4\\_CIP\\_Safety.pdf](https://www.odva.org/wp-content/uploads/2020/11/PUB00110R4_CIP_Safety.pdf)