THE REYNOLDS COMPANY
ELECTRICAL SUPPLY

User Group
Online Seminars

Smart Safety for Machines

March 23, 2022

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THE REYNOLDS COMPANY
ELECTRICAL SUPPLY

Tech Talk

Online Seminars

Monthly online technical seminars for all TRC customers and locations.

User Group

Seminars

Monthly hybrid technical seminars in the local TRC branches.

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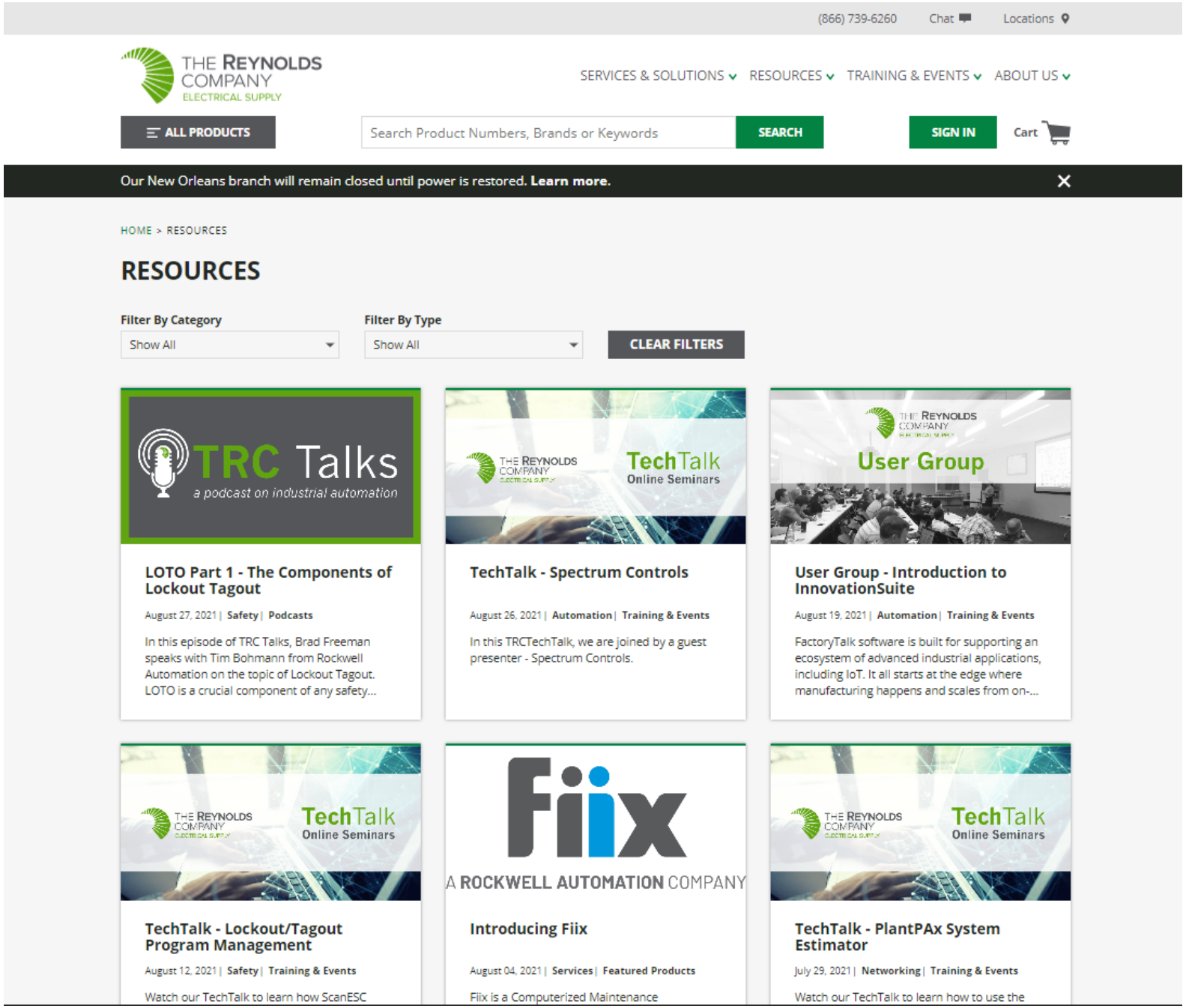

Our Presenters

David Aldrich
Automation Specialist
The Reynolds Company

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Automation Specialist
The Reynolds Company

Wayne Welk
Automation Specialist
The Reynolds Company

Smart Safety – enabling smarter machines and equipment

Harnessing the power of safety and operational data can substantially improve safety compliance and performance. Accessing safety system data and transforming it into meaningful information results in increased machinery productivity, and minimises downtime.

To gain more diagnostic data traditional safety devices required more complex wiring solutions. With a Smart Safety solution, you can now access more diagnostic data and simplify your wiring system.

An integrated Smart Safety solution provides all the data needed to create a comprehensive picture of the status of the machine or production line.

Challenges to safe operations

Worker behaviours

- Operators bypassing poorly designed safety systems
- Systems that don't account for procedural anomalies
- Standard operating procedures not being followed

Evolving workforce

- Safety implications of major workforce shift worldwide
- Older workers nearing retirement at higher risk for musculoskeletal injuries
- Younger, less experienced workers more prone to injury

Machinery downtime

- Downtime for jams, misfeeds, adjustments, changeovers and maintenance
- Minimal visibility of downtime information
- No context of downtime issues (workers interaction, machinery fault, shift patterns)
- Limited information to remedy issues

Regulatory compliance

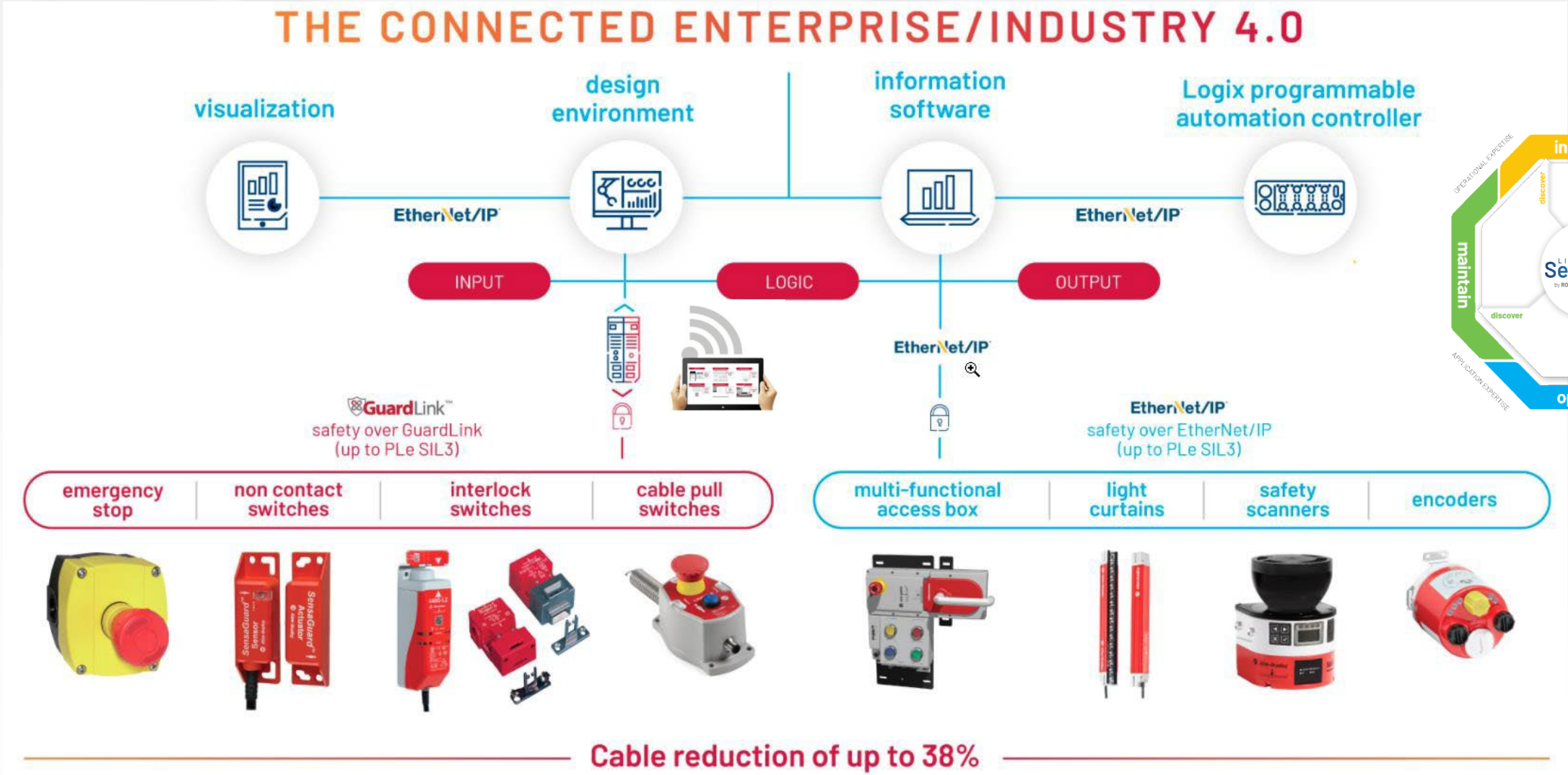
- Compliance with industry standards can be challenging
- Documenting and reporting on approved safety systems can be challenging

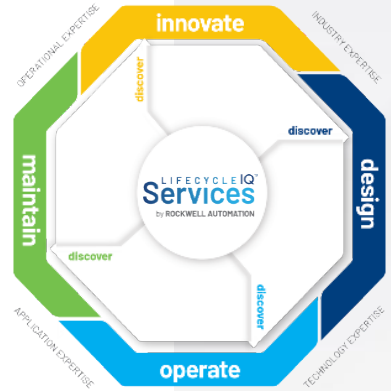
Data management

- Continuing reliance on outdated data collection and reporting methods
- Safety data often manually entered for inspections, compliance logs, incident reports, training and other processes
- Systems in which data is stored typically not connected to plant floor systems

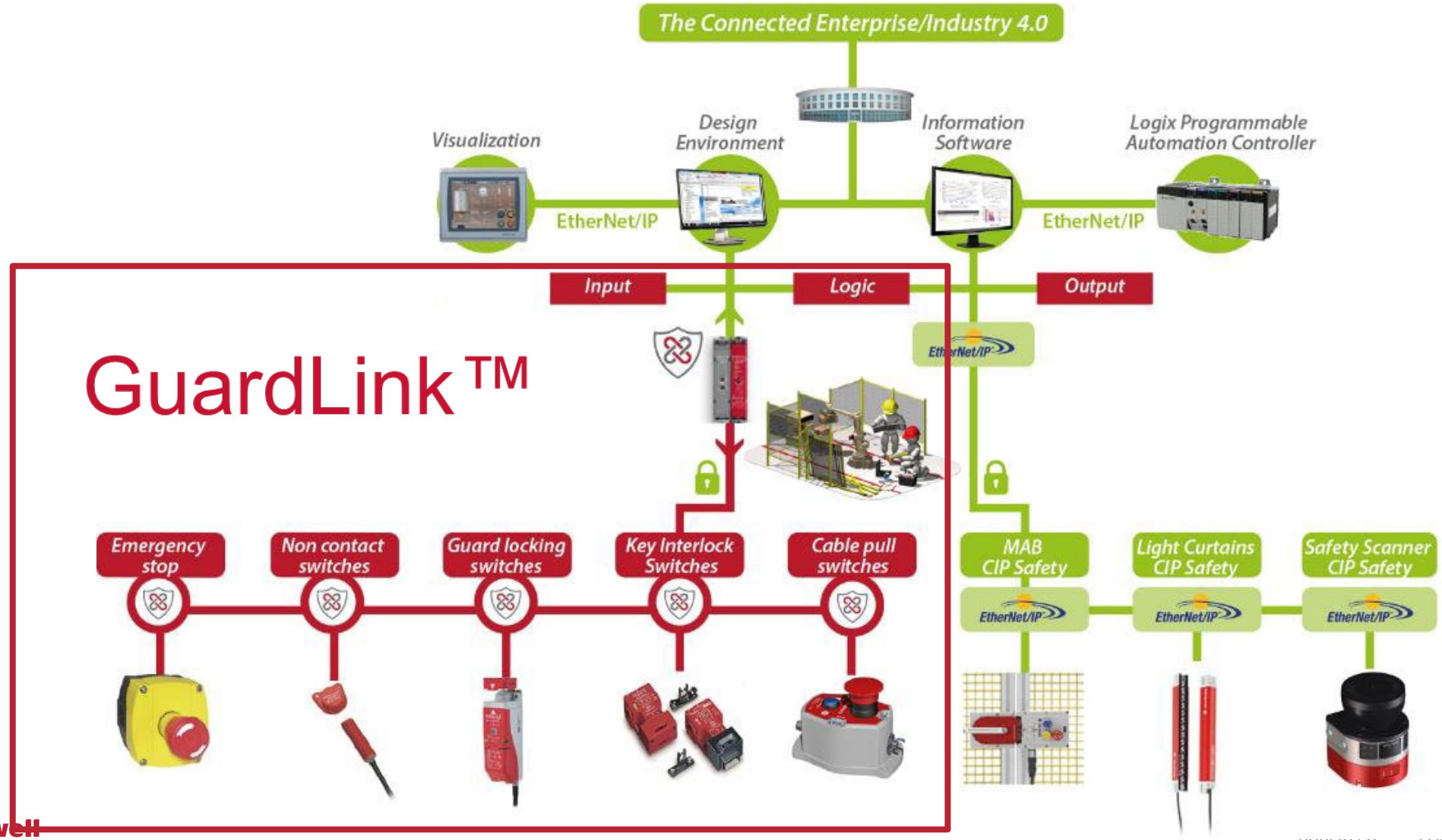
Smart Safety - Enabling the Connected Enterprise

Device to Dashboard: Smart Safety Helps Customers Make Smart Decisions





Smart Safety Devices



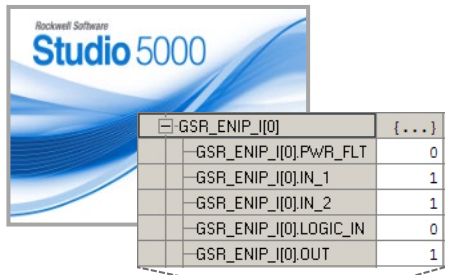
GuardLink™
Architecture

Supports diagnostics, remote reset and lock/unlock command over network

Add-on Profile in Studio 5000 Logix Designer® to seamlessly integrate with Logix5000™ controller platform

Up to 1000 m link distance, max 100 m between devices and 10 m from the tap to the device

Generic safety devices– electromechanical contacts (EMSS) and with solid state output (OSSD)



GSR_ENIP_I[0]	{...}
GSR_ENIP_I[0].PWR_FLT	0
GSR_ENIP_I[0].IN_1	1
GSR_ENIP_I[0].IN_2	1
GSR_ENIP_I[0].LOGIC_IN	0
GSR_ENIP_I[0].OUT	1

GuardLink

PLe / SIL3

Functional Safety Type Approved

TÜVRheinland® FS

Up to 32 GuardLink enabled connection taps (SMART taps)

440R-ENETR EtherNet/IP™ interface to share diagnostics over network

Guardmaster® Dual GuardLink (DG) safety relay – GuardLink-enabled safety relay supporting two links

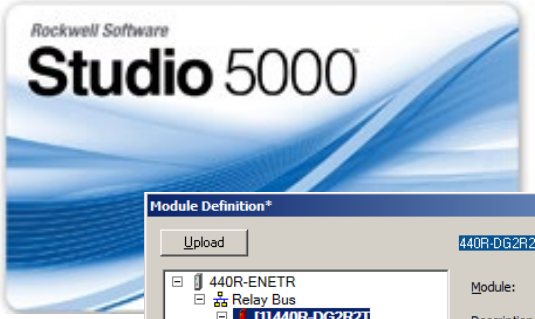
Trunk and drop topology with standard four (trunk) or five/ eight (drop)-wire conductor patch cords

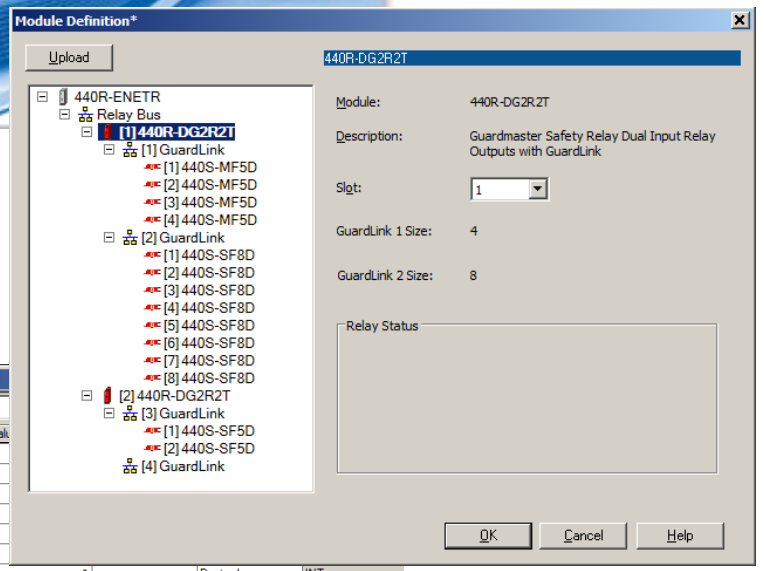
Rockwell Automation

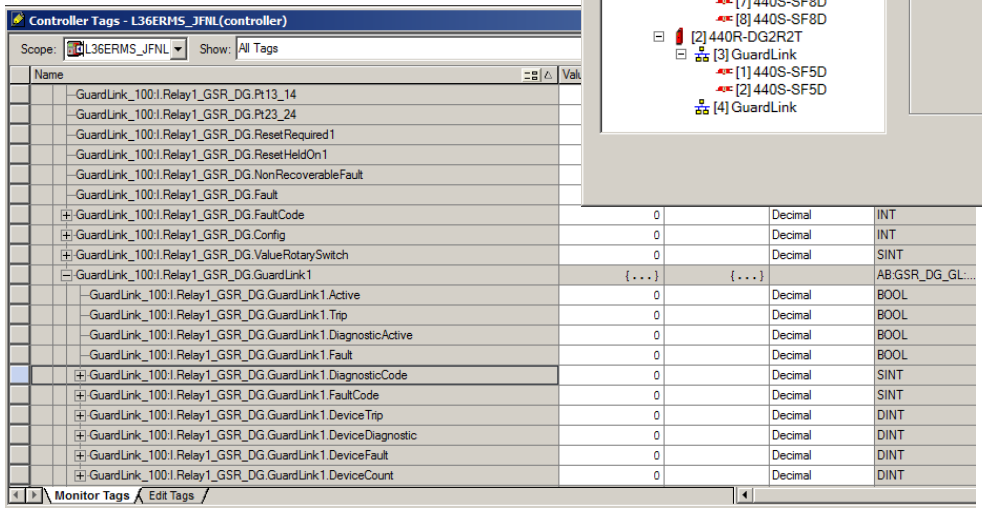
GuardLink™ Integration

AOP

- Easy integration within Studio5000® v20 and newer
- Single software required for product configuration
- Tags are automatically populated in the controller
- Tags when using the AOP, allowing for easy integration into Logix 5000® program







The Broadest Portfolio of Safety Products in the Industry

GuardLogix

Compact GuardLogix

Gate Switches

E-Stops & Signaling

Safety/Lifecycle Services

Safety Encoder

CR30 (Configurable Safety Relay)

Safety Relays

Trapped Key

On-Machine Standard and Safety I/O

Safety Drives

284/281 ES PF525 PF527 PF755

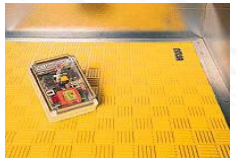
Kinetix 5700 Servo Drive

Safety Contactors

Laser Scanner

Light Curtains

Safety Mats



Integrated Safety Portfolio

Safety Input Devices

Presence sensing safety devices

- Detection of a person or moving object
- Passive safety interlocking option - no physical action required between the devices and the operator/object
- Devices include:
  - Safety light curtains
  - Safety laser scanners
  - Hand Detection Vision Sensor
  - Pressure sensitive mats
  - Pressure sensitive edging

Safety interlock switches

- Physical Interlocking of guard doors or systems
- Opening the guard door activated the interlocks
- Non-contact or physical interlocking versions are available
- Versions to lock guard door closed available
- Key exchange systems
- Devices include:
  - Tongue operated interlocks
  - Hinge operated interlocks
  - Guard locking interlocks
  - Access control box
  - Non-contact interlocks
  - Safety Limit Switches
  - Trapped key systems

Emergency stop & trip devices

- Devices used in the event of an emergency to stop a hazard
- Versions with push-button or rope (cable) pull actuation
- Devices include:
  - Emergency stop buttons
  - Cable pull safety switches

Operator interface

- Devices used to safety interact with applications
- Physical actuation of capacitive actuation
- Devices include:
  - Enabling grip switches
  - Two hand controls

Safety Logic Controllers

Monitoring safety relays

- Dual channel monitoring of the safety systems
- Comprehensive range for your application
- Single function, modular of configurable versions

- Devices include:
  - MSR100 - Single function safety relays
  - Guardmaster Safety Relays

Configurable Safety Relay

- Configurable safety controller
- Ple SIL3 to ISO 13849-1 and IEC 62061
- Can be configured through Studio 5000 or CCW
- Ethernet Plugin for diagnostics
- Modbus built in

- Devices include:
  - 440C-CR30 configurable Safety Relay

Integrated safety controllers

- GuardLogix integrated safety controller for ControlLogix & CompactLogix
- Standard and safety control in one platform
- CIP safety over EtherNet/IP or DeviceNet
- Communicates and controls safety I/O

- Devices include:
  - GuardLogix 5570
  - GuardLogix 5580
  - Compact GuardLogix 5370
  - Compact GuardLogix 5380

Safety I/O devices

- Safety rated I/Os
- EtherNet/IP or DeviceNet connectivity
- Use with programmable and integrated safety controllers

- Devices include:
  - ArmorBlock GuardI/O
  - ArmorBlock 1732ES
  - POINT Guard I/O
  - Flex 5000 I/O
  - 5069 I/O
  - 1756 I/O

Safety Output Devices

Safety contactors

- Mechanically linked, positively guided contacts
- Feedback circuit for safety integrity
- Range of power ratings

- Devices include:
  - 100S Safety Contactors
  - 700S Safety Contactors
  - 109S Safety Contactors
  - 700 HPS Safety Relay

PowerFlex AC drives

- PowerFlex AC drives with optional integrated safety functions
- Advanced safety functions in PowerFlex 750 series AC drives
- May replace the need for safety contactors
- Remove torque without powering down machine
- Restart machines faster

- Devices include:
  - Powerflex 4 series
  - Powerflex 5 series
  - Powerflex 7 series

Kinetix integrated motion

- Kinetix 6000 with optional integrated safety functions
- Safe Torque Off and advanced safety
- Remove torque without powering down machine
- Restart machines faster

- Devices include:
  - Kinetix 6000
  - Kinetix 7000
  - Kinetix 6500
  - Kinetix 6200
  - Kinetix 5500
  - Kinetix 350
  - Kinetix 300

Connection Systems/Networks

‘Quick connect’ connection systems

- Quick connect / disconnection systems
- Reduces installation time and simplifies troubleshooting

- Devices include:
  - Cordsets and patchchords
  - T-ports
  - Distribution boxes
  - Passive Discrete I/O Block

CIP Safety over EtherNet/IP

- Open device level network
- Standard and safety communication across EtherNet/IP media
- Uses the proven Common Industrial Protocol (CIP)

- Devices include:
  - Physical media
  - Sensors, controllers and actuators
  - Software

Rockwell Automation

Safety Logic Controllers

Integrated Safety

No. 1 global supplier of Machine Safety Source: ARC Advisory Group

Scalable Logic Options for Connected Safety Applications

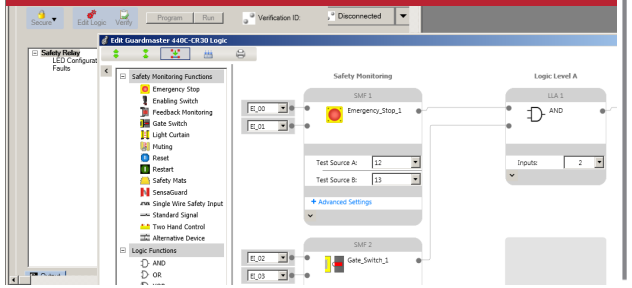
Guardmaster EtherNet/IP Network Interface

- Guardmaster EtherNet/IP connectivity
- Dual port design supports DLR
- Optical link = no physical connectors
- Real-time terminal-level diagnostics
- Connect up to 6 Guardmaster relays
- Full Add-on Profile in Logix Designer

Guardmaster 440C-CR30 Configurable Safety Relay

- Configuration via Logix Designer™ or Connected Components Workbench™
- Pre-defined drag-and-drop safety FBs
- 22 embedded Safety I/O
- Optional Ethernet plug-in module
- Supports Single Wire Safety for easy interlocking of CR30s

AOP v2.01 contains fully functional Logix Designer Logic editor



Compact GuardLogix® 5380 GuardLogix® 5580 Controller

- 1 controller for standard & safety control
- 1 network for standard & safety control
- Use both standard & safety I/O
- Integrated Motion on EtherNet/IP
- SIL 3, PLe CAT 4 Safety applications
- Support 5069 local / remote safety IO

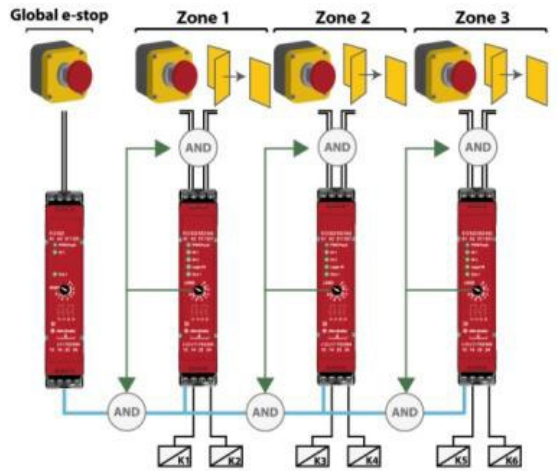
Safety Monitoring Relays – GSR Family

440R Guardmaster Safety Relays (GSR Family)

- A broad range of safety functions
- Simple logic, reset, and timing configurations
- Single-wire safety relay connection
- Universal inputs
- Compact 22.5 mm housings
- Optional EtherNet/IP network interface

Guardmaster Safety Relays

- Universal Inputs
  - Supports numerous sensor types such as E-Stops, interlock switches, light curtains and mats
  - Automatic enabling of cross-loop monitoring
- Logic
  - Simple AND/OR logic between stand-alone units via single wire cascading
  - logic combination of input devices on dual input modules
- Configuration
  - Automatic/manual and manual monitored Reset
  - Logic for inputs and SWC
  - Timing functions and ranges on Timer modules
- Single Wire Safety Connection
  - Cascading of safety functions in multi zone applications
  - Logic combination of stand alone units
- Monitoring for zero speed, or safe limited Speed
  - GSR-GLP utilising proximity switches
- Safe Timer for Guard locking applications
  - GSR-GLT provides safe time functions when zero speed is achieved in a constant time period



Safety Monitoring Relays – MSR Family

440R Single and Specialty Function Safety Relays (MSR Family)

- Single function and specialty relays
- Broad range of input types
- Multiple output configurations
- Electromechanical or solid-state
- Compact housings
- Fixed or removable terminals
- Safe speed control (MSR57)

440C-CR30: Configurable Safety Relay

- The key features of the **Guardmaster 440C-CR30 safety** relay are:
  - Certified to PLe, SIL3, EN ISO 13849-1, IEC62061
  - 22 embedded safety I/O points
  - 2 Single-Wire Safety (SWS) inputs and 2 SWS outputs allows integration with Guardmaster Safety Relays to expand safety functionality
  - Supports standard control I/O plug in modules (2080-IQ4OB4) which allows a user to expand their I/O count for non-safety rated signals - resets, feedback circuits, muting sensors
  - Embedded RS232 port supports Modbus communications to PanelView™ 800 HMIs or Micro800™ controllers
  - Plug in Ethernet I/P module allows configuration via connected component workbench or Studio 5000

Compact GuardLogix® 5380 Controller

High Performance CPU

- Optimized for faster safety reaction time

Scalable Safety Level

- SIL CL2, Up to PLd – 1oo1
- SIL CL3, Up to PLe – 1oo2

1-Gb Embedded Ethernet/IP Port

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

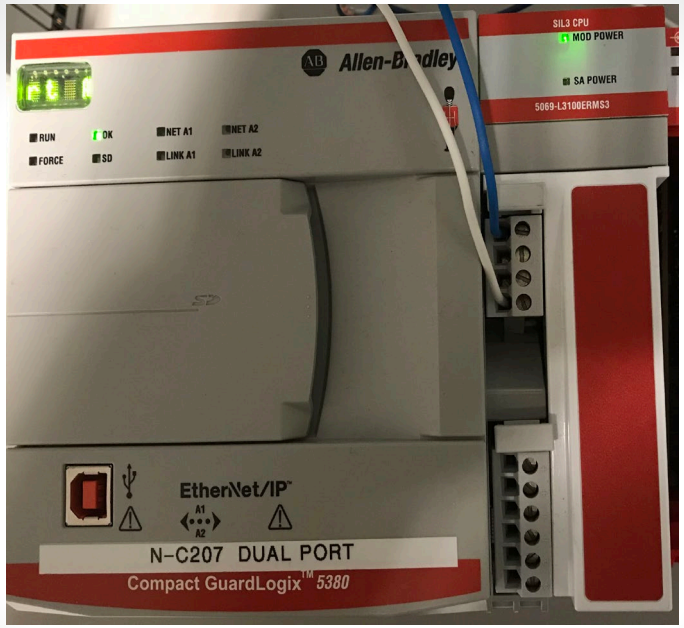
IEC 61800-5-2 Safety Instructions

- New Drive Safety Instructions with Kinetix® 5700 ERS4 drive
  - Safe feedback scaling, Safe Stop 1, Safe Stop 2, Safe Operation Stop
  - Safe Limited Speed, Safe Limited Position
  - Safe Brake Control with external brake, Safe Direction

Increased Scalability

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

Compact GuardLogix® 5380 | SIL 3



High-performance CPU

- Optimized for faster safety reaction time

Scalable safety level

- SIL CL3, Up to PLe

Dual 1-Gb embedded EtherNet/IP™ ports

- Configurable dual IP or DLR
- Integrated safety on EtherNet/IP™

Compact 5000™ local safety I/O - increased scalability

- 5069-L306ERMS3: 600 KB Std / 300 KB Sfy; 2 axes; 16 nodes
- 5069-L310ERMS3: 1 MB Std / 0.5 MB Sfy; 4 axes; 24 nodes
- 5069-L320ERMS3: 2 MB Std / 1 MB Sfy; 8 axes; 40 nodes
- 5069-L330ERMS3: 3 MB Std / 1.5 MB Sfy; 16 axes; 60 nodes
- 5069-L340ERMS3: 4 MB Std / 2 MB Sfy; 20 axes; 90 nodes
- 5069-L350ERMS3: 5 MB Std / 2.5 MB Sfy; 24 axes; 120 nodes
- 5069-L380ERMS3: 8 MB Std / 4 MB Sfy; 28 axes; 150 nodes
- 5069-L3100ERMS3: 10 MB Std / 5 MB Sfy; 32 axes; 180 nodes

GuardLogix® 5580 controller

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 Stop 1, Safe Stop 2, Safe Operation Stop
  - Safe Limited Speed, Safe Limited Position
  - Safe brake control with external brake, safe direction

Increased Scalability

- 1756-L81ES: 3.0 MB Std /1.5 MB Sfy; 100 Nodes
- 1756-L82ES: 5.0 MB Std / 2.5 MB Sfy; 175 Nodes
- 1756-L83ES: 10 MB Std / 5.0 MB Sfy; 250 Nodes
- 1756-L84ES: 20 MB Std / 6.0 MB Sfy 250 Nodes

GuardLogix® Integrated Architecture

Single Controller for Standard and Safety Control

- No Extra Time For Data Integration
- Better diagnostics, Easy data sharing up to HMI

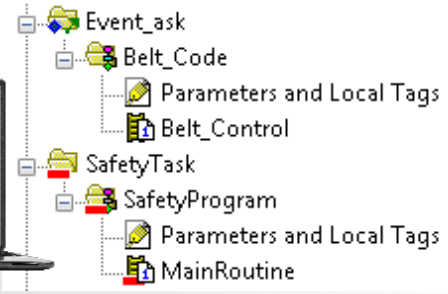
Name	Usage
CIP_Safety_Acting	Public
Reset	Local

Parameter Connections {2:0}

Connection	\UN01_ExampleMachine.CIP_Safe_Off_Demand
Connection	\UN01_ExampleMachine.CIP_Safety_Demand

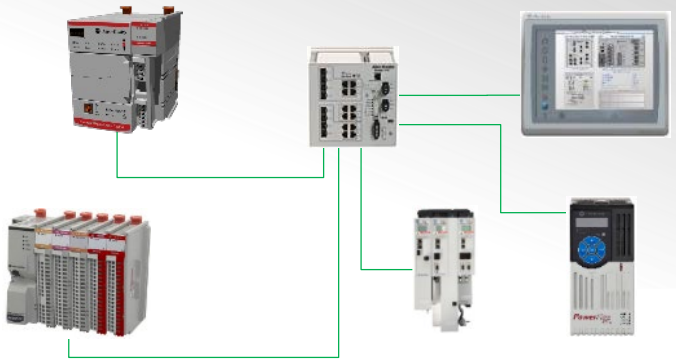
Single Software for Standard and Safety Control

- Same look and feel; speeds up application building
- Design Flexibility saves time



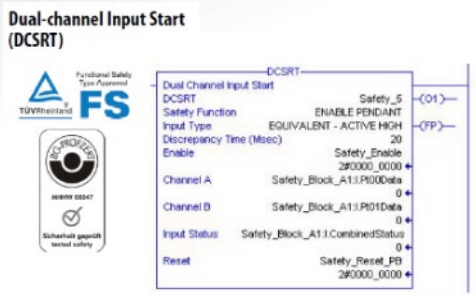
Single Controller for Standard and Safety Control

- No special network or gateways for I/O
- Ability to mix and match with standard I/O



Capable and flexible

- Certified Safety instructions (More than 100)
- Also facilitates to create your own (Add-On Instructions)



Safety I/O

1723ES ArmorBlock Guard I/O

- Module IO mix, 2 separate catalogs:
  - 12 single channel input (6 dual)+ 2 dual channel bipolar output
  - 12 single channel input (6 dual)+ 2 dual channel sourcing output
- Feature Overview
  - Ethernet/IP, supporting unicast and multicast
  - Dual port: embedded switch for DLR & liner topologies
  - Rotary switches to set last octet of IP address
  - Standardized M12 input and output connectors (same as 1732DS)
  - Separate input and output Power via mini connector, with pass through
  - IP67 rated package for use on machine
  - CE, C-Tick, KCC markings
  - TUV certified up to Category 4, SIL 3, Ple
  - Configure with Studio 5000

1734 POINT Guard I/O

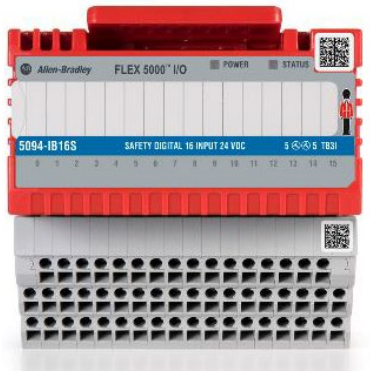
- Integrated safety and standard control in 1734 POINT I/O
- High density and granularity to optimize design
  - POINT standard (grey) I/O available in 2,4, and 8-point module densities
  - POINT Guard I/O (red) safety modules available
    - 1734-IB8S - 8 Point Safety Sink Input
    - 1734-OB8S - 8 Point Safety Source Output
    - 1734-IE4S – 4 Point Safety Analog Module
- For use with GuardLogix® and SmartGuard™600
- Certified to SIL 3 IEC61508, PL e ISO 13849-1
- Electronic over current protection of all outputs
- Studio 5000 used to configure both standard and safety functions over EtherNet/IP
- Compact design: combining safety + standard POINT I/O saves panel space

FLEX 5000™ I/O

Discrete safety I/O

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

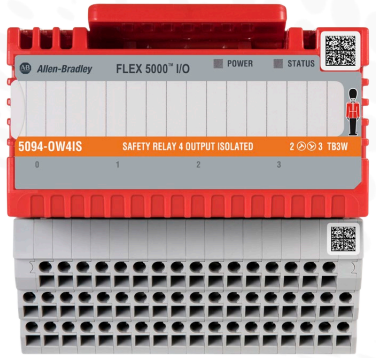


Safety digital 16 output

- SIL 3, PLe, Cat. 4 single channel
- 4.5 ms safety reaction time
- Output rating: 0.5 A
- 1.5 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 A – 2 Channels
- 100K cycles @ 2 A resistive load
- Safety mode



See FLEX 5000™ I/O modules technical data (5094-TD001) for more details.

**Conditions apply*

FLEX 5000™ safety HART I/O modules

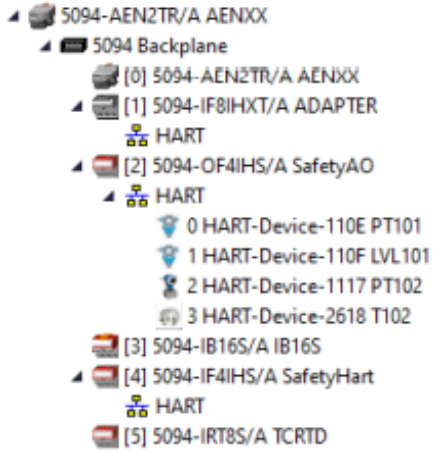
Analog 4-channel isolated current/voltage/HART safety modules

Features and benefits

- 4-channel to channel isolated input and output modules
- Up to SIL 3, PLe, Cat. 4 single channel
- Up to 10 ms safety reaction time
- 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

Catalog 5094-IF4IHS
Catalog 5094-IF4IHSXT

Catalog 5094-OF4IHS
Catalog 5094-OF4IHSXT



FLEX 5000™ safety specialty I/O modules

Safety modules for temperature and frequency measurement

Safety thermocouple/RTD input modules

Features and benefits

- 8-channel RTD/thermocouple safety input Modules
- Four isolated groups of two channels per group.
- 2-wire, 3-wire and 4 wire RTD mode
- Thermocouple with built-in per channel CJC
- Up to SIL 3, PLe, Cat. 4 single channel
- Up to 10 ms safety reaction time

Catalog 5094-IRT8S

Safety frequency input modules

Features and benefits

- 2-channel Isolated frequency input Modules
- Supports AC and DC signal frequency measurements
- Supports frequency, acceleration, and direction
- Supports up to 50KHz input measurement.
- Up to SIL 3, PLe, Cat. 4 single channel
- Up to 10 ms safety reaction time

Catalog 5094-IJ2IS

Compact 5000™ I/O discrete safety input

5069-IB8S

- Safety digital input module
- Single channel: PLd
  - Single channel allows use of the module for up to safety category 3, in applications rated up to and including performance level d/SIL 3 with safety pulse test enabled
- Dual channel: PLe
  - Dual channel allows use of the module for up to safety category 4, in application rated up to and including performance level e/SIL 3 with safety pulse test enabled
- Diagnostic capability:
  - Short circuit, muting lamp error, over & critical temperature, field power off, internal fault, overload detection with test output.

Local and distributed I/O for Compact GuardLogix®
Distributed I/O for GuardLogix® 5580 controller

Compact 5000™ I/O discrete safety output

5069-OBV8S

- Configurable safety output module (sourcing/bipolar) sourcing mode:
  - Single channel: up to Cat 4, up to and including PLe with pulse test enabled, IEC 60947 for contactors/actuators
  - Dual channel: up to Cat 4, up to and including PLe with wiring according to EN 13849 and safety pulse test enabled Fault of one channel does not shut down the whole module
- Bipolar mode: PLe
- Diagnostic capability:
  - Short circuit, no load(open wire), overload, over & critical temperature, field power off, dual channel fault(only sourcing mode)

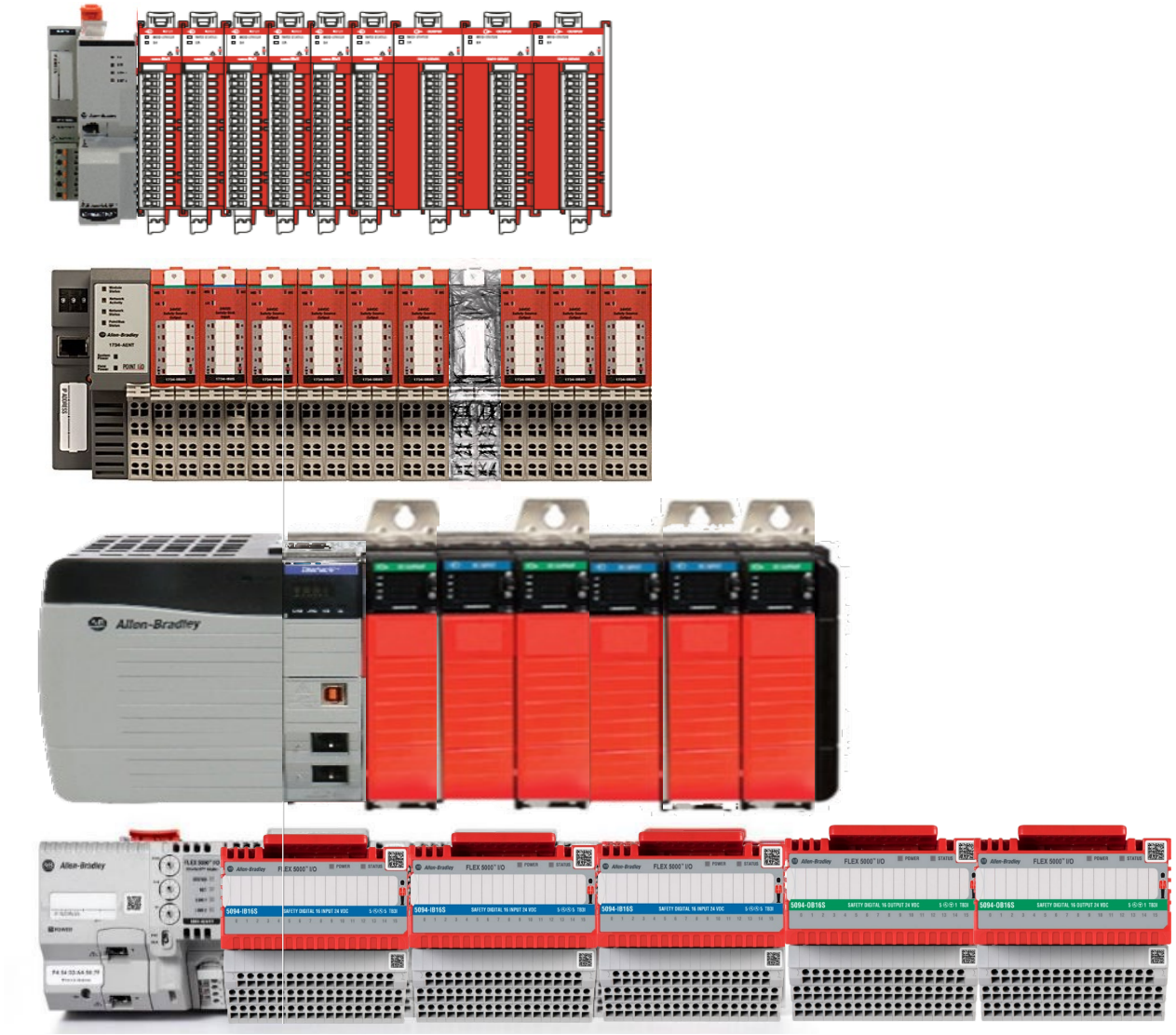
Local and distributed I/O for Compact GuardLogix® 5380 controller

Distributed I/O for GuardLogix® 5580 controller

New 1756 Catalog Numbers

New Catalog Numbers	Description
1756-IB16S	16 channel safety input module
1756-OBV8S	8 channel safety output module
1756-TBSHS	Terminal Block, ControlLogix® controller, 20 Pin, Spring-Clamp, with Low Profile Housing, Red
1756-TBS6HS	Terminal Block, ControlLogix® controller, 36 Pin, Spring-Clamp, with Low Profile Housing, Red
1756-TBNHS	Terminal Block, ControlLogix® controller, 20 Pin, screw, with Low Profile Housing, Red
1756-TBCHS	Terminal Block, ControlLogix® controller, 36 Pin, screw, with Low Profile Housing, Red
1756-TBES	Terminal Block Housing, ControlLogix® controller, Extended Depth, Red

Comparable I/O densities



- Relative size compared
- I/O density shown: 48 input + 24 output
- 1756 options for remote power supply may further optimize panel space requirements
- All typical hardware included
  - Adapter
  - Power supply

Supported architectures

- New GuardLogix® and Compact GuardLogix® controllers (Studio 5000® software V32 and newer releases)
  - **Bulletin 5580 and Bulletin 5380 series controllers only**
  - **Not supported: Bulletin 5570, Bulletin 5370 or older controllers cannot own these safety I/O modules**
- For controller to controller interlocking:
  - Safety Peer-to-peer can be used
  - Support for CIP Safety™ bridging/routing
- Applies to both SIL2 and SIL 3 configurations

Local

Or Remote

Safety Input Devices

GuardShield: Safety Light Curtains

- Allen-Bradley Guardmaster safety light curtains offer optimal safety while allowing for greater productivity and ergonomics on the work floor.
  - Type 2 or Type 4 to IEC 61496, up to Ple EN ISO 13849-1
  - PNP Outputs (2 N.O. Safety + 1 N.O. Aux.)
  - 14 mm or 30 mm objects sensitivity (POC only)
  - Up to 18m sensing range
  - Fixed and floating blanking, beam coding
  - External device monitoring (EDM)
  - Start/restart interlock
- Products include:
  - Point of Operation Control light curtains (POC), Perimeter Access Control light curtains (PAC) and Area Access Control (AAC)
  - Micro-sized light curtains for when space is a premium
  - Integrated Laser Alignment Tool

Safety Light Curtains - 450L GuardShield™ Safety Light Curtains

Product Overview

- **Modern Compact** design
  - 30 mm x 30 mm (1.2 in. x 1.2 in.) IP65 profile
  - Available in lengths of 150…1950 mm (5.9…76.7 in.) in increments of 150 mm (0.5 ft)
- IP65 rated
- Patented universal transceiver design **reduces inventory**
- **Ease of use** with unique Plug-in System
  - Plug-in module provides application-specific functionality
- Active sensing over entire length allows for **flexible mounting**
  - Top/bottom or side mount with no loss of resolution
- Advanced Safety Light Curtain **platform**
  - Two models (450L-B & 450L-E) provide functionality based on application requirements
- **Meets highest safety standards**: Type 4 (IEC 61496), PLe (EN 13894), SIL 3 (IEC 61508)
- Premier integration via optional CIP Safety over EtherNet/IP accessories

450L GuardShield™ Safety Light Curtains

CIP Safety over EtherNet/IP™

Introduction

450L-APR-EN-8

450L-ENETR

What is it?

- The 450L-ENETR network interface module and 450L-APR-EN-8 receiver plug-in are accessories that connect to the 450L GuardShield family of safety light curtains, which transform the standard light curtains into smart devices

Where is it used?

- Wherever a safety light curtain is used
- New installations or retrofitting existing installations

What are the benefits?

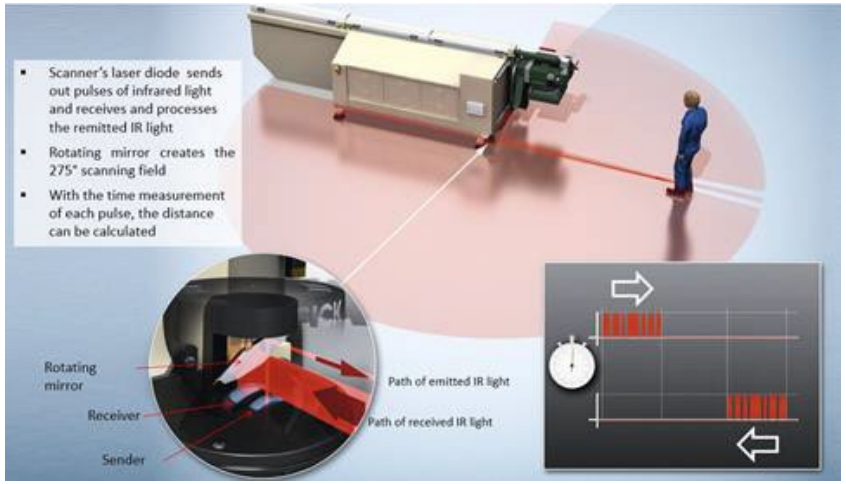
- Convert any 450L with fw 5.002 or above into a SMART SAFETY sensor
- Enables communication of diagnostics and status information to Logix Systems
- Enables CIP safety over EtherNet/IP™ to support safety requirements
- Supports DLR to cascade multiple 450L or other EtherNet/IP products
- Allows configuration of 450L features within AOP for Studio 5000®
- Reduced system cost – reduction in wiring of safety circuit
- Increased flexibility and modularity of system design and safety zoning

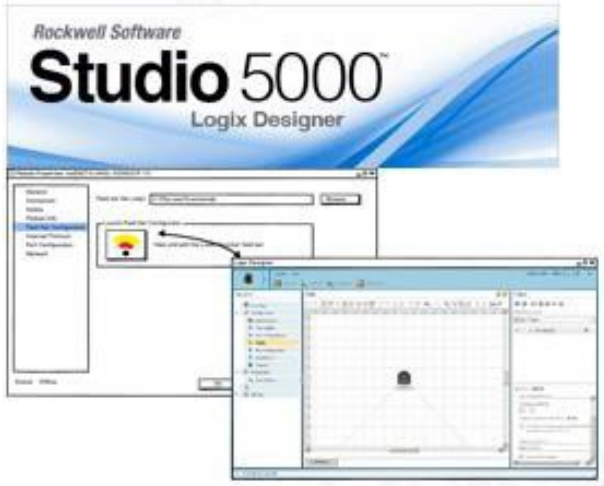
SafeZone: Safety Laser Scanners

- The SafeZone™ Multizone safety laser scanner provides flexible area guarding within hazardous cells.
  - Multi-Zone, Single-Zone, and MiniZone
  - Vertical or horizontal mounting in stationary or mobile applications
  - Auto configured safety field using ambient contour
  - Angular scanning range 190°, (270° mini zone)
    - Safety field range 5 m (Multi Zone)
    - Safety field range 4m (Single Zone)
    - Safety field range 2m or 3m (Mini Zone)
  - Application resolutions of 30mm, 40mm, 50mm, 70mm, or 150 mm
  - Configurable samplings: 2-16 samplings before outputs switch off (Multi and Single)
  - Configurable restart delay: 2 to 60 sec
  - 7-segment diagnostic display
  - Application diagnostic output
  - CE and cULus marked, meets PLd ISO 13849-1, Type 3 IEC61496 and SIL2 per IEC61508

SafeZone 3 Safety Laser Scanner

Product overview





What is it?

- **SafeZone™ 3 is the next generation safety laser scanner** that features high-definition distance measurement scanning technology which improves the accuracy of the scan data and thereby increases the scanner's immunity to dust, smoke and optical interferences
- **CIP Safety over EtherNet/IP** enables integration of the SafeZone 3 safety laser scanner into a SIL 2/ PLd GuardLogix® Safety Control System

What are the benefits?

- **442L AOP in Studio 5000 Logix Designer®** allows configuration of the SafeZone 3 and easy integration into an Allen-Bradley® safety Logix controller system by Rockwell Automation®
- **Display screen for diagnostic information** with push buttons to call up additional information such as IP address
- **Configuration program and IP address is stored in the removable system plug** allowing for quick device replacement

843ES CIP Safety Encoder SIL3/PLE

First encoder to market that supports CIP Safety over EtherNet/IP and SIL 3/PLe capable

- SIL3 + PLe capable
- CIP Safety over EtherNet/IP
- IP 67 housing
- Servo mount, solid and hollow shaft in English/Metric unit sizes
- Standard 18 bits, Safety 15 bits Single-turn resolution
- 12 bits Multi-turn resolution + Single-turn resolution
- 1 ms RPI in standard connection, 6 ms RPI in safety connection
- Supports the Integrated Architecture
  - ControlFlash
  - Studio 5000 w/AOP (v31 and later)
  - Two Ethernet ports to support DLR

MatGuard: Pressure Sensitive Safety Mat System

- Highest quality safety mat available today. This robust family of products withstands the force of a forklift driving over it, yet is sensitive enough to be triggered by the footstep of a 30kg person.
  - Pld Category 3 according to ISO 13849-1
  - Third party certification to EN ISO 13856-1
  - Overall sensitivity including uniting strip
  - Rugged construction withstands the pressure of 4500psi
  - IP 67 vinyl construction resistant to most oils
  - 5-year warranty
  - Mat manager monitors the status of up to 8 mats individually

Safedge: Pressure Sensitive Edge System

- Pressure sensitive system can be applied along or around applications
- Ideal for use in potential trapping or pinch points
- Utilises durable rubber compound (conductive and nonconductive)
- Selection of cushion sizes: 5mm (0.2 in), 19mm (0.75 in) and 41mm (1.6 in)
- Order parts and configure yourself or specify factory configured solution for your application
- Up to 50m lengths with min bend radius of 500mm (19.6 in)
- Fully active corners
- Utilizes safety controller

Tongue Operated Interlock Switches

- Ideal for interlocking of sliding, hinged and lift-off guard doors
- These devices require a physical actuator key to be inserted or removed from the switch for operation
- Positive actuation via direct opening contacts
- Versions with metal and plastic housings for flexibility and robustness
- Small 25mm width versions for use in small spaces
- A range of fixed, semi-flexible and fully flexible actuators allow application flexibility
- Versions with actuator holding force ≤ 40 N (9 lbs)
- Conduit: Metric, ½ inch NPT and quick connect versions available

Note: These devices do not lock the guard closed with a locking function

Non-contact Interlock Switches

- Ideal for interlocking of sliding, hinged and lift-off guard doors
- Requires no physical contact between the switch and actuator to achieve operation
- Small physical sizes, ideal where space is at a premium
- Suitable for wash down thus ideal for hygiene sensitive applications
- Versions available with 25 mm assured sensing distances
- Versions with and without control units
- SensaGuard family offer:
  - RFID coding for security integrity
  - Unique Coding Available
  - Inductive technology for sensing
  - High tolerance to misalignment
  - Version with selectable magnetic latch at 20,40 or 60N
  - Achieves Cat. 4 Ple ISO 13849-1 SIL3 IEC61508 ratings even when wired in series
  - Visual diagnostics for ease of troubleshooting

Note: These devices do not lock the guard closed with a locking function

Guard Locking Interlock Switches

- Ideal for interlocking of sliding, hinged and lift-off guard doors
- Guard locking interlocks help keep guard door locked
- closed until a safe machine condition exists
- These devices require a physical actuator key to be
- inserted or removed from the switch for operation
- Positive actuation via direct opening contacts
- Power to release and power to lock versions
- Versions with actuator holding force ≤ 5000 N (1124 lbs)
- Versions with metal and plastic housings for flexibility and robustness
- A range of fixed, semi-flexible and fully flexible actuators allow application flexibility
- Rotatable head: 4 possible actuator key entry slots (440G-MT and TLS-GD2)
- Improved Diagnostics for 440G-MT & IP69K for TLS-GD2

440G-EZ Electromagnetic Safety Switch

Designed to enhance machine safety and help protect a working process from unplanned downtime

- Noncontact Interlocking device with a locking function (PTL)
- Process and machine protection per ISO EN 14119
  - Per ISO EN 14119 for process protection. Currently the holding force is NOT monitored and is not required to be monitored for process protection.
- PLe, SIL 3 for Interlocking applications
- 500 N holding force
- 50 ms response time
- Ease of installation and alignment: no tongue interlocks
- Mounting options: surface or flush mount
- IP67 enclosure
- Benefits:
  - Increased productivity
  - Reduce long restart delays
  - Reduce scrap
  - Improved efficiency by minimizing downtime

Guard Locking Interlock Switches

440G-LZ Guard locking– For partial Body Access

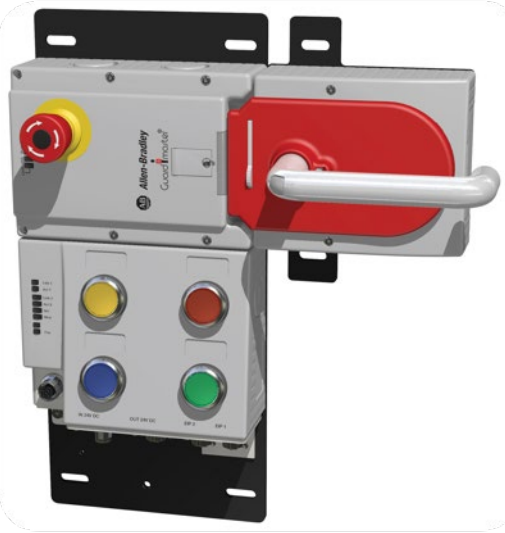
- TUV Certified PIe Category 4 to EN ISO 13849-1 for both door position monitoring and lock monitoring
- Integrated RFID unique (high) or standard (low) coded actuators
- High holding force for partial body access applications – 1300N Holding force
- Power-to-release and power-to-lock versions
- IP69K and hygienic design

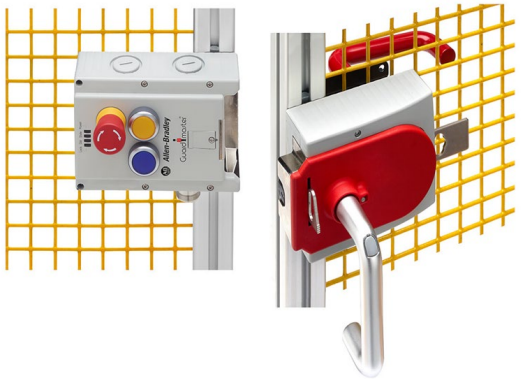
440G-MZ Guard Locking Switches – for whole body access

- PLe Cat 4, SIL cl3 – the highest level of safety for guard position and lock monitoring
- Solid-state OSSD outputs & **GuardLink ready**
- RFID unique (high) or standard (low) coded actuators
- High holding force for whole body access applications -2500N holding force
- Power-to-release and power-to-lock versions
- IP69K and hygienic design
- +/- 5mm misalignment tolerance

Multifunctional Access Box (MAB) - 442G

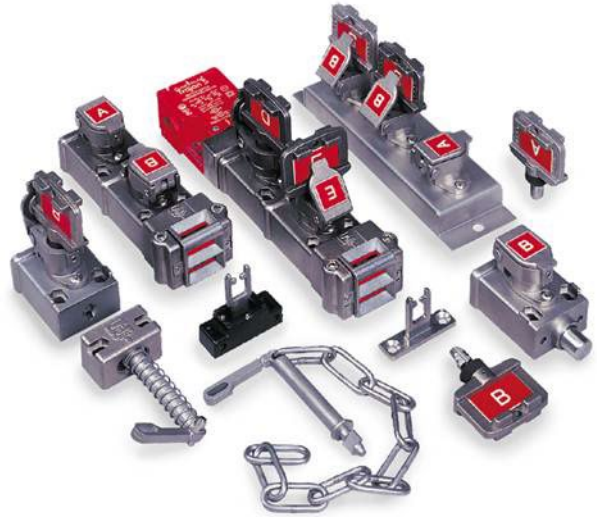
- Integrated solution for Full Body Access applications
  - Integrated Door Handle, Guard Locking Switch and Access Control and Indicator Panel
- Power-to-Release or Power-to-Lock modules
- Diagnostic outputs for door position, bolt position, and lock status are available to the control system
- Standard models can be operated as a standalone device or in series with other devices, maintaining a PLe Cat 4 safety rating
- Ethernet models enable easy integration in a networked automation control system using Studio 5000 Logix Designer





Prosafe Trapped Key Systems

Based upon the premise that no one key can be in two places at once, key interlock systems can be configured so that a predetermined sequence of events takes place, so as to minimize the possibility of a safety incident.



- Individually coded keys for high security
- All stainless-steel interlocking and coded parts
- Replaceable code barrel assembly for key sequence change-over or part replacement
- The range includes:
  - Power isolators (electrical, pneumatic etc)
  - Key exchange units
  - Interlocks (single and dual key)
    - Bolt interlocks, access/chain interlocks, tongue interlocks, miniature valve interlocks

Emergency Stop Buttons

- Fixing hole diameter: 16, 22, 30 mm
- Plastic / Metal
- Modular / Monolithic
- Operator diameter: 40, 60, 90 mm
- Illuminated / Not illuminated
- Keyed and non-keyed
- Pull or Twist to reset
- Panel mounted or Enclosed
- Wide choice of contact functionality,
- Patented Self-Monitoring Contact Blocks (SMCB) monitors if the contact block is correctly fixed to the mushroom actuator
  - IP2X finger-safe protection
  - Terminals identified with IEC-style markings
  - If the SMCB is separated from the E-stop operator for any reason, the controller circuit will automatically open

Cable (Rope) Pull Safety Switches

- The Lifeline family of cable-actuated emergency stop switches is ideal for installation along or around awkward machinery such as conveyors, and provides a continuous length of emergency stop access via the cable (rope)
  - Unique cable grip system
  - System can be installed and commissioned quickly
  - Up to 300 mm of cable tension adjustment
  - IP67 stainless steel versions available
  - Cable span up to 125 m for standard models and 75 m for stainless steel models
  - Switch mounted mushroom Emergency stop button on Lifeline 4 versions
  - Visual rope tension indicator

Enabling Grip Switches

- Manually operated device used in conjunction with a start command
- Safety function of the enabling grip switch has two parts
  - When continually actuated, machine can operate
  - When not actuated, switch initiates a stop command
- 3 position switch with middle position as actuated (safety contacts closed, machine run)
- Gripping or releasing the enabling grip switch either way of the middle position will generate a machine stop command
- Versions available with:
  - Machine jog / restart button
  - E-Stop mounted mushroom button
- Ideal for maintenance applications

  where limited power has to be maintained

Two-Hand Control Devices

- Ideal for machine control systems requiring two hand operation
- Internationally rated ergonomic touch buttons
- Capacitive sensing - Zero force to operate
- Diagnostic LED’s for status indication and troubleshooting
- Pre-wired or quick connection options
- Robust design for use in demanding environments

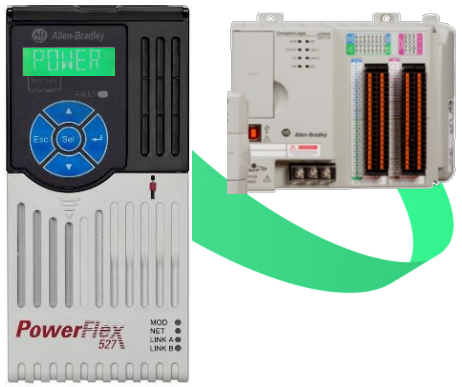
Safety Output Devices

Safety Contactors & Relays

- Safety Contactors provide either mechanically linked or mirror contacts, which are required in feedback circuits for modern safety applications
- Mechanically linked (positively guided) contacts are linked together thereby preventing the re-closing of the N.C. contacts if a N.O. contact has welded
- This helps to protect personnel from unintended machine starts and loss of the safety function
- Protective cover to prevent manual operation
- 700 HPS PCB Pin Style Safety Control Relay
  - Positively guided contacts
  - Use two in parallel for safety applications

PowerFlex 5-Series

- PowerFlex 525
  - 0.2 to 2.2 kW at 220V 1ph
  - 0.4 to 22 kW at 380-600V 3ph
  - Safety Option
    - SafeTorqueOff Hardwire (SIL2; PLd)
- PowerFlex 527
  - 0.2 to 2.2 kW at 220V 1ph
  - 0.4 to 22 kW at 380-600V 3ph
  - Safety Option
    - SafeTorqueOff Hardwire (SIL3; PLe)
    - SafeTorqueOff **EtherNet** (SIL3; PLe)



PowerFlex 7-Series

- PowerFlex 753 / 755
  - 0.75 to 1500 kW at 380-690V 3ph
  - Basic Safety Option
    - SafeTorqueOff Hardwire (SIL3; PLe)
  - Advances Safety Option
    - SafeTorqueOff Hardwire (SIL3; PLe)
    - SaveSpeedMonitoring Hardwire (SIL3; PLe)

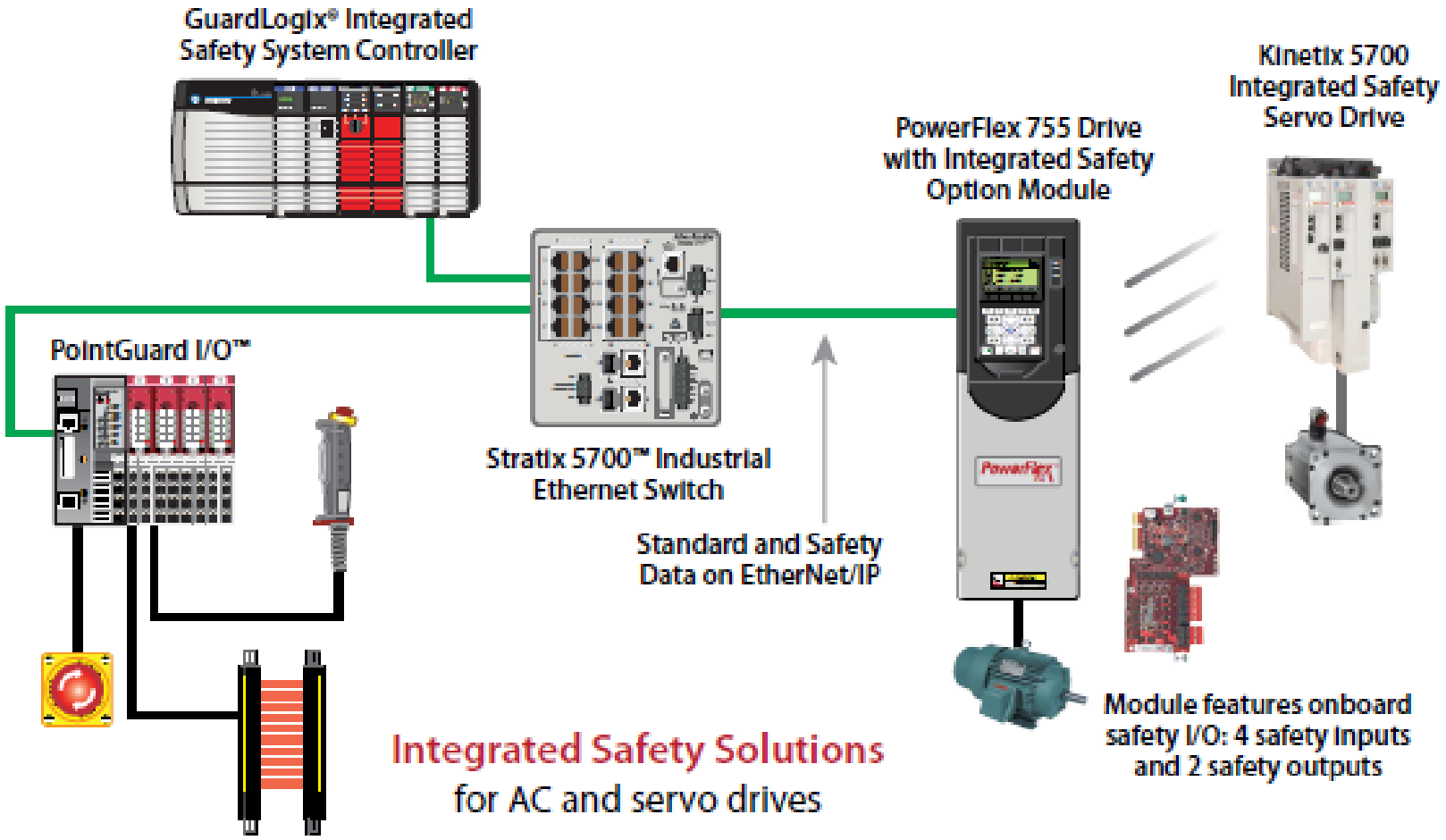
Kinetix integrated motion with optional integrated safety

- Safety functionality is available as an optional integrated feature
- Power can be maintained to the drive after a demand on the safety function
  - The DC bus is not discharged
  - Reduces wear on drive increasing life
  - Quicker restart times for higher productivity
- Simplified circuit with less wiring
- Input or output contactors may not be required
- **Safe Torque Off over CIP safety available in:**
  - K5700, K5500
- **Standard Safe Torque Off available in**:
  - Kinetix 300, 350, 5500, 6000 and 7000
- **Advanced safety functions available in :**
  - Kinetix 6200 & 6500 (S0 S1)
    - Safe Torque Off
    - Zero Speed Monitoring
    - Safe Limited Speed
    - Safe Stop to Cat 0, 1 or 2
    - Safe Maximum
    - Safe Acceleration and Deceleration
    - Door monitoring and control
    - Enabling grip switch control

20-750-S4 Integrated Safety Functions Option Module

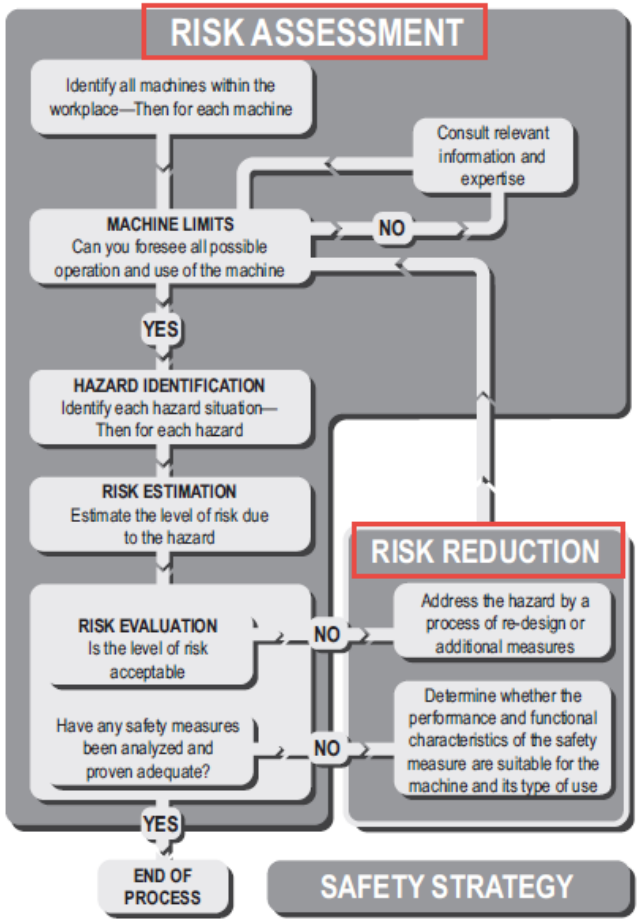
Functionality

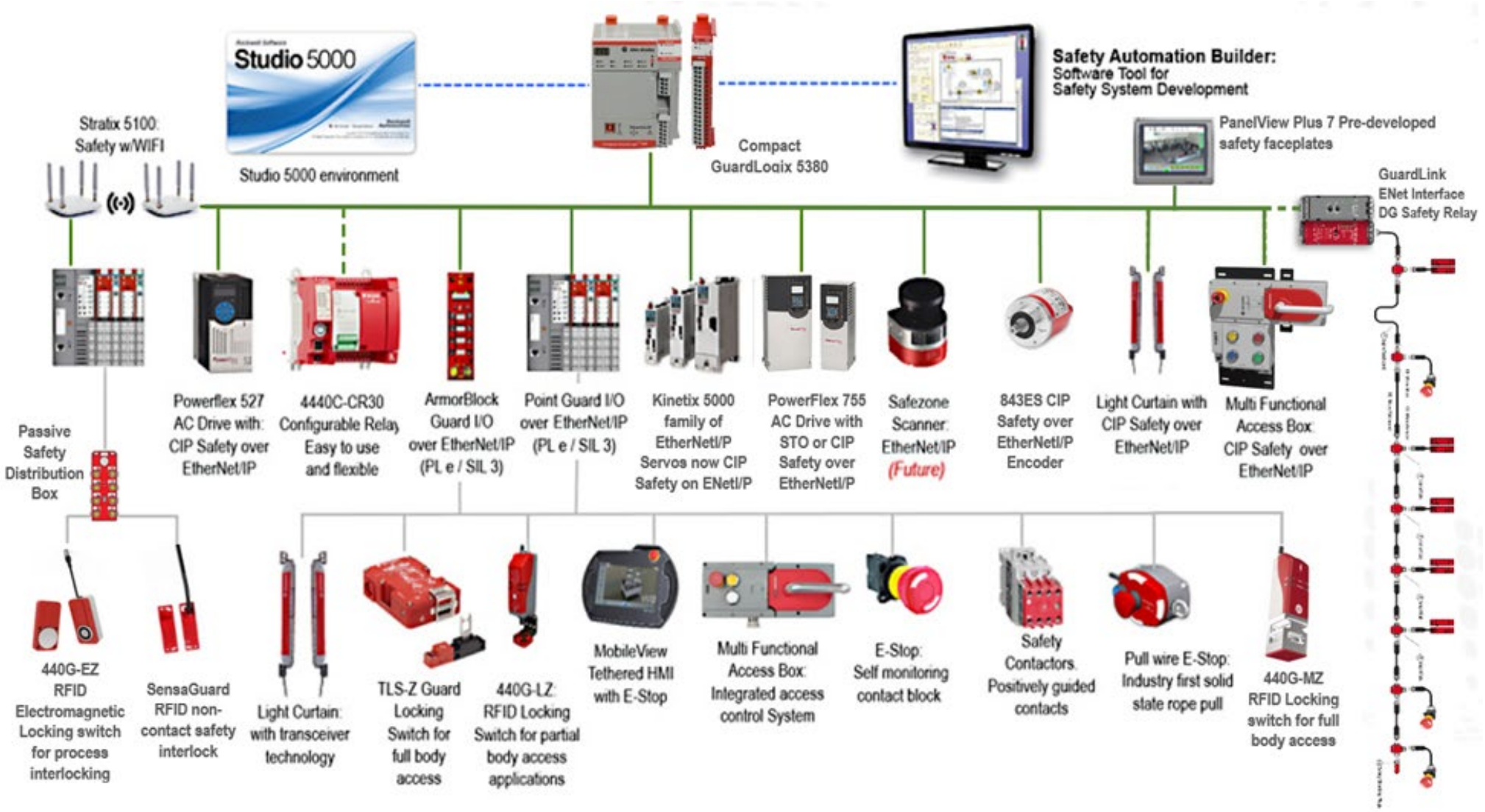
Safety Application Example



Note: You still need a Universal Feedback option (20-750-UFB1) or a Dual Encoder option (20-750-DENC1) to connect the encoders to obtain the safe motion feedback.

Safety Strategy





Smart Safety – The safety portfilio delivering a full safety solution

Enhancements in safety devices are simplifying systems while increasing functionality.

Any questions…?