



GuardLink®  
Device level safety  
linking technology





# Smart Safety

**Smart Safety** solutions provide detailed diagnostic data to your design environment, visualization system, information software, and GuardLogix® Programmable Automation Controller – enabling Smart Machines for Smart Manufacturing and helping to increase productivity and minimize downtime while reducing the total cost of ownership.

## 440G-MZ Guard Locking Interlock Switch

Guard Locking switches lock/unlock signals can be provided, giving the devices current state and specific location within the system. Individual indications of the guard doors state including guard open, guard closed, guard locked or guard unlocked can also be provided.



## 450L Light Curtains

450L Light curtains can be connected simply to GuardLink® via a GuardLink-enabled tap. Access to the light curtains status along with the location can be communicated.



## Lifeline 5

Connect a Lifeline™ 5 Cable Pull Switch to get the location of the device and rope tension status to avoid nuisance trips from occurring when operated.



## GuardLink-Enabled Tap Indication

### LED Input

**Green** = Connected input device healthy  
**Flashing Green** = Connected input device healthy but fault on system  
**Red** = Trip on connected input device  
**Flashing Red** = Connected input device has not performed correctly

### LED Link

**Green** = Operational  
**Red** = Tripped  
**Flashing Red** = Faulty tap



## 800F Emergency Stop Push Button

Connect Emergency Stop Push Buttons to a GuardLink-enabled tap quickly and simply via an M12 connector. Get information on its location when the device is operated.



## SensaGuard™ Non-contact Guard Interlock Switch

Connect Non-contact Interlock Switches to a GuardLink-enabled tap and receive data on the location of the switch and any fault conditions through GuardLink when the guard door is opened or closed.



## 432ES GuardLink EtherNet/IP On-Machine™ Interface

The 432ES GuardLink EtherNet/IP Interface monitors three independent channels of GuardLink-enabled devices and communicates the status of those devices to a safety-rated controller over a CIP Safety EtherNet/IP network.



## GSR DG - Dual GuardLink Safety Relay

The GSR DG - Dual GuardLink Safety Relay can monitor two GuardLink channels and communicate status information for each safety input device via the EtherNet/IP Network Interface.



# Smart Manufacturing

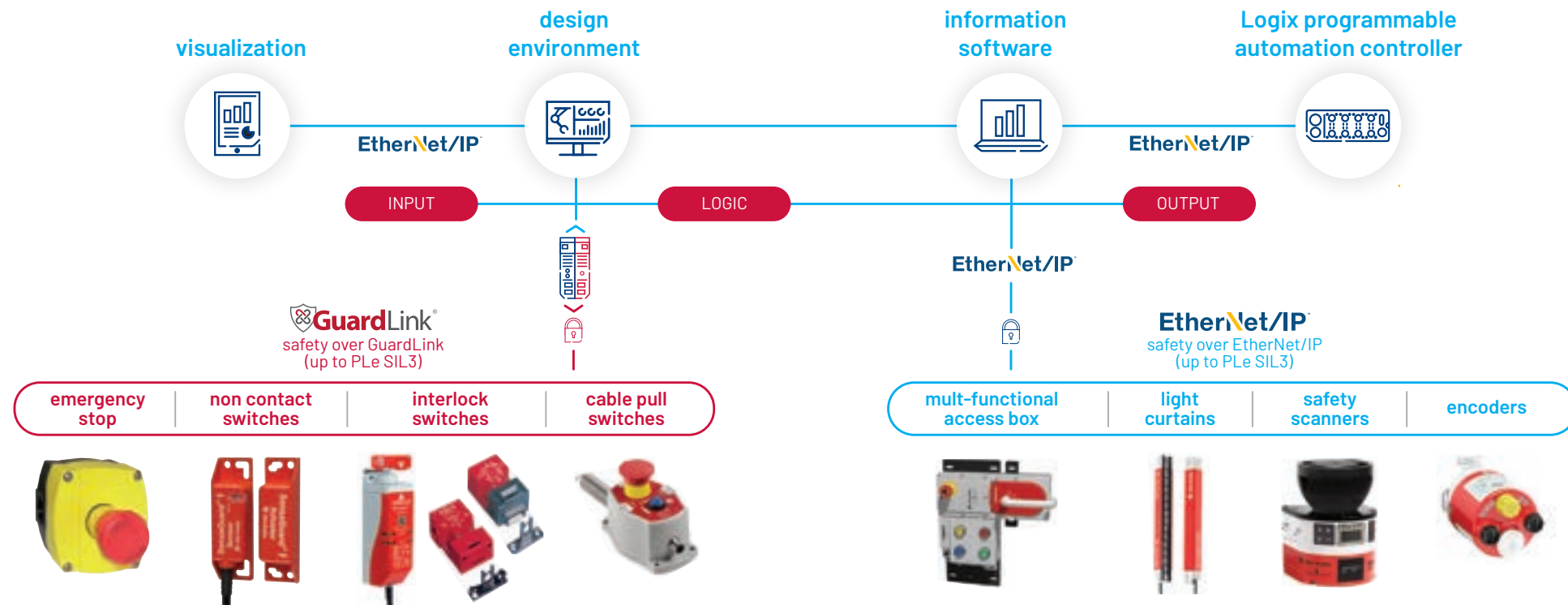
Smart manufacturing is the gateway to digital transformation. Connected smart devices open new windows of visibility into processes. Data and analytics enable better and faster decision-making. Seamless connectivity spurs new collaboration.

The Connected Enterprise® makes all this possible. It converges plant-level and enterprise networks, and securely connects people, processes, and technologies.

## What is GuardLink?

GuardLink is device level safety linking technology that is part of an integrated Smart Safety solution, which can provide a comprehensive picture of the status of the machine or production line.

### The Connected Enterprise



Imagine machine safety that actually improves productivity and business performance. Companies that adopt a holistic approach to machine safety leveraging Smart Devices achieves significantly higher Overall Equipment Effectiveness (OEE). These companies have less unscheduled downtime and less than half the injury rate of average performers. Whether you build machines or use it, smart safety is synonymous with improving productivity, protecting personnel and enabling the Connected Enterprise.

## 38% reduction in wiring cost

GuardLink eliminates separate wiring of each safety device to the controller and uses smart four conductor cabling instead of 8-pin cables. GuardLink brings diagnostics and safety function in one cable reducing the cost of ownership.

## 50% reduction in installation time

GuardLink provides a premier safety integration that is clean, simple plug-and-play solution to enable quick install of safety devices and eliminate wiring faults.

## 34% cost reduction in safety installation

GuardLink seamlessly connects safety devices in series allowing to keep the physical topology and gain higher safety and diagnostics at minimal investment.

# Why choose GuardLink?

Series connection of safety input devices is common practice in safety-related control systems. However, when the system trips, fault finding can be difficult due to the lack of diagnostic information. Providing diagnostics historically meant connecting auxiliary contacts from each safety input device to the PLC increasing costs due to the need for additional input cards, and increased installation time to hard wire each auxiliary contact to the allocated input.

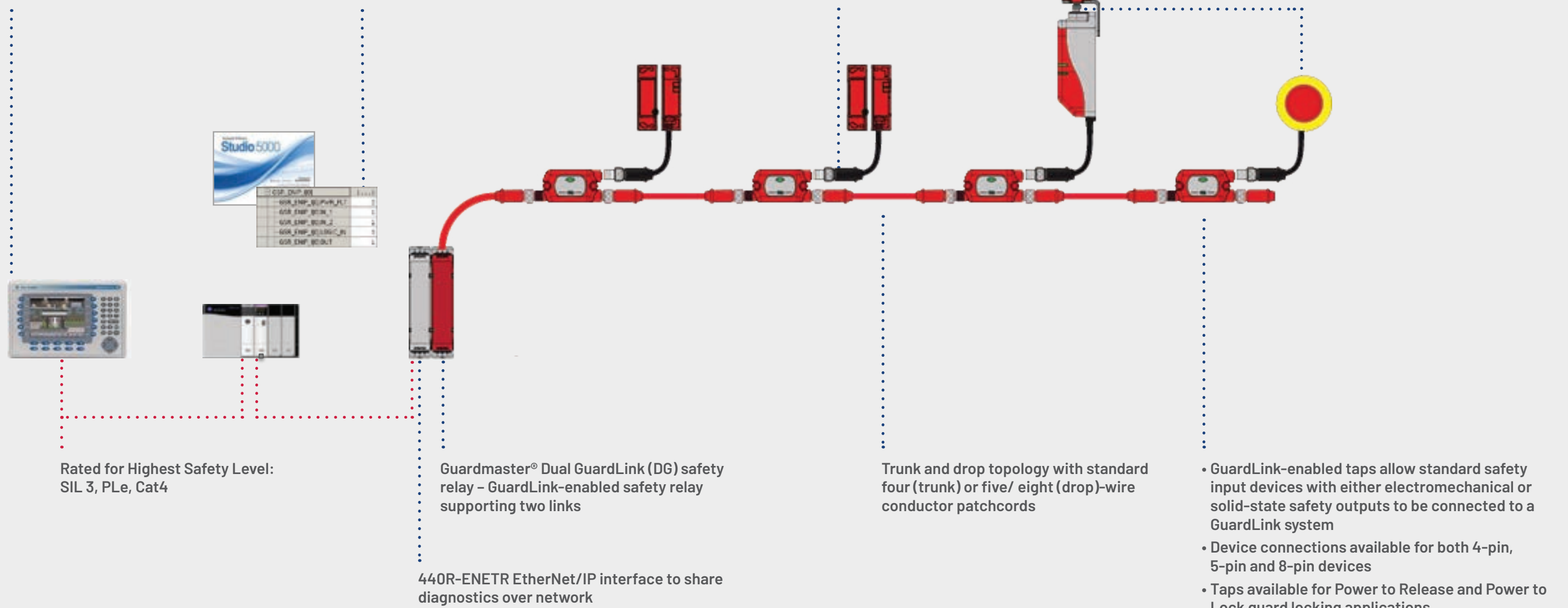
GuardLink provides both safety information and diagnostics through the same cable, with the diagnostics available via EtherNet/IP, reducing the amount of wiring required for the safety system, and the cost and time to install the solution.

Provides status, diagnostics, remote reset, fault information and lock/unlock command over network

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

Connect up to 32 devices on each GuardLink channel/zone with 3130 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)



Rated for Highest Safety Level: SIL 3, PLe, Cat4

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

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

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

- GuardLink-enabled taps allow standard safety input devices with either electromechanical or solid-state safety outputs to be connected to a GuardLink system
- Device connections available for both 4-pin, 5-pin and 8-pin devices
- Taps available for Power to Release and Power to Lock guard locking applications
- Remote lock/unlock and fault reset of safety

Simple Installation

Smart Integration

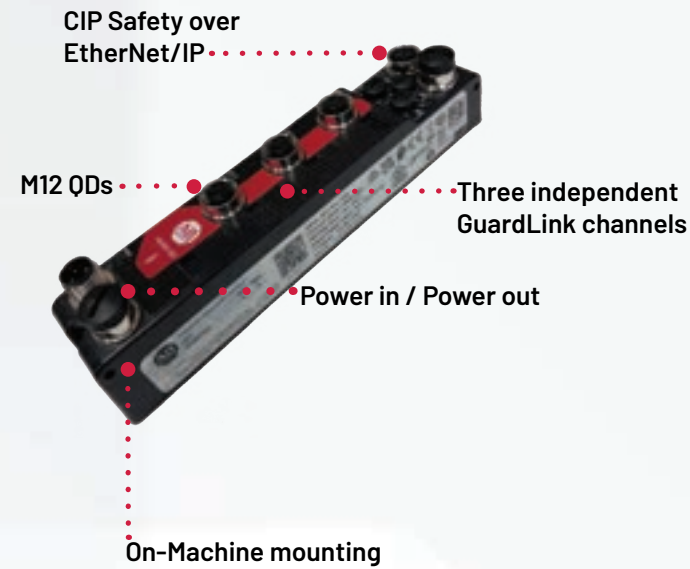
Highest Safety Performance



# GuardLink

## Controller and communication technology:

GuardLink provides two control and communication alternatives.



### 432ES GuardLink EtherNet/IP Interface (432ES-IG3)

- GuardLink 2.0 protocol with enhanced diagnostics
- CIP Safety over EtherNet/IP compatible with GuardLogix L3 and L8 controllers
- Linear, star, or DLR network connections
- On-machine mounting, IP66, 67 and 69K
- Three independent GuardLink channels up to 32 devices per channel
- Control 1, 2, or up to 3 machine zones
- Power in and power out connections for daisy chaining with similar products
- Automatic diagnostic reporting when used with PanelView™ 5000 displays and FactoryTalk® View Site Edition

The safety device is connected to a GuardLink-enabled connection tap or a passive tap in a trunk and drop topology. The DG Guardmaster safety relay monitors up to two GuardLink circuits. Or use the 432ES EtherNet/IP On-Machine GuardLink adapter to control up to three zones with directly linking the GuardLink system to The Connected Enterprise.

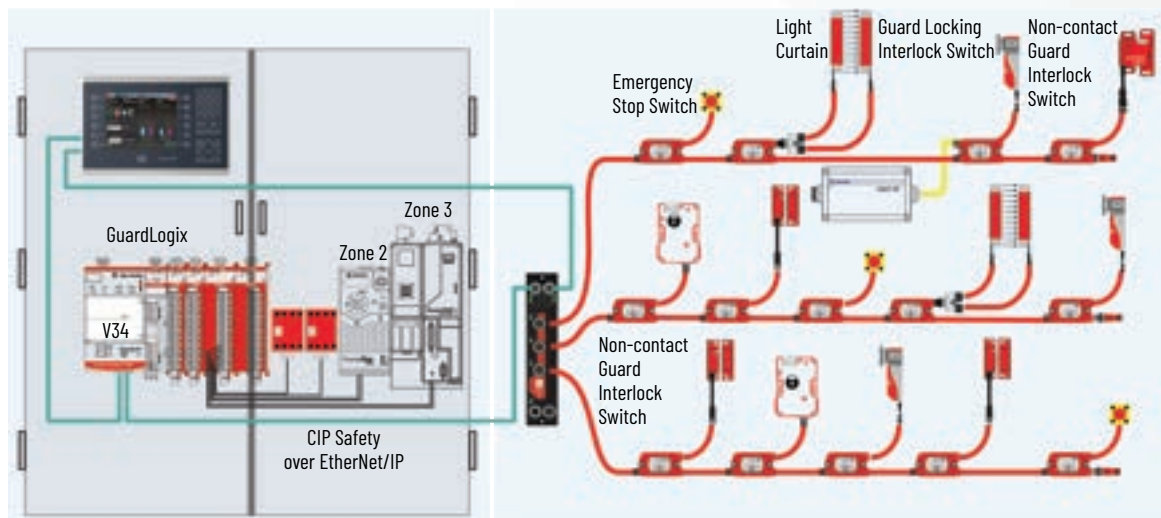


### Dual GuardLink Relay with GuardLink EtherNet/IP Interface (440R-DG2R2T (DG) with 440R-ENETR)

- GuardLink 1.0 protocol with sequential diagnostics
- Standard message communication over EtherNet/IP compatible ControlLogix controllers
- Linear, star, or DLR network connections
- In-cabinet mounting, IP40
- Two GuardLink channels, up to 32 devices per channel
- Inputs can also connect to devices with OSSD and mechanical contacts
- Control one zone with each DG relay

## System examples

### 432ES GuardLink EtherNet/IP Interface (432ES-IG3)

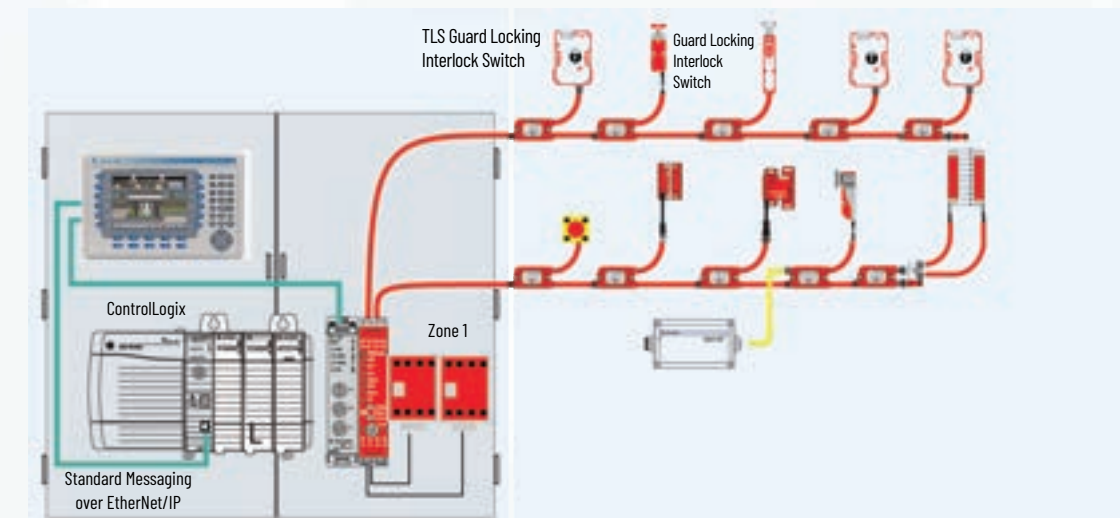


Three independent GuardLink channels controlling three machine zones with a GuardLogix controller.

In-Cabinet

On-Machine

### Dual GuardLink Relay with GuardLink EtherNet/IP Interface (440R-DG2R2T (DG) with 440R-ENETR)



Two GuardLink channels controlling one machine zone, with lock control from a ControlLogix® controller.

In-Cabinet

On-Machine

# Next generation of machinery safety devices

## A GuardLink-enabled device provides advanced features such as:

- **Enunciation** – easily identify which devices on the link are tripped
- **Diagnostics** – ready to lock status, lock or unlock attempts, approaching max/min input voltage, actuator not paired
- **Door Status** – easily identify if the door is open or closed
- **Lock Status** – easily identify if the device is locked or unlocked
- **Fault Information** – failure to lock/unlock, commissioning error codes, actuator detection fault, bolt detection fault, exceeds max/min input voltage
- **Device RESET** and LOCK/UNLOCK over the link can be initiated remotely from the HMI

The **440G-MZ Guard Locking Interlock Switch** has embedded GuardLink technology making it a smart safety device that provides the benefits of enunciation and product-specific diagnostics without any additional wiring, which would be the case with competitor products.



The 440G-MZ, with built-in GuardLink technology, connects to a GuardLink system using a passive tap. A combination of passive and smart taps can be connected in series using standard patchcords with M12 connectors. The linked system interfaces to the Connected Enterprise via an Ethernet interface and a GuardLink safety master.

GuardLink 2.0 helps reduce troubleshooting and machine downtime by providing automatic diagnostics, reporting enhanced warning and fault conditions including:

- Internal fault
- High/low system power warning
- GuardLink signal fault
- End of Life warning
- Under/over temperature
- See product User Manuals for complete and detailed list of diagnostics

# Product Selection



| CATALOG #   | DESCRIPTION   | PROTOCOL |
|---|---|----------|
| <b>432ES-IG3, network cable and power cable</b>   |   |          |
| 432ES-IG3   | GuardLink EtherNet/IP Network Interface   | 2.0      |
| 1585D-M4UBJM-*(1)   | Ethernet Cable: Cat5e, 100 Mbit/s, 4 Conductors, M12, Straight Male, RJ45, Straight Male, Teal, PUR                     | -        |
| 889D-F4AE-*(2)  | Cordset: DC Micro (M12), Female, Straight, 4-pin, PVC, Yellow, Unshielded, No Connector, 18 AWG                         | -        |
| <b>Safety Relay, Ethernet/IP Network Interface and cable to the first GuardLink enabled tap</b> |   |          |
| 440R-ENETR  | EtherNet/IP Network Interface   | -        |
| 440R-DG2R2T   | Guardmaster Safety Relay Dual GuardLink   | 1.0      |
| 889D-F4NE-*(2)  | Cordset: DC M12, Female, Straight, 4-pin, PVC, Red, Unshielded, No Connector, 18 AWG                                    | -        |
| <b>GuardLink enabled taps and cables to connect between the taps</b>                            |   |          |
| 400S-SF5D   | 5-Pin Tap for use with 4- or 5-pin electronic safety input devices  | 2.0      |
| 440S-SF8D   | 8-Pin Tap for use with 8-pin electronic safety input devices, power-to-release  | 2.0      |
| 440S-SLF8D  | 8-Pin Tap for use with 8-pin electronic safety input devices, power-to-lock   | 2.0      |
| 440S-MF5D   | 5-Pin Tap for use with 4- or 5-pin electromechanical safety devices   | 2.0      |
| 440S-MF8D   | 8-Pin Tap for use with 8-pin electromechanical safety devices, power-to-release   | 2.0      |
| 440S-MLF8D  | 8-Pin Tap for use with 8-pin electromechanical safety devices, power-to-lock  | 2.0      |
| 440S-PF5D   | 5-Pin Passive tap for use with 5-pin GuardLink-enabled safety devices   | -        |
| 440S-PF5D4  | 5-Pin Passive power tap for use with 5-pin GuardLink-enabled devices and additional power                               | -        |
| 889D-F4NEDM-*(3)  | Patchcord: DC M12, Female, Straight, 4-pin, PVC, Red, Unshielded, DC M12, Male, Straight, 18 AWG                        | -        |
| <b>Connection cables from the GuardLink enabled taps to the input devices</b>                   |   |          |
| 889D-F5NCDM-*(4)  | Patchcord: DC M12, Female, Straight, 4-pin, PVC, Red, Unshielded, DC M12, Male, Straight, 18 AWG                        | -        |
| 889D-F4NEDM-*(4)  | Patchcord: DC M12, Female, Straight, 5-pin, PVC, Red, Unshielded, DC M12, Male, Straight, 22 AWG                        | -        |
| 889D-F8NBDM-*(4)  | Patchcord: DC M12, Female, Straight, 8-pin, PVC, Red, Unshielded, DC M12, Male, Straight, 24 AWG                        | -        |
| <b>GuardLink-enabled switches</b>   |   |          |
| 440G-MZ Ser. B  | Guard locking switch, power-to-release, power-to-lock, standard or unique, escape release. See 440G-UM004 for selection | 2.0      |
| <b>Accessories</b>  |   |          |
| 898D-418U-DM2   | Terminator for last GuardLink tap   | -        |
| 440S-GLTAPBRK1  | GuardLink tap mounting bracket - QTY 1  | -        |
| 440S-GLTAPBRK5  | GuardLink tap mounting bracket - QTY 5  | -        |

(1) Replace \* in order number with OM15, OM2, OM3, OM6, 1, 2, 2M5, 3, 4, 5, 10, 15, 20, 30 or 40 for standard cable length in meters

(2) Replace \* in order number with OM3, OM6, 1, 2, 5, 10, 15, 20 or 30 (max) for standard cable length in meters

(3) Replace \* in order number with OM3, OM6, 1, 2, 5, 10, 15, 20 or 30 for standard cable length in meters (30 m max with guard locking, 100 m max with no guard locking)

(4) Replace \* in order number with OM3, OM6, 1, 2, 5 or 10 (max) for standard cable length in meters where OM15=150 mm, OM2=200 mm, OM3=300 mm, OM6=600 mm, 2M5=2.5 m



## Safety, Compliance and Productivity

Rockwell Automation has a well-deserved reputation for helping you improve productivity and quality. We're also the world's largest safety system provider.

Rockwell Automation is the industry leader in safety & compliance, helping reduce injuries and costs while improving productivity throughout your site.

Our expertise, experience, and products have established us as the world leader in industrial safety technology, enhancing your business performance with functional safety solutions.

## Best-in-Class Safety & Productivity

Multiple studies have shown that safety and productivity go hand in hand. These studies identified three key elements separating best-in-class plants from average performers:

- The safety culture
- A formalized risk management strategy
- Use of technologies that significantly improve both safety and productivity

## Reduce Time to Design, Develop and Deliver Safety Solutions

Rockwell Automation can help improve your performance through formalized risk management practices and technologies to identify and mitigate machine, process, and electrical safety hazards. We provide the industry's most complete offering of safety services and products, and a suite of tools to help accelerate safety system development and achieve compliance.



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