NHP ELECTRICAL ENGINEERING PRODUCTS

# Smart Machine Safety Selection Guide

A tool for selection of integrated and reliable machine safety components




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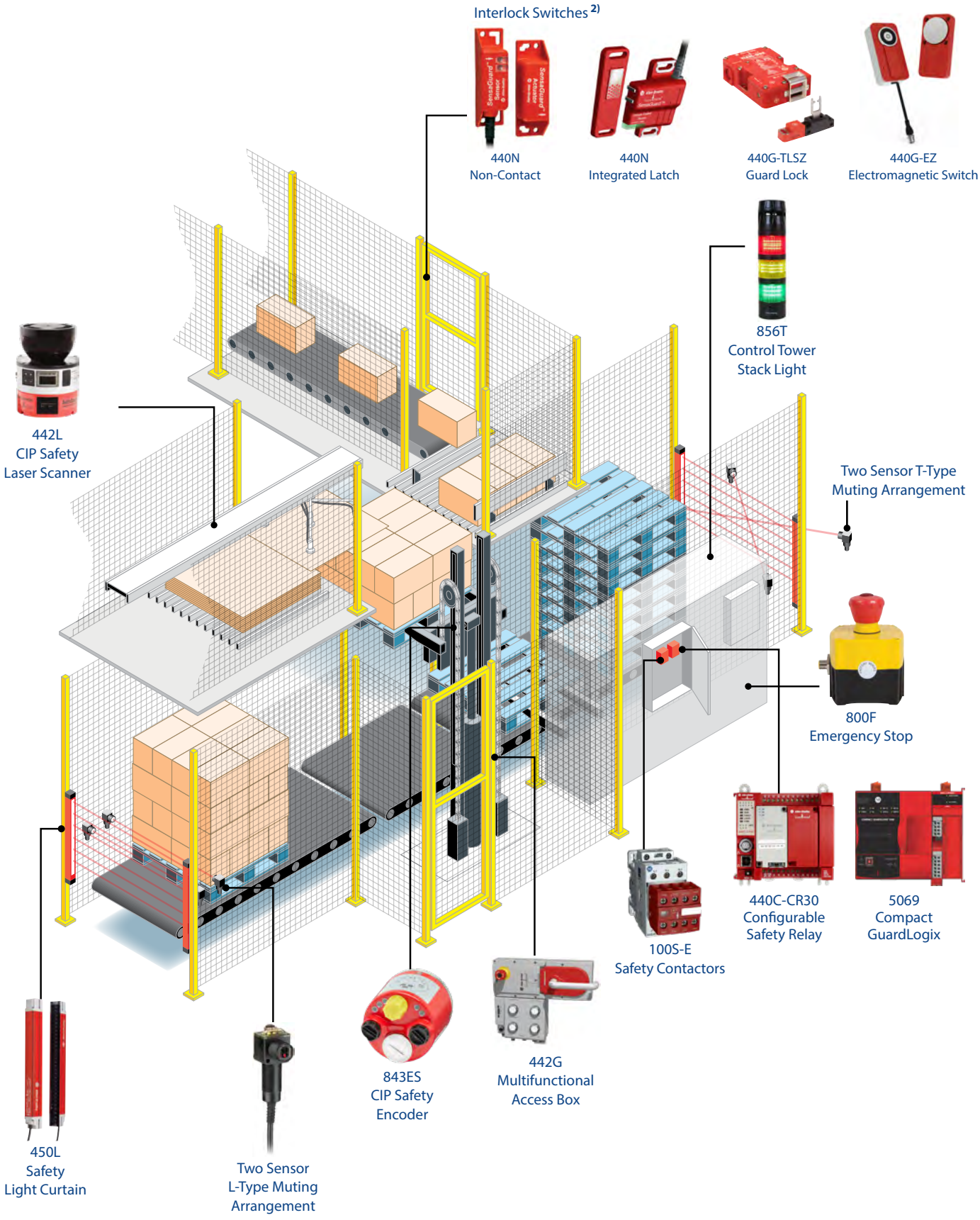
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# Smart Palletiser Safety System

Functional Safety System [1)]

## SMSSG HOT TIPS to look for

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2) Click on images to be directed to Product website Landing Pages.
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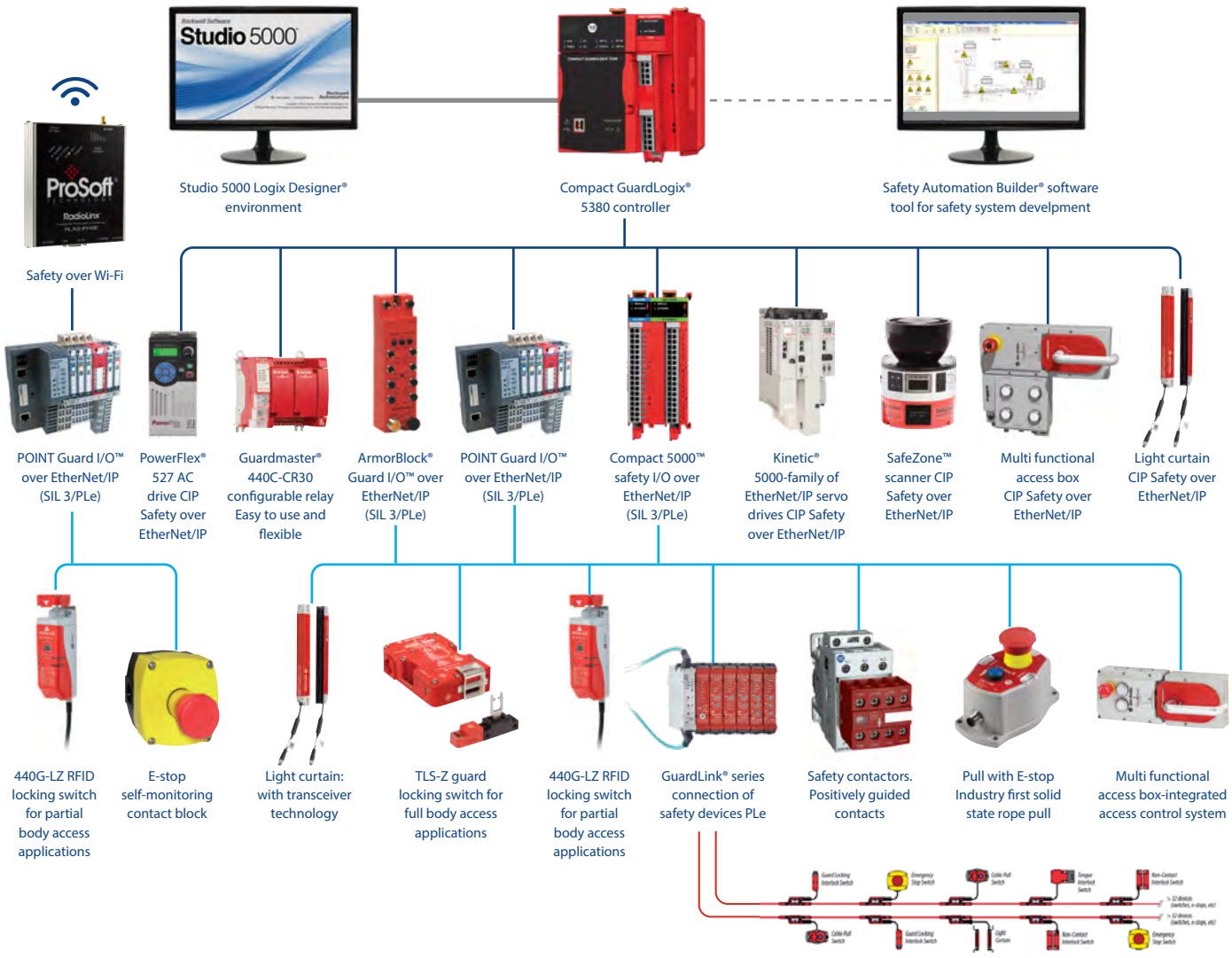
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# The complete solution

A solution incorporating Smart Safety devices enables safety professionals to transform the way they monitor and manage safety. NHP provides a complete Smart Safety solution to meet safety requirements, covering safety input devices, safety logic and safety output devices.




**Step 1** Conduct a Risk Assessment as per AS / NZS 4024 -2014 standard. The risk assessment documentation provides the framework for the product selection for steps 2 - 6

**Step 2** Select the appropriate safety switches and / or presence sensing devices

**Step3** Select suitable safety controller to monitor the input and output devices. Controllers are categorised from basic to advance based on the functionality of the controller

**Step 4** Select the appropriate output devices - Safety Contactors, Safety Control Relays and Safety enabled drives (embedded safe torque off)

**Step 5** Select any additional products required for a safety solution as per the risk assessment. These products include Signalling devices, Connection Systems, Software, HMIs and Networks.

**Step 6** Once the system has been installed conduct a validation to as per AS / NZS 4024 - 2014 standard to ensure that the safety system meets the requirements and specifications listed in the risk assessment.

# Safety categories explained

Standards are available to help with a safety system design – however there are a few around which are currently in use in Australia/New Zealand and around the world.

All three are perfectly valid for use in Australia and New Zealand for machine safety applications.

These standards can be categorised into two types: Qualitative, and Quantitative, and this depends on the methods used to determine how a safety control system is designed to ensure an adequate level of risk reduction.

| Category AS/NZS 4024.1501 / EN 954 | Performance Level AS/NZS 4024.1503 / ISO 13849 | Safety Integrity Level AS 62061 / IEC 62061 |
|---|---|---|
| Category B | PL a | - |
| Category 1 | PL b | SIL 1 |
| Category 2 | PL c | |
| Category 3 | PL d | SIL 2 |
| Category 4 | PL e | SIL 3 |

**Note:** Intended to show approximate equivalency for guidance only; attaining the corresponding PL or SIL requires more information and calculation based on several additional factors.

## Qualitative
### Category Levels

The Qualitative standard is based on Safety Categories, and there are 5 of them between Category B and Category 4.

What makes this a Qualitative standard is that it is based around the behaviour of a safety control system and how it responds to faults – in other words, the "Quality" of the safety control system.

It does not address the probability of faults occurring, or the time taken for them to occur.

The categories are scaled from least effective to most effective in reducing risk.

| Category Level | Safety Function |
|---|---|
| B | Standard product not designed specifically for safety application. |
| 1 | Product designed using reliable components and well tried safety principles. Can still fail but is less likely to. In practice Category 1 is regarded as the minimum Category for safety. |
| 2 | Product designed using reliable components and well tried safety principles, plus a periodic manual of automatic check of safety function. |
| 3 | A single fault shall not cause the loss of the safety function and that fault should be detected at or before next demand on the safety function. |
| 4 | A single fault must be detected before the next demand on the safety function. An accumulation of non-detected single faults shall not cause the loss of the safety function (in practice, 2 or 3 faults). |

## Quantitative
### Safety Integrity Level (SIL) and Performance Level (PL)

The Quantitative standards consider not only the behaviour of the system with respect to faults, but also consider calculated probabilities, which include the likelihood of a failure occurring, the failure being dangerous or safe and the likelihood of detecting failures.

Both ratings are based on calculations of the performance of the individual components in the safety control system and how they are arranged; and ultimately are a function of the probability of dangerous failure in any given hour.

For example, PLe and SIL 3 are defined by the probability of a dangerous fault in any given hour of between $10^{-8}$ and $10^{-7}$ – you could also look at this as the reciprocal, which is roughly the equivalent of once every 1,000 to 10,000 years. Considering the defined expected lifetime of the machine is 20 years, you can see how effective a high integrity safety control system to PLe or SIL3 can be.

| Performance Level | Average probability of dangerous failure per hour | Safety Integrity Level (SIL) | Average probability of dangerous failure per hour |
|---|---|---|---|
| a | $\geq 10^{-5}$ to $< 10^{-4}$ | | |
| b | $\geq 3 \times 10^{-6}$ to $< 10^{-5}$ | | |
| c | $\geq 10^{-6}$ to $< 3 \times 10^{-6}$ | 1 | $\geq 10^{-6}$ to $< 10^{-5}$ |
| d | $\geq 10^{-7}$ to $< 10^{-8}$ | 2 | $\geq 10^{-7}$ to $< 10^{-6}$ |
| e | $\geq 10^{-8}$ to $< 10^{-7}$ | 3 | $\geq 10^{-8}$ to $< 10^{-7}$ |

# GuardLink Technology

Video

GuardLink 1.0

User Manual | Installation Instructions

GuardLink 2.0

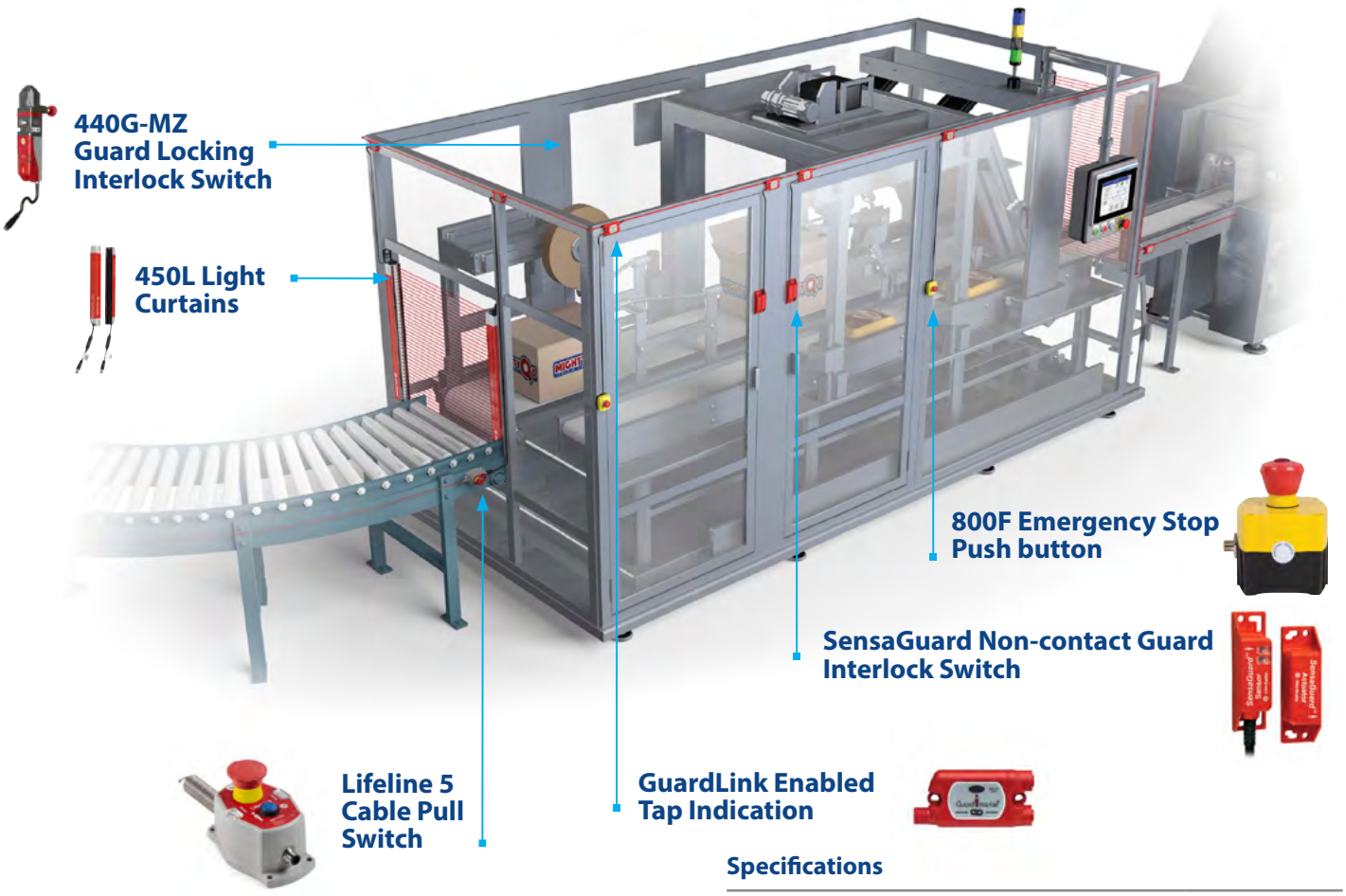
User Manual | Installation Instructions

## 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.

## Features

- Remote lock/unlock and fault reset of safety input devices can be achieved
- Up to 32 devices per safety channel (guardlocking, light curtains and e-stops)
- Up to 1000m link total distance
- Up to 30m(with-guardlocking) &100m (without-guardlocking) between Taps
- Up to 10m from Tap to Safety Device)
- No configuration required, with wiring achieved through use of M12 connecting cables
- CIP Safety over EtherNet/IP




## Specifications

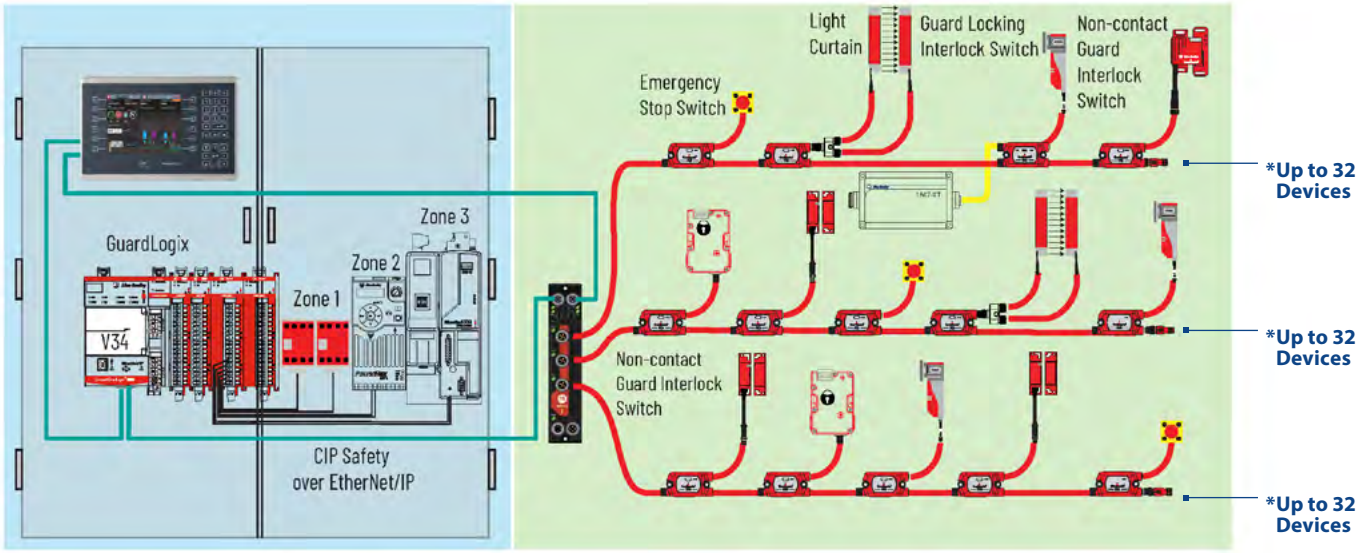
| | |
|---|---|
| Safety Rating | CAT 4, SIL 3, PLe |
| Ingress Protection | IP66/67/69k |
| Operating Voltage | 24V DC |

# System Examples

## GuardLink 2.0

| In-Cabinet | On-Machine |
|---|---|

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

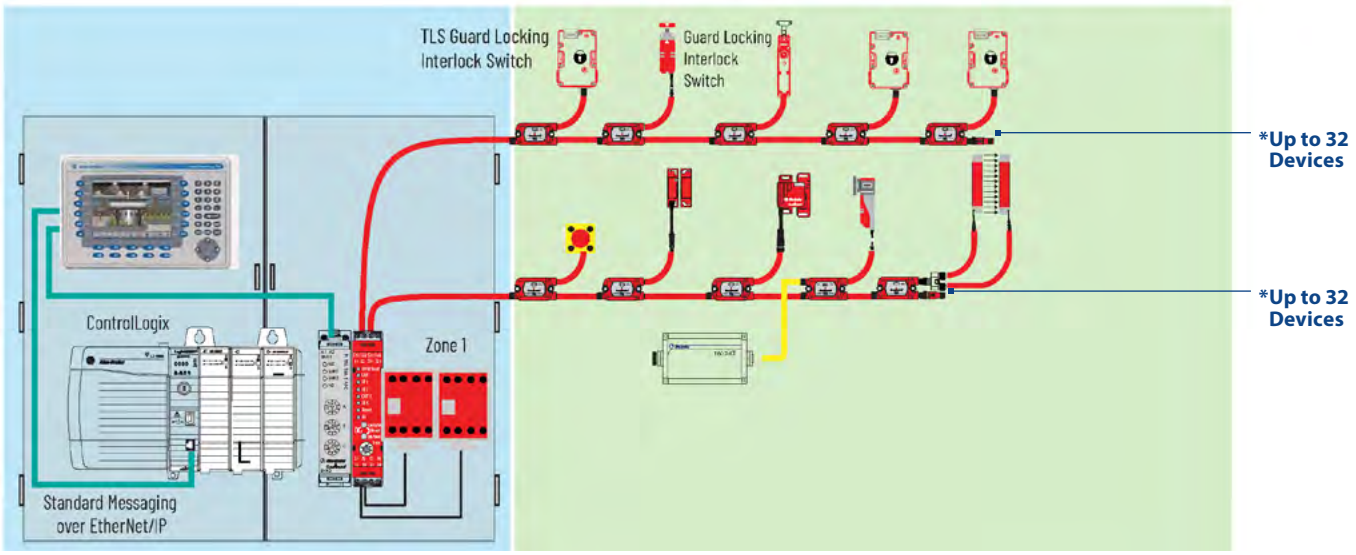



**Three independent** GuardLink channels controlling **three machine zones** with a 1756 Control GuardLogix 5580 or 5069 Compact GuardLogix 5380.

## GuardLink 1.0

| In-Cabinet | On-Machine |
|---|---|

**Dual GuardLink Relay with GuardLink EtherNet/IP Interface (44OR-DG2R2T (DG) with 44OR-ENETR)**

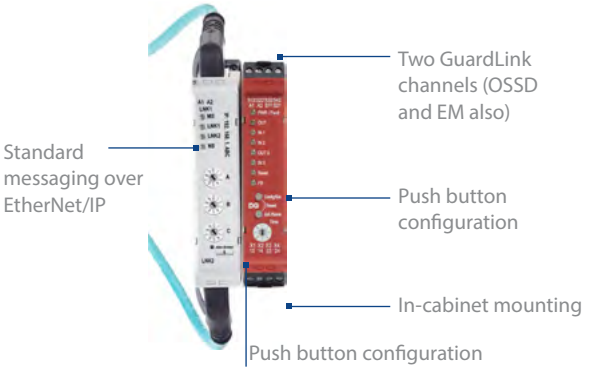



**Two GuardLink channels** controlling **one machine zone**, with lock control from a GuardLogix® controller.

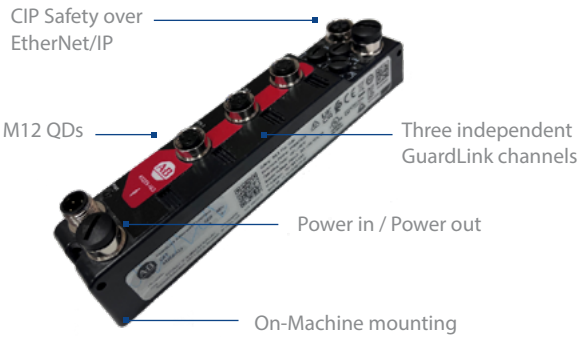
# Product selection

**Step 01:** Select either 01a) In-Cabinet, or, 01b) On-Machine EtherNet/IP Communication module

## 01a) GuardLink 1.0
## Dual GuardLink Relay with GuardLink EtherNet/IP Interface (440R-DG2R2T (DG) with 440R-ENETR)




## 01b) GuardLink 2.0
## 432ES GuardLink EtherNet/IP Interface (432ES-IG3)




### Step 01a: GuardLink 1.0 In-Cabinet Safety Relay

| | |
|---|---|
| Guardmaster Ethernet Interface Communication Relay | 440R-ENETR |
| In-Cabinet Unshielded Teal Ethernet Cordset RJ45 straight to RJ45 Right Angle | 1585J-M8TBJM-* |

Replace * with 0M15(.15m), 0M2(.2m) 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 3(3m), 4(4m), 5(5m), 10(10m), 15(15m), 20, (20m), 30(30m), 40(40m)

| | |
|---|---|
| Guardmaster Safety Relay Dual GuardLink Master | 440R-DG2R2T |
| DC Micro 4-Pin (M12) Red Cordset (30m max) | 889D-F4NE* |

Replace * with 2(2m), 5(5m), 10(10m, 15(15m), 20(20m, 30(30m)

### Step 01b: GuardLink 2.0 On-Machine CIP Safety Interface Module

| | |
|---|---|
| CIP SAFETY EtherNet/IP Network Interface module | 432ES-IG3 |
| Module to Tap - DC Micro 4-Pin Red Patchcord | 889D-F4NEDM* |
| Module to Power Supply - DC Micro 4-Pin Yellow Cordset(M12>Flying Lead) | 889D-F4AE-* |
| Module to Power Supply - DC Micro 4-Pin Yellow Patchcord(M12>M12) | 889D-F4AEDM-* |
| Unshielded Teal Ethernet patchcord (M12>RJ45) | 1585D-M4TBJM-* |
| Unshielded Teal Ethernet patchcord (M12>M12) | 1585D-M4TBDM-* |

Replace * with 0M15(.15m), 0M2(.2m) 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 3(3m), 4(4m), 5(5m), 10(10m), 15(15m), 20, (20m), 30(30m), 40(40m)

**Step 02:**

### Step 02a: Select GuardLink Enabled Tap

| | |
|---|---|
| 5-Pin EMSS (Electromechanical Safety Switch) GuardLink Enabled Tap PTR (Power to Release) | 440S-MF5D |
| 8-Pin EMSS (Electromechanical Safety Switch) GuardLink Enabled Tap PTR (Power to Release) | 440S-MF8D |
| 5-Pin OSSD (Output Signal Switching Device) GuardLink Enabled Tap PTR (Power to Release) | 440S-SF5D |
| 8-Pin OSSD (Output Signal Switching Device) GuardLink Enabled Tap PTR (Power to Release) | 440S-SF8D |
| 8-Pin EMSS (Electromechanical Safety Switch) GuardLink Enabled Tap PTL (Power to Lock) | 440S-MLF8D |
| 8-Pin OSSD (Output Signal Switching Device) GuardLink Enabled Tap PTL (Power to Lock) | 440S-SLF8D |

### Step 02b: Select GuardLink Passive Tap

| | |
|---|---|
| GuardLink Power Tap (for extended length applications with Voltage drop requirements)* | 440S-PF5D4 |
| 5-Pin GuardLink Passive Tap (Only for use with GuardLink Embedded Devices Ex. 440G-MZ) | 440S-PF5D |

**Note*** Armor Block on Machine IP67 Power Supply 1607-XT100D1A
Connecting cable 889D-F4AENM-1

**Step 03:**

### Step 03a: Select Patchcord (M12 to M12) from Tap to Safety Device

| | |
|---|---|
| DC Micro 5-Pin Red Patchcord (10m max) | 889D-F5NCDM* |
| DC Micro 8-Pin Red Patchcord (10m max) | 889DF8NBDM* |

Replace * with 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 5(5m), 10(10m)

### Step 03b: Select Patchcord (M12 to M12) from Tap to Tap

| | |
|---|---|
| DC Micro 4-Pin Red Patchcord (30m max) | 889D-F4NEDM* |

Replace * with 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 5(5m), 10(10m, 15(15m), 20(20m, 30(30m)

**Step 04 & Step 05:**

### Step 04: Select required GuardLink Tap Mounting Bracket

| | |
|---|---|
| GuardLink Enabled Tap Mounting Bracket - QTY 1 | 440S-GLTAPBRK1 |
| GuardLink Enabled Tap Mounting Bracket - QTY 5 | 440S-GLTAPBRK5 |

### Step 05: Select required GuardLink Tap Terminator Plug

| | |
|---|---|
| GuardLink Terminator Plug for last Guardlink Enabled Tap | 898D-418U-DM2 |

### Step 06: Select optional Accessories

| | |
|---|---|
| GuardLink Shorting Plug (When no input safety device at Tap) | 898D-41KU-DM2 |
| T-Port for 450L 5-Pin Light Curtains | 1485P-RDR5 |
| GuardLink Voltage Calculator Spreadsheet - FREE | 440S-TVC |
| GuardLink Enabled Tap Interoperability List - FREE | 440S-TIL |

**Note:** Guard Switches Locking and Unlocking functions must be configured in controller via the 440R-ENETR network interface module.
The 440R-ENETR is not safety rated and only for resets, monitoring and status, diagnostics and Lock/ Unlock functions.

Step 01a





Step 01b

Cordset,
Relay to 1st Tap
01a) 889D-F4NE-*
01b) 889D-F4NEDM*

Step 02a

**440S-MF5D**
GuardLink enabled tap PTR
5-Pin M12 EM Contacts
(Electromechanical)

Step 03a

**Compatible 5-Pin EMSS Devices**



800F E-Stop



440P
Limit Switches

Patchcord
Tap 01 to Tap 02
889D-F4NEDM*

Step 03b

**440S-MF8D**
GuardLink enabled tap PTR
8-Pin M12 EM Contacts
(Electromechanical)

**Compatible 8-Pin EMSS Devices**



440G-TLS-GD2
Guard Lock

Patchcord
Tap 02 to Tap 03
889D-F4NEDM*

**440S-SF5D**
GuardLink enabled tap PTR
5-Pin M12 SS Contacts
(Solid State)

**Compatible 5-Pin OSSD Devices**



440E
Pull Wire



440N
Non-Contact



440N
Latch Actuator



440N
Non-Contact



450L
Light Curtain

Patchcord
Tap 03 to Tap 04
889D-F4NEDM*

**440S-SF8D**
GuardLink enabled tap PTR
8-Pin M12 SS Contacts
(Solid State)

**Compatible 8-Pin OSSD Devices**



440E
Pull Wire



440N
Non-Contact



440N
Latch Actuator



440G-TLS-Z-GD2
Guard Lock



440G-LZ
Bolt Lock

Patchcord
Tap 04 to Tap 05
889D-F4NEDM*

**440S-MLF8D**
GuardLink enabled tap PTL
8-Pin M12 EM Contacts
(Electromechanical)

**Compatible 5-Pin EMSS Devices**



440G-TLS-GD2
Guard Lock

Patchcord
Tap 05 to Tap 06
889D-F4NEDM*

**440S-SLF8D**
GuardLink enabled tap PTL
8-Pin M12 SS Contacts
(Solid State)

**Compatible 8-Pin OSSD Devices**



440G-EZ
Electromagnetic
Lock



440G-LZ
Bolt Lock

Step 05

**898D-418U-DM2**
Terminator Plug



440G-MZ
Guard Lock

**440S-PF5D**
GuardLink Passive
Tap M12 5-Pin

Patchcord
Tap 06 to Tap 07
889D-F4NEDM*



Power
Supply

**440S-PF5D4**
Power Tap

Step 2b

Patchcord
Tap 06 to Tap 07
889D-F4NEDM*



440G-MZ
Guard Lock

# Guardshield POC/PAC Safety Light Curtains 450L

User Manual | POC Installation Instructions | PAC Installation Instructions

POC



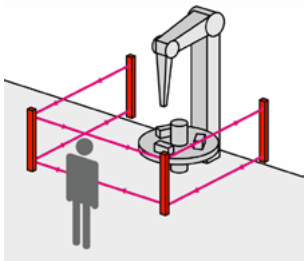
PAC



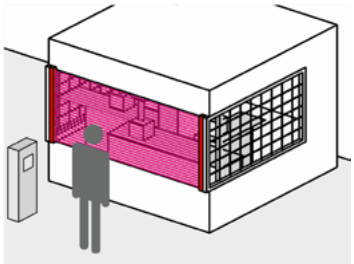
## Overview

The 450L GuardShield™ POC and PAC safety light curtains features patented technology allowing each transceiver stick to be used as a transmitter or receiver via an plug-in module. The 450L-B is a basic model with on/off functionality. The 450L-E in a enhanced model featuring integrated laser alignment, cascading, and integrated muting. This advanced technology greatly reduces stock and provides a flexible, cost-effectivey solution.

PAC



POC



## Features

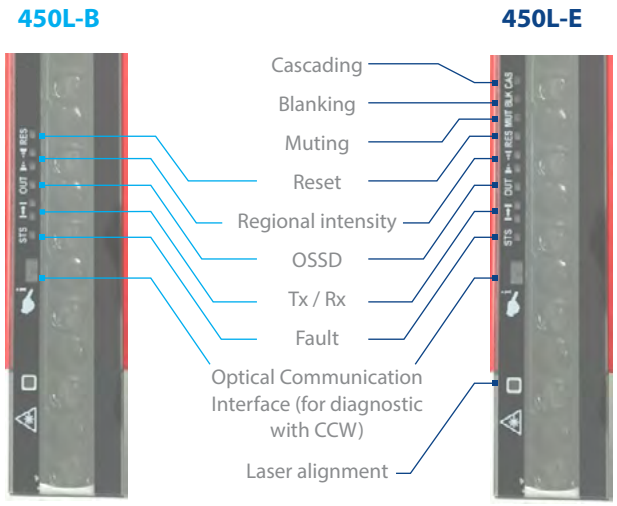
- Point of Operation Control (POC) for finger (14mm) or hand (30mm) protection
- Perimeter Access Control (PAC) covering 1, 2, 3 or 4-beam hight models
- Innovative plug-in modules for application flexibility and reduced inventory costs
- Integrated laser alignment system helps provide quick and more reliable installation
- CIP Safety over EtherNet/IP

### POC (Point of Operation Control)

A safety light curtain designed for partial-body detection close to the hazard where personnel interact with a machine as part of the process.

### PAC (Perimeter Access Control)

A safety light curtain designed for whole-body detection to create a safety perimeter around a machine.




| Function | POC 450L-B | POC 450L-E | PAC 450L-E |
|---|---|---|---|
| Operating Range 14mm Res. | 0.5 .. 4m | 0.5 .. 9m | n/a |
| Operating Range 30mm Res. | 0.9 .. 7m | 0.9 .. 16.2m | 0.9 .. 16.2m |
| Reset | ✔ | ✔ | ✔ |
| External Device Monitoring | ✔ | ✔ | ✔ |
| Low Operating Range | ✔ | ✔ | ✔ |
| Muting | – | ✔ | ✔ |
| Blanking | – | ✔ | – |
| Cascading | – | ✔ | ✔ |
| CIP Safety over EtherNet/IP | ✔ | ✔ | 2024 release |
| Laser Alignment | External | Integrated | Integrated |

## Specifications

| | |
|---|---|
| **Safety Rating** | Type 4, PLe, CAT 4, SIL3 |
| **Enclosure Rating** | IP65 |
| **Cross Section** | 30 x 30mm |
| **Power Supply & Current** | 24V DC ±15% |
| **Safety Output** | 2 OSSDs max .5A |

# Product selection

## Step 01

- Select 2 Transceiver sticks of the same functionality, resolution and height

| A) Determine Functionality: | B) Determine Resolution: | C) Determine Protected height: |
|---|---|---|
| POC 450L-Basic or 450L-Enhanced<br>PAC 450L-Enhanced | Hand Protection (30mm)<br>or Finger Protection (14mm) | From 150mm to 1950mm<br>in 150mm increments |
| | 1-Beam, 2-Beam, 3-Beam, 4-Beam | 150mm, 600mm, 900mm, 1050mm |



### POC: Point of Operation Control

| Basic | Catalogue No. |
|---|---|
| Transceiver Stick with 14 mm Finger Resolution (mounting kit included)* | 450L-B4FNxxxxYD |
| Transceiver Stick with 30 mm Hand Resolution (mounting kit included)* | 450L-B4HNxxxxYD |
| **Enhanced** | |
| Transceiver Stick with 14 mm Finger Resolution (mounting kit included)* | 450L-E4FLxxxxYD |
| Transceiver Stick with 30 mm Hand Resolution (mounting kit included)* | 450L-E4HLxxxxYD |

**xxxx:** 0150 … 1950 mm in increments of 150 mm (150, 300, 450, 600, 750, **900**, 1050, 1200, 1350, 1500, 1650, 1800, 1950).
For example: "450L-E4FL0900YD" indicates an order for **900 mm** finger detection light curtain transceiver stick.
* Mounting Brackets included. For optional side mounting bracket kit see Step 05: Accessories.



### PAC : 450L-Enhanced

| Description | 1-Beam (150mm) | 2-Beam (600mm) | 3-Beam (900mm) | 4-Beam (1050mm) |
|---|---|---|---|---|
| PAC (short 0.9 ... 16.2m)* | 450L-E4A1L0150YD | 450L-E4A2L0600YD | 450L-E4A3L0900YD | 450L-E4A4L1050YD |
| PAC (5 ... 30m)* | 2024 release | | | |

* Mounting Brackets included. For optional side mounting bracket kit see Step 05: Accessories.

## Step 02

- Select a Transmitter Plug-in module for one Transceiver stick



### Transmitter plug-in

| Catalogue No. | Pins | Function | POC 450L-B | POC 450L-E | PAC 450L-E |
|---|---|---|---|---|---|
| 450L-APT-PW-5 | 5 | Transmitter | ✔ | ✔ | ✔ |
| 450L-APT-PW-8 | 8 | Transmitter | ✔ | ✔ | ✔ |
| 450L-APU-UN-8 | 8 | Universal Transmitter/Receiver | ✔ | ✔ | ✔ |

## Step 03

- Select a Receiver Plug-in module for one Transceiver stick



### Receiver plug-in

| Catalogue No. | Pins | Function | POC 450L-B | POC 450L-E | PAC 450L-E |
|---|---|---|---|---|---|
| 450L-APR-ON-5 | 5 | Auto reset | ✔ | ✔ | ✔ |
| 450L-APR-ED-8 | 8 | Reset, EDM, Range | ✔ | ✔ | ✔ |
| 450L-APR-BL-5 | 5 | Blanking, Range | n/a | ✔ | n/a |
| 450L-APR-MU-8 | 8 | Muting & Blanking | n/a | ✔ | ✔ |
| 450L-APU-UN-8 | 8 | Universal Transmitter/Receiver | ✔ | ✔ | ✔ |
| 450L-APC-IO-8 | 8 | Cascading & Muting I/O | n/a | ✔ | ✔ |
| 450L-APR-EN-8 | 8 | EtherNet IP Module | ✔ | ✔ | 2024 release |

# Step 04

- Select cordset based on the number of pins on Plug-in modules



889D-F5BC-*

## Cordset

| Description | Catalogue No. |
|---|---|
| Cordset - connector to flying lead DC Micro (M12), Female, Straight, 5-Pin, PVC Cable, Black, Unshielded | 889D-F5BC-* |
| Cordset - connector to flying lead DC Micro (M12), Female, Straight, 8-Pin, PVC Cable, Black, Unshielded | 889D-F8AB-* |

**Note:** For CIP Safety over EtherNet/IP Light Curtain System it's recommended to use a Red Patchord as displayed on next page 889D-F8NBDM-*. Replace * with 2, 5, 10, 15, 20 for required length

# Step 05

- Select optional accessories



450L-AD-OID



800F-MUT-2-MS



450L-AMOD-MUT-8



450L-AM-SM



450L-ENETR

## Accessories

| Description | Catalogue No. |
|---|---|
| Optical interface tool (required for diagnostics on Connected Components Workbench software v12 onwards) | 450L-AD-OID |
| Weld shield kit (xxxx = 0150 … 1950 mm in increments of 150 mm) | 450L-AW-xxxx |
| Laser alignment tool for 450L-B (Requires 450L-ALAT-C) | 440L-ALAT |
| Mounting bracket for laser alignment tool 440L-ALAT | 450L-ALAT-C |
| Side mounting bracket kit | 450L-AM-SM |
| Shock mounting bracket kit (1 Stick) | 445L-AF6142 |
| Termination plug, M12 8-pin for cascading plug-in | 898D-81CU-DM |
| CIP Safety over EtherNet/IP Module | 450L-ENETR |

## Muting Accessories

| Description | Catalogue No. |
|---|---|
| Muting distribution block | 450L-AMOD-MUT-8 |
| Muting Indication and Reset Block | 800F-MUT-2-MS |
| Muting Lamp | 450L-AMUT-IL |
| Photoelectric Polarised Retroreflective Sensor 11-30VDC 25mm-3m sensing range (Requires 92-90 Reflector) | 42EF-P2MPB-F4 |
| Reflector Cube 86mm diameter | 92-90 |

## **Safety Relays** (for more information see pages 92-90)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

## **Guardlink Smart Taps** (for more information see pages 6-7)

| Description | Catalogue No. |
|---|---|
| GuardLink Enabled Tap 5-pin OSSD Input device | 440S-SF5D |
| T Connector M12-5 Pin (Two Transceiver sticks into single GuardLink Tap) | 1485P-RDR5 |
| GuardLink Red Patchcord to device 5-Pin | 889D-F5NCDM-* |
| GuardLink Red Patchcord to device 8-Pin | 889D-F8NBDM-* |
| GuardLink Red Patchcord from Tap to Tap | 889D-F4NEDM-* |
| GuardLink Red Patchcord from Tap to Safety Relay | 889D-F4NE-* |

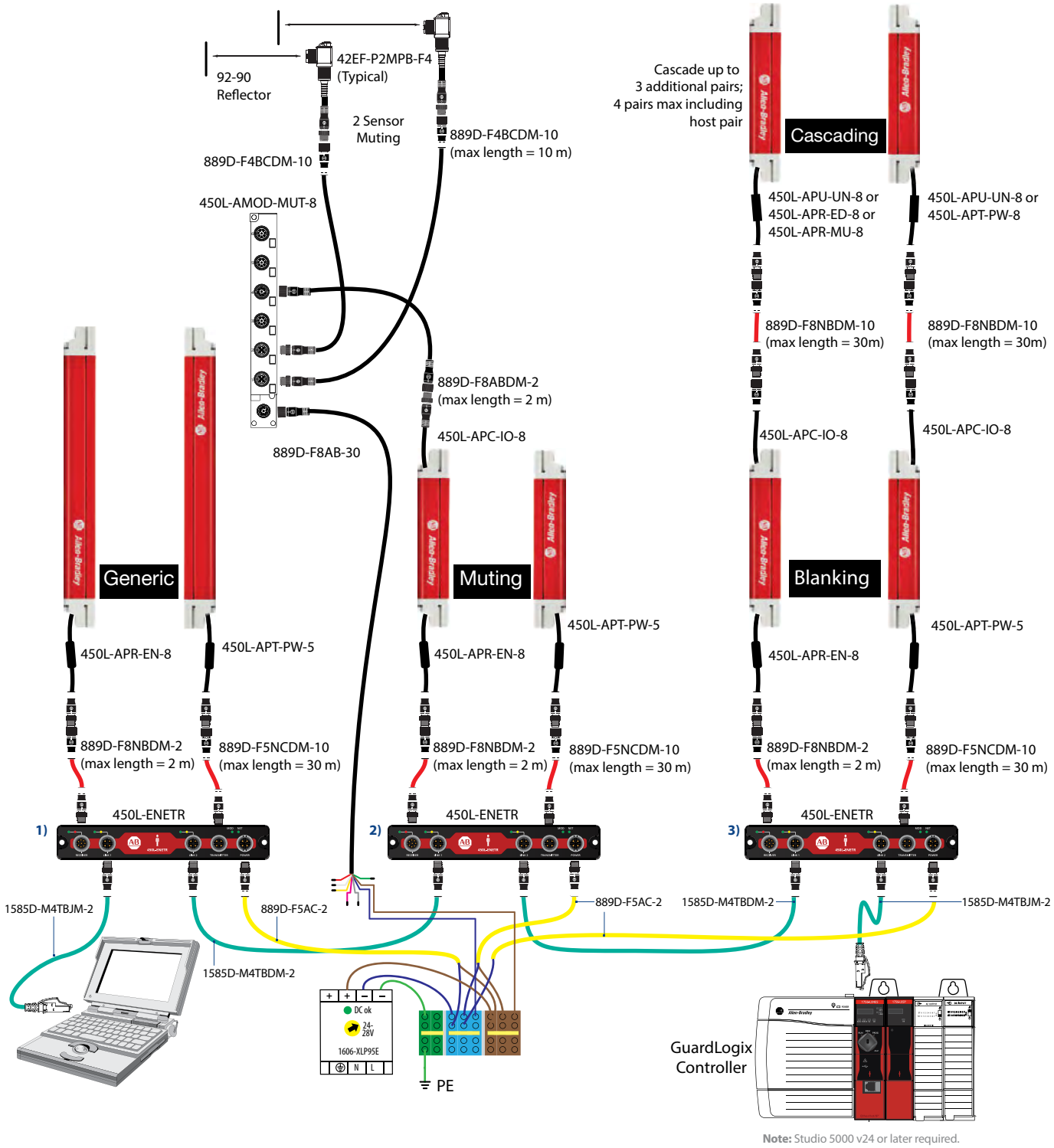
**Note:** Replace * with 0M3 (0.3m), 0M6 (0.6m), 2 (2m), 5 (5m), 10 (10m), 15 (15m), 20 (20m) for required length.

# CIP Safety Light Curtain System

User Manual

The 3 examples below illustrate how a

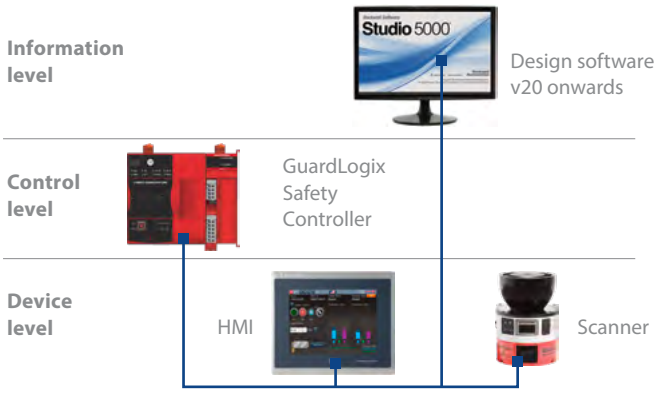
1) Generic Light curtain system is configured
2) Muting Light curtain system is configured
3) Cascading/Blanking system is configured




**Note:** Studio 5000 v24 or later required.

# SafeZone 3 CIP Safety Laser Scanner 442L



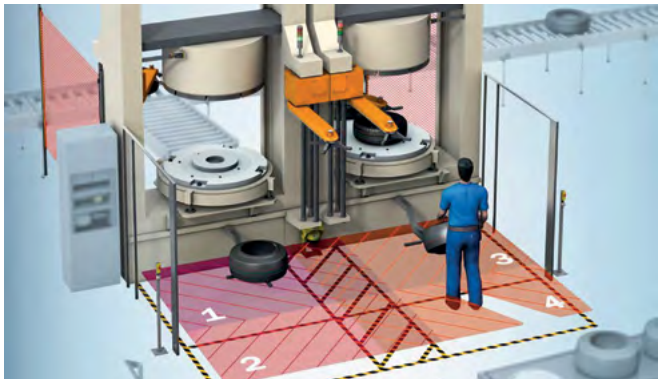



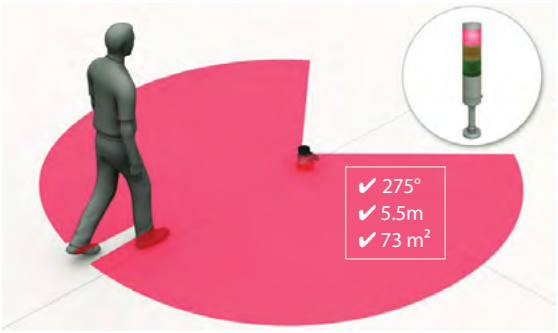

**Bright multicolor text display**
Easy-to-understand displays, providing current status and diagnostic information.

## Features

User Manual | Installation Instructions

- EtherNet/IP connectivity can help improve installation time
- Easy integration using an add-on profile in Studio 5000 Logix Designer
- Supports Device Level Ring (DLR) network topology
- High definition distance measurement scanning technology helps prevents dust, smoke and optical interferences
- Multi-coloured display and push buttons offer device settings and diagnostic information
- MultiZone safety field is 5.5 m, 8 fields
- Wide 275° scanning angle









## New Generation of Safety Laser Scanner

Using Common Industrial Protocol (CIP) Safety over Ethernet/IP, the SafeZone3 laser scanner adds the advantage of integration with a GuardLogix control system using Studio 5000 Logix Designer. Along with supporting Device Level Ring (DLR) network topology which helps increase network resiliency. The scanner also Features high definition distance measurement scanning technology with a substantial increase in the number of pulses per scan along with two scan cycle settings which result in improved performance in dusty environments and increased immunity to optical interference.

### Specifications

| | |
|---|---|
| **Safety Rating** | SIL2, PLd |
| **Enclosure Rating** | IP65 |
| **Dimensions** | 135 x 110 x 110 |
| **Power Supply** | 24VDC |
| **Temperature Range** | -10…+50C |
| **Safety Field Range** | 5.5m |
| **Scanning Angle** | 275 |
| **Resolution** | 30/40/70/150/200mm |
| **Fields** | 8 |
| **Monitoring cases Simultaneously** | 8<br>4 |

# Product selection

## Step 01

- Select SafeZone 3 Safety Laser Scanner



### SafeZone 3 Safety Laser Scanner

| Description | Catalogue No. |
|---|---|
| SafeZone 3 Multizone CIP Safety Laser Scanner 5.5 Meter, 8 Fields | 442L-SZNMZCP |

## Step 02

- Select Required System Plug




442L-SZNCPMOD

### System Plug

| Description | Catalogue No. |
|---|---|
| SafeZone 3 System Plug (stores configuration memory) | 442L-SZNCPMOD |

**Note:** A complete SafeZone 3 system consists of the multizone scanner with a SafeZone 3 system plug

## Step 03

- Select Required Mounting brackets



Bracket 1



Bracket 2



Bracket 3



Bracket 4

### Mounting brackets

| Description | Catalogue No. |
|---|---|
| Mounting Bracket 1 - Most commonly used | 442L-AMBSZCP1 |
| Mounting Bracket 2 - Provides protection for Optics Cover | 442L-AMBSZCP2 |
| Mounting Bracket 3 - When system plug installed on the bottom (connects to bracket 1 or 2) | 442L-AMBSZCP3* |
| Mounting Bracket 4 - When system plug installed at rear and right angled connectors used | 442L-AMBSZCP4* |

* Connects to mounting bracket 1 or 2

## Step 04

- Select Required Power Cable

### Power cable

| First End Connector | Second End Connector | Cable Type | Catalogue No. |
|---|---|---|---|
| Straight Female | Straight Male | Braided shield 4-pin M12 Yellow | 889D-F4ECDM-* |
| Straight Female | Flying leads | | 889D-F4EC-* |
| Straight Female | Straight Male | Foil and braided shield 4-pin M12 Yellow | 889D-F4FCDM-* |
| Straight Female | Flying leads | | 889D-F4FC-* |

**Note:** Replace * with 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 5(5m), 10(10m), 15(15m), 20(20m), 30(30m)

## Step 05

- Select Required Ethernet Cables

### Ethernet Cable

| First End Connector | Second End Connector | Cable Type | Catalogue No. |
|---|---|---|---|
| Male M12 D-Code, straight | Flying leads | Foil and braided shield, 4 conductor, teal PUR, flex rated, halogen-free | 1585D-M4UB-* |
| Male M12 D-Code, straight | Male M12 D-Code, straight | | 1585D-M4UBM-* |
| Male M12 D-Code, straight | Female M12 D-Code, straight | | 1585D-M4UBDF-* |
| Male M12 D-Code | RJ45 | | 1585D-M4UBJM-* |

**Note:** Replace * with 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 3(3m), 5(5m), 10(10m), 15(15m), 20(20m), 30(30m).

## Step 06

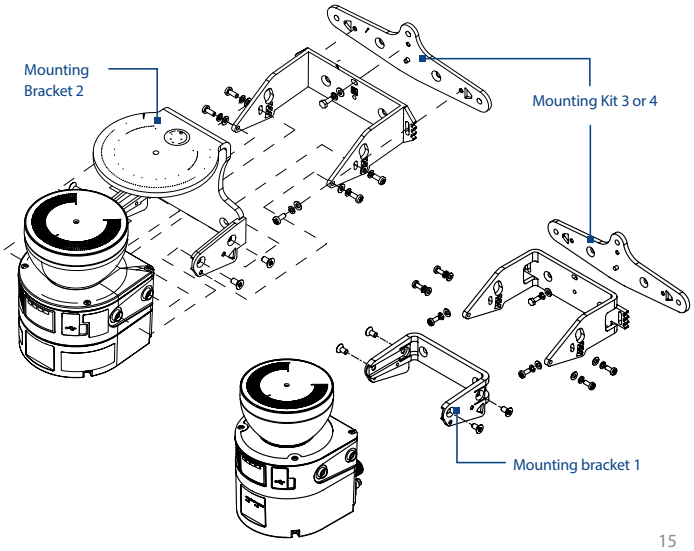
- Select optional accessories



442L-ASZNCPW

### Accessories

| Description | Catalogue No. |
|---|---|
| SafeZone 3 CIP Laser Scanner Replacement Optics Cover | 442L-ASZNCPW |
| SafeZone 3 CIP Laser Scanner Replacement Cover Plate | 442L-ACVR |



# SafeZone Mini, Single, Multi Zone Laser Scanners 442L

SafeZone Mini
- User Manual
- Installation Instructions

SafeZone Single/Multi
- User Manual
- Software Manual
- Software Download

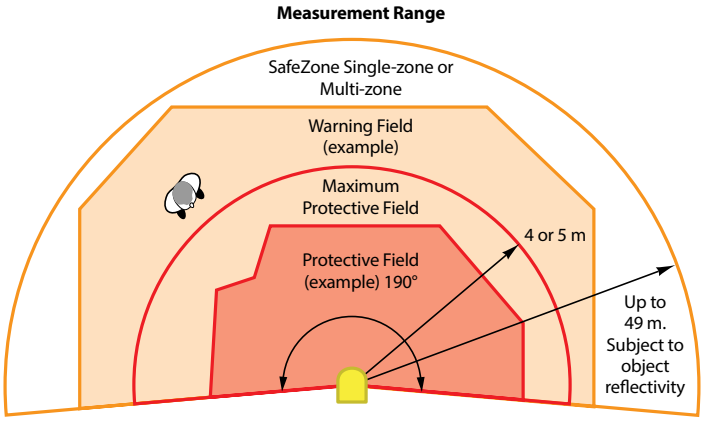



## A flexible, easy-to-use machine safeguarding solution

SafeZone safety laser scanners are Type 3 optoelectronic devices that use reflection of emitted infrared laser light to sense a person or object within a user-defined area.

The Class 1 (eye safe) infrared laser scans a 190° or 270° angular area to create a two-dimensional detection field. Light reflected off an object or person in the field is processed by the SafeZone, which sends a stop signal to the machine.

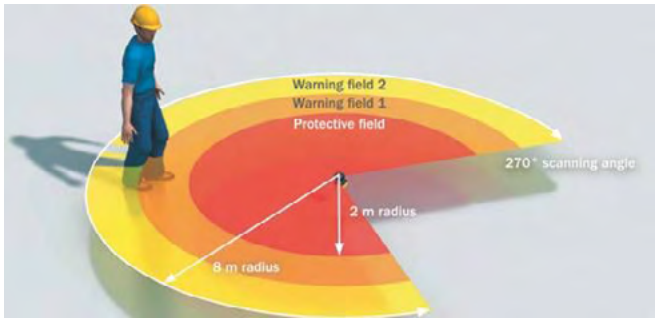
SafeZone single-zone scanners feature one user configured sensing field, while multi-zone versions provide four switchable, configurable field sets (warning and safety).




## Features

- Single-zone, multi-zone, and mini versions
- Selectable resolutions of 30, 40, 50, 70, and 150 mm
- Horizontal or vertical mounting
- Stationary or mobile applications
- Class 1 laser (eye safe)
- Easy-to-use configuration wizard
- Seven-segment diagnostic display, rotatable by 180°






## Specifications

| | |
|---|---|
| **Safety Rating** | Type 3, PLd, CAT 3, SIL2 |
| **Enclosure Rating** | IP65 |
| **Cross Section** | 30 x 40mm |
| **Power Supply** | 24V DC ±20%30% |
| **Power Consumption** | 55W with max output load, 19W without output load |

# Product selection

## Step 01

- Select SafeZone safety scanner




442L-SFZNSZ

442L-SFZNMN3

### SafeZone safety scanner

| Model | Application specific resolutions | Safety outputs | Auxiliary outputs | Angular scanning range | Safety field range | Catalogue No. |
|---|---|---|---|---|---|---|
| SafeZone Mini, 3 m | 30, 40, 50, 70 and 150 mm | 2 PNP | 2 (configurable) | 270° | 3 m | 442L-SFZNMN3 |
| SafeZone Single-zone | 30, 40, 50, 70 and 150 mm | 2 PNP | 1 | 190° | 4 m | 442L-SFZNSZ |
| SafeZone Multi-zone* | 30, 40, 50, 70 and 150 mm | 2 PNP | 1 | 190° | 5 m | 442L-SFZNMZ |

**Note:** V3.0.0 operating software CD ships with each SafeZone safety laser scanner and also contains pdf files of the Installation and Software manuals.
*Multi Zone has FOUR configurable switchable field sets

## Step 02a
## SafeZone Mini

- Select cable



442L-ACABL10

### SafeZone Mini M12 shielded 8-conductor cordset

| Cable Length | Catalogue No. |
|---|---|
| 2 m | 442L-ACABL2 |
| 10 m | 442L-ACABL10 |
| 20 m | 442L-ACABL20 |

## Step 02b
## SafeZone Single and Multi-zone

- Select Prewired I/O connector cable and Memory Module



442L-CSFZNMZ-10

### Prewired I/O connector cable and memory module

| Cable Length | Catalogue No. |
|---|---|
| 10 m | 442L-CSFZNMZ-10 |
| 20 m | 442L-CSFZNMZ-20 |

## Step 03
## SafeZone Mini, Single and Multi-Zone

- Select Suitable RS232 USB Service Programing Cable



442L-ACUSB-2

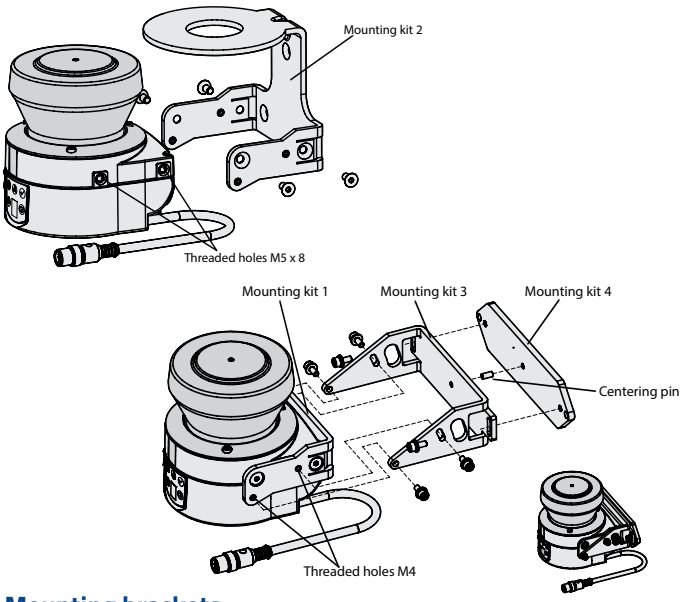
### RS232 USB

| Cable Length | Catalogue No. |
|---|---|
| 2 m | 442L-ACUSB-2 |
| 10 m | 442L-ACUSB-10 |

**Note**
Only one cable required if multiple safety Laser Scanners are selected

## Step 04a
## SafeZone Mini

- Select Mounting Brackets

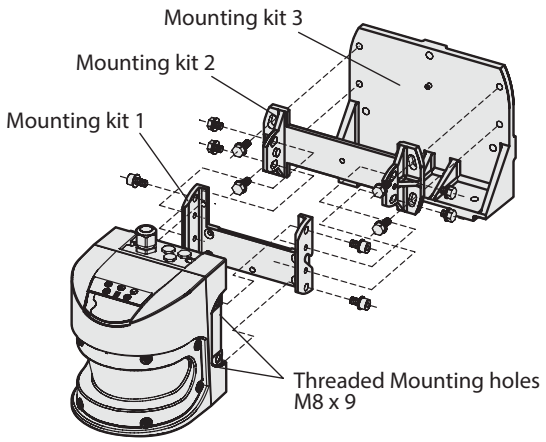



### Mounting brackets

| Description | Catalogue No. |
|---|---|
| **SafeZone Mini Mounting Bracket 1** for direct mounting | 442L-AMBSZMN1 |
| **SafeZone Mini Mounting Bracket 2** for optical cover protection | 442L-AMBSZMN2 |
| **SafeZone Mini Mounting Bracket 3** longitudinal and cross wise adjustment possible (requires bracket 1 or 2) | 442L-AMBSZMN3 |
| **SafeZone Mini Mounting Bracket 4** backplane mounting (requires brackets 2 and 3 | 442L-AMBSZMN4 |

## Step 04b
## SafeZone Single and Multi-Zone

- Select Mounting Brackets




### Mounting brackets

| Description | Catalogue No. |
|---|---|
| **SafeZone Mounting Bracket 1** For mounting the back of the scanner to a solid surface without adjustment | 442L-AMBSFZNMZ1 |
| **SafeZone Mounting Bracket 2** For +/- 4 degrees of adjustability (requires bracket 1) | 442L-AMBSFZNMZ2 |
| **SafeZone Mounting Bracket 3** Used for floor mounting (requires brackets 1 or 2 and 3) | 442L-AMBSFZNMZ3 |

## Step 05

- Select optional accessories



442L-SZMNW

### Accessories

| Description | Catalogue No. |
|---|---|
| SafeZone Mini Replacement window kit | 442L-SZMNW |
| SazeZone Single and MultiZone window kit | 442L-SFZNMZW |
| USB to Serial Port Adaptor Cable | 9300USBS |
| 100 Meter Cable Spool 13 conductor (Step 02b) | 442L-C13GD-S100 |
| Power Supply | 1606-XLP72E |



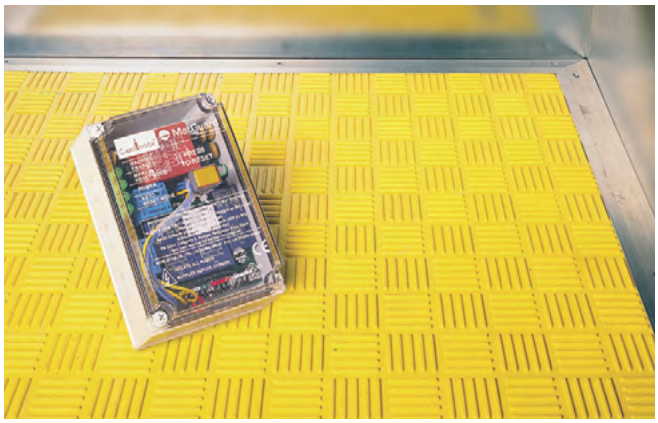
### Safety Relays (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster (CI) Compatible Input Relay | 440R-S13R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

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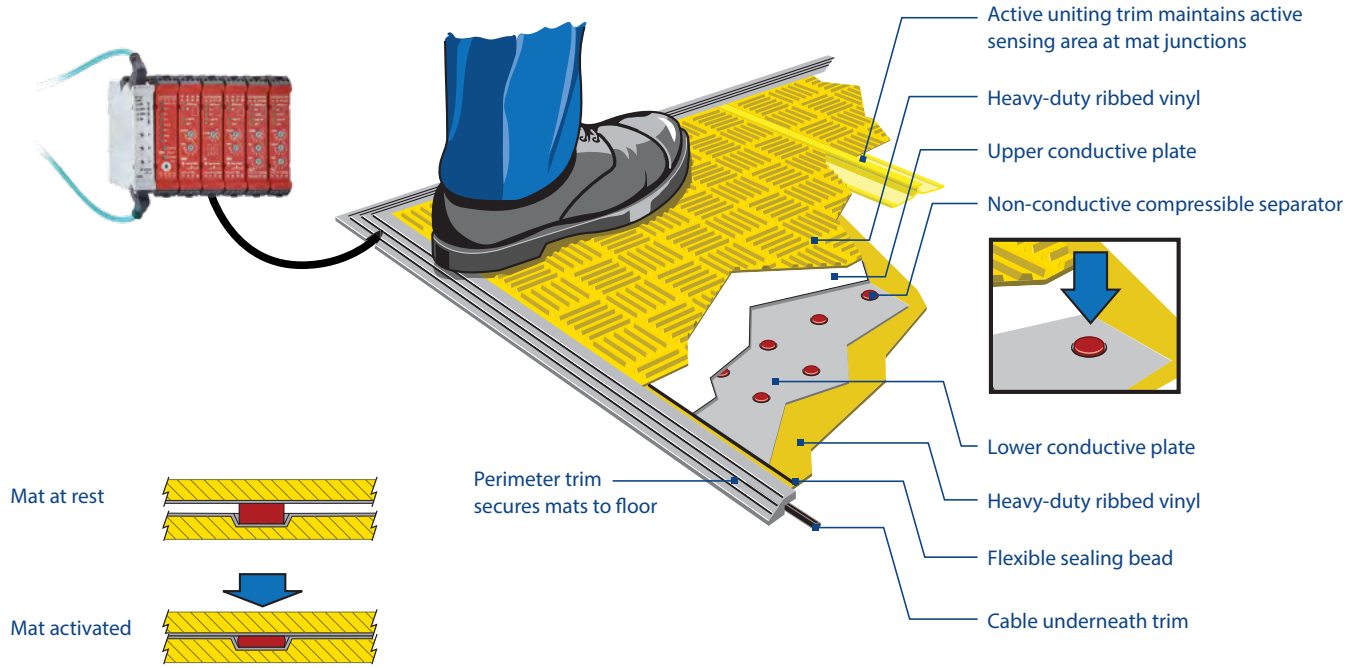
# Safety Mat System 440F

User Manual

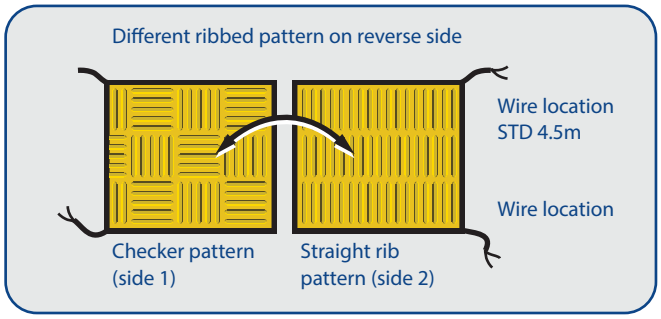


## Features

- Pressure-sensitive protective device per ISO 13856 for machine safeguarding
- Hardened steel plate construction
- No dead spots
- Four-wire system to detect opens and shorts
- Withstands 4500 psi static pressure




When the mat is activated, the non-conductive compressible separators (shown in red) compress into their recess allowing the two plates to make contact giving all over sensitivity.




## Anatomy of a Safety Mat System

When integrated to a suitable safety mat controller, it detects a presence on the mat, a short circuit, or an open circuit. Under each of these conditions, the safety control issues a stop command. Multiple mats can be combined into one safety mat system with the use of joining trim.

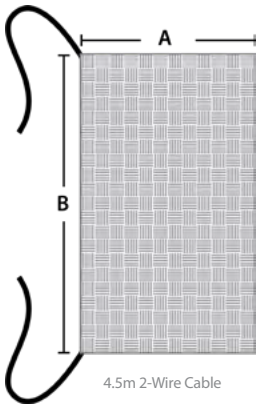
### Specifications

| | |
|---|---|
| **Safety Rating** | CAT 1 |
| **Enclosure Rating** | IP67 |
| **Power Supply** | 24V DC -20% + 10% |
| **Mechanical Life** | 10,000,000 |

# Product selection

## Step 01

- Select dimensions for "A" and "B"



4.5m 2-Wire Cable

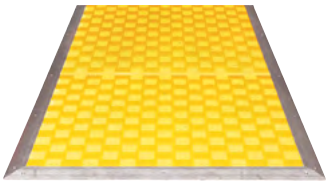
### Preferred availability

| A (mm) | B (mm) |
|---|---|
| 750 | 750, 1500 |
| 1000 | 1250, 1500 |

**Note**
Length "A" options available in 50mm increments from 150mm to 1000mm
Length "B" options available in 50mm increments from 200mm to 1800mm.
Single or Double Cable entries can be selected with Safety mats (see ProposalWorks)

## Step 02

- Select Trim Kit
- When selecting trim for a single mat, ensure that the dimensions are the same as the safety mat


440F-M1515BYNN


440F-T1515

### Trim Kit

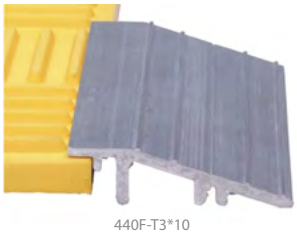
| Mat Size (mm) | Step 01 | Step 02 |
|---|---|---|
| | Safety Mat | Standard Perimeter Trim Kit |
| 750 x 750 | 440F-M1515BYNN | 440F-T1515 |
| 750 x 1500 | 440F-M1530BYNN | 440F-T1530 |
| 1000 x 1250 | 440F-M2025BYNN | 440F-T2025 |
| 1000 x 1500 | 440F-M2030BYNN | 440F-T2030 |

## Step 03

- Select accessories


440F-T3012


440F-T3013


440F-T3*10

### Perimeter trim options

| Description | Catalogue No. |
|---|---|
| Aluminium Perimeter Trim (3 cables), Straight piece (Replace * with 2, 3 for required m length) | 440F-T3*10 |
| Aluminium Perimeter Trim (8 cables), Straight piece (Replace * with 2, 3, 4 for required m length) | 440F-T3*11 |
| Aluminium Perimeter Trim, 90° Right Angle (Replace * with 2, 3 for required m length) | 440F-T3*16 |
| Aluminium Perimeter Trim (3 cables), External Corner | 440F-T3012 |
| Aluminium Perimeter Trim (3 cables), Internal Corner | 440F-T3013 |
| Vinyl Wire Guide 2m (protect cables from trim outwards) | 440F-T3230 |
| Active Uniting Trim (joining mats) (Replace * with 1(1m), 0(1.5m) 2(2m) , 3(3m) for required m length) | 440F-T3*20 |

### **Safety Relays** (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

# Guard Locking Switches 440G

Guard Locking Switches protect hazardous areas where a danger is not immediately removed after a stop request. On many machines, removing power to the motor or actuator will not immediately stop the dangerous motion. Typical applications are high inertia rotating machines, fast rotating machines, and machines where high pressure needs to be released from pneumatic valves.

| Features | 440G-MZ | 440G-TLSZ | 440G-LZ | 440G-EZ | 440G-TLS |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Dimensions (H x W x D)** | 182.7 x 45.2 x 50 | 126 x 86 x 39 | 33 x 86 x 126 | 17 x 60 x 120 | 135 x 45 x 50 |
| **Holding Force** | 2500N | 2000N | 1300N | 500N | 1500 or 2000N |
| **Safety Outputs** | OSSD or GuardLink | OSSD | OSSD | OSSD | Dual Channel EMSS |
| **Available types**[1)] | PTR or PTL | PTR or PTL | PTR or PTL | PTL only | PTR or PTL |
| **Suitable for Whole Body Access** | Yes | Yes | No | Interlocking Only | Yes |
| **Misalignment tolerance** | +/- 5mm | N/A | +/-2.5mm | +/- 5mm | N/A |
| **Actuator coding** | Standard or High | Unique | Standard or High | Standard or High | Standard |
| **Integrated latch** | No | Yes | No | Yes | Yes |
| **Escape release** | Optional | No | No | No | Optional |
| **Connection Options** | 5-Pin only | 8-Pin Only | 5-Pin, 8-Pin, Cable | 5-Pin and 8-Pin | Conduit, 8-Pin, 12-Pin |
| **Material** | ABS | Glass-filled PBT | Glass-filled PBT | Anodised Aluminium | ABS |
| **Safety Function** | | | | | |
| **Door position monitoring** | Yes | Yes | Yes | Yes | Yes |
| **Guard locking** | Yes | Yes | Yes | Process Protection | Yes |

Power to release (PTR) must be used for personnel protection unless otherwise dictated by a risk assessment as per regulations

# 440G-MZ Guard Locking Switch



## Features

- Optimized for full body access
- Provides holding force of 2500 N for guard locking a full-size door
- Tongue actuator movement in multiple axes +/-5 mm misalignment
- Network integration via EtherNet/IP adapter with safety relay
- RFID unique (high) or standard (low) coded actuators
- Features Highly visible 270° wrap-around LEDs for LINK/DEVICE status
- Operate as a standalone device (5-pin OSSD) or GuardLink
- Includes mounting with three entry points on hinged or sliding door

Switch helps protect personnel and is suitable for use with many types of guard doors, including full-sized guard doors, which allow full body access to the safeguarded area, where a high holding force and a wide tolerance to guard misalignment are commonly required. Typical applications include machines which are surrounded by perimeter fences with guard doors for full body access (for example, robotic assembly or packaging machines), machines with built-in full-size doors (for example, bottling machines) and small to medium CNC machines.

### Specifications

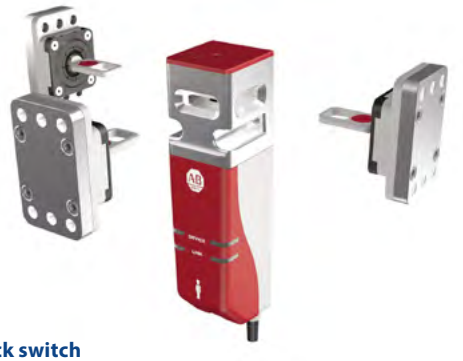
| | |
|---|---|
| **Safety Rating** | Type 4, PLe, CAT 4 , SIL3 |
| **Enclosure Rating** | IP65, IP66, IP67, IP69, IP69K |
| **Safety/Auxiliary outputs** | 2 x PNP (0.2 mA max) No Aux |
| **Power Supply** | 24V DC +10%/-15% Class 2 |
| **Holding Force** | 2500N |

## Product selection Step 01

User Manual

Installation Instructions

- Select Guardlock switch with actuator type



**Guardlock switch**

| Model type | Actuator | Catalogue No.* |
|---|---|---|
| Power to release | RFID standard | 440G-MZS20SNRJ |
| | RFID unique | 440G-MZS20UNRJ |
| Power to lock | RFID standard | 440G-MZS20SNLJ |
| | RFID unique | 440G-MZS20UNLJ |

*** Add an 'E' to the end of the catalogue no. to order escape release version**

## Step 02

- Select cordset and optional accessories



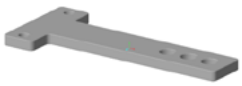
440G-MZAM1



440G-MZAM2



440G-MZAM3



440G-MZAM4

**Cordset and accessories**

| Description | Catalogue No. |
|---|---|
| Actuator Mounting bracket L- shaped | 440G-MZAM1 |
| Actuator Mounting bracket Z- shaped | 440G-MZAM2 |
| Switch Mounting bracket | 440G-MZAM3 |
| Padlock accessory | 440G-MZAL |
| DC Micro M12 to flying lead 5-Pin yellow cordset | 889D-F5AC* |

**Note:** Replace * with 2, 5, 10, 15, 20 for required length

**Safety Relays** (for more information see pages 62-69)

| | |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

**Guardlink** (for more information see pages 6-7)

| | |
|---|---|
| GuardLink Enabled Tap 5-pin Passive Input device | 440S-PF5D |
| Guardlink Red patchord to device 5-Pin | 889D-F5NCDM-* |
| Guardlink Red patchord from Tap to Tap | 889D-F4NEDM-* |
| Guardlink Red patchord from Tap to Relay | 889D-F4NE-* |

**Note:** Replace * with 0M3 (0.3m), 0M6 (0.6m), 2 (2m), 5 (5m), 10 (10m), 15 (15m), 20 (20m) for required length

# TLS-Z GD2 Guard Locking Switch



## Features

- Guard locking plus RFID technology for full body access
- Provides holding force of 2000 N for guard locking a full-size door
- Tongue actuator movement in multiple axes +/-5 mm misalignment
- Built in uniquely coded RFID door sensor
- Auxiliary functionality either lock status (locked/unlocked) or door position status (door open/closed)
- Operate as a standalone device (8-pin OSSD) or GuardLink

The TLS-Z GD2 Guard Locking Switch is an interlock switch that has a uniquely coded RFID door sensor with inductive door position sensing technology. This switch can detect if an actuator key breaks or becomes separated from its door mounted position. Built with the same solid-state technology as the TLS GD2, this switch supports the highest level of safety – Performance Level "e" (PLe) to EN ISO 13849-1.

### Specifications

| | |
|---|---|
| **Safety Rating** | Type 4, PLe, CAT 4 |
| **Enclosure Rating** | IP66, IP67, IP69K |
| **Safety Outputs** | 2 x PNP (0.2 mA max) Status: ON |
| **Auxiliary Outputs** | 1 x PNP (0.2 mA max) Status:)OFF |
| **Power Supply** | 24V DC +10%/-15% Class 2 |
| **Holding Force** | 2000 N |

## Product selection Step 01

User Manual

Installation Instructions

- Select Guard Locking Switch with actuator



### Guardlock switch with actuator

| Model type | Catalogue No. |
|---|---|
| Power to release | 440G-TZS21UPRH |
| Power to lock | 440G-TZS21UPLH |

**Note:** For auxilary output type, replace P (lock status) with T for door status.

## Step 02

- Select cordset optional accessories



440G-A27371



440G-A27356



440G-A36026

### Cordset and accessories

| Description | Catalogue No. |
|---|---|
| DC Micro M12 to flying lead 5-Pin yellow cordset | 889D-F8AB* |
| DC Micro M12 to M12 8-Pin black patchcord | 889D-F8ABDM* |
| Fully Flexible Actuator | 440G-A27143 |
| Cover with external overide Key | 440G-A27371 |
| Cover with overide Key attached | 440G-A27373 |
| Emergency Overide Key | 440G-A36026 |
| Flexible Release cable 1m | 440G-A27356 |
| Flexible Release cable 3m | 440G-A27357 |

**Note:** Replace * with 2, 5, 10, 15, 20 for required length

### **Safety Relays** (for more information see pages 62-69)

| | |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

### **Guardlink** (for more information see pages 6-7)

| | |
|---|---|
| GuardLink Enabled Tap 8-pin OSSD PTL | 440S-SLF8D |
| GuardLink Enabled Tap 8-pin OSSD PTR | 440S-SF8D |
| Guardlink Red patchord to device 8-Pin | 889D-F8NBDM-* |
| Guardlink Red patchord from Tap to Tap | 889D-F4NEDM-* |
| Guardlink Red patchord from Tap to Relay | 889D-F4NE-* |

**Note:** Replace * with 0M3 (0.3m), 0M6 (0.6m), 2 (2m), 5 (5m), 10 (10m), 15 (15m), 20 (20m) for required length

# 440G-LZ Guard Locking Bolt Switch




## Features

- Optimized for partial body access
- Provides holding force of 1300 N for guard locking a full-size door
- Tongue actuator movement in multiple axes +/-5 mm misalignment
- RFID unique (high) or standard (low) coded actuators
- Features Highly visible 270° wrap-around LEDs for LINK/DEVICE status
- Operate as a standalone device (8-pin OSSD) or GuardLink
- Includes mounting with three entry points on hinged or sliding door

The 440G-LZ Guard Locking Switch is designed for partial body access guard doors. This switch combines microprocessor technology with an RFID coded actuator, and it features a locking bolt drive mechanism that locks only when the correct actuator is detected. With this functionality, the switch is TÜV certified to PLe, Cat. 4 (EN/ISO 13849-1) which is the highest level of safety for guard door position and lock monitoring.

### Specifications

| | |
|---|---|
| **Safety Rating** | Type 4, PLe, CAT 4 |
| **Enclosure Rating** | IP66, IP67, IP69K |
| **Safety Outputs** | 2 x PNP (0.2 mA max) Status: ON |
| **Auxiliary Outputs** | 1 x PNP (0.2 mA max) Status: OFF |
| **Power Supply** | 24V DC +10%/-15% Class 2 |
| **Holding Force** | 1300 N |

## Product selection Step 01

User Manual

Installation Instructions

- Select Guardlock switch with actuator type




### Guardlock switch with actuator

| Model type | Actuator | 3m lead | 10m lead |
|---|---|---|---|
| Power to release | Standard | 440G-LZS21SPRA | 440G-LZS21SPRB |
| | Unique | 440G-LZS21UPRA | 440G-LZS21UPRB |
| Power to lock | Standard | 440G-LZS21SPLA | 440G-LZS21SPRB |
| | Unique | 440G-LZS21UPLA | 440G-LZS21UPLB |

| Model type | Actuator | 6in Pigtail M12 5-Pin QD | 6in Pigtail M12 8-Pin QD |
|---|---|---|---|
| Power to release | Standard | 440G-LZS21SJRJ | 440G-LZS21SPRH |
| | Unique | 440G-LZS21UJRJ | 440G-LZS21UPRH |
| Power to lock | Standard | 440G-LZS21SJLJ | 440G-LZS21SPLH |
| | Unique | 440G-LZS21UJLJ | 440G-LZS21UPLH |

**Note:** For auxilary output type, replace P (lock status) with T for door status.

## Step 02

- Select optional accessories

### Cordset and accessories

| Description | Catalogue No. |
|---|---|
| DC Micro M12 to flying lead 8-Pin black cordset | 889D-F8AB* |
| DC Micro M12 to M12 8-Pin black patchcord | 889D-F8ABDM* |
| Standard power to release actuator | 440G-LZASPR |
| Unique power to release actuator | 440G-LZAUPR |
| Standard power to lock actuator | 440G-LZASPL |
| Unique power to lock actuator | 440G-LZAUPL |
| Actuator mounting bracket | 440G-LZAM1 |
| Switch body mounting bracket | 440G-LZAM2 |

**Note:** Replace * with 2, 5, 10, 15, 20 for required length

### **Safety Relays** (for more information see pages 62-69)

| | |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

### **Guardlink** (for more information see pages 6-7)

| | |
|---|---|
| GuardLink Enabled Tap 8-pin OSSD PTL | 440S-LF8D |
| GuardLink Enabled Tap 8-pin OSSD PTR | 440S-SF8D |
| Guardlink Red patchord to device 8-Pin | 889D-F8NBDM-* |
| Guardlink Red patchord from Tap to Tap | 889D-F4NEDM-* |
| Guardlink Red patchord from Tap to Relay | 889D-F4NE-* |

**Note:** Replace * with 0M3 (0.3m), 0M6 (0.6m), 2 (2m), 5 (5m), 10 (10m), 15 (15m), 20 (20m) for required length

# 440G-EZ Electromagnetic Switch



## Features

- Process and machine protection per ISO 14119
- Non-contact interlocking device with a power-to-lock (PTL) electromagnetic locking function for process protection
- Switches can be connected in series
- High tolerance to door offset within 5 mm in all directions
- Reduced long-restart delays

440G-EZ Interlocking switch is designed to enhance machine safety as well as reliably help protect a working process from unplanned downtime, which will help improve productivity and increase efficiency. This safety switch combines a Power to Lock (PTL) magnetic locking function with a 500 N holding force and generous 5 mm tolerance to misalignment.

### Specifications

| | |
|---|---|
| **Safety Rating** | PLe, CAT 4 , SIL3 |
| **Enclosure Rating** | IP67, IP69K |
| **Safety Outputs** | 2 x OSSDs 2 PNP, max |
| **Auxiliary Outputs** | 25mA max |
| **Power Supply** | 24V DC |
| **Holding force with power** | 500N |
| **Holding force without power** | 25N |
| **Temperature** | -25 … +70C |

## Product selection Step 01

User Manual

Installation Instructions

- Select Magnetic switch



**Magnetic switch**

| Description | Catalogue No. |
|---|---|
| 5-pin Micro QD version | 440G-EZS21STL05J |
| 8-pin Micro QD version | 440G-EZS21STL05H |

## Step 02

- Select cordset and optional accessories

**Cordset and accessories**

| Description | Catalogue No. |
|---|---|
| DC Micro M12 to Flying Lead 5-Pin black cordset | 889D-F5BC* |
| DC Micro M12 to M12 5-Pin black patchcord | 889D-F5BCDM* |
| DC Micro M12 to Flying Lead 8-Pin black cordset | 889D-F8AB* |
| DC Micro M12 to M12 8-Pin black patchcord | 889D-F8ABDM* |
| Replacement Actuator | 440G-EMAS |

**Note:** Replace * with 2, 5, 10, 15, 20 for required length

**Safety Relays** (for more information see pages 62-69)

| | |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

**Guardlink** (for more information see pages 6-7)

| | |
|---|---|
| GuardLink Enabled Tap 8-pin OSSD PTL | 440S-LF8D |
| Guardlink Red patchord to device 5-Pin | 889D-F5NCDM-* |
| Guardlink Red patchord from Tap to Tap | 889D-F4NEDM-* |
| Guardlink Red patchord from Tap to Relay | 889D-F4NE-* |

**Note:** Replace * with 0M3 (0.3m), 0M6 (0.6m), 2 (2m), 5 (5m), 10 (10m), 15 (15m), 20 (20m) for required length

# TLS-GD2 Guard Locking Switch

## Features

Installation Instructions

- Plastic enclosure with stainless steel actuator guide
- High locking force ≤ 2000 N
- Rotatable head: Four actuator entry points
- Five contacts: 2 NC & 1 NO for door position monitoring




The TLS-GD2 is for demanding full-body access guard locking applications where "zero volt" connectivity is needed. A stainless steel actuator guide is fitted to protect the unit from actuator damage due to poor guard alignment or guard wear. The TLS-GD2 is available in two versions: TLS-3 GD2 is power-to-release while the TLS-2 is power-to-lock. Each product has five sets of contacts of various forms. Four actuator entry points are possible; two manual release points. Optional key release and escape release versions are available. An ingress rating of IP69K makes TLS-GD2 suitable for washdown applications.

### Specifications

| | |
|---|---|
| **Safety Rating** | Type 2 |
| **Enclosure Rating** | IP66, IP67, IP69K |
| **Safety Outputs** | 2 x N/C |
| **Auxiliary Outputs** | 1 x N/O |
| **Power Supply** | 24V DC +10%/-15% Class 2 |
| **Holding Force** | 2000 N |

## Product selection

### Step 01

| Type | Solenoid contacts | Voltage | M20 | 8-Pin Micro (M12) |
|---|---|---|---|---|
| TLS-1 GD2 Power to Release | 1 NO 1 NC | 24V AC/DC | 440G-T27121 | 440G-T2NBBPH-1R |
| | | 230V AC/DC | 440G-T27123 | – |
| TLS-2 GD2 Power to Lock | 1 NO 1 NC | 24V AC/DC | 440G-T27127 | 440G-T2NBBPH-1L |
| | | 230V AC/DC | 440G-T27129 | – |
| TLS-3 GD2 Power to Release | 2 NC | 24V AC/DC | 440G-T27134 | 440G-T2NBBPH-2R |
| | | 230V AC/DC | 440G-T27136 | – |
| TLS-1 GD2 Power to Release Escape Release | 1 NO 1 NC | 24V AC/DC | 440G-T21BNPM-1B | 440G-T2NBNPH-1B |
| TLS-3 GD2 Power to Release Escape Release | 2 NC | 24V AC/DC | 440G-T21BNPM-2B | 440G-T2NBNPH-2B |

### Step 02

| Actuator |
|---|
| GD2 Standard 440G-A27011 |
| or |
| Fully Flexible 440G-A27143 |

### Step 03

- Select optional accessories

#### Cordset and accessories

| Description | Catalogue No. |
|---|---|
| DC Micro M12 to flying lead 8-Pin black cordset | 889D-F8AB* |
| DC Micro M12 to M12 8-Pin black patchcord | 889D-F8ABDM* |
| Cover for TLS-3 external override key | 440G-A27372 |
| Cover for TLS-3 override key attached | 440G-A27374 |
| Sliding bolt actuator | 440K-AMDS |

**Note:** Replace * with 2, 5, 10, 15, 20 for required length

**Safety Relays** (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

**Guardlink** (for more information see pages 6-7)

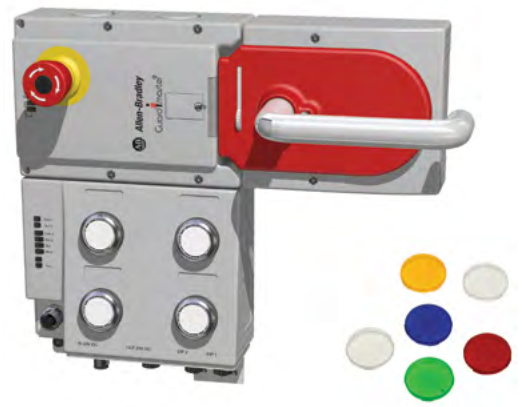
| | |
|---|---|
| GuardLink Enabled Tap 8-pin | 440S-MF8D |
| Guardlink Red patchord to device 8-Pin | 889D-F8NBDM-* |
| Guardlink Red patchord from Tap to Tap | 889D-F4NEDM-* |
| Guardlink Red patchord from Tap to Relay | 889D-F4NE-* |

**Note:** Replace * with 0M3 (0.3m), 0M6 (0.6m), 2 (2m), 5 (5m), 10 (10m), 15 (15m), 20 (20m) for required length

# Multifunctional Access Box 442G

Standard
- User Manual
- Installation Instructions

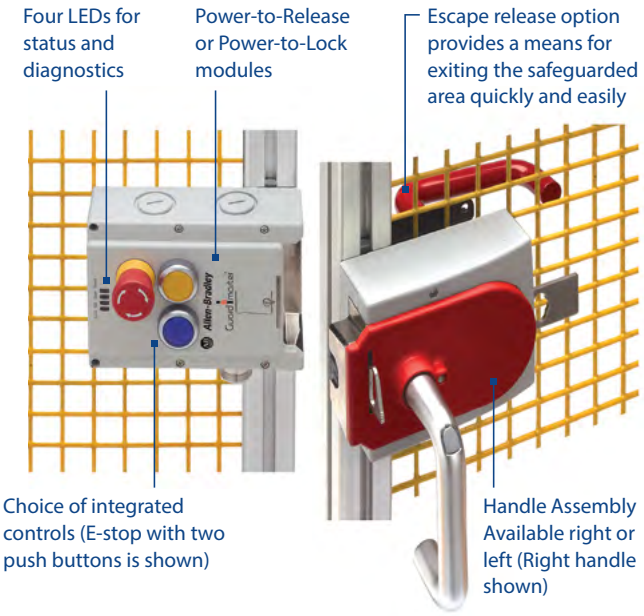
Ethernet
- User Manual
- Installation Instructions





## Features

- High holding force of 2000 N per ISO 14119
- 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









EtherNet/IP

Multifunctional Access Box with CIP Safety over EtherNet/IP Interface

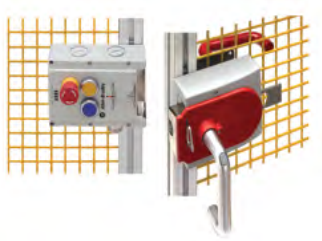
The Guardmaster® 442G Multifunctional Access Box, is an integrated access control and guard locking device which provides a complete safeguarding solution for full body access applications.

## Specifications

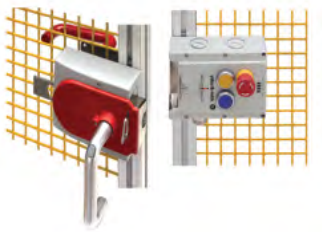
| | |
|---|---|
| **Safety Rating** | Type 4, PLe, CAT 4 |
| **Enclosure Rating** | IP65 |
| **Power Supply & Current** | 24V DC ±10/-15% required |
| **Holding Force Fzh** | 2000N |
| **Safety Outputs** | Semiconductor outputs, PNP |

# Product selection
# Step 01

- Select handle assembly



Right hand orientation



Left hand orientation

### Handle assembly

| | Description | Catalogue No. |
|---|---|---|
|  | Right handle | 442G-MABH-R |
|  | Left handle | 442G-MABH-L |
|  | Handle assembly mounting plate[1)] | 442G-MABAMPH |

1) Handle Assembly mounting plate is required for Ethernet versions, optional for standard

# Step 02

- Select Standard (02a) or Ethernet/IP (02b) Lock Module

## Step 02a

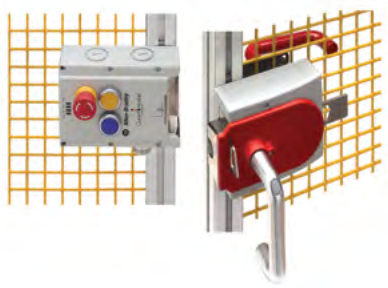
### Standard Lock Module

| Lock Type | Connector | Catalogue No. |
|---|---|---|
| Power to Release | M23 (19-pin) | 442G-MABR-U⊗M-*** |
| | M20 cable entry | 442G-MABR-UT-*** |
| Power to Lock | M23 (19-pin) | 442G-MABL-U⊗M-*** |
| | M20 cable entry | 442G-MABL-UT-*** |

Replace ⊗ with R for use with right handle or L for use with left handle. Replace the *** with the code for the selected cover controls below.
**Note:** M23 19 Pin Cordset available in step 03 Accessories 889M-F19M-2

### Example

442G-MABR-U**R**M-**C03**
Lock Module Power To Release **Right** Hand,
**E-Stop with two illuminated push button**



### Cover controls

| | Description | Catalogue No. |
|---|---|---|
|  | Blank Cover | C00 |
|  | E-stop only | C05 |
|  | One illuminated push button | C01 |
|  | Two illuminated push buttons | C02 |
|  | E-stop with two illuminated push buttons | C03 |
|  | E-stop with three illuminated push buttons | C04 |

# Step 02b

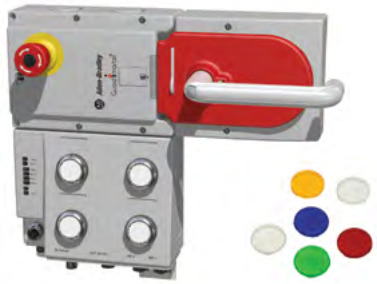
## CIP safety over Ethernet/IP lock module

| Description | Lock Type | Catalogue No. |
|---|---|---|
| Two push buttons | Power to Release | 442G-MABRB-U⊗-P49 |
| | Power to Lock | 442G-MABLB-U⊗-P49 |
| E-Stop, two push buttons | Power to Release | 442G-MABRB-U⊗-E0P49 |
| | Power to Lock | 442G-MABLB-U⊗-E0P49 |
| E-Stop, Four push buttons Enabling Connector | Power to Release | 442G-MABRB-U⊗-E0JP4679 |
| | Power to Lock | 442G-MABLB-U⊗-E0JP4679 |

Replace ⊗ with R for use with right handle or L for use with left handle.
Covers with pushbuttons are supplied with coloured lens blue, green, red, yellow and white.

**Example**

442G-MABRB-U**R**-E0JP4679
Lock Module Power To Release **Right** Hand,
E-Stop with four illuminated push button
Enabling connector

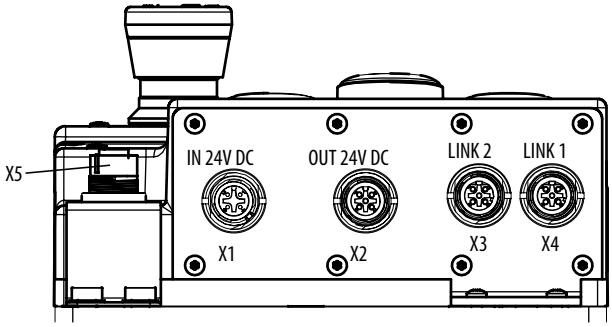


# Step 03a

- Select Standard Lock Modules required cable

### Standard lock module power and communication cable

| Description | Catalogue No. |
|---|---|
| 19-pin M23 black unshielded cordset with flying lead (Replace * with 2, 5, 10, 15, 20, 30 for required length) | 889M-F19RM-* |




**Power Connections - Step 03b Ethernet/IP example**
The bus module includes the EtherNet/IP connections (X3 and X4, M12 D-coded) and the power supply connections (X1 and X2) and the Enabling Connector Switch (X5).

# Step 03b

- Select Ethernet/IP Lock Modules required cables

### CIP safety lock module power cable

| Description | Catalogue No. |
|---|---|
| Micro Straight 4-pin Female to Flying Lead yellow cordset (Replace * with 2, 5, 10, 15, 20, 30 for required length) | 889D-F4AC-* |
| Micro Straight 4-pin Male to Flying Lead yellow cordset (Replace * with 2, 5, 10, 15, 20, 30 for required length) | 889D-M4AC-* |

### CIP Safety Communications EtherNet/IP Cable

| | |
|---|---|
| M12 D-coded straight to RJ45 Teal patchcord | 1585D-M4UBJM* |
| M12 D-coded straight to flying lead Teal cordset | 1585D-M4UB* |
| M12 D-coded straight to M12 straight Teal patchcord | 1585D-M4UBDM* |

(Replace * with 1, 2, 3, 4, 5, 10, 15, 20, 30 for required length)

# Step 04

- Select optional accessories



442G- MABE1



442G-MABASHFT



442G-MABAMPE

### Optional escape release

| Description | Catalogue No. |
|---|---|
| Escape Release assembly (standard 150mm shaft) | 442G-MABE1 |
| Escape release extended shaft (250mm shaft) | 442G-MABASHFT |
| Escape release mounting plate (Required with escape release) | 442G-MABAMPE |

### Enabling Switch

| | |
|---|---|
| Enabling Switch Standard No additional buttons (See next page) | 440J-N21TNPM |
| Enabling switch micro straight male to flying lead cordset (Replace * with 2, 5 or 10 for required length) | 889D-M4AC-* |

**Note:** Enabling Switches connector only available on Four push button CIP safety over Ethernet/IP lock modules

### Logic interfaces (for more information see pages 62-69 and 69-73)

| | |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster Ethernet Interface | 440R-ENETR |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

# Grip Enabling Switches 440J

## Features

Installation instructions

- Three position enabling switch
- Lightweight and easy-to-use
- Optional jog and e-stop functions
- M20 conduit



## Overview

The 440J is a three position enabling switch that can be used to reduce risks when working inside a machine guard, The standard model includes two independent three-position switches which are actuated by squeezing the trigger. The trigger switch has three positions. The mid-position is the "enabled" position.

**Position 1 –** there is no pressure on the trigger switch, and the safety contacts are open.

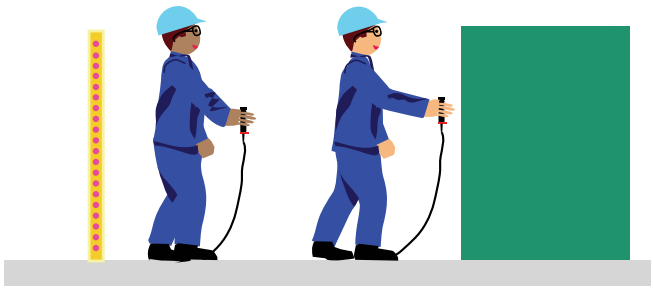
**Position 2 –** the trigger switch is squeezed to the mid-position, and the safety contacts are closed. This mid-position is the "enabled" position.

**Position 3 –** the trigger switch is fully pressed and the safety contacts are open.

When the trigger switch is released from position three back to position one, the safety contacts remain open, as it passes through position two

### Multiple Personnel Access

When more than one person must access the hazard, all persons utilize their own enabling device.



### Specifications

| | |
|---|---|
| **Enclosure Rating** | IP66 Standard switch<br>IP65 job button/E-STOP |
| **Thermal current** | 3 A |
| **Switch current @ Voltage, min** | 5 mA @ 3V AC/DC |
| **Safety Outputs** | Semiconductor outputs, PNP |

## Product selection

## Step 01

- Select Desired Enabling switch

| Description | Main contacts | Monitoring contacts | Jog contacts | Emergency stop contacts | Connection type | Catalogue No. |
|---|---|---|---|---|---|---|
| Switch with Jog Pushbutton | 2 N/C | 2 N/O | 1 N/O | - | M20 Conduit + Cable Strain | 440J-N21TNPM-NP |
| Standard Switch | 2 N/C | 2 N/O | - | - | M20 Conduit + Cable Strain | 440J-N21TNPM |
| Switch with E-Stop Pushbutton | 2 N/C | - | - | 2 N/C | M20 Conduit + Cable Strain | 440J-N2NTNPM-NE |

## Step 02

- Select optional accessories



440J-A00N

### Accessories

| Description | Catalogue No. |
|---|---|
| Mounting Bracket for Single Enabling Switch | 440J-A00N |
| Mounting Bracket for Single Enabling Switch and Safety Interlock Switch | 440J-A02N |
| Mounting Bracket Suitable for Single Enabling Switch and Two Safety Interlock switches | 440J-A04N |
| Rubber Boot Kit( Silicone Free) | 440J-A10N |

# Prosafe Trapped Key Systems 440T

## Features

- Interlocking for pre-determined sequence of events
- All stainless interlocking and coded parts
- Weather cap as standard
- Standard red colour-coded key and ID tags
- A complete range of isolators, gate (guard) interlocks, key exchange units and specialty devices



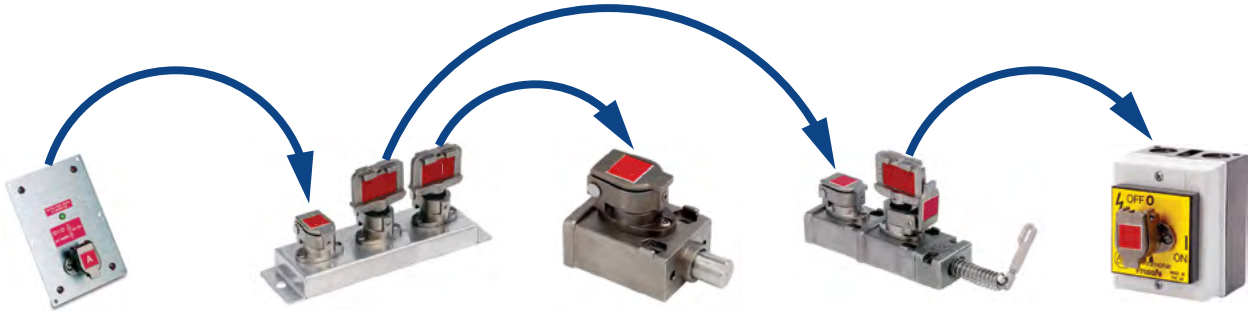

Trapped key interlocking systems are based upon the premise that one key cannot be in two places at the same time. These systems can be configured to ensure that a predetermined sequence of events takes place or that hazards have been reduced before operators can become exposed to them. They are mechanical systems, which makes them suitable for applications where the location of the plant, environment or explosive atmospheres make the use of electrical interlocking systems unsuitable or expensive to install. Unique key coding allows for a high degree of security and tamper-resistance.

### Specifications

| | |
|---|---|
| **Safety Rating** | Type 3, PLd, CAT 3 |
| **Enclosure Rating** | IP65 |

# Design suggestions for an interlocking system

## Plant and machinery interlocking



**AA**
**440T-MSRUE10AA**
Solenoid Release Unit (SRU) key release

**AA AB AB**
**440T-MKEXE11AAABAB**
Trapped key 'AA' Locking off SRU, Release access door lock, key 'AB'

**AB**
**440T-MSBLE10AB**
'AB' key in to retract bolt from guard door

**AB AC**
**440T-MDALE10ABAC**
AB' key in then 'AC' key out to open guard door

**AC**
**440T-MRKSE10AC**
To energize robot teach mode

### Sequence of operation

**1)** The Solenoid Release Unit (SRU) is used for electrical isolation of machinery to improve safe access. It consists of a rotary power switch and a solenoid. The trapped key can be removed once an external signal is given to its internal solenoid locking mechanism. An indicator light on the solenoid release unit indicates when the trapped key "AA" key can be removed. Insert the "AA" key into the Key Exchange Unit (KEX) and turn it 90°.

**2)** Turn one of the "AB" keys 90° and remove it from the KEX. This traps the "AA" key in the KEX and prevents the restarting of the machine.

**3)** Insert the "AB" key into the Single-key Bolt Lock (SBL) and turn it 90° to gain partial body access to the machine.

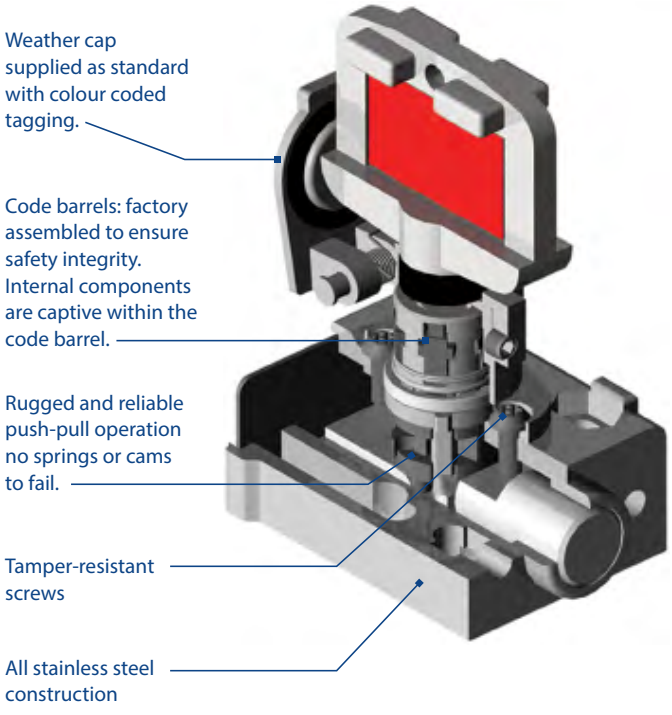
**4)** Turn the second "AB" key 90° and remove it from the KEX. Removal of this key also traps the "A" key in the KEX and prevents the restarting of the machine.

**5)** Insert the "AB" key into the Dual-key Access Lock (DAL) and turn it 90°.

**6)** Turn the "AC" key 90° and remove the "C" key. Rotate the access handle to allow full body entry into the hazard zone.

**7)** Take the "AC" key into the hazard zone, insert it into the rotary key switch (RKSE) and turn it 90° to send a signal to the machine control system, to allow the machine to operate in a slow or teach mode.

**8)** Reverse the process to return the machine to full operational mode.



# Product selection

## Step 01a

- Select the Primary Key for your isolating unit (Start devices)
- Primary key can be used with your Isolating unit, alternatively where an Isolating device is not required you can use the Primary Key for your Key Exchange Unit (Step 02)

### Preferred key codes

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| **0** | A | B | C | D | E | F | G |
| **A** | AA | AB | AC | AD | AE | AF | AG |
| **B** | BA | BB | BC | BD | BE | BF | BG |
| **C** | CA | CB | CC | CD | CE | CF | CG |
| **D** | DA | DB | DC | DD | DE | DF | DG |
| **E** | EA | EB | EC | ED | EE | EF | EG |
| **F** | FA | FB | FC | FD | FE | FF | FG |
| **G** | GA | GB | GC | GD | GE | GF | GG |

**Note:** These codes are readily available and will typically result in the quickest delivery




440T-AKEYE100A

### Primary key

| Description | Base Catalogue No. |
|---|---|
| Trapped key | 440T-AKEYE10 _ _ |

**Note:** Replace _ _ with key code required.
Example: For a Key bearing code "**0A**", you would select Trapped Key catalogue number 440T-AKEYE10**0A**

## Step 01b

- Select the isolating unit (start devices)
- These are the devices that isolate power to the hazard. Once the power is isolated, the trapped key can then be removed and used in a key exchange unit or an access device




440T-MRPSE110A




440T-MRKSE110A

### Rotary switches

Rotary switches are electrical isolators which directly remove power to the hazard.

Application

- Disconnecting power to a device

| Description | Base Catalogue No. | Required Key Codes |
|---|---|---|
| Panel mounted, 2NO/2NC, 20 A | 440T-MRPSE11 | Primary code _ _* |
| Enclosed (IP65), 2NO/2NC, 20 A | 440T-MRKSE11 | Primary code _ _* |

Example: For a Key bearing code "**0A**", you would select Panel Mounted Rotary Switch catalogue number 440T-MRPSE11**0A**
* Key not supplied (Selected in Step 01a)

Installation instructions:
Panel Mounted | Enclosed




440T-MSRUE110A

### Solenoid release units

Solenoid release units will release a trapped key upon receiving an external electrical signal indicating that the hazard has been isolated.

Applications

- Integrating auxiliary feedback from another field device into the trapped key system
- Releasing a key based on a control signal from a PLC

| Description | Base Catalogue No. | Required Key Codes |
|---|---|---|
| 24V DC, 2NO/2NC, 20 A | 440T-MSRUE11 | Primary code _ _* |
| 230V AC, 2NO/2NC, 20 A | 440T-MSRUE33 | Primary code _ _* |

**Note:** For more barrels replace 'RUE' in catalogue number with – 2097 for dual key, 3417 for Triple key, 3418 for Quad key
Example: For a Key bearing code "**0A**", you would select Solenoid Release Unit catalogue number 440T-MSRUE11**0A**
* Key not supplied (Selected in step 01a)

Installation instructions




440T-MDTUE110A0A

## Electronic time delay units

Time delay units include an electrical isolator and a timing unit. Once the isolator has been switched off, the timer counts down the specified time before releasing the trapped keys.

Application

- High-inertia machines with some run-down time

| Description | Base Catalogue No. | Required Key Codes |
|---|---|---|
| Single key 24 V DC, 2NO/1NC, 20 A | 440T-MSTUE11 | Primary code _ _* |
| Single key 230 V AC, 2NO/1NC, 20 A | 440T-MSTUE33 | Primary code _ _* |
| Dual key 24 V DC, 2NO/1NC, 20 A | 440T-MDTUE11 | Primary code _ _* |
| Dual key 230 V AC, 2NO/1NC, 20 A | 440T-MDTUE33 | Primary code _ _* |

Example: For a Key bearing code "**0A**", you would select Dual Key ETDU catalogue number 440T-MDTUE11**0A0A**
* Key not supplied (Selected in step 01a)

Installation instructions

# Step 02

- Select a Key Exchange Unit (Middle Devices)
- This is required if more than one isolating unit or access device is being used. The key from the isolating unit is placed into the vacant barrel of the exchange unit. This key is referred to as the primary key. This allows the trapped keys, known as secondary keys, to be removed from the unit. The secondary keys can then be used in access devices.

Applications

- Multiple isolating devices
- Multiple access devices




440T-MKEXE110A0B0B




440T-MKEXE140A0B0B0B0B0B

## Key exchange unit

| Description | Base Catalogue No. | Required Primary Key Codes (= no. of keys in) | Required Secondary Key Code (= no. of keys out) |
|---|---|---|---|
| 2 way: 1 key in, 1 key out | 440T-MKEXE10 | | |
| 3 way: 1 key in, 2 keys out | 440T-MKEXE11 | | |
| 4 way: 1 key in, 3 keys out | 440T-MKEXE12 | | |
| 4 way: 2 keys in, 2 keys out | 440T-MKEXE15 | | |
| 5 way: 1 key in, 4 keys out | 440T-MKEXE13 | | |
| 5 way: 2 key in, 3 keys out | 440T-MKEXE16 | | |
| 6 way: 1 key in, 5 keys out | 440T-MKEXE14 | Primary code _ _* | Secondary code _ _** |
| 6 way: 2 key in, 4 key out | 440T-MKEXE17 | | |
| 6 way: 3 key in, 3 key out | 440T-MKEXE18 | | |
| 7 way: 1 key in, 6 keys out | 440T-MKEXE19 | | |
| 8 way: 1 key in, 7 keys out | 440T-MKEXE20 | | |
| 9 way: 1 key in, 8 keys out | 440T-MKEXE22 | | |
| 10 way: 1 key in, 9 keys out | 440T-MKEXE23 | | |

**Note:** Available in upto 25 way Key Exchange Units (9 way and upwards contain only 1 Key in)
* Primary key not supplied (Selected in step 01a)
** Secondary key supplied

Installation instructions:
2-6 Way | 7-11 Way | 12-15 Way | 16-25 Way

### Example

To order a 6 way: 1 key in and 5 keys out, order catalogue number 440T-MKEXE14**0A0B0B0B0B0B** to get a key exchange unit with **'0A' primary** code and **five '0B' secondary codes**. The '0A' key is not included. The five '0B' keys, which are trapped in the secondary code barrels are included.

| 440T | M | KEXE | 14 | 0A | 0B | 0B | 0B | 0B | 0B |
|---|---|---|---|---|---|---|---|---|---|
| Bulletin Number (T= Trapped Key) | M= Machine Interlock | Product Type (Dual-key Access Lock) | Product Feature | Two character Primary Code (key not included) | Two character Secondary Code (key included) | Two character Secondary Code (key included) | Two character Secondary Code (key included) | Two character Secondary Code (key included) | Two character Secondary Code (key included) |

# Step 03

- Select the Access Devices (End Devices)

- These are the devices that allow access to the hazard. They can be single key or dual key units. Single key units contain only a primary key. Dual key units contain a primary key and a secondary key. When the primary key is inserted into a dual key access device, the secondary key is released as a personnel key, which an operator takes with them into the hazardous area. The primary key remains trapped until the personnel key is replaced by the operator. This prevents the access device from being locked and power being restored to the hazard while an operator is in the area.



440T-MSALE100A



440T-MDALE100C0B

## Access locks

Access locks are used to prevent access to a door, gate or hinged guard.

Applications

- Lever actuators: Sliding/ Hinged Guards
- Chain actuators: Misaligned Sliding/Hinged Guards
- Dual key option: Improved safety for personnel working inside hazardous area

| Description | Base Catalogue No. | Required Key Codes | Required Secondary Key Codes |
|---|---|---|---|
| Single key, key trapped to release actuator, lever actuator | 440T-MSALE10 | Primary code _ _* | N/A |
| Single key, key trapped to release actuator, chain actuator | 440T-MSCLE10 | Primary code _ _* | N/A |
| Dual key, primary key trapped and secondary key free to release actuator, lever actuator | 440T-MDALE10 | Primary code _ _* | Secondary code _ _** |
| Dual key, primary key trapped and secondary key free to release actuator, chain actuator | 440T-MDCLE10 | Primary code _ _* | Secondary code _ _** |

Example: For a Key bearing code "**0A**", you would select Single Key Access Lock catalogue number 440T-MSALE10**0A**
* Primary key not supplied
** Secondary key supplied

Installation instructions



440T-MDSLE100A0B

## Slamlock mechanical

Mechanical slamlocks feature a tongue actuator similar to a standard safety interlock switch.

Applications

- Hinged/Sliding Guards
- Dual key option: Improved safety for personnel working inside hazardous area

| Description | Base Catalogue No. | Required Primary Key Codes | Required Secondary Key Codes |
|---|---|---|---|
| Single key, key trapped to release actuator | 440T-MSSLE10 | Primary code _ _* | N/A |
| Dual key, primary key trapped and secondary key free to release actuator | 440T-MDSLE10 | Primary code _ _* | Secondary code _ _** |

**Note:** To change actuator type update '10' in catalogue number with – 11 Flexible type, 12 Flat type
Example: For a Key bearing code "**0A**", you would select Slamlock catalogue number 440T-MSSLE10**0A**
* Primary key not supplied
** Secondary key supplied

Installation instructions

## Slamlock electrical



440T-MDSSE100A0E

Electrical slamlocks feature a tongue actuator similar to a standard safety interlock switch. They also include safety and auxiliary output electrical contacts.

Applications

- Hinged/Sliding Guards
- Dual key option: Improved safety for personnel working inside hazardous area

| Description | Base Catalogue No. | Required Primary Key Codes | Required Secondary Key Codes |
|---|---|---|---|
| Single key, key trapped to release actuator, 2NC/1NO | 440T-MSSSE10 | Primary code _ _* | N/A |
| Dual key, primary key trapped and secondary key free to release actuator, 2NC/1NO | 440T-MDSSE10 | Primary code _ _* | Secondary code _ _** |

**Note:** To change actuator type update '10' in catalogue number with – '11' Flexible type, '12' Flat type
Example: For a Key bearing code "**0A**", you would select Dual Key Electrical Slamlock catalogue number 440T-MDSSE10**0A**0E
* Primary key not supplied
** Secondary key supplied

Installation instructions

## Bolt interlocks




440T-MSSSE100A

Bolt interlocks are used to interlock an operator handle or control element of a switching device as the extended bolt blocks operator movement. Bolt interlocks should not be used on hinged doors or guards as it is possible to extend the bolt and remove the trapped key without actually closing the door, therefore bypassing the safety system.

Application

- Switchgear interlocking

| Description | Base Catalogue No. | Required Primary Key Codes | Required Secondary Key Codes |
|---|---|---|---|
| Single key, key trapped to retract bolt | 440T-MSBLE10 | Primary code _ _* | – |
| Dual key, primary key trapped and secondary key free to retract bolt | 440T-MDBLE14 | Primary code _ _* | Secondary code _ _** |

**Note:** To change actuator type update '10' in catalogue number with – '11' Flexible type, '12' Flat type
Example: For a Key bearing code "**0A**", you would select Bolt Interlock catalogue number 440T-MSBLE10**0A**
* Primary key not supplied
** Secondary key supplied

Installation instructions

# Step 04

- Add any trapped keys or other accessories required
- Check that these keys are not already included with another product in the system. (e.g. a key exchange unit).



440T-AKITE45ER

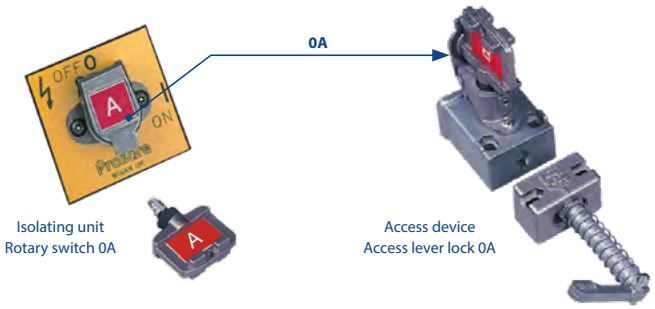
| Description | Base Catalogue No. | Required Primary Key Codes |
|---|---|---|
| Trapped key | 440T-AKEYE10 | Primary code _ _ |
| Trapped ejector key | 440T-AKEYE13 | Primary code _ _ |
| Spare weatherproof dust cap | 440T-ASFC10 | Primary code _ _ |
| Emergency Repair Kit for code barrels | 440T-AKITE45ER* | – |

**Note:** Replace * with ER Code barrels required 1, 2, 3, 4, 5, 6, 7, 8, 9.
Example: for single barrel use 440T-AKITE45ER1

# Example systems

## One access device

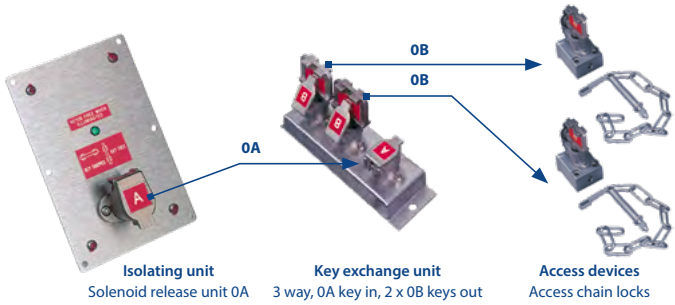
- The rotary switch disconnects power to the machine.
- The key is released from the switch and can be used to open a hatch on the machine.




| Steps | Description | Base Catalogue No. | Required Key Codes | Complete Catalogue No. | Quantity |
|---|---|---|---|---|---|
| Step 01a | Trapped key | 440T-AKEYE10 | 0A | 440T-AKEYE100A | 1 |
| Step 01b | Panel mounted rotary switch, 2NO/2NC, 20 A | 440T-MRPSE11 | 0A | 440T-MRPSE110A | 1 |
| Step 03 | Single key access lock, lever actuator | 440T-MSALE10 | 0A | 440T-MSALE100A | 1 |

## Two access devices

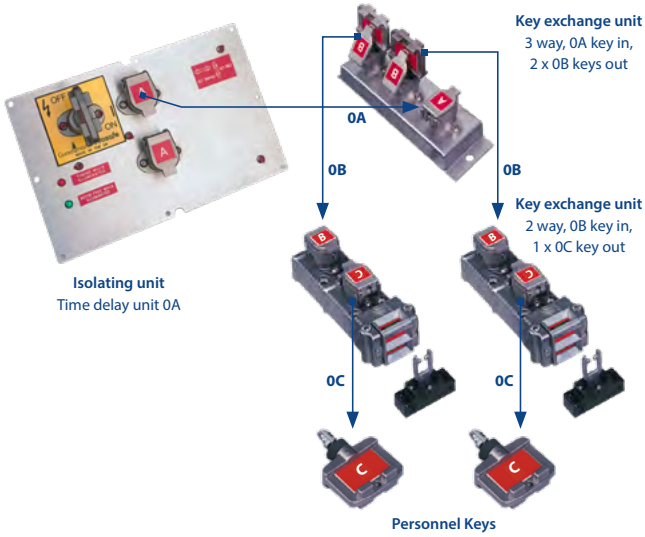
- The solenoid release unit is energised upon receiving a signal from a PLC. The key from the solenoid goes into a 3-way key exchange unit, releasing the two trapped keys. These can then be used to open access gates




| Steps | Description | Base Catalogue No. | Required Key Codes | Complete Catalogue No. | Quantity |
|---|---|---|---|---|---|
| Step 01a | Trapped key | 440T-AKEYE10 | 0A | 440T-AKEYE100A | 1 |
| Step 01b | Solenoid release unit 24 V DC | 440T-MSRUE11 | 0A | 440T-MSRUE110A | 1 |
| Step 02 | 3-way key exchange unit | 440T-MKEXE11 | 0A, 0B, 0B | 440T-MKEXE11AA0B0B | 1 |
| Step 03 | Single key access lock, chain actuator | 440T-MSCLE10 | 0B | 440T-MSCLE100B | 2 |

## Two access devices with personal Keys

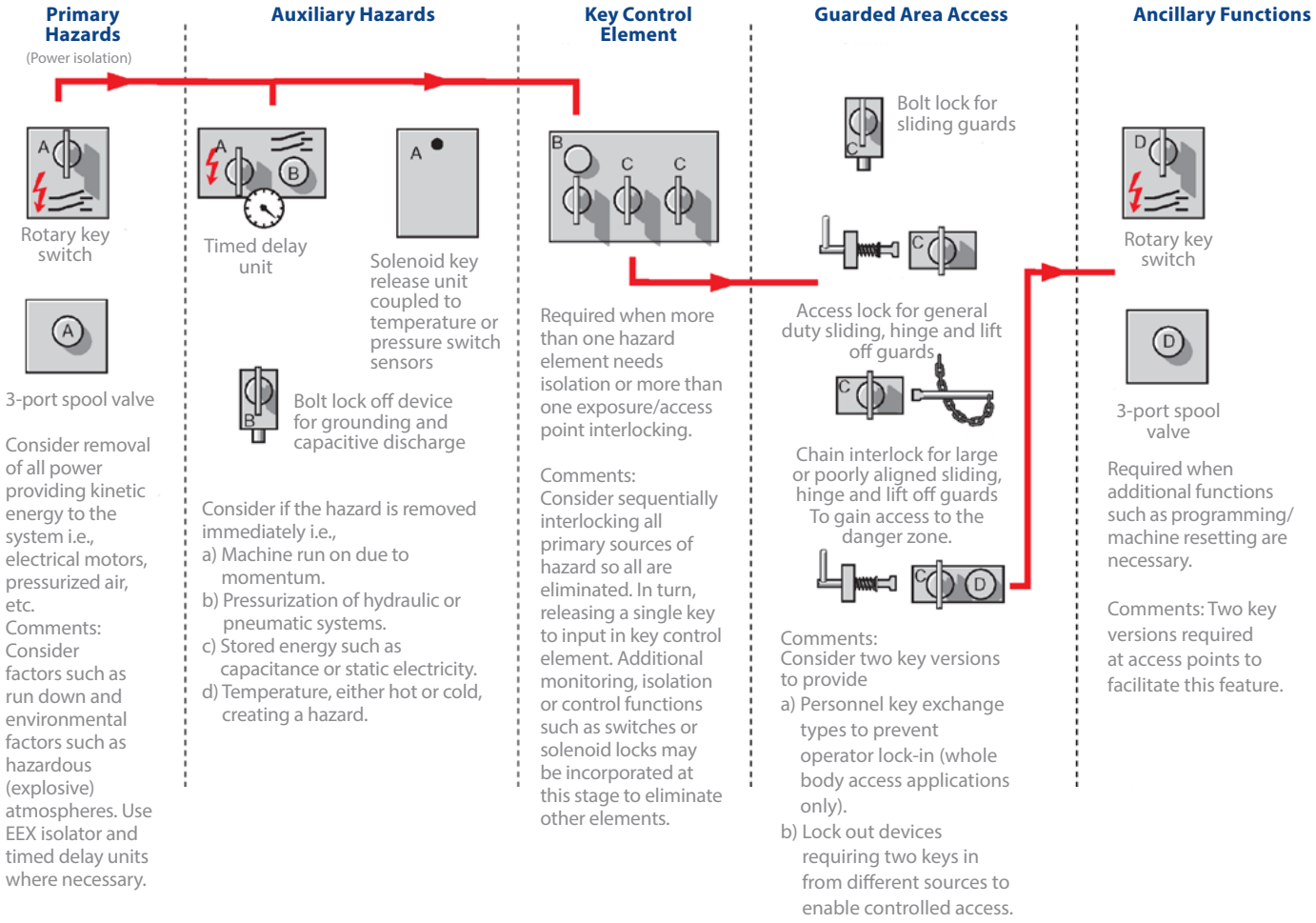
- Power to the machine is switched off using the timed isolator unit. The timer begins timing to allow the machine to slow down to a safe state. After the time delay, the key is released. This then goes into the key exchange to release the keys to the two access devices. When a key is inserted into an access device, the gate can be opened and a secondary personnel key is released. The operator takes this key with them when they enter the gated area. The removal of the personnel key traps the primary key in the access device, which prevents the operator from being locked inside the gated area and the machine being restarted.



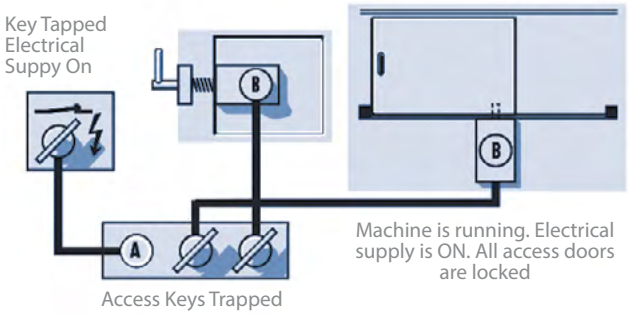

| Steps | Description | Base Catalogue No. | Required Key Codes | Complete Catalogue No. | Quantity |
|---|---|---|---|---|---|
| Step 01a | Trapped key | 440T-AKEYE10 | 0A | 440T-AKEYE100A | 1 |
| Step 01b | Electronic time delay unit 24 V DC 2NO/1NC | 440T-MSTUE11 | 0A | 440T-MSTUE110A | 1 |
| Step 02 | 3-way key exchange unit | 440T-MKEXE11 | 0A, 0B, 0B | 440T-MKEXE110A0B0B | 1 |
| Step 03 | Dual key slamlock | 440T-MDSLE10 | 0B, 0C | 440T-MDSLE100B0C | 2 |

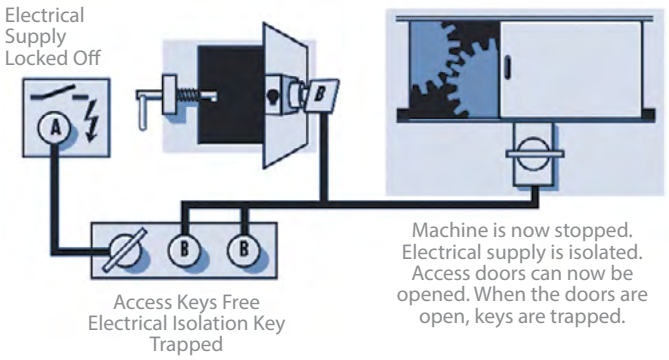
# Example Systems

## Plant and Machinery Interlocking

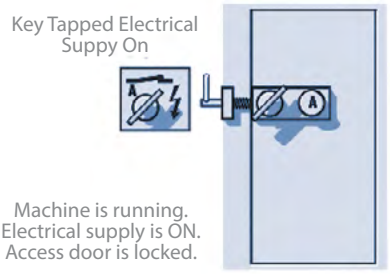


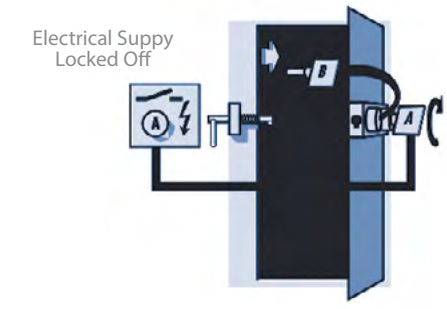

## Part Body Access




## Full Body Access

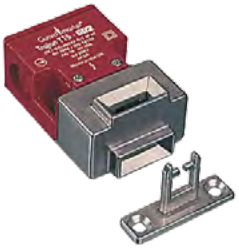



Machine is now stopped. Electrical supply is isolated. Door can now be opened. With the door open, Key A is trapped. Key B is taken into the guarded area so that a third-party cannot lock the door.

# Tongue Interlock Switches 440K

Tongue Interlock Switches allow the head of the switch to rotate, offering different options on how you can operate the switch and mount it on the guard. This flexibility offers the best fit for your applications.

| Features | Trojan™ T15 | Trojan T5 and T6[1)] | Elf™ | Cadet™ | MT-GD2 |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Dimensions (H x W x D)** | 75 x 31 x 52 mm | 95 x 32 x 52 mm | 75 x 25 x 29 mm | 90.5 x 31 x 30.4 mm | 116.5 x 38 x 40 mm |
| **Holding Force** | 30 N | T5: 12 N typical, max. 30 N<br>T6: 20 N | 6 N | 15 N | 12, 32, 40 N |
| **Safety / Auxiliary Contacts** | 2 N/C<br>1 N/C / 1 N/O | T5: 2 N/C / 1 N/O<br>T6: 3 N/C / 1 N/O<br>T6: 2 N/C / 2 N/O | 2 N/C<br>1 N/C / 1 N/O | 3 N/C<br>2 N/C / 1 N/O | 3 N/C / 1 N/O<br>2 N/C / 2 N/O |
| **Material** | Plastic with plastic or metal head (GD2) | Plastic with plastic or metal head (GD2) | Plastic with optional metal alignment guide | Plastic with optional metal alignment guide | Metal |
| **Actuator Options** | Standard and fully flexible | Standard, semi-flexible and fully flexible | Flat, 90°, and semi-flexible | Flat, 90°, and semi-flexible | Standard, semi-flexible and fully flexible |

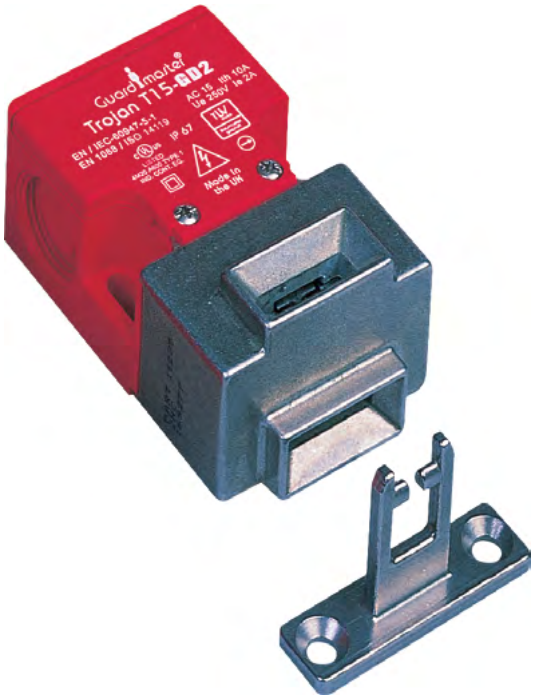
1) Four-contact models are available (Trojan 6).

# Trojan T15
# Trojan T15-GD2
# Tongue Interlocks

## Features

Installation Instructions

- GD2 (metal head) style available for demanding applications
- Three M20 conduit entries
- Optional catch mechanism help keep doors shut on vibrating machinery




The Trojan™ T15 & T15-GD2 Tongue Interlock Switches are compact universal tongue- or key-operated safety interlock switches that fit at the leading edge of sliding, hinged or lift-off guards. With dual entry slots and rotatable heads, movable only by releasing the cover screws, these switches offer four different options for actuator entry.

### Specifications

| | |
|---|---|
| **Safety Rating** | Type 2 interlocking device |
| **Enclosure Rating** | IP67 |
| **Operating Voltage** | 120V AC – 600V AC<br>24V DC |
| **Holding Force** | 30 N |
| **Housing Material** | Glass Filled PBT |

## Product selection

### Step 01

| Type | Safety | Auxiliary | M20 Conduit | 4-Pin Micro M12 |
|---|---|---|---|---|
| Trojan T15 Standard | 2 NC | – | 440K-T11269 | 440K-T11385 |
| | 1 NC | 1 NO | 440K-T11270 | 440K-T11388 |
| Trojan T15 GD2 (metal head) | 2 NC | – | 440K-T11280 | 440K-T11391 |
| | 1 NC | 1 NO | 440K-T11279 | 440K-T11394 |

### Step 02

| Actuator |
|---|
| Standard<br>440K-A11238 |
| Standard GD2<br>440G-A27011<br>or<br>Fully Flexible GD2<br>440K-A27010<br>or<br>Flat GD2<br>440K-A11112 |

### Step 03

- Select optional accessories

**Cordset and accessories**

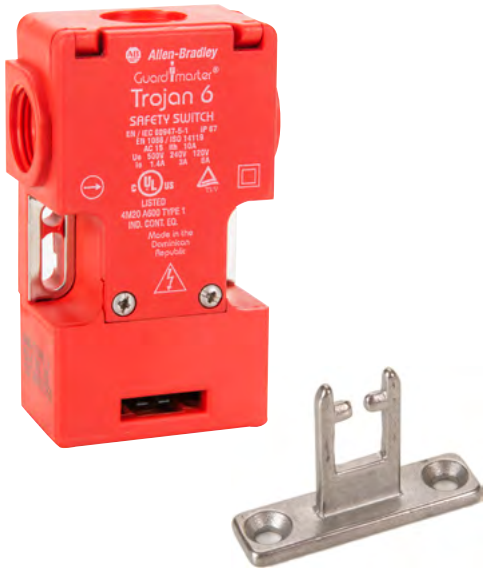
| Description | Catalogue No. |
|---|---|
| DC Micro M12 to flying lead 4-Pin black cordset | 889D-F4BC* |
| DC Micro M12 to M12 lead 4-Pin black patchcord | 889D-F4BBDM* |
| Sliding bolt actuator | 440G-A27010 |
| Dust Cover | 440K-A17180 |

**Note:** Replace * with 2, 5, 10, 15, 20 for required length

**Safety Relays** (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

# Trojan T5/6 Universal Tongue Interlocks




## Features

Installation Instructions

- Strong and versatile, can be used in most applications
- Self-ejecting tamper resistant actuator, only operates when mounted to the guard (not with GD2 models
- 30 N actuator retention force
- GD2 (metal head) style available for demanding applications
- Four M20 conduit entries

The Trojan 5 & 6 Universal Tongue Interlock Switches are universal tongue -or key-operated safety interlock switches. They fit at the leading edge of sliding, hinged or lift-off guards. With dual key entry slots and rotatable heads, movable only by releasing the cover screws, these switches offer four actuator entry options.

### Specifications

| | |
|---|---|
| **Safety Rating** | Type 2 interlocking device |
| **Enclosure Rating** | IP67 |
| **Operational Voltage** | T5: 120V AC – 240V AC/24V DC<br>T6 : 120V AC – 600V AC/24V DC |
| **Holding Force T5** | 30 N |
| **Holding Force T6** | 20N |
| **Housing Material** | Glass Filled PBT |

## Product selection

### Step 01

| Type | Safety | Auxiliary | M20 Conduit | 6-Pin Micro M12 |
|---|---|---|---|---|
| Trojan 5 Standard | 2 NC | 1 NO | 440K-T11089 | 440K-T11129 |
| Trojan 5 GD2 | 2 NC | 1 NO | 440K-T11147 | 440K-T11226 |
| Trojan 5 30 N | 2 NC | 1 NO | 440K-T11333 | 440K-T11492 |

| Type | Safety | Auxiliary | M20 Conduit | 8-Pin Micro M12 |
|---|---|---|---|---|
| Trojan 6 Switch | 3 NC | 1 NO | 440K-T11449 | – |
| | 2 NC | 2 NO | 440K-T11452 | 440K-W21BNPH |
| Trojan 6 GD2 (metal head) | 3 NC | 1 NO | 440K-T11188 | – |
| | 2 NC | 2 NO | 440K-T11459 | 440K-W21BNPH-NG |

### Step 02

| Actuator |
|---|
| Standard 440K-A11095 |
| Standard GD2 440G-A27011<br>or<br>Fully Flexible GD2 440K-A27010<br>or<br>Flat GD2 440K-A11112 |

| Actuator |
|---|
| Standard - 440K-A11095 |
| Standard GD2 440G-A27011<br>or<br>Fully Flexible GD 2440K-A27010<br>or<br>Flat GD2 440K-A11112 |

### Step 03

- Select optional accessories

**Cordset and accessories**

| Description | Catalogue No. |
|---|---|
| DC Micro M12 to flying lead 6-Pin yellow cordset | 889R-F6ECA* |
| DC Micro M12 to M12 8-Pin black patchcord | 889D-F8AB* |
| Sliding bolt actuator (GD2) | 440G-A27163 |
| Dust Cover | 440K-A17180 |

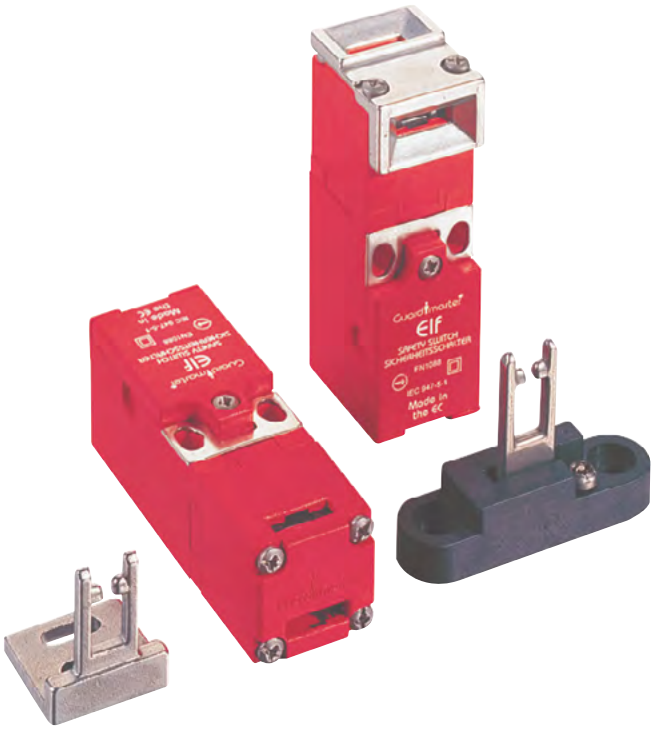
**Note:** Replace * with 2, 5, 10, 15, 20 for required length

**Safety Relays** (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

# Elf Miniature Tongue Interlocks

Installation Instructions



## Features

- Ideal for small, lightweight guards
- The smallest interlock switch available
- Eight possible actuator entry points, easy to install
- GD2 (metal head) style available for demanding applications

The Elf™ Miniature Tongue Interlock Switches are tongue- or key-operated safety interlock switches that fit at the leading edge of sliding, hinged or lift-off guards. The unique miniature housing makes the Elf interlock switch one of the smallest of its kind currently available. This switch is ideal for smaller machines such as printers, copiers and domestic machinery which, until now, have been unable to use safety interlocks due to space restrictions.

### Specifications

| | |
|---|---|
| **Safety Rating** | Type 2 interlocking device |
| **Enclosure Rating** | IP67 |
| **Operational Voltage** | 120V AC – 600V AC/24V DC |
| **Holding Force** | 6 N |
| **Housing Material** | Glass-filled PBT |

## Product selection

### Step 01

| Safety | Auxiliary | M16 Conduit | 4-Pin Micro M12 |
|---|---|---|---|
| 1 NC | 1 NO | 440K-E33014 | 440K-E33076 |
| 2 NC | – | 440K-E33047 | 440K-E33079 |

### Step 02

| Actuator |
|---|
| Flat 440K-A21014<br>or<br>90° Angle 440K-A21006<br>or<br>Semi-Flexible 440K-A21030 |

### Step 03

- Select optional accessories

**Cordset and accessories**

| Description | Catalogue No. |
|---|---|
| DC Micro M12 to flying lead 4-Pin yellow cordset | 889R-F4AC* |
| DC Micro M12 to M12 4-Pin yellow patchcord | 889D-F4ACDM* |
| Metal Alignment Guide | 440K-A21069 |
| Dust Cover | 440K-A17182 |

**Note:** Replace * with 2, 5, 10, 15, 20 for required length

**Safety Relays** (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

# Cadet 3
# Tongue Interlocks

Installation Instructions



## Features

- Compact size
- Ideal for small, lightweight guards
- Eight possible actuator entry points
- GD2 (metal head) style available for demanding applications

The Cadet 3 Tongue Interlock Switches are tongue- or key-operated safety interlock switches that fit at the leading edge of sliding, hinged or lift-off guards. With dual entry slots and rotatable head, the versatile Cadet 3 offers up to eight different actuator entry options.

### Specifications

| | |
|---|---|
| **Safety Rating** | Type 2 interlocking device |
| **Enclosure Rating** | IP67 |
| **Operational Voltage** | 120V AC – 600V AC/24V DC |
| **Holding Force** | 15 N |
| **Housing Material** | Glass Filled PBT |

## Product selection

### Step 01

| Safety | Auxiliary | M16 Conduit |
|---|---|---|
| 3 NC | – | 440K-C21070 |
| 2 NC | 1 NO | 440K-C21055 |
| 2 NC | 1 NO | 440K-C21080 |

### Step 02

| Actuator |
|---|
| Flat 440K-A21014<br>or<br>90° Angle 440K-A21006<br>or<br>Semi-Flexible 440K-A21030 |

### Step 03

- Select optional accessories

**Accessories**

| Description | Catalogue No. |
|---|---|
| Replacement Cover | 440A-A21115 |
| Dust Cover | 440K-A17182 |

**Safety Relays** (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

# MT-GD2 Metal Tongue Interlocks

Installation Instructions




## Features

- Strong and versatile, can be used in most applications
- Eight possible actuator entry points
- Optional latch release styles

The MT-GD2 Tongue Interlock Switches are tongue- or key-operated safety interlock switches that fit at the leading edge of sliding, hinged or lift-off guards. With dual entry slots and rotatable head, the MT-GD2 offers eight different options for actuator entry.

### Specifications

| | |
|---|---|
| **Safety Rating** | Type 2 interlocking device |
| **Enclosure Rating** | IP67 |
| **Operational Voltage** | 120V AC – 600V AC/24V DC |
| **Holding Force** | 32N |
| **Housing Material** | Painted Zinc |

## Product selection

### Step 01

| Type | Safety | Auxiliary | M20 Conduit |
|---|---|---|---|
| MT-GD2 | 3 NC | 1 NO | 440K-MT55002 |
| | 2 NC | 2 NO | 440K-MT55005 |
| MT-GD2 Latch Release | 3 NC | 1 NO | 440K-MT55039 |

### Step 02

| Actuator |
|---|
| GD2 Standard 440G-A27011<br>or<br>GD2 Flat 440K-A11112<br>or<br>Fully-Flexible 440G-A27143 |

### Step 03

- Select optional accessories

**Cordset and accessories**

| Description | Catalogue No. |
|---|---|
| Dust Cover | 440K-A17180 |
| Sliding Bold Actuator | 440G-A27143 |

**Safety Relays** (for more information see pages 62-69)

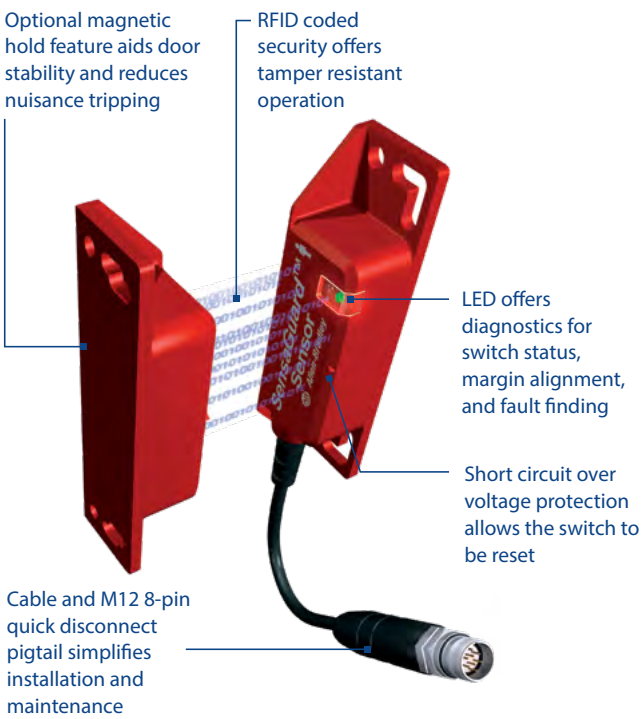
| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

# Sensaguard Non-Contact Interlock Switches



## Features

- RFID unique (high) or standard (low) coded actuators
- Flat pack and barrel (plastic housings)
- Heavy-duty stainless-steel barrel models
- Standard, magnetic hold, and integrated latch versions
- Assured ON 10…25 mm
- LED located on the switch for door status and troubleshooting







## Non-contact Machine Safeguarding with RFID Technology

Featuring RFID technology for coding, inductive technology for sensing and combining a large sensing range with optimal operation and a generous tolerance to misalignment, SensaGuard switches offer a cost-effective solution that is ideally suited to a wide range of safety applications and is intended for use with all types of guard doors.

### Specifications

| | |
|---|---|
| **Safety Rating** | Type 4, PLe, CAT 4 |
| **Enclosure Rating** | IP69k |
| **Power Supply & Current** | 24V DC ±10/-15%; Class 2 |
| **Safety Outputs** | 2 x PNP 0.2A Status ON |
| **Auxiliary Outputs** | 1 x PNP 0.2A Status OFF |

# Product selection

## Step 01

| Type | Sensing Distance | Margin Indication | Magnetic Hold |
|---|---|---|---|
| 18 mm plastic barrel<br>18 mm actuator<br>  <br>440N-Z21S16H | On: 15 mm<br>Off: 25 mm | – | – |
| 18 mm plastic barrel<br>30 mm actuator<br>  <br>440N-Z21S26A | On: 25 mm<br>Off: 35 mm | – | – |
| 18 mm stainless barrel<br>18 mm actuator<br>  <br>440N-Z21S17A | On: 10 mm<br>Off: 20 mm | – | – |
| Plastic rectangular<br>rectangular actuator<br>  <br>440N-Z21SS2AN | On: 15 mm<br>Off: 35 mm | –<br>Yes<br>Yes | –<br>–<br>Yes (9 N) |
| Plastic housing with<br>integrated latch<br>  <br>440N-Z21SS3PH | On: latched<br>Off: 35 mm | – | Adjustable<br>20…60 N |

Installation Instructions

## Step 02

| Actuator |
|---|
| Standard |
| Unique |
| Standard |
| Unique |
| Standard |
| Unique |
| Standard |
| Unique |
| Standard |
| Unique |
| Standard |
| Unique |
| Standard |
| Unique |

## Step 03

| 3 m Cable | 10 m cable | 6 inch Pigtail 8-pin (M12)* |
|---|---|---|
| 440N-Z21S16A | 440N-Z21S16B | 440N-Z21S16H |
| 440N-Z21U16A | 440N-Z21U16B | 440N-Z21U16H |
| 440N-Z21S26A | 440N-Z21S26B | 440N-Z21S26H |
| 440N-Z21U26A | 440N-Z21U26B | 440N-Z21U26H |
| 440N-Z21S17A | 440N-Z21S17B | 440N-Z21S17H |
| 440N-Z21U17A | 440N-Z21U17B | 440N-Z21U17H |
| 440N-Z21SS2A | 440N-Z21SS2B | 440N-Z21SS2H |
| 440N-Z21US2A | 440N-Z21US2B | 440N-Z21US2H |
| 440N-Z21SS2AN | 440N-Z21SS2BN | 440N-Z21SS2HN |
| 440N-Z21US2AN | 440N-Z21US2BN | 440N-Z21US2HN |
| 440N-Z21SS2AN9 | 440N-Z21SS2BN9 | 440N-Z21SS2HN9 |
| 440N-Z21US2AN9 | 440N-Z21US2BN9 | 440N-Z21US2HN9 |
| 440N-Z21SS3PA | 440N-Z21SS3PB | 440N-Z21SS3PH |
| 440N-Z21SU3PA | 440N-Z21SU3PB | 440N-Z21SU3PH |

# Step 04

- Select optional accessories



889D-F8AB-*

## Cordsets

| Description | Catalogue No. |
|---|---|
| Cordset - connector to flying lead DC Micro (M12), Female, Straight, 8-Pin, PVC Cable, Black, Unshielded | 889D-F8AB-* |
| Patchcord - connector to connector lead DC Micro (M12), Female, Straight, 8-Pin, PVC Cable, Black, Unshielded | 889D-F8ABDM-* |

**Note:** Replace * with 2, 5, 10, 15, 20 for required length



871A-BP18



871A-BRS18



871A-SCBP18

## Accessories

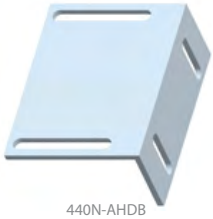
| Description | Catalogue No. |
|---|---|
| Mounting Bracket for Tubular Sensors - Right Angle Style (18mm barrel models) | 871A-BRS18 |
| Mounting Bracket for Tubular Sensors - Clamp Style (18mm barrel models) | 871A-BP18 |
| Snap Clamp Mounting Bracket (18mm barrel models) | 871A-SCBP18 |
| 18 mm Swivel/tilt mounting bracket Mounting Bracket for Tubular Sensors - Clamp Style | 60-2649 |
| Mounting Plate for vertically hinged doors (Integrated Latch version) | 440N-AHDB |
| Mounting Plate for slide and gull wing doors (Integrated Latch version) | 440N-ASDB |
| 18 mm Plastic Actuator for Series "B" Standard Coded Models | 440N-Z18PTB |
| 30 mm Plastic Actuator for Series "B" Standard Coded Models | 440N-Z30PTB |
| 18 mm Stainless Steel Actuator for Series "B" Standard Coded Models | 440N-Z18SSTB |
| Rectangular Plastic Actuator for Series "B" Standard Coded Models | 440N-ZPRECB |
| Rectangular Plastic Actuator for Margin Indication/Magnetic Field Hold for Series "B" Standard Coded Models | 440N-ZPRECMB |
| Integrated Latch Actuator for Series "B" Standard Coded Models | 440N-ZLPRECB |



440N-ASDB

## **Safety Relays** (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |



440N-AHDB

## **Guardlink Smart Taps** (for more information see pages 6-7)

| Description | Catalogue No. |
|---|---|
| GuardLink Enabled Tap 5-pin OSSD Input device | 440S-SF5D |
| GuardLink Enabled Tap 8-pin OSSD Input device | 440S-SF8D |
| GuardLink Red Patchcord to device 8-Pin | 889D-F8NBDM-* |
| GuardLink Red Patchcord from Tap to Tap | 889D-F4NEDM-* |
| GuardLink Red Patchcord from Tap to Safety Relay | 889D-F4NE-* |

**Note:** Replace * with 0M3 (0.3m), 0M6 (0.6m), 2 (2m), 5 (5m), 10 (10m), 15 (15m), 20 (20m) for required length



60-2649

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# Magnetically Coded Non-Contact Interlock Switches

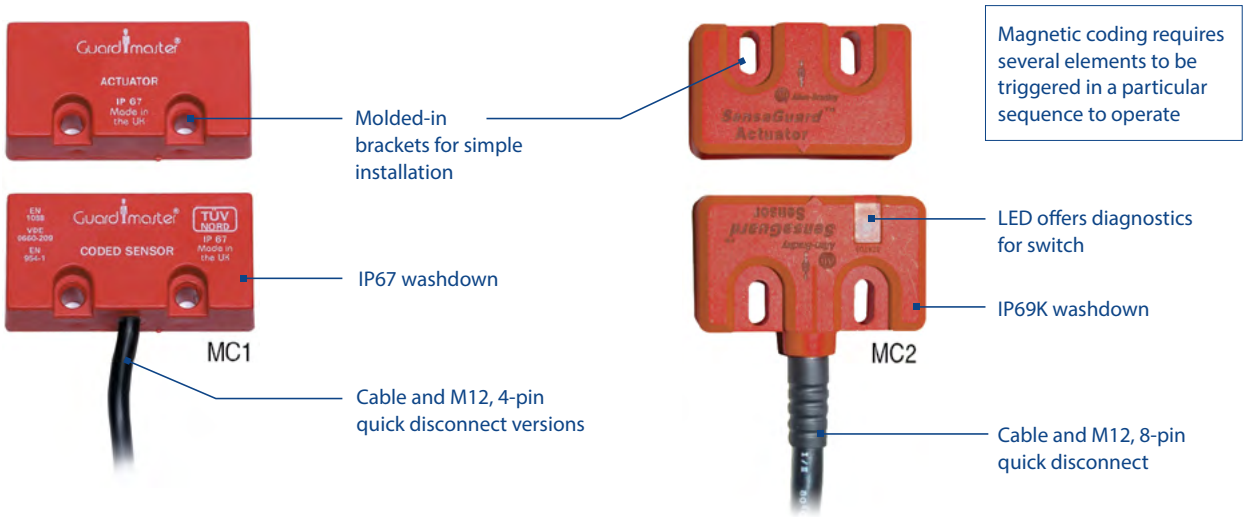
MC1 Installation Instructions

MC2 Installation Instructions




## Features

- Magnetic coded sensing
- Compact enclosure
- Molded-in mounting brackets
- High tolerance to misalignment
- Type 4 interlocking device per ISO 14119 with low coded actuators




With the increasing speed and complexity of applications, a simple magnetic switch may be insufficient to meet the increased risks. The Magnetically Coded MC1 and MC2 non-contact switches incorporate several magnetically sensitive elements, which must be triggered in a particular sequence to operate correctly.

The sensor with its molded-in brackets and diminutive size, is extremely versatile and simple to install.

## Specifications

| | |
|---|---|
| **Safety Rating** | Type 4 |
| **Enclosure Rating** | MC1: IP67 |
| | MC2: IP69k |
| **Power Supply and Current** | 24V DC ±10/-15% |
| **Safety Outputs Auxiliary Outputs** | MC1 : 2 NC Reeds/No Safety |
| | MC2 : 2 NC SSR/1 x PNP, 0.2A max |
| | Status: OFF (0V DC) |

# Product selection

## Step 01

## Step 02

| Type | Operating Voltage/ Input Current | Safety Outputs | Auxiliary Outputs | Status Indicator | Connection | Catalogue Number | Recommended Cordset |
|---|---|---|---|---|---|---|---|
| MC1 | – | 2 NC REEDS | – | No | 4-pin micro (M12) | 440N-Z2NRS1C | 889D-F4AC-* |
| | | | | | 3 m cable | 440N-Z2NRS1A | – |
| | | | | | 10 m cable | 440N-Z2NRS1B | – |
| MC2 | 24 V DC, +10% / 15% / 50 mA max. | 2 NC Solid- State Relays | 1 x PNP, 0.2 A max.; Status: OFF (0V DC) | Yes | 8-pin micro (M12) | 440N-Z21W1PH | 889D-F8AB-* |
| | | | | | 3 m cable | 440N-Z21W1PA | – |
| | | | | | 10 m cable | 440N-Z21W1PB | – |

**Note:** Replace * with 2, 5, 10 for required length

## Step 03

- Select optional accessories




440N-A17233

### Spare actuators

| Description | Catalogue No. |
|---|---|
| MC1 Spare Actuator | 440N-A17233 |
| MC2 Spare Actuator | 440N-A32114 |



### **Safety Relays** (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

# 440P Safety Limit Switches

## Features

Technical Data

- 30 mm metal, 22 mm metal and plastic, and 15 mm plastic body styles
- Flexible installation, wide range of actuator and contact configurations
- Safety Rated, Positive opening-action contacts (Slow Acting)

### Actuator Head Types

**Note:** Adjustable actuators cannot be used in Safety applications (Adjustable Roller Lever, Spring Rod, Telescopic Arm).


Short roller lever


Adjustable roller lever


Dome plunger


Roller plunger


Panel mount roller plunger


Rod lever


Spring rod


Adjustable Rubber Roller


Hinge lever

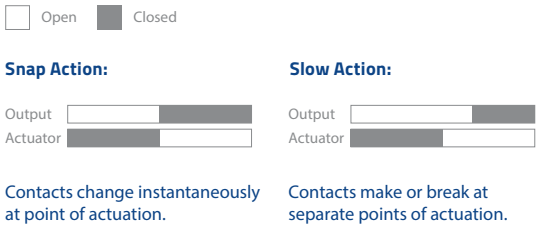

Telescopic arm


Offset hinge


Cross roller plunger

## A full line of IEC safety switches

The 440P limit switch family offers a full range of international-style solutions for both safety and standard sensing applications. Available in four different body styles – 30 mm metal, 22 mm metal and plastic, and 15 mm plastic – with a broad selection of operator types, circuit arrangements and connection options, the 440P is ideal for a wide variety of applications. These include material handling, packaging, elevators, escalators, scissor lifts, industrial trucks and tractors, cranes and hoists, overhead door as well as general safety guarding applications.




### Specifications

| | 30mm Metal | 22mm Plastic | 22mm Metal | 15mm Plastic |
|---|---|---|---|---|
| **Dimensions (H x W x D) mm** | 76.5 x 40 x 45 | 68 x 31 x 30 | 34 x 35 x 16 | 37.7 x 25.1 x 23.3 |
| **Safety Rating** | Type 1, CAT 1 | Type 1, CAT 1 | Type 1, CAT 1 | Type 1, CAT 1 |
| **Enclosure Rating** | IP66 | IP66 | IP66, IP67, IP69K | IP30 |
| **Safety outputs** | 1NC, 2 NC, 3NC, 4NC | 1NC, 2NC, 3NC | 1NC, 2NC, 3NC, 4NC | 1NC |
| **Auxiliary outputs** | 1NO (with 2NC) | 1NO | 1NO, 2NO | 1NO |
| **Operational Voltage** | 240V / 3A | 240V / 3A | 240V / 3A | 240V / 3A |
| | Installation Instructions | Installation Instructions | Installation Instructions | Installation Instructions |

# Product selection

## Step 01

**Housing Type**

30 mm metal



440P-MALS11B

22 mm plastic



440P-CALS11B

## Step 02

**Actuator Head**

- Short Roller Lever
- Adjustable Roller Lever
- Dome Plunger
- Roller Plunger
- Adjustable Rod Lever
- Spring Rod
- Telescopic Arm
- Adjustable Rubber Roller
- Short Roller Lever
- Adjustable Roller Lever
- Dome Plunger
- Plastic Roller Plunger
- Hinge Lever
- Adjustable Rubber Roller

## Step 03

| Safety Contacts | Auxillary Contacts | Contact Type |
|---|---|---|
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1NC | 1NO | Snap acting |
| 2NC | 2NO | Slow acting |
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1 NC | 1 NO | Snap acting |
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1 NC | 1 NO | Snap acting |
| 2 NC | 2 NO | Slow acting |
| 1NC | 1NO | Snap acting |
| 2NC | 2NO | Slow acting |

## Step 04

| M20 Conduit | Quick Disconnect [1] |
|---|---|
| 440P-MSLS11B | 440P-MSLS11N5 |
| 440P-MSLB22B | 440P-MSLB22M9 |
| 440P-MALS11B | 440P-MALS11N5 |
| 440P-MALB22B | 440P-MALB22M9 |
| 440P-MDPS11B | 440P-MDPS11N5 |
| 440P-MDPB22B | 440P-MDPB22M9 |
| 440P-MRPS11B | 440P-MRPS11N5 |
| 440P-MRPB22B | 440P-MRPB22M9 |
| 440P-MARS11B | 440P-MARS11N5 |
| 440P-MARB22B | 440P-MARB22M9 |
| 440P-MSRS11B | 440P-MSRS11N5 |
| 440P-MSRB22B | 440P-MSRB22M9 |
| 440P-MTAS11B | 440P-MTAS11N5 |
| 440P-MTAB22B | 440P-MTAB22M9 |
| 440P-MRRS11B | 440P-MRRS11N5 |
| 440P-MRRS11N5 | 440P-MRRB22M9 |
| 440P-CSLS11B | 440P-CSLS11D4 |
| 440P-CSLB12B | 440P-CSLB12R6 |
| 440P-CALS11B | 440P-CALS11D4 |
| 440P-CALB12B | 440P-CALB12R6 |
| 440P-CDPS11B | 440P-CDPS11D4 |
| 440P-CRPS11B | 440P-CRPS11D4 |
| 440P-CRPB12B | 440P-CRPB12R6 |
| 440P-CHLS11B | 440P-CHLS11D4 |
| 440P-CHLB12B | 440P-CHLB12R6 |
| 440P-CRRS11B | 440P-CRRS11D4 |
| 440P-CRRB12B | 440P-CRRB12R6 |

**1)** 30mm Metal
For contacts 1NC 1NO use patchcord 889N-F5AE-6F
For contacts 2NC 2NO use patchcord 889M-FX9AE-2

22mm Plastic
For contacts 1NC 1NO use patchcord 889D-F4AB-2
For contacts 2NC 2NO use patchcord 889R-F6ECA-2

| Housing Type | Description | Safety Contacts | Auxillary Contacts | Contact Type | 2 m Bottom Cable | 2 m Side Cable |
|---|---|---|---|---|---|---|
| 22 mm metal with flying lead  440P-ASLS11C | Short Roller Lever | 1 NC | 1 NO | Snap acting | 440P-ASLS11C | 440P-ASLS11CS |
| | Adjustable Roller lever | 1 NC | 1 NO | Snap acting | 440P-AALS11C | 440P-AALS11CS |
| | Dome Plunger | 1 NC | 1 NO | Snap acting | 440P-ADPS11C | 440P-ADPS11CS |
| | Metal Roller Plunger | 1 NC | 1 NO | Snap acting | 440P-ARPS11C | 440P-ARPS11CS |

| Housing Type | Description | Safety Contacts | Auxillary Contacts | Contact Type | 1/2 in' NPT |
|---|---|---|---|---|---|
| 15 mm plastic  440P-M18001 | Roller Plunger | 1 NC | 1 NO | Snap acting | 440P-M18001 |
| | Cross Roller Plunger | 1 NC | 1 NO | Snap acting | 440P-M18002 |

# Lifeline Cable Pull Switches 440E

Technical Data



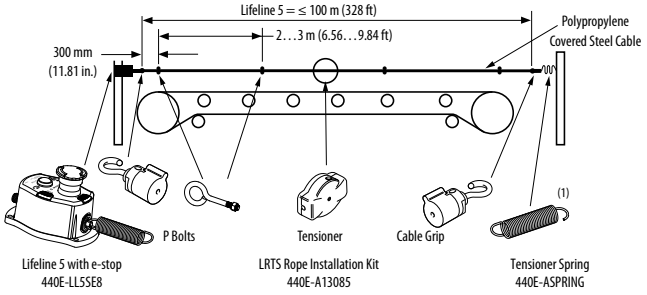
Lifeline 3 | Lifeline 4 | Lifeline 4 SS

Lifeline 5 | Lifeline 5 | Lifeline 5 SS

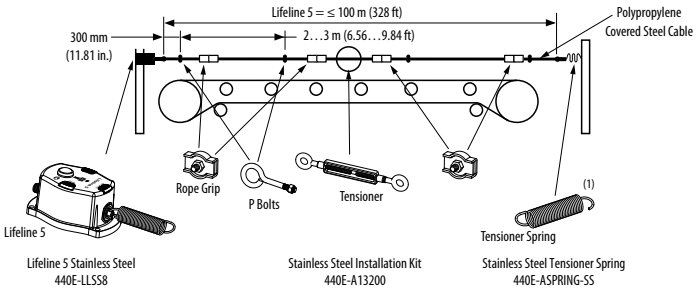
## Features

- Up to 125 m cable span
- Universal mounting and operation
- Lid mounted emergency stop button
- Switch latches when cable is pulled, or cable is slack
- Cable status indicator on switch lid
- Lifeline Rope Tensioner System (LRTS) speeds installation

### Typical Mounting Example with One Switch Using Lifeline Rope Tensioner System (LRTS)

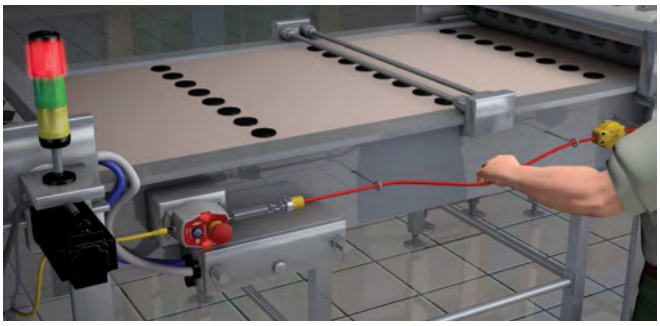



### Typical Mounting Example with One Switch Using the Stainless Steel Installation Kit




## Cable pull switches overview

The patented Lifeline 5 Cable Pull Switch is a microprocessor-based solution that brings advanced features and diagnostics that help enhance safety while improving productivity. The Lifeline 5 offers features and functions that simplify setup and allow for more efficient maintenance and troubleshooting, making it the most advanced switch on the market today.



### Specifications

| | Lifeline 5 | Lifeline 4 | Lifeline 3 |
|---|---|---|---|
| **Safety Rating** | PLe, CAT4, SIL3 | CAT3 | CAT3 |
| **Enclosure Rating** | IP66,IP67, IP69K | IP66, IP67, IP69K | IP67 |
| **Material** | Die Cast and Stainless Steel | Painted Alloy and Stainless Steel | Painted Zinc Alloy |
| **Reset** | Yes | Yes | Yes |
| **E-stop** | Yes | Yes | No |
| **Cable Span** | 100m | 75m and 125m | 30m |
| | Installation Instructions | Installation Instructions | Installation Instructions |

# Product selection

## Step 01

| Model | Cable Span |
|---|---|
| Lifeline 5 | ≤100 m |
| Lifeline 5 with e-stop | |
| Lifeline 5 stainless steel[1)] | |
| Lifeline 4 | ≤75 m |
| | 75…125 m |
| Lifeline 4 stainless steel[1)] | ≤75 m |
| Lifeline 3 | ≤30 m |

## Step 02

| Safety Outputs | Auxiliary Outputs |
|---|---|
| 2 OSSDs | 1 Aux |
| 2 OSSD Outputs<br>2 OSSD Inputs | 1 Aux,<br>1 Tension |
| 2 OSSDs | 1 Aux |
| 2 OSSD Outputs<br>2 OSSD Inputs | 1 Aux,<br>1 Tension |
| 2 OSSDs | 1 Aux |
| 2 OSSD Outputs<br>w/ 2 OSSD Inputs | 1 Aux,<br>1 Tension |
| 2 NC | 2 NO |
| 3 NC | 1 NO |
| 2 NC | 2 NO |
| 3 NC | 1 NO |
| 2 NC | 2 NO |
| 2 NC | |
| 3 NC | |

## Step 03

| Catalogue No. | | |
|---|---|---|
| M20 | 5-pin Micro (M12) | 8-pin Micro (M12) |
| – | 440E-LL5SN5 | – |
| – | – | 440E-LL5SN8 |
| – | 440E-LL5SE5 | – |
| – | – | 440E-LL5SS8 |
| – | 440E-LL5SS5 | – |
| – | – | 440E-LL5SS8 |
| 440E-L13137 | – | – |
| 440E-L13042 | – | – |
| 440E-L13153 | – | – |
| 440E-L13150 | – | – |
| 440E-L22BNSMNH | | |
| 440E-D13118 | – | – |
| 440E-D13112 | – | – |

## Step 04

| Required Cordset |
|---|
| 889D-F5AC-* |
| 889D-F8AB-* |
| 889D-F5AC-* |
| 889D-F8AB-* |
| 889D-F5AC-* |
| 889D-F8AB-* |
| – |
| – |
| – |
| – |
| |
| – |
| – |

**Note:** Replace * with 2 (2m), 5 (5m), 10 (10m), 15 (15m), 20 (20m) for required length

1) A dedicated stainless steel installation kit must be used with the stainless steel Lifeline instead of the LRTS.

## Step 05

- Select Installation Kits and Accessories



440E-A13080



440E-A13194

### LRTS Standard Rope Tension Installation Kits

| Description | Catalogue No. |
|---|---|
| 5m | 440E-A13079 |
| 10m | 440E-A13080 |
| 15m | 440E-A13081 |
| 20m | 440E-A13082 |
| 30m | 440E-A13083 |
| 50m | 440E-A13084 |
| 75m | 440E-A13085 |

**Note:** LRTS System contains 1 x length of cable (rope), 2 x grippers, 1 x tensioner and quantity of eyebolts

Installation instructions

### Stainless Steel Installation Kits

| Description | Catalogue No. |
|---|---|
| 5m | 440E-A13194 |
| 10m | 440E-A13195 |
| 15m | 440E-A13196 |
| 20m | 440E-A13197 |
| 30m | 440E-A12198 |
| 50m | 440E-A13199 |
| 75m | 440E-A13200 |

**Note:** Installation Kits include 1 x length of cable (rope), 1 x turnbuckle tensioner, 4 x thimbles, 8 x rope grips and eyebolts, nuts and washers depending on the length of the rope.

# Step 06

- Select optional accessories



440E-A13227



440E-A17105



440E-A13205



440E-A13206



Lifeline 5
440E-ASPRING



Lifeline 3/4
440E-A13078

## Accessories

| Description | Catalogue No. |
|---|---|
| LRTS Tensioner and Allen key | 440E-A17105 |
| Gripper 2 Pack | 440E-A17107 |
| Gripper 20 pack | 440EA17106 |
| Lifeline 3 / 4 Tensioner Spring | 440E-A13078 |
| Lifeline 4 Tensioner Spring Stainless Steel | 440E-A13202 |
| Lifeline 5 Tensioner Spring | 440E-ASPRING |
| Lifeline 5 Tensioner Spring Stainless Steel | 440E-ASPRING-SS |
| Turn Buckle Kit Stainless Steel | 440E-A13227 |
| Inside Corner Pulley | 440A-A17101 |
| Outside Corner Pulley | 440A-A17102 |
| Inside Corner Pulley Stainless Steel | 440E-A13205 |
| Outside Corner Pulley Stainless Steel | 440E-A13206 |
| Lifeline Eyebolt M8 x 1.25 thread 58mm thread length | 440E-A17003 |
| Lifeline Stainless Steel Eyebolt M8 x 1.25 thread 58mm thread length | 440E-A13201 |

## **Safety Relays** (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

## **Guardlink Smart Taps** (for more information see pages 6-7)

| Description | Catalogue No. |
|---|---|
| GuardLink Enabled Tap 5-pin OSSD Input device | 440S-SF5D |
| GuardLink Red Patchcord to device 5-Pin | 889D-F5NCDM- |
| GuardLink Enabled Tap 8-pin OSSD Input device | 440S-SF8D |
| GuardLink Red Patchcord to device 8-Pin | 889D-F8NBDM-* |
| GuardLink Red Patchcord from Tap to Tap | 889D-F4NEDM-* |
| GuardLink Red Patchcord from Tap to Safety Relay | 889D-F4NE-* |

**Note:** Replace * with 0M3 (0.3m), 0M6 (0.6m), 2 (2m), 5 (5m), 10 (10m), 15 (15m), 20 (20m) for required length

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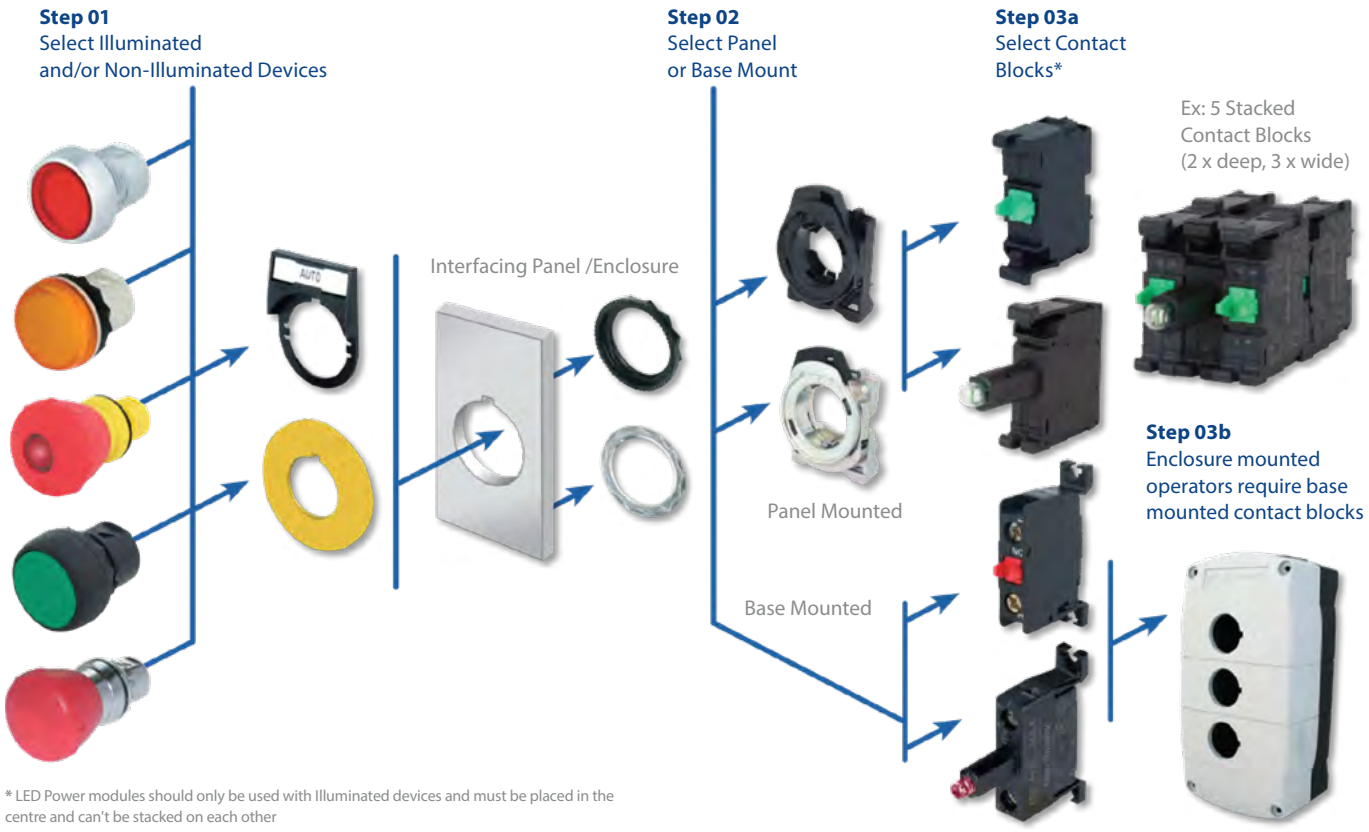
# Operator Devices 800F





## Features

- 22.5 mm mounting hole
- Self-monitoring contact blocks for increased safety
- Engineering grade thermoplastics
- Die-cast metal construction
- Illuminated and non-illuminated options
- With or without key operation




* LED Power modules should only be used with Illuminated devices and must be placed in the centre and can't be stacked on each other

**Note:** Base Mounted back of panel components must be selected for Enclosure type installations
Panel Mounted back of panel components must be selected for Panel type installations

The 800F line of 22 mm push buttons is designed and manufactured to demanding performance specifications. Using state-of-the-art solid modelling techniques and finite element analysis, every component built into 800F Push Buttons is optimized for durability and performance.

## Specifications

| | | |
|---|---|---|
| **Material** | Plastic | Glass-filled Polyamide |
| | Metal | Chromated Zinc |
| **Ingress Protection** | Plastic | IP65/66(Type 3/3R/4/4X/12/13), IP69K |
| | Metal | IP65/66(Type 3/3R/4/12/13) |
| **Operational Temperature** | -25….+70 OC | |

**Note:** IP69K applies to specific complete units of 800F Operator devices and Enclosures, contact NHP for more information

# Product selection

## Step 01

- Select Operator Devices

## Step 01a

- Select complete assembled E-Stop Station



800F-1YM2



800F-1YMD51

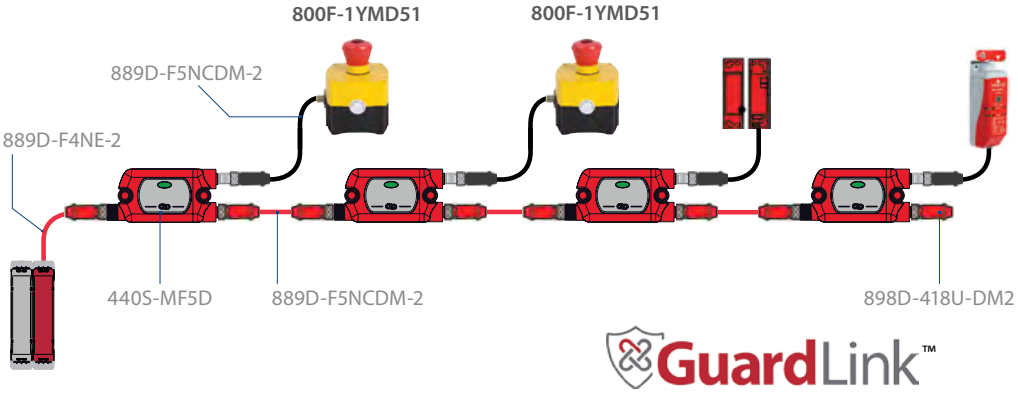
### Assembled E-Stop Operators

| Description | Contact Configuration | Pins | SensaGuard/ GuardLink | Catalogue No. |
|---|---|---|---|---|
| Unwired | 1NC | – | – | 800F-1YM1 |
| Unwired | 1NC/1NO | – | – | 800F-1YM2 |
| Unwired | 1NC/1NO Keyed | – | – | 800F-1YM5 |
| Unwired | 2NC | – | – | 800F-1YM3 |
| End Station (1 x M12) | 2NC/1NO, 24V DC Illuminated | 5 | Y | 800F-1YMD51 |
| T-Port Station (2 x M12) | 2NC/1NO, 24V DC Illuminated | 5 | Y | 800F-1YMD52 |

**Note:** Complete E-stop station does not require contact blocks or adapter plates

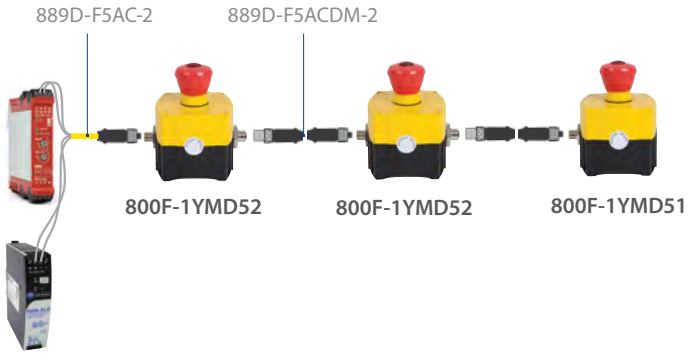
### 800F-1YMD51

- For use with GuardLink enabled taps
- Illuminated when activated
- 2 N.C. circuits (safety)
- 24V AC/DC
- External panel mounting holes




### 800F-1YMD52

- Illuminated when activated
- 2 N.C. circuits (safety)
- 1 N.O. circuit (illumination)
- 24V AC/DC
- External panel mounting holes



# Step 01b

- Select Front of panel operator devices

### 800F Momentary Pushbutton Operators

| Type of Operator | | Colour | Text | Flush Operator |
|---|---|---|---|---|
| Non-Illuminated |  800FP-F3 | Green | START | 800F*-F301 |
| | | Green | I | 800F*-F306 |
| | | Green | – | 800F*-F3 |
| | | Red | STOP | 800F*-F402 |
| | | Red | O | 800F*-F405 |
| | | Red | – | 800F*-F4 |
| |  800FP-F611 | Blue | R | 800F*-F611 |
| | | Blue | – | 800F*-F6 |
| | | Orange | – | 800F*-F0 |
| | | White | – | 800F*-F1 |
| | | Black | – | 800F*-F2 |
| | | Yellow | – | 800F*-F5 |
| Illuminated |  800FM-LF4 | Green | – | 800F*-LF3 |
| | | Red | – | 800F*-LF4 |
| | | Blue | – | 800F*-LF5 |
| | | Orange | – | 800F*-LF0 |
| | | White | – | 800F*-LF1 |
| | | Black | – | 800F*-LF2 |
| | | Yellow | – | 800F*-LF5 |

Replace * with "P" for Plastic Operator and "M" for Metal Operator
**Note:** Text colour is white


800FP-P4


800FD-P7N3

### 800F Pilot Light Operators

| Colour | Catalogue No. | |
|---|---|---|
| | Plastic | Metal |
| Green | 800FP-P3 | 800FM-P3 |
| Red | 800FP-P4 | 800FM-P4 |
| Yellow | 800FP-P5 | 800FM-P5 |
| Amber | 800FP-P0 | 800FM-P0 |
| Blue | 800FP-P6 | 800FM-P6 |
| Clear | 800FP-P7 | 800FM-P7 |

### 800F Pilot Light Operators (Monolithic)

| Colour | Catalogue No. | Voltage |
|---|---|---|
| Green | 800FD-P3N3 | 24V AC/DC |
| Red | 800FD-P4N3 | |
| Yellow | 800FD-P5N3 | |
| Amber | 800FD-P0N3 | |
| Blue | 800FD-P6N3 | |
| Clear | 800FD-P7N3 | |


800FP-MT34


800FP-MT44


800FP-LMT44


800FP-MK44

### E-stop operators

| | Size (mm) | Non-Illuminated | | Illuminated | |
|---|---|---|---|---|---|
| | | Plastic | Metal | Plastic | Metal |
| Twist-to-release | 30 | 800FP-MT34 | 800FM-MT34 | - | - |
| | 40 | 800FP-MT44 | 800FM-MT44 | 800FP-LMT44 | 800FM-LMT44 |
| | 60 | 800FP-MT64 | 800FM-MT64 | 800FP-LMT64 | 800FM-LMT64 |
| | 40 keyed | 800FP-MK44 | 800FM-MK44 | - | - |
| Push-Pull | 40 | 800FP-MP44 | 800FM-MP44 | 800FP-LMP44 | 800FM-LMP44 |

# Step 02

- Select suitable Adapter Plates



800F-ALP

### 800F Adapter Plates

| Material | Catalogue No. |
|---|---|
| Plastic | 800F-ALP |
| Metal | 800F-ALM |

# Step 03a

- Select Back of panel components



800F-X01



800F-BX10



800F-BN3R

### 800F Contact Blocks

| Type | Mounting Type | Catalogue No. |
|---|---|---|
| NO - Normally Open | Panel Mount | 800F-X10 |
| NO/NC - Normally Open/Normally Closed | Panel Mount | 800F-X11D |
| NC - Normally Closed | Panel Mount | 800F-X01 |
| NC - Self Moitoring | Panel Mount | 800F-X01S |
| NO - Normally Open | Base Mount | 800F-BX10 |
| NC - Normally Closed | Base Mount | 800F-BX01 |

**Note:** Base mounted contact blocks are used only with enclosures

### 800F LED Power Modules

| Colour | Mounting Type | Catalogue No. | Voltage |
|---|---|---|---|
| Green | Panel Mount | 800F-N3G | 24V AC/DC |
| Red | Panel Mount | 800F-N3R | |
| Clear | Panel Mount | 800F-N3W | |
| Green | Base Mount | 800F-BN3G | |
| Red | Base Mount | 800F-BN3R | |
| Clear | Base Mount | 800F-BN3W | |

**Note:** Base mounted contact blocks are used only with enclosures

# Step 03b

- Select optional enclosure



800F3PM-C



800F5MM-C

### Enclosures

| Holes | Gray Plastic | Yellow Plastic | Metal |
|---|---|---|---|
| 1 | 800F-1PM | 800F-1YM | 800F-1MM |
| 2 | 800F-2PM | – | 800F-2MM |
| 3 | 800F-3PM | – | 800F-3MM |
| 4 | 800F-4PM | – | – |
| 5 | – | – | 800F-5MM |
| 6 | 800F-6PM | – | – |

**Note:** Through holes are metric for enclosures.
IP69K applies to specific complete units of 800F Operator devices and Enclosures, contact NHP for more information.

# Step 04

- Select optional accessories




800F-15YSE112




800F-12WE100

### Legend Plates

| Description | Catalogue No. |
|---|---|
| "EMERGENCY STOP" | 800F-15YSE112 |
| "EMERGENCY STOP", 90mm wide | 800F-16YE112 |
| Blank | 800F-15YS |
| 30 x 40 mm 2-piece Snap-in Plate and Frame, White text | 800F-11WE100 |
| 31 x 50 mm 2-piece Snap-in Plate and Frame, White text | 800F-12WE100 |
| 32 x 40 mm 1-piece Snap-in Plate and Frame, White text | 800F-34WE100 |

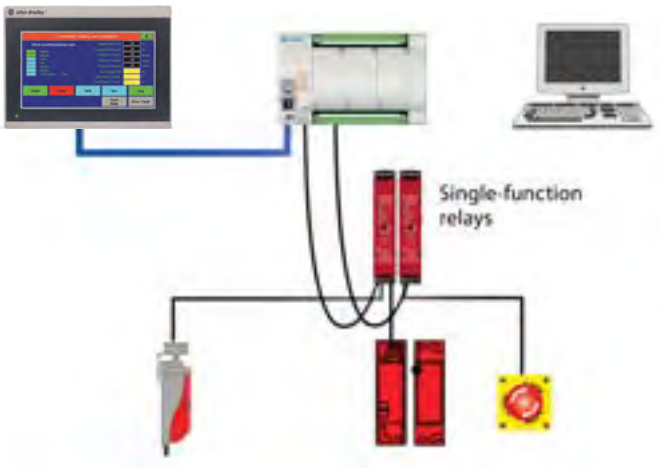
### **Safety Relays** (for more information see pages 62-69)

| Description | Catalogue No. |
|---|---|
| Guardmaster (SI) Single Input Safety Relay | 440R-S12R2 |
| Guardmaster (DI) Dual Input Safety Relay | 440R-D22R2 |
| Guardmaster Ethernet Interface | 440R-ENETR |
| Guardmaster CR30 Configurable Relay | 440C-CR30-22BBB |

# Logic Devices

## Basic

Guardmaster Safety Monitoring Relays 440R



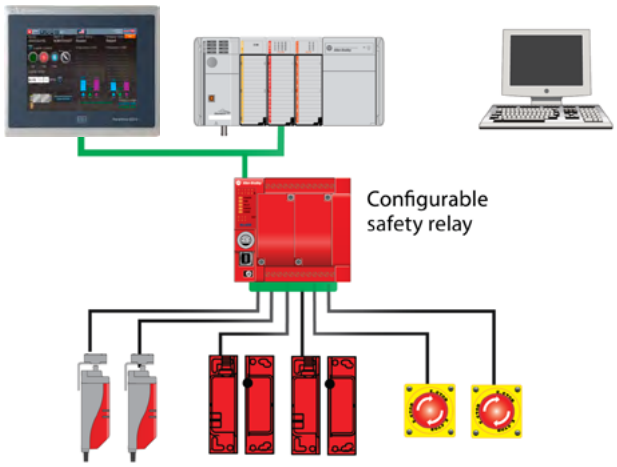

Basic safety relays should be considered for single zone control, with a minimal number of input devices. Safety relays simply monitor the status of input devices, and when an unhealthy condition is observed will de-energise safety outputs – this de-energises the intended system. They do offer more advanced features such as timed responses and guard locking with standard proximity inputs – these features are highly brand dependant.

You would typically expect the following basic features as a minimum on a safety relay:

- dual-channel inputs
- 2x safety outputs
- A non-safety rated auxiliary output for system monitoring
- Auto / manual reset feature

## Intermediate

Software Configurable Safety Relay 440C-CR30

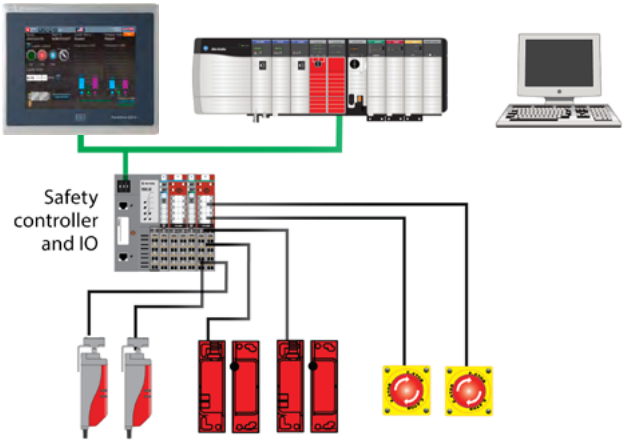



Simplified safety PLC, ideal for applications requiring many dual-channel safety circuits. Can be configured via software selecting TUV certified safety function blocks. 440C-CR30

- Useful for higher concentration of I/O (22-point embedded safety I/O included)
- Expandable via Micro800 plug-in modules
- Extra input, output or Ethernet
- Communication via USB or RS-232 serial
- Single-wire safety I/O for cascading with GSR series and other 440C-CR30
- Built-in redundancy, diversity and diagnostics. Suitable for CAT4, PLe, SIL3 applications

## Advanced

Safety Programmable Controllers
Control GuardLogix 5580
Compact GuardLogix 5380




Safety PLC systems bring the benefits of traditional PLC systems to complex safety applications. Allow standard and safety-related programs to reside in a single controller chassis, providing flexibility in programming.

- Standard control and safety control in one controller
- One common chassis
- Standard and safety control on common networks
- Processor redundancy, diversity and diagnostics. Some suitable for CAT4, PLe, SIL3 applications
- Integrated architecture combining safety and non-safety systems over a single network

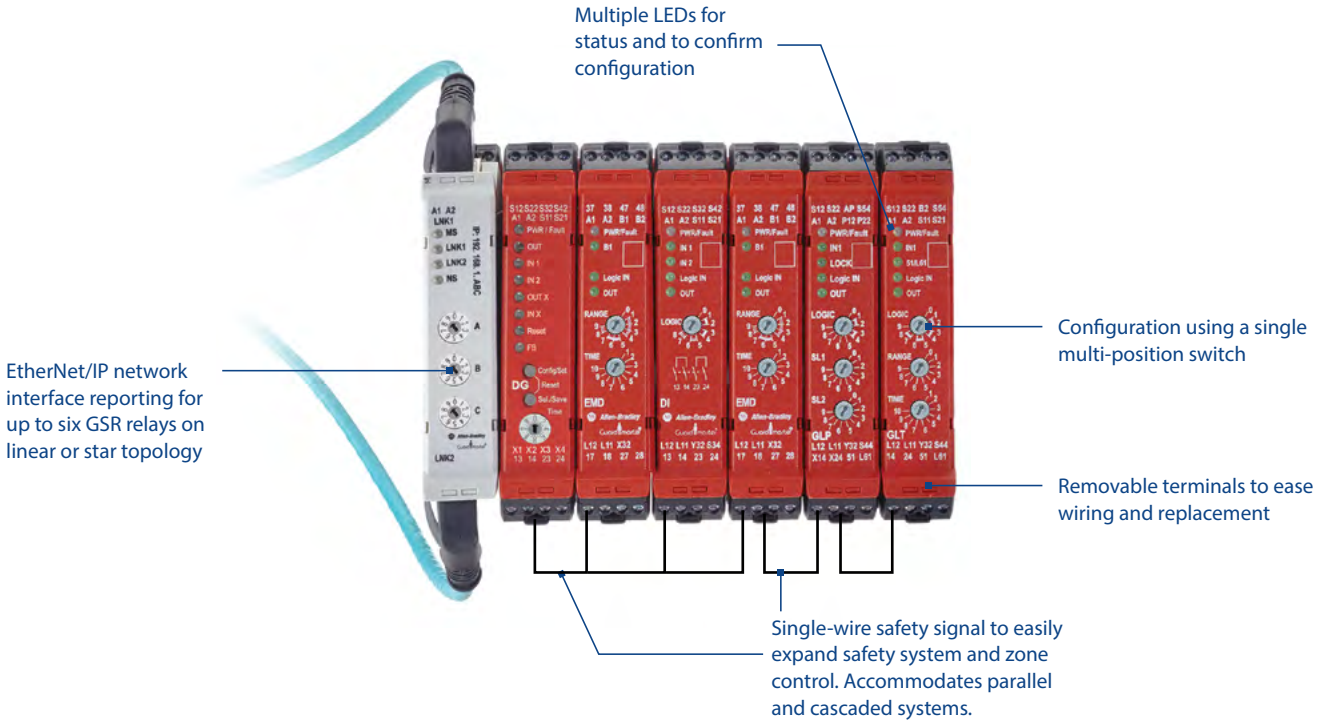
User Manual

# Guardmaster Safety Relays 440R



## Features

- 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



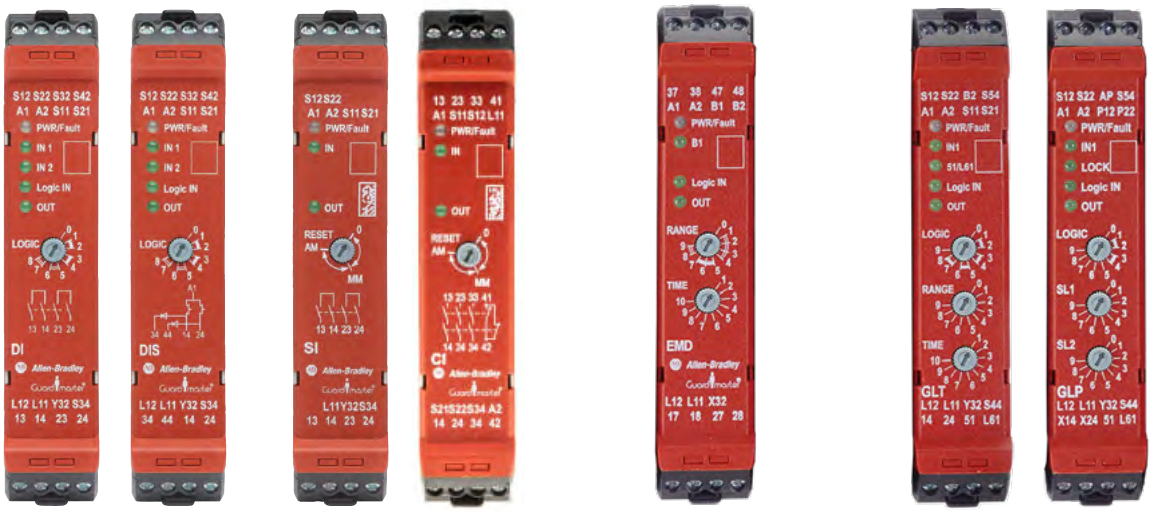

The Allen-Bradley Guardmaster Safety Relays include units capable of monitoring a broad range of safety devices in a variety of applications. These units can achieve most of the functions safety systems require, helping simplify purchasing and parts management. The family is designed to meet new functional safety standards, such as EN ISO 13849-1 or IEC/EN 62061 and offers key functions to simply installations and system complexity.

### Specifications

| | |
|---|---|
| **Power Supply** | 24VDC |
| **Safety Rating** | PLe, CAT4, SIL3 |
| **Operating Temperature** | -5….+55 °C |
| **Conductor Size** | 0.2…4mm |

# Guardmaster Safety Monitoring Relay Comparison

Example Wiring Diagrams




| | Safety Relays | | | | Expansion Modules | | Access Control | |
|---|---|---|---|---|---|---|---|---|
| | Guardmaster DI/DIS | | Guardmaster SI/CI | | Guardmaster EM/EMD | | Guardmaster GLT/GLP | |
| | Consolidates functionality of two safety relays into a single electromechanical relay (DI) or solid state (DIS) outputs | | Ideal for safety functions using one dual or single channel safety device. Ideally suited for global E-stop function in combination with another GSR relay | | Easily add 4 N.C. instantaneous (EM) or delayed (EMD) outputs to a system | | Developed for applications requiring access control monitoring the stop time, standstill or safe limited speed to unlock guards when equipment reaches a safe condition. | |
| **Model** | **DI** | **DIS** | **SI** | **CI** | **EM** | **EMD** | **GLT** | **GLP** |
| **Catalogue No.** | 440R-D22R2 | 440R-D22S2 | 440R-S12R2 | 440R-S13R2 | 440R-EM4R2 | 440R-EM4R2D | 440R-GL2S2T | 440R-GL2S2P |
| **Features** | - Two Dual Channel inputs<br>- Rotary switch configures auto/ manual or monitored manual reset or logic of inputs<br>- Universal inputs are compatible with interlocks, light curtains, safety mats, E-stops, and SensaGuard<br>- Single wire safety input and output to cascade safety relays and expand with output modules while maintaining SIL 3, PLe | | - Rotary switch configures auto or manual or monitored manual reset<br>- Universal inputs are compatible with interlocks, light curtains, safety mats, E-stops, and SensaGuard<br>- Single wire safety output connects to control other safety relays e.g. as Global E-Stop and expand with output modules while maintaining SIL 3, PLe | | - Four instantaneous or delayed safety outputs and one auxiliary PNP output<br>- Controlled by single wire safety to expand outputs of a GSR module while maintaining SIL 3, PLe<br>- Timer version provides on-delay, off-delay and jog outputs that can be configured via rotary switches | | - Applicable for Stop Category 0 and 1<br>- Rotary switch configures reset type and speed monitoring mode (GLP) or time delay (GLT) | |
| | | | | | | | - Allow access when maximum stop time of equipment has lapsed & reaches standstill<br>- Combinations of two instantaneous & two delayed switching output | - 2 PNP proximity sensor inputs for standstill or slow-speed monitoring to allow access when equipment reaches safe speed<br>- Supports standard proximity switches while maintaining PLd, SIL 2 |
| **Input Type** | 2 Universal Safety Inputs, 1 Single Wire Safety | | 1 Universal Safety Inputs, 1 Single Wire Safety | | 1 Single Wire Safety | 1 Single Wire Safety Jog Input | Universal Safety Input, 1 Single Wire Safety Time based Stop monitoring | 1 Universal Safety Input, 1 Single Wire Safety 2 Proximity Switch Inputs for speed monitoring |
| **Safety Outputs** | 2 NO 1 Single wire safety | 2 PNP 1 Single wire safety | 2 NO | 3 NO | 4 NO 1 Single Wire Safety | 4 NO delayed 1 Single Wire Safety | 2 PNP 2 Lock 1 Single Wire Safety | |
| **Diagnostics** | LED indicators, 1 PNP Aux, optical bus | | | LED indicators 1 NC | Led indicators, 1 PNP Aux, optical bus | | | |
| **Utilization category** | AC15 - 3A/250V AC | 14, 24: 1.5 A each | AC15 - 1.5 A/250V AC | | AC15 - 1.5 A/250V AC | | – | X14, X24: 0.5 A each |
| | DC13 - 4A/24V DC | 34, 44: 0.5 A each | DC13 - 2 A/24V DC (0.1Hz) | | DC13 - 2 A/24V DC | | | 51, L61: 0.3 A each |

# Product selection
# Step 01

- Select Safety Relay

| Relay Type | Number of inputs | Input Type | Immediate off Safety Outputs | Delayed Safety Outputs | Time Delay | Immediate Auxiliary Outputs | Catalogue No. |
|---|---|---|---|---|---|---|---|
| **DG** Dual Guardlink | 2 dual-channel 1 Single Wire Safety | 1 NC 2NC OSSD, Guardlink | Single Wire Safety | 2 NO | 0ms…30s | up to 1 Solid State | 440R-DG2R2T |
| **DI** Dual Input | | 1 NC 2NC OSSD Light Curtain, Safety Mat | 2 NO | – | – | 1 Solid State | 440R-D22R2 |
| **DIS** Dual Input Solid State | | | 2 Solid State | | | 1 Solid State | 440R-D22S2 |
| **SI** Single Input | 1 dual-channel | | 2 NO | – | – | 1 Solid State | 440R-S12R2 |
| **CI** Compatible Input | | | 3 NO | | | 1 Solid State | 440R-S13R2 |
| **GLP** Guard Locking Proximity | 1 dual-channel 2 PNP 1 Single Wire Safety | 2 NC OSSD | 2 Solid State | – | – | 1 Solid State | 440R-GL2S2P |
| **GLT** Guard Locking Time Delay | 1 dual-channel 1 SWS | 2 NC or OSSD | 2 Solid State | 2 Solid State | 100ms… 30min | 1 Solid State | 440R-GL2S2T |
| **EM** Expansion Module | 1 Single Wire Safety (on top of above relays) | | 4 NO | – | – | 1 Solid State | 440R-EM4R2 |
| **EMD** Expansion Module Time Delay | | | **DI/SI:** 2 NO **CI:** 3 NO **DIS:** 2 PNP **EM:** 4 NO **EMD:** 4NO delay **DIS/GLP:** 2 PNP lock | 4 NO | 100ms…300s on/off delay 100ms…20s jog | | 440R-EM4R2D |
| Ethernet Module | For interfacing between GSR module and Safety Controller | | | | | | 440R-ENETR |

**Note:** For 440R-ENETR Select suitable E/net cable from accessories

# Step 02

- Select Required cordset and Accessories



1585J-M8TBJM-2

| Description | Catalogue No. |
|---|---|
| Straight male RJ45 to straight male RJ45 ethernet patchcord, 8-conductor (4 pair), Cat 5e, TPE, 2meter | 1585J-M8TBJM-2[1)] |
| Right angle male RJ45 to straight male RJ45 ethernet patchcord, 8-conductor (4 pair), Cat 5e, TPE, 2meter [2)] | 1585J-E8TBJM-2[1)] |
| Left angle male RJ45 to straight male RJ45 ethernet patchcord, 8-conductor (4 pair), Cat 5e, TPE, 2 meter [3)] | 1585J-L8TBJM-2[1)] |
| GSR Replacement Screw Terminal kit, 4 pcs | 440R-ATP4 |
| GSR Replacement Spring Clamp Terminal kit, 4 pcs | 440R-ATSC4 |
| Proximity sensor for GLP - Nickel/Brass 18mm 10-30VDC 8mm Unshielded NO PNP 3WIRE DC-MICRO-4 | 872C-D8NP18-D4 |
| DC Micro 4 cable to suit Proximity sensor for GLP | 889D-F4AC-2[1)] |

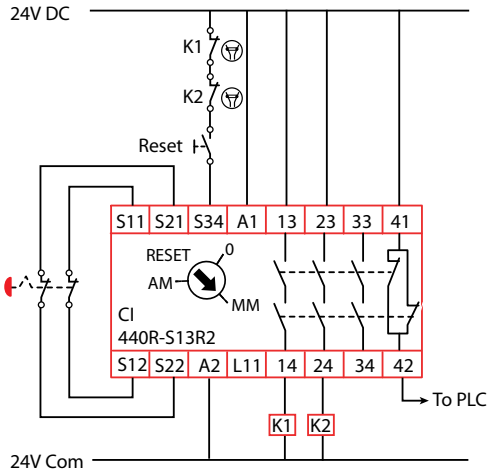
1) In catalogue number, replace 2(2m) with 1(1m), 5(5m), or 10(10m)
2) Recommended for RJ45 connection located at the top of the Guardmaster EtherNet/IP network interface.
3) Recommended for RJ45 connection located at the bottom of the Guardmaster EtherNet/IP network interface.

# Typical Applications

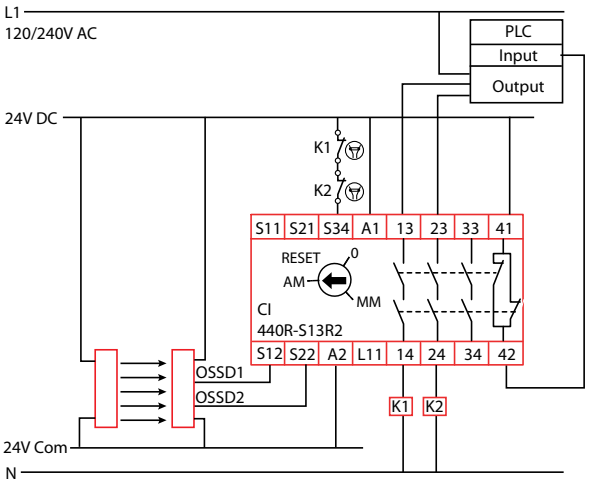
## CI Safety Relay (440R-S13R2)

User Manual | Installation Instructions

### Mechanical Contacts with Monitored Manual Reset



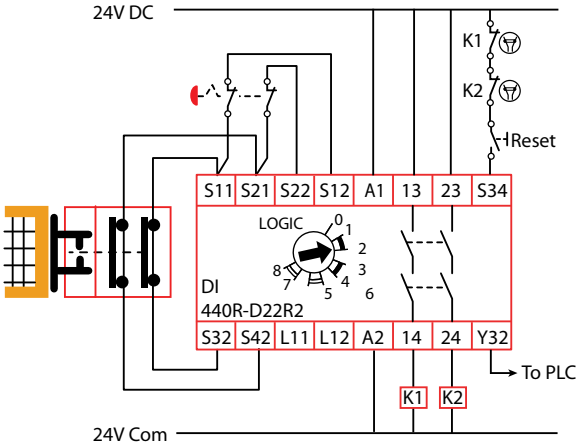

### With Device Using OSSD Outputs, Automatic Reset, AC Load Voltage



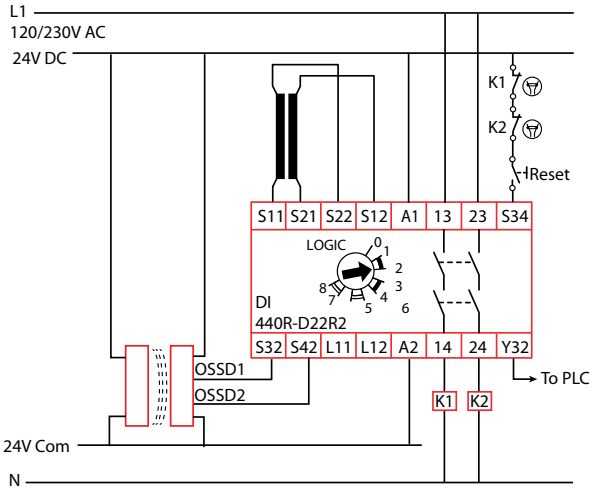

## DI Safety Relay (440R-D22R2)

User Manual | Installation Instructions

### With Two Devices with Mechanical Contacts and Monitored Manual Reset



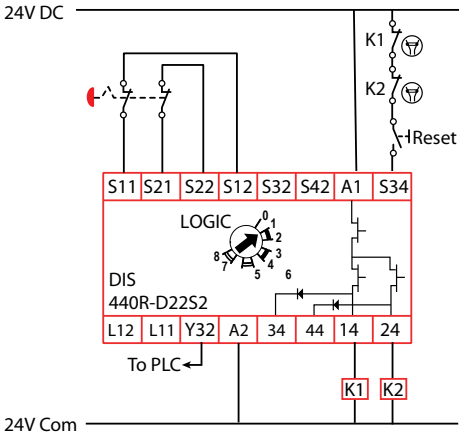

### With a Safety Mat and Device with OSSD Outputs, Monitored Manual Reset, AC Loads



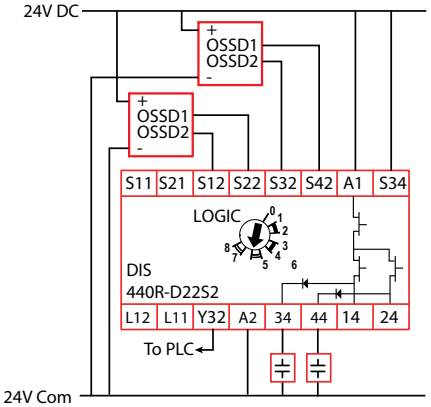

## DIS Safety Relay (440R-D22S2)

User Manual | Installation Instructions

### Single Input, Monitored Reset



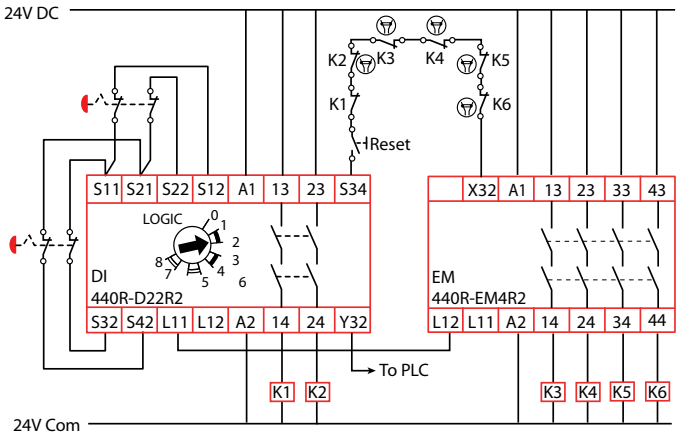

### High Capacitive Load



# EM Safety Relay (440R-EM4R2)

## Expansion of Immediate Safety Outputs

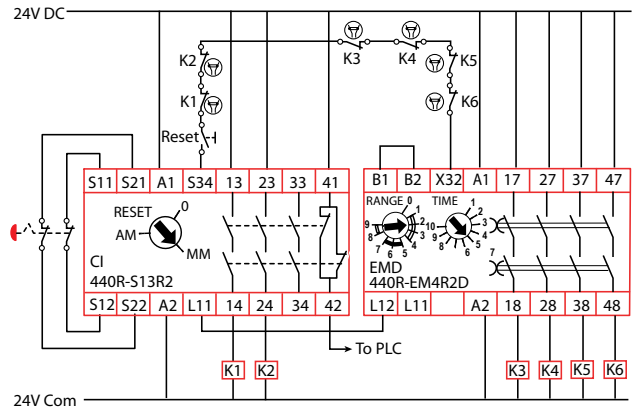
User Manual | Installation Instructions



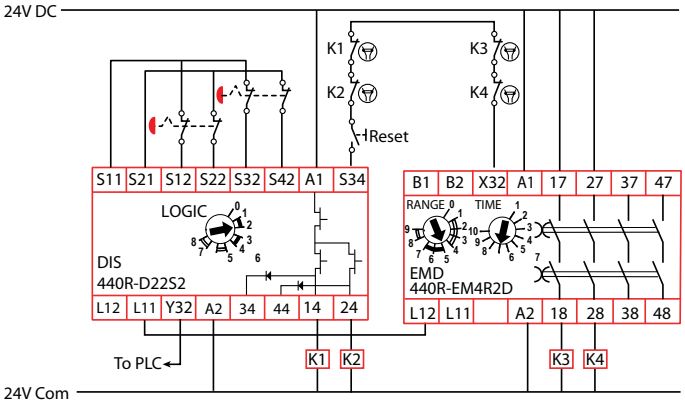

# EMD Safety Relay (440R-EM4R2D)

User Manual | Installation Instructions

## EMD - Off Delay



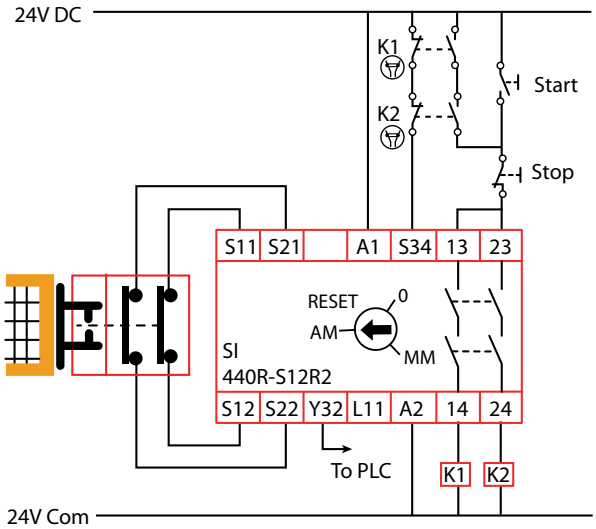

## EMD - On Delay




# SI Safety Relay (440R-S12R2)

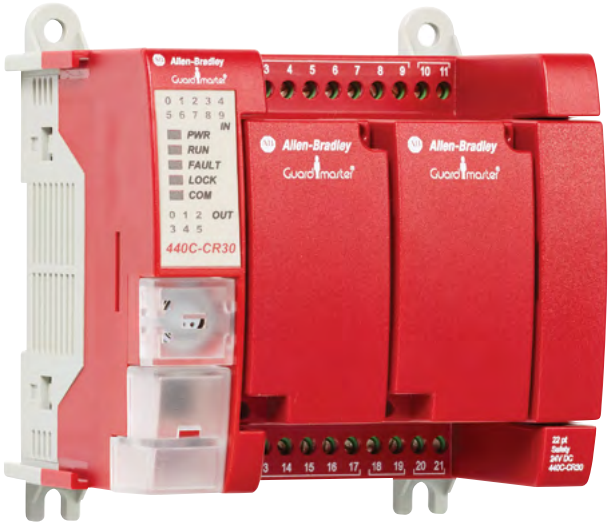
User Manual | Installation Instructions

## EMD - Off Delay



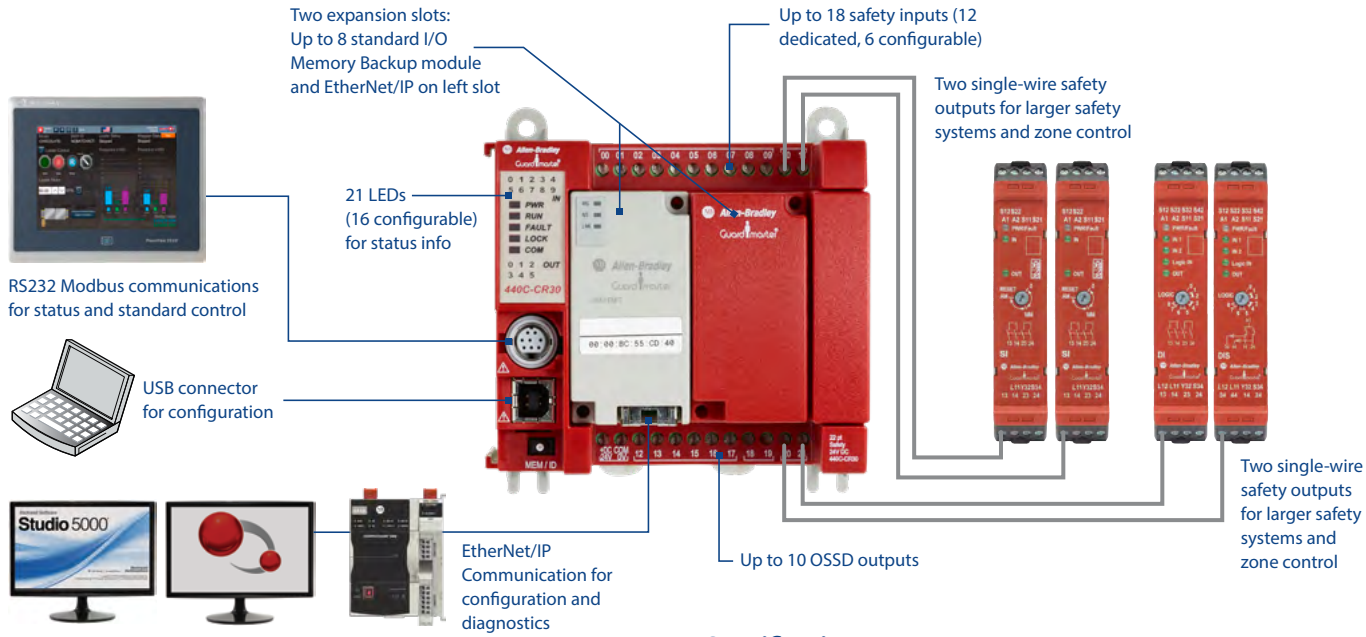
# CR30 Configurable Safety Relay 440C

User Manual | Installation Instructions




## Features

- Monitoring and Configuration from Studio 5000 Logix Designer® or Connected Components Workbench software
- Predefined function blocks • AND, OR, NAND, NOR, XOR Logic functions
- 22-point embedded safety I/O
- Expandable via two Micro800® Plug-in I/O Modules
- Expandable with EtherNet/IP™ plug-in
- Embedded communication via USB programming port and non-isolated RS-232 serial port
- Two single-wire safety input/output points




## Specifications

| | |
|---|---|
| **Safety Rating** | SIL3, CAT4, PLe |
| **Operating Temp** | -5…+55C |
| **Power Consumption** | 5.28W |
| **Response Times** | Safety inputs <45 ms<br>Safety mats < 70 ms<br>Single-wire safety output <60 ms |
| **Dimensions** | 90 x 100 x 80 mm |
| **Communication ports** | USB 2.0 (non-isolated)<br>RS232 non-isolated serial |
| **Base programming cable** | USB 2.0 (non-isolated) |
| **Number of I/O** | 22 (plus 16 additional on plug in modules) |
| **Plug in modules** | 2 |
| **Software** | Studio 5000 Logix Designer or Connected Components Workbench |

The Guardmaster® 440C-CR30 Software Configurable Safety Relay is flexible, cost-effective, and easy to use. This relay is ideal for applications requiring as many as ten dual-channel safety circuits and controlling as many as five output zones. You can configure this relay by selecting certified safety function blocks to rapidly build your applications. This relay is completely integrated with AllenBradley Logix controllers and can be configured using Studio 5000 Logix Designer® software or Connected Components Workbench software. The 440C-CR30 relay can share information with the control system through the optional EtherNet/IP plug in module which increases uptime and enables The Connected Enterprise.

# Product selection

## Step 01

- Select Configurable Relay

| Relay Type | No. of Inputs | Type of Inputs | No. of Outputs | Catalogue No. |
|---|---|---|---|---|
| Software configurable | Up to 18 | 1 NC, 2 NC, 3 NC, 10 SSD, 20 SSD, 20 SSD, Mat, 2-hand control | Up to 10 | 440C-CR30-22BBB |

## Step 02

- Select Required Power Supply

| Relay Type | No. of Inputs |
|---|---|
| M800 Power supply, 120/240VAC to 24VDC 1.6A | 2080-PS120-240VAC |

## Step 03

User Manual

- Select Plug-in Modules

**Plug in Modules**

| Description | Catalogue No. |
|---|---|
| Ethernet Plug-in Module, Slot 1 only | 440C-ENET |
| 8-pt Combo: 4-pt Digital Input, 12/24VDC, Sink/Source, Type3, and 4-pt Digital Output, 12/24VDC, Source | 2080-IQ4OB4 |
| 4-pt Digital Input, 12/24VDC, Sink/Source, Type3 | 2080-IQ4 |
| 4-pt Digital Output, 12/24VDC, Source | 2080-OB4 |
| 4-pt Relay Output, Individually Isolated, 2A | 2080-OW4I |
| Project Backup and Restore module | 2080-MEMBAK-RTC |

## Step 04

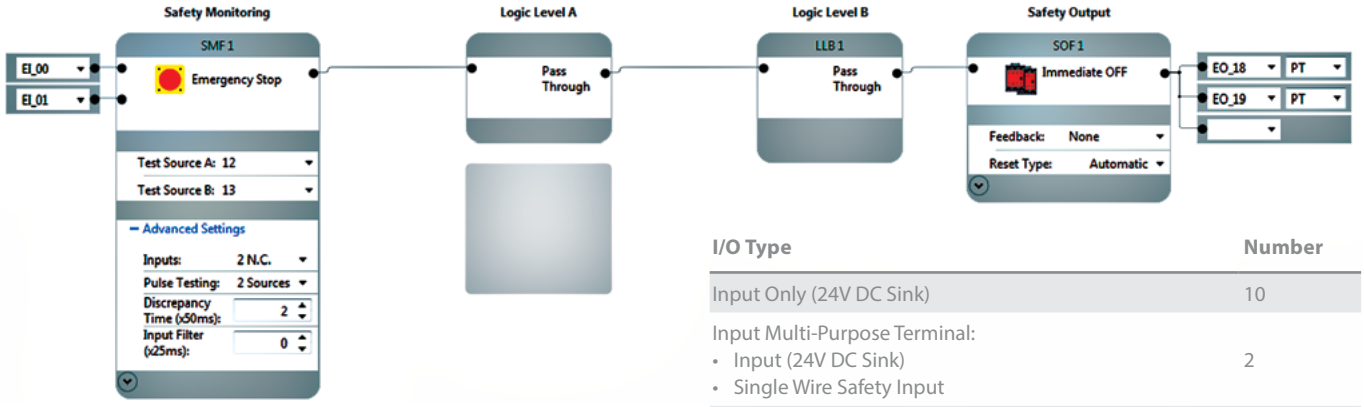
- Select optional accessories

**Accessories**

| Description | Catalogue No. |
|---|---|
| 8-pin mini DIN to 8-pin mini DIN 0.5 m (440C-CR30 to Micro830/850) | 1761-CBL-AM00 |
| 8-pin mini DIN to 8-pin mini DIN 2 m (440C-CR30 to Micro830/850) | 1761-CBL-HM02 |
| 8-pin mini DIN to 9-pin D shell 0.5 m (CR30 to PanelView Component) | 1761-CBL-AP00 |
| 8-pin mini DIN to 9-pin D shell 2 m (CR30 to PanelView Component) | 1761-CBL-PM02 |
| Straight male RJ45 to straight male RJ45 ethernet patchcord, 8-conductor (4 pair), Cat 5e, TPE, 2m length | 1585J-M8TBJM-2 |
| Right angle male RJ45 to straight male RJ45 ethernet patchcord, 8-conductor (4 pair), Cat 5e, TPE, 2m length | 1585J-M8TBJM-2 |
| Left angle male RJ45 to straight male RJ45 ethernet patchcord, 8-conductor (4 pair), Cat 5e, TPE, 2m length | 1585J-M8TBJM-2 |

# Configuration with Connected Components Workbench

Standard Edition Free Software Download




| I/O Type | Number |
|---|---|
| Input Only (24V DC Sink) | 10 |
| Input Multi-Purpose Terminal:<br>• Input (24V DC Sink)<br>• Single Wire Safety Input | 2 |
| Multi-Purpose Terminal:<br>• Input (24V DC Sink)<br>• Test Output<br>• Output (24V DC Source) | 6 |
| Output Only (24V DC Source) | 2 |
| Output Multi-Purpose Terminal:<br>• Output (24V DC Sink)<br>• Single Wire Safety Output | 2 |

# MSR55P Back EMF Speed Monitoring Safety Relay

User Manual | Installation Instructions




## Features

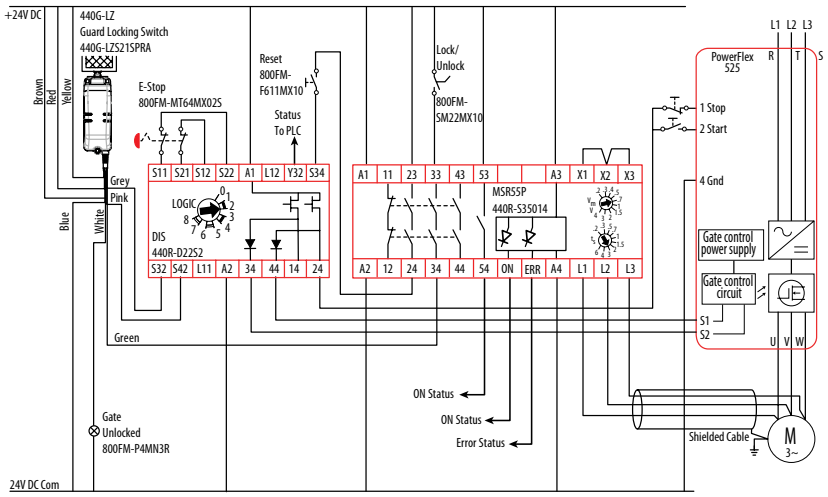
- Offers safe standstill detection on single and three phase motors
- Needs no external sensors
- Independent of direction
- Broken wire detection
- Provides 45mm housing

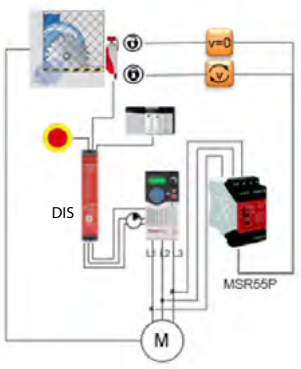
MSR55P Speed Monitoring Safety Relays are used for standstill detection on single and three phase motors without the need for sensors.

### Specifications

| | |
|---|---|
| **Safety Rating** | PLe, CAT4, SIL3 |
| **Enclosure Protection** | IP40 |
| **Operating Temp** | -25….+60 °C |
| **Conductor Size** | 0.2…2.5mm |

### MSR55P safe motor feedback to safety logic device




A PowerFlex 525 drive controls the speed and direction of the motor. The MSR55P allows access to the hazard after the motor has achieved its standstill settings. The GSR DIS monitors the guard locking switch and the E-stop.

The DIS relay enables the drive to restart after the gate is closed, locked and the E-stop is released.

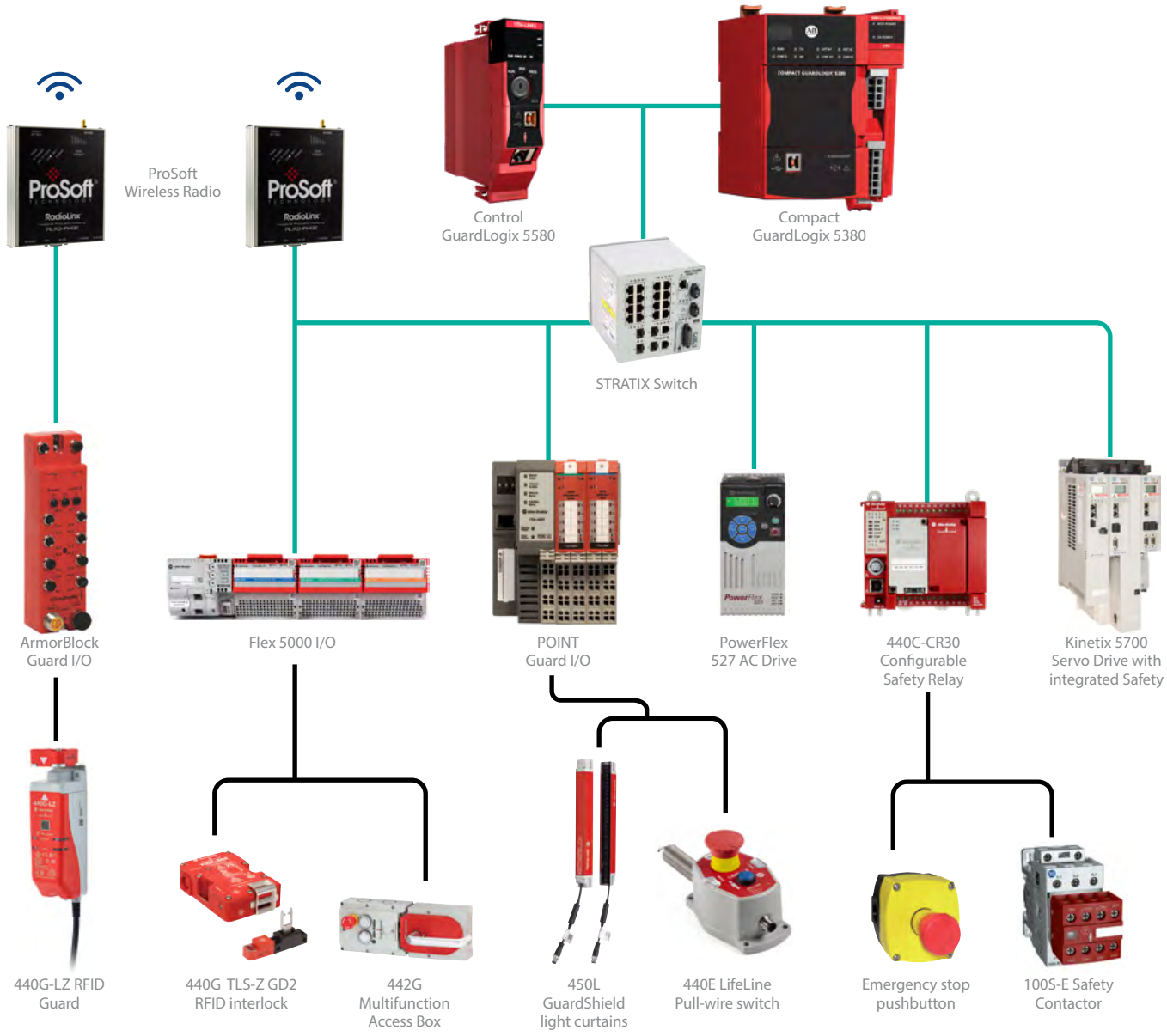
## Product selection

| Description | A1/A2 Voltage | Standstill Monitoring Voltage | Typical Applications | Catalogue No. |
|---|---|---|---|---|
| Back EMF monitoring relay, 45mm wide, 3 NO contacts, 1 NC contact AC 250 V, 3 status outputs (2 semiconductor and 1 NO contact) | 24VDC | 20…400 mV | Induction motors | 440R-S35011 |
| | 24VDC | 200 mV…4V | Servo motors (permanent magnet) | 440R-S35014 |

**Note:** 110/240V AC versions available

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# Safety PLCs




| | Control GuardLogix 5580 | Compact GuardLogix 5380 |
|---|---|---|
| **Overview** | ControlLogix controllers are ideal for more demanding applications and can perform standard and safety control in the same chassis for a truly integrated system and leverage the high-availability and extreme environment capabilities to meet your application needs. | CompactLogix controllers are ideal for small to mid-size machines and provide the benefits of Integrated Architecture for lower-cost machines in both standard and safety options. |
| **Built in Memory** | Up to 40 MB<br>GuardLogix: Up to 5 MB safety memory | Up to 10 MB<br>Compact GuardLogix 5380 up to 5 MB safety memory |
| **Motion Control** | Up to 256 axes Integrated Motion EtherNet/IP | Up to 32 axes of Integrated Motion on EtherNet/IP |
| | Typical controller performance 32 axes/ms | Typical controller performance 32 axes/ms |
| **Safety Level** | SIL 2, PLd, Cat. 3 | SIL 2, PLd, Cat. 3 |
| | SIL 3, PLe, Cat. 4 | SIL 3, PLe, Cat. 4 |
| **Language Support** | Ladder Logic, Structured Text, Function Block, Sequential Function Chart | |
| **Communications** | Embedded USB and 1 Gb Ethernet port | • Embedded USB and Ethernet with DLR/Dual IP<br>• 1 Gb Ethernet port |
| **Environmental** | 0-60 °C | 0-60 °C |

# Compact GuardLogix 5380 Safety Controllers






## Features

- Achieve up to SIL 2/PLd with 1oo1 architecture or up to SIL 3/PLe with 1oo2 architecture
- Offer standard memory options from 0.6…10 MB
- Offer safety memory options from 0.3…5 MB
- Offer 1 gigabit (Gb) embedded Ethernet port
- Support communication options for up to 180 EtherNet/IP nodes
- Offer conformal coated options for harsh environments
- Provide single controller/software/network for standard and safety control
- Ability to mix and match safety and standard I/O
- Provide integrated safety functions with drives and motion

Manufacturers are continually looking for control solutions that adhere to the latest global safety standards while dealing with competitive pressures to reduce costs and improve productivity. As the latest addition to the CompactLogix 5380 family of controllers, the Compact GuardLogix 5380 delivers scalable options for high performance, integrated safety in standard and conformally coated formats.



Greatness of CompactLogix 5380

+



Integrated with safety

=



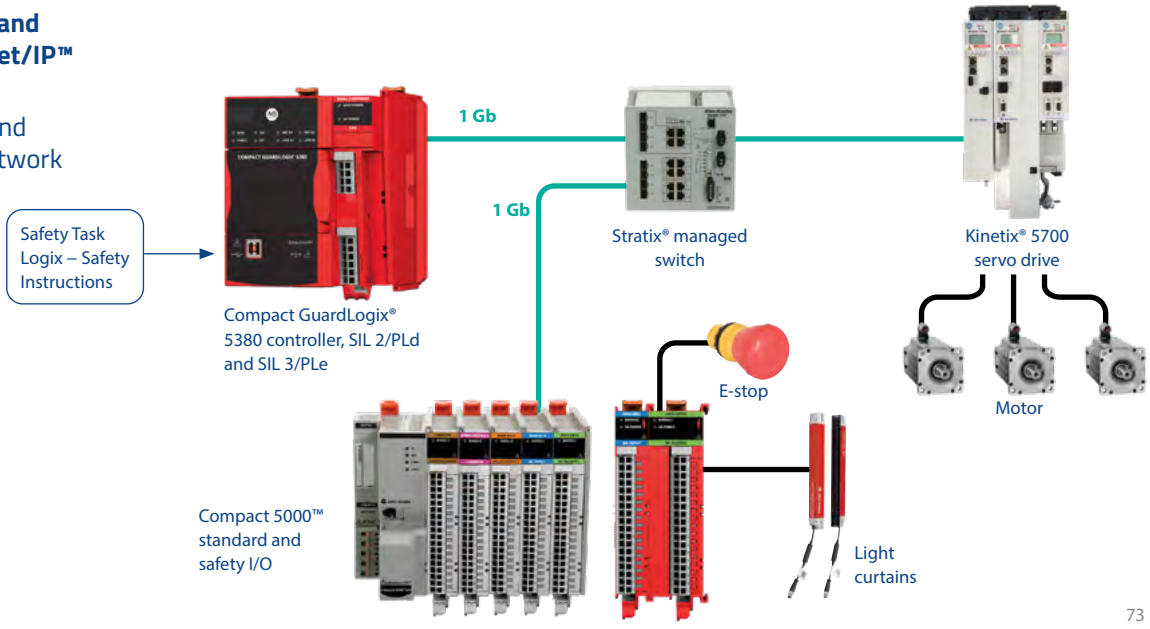
Compact GuardLogix® 5380 SIL 2



Compact GuardLogix® 5380 SIL 3

### Integrated motion and safety over EtherNet/IP™

Simplifying multi-disciplined design and control with one network



# Product selection
# Step 01

- Select Compact GuardLogix Controller



5069-L306ERS2

### Compact GuardLogix 5380 SIL2 controller

Installation Instructions

| Catalogue Number* | Memory Size | | I/O Expansion | Motion Axes | EtherNet/IP Nodes |
|---|---|---|---|---|---|
| | Standard | Safety | | | |
| 5069-L306ERS2 | 0.6 MB | 0.3 MB | 8 | - | 16 |
| 5069-L306ERMS2 | 0.6 MB | 0.3 MB | 8 | 2 | 16 |
| 5069-L310ERS2 | 1 MB | 0.5 MB | 8 | - | 24 |
| 5069-L310ERMS2 | 1 MB | 0.5 MB | 8 | 4 | 24 |
| 5069-L320ERS2* | 2 MB | 1 MB | 16 | - | 40 |
| 5069-L320ERMS2* | 2 MB | 1 MB | 16 | 8 | 40 |
| 5069-L330ERS2* | 3 MB | 1.5 MB | 31 | - | 60 |
| 5069-L330ERMS2* | 3 MB | 1.5 MB | 31 | 16 | 60 |
| 5069-L340ERS2 | 4 MB | 2 MB | 31 | - | 90 |
| 5069-L340ERMS2 | 4 MB | 2 MB | 31 | 20 | 90 |
| 5069-L350ERS2* | 5 MB | 2.5 MB | 31 | - | 120 |
| 5069-L350ERMS2* | 5 MB | 2.5 MB | 31 | 24 | 120 |
| 5069-L380ERS2 | 8 MB | 4 MB | 31 | - | 150 |
| 5069-L380ERMS2 | 8 MB | 4 MB | 31 | 28 | 150 |
| 5069-L3100ERS2 | 10 MB | 5 MB | 31 | - | 180 |
| 5069-L3100ERMS2 | 10 MB | 5 MB | 31 | 32 | 180 |

*Conformally Coated options available by adding 'K' to the end of catalogue number



5069-L306ERMS3

### Compact GuardLogix 5380 SIL3 controller

Installation Instructions

| Catalogue Number* | Memory Size | | I/O Expansion | Motion Axes | EtherNet/IP Nodes |
|---|---|---|---|---|---|
| | Standard | Safety | | | |
| 5069-L306ERMS3 | 0.6 MB | 0.3 MB | 8 | 2 | 16 |
| 5069-L310ERMS3 | 1 MB | 0.5 MB | 8 | 4 | 24 |
| 5069-L320ERMS3* | 2 MB | 1 MB | 16 | 8 | 40 |
| 5069-L330ERMS3* | 3 MB | 1.5 MB | 31 | 16 | 60 |
| 5069-L340ERMS3 | 4 MB | 2 MB | 31 | 20 | 90 |
| 5069-L350ERMS3* | 5 MB | 2.5 MB | 31 | 24 | 120 |
| 5069-L380ERMS3 | 8 MB | 4 MB | 31 | 28 | 150 |
| 5069-L3100ERMS3 | 10 MB | 5 MB | 31 | 32 | 180 |

*Conformally Coated options available by adding 'K' to the end of catalogue number

# Step 02

- Select required Power Terminal



### Power Terminal

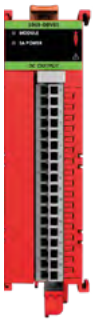
| Description | Catalogue No. |
|---|---|
| 5069 Compact I/O Power Terminal RTB kit (4 & 6 Pin) Screw | 5069-RTB64-SCREW |
| 5069 Compact I/O Power Terminal RTB kit (4 & 6 Pin) Spring | 5069-RTB64-SPRING |

# Step 03

- Select optional Chassis I/O



5069-IB8S



5069-OBV8S

### Compact 5000 Chassis Based I/O Safety Modules

| Step 03a Catalogue No. | Description | Step 03b Terminal Block |
|---|---|---|
| 5069-IB8S* | 18…32V DC 8-point, safety sinking input module | 5069-RTB18-SPRING<br>5069-RTB18-SCREW |
| 5069-OBV8S* | 18…32V DC 8-point, safety output module that can be used as a Bipolar output module or sourcing output module | |

* Conformally Coated options available by adding 'K' to the end of catalogue number.
**Note:** For distributed in cabinet Safety I/O see page 78

# Control GuardLogix 5580 Safety Controllers

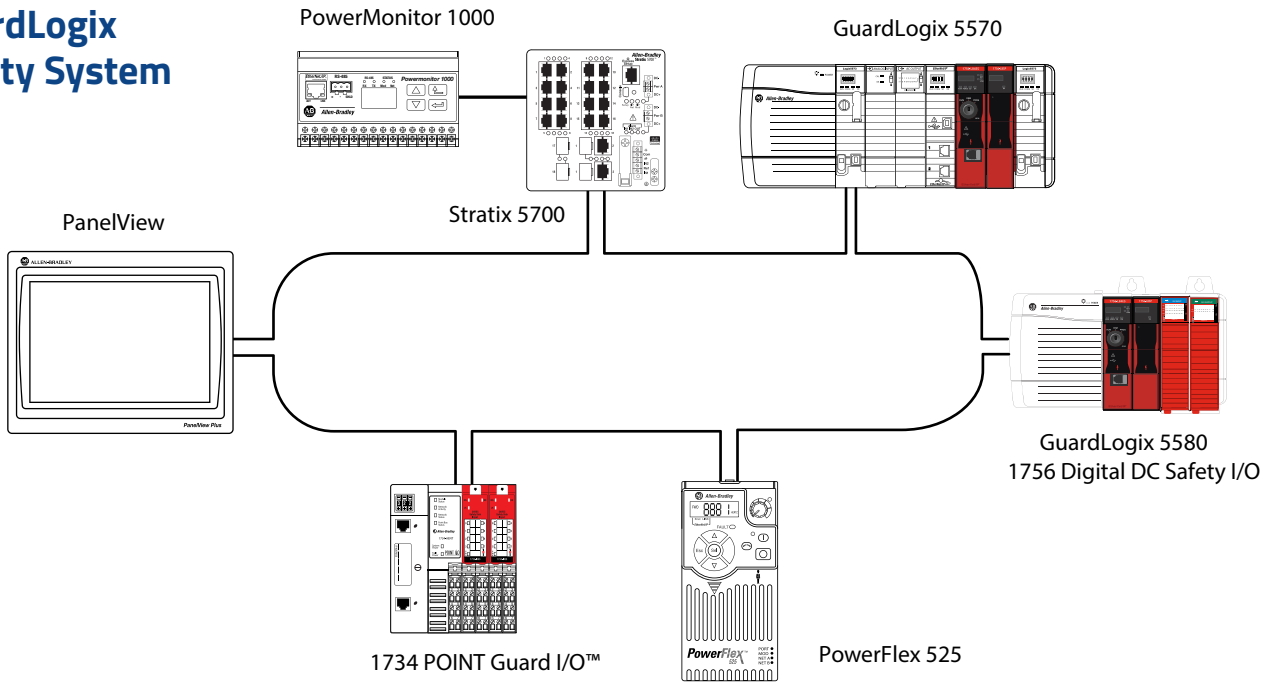


## Features

User Manual | Installation Instructions

- Achieves SIL CL 2 / PLd with primary controller
- Achieves SIL CL 3 / PLE with primary controller plus safety partner
- Optimized for faster safety reaction time to achieving protective device coverage and reducing the risk of injury
- Offers Standard memory options from 3...20 MB
- Offers safety memory options from 1.5...6 MB
- Offers communication options from 100...250 EtherNet/IP nodes
- Offers conformal coated options for harsh environments
- Provides single controller/software/network for standard and safety control
- Includes mix and match safety and standard I/O
- Provides networked safety functions with motion and the following drives: Kinetix® 5700 with Advanced Safety and PowerFlex® 755 with Advanced Safety

## GuardLogix Safety System




The Allen-Bradley GuardLogix® 5580 controllers provide increased performance, capacity, productivity, and security to help meet the growing demands of smart machines and equipment for manufacturing. These controllers use the Studio 5000® design environment as the standard framework that optimizes productivity, reduces time to commission. This framework manages Integrated Motion over EtherNet/IP for high-speed motion applications and SIL2/PLd and SIL3/PLe safety solutions. These controllers are ideal for applications that require high-performance communications, I/O, and motion control for up to 256 axes.

# Product selection

## Step 01

- Select GuardLogix Controller



1756-L84ES

### GuardLogix Controller

| GuardLogix 5580 Controllers | Memory Size | | Safety Communication options | Network connections, per network module | EtherNet/IP nodes supported, max* |
|---|---|---|---|---|---|
| | Standard | Safety | | | |
| 1756-L81ES | 3 MB | 1.5 MB | EtherNet/IP<br>ControlNet<br>DeviceNet | Not Applicable | 100 |
| 1756-L82ES | 5 MB | 2.5 MB | | | 175 |
| 1756-L83ES | 10 MB | 5 MB | | | 250 |
| 1756-L84ES | 20 MB | 6 MB | | | 250 |

**Note:** A node is an EtherNet/IP device that you add directly to the I/O configuration, and counts toward the node limits of the controller.

## Step 02

- Select optional Safety Partner if SIL 3 is required



1756-L8SP

### Safety Partner

| Description | Catalogue No. |
|---|---|
| Safety Partner for SIL3 applications | 1756-L8SP |

**Note:** In SIL 3 applications, one safety partner is required for each GuardLogix 5580 controller

## Step 03

User Manual

- Select Required Chassis based I/O

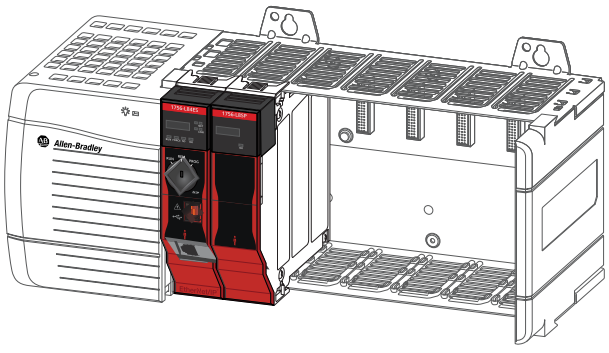


1756-TBS6HS

### ControlLogix Chassis Based I/O Safety Modules

| Step 03a Module base | Description | Step 03b Removable Terminal Block |
|---|---|---|
| 1756-IB16S | 10…32V DC 16-channels, safety sinking input module (36Pin) | 1756-TBCHS (screw)<br>1756-TBS6HS (spring) |
| 1756-OBV8S | 18…32V DC 8-point, safety output module (20Pin) | 1756-TBNHS (screw)<br>1756-TBSHS (spring) |

**Note:** 1756-IB16S and 1756-OBV8S modules are only compatible with GuardLogix 5580 controllers as local or remote I/O, and Compact GuardLogix 5380 controllers as remote I/O.
1756-IB16S and 1756-OBV8S modules are only compatible with a 1756 ControlLogix Chassis, Series C.




**Note:** To use the controller, a chassis and power supply are required. The GuardLogix 5580 controllers are compatible with these chassis and power supplies.

Chassis, Series C and Series B: 1756-A**
Power Supply, Standard : 1756-P***
Power Supply, Redundant: 1756-P***"

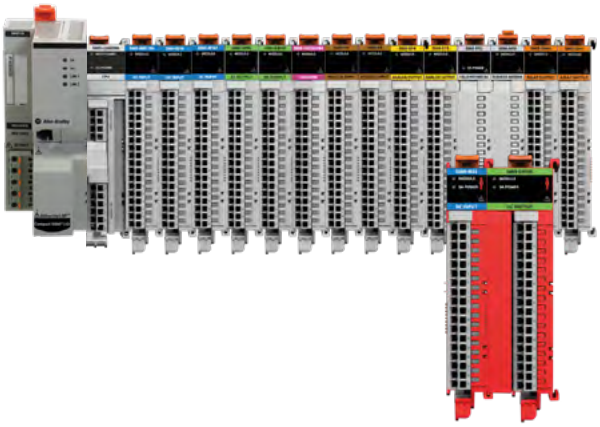
# In Cabinet Modular Safety Distributed I/O Modules






| | Compact 5000 | Flex 5000 | Point | ArmorBlock |
|---|---|---|---|---|
| **Overview** | Machine Focus. The Compact 5000 I/O platform offers high performance communication in a compact design and includes SIL-rated safety modules. | Disrtibuted and Harsh Duty Focus. The FLEX 5000 I/O is a flexible and reliable I/O solution that is modular and easy to install. It is also designed for use in extreme or hazardous environments, and includes fail-safe SIL 3 rated Safety modules. | Ideal for applications requiring flexibility and low-cost of ownership. Granularity of 1 to 8 points lets you buy only the I/O you need. The compact design makes installation easier in limited panel space. POINT I/O is the only IP20-rated modular I/O solution compliant with ODVA requirements for Linear, Star and Ring EtherNet/IP architectures. | ArmorBlock I/O Modules are low-cost, hardened I/O that can be mounted on machines to help reduce wiring cost and enable easier maintenance. ArmorBlock I/O can be used for automotive, material handling and packaging applications or for machinery applications where diagnostics and local control are not needed |
| **I/O Types Offered** | **Digital**<br>• 4 to 16 points per module<br>• Offers a variety of AC and DC V.<br>• Include contact output modules<br>• Isolated and non-isolated modules<br>• Enhanced built-in capabilties; event triggers, simple counter, time stamping, schedule output<br>**Analog**<br>• Universal analog input modules<br>• Analog output modules<br>• High resolution fast conversion rates<br>**Specialty**<br>• Serial communication<br>• Address reserve, high speed counter, field power distribution<br>**Safety**<br>• Safety digital input module single-channel PLd, dual-channel PLe<br>• Configurable safety output module (sourcing/bipolar) Sourcing Mode: single channel PLe, dual channel PLe, Bipolar Mode: PLe | **Digital**<br>• 16-point input and output modules<br>- High current output module<br>- 8-channel relay output module<br>**Analog**<br>• 8-channel analog input module supporting Voltage, Current, RTD, and TC inputs<br>• 8-channel input/output<br>**Safety**<br>• 16-point digital input and output modules<br>• 4-point isolated relay output module | **Digital**<br>• Input, output, and relay output modules<br>• Wide variety of voltages Analog<br>• Up to eight single inputs or outputs per module<br>• 4-channel input/output<br>• Thermocouple and RTD modules<br>**Specialty**<br>• Counter and encoder modules<br>• Serial synchronous interface Absolute Encoder module<br>• Serial interface modules<br>• Address Reserve Module (ARM)<br>• IO-Link master module POINT Guard I/O<br>**Safety**<br>• Digital input, digital output, and analog input modules and bipolar output modules<br>• TUV-certified for functional safety up to and including SIL 3, Cat. 4, PLe<br>• Can be used side-by-side in a standard POINT I/O system | **ArmorBlock I/O**<br>• Input, output and combination modules, up to 16 points per block<br>• Available with CIP Sync<br>• 4-point analog, thermocouple and RTD I/O blocks<br>• Supports connection to IO-Link devices with IO-Link master module<br>• Available with Quick Connect<br>• IP69K<br>**Armor WeldBlock**<br>• 16-points<br>• Resists the effects of weld slag and magnetic fields<br>• Aluminum metal housing<br>**ArmorBlock Guard I/O Safety**<br>• 16-point combined I/O blocks<br>• PLd-rated, single channel safety inputs<br>• PLe-rated, dual channel, safety inputs<br>• Safety outputs rated up to PLe<br>• Dual IP65 and IP67 ratings |
| **Communications** | Local chassis CompactLogix 5380 CompactLogix 5480 controllers Distributed on EtherNet/IP to ControlLogix 5580 controller | Distributed on EtherNet/IP to CompactLogix 5380, CompactLogix 5480 or ControlLogix 5580 controllers | EtherNet/IP, ControlNet, DeviceNet, PROFIBUS DP | DeviceNet or EtherNet/IP |

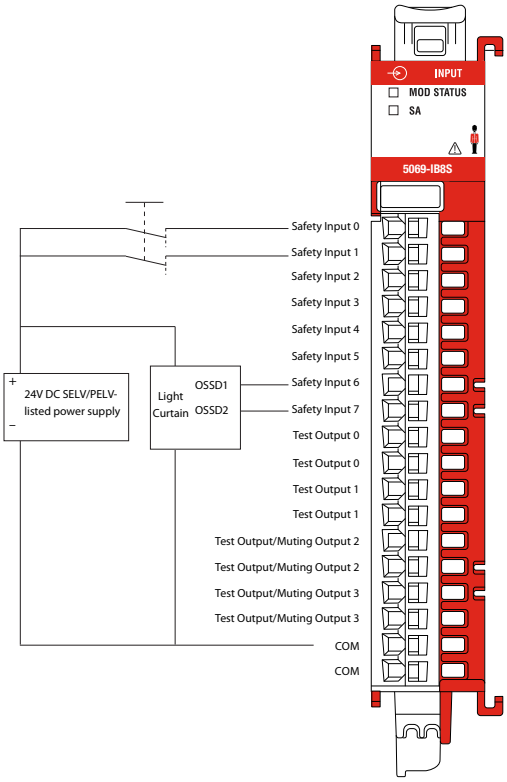
# Compact 5000 Safety I/O Modules

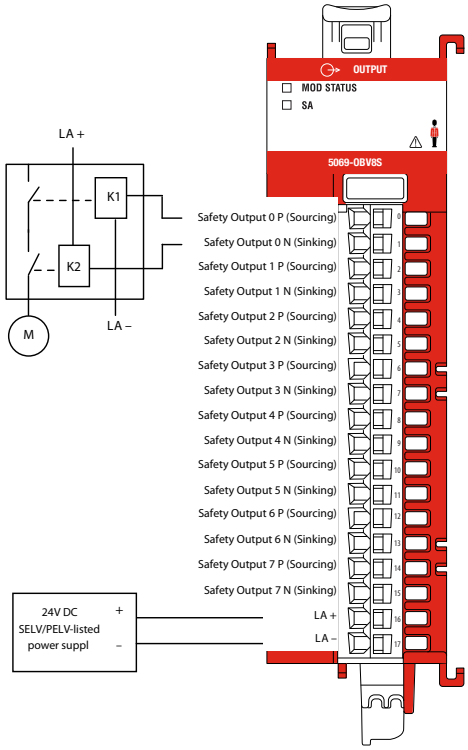


## Features

Technical Data

- Provide a local safety connectivity to the Compact GuardLogix 5380
- Provide distributed I/O to the Compact GuardLogix 5380 and GuardLogix 5580, which is accessible via a 5069-AEN2TR or 5069-AENTR over an EtherNet/IP
- Support up to 31 I/O modules per controller or adapter
- Provide faster safety reaction time
- Provide enhanced diagnostics information
- Rated up to SIL3/PLe




## Product selection
## Step 01

- For remote compact 5000 I/O select Slim EhterNet/IP Adaptor

User Manual



### Safety Partner

| Step 01a Catalogue No. | Description | Step 01b Removable Terminal Block |
|---|---|---|
| 5069-AENTR* | Dual-Port Ethernet/IP Adaptor | 5069-RTB5-SPRING<br>5069-RTB5-SCREW |

## Step 02

- Select Safety I/O

### Safety I/O

| Step 02a Catalogue No. | Description | Step 02b Removable Terminal Block |
|---|---|---|
| 5069-IB8S* | 18…32V DC 8-point, safety sinking input module | |
| 5069-OBV8S* | 18…32V DC 8-point, safety output module that can be used as a Bipolar output module or sourcing output module | 5069-RTB18-SPRING<br>5069-RTB18-SCREW |

* Conformally Coated options available by adding 'K' to the end of catalogue number.

# Flex 5000 Safety I/O Modules





## Features

User Manual | Technical Data

- Offers true integrated safety with discrete fail-safe I/O modules, TÜV certified up to SIL 3/PLe/Cat. 4
- Enhances communication with 1 Gb EtherNet/IP connectivity through copper or fiber, with SFP adapters
- Supports a wide range of network topologies: DLR, Star, Linear and PRP
- Allows users to replace modules while system is in operation with easy snap-on installation via Removal and Insertion Under Power (RIUP)
- Offers flexible and modular capability to support up to 32-channel digital and 8-channel analog input/output
- -40…70 °C temperatures and in hazardous areas in Class I, Division 2, Zone 2, Groups A, B, C,D
- Allows for use in extreme environments with XT version up to G3 with conformal coating
- Functions as remote I/O modules with ControlLogix 5580, CompactLogix 5380/5480 controllers-
- Supports ControlLogix 5580 controller redundancy for high availability applications from Studio 5000 application, V33 or later

## Product selection Step 01

- Select Adaptor



5094-AENSFPR

### Adaptor

| Description | Catalogue No. | |
|---|---|---|
| | Non-Extreme Environment | Extreme Environment (XT) |
| EtherNet/IP adapter, 2 RJ45 ports, up to 8 FLEX I/O modules | 5094-AENTR | 5094-AENTRXT |
| EtherNet/IP adapter, 2 RJ45 ports, up to 16 FLEX I/O modules | 5094-AEN2TR | 5094-AEN2TRXT |
| EtherNet/IP adapter, 2 SFP slots, up to 8 FLEX I/O modules* | 5094-AENSFPR | 5094-AENSFPRXT |
| EtherNet/IP adapter, 2 SFP slots, up to 16 FLEX I/O modules* | 5094-AEN2SFPR | 5094-AEN2SFPRXT |

*Small form factor pluggable (SFP) transceivers sold separately

## Step 02

- Select Mounting Base and Terminal Block



5094-MB



5094-RTB3T

### 02a Mounting Base

| Description | Catalogue No. | |
|---|---|---|
| | Non-Extreme Environment | Extreme Environment (XT) |
| Mounting base | 5094-MB | 5094-MBXT |

### 02b Terminal Block

| | | |
|---|---|---|
| Removable terminal block spring | 5094-RTB3S | 5094-RTB3SXT |
| Removable CJC terminal block screw | 5094-RTB3T | 5094-RTB3TXT |
| Removable relay terminal block screw | 5094-RTB3W | 5094-RTB3WXT |
| Removable isolated terminal block screw | 5094-RTB3I | 5094-RTB3IXT |

## Step 03

- Select Safety I/O Module



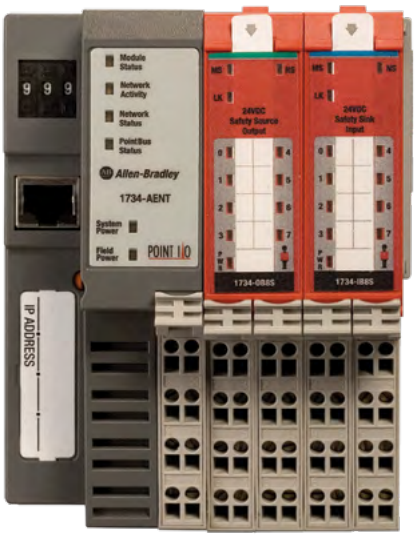
5094-OB16S

### Safety I/O Module

| Description | Catalogue No. | |
|---|---|---|
| | Non-Extreme Environment | Extreme Environment (XT) |
| Safety digital 16 input 24V DC | 5094-IB16S | 5094-IB16SXT |
| Safety digital 16 output 24V DC | 5094-OB16S | 5094-OB16SXT |
| Safety relay 4 output isolated | 5094-OW4IS | 5094-OW4ISXT |
| Safety analog 4 input isolated HART | 5094-IF4IHS | 5094-IF4IHSXT |
| Safety analog 4 output isolated HART | 5094-OF4IHS | 5094-OF4IHSXT |
| Safety analog 8 input RTD/TC | 5094-IRT8S | 5094-IRT8SXT |
| Safety frequency 2 input isolated | 5094-IJ2IS | 5094-IJ2ISXT |

# Point Guard Safety I/O Modules

User Manual




## Product selection Step 01

- Select Adaptor



1734-AENTR

**Adaptor**

| Description | Catalogue No. |
|---|---|
| 24V DC EtherNet/IP Adapter | 1734-AENT |
| 24V DC Dual Port Ethernet/IP Adapter | 1734-AENTR |

## Features

- For use with standard POINT I/O system
- Communicates by using the CIP Safety protocol over EtherNet/IP for Compact GuardLogix or GuardLogix controllers
- For EtherNet/IP connectivity, use a POINT I/O EtherNet/IP adapter (1734-AENT, 1734-AENTR)
- Supports 24V DC I/O circuits
- Includes analog input circuits

## Step 02

- Select Point Guard I/O Safety Module



1734-IE4S

**Point Guard I/O Safety Module**

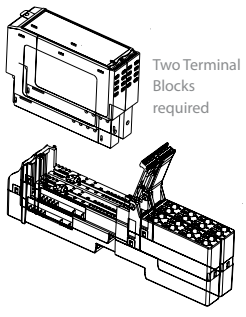
| Description | Catalogue No. |
|---|---|
| Safety IO 8 Digital Input (Compatible with terminal bases with 8 terminations) | 1734-IB8S |
| Safety IO 4 Analog Input (Compatible with terminal bases with 12 terminations) | 1734-IE4S |
| Safety IO 8 Digital Output (Compatible with terminal bases with 8 terminations) | 1734-OB8S |
| Safety IO 2 Digital Output | 1734-OBV2S |

## Step 03

- Select Terminal Block and Base



1734-TB




**Terminal Block and Base**

| Description | Catalogue No. |
|---|---|
| Point I/O One-Piece Terminal Base With Screw Clamp, 8 Terminations | 1734-TOP |
| Point I/O One-Piece Terminal Base With Spring Clamp, 8 Terminations | 1734-TOPS |
| Module Bases with Removable IEC Screw Terminals, 8 Terminations | 1734-TB |
| Module Bases with Removable IEC Spring Terminals, 8 Terminations | 1734-TBS |

**Note:** Two Terminal Blocks and bases must be selected for Safety I/O Modules(Step 02)

# ArmorBlock Safety I/O Modules



## Features

User Manual | Installation Instructions

- Used only with GuardLogix®, Compact GuardLogix, and Armor™ GuardLogix, configurable with a module-specific profile in Studio 5000 Logix Designer® software
- Provides PLd-rated, single channel safety inputs and PLe-rated, dual channel, safety inputs; safety outputs rated up to PLe
- Available in bipolar and sourcing safety output configurations
- Includes dual Ethernet ports for Linear and Device Level Ring topologies
- Provides rotary switches to set the IP address
- Mounts on the machine with an IP67-rated package for dust and wash-down protection
- Provides standardized M12 connectors to wire your field devices

## Product selection Step 01

- Select ArmorBlock Guard I/O



1732ES-IB8XOB8

### ArmorBlock Guard I/O

| Description | Catalogue No. |
|---|---|
| 24V DC, 16-Input EtherNet/IP Safety | 1732ES-IB16 |
| 24V DC, 8-Input/8-Sourcing Out EtherNet/IP Safety | 1732ES-IB8XOB8 |
| 24V DC, 8-Input/4-Bipolar Pair Out EtherNet/IP Safety | 1732ES-IB8XOBV4 |
| 24V DC, 12-Input/2-Bipolar Pair Out EtherNet/IP Safety | 1732ES-IB12XOBV2 |
| 24V DC, 12-Input/4-Sourcing Out EtherNet/IP Safety | 1732ES-IB12XOB4 |

## Step 02

- Select Mating Cable



889D-F5ACDM-*

### Mating Cables

| Description | Catalogue No. |
|---|---|
| Patchcord (Double-Ended), Straight 5-Pin Micro Female to Straight 5-Pin Micro Male | 889D-F5ACDM-* |

**Note:** Replace * with 1 (1m), 2 (2m), 5 (5m), 10 (10m) for required length

## Step 03

- Select Network Connection



### Network Connection

| Description | Catalogue No. |
|---|---|
| M12 to RJ45 Patchcord, Unshielded Twisted Pair, TPE Cable | 1585D-M4TBJM-* |
| M12 to RJ45 Patchcord, Shielded - Braided with Foil shielded, PUR Cable | 1585D-M4UBJM-* |

**Note:** Replace * with 1 (1m), 2 (2m), 5 (5m), 10 (10m) for required length

## Step 04

- Select Auxiliary Power



889N-F4AFNM-*

### Auxiliary Power

| Description | Catalogue No. |
|---|---|
| Thick Round Patchcord, Straight 4-Pin Mini Female to Straight Mini Male | 889N-F4AFNM-* |

**Note:** Replace * with 1 (1m), 2 (2m), 5 (5m), 10 (10m) for required length

# CIP Safety Ethernet/IP Absolute Encoders 843ES



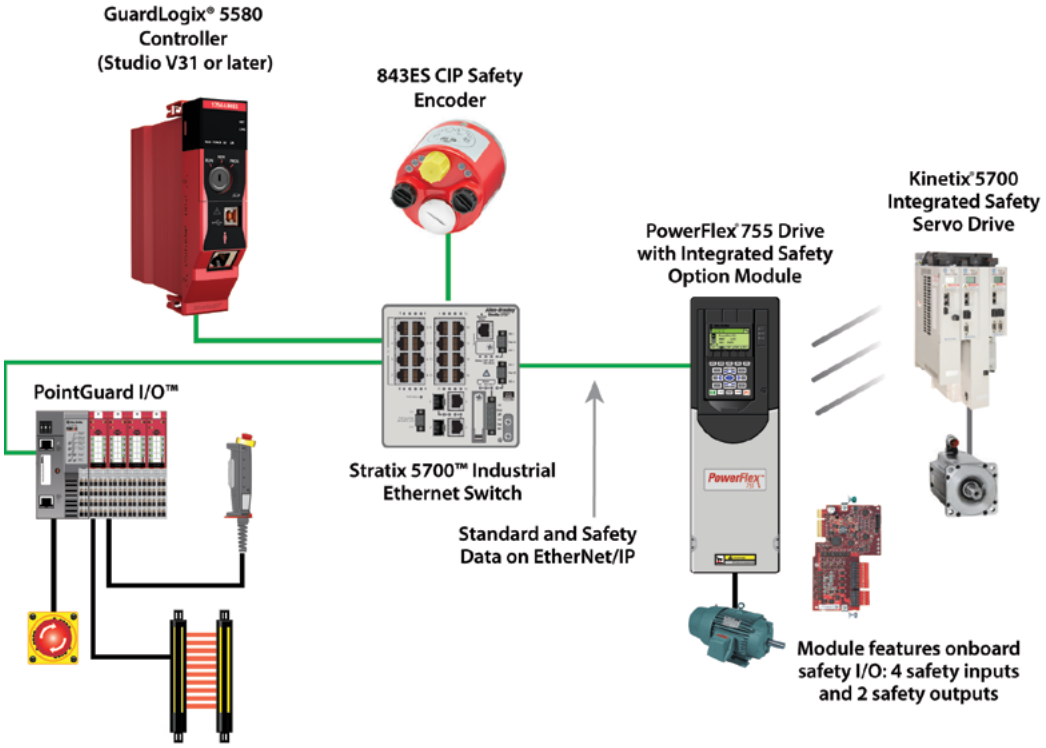
## Features

User Manual | Installation Instructions

- Offers 15-bit single-turn safety resolution and 27-bit multi-turn safety resolution
- Offers 18-bit single-turn standard resolution and 30-bit multi-turn standard resolution
- Features feather key solid shaft to prevent relative rotation
- Blind-hollow shaft available with stator coupling
- Offers clamping, synchro, and square flange options for solid shaft
- Includes dual Ethernet ports to support linear and Device Level Ring topologies

Designed for safety applications that require speed, direction, or position monitoring safety functions. These encoders support the GuardLogix controller-based safety functions, in the Studio 5000 Logix Designer application. By providing auxiliary feedback directly through an EtherNet/IP network on CIP Safety, it makes it easier to achieve the desired safety integrity or performance level by reducing the number of components needed and utilizing the already available advanced drive safety instructions.

### Integrated Safety Solutions for AC and Servo Drives




## Specifications

| | |
|---|---|
| **Safety Rating** | CAT3, SIL3, PLe |
| **Communication Rate** | 10/100 Mbit/s Studio 5000 Logix Designer v31 or later |
| **Code Direction** | CW or CCW programmable |
| **Operating Voltage Range** | 10…30VDC(±5%) |
| **No. of Revolutions, Max.** | 4096 turns (12 bit) |
| **Rotational Speed, max** | 9000 RPM, max (<10 min) |
| | 6000 RPM (typical operation) |

| | |
|---|---|
| **Housing Material** | Aluminum |
| **Shaft Material** | Stainless Steel |
| **Operating Temperature** | -40…+100°C |
| **Enclosure Type Rating** | IP67 |
| **CIP Safety** | ODVA CIP Volume 5 |
| **Shaft Loading** | 80 N (17.9 lb) radial |
| | 40 N (9 lb) axial |

**Note:** A GuardLogix 5580/Compact GuardLogix 5380 safety controller is required for integrated safety control.

# Product selection



Solid shaft with Synchro flange



Hollow shaft



Solid shaft with square flange



Solid shaft with clamping flange

## Step 01

**Number of Turns**

| Code | Description |
|---|---|
| M | Multi Turn (4096 turns) |
| S | Single Turn (1 turn) |

## Step 02

**Shaft**

| Code | Description |
|---|---|
| 7 | Hollow shaft 9.52 mm (3/8 in.) |
| 8 | Hollow shaft 10 mm (0.39 in.) |
| 9 | Hollow shaft 12 mm (0.47 in.) |
| 10 | Hollow shaft 12.7 mm (1/2 in.) |
| 11 | Hollow shaft 14 mm (0.55 in.) |
| 12 | Hollow shaft 15 mm (0.59 in.) |
| 14 | Solid shaft 10 mm (0.39 in) with key |
| 15 | Solid shaft 12 mm (0.47 in.) with key |
| 16 | Solid shaft 9.52 mm (3/8 in.) with key |

## Step 03

**Flange**

| Code | Description |
|---|---|
| 1 | Clamping flange 58 mm (2.28 in.) |
| 4 | Synchro flange 58 mm (2.28 in.) |
| 6 | Diameter flange 63 mm (2.48 in.) |
| 7 | Square flange 63.5 mm (2.5 in.) |

## Step 04

- Select encoder catalogue number

| 843ES | M | IP | 7 | BA | 6 |
|---|---|---|---|---|---|
| | Step 01 | | Step 02 | | Step 03 |
| Example | Multi-Turn | | Hollow Shaft 9.52mm | | Diameter Flange 63mm |

## Step 05

- Select Required Power Cable



889D-F4ECDM-2

**Power Cable**

| First End Connector | Second End Connector | Cable Type | Catalogue No. |
|---|---|---|---|
| Straight Female | Straight Male | Braided shield 22 AWG 4-pin M12 Yellow | 889D-F4ECDM-* |
| Straight Female | Right Angle Male | | 889D-F4ECDE-* |
| Right Angle Female | Straight Male | | 889D-R4ECDM-* |
| Right Angle Female | Right Angle Male | | 889D-R4ECDE-* |
| Straight Female | Flying leads | | 889D-F4EC-* |
| Right Angle Female | Flying leads | | 889D-R4EC-* |
| Straight Female | Straight Male | Foil and braided shield 22 AWG 4-pin M12 Yellow | 889D-F4FCDM-* |
| Straight Female | Right Angle Male | | 889D-F4FCDE-* |
| Right Angle Female | Straight Male | | 889D-R4FCDM-* |
| Right Angle Female | Right Angle Male | | 889D-R4FCDE-* |
| Straight Female | Flying leads | | 889D-F4FC-* |
| Right Angle Female | Flying leads | | 889D-R4FC-* |

**Note:** Replace * with 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 5(5m), 10(10m), 15(15m), 20(20m), 30(30m)

## Step 06

- Select Required Ethernet Cables



1585D-M4TBJM-2

**Ethernet Cable**

| First End Connector | Second End Connector | Cable Type | Catalogue No. |
|---|---|---|---|
| Male M12 D-Code, straight | Flying leads | Foil and braided shield, 4 conductor, teal PUR, flex rated, halogen-free | 1585D-M4UBDM-* |
| Male M12 D-Code, straight | Male M12 D-Code, straight | | 1585D-M4UBM-* |
| Male M12 D-Code, right angle | Male M12 D-Code, right angle | | 1585D-E4UBDE-* |
| Male M12 D-Code, straight | Male M12 D-Code, right angle | | 1585D-M4UBDE-* |
| Male M12 D-Code, straight | Female M12 D-Code, straight | | 1585D-M4UBDF-* |
| Male M12 D-Code | RJ45 | | 1585D-M4UBJM-* |

**Note:** Replace * with 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 3(3m), 5(5m), 10(10m), 15(15m), 20(20m), 30(30m)

# EtherNet/IP Absolute Encoders 842E



## Features

User Manual | Installation Instructions

- Single-turn 18-bit resolution and multi-turn 30-bit resolution
- Supports endless shaft functionality
- Dual Ethernet ports to support linear and Device Level Ring topologies 842E EtherNet/IP Absolute Encoders
- Includes dual Ethernet ports to support linear and Device Level Ring topologies 842E-CM Integrated Motion on EtherNet/IP Absolute Encoders
- Supports integrated motion on EtherNet/IP as a feedback only axis

## Product selection

### Step 01

**Encoder Type**

| Code | Description |
|---|---|
| 842E-CM | CIP Motion |

### Step 02

**Number of turns**

| Code | Description |
|---|---|
| S | Single Turn (1 turn) |
| M | Multi Turn (4096 turns) |

### Step 03

**Shaft**

| Code | Description |
|---|---|
| 1 | Solid Shaft 3/8 in. |
| 2 | Solid shaft 3/8 in. with flat |
| 3 | Solid shaft 10 mm |
| 4 | Solid shaft 10 mm with flat |
| 5 | Hollow shaft 1/4 in. |
| 6 | Hollow shaft 8 mm |
| 7 | Hollow shaft 3/8 in |
| 8 | Hollow shaft 10 mm |
| 9 | Hollow shaft 12 mm |
| 10 | Hollow shaft 1/2 in |
| 11 | Hollow shaft 14 mm |
| 12 | Hollow shaft 15 mm |

### Step 04

- Select encoder catalogue number

| | 842E-CM | M | IP | 12 | BA |
|---|---|---|---|---|---|
| | Step 01 | Step 02 | | Step 03 | |
| Example | CIP Motion | Multi-Turn | | Hollow Shaft 15mm | |

### Step 05

- Select Power Cable Required



889D-F4ACDM-2

**Power Cable**

| Female First End Connector | Male Second End Connector | Cable | Yellow PVC Cable Unshielded |
|---|---|---|---|
| Straight Female | Flying Lead | 4 Pin M12 | 889D-F4AC-* |
| | Straight Male | | 889D-F4ACDM-** |
| | Right Angle Male | | 889D-F4ACDE-** |
| Right Angle Female | Flying Lead | | 889D-R4AC-* |
| | Straight Male | | 889D-R4ACDM-** |
| | Right Angle Male | | 889D-R4ACDE-** |

**Note:** Replace * with 0M3(.3m), 2(2m), 5(5m), 10(10m), 15(15m), 20(20m), 30(30m)
Replace ** with 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 5(5m), 10(10m), 15(15m), 20, (20m), 30(30m)

### Step 06

- Select Ethernet Cable Required



1585D-M4TBJM-2

**Ethernet Cable**

| First End Connector | Second End Connector | Cable | Teal Unshielded |
|---|---|---|---|
| Straight Male | Flying Lead | 4 Pin M12 | 1585D-M4TB-* |
| | Straight Male | | 1585D-M4TBDM-* |
| | Female Straight | | 1585D-M4TBDF-* |
| | Right Angle Male | | 1585D-M4TBDE-* |
| | RJ45 | | 1585D-M4TBJM-* |
| Right Angle Male | Right Angle Male | | 1585D-E4TBDE-* |

**Note:** Replace * with 0M15(.15m), 0M2(.2m) 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 3(3m), 4(4m), 5(5m), 10(10m), 15(15m), 20, (20m), 30(30m), 40(40m)

### Step 07

- Select Accessories



845-FC-T-T

**Accessories**

| Description | Catalogue No. |
|---|---|
| 3/8inch .. 3/8inch Flexible Coupling (32mm length) | 845-FC-B-B |
| 10mm ... 10mm Flexible Coupling (32mm length) | 845-FC-T-T |

**Note:** For diifferent size Couplings replace the last two letters in catalogue number with A(1/4Inch), B(3/8Inch), R(6mm), T(10mm).
Example: 845-FC-A-B 1/4inch … 3/8inch Flexible Coupling (32mm length)

# EtherNet/IP Absolute Encoders 843E

## Features

User Manual | Installation Instructions

- Single-turn 18-bit resolution and multi-turn 30-bit resolution
- Supports endless shaft functionality
- Dual Ethernet ports to support linear and Device Level Ring topologies 843E EtherNet/IP Absolute Encoders
- Automatic diagnostics available from version 33 Studio 5000, enabling information sent to FatoryTalk version 12 display without additional programing



Solid Shaft
Clamping Flange



Solid Shaft
Square Flange



Solid Shaft
Synchro Flange



Hollow Shaft
Stator Coupling



Hollow Shaft Flange
150mm Torque Arm

## Step 01

**Number of Turns**

| Code | Description |
|---|---|
| M | Multi Turn (4096 turns) |
| S | Single Turn (1 turn) |

## Step 02

**Shaft**

| Code | Description |
|---|---|
| 2 | Solid shaft with flat, 3/8" |
| 4 | Solid shaft w/flat, 10 mm (.39in) |
| 5 | Hollow shaft, 1/4" |
| 6 | Hollow shaft, 8 mm (0.31in.) |
| 7 | Hollow shaft, 3/8" |
| 8 | Hollow shaft 10 mm (0.39 in.) |
| 9 | Hollow shaft 12 mm (0.47 in.) |
| 10 | Hollow shaft, 1/2" |
| 11 | Hollow shaft, 14 mm (0.55in) |
| 12 | Hollow shaft 15 mm (0.59 in.) |
| 13 | Solid shaft w/flat, 6 mm (0.27in.) |
| 17 | Solid shaft w/flat, 12 mm (0.47in.) |

## Step 03

**Flange**

| Code | Description |
|---|---|
| 1 | Clamping flange 58 mm (2.28 in.) |
| 2 | Flange w/spring element 150 mm |
| 4 | Synchro flange 58 mm (2.28 in.) |
| 6 | Diameter flange 63 mm (2.48 in.) |
| 7 | Square flange 63.5 mm (2.5 in.) |

## Step 04

- Select encoder catalogue number

| 843E | M | IP | 7 | BA | 6 |
|---|---|---|---|---|---|
| Example | Step 01 | | Step 02 | | Step 03* |
| | | | Hollow Shaft, 3/8" | | Diameter Flange 63mm |

**Note:** * Add 'C' to end of catalogue number for 'Nano Coating'

## Step 05

- Select Required Power Cable



889D-F4ECDM-2

**Power Cable**

| First End Connector | Second End Connector | Cable Type | Catalogue No. |
|---|---|---|---|
| Straight Female | Straight Male | Braided shield 22 AWG 4-pin M12 Yellow | 889D-F4ECDM-* |
| Straight Female | Right Angle Male | | 889D-F4ECDE-* |
| Right Angle Female | Straight Male | | 889D-R4ECDM-* |
| Right Angle Female | Right Angle Male | | 889D-R4ECDE-* |
| Straight Female | Flying leads | | 889D-F4EC-* |
| Right Angle Female | Flying leads | | 889D-R4EC-* |

**Note:** Replace * with 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 5(5m), 10(10m), 15(15m), 20(20m), 30(30m)

## Step 06

- Select Required Ethernet Cables



1585D-M4TBJM-2

**Ethernet Cable**

| First End Connector | Second End Connector | Cable Type | Catalogue No. |
|---|---|---|---|
| Male M12 D-Code, straight | Flying leads | Foil and braided shield, 4 conductor, teal PUR, flex rated, halogen-free | 1585D-M4UBDM-* |
| Male M12 D-Code, straight | Male M12 D-Code, straight | | 1585D-M4UBM-* |
| Male M12 D-Code, right angle | Male M12 D-Code, right angle | | 1585D-E4UBDE-* |
| Male M12 D-Code, straight | Male M12 D-Code, right angle | | 1585D-M4UBDE-* |
| Male M12 D-Code, straight | Female M12 D-Code, straight | | 1585D-M4UBDF-* |
| Male M12 D-Code | RJ45 | | 1585D-M4UBJM-* |

**Note:** Replace * with 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 3(3m), 5(5m), 10(10m), 15(15m), 20(20m), 30(30m)

# Safety Contactors

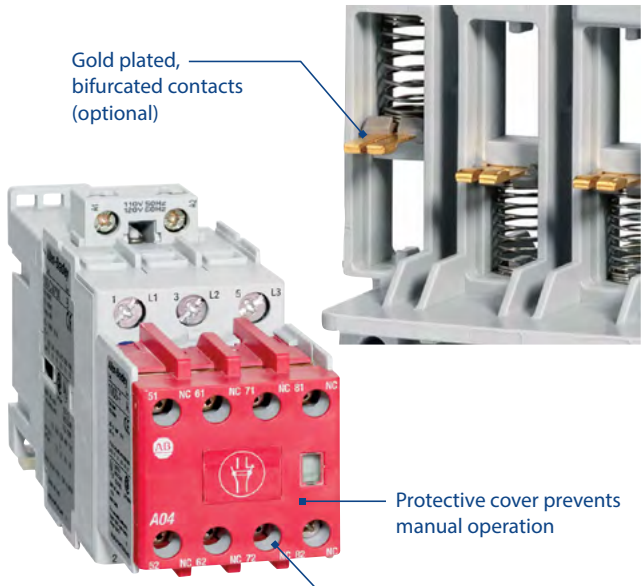


## Features

Technical Data

- Positively guided/mechanically linked auxiliary contacts
- SUVA third party certification
- Red contact housing for easy identification
- Mechanically linked or mirror contact performance
- AC/DC Operating Coils

100S/104S IEC Safety Contactors provide mechanically linked, or mirror contact, performance up to 750 A, which is required in feedback circuits for modern safety applications. Our Bulletin 100S Safety Contactors use mirror contacts to provide safe isolation of hazardous motion loads. Mirror contacts provide reliable indication about the open or closed status of the main power poles.




100S-C Safety Contactor




100S-E Safety Contactor

## Specifications

| | 100S-C | 100S-E |
|---|---|---|
| **Screw Terminals** | 3 | Thru-hole |
| **Current Rating** | 9…97 A | 9…750 A |
| **Contacts** | 3 main poles with N.C. mechanically linked or mirror feedback contacts | 3 main poles with N.C. mirror feedback contacts |
| **Coil Voltages** | AC = 12…600V, 50/60Hz<br>DC = 12…250V | 20…500V 50/60 Hz/DC |
| **Features** | • Positively guided/mechanically linked auxiliary contacts<br>• Front-mounted auxiliary contacts:<br>– Permanently fixed<br>– Protective cover to prevent manual operation<br>– Red contact housing for easy identification<br>– Incorporates IEC 947-5-1 "Mechanically Linked" symbol<br>– Optional gold-plated bifurcated versions<br>• AC and DC operating coils<br>• SUVA third-party certification | • Mirror contact performance on auxiliary contacts<br>• Red N.C. low-power auxiliary contacts used for feedback circuit<br>• SUVA third-party certification<br>• AC/ DC operating coils<br>• "Mirror Contact" symbol on front |

# 100S-E Safety Contactors

**AC-1:** Non Inductive or slightly inductive loads, example: resistive furnaces, Heaters(kW rating is not considered for Contactors)

**AC-3:** Squirrel-cage motors: starting, switches off motors during running time Most typical industrial application for motors (kW rating must be considered for contactors)



100S-E09



100S-E80



100S-E116

# Product selection

## Step 01a

**Rated Operational Current / $I_e$[A]**

| 40°C | 60°C |
|---|---|
| AC-1 (690V) | AC-3 (400V) |
| 25 | 9 |
| 28 | 12 |
| 30 | 16 |
| 45 | 26 |
| 50 | 32 |
| 50 | 38 |
| 70 | 40 |
| 100 | 52 |
| 105 | 65 |
| 125 | 80 |
| 130 | 96 |
| 160 | 116 |
| 225 | 146 |
| 275 | 190 |
| 350 | 205 |
| 400 | 265 |
| 500 | 305 |
| 600 | 370 |
| 600 | 400 |
| 700 | 460 |
| 800 | 580 |
| 1050 | 750 |

## Step 01b

(Applies when AC-3 Utilisation Category is selected)

**Ratings for switching AC motors - AC-2, AC-3**

| kW (50Hz) | | | |
|---|---|---|---|
| 380 – 400V | 415V | 690V | 1000V |
| 4 | 4 | 5.5 | - |
| 5.5 | 5.5 | 7.5 | - |
| 7.5 | 9 | 9 | - |
| 11 | 11 | 15 | - |
| 15 | 15 | 18.5 | - |
| 18.5 | 18.5 | 22 | - |
| 18.5 | 22 | 22 | - |
| 22 | 30 | 30 | - |
| 30 | 37 | 37 | - |
| 37 | 45 | 45 | 35 |
| 45 | 55 | 55 | 40 |
| 55 | 55 | 55 | 55 |
| 75 | 75 | 90 | 75 |
| 90 | 90 | 132 | 110 |
| 110 | 110 | 160 | 132 |
| 132 | 132 | 200 | 132 |
| 160 | 160 | 250 | 132 |
| 200 | 200 | 315 | 132 |
| 200 | 200 | 315 | 220 |
| 250 | 250 | 355 | 280 |
| 315 | 355 | 500 | 355 |
| 400 | 425 | 600 | 400 |

## Step 02

**Auxiliary contacts per contactor**

| NO | NC | NC | Catalogue No. |
|---|---|---|---|
| 1 | 0 | 4 | 100S-E09*14C |
| 1 | 0 | 4 | 100S-E12*14C |
| 1 | 0 | 4 | 100S- E16*14C |
| 1 | 0 | 4 | 100S- E26*13C |
| 1 | 0 | 3 | 100S-E30*13C |
| 1 | 0 | 3 | 100S- E38*13C |
| 1 | 0 | 3 | 100S-E40*13C |
| 1 | 0 | 3 | 100S- E52*13C |
| 1 | 0 | 3 | 100S-E65*13C |
| 1 | 0 | 3 | 100S-E80*13C |
| 1 | 0 | 3 | 100S-E96*13C |
| 1 | 1 | 1 | 100S-E116*12C [1] |
| 1 | 1 | 1 | 100S-E146*12C [1] |
| 1 | 1 | 1 | 100S-E190*12C |
| 1 | 1 | 1 | 100S-E205*12C |
| 1 | 1 | 1 | 100S-E265*12C |
| 1 | 1 | 1 | 100S-E305*12C |
| 1 | 1 | 1 | 100S-E370*12C |
| 1 | 1 | 1 | 100S-E400*12C |
| 1 | 1 | 1 | 100S-E460*12C |
| 1 | 1 | 1 | 100S-E580*12C |
| 1 | 1 | 1 | 100S-E750*12C |

1) To order with built-in terminal lugs, add the letter "L" to the end of the catalogue number (example: 100S-E116*12CL)

## Step 03

- Replace * from Catalogue Number with Coil Code

| Electronic Coils | Voltage 50/60Hz | 24-60V AC, 20-60V DC | 48-130V AC/DC | 100-250V AC/DC | 250-500V AC/DC |
|---|---|---|---|---|---|
| 100S-E09...100S-E370 | Standard AC/DC | KJ | KY | KD | KN |
| 100S-E116...100S-E370 | Standard AC/DC with 24V DC PLC Interface | – | – | ED | EN |
| 100S-E400...100S- E750, 100S-E1260 | | EJ | EY | ED | EN |

## Step 04

- Select 100S-E Accessories

| Description | Contacts | For use with | Catalogue No. |
|---|---|---|---|
| Auxilliary Contact Side Mount | 1NO | 100-E09…100-E96 | 100-EFA10 |
| Auxilliary Contact Side Mount | 1NC | 100-E09…100-E97 | 100-EFA01 |
| Auxilliary Contact Side Mount 2-Pole | 1NO 1NC | 100-E116…E370 | 100-ES1-11 |
| Mechanical Interlock | – | 100-E116...100-E370 | 100-EM1-00 |
| | | 100-E116...100-E205 | 100-EM4-00 |
| | | 100-E190...100-E370 | 100-EM5-00 |
| | | 100-E400…100-E750 | 100-EM2-00 |

# 100S-C Safety Contactors



100SC-09

## Product selection

### Step 01a

**Rated Operational Current / $I_e$[A]**

| 40°C | 60°C |
|---|---|
| AC-1 (690V) | AC-3 (400V) |
| 32 | 9 |
| 32 | 12 |
| 32 | 16 |
| 32 | 23 |
| 65 | 30 |
| 65 | 37 |
| 85 | 43 |
| 85 | 55 |
| 100 | 60 |
| 100 | 72 |
| 100 | 85 |
| 130 | 97 |

### Step 01b

(Applies to when AC-3 Utilisation Category is selected)

**Ratings for switching AC motors - AC-2, AC-3**

| 3-Phase kW (50Hz) | | | |
|---|---|---|---|
| 230V | 400-415V | 500V | 690V |
| 3 | 4 | 4 | 4 |
| 4 | 5.5 | 5.5 | 5.5 |
| 5.5 | 7.5 | 7.5 | 7.5 |
| 7.5 | 11 | 13 | 10 |
| 10 | 15 | 15 | 15 |
| 11 | 18.5/20 | 20 | 18.5 |
| 13 | 22 | 25 | 22 |
| 15 | 30 | 30 | 30 |
| 18.5 | 32 | 37 | 32 |
| 22 | 40 | 45 | 40 |
| 25 | 45 | 55 | 45 |
| 30 | 55 | 55 | 55 |

### Step 02

**Auxiliary contacts per contactor**

| NO | NC | NC [1] | Catalogue No. [1] |
|---|---|---|---|
| 1 | 0 | 4 | 100S-C09*14BC |
| 1 | 0 | 4 | 100S-C12*14BC |
| 1 | 0 | 4 | 100S- C16*14BC |
| 1 | 0 | 4 | 100S- C23®14BC |
| 1 | 0 | 3 | 100S-C30*14BC |
| 1 | 0 | 3 | 100S- C37*14BC |
| 1 | 0 | 3 | 100S-C43*14BC |
| 1 | 0 | 3 | 100S- C55*14BC |
| 1 | 0 | 3 | 100S-C60*14BC(2) |
| 1 | 0 | 3 | 100S-C72*14BC(2) |
| 1 | 0 | 3 | 100S-C85*14BC(2) |
| 1 | 0 | 1 | 100S-C97*14BC(2) |

1) If front-mount auxiliary contacts are required, remove the letter "B" from catalogue number Example: Cat. No. 100S-C09*05BC becomes 100S-C09*05C
2) Front- and side-mount auxiliary contacts on Cat. Nos. 100S-C60…C97 conform to mirror contact performance only

## Step 03

- Replace * from Catalogue Number with Coil Code

| Electronic Coils | 24V DC | 24V AC | 110V AC | 240V AC | 415V AC |
|---|---|---|---|---|---|
| 100S-C09...100S-C55 | EJ | K | D | T | G |
| 100S-C60…100S-C97 | DJ | K | D | T | G |

## Step 04

- Accessories 100SC



100-SA10



100-MCA00

**Auxilliary Contact Blocks**

| Description | Contacts | Catalogue No. |
|---|---|---|
| Standard Aux Contact Side Mount | 1NC | 100-SA01 |
| Standard Aux Contact Side Mount | 1NO | 100-SA10 |
| Standard Aux Contact Side Mount | 2NC | 100-SA02 |
| Mechanical Interlock, No Aux contacts | – | 100-MCA00 |
| Mechanical/Electrical Interlock w/2NC Contacts | | 100-MCA02 |
| Protective Cover | | 100-SCCA |

# Select overload Required
# E100/E200/E300 Electronic Overload Relays







| Protection Features | Bimetallic | E100 | E200 | E300 |
|---|---|---|---|---|
| Overload | Yes | Yes | Yes | Yes |
| Phase Loss | - | Yes | Yes | Yes |
| Ground Fault | Yes | Yes | Yes | Yes |
| Current Imbalance | - | | Yes | Yes |
| Jam | - | Yes | Yes | Yes |
| Over/ Under Voltage | - | - | Yes | Yes |
| Voltage Imbalance | - | - | Yes | Yes |
| Over/ Under Power | - | - | Yes | Yes |

| Diagnostics Features | | | | |
|---|---|---|---|---|
| % Full Load Amperes (FLA) | - | Yes | Yes | Yes |
| % Thermal Capacity Utilization (TCU) | - | Yes | Yes | Yes |
| Voltage | - | - | Yes | Yes |
| Power | - | - | Yes | Yes |
| Energy | - | - | Yes | Yes |

| Integration Features | | | | |
|---|---|---|---|---|
| DeviceLogix™ | - | | Yes | Yes |
| Logix Controller | - | - | - | Yes |
| Connected Components Workbench Software | - | - | Yes | - |
| EtherNet/IP™ | - | - | - | Embedded (dual-port) |
| DeviceNet™ | - | - | - | Embedded (single-port) |
| Local Programming Method | - | - | USB Type B | EtherNet/IP or DeviceNet(2) |

# E100 Electronic Motor Protection Relay



The E100 overload relay is part of the Rockwell Automation integrated motor control system. It can mount directly to bulletin 100S-C IEC contactors up to 100 A. The E100 basic model has two user-adjustable trip class settings of 10 and 20.

## Features

User Manual

- Electronic overload detection
- Selectable trip class
- Adjustable trip current
- External current transformer configurations
- Integration with both IEC contactors
- Direct and pass-through mounting options

## Specifications

| | |
|---|---|
| **Utilisation Category** | AC-15/DC-13 |
| **Contact Type** | AgNi |
| **Ingress Protection** | IP20 |

**Basic**

| Current Range (A) | Catalogue Number |
|---|---|
| 0.1 - 0.5 | 193-1EEAB |
| 0.2 - 1 | 193-1EEBB |
| 1 - 5 | 193-1EECB |
| 3.2 - 16 | 193-1EEDB |
| 5.4 - 27 | 193-1EEEB |
| 5.4 - 27 | 193-1EEED |
| 11 - 55 | 193-1EEFD |
| 20 - 100 | 193-1EEGE |

**Advanced**

| Current Range (A) | Catalogue Number |
|---|---|
| 0.1 - 0.5 | 193-1EFAB |
| 0.2 - 1 | 193-1EFBB |
| 1 - 5 | 193-1EFCB |
| 3.2 - 16 | 193-1EFDB |
| 5.4 - 27 | 193-1EFEB |
| 5.4 - 27 | 193-1EFED |
| 11 - 55 | 193-1EFFD |
| 20 - 100 | 193-1EFGE |

# E300/E200 Electronic Overload Relays



User Manual Installation Instructions

## Features

- Includes Smart Motor Control (EtherNet/IP, DeviceNet, and non-networked options available)
- Offers a modular solution with a wide current range and adjustable trip class
- Provides enhanced diagnostic information for single and three phase applications
- Includes integrated I/O (additional expansion I/O available)
- Offers simplified wiring and easy integration into Logix

The E300/E200 relay consists of three modules: Sensing, Control, and Communications. You have choices in each of the three with additional accessories to tailor the electronic overload for the exact needs of your application. The communication module determines whether the complete assembled device is an E300 or an E200 overload relay.

The modular design, communication options, diagnostic information, simplified wiring, and integration into Logix technology make it the ideal overload for motor control applications in an automation system.

These modules are to be used with 100S-E116 and above.

## Specifications

| | |
|---|---|
| **Utilisation Category** | AC-15/DC-13 |
| **Contact Type** | AgNi |
| **Ingress Protection** | IP20 |
| **Safety Rating** | SIL2 |

# Product selection

**1** Communication module

**193** | **ECM** | **ETR**

**BULLETIN NUMBER**
**193** Overload relay

**MODULE TYPE**
**ECM** Communication module

**COMMUNICATION TYPE**
**ETR** EtherNet/IP with dual ethernet ports
**DNT** DeviceNet
**PCM** Parameter configuration module E200

**2** Control module

**193** | **EIO** | **43** | **120**

**BULLETIN NUMBER**
**193** Overload relay

**MODULE TYPE**
**EIO** I/O only control module
**EIOGP** I/O and protection control module (external ground fault sensing and PTC)

**I/O COUNT**
**63** 6 inputs / 3 relay outputs
**43** 4 inputs / 3 relay outputs
**42** 4 inputs / 2 relay outputs
**22** 2 inputs / 2 relay outputs

**CONTROL VOLTAGE**
**24D** 24 V DC
**120** 110...120 V AC, 50/60 Hz
**240** 220...240 V AC, 50/60 Hz

**3** Sensing module

**193** | **ESM** | **VIG** | **30A** | **C23**

**BULLETIN NUMBER**
**193** Overload relay

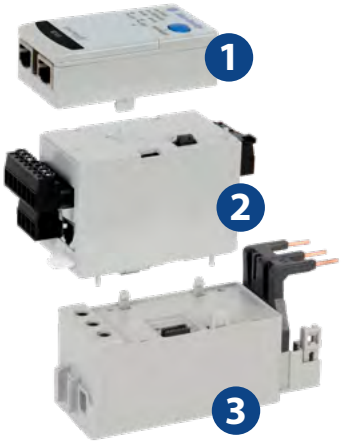
**MODULE TYPE**
**ESM** Sensing module

**SENSING MODULE TYPE**
**VIG** Current, Ground fault current, Voltage and power
**IG** Current and Ground fault current

**SENSING CURRENT RANGE**
**30A** 0.5...30A
**60A** 6..60A
**100A** 10...100A
**200A** 20...200A

**SENSING MODULE MOUNTING STYLE**
**C23** Mounts to 100-C09...C23 Contactor
**C55** Mounts to 100-C30...C55 Contactor
**C97** Mounts to 100-C60...C97 Contactor
**E146** Mounts to 100-E116...E146 Contactor
**E205** Mounts to 100-E190...E205 Contactor
**E3T** Replacement DIN Rail / Panel mount with Power terminals for an E3 Plus Panel Mount Adapter
**CT** DIN Rail / Panel mount with Pass-through Power Conductors (used with External CTs)
**T** Din Rail/Panel mount with Power Terminals
**P** Din Rail/Panel mount with Pass-thru Power Conductors






**1** **Step 1**
Select a communication module

**2** **Step 2**
Select control module

**3** **Step 3**
Select a sensing module

## Step 01



### E300 Communication Modules

| Description | Catalogue No. |
|---|---|
| E200 parameter configuration module | 193-ECM-PCM |
| E300 communication module DeviceNet | 193-ECM-DNT |
| E300 communication module Ethernet/IP with dual ethernet ports | 193-ECM-ETR |

## Step 03

### E300 Sensing Module

| Mounting | Contactor | Overload Range (A, min-max) | Catalogue No. |
|---|---|---|---|
| Contactor Mount | 100-E116...E146 | 20 - 200 | 193-ESM-VIG-200A-E146 |
| | 100-E190...E205 | 20 - 200 | 193-ESM-VIG-200A-E205 |
| | 100-C09...23 | 0.5 - 30 | 193-ESM-VIG-30A-C23 |
| | 100-C30...55 | 0.5 - 30 | 193-ESM-VIG-30A-C55 |
| | 100-C30...55 | 6 - 60 | 193-ESM-VIG-60A-C55 |
| | 100-C60...97 | 10 - 100 | 193-ESM-VIG-100A-C97 |

## Step 02





### I/O Modules

| Inputs / Outputs (qty) | Control Voltage (V AC / V DC) | Catalogue No. |
|---|---|---|
| 2 in / 2 out | 110 - 120V AC | 193-EIO-22-120 |
| 2 in / 2 out | 24V DC | 193-EIO-22-24D |
| 4 in / 3 out | 110 - 120V AC | 193-EIO-43-120 |
| 6 in / 3 out | 24V DC | 193-EIO-63-24D |

### I/O and Protection modules

| | | |
|---|---|---|
| 2 in / 2 out | 110 - 120V AC | 193-EIOGP-22-120 |
| 2 in / 2 out | 220 - 240V AC | 193-EIOGP-22-240 |
| 4 in / 2 out | 24V DC | 193-EIOGP-42-24D |

# Control Tower Stack Lights 856T



## Features

IO-LINK Technical Data

- Up to 7 modules in a single stack
- Light modules with multi-function capabilities available in seven colours
- Choice of piezoelectric, transducer and recordable sound modules
- Beacon shaped light modules available for low profile signalling applications

## Specifications

| | | |
|---|---|---|
| **Materials** | Bases/Modules | Polycarbonate |
| | Tube/Pole Bases | Aluminum |
| | Gaskets O-rings | Nitrile rubber |
| **Ingress Ratings** | IP66 IP67 | |
| **Operating Temperature Range** | -30° to +70° C | |
| **Flashing Frequency Multi-function Module** | Flashing mode 2 Hz<br>Single Strobe mode (1.4 Hz) | |
| | Double Flash Strobe mode (1.4 Hz) | |
| **Sound Module dB Rating** | Piezo Top sounder (105 dB) In-line Piezo sounder (102 dB) Transducer sounder (105 dB) | |
| **Diameter** | 70mm | |
| **Operating Voltage** | 24V AC/DC<br>(Converted at base for 240VAC) | |
| **Luminous Intensity** | 42Cd | |

## Component Selection

**4** Select Top Sounder or Beacon
(if top cap not used)



**3** Select the Light Modules or In-Line Sounders
(top cap from step 2 will seal top)



**2** Select the Power Module
(top cap included with each module)



Top cap | IO Link, 7 circuits | 24 V AC/DC, 7 circuits | 240 V AC, 3 circuits | 240 V AC, 7 circuits

**1** Select the Base Mounting Adaptor



Vertical Mount | Surface Mount 1/2 NPT w/screws | M12 | Tube mount | Pole mount

# Product selection

## Step 01

| Base Style | Base Adaptor |
|---|---|
| | Catalogue No. |
| Surface Mount 1/2 NPT | 856T-BMASN |
| Surface Mount 1/2 NPT w/screws | 856T-BMASH |
| Vertical Mount | 856T-BMAVM |
| Tube Mount | 856T-BMAT* |
| Pole Mount | 856T-BMAP* |
| M12 5-pin connector 2 | 856T-B24QD5C |
| M12 8-pin connector 2 | 856T-B24QD8C |

## Step 02

| Power Module 24 V AC/DC up to 7 circuits | Power Module 240 V AC up to 3 circuits | Power Module 240 V AC up to 7 circuits | IO-Link Power Module up to 7 circuits |
|---|---|---|---|
| Catalogue No. | Catalogue No. | Catalogue No. | Catalogue No. |
| 856T-B24C | 856T-BAC3C | 856T-BAC7C | 856T-B24LC |
| – | – | – | – |
| – | – | – | – |

**Note:** Replace * for length required 10, 25, 40, 60cm. example 856T-BMAP10 – 10cm Pole mount
IO-Link Power Module requires 889D-F5ACDM4M-10-SW Patchcord connected to an 1732E-8IOLM12R IO-Link Master

## Step 03

- Select In-Line Modules (Sound and Light modules)



856T-BB4



856T-BPL1

### Light Modules

| Description | Catalogue No. |
|---|---|
| LED Steady (ON/OFF) | 856T-BT* |
| LED Multi Function (Steady/Flashing/Strobing via DIP switch) | 856T-BB* |
| LED Rotating (90 or 180 rpm via DIP switch) | 856T-BR* |
| Seven Colour RGB LED Module (Steady) | 856T-BMC |

### Sound Module

| Description | Catalogue No. |
|---|---|
| Piezo Sounder In Line (8 tones/single circuit/102dB) | 856T-BPL1 |

**Note:** Replace * with 3=Green, 4=RED, 5=Amber, 6=Blue, 7=White, 8=Yellow, 9=Magenta
Example: 856T-BB4 - Red LED Multifunction in-line module

## Step 04

- Select Top Mount Beacon Shape Modules



856T-BGB5



856T-BTR3

### Light Modules

| Description | Catalogue No. |
|---|---|
| LED Steady/Flashing | 856T-BGB* |
| LED Strobe (one or two pulses) | 856T-BSB* |
| LED Rotating | 856T-BRB* |
| Seven Colour RGB LED Module (Steady) | 856T-BMB |

### Sound Module

| Description | Catalogue No. |
|---|---|
| Piezo Sounder TopMount (8 tones/single circuit/105dB) | 856T-BP1 |
| Transducer Sounder TopMount (16 tables/7 tones per table/3 circuits/105dB) | 856T-BTR3 |
| Voice Recordable Sounder TopMount (7 channels pre-recorded voice 90mins/3 circuits/95dB) | 856T-BH3 |

**Note:** Replace * with 3=Green, 4=RED, 5=Amber, 6=Blue, 7=White, 8=Yellow, 9=Magenta
Example: 856T-BGB5 - Amber LED Steady/Flashing

## Step 05

- Select optional accessories



856T-ASFG

### Accessories

| Description | Catalogue No. |
|---|---|
| Replacement O RING For LIGHT/Power ModuleBase Adaptor | 856T-ARNG |
| Replacement Flat Gasket For Surface Mount Base Adaptor | 856T-ASFG |
| Replacement Flat Gasket For Vertical Mount Base Adaptor | 856T-AVFG |
| Replacement Black Cap | 856T-ABCAP |
| Replacement Lens Diffuser KIT | 856T-ADK |
| Replacement Screws For Pole Connection Boxes | 856T-AJBS |
| Transition Module 855T DeviceNet Base to 856T Stack Lights (5 circuit) | 856T-ATM |
| Vertical Mount Bracket for Tube Mount | 855T-AVM |

# Stratix Ethernet Switches



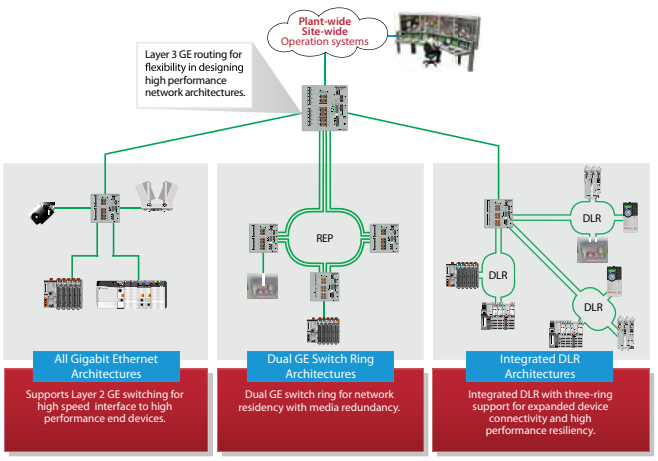





| | Stratix 2000 Unmanaged Switch | Stratix 2500 Lightly Managed Switch | Stratix 5700 Managed Switch | Stratix 5400 Managed Switch |
|---|---|---|---|---|
| **Ports** | 5,8,10,16,18 versions | 5 and 8 versions | 6,10,18,20 versions | 8,12,16,20 versions |
| **Fiber Ports** | up to 2 | - | up to 6 SFP | up to 12 SFP |
| **Copper Ports** | up to 16 | Up to 8 | 6 to 18 | 8 to 20 |
| **1G Ports** | up to 8 copper<br>2 SFP slots | – | up to 2 copper<br>or 2 SFP slots | up to all |
| **Fiber Support** | 100Mbs<br>1G Fiber | – | 100Mbs<br>1G Fiber | 100Mbs<br>1G Fiber |
| **Power over Ethernet** | – | – | up to 4 | up to 8 |
| **Flash Memory** | – | – | Internal Flash and SD Card Option | Internal Flash and SD Card Included |
| **Operating Temperature** | -40 to 70 °C | -20 to 60°C | -40 to 60 °C | -40 to 70 °C |
| **Environment Rating** | IP30 | IP30 | IP31 | IP32 |
| **Dimensions** | 115 to 135 mm H<br>30 to 88 mm W<br>68 to 106 mm D | 130 mm H<br>38 to 46 mm W<br>117 mm D | 130 mm H<br>75 to 127 mm W<br>117 to 128 mm D | 160 mm H<br>150 mm W<br>129 mm D |
| **Power** | 18-60V DC<br>18-30V AC | 12-24V DC<br>0.3-2.0A | 12V/24V/48V DC | 12V-54V DC |
| **Cisco** | – | – | IOS | IOS |
| **Device Level Ring (DLR)** | – | – | Yes (single Ring) | Yes (three rings) |
| **VLANs** | – | Yes with trunking | Yes with trunking | Yes with trunking |
| **Network Address Translation (NAT)** | – | – | Yes | Yes |
| **Port Control in Logix** | – | Yes | Yes | Yes |
| **Access Control Lists (ACL)** | – | – | Yes | Yes |
| **AOP (CIP)** | – | Yes | Yes | Yes |
| **Smart Ports** | – | Yes | Yes | Yes |
| **DHCP per port** | – | Yes | Yes | Yes |
| **Broken Wire Detection** | – | Yes | Yes | Yes |

| | |
|---|---|
| **Device Level Ring (DLR)** | Device Level Ring (DLR) Allows establishment of a resilient ring network at the device level without the need of external switching hardware. The fast network recovery rate makes the protocol ideal for real-time control applications. The DLR protocol is a standard protocol supported and maintained by ODVA. |
| **Network Address Translation (NAT)** | Network Address Translation (NAT) provides 1:1 translations of IP addresses from one subnet to another. Can be used to integrate machines into an existing network architecture. |
| **VLANs** | VLANs with Trunking is a feature that allows you to group devices with a common set of requirements into network segments. VLANs can be used to provide scalability, security and management to your network |
| **Access Control Lists (ACL)** | Access Control Lists (ACL) allow you to filter network traffic. This can be used to selectively block types of traffic to provide traffic flow control or provide a basic level of security for accessing your network. |
| **DHCP** | DHCP per port allows you to assign a specific IP address to each port, ensuring that the device attached to a given port will get the same IP address. This feature allows for device replacement without having to manually configure IP addresses. |
| **Smartports** | Smartports provide a set of configurations to optimize port settings for common devices like automation devices, switches, routers, PCs and wireless devices. Smartports can also be customized for specific needs |
| **CIP SYNC** | CIP SYNC (IEEE1588) is the ODVA implementation of the IEEE 1588 precision time protocol. This protocol allows very high precision clock synchronization across automation devices. CIP SYNC is an enabling technology for time-critical automation tasks such as accurate alarming for post-event diagnostics, precision motion and high precision first fault detection or sequence of events |

## Stratix 5400 configuration options



# Product selection

## Stratix 2000 Unmanaged Switches

Ideal for small control networks. These industrial-grade switches do not require any configuration and use simple cable connections for easy connection with Logix-based controllers.



1783-US7T1F

User Manual

Installation Instructions

| Switch | Ports | | | Catalogue No. |
|---|---|---|---|---|
| | Copper | Fibre | SFP | |
| 5 Port | 5 FE | 0 | – | 1783-US5T |
| 5 Port | 5 FE | 1 | 1 FE multimode | 1783-US4T1F |
| 5 Port | 4 FE | 1 | 1 FE singlemode | 1783-US4T1H |
| 8 Port | 8 FE | 0 | – | 1783-US8T |
| 8 Port | 6 FE | 2 | 2 FE multimode | 1783-US6T2F |
| 8 Port | 6 FE | 2 | 1 FE singlemode | 1783-US6T2H |
| 8 Port | 7 FE | 1 | 1 FE multimode | 1783-US7T1F |
| 16 Port | 16 FE | 0 | – | 1783-US16T |

## Stratix 2500 Lightly Managed Switch

Enable network connectivity in applications where traditional unmanaged switches lack the ability to provide diagnostics and security. This connectivity helps you achieve higher productivity and network reliability.



1783-LMS5

User Manual

Installation Instructions

| Switch | Description | Catalogue No. |
|---|---|---|
| 5 Port | 5x10/100BaseT | 1783-LMS5 |
| 8 Port | 8x10/100BaseT | 1783-LMS8 |

## Stratix 5700 Managed Switches

Uses the current Cisco Catalyst switch architecture and feature set. They are designed to meet your switching capability needs, from smaller applications to IT-ready integration with plantwide infrastructure. Configuration and monitoring tools provide secure integration to the enterprise network and allow easy setup and diagnostics with our Integrated Architecture system.



1783-BMS20CA

User Manual

Installation Instructions

| Switch | Ports | | Slots | Switch Type | IEEE 1588 | | NAT | DLR | Catalogue No. |
|---|---|---|---|---|---|---|---|---|---|
| | Copper | Combo* | SFP | | PTP | CIP Sync | | | |
| 6 Port | 4 FE | 0 | 2 FE | LITE | - | - | - | - | 1783-BMS06SL |
| 6 Port | 6 FE | 0 | 0 | LITE | - | - | - | - | 1783-BMS06TL |
| 6 Port | 4 FE | 0 | 2 GE | FULL | - | - | - | - | 1783-BMS4S2SGA |
| 10 Port | 8 FE | 2 FE | 0 | LITE | - | - | - | - | 1783-BMS10CL |
| 10 Port | 8 FE | 2 FE | 0 | FULL | - | - | - | - | 1783-BMS10CA |
| 10 Port | 8 FE | 2 GE | 0 | LITE | - | - | - | - | 1783-BMS10CGL |
| 10 Port | 8 FE | 2 GE | 0 | FULL | - | - | - | - | 1783-BMS10CGA |
| 10 Port | 8 FE | 2 GE | 0 | FULL | - | Yes | - | Yes | 1783-BMS10CGP |
| 10 Port | 8 FE | 2 GE | 0 | FULL | Yes | Yes | Yes | Yes | 1783-BMS10CGN |
| 20 Port | 16 FE | 2 FE | 2 FE | LITE | - | Yes | - | Yes | 1783-BMS20CL |
| 20 Port | 16 FE | 2 FE | 2 FE | FULL | - | Yes | - | Yes | 1783-BMS20CA |
| 20 Port | 16 FE | 2 GE | 2 FE | LITE | - | Yes | - | Yes | 1783-BMS20CGL |
| 20 Port | 16 FE | 2 GE | 2 FE | FULL | - | Yes | - | Yes | 1783-BMS20CGP |
| 20 Port | 16 FE | 2 GE | 2 FE | FULL | Yes | Yes | Yes | Yes | 1783-BMS20CGN |

* Combo ports can be either copper or SFP

## Stratix 5400 Managed Switches

Support layer 2 switching and layer 3 routing using a combination of Gigabit Ethernet (GE), Power over Ethernet (PoE) and GE fiber ports to help offer enhanced scalability. In addition, this switch offers DLR with three-ring support, which allows more connected devices at the Cell/Area Zone level for increased network design flexibility.



1783-HMS16TG4CGN

User Manual

Installation Instructions

| Switch | Ports | | Slots | Switch Type | IEEE 1588 | NAT | DLR | Catalogue No. |
|---|---|---|---|---|---|---|---|---|
| | Copper | Combo* | SFP | | PTP | | | |
| 12 Port | 8 FE | 4 GE | 0 | 2 | Yes | Yes | Yes | 1783-HMS8T4CGN |
| 20 Port | 16 FE | 4 GE | 0 | 2 | Yes | Yes | Yes | 1783-HMS16T4CGN |
| 20 Port | 16 GE | 4 GE | 0 | 2 | Yes | Yes | Yes | 1783-HMS16TG4CGN |

* Combo ports can be either copper or SFP

# Ethernet cables



## Product selection

### On-Machine Ethernet M12 D Code 1585D



| First End Connector | Second End Connector | Cable Type | Catalogue No. | |
|---|---|---|---|---|
| | | | Unshielded | Braided Shield |
| Straight Male | Flying Lead | 4 Pin M12 | 1585D-M4TB-* | 1585D-M4UB-* |
| | Straight Male | | 1585D-M4TBDM-* | 1585D-M4UBDM -* |
| | Female Straight | | 1585D-M4TBDF-* | 1585D-M4UBDF-* |
| | Right Angle Male | | 1585D-M4TBDE-* | 1585D-M4UBDE-* |
| | RJ45 | | 1585D-M4TBJM-* | 1585D-M4UBJM-* |
| Right Angle Male | Right Angle Male | | 1585D-E4TBDE-* | 1585D-E4UBDE-* |

**Note:** Replace * with 0M15(.15m), 0M2(.2m) 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 3(3m), 4(4m), 5(5m), 10(10m), 15(15m), 20, (20m), 30(30m), 40(40m)



1585D-M4DC-SH

**Accessories**

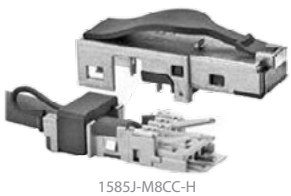
| Description | Catalogue No. |
|---|---|
| 4-Pin M12 Straight Through Male Shielded | 1585D-M4DC-SH |
| 4-Pin M12 Straight Through Female Shielded | 1585D-F4DC-SH |
| 4-Pin M12 Straight Through Male Unshielded | 1585D-M4DC-H |

### In-Cabinet Ethernet RJ45 1585J



| First End Connector | Second End Connector | Cable Type | Catalogue No. | |
|---|---|---|---|---|
| | | | Unshielded | Braided Shield |
| RJ45 Straight | Flying Lead | 4 conductors (2 Pair) | 1585J-M4TB-* | 1585J-M4UB-* |
| | RJ45 Straight | | 1585J-M4TBJM-* | 1585J-M4UBJM-* |
| | RJ45 Right Angle | | 1585J-E4TBJM-* | 1585J-E4UBJM-* |
| | RJ45 Left Angle | | 1585J-L4TBJM-* | 1585J-L4UBJM-* |
| | Flying Lead | 8 conductors (4 Pair) | 1585J-M8TB-* | – |
| | RJ45 Straight | | 1585J-M8TBJM-* | 1585J-M8CBJM-* |
| | RJ45 Right Angle | | 1585J-E8TBJM-* | 1585J-E8CBJM-* |
| | RJ45 Left Angle | | 1585J-L8TBJM-* | 1585J-L8CBJM-* |

**Note:** Replace * with 0M15(.15m), 0M2(.2m) 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 3(3m), 4(4m), 5(5m), 10(10m), 15(15m), 20, (20m), 30(30m), 40(40m)



1585J-M8CC-H

**Accessories**

| Description | Catalogue No. |
|---|---|
| RJ45 Straight Through Male | 1585J-M8CC-H |

### Specifications

| | |
|---|---|
| **Coupling Nut** | Nickel-plated brass |
| **Material** | Polyurethane (PUR) |
| **Contact Material** | Gold-plated brass |
| **Bend Radius** | 10 x cable diameter |
| **Enclosure Rating** | IP67 |
| **Temperature** | -20…+105 °C |

# DC Micro M12 Cables



889 DC Micro (M12) Cordsets & Patchcords provide secure connections for proximity sensors, limit switches, photoelectric sensors and other field devices. Available with straight or right-angle 4- or 5-pin overmolded connectors, these cables feature a choice of materials and jacket colors, including red to identify safety applications. Some models include braided shielding for noise reduction and status indicators for power and output status indication.

## Features

Technical Data

- Multiple jacket types: PVC, PUR, TPE, Toughlink™ and Toughweld™
- Offers standard 16, 18, 22 and 24 AWG cable
- Includes ratcheting coupling nut for added vibration resistance
- Offers DC micro-to-mini and DC micro-to-pico cable models
- Offers red cable jackets to identify safety networks on your machines

### Specifications

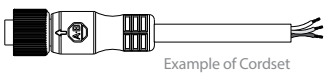
| | |
|---|---|
| **Coupling Nut** | Epoxy-coated zinc |
| **Material** | Molded oil-resistant PUR |
| **Contact Material** | Gold over nickel-plated brass |
| **Bend Radius** | 10 x cable diameter |
| **Enclosure Rating** | IP69K |
| **Temperature** | -20…+105 °C |
| **Rating** | 250V, 4A |

## Product selection

### On-Machine DC Micro M12 889D

| Female First End Connector (Sensor End) | Male Second End Connector (I/O End) | Cable | PVC Cable, Unshielded | | | PVC Braided Shield |
|---|---|---|---|---|---|---|
| | | | Yellow | Black | Red (Guardlink) | Yellow |
| Straight Female | Flying Lead | 4 Pin M12 | 889D-F4AC-* | 889D-F4BC-* | 889D-F4NE-* | 889D-F4EC-* |
| | Straight Male | | 889D-F4ACDM-** | 889D-F4BCDM-** | 889D-F4NEDM-** | 889D-F4ECDM-** |
| | Right Angle Male | | 889D-F4ACDE-** | 889D-F4BCDE-** | 889D-F4NEDE-** | 889D-F4ECDE-** |
| Right Angle Female | Flying Lead | | 889D-R4AC-* | 889D-R4BC-* | 889D-R4NE-* | 889D-R4EC-* |
| | Straight Male | | 889D-R4ACDM-** | 889D-R4BCDM-** | 889D-R4NEDM-** | 889D-R4ECDM-** |
| | Right Angle Male | | 889D-R4ACDE-** | 889D-R4BCDE-** | 889D-R4NEDE-** | 889D-R4ECDE-** |
| Straight Female | Flying Lead | 5 Pin M12 | 889D-F5AC-* | 889D-F5BC-* | 889D-F5NC-* | 889D-F5EC-* |
| | Straight Male | | 889D-F5ACDM-** | 889D-F5BCDM-** | 889D-F5NCDM-** | 889D-F5ECDM-** |
| Straight Female | Flying Lead | 8 Pin M12 | – | 889D-F8AB-* | 889D-F8NB-* | 889D-F8FB-* |
| | Straight Male | | – | 889D-F8ABDM-** | 889D-F8NBDM-** | 889D-F8FBDM-** |

**Note:** Replace * with 0M3(.3m), 2(2m), 5(5m), 10(10m), 15(15m), 20(20m), 30(30m)
Replace ** with 0M3(.3m), 0M6(.6m), 1(1m), 2(2m), 5(5m), 10(10m), 15(15m), 20, (20m), 30(30m)



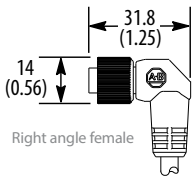
Example of Cordset



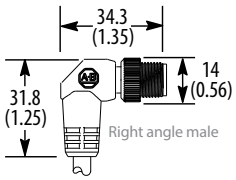
Example of Patchcord



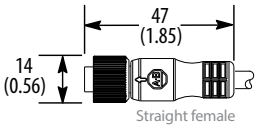
871A-TS4-DM



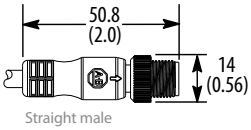

Right angle female




Right angle male




Straight female




Straight male

### Accessories

| Description | Catalogue No. |
|---|---|
| 4-Pin M12 Straight Male (4-6mm Cable diameter) | 871A-TS4-DM |
| 4-Pin M12 Straight Female (4-6mm Cable diameter) | 871A-TR4-D |
| 5-Pin M12 Straight Male (4-6mm Cable diameter) | 871A-TS5-DM |
| 5-Pin M12 Straight Female (4-6mm Cable diameter) | 871A-TS5-D |
| 8-Pin M12 Straight Male (6-8mm Cable diameter) | 871A-TS8-DM1 |
| 8-Pin M12 Straight Female (6-8mm Cable diameter) | 871A-TS8-D1 |

# Machine Safety Services

## What is the Safety Lifecycle?

The Safety Lifecycle helps maximize productivity and improve safety by identifying the steps required to assess and mitigate machinery risks. The steps of the Safety Lifecycle include:

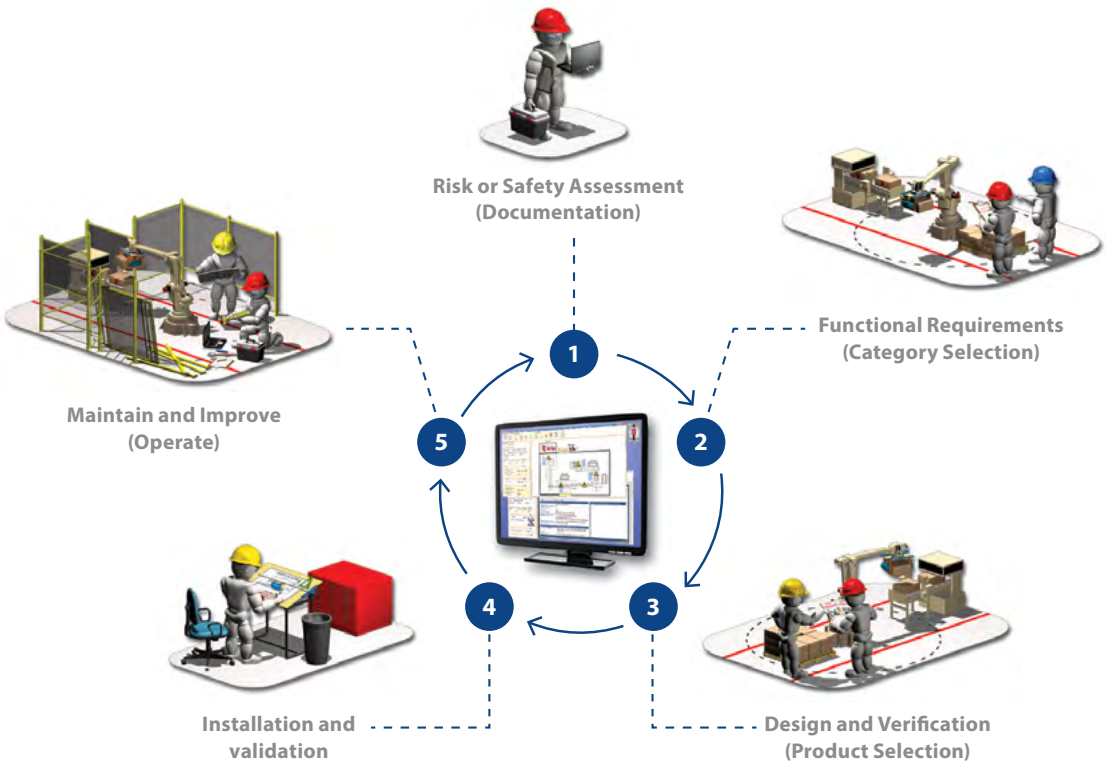
1) **Perform a hazard or risk assessment**
   Identify hazards and estimate the associated risk.

2) **Determine the functional safety system requirements**
   Evaluate safeguarding options based on industry acceptable solutions and select mitigation techniques.

3) **Design and verify the system**
   Design system architecture, document safety circuit design, procure materials.

4) **Install and validate the system**
   Verify systems are operating with in defined parameters and applicable standards have been satisfied.

5) **Maintain and improve the system**
   Verify that system requirements operate within specified parameter for production and safety preventative maintenance and system upgrades.



# Scalable Assessment Solutions

NHP, an Australian owned company providing power/ control solutions for over 50 years, has the experience and expertise to provide you with the most appropriate audit solution for your application and can assist with:

- Reducing unscheduled downtime
- Stabilising maintenance budgets
- Maximising productivity
- Improving security and safety
- Increase reliability Contact your local sales representative or the NHP Services and Training team for more details. Better understand and pinpoint your lifecycle risk through a comprehensive analysis of your critical plant assets and their condition

## Product selection

| Description | Catalogue No. |
|---|---|
| Audit On-Site Rockwell Machine Safety | SAT-AUD-R02 |

### Scalable Assessment Solutions

| Conformity Audits | Guarding Evaluation | Risk Assessments |
|---|---|---|
| Multiple machines/ plant-wide machine audit | Identifies primary guarding hazards | Risk Assessment or Team-Based Risk Assessment (TBRA) |
| Provides a high-level analysis of specific safety areas | Identifies guarding hazards for immediate plant actions | Risk Assessment – provides analysis using limited customer personnel<br><br>Team-Based Risk Assessment – In-depth analysis from a multidisciplinary team, required for critical or complex machines |
| Provides a high-level safety analysis of machine:<br>• Conformity audit that analyses guarding, components that perform a safety function, E-stops, lockout/tagout and/or isolation devices are identified and labelled<br>• Existing safety circuit estimation<br>• Prioritizes machines for further assessment | Provides a rapid approach to identifying point-of-operation and power transmission hazards and identifying appropriate and effective safeguarding measures for reducing risk and exposure<br><br>Generates report identifying:<br>• Hazard exposure<br>• Category/performance level per standards<br>• Potential safeguard or risk mitigation solution | Risk Assessment (Standard):<br>• Evaluation by Rockwell Automation safety engineer/consultant, limited customer involvement (typically operations/maintenance)<br>• Evaluation report includes:<br>– Documentation of participants<br>– Identification of primary hazards/tasks<br>– Risk-in/risk-out rating<br>– Recommendations for safety improvements, such as: protective guarding; electrical safety controls; pneumatic/fluid power safety controls<br>• Safety circuit performance requirements<br>• Photograph of critical identified hazards (based on customer approval)<br><br>Team-based Risk Assessment: All features of the standard Risk Assessment (above) with the following additional features:<br>• Team-based assessment facilitated by Rockwell Automation safety engineer/consultant<br>• Customer team typically consists of operations, maintenance, engineering, technicians, cleaning, sanitation and safety personnel<br>• Basic risk assessment training<br>• Hazard identification during setup, normal and abnormal operation, sanitation/cleaning, maintenance (under limited energy), emergency conditions<br>• Report documentation includes all elements from safety evaluation with additional information:<br>– Plan view machine layout with recommended safety improvements<br>– Limits of machine<br>– Incident/accident history<br>– This service can satisfy the risk assessment requirements of safety standards |

# SAF-TUV0T – Functional Safety for Machinery Technician Certification Course

## Course Purpose

The standards regarding functional safety and relevant laws and directives demand that people and organizations performing responsible tasks during relevant life cycle phases of a machine must achieve and prove required competencies.

In this training, students will learn how the current standards dictate the selection, assembly, installation, validation, and maintenance of safety devices and components to reduce hazards from machinery and ensure the safety of people and the environment. Practical examples will demonstrate possibilities regarding machine protection.

This training will also cover safety topics, such as: redundancy, testing, distance calculations, assigning required level of risk reduction as PL, monitoring moveable guard positions, and fault avoidance for relevant life cycle phases.

After completing this course, students should understand and be able to use ISO 12100, IEC 60204-1 and other relevant machine functional safety standards.

## Who Should Attend

Machine technicians, application engineers, safety specialists, and those responsible for repairing and maintaining machine safety should attend this course.

## Certificate Eligibility Requirements

Requirements to receive the Functional Safety for Machinery Technician Certificate (TÜV Rheinland):

- Before taking the course, an eligibility form from TÜV Rheinland must be completed and approved, proving:
  - Minimum of 1 year experience working on industrial machinery
  - Documented education, high school diploma or global equivalent or
  - Experience in machinery maintenance and operation verified by employer
- Attended complete two-day course
- Passing grade of 75% or higher on the exam

## Course Agenda

### Day 1

- Understanding the Functional Safety for Machinery Technician Certification (TÜV Rheinland)
- Defining Legal Guidelines and Standards
- Defining Risk Analysis and Processes(ISO 12100:2010)
- Defining Basic Electrical Safety Principles (IEC 60204-1)
- Defining Basic Safety Principles
- Defining Machine Guarding Principles

### Day 2

- Identifying Safety Functions
- Identifying Safety Devices
- Identifying Circuits, Schematics, and Examples
- Defining New Standards Regarding Safety of Machinery
- Evaluating Machine Safety Using a Practical Example
- Exam (1 hour)

## Product selection

| Description | Catalogue No. |
|---|---|
| Training Rockwell TUV Functional Safety Technician | SAF-TUV0T |

# SAF-TUV1 – Functional Safety for Machinery Introduction Course

## Course Purpose

This is an introduction to functional safety for machinery standards and is highly recommended to prepare students for the Rockwell Automation/TÜV Rheinland engineer certification course.

This course will define the design and proof requirements for functional safety of machines, according to current standards and guidelines. Practical examples will demonstrate possible techniques for machine guarding and protection.

This course will also introduce organizational measures that can be instituted to protect employees and equipment. The organizational measures include quality assurance techniques and documentation for lifecycle design and validation.

After completing this course, you should understand how safety devices and components are assembled and applied to reduce hazards from machinery so the necessary safety for people and the environment is achieved.

## Who Should Attend

Application engineers, system integrators, developers, safety specialists, and authorized experts in machinery should attend this course.

## Standards Required

- IEC 60204-1
- IEC 62061
- ISO 12100: 2010
- ISO 13849 part 1 and part 2

## Course Agenda

### Day 1

- Understanding the Functional Safety for Machinery Certification (TÜV Rheinland)
- Defining European Guidelines and Requirements
- Defining OSHA Guidelines and Requirements
- Defining Risk Analysis and Processes (ISO 12100:2010)
- Defining ISO 13849-1
- Identifying Safety Devices

### Day 2

- Identifying Safety Functions of Machines
- Identifying Circuits, Schematics, and Examples
- Defining New Standards Regarding Safety of Machinery

### Day 3

- Defining ISO 13849-1/2
- Defining IEC 62061
- Defining Basic Electrical Safety Principles (IEC 60204-1)
- Performing ISO 13849/IEC 62061 calculations

# Product selection

| Description | Catalogue No. |
|---|---|
| TÜV Functional Safety for Machinery - Introduction | SAF-TUV1 |

# SAF-TUV2T – Functional Safety for Machinery Engineer Certification

## Course Purpose

The standards regarding functional safety and relevant laws and directives demand that people and organizations performing responsible tasks during all life cycle phases of a machine must achieve and prove required competencies.

In this training, students will learn how current standards dictate the design and proof of functional safety for machines. The participant will learn how safety devices and components are assembled and applied to reduce hazards from machinery so the necessary safety for people and environment is achieved. Practical examples will demonstrate possibilities regarding machine protection.

In addition to the technical requirements, students will learn about organizational measures, quality assurance techniques, and documentation for lifecycle design and validation.

After completing this course, students should understand and be able to use IEC 60204-1, IEC 62061, ISO 12100, ISO 13849-1, -2, and other relevant machine functional safety standards.

## Who Should Attend

Application engineers, system integrators, developers, safety specialists, and authorized experts in machinery should attend this course.

### Prerequisites

- **Required:** A completed and approved eligibility form to receive certification
- **Strongly Recommended:** Functional Safety for Machinery Introduction (Course No. SAF-TUV1)

## Certificate Eligibility Requirements

Requirements to receive the Functional Safety for Machinery Engineer Certificate (TÜV Rheinland):

- Before taking the course, an eligibility form from TÜV Rheinland must be completed and approved, proving:
  - Minimum of 3 years of experience in the field of functional safety
  - University engineering degree (Master's or Bachelor's) or global equivalent or
  - Equivalent engineer level responsibilities status certified by employer
- Attended full SAF-TUV2T course
- Passing grade of 70% or higher on the exam

### Participant Must Bring copies of Standards

| | |
|---|---|
| IEC 60204-1 | ISO 12100: 2010 |
| IEC 62061 | ISO 13849 part 1 and part 2 |

## Course Agenda

### Day 1

- Understanding the Functional Safety for Machinery Engineer Certification (TÜV Rheinland)
- Defining Legal Guidelines and Standards
- Defining Risk Analysis and Processes(ISO 12100:2010)
- Defining Basic Electrical Safety Principles (IEC 60204-1)
- Identifying Safety Devices

### Day 2

- Identifying Safety Functions of Machines
- Identifying Circuits, Schematics, and Examples
- Defining New Standards Regarding Safety of Machinery

### Day 3

- Defining ISO 13849-1
- Defining ISO 13849-2

### Day 4

- Defining IEC 62061
- Performing ISO 13849/IEC 62061 calculations

### Day 5

- Exam (4 hours)

# Product selection

| Description | Catalogue No. |
|---|---|
| TÜV Functional Safety Engineer | SAF-TUV2 |

# Resources




## Safebook 5

Principals, standards and implementation

https://literature.rockwellautomation.com/idc/groups/literature/documents/rm/safebk-rm002_-en-p.pdf

## Safety Functions Documents

Common application examples by product and safety rating

https://www.rockwellautomation.com/en-us/support/documentation/technical-data/functionalsafetydocum20180905-1614.html

## Wiring Diagrams

GSR Safety Relays

https://literature.rockwellautomation.com/idc/groups/literature/documents/wd/safety-wd001_-en-p.pdf

## Smart Safety - Whitepaper

https://literature.rockwellautomation.com/idc/groups/literature/documents/wp/smart-wp001_-en-p.pdf

## Smart Safety

https://www.rockwellautomation.com/en-au/capabilities/smart-manufacturing/smart-devices/smart-safety.html

## EtherNet/IP Device Level Ring

Application Technique

https://literature.rockwellautomation.com/idc/groups/literature/documents/at/enet-at007_-en-p.pdf

## CIP Safety

ODVA

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

## CIP Safety Technology overview

ODVA Networking

https://www.odva.org/wp-content/uploads/2020/11/PUB00110R4_CIP_Safety.pdf

## Machinery Safety Solutions

https://literature.rockwellautomation.com/idc/groups/literature/documents/qr/safety-qr003_-en-p.pdf

## CIP Safety Networking - White Paper

https://literature.rockwellautomation.com/idc/groups/literature/documents/wp/safety-wp038_-en-p.pdf

## Rockwell Safety Products

https://www.rockwellautomation.com/en-au/products/hardware/allen-bradley/safety-products.html

## CCW Software

https://www.rockwellautomation.com/en-us/capabilities/industrial-automation-control/design-and-configuration-software.html

## Safety Automation Builder

Software Safety System Development Tool

https://www.rockwellautomation.com/en-au/capabilities/industrial-safety-solutions/safety-automation-builder.html

## Rockwell Safety Maturity

Improve Safety, Productivity and Compliance

https://www.rockwellautomation.com/en-au/capabilities/industrial-safety-solutions/safety-maturity.html

## Safety ROI Tool

http://safetyroi.aquentstudioscle.com/php/index.php

## NHP - Safety

https://www.nhp.com.au/Industries-and-Solutions/Solutions/Connected-Enterprise/SMART-Safety

## Presence Sensing Safety Devices

https://literature.rockwellautomation.com/idc/groups/literature/documents/br/glsafe-br001_-en-p.pdf

## Safety Standards Overview

https://literature.rockwellautomation.com/idc/groups/literature/documents/qr/safety-qr004_-en-p.pdf




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