

Installation Instructions

Original Instructions



Lifeline 5 Cable-pull Safety Switch

Catalog Numbers: Single Head (440E-LL5SS8, 440E-LL5SS5, 440E-LL5SE8, 440E-LL5SE5, 440E-LL5SN8, 440E-LL5SN5) and Dual Head (440E-LL5DSE5, 440E-LL5DSN5, 440E-LL5DSS5)

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ATTENTION: Read this document and the documents that are listed in [Additional Resources on page 18](#) about the installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wire instructions and requirements of all applicable codes, laws, and standards. Suitably trained personnel are required to install, adjust, put into service, use, assemble, disassemble, and maintain this equipment in accordance with the applicable code of practice. The protection that is provided by the equipment can be impaired if the equipment is used in a manner that the manufacturer has not specified.

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
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Introduction

Lifeline™ 5 cable-pull safety rope switches allow operators to initiate an E-stop from any point along the installed cable length, which provides protection for exposed conveyors or machines, or wherever guarding cannot protect equipment. It uses a cable that can be pulled at any point along its length to activate the switch and stop the equipment.

After the machinery is stopped, the switch requires a manual reset before the machinery can be restarted.

It is required that installation is in accordance with these instructions and implemented by qualified personnel.

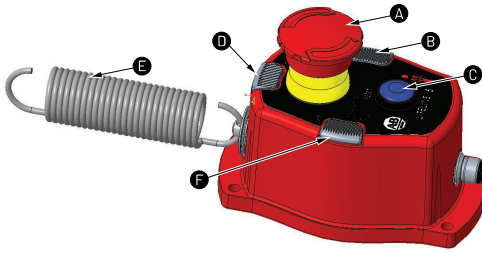
This device is intended to be part of the safety-related control system of a machine. Before installation, a risk assessment must be performed to determine whether the specifications of this device are suitable for all foreseeable operational and environmental characteristics of the application. See the Specifications for certification information and ratings.

Use appropriate screws, bolts, or nuts that are fitted by tools to mount the switch to avoid the risk of tampering. Do not over torque the mounting hardware.



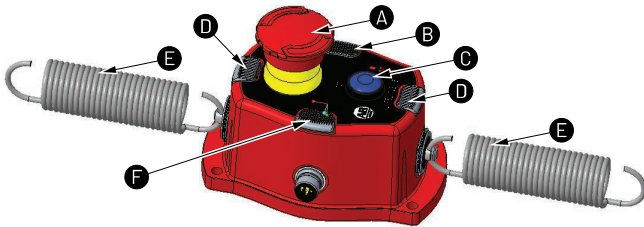
ATTENTION: Do not attempt to install this device unless the installation instructions have been studied and understood. This document acts as a guide for a typical installation and is available at [rok.auto/literature](#).

Single-head Switch – Standard Aluminum Housing



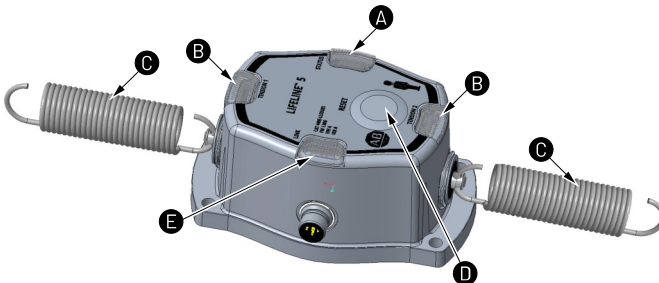
Item	Description
A	E-stop
B	Status indicator
C	Reset
D	Tension indicator
E	Tension spring (included)
F	Link indicator

Dual-head Switch – Standard Aluminum Housing



Item	Description
A	E-stop
B	Status indicator
C	Reset
D	Tension indicator
E	Tension spring (included)
F	Link indicator

Dual-head Switch – Stainless-steel Housing



Item	Description
A	Status Indicator
B	Tension indicator
C	Tension spring (included)
D	Reset
E	Link indicator

Specifications



All specifications apply to both single-head and dual-head models unless noted.

Attribute	Standard Aluminum Housing with E-stop	Standard Aluminum Housing without E-stop	Stainless-steel Housing without E-stop
Safety Ratings			
Standards Safety classification	PLe Cat 4 according to EN ISO 13849-1, SIL CL 3 per IEC 61508. Suitable for use in IEC 60821 applications. The intent of the operational functionality that EN ISO 13850 and IEC 60947-5-5 require is achieved by using electronic technology.		
Functional safety data	PFHd = 1.45E-9 (average frequency of a dangerous failure per hour) T1 = 20 (Proof test interval)		
Certifications	CE Marked for all applicable directives, UKCA marked for all applicable regulations, cULus Listed (UL 508), CCC Marked, and TUV Certified.		
Operating Characteristics			
Cable span	- Single-head: 100 m (328.1 ft) - Dual-head: 200 m (656.2 ft)		
Tension force to run position	135 N (30.35 lbf)		
Tension force to lock out	195 N (43.84 lb)		
Operating voltage	24V DC +10%/-15% Class 2 SELV or PELV power supply		
Response time (off)	60 ms		
Switches connected in series	Response time off is 5 ms for each additional switch (OSSD mode only)		
Utilization category according to U _e /I _e	DC-12 and DC-13 24V 200 mA		
Frequency of operating cycle	0.25 Hz		
Off-state output current	< 0.5 mA		
Outputs (OSSD Mode Only)			
Safe state	De-energized (2 x PNP, 0V), AUX energized (1 x PNP, 24V)		
Run state	Energized (2 x PNP, 24V), AUX de-energized (1 x PNP, 0V)		
Tension	Energized (1 x PNP, 24V) (M12 8-pin only)		
No-load supply current	< 50 mA		
Load current	200 mA maximum		
Voltage drop	< 2V		
Mechanical			
Housing material	Aluminum		304 stainless steel
Environmental			
Operating temperature	-20...+75 °C (-4...+167 °F)		- M12 5-pin: -40...+75 °C (-40...+167 °F) - M12 8-pin: -20...+75 °C (-4...+167 °F)
Operating humidity	5...95% relative		
Washdown rating	IP66	IP66	IP66, IP67, IP69
Shock and vibration	IEC 60068-2-27: 30 g (1.05 oz), 11 ms IEC 60068-2-6: 10...500 Hz		
Pollution degree	IEC 60947-1: 3		

Attribute	Single Head (440E-LL5SS8, 440E-LL5SS5, 440E-LL5SE8, 440E-LL5SE5, 440E-LL5SN8, 440E-LL5SN5), Dual Head (440E-LL5DSE5, 440E-LL5DSN5, 440E-LL5DSS5)
Electromagnetic Compatibility (EMC) ⁽¹⁾	
Electrostatic discharge (ESD)	IEC 61000-4-2: Air discharge IEC 61000-4-2: Contact discharge
Radiated EMF immunity	IEC 61000-4-3
Electrical fast transient/burst immunity	IEC 61000-4-4
Conducted immunity	IEC 61000-4-6
Rated impulse withstand voltage	IEC 60947-1: 1 kV
Protection	Short circuit, overload, reverse polarity, overvoltage, loss of ground

(1) EMC requirements were tested to safety levels per IEC 61326-3-1.

Mounting

We recommend using M5 or #10-32 bolts to mount the sensor to the frame of the machine. See [Typical Mounting Examples on page 6](#) for common ways to mount the Lifeline 5 cable-pull safety switch.

Output Indicators

Table 1 - OSSD Mode

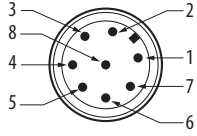
Indicator LEDs		Output		Status	Troubleshooting
Status	Link	OSSD	GuardLink		
Off	Off	Off	—	Not powered	Normal operational
Red	Off	Off	—	OSSD not active	
Green	Off	On	—	OSSD active	
Flashing green	Off	Off	—	Power up test or OSSD inputs not valid	Check 24V DC supply or OSSD inputs (yellow or red wire).
Flashing red	Off	Off	—	OSSD fault / Internal fault	OSSD fault — check that OSSD outputs are not shorted to GND, 24V DC or each other. Cycle Power.

Table 2 - GuardLink Mode

Indicator LEDs		Output State		Status	Troubleshooting
Status	Link	Safe Mode			
		OSSD	GuardLink		
Off	Off	—	Off	Not powered	Normal operation
Red	Red	—	Off	Safe state	
Red	Off	—	Off	Check link	
Green	Green	—	On	Operational mode	
Flashing green	Red	—	Off	Safe state	No demand on the primary safety function, but there is no safety input.
Flashing red	Red	—	Off		Fault present. Cycle power or issue a RESET command over the link in a GuardLink® system.
Flashing red/ green	Red	—	Off		FW update in process.
—	Flashing red/ green	—	Off		Device has been instructed to flash for location indication by the controller.

Wiring

Table 3 - 8-pin Connection (OSSD Only)⁽¹⁾

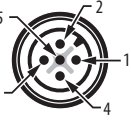
	Pin	Wire Color	Signal
	1	White	Auxiliary Output
	2	Brown	24V DC
	3	Green	Tension Output
	4	Yellow	Safety OSSD 2 Input
	5	Gray	Safety OSSD 1 Output
	6	Pink	Safety OSSD 2 Output
	7	Blue	0V
	8	Red	Safety OSSD 1 Input

(1) Not available for dual-head switches.

Description	Temperature Rating	Jacket Material	Coupling Nut	Cat. No.
M12 8-pin cordset	-20...+105 °C (-4...+221 °F)	PVC	Epoxy-coated zinc	889D-F8AB-2
			Stainless steel	889DS-F8AB-2

Replace the 2 with 5 (5 m [16.4 ft]) or 10 (10 m [32.8 ft]) for standard cable lengths.

Table 4 - 5-pin Connection

	Pin	Color	Function	
			OSSD Mode	GuardLink Mode
	1	Brown	+24V DC	+24V DC
	2	White	Safety OSSD 1 Output	Safety Out
	3	Blue	0V	Ground 0V
	4	Black	Safety OSSD 2 Output	Safety In
	5	Gray	Auxiliary Output	CLU

Description	Temperature Rating	Jacket Material	Coupling Nut	Cat. No.
M12 5-pin cordset	-20...+105 °C (-4...+221 °F)	PVC	Epoxy-coated zinc	889D-F5AC-2
			Stainless steel	889DS-F5AC-2
M12 4-pin cordset	-50...+105 °C (-58...+221 °F)	TPE	Stainless steel	889DS-F4HJ-2

Replace the 2 with 5 (5 m [16.4 ft]) or 10 (10 m [32.8 ft]) for standard cable lengths.

IMPORTANT

If you do not require the auxiliary signal, a 4-pin cordset (catalog number 889D-F4AC-2) can be used. This cordset cannot be used in GuardLink applications.

For low temperature applications, use a 4-pin cordset (catalog number 889DS-F4HJ-2).

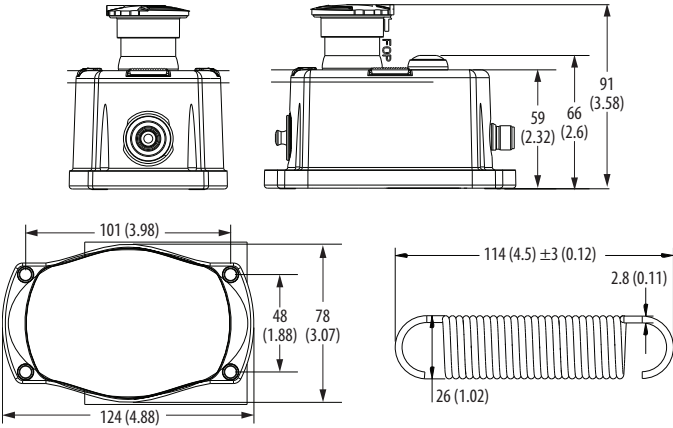
The recommended patchcord for use with ArmorBlock® Guard I/O™ is 2 m (6.5 ft) - 889D-F4ACDM-2. Replace the 2 with 0M3 (0.3 m [0.98 ft]), 1 (1 m [3.28 ft]), 5 (5 m [16.4 ft]), or 10 (10 m [32.8 ft]) for standard cable lengths.

Approximate Dimensions

Single-head Switches

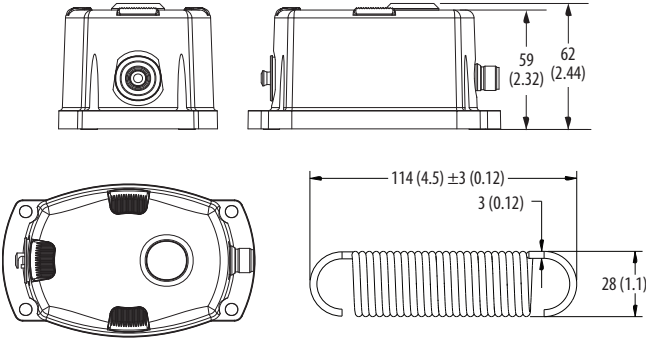
For the standard housing, the spring rate is 2.1 N/mm (12 lbf/in.) and the spring material is carbon steel/spring steel.

Figure 1 - Standard Housing [mm (in.)]



For the stainless-steel housing, the spring rate is 2.1 N/mm (12 lbf/in.) and the spring material is 302 stainless steel.

Figure 2 - Stainless-steel Housing [mm (in.)]



Dual-head Switches

For the standard housing, the spring rate is 2.1 N/mm (12 lbf/in.) and the spring material is carbon steel/spring steel.

Figure 3 - Standard Housing, No E-stop [mm (in.)]

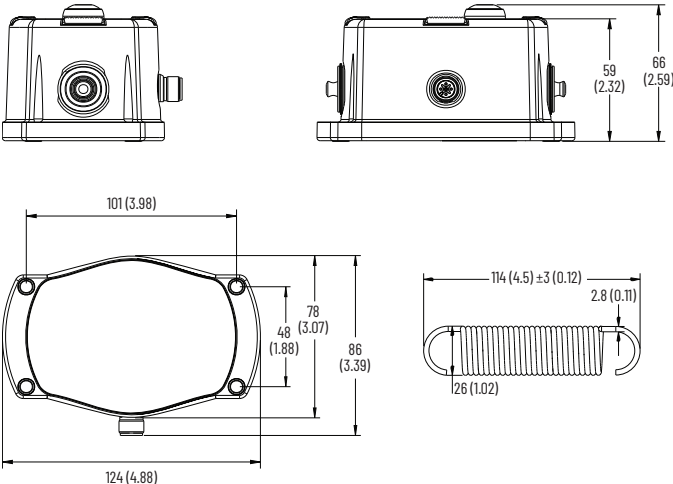
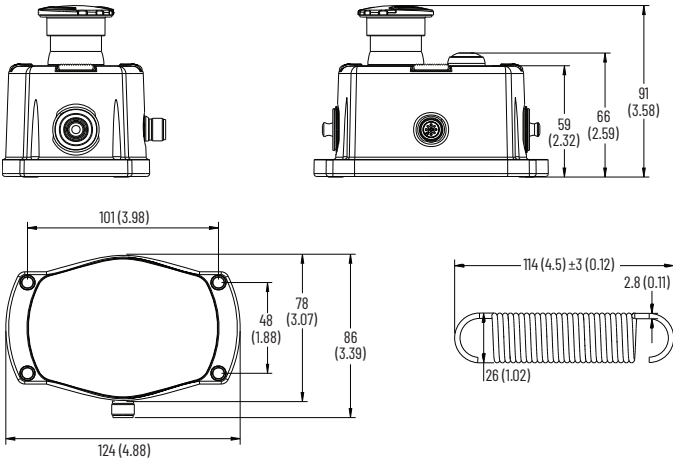
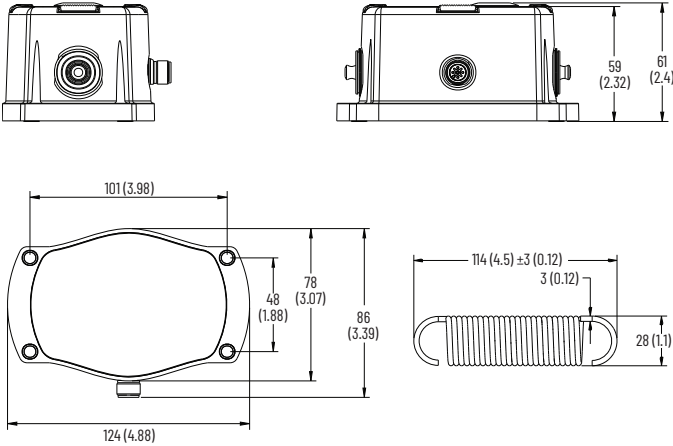


Figure 4 - Standard Housing, with E-stop [mm (in.)]



For the stainless-steel housing, the spring rate is 2.1 N/mm (12 lbf/in.) and the spring material is 302 stainless steel.

Figure 5 - Stainless-steel Housing [mm (in.)]



Function Overview

A Lifeline 5 cable-pull system consists of the Lifeline 5 safety cable-pull switch, red colored rope/cable, and supports (eyebolts and pulleys). The Lifeline 5 meets the intent of the international requirements according to IEC 60947-5-5 and EN ISO 13850.

Function Safety

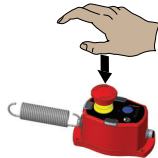
The following table describes the demand on the safety switch that results in a stop function and how to reset that function.

Table 5 - Safety Function

Function	Result	Restore to Normal Operation
Actuation of rope/cable	Safety outputs OFF state	Press the Reset button
E-stop pressed		Rotating the E-stop button clockwise
Safety OSSD inputs off and not floating		Turn on OSSD inputs
Safety OSSD input wires floating		Connect input wires

Integrated Emergency Stop Push Button

The Lifeline 5 safety cable-pull switch is offered with a twist release E-stop push button that can be pressed in emergency situations to stop the machine. After E-stop actuation, the safety outputs remain in the off state and can only be reset manually by rotating the E-stop push button clockwise.



Indication of Rope Tension

During installation/adjustment of the rope/cable assembly, the correct tension of the rope can be checked by observing the tension indicator. During setup, the tension indicator flashes at 1 Hz and the tension output on M12 8-pin models pulses at the same rate. This output can be wired to an indicator light to help with initial setup and diagnostics. As the tension is increased on the rope/cable, the tension indicator flash rate increases. When the tension indicator turns off, the sensor is properly tensioned.

Margin Indication the Rope Tension

If the status indicator is green and the tension indicator flashes amber, the rope/cable requires maintenance/adjustment before the machine shuts down. This output can be used as an indication signal or be connected directly to an indicator light.

Indicators (OSSD Mode Only)

Table 6 - 8-pin Connector Functions

Function	Switch Outputs			Status Indicators	
	Safety	Auxiliary	Tension	Status	Tension
E-stop pressed	Off	On	Off	Red	Off
Sensor not tensioned/ cable cut	Off	On	On	Red	Amber flash
Low tension indication	On	Off	On	Green	Amber flash
Sensor tensioned properly	On	Off	Off	Green	Off
High tension indication	On	Off	On	Green	Amber flash
Cable pulled/tripped	Off	On	Off	Red	Off
Safety OSSD inputs not connected	Off	On	Off	Flashing green	Off

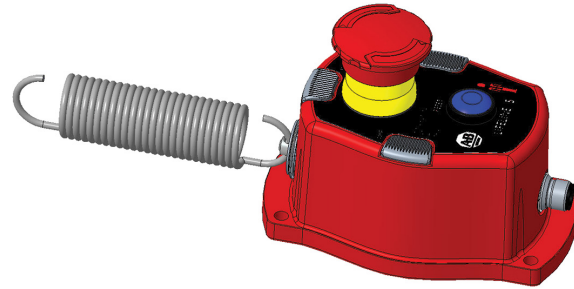
Table 7 - 5-pin Connector Functions

Function	Switch Outputs		Status Indicators	
	Safety	Auxiliary	Status	Tension
E-stop pressed	Off	On	Red	Off
Sensor not tensioned/ cable cut	Off	On	Red	Amber flash
Low tension indication	On	Off	Green	Amber flash
Sensor tensioned properly	On	Off	Green	Off
High tension indication	On	Off	Green	Amber flash
Cable pulled/tripped	Off	On	Red	Off

Status indicator flashes red, see [Output Indicators on page 3](#).

Installation of Rope/Cable

Attach the tension spring to the eye hook on the front of the switch, as shown in the following image.



ATTENTION: The sensor must not be used without this spring attached.

IMPORTANT

The first eyebolt must be located 300 mm (11.8 in.) from the switch eyelet. This distance provides for a straight and efficient pulling action on the sensor.

Additional eyebolts are spaced 2...3 m (6...9 ft) apart to help keep the perpendicular pull force within IEC 60947-5-5 specifications of 200 N (45 lbf) and 400 mm (15.75 in.).

EN ISO 13850 standard requires that the full length of the cable is within view when the reset is pressed. Or the machine must be inspected over the whole length of the cable, before and after resetting.

Install inside and outside pulley so cable can go around corners or whenever direction is changed, even slightly.

Set/Adjust the Cable Tension

Power up the Switch ([Application Wiring Examples on page 12](#))

The status indicator becomes steady red and the tension indicator begins to blink amber/1 Hz rate.

Slowly increase the tension on the cable. The tension indicator blink rate increases as the tension is increased. When the tension indicator turns off, the sensor is properly set.

Press the Reset button. The status indicator turns green (the reset button must be pressed between 125 ms and 3 seconds for the sensor to be reset). The tension is set.

Verify the System

When the installation is complete, you have performed a thorough functional test. This test includes checking all types and directions of pull over the length of the cable.

IMPORTANT

EN ISO 13850 requires the full length of the cable to be within view when the reset is pressed. If it is not, the machine must be inspected over the whole length of the cable, both before and after resetting.

Cable Considerations/Thermal Expansion

The cable is the actual interface with the user, and is typically red plastic coated and less than 4 mm (0.16 in.) in diameter. The cable is installed between the switch at one end and a support at the opposite end. It is important that the support for the cable is sturdy enough to handle the force that is required to operate the switch.

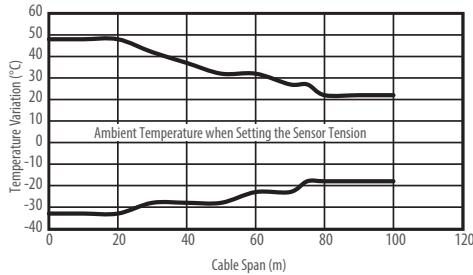
Temperature effects on the cable are important to note when configuring a system.

EXAMPLE:

A cable that runs along a conveyor is 20 m (65.6 ft). After the tension is adjusted properly, the Lifeline 5 safety cable-pull switch can accommodate a temperature variance from $-32...+48^{\circ}\text{C}$ ($-26...+118^{\circ}\text{F}$) without readjustment required (see [Figure 6](#)).

Another consideration of the cable is that when it is pulled with great force, the cable can initially expand or stretch and affect system setup. It is recommended that the cable is forcefully pulled before tuning the cable tension with the turnbuckle. This step exposes areas in the system that initially stretch or expand. Adjustments can then be made to take up the added slack.

Figure 6 - Thermal Expansion Chart



Typical Mounting Examples

Figure 7 - Mount One Switch with the Lifeline Rope Tensioner System (LRTS)

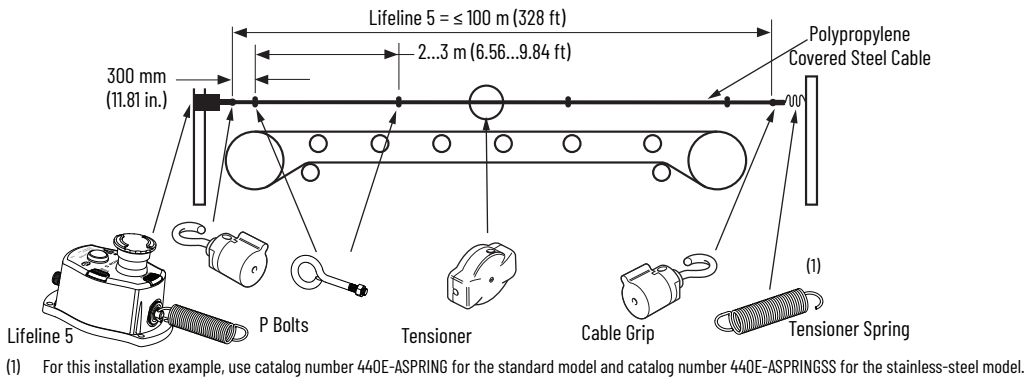


Figure 8 - Mount Two Switches with the LRTS

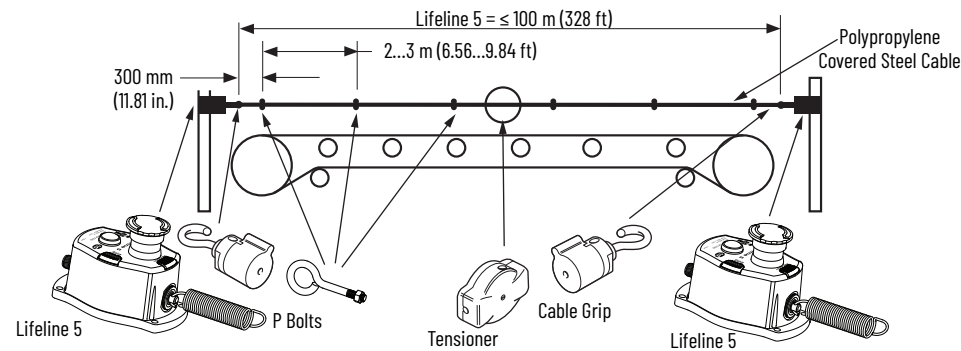


Figure 9 - Mount One Switch with the Stainless-steel Installation Kit

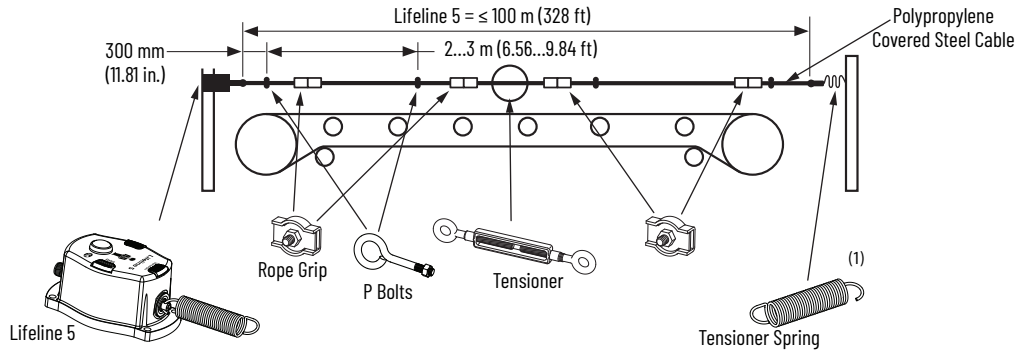
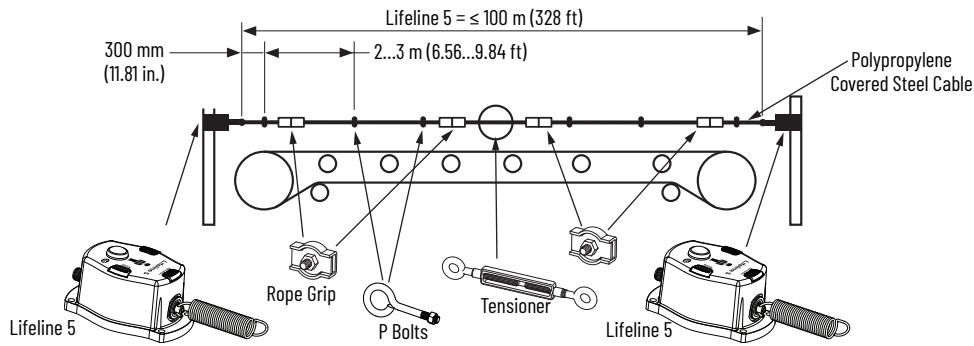
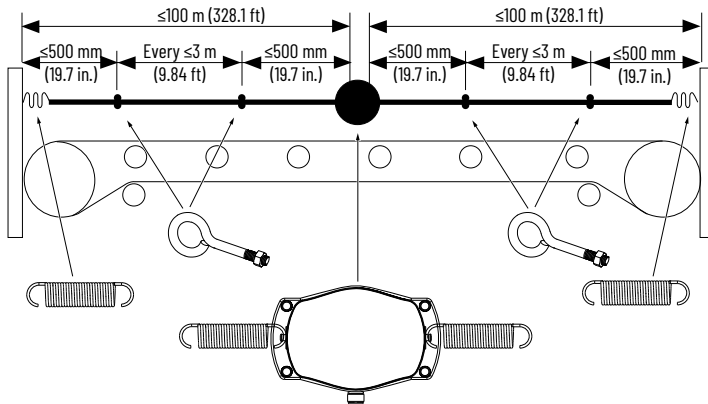


Figure 10 - Mount Two Switches with the Stainless-steel Installation Kit

Figure 11 - Dual-head Installation


A secondary spring can be used when it is likely that actuation is attempted by pulling the wire along its axis. When you pull the wire in either direction, it generates the emergency stop command.

The choice between two switches or one switch is a matter of a risk assessment while considering the probability of a trapped rope along the span.

GuardLink System Integration

The 440E-LL5 cable-pull safety switch can be used in either of the two available GuardLink systems:

- Dual GuardLink (DG) safety relay system
- 432ES-IG3 CIP Safety™ EtherNet/IP™ system

Implementation is slightly different, but GuardLink 2.0 or later enhances performance with the 432ES safety system.

DG Safety Relay System Integration

The DG integration system has two significant concepts:

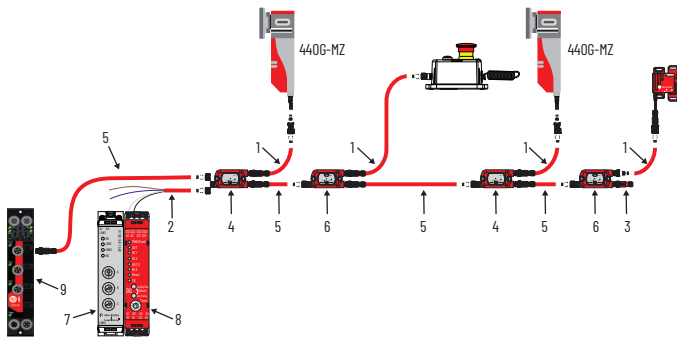
- The DG relay plays a part of the safety function
- The DG relay provides non-safety rated information to the machine control system

The following image shows the basic components of a GuardLink system with a DG safety relay and a 432ES network interface module.

The 440E-LL5 safety switch with embedded GuardLink technology, connects to the link with a passive tap (as shown in following image) or a passive power tap (catalog number 440S-PF5D4).

Different types and versions of GuardLink-enabled and passive taps can connect in any order and can be mixed on the same link. For more information about the configuration a GuardLink safety system, see the Guardmaster® DG Safety Relay and GuardLink System User Manual, publication [440R-UM015](#).

Figure 12 - GuardLink System Components



Item	Description	Cat. No.
1	5-pin device patchcord ⁽¹⁾	889D-F5NCDDM-x ^{(2) (3)}
2	Cordset	889D-F4NE-y ⁽⁴⁾
3	Terminator	898D-418U-DM2
4	GuardLink passive tap	440S-PF5D ^{(5) (6)}
5	4-pin link patchcords	889D-F4NEDM-x ^{(3) (7)}
6	GuardLink-enabled tap	440S-SF5D ⁽⁶⁾
7	EtherNet/IP Network Interface	440R-ENETR
8	DG Safety Relay	440R-DG2R2T
9	CIP Safety EtherNet/IP Interface	432ES-IG3

- (1) Optional: Device can be connected directly to the passive tap.
 (2) 10 m (32.8 ft) length, maximum
 (3) Replace x with OM3 (300 mm [0.98 ft]), OM6 (600 mm [1.97 ft]), 1 (1 m [3.3 ft]), 2 (2 m [6.6 ft]), 5 (5 m [16.4 ft]), or 10 (10 m [32.8 ft]) for standard cable lengths.
 (4) Replace y in order number with 2 (2 m [6.6 ft]), 5 (5 m [16.4 ft]), 10 (10 m [32.8 ft]), 15 (15 m [49.2 ft]), 20 (20 m [65.6 ft]), or 30 (30 m [98.4 ft]) for standard cable lengths.
 (5) A passive power tap (Cat. No. 440S-PF5D4) can also be used.
 (6) Mounting brackets sold separately. Cat. No. 440S-GLTAPBRK1 (pack of 1) or Cat. No. 440S-GLTAPBRK5 (pack of 5).
 (7) 30 m (98.4 ft) length, max

432ES Safety System Integration

The 432ES safety system integration is a solution that uses CIP Safety over EtherNet/IP. The 432ES safety system conveys safety-rated status information over an EtherNet/IP connection, as compared to the DG solution, which provides non-safety rated status information to the machine control system. This integration requires the 432ES safety system to communicate with a safety-rated controller. At the time of release of the 432ES safety system, the safety controller must be one of the following GuardLogix® controllers (where x is the amount of memory in the controller):

- 1756-L8xS
- 5069-L3xERS
- 5069-L3xERMS

In addition, the controller must run Studio 5000® version 34.01 or later and communication must be with FactoryTalk® Linx 6.30 or later.

The 440E-LL5 safety switch appears as an icon on the Studio 5000 controller tree and its Module Profile [Add-on Profile (AOP)] is included in the 432ES AOP, which is available at [rok.auto/pcdc](#).

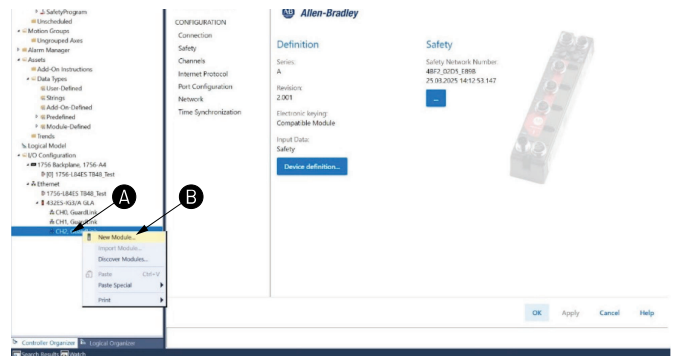
The Module Profile provides a significant number of status, diagnostic, and fault tags to help contribute to the maintaining machine uptime. The AOP for the 440E-LL5 safety switch is considered a standard (non-safety rated) AOP. The Main Routine can use the controller tags for status and diagnostic information. None of the controller tags for the 440E-LL5 safety switch must be used as part of a safety function. The 440E-LL5 safety switch devices can be added to the controller tree in one of two ways:

- Manual method: Select each device individually, offline.
- Discover modules: When the switches are installed, they can be discovered and loaded onto the controller tree.

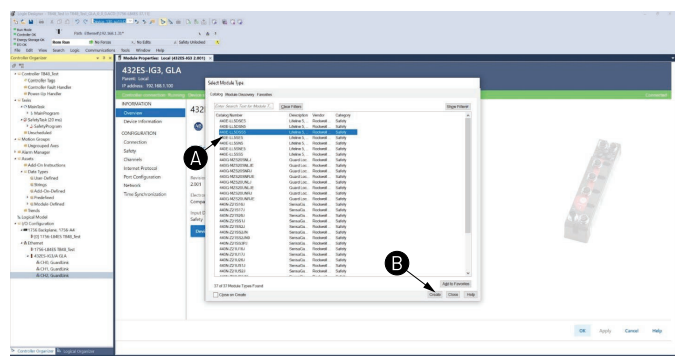
Manual Method

With the manual method, a 440E-LL5 safety switch can be added to the controller tree while offline with controller.

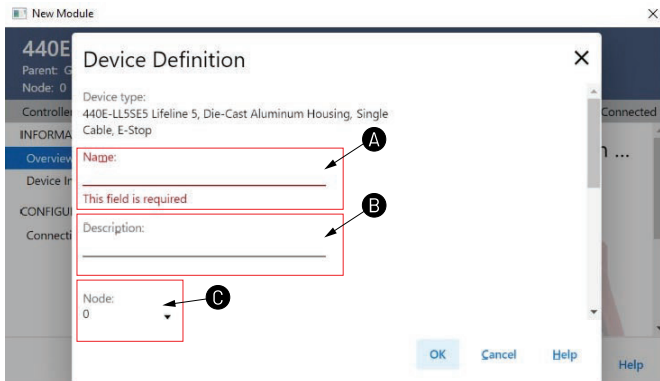
1. Right-click the desired channel (A).
2. Click New Module (B).



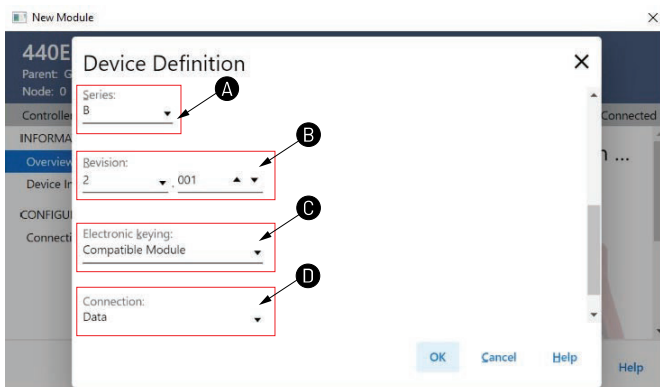
3. Click the 440E-LL5 safety switch variant that you want to add to the GuardLink channel (A).
4. Click Create (B).



5. Enter a name (A). This field is required.
 6. Type a description (B), if desired. This field is optional.
 7. Select the node number (C). Nodes must be numbered in consecutive order. Each device must correspond to its node location
- The nodes can be assigned in any order at the time of creation. For example, this device can be assigned to node 3, but eventually, there must be devices that are assigned to nodes 0, 1 and 2.

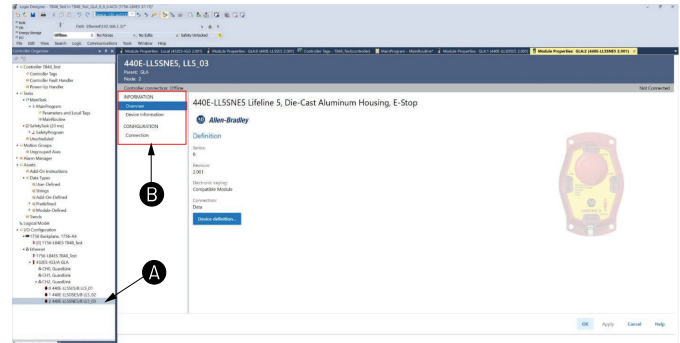


8. Scroll down to adjust the Module Definition, if necessary.
9. The 432ES safety system operates with Series B of the 440E-LL5 safety switch (A).
10. The major revision is 2 and the minor revision is 1. There are no other revisions for now (B).
11. Select the desired level of Electronic Keying (C):
 - Compatible Module: Default. Verifies the product variant and major revision.
 - Exact: Verifies the product variant, major and minor revision.
 - Disabled: Does not use keying. Only use this level for troubleshooting purposes.
12. The connection option is limited to Data (D). This option is standard non-safety rated data.
13. Click OK



Follow the prompts and accept the changes.

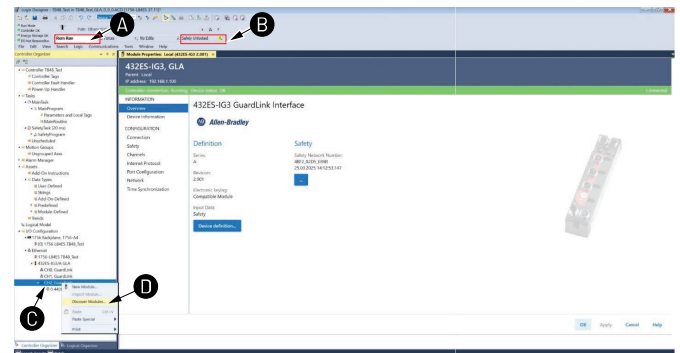
14. The 440E-LL5 safety switch is added to the CH2 GuardLink Channel (A).
15. The Module Properties window shows three sections (B):
 - Overview
 - Device information
 - Connection



Discover Modules

To use the Discover Modules feature, install and power the safety switches.

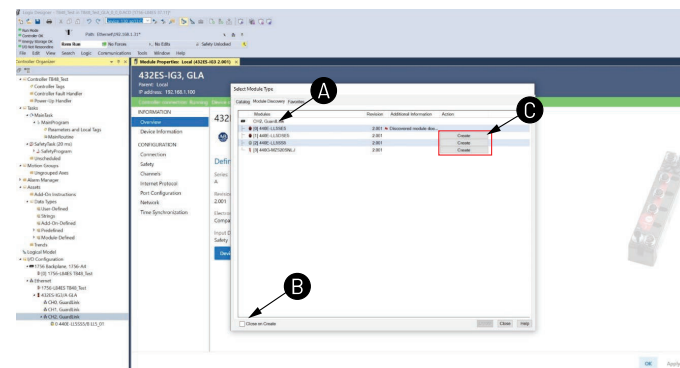
1. The controller must be online in one of the following modes (A):
 - Rem Run
 - Rem Prog
 - Rem Test mode
2. The controller can be either Safety Unlocked or Safety Locked (B).
3. Right-click the desired channel (C).
4. Click Discover Modules (D).



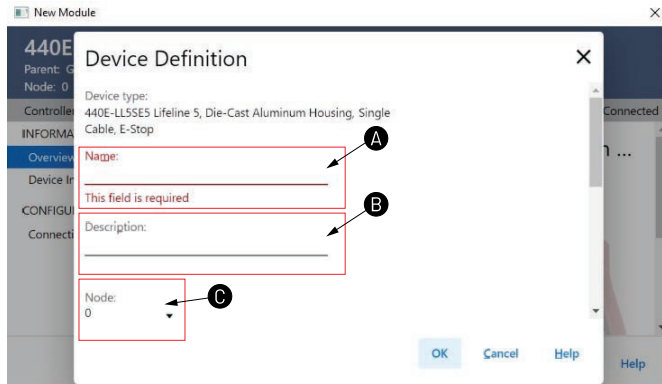
5. The discovery of node 0 shows that the device is 440E-LL5SE5 (aluminum housing, single cable, E-stop), whereas there is 440E-LL5SS5 (stainless steel, single cable) added to the controller tree (A).

To correct this issue, delete the device from the controller tree (the controller must be offline to remove device from I/O tree, then the modified project must be downloaded to the controller) and use Discover Modules to create the proper device, the 440E-LLSE5.

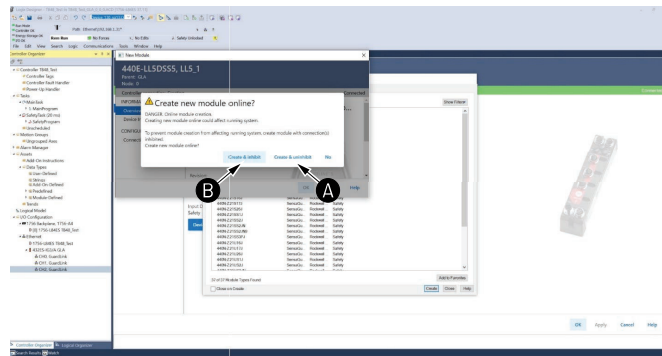
6. Uncheck the Close on Create checkbox (B). This action keeps the window open and allows faster creation of multiple devices. This example shows three devices to create.
7. Click the Create button of any Lifeline 5 device (C).



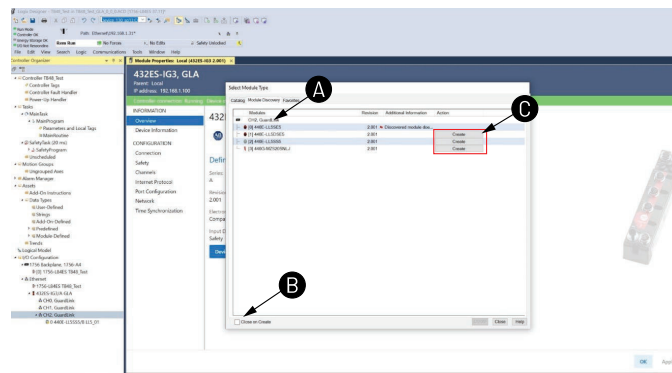
8. Type in a unique name (A). This field is required and must be unique.
9. Type in an optional description (B).
10. The node number does not need to be changed, as the number reflects the discovered position (C).
11. The remaining data in this window, which appears after scrolling down, is discovered and does not require changing.
12. To accept the new module, click OK and confirm your choice with another OK.



13. Consider whether you want to inhibit the module connection. If no logic code was previously created for this device, change to 'Create and uninhibit' option. If a logic code exists, use default option: 'Create and inhibit'.



14. The Select Module Type window reappears and shows that the node 0 definition in I/O tree matches the discovered module (A).
15. The 440E-LL5 shows in the controller tree.
16. Uncheck the Close on Create checkbox (B). This action keeps the window open and allows faster creation of multiple devices. This example shows three devices to create.
17. Click the Create button of any Lifeline 5 device (C). To add the remaining switches, repeat the process.



18. The Controller Organizer for CH2 shows the current tree with node 0 corrected and all switches are listed in the Controller Organizer (A).
19. The 440E-LL5 safety switches have the input tags (B) that show operating and diagnostic information. The class is standard, none of the tags are safety-rated, and must not be used as part of a safety function.
20. The 440E-LL5 safety switch has one output tag (C): Reset the switch (power cycle) if there is an internal recoverable fault.

Figure 13 - Dual Head – I/O Tags

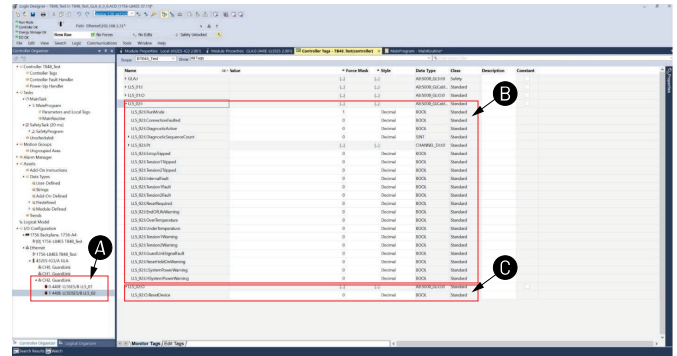
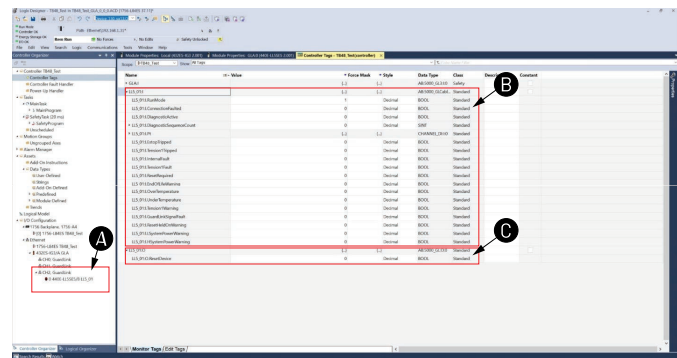


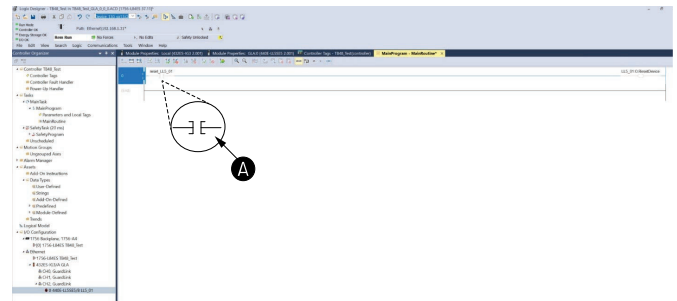
Figure 14 - Single Head – I/O Tags



Send Commands to 440E-LL5 Safety Switch

The following screenshot shows examples of sending commands to a 440E-LL5 safety switch. The example uses momentary commands; the duration of the command must accommodate network delays.

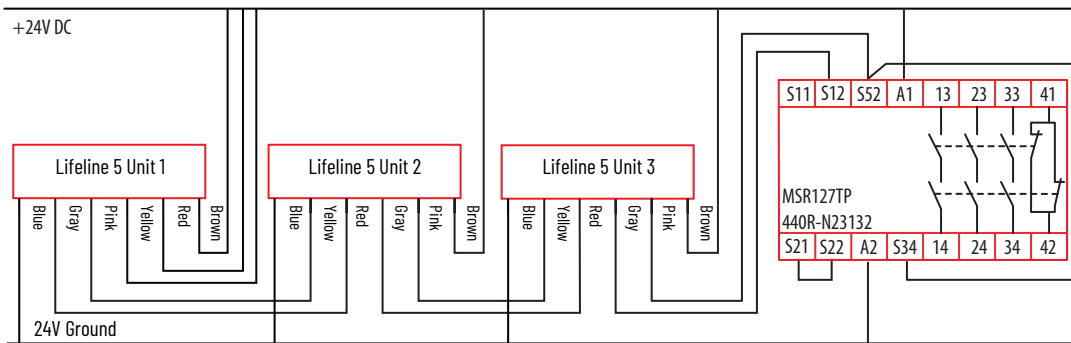
1. A momentary icon (A) on an HMI sends a Reset command to the 440E-LL5 safety switch, named LL5_01. A momentary icon is needed as the Reset Device command must be turned off before it can be turned on again.



ControlFLASH Firmware Update

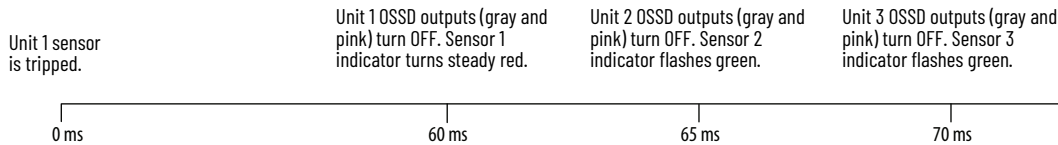
For details on how to update your firmware, see Upgrade Firmware in the ControlFLASH™ User Manual, publication [1756-UM105](#).

Timing Diagram (M12 8-pin Models Only)



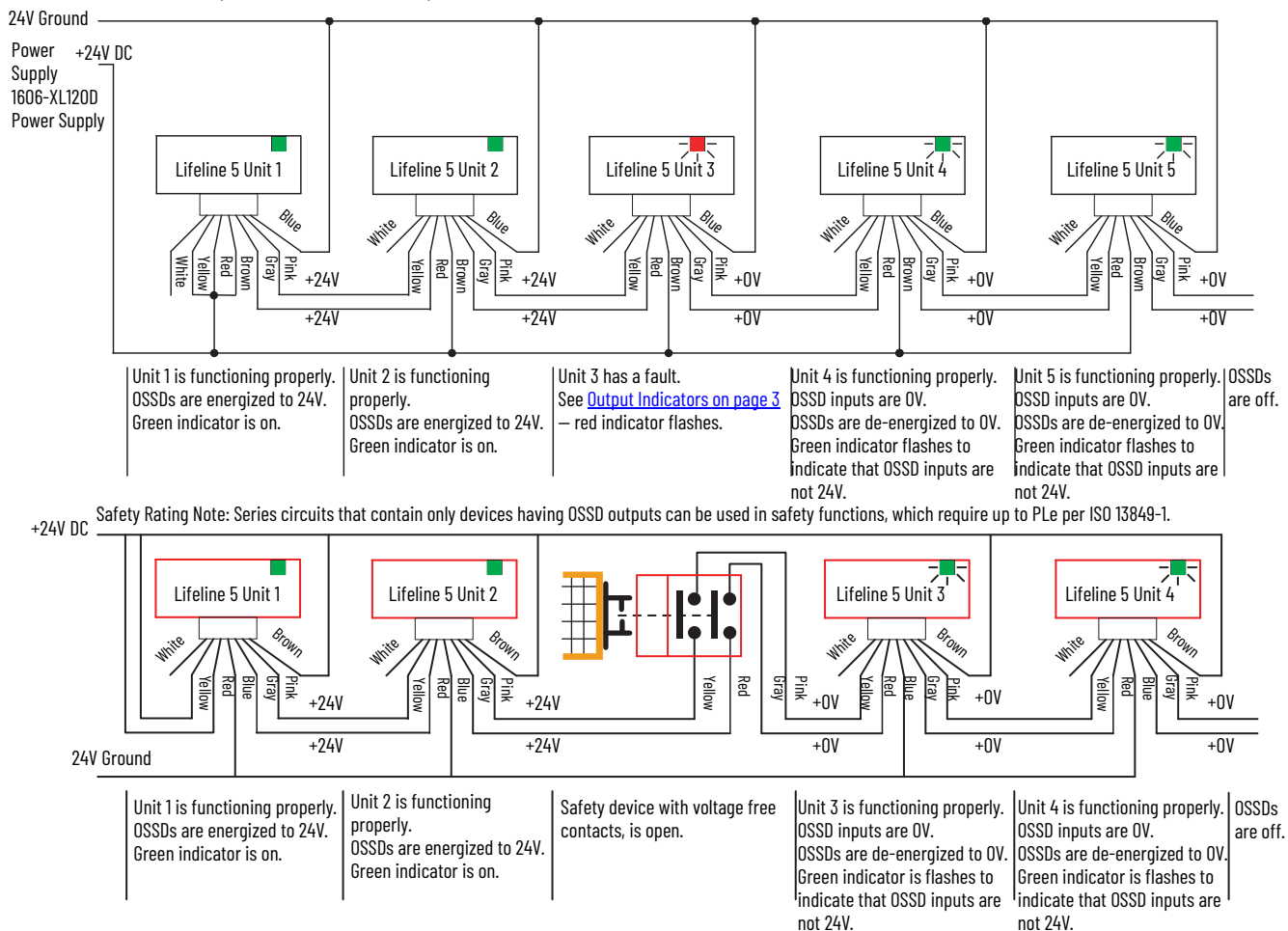
Response Time: Safety Outputs Turn OFF

Initial Conditions: All Lifeline 5 and tensioned properly.



Series Circuit (M12 8-pin Models Only)

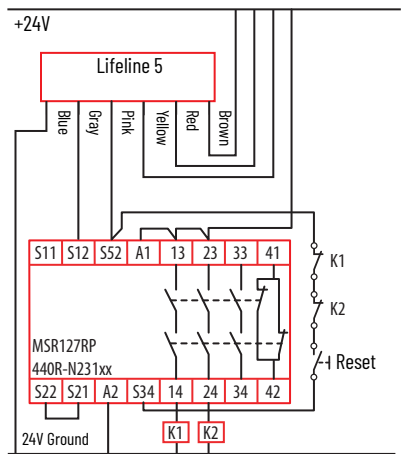
Consideration must be given to the protection of the wiring. For example, by using wire duct, conduit, shielded cable, separation, or other means to help prevent faults or to confirm detection of faults (see ISO 13849-2, Table D.4).



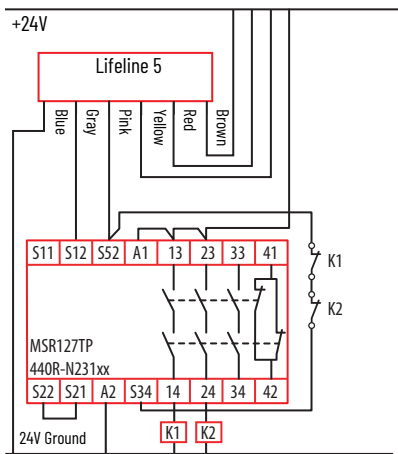
Safety Rating Note: A maximum safety function rating of PLd is achievable depending on the installation details when wiring the series circuits that contains voltage from contacts.

Application Wiring Examples

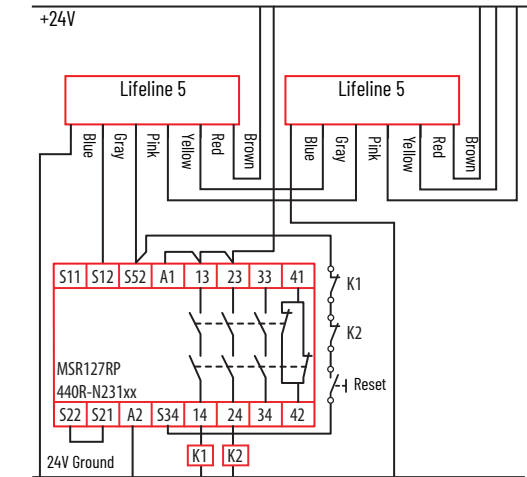
Wiring to MSR127 Safety Relay (M12 8-pin Model)



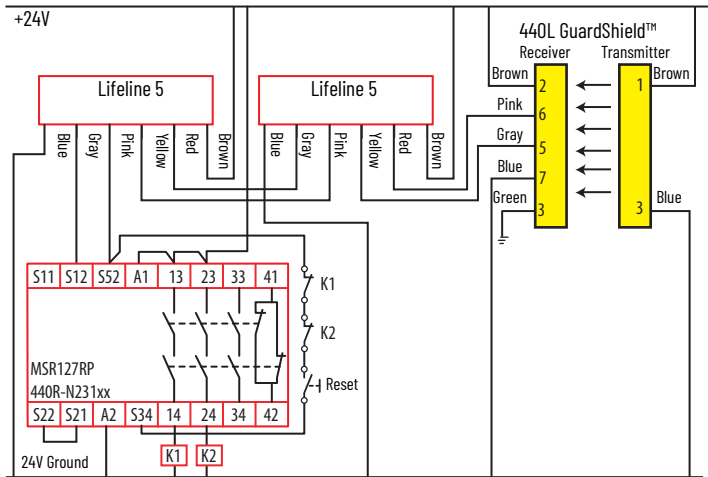
MSR127RP Safety Relay with One Sensor and Monitored Manual Reset Controlling a 100S Safety Contactor or 700S Safety Relays



MSR127TP Safety Relay with One Sensor and Automatic Reset Controlling a 100S Safety Contactor or 700S Safety Relays



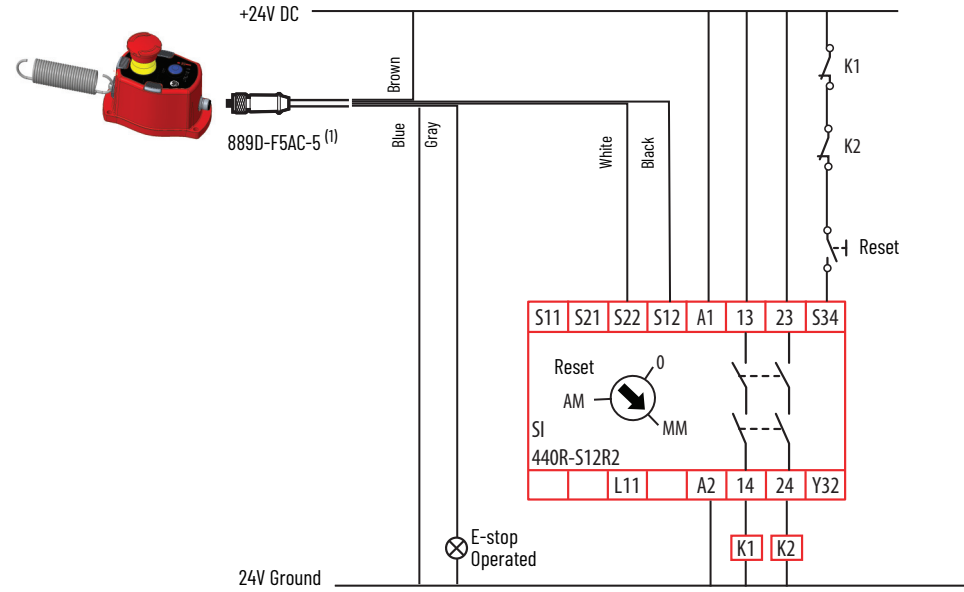
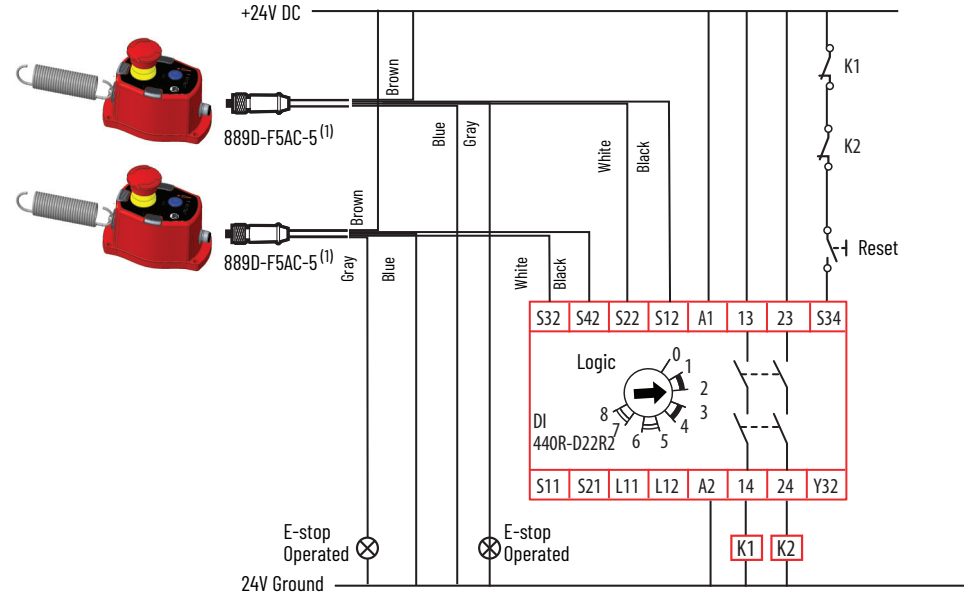
MSR127RP Safety Relay with One Sensor and Monitored Manual Reset Controlling a 100S Safety Contactor or 700S Safety Relays



MSR127RP Safety Relay with Two Sensors, One 440L Light Curtain in Series, and Monitored Manual Reset Controlling a 100S Safety Contactor or 700S Safety Relays

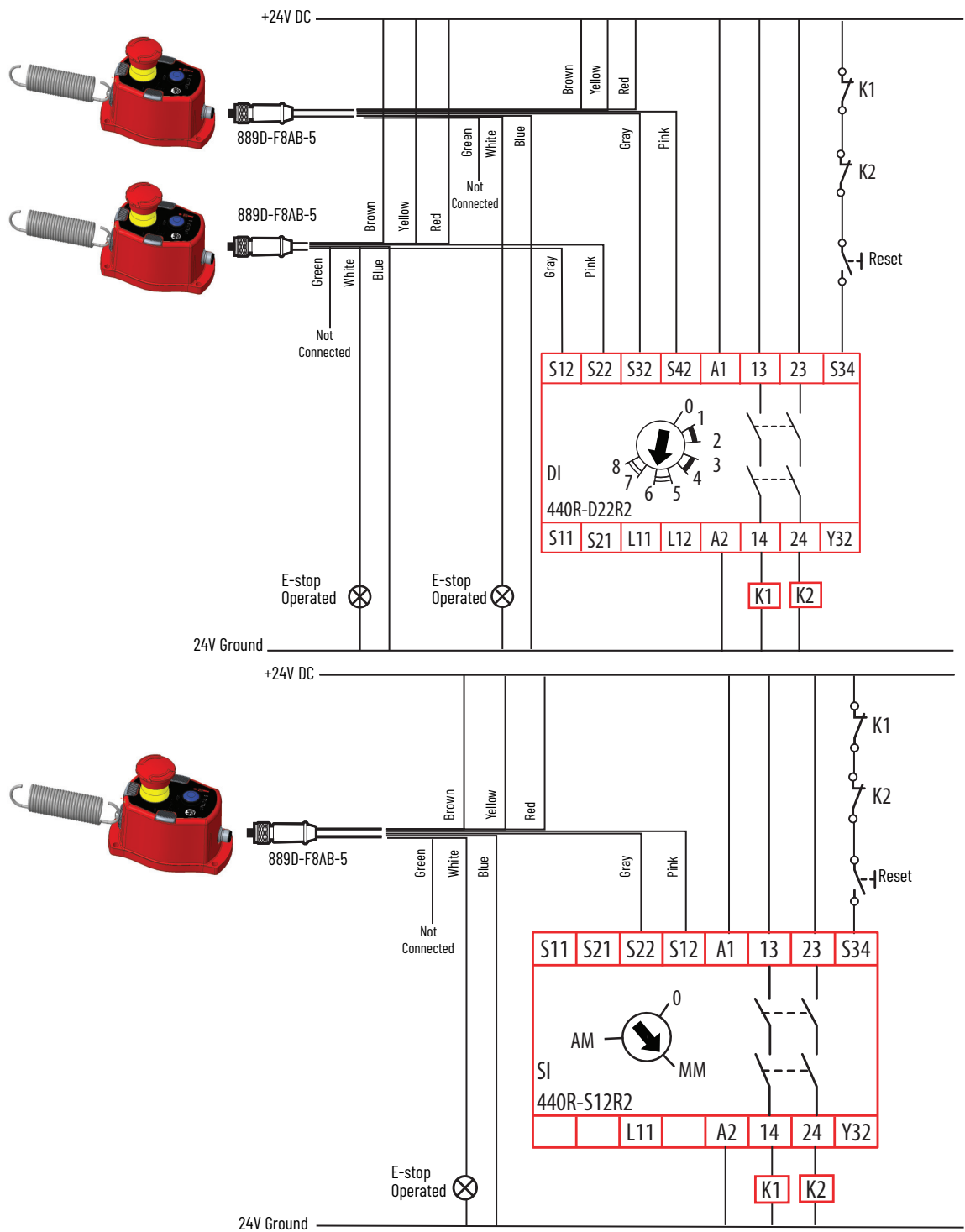
IMPORTANT The light curtain must be last (the furthest from MSR127 safety relay).

Guardmaster SI or DI Safety Relay Wiring (M12 5-pin Model)

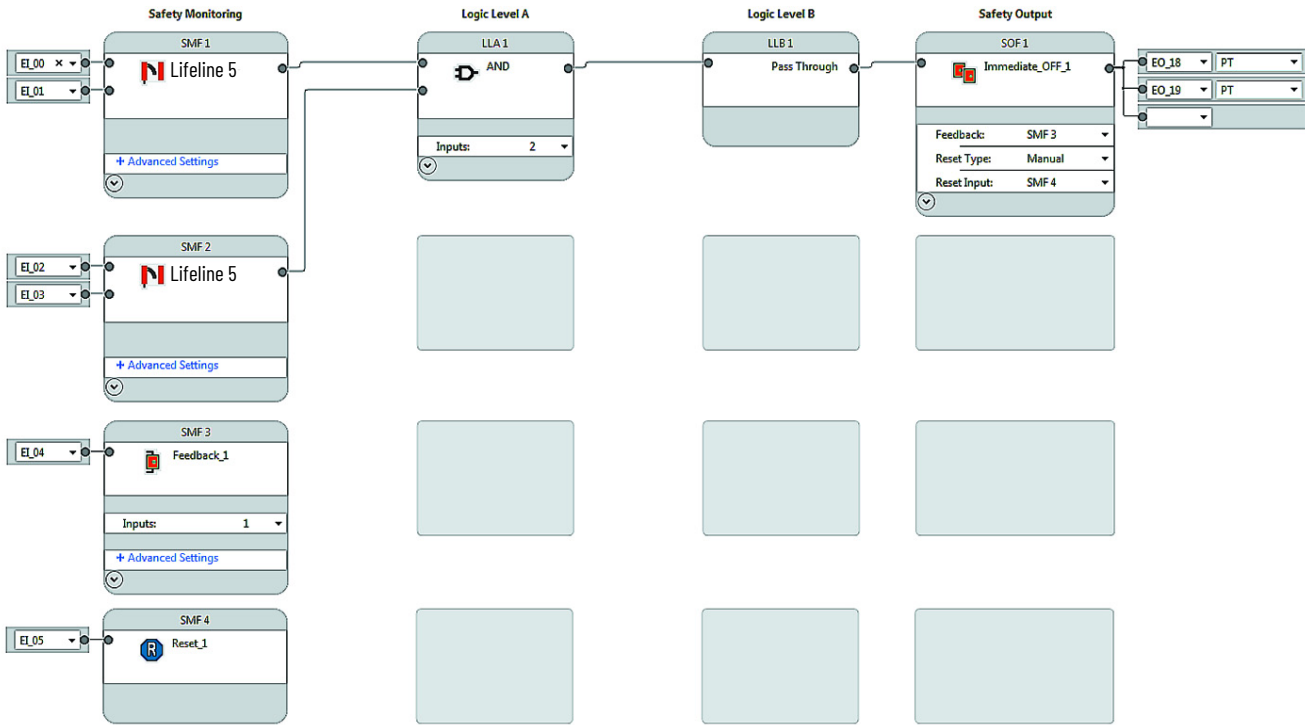
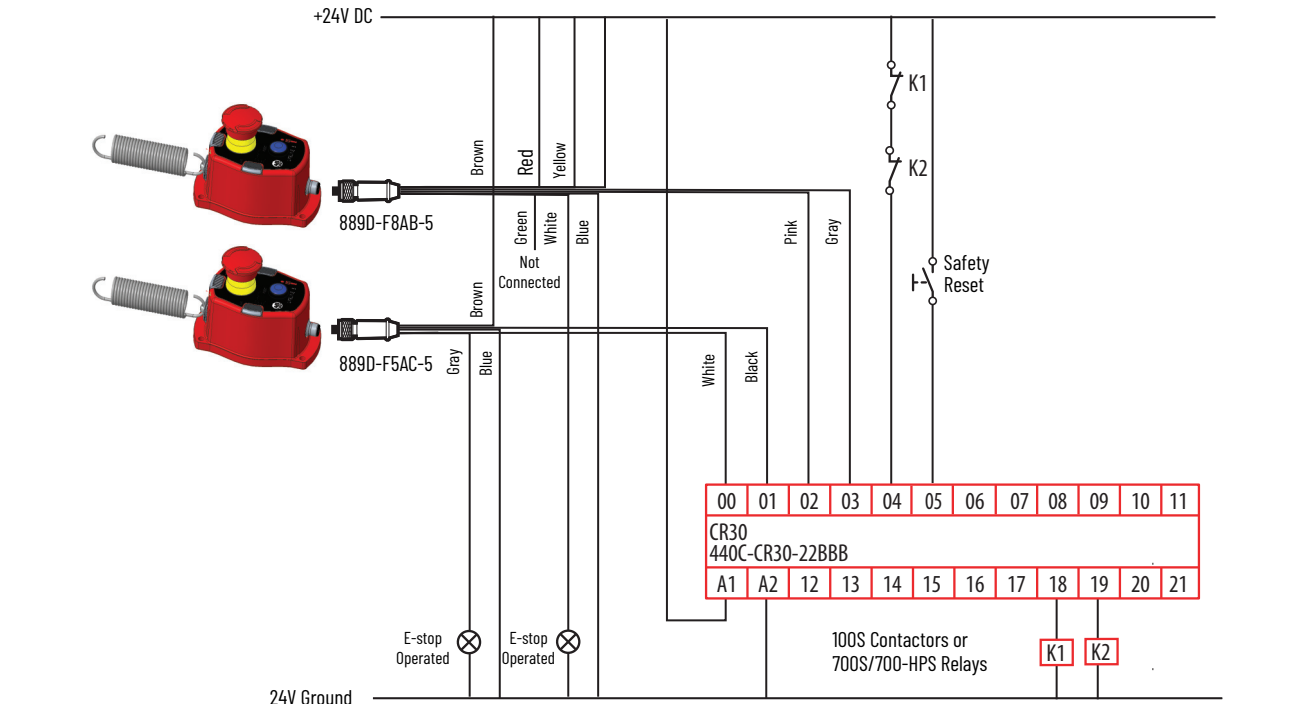


(1) For low temperature applications, use 889DS-F4HJ-2 instead of 889D-F5AC-5.

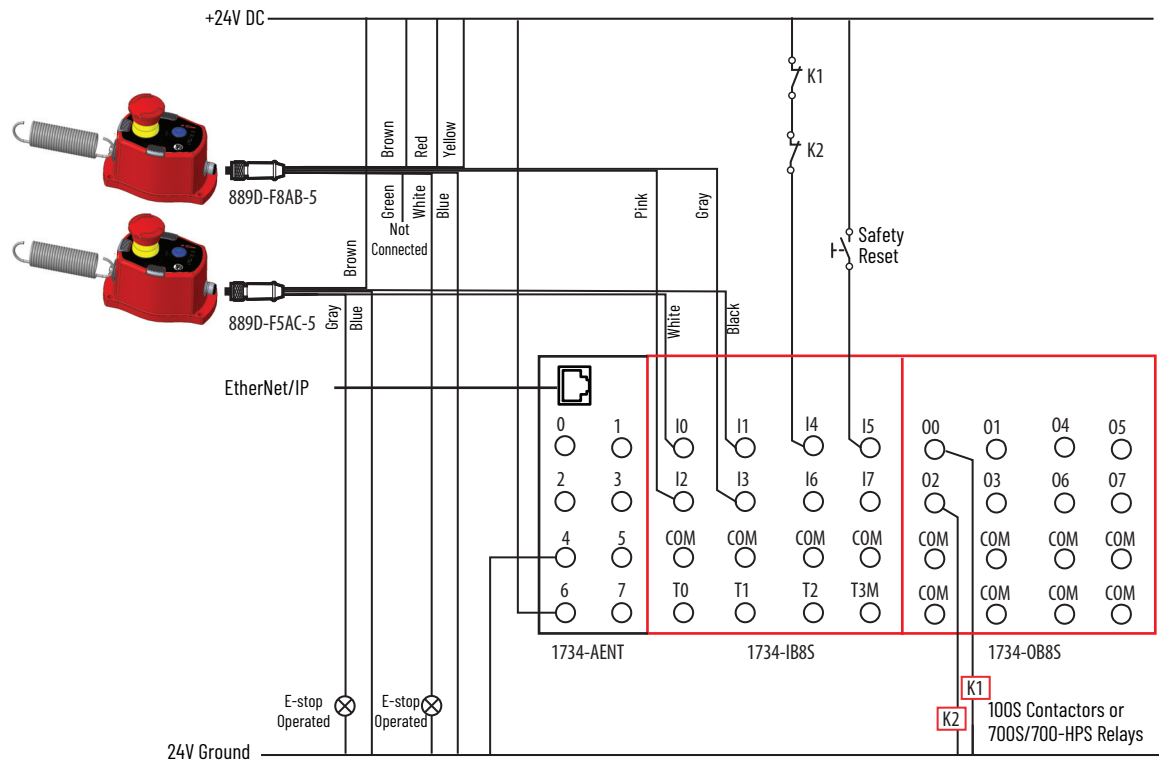
Guardmaster SI or DI Safety Relay Wiring (M12 8-pin Models)



CR30 Software Configurable Relay Wiring (M12 5-pin Models)



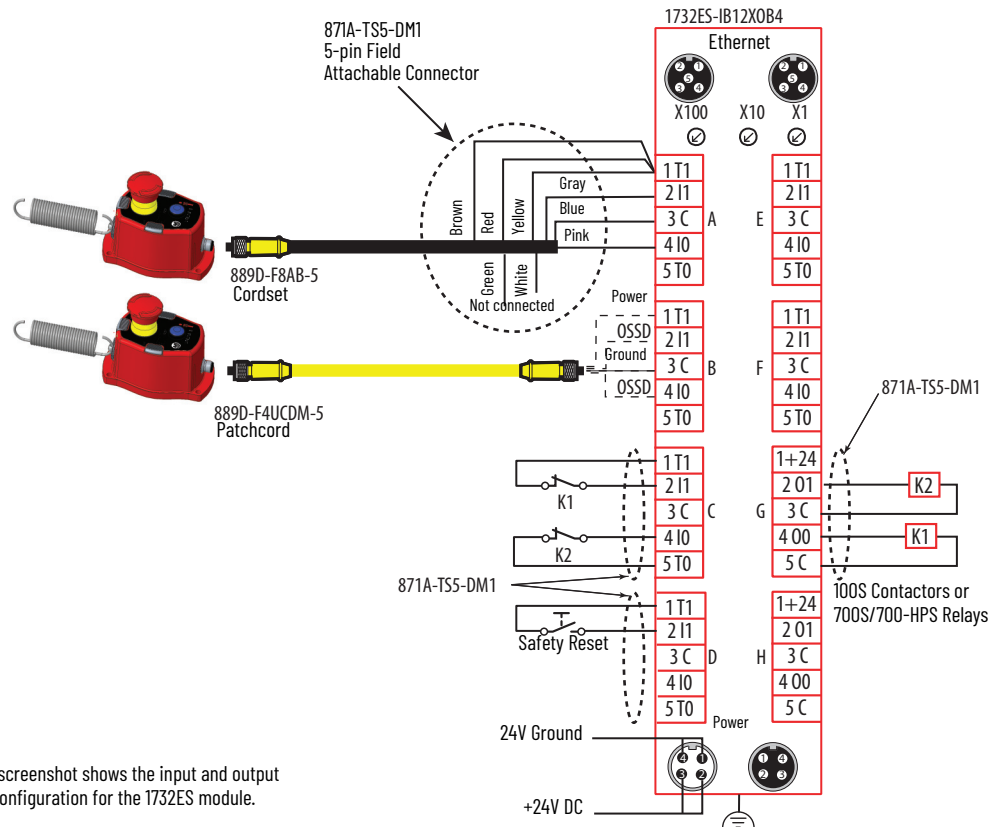
1734 POINT Guard I/O Wiring (M12 5-pin Models)



General						
Connection						
Safety						
Module Info						
Input Configuration						
Test Output						
Point	Point Operation		Point Mode	Test Source	Input Delay Time (ms)	
	Type	Discrepancy Time (ms)			Off->On	On->Off
0	Equivalent	10	Safety	None	0	6
1	Equivalent	10	Safety	None	0	6
2	Equivalent	10	Safety	None	0	6
3	Equivalent	10	Safety	None	0	6
4	Single	0	Standard	None	0	0
5	Single	0	Standard	None	0	0
6	Single	0	Not Used	None	0	0
7	Single	0	Not Used	None	0	0

Set On->Off Input Delay Time to 6 ms to ignore the OSSD output test pulses.

1732DS/ES ArmorBlock Guard I/O Wiring (M12 5-pin Models)



The screenshot shows the input and output configuration for the 1732ES module.

Module Info		Internet Protocol		Port Configuration		Network		Input Configuration		Test Output		Output Configuration	
Point	Point Operation			Point Mode	Test Source	Input Delay Time (ms)							
	Type	Discrepancy Time (ms)				Off->On	On->Off						
0	Equivalent		10 ▲	Safety	None	0 ▲	6 ▲						
1			▼	Safety	None	0 ▲	6 ▲						
2	Equivalent		10 ▲	Safety	None	0 ▲	6 ▲						
3			▼	Safety	None	0 ▲	6 ▲						
4	Equivalent		10 ▲	Safety Pulse Test	4	0 ▲	0 ▲						
5			▼	Safety Pulse Test	5	0 ▲	0 ▲						
6	Single		0 ▲	Standard	None	0 ▲	0 ▲						
7			▼	Not Used	None	0 ▲	0 ▲						
8	Single		0 ▲	Not Used	None	0 ▲	0 ▲						
9			▼	Not Used	None	0 ▲	0 ▲						
10	Single		0 ▲	Not Used	None	0 ▲	0 ▲						
11			▼	Not Used	None	0 ▲	0 ▲						

Module Info | Internet Protocol | Port Configuration | Network | Input Configuration | **Test Output** | Output Configuration

Point	Point Mode
0	Not Used
1	Power Supply
2	Not Used
3	Power Supply
4	Pulse Test
5	Pulse Test
6	Not Used
7	Power Supply

Safety			Module Info	Internet Protocol	Port Configuration	Network	Input Configuration	Test Output	Output Configuration
Point	Point Operation	Point Mode							
	Type								
0	Dual	Safety							
1		Safety							
2	Dual	Not Used							
3		Not Used							

Recommended Safety Control Interfaces

We recommend Guardmaster safety relays (DI, DIS, SI, CR30), Minotaur™ safety relays (MSR126, MSR127, MSR131, MSR138), SmartGuard™ controller, 1791DS/ES CompactBlock™ Guard I/O modules, 1732DS/ES ArmorBlock Guard I/O module, 1734 POINT Guard I/O™ modules.

Maintenance

Frequency	Description
Every month	- Check the correct operation of the switching circuit. - Check for signs of abuse or interference. - Inspect the switch casing for damage. Of particular importance is damage, which causes loss of sealing at the lid or conduit entry.
Every 5 years	- Check the correct operation of the switching circuit. - Check for signs of abuse or interference. - Inspect the switch casing for damage. - The switch must be disconnected and readjusted.

Repair

If there is any malfunction or damage, no attempts at repair can be made. The unit must be replaced before machine operation is allowed.

Additional Resources

To download publications, visit rok.auto/literature and search for the following publication numbers.

Resources	Description
Lifeline 5 Cable-pull Safety Switch (Series B Models Only) Product Information, publication 440E-PC002	Provides the installation procedure for the Lifeline 5 switch.
Lifeline 5 Dual-head Cable-pull Safety Switch Product Information, publication 440E-PC003	Provides the installation procedure for the dual-head Lifeline 5 switch.
Lifeline Cable-pull Safety Switch Technical Documentation Center, rockwellautomation.com/en-us/support/documentation/technical/push-buttons-and-signaling-devices/emergency-stop-devices.html#lifelinecablepull	Provides all technical documentation for Lifeline cable-pull safety switches in one place.
Emergency Stop Devices Technical Data, publication 440-TD001	Provides specification and selection information for 440E and 440J emergency stop devices.
Guardmaster DG Safety Relay and GuardLink System User Manual, publication 440R-UM015	Provides general guidelines for configuring a Rockwell Automation GuardLink safety system.
Functional Safety Data Sheet, publication SAFETY-SR001	Provides functional safety data for Rockwell Automation products.
System Security Design Guidelines Reference Manual, publication SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley® industrial automation controls and assemblies.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation® industrial system.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

Security Disposal Procedure

These products do not contain any customer sensitive data. Therefore, it does not require a security disposal procedure.

Declaration of Conformity

CE Conformity

Rockwell Automation declares that the products that are shown in this document conform with the 2014/30/EU Electromagnetic Compatibility Directive (EMC) and 2006/42/EC Machinery Directive (MD) and that the respective standards and/or technical specifications have been applied.

For a comprehensive CE certificate, visit rok.auto/certifications.

UKCA Conformity

Rockwell Automation declares that the products that are shown in this document are in compliance with 2016 No. 1091 Electromagnetic Compatibility Regulations and 2008 No. 1597 Supply of Machinery (Safety) Regulations and that the respective standards and/or technical specifications have been applied.

For a comprehensive UKCA certificate, visit rok.auto/certifications.

Notes:

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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Waste Electrical and Electronic Equipment (WEEE)



At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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