



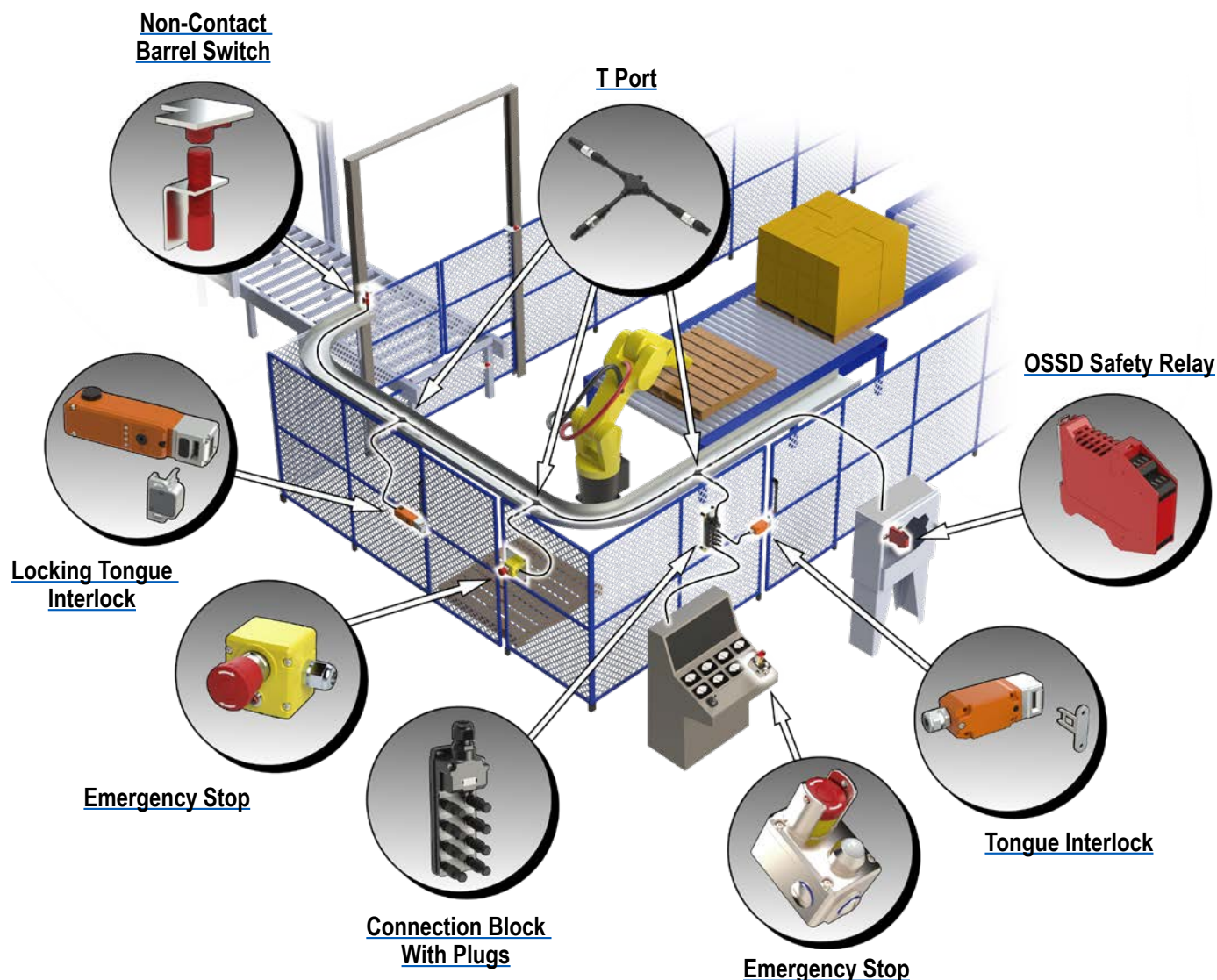
# IDEM Z-Range Safety Switches

IDEM's Z-Range of products have one set of dual OSSD outputs and one set of dual OSSD inputs. This enables the devices to be wired in series, reducing cost and time associated with wiring back to the panel. Up to 30 Z-Range devices can be connected to one safety relay.

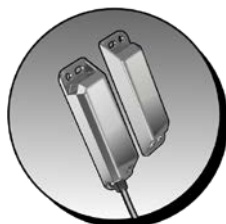
These safety switches feature self monitoring OSSD outputs to achieve CAT 4 PLe, according to ISO 13849-1, and SIL3, according to IEC 62061, even when connected in a series.

Components in the Z-Range consists of non contact switches, hinge switches, emergency stop control stations, solenoid locking RFID tongue interlocks, and non-locking tongue interlocks, along with t-port cables, connection blocks and accessories.

## Z-Range Safety Switch Installation Example



Set-ups similar to the one illustrated here may also include these other Z-Range safety components:



Non-Contact Rectangular Switch



Hinge Switch



Cable Pull

# IDEM Z-Range (KM-Z / KM-SS-Z) Interlock Safety Switches

**KM-203300-Z****KM-SS-204300-Z**

## Description

KM-Z and KM-SS-Z tongue interlock switches are designed to fit to the leading edge of sliding, hinged or lift-off machine guards to provide positively operated switching circuits and a tamper-resistant actuator mechanism. They provide robust position interlock detection for moving guards.

When used in combination with an OSSD safety relay or control device, the tongue interlock safety switches can provide protection up to Category 4 and PLe to ISO13849-1, and they can maintain PLe level performance with other IDEM Z-Range switches connected in series due to internal test functions of the switches.

In addition, each switch provides input, output and guard state LEDs. It is recommended to limit the number of switches connected in series to a maximum of 30.

## Application

The switch is rigidly mounted to the frame of the guard or machine. The actuator (sold separately) is fitted to the moving part (frame) of the guard and is aligned to the switch entry aperture. The actuator profile is designed to match a cam mechanism within the switch head and provides a positively operated and not easily defeatable interlock switch. When the actuator is inserted into the switch, the safety circuits close and allow the machine start circuit to be enabled. When the actuator is withdrawn, the safety circuits are positively opened and the machine circuit is broken.

## Features

- Tongue (key) interlock operated
- 90 degree adjustable head
- 8 actuator entry positions
- One 1/2 in. NPT female conduit opening
- 30mm mounting profile
- Aluminum and 316 stainless steel options available
- Includes one tamper-proof T20 Torx bit
- Purchase actuating key separately. (See accessories)

## IDEM Z-Range (KM-Z /KM-SS-Z) Interlock Safety Switches Selection Guide

Part Number	Price	Body Material	Head Material	Actuator Travel/Force for Positive Opening	Circuit Configuration	Drawing
<a href="#"><u>KM-203300-Z</u></a>	\$234.00	Die-cast aluminum	Die-cast aluminum	6mm/12N	2 OSSD and 1 Status	<a href="#"><u>PDF</u></a>
<a href="#"><u>KM-SS-204300-Z</u></a>	\$311.00	316 stainless steel	316 stainless steel			<a href="#"><u>PDF</u></a>

## Safety Classification and Reliability Data

<b>Mechanical Reliability B10d</b>	1.5 x 10 <sup>6</sup> operations at 100mA load
<b>ISO 13849-1</b>	Up to PLe depending upon system architecture
<b>EN 62061</b>	Up to SIL3 depending upon system architecture
<b>Safety Data - Annual Usage</b>	8 cycles per hour / 24 hours per day / 365 days
<b>PFHd</b>	8.8x10 <sup>-5</sup>
<b>Proof Test Interval (Life)</b>	20 years
<b>MTTFd</b>	771 years

# IDEM Z-Range Safety Switches



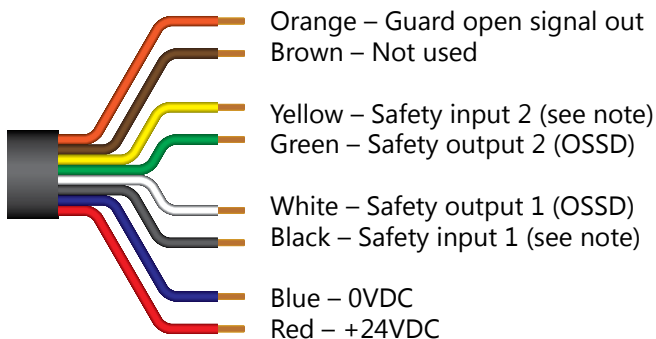
IDEM Z-Range General Specifications			
	<i>GLx-Z (Cable Pull)</i>	<i>KM-Z / KM-SS-Z (Interlock Switch)</i>	<i>ES-P-Z/ESL-SS-Z (E-Stop Station)</i>
<b>Enclosure / Cover</b>	Polyester or stainless steel 316		
<b>IP Rating / NEMA</b>	IP67 plastic / IP69K stainless steel / NEMA 6		
<b>Mounting</b>	4 x M4		
<b>Torque Settings</b>	Mounting: M4 4.0 N·m Lid: T20 Torx M4 1.5 N·m		
<b>Ambient Temperature</b>	-25 to 50°C [-13 to 122°F]		
<b>Weight</b>	Plastic: 250g [0.55 lb] Stainless steel: 1000g [2.20 lb]		
<b>Rated Operating Voltage</b>	20.4 VDC to 26.4 VDC		
<b>Withstand Voltage (<math>U_{imp}</math>)</b>	250V		
<b>Power Consumption</b>	0.7 W		
<b>Output Voltage / Min and Max Current</b>	24VDC / 1mA to 0.2 A		
<b>Input Voltage / Current</b>	24VDC / 2mA		
<b>Response Time (Device Activated)</b>	60ms max		
<b>Response Time (Inputs Off)</b>	20ms max		

# IDEM Z-Range Safety Switches Electrical Connections

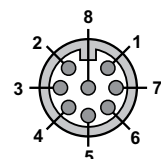


## Wiring

### IDEM Quick Disconnect Leads Color Coding



### Connection Colors



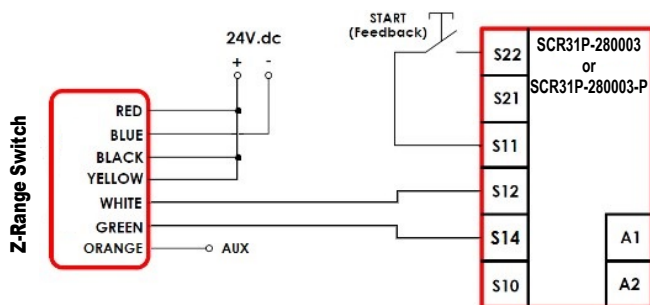
Pin View from Switch  
M12 Male

### Coded Magnetic Switches Electrical Connections

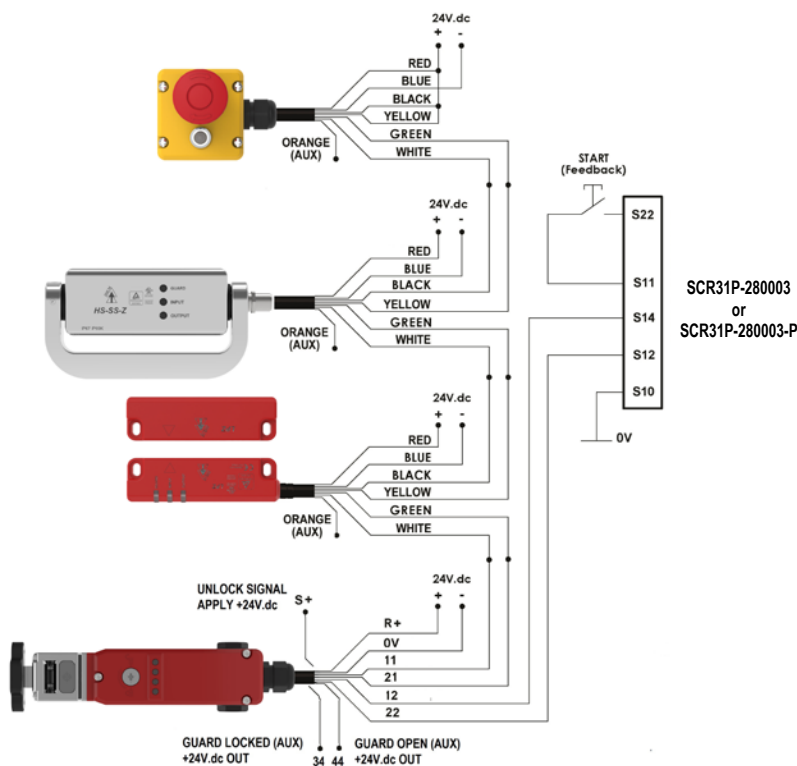
Quick Disconnect Connector Pin Out	IDEM Quick Disconnect Leads Color Coding	Terminal	Switch Circuit
2	Red	R+	Supply +24 VDC
3	Blue	0V	Supply 0VDC
7	Black	11	Safety Input 1
1	White	12	Safety Output 1
4	Yellow	21	Safety Input 2
6	Green	22	Safety Output 2
8	Orange	44	Guard open signal +24VDC out
N/A	–	34	Guard unlocked signal +24VDC out
5	Brown	Not used	Not used

NOTE: Safety outputs 1 and 2 are OSSD signals  
Safety inputs 1 and 2 are 24VDC if not in series or OSSD inputs if in series

### Single Switch to SCR31P-280003 or SCR31P-280003-P



### Multiple Switches to SCR31P-280003 or SCR31P-280003-P



# IDEM Cables

## Connection Cables

IDEM connection cables are sold as a complete cable that is not meant to be cut into, so the manufacturer doesn't guarantee the internal wire colors will always be the same. It will always be pin 1 to pin 1, pin 2 to pin 2, etc., but the internal colors might change.

Only the pigtail cables have fixed wire colors.



**140201**



### IDEM Connection Cables Selection Chart

Part Number	Price	Description	Connection	Length	Cable Jacket
<a href="#"><b>140201</b></a>	\$41.00	Connection cable	8-pin M12 axial female to 8-pin M12 axial male	2m [6.56 ft]	Black PVC
<a href="#"><b>140202</b></a>	\$51.00	Connection cable	8-pin M12 axial female to 8-pin M12 axial male	5m [16.40 ft]	Black PVC
<a href="#"><b>140203</b></a>	\$62.00	Connection cable	8-pin M12 axial female to 8-pin M12 axial male	10m [32.81 ft]	Black PVC

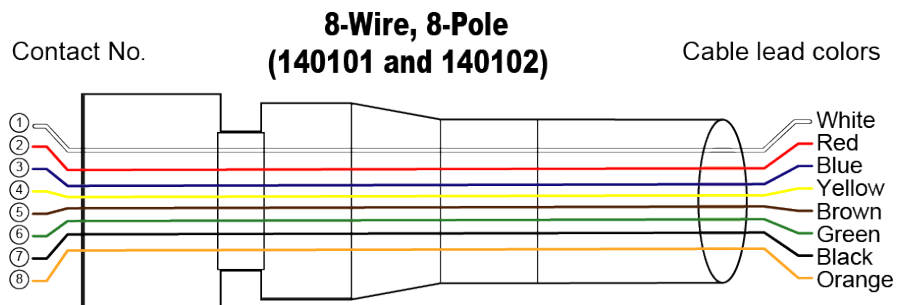
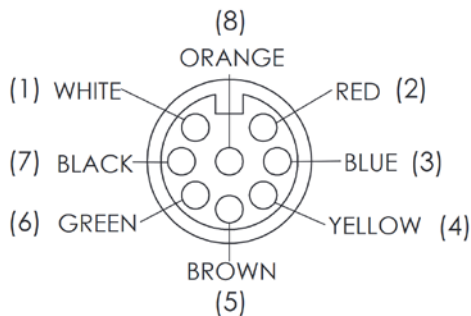
### Female Quick Disconnect Lead

Part Number	Price	Description	Exit Type/Cable Length
<a href="#"><b>140101</b></a>	\$59.00	8-pin M12 female quick disconnect	Pigtail, 5m [16.4 ft]
<a href="#"><b>140102</b></a>	\$88.00		Pigtail, 10m [32.8 ft]



**140101**

### CONNECTION DETAIL (VIEW X)



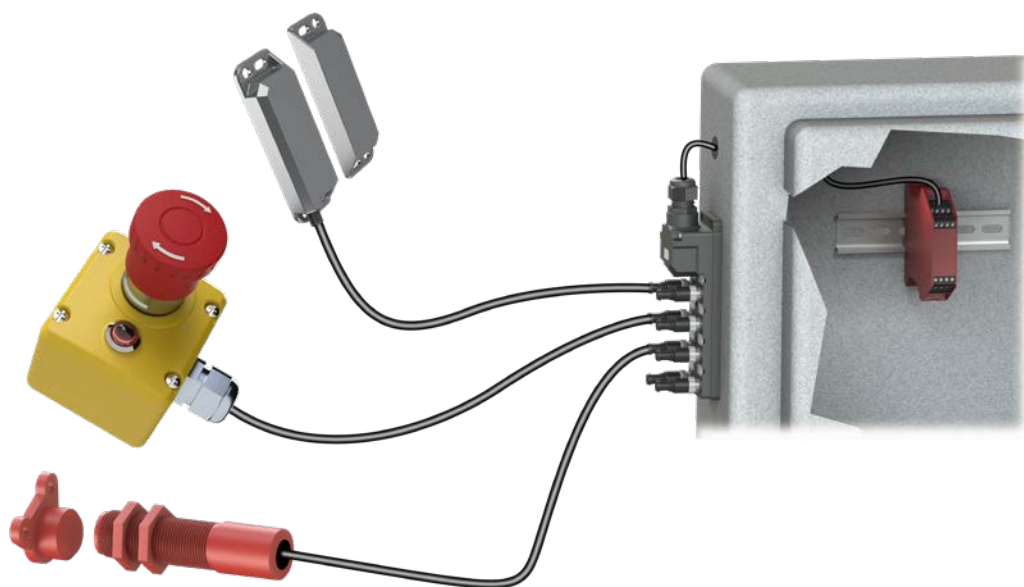
**NOTE: Only the pigtail cables have fixed wire colors.**

### IDEM Connection Cables General Specifications

Temperature Rating	105°C [221°F]
Core	22 strands of 0.12 mm bare copper
Inner insulation (Core) Diameter	1.35 (±0.1) mm
Outer Sheath (Jacket) Color	Black (printed)
Outer Insulation	PVC
Inner Insulation	PVC
Number of cores	8 cores (24AWG) UL style 2517
Rated Voltage/Current	250V / 3A



# IDEM M12 Connection Box For Use With Z-Range Switches



## Features

- When combined with the T-port, allows you to connect up to 30 Z-Range devices in series to a single safety controller
- Configured for dual channel to a safety controller
- Shorting plugs must be inserted into all unused ports
- M20 conduit exit; M20 cable gland accepts cable OD 6.5-12.0 mm [0.26-0.47 in]

**IDEM M12 Connection Box For Use With Z-Range Switches Selection Chart**

Part Number	Price	Description	Ports	Input Connections	Output Connection	Indicators	Drawing
<a href="#"><u>140210-Z</u></a>	\$262.00	IDEM junction block for use with IDEM Z-Range switches only	8	8-pin M12 sockets	Cable clamp for field-wired connection	24VDC LED	<a href="#"><u>PDF</u></a>
<a href="#"><u>140205</u></a>	\$22.00	Shorting plug, 8 pole, for use with IDEM Z-Range connection blocks	—	—	—	—	<a href="#"><u>PDF</u></a>
<a href="#"><u>140204</u></a>	\$41.00	T-port for use with Z-Range safety switches	—	2 8-pole M12 axial male	1 8-pole M12 axial female	—	<a href="#"><u>PDF</u></a>

NOTE: The appropriate shorting plug must be inserted into all unused ports.



[140210-Z](#)



[140204](#)



[140205](#)

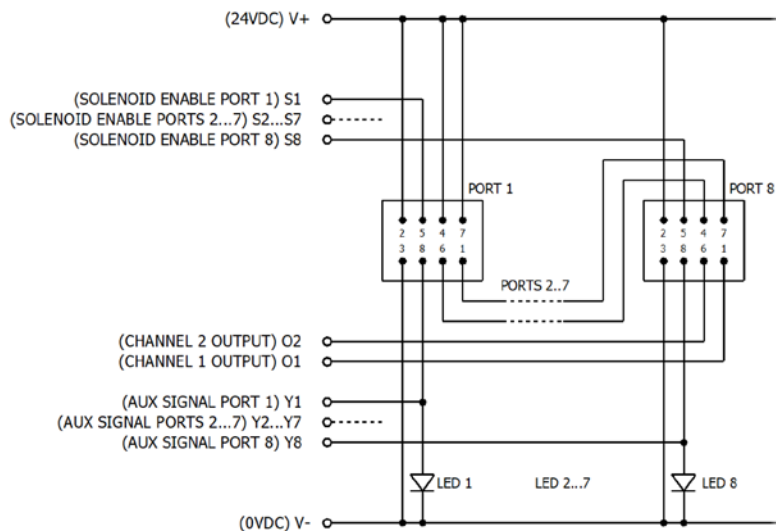
# IDEM Connection Box For Use With Z-Range Switches



## IDEM M12 Connection Box For Use With Z-Range Switches Specifications

<b>Port Connection Type</b>	8-pin M12 female sockets (qty 8)
<b>Operating Temperature</b>	-20 to +40°C [-4 to +104°F]
<b>Supply Voltage</b>	24VDC ±10%
<b>Maximum Current</b>	500mA (each port) if solenoid feed is used
<b>Body Material</b>	Polyester
<b>Internal Terminals</b>	Spring-type clamp for 22-30 AWG conductors
<b>Cable Exit</b>	M20 x 1.5 mm cable gland (M20 cable gland accepts cable OD 6.5 mm to 12.0 mm [0.26 in to 0.47 in])
<b>Mounting</b>	2xM4 bolts, 4.6 mm [0.18 in] diameter clearance holes
<b>Accessory</b>	Shorting plug for unused ports
<b>LEDs (1-8)</b>	Red, auxiliary indication of switch open

## Connections (140210-Z) for Z-Range Switches Only



## Output Terminal Connections

<i>Terminal</i>	<i>Output</i>	<i>Indication</i>	<i>LED Status</i>
<b>Y1</b>	Auxiliary out +24VDC	Switch 1 open	LED 1 on
<b>Y2</b>	Auxiliary out +24VDC	Switch 2 open	LED 2 on
<b>Y3</b>	Auxiliary out +24VDC	Switch 3 open	LED 3 on
<b>Y4</b>	Auxiliary out +24VDC	Switch 4 open	LED 4 on
<b>Y5</b>	Auxiliary out +24VDC	Switch 5 open	LED 5 on
<b>Y6</b>	Auxiliary out +24VDC	Switch 6 open	LED 6 on
<b>Y7</b>	Auxiliary out +24VDC	Switch 7 open	LED 7 on
<b>Y8</b>	Auxiliary out +24VDC	Switch 8 open	LED 8 on
<b>V+</b>	Supply +24VDC		
<b>V-</b>	Supply 0VDC		
<b>S1</b>	Solenoid energize (apply +24VDC (if used))		Port 1
<b>S2</b>	Solenoid energize (apply +24VDC (if used))		Port 2
<b>S3</b>	Solenoid energize (apply +24VDC (if used))		Port 3
<b>S4</b>	Solenoid energize (apply +24VDC (if used))		Port 4
<b>S5</b>	Solenoid energize (apply +24VDC (if used))		Port 5
<b>S6</b>	Solenoid energize (apply +24VDC (if used))		Port 6
<b>S7</b>	Solenoid energize (apply +24VDC (if used))		Port 7
<b>S8</b>	Solenoid energize (apply +24VDC (if used))		Port 8
<b>O1</b>	Safety output channel 1		
<b>O2</b>	Safety output channel 2		

# Safety Products



*Warning: Safety products sold by AutomationDirect are Safety components only. The purchaser/installer is solely responsible for the application of these components and ensuring all necessary steps have been taken to assure each application and use meets all performance and applicable safety requirements and/or local, national and/or international safety codes as required by the application. AutomationDirect cannot certify that our products, used solely or in conjunction with other AutomationDirect or other vendors' products, will assure safety for any application. Any person using or applying any products sold by AutomationDirect is responsible for learning the safety requirements for their individual application and applying them, and therefore assumes all risks, and accepts full and complete responsibility, for the selection and suitability of the product for their respective application.*

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