



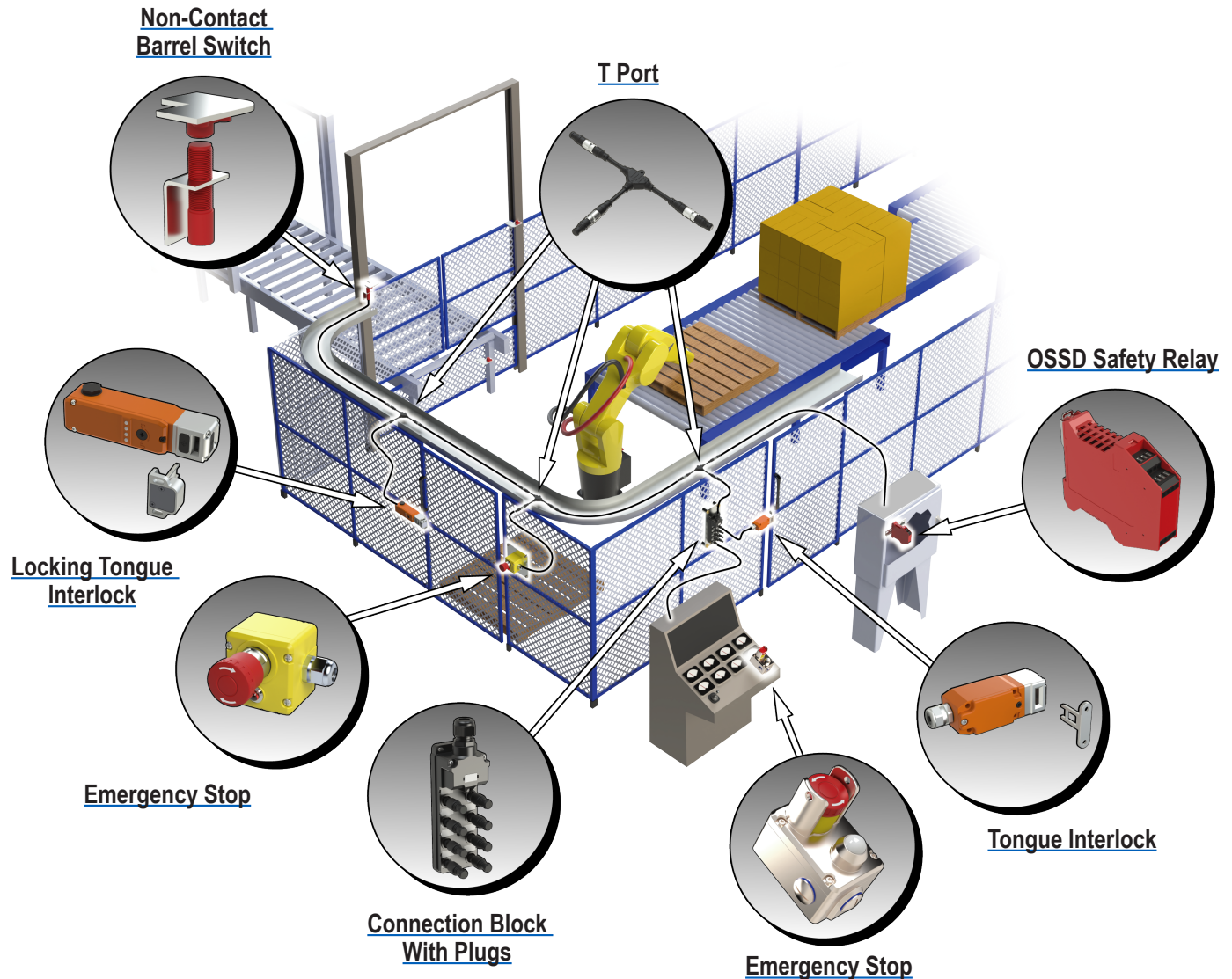
# IDEM Z-Range Safety Switches

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.

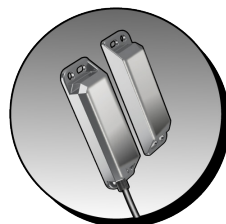
These safety switches feature self monitoring OSSD outputs to achieve CAT 4 PLe, according to ISO 13849-1, and SIL3, according to IEC 62061, even when connected in a series.

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



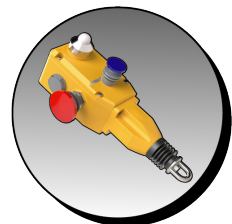
Set-ups similar to the one illustrated here may also include these other Z-Range safety components:



Non-Contact Rectangular Switch



Hinge Switch



Cable Pull

# IDEM Z-Range (ES-P-Z/ESL-SS-Z) Emergency Stop Control Stations



## Features

- Dual channel OSSD output with one additional status signal
- Plastic housing (IP67) or 316 Stainless Steel housing (IP69K/NEMA6)
- 40mm twist to release mushroom head operator
- Conformance to ISO 13850, IEC 60947-5-1 and IEC 60947-5-5
- UL file E365665
- Lid Safety Trip mechanism ensures that safety contacts will open if the lid is removed
- Includes one tamper proof T20 Torx bit for Stainless steel versions
- Up to 30 Z-Range devices can be connected to one safety relay and still maintain CAT 4, PLe, and SIL3



**ES-P-230300-Z**



**ES-P-230301-Z**



**ESL-SS-L-232300-Z**



**ESL-SS-LP-232301-Z**

## 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 (ES-P-Z/ESL-SS-Z) Emergency Stop Control Stations Selection Guide

| Part Number                               | Price    | Housing Material    | Output              | LED          | Cable Length   | Cable Exit | Connection                 | Drawing                    |
|-------------------------------------------|----------|---------------------|---------------------|--------------|----------------|------------|----------------------------|----------------------------|
| <a href="#"><u>ES-P-230300-Z</u></a>      | \$143.00 | Plastic             | 2 OSSD and 1 status | Dual colored | 9.8 in [250mm] | Left       | 8-pin M12 quick disconnect | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>ES-P-230301-Z</u></a>      | \$143.00 |                     |                     |              |                | Right      |                            | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>ESL-SS-L-232300-Z</u></a>  | \$351.00 | 316 stainless steel |                     |              |                | —          |                            | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>ESL-SS-LP-232301-Z</u></a> | \$364.00 |                     |                     |              |                | —          |                            | <a href="#"><u>PDF</u></a> |

## LED Operation

| LED Operation          |                                                           |
|------------------------|-----------------------------------------------------------|
| <b>Green On</b>        | Outputs enabled                                           |
| <b>Red On</b>          | Outputs disabled                                          |
| <b>Red/Green Flash</b> | Fault – remove cover and check internal LEDs (see manual) |

# IDEM Z-Range Safety Switches



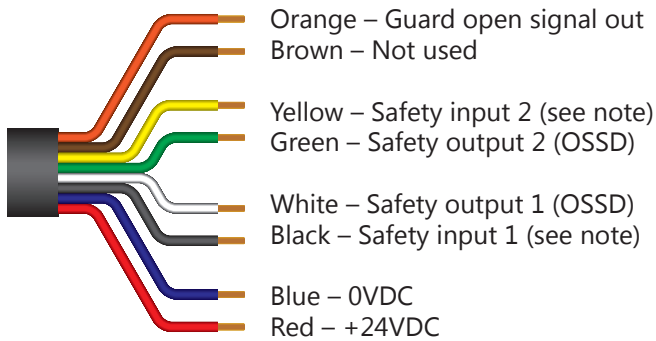
| IDEM Z-Range General Specifications             |                                                             |                                          |                                         |
|-------------------------------------------------|-------------------------------------------------------------|------------------------------------------|-----------------------------------------|
|                                                 | <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<br>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]<br>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

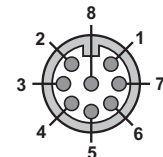


## Wiring

### IDEM Quick Disconnect Leads Color Coding



### Connection Colors



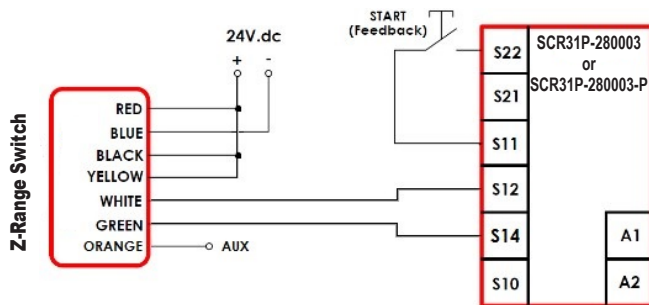
Pin View from Switch  
M12 Male

### Coded Magnetic Switches Electrical Connections

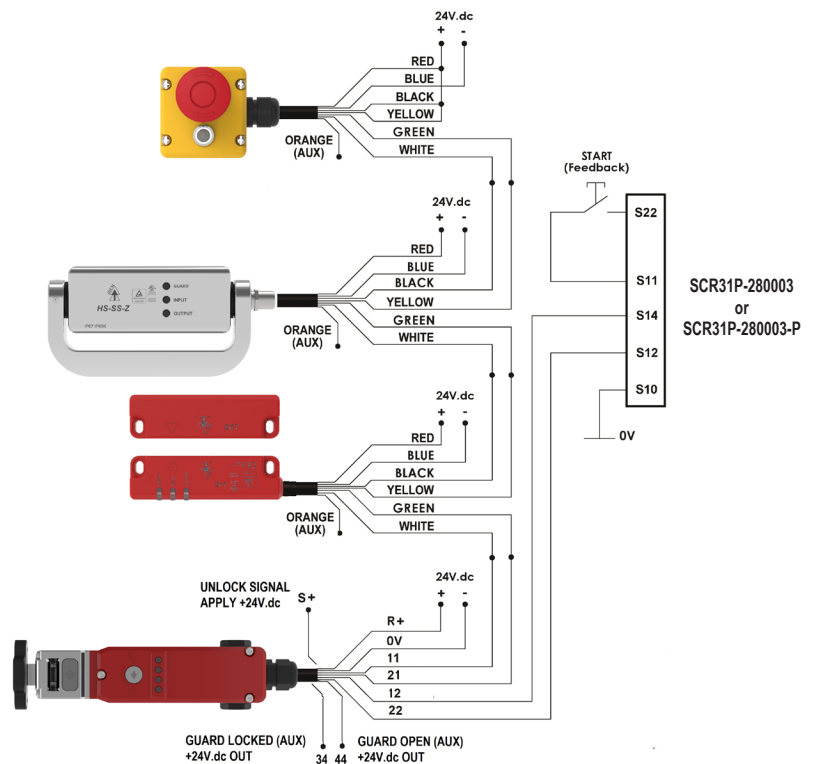
| Quick Disconnect Connector Pin Out | IDEM Quick Disconnect Leads Color Coding | Terminal | Switch Circuit                   |
|------------------------------------|------------------------------------------|----------|----------------------------------|
| 2                                  | Red                                      | 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**



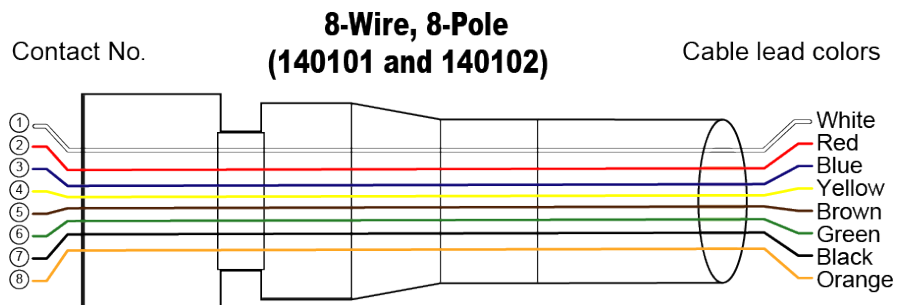
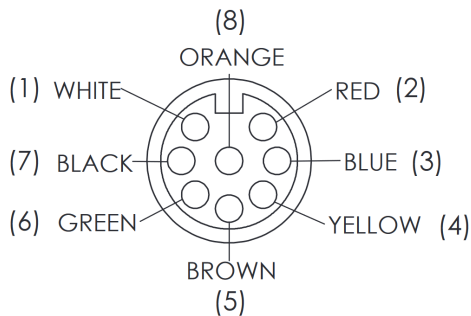
| IDEM Connection Cables Selection Chart |         |                  |                                                |                |              |
|----------------------------------------|---------|------------------|------------------------------------------------|----------------|--------------|
| Part Number                            | Price   | Description      | Connection                                     | Length         | Cable Jacket |
| <a href="#"><u>140201</u></a>          | \$41.00 | Connection cable | 8-pin M12 axial female to 8-pin M12 axial male | 2m [6.56 ft]   | Black PVC    |
| <a href="#"><u>140202</u></a>          | \$51.00 | Connection cable | 8-pin M12 axial female to 8-pin M12 axial male | 5m [16.40 ft]  | Black PVC    |
| <a href="#"><u>140203</u></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="#"><u>140101</u></a> | \$59.00 | 8-pin M12 female quick disconnect | Pigtail, 5m [16.4 ft]  |
| <a href="#"><u>140102</u></a> | \$88.00 |                                   | Pigtail, 10m [32.8 ft] |



**140101**

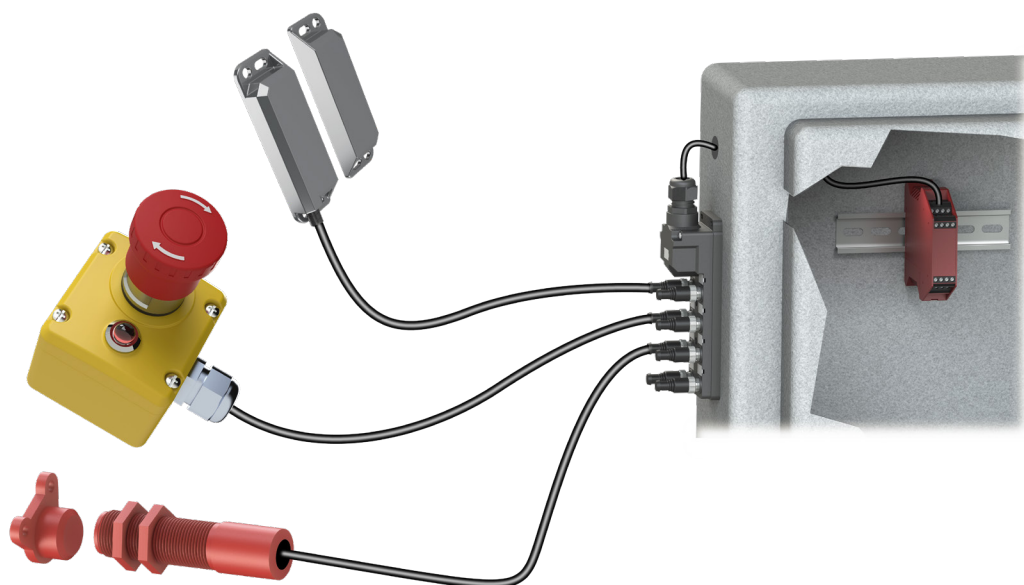
### CONNECTION DETAIL (VIEW X)



**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](#)

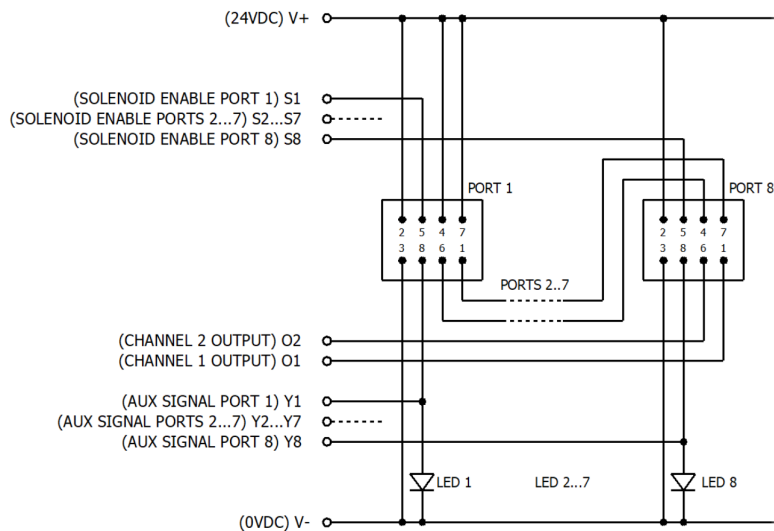
# IDEM Connection Box For Use With Z-Range Switches



## 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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