



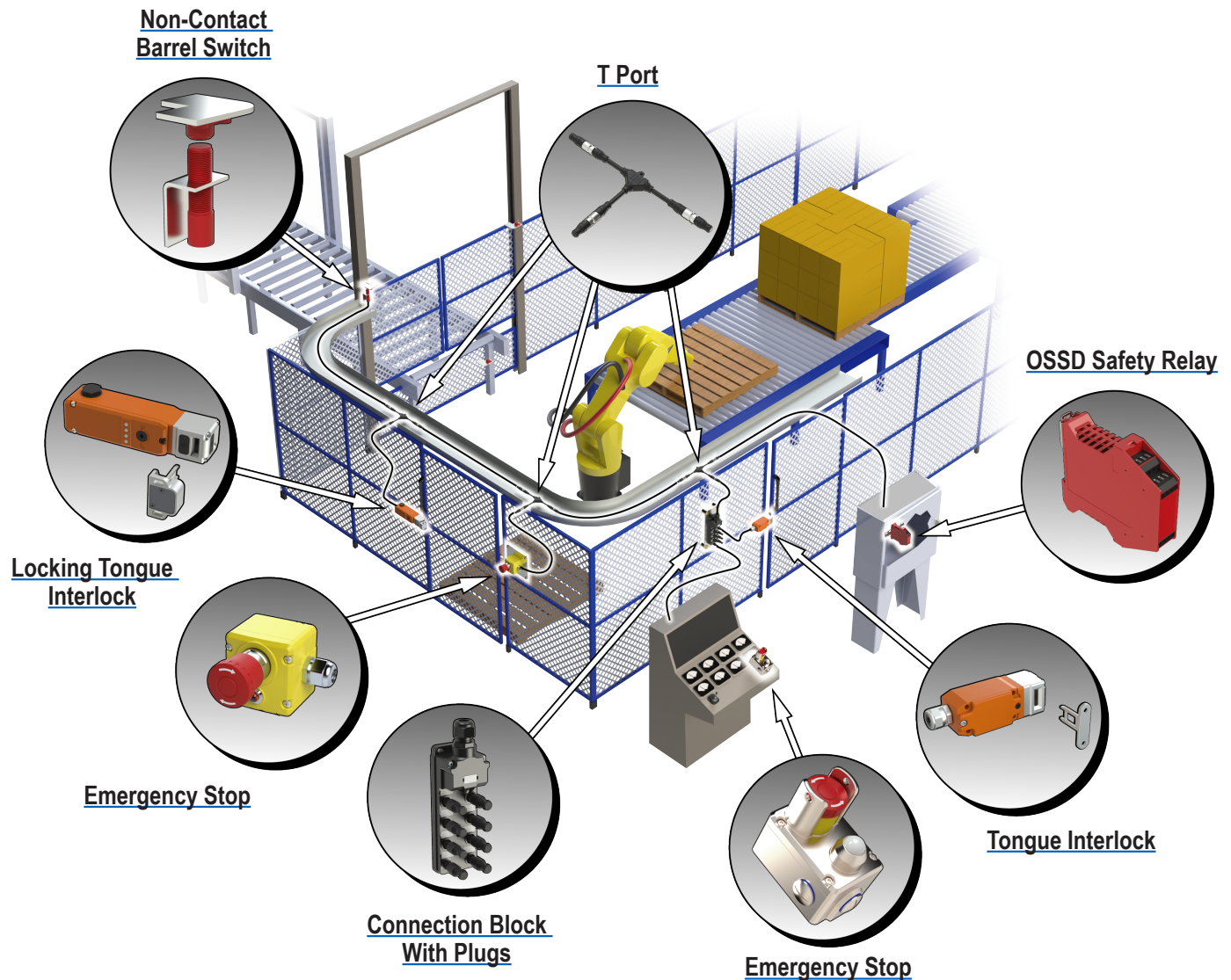
# IDEM Z-Range Safety Switches

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.

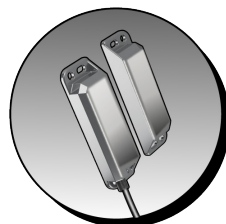
These safety switches feature self monitoring OSSD outputs to achieve CAT 4 PLe, according to ISO 13849-1, and SIL3, according to IEC 62061, even when connected in a series.

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



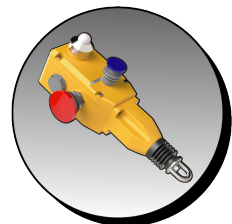
Set-ups similar to the one illustrated here may also include these other Z-Range safety components:



Non-Contact Rectangular Switch



Hinge Switch



Cable Pull

# IDEM Z-Range (HS-SS/HSM) Hinge Safety Switches



**HS-SS-Z-RH-352003**  
(Right Hand)



**HS-SS-Z-LH-352006**  
(Left Hand)

## Description

HS-SS-Z and HSM-Z hinge switches are designed to be fitted to the hinged axis of machine guard doors and provide a robust hinge function in addition to interlock position sensing. Enclosures are protected to IP67/ IP69K with a low profile, hygienic design for washdown.

When used in combination with an OSSD safety relay or control device, the hinge safety switches can be used to provide protection up to Category 4 and PLe to ISO13849-1, and they can maintain PLe level protection 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.

## Features

- Designed to provide a safety interlock on a hinge door
- Suitable for use in extreme temperature or moisture environments
- Adjustable guard open detection of 0 to 10 degrees
- Provides a high level of anti-tamper protection
- Suitable for use in high-hygiene requirement areas (e.g. food industry hosedown) IP67 / IP69K
- Long mechanical life (no moving or touching parts)
- Designed to conform to EN60947-5-3
- For use as directed by ISO14119 and EN ISO12100

## IDEM Z-Range (HS-SS/HSM Series) Hinge Safety Switches Selection Guide

| Part Number                       | Price    | Body Material           | Coding     | Connection                 | Cable Length (Dim A) | Outputs             | Drawing             |
|-----------------------------------|----------|-------------------------|------------|----------------------------|----------------------|---------------------|---------------------|
| <a href="#">HS-SS-Z-RH-352001</a> | \$342.00 | 316 stainless steel     | Right hand | Pigtail                    | 5m [16.4 ft]         | 2 OSSD and 1 Status | <a href="#">PDF</a> |
| <a href="#">HS-SS-Z-RH-352002</a> | \$350.00 |                         |            | Pigtail                    | 10m [32.8 ft]        |                     | <a href="#">PDF</a> |
| <a href="#">HS-SS-Z-RH-352003</a> | \$368.00 |                         |            | 8-pin M12 quick-disconnect | 250mm [9.8 in]       |                     | <a href="#">PDF</a> |
| <a href="#">HS-SS-Z-LH-352004</a> | \$342.00 |                         | Left hand  | Pigtail                    | 5m [16.4 ft]         |                     | <a href="#">PDF</a> |
| <a href="#">HS-SS-Z-LH-352005</a> | \$350.00 |                         |            | Pigtail                    | 10m [32.8 ft]        |                     | <a href="#">PDF</a> |
| <a href="#">HS-SS-Z-LH-352006</a> | \$368.00 |                         |            | 8-pin M12 quick-disconnect | 250mm [9.8 in]       |                     | <a href="#">PDF</a> |
| <a href="#">HSM-Z-RH-353001</a>   | \$254.00 | Die-cast aluminum alloy | Right hand | Pigtail                    | 5m [16.4 ft]         |                     | <a href="#">PDF</a> |
| <a href="#">HSM-Z-RH-353002</a>   | \$261.00 |                         |            | Pigtail                    | 10m [32.8 ft]        |                     | <a href="#">PDF</a> |
| <a href="#">HSM-Z-RH-353003</a>   | \$278.00 |                         |            | 8-pin M12 quick-disconnect | 250mm [9.8 in]       |                     | <a href="#">PDF</a> |
| <a href="#">HSM-Z-LH-353004</a>   | \$254.00 |                         | Left hand  | Pigtail                    | 5m [16.4 ft]         |                     | <a href="#">PDF</a> |
| <a href="#">HSM-Z-LH-353005</a>   | \$261.00 |                         |            | Pigtail                    | 10m [32.8 ft]        |                     | <a href="#">PDF</a> |
| <a href="#">HSM-Z-LH-353006</a>   | \$278.00 |                         |            | 8-pin M12 quick-disconnect | 250mm [9.8 in]       |                     | <a href="#">PDF</a> |

## Blank Hinge

### IDEM Z-Range (HS-SS/HSM Series) Blank Hinge Selection Guide

| Part Number                    | Price    | Body Material           | Handing | Drawing             |
|--------------------------------|----------|-------------------------|---------|---------------------|
| <a href="#">HS-SS-Z-350020</a> | \$152.00 | 316 stainless steel     | None    | <a href="#">PDF</a> |
| <a href="#">HSM-Z-351020</a>   | \$73.00  | Die-cast aluminum alloy |         | <a href="#">PDF</a> |



**HS-SS-Z-350020**  
Works with either right- or left-handed doors

## Mounting Plate

### IDEM Z-Range (HS-SS/HSM Series) Mounting Plate Selection Guide

| Part Number                  | Price   | Description                          | Handing | Drawing             |
|------------------------------|---------|--------------------------------------|---------|---------------------|
| <a href="#">HSM-Z-350025</a> | \$36.00 | Door hinge switches mounting bracket | None    | <a href="#">PDF</a> |



**HSM-Z-350025**

# IDEM Z-Range Hinge Safety Switches



## IDEM Z-Range Hinge Safety Switches General Specifications

| HSM-Z / HS-SS-Z                            |                                                                                                                                                                                                                                               |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety Classification and Reliability Data |                                                                                                                                                                                                                                               |
| Switching Reliability (B10d)               | N/A - no mechanical parts are implemented                                                                                                                                                                                                     |
| ISO 13849-1                                | Up to Category 4 with Safety Relay<br>Up to PLe depending upon system architecture                                                                                                                                                            |
| EN 62061                                   | Up to SIL3 depending upon system architecture                                                                                                                                                                                                 |
| Safety Data - Annual Usage                 | 8 cycles per hour / 24 hours per day / 365 days                                                                                                                                                                                               |
| MTTFd                                      | 771 years                                                                                                                                                                                                                                     |
| Max Response Time (Actuator Removed)       | 60ms                                                                                                                                                                                                                                          |
| Max Response Time (Input Off)              | 20ms                                                                                                                                                                                                                                          |
| Agency Approvals                           | cULus E258676, CE                                                                                                                                                                                                                             |
| Electrical and General Specifications      |                                                                                                                                                                                                                                               |
| Rated Operating Voltage                    | 20.4 VDC to 26.4 VDC                                                                                                                                                                                                                          |
| Power Consumption                          | 0.7 W                                                                                                                                                                                                                                         |
| Output Current                             | Max = 0.2 A<br>Min = 1mA                                                                                                                                                                                                                      |
| Switching Angle Window                     | Fixed at 10 degrees                                                                                                                                                                                                                           |
| Fixed Switching Angle                      | Typical is 0 to 10 degrees.<br>Alternate installations could be (for example) 90 to 100 degrees, or 355 to 5 degrees, or any other 10-degree range.<br>See illustration below and refer to operating instructions for additional information. |
| Enclosure Protection                       | IP67                                                                                                                                                                                                                                          |
| Operating Temperature                      | -25°C to +80°C [-13°F to +176°F]<br>For UL applications: -25 to 45°C [-13 to 113°F]                                                                                                                                                           |
| Recommended Mounting Screws/Torque         | 7 x M5 screws; 1N•m [0.74 lb•ft]                                                                                                                                                                                                              |

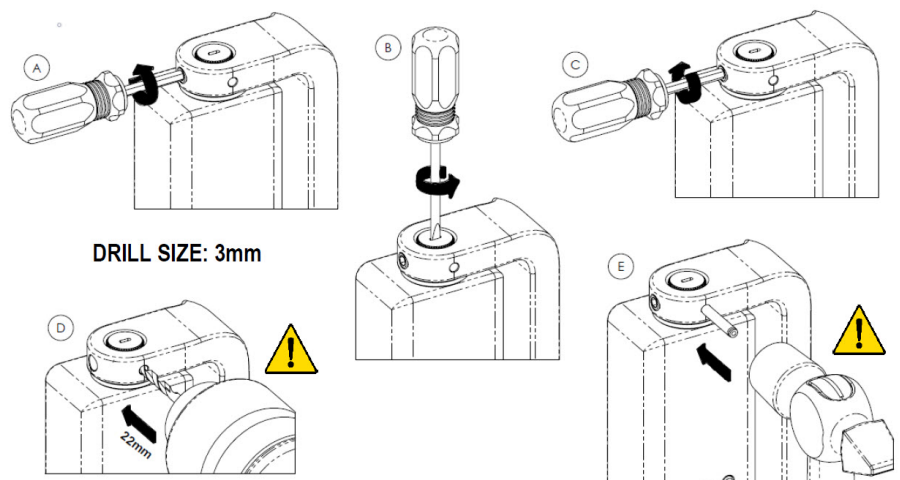
## LED Operation

| Guard        |       |
|--------------|-------|
| Guard Closed | Green |
| Guard Open   | Red   |

| Input                |                  |
|----------------------|------------------|
| Safety Inputs On     | Green (steady)   |
| Safety Input Missing | Green (flashing) |
| Safety Inputs Off    | Off              |
| Internal Fault       | Red (steady)     |

| Output             |                |
|--------------------|----------------|
| Safety Outputs On  | Green (steady) |
| Safety Outputs Off | Off            |
| External Fault     | Red (flashing) |

## Final Setting After Installation



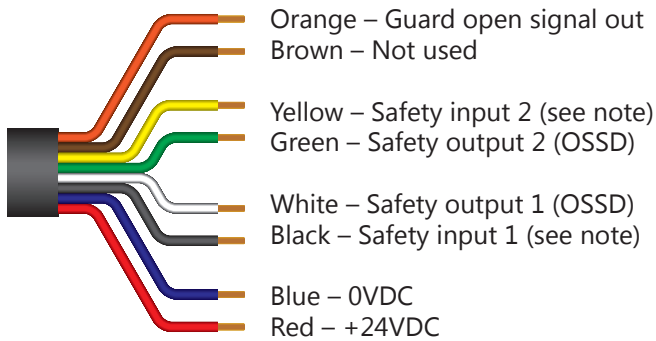
**Installer MUST drill and pin switch in final switching position. Installer must not rely only on adjustment grub screw for safety. See operating instructions for additional information on switching angle window adjustment.**

# IDEM Z-Range Safety Switches Electrical Connections

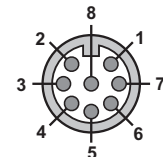


## Wiring

### IDEM Quick Disconnect Leads Color Coding



### Connection Colors



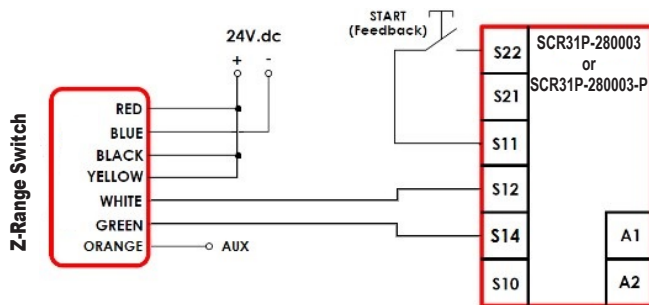
Pin View from Switch  
M12 Male

### Coded Magnetic Switches Electrical Connections

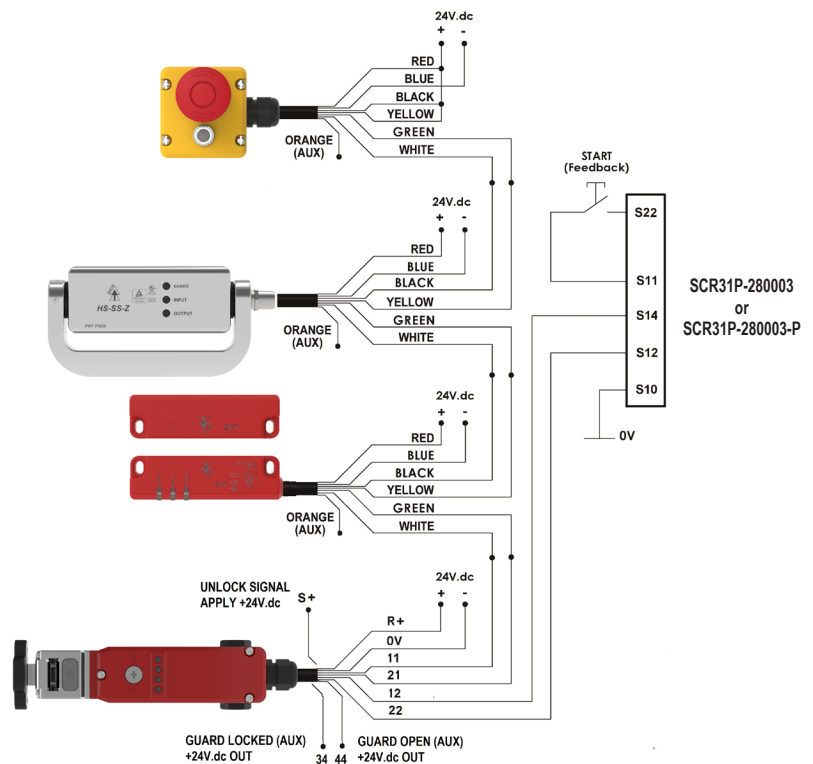
| Quick Disconnect Connector Pin Out | IDEM Quick Disconnect Leads Color Coding | Terminal | Switch Circuit                   |
|------------------------------------|------------------------------------------|----------|----------------------------------|
| 2                                  | Red                                      | 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 |
|---------------|---------|------------------|------------------------------------------------|----------------|--------------|
| <b>140201</b> | \$42.50 | Connection cable | 8-pin M12 axial female to 8-pin M12 axial male | 2m [6.56 ft]   | Black PVC    |
| <b>140202</b> | \$53.00 | Connection cable | 8-pin M12 axial female to 8-pin M12 axial male | 5m [16.40 ft]  | Black PVC    |
| <b>140203</b> | \$63.00 | Connection cable | 8-pin M12 axial female to 8-pin M12 axial male | 10m [32.81 ft] | Black PVC    |

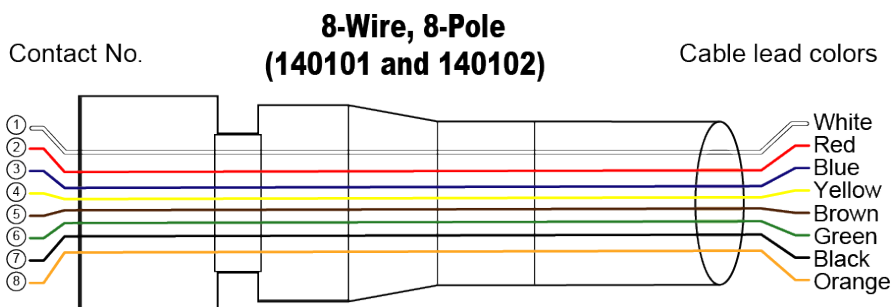
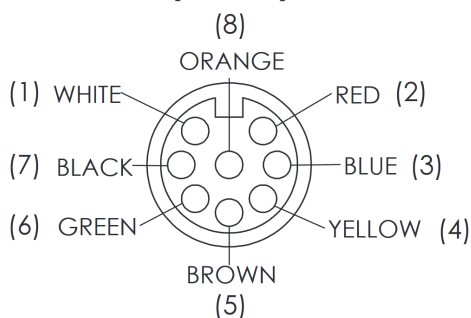
### Female Quick Disconnect Lead

| Part Number   | Price   | Description                       | Exit Type/Cable Length |
|---------------|---------|-----------------------------------|------------------------|
| <b>140101</b> | \$60.00 | 8-pin M12 female quick disconnect | Pigtail, 5m [16.4 ft]  |
| <b>140102</b> | \$91.00 |                                   | Pigtail, 10m [32.8 ft] |



**140101**

### CONNECTION DETAIL (VIEW X)

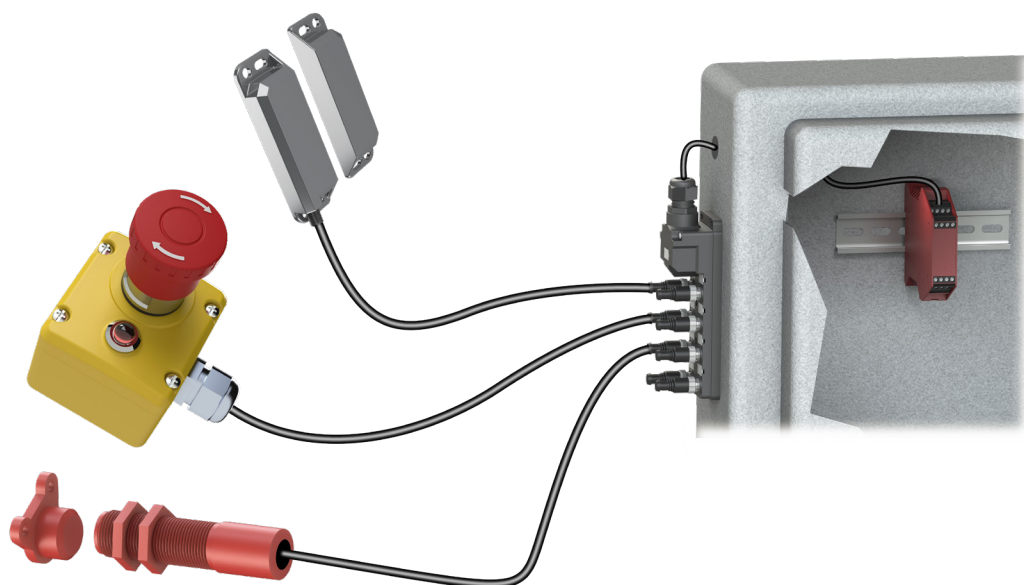


**NOTE: Only the pigtail cables have fixed wire colors.**

### 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> | \$297.00 | 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>   | \$31.50  | Shorting plug, 8 pole, for use with IDEM Z-Range connection blocks | —     | —                       | —                                      | —          | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>140204</u></a>   | \$46.50  | 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](#)

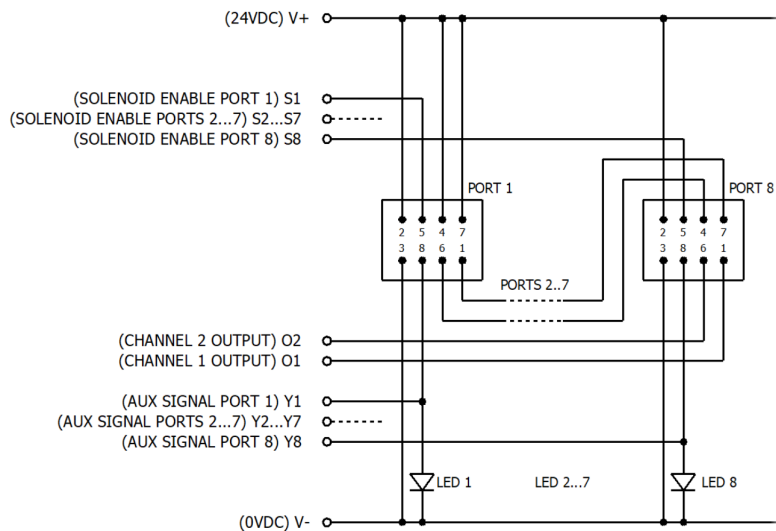
# IDEM Connection Box For Use With Z-Range Switches



## 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.*

*AutomationDirect does not provide design or consulting services, and cannot advise whether any specific application or use of our products would ensure compliance with the safety requirements for any application.*