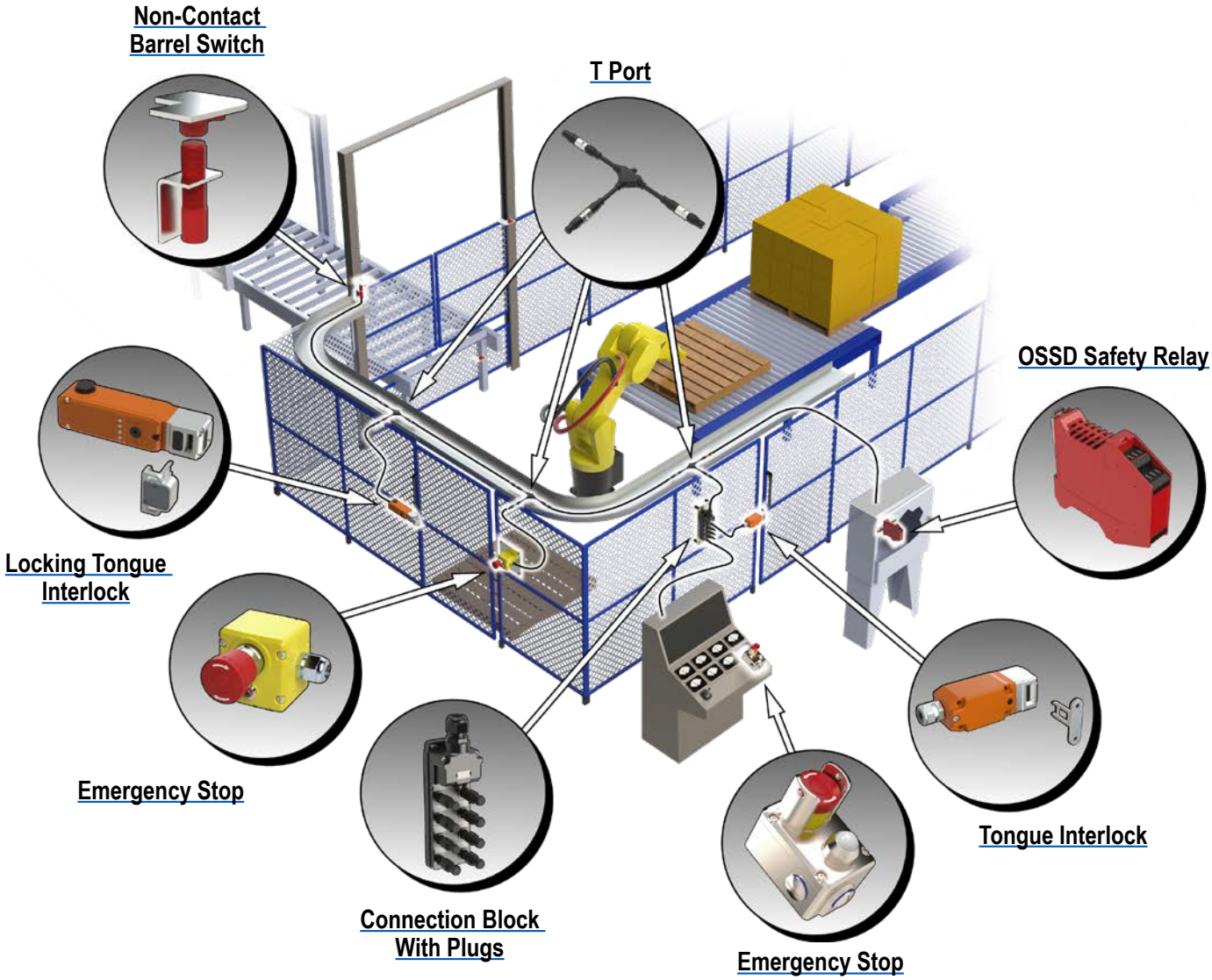
IDEM Z-Range Safety Switches

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 KLP-Z/KLM-Z/KL3-Z Tongue Interlock Safety Switches with Guard Locking and RFID Coding

Description

IDEM's KLP/KLM/KL3 Series of RFID Coded Safety Switches has been designed to fit into the leading edge of machine guard doors to provide robust guard locking while also providing a double tamper resistant interlock mechanism.

They are designed to provide robust position interlock detection for moving guards and will remain locked until the solenoid voltage is applied to the switch.

These switches can be used in conjunction with delay timers to provide the solenoid energize signal only after a pre-determined amount of time has passed.

When used in combination with a dual channel safety relay or control device, Non-Contact Safety Switches can be used to provide protection up to Category 4 and PLe to ISO13849-1.

Features

- Highly effective anti-tamper RFID coding.
- Holding force of 3000N to keep guard doors closed until hazards have been removed.
- Unique rotating head offers both front and end actuation.
- Diecast housing fitting with a robust 316 stainless steel head.
- Choice of standard or flexible actuators.
- For use as directed by ISO14119 and EN ISO12100

KLP/KLM/KL3 Tongue Interlock Safety Switches with Guard Locking and RFID Coding Selection Guide

Part Number	Price	Body Material	Actuator Type*	Connection	Circuits	Head	Holding Force	To Unlock
KLP-Z-455002AZ	$-04jz8:	Polyester	Standard actuator	Two 0.5 in [12.7 mm] NPT cable entries	2 OSSD outputs	90° adjustable	2000N	24VDC
KLP-Z-455002HFZ	$-04jz9:	Polyester	Flexible actuator	Two 0.5 in [12.7 mm] NPT cable entries	2 OSSD outputs	90° adjustable	2000N	24VDC
KLP-Z-455003AZ	$-04jza:	Polyester	Standard actuator	8-pin M12 quick-disconnect	2 OSSD outputs	90° adjustable	2000N	24VDC
KLP-Z-455003HFZ	$-04jzb:	Polyester	Flexible actuator	8-pin M12 quick-disconnect	2 OSSD outputs	90° adjustable	2000N	24VDC
KLM-Z-454002AZ	$-04jyy:	Die-cast aluminum	Standard actuator	Two 0.5 in [12.7 mm] NPT cable entries	2 OSSD outputs	90° adjustable	3000N	24VDC
KLM-Z-454002HFZ	$-04jyz:	Die-cast aluminum	Flexible actuator	Two 0.5 in [12.7 mm] NPT cable entries	2 OSSD outputs	90° adjustable	3000N	24VDC
KLM-Z-454003AZ	$;-04jy]:	Die-cast aluminum	Standard actuator	8-pin M12 quick-disconnect	2 OSSD outputs	90° adjustable	3000N	24VDC
KLM-Z-454003HFZ	$-04jz7:	Die-cast aluminum	Flexible actuator	8-pin M12 quick-disconnect	2 OSSD outputs	90° adjustable	3000N	24VDC
KL3-SS-Z-456002AZ	$-04jy_:	316 stainless steel	Standard actuator	Two 0.5 in [12.7 mm] NPT cable entries	2 OSSD outputs	90° adjustable	3000N	24VDC
KL3-SS-Z-456002HFZ	$-04jy#:	316 stainless steel	Flexible actuator	Two 0.5 in [12.7 mm] NPT cable entries	2 OSSD outputs	90° adjustable	3000N	24VDC
KL3-SS-Z-456003AZ	$;-04jy!:	316 stainless steel	Standard actuator	8-pin M12 quick-disconnect	2 OSSD outputs	90° adjustable	3000N	24VDC
KL3-SS-Z-456003HFZ	$-04jy?:	316 stainless steel	Flexible actuator	8-pin M12 quick-disconnect	2 OSSD outputs	90° adjustable	3000N	24VDC

*** All actuators feature uniquely coded RFID**

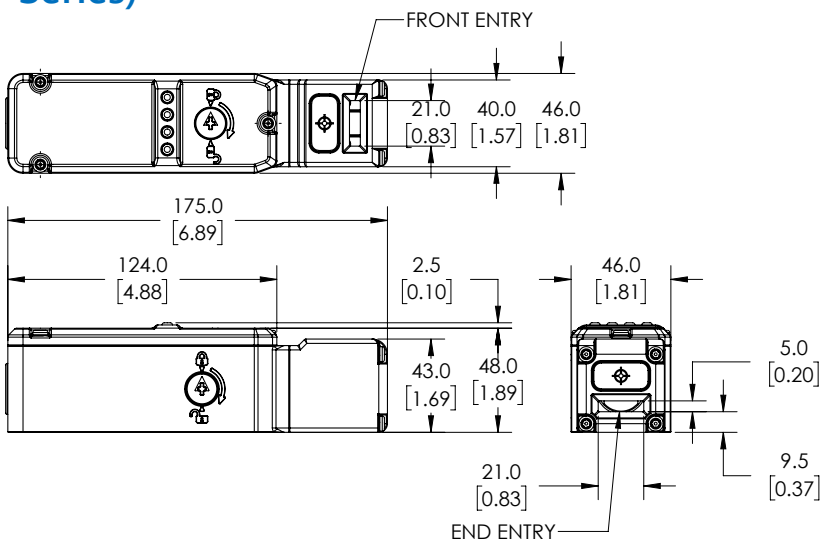
Female Quick Disconnect Lead

Part Number	Price	Description	Exit Type/Cable Length
140101	$;1g!_:	Female QD Lead	M12 Female 5m [16.4 ft], 8-pin
140102	$;1g!#:	Female QD Lead	M12 Female 10m [32.8 ft], 8-pin

IDEM KLP-Z/KLM-Z/KL3-Z Tongue Interlock Safety Switches with Guard Locking and RFID Coding

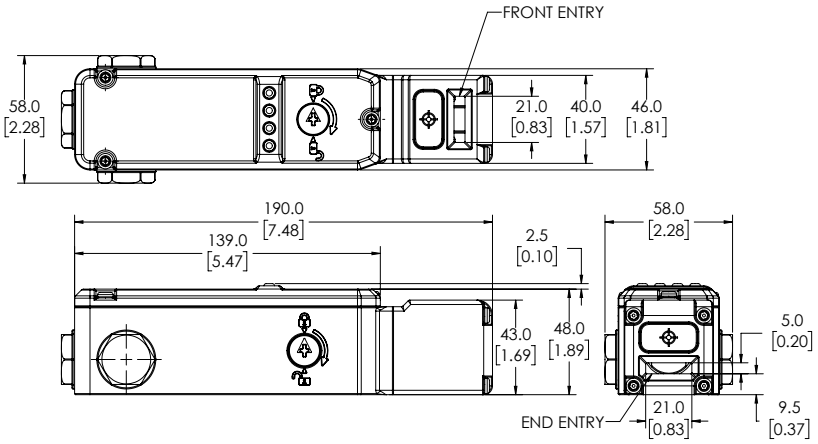
Dimensions (KLP Series)

mm [in]



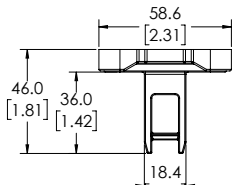
Dimensions (KLM Series and KL3 Series)

mm [in]



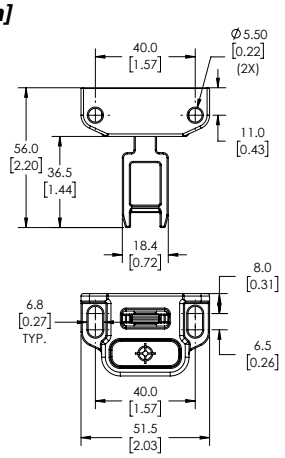
Key (AZ Standard Actuator)

mm [inch]



Key (HFZ Flexible Actuator)

mm [inch]



See our website www.AutomationDirect.com for complete engineering drawings.

IDEM KLP-Z/KLM-Z/KL3-Z Tongue Interlock Safety Switches with Guard Locking and RFID Coding

LED Operation

GUARD	
Guard Closed and Locked	Green (Steady)
Guard Closed and Unlocked	Green (Flash)
Code Incorrect	Red (Flash)
Guard Open	Red

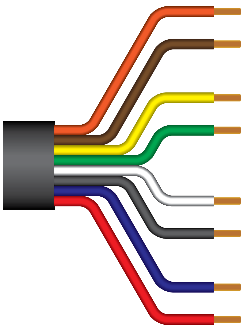
INPUT	
Safety Inputs On	Green (Steady)
Safety Input Missing	Green (Flash)
Safety Inputs Off	Off
Internal fault	Red (Steady)

OUTPUT	
Safety Outputs On	Green (Steady)
Safety Outputs Off	Off
External fault	Red (Flashing)

SOLENOID	
Solenoid Energised	Red
Solenoid De-energised	Off

Wiring

IDEM Quick Disconnect Leads Color Coding



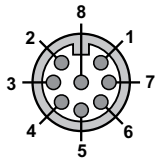
Orange – Guard open signal out
Brown – Unlock signal +24VDC in

Yellow – Safety input 2 (see note)
Green – Safety output 2 (OSSD)

White – Safety output 1 (OSSD)
Black – Safety input 1 (see note)

Blue – 0VDC
Red – +24VDC

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	S+	Unlock signal Apply +24VDC

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

Travel Charts

Actuator Insertion	**15.0 mm**	**5.0 mm**	**0mm**
11/12	Open		Closed
21/22	Open		Closed
44	Guard open signal ON	Guard open signal OFF	
34	Guard unlocked signal (ON when solenoid energized)		

IDEM KLP-Z/KLM-Z/KL3-Z Tongue Interlock Safety Switches with Guard Locking and RFID

Solenoid Interlock Safety Switches Specifications			
	KLP-Z	***KLM-Z***	***KL3-Z***
Safety Classification and Reliability Data			
Switching Reliability (B10d)	2.5M operations at 100mA load		
EN 954-1	Up to Category 4 with Safety Relay		
ISO 13849-1	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		
Agency Approvals	cULus E258676, CE		
Electrical and General Specifications			
Rated Insulation Voltage	500VAC		
Contact Terminals	Plated Brass, Max conductor 1mm^2, 16AWG; 0.7 N•m [0.52 lb•ft] torque		
Solenoid Wattage	12W		
Solenoid Voltage	24VDC		
Max. Switching Current	Safety contacts 2.5A @24VDC, 6A @ 120VAC, 3A @ 240VDC (720VA Break); Auxiliary contacts max 230V@0.5A		
Maximum Approach/Withdrawal Speed	1000 mm/s [39.37 in/s]	600 mm/s [23.62 in/sec]	600 mm/s [23.62 in/sec]
Enclosure Protection	IP67 (IP69K on all KL3-Z models)		
Operating Temperature	-25°C to +55°C [-13°F to +131°F]	-25°C to +55°C [-13°F to +131°F]	-25°C to +40°C [-13°F to +104°F]
Vibration	IEC 68-2-6, 10-55 Hz + 1Hz		
Lid Screws/Torque	Stainless steel; T20 Torx; 1.5 N•m [1.11 lb•ft]	Stainless steel; T20 Torx; 1N•m [0.74 lb•ft]	Stainless steel; T20 Torx; 1.5 Nm [1.11 lb•ft]
Recommended Mounting Screws/Torque	M5; 4N•m [2.95 lb•ft]		
Head Screws/Torque	Stainless steel, T20 Torx 1.5 N•m [1.11 lb•ft]	Stainless steel; T20 Torx; 1.5 N•m [1.11 lb•ft]	Stainless steel; T20 Torx; 1N•m [0.74 lb•ft]

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.

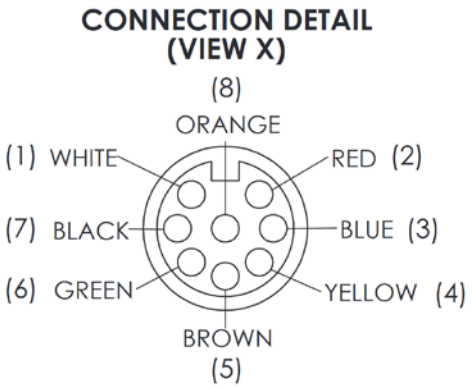
Only the pigtail cables have fixed wire colors.

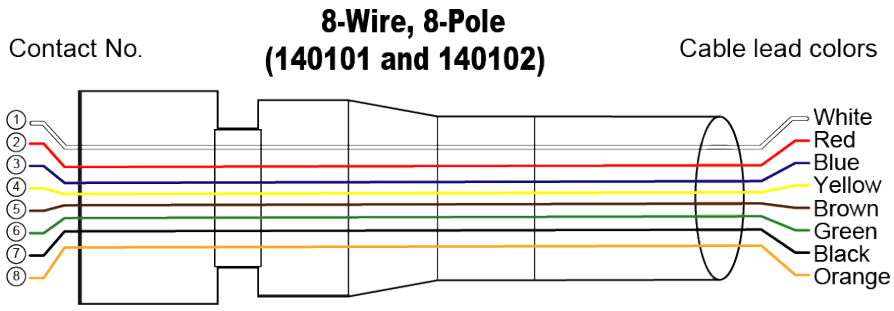
140201

IDEM Connection Cables Selection Chart					
Part Number	***Price***	***Description***	***Connection***	***Length***	***Cable Jacket***
140201	$-4jz3:	Connection cable	8-pin M12 axial female to 8-pin M12 axial male	2m [6.56 ft]	Black PVC
140202	$-4jz4:	Connection cable	8-pin M12 axial female to 8-pin M12 axial male	5m [16.40 ft]	Black PVC
140203	$-4jz5:	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***
140101	$;1g!_:	8-pin M12 female quick disconnect	Pigtail, 5m [16.4 ft]
140102	$;1g!#:		Pigtail, 10m [32.8 ft]

140101

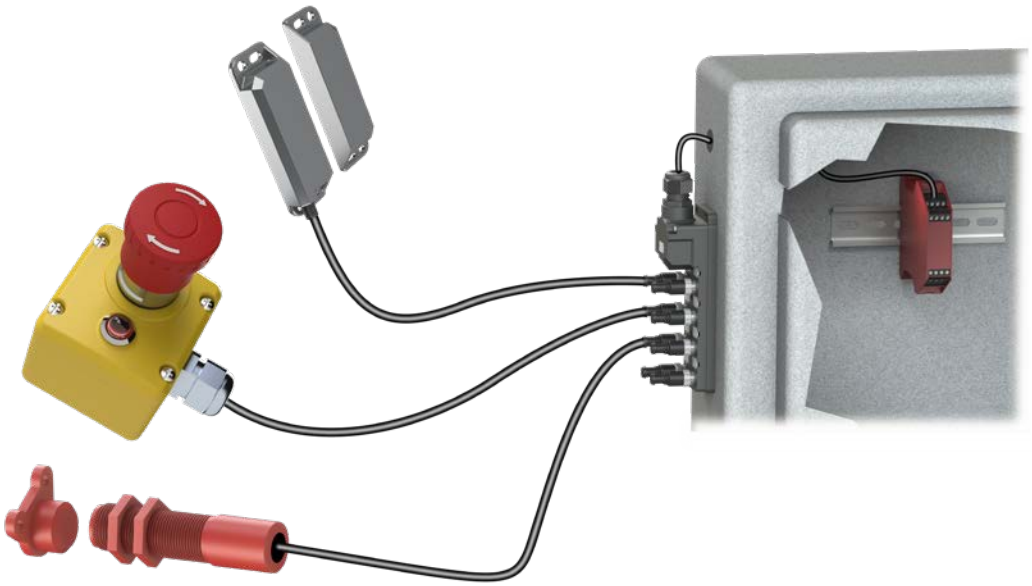




NOTE: Only the pigtail cables have fixed wire colors.

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
140210-Z	$;-05,jg:	IDEM junction block for use with IDEM Z-Range switches only	8	8-pin M12 sockets	Cable clamp for field-wired connection	24VDC LED	PDF
140205	$;-5,jk:	Shorting plug, 8 pole, for use with IDEM Z-Range connection blocks	–	–	–	–	PDF
140204	$;;-5,jf:	T-port for use with Z-Range safety switches	–	2 8-pole M12 axial male	1 8-pole M12 axial female	–	PDF

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

140210-Z

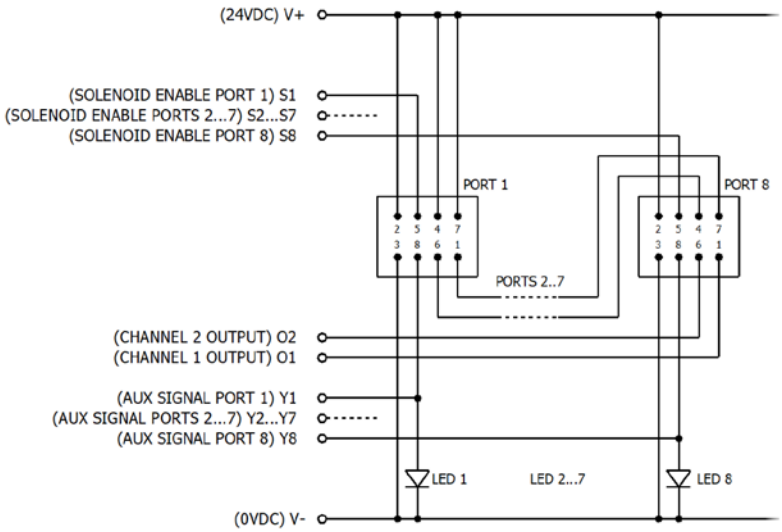
140204

140205

IDEM Connection Box For Use With Z-Range Switches

IDEM M12 Connection Box For Use With Z-Range Switches Specifications	
Port Connection Type	8-pin M12 female sockets (qty 8)
Operating Temperature	-20 to +40°C [-4 to +104°F]
Supply Voltage	24VDC ±10%
Maximum Current	500mA (each port) if solenoid feed is used
Body Material	Polyester
Internal Terminals	Spring-type clamp for 22-30 AWG conductors
Cable Exit	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]
Mounting	2xM4 bolds, 4.6 mm [0.18 in] diameter clearance holes
Accessory	Shorting plug for unused ports
LEDs (1-8)	Red, auxiliary indication of switch open

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



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