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Overview

The Zener Barrier provides intrinsically safe operation of thermocouple applications or any other intrinsically safe device that falls within the safety data and electrical data parameters of the Zener Barrier.

This compact, space-saving device is easy to install on a DIN rail. Simply snapping the barrier onto a grounded DIN rail provides a connection to ground.

Features

- Space-saving design
- Easily grounded via the DIN rail
- Convenient grounding lugs on top and bottom of barrier
- Only one type of exchangeable fuse allows reduced stocking requirements and eliminates risk of errors during fuse replacement

The Zener Barrier must be grounded in accordance with Article 504/505 of the National Electrical Code or the Canadian Electrical Code, Part 1, whichever applies. There are multiple ways to ground the Zener Barrier:

- The DIN rail connection can provide a path to ground if the DIN rail is properly grounded.
- Ground the Zener Barrier by utilizing the top or bottom grounding lug.

Refer to the installation manual for full installation instructions. NOTE: An isolator barrier can be used if grounding is unavailable.

STAHL Intrinsically Safe Zener Barrier Selection Guide				
Part Number	Price	Signal Type	Field Device Example	Drawing
<u>9002-77-093-300001</u>	\$202.00	Temperature input (mV signal)	Ungrounded thermocouple	PDF
<u>9002/13-280-110-001</u>	\$269.00	Binary input (3-wire prox) Binary output 4-20 mA input or output	PNP prox sensor, solenoid valve, indicators 4-20 mA transmitter 4-20 mA positioner	PDF
<u>9002/11-280-186-001</u>	\$213.00	Binary input (NPN sensors or dry contacts)	Dry contact NPN prox sensor	PDF
<u>9002/22-158-200-001</u>	\$201.00	11V pulse train	15.8 entity parameter	PDF
9002/22-240-024-001	\$201.00	18V pulse train	24V entity parameter	PDF
9002/11-130-360-001	\$252.00	Strain gauge	Load cell, 10VDC excitation	PDF
9002/11-120-024-001	\$252.00	Strain gauge	Load cell, 10VDC signal	PDF

Replacement Fuses

STAHL Zener Barrier Replacement Fuses Selection Guide				
Part Number	Price	Quantity Per Package	For Use With	
<u>158964</u>	\$40.50	5	STAHL Zener Barriers	



<u>15896</u>4



STAHL Intrinsically Safe Zener Barrier Specifications									
		<u>9002-77-093-</u> <u>300001</u>	<u>9002/13-280-</u> <u>110-001</u>	<u>9002/11-280-</u> <u>186-001</u>	<u>9002/22-158-</u> 200-001	<u>9002/22-240-</u> 024-001	<u>9002/11-130-</u> <u>360-001</u>	<u>9002/11-120-</u> 024-001	
Explosion Protection	Installation Location (per NEC 500)	Class I, Division 2							
	Ex Interface (for intrinsically safe interface) (per NEC 500)	Class I, II, III Division 1 or 2							
	Agency Approvals	ATEX (PTB), Brazil (ULB), Canada (FM), China (CQST), IECEx (PTB), India (PESO), Japan (CML), Korea (KGS), USA (FM), USA (UL)							
Safety Data*	Max Voltage (V _{oc})	9.3 V	28.0 V	28.0 V	7.9 V	12.0 V	13.0 V	12.0 V	
	Max Current (I _{sc})	150mA	107mA	93mA	100mA	12mA	321mA	12mA	
	Max Power (P ₀)	350mW	749mW	650mW	198mW	40mW	1040mW	40mW	
Electrical Data	Number of Channels	2 in / 2 out (or 1 thermocouple in/ out)	2 in / 2 out (or 1 combined in/out)	2 in / 2 out (or 1 combined in/out)	2 in / 2 out (or 1 combined in/out)	2 in / 2 out (or 1 combined in/out)	2 in / 2 out (or 1 combined in/out)	2 in / 2 out (or 1 combined in/out)	
	Nominal Voltage (V _{nom})	6.00 V	24.00 V	25.00 V	5.5 V	9.00 V	10.00 VDC	9.00 V	
	Min Resistance (R _{min})	71.7 Ω	270Ω	322Ω	84Ω	1051Ω	46Ω	1052Ω	
	Max Resistance (R _{max})	81.5 Ω	296Ω	359Ω	95Ω	1164Ω	52Ω	1165Ω	
	Output	Equal to input signal							
Ambient Conditions	Operating Temperature	-20°C to 60°C [-4°F to 140°F]							
	Storage Temperature	-20°C to 75°C [-4°F to 167°F]							
Mechanical Data	Degree of Protection	IP20							
	Mounting Type	DIN rail							
	Wire Gauge Range	16AWG for terminals 12AWG for ground connections							

* These safety data values are for one of two channels.

Connection Diagram for 9002-77-093-300001

Safe area

Hazardous area



Two-channel safety barriers, star barrier / star barrier

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- Ground the Zener Barrier by utilizing the top or bottom grounding lug.

Refer to the installation manual for full installation instructions. NOTE: An isolator barrier can be used if grounding is unavailable.



Application-Specific Diagrams



9002-77-093-300001



Application: Use of potential-free contacts 9002/13-280-110-001

<u>9002/13-280-110-001</u>



Hazardous area NPN Supply 3 4 9002/11-280-186-001 2 RL 0 V

Application: 3-wire NPN inputs (negative switching) of proximity switches, photocells and encoders

9002/11-280-186-001



Application: Discrete 2-wire output for solenoid valves, LEDs and signalling devices

9002/11-280-186-001

Nonhazardous Location

49002/22-240-024-0012

 Application: 2-wire 4 to 20 mA I/P converters and control valves – standard and HART, 4 to 20 mA indicators

9002/13-280-110-001



Application: Discrete 2-wire output for solenoid valves LEDs and signalling devices

<u>9002/13-280-110-001</u>

The Zener Barrier must be grounded in accordance with Article 504/505 of the National Electrical Code or the Canadian Electrical Code, Part 1, whichever applies. There are multiple ways to ground the Zener Barrier:

- The DIN rail connection can provide a path to ground if the DIN rail is properly grounded.
- Ground the Zener Barrier by utilizing the top or bottom grounding lug.

Refer to the installation manual for full installation instructions. NOTE: An isolator barrier can be used if grounding is unavailable.

Application: Voltage pulse inputs

Hazardous Location

M

9002/22-240-024-001 or 9002/22-158-200-001



Application-Specific Diagrams, continued





The Zener Barrier must be grounded in accordance with Article 504/505 of the National Electrical Code or the Canadian Electrical Code, Part 1, whichever applies. There are multiple ways to ground the Zener Barrier:

- The DIN rail connection can provide a path to ground if the DIN rail is properly grounded.
- Ground the Zener Barrier by utilizing the top or bottom grounding lug.

Refer to the installation manual for full installation instructions.

NOTE: An isolator barrier can be used if grounding is unavailable.

Operating Data					
Operating Voltage	V _{nom} = 10V				
Maximum Resistance of the Zener Barrier	$R_{max} = 2 \times 52\Omega = 104\Omega$				
Number of Load Cells	350Ω				
Connected in Parallel	R _{sum} (Ω)	V _L (V)	I _L (mA)		
1	454.0	7.7	22.0		
2	279.0	6.3	35.8		
3	220.7	5.3	45.3		
4	191.5	4.6	52.2		
Safety Data					
Maximum Voltage	Maximum Voltage V _{oc} / U _o = max (13V; 12V; 12V) = 13V				
Maximum Current	I _{sc} / I _o = 360ma+24mA+24mA = 408mA				
Maximum Power	P _o = 1070mW+70mW+70mW = 1210mW				
According to EN 60079-11					
Maximum Dormiccible	L _a / L _o	A, B, E	C, D, F, G		
External Inductance		or IIC	or IIB		
		0.18 mH	1.45 mH		
Maximum Damaia-ikla	C _a / C _o	A, B, E	C, D, F, G		
External Capacitance		or IIC	or IIB		
		0.270 μF	1.64 μF		

Application Note

For 4-wire circuits (without sense) there is no need for the corresponding zener barrier. The operating data remains unchanged. The safety-relevant maximum current is reduced to $\rm I_{SC}$ / $\rm I_{O}$ = 384mA, and the maximum power to Po=1330mW.

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.