



TURCK
works

Industrial
Automation

MZB SERIES

Intrinsically Safe Shunt
Diode Safety Barriers

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MZB Series

Turck MZB Series of Intrinsically Safe Shunt Diode Safety Barriers

New series of Zener Barriers include a wider product range for more flexibility in more applications.

New Features Include:

- Removable Terminals
- 35mm DIN Rail mounting
- Bussed Power Feed
- Relay and solid state switch models
- Dual Channel versions of some models

The introduction of the MZB series of Shunt Diode Safety Barriers allows the widest range of barriers to be used in more applications and allow more flexibility than ever was available before. The high packing density (as little as 6.3mm per channel) saves space in areas where space is at a premium. The MZB Series is an expanded and enhanced version of the popular MZ series that were introduced long ago. This advanced state-of-the-art series of Shunt Diode Safety Barriers is elegant yet is still the most technologically advanced design of its kind available.

Introduction to the Turck MZB series of Zener (Shunt Diode) Safety Barriers

The Turck MZB series of barriers are based on a simple principle. Each channel is fitted with two stages of pulse tested Zener Diodes and an infallible terminating resistor. In the event of an electrical fault in the non-hazardous (controls side) of the barrier, such as an overvoltage, the Zener diodes limit the voltage available to the hazardous area circuits and a series resistance limits the current. There is also a fuse designed into the circuit that will rupture in the event of a continuous application of excess energy being applied to the barrier that is outside the design criteria for the loop.

There are some brief descriptions of the Terminology used when describing these devices and they are:

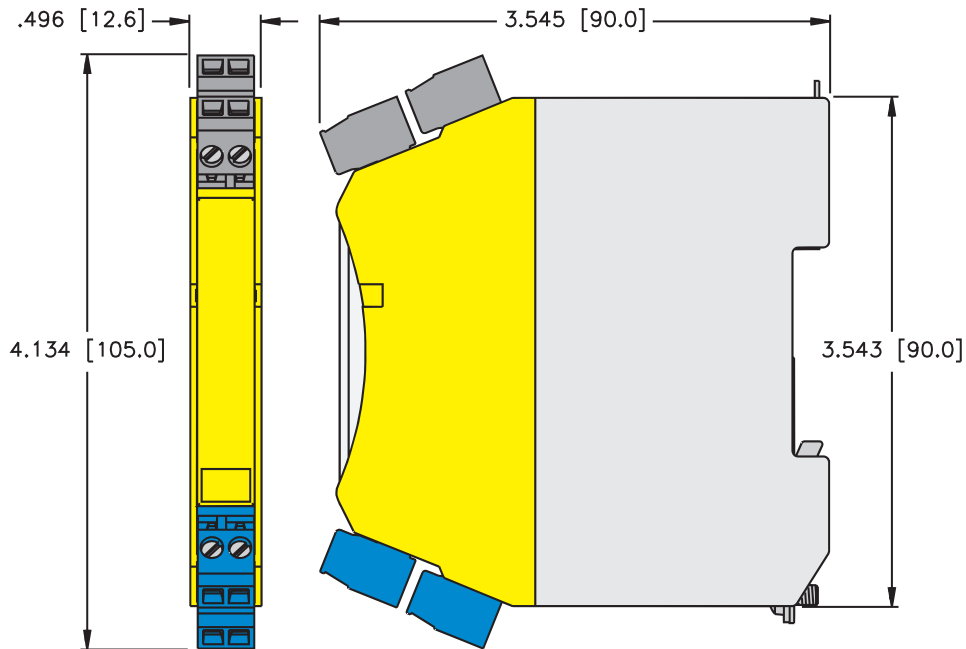
Maximum End-to-End Resistance: This is the total resistance between two ends of a barrier at 20 °C. This includes all resistors and the fuse in the loop. If a signal diode is in the loop, the forward biased voltage of the chain (3 diodes) is added as a voltage drop for calculation purposes.

Vwkg: The working voltage. This is the voltage that the barriers are designed to operate at without the Zener diodes going into conduction or "ON" state. This is defined as the maximum steady state voltage that can be applied from the control side of a single channel of a barrier between that channel and ground, of appropriate polarity at 20 °C for the specified leakage current and the hazardous side terminals open circuit.

Maximum Voltage: The greatest continuous voltage of appropriate polarity that can be applied to the control side of a barrier channel at 20 °C, without rupturing the fuse with the hazardous area terminal open circuit.

Fuse Rating: The maximum amount of current that can be passed through the fuse continuously for 1000 hours at 35 °C.

Star Connected: In this configuration two channels are interconnected so that the voltage between them will not exceed the Vwkg.



General Specifications

Ambient temperature and humidity limits

- 20 to +60°C continuous working
- 40 to +80°C storage
- 5-95% RH

Weight

140 g approx.

Mounting and earthing

By 35 mm top hat DIN rail

Terminations

Removable terminals accommodate conductors up to 2.5 mm² (13 AWG). Hazardous-area terminals are identified by blue labels. Removal force >15N.

Mounting / Grounding

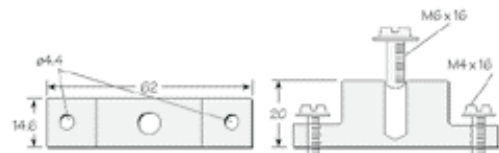
DIN 35S standard DIN rail 6943000

The MZ-series barriers mount easily and quickly onto standard DIN rails (35 X 7.5 mm), which also act as the intrinsically safe ground. Made of steel with chromated cadmium finish, the DIN rail withstands use in potentially corrosive atmospheres. Supplied in 1 meter lengths.



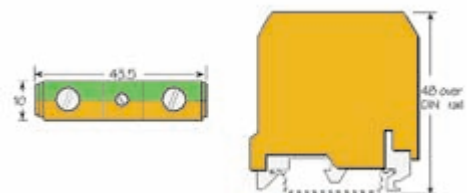
MZSP Insulating Spacer K1035

Attaches to the base of a DIN rail at either end or at intervals (depending upon DIN-rail length) to isolate the IS ground from panel ground.



MZGT Ground Terminal K1036

Provides connections for routing the IS ground from the DIN rail to an appropriate ground electrode. Two recommended per discrete length of DIN rail.



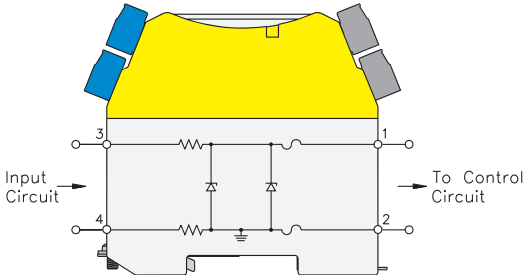
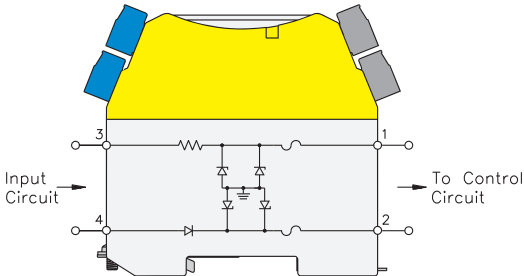
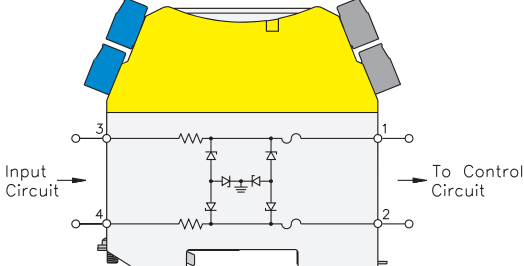
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MZB Series

Single Channel							
Part Number	ID Number	Channel	Max. End-To-End Resistance (Ω)	V_{WKG} @10 μ A (V)	V_{MAX} (V)	Fuse Rating (mA)	Drawing #
MZB10P	K1053	1	75	6.0	7.0	50	1
MZB15P	K1054	1	119	12.0	13.1	100	1
MZB15PX	K1055	1	64	12.6	13.7	100	1
MZB28P	K1056	1	333	25.9	26.5	50	1
MZB28PX	K1057	1	252	24.9	25.9	100	1
MZB29PX	K1058	1	184	24.9	25.9	100	1

2 Channel							
Part Number	ID Number	Channel	Max end-to-end Resistance	V (working) @ 10 μ A	V (max)	Fuse Rating (mA)	Drawing #
MZB87P	K1075	1	300	26.6	27.2	50	2
		2	0.9 V + 26 Ω	26.6	27.2	50	
MZB87PX	K1076	1	253	26.4	27.2	80	2
		2	0.9 V + 21 Ω	26.4	27.2	80	

2 Channel							
Part Number	ID Number	Channel	Max. End-To-End Resistance (Ω)	V_{WKG} @10 μ A (V)	V_{MAX} (V)	Fuse Rating (mA)	Drawing #
MZB60A	K1066	1	75	6.0	6.7	50	3
		2	75	6.0	6.7	50	
MZB65A	K1070	1	124	12.0	12.5	50	3
		2	124	12.0	12.5	50	

<p>Drawing #1</p> 	<p>These are Single Channel, Grounded (-) return, devices. These devices are available in several options dependent on the voltage and current requirements of the field circuit .</p>
<p>Drawing #2</p> 	<p>These are 2 channel diode return devices designed for use with 2-wire analog transmitters or common grounded analog output circuits. The diode return leg provides a path for the return current in one direction only. The 2 channels provide a floating circuit that is free from ground.</p>
<p>Drawing #3</p> 	<p>These are 2 channel, double dual polarity devices. These devices are available with options that are dependent on the voltage and current requirements of the field circuit. These devices are designed to be used for AC +/- voltage sources and can be used with 2 independent field circuits. These circuits are also know as STAR connected circuits.</p>

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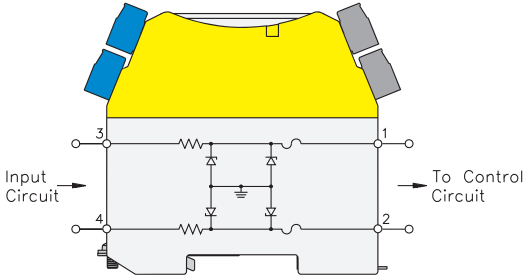
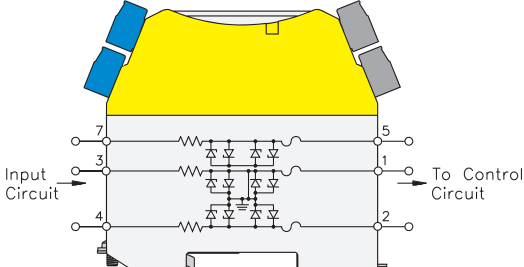
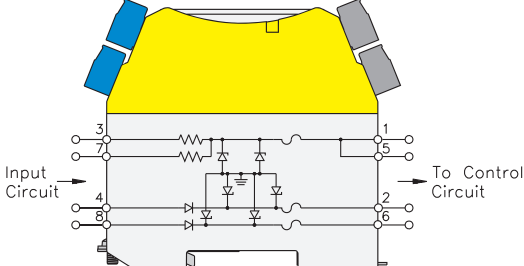
MZB Series

2 Channel							
Part Number	ID Number	Channel	Max. End-To-End Resistance (Ω)	V_{WKG} @10 μ A (V)	V_{MAX} (V)	Fuse Rating (mA)	Drawing #
MZB58P	K1065	1	17.0	6.0	7.3	200	4
		2	17.0	6.0	7.3	200	
MZB67P	K1073	1	119	12.0	13.1	100	4
		2	119	12.0	13.1	100	
MZB79P	K1074	1	333	25.9	26.5	50	4
		2	333	25.9	26.5	50	

2 Channel							
Part Number	ID Number	Channel	Max. End-To-End Resistance (Ω)	V_{WKG} @10 μ A (V)	V_{MAX} (V)	Fuse Rating (mA)	Drawing #
MZB61A	K1067	1	107	6.0	7.0	100	4
		2	107	6.0	7.0	100	
MZB61AX	K1068	1	378	6.8	7.5	50	4
		2	378	6.8	7.5	50	
MZB64A	K1069	1	1050	10.0	10.9	50	4
		2	1050	10.0	10.9	50	
MZB66A	K1071	1	174	10.0	10.6	50	4
		2	174	10.0	10.6	50	
MZB66AX	K1072	1	92	9.6	10.5	100	4
		2	92	9.6	10.5	100	

3 Channel							
Part Number	ID Number	Channel	Max. End-To-End Resistance (Ω)	V_{WKG} @10 μ A (V)	V_{MAX} (V)	Fuse Rating (mA)	Drawing #
MZB56A	K1064	1	19.0	0.7	2.7	250	5
		2	19.0	0.7	2.7	250	5
		3	19.0	0.7	2.7	250	5

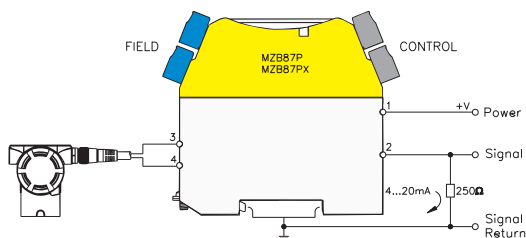
4 Channel							
Part Number	ID Number	Channel	Max. End-To-End Resistance (Ω)	V_{WKG} @10 μ A (V)	V_{MAX} (V)	Fuse Rating (mA)	Drawing #
MZB89P	K1077	1	651	26.6	27.7	50	6
		2	651	26.6	27.7	50	6
		3	0.9 V + 26 (Ω)	26.6	27.7	50	6
		4	0.9 V + 26 (Ω)	26.6	27.7	50	6

<p>Drawing #4</p> 	<p>These are 2 channel, Grounded (-) return “or” single channel dual polarity devices. These devices are available with options that are dependent on the voltage and current requirements of the field circuit. These devices can be used for AC +/- voltage sources or for use with 2 independent field circuits.</p>
<p>Drawing #5</p> 	<p>This device is designed for use with 3-Wire RTD's. All three channels have very tightly matched components so that there is no offset induced. The design allows direct input to control card with a grounded bridge 3-Wire RTD input configuration.</p>
<p>Drawing #6</p> 	<p>This is a dual signal diode return for use with switch inputs, or special functions.</p>

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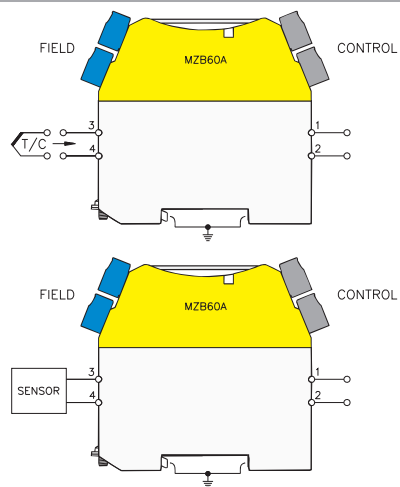
MZB Series - Applications

Transmitters



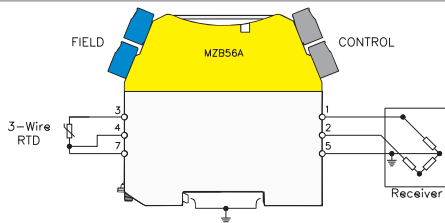
Conventional Analog Inputs (mA signals)
 2-wire transmitters for conventional 4/20 mA signals
 Barriers for transmitters with conventional or signals can be accommodated using the MZB87P or MZB87X. Typical applications would use the MZB87P where the compliance voltage is lower than HART units. The MZB87PX can be used in the lower Gas groups (C&D) where more compliance voltage is required or a higher load at the controller is present. HART Analog Input applications should use the MZB06 in order to provide the additional compliance voltage for these circuits. See section on active barriers for configuration for HART transmitters.

Analog Input



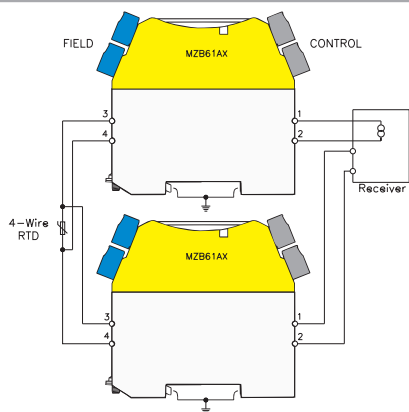
Analog Inputs (mV signals)
 mV Signals for Thermocouples and other mV sources
 The barrier recommended for thermocouples and other mV sources is the MZB60A. This barrier is a non-polarized barrier that will allow the transfer of a mV signal to be passed from a hazardous area into a control system. When using T/C's, compensating T/C cable must be used to prevent offsets and CJ issues.

RTD's



RTD'S (Resistance Temperature Devices)
 3-wire RTD's
 RTD's are devices that are considered "Simple Apparatus" and can be incorporated into IS loops with as long as an appropriate Barrier is used with it. 3-wire RTD's can be accommodated by using the MZB56AC. This device has matched, resistance balanced channels that prevent any offset between channels.

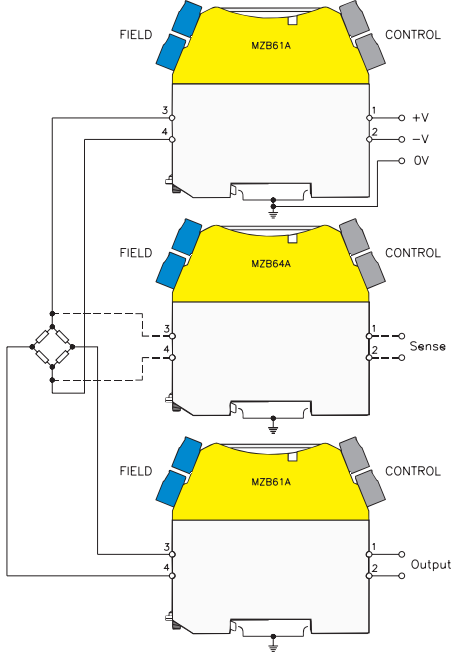
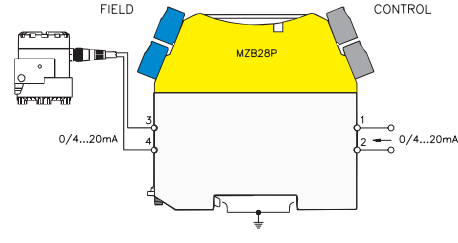
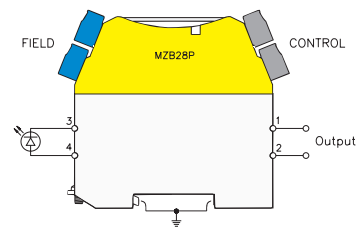
RTD's



RTD'S (Resistance Temperature Devices)
 4-wire RTD's
 4-wire RTD's can be accommodated using 2 MVB61A barriers.

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MZB Series - Applications

Load Cells	
	<p>Strain Gauge of Load Cells Single Strain Gauge Bridges or Load Cells (passive) This configuration can be used to accommodate a single load cell or strain gauge bridge. The configuration shown can be used in any Gas Group if powered from a source of 14 volts from 230 ohms. The configuration is designed to be used as a 6-wire system incorporating an Excitation Voltage, mV input to a control system, and Sense lines. Many other configurations can be used to accommodate multiple load cells, 4-wire systems and different Excitation voltages.</p>
Analog Outputs	
	<p>Analog mA output signals Controller Outputs for I/P Converters and Valve Positioners The MZB28P and lower resistance MZB29PX are designed to drive a 0/20 mA or 4/20 mA signal from a control system to an I/P or valve positioner in a hazardous area. The MZB28P can be used in all gas Groups where the higher power MZB29PX is suitable for the lower Gas groups (C & D).</p>
Discrete Outputs	
	<p>Discrete (on/off) Outputs Audible and Visual Alarms, LEDs IS Solenoid Valves, Display Backlighting The MZB28P and MZB29PX are single ended (grounded) barriers that will transfer a discrete signal from a control system to an IS field device in a hazardous area. The MZB28P can be used in all Gas Groups and the MZB28PX higher powered output is restricted to Gas Groups (C & D). If a non-grounded system or system with multiple common returns are used the MZB87P or MZB87PX can be used.</p>

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MZB Series

Active Barriers

The MZB series of Active Barriers are Hybrid devices that are a combination of simple traditional Shunt Diode Safety Barrier designs with the addition of some active circuitry. These Active Barriers provide additional functions that simple “passive” Shunt Diode Safety Barriers are not capable of. The ability to provide the additional functionality allows the MZB series to handle a wider variety of applications that were difficult or impossible to achieve with traditional methods that incorporated the use of traditional Shunt Diode Safety Barriers. The wider range power input circuit allows up to 35vdc which means that unregulated Power Supplies can be incorporated, lowering the cost of installations. These devices also provide Electronic Overvoltage Protection that protects the devices against damage during commissioning.

Active Shunt Diode Safety Barrier For Use With 2-Wire HART Transmitters

MZB06

This device is a specially designed Shunt Diode Safety Barrier to be used with 2-wire HART field transmitters. The active circuits provide an elevated output voltage required to operate HART transmitters. The flexibility of the input power supply (20-35VDC) required lends itself to the use of less expensive non-regulated power supplies. Bidirectional communications of the HART signal and an extremely accurate signal transfer make this device ideal for the application, short-circuit protection is incorporated in order to protect the Barrier’s internal fuse in the event of a short-circuit in the field wiring. The typical power consumption of the unit is 45mA with a 24VDC supply.

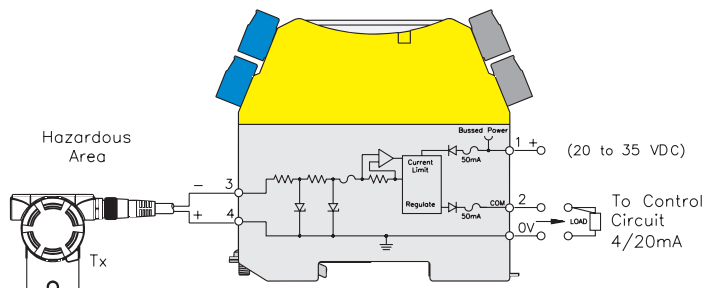
Specifications (Operating Parameters)

See Control Drawings in the back of the document for “Entity Parameters”


Supply Voltage 20-35VDC with respect to ground

Output Current 4-20ma

Available Voltage at Field Terminals 16.2VDC @ 20ma with a 250 ohm load (negative with respect to ground) and 11.0VDC @ 20ma with a 500 ohm load (negative with respect to ground).

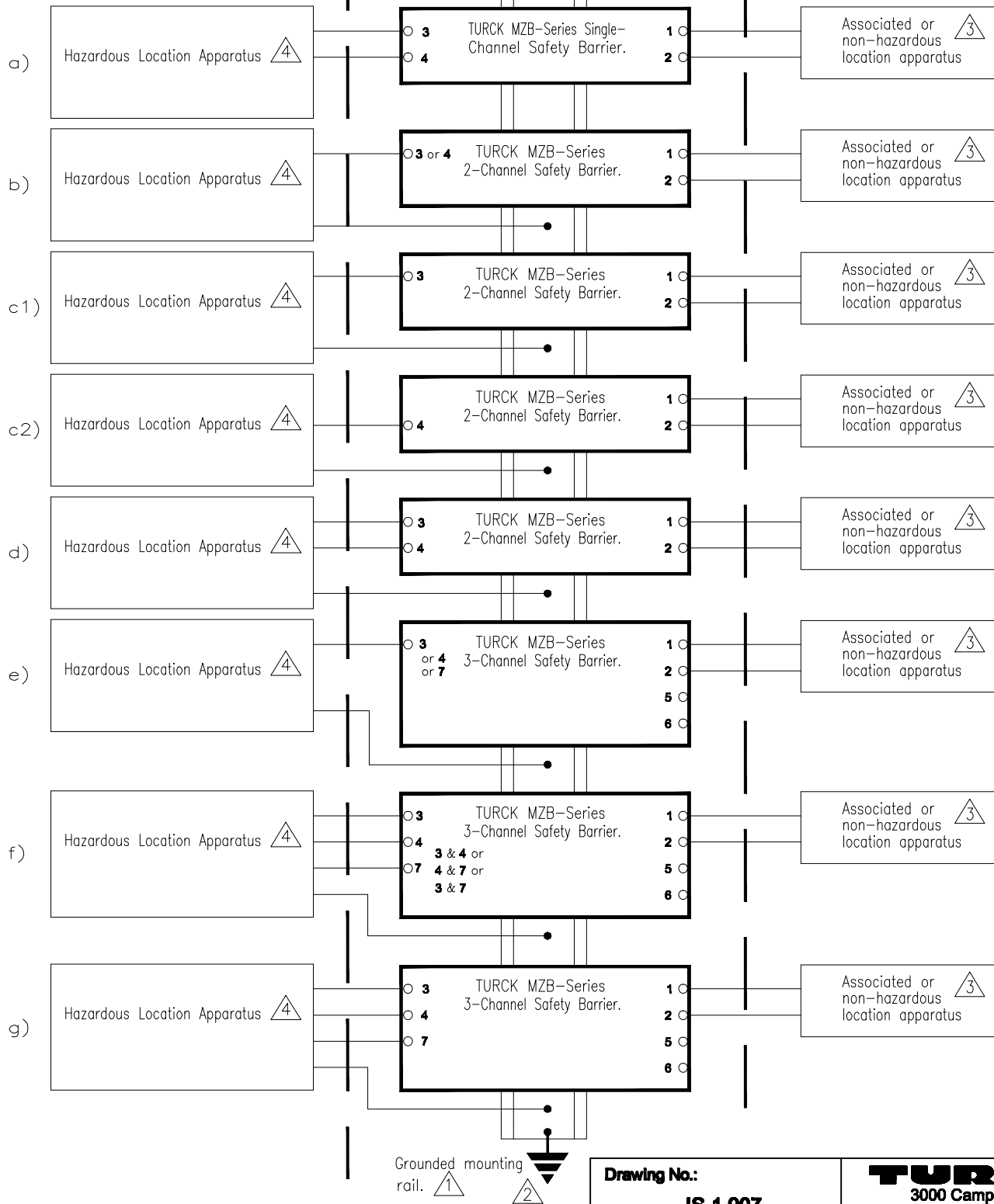


Approvals/ FM Entity Parameters

HAZARDOUS LOCATION
CLASS I, II, III; DIVISION 1
Groups A,B,C,D,E,F,G 

NON-HAZARDOUS LOCATION OR
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I; DIVISION 2, GROUPS A,B,C,D

NON-HAZARDOUS LOCATION




Drawing No.:
IS-1.907

TURCK
3000 Campus Drive
Plymouth, MN 55441
Phone: (763) 553-7300

Title: **Control Drawing for CSA Certified MZB Series Barriers**

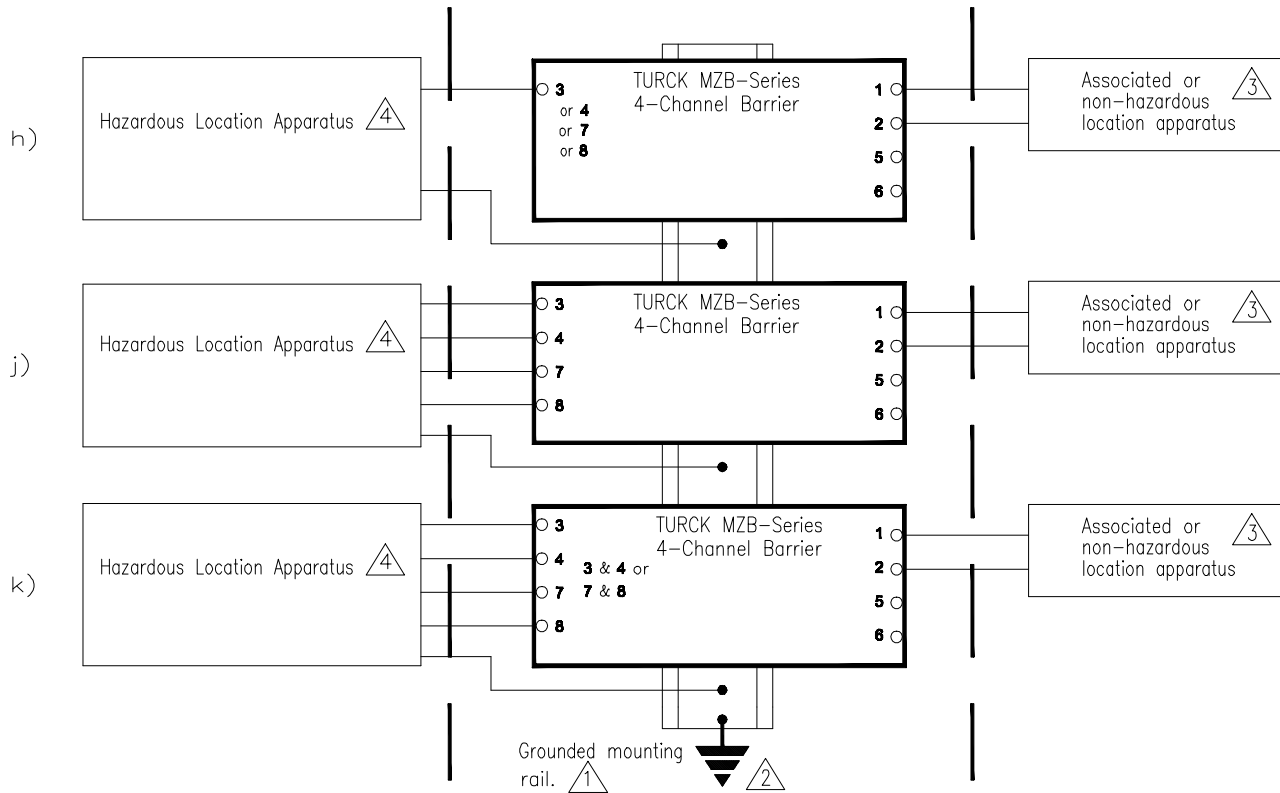
A	Release	BVL	7/17/08
Rev	Description	Drft	Date

Scale: **NONE** Sheet **1** of **6**

HAZARDOUS LOCATION
CLASS I, II, III; DIVISION 1
Groups A,B,C,D,E,F,G 

NON-HAZARDOUS LOCATION OR
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I; DIVISION 2, GROUPS A,B,C,D




NON-HAZARDOUS LOCATION



CONFIGURATIONS

- a) Single channel barrier to one device with ground return.
- b) Dual channel barrier, each channel to separate devices with separate ground returns.
- c1) Dual channel barrier, first channel (power channel on diode return barriers) to separate device with separate ground return.
- c2) Dual channel barrier, second channel (power channel on diode return barriers) to separate device with separate ground return.
- d) Dual channel barrier, both channels to the same device with or without ground return.
- e) Three channel barrier, each channel to separate devices with separate ground returns.
- f) Three channel barrier, two channels to same device with or without ground return and one channel to separate device with separate ground return.
- g) Three channel barrier, three channels to same device with or without ground return.
- h) 1st, 2nd, 3rd, or 4th channel of a four channel barrier, each channel to separate devices with separate ground returns.
- j) Four channel barrier, all channels to same device with or without ground return.
- k) Four channel barrier, channels 1 and 2 or channels 3 and 4 to same device with or without ground return.

Notes:

-  Turck MZB Series shunt diode barriers must be secured to a DIN 'T' section (35x27x7.5mm) mounting rail. Rails constructed of aluminum or aluminum-based alloys must not be used. The mounting rail must be provided with at least one grounding terminal (two are recommended) which should be situated at each end of the rail. These terminals are to be used for the intrinsic safety grounding and must be capable of accommodating conductors up to 12 AWG (4mm in cross-section).
-  The intrinsic safety grounding system must be such that when installed the ground loop impedance (including the mounting rail) does not exceed 1.0 ohm.
-  The nonhazardous (safe) location or Division 2/Zone 2 equipment must not generate or use voltages (U_m) in excess of 250V rms or dc.

A	Release	BVL	7/17/08	Drawing No.:	IS-1.907
Rev	Description	Drft	Date	Scale: NONE	Sheet 2 of 6

Notes (continued):

4. The hazardous location equipment may be CSA approved devices suitable for the locations in which it is to be installed and with correct Entity parameters or Simple Apparatus.
 If the simple apparatus consists only of switches, then the entity parameter table on subsequent sheets of this drawing applies without any temperature limitation.
 If the simple apparatus consists of thermocouples (TC), light emitting diodes (LEDs) or resistance temperature devices (RTDs), with or without switches, then the maximum output power (P_o) from the barrier connected to simple apparatus must not exceed the following:

Maximum barrier output power (P_o)	Maximum ambient Temperature (T_a) where simple apparatus is located
1.3 Watts	40°C
1.2 Watts	60°C
1.0 Watts	80°C

5. Barriers must be installed in suitable equipment meeting the requirements of CSA Standard C22.2 No.1010.1-92 or in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
6. MZB Series shunt diode safety barriers are associated apparatus, and when mounted in an appropriate enclosure may be installed in the following locations:
- i Nonhazardous locations
 - ii Class I, Division 2, Groups A, B, C or D; or Class I, Zone 2, IIC, IIB, IIA hazardous locations, T4 temperature Code
- When installed in a CSA approved or NRTL listed dust-ignitionproof enclosure, the barriers may also be installed in the following locations:
- iii Class II, Division 2, Groups F or G hazardous locations, T4 temperature code
 - iv Class III, Division 2, hazardous locations, T4 temperature code
7. For guidance on the installation refer to the Canadian Electrical Code Part I.
8. Entity parameters for barriers listed in the parameters table must be used to determine the suitability of the barrier for connection to hazardous location apparatus. The following must be observed:

$$V_{OC} \text{ or } V_t(U_o) \leq V_{max}(U_i)$$

$$I_{SC} \text{ or } I_t(I_o) \leq I_{max}(I_i)$$

$$P_o \leq P_i$$

$$C_a(C_o) \geq C_{cable} + C_i$$

$$L_a(L_o) \geq L_{cable} + L_i \text{ or } L_a/R_a(L_o/R_o) \geq L_{cable}/R_{cable} \text{ and } L_a/R_a(L_o/R_o) \geq L_i/R_i$$

9. Certain barriers are not permitted as associated apparatus for Div 1, Groups A, B or Zones 0,1 Group IIC. Refer to entries with asterisks in the following table.
10. If the CSA certified intrinsically safe apparatus to be used with the MZ Series barriers is not entity certified, then the barrier terminals connected to it may be considered a source of power with a maximum open circuit voltage of V , a minimum output resistance of R , and a maximum short circuit current of I in the following table. The parameters of loads/cables connected to the hazardous area terminals of the barrier must comply with the recommended values given in section F6, appendix F of the Canadian Electrical Code, Part I.
11. When fitted in a nonhazardous location, the barriers may be used at the same maximum ambient temperature as when installed in Division 2.

WARNING

The following precautions must be taken when MZB Series shunt diode barriers are installed in in Division 2 hazardous locations:

- i Barriers must not be fitted to or removed from the DIN rail unless power is off or the location is known to be free of flammable vapors.
- ii Plug in terminals on nonhazardous side of the barriers as well as the bus power terminal jumper of barriers fitted with the bus power feature, must not be inserted or removed unless power is off or the location is known to be free of flammable vapors.

A	Release	BVL	7/17/08	Drawing No.:	IS-1.907
Rev	Description	Drft	Date	Scale: NONE	Sheet 3 of 6

Barrier Model Terminals	Configuration	V _{oc} or U _o (V)	I _{sc} or I _o (mA)	R _o (Ohms)	P _o (W)	C _a or C _o (uF) AB/CE/DFG)	L _a or L _o (mH) AB/CE/DFG)	L _a /R _a or L _o /R _o (uH/Ohms) AB/CE/DFG)
MZB06 3 - 4	a	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB10P 3 - 4	a	10	200	50	0.5	3.0/20/100	0.91/2.72/7.25	74/310/627
MZB15P 3 - 4	a	15	150	100	0.56	0.58/3.55/14.0	1.45/7.22/14	66/263/544
MZB15PX 3 - 4	a	15	291	51	1.09	0.58/3.55/14.0	0.33/0.99/2.64	28/140/280
MZB28P 3 - 4	a	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB28PX 3 - 4	a	28	119	234.6	0.83	0.083/0.65/2.15	2.5/7.53/20	44/168/354
MZB29PX 3 - 4	a	28	170	164	1.19	*/0.65/2.15	*/5.65/11.34	*/127/260
MZB41R 3 - 4	d	10	19	-	0.039	2.86/20.0/100	96/365/696	742/1900/1900
MZB42T 3 - 4	d	10	19	-	0.039	2.86/20.0/100	96/365/696	742/1900/1900
MZB43R 3 - 4 or 7 - 8	k	10	19	-	0.039	2.86/20.0/100	96/365/696	742/1900/1900
MZB43R 3-4-7-8	j	10	38	-	0.078	2.73/19.9/100	25/91/193	184/694/1323
MZB44T 3 - 4 or 7 - 8	k	10	19	-	0.039	2.86/20.0/100	96/365/696	742/1900/1900
MZB44T 3-4-7-8	j	10	38	-	0.078	2.73/19.9/100	25/91/193	184/694/1323
MZB45R 3 - 4	d	10	19	-	0.039	2.86/20.0/100	96/365/696	742/1900/1900
MZB56A 3-gnd or 4-gnd or 7-gnd	e	3	300	10	0.225	100/1000/1000	0.46/1.37/3.66	145/722/1442
MZB56A 3-4 or 4-7 or 3-7	f	6	600	5	0.45	40/1000/1000	0.13/0.39/1.03	69/206/548
MZB56A 3-4-7	g	6	900	3.3	0.675	40/1000/1000	0.06/0.19/0.49	44/131/349
MZB58P 3 - gnd	c1	7.5	750	10	1.4	11.1/174/1000	0.07/0.20/0.54	26/77/206
MZB58P 4 - gnd	c2	7.5	750	10	1.4	11.1/174/1000	0.07/0.20/0.54	26/77/206
MZB58P 3 - 4	d	7.9	1500	5	2.8	8.8/115/1000	0.02/0.05/0.14	10/30/81
MZB60A 3-gnd or 4-gnd	b	10	200	50	0.5	3.0/20.2/100	0.91/2.72/7.25	74/310/627
MZB60A 3 - 4	d	10	400	25	1.0	3.0/20.2/100	0.2/1.0/1.8	35.6/142.2/284.4
MZB61A 3-gnd or 4-gnd	b	9	100	90	0.225	4.9/40/500	3.72/15/500	163/616/1299

* Not permitted for Groups A/B

A	Release	BVL	7/17/08	Drawing No.:	IS-1.907
Rev	Description	Drft	Date	Scale: NONE	Sheet 4 of 6


Barrier Model Terminals	Configuration	V _{oc} or U _o (V)	I _{sc} or I _o (mA)	R _o (Ohms)	P _o (W)	C _a or C _o (uF) AB/CE/DFG)	L _a or L _o (mH) AB/CE/DFG)	L _a /R _a or L _o /R _o (uH/Ohms) AB/CE/DFG)
MZB61A 3 - 4	d	18	200	45	0.45	0.31/1.78/7.6	0.91/2.72/7.2	62/258/522
MZB61AX 3-gnd or 4-gnd	b	9	26	351	0.58	4.9/40/500	54/208/419	613/2382/2778
MZB61AX 3 - 4	d	18	52	175	0.115	0.31/1.78/7.6	14/55/116	236/870/1747
MZB64A 3-gnd or 4-gnd	b	12	12	1000	0.036	1.41/9/36	240/932/1000	1000/1000/1000
MZB64A 3 - 4	d	24	24	500	0.072	0.125/0.93/3.35	61/226/452	360/1398/1500
MZB65A 3-gnd or 4-gnd	b	15	150	100	0.56	0.58/3.55/14.0	1.45/7.22/14.0	66/263/544
MZB65A 3 - 4	d	15	300	50	1.12	0.58/3.55/14.0	0.32/0.95/2.54	31.6/126.4/252.8
MZB66A 3-gnd or 4-gnd	b	12	80	150	0.24	1.41/9/36	5.8/23/48	151/556/1174
MZB66A 3 - 4	d	24	160	75	0.48	0.125/0.93/3.35	1.41/4.4/11	58/234/481
MZB66AX 3-gnd or 4-gnd	b	12	157	76.4	0.471	1.41/9/36	1.47/4.4/11	78/313/644
MZB66AX 3 - 4	d	24	314	38.2	0.942	0.125/0.93/3.35	0.34/1.02/2.71	29/87/231
MZB67P 3-gnd or 4-gnd	b	15	150	100	0.56	0.58/3.55/14	1.45/7.22/14	66/263/544
MZB67P 3 - 4	d	15	300	50	1.125	0.58/3.55/14	0.32/0.95/2.54	22/108/216
MZB79P 3-gnd or 4-gnd	b	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB79P 3 - 4	d	28.3	188	150	1.3	*/0.63/2.09	*/4.1/7.9	*/108/217
MZB87P 3 - gnd	c1	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB87P 4 - gnd	c2	28	0	diode	-	0.083/0.65/2.15	-	-
MZB87P 3 - 4	d	29.4	93	300	0.65	0.071/0.578/1.91	4.2/12.6/33.9	56/210/444
MZB87PX 3 - gnd	c1	28	119	234.6	0.835	0.083/0.65/2.15	2.5/7.53/20	44/168/354
MZB87PX 4 - gnd	c2	28	0	diode	-	0.083/0.65/2.15	-	-
MZB87PX 3 - 4	d	28.5	119	234.6	0.835	0.078/0.627/2.05	2.51/7.53/20	44/168/354
MZB89P 3-gnd or 7-gnd	h	28	46.5	600	0.33	0.083/0.65/2.15	16/63/133	106/393/781

* Not permitted for Groups A/B

A	Release	BVL	7/17/08	Drawing No.:	IS-1.907
Rev	Description	Drft	Date	Scale: NONE	Sheet 5 of 6

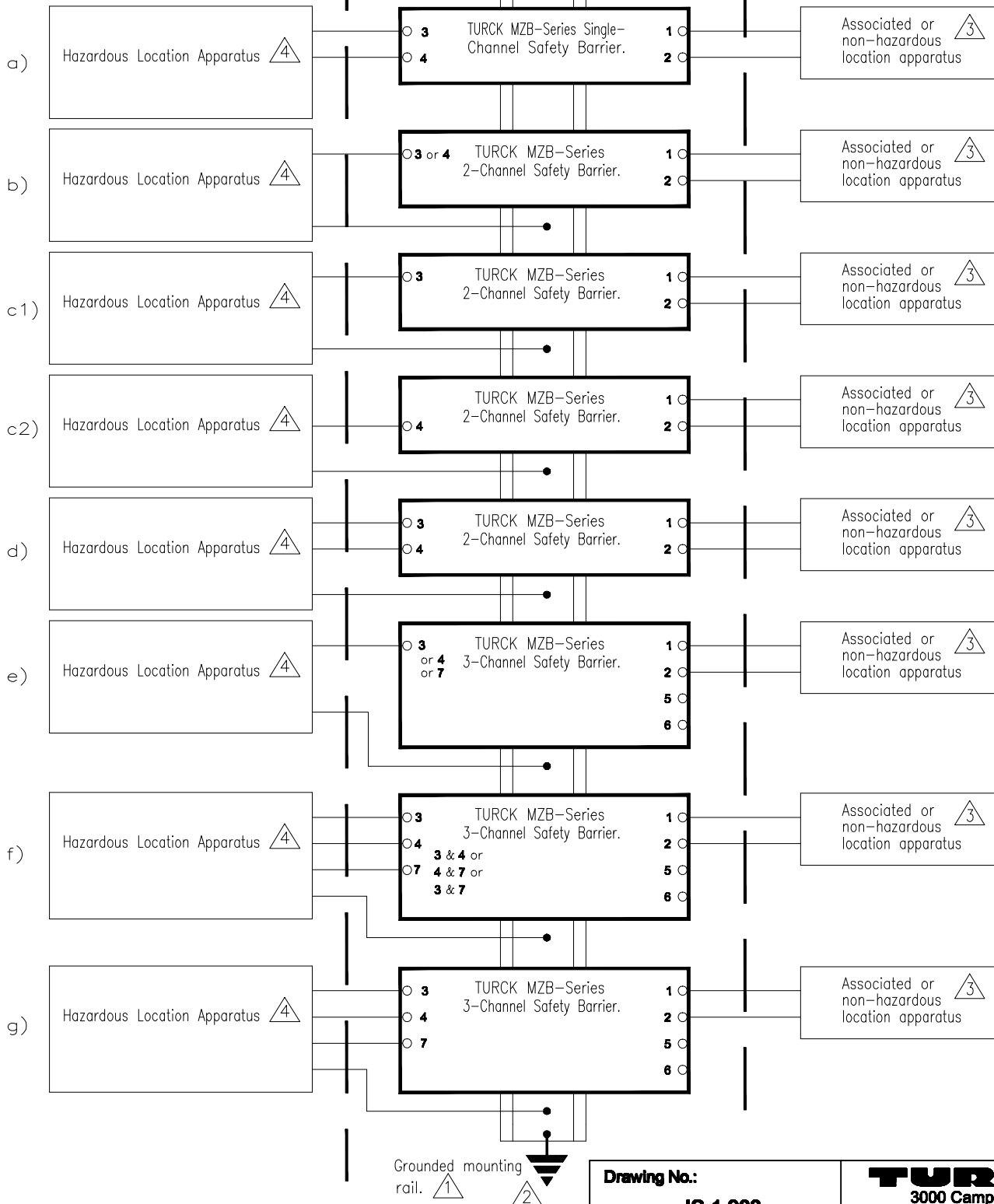
Barrier Model Terminals	Configuration	V _{oc} or U _o (V)	I _{sc} or I _o (mA)	R _o (Ohms)	P _o (W)	C _a or C _o (uF) AB/CE/DFG	L _a or L _o (mH) AB/CE/DFG	L _a /R _a or L _o /R _o (uH/Ohms) AB/CE/DFG
MZB89P 4-gnd or 8-gnd	h	28	0	diode	0	0.083/0.65/2.15	-	-
MZB89P 3-4 & 7-8	j	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB89P 3-4 or 7-8	k	28	46.5	600	0.33	0.083/0.65/2.15	16/63/133	106/393/781



A	Release	BVL	7/17/08	Drawing No.:	IS-1.907
Rev	Description	Drft	Date	Scale: NONE	Sheet 6 of 6

HAZARDOUS LOCATION
 CLASS I, II, III; DIVISION 1
 Groups A,B,C,D,E,F,G or Class I;
 Zone 0,1,2 Groups IIC,IIB,IIA 

NON-HAZARDOUS LOCATION OR
 HAZARDOUS (CLASSIFIED) LOCATION
 CLASS I; DIVISION 2, GROUPS A,B,C,D
 or CLASS I; Zone 2 GROUPS IIC,IIB,IIA

NON-HAZARDOUS LOCATION




Grounded mounting rail.  

Drawing No.: **IS-1.903**
TURCK
 3000 Campus Drive
 Plymouth, MN 55441
 Phone: (763) 553-7300

Title: **Control Drawing for FM Approved MZB Series Barriers**

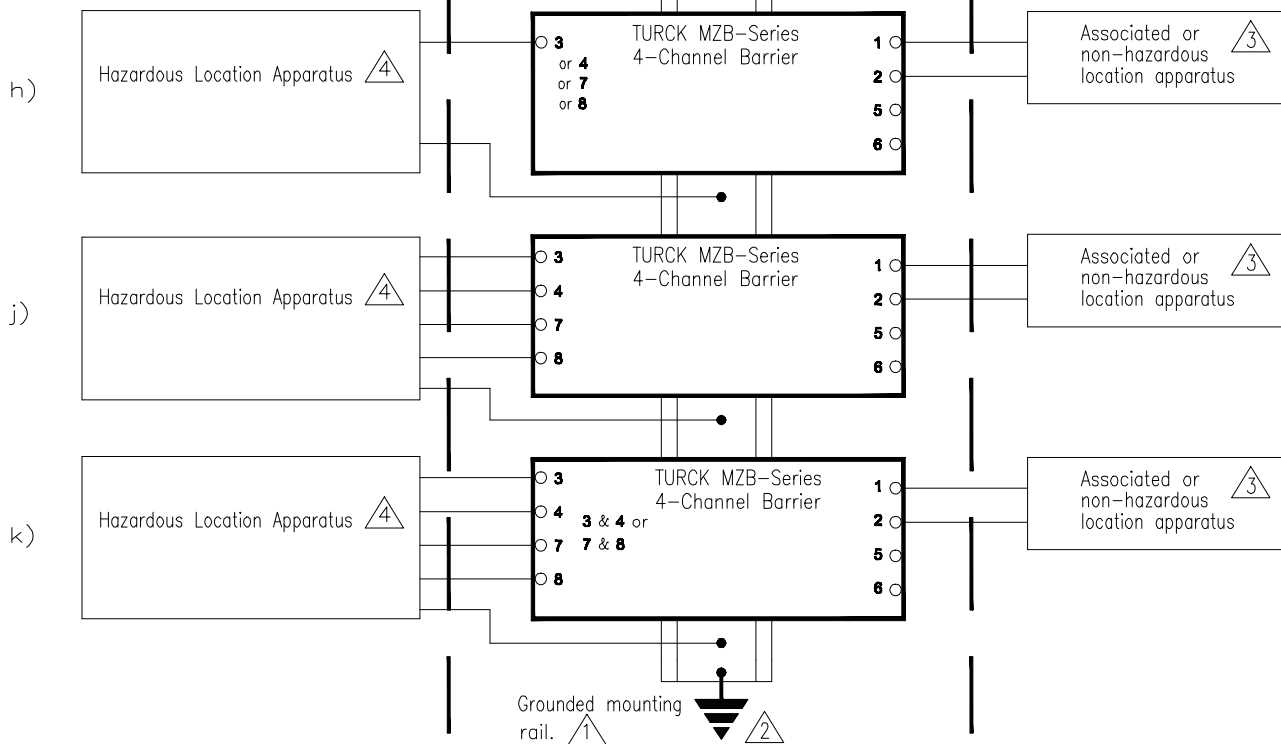
A	Release	BVL	5/1/08
Rev	Description	Draft	Date

Scale: **NONE** Sheet **1** of **6**

HAZARDOUS LOCATION
CLASS I, II, III; DIVISION 1
Groups A,B,C,D,E,F,G or Class I;
Zone 0,1,2 Groups IIC,IIB,IIA 

NON-HAZARDOUS LOCATION OR
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I; DIVISION 2, GROUPS A,B,C,D
or CLASS I; Zone 2 GROUPS IIC,IIB,IIA




NON-HAZARDOUS LOCATION



CONFIGURATIONS

- a) Single channel barrier to one device with ground return.
- b) Dual channel barrier, each channel to separate devices with separate ground returns.
- c1) Dual channel barrier, first channel (power channel on diode return barriers) to separate device with separate ground return.
- c2) Dual channel barrier, second channel (power channel on diode return barriers) to separate device with separate ground return.
- d) Dual channel barrier, both channels to the same device with or without ground return.
- e) Three channel barrier, each channel to separate devices with separate ground returns.
- f) Three channel barrier, two channels to same device with or without ground return and one channel to separate device with separate ground return.
- g) Three channel barrier, three channels to same device with or without ground return.
- h) 1st, 2nd, 3rd, or 4th channel of a four channel barrier, each channel to separate devices with separate ground returns.
- j) Four channel barrier, all channels to same device with or without ground return.
- k) Four channel barrier, channels 1 and 2 or channels 3 and 4 to same device with or without ground return.

Notes:

-  Turck MZB Series shunt diode barriers must be secured to a DIN 'T' section (35x27x7.5mm) mounting rail. Rails constructed of aluminum or aluminum-based alloys must not be used. The mounting rail must be provided with at least one grounding terminal (two are recommended) which should be situated at each end of the rail. These terminals are to be used for the intrinsic safety grounding and must be capable of accommodating conductors up to 12 AWG (4mm in cross-section).
-  The intrinsic safety grounding system must be such that when installed the ground loop impedance (including the mounting rail) does not exceed 1.0 ohm.
-  The nonhazardous (safe) location or Division 2/Zone 2 equipment must not generate or use voltages (U_m) in excess of 250V rms or dc.

A	Release	BVL	5/1/08	Drawing No.:	IS-1.903
Rev	Description	Drft	Date	Scale: NONE	Sheet 2 of 6

Notes (continued):

4. The hazardous location equipment may be:
- a) FM approved equipment suitable for the location in which it is to be installed, with correct entity parameters, or
 - b) Simple apparatus.

If the simple apparatus consists only of switches, then the entity parameter table on subsequent sheets of this drawing applies without any temperature limitation.

If the simple apparatus consists of thermocouples, light emitting diodes or resistance temperature devices, with or without switches, then the maximum output power (Po) from the barrier connected to simple apparatus must not exceed the following:

Maximum barrier output power (Po)	Maximum ambient Temperature (Ta) where simple apparatus is located
1.3 Watts	40°C
1.2 Watts	60°C
1.0 Watts	80°C

5. Barriers must be installed in suitable equipment enclosure meeting requirements of ANSI/ISA S82.02.01 or in compliance with the enclosure, mounting, spacing, and segregation requirements of the ultimate application.

6. MZB Series shunt diode safety barriers are associated apparatus, and when mounted in an appropriate enclosure may be installed in the following locations:

- i Nonhazardous locations
- ii Class I, Division 2, Groups A, B, C or D; or Class I, Zone 2, Group IIC, IIB or IIA hazardous locations:

When installed in a FM Approved or NRTL listed, dust-ignitionproof enclosure, the barriers may also be installed in the following locations:

- iii Class II, Division 2, Groups F or G hazardous locations, T4 temperature code
- iv Class III, Division 2, hazardous locations, T4 temperature code

7. For guidance on the installation refer to ANSI/ISA RP12.6 "Wiring Practices for Hazardous (Classified) Locations Instruments, Part I: Intrinsic Safety" and the National Electrical Code (ANSI/NFPA 70)

8. Entity parameters for barriers listed in the parameters table must be used to determine the suitability of the barrier for connection to hazardous location apparatus. The following must be observed:

$$V_{OC} \text{ or } V_t(U_o) \leq V_{max} (U_i)$$

$$I_{SC} \text{ or } I_t(I_o) \leq I_{max} (I_i)$$

$$P_o \leq P_i$$

$$L_a(L_o) \geq L_{cable} + L_i \text{ or } L_a/R_a(L_o/R_o) \geq L_{cable}/R_{cable} \text{ and } L_a/R_a(L_o/R_o) \geq L_i/R_i$$

9. Certain barriers are not permitted as associated apparatus for Div 1, Groups A, B or Zones 0,1 Group IIC. Refer to entries with asterisks in the following table.

10. When fitted in a nonhazardous location, the barriers may be used at the same maximum ambient temperature as when installed in Division 2 or Zone 2.

WARNING

The following precautions must be taken when MZB Series shunt diode barriers are installed in in Division 2 or Zone 2 hazardous locations.

- i Barriers must not be fitted to or removed from the DIN rail unless power is off or the location is known to be nonhazardous.
- ii Plug in terminals on nonhazardous side of the barriers as well as the bus power terminal jumper of barriers fitted with the bus power feature, must not be inserted or removed unless power is off or the location is known to be nonhazardous.

A	Release	BVL	5/1/08	Drawing No.:	IS-1.903
Rev	Description	Drft	Date	Scale: NONE	Sheet 3 of 6

Barrier Model Terminals	Configuration	V _{oc} or U _o (V)	I _{sc} or I _o (mA)	V _t or U _o (V)	I _t or I _o (mA)	P _o (W)	C _a or C _o (μ F) AB(IIC)/CE(IIB)/DFG(IIA)	L _a or L _o (mH) AB(IIC)/CE(IIB)/DFG(IIA)	L _a /R _a or L _o /R _o (μ H/Ohms) AB(IIC)/CE(IIB)/DFG(IIA)
MZB06 3 - 4	a	28	93	-	-	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB10P 3 - 4	a	10	200	-	-	0.5	3.0/20/100	0.91/2.72/7.25	74/310/627
MZB15P 3 - 4	a	15	150	-	-	0.56	0.58/3.55/14.0	1.45/7.22/14	66/263/544
MZB15PX 3 - 4	a	15	291	-	-	1.09	0.58/3.55/14.0	0.33/0.99/2.64	28/140/280
MZB28P 3 - 4	a	28	93	-	-	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB28PX 3 - 4	a	28	119	-	-	0.83	0.083/0.65/2.15	2.5/7.53/20	44/168/354
MZB29PX 3 - 4	a	28	170	-	-	1.19	*/0.65/2.15	*/5.65/11.34	*/127/260
MZB41R 3 - 4	d	-	-	10	19	0.039	2.86/20.0/100	96/365/696	742/1900/1900
MZB42T 3 - 4	d	-	-	10	19	0.039	2.86/20.0/100	96/365/696	742/1900/1900
MZB43R 3 - 4 or 7 - 8	k	-	-	10	19	0.039	2.86/20.0/100	96/365/696	742/1900/1900
MZB43R 3-4-7-8	j	-	-	10	38	0.078	2.73/19.9/100	25/91/193	184/694/1323
MZB44T 3 - 4 or 7 - 8	k	-	-	10	19	0.039	2.86/20.0/100	96/365/696	742/1900/1900
MZB44T 3-4-7-8	j	-	-	10	38	0.078	2.73/19.9/100	25/91/193	184/694/1323
MZB45R 3 - 4	d	-	-	10	19	0.039	2.86/20.0/100	96/365/696	742/1900/1900
MZB56A 3-gnd or 4-gnd or 7-gnd	e	3	300	-	-	0.225	100/1000/1000	0.46/1.37/3.66	145/722/1442
MZB56A 3-4 or 4-7 or 3-7	f	-	-	6	600	0.45	40/1000/1000	0.13/0.39/1.03	69/206/548
MZB56A 3-4-7	g	-	-	6	900	0.675	40/1000/1000	0.06/0.19/0.49	44/131/349
MZB58P 3 - gnd	c1	7.5	750	-	-	1.4	11.1/174/1000	0.07/0.20/0.54	26/77/206
MZB58P 4 - gnd	c2	7.5	750	-	-	1.4	11.1/174/1000	0.07/0.20/0.54	26/77/206
MZB58P 3 - 4	d	-	-	7.9	1500	2.8	8.8/115/1000	0.02/0.05/0.14	10/30/81
MZB60A 3-gnd or 4-gnd	b	10	200	-	-	0.5	3.0/20.2/100	0.91/2.72/7.25	74/310/627
MZB60A 3 - 4	d	-	-	10	400	1.0	3.0/20.2/100	0.2/1.0/1.8	35.6/142.2/284.4
MZB61A 3-gnd or 4-gnd	b	9	100	-	-	0.225	4.9/40/500	3.72/15/500	163/616/1299

* Not permitted for Groups A/B (IIC)

A	Release	BVL	5/1/08	Drawing No.:	IS-1.903
Rev	Description	Drft	Date	Scale: NONE	Sheet 4 of 6


Barrier Model Terminals	Configuration	V _{oc} or U _o (V)	I _{sc} or I _o (mA)	V _t or U _o (V)	I _t or I _o (mA)	P _o (W)	C _a or C _o (μ F) AB(IIC)/CE(IIB)/DFG(IIA)	L _a or L _o (mH) AB(IIC)/CE(IIB)/DFG(IIA)	L _a /R _a or L _o /R _o (μ H/Ohms) AB(IIC)/CE(IIB)/DFG(IIA)
MZB61A 3 - 4	d	-	-	18	200	0.45	0.31/1.78/7.6	0.91/2.72/7.2	62/258/522
MZB61AX 3-gnd or 4-gnd	b	9	26	-	-	0.58	4.9/40/500	56/208/419	613/2382/2778
MZB61AX 3 - 4	d	-	-	18	52	0.115	0.31/1.78/7.6	14/55/116	236/870/1747
MZB64A 3-gnd or 4-gnd	b	12	12	-	-	0.036	1.41/9/36	240/932/1000	1000/1000/1000
MZB64A 3 - 4	d	-	-	24	24	0.072	0.125/0.93/3.35	61/226/452	360/1398/1500
MZB65A 3-gnd or 4-gnd	b	15	150	-	-	0.56	0.58/3.55/14.0	1.45/7.22/14.0	66/263/544
MZB65A 3 - 4	d	-	-	15	300	1.12	0.58/3.55/14.0	0.32/0.95/2.54	31.6/126.4/252.8
MZB66A 3-gnd or 4-gnd	b	12	80	-	-	0.24	1.41/9/36	5.8/23/48	151/556/1174
MZB66A 3 - 4	d	-	-	24	160	0.48	0.125/0.93/3.35	1.47/4.4/11	58/234/481
MZB66AX 3-gnd or 4-gnd	b	12	157	-	-	0.471	1.41/9/36	1.47/4.4/11	78/313/644
MZB66AX 3 - 4	d	-	-	24	314	0.942	0.125/0.93/3.35	0.34/1.02/2.71	29/87/231
MZB67P 3-gnd or 4-gnd	b	15	150	-	-	0.56	0.58/3.55/14	1.45/7.22/14	66/263/544
MZB67P 3 - 4	d	-	-	15	300	1.125	0.58/3.55/14	0.32/0.95/2.54	22/108/216
MZB79P 3-gnd or 4-gnd	b	28	93	-	-	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB79P 3 - 4	d	-	-	28.3	186	1.3	*/0.63/2.09	*/4.1/7.9	*/108/217
MZB87P 3 - gnd	c1	28	93	-	-	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB87P 4 - gnd	c2	28	0	-	-	-	0.083/0.65/2.15	-	-
MZB87P 3 - 4	d	-	-	29.4	93	0.65	0.071/0.587/1.91	4.2/12.6/33.6	56/210/444
MZB87PX 3 - gnd	c1	28	119	-	-	0.835	0.083/0.65/2.15	2.5/7.53/20	44/168/354
MZB87PX 4 - gnd	c2	28	0	-	-	-	0.083/0.65/2.15	2.5/7.53/20	44/168/354
MZB87PX 3 - 4	d	-	-	28.5	119	0.835	0.078/0.627/2.05	2.5/7.53/20	44/168/354
MZB89P 3-gnd or 7-gnd	h	28	46.5	-	-	0.33	0.083/0.65/2.15	16/63/133	106/393/781

* Not permitted for Groups A/B (IIC)

A	Release	BVL	5/1/08	Drawing No.:	IS-1.903
Rev	Description	Drft	Date	Scale: NONE	Sheet 5 of 6

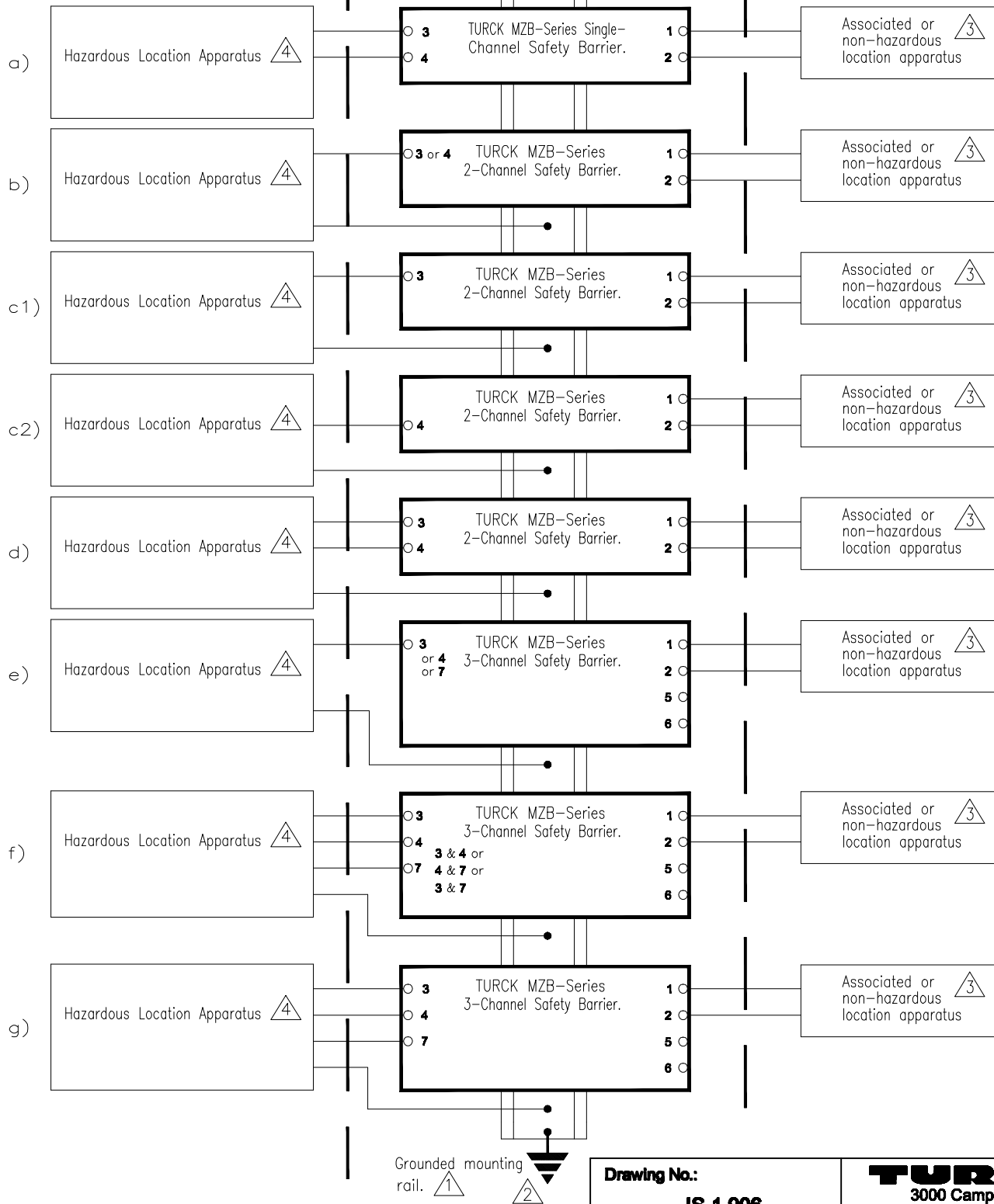
Barrier Model Terminals	Configuration	V _{oc} or U _o (V)	I _{sc} or I _o (mA)	V _t or U _o (V)	I _t or I _o (mA)	P _o (W)	C _a or C _o (uF) AB(IIC)/CE(IIB)/DFG(IIA)	L _a or L _o (mH) AB(IIC)/CE(IIB)/DFG(IIA)	L _a /R _a or L _o /R _o (uH/Ohms) AB(IIC)/CE(IIB)/DFG(IIA)
MZB89P 4-gnd or 8-gnd	h	28	0	-	-	0	0.083/0.65/2.15	-	-
MZB89P 3-4 & 7-8	j	-	-	28	93	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB89P 3-4 or 7-8	k	-	-	28	46.5	0.33	0.083/0.65/2.15	16/63/133	106/393/781

A	Release	BVL	5/1/08	Drawing No.:	IS-1.903
Rev	Description	Drft	Date	Scale: NONE	Sheet 6 of 6

HAZARDOUS LOCATION
CLASS I, II, III; DIVISION 1
Groups A,B,C,D,E,F,G 

NON-HAZARDOUS LOCATION OR
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I; DIVISION 2, GROUPS A,B,C,D

NON-HAZARDOUS LOCATION




Drawing No.: IS-1.906	TURCK 3000 Campus Drive Plymouth, MN 55441 Phone: (763) 553-7300
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Title: Control Drawing for UL Listed MZB Series Barriers

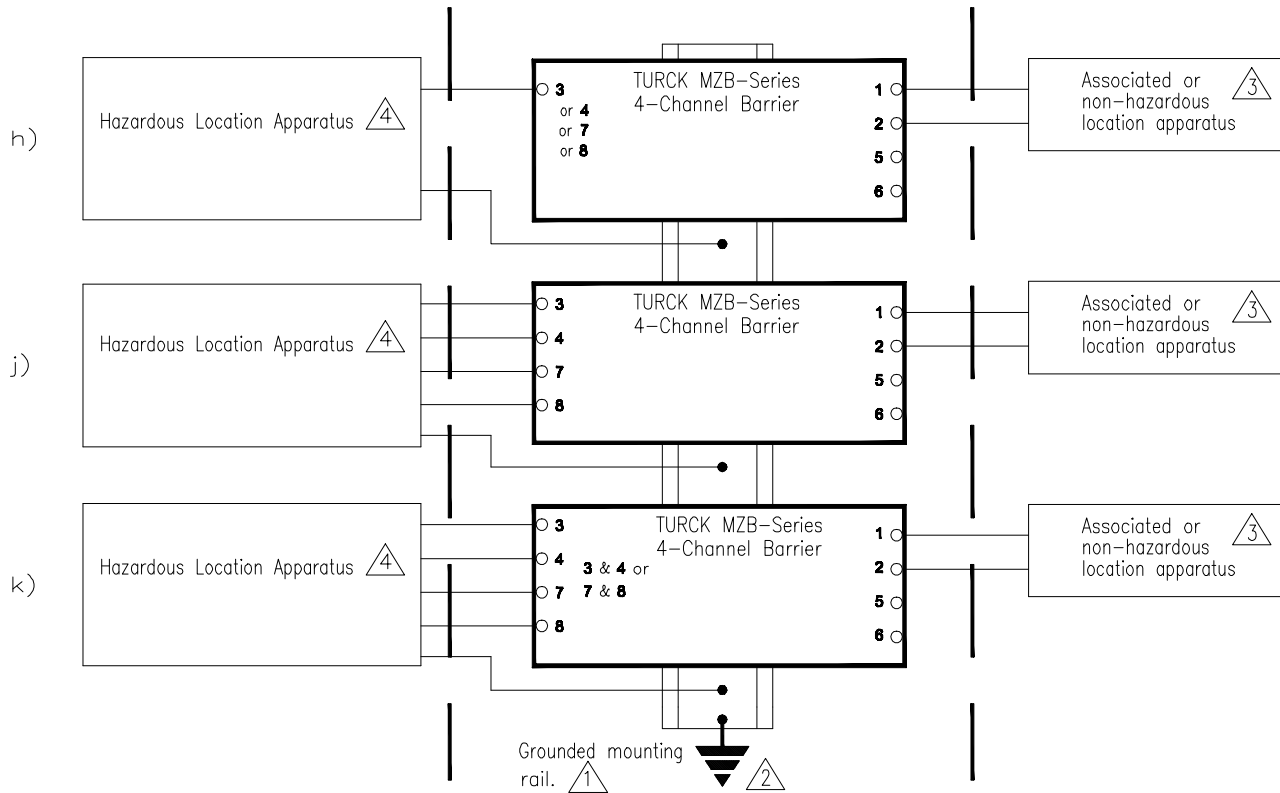
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HAZARDOUS LOCATION
CLASS I, II, III; DIVISION 1
Groups A,B,C,D,E,F,G 

NON-HAZARDOUS LOCATION OR
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I; DIVISION 2, GROUPS A,B,C,D




NON-HAZARDOUS LOCATION



CONFIGURATIONS

- a) Single channel barrier to one device with ground return.
- b) Dual channel barrier, each channel to separate devices with separate ground returns.
- c1) Dual channel barrier, first channel (power channel on diode return barriers) to separate device with separate ground return.
- c2) Dual channel barrier, second channel (power channel on diode return barriers) to separate device with separate ground return.
- d) Dual channel barrier, both channels to the same device with or without ground return.
- e) Three channel barrier, each channel to separate devices with separate ground returns.
- f) Three channel barrier, two channels to same device with or without ground return and one channel to separate device with separate ground return.
- g) Three channel barrier, three channels to same device with or without ground return.
- h) 1st, 2nd, 3rd, or 4th channel of a four channel barrier, each channel to separate devices with separate ground returns.
- j) Four channel barrier, all channels to same device with or without ground return.
- k) Four channel barrier, channels 1 and 2 or channels 3 and 4 to same device with or without ground return.

Notes:

-  Turck MZB Series shunt diode barriers must be secured to a DIN 'T' section (35x27x7.5mm) mounting rail. Rails constructed of aluminum or aluminum-based alloys must not be used. The mounting rail must be provided with at least one grounding terminal (two are recommended) which should be situated at each end of the rail. These terminals are to be used for the intrinsic safety grounding and must be capable of accommodating conductors up to 12 AWG (4mm in cross-section).
-  The intrinsic safety grounding system must be such that when installed the ground loop impedance (including the mounting rail) does not exceed 1.0 ohm.
-  The nonhazardous (safe) location or Division 2/Zone 2 equipment must not generate or use voltages (U_m) in excess of 250V rms or dc with respect to earth.

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Notes (continued):

4. The hazardous location equipment may be UL Listed devices suitable for the locations in which it is to be installed and with correct Entity parameters or Simple Apparatus.
 If the simple apparatus consists only of switches, then the entity parameter table on subsequent sheets of this drawing applies without any temperature limitation.
 If the simple apparatus consists of thermocouples (TC), light emitting diodes (LEDs) or resistance temperature devices (RTDs), with or without switches, then the maximum output power (P_o) from the barrier connected to simple apparatus must not exceed the following:

Maximum barrier output power (P_o)	Maximum ambient Temperature (T_a) where simple apparatus is located
1.3 Watts	40°C

5. Barriers must be installed in suitable equipment that complies with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
6. MZB Series shunt diode safety barriers are associated apparatus, and when mounted in an appropriate enclosure may be installed in the following locations:
- i Nonhazardous locations
 - ii Class I, Division 2, Groups A, B, C or D; T4 temperature Code
- When installed in a Listed, dust-ignitionproof enclosure, the barriers may also be installed in the following locations:
- iii Class II, Division 2, Groups F or G hazardous locations, T4 temperature code
 - iv Class III, Division 2, hazardous locations, T4 temperature code
7. Barriers must be installed in accordance with the barrier manufacturer's control drawing and Article 504 of the National Electrical Code (ANSI/NFPA 70) for installation in the United States.
8. Entity parameters for barriers listed in the parameters table must be used to determine the suitability of the barrier for connection to hazardous location apparatus. The following must be observed:
- $$V_{OC} \text{ or } V_t(U_o) \leq V_{max} (U_i)$$
- $$I_{SC} \text{ or } I_t (I_o) \leq I_{max} (I_i)$$
- $$P_o \leq P_i$$
- $$C_a (C_o) \geq C_{cable} + C_i$$
- $$L_a (L_o) \geq L_{cable} + L_i \text{ or } L_a/R_a(L_o/R_o) \geq L_{cable}/R_{cable} \text{ and } L_a/R_a(L_o/R_o) \geq L_i/R_i$$

9. Certain barriers are not permitted as associated apparatus for Div 1, Groups A, B or Zones 0,1 Group IIC. Refer to entries with asterisks in the following table.
10. When fitted in a nonhazardous locaton, the barriers may be used at the same maximum ambient temperature as when installed in Division 2.

WARNING

The following precautions must be taken when MZB Series shunt diode barriers are installed in in Division 2 hazardous locations:

- i Barriers must not be fitted to or removed from the DIN rail unless power is off or the location is known to be free of flammable vapors.
- ii Plug in terminals on nonhazardous side of the barriers as well as the bus power terminal jumper of barriers fitted with the bus power feature, must not be inserted or removed unless power is off or the location is known to be free of flammable vapors.

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Barrier Model Terminals	Configuration	V _{oc} or U _o (V)	I _{sc} or I _o (mA)	R _o (Ohms)	P _o (W)	C _a or C _o (uF) AB/CE/DFG)	L _a or L _o (mH) AB/CE/DFG)	L _a /R _a or L _o /R _o (uH/Ohms) AB/CE/DFG)
MZB06 3 - 4	a	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB10P 3 - 4	a	10	200	50	0.5	3.0/20/100	0.91/2.72/7.25	74/310/627
MZB15P 3 - 4	a	15	150	100	0.56	0.58/3.55/14.0	1.45/7.22/14	66/263/544
MZB15PX 3 - 4	a	15	291	51	1.09	0.58/3.55/14.0	0.33/0.99/2.64	28/140/280
MZB28P 3 - 4	a	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB28PX 3 - 4	a	28	119	234.6	0.83	0.083/0.65/2.15	2.5/7.53/20	44/168/354
MZB29PX 3 - 4	a	28	170	164	1.19	*/0.65/2.15	*/5.65/11.34	*/127/260
MZB41R 3 - 4	d	10	19	-	0.039	2.86/20.0/100	96/365/696	658/1900/1900
MZB42T 3 - 4	d	10	19	-	0.039	2.86/20.0/100	96/365/696	658/1900/1900
MZB43R 3 - 4 or 7 - 8	k	10	19	-	0.039	2.86/20.0/100	96/365/696	658/1900/1900
MZB43R 3-4-7-8	j	10	38	-	0.078	2.73/19.9/100	25/91/193	184/694/1323
MZB44T 3 - 4 or 7 - 8	k	10	19	-	0.039	2.86/20.0/100	96/365/696	658/1900/1900
MZB44T 3-4-7-8	j	10	38	-	0.078	2.73/19.9/100	25/91/193	184/694/1323
MZB45R 3 - 4	d	10	19	-	0.039	2.86/20.0/100	96/365/696	658/1900/1900
MZB56A 3-gnd or 4-gnd or 7-gnd	e	3	300	10	0.225	100/1000/1000	0.46/1.37/3.66	145/722/1442
MZB56A 3-4 or 4-7 or 3-7	f	6	600	5	0.45	40/1000/1000	0.13/0.39/1.03	69/206/548
MZB56A 3-4-7	g	6	900	3.3	0.675	40/1000/1000	0.06/0.19/0.49	44/131/349
MZB58P 3 - gnd	c1	7.5	750	10	1.4	11.1/174/1000	0.07/0.20/0.54	26/77/206
MZB58P 4 - gnd	c2	7.5	750	10	1.4	11.1/174/1000	0.07/0.20/0.54	26/77/206
MZB58P 3 - 4	d	8	1500	5	2.8	8.4/100/1000	0.02/0.05/0.14	10/30/81
MZB60A 3-gnd or 4-gnd	b	10	200	50	0.5	3.0/20.2/100	0.91/2.72/7.25	74/308/617
MZB60A 3 - 4	d	10	400	25	1.0	3.0/20.2/100	0.2/1.0/1.8	35.6/142.2/284.4
MZB61A 3-gnd or 4-gnd	b	9	100	90	0.225	4.9/40/500	3.65/14.6/29.2	160/616/1281

* Not permitted for Groups A/B

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Barrier Model Terminals	Configuration	V _{oc} or U _o (V)	I _{sc} or I _o (mA)	R _o (Ohms)	P _o (W)	C _a or C _o (uF) AB/CE/DFG)	L _a or L _o (mH) AB/CE/DFG)	L _a /R _a or L _o /R _o (uH/Ohms) AB/CE/DFG)
MZB61A 3 - 4	d	18	200	45	0.45	0.31/1.78/7.6	0.91/2.72/7.2	62/258/522
MZB61AX 3-gnd or 4-gnd	b	9	26	351	0.58	4.9/40/500	54/208/419	613/2382/2778
MZB61AX 3 - 4	d	18	52	175	0.115	0.31/1.78/7.6	13.5/52.6/105.2	236/870/1747
MZB64A 3-gnd or 4-gnd	b	12	12	1000	0.036	1.41/9/36	240/932/1000	1000/1000/1000
MZB64A 3 - 4	d	24	24	500	0.072	0.125/0.93/3.35	61/226/452	360/1398/1500
MZB65A 3-gnd or 4-gnd	b	15	150	100	0.56	0.58/3.55/14.0	1.45/7.16/14.3	66/263/544
MZB65A 3 - 4	d	15	300	50	1.12	0.58/3.55/14.0	0.32/0.95/2.54	31.6/126.4/252.8
MZB66A 3-gnd or 4-gnd	b	12	80	150	0.24	1.41/9/36	5.6/22.4/44.9	149/556/1174
MZB66A 3 - 4	d	24	160	75	0.48	0.125/0.93/3.35	1.41/4.4/11	58/234/481
MZB66AX 3-gnd or 4-gnd	b	12	157	76.4	0.471	1.41/9/36	1.47/4.4/11	78/313/644
MZB66AX 3 - 4	d	24	314	38.2	0.942	0.125/0.93/3.35	0.34/1.02/2.71	29/87/231
MZB67P 3-gnd or 4-gnd	b	15	150	100	0.56	0.58/3.55/14	1.45/7.22/14	66/263/544
MZB67P 3 - 4	d	15	300	50	1.125	0.58/3.55/14	0.32/0.95/2.54	22/108/216
MZB79P 3-gnd or 4-gnd	b	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB79P 3 - 4	d	28.5	188	150	1.3	*/0.627/2.05	*/4.1/7.9	*/108/212
MZB87P 3 - gnd	c1	28	93	300	0.65	0.083/0.65/2.15	4.2/12.6/33.6	56/210/444
MZB87P 4 - gnd	c2	28	0	diode	-	0.083/0.65/2.15	-	-
MZB87P 3 - 4	d	29.6	94	300	0.698	0.07/0.578/1.88	3.99/12.6/31.9	50/203/407
MZB87PX 3 - gnd	c1	28	119	234.6	0.835	0.083/0.65/2.15	2.5/7.53/20	44/168/354
MZB87PX 4 - gnd	c2	28	0	diode	-	0.083/0.65/2.15	-	-
MZB87PX 3 - 4	d	30.7	122	252	0.934	0.061/0.524/1.7	2.4/7.53/19.2	38.1/152/304.5
MZB89P 3-gnd or 7-gnd	h	28	46.5	600	0.33	0.083/0.65/2.15	16/63/133	106/393/781

* Not permitted for Groups A/B

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Barrier Model Terminals	Configuration	V _{oc} or U _o (V)	I _{sc} or I _o (mA)	R _o (Ohms)	P _o (W)	C _a or C _o (uF) AB/CE/DFG	L _a or L _o (mH) AB/CE/DFG	L _a /R _a or L _o /R _o (uH/Ohms) AB/CE/DFG
MZB89P 4-gnd or 8-gnd	h	28	0	diode	0	0.083/0.65/2.15	-	-
MZB89P 3-4 & 7-8	j	29.6	96	300	0.72	0.07/0.587/1.88	3.8/15.4/30.8	50.8/200.7/401
MZB89P 3-4 or 7-8	k	29.6	48	600	0.36	0.07/0.587/1.88	15.4/61.7/123.5	100.7/393/781

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Approvals/ FM Entity Parameters



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