

## Installations of IDEC Intrinsically Safe System Type EB3C-N Relay Barrier

Draw. No. B-1340-7 rev.C  
Nov. 4, 2014

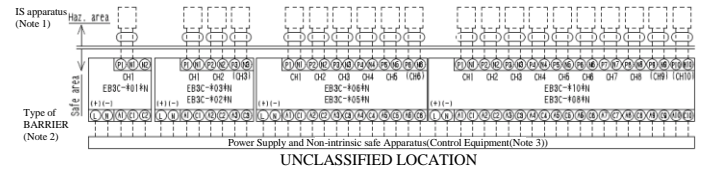
When installing an IDEC Type EB3C-N Relay Barrier, make sure it conforms to the following drawings and descriptions as well as all applicable requirements. ANSI/NFPA70.

- This associated apparatus may also be connected to simple apparatus as defined in Article 504.2 and installed and temperature classified in accordance with Article 504.10(B) of the National Electrical Code (ANSI/NFPA 70), or other local codes, as applicable.
- Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations. Cable capacitance, C<sub>cable</sub>, plus intrinsically safe equipment capacitance, C<sub>i</sub> must be less than the marked capacitance, C<sub>a</sub> (or C<sub>o</sub>), shown on any associated apparatus used. The same applies for inductance (L<sub>cable</sub>, L<sub>i</sub> and L<sub>a</sub> or L<sub>o</sub>, respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used: C<sub>cable</sub> = 60 pF/ft., L<sub>cable</sub> = 0.2 μH/ft.
- Where multiple circuits extend from the same piece of associated apparatus, they must be installed in separate cables or in one cable having suitable insulation. Refer to Article 504.30(B) of the National Electrical Code (ANSI/NFPA 70) and Instrument Society of America Recommended Practice ISA RP12.6 for installing intrinsically safe equipment.
- Intrinsically safe circuits must be wired and separated in accordance with Article 504.20 of the National Electrical Code (ANSI/NFPA 70) or other local codes, as applicable.
- This associated apparatus has not been evaluated for use in combination with another associated apparatus.
- Control equipment must not use or generate more than 125V rms or 125V dc with respect to earth.
- For installations in which both the C<sub>i</sub> and L<sub>i</sub> of the intrinsically safe apparatus exceeds 1% of the C<sub>o</sub> and L<sub>o</sub> parameters of the associated apparatus (excluding the cable), then 50% of C<sub>o</sub> and L<sub>o</sub> parameters are applicable and shall not be exceeded. (In the case of 50% of C<sub>o</sub> and L<sub>o</sub> parameters are applicable, the maximum capacitance allowed shall not be more than C<sub>o</sub> = 1 μF for IIB and C<sub>o</sub> = 600 nF for IIC.)

### Wiring Example (IS terminals: Pn= +, Nn= -)

Channel separate wiring (any one channel)

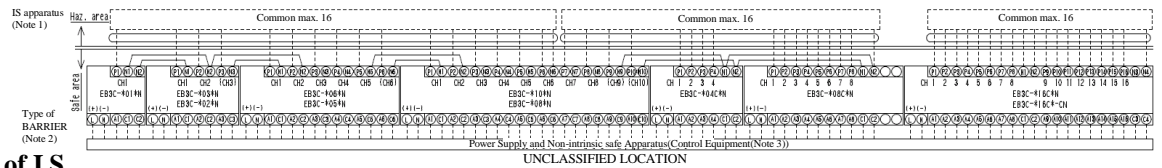
HAZARDOUS (CLASSIFIED) LOCATION  
Class I, II and III, Division 1, Groups A, B, C, D, E, F and G



### Channel common wiring (Common max. 16 between any Pn(+) terminals and any Nn(-) terminal)

Note: To set up common wiring, connect two "N" terminals between adjoining Relay Barriers in parallel.

HAZARDOUS (CLASSIFIED) LOCATION Class I, II and III, Division 1, Groups A, B, C, D, E, F and G  
Class I, Zone 0, [AExia] IIC



### • Rating and Parameters of IS.

Ta= 60°C, Um= 125V, Uo=13.2V, Io= 14.2mA, Po= 46.9mW at each channel Pn-Nn

Io=227.2mA, Po= 750mW at max 16 channels Pn-Nn

Io(mA)	14.2	28.4	42.6	56.8	71.0	85.2	99.4	113.6	127.8	142.0	156.2	170.4	184.6	198.8	213.0	227.2	Combined Lo(mH)	Note 2 The intrinsic safe apparatus and wirings shall be accordance to following formulas; for examples, $U_i \geq U_o$ $I_i \geq I_o$ $P_i \geq P_o$ $C_i + C_c \leq C_o$ $L_i + L_c \leq L_o$	
Po(mW)	46.9	93.8	140.6	187.5	234.3	281.2	328.1	375.9	421.8	468.7	515.5	562.4	609.2	656.1	702.9	750			
Co(μF)	0.67	0.65	0.63	0.61	0.59	0.57	0.55	0.53	0.51	0.49	0.47	0.44	0.42	0.39	-	-	1.0		
	0.79	0.77	0.76	0.75	0.73	0.72	0.70	0.69	0.67	0.66	0.64	0.62	0.61	0.59	0.57	0.55	0.5		
	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.93	0.92	0.91	0.90	0.88	0.87	0.86	0.85	0.84	0.2		
0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.1		
Note 1 Added to above table, the next values combined Lo and Co are allowable;																			
Io(mA)	14.2				28.4				227.2										
Lo(mH)	175*	87.5	30.0	2.5	0.55	0.25	43.5*	21.5	20.0	3.5	0.43	0.25	0.68*	0.34	0.68	0.6	0.22	0.13	
Co(μF)	0.90*	0.45	0.33	0.54	0.77	0.90	0.90*	0.45	0.30	0.48	0.80	0.90	0.90*	0.45	0.45	0.49	0.80	0.90	
*: Therefore, the values are allowable only at $L_i \leq 1\%L_o$ and $C_i \leq 1\%C_o$ of the intrinsic safe apparatus. (In the case of 50% of C <sub>o</sub> and L <sub>o</sub> parameters are applicable, the maximum capacitance allowed shall not be more than C <sub>o</sub> = 1 μF for IIB and C <sub>o</sub> = 600 nF for IIC.)																			

### Note

1. Use intrinsically safe equipment that is UL or simple apparatus (a device which will neither generate nor store more than 1.5V, 0.1A, 25mW such as switches, thermocouples, LED's and RTD's).
2. Install the EB3C-N relay barrier in compliance with the enclosure, mounting, spacing, and segregation requirements of the ultimate application.
3. Make sure that the control equipment connected to the EB3C-N relay barrier does not use or generate more than 125 Vrms or 125Vdc (Um = 125V).
4. Make sure that all bolts, nuts, screws, and other means of fastening, including the unused wiring screws, are fastened in place, properly tightened and secured. Mount the EB3C-N on a 35mm track or directly on a panel surface using screws.
5. Make the layout and wiring so as to prevent the electromagnetic or electrostatic inductions to the intrinsically safe circuit. For example, separate the intrinsically safe circuit from the non-intrinsically safe circuit by a minimum space of 50 mm or using a full height metal separator. If color-coding is required for the intrinsic safe components and terminals, use only cables and terminals with light blue markings.

### ■ General Specification

Power Supply	100V to 120V AC (50/60Hz) 24V DC Class 2
Operating Temperature	-20 to 60 °C (no freezing)
Operating Humidity	45 to 85 %RH (no condensation)
Pollution Degree	2
Altitude	2000m under
Dielectric Strength	Between intrinsically safe circuit and non-intrinsically safe circuit :1526.4V Between AC power and signal input:1500V AC

### ■ Power consumption

Number of Circuit	AC power supply(VA)		DC power supply (W)	
	at 120V AC(50/60Hz)(MAX)		at 26.4V DC (MAX)	
	R	T	R	T
01	4.1	3.8	1.1	1
02	4.7	4.2	1.4	1.2
03	5.4	4.5	1.7	1.3
05	6.6	5.2	2.4	1.7
06	7.2	5.5	2.7	1.8
08	8.3	6.1	3.3	2.2
10	9.6	6.7	3.9	2.5
08C	8.3	6.1	3.3	2.2
16C	-	8.6	5.8	3.5
16C-C	-	-	-	3.5

R: Relay output T: Transistor output