

# | INTRINSIC SAFETY BARRIER

## ELECTRONIC MODULES



### Introduction

This Intrinsic Safety Barrier Module is the perfect complement to our Intrinsically Safe Encoders and, when used together, constitutes a completely engineered solution for encoder operation in Class I and Class II, Division 1 (Zone 0) Hazardous Environments. This single barrier provides both power and signal isolation for an incremental encoder with differential quadrature outputs and an index. This all-in-one approach saves the cost, inconvenience and system design time needed when using separate power and signal barriers. This barrier is galvanically isolated which eliminates the added cost of maintaining a high integrity earth ground. With differential line driver outputs, this barrier can be used to carry signals reliably up to 500 feet with a bandwidth of up to 250 kHz. It is designed around a standard DIN Rail mounting (Type EN 50022, 35 mm X 7.5 mm) for easy installation in standard enclosures. A length of DIN rail is supplied with each module. The module simply snaps directly to the DIN rail and is ready to use.

The Intrinsic Safety Barrier Module is also certified to be installed in Class I, Div. 2 (Zone 2) areas.

When properly connected, differential data signals have an inherent immunity to noise since it is rejected as common mode. However if a connection between the encoder and the barrier is broken or improperly terminated it can act as an antenna and still create a signal. An open wire detection (ISD) option is available on BEI's Intrinsically Safe Barriers (28V/V and 28V/5 only). In the event that the data line is cut or not properly connected the ISD option can detect a change in the impedance of the connection and cause the output data on both legs of the differential signal to go low. This creates an erroneous logic state that can be used by the operator to halt or modify a process.

### SPECIFICATIONS

| Power Supply / Output Type                                                                                                                                                                           |                        |                                              |                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------|---------------------------------------------------------------------|
| Part Number                                                                                                                                                                                          | Barrier Supply: Vs ±5% | Output logic to Non-hazardous Area Apparatus |                                                                     |
| 60004-002                                                                                                                                                                                            | 12-28 VDC              | Vout = 5V                                    | Line Driver<br>up to 100 mA source/sink<br>(TTL & RS422 compatible) |
| 60004-003                                                                                                                                                                                            |                        | Vout = Vin                                   | Line Driver<br>up to 100 mA source/sink                             |
| 60004-004                                                                                                                                                                                            |                        | Open Collector                               | NPN<br>up to 80 mA sink                                             |
| 60004-005                                                                                                                                                                                            |                        | Vout = 5V                                    | Line Driver<br>up to 100 mA source/sink<br>Open wire detect option  |
| 60004-006                                                                                                                                                                                            |                        | Vout = Vin                                   | Line Driver<br>up to 100 mA source/sink<br>Open wire detect option  |
|  Caution: Operation above or below barrier supply voltage (Vs) range noted will cause permanent damage to barrier |                        |                                              |                                                                     |

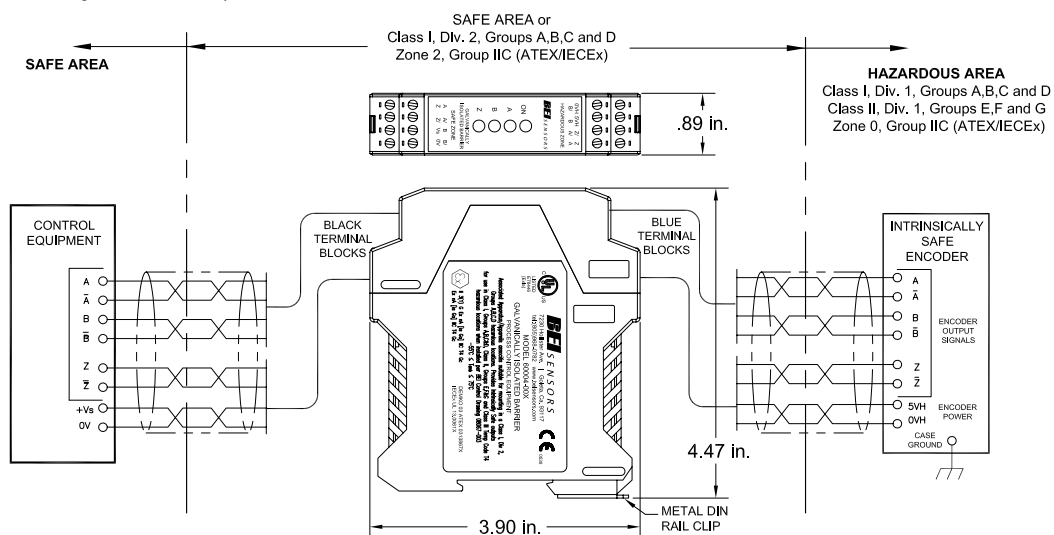
| Barrier Parameters  |          |          |                                                   |         |                  |                                                      |         |                  |                                                          |         |                   |
|---------------------|----------|----------|---------------------------------------------------|---------|------------------|------------------------------------------------------|---------|------------------|----------------------------------------------------------|---------|-------------------|
|                     |          |          | Class I, Gp D<br>Class II, Gps E,F,G<br>Group IIA |         |                  | Class I, Gps C,D<br>Class II, Gps E,F,G<br>Group IIB |         |                  | Class I, Gps A,B,C,D<br>Class II, Gps E,F,G<br>Group IIC |         |                   |
| Barrier Output (Po) | Voc (Vo) | Isc (Io) | Ca (Co)                                           | La (Lo) | L/R Ratio        | Ca (Co)                                              | La (Lo) | L/R Ratio        | Ca (Co)                                                  | La (Lo) | L/R Ratio         |
| 870 mW              | 9.48 VDC | 367 mA   | 255 uF                                            | 2.1 mH  | 327 uH/ $\Omega$ | 27 uF                                                | 1.05 mH | 160 uH/ $\Omega$ | 3.7 uF                                                   | 0.26 mH | 40.8 uH/ $\Omega$ |

| Input to Barrier from Encoder |                                                        |
|-------------------------------|--------------------------------------------------------|
| Signals                       | A, B, Z, A/, B/, Z/ differential or A,B,Z single-ended |
| Input Signal Impedance        | 500 $\Omega$ nominal (A to A/, B to B/, Z to Z/)       |
| Input Signal level            | 4 VDC minimum, 6 VDC maximum                           |



## GENERAL WIRING DIAGRAM

(see BEI Sensors drawing 08067-003 for important details)

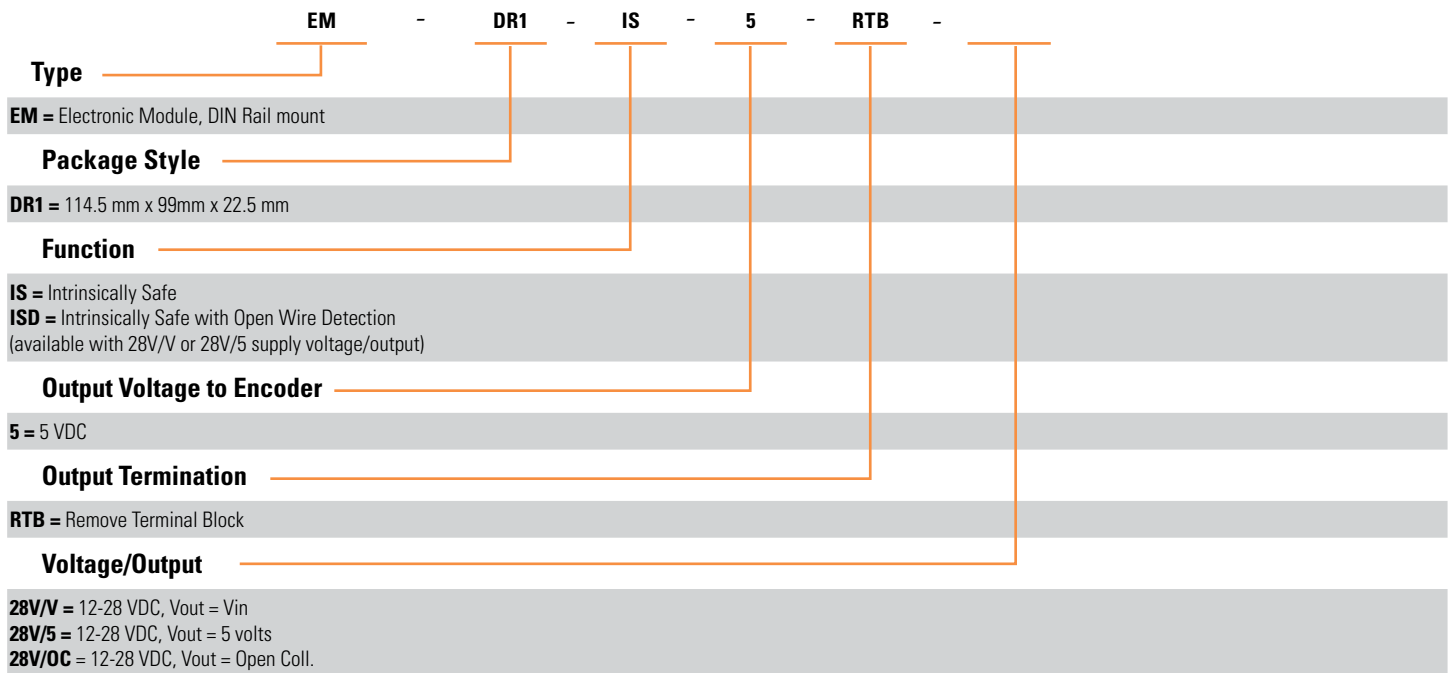




## ORDERING OPTIONS

Example : EM-DR1-IS-5-RTB-28V/V

Use this diagram, working from left to right to construct your model number



## AGENCY APPROVALS & CERTIFICATES

This Intrinsic Safety Barrier has certifications to be used as an associated apparatus for intrinsically safe encoders installed in the following hazardous locations:



US Class I, Group A,B,C,D;  
Class II, Groups E,F,G; Class III



II 3 (1) G Ex nA [ia Ga] IIC T4 Gc



Canadian Class I, Zone 0, Group IIC



Ex nA [ia Ga] IIC T4 Gc



EN 55011 and 61000-6-2

Made In France

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