

MIL-157 SERIES OPTICAL INCREMENTAL ENCODERS

The MIL-Series incremental encoders represents BEI's response to today's high reliability optical encoder demands. By utilizing state-of-the-art design techniques and offering the most common resolutions, the MIL-157 presents a highly accurate and reliable off-the-shelf solution to high-rel needs in a compact package size.

The electronics were designed to meet the stringent requirements of MIL-STD-454 to insure the highest level of quality and reliability. Seals at the connector and housing provide reliable protection for the electronics and optics assemblies against water spray and oil mist. An optional (at no extra cost) shaft seal provides additional protection from fluid contamination.



OPTIONS:

- Zero reference signal
- Shaft seal
- Special shaft configurations
- Other disk resolutions
- Mil-Temp (Non 883 Screened) parts
- Connector pin-outs or wire colors to customer requirements
- Screened LED and photodetectors

FEATURES:

- Single solid state LED light source
- Single substrate photocell array
- Printed wiring boards designed to MIL-STD-275 and procured per MIL-P-55110
- Integrated circuits screened per MIL-STD-883, Level B
- Complementary digital outputs from DS7830 line drivers
- Resolution to 2048 cycles per turn
- Incremental output code of two signals phased 90 elec. deg. apart
- All units 100% inspected for electrical and mechanical features
- Meets or exceeds applicable portions of MIL-STD-810 Methods 514.3 and 516.3

MODEL NUMBER STRUCTURE

STANDARD DISK RESOLUTIONS	
Description	Counts/Turn
0060	60
0120	120
0128	128
0240	240
0256	256
0360	360
0512	512
0720	720
1024	1024
1440	1440
2048	2048

NOTE: Any disk resolution less than 512 is available with any of standard options.

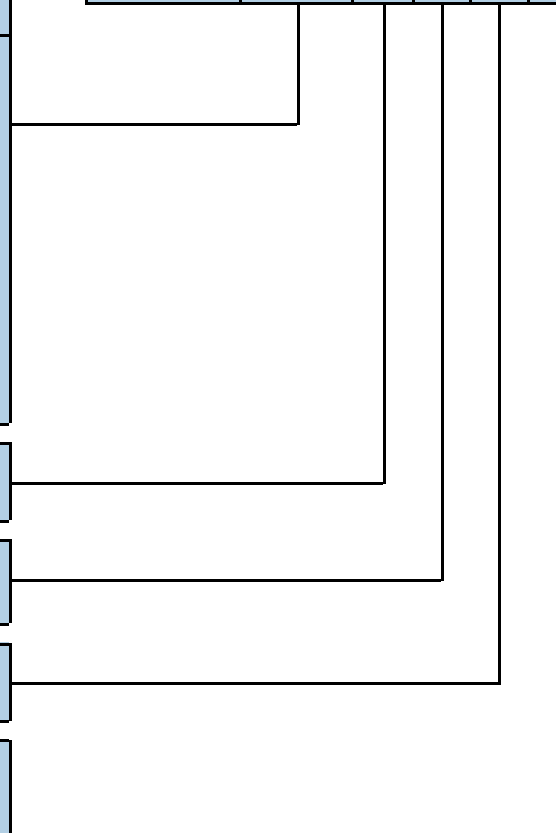
MIL-157-	XXXX	A	Z	S	/E
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INTERNAL ELECTRONICS OPTION:
 "A" - Schmitt-trigger outputs in quadrature

ZERO REFERENCE OPTION:
 Place a "Z" here if reference required

SHAFT SEAL OPTION:
 Place an "S" here if seal required

CONNECTOR OPTION:
 No designator for end mtg connector
 "/EC" - End exit cable with DA-15P connector
 "/SC" - Side exit cable with DA-15P connector
 "/E" - End exit cable with flying leads
 "/S" - Side exit cable with flying leads



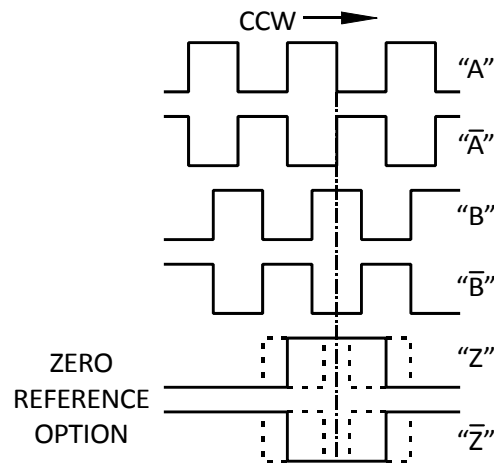
Approved for general release.

CONNECTOR PIN FUNCTIONS

PIN NO.	WIRE COLOR	FUNCTION
1	Orange	A count-signal (Lead)
2	Yellow	\bar{A} count-signal
4	Blue	B count-signal (Lag)
5	Violet	\bar{B} count-signal
7	White	C zero-reference
8	Gray	\bar{C} zero-reference
10	Red	+ 5 VDC input
12	Black	Circuit Ground
15	Brown	Case Ground

Lead/Lag relationship shown above assumes counter clockwise shaft rotation as viewed from shaft end.

SCHMITT TRIGGER OUTPUT WAVEFORMS



SPECIFICATIONS

ELECTRICAL

Power Required:	+5.0 ± 0.25 Vdc at 150 mA max
Output Logic Level:	
Binary "1":	1.8 Vdc min at -40mA source
Binary "0":	0.5 Vdc max at +40mA sink
Risetime and Falltime:	200 nsec. max (measured from 10% to 90% level)
Output Frequency Range:	0 to 50 KHz or 5000 rpm
Code:	Incremental – Two count tracks phased 90 ± 30 electrical degrees apart - 2048 cpt max
Accuracy:	
Bit-to-Bit:	5 arcsec rms typical
Absolute:	32 arcsec rms typical

MECHANICAL

Weight:	6.0 oz. max
Torque:	(at 21 degrees centigrade)
Starting:	0.15 oz-in max. without seal 1.00 oz-in max. with seal
Running:	0.10 oz-in max. without seal 0.75 oz-in max. with seal
Shaft Load:	
Radial:	5.0 lbs max ¼" from bearing flange
Axial:	3.0 lbs max
Moment of Inertia:	0.000040 oz-in-sec ²
Slew Speed:	5,000 rpm max
Acceleration:	750,000 rad/sec ² max

RELIABILITY

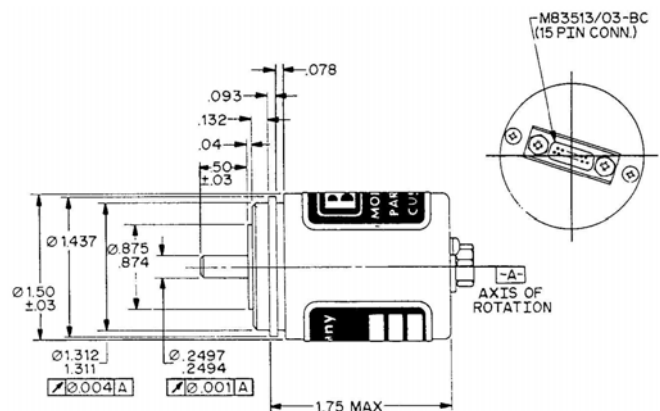
Bearing Fatigue Life:	1 x 10 ⁹ rev at max rated load
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Electronics MTBF:

Special order: 1,000,000 hours calculated per MIL-HDBK-217D for a ground, fixed environment using MIL-STD-883 Level B parts and screened LED and photodetector

ENVIRONMENTAL

Temperature:	
Operating:	-55° C to +85° C
Storage:	-65° C to +95° C
Altitude:	70,000 ft max
Vibration:	Meets or exceeds MIL-STD-810, Method 514.3, Category 7B; 7.3 grms
Shock:	50 g's at 11 msec; per MIL-STD-810, Method 516.3, Procedure 1(b)
Humidity:	99% RH max



Specifications subject to change without notice.