

MIL-257 SERIES OPTICAL INCREMENTAL ENCODERS

BEI's MIL-257 Series incremental encoders were designed to meet military demands for an optical encoder. By incorporating all the latest state-of-the-art advances and the most widely used resolutions, the MIL-257 series offers medium resolution, high accuracy, and high reliability suitable for most military applications.

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.



FEATURES:

- Single solid state LED light source
- Single substrate photocell array
- Printed wirings boards designed to MIL-STD-275 and procured per MIL-P-55110
- Integrated circuits screened per MIL-STD-833. Level B
- Complementary digital outputs from DS7830 line drivers
- Resolution to 10,160 pulses 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.

OPTIONS:

- Zero reference signal
- Side or end exit connector
- Shaft seal
- Special shaft configuration
- Square or round mtg. flange
- Other disk resolutions
- Mil-Temp (Non 883 Screen) Parts
- Connector pin-outs or wire colors to customer requirements
- Anodized housing
- Screened LED and photodetectors

MODEL NUMBER STRUCTURE

MIL-257 - XXXX A Z - D - E

STANDARD DISK RESOLUTIONS AVAILABLE			
Description	Counts/turn	Description	Counts/turn
0060	60	0625	625
0064	64	0800	800
0090	90	0900	900
0100	100	1000	1000
0120	120	1024	1024
0125	125	1200	1200
0200	200	1800	1800
0256	256	2000	2000
0300	300	2048	2048
0360	360	2500	2500
0500	500	2540	2540
0600	600		

NOTE: Any disk resolution less than 2540 is available with any of the std. options on special order.

ELECTRONICS OPTION	
(A)	Line Driver Output
(B)	Line Driver Output w/Dir Sens. (1x Disk Res)
(C)	Line Driver Output w/Dir Sens. (2x Disk Res)
(D)	Line Driver Output w/Dir Sens. (4x Disk Res)

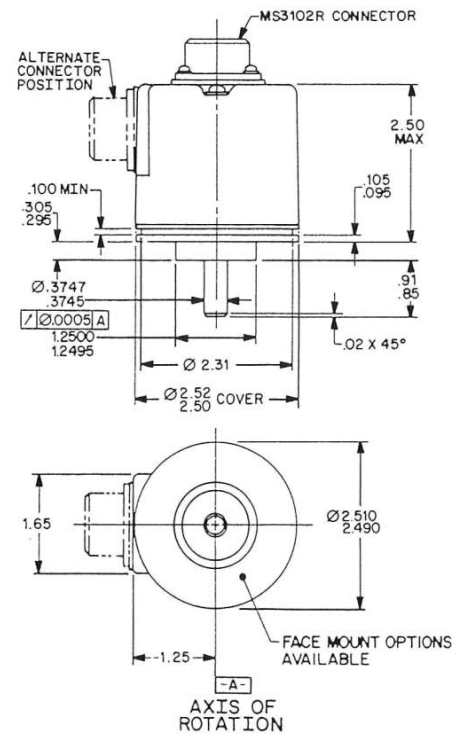
ZERO REFERENCE OPTION	
(Z)	With Zero Ref

SEAL OPTION	
(-)	Bearing Shields
(S)	Bearing Seals
(SS)	Shaft Seal

HOUSING OPTION	
(D)	Square Flange
(E)	1.250 Dia Pilot
(G)	2.500 Dia Pilot

FACE MOUNTING OPTION	
-	1, 2, 3, 4

CONNECTOR MOUNTING OPTION	
(E)	End Mount
(S)	Side Mount



Approved for general release.

CONNECTOR PIN FUNCTIONS MS3102R18-1P

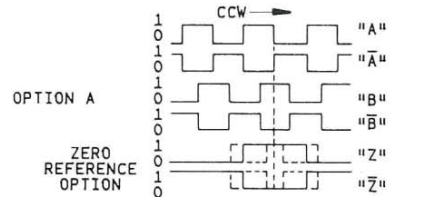
FUNCTION

PIN	A OPTION ELECTRONICS		B,C,D, OPTION ELECTRONICS	
	CCW ROTATION	CW ROTATION	CCW ROTATION	CW ROTATION
A	(A) Count-Signal output (LEAD)	(A) Count-Signal output (LAG)	Count-Signal output	No Output
H	(\bar{A}) Count-Signal output comp	(\bar{A}) Count-Signal output comp	Count-Signal output comp	No Output
B	(B) Count-Signal output (LAG)	(B) Count-Signal output (LEAD)	No Output	Count-Signal output
I	(\bar{B}) Count-Signal output comp	(\bar{B}) Count-Signal output comp	No Output	Count-Signal output comp
C	(C) Zero-ref output	(C) Zero-ref output	Zero-ref output	Zero-ref output
J	(\bar{C}) Zero-ref output comp	(\bar{C}) Zero-ref output comp	Zero-ref output comp	Zero-ref output comp
E	SPARE	SPARE	SPARE	SPARE
D	+ 5 VDC input	+ 5 VDC input	+ 5 VDC input	+ 5 VDC input
F	Circuit Ground	Circuit Ground	Circuit Ground	Circuit Ground
G	Case Ground	Case Ground	Case Ground	Case Ground

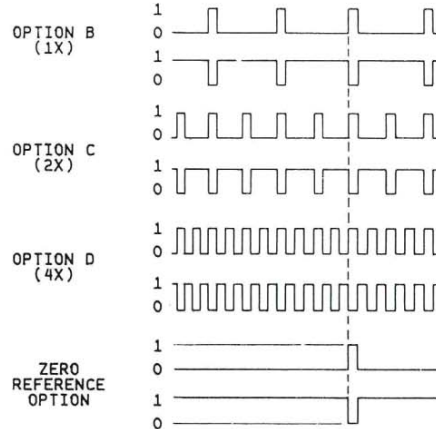
NOTE: ABOVE OUTPUT CONFIGURATIONS ASSUME ROTATION AS VIEWED FROM SHAFT END.

OUTPUT WAVEFORMS

NOTE: OUTPUTS APPEAR SIMULTANEOUSLY ON TWO PAIRS OF CONNECTOR PINS.



NOTE: THE FOLLOWING PULSED OUTPUTS APPEAR ON ONE OF TWO PAIRS OF CONNECTOR PINS, DEPENDING ON DIRECTION OF SHAFT ROTATION.



SPECIFICATIONS

ELECTRICAL

Power:

A Option: +5.0 +/- 0.25 Vdc at 150 mA max.
 B, C, D Option: +5.0 +/- 0.25 Vdc at 385 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)

Pulse Width (B, C & D Option): 4 usec +/- 2 usec

Output Frequency Range: 0 to 50 KHz or 5000 rpm

Code: Incremental-Two count tracks phased 90 +/- 30 electrical degrees apart-2540 cpt max on disk.

Accuracy:

Bit-to-Bit: 4 arc sec rms typical
 Absolute: 20 arc sec rms typical

MECHANICAL

Weight: 20.0 oz. max.

Torque: (at 21 degrees centigrade)
 Starting: 1.00 oz-in max. without seal
 1.50 oz-in max. with sealed Brg.
 5.00 oz-in max. with seal

Shaft Load:

Radial: 35.0 lbs max. 1/4" from bearing flange
 Axial: 40.0 lbs max.

Moment of inertia: 0.000041 oz-in-sec²

Slew Speed: 5,000 rpm max.

Acceleration: 750,000 rad/sec² max.

RELIABILITY

Bearing Fatigue Life: 2E8 rev. at max. rated load

Electronics MTBF:
 1,800,000 hours calculated per MIL-HDBK-217D for a ground, fixed environment using MIL-STD-883, Level B 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 I(b).

Humidity: 99% rh max.

Specifications subject to change without notice.