Model 25B-F/S/L Solid Shaft Low Line Incremental Optical Rotary Encoder

- **Up to 1250 line count disc**
- **Chrome on glass disc**
- **+/- 45 arc sec accuracy**
- **Optional internal 2X, 5X, or 10X cycle interpolation electronics**
- **Flange or servo mount configuration**
- **Up to 200KHz frequency response**
- **Operating temperature range up to +85° C**

The Model 25B-F/S/L has been designed for rugged, OEM applications where reliability is a prime consideration. Features such as 100K hours MTBF, LED light source, 200KHz frequency response all channels, and 50G's shock specification allow the model 25B-F/S/L to be used in machine tool, robotic, and other harsh environment's rough usage applications. For high ambient noise or long transmission length applications, the Model 25B-F/S/L can be supplied with RS422 line drivers. In line driver or internal cycle interpolation configuration, the Model 25B-F/S/L provides a 1/4 cycle wide gated zero reference output.

GSI MicroE Systems®
DRC Encoders

25B-F/S/L SPECIFICATIONS

ELECTRICAL

Resolution range:	Up to 12,500 cycles per shaft revolution, (50,000 counts with internal interpolation and external quadrature).
Light source:	Gallium aluminum arsenide L.E.D. rated @ 100,000 Hrs. MTBF (mfg's spec).
Light sensor:	Monolithic photodiode array.
Excitation voltage:	+5Vdc, +12Vdc, +15Vdc, +/- 5%. Variable voltage, +5 to +24Vdc.
Output format:	Two count channels (A & B) in phase quadrature with a zero reference output.
Quadrature:	90° ± 22° (interpolation models 90° ± 45°).
Symmetry:	180° ± 18° (at 10 KHz output frequency).
Rise and fall time:	1 microsecond max. into 1,000pf load capacitance.
Amp Analog Output:	Count channels a, a-, b, b- 3 Volts peak to peak.
:	DC offset is 10% of peak to peak signal max.
Analog units TTL ZR:	TTL Zero reference = 1 +/- ½ count track cycles wide.
Analog units analog ZR:	Complimentary single ended amplitude = 1 +/- ¼ volts from peak of signal to highest secondary peak.
Frequency response:	Up to 200 KHz all channels. (interpolation models 100KHz).
Zero reference width:	1± 1/2 cycle, 1/4 cycle or 1/2 cycle gated, depending on electronic configuration.
ZR alignment:	Full cycle: output type 1 no alignment between ZR and count channels. All other output types: Center of ZR aligns between 90° and 180°of channel A. 1/2 cycle aligns with negative transition of channel B. 1/4 cycle aligns with both A and B high.
Phase sense:	Channel A leads Channel B for counterclockwise rotation of the shaft, as viewed from the shaft side of the unit.
Output:	See electronics type.

MECHANICAL

Disc accuracy:	+/- 45 Arc sec.
Shaft loading:	50 Lbs axial; 40 Lbs radial.
Shaft radial run-out:	.001" TIR.
Bearing life:	(L10) 2 x 10 to the 8th rev at full load. (5 x 10 to the 10th rev at 10% load).
Case sealing:	Enclosure sealing per NEMA 13 (IP65) Cover and connector only.
Shaft material:	Stainless steel.
Housing material:	Aluminum.
Cable type:	.25 Dia. Max PVC jacket with 26 AWG (7/32) shielded twisted pair.
Connectors:	MS3102R18-1P (10 pin type). MS3102R16S-1P (7 pin type)

ENVIRONMENTAL

Operating temperature:	Standard 0°C to +70°C
:	Optional -20°C to +85°C
Storage temperature range:	-25°C TO +90°C
Shock:	50 G for 11 millisecond duration.
Vibration:	20 Hz to 2000 Hz @ 20 G.
Humidity:	To 98% R.H. (non-condensing).
Enclosure rating:	NEMA 13

ANALOG OUTPUT

CIRCUITRY TYPE	AVAILABLE ZR OPTIONS
1, 8, 9, B, C, D	0, 4
V	0, 4, 5
5, 7	0, 1, 2, 4
6	0, 1, 4
A, U, Y	0, 1

CABLE WIRE COLOR	10 PIN	FUNCTION
ORANGE	A	CHANNEL +A
YELLOW	B	CHANNEL +B
BROWN	C	CHANNEL +ZR
RED	D	+VDC
BLUE	I	CHANNEL −B
BLACK	F	COMMON
VIOLET	G	CASE GROUND
GREEN	H	CHANNEL −A
GRAY	J	CHANNEL −ZR
—	E	N.C.

7 PIN CONNECTOR		
	ELECTRONICS WITH	
PIN	NO ZR	NO COMPLEMENTS
A	+A	+A
B	+B	+B
C	−A	ZR
D	+Vdc	+Vdc
E	−B	
F	COMMON	COMMON
G	CASE GND	CASE GND

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SPECIAL MOD CODE

HOUSING:
F = FLANGE
S = STD. SERVO
L = L SERVO

THREADS FOR FACE MOUNT:
0 = NONE
1 = TYPE 1

SHAFT SEAL:
N = NONE
S = SEALED

SUPPLY VOLTAGE OPTION:
B = 5V
C = 12V
D = 15V

CONNECTION TYPE:
1 = 10 PIN SIDE MT
2 = 7 PIN SIDE MT **
3 = 10 PIN TOP MT
4 = 7 PIN TOP MT **
5 = SIDE MT CABLE, 18" L
6 = TOP MT CABLE, 18" L

** AVAILABLE WHEN NO ZR OR NO COMPLEMENTS ARE REQUIRED.

ZR CHANNEL:
0 = NONE
1 = 1/4 WIDE
2 = 1/2 WIDE
4 = 1 CYCLE WIDE
(SEE ELECTRONIC TYPES FOR AVAILABLE ZR)

ELECTRONICS TYPE
(SEE PRODUCT SPECIFICATION DOCUMENT # PS 34400 FOR DETAILED SPECS.)

1 = SINGLE ENDED TTL LM339 (200Khz 85°C)
5 = DIFFERENTIAL TTL 7404 (100Khz; 70°C)
6 = DIFFERENTIAL LINE DRIVER (200Khz; 85°C)
7 = DIFFERENTIAL TTL 7406 (100Khz; 70°C)
8 = DIFFERENTIAL AMPLIFIED ANALOG A, B, ZR
9 = DIFFERENTIAL AMPLIFIED ANALOG A, B, COMPLEMENTARY SQUARE WAVE ZR
A = 2X INTERPOLATION, LINE DRIVER OUT
B = VARIABLE VOLTAGE LINE DRIVER (5Vdc TO 24Vdc)
C = 12 Vdc SINGLE ENDED TTL LM339 (100khz; 70°C)
D = 15 Vdc SINGLE ENDED TTL LM339 (100Khz; 70°C)
U = 5X INTERPOLATION, LINE DRIVER OUT
V = AMPLIFIED ANALOG REFERENCED TO GND. SINGLE ENDED SQUARE WAVE ZR (MODIFICATION # REQUIRED TO SPECIFY VOLTAGES AND CABLE FUNCTIONS.)
Y = 10X INTERPOLATION, LINE DRIVER OUT

LINE COUNT
(CYCLES / REV)
100
125
127
200
250
256
360
384
400
420
500
512
625
635
800
900
1000
1024
1200
1250

DRC ENCODER

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25B-F FLANGE HOUSING

25B-S SERVO HOUSING

TOP MOUNT
CABLE W/STRAIN RELIEF
OR CONNECTOR
MS-3102R-18-P

OPTIONAL SIDE MOUNT
CABLE W/STRAIN RELIEF

TYPE 1 FACE MOUNT THREADS
#10-32 UNF-2B 3 PLACES 120°
APART ON A ø1.875 BC.

25B-L SERVO HOUSING

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MODEL 25B-C/P
Integral Shaft Coupling Low Line Count Incremental Optical Rotary Encoder

- **Up to 1250 line count disc**
- **Chrome on glass disc**
- **+/- 45 arc arc accuracy**
- **2 mounting flange configurations available**
- **Option internal 2X, 4X, 5X, or 10X cycle interpolation electronics**
- **Up to 200KHz frequency response**
- **Single LED light source**

The Model 25B-C/P has been designed for rugged OEM applications where reliability is a prime consideration. Features such as 100K hours MTBF, LED light source, 200KHz all channels frequency response, and 50G's shock specification allow the model 25B-C/P to be used in machine tool, robotic, and other harsh environment's rough usage applications. The Model 25B-C/P's integral shaft coupling and circular mounting flange allow the user to avoid the added costs of brackets and couplings. For high ambient noise or long transmission length applications, the Model 25B-C/P can be supplied with an RS422 compatible line driver. In the line driver configurations, The Model 25B provides a 1/4 cycle wide gated zero reference output.

DRC Encoders

25B-C/P SPECIFICATIONS

ELECTRICAL

Resolution range:	Up to 12,500 cycles per shaft revolution, (50,000 counts with internal interpolation and external quadrature).
Light source:	Gallium aluminum arsenide L.E.D. rated @ 100,000 Hrs. MTBF (mfg's spec).
Light sensor:	Monolithic photodiode array.
Excitation voltage:	+5Vdc, +12Vdc, +15Vdc, +/- 5%. Variable voltage, +5 to +24Vdc.
TTL Output format:	Two count channels (A & B) in phase quadrature with a zero reference output.
Quadrature:	90° ± 22° (interpolation models 90° ± 45°).
Symmetry:	180° ± 18° (at 10 KHz output frequency).
Rise and fall time:	1 microsecond max. into 1,000pf load capacitance.
Amp Analog Output:	Count channels a, a-, b, b- 3 Volts peak to peak. DC offset is 10% of peak to peak signal max.
Analog units TTL ZR:	TTL Zero reference = 1 +/- ½ count track cycles wide.
Analog units analog ZR:	Complimentary single ended amplitude = 1 +/- ¼ volts from peak of signal to highest secondary peak.
Frequency response:	Up to 200 KHz all channels. (interpolation models 100KHz).
Zero reference width:	1± 1/2 cycle, 1/4 cycle or 1/2 cycle gated, depending on electronic configuration. Full cycle: output type 1 no alignment between ZR and count channels.
ZR alignment:	All other output types: Center of ZR aligns between 90° and 180°of channel A. 1/2 cycle aligns with negative transition of channel B. 1/4 cycle aligns with both A and B high.
Phase sense:	Channel A leads Channel B for counterclockwise rotation of the shaft, as viewed from the shaft side of the unit.
Output:	See electronics type.

MECHANICAL

Disc accuracy:	+/- 45 Arc sec.
Coupling characteristics:	Maximum allowable angular misalignment: 5°. Maximum axial play +/- .010" (.26mm). Maximum parallel misalignment .010".
Case sealing:	Enclosure sealing per NEMA 13 (IP65) Cover and connector only.
Shaft material:	Stainless steel.
Housing material:	Aluminum.
Cable type:	.25 Dia. Max PVC jacket with 26 AWG (7/32) shielded twisted pair.
Connectors:	MS3102R18-1P (10 pin type). MS3102R16S-1P (7 pin type)

ENVIRONMENTAL

Operating temperature:	Standard 0°C to +70°C
:	Optional -20°C to +85°C
Storage temperature range:	-25°C TO +90°C
Shock:	50 G for 11 millisecond duration.
Vibration:	20 Hz to 2000 Hz @ 20 G.
Humidity:	To 98% R.H. (non-condensing).
Enclosure rating:	NEMA 13

ANALOG OUTPUT

CIRCUITRY TYPE	AVAILABLE ZR OPTIONS
1, 8, 9, B, C, D	0, 4
V	0, 4, 5
5, 7	0, 1, 2, 4
6	0, 1, 4
A, U, Y	0, 1

CABLE WIRE COLOR	10 PIN	FUNCTION
ORANGE	A	CHANNEL +A
YELLOW	B	CHANNEL +B
BROWN	C	CHANNEL +ZR
RED	D	+VDC
BLUE	I	CHANNEL −B
BLACK	F	COMMON
VIOLET	G	CASE GROUND
GREEN	H	CHANNEL −A
GRAY	J	CHANNEL −ZR
—	E	N.C.

7 PIN CONNECTOR		
	ELECTRONICS WITH	
PIN	NO ZR	NO COMPLEMENTS
A	+A	+A
B	+B	+B
C	−A	ZR
D	+Vdc	+Vdc
E	−B	
F	COMMON	COMMON
G	CASE GND	CASE GND

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SPECIAL MOD CODE

HOUSING:
C = COUPLING
P = COUPLING W/PILOT

COUPLING I.D.:
4E = 1/4"
6E = 3/8"
8E = 1/2"
04 = 4MM
05 = 5MM
06 = 6MM
07 = 7MM
08 = 8MM
09 = 9MM
10 = 10MM

SUPPLY VOLTAGE OPTION:
B = 5V
C = 12V
D = 15V

CONNECTION TYPE:
1 = 10 PIN SIDE MT
2 = 7 PIN SIDE MT **
3 = 10 PIN TOP MT
4 = 7 PIN TOP MT **
5 = SIDE MT CABLE, 18" L
6 = TOP MT CABLE, 18" L

** AVAILABLE WHEN NO ZR OR NO COMPLEMENTS ARE REQUIRED.

ZR CHANNEL:
0 = NONE
1 = 1/4 WIDE
2 = 1/2 WIDE
4 = 1 CYCLE WIDE
(SEE ELECTRONIC TYPES FOR AVAILABLE ZR)

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8 = DIFFERENTIAL AMPLIFIED ANALOG A, B, ZR
9 = DIFFERENTIAL AMPLIFIED ANALOG A, B, COMPLIMENTARY SQUARE WAVE ZR
A = 2X INTERPOLATION, LINE DRIVER OUT
B = VARIABLE VOLTAGE LINE DRIVER (5–24 VDC)
C = 12 Vdc SINGLE ENDED TTL LM339 (100khZ; 70°C)
D = 15 Vdc SINGLE ENDED TTL LM339 (100khZ; 70°C)
U = 5X INTERPOLATION, LINE DRIVER OUT
V = AMPLIFIED ANALOG REFERENCED TO GND. SINGLE ENDED SQUARE WAVE ZR (MODIFICATION # REQUIRED TO SPECIFY VOLTAGES AND CABLE FUNCTIONS.)
Y = 10X INTERPOLATION, LINE DRIVER OUT

LINE COUNT (CYCLES / REV)
100
125
127
200
250
256
360
384
400
420
500
512
625
635
800
900
1000
1024
1200
1250

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25B-C HOUSING TYPE

25B-P HOUSING TYPE

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