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.
**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.

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

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
**Circuitry Type and Available ZR Options**

<table>
<thead>
<tr>
<th>Circuitry Type</th>
<th>Available ZR Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 8, 9, B, C, D</td>
<td>0, 4</td>
</tr>
<tr>
<td>V</td>
<td>0, 4, 5</td>
</tr>
<tr>
<td>5, 7</td>
<td>0, 1, 2, 4</td>
</tr>
<tr>
<td>6</td>
<td>0, 1, 4</td>
</tr>
<tr>
<td>A, U, Y</td>
<td>0, 1</td>
</tr>
</tbody>
</table>

**Electronics with No Complements**

<table>
<thead>
<tr>
<th>Pin</th>
<th>No ZR</th>
<th>Complements</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>+A</td>
<td>+A</td>
</tr>
<tr>
<td>B</td>
<td>+B</td>
<td>+B</td>
</tr>
<tr>
<td>C</td>
<td>-A</td>
<td>ZR</td>
</tr>
<tr>
<td>D</td>
<td>+Vdc</td>
<td>+Vdc</td>
</tr>
<tr>
<td>E</td>
<td>-B</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>COMMON</td>
<td>COMMON</td>
</tr>
<tr>
<td>G</td>
<td>CASE GND</td>
<td>CASE GND</td>
</tr>
</tbody>
</table>

**Connection Types**

- **25B**
- **7 Pin Connector**

**Cable Wire Color**

- 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.

**Supply Voltage Options**

- B = 5V
- C = 12V
- D = 15V

**Electronics Type**

1. Differential TTL 7404 (100 kHz, 70°C)
2. Differential Line Driver (200 kHz, 85°C)
3. Differential Amplifier Analog A, B
4. Complementary Square Wave ZR
5. 12 Vdc Single Ended TTL LM339 (100 kHz, 70°C)
6. 5x Interpolation, Line Driver Out
7. 10x Interpolation, Line Driver Out

**Connection Types**

- Side MT Cable, 18" L
- Top MT Cable, 18" L
- Not Available With Electronic Types Having Complements

**Special Mod Code**

- Line Count (Cycles/Rev): 125, 200, 250, 400, 500, 1000, 1024, 1200, 1250
25B-F FLANGE HOUSING

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

OPTIONAL SIDE MOUNT CABLE W/STRAIN RELIEF

SHAF T Dia.
SEE P.N.
Ø.218 TYP.

2.064 TYP.
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

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

SIDE MOUNT CONNECTOR
SIDE MOUNT CABLE
W/STRAIN RELIEF

MS-3102R-18-P
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.
**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: 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.

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

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
25B-C HOUSING TYPE

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*Original content will be transcribed here.*

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25B-P HOUSING TYPE

\[ \phi .171 \text{ THRU 4 LCS. EQU. SPACED ON A } \phi 2.952 \text{ B.C.} \]

\[ .688 \text{ COUPLING ACCESS} \]

\[ \text{COUPLING I.D. SEE ORDER CODE} \]

\[ .260 \]

\[ 2.56 \]

\[ .197 \]

\#2 SOCKET HEAD CAP SCREW

MS-3102R-18-P SIDE MOUNT CONNECTOR

SIDE MOUNT CABLE W/STRAIN RELIEF

MS-3102R-18-P SIDE MOUNT CONNECTOR

SIDE MOUNT CABLE W/STRAIN RELIEF

2.52

3.4