

# Model 25SF

## Incremental Shaft Encoder



### Features

- Industry Standard Size 25 Package (63.5mm x 63.5mm)
- Optical Technology for High Accuracy
- Resolutions from 1 to 65,536 PPR (262,144 quadrature counts)
- Servo and Flange Mounting
- Standard with Heavy-Duty Dual Bearings Rated load of 36 Kg axial & radial
- IP67 Sealing Available

The Model 25SF Size 25 shaft encoder offers the performance advantages of the programmable model 25SP, but in an economical, fixed resolution version. The versatile model 25SF offers 32 different waveform options, six output types, and any resolution from 1 up to 65,536 PPR. Specifically designed for the challenges of an industrial environment, the model 25SF features a rugged, industrial housing and comes standard with dual bearings rated 36Kg axial or radial. Offering shaft sizes up to 10mm, multiple mounting options, and sealing up to IP67, this encoder can take on your most demanding application.

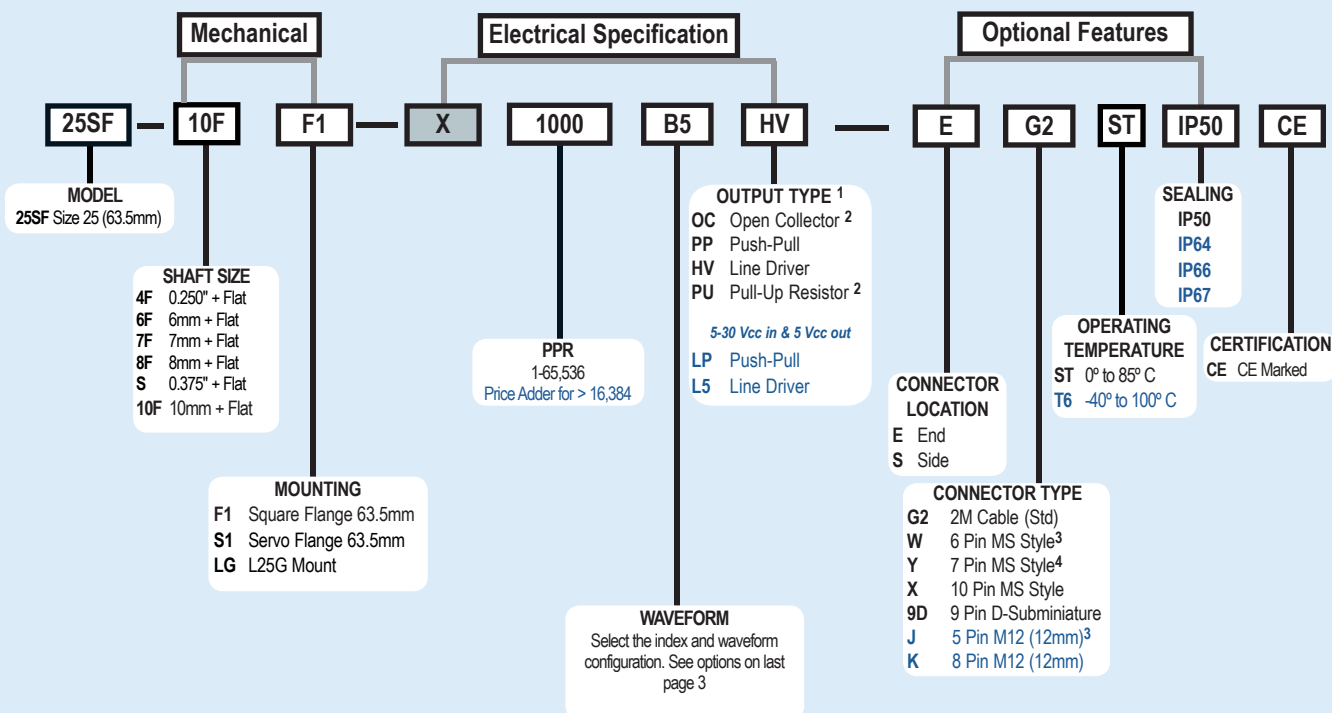
Ø2.5" (63.5mm)

### Model 25SF Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.

### Common Applications

Motion Control Feedback, Conveyors, Elevator Controls, Machine Control, Food Processing, Process Control, Robotics, Material Handling, Textile Machines



For specification assistance call  
Customer Service at  
**+44 (0)1978 262100**

#### NOTES:

- 1 All Output types are 5V to 24V in/out **Except** L5 Line Driver and LP Push-Pull output types which are 5-24Vcc in and 5Vcc out.
- 2 Open Collector (OC) and Pull-Up Resistor (PU) outputs not recommended for PPR > 8192 and/or frequencies > 150 KHz.
- 3 6-Pin MS and 5-Pin M12 Connectors only available with Pull-Up, Open Collector and Push-Pull output types.
- 4 7-Pin MS Connector does not provide index (Marker) Pulse Z when selected output is Line Driver (HV or L5)

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## Model 25SP Specifications

### Electrical

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage.....         | 4.75 to 30 Vcc max. See Output Types for limitations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Input Current.....         | 100 mA max with no output load (65 mA typical)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Output Format.....         | Incremental, See Waveforms on page X for options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Output Types.....          | <b>Line Driver* (HV)</b> – 20 mA max per channel, max freq 1.0 MHz, 5 Vcc max at 100° C or 24 VDC max at 85° C.<br><b>Line Driver* (L5)</b> – 5-30 Vcc in/5 Vcc out, 20 mA max per channel, max freq 2.7 MHz, 5 VDC max at 100° C.<br><b>Push-Pull (PP)</b> – 20 mA max per channel, max frequency 1.0 MHz, 5 Vcc max at 100° C or 24 Vcc max at 85° C.<br><b>Push-Pull (P5)</b> – 5-30 Vcc in/5 Vcc out, 20 mA max per channel, max frequency 2.7 MHz, 5 Vcc max at 100° C.<br><b>Open Collector (OC)</b> – 100 mA max per channel, 200 KHz max freq recommended<br><b>Pull-Up (PU)</b> – 2.2K ohm internal resistors, 100 mA max per channel, 150 KHz max freq recommended, max temp 85° C at > 24 Vcc<br>*Meets RS 422 at 5 Vcc supply |
| Index.....                 | Once per revolution, BEPC standard is 180° gated to output A (waveform B5). See Waveform Diagrams on model 25SP for options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Max Frequency.....         | 2.7 MHz subject to RPM restrictions for high resolution (PPR):<br>5000 RPM max for PPR 16385 to 32768 and 2500 RPM max for PPR 32769 to 65536<br>NOTE: Use 5 Vcc Line Driver (L5 or HV output type) to obtain high frequencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Electrical Protection..... | Overvoltage, reverse voltage, and output short circuit protected. NOTE: Sustained over or reverse voltage may result in permanent damage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Min Edge Sep.....          | 1 to 16384 PPR: 36° electrical min, 63° or better typical<br>16385 to 65536 PPR: 20° electrical min, 36° or better typical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Rise Time.....             | Less than 1 microsecond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Accuracy.....              | Better than 0.013° or 47 arc-sec from true position                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

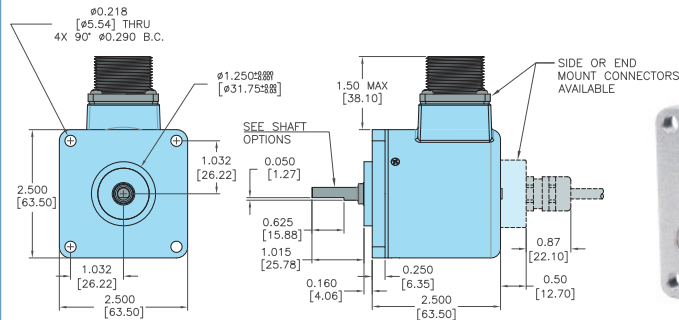
### Mechanical

|                        |                                                                                                                                                                                        |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max Shaft Speed.....   | 8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.                                                                                                             |
| Shaft Material.....    | 303 Stainless Steel                                                                                                                                                                    |
| Shaft Rotation.....    | Bi-directional                                                                                                                                                                         |
| Radial Shaft Load..... | 36 Kg max. Rated load of 9 to 18 Kg for rated life of 1.5x10 <sup>9</sup> revs                                                                                                         |
| Axial Shaft Load.....  | 36 Kg max. Rated load of 9 to 18 Kg for rated life of 1.5x10 <sup>9</sup> revs                                                                                                         |
| Starting Torque.....   | 7.0615 X 10 <sup>-3</sup> Nm typical with IP64 seal or no seal<br>2.118 X 10 <sup>-2</sup> Nm typical with IP66 shaft seal<br>4.943 X 10 <sup>-2</sup> Nm typical with IP67 shaft seal |
| Housing.....           | Black non-corrosive finish                                                                                                                                                             |
| Bearings.....          | Precision ABEC ball bearings                                                                                                                                                           |
| Weight.....            | 566 grams typical                                                                                                                                                                      |

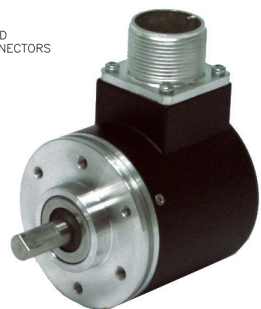
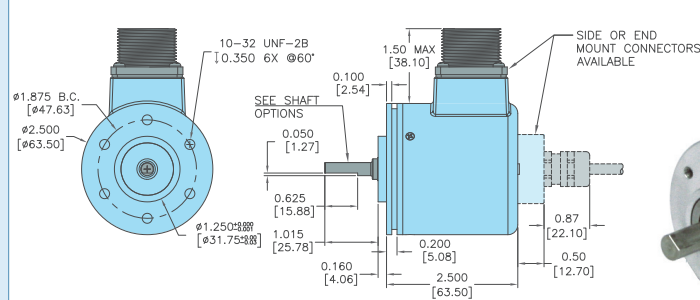
### Environmental

|                     |                                                                              |
|---------------------|------------------------------------------------------------------------------|
| Operating Temp..... | -20° to 85° C for standard models<br>-40° to 100° C for extended temp option |
| Humidity.....       | 95% RH non-condensing                                                        |
| Vibration.....      | 20 g @ 5 to 2000 Hz                                                          |
| Shock.....          | 80 g @ 11 ms duration                                                        |
| Sealing.....        | IP50 standard; IP64, IP66 or IP67 optional                                   |

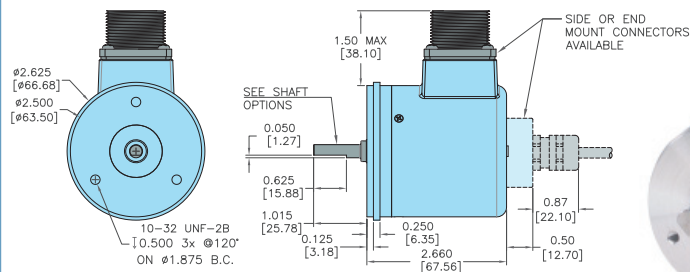
## Model 25SF Flange Mount (F1)



## Model 25SF 63.5mm Servo Mount (S1)



## Model 25SF 66.54mm Servo Mount (LG)



All dimensions are in Imperial & Metric with a tolerance of 0.005" (±0.127mm) or 0.01" (±0.254) unless otherwise specified

### ENCODER WIRING TABLE

(For BEPC-supplied mating cables, wiring table is provided with cable.)

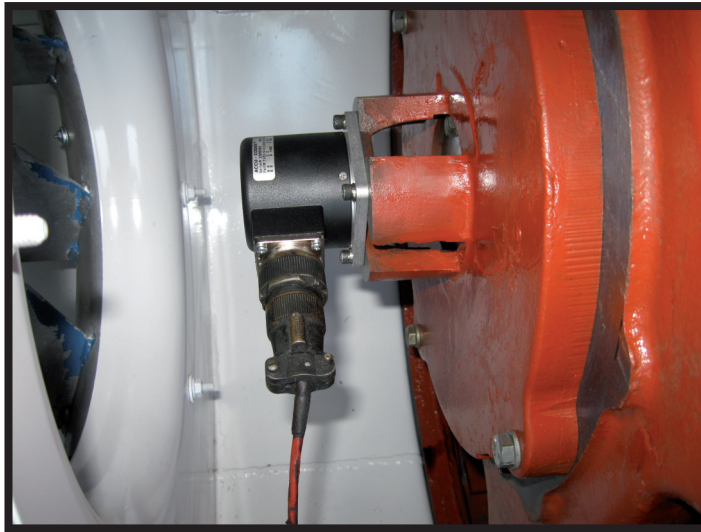
| Function | Gland Cable† Wire Color | 5-pin M12** | 8-pin M12** | 10-pin MS | 7-pin MS HV,L5 | 7-pin MS PU,PP, OC,LP | 6-pin MS PU,PP, OC,LP | 9-pin D-sub |
|----------|-------------------------|-------------|-------------|-----------|----------------|-----------------------|-----------------------|-------------|
| Com      | Black                   | 3           | 7           | F         | F              | F                     | A                     | 9           |
| +VDC     | Red                     | 1           | 2           | D         | D              | D                     | B                     | 1           |
| A        | White                   | 4           | 1           | A         | A              | A                     | D                     | 2           |
| A'       | Brown                   | --          | 3           | H         | C              | --                    | --                    | 3           |
| B        | Blue                    | 2           | 4           | B         | B              | B                     | E                     | 4           |
| B'       | Violet                  | --          | 5           | I         | E              | --                    | --                    | 5           |
| Z        | Orange                  | 5           | 6           | C         | --             | C                     | C                     | 6           |
| Z'       | Yellow                  | --          | 8           | J         | --             | --                    | --                    | 7           |
| Case     | Green                   | --          | --          | G         | G              | G                     | F                     | 8           |
| Shield   | Bare*                   | --          | --          | --        | --             | --                    | --                    | --          |

\*CE : Cable shield (bare wire) is connected to internal case.

†Standard cable is 24 AWG conductors with foil and braid shield.

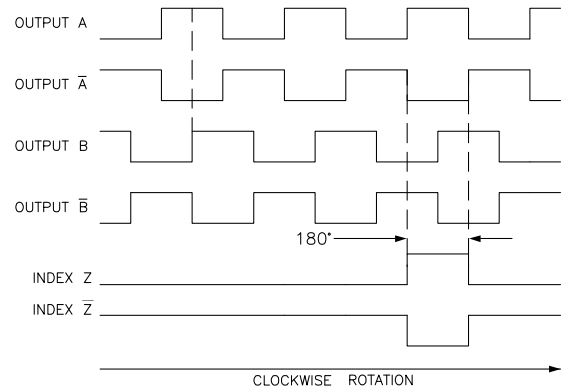
\*\*CE : Use cable cordset with shield connected to M12 connector coupling nut.

# Model 25SF Incremental Shaft Encoder



An BEPc Size 25 Encoder in a common application.

## BEPc Standard Waveform (B5)

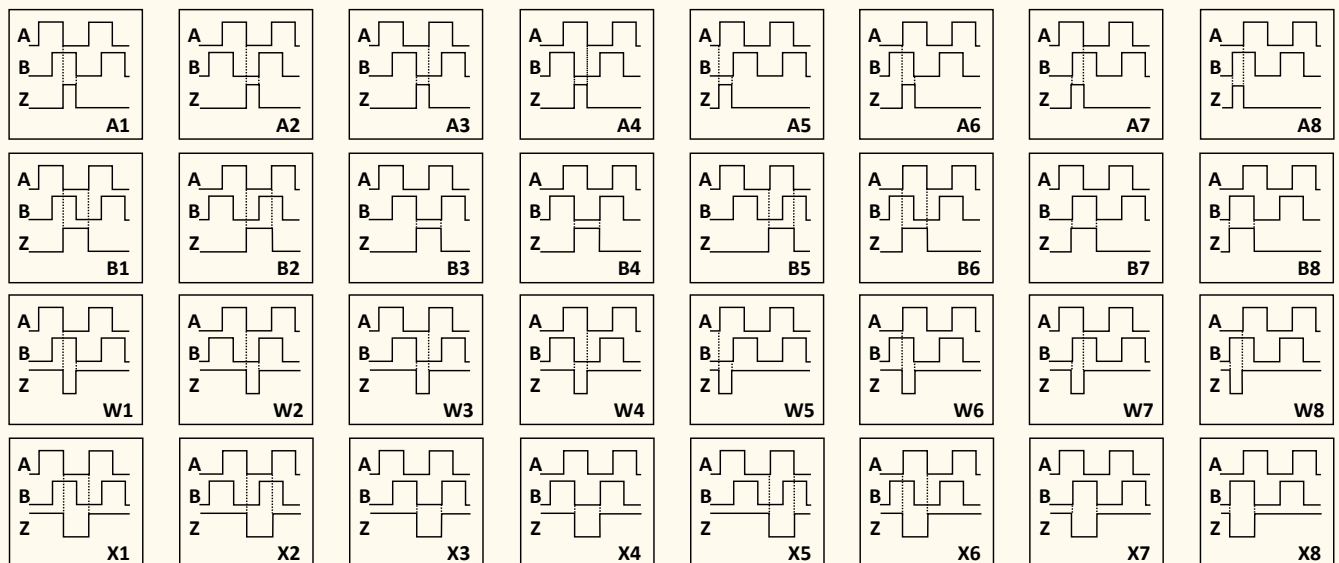


NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES.

NOTE: COMPLEMENTARY SIGNALS (A, B & Z) APPLY TO LINE DRIVER (HV & L5) OUTPUTS ONLY.

## WAVEFORMS

Choose any of these waveforms using the Ordering Guide on First Page



Odd numbers - A leads B  
Even numbers - B leads A

A and B - High Going Index  
W and X - Low Going Index

A and W - 90 Degree Index  
B and X - 180 Degree Index