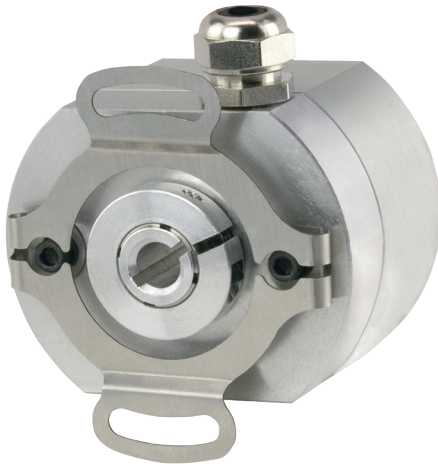


# MODEL 960 – SINGLE TURN ABSOLUTE ENCODER



Ø2.0"

## FEATURES

**Low-Profile – 1.55"**

**Thru-Bore or Hollow Bore Styles**

**Industrial Grade, Heavy Duty Housing**

**State-of-the-Art Opto-ASIC Circuitry**

The single turn Model 960 Absolute Series Encoder provides a unique solution to a wide variety of industrial applications requiring absolute position information. By providing a low profile package of just 1.55", as well as a variety of hollow and thru-bore sizes and an easy to use flexible mounting system, the Model 960 goes where traditional absolute encoders do not fit. In addition, its innovative Opto-ASIC circuitry, coupled with its digital output, make it an excellent choice in those applications plagued by an unusually high level of electrical noise. The Model 960 can easily be mounted directly on a motor shaft, bringing the advantage of absolute positioning in an all metal housing, while eliminating the fixtures, couplers and adapters required by other absolute encoder designs.

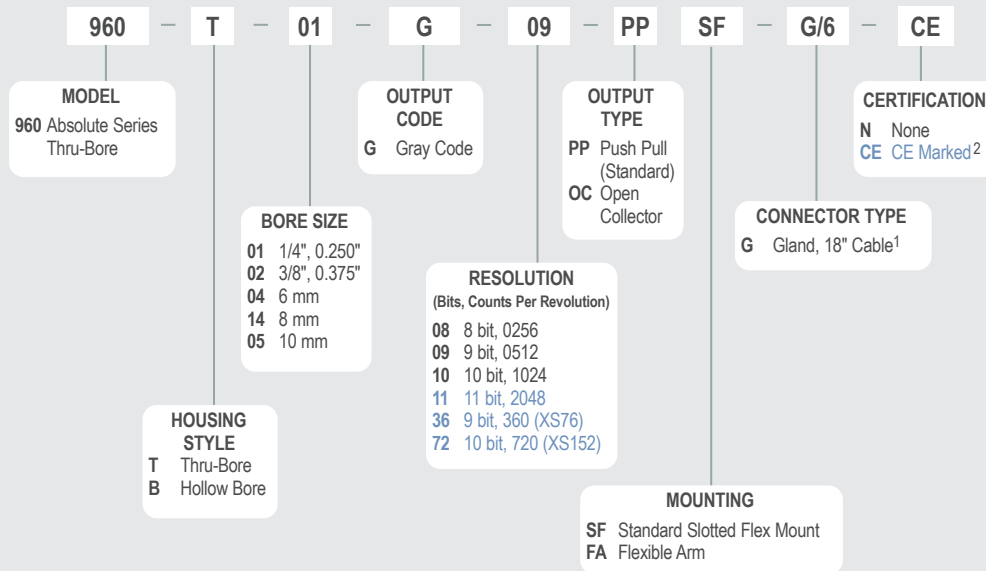
## COMMON APPLICATIONS

**Machine Tools, Robotics, Telescopes, Antennas, Rotary & X-Y Positioning Tables, Medical Scanners**

*Not recommended for new applications.*

## MODEL 960 ORDERING GUIDE

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



### NOTES:

- For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
- Please refer to Technical Bulletin [TB100: When to Choose the CE Mark](#) at [encoder.com](http://encoder.com).

## MODEL 960 SPECIFICATIONS

### Electrical

|                     |   |
|---------------------|---|
| Input Voltage ..... | 4.75 to 26 VDC max  |
| Regulation .....    | 100 mV peak-to-peak, max ripple at 0 to 10 kHz                              |
| Input Current ..... | 100 mA max with no external load  |
| Output Format ..... | Absolute – Parallel Outputs   |
| Output Type .....   | Open Collector – 20 mA max per channel<br>Push-Pull – 20 mA max per channel |
| Code .....          | Gray Code, Excess Gray Code   |
| Max Frequency ..... | 25.6 kHz (LSB)  |
| Rise Time .....     | Less than 1 microsecond   |
| Resolution .....    | Up to 11 bit  |
| Accuracy .....      | ±1/2 LSB  |

### Control

Directional Control... Field selectable for increasing counts (CW or CCW). Standard configuration user selects the applicable MSB wire for direction of count. Direction control option allows user to select count direction by applying 0 VDC to an encoder input. See *Wiring Table*.

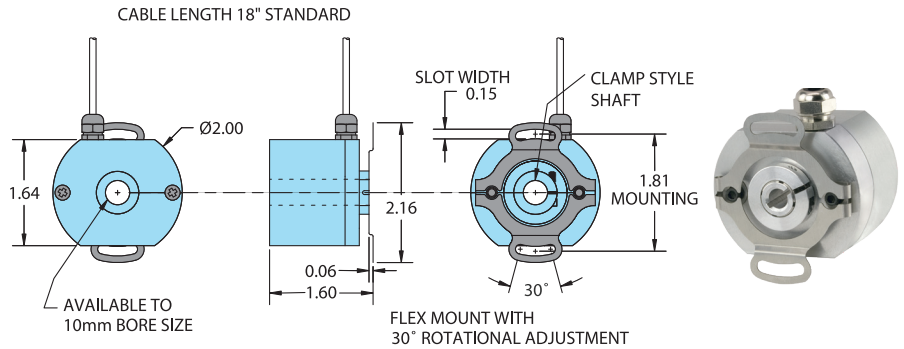
### Mechanical

|                       |   |
|-----------------------|---|
| Max Shaft Speed ..... | 6000 RPM continuous   |
| Bore Size .....       | 0.250", 0.3125", 0.375", 6 mm, 8 mm, 10 mm                            |
| Bore Tolerance .....  | -0.0000" / +0.0006"   |
| User Shaft Tolerances |   |
| Radial Runout .....   | 0.007"  |
| Axial Endplay .....   | ±0.030"   |
| Starting Torque ..... | 0.3 oz-in typical for thru-bore<br>0.14 oz-in typical for hollow bore |
| Electrical Conn ..... | Gland with 18" cable (braid shield, 30 AWG conductors)                |
| Housing .....         | Aluminum with non-corrosive finish                                    |
| Mounting .....        | Slotted Flex Mount standard,<br>Flex Arm optional                     |
| Weight .....          | 7 oz typical  |

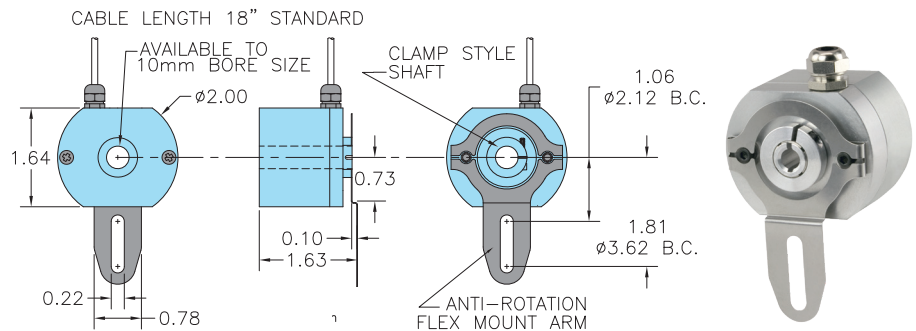
### Environmental

|                      |                       |
|----------------------|-----------------------|
| Operating Temp ..... | 0° to 70° C           |
| Storage Temp .....   | -20° to 85° C         |
| Humidity .....       | 98% RH non-condensing |
| Vibration .....      | 10 g @ 58 to 500 Hz   |
| Shock .....          | 20 g @ 11 ms duration |
| Sealing .....        | IP50                  |

## MODEL 960 SLOTTED FLEX MOUNT (SF)



## MODEL 960 WITH FLEX ARM (FA)



All dimensions are in inches with a tolerance of ±0.005" or ±0.01" unless otherwise specified.

### WIRING TABLE

For EPC-supplied mating cables, refer to wiring table provided with cable. Trim back and insulate unused wires.

| Function            | Gland Cable†<br>Wire Color |
|---------------------|----------------------------|
| Common              | Black                      |
| +VDC                | Red                        |
| S1 CW MSB           | Brown                      |
| S1 CCW MSB          | Yellow                     |
| S2                  | White                      |
| S3                  | Green                      |
| S4                  | Orange                     |
| S5                  | Blue                       |
| S6                  | Violet                     |
| S7                  | Gray                       |
| S8 LBS 8-bit        | Pink                       |
| S9 LSB 9-bit        | Red/Green                  |
| S10 LSB 10-bit      | Red/Yellow                 |
| S11 LSB 11-bit      | Turquoise                  |
| Direction Control** | Red/blue                   |
| Case Ground*        | Shield                     |

\*CE Option only.

\*\*Standard is CW increasing count (when viewed from shaft end, and using brown wire for MSB). Red/Blue is pulled up internally to 5 VDC. To reverse count direction, Red/Blue must be pulled to low (0 VDC). If 5 VDC is applied to Red/Blue, unit remains in standard CW increasing count mode. Count direction can also be reversed by using the yellow MSB wire instead of the Brown. At no time should voltage applied to Red/Blue exceed 5 VDC.

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