# Optical Encoders

## Series 63Q — High Resolution, 20mm

### FEATURES

- Miniature Size, 20mm (0.787") Diameter
- Resolutions up to 1024 Lines per Revolution
- Single Ended and Differential Outputs
- 1 Billion Rotational Life Cycles
- Conductive Carbon Fiber Housing
- IP 50 Sealing
- High Noise Immunity
- Low Supply Current Requirements

### APPLICATIONS

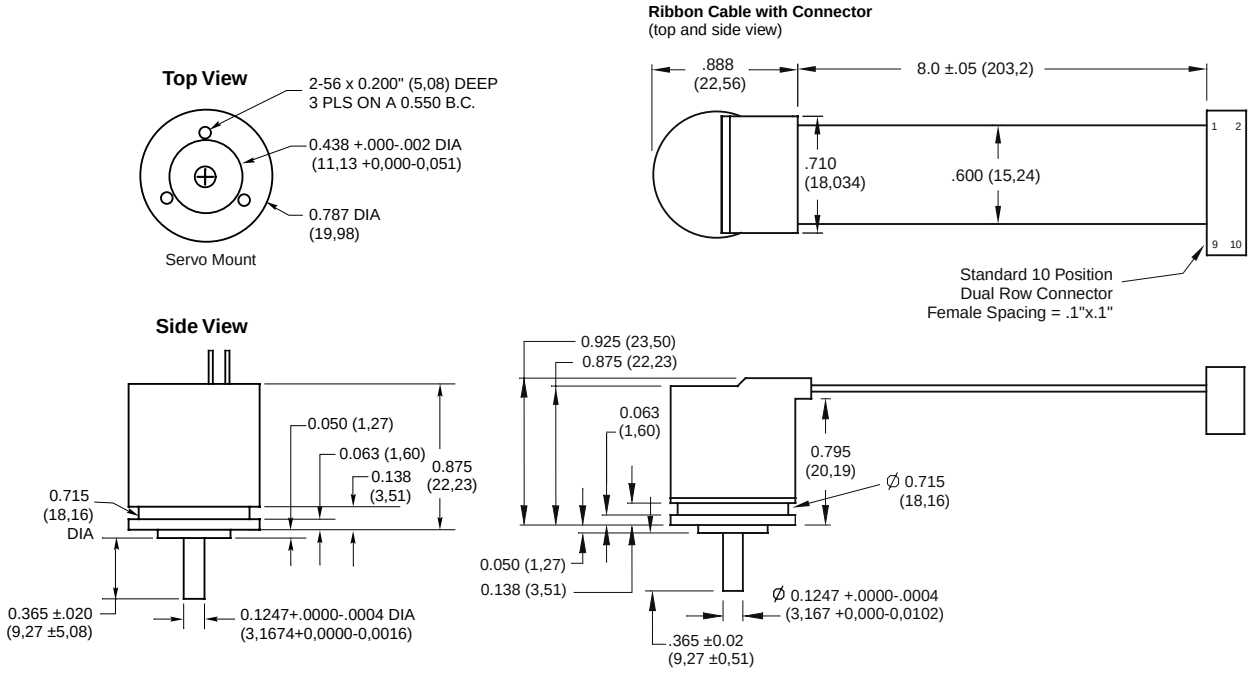
- Steer by Wire
- Fractional Horse Power Motors
- Machine Tool Controls
- Material Handling
- Flow Meters


### DESCRIPTION

The Series 63Q is intended for applications requiring high performance, high-resolution digital feedback in a very small package. It provides the resolution of larger encoder packages but in a package only 20mm (0.787") in diameter. Outputs can be configured in either single ended, open collector or internal pull-up resistor, or with an industrial standard RS422A differential line driver.

The sensing scheme also embodies a much simplified encoder design, which ultimately results in longer service life, and less down time due to feedback device failure. The encoder housing is constructed of a conductive carbon fiber composite that provides the EMI shielding of an all metal housing and the performance of a lightweight robust assembly.

### DIMENSIONS In inches (and millimeters)



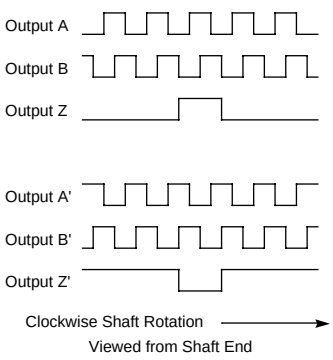

**Unless otherwise specified, standard tolerance is ±.010 (0,25)**

## PIN WIRING, CIRCUITRY, AND WAVEFORM STANDARD

### Pin Wiring

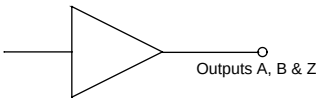
| | |
|---|---|
| Pin #1 | Common |
| Pin #2 | +Vdc |
| Pin #3 | Z |
| Pin #4 | Z' |
| Pin #5 | B |
| Pin #6 | B' |
| Pin #7 | A |
| Pin #8 | A' |
| Pin #9 | N/C |
| Pin #10 | Case |

### Waveforms

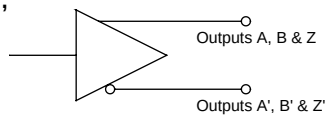



### Output Circuits

**TTL Output**




**RS422A Line Driver, OL7272 5-26VDC Line Driver**




## SPECIFICATIONS

### Electrical Ratings

**Input Voltage:** 5.0 ± 5% Vdc or 5-26 Vdc
**Input Current Requirements:** 100 mA maximum output option 1 and 2, 50 mA maximum output option 3; plus interface loads
**Ripple Current**: 2% peak-to-peak @ 5 Vdc
**Output Circuits:** AM26LS31 RS422A line driver, OL7272 line driver, TTL
**Logic Output Characteristics:** Output Type: Quadrature with channel A leading channel B for CW rotation with ungated index pulse true over A and B high
**Frequency Response:** 200 kHz
**Symmetry:** 180° ±10% typical
**Minimum Edge Separation:** 54 electrical degrees

### Mechanical Ratings

**Maximum Shaft Speed:** 8,000 RPM
**Shaft Diameter:** 0.125" (3,175)
**Shaft Material:** Stainless steel
**Bearings:** Radial ball bearing, R2 type
**Radial Shaft Load:** 2 lbs maximum
**Axial Shaft Load:** 1 lbs maximum
**Housing:** Carbon fiber composite (case ground via connector)
**Housing Volume Resistivity:** $10^{-2}$ ohm-cm
**Termination:** Two rows of 5 pins on 0.100" centers. 8" ten conductor ribbon cable with 2x5 connector
**Mounting:** Servo
**Moment of Inertia:** $9.5 \times 10^{-6}$ oz-in-sec$^2$
**Acceleration:** $1 \times 10^5$ radians per second$^2$

### Environmental Ratings

**Operating Temperature Range:** 0 to 70°C typical; -20°C to 100°C optional (contact Grayhill for more information)
**Storage Temperature Range:** -40°C to 125°C
**Relative Humidity:** 98% non-condensing
**Vibration:** 20G's @ 50-500 CPS
**Mechanical Shock:** 50G @ 11mS duration

### OPTIONS

Contact Grayhill for custom terminations, resolutions, mounting configurations, shaft couplings and configurations, and absolute positioning up to 256 positions.

## ORDERING INFORMATION

**63QAL-1-P**

**Series**
**Resolution:** (quadrature cycles per revolution) A = 500, B = 512, C = 1000, D = 1024
**Voltage:** L = 5 ±5% Vdc, H = 5-26 Vdc

**Termination:** C = 8" cable with connector, P = pin (no cable)
**Output Option:** 1 = RS422A line driver; 2 = OL7272 (5-26 Vdc) line driver; 3 = TTL output;

**Available from your local Grayhill Component Distributor.** For prices and discounts, contact a local Sales Office, an authorized local Distributor,