

OPTICAL RING ENCODER

Higher Performance at a Competitive Cost

FEATURES

- 24 pulses per revolution output
- Long life optical encoder far exceeds the typical life for competitors' mechanical contact products
- Center thru-hole allows for knob lighting and/or pushbutton
- Three standard torque options (no detent, low, and high) ⁺
- PCB mount
- 3.3 V and 5 V options
- Low-power option uses nearly 100 times less power than most optical encoders

APPLICATIONS

Grayhill's Ring Encoder is ideal for applications that require extended rotational life, including:

- Ultrasound, patient monitoring, and other medical equipment
- Test and measurement equipment
- Global positioning/driver information systems
- Home appliances and other white goods
- Low-power version ideal for battery-operated and other power-sensitive applications

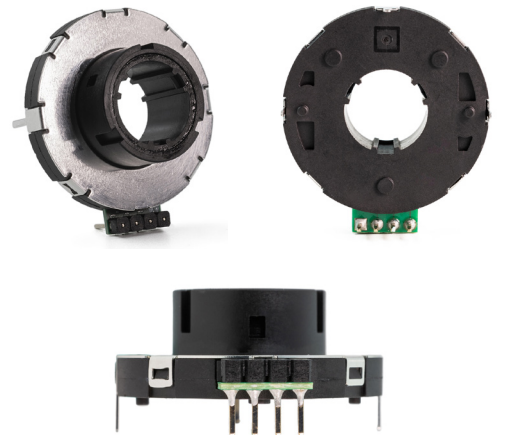
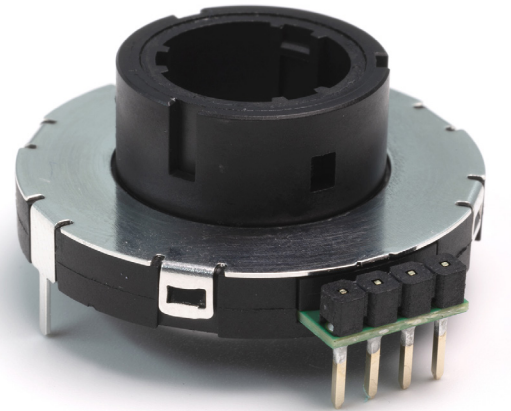
⁺ Customized torques available upon request.

YOUR EXPERTS IN ROTATIONAL CONTROLS

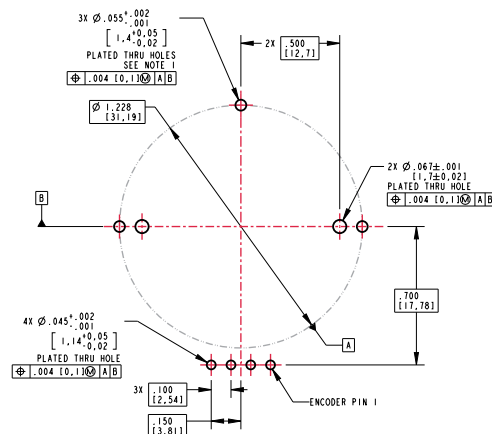
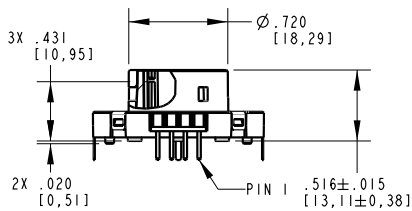
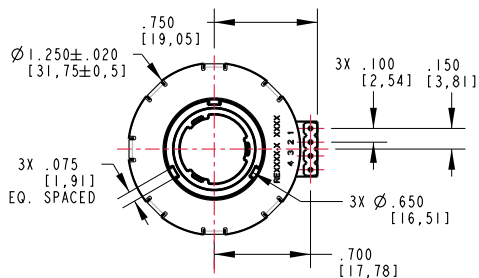
The Ring Encoder has a unique center thru-hole which makes it possible to easily add LED integration for knob illumination and/or a pushbutton switch. The long rotational life of the encoder makes it a perfect choice for high-use applications. The unit is designed to be compatible with both standard (5 V) and energy-efficient (3.3 V) circuits, making it a versatile option. Additionally, the Ring Encoder offers a low-power version of the encoder that uses nearly 100 times less current than most other optical encoders, making it ideal for battery-operated and other power-sensitive applications. The Ring Encoder features an integrated Schmitt trigger and pull-up resistor eliminating the need for these components to be integrated on the customer's PC board, saving both space and cost.

With Grayhill's Ring Encoder, you can enjoy dependable, long-lasting, and cost-effective performance in all your rotational applications.

Specifications are subject to change.

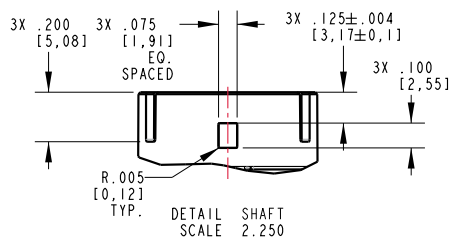
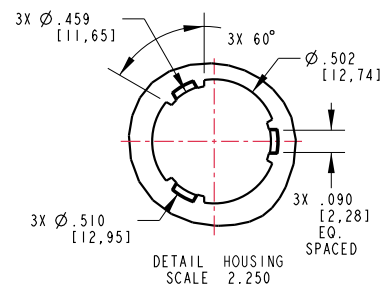
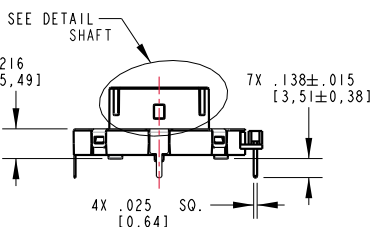
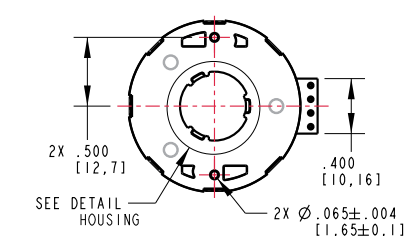


DIMENSIONS in inches (and millimeters)

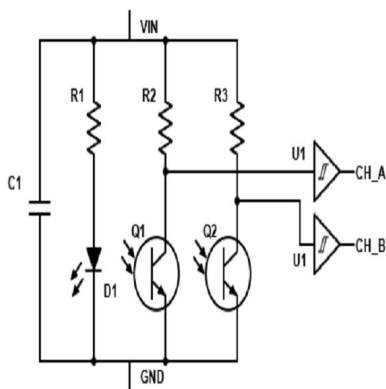


NOTES
1. FOR PROPER ESD PROTECTION, AT LEAST ONE OF THE THREE .055 [1.4] HOLES SHOULD BE CONNECTED TO GROUND.

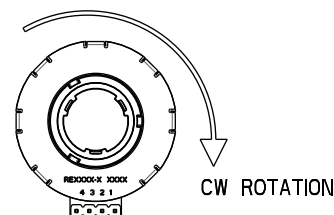
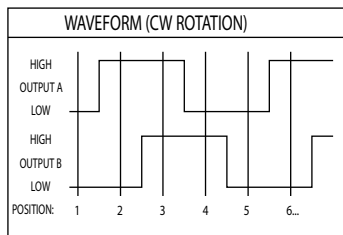
Suggested PC Board Mounting Pattern



WAVEFORM AND TRUTH TABLE



ENCODER PINOUT	
PIN #	FUNCTION
1	GROUND
2	OUTPUT B
3	OUTPUT A
4	POWER



TRUTH TABLE (CW ROTATION)		
POSITION	OUTPUT A	OUTPUT B
1		
2	●	
3	●	●
4		●
BLANK = LOGIC LOW ● = LOGIC HIGH CODE REPEATS EVERY FOUR POSITIONS.		

SPECIFICATIONS

Environmental Specifications

Operating Temperature	-40 °C to 85 °C
Storage Temperature	-40 °C to 85 °C
Humidity	96 hrs @ 90-95% humidity @ 40 °C
Mechanical Vibration	Harmonic motion with amplitude of 15 g within a varied frequency of 10 to 2000 Hz for 12 hrs
Mechanical Shock	Test 1: 100 g for 6 ms half-sine wave with a velocity change of 12.3 ft/s Test 2: 100 g for 6 ms sawtooth wave with a velocity change of 9.7 ft/s
Soldering Requirements	Hand soldering recommended. Contact Grayhill regarding other soldering processes.

Rotary Electrical and Mechanical Specifications

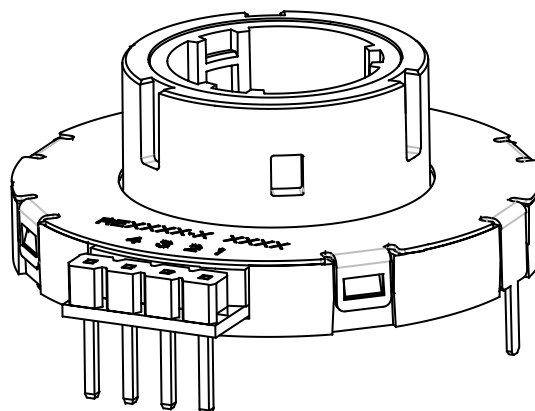
Operating Voltage	RE5 Style 5.00±0.25 Vdc RE3 Style 3.30±0.125 Vdc
Supply Current	Standard Option: 15 mA maximum Low-Power Option: 125 µA average 3 mA maximum peak
Logic Output Characteristics	RE5 and RE5L Style Logic high no less than 4.5 Vdc at 4.75 Vdc operating voltage Logic low shall be no greater than 0.5 Vdc at 5.25 Vdc operating voltage RE3 and RE3L Style Logic high no less than 2.8 Vdc at 3.175 Vdc operating voltage Logic low shall be no greater than 0.5 Vdc at 3.425 Vdc operating voltage
Output	Push-pull outputs
Average Rotational Torque	Low = 1.0±0.5 in-oz throughout life High = 2.0±1.4 in-oz throughout life
Mechanical Life	1,000,000 cycles of operation @ 30 RPM for detented version. 2,000,000 cycles of operation @ 30 RPM for non-detented version. 1 cycle is a rotation through all positions and a full return.
Terminal Strength	Header pullout force 5 lbs minimum
Solderability	95% free of pin holes & voids
Maximum rotational speed	100 RPM

Materials and Finishes

Housing	Glass-reinforced nylon 6
Shaft	Glass-reinforced nylon 6
Printed Circuit Board	NEMA grade FR4, double clad with copper, plated with gold over nickel
Solder	96.5% tin / 3% silver / 0.5% copper. No clean.
Header Pins	Gold flash over nickel plated brass

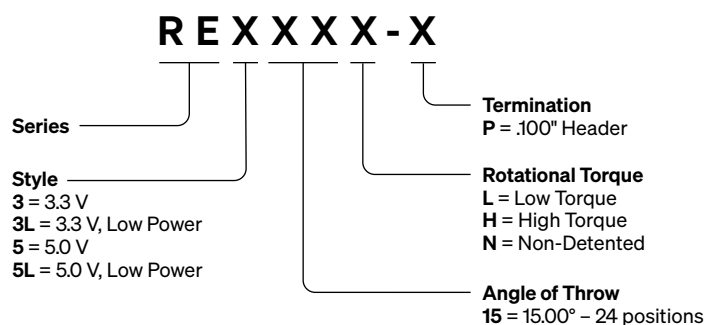
EMC Ratings

Radiated Immunity	Meets IEC 61000-4-3, level 3
Conducted Immunity	Meets IEC 61000-4-6, level 3
Radiated Emissions	Meets ANSI C63.4
Conducted Emissions	Meets EN 55022
Electrostatic Discharge	Meets IEC 61000-4-2
Power Frequency Magnetic Field	Meets IEC 61000-4-8



ORDERING INFORMATION

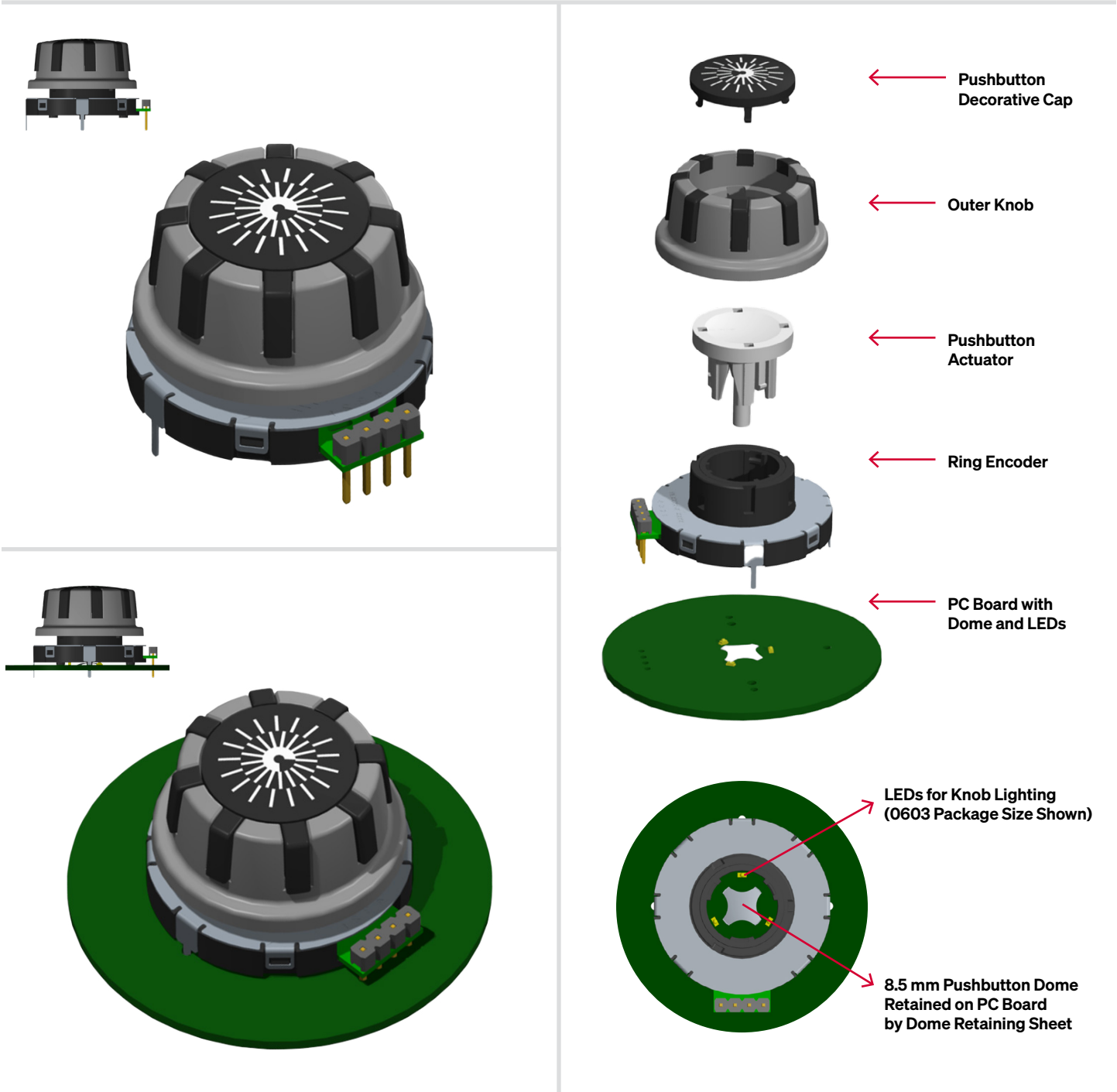
Available from your local
Component Grayhill Distributor.
For prices and discounts, contact
a local Sales Office, an authorized
local Distributor, or Grayhill.





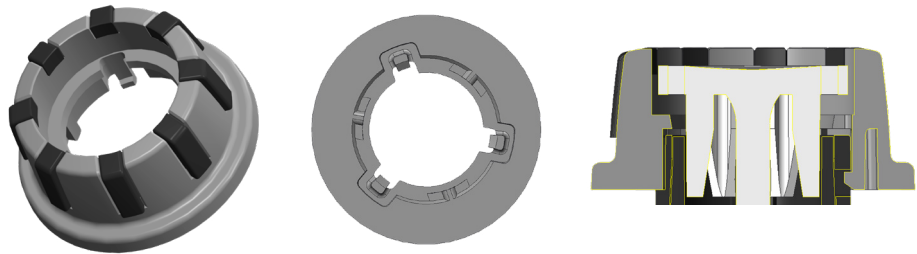
KNOB DESIGN GUIDE

Grayhill's innovative optical Ring Encoder features a hollow shaft that allows for easy integration of electro-mechanical functions, such as LEDs and center pushbuttons. Knob materials and colors can be fully customized. This versatility makes the Ring Encoder ideal for various industries, including agriculture, construction, healthcare, home appliances, and more.



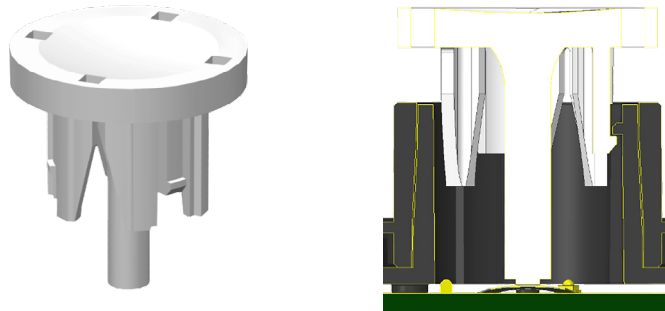
OUTER KNOB

- Concept: molded plastic with overmolded rubber
- Snaps and aligns to rotating Ring Encoder shaft



PUSHBUTTON ACTUATOR

- Concept: molded from semi-clear white plastic for light diffusion
- Snaps and aligns to center of Ring Encoder housing
- Follow dome manufacturer recommendations for actuator diameter



PUSHBUTTON DECORATIVE CAP

- Molded plastic with in-mold decoration or pad printing
- Concept shows lit areas as white
- Snaps to pushbutton actuator

