

# Grayhill Optical Rotary Encoders

## Series 61C

**Features:** • Competitively priced to similar electromechanical switches • Optically coupled for more than a million trouble-free operations • Has data entry pushbutton switch activated by switch shaft • Compatible with CMOS, TTL and HCMOS Logic • Operationally used to move display icon and input data • Used to set ratio frequency, drill depth, RPM, etc. Plastic shaft and bushing.

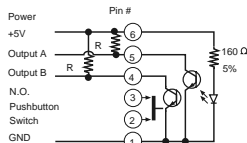
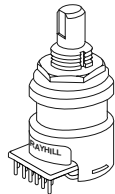
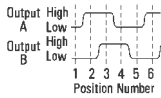
**Dimensions:** • Shaft: .250" (6.35mm) dia., .375" (9.52mm) long • Pin Spacing: .1" x .025" (2.54mm x .64mm) diameter • Thread: 3/8-32 • Overall Diameter: .750" (19.05mm)

**Encoder Ratings:** • Operating Voltage: 5 ± .25 VDC • Supply Current: 30ma max. at 5VDC • Life: 1 million cycles of operation, 1 cycle is rotation through all positions and a full return • Rotational Torque: 1.5 inch-ounces ± 30% • Load Current: 5mA max. per channel • Turn-On Time: ≤30 mSec at 16.6 RPM • Turn-Off Time: ≤30 mSec at 16.6 RPM

**Pushbutton Switch Ratings:** • Rating: at 5VDC, 10 mA, resistive • Contact Resistance: <10Ω • Life Expectancy: 3 million operations • Contact Bounce: <4 mSec at make <10 mSec at break • Operating Temperature Range: -40°C to +70°C.

Position	Clockwise Rotation	
	Output A	Output B
1	○	○
2	●	○
3	●	●
4	○	●

● indicates logic high.  
○ indicates logic low.  
Code repeats every 4 positions



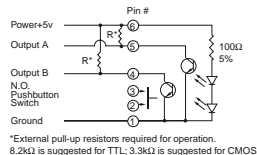
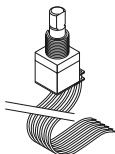
Description	Digi-Key Part No.	Price Each			Grayhill Part No.	
		1	25	100		250
16-Position	GH6101-ND	20.54	16.44	12.33	10.28	61C22-01-04-02
32-Position	GH6102-ND	20.54	16.44	12.33	10.28	61C11-01-08-02

## Optical Rotary Encoders Series 62A

These low cost encoders offer long life (over 1 million operations) with small size and optional integrated pushbutton. These encoders are ideal for radio frequency setting, drill depth setting and other applications where detents are desired for operator feedback. Rugged metal shaft and bushing for long life.

### Electrical Ratings:

- Operating Voltage: 5 ± .25 Vdc
- Supply Current: 30mA max. at 5 Vdc.
- Operating Torque: 1.5 in-oz ±50in-oz initially
- Rotational Life: >1 million cycles of operation (cycle is rotation through all positions and return)



\*External pull-up resistors required for operation. 8.2kΩ is suggested for TTL; 3.3kΩ is suggested for CMOS.

Description	Digi-Key Part No.	Price Each			Grayhill Part No.	
		1	25	100		250
32-Position, 2" Cable	GH3046-ND	33.20	26.56	19.92	16.60	62A11-01-020S
32-Position w/Switch 2"	GH3047-ND	36.29	29.02	21.77	18.14	62A11-02-020S
32-Position, 5" Cable	GH3048-ND	33.89	28.48	20.28	16.94	62A11-01-050S
32 Position w/Switch 5"	GH3049-ND	37.01	22.21	17.03	15.92	62A11-02-050S

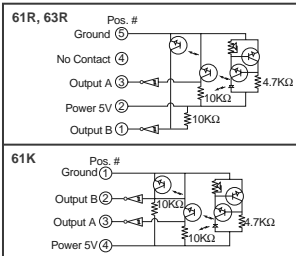
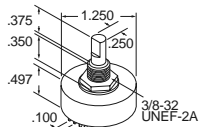
## Industrial Optical Rotary Encoders Series 61K, 61R, 63R

These rugged encoders are designed for continuous operations with high resolution. Made with stainless steel shaft and bushing for exceedingly long life (10 million life cycles). No detents.

- High resolution • Rugged construction • Cable or pinned version • 10 million life cycles • 300 RPM shaft rotation • 61K is a 4 pin output • 61R is a 5 pin output • 63R is a 5 pin output with 500 million life cycles

### Specifications:

- Operating Voltage: 5 ± .25 Vdc • Supply Current: 30 mA maximum at 5 Vdc • Logic Output Characteristics: Output Type: Open collector with integrated Schmitt Trigger and 10KΩ pull-up resistor. Maximum Sink Current: 16mA at .40 Volts. • Power Consumption: 150 mW maximum • Optical Rise Time: 500 ns • Optical Fall Time: 16 ns • Mechanical Life: 10 million revolutions • Time Life: Guaranteed for 10 years of continuous operation (calculated from emitter degradation data) • Operating Temperature Range: -40°C to 85°C



Description	Pulse Per Revolution	Digi-Key Part No.	Price Each			Grayhill Part No.	
			1	25	100		250
4 Pin PC Mount	64	GH3064-ND	40.02	35.70	31.23	27.66	61K64
4 Pin PC Mount	128	GH3065-ND	40.02	35.70	31.23	27.66	61K128
5" Cable	128	GH3066-ND	41.71	38.82	33.96	30.08	61K128-050
5 Pin PC Mount	64	GH3067-ND	40.02	35.70	31.23	27.66	61R64
5 Pin PC Mount	128	GH3068-ND	40.02	35.70	31.23	27.66	61R128
5 Pin PC Mount	128	GH3069-ND	49.83	39.86	34.88	30.89	63R128
5 Pin PC Mount	256	GH3070-ND	51.63	41.30	36.14	32.01	63R256

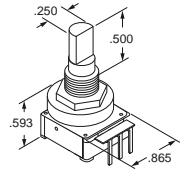
# Grayhill Mechanical Rotary Encoders

## Series 25L

The 25L series of encoders are inexpensive single deck mechanical encoders designed for human interface terminals. Has detents.

- Quality construction and contact materials • 100,000 life cycles

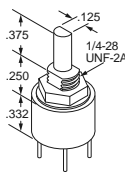
**Specifications:** • Switching Loads: 1.5mA @ 115Vac, resistive; 150mA @ 14Vdc, resistive • Life Expectancy: 100,000 cycles of operation @ rated loads; one cycle of operation is a rotation through all of the active positions and a return to the starting position • Operating Temperature: -65°C to +85°C



Description	Digi-Key Part No.	Price Each			Grayhill Part No.	
		1	25	100		250
36 Position, 2 Bit - 3 Pin PC Mount	GH3071-ND	3.26	2.61	1.96	1.63	25LB10-Q
24 Position, 2 Bit - 3 Pin PC Mount	GH3072-ND	3.26	2.61	1.96	1.63	25LB15-Q
16 Position, 2 Bit - 3 Pin PC Mount	GH3073-ND	3.26	2.61	1.96	1.63	25LB22-Q
16 Position, Hex - 3 Pin PC Mount	GH3074-ND	3.26	2.61	1.96	1.63	25LB22-H

## Mechanical Rotary Encoders Series 26

The series 26 rotary encoders are pc mounted mechanical encoders that come complete with a threaded shaft (mounting hardware included) and internal detents for user feedback. User selectable for either continuous rotation or present stops (two supplied). Fully sealed with panel and shaft seal for use in the harshest environments.



### Code And Truth Table

Switch Position	Code Position	BCD Output*				Gray Output*			
		1	2	4	8	1	2	4	8
1	0								
2	1	●				●			
3	2		●				●		
4	3	●	●					●	
5	4			●					●
6	5	●		●		●			●
7	6		●		●				●
8	7	●	●						●
9	8			●	●				●
10	9	●				●			●
11	10		●		●				●
12	11	●	●						●
13	12			●	●				●
14	13	●				●			●
15	14		●		●				●
16	15	●	●						●

\*Dot indicates terminal tied to common.

### Specifications:

- Electrical Rating: 25,000 cycles with logic compatible loads. Make and break 200mA.
- Detent Balls: Carbon steel, nickel plated
- Terminals: Brass, gold plated nickel plate; Contacts: Copper alloy, gold plated over nickel plate

Description	Digi-Key Part No.	Price Each				Grayhill Part No.
		1	25	100	250	
8 Position, BCD - 5 Pin PC Mount	GH3075-ND	13.87	11.10	8.32	6.38	26ASD45-01-1-AJS
16 Position, BCD - 5 Pin PC Mount	GH3076-ND	13.87	11.10	8.32	6.38	26ASD22-01-1-AJS
16 Position, Grey Code - 5 Pin PC Mount	GH3077-ND	21.26	17.00	12.75	10.63	26GS22-01-1-16S-C

## CTS Mechanical Rotary Encoders Series 288

**Features:** Miniature 16mm style. Low cost. Metal shaft. **Specifications:** • Power Rating: 1W • Operating Temp.: -25°C to 100°C • Rotational Life: 10K cycles • Contact Resistance: 5000Ω static closed circuit maximum and 1 MΩ open circuit maximum • Continuous rotation

Fig. 1 - Binary Switching Codes

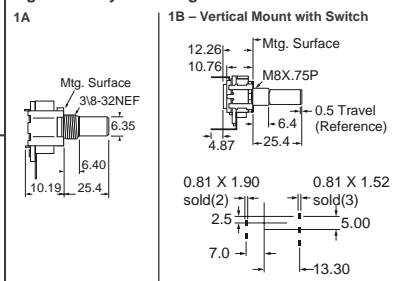


Fig. 2 - Gray Switching Code

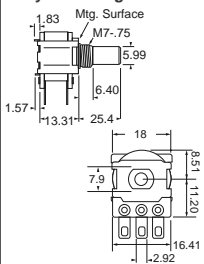


Fig. Description	Digi-Key Part No.	Price Each			CTS Part No.	
		1	10	50		100
1A 2 Bit Non-Detented 16 Position	CT3001-ND	2.58	2.40	2.00	1.80	288T232R161A1
1A 2 Bit Detented 16 Position	CT3002-ND	2.58	2.40	2.00	1.80	288T232R161A2
1B 2 Bit Binary w/Switch, Vertical, 16 Pos.	CT2999-ND	5.42	5.04	4.19	3.78	288V232R161B2
1C 2 Bit Binary w/Switch, Horizontal, 16 Pos.	CT3000-ND	5.42	5.04	4.19	3.78	288X232R161B2
2 4 Bit Non-Detented 16 Position	CT3003-ND	3.50	3.26	2.71	2.45	288T232R162A1