

**Precision, Long-life
Compact 12mm Size
Optical Encoder****Features**

- Package Size (12 X 14 X 7 mm)
- 3 Million life cycles (No detent)
- 1 Million life cycles (With detent)
- Durable Metal Shaft & Bushing
- Optional momentary switch
- Multiple options for terminations, resolution, cables, voltage
- RoHS Compliant

**Electrical and Mechanical Specifications****Encoder:****Operating Voltage**5.0 $\pm$ 0.25 VDC3.3 $\pm$ 0.125 VDC**Supply Current**

5.0 VDC @ 30mA maximum

3.3 VDC @ 24mA maximum

Output Code

2-Bit Quadrature

Channel A leads channel B by 90°
electrically during clockwise rotation
of the shaft**Minimum Sink Current**

2.0 mA for 5.0 VDC

1.0 mA for 3.3 VDC

Power Consumption

150 mW maximum for 5.0 VDC

80 mW maximum for 3.3 VDC

Rotational TorqueRunning: 20 $\pm$ 10 gf-cmDetent: 140 $\pm$ 50 gf-cm (24 Detents)100 $\pm$ 50 gf-cm (32 Detents)**Detent Options**

0, 24, 32

Resolution

6, 8 Pulses per Revolution

Rotational Life (@30 RPM)

3 Million cycles (No detent)

1 Million cycles (With detent)

Temperature Range

Operating: - 40°C to 85°C

Storage: - 55°C to 100°C

Push-Pull Strength of Shaft

20 kg minimum for 10 seconds

Terminal Pull-out Strength

6 kg minimum for 10 seconds

Solder Heat Resistance

350°C for 5 seconds

Mechanical Vibration

15G, (MIL-STD-883F-2004)

Mechanical Shock

100G, (MIL-STD-883F-2004)

SpecialConsult CTS for custom features not
listed

Electrical and Mechanical Specifications (continued)

Optional Momentary Switch:

Switch Contact Resistance

10 Ω maximum

Switch Rating

5 VDC @ 10 mA

Switch Travel

0.5 $\pm$ 0.25 mm

Actuation Force

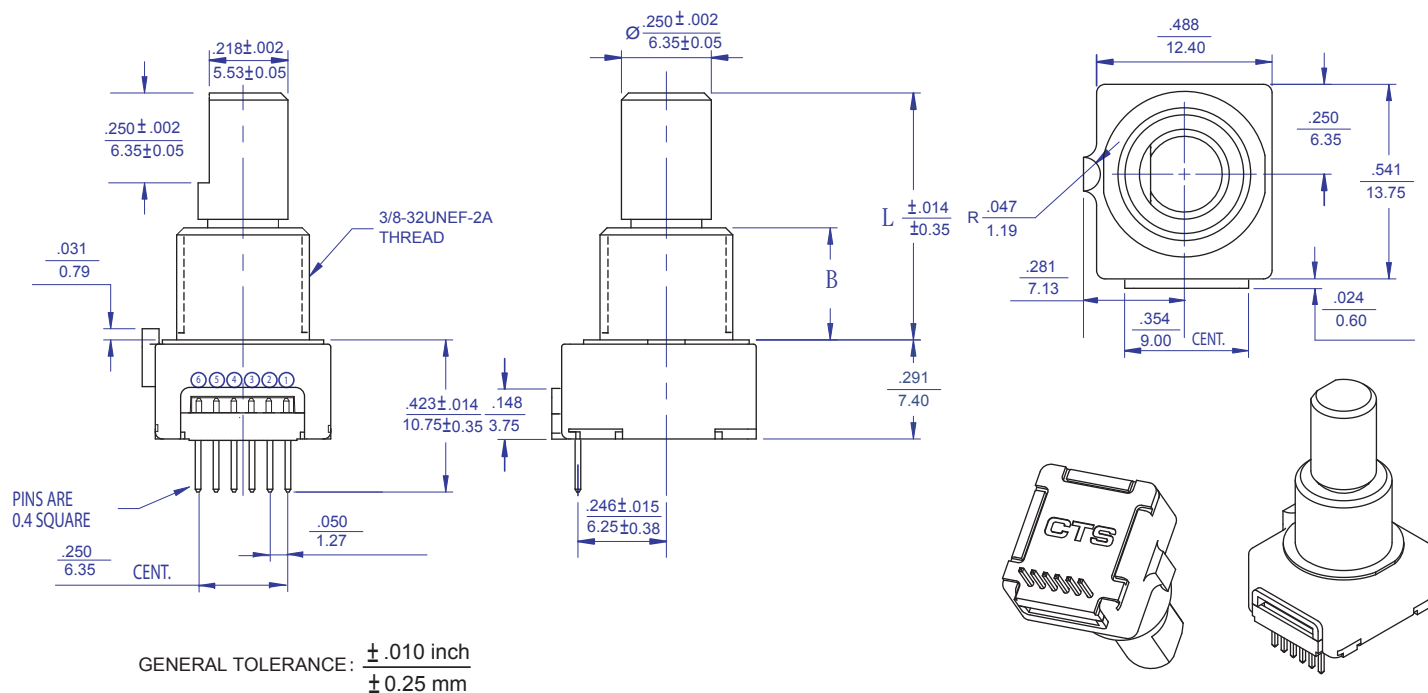
510 $\pm$ 110 grams

Switch Life

Standard: 1 Million actuations minimum

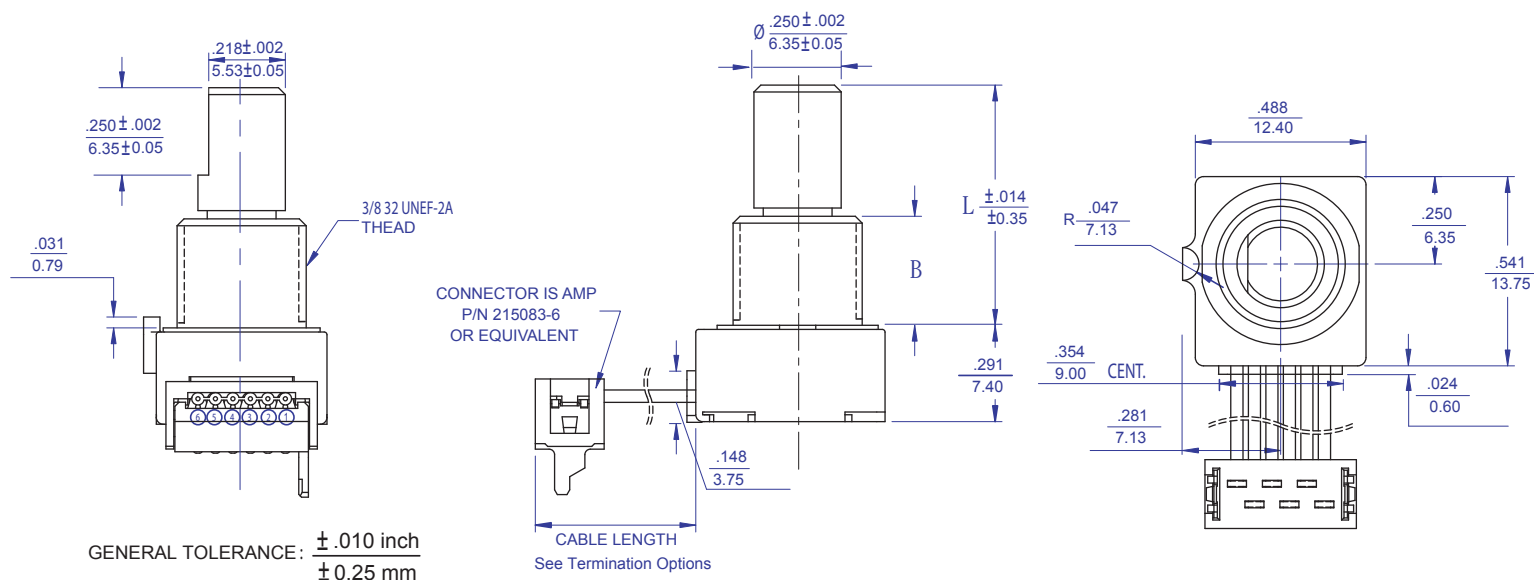
Special: Consult CTS for custom life requirements.

TYPE 291V 2-Bit Encoder With Momentary Switch, Shaft Perpendicular to PC Board

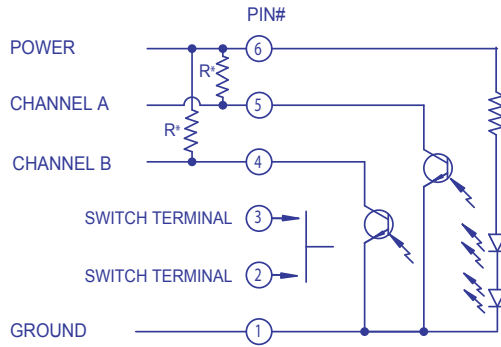


DIMENSION: inch
mm

TYPE 291C 2-Bit Encoder With Momentary Switch, Cable, and Connector

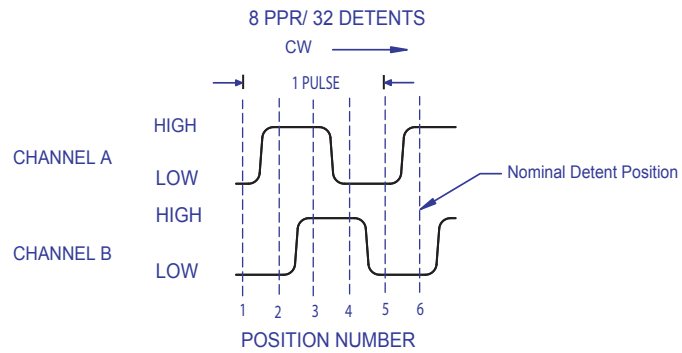


ELECTRIC CIRCUITRY AND WAVEFORM



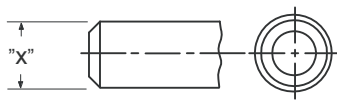
* External pull-up resistors required for operation (2.2K ohm)

Standard Quadrature 2-Bit Code



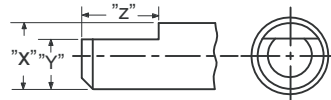
1. 8 PPR/32 detents is shown
2. Code repeats every 4 positions
3. Channel A Leads Channel B in CW direction and lags in CCW direction

Shaft Trim



R - ROUND

	X
Imperial Shaft	.250"
Metric Shaft	6.35



F - FLATTED

	X	Y	Z
Imperial Shaft	.250"	.218"	.250"
Metric Shaft	6.35	5.53	6.35

DIMENSION: $\frac{\text{inch}}{\text{mm}}$

Ordering Information

291

V1

0

22

F

832

A

B

TERMINATION

- V1** - .050" Pitch Center Pins Form to Rear with .144 length
- C4** - .050" Pitch Center 4" Ribbon Cable with Connector
- C5** - .050" Pitch Center 5" Ribbon Cable with Connector
- C6** - .050" Pitch Center 6" Ribbon Cable with Connector
- Connector is AMP P/N 215083-6 or Equivalent

"B" BUSHING LENGTH

mm	inch
D - 9.53mm	2 - .250"
	3 - .375"
	0 - .312"
M9X.75P	3/8-32 UNEF-2A

SHAFT TRIM

- R** - ROUND
- F** - FLATTED

"L" SHAFT LENGTH

mm	inch
A5 - 15mm	20 - .625"
B0 - 20mm	22 - .688"
B5 - 25mm	24 - .750"
C0 - 30mm	28 - .875"
	32 - 1.000"
ALL	ALL
6.35mm Dia.	.250" Dia.

OPERATING VOLTAGE

- A** - 5.0V
- B** - 3.3V

SWITCH

- A** - NONE
- B** - MOMENTARY

OUTPUT COMBINATION

- 832** - 8PPR, 32-DETENTS
- 624** - 6PPR, 24-DETENTS
- 800** - 8PPR, NO DETENTS
- 600** - 6PPR, NO DETENTS