

- **Compact Size 23**
- **Up to 5000 PPR with optional marker pulse**
- **High performance**

The Series 523 is a high resolution, optical incremental encoder designed for industrial and commercial applications. A mechanical standard size 23, the 523 is ideal for machine and equipment designs with limited space and high performance requirements.

A pre-wired cable or terminal screw connections are included with either servo clip or face mounting options.

The bidirectional and marker pulse, current sink and differential line driver outputs are compatible with most electronic counters, instruments, PLC's, robot controls, CNC's, and industrial computers. The 523 is mechanically interchangeable with most size 23 encoders on the market.

#### Applications

- Motor-mounted feedback for servo systems
- Assembly machines
- Robotics and material handling
- Printers, X/Y plotters, and phototypesetters
- Semiconductor I.C. bonders
- Medical diagnostic equipment (X-ray & CAT scanners)
- Position and/or velocity input for CNC's, PLC's, motion controllers, etc.

#### Mechanical and Environmental Features

- 1/4" stainless steel shaft
- Low inertia, low starting torque
- Up to 5000 RPM
- 0 to 70°C operating range
- Outline dimensions: 2.3" x 2.1"

#### Electrical Features

- Shielded cable or terminal screw mounting options
- Up to 5000 pulses per revolution
- Bidirectional outputs and gated markers available
- 100 kHz frequency response standard, 250 kHz available
- 5-26 VDC supply voltage
- Single LED light source standard

#### SPECIFICATIONS

##### Electrical

**Resolution:** See Ordering Info

**Code:** Incremental

##### **Power Supply:**

Open Collector, TTL Totem Pole or TTL Line Driver outputs: 5 to 26 VDC; 120 mA max.

CMOS Line Driver: 5 to 15 VDC; 70 mA max.

##### **Output Current:**

Open Collector: 7406; 40 mA sink at 0.5V

TTL Totem Pole: 7404

TTL Line Driver: TC4428; 40 mA sink/source

CMOS Line Driver: TC4428; 40 mA sink/source

**Quadrature Phasing:** 90° ± 18°

**Symmetry:** 180° ± 9°

**Phase Sense:** A leads B for CW rotation as viewed from the shaft end of the encoder

**Zero Reference:** Gated: .5 cycles wide

**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

**Frequency Response:** Count channel 100 kHz. Zero reference 75 kHz relative to count channel; 250 kHz available, see Ordering Information table, Code 5

**Illumination:** Single gallium-aluminum-arsenide LED

##### Mechanical

**Bearings:** Shielded precision bearings (Sealed bearings optional)

**Shaft Loading:** 5 lbs. axial and radial

**Starting Torque:** With shielded bearings: 0.2 oz-in max.

**Shaft Tolerance:** - 0.0003/ - 0.0007

**Moment of Inertia:** 3.7 x 10<sup>-4</sup> oz-in-sec<sup>2</sup> max.

**Weight:** 13 oz. max.

**Slew Speed:** 5000 RPM max.

##### Environmental

**Operating Temperature Range:** 0° to +70°C

**Storage Temperature Range:** -40° to +90°C

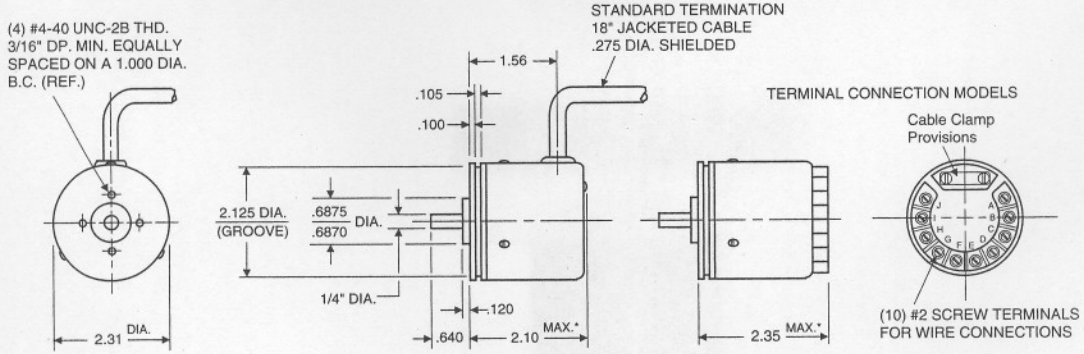
**Shock:** 50 G's for 11 milliseconds duration

**Vibration:** 5 to 2000 Hz @ 2 G's

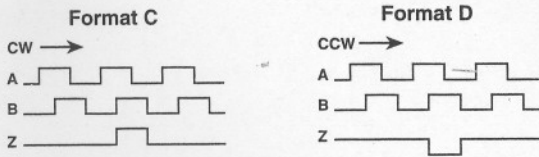
**Humidity:** to 98% without condensation

**Enclosure Rating:** NEMA 12 / IP54

### Approximate Dimensions (in inches)



### Waveform Format Diagrams



### Electrical Connections

Note: Wire color codes are referenced here for models that are specified with pre-wired cable.

Single Ended		
Pin	Function (If Used)	Wire Color Code
A	Signal A	BRN
B	Signal B	ORN
C	Signal Z	YEL
D	Power Source	RED
E	No Connection	—
F	Common	BLK
G	Case	GRN

Differential		
Pin	Function (If Used)	Wire Color Code
A	Signal A	BRN
B	Signal B	ORN
C	Signal Z	YEL
D	Power Source	RED
E	No Connection	—
F	Common	BLK
G	Case	GRN
H	Signal $\bar{A}$	BRN/WH
I	Signal $\bar{B}$	ORN/WH
J	Signal $\bar{Z}$	YEL/WH

### Ordering Information

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: Pulses/Rev	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination
<b>523</b>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>523</b> Size 23 Enclosed	For Resolutions below 3000, see Series E23 <b>3000</b> <b>3600</b> <b>4096</b> <b>5000</b>	<b>0</b> 1/4" Shaft, Shielded Bearings <b>1</b> 1/4" Shaft, Sealed Bearings	<b>4</b> Single Ended, with Index, Format C <b>5</b> Differential, with Index, Format C <b>6</b> Single Ended, with Index, Format D <b>7</b> Differential, with Index, Format D <b>8</b> Single Ended, no Index, Format C <b>9</b> Differential, no Index, Format C	<b>0</b> 5-26 VDC in; 5-26 VDC 7406 Open Collector w/2.2kΩ Pullup out <b>1</b> 5-26 VDC in; 5-26 VDC 7406 Open Collector out <b>2</b> 5-26 VDC in; 5V 7404 TTL Totem Pole out <b>3</b> 5-26 VDC in; 5V 1428 TTL Line Driver out <b>4</b> 5-15 VDC in; 5-15V 1428 CMOS Line Driver out <b>5</b> 5-26 VDC in; 5V 250kHz TTL Line Driver out <b>6</b> 5-15 VDC in; 5-15V 250kHz CMOS Line Driver out	<b>0</b> 18" Cable <b>1</b> 3' Cable <b>2</b> 6' Cable <b>3</b> 10' Cable <b>4</b> 15' Cable <b>8</b> Screw Terminals