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Find the *Novanta Inc. / Dynamics Research 153/121-1000-120CBW* at our website: *Click HERE*

Model 150/152/153
Incremental Optical Rotary Encoder



- **Our most compact rotary encoder**
- **Single LED light source**
- **Up to 8,000 counts per shaft revolution**
- **Sealed bearings available for maximum reliability**
- **Optional differential line driver output stage**

The Model 150/152/153 is a compact incremental, optical rotary encoder for light industrial applications. The Model 150/152/153 is available with discs having up to 2,000 cycles per shaft revolution to provide a maximum of 8,000 counts per revolution utilizing external 4X circuitry. This encoder is available with either sinewave, TTL compatible complementary squarewave, or differential line driver TTL compatible outputs. Custom electronics can be provided to maximize encoder performance to best suit your application. This unit's small diameter (1.625") is appropriate for many limited size applications. In its standard configuration the unit can be used in applications where a low cost, easy to install, totally enclosed optical encoder is required. Typical applications include machine tools, assembly machinery, phototypesetters, and robotics.

SPECIFICATIONS

ELECTRICAL

Resolution range:	• To 2,000 cycles per shaft revolution (to 8,000 counts/revolution with 4X counting circuitry).
Light source:	• Gallium aluminum arsenide LED rated for 100,000 hours MTBF (manufacturer拑 specification).
Light sensors:	• Photovoltaic cells for count channels, phototransistor for zero reference.
Excitation voltages:	• 150/152: 5Vdc (�) at 125ma (maximum). 153: 5Vdc (�) at 175ma (maximum).
Output format:	• Two count channel outputs (A and B) in phase quadrature with an optional zero reference (ZR) output.
Quadrature specification:	• 90° ± 30° (at 10KHz output frequency).

Symmetry specification:
- 180° ± 10° (at 10KHz output frequency).

Rise and fall times:
- 1 µ sec (maximum) into 1,000pf load capacitance.

Frequency response:
- 50KHz for count channels, 10KHz for zero reference.

Zero reference angular width:
- 150/152: 1 ± ° count channel cycle. 153: ° (1/4 cycle is standard and is designated as GZ).

Zero reference alignment:
- 150/152: There is no specified alignment between the ZR and count channels. 153: GZ aligns with output quadrant AB.

Phase sense:
- Channel A leads Channel B for clockwise rotation of the shaft as viewed from the shaft end of the unit.

Pin connections:
- See Table 1.

Output specifications:

Waveform:

Signal levels:

Sinewave
(See Figure 1)
- Count channels: Sinewave outputs with amplitudes of 30mv p-p (minimum) into a (user-supplied) 2KW load at 50KHz output frequency or 3,000 RPM whichever occurs first. DC offset is ±% of p-p signal output (maximum).
- Zero reference: 100mv (minimum) usable signal level into a 5K load resistor to ground (user-supplied) at 10KHz count channel output frequency.

Squarewave
(See Figure 2)
- TTL compatible complementary outputs from a 74LS04* output stage providing 8ma sink current.
- TTL compatible differential line driver outputs with 40ma sink and ±ma source current from a 75158* output stage.

Output options:
- Reversed phase sense栈hannel B leads Channel A for clockwise rotation.
- 7406* open collector output stage with 40ma/30V capability.
- Custom electronics can be provided for non-recurring charge.

MECHANICAL

Outline dimensions:
- See Figure 3.

Shaft loading:
- 5 lbs. axially and radially (maximum).

Shaft radial runout:
- .001" T.I.R.

Starting torque at 25° C:	• Models with shielded bearings: .1 oz.-in. (maximum). • Models with sealed bearings: .5 oz.-in. (maximum).
Shaft angular acceleration:	• 10^5 radians/sec^2 (maximum).
Moment of inertia:	• 1.0 × 10^{-4} oz.-in.-sec^2(maximum).
Bearing type:	• ABEC class 5 (sealed or shielded).
Bearing life:	• 1 × 10^9 revolutions at full load (manufacturer± specifications).
Shaft material:	• 303 series stainless steel.
Cover material:	• Aluminum or plastic (Valox)*.
Slew speed:	• 5,000 RPM.
Maximum operating speed:	• 3,000 RPM or 50KHz output frequency, whichever occurs first.
Weight:	• 6 oz. (maximum).
Connector:	• Not supplied on standard units.

ENVIRONMENTAL

Operating temperature range:	• 0° to +70° C
Storage temperature range:	• - 25° to +90° C.
Shock:	• 10 G± for 11 milliseconds duration.
Vibration:	• 20Hz to 2,000Hz at 5G±.
Humidity:	• To 98% R.H. (non-condensing).

***or performance equivalent.**

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

The diagrams, tables, and how to order information are published as .pdf files. You will need the Adobe Acrobat Reader Software to display and print this information. It can be downloaded for free by clicking on the Adobe icon.



Model 150/152/153 Timing Diagram and How To Order Information in .pdf file format.

Model 150/152/153 Outline Dimensions in .pdf file format.



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