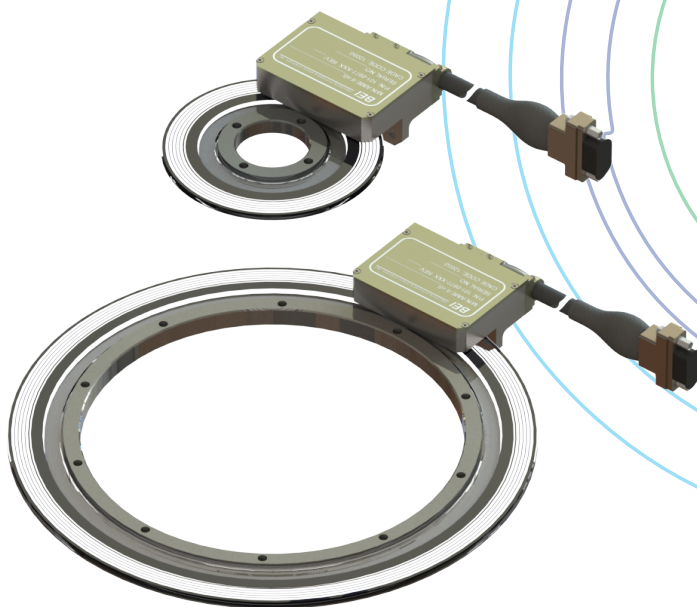


OPTICAL ENCODER > ABSOLUTE KIT ENCODER > NANOSERIES® AIME-II



### FEATURES:

- Modular Kit Optical Encoder
- True Absolute 28-bit Position Output
- Vacuum Compatible Materials
- Sample Rate to 16 kHz
- In-Situ Auto Calibration (360° or limited angle)
- Radial & Tangential Alignment Reporting

### APPLICATIONS:

- High Precision Gimbals
- Telescope Observatory/Array
- Metrology Rate/Position Tables
- Active Protection Systems
- Interchangeable with ARA (Space Encoder) for Rapid Development Path

**FOR MORE INFORMATION CONTACT**  
**SALES@BEIPRECISION.COM**

**OPTICAL ENCODER > ABSOLUTE KIT ENCODER > NANOSERIES® AIME-II****DESCRIPTION:**

BEI Precision is proud to offer the Absolute Intuitive Modular Encoder (AIME-II) which is a member of the nanoSeries® Encoder family. This is a high resolution, single read station, absolute optical encoder available in our array of 3-7.25" disk diameters. This encoder achieves a resolution of 24 bits ENOB with accuracy of 1 arc-second RMS (excluding user bearing and spindle errors). Special diameters, configurations, and resolutions available on request at an additional cost.

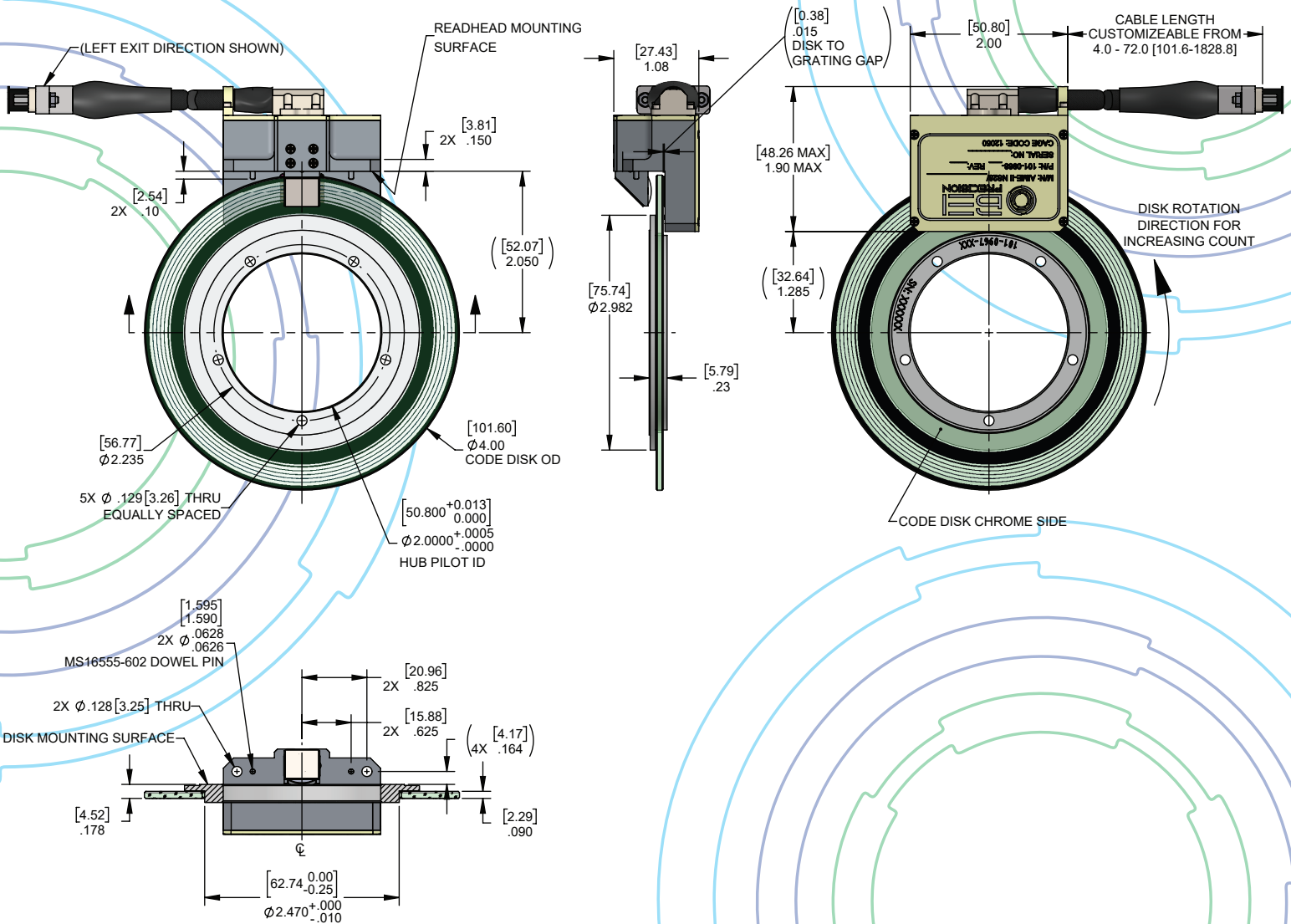
The encoder comes equipped with in situ auto-calibration capability and wide angle error correction. The encoder may be calibrated in full revolution as well as partial angle designs with as few as 10 degrees swept arc, making it an excellent choice for gimbal applications. Mounting and alignment on a piloted shaft simplifies the installation on a user bearing/shaft assembly by removing the need for optical alignment. The optical system uses a large air gap (0.015") and is tolerant to shock and vibration induced gap variations.

The absolute encoder data is derived from several tiers of multi-speed sinusoidal data tracks which are digitized and merged into a continuous data word. The resultant absolute position word is not sensitive to power interruptions. This technique minimizes the number of data tracks (minimizes size and parts count). All data is derived from ratiometric tracks on the code disk, resulting in excellent tolerance to aging, temperature, etc.

There are a number of BEI Precision proprietary techniques used in these encoders that allow most repeatable errors to be removed from the output data. These encoders incorporate algorithms that can cancel disk centering and bearing eccentricities, even with a single readhead. The ultimate limitation of how accurate and repeatable the nanoSeries® AIME-II can be is determined by the thermal and mechanical stability of the axis of rotation of the spindle – most other errors are cancelled or minimized. Tangential and radial alignment error reporting feature makes precise mounting of the code disk and readhead easy and fast. For detailed information on this feature see MM-247 AIME-II/ARA nanoSeries® Encoder Alignment Mode Technical Bulletin.

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**READHEAD & CODE DISK IN INSTALLED STATE**  
(4.00" CODE DISK & LEFT-EXIT READHEAD SHOWN)



**NOTES:**

- SEE APPLICABLE OUTLINE DRAWING FOR COMPLETE DIMENSIONAL SPECIFICATIONS AND MOUNTING INTERFACE RECOMMENDATIONS.
  - 190-0315-01 (3.00")
  - 190-0315-02 (4.00")
  - 190-0315-03 (5.00")
  - 190-0315-04 (6.00")
  - 190-0315-05 (7.25")
- UNBRACKETED DIMENSIONS ARE INCHES AND BRACKETED [X.XX] DIMENSIONS ARE MILLIMETERS.

**OPTICAL ENCODER > ABSOLUTE KIT ENCODER > NANOSERIES® AIME-II**
**GENERAL SPECIFICATIONS:**

The standard nanoSeries® AIME-II output connector is a 15-pin Micro-D connector (M83513/04-B\_N) type with the following pinout:

Pin	Signal Name	I/O	Description
1	HOST_CLK_IN_P	LVDS	DIFFERENTIAL CLOCK RECEIVED FROM THE HOST FOR LATCHING CMD
2	HOST_CLK_IN_N	LVDS	
3	SPARE1	TBD	NOT USED
4	HOST_CMD_P	LDVS	DIFFERENTIAL COMMAND DATA BUS RECEIVED FROM THE HOST
5	HOST_CMD_N	LDVS	
6	SPARE2	TBD	NOT USED
7	DC_5VIN	PWR	5VDC INPUT
8	DC_VIN	PWR	6 - 36VDC INPUT
9	CHASSIS	GND	Chassis GND
10	HOST_CLK_OUT_P	LVDS	DIFFERENTIAL CLOCK TRANSMITTED TO THE HOST FOR LATCHING DATA
11	HOST_CLK_OUT_N	LVDS	
12	SPARE3	TBD	NOT USED
13	HOST_DATA_P	LVDS	DIFFERENTIAL DATA BUS TRANSMITTED TO THE HOST
14	HOST_DATA_N	LVDS	
15	DC_RTN	PWR	POWERGND

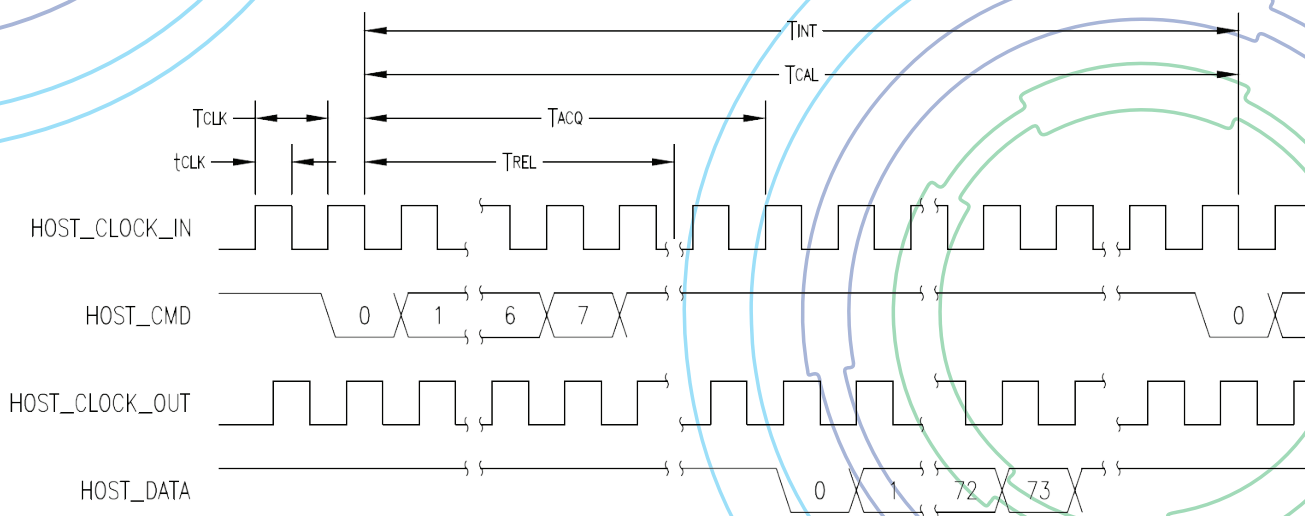
**OUTPUT PROTOCOL:**


Figure 1.  
 Electrical Interface Timing Diagram (System)  
 Timing Values Per Table 1

## OPTICAL ENCODER > ABSOLUTE KIT ENCODER > NANOSERIES® AIME-II

Table 1. Electrical Interface Timing Values (See 190-0308-04 For Details)

Parameter	Symbol	Min	Typical	Max	Units
Encoder Interrogation Period	T <sub>INT</sub>	62.5	--	--	µS
Encoder Interrogation Period During Calibration	T <sub>CAL</sub>	62.5	--	--	µS
Encoder Data Relevancy	T <sub>REL</sub>	25	27	29	µS
Encoder Data Acquisition Time	T <sub>ACQ</sub>		47*		µS
Host Clock Period	T <sub>CLK</sub>	100	--	1000	nS
Host Clock Duty Cycle	T <sub>CLK</sub>	45	50	55	%

\*+1.5 to 2.5 Host CLK Cycles

### GENERAL SPECIFICATIONS:

	Quanta/ Revolution	Resolution (Arc Seconds)	Accuracy (RMS) (Arc Seconds)	Speed (rps for full accuracy)
NS 28/xxx	268,435,456 (28-bit)	0.077 (0.375 µrad)	1.0*	5 max <sup>(1)</sup>
Interrogation Rate/Acquisition Time	16 kHz max / data Acquisition Time 47 µSec typ			
Slew Speed (non-operating)	3600 rpm max			
Operating Temperature Range - Standard	-40°C to +85°C			
Storage Temperature Range	-55°C to +90°C			

Mass, Max (grams)	Structural Component Material <sup>(2)</sup>	Stainless Steel	Titanium
		Readhead with 72" cable	267
	Readhead with L" cable	132.3+1.87(L)	86.7+1.87(L)
	3.00" Disk/Hub	59	44
	4.00" Disk/Hub	97	72
	5.00" Disk/Hub	144	98
	6.00" Disk/Hub	243	166
	7.25" Disk/Hub	292	210

Input Power	Standard Optional	+5VDC ± 5% at 1.2 watts +6.0 to 36 VDC at 1.5 watts, with Switching Regulator
Altitude	To 70,000 feet (21,335 meters)	
Vibration	20.7 grms from 10 to 2000 Hz per MIL-STD-202, Method 214, Cond. B	
Shock	50g at 11ms half-sine pulse per MIL-STD-202, Method 213B, Test Condition A	
Relative Humidity	To 99% (avoid condensation)	
Rated Life, LED	100,000 hours min.	

(1) AIME II is a strobed encoder, higher speeds = greater position lag.

(2) Structural component materials are limited to readhead housing, disk hub, and optics housing other components made of aluminum.

\* Does not include mounting errors

**OPTICAL ENCODER > ABSOLUTE KIT ENCODER > NANOSERIES® AIME-II**
**SPECIAL MODELS:**

Many other sizes, configurations, and resolutions are possible at a nominal NRE fee. Available options (priced separately) include vacuum rating, special materials, cable or connector variations, etc. Contact the factory for price and delivery information.

**ORDERING INFORMATION:**
