

## Description

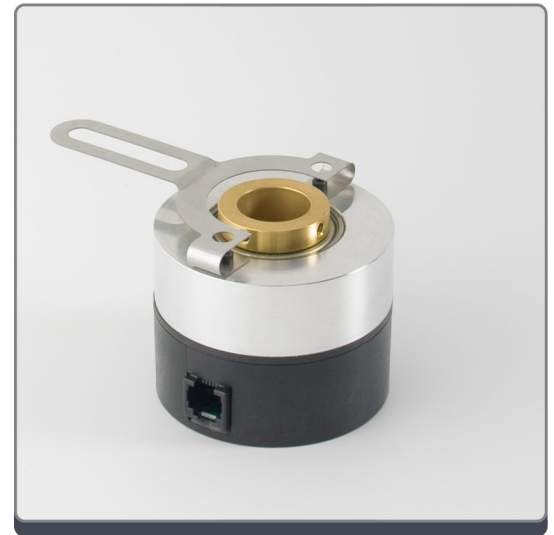
The **HBA2** is a fully programmable blind hollow bore 12 bit absolute encoder designed to easily mount to any rotating shaft. This single turn absolute encoder provides 12 bit resolution over 360 degrees of rotation in a serial output format. The **HBA2** communicates via US Digital's SEI (Serial Encoder Interface) bus. The SEI bus is a simple convenient network of devices interfacing to a RS232 serial port. This bus can support 1 to 15 devices on a single 6-wire cable with lengths up to 1000 feet.

The **HBA2** is a bearing style encoder which features a hollow bore that may be ordered in sizes to accept shaft diameters of 0.250" up to 0.750". The Absolute encoder slips over the shaft and is locked in place with two 6-32 set screws. A flexible anti-rotation tether provides single point mounting for bolt circles ranging from 2.50" up to 5.00" in diameter and compensates for shaft run out of up to  $\pm 0.03$ " axial and  $\pm 0.01$ " radial.

SEI Explorer software is provided along with the **HBA2** absolute encoder to allow access to the programmable features of the encoder. The SEI bus connects to a serial port via US Digital's AD2B or SEI-USB interface adapters. The AD2-B adapter is powered by a wall mount 12VDC power supply and also provides power to the **HBA2** encoder by means of the interconnection cable. The SEI-USB can source power from the USB cable, or accept power from a wall mount power supply.

The **HBA2** absolute encoder may be used in many stand alone applications that do not require a PC interface. For these applications we provide detailed communications protocols for this product (see the SEI Absolute Encoder Communications Protocol data sheet).

An analog output option is available for the **HBA2** hollow bore absolute encoder. It provides a 12 bit analog output voltage proportional to angular position over 360 degrees. The Analog output option is fully functional with the SEI bus, but is limited to one device on the bus instead of multiple units on the bus.



## Features

- 12 bit single turn absolute encoder
- Hollow bore design tolerates run-out
- Programmable zero location
- Low cost
- Industrial duty 6805 series bearings
- Analog output option available
- Programmable resolution
- Programmable CW or CCW count direction
- -25C to 70C operating temperature
- Two year warranty



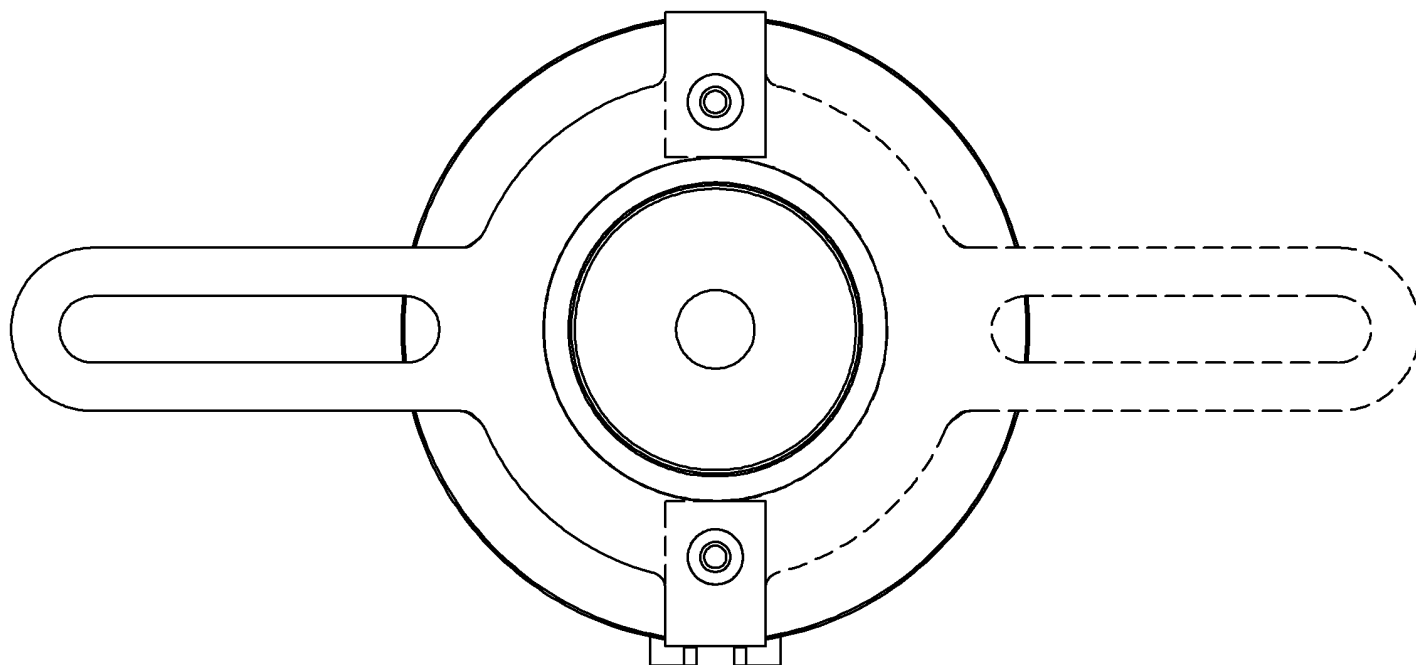


### Software

- [www.usdigital.com/support/software/sei](http://www.usdigital.com/support/software/sei)
- [www.usdigital.com/assets/USDProducts.zip](http://www.usdigital.com/assets/USDProducts.zip) (.zip file with installer)

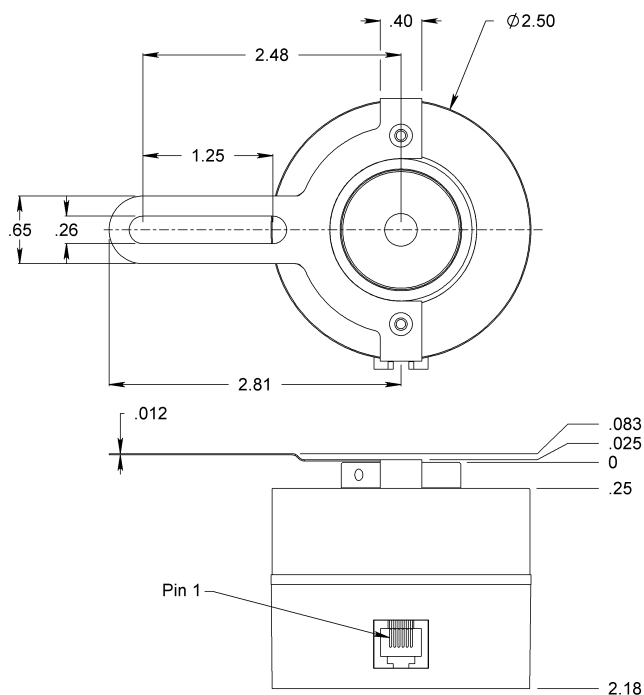


### Tether Mounting



### Mechanical Drawing





### Environmental

Parameter	Value	Units
Operating Temperature	-25 to 70	C
Storage Temperature	-40 to 100	C
Humidity, Non-condensing	0 to 95	%
Vibration (5Hz to 2kHz)	20	G
Shock, 11 mSec	50	G
Electrostatic Discharge, Human Body Model	± 4	kV

### Mechanical

Parameter	Value
Max. Acceleration	100000 rad/sec^2
Max. Shaft Speed	6000 rpm
Max. Shaft Torque	0.70 oz-in typical
Max. Shaft Loading	5 lb.
Weight	11.5 oz.
Max. Shaft Total Indicated Runout	0.010 in.



Max. Shaft Axial Play	± 0.030 in.
Max. Shaft Insertion Depth	0.85 in.
Moment of Inertia	3.7 x 10 <sup>-3</sup> oz-in-s <sup>2</sup>
Technical Bulletin TB1001 - Shaft and Bore Tolerances	
<a href="#">Download</a>	

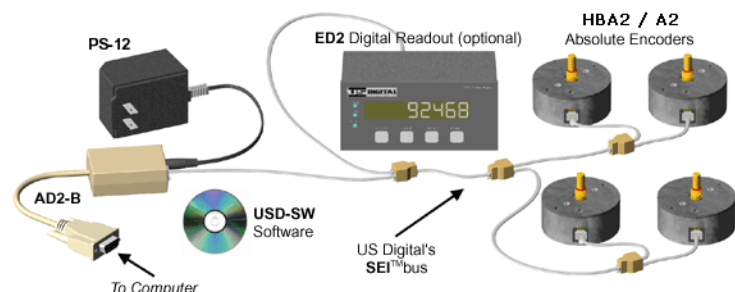
### Electrical

- Specifications apply over entire operating temperature range.
- Typical values are specified at Vcc = 12V and 25C.

Parameter	Min.	Typ.	Max.	Units
Supply Voltage	5.5	12	16	V
Supply Current				
Active		14	18.5	mA
Sleep			1.5	
Analog Output Impedance	950	1000	1050	Ohms
Zero Scale Analog Voltage	0	0.0005	0.003	V
Full Scale Analog Voltage	4.079	4.095	4.111	V
Output Noise (Analog version)		10		mVrms
Differential Nonlinearity	-1.0		1.0	LSB
Absolute Accuracy (SEI interface version)		0.18	0.25	Degrees
Angle tracking speed				
Single-turn mode			3600	rpm
Multi-turn mode			1800	
Position Update Rate (1)			7	msec.

(1) The internal microcontroller takes a snapshot of the disk every 7 msec. and stores the position in memory. It responds immediately to a "report position request" by sending this value which is always the most current position.

### SEI Network







## Analog Output

The analog version of the **HBA2** has a 12-bit DAC on the output which feeds to 2 lines that are otherwise used for the BUSY handshaking pair. This DAC has a full range of 0 to 4.095 volts which is 1 milli-volt per bit. The value which the internal microcontroller sends to that DAC is the same as the digital value that it sends to the host. Since the resolution (which represents the number of codes per revolution) is field programmable, the range of the DAC will also follow that setup. Our default resolution is 3600 codes per revolution which yields 1 count per tenth of a degree. This makes the DAC output equal to 1 milli-volt per tenth of a degree or 0 to 3.599 volts. When the DAC needs to have the full range to 4.095 volts, the single turn resolution should be set to 4096. This is easily done with the available software which runs on a PC. Cable CA-MD6A-SS-MD6-6FT and either the SEI-USB or the AD2B adapter are needed to interface the **HBA2** analog version to a USB port or RS-232 serial COM port.

**Please Note:** The BUSY handshaking lines are replaced by the analog output option. This means that only one device will be able to be connected to the SEI bus when using the analog output option.



## Pin-Out

Pin	Description
1	Ground
2	Busy+ Analog+
3	Busy- Analog-
4	Power
5	DataL
6	DataH



### Ordering Information

HBA2 -	<input type="text"/>	-	<input type="text"/>
	<b>Interface</b>		<b>Shaft diameter</b>
	S = <i>SEI bus</i>		237 = 6mm
	A = <i>Analog output</i>		250 = 1/4"
			312 = 5/16"
			315 = 8mm
			375 = 3/8"
			394 = 10mm
			472 = 12mm
			500 = 1/2"
			551 = 14mm
			625 = 5/8"
			750 = 3/4"

#### Notes

- Cables and connectors are not included and must be ordered separately.
- US Digital warrants its products against defects in materials and workmanship for two years. See complete warranty for details.

### Base Pricing

Quantity	Price
1	\$385.00
10	\$345.04

For volume discounts, please contact us at sales@usdigital.com or 800.736.0194.

- Add \$20.00 per unit for **Interface** of Analog output