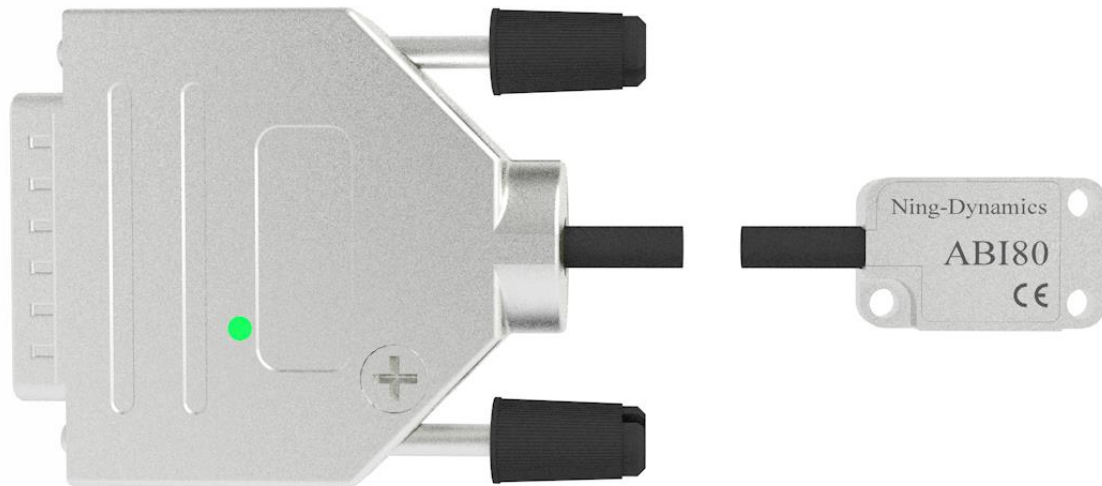


## Datasheet

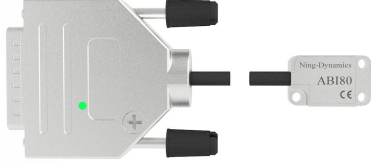
### ABI80 Series Encoder System



### Highlights

<b>Readhead</b>	<ul style="list-style-type: none"><li>• Non-contact optical incremental encoder</li><li>• Industry-standard SinCos 1Vpp signals or TTL signals</li><li>• Integrated Automatic Gain Control ensures optimal signal strength</li><li>• Ideal for high-precision applications</li><li>• Ultra-compact design suitable for integrating into compact systems</li><li>• Simple installation with the diagnostic LED</li></ul>
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## 1. Specifications

Readhead		
<b>Image</b>		
<b>Series</b>		<b>ABI80</b>
<b>Description</b>		Miniature, supports short-stroke linear and angular motion, suitable for compact systems
<b>Scanning Principle</b>		Optical (Reflective)
<b>Scanning Type</b>		Incremental
<b>Signal Period</b>		80 μm
<b>Output Signal</b>		SinCos 1Vpp
		TTL
<b>Resolution</b>	<b>SinCos 1Vpp</b>	80μm
	<b>TTL</b>	1.0 μm (80X angle steps per period)
		0.5 μm (160X angle steps per period) 0.2 μm (400X angle steps per period)
<b>Power Supply</b>	<b>5 V ±10%</b>	60 mA (Typical)
		200 mA (Max)
<b>Temperature</b>	<b>Storage</b>	-20 °C to +70 °C @ RH < 80% (Non-condensing)
	<b>Operating</b>	0 °C to +70 °C @ RH < 80% (Non-condensing)
<b>Acceleration</b>	<b>Operating</b>	500 m/s <sup>2</sup> , 3 Axes
<b>Shock</b>	<b>Non-Operating</b>	<1000 m/s <sup>2</sup> , 6 ms, ½ Sine, 3 Axes
<b>Vibration</b>	<b>Operating</b>	<100 m/s <sup>2</sup> Max @ 55 to 2000 Hz, 3 Axes
<b>Mass</b>	<b>Readhead</b>	3.5 g
	<b>Cable</b>	25 g/m
<b>Cable Design</b>		10 Cores, Double Shielded
<b>Cable Diameter</b>		3.5±0.2 mm
<b>Cable Bend Radius</b>	<b>Static</b>	30 mm
	<b>Dynamic</b>	70 mm
<b>Cable Termination</b>		DSUB 15 Male
<b>Readhead Dimension</b>	<b>Length</b>	20.6 mm
	<b>Width</b>	12.7 mm
	<b>Height</b>	7.5 mm
<b>IP Rating</b>		IP40

## 2. Speed Performance

### 2.1 SinCos 1Vpp Output Signal

#### 2.1.1 Linear Motion

Max Speed (m/s)	
<b>8</b>	

#### 2.1.2 Angular Motion

Lines per Revolution, LPR	Outer Diameter (mm)	Inner Diameter (mm)	Max Speed (RPM)
1650	46.00	32.00	<b>3491</b>
2500	68.00	54.00	<b>2304</b>
3600	96.00	82.00	<b>1600</b>
4096	109.00	95.00	<b>1406</b>
5000	132.00	118.00	<b>1152</b>

### 2.2 TTL Output Signal

#### 2.2.1 Linear Motion

##### 2.2.1.1 Minimum Edge Separation: 50 ns

Interpolator Factor	Angle Steps per Period	Resolution (μm)	Max Speed (m/s)
20X	80X	1.0	<b>8</b>
40X	160X	0.5	<b>8</b>
100X	400X	0.2	<b>3</b>

##### 2.2.1.2 Minimum Edge Separation: 200 ns

Interpolator Factor	Angle Steps per Period	Resolution (μm)	Max Speed (m/s)
20X	80X	1.0	<b>4</b>
40X	160X	0.5	<b>1.8</b>
100X	400X	0.2	<b>0.7</b>

#### 2.2.2 Angular Motion

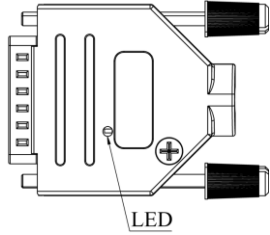
##### 2.2.2.1 Minimum Edge Separation: 50 ns

Lines per Revolution, LPR	Angle Steps per Period					
	80X		160X		400X	
	Counts per Revolution, CPR	Max Speed (RPM)	Counts per Revolution, CPR	Max Speed (RPM)	Counts per Revolution, CPR	Max Speed (RPM)
1650	132000	<b>3491</b>	264000	<b>3491</b>	660000	<b>1457</b>
2500	200000	<b>2304</b>	400000	<b>2304</b>	1000000	<b>962</b>
3600	288000	<b>1600</b>	576000	<b>1600</b>	1440000	<b>668</b>
4096	327680	<b>1406</b>	655360	<b>1406</b>	1638400	<b>587</b>
5000	400000	<b>1152</b>	800000	<b>1152</b>	2000000	<b>481</b>

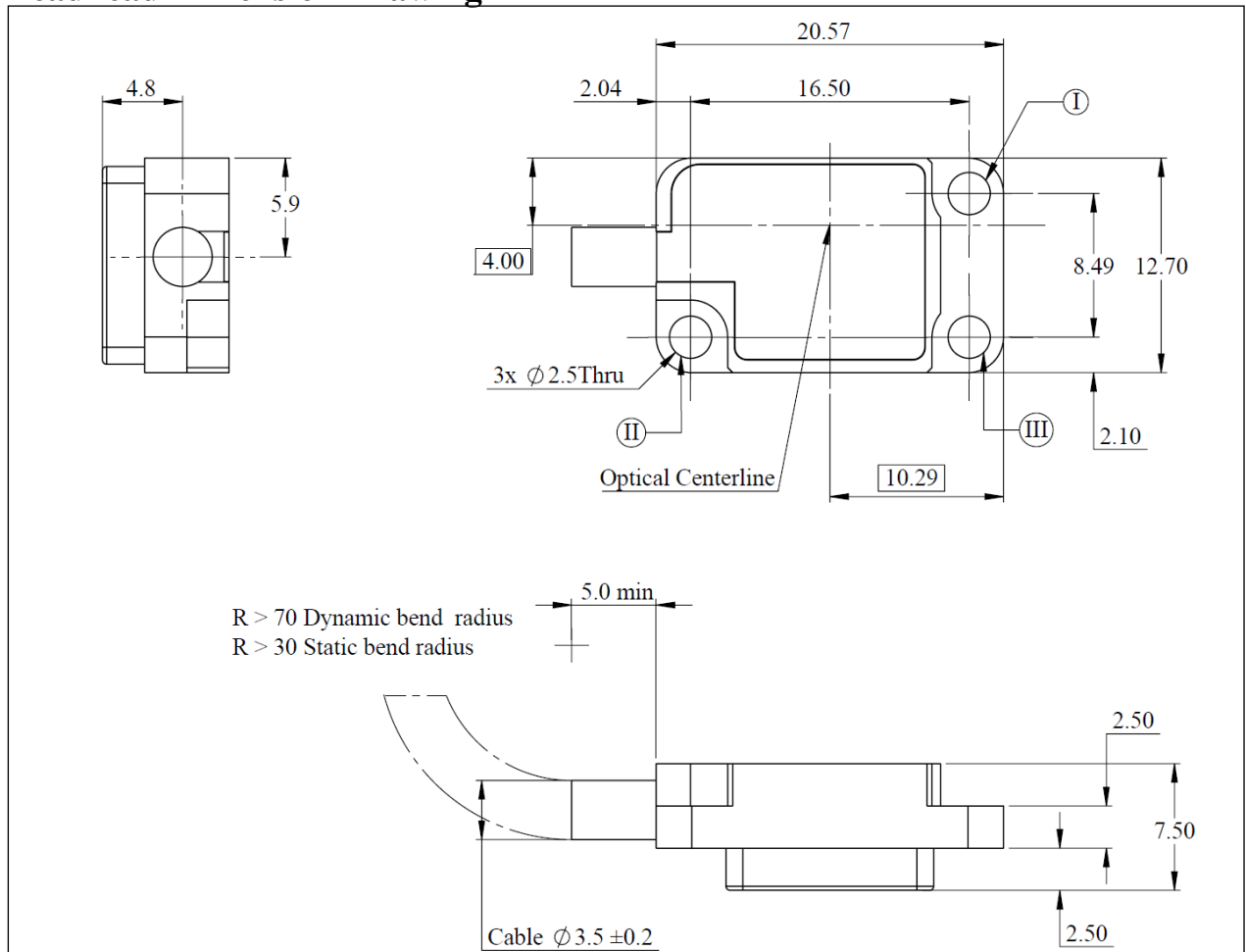
##### 2.2.2.2 Minimum Edge Separation: 200 ns

Lines per Revolution, LPR	Angle Steps per Period					
	80X		160X		400X	
	Counts per Revolution, CPR	Max Speed (RPM)	Counts per Revolution, CPR	Max Speed (RPM)	Counts per Revolution, CPR	Max Speed (RPM)
1650	132000	<b>1818</b>	264000	<b>836</b>	660000	<b>327</b>
2500	200000	<b>1200</b>	400000	<b>552</b>	1000000	<b>216</b>
3600	288000	<b>833</b>	576000	<b>383</b>	1440000	<b>150</b>
4096	327680	<b>732</b>	655360	<b>337</b>	1638400	<b>132</b>
5000	400000	<b>600</b>	800000	<b>276</b>	2000000	<b>108</b>

### 3. LED Definition

Model		ABI80
LED Location		On DSUB 15 Male connector 
LED Colour	Green	Optimal signal quality
	Amber	Warning
	Red	Error

### 4. Readhead Dimension Drawing

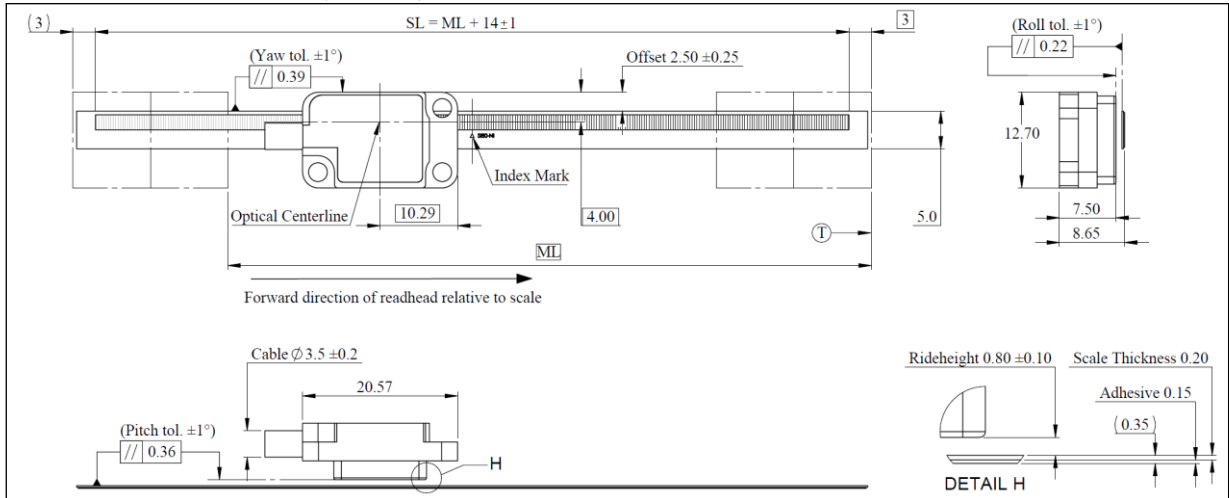


**Note:**

1. All dimensions are in mm.
2. Mount the readhead using two holes, such as (I)(II) or (II)(III).

### 5. Readhead Installation Guide

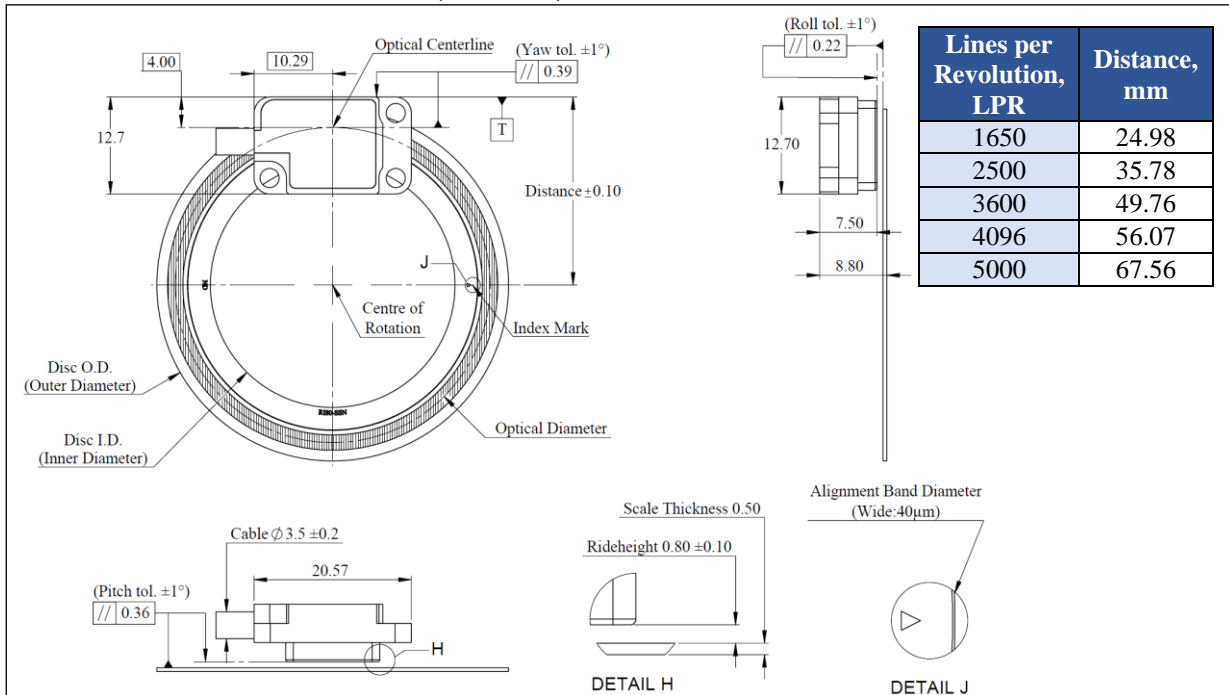
#### 5.1 Nickel Scale with Adhesive (SI80-NI)



**Note:**

1. All dimensions are in mm.
2. SL = Scale length
3. ML = Measuring length
4. (T) = Beginning of the measuring length
5. Δ = Index mark

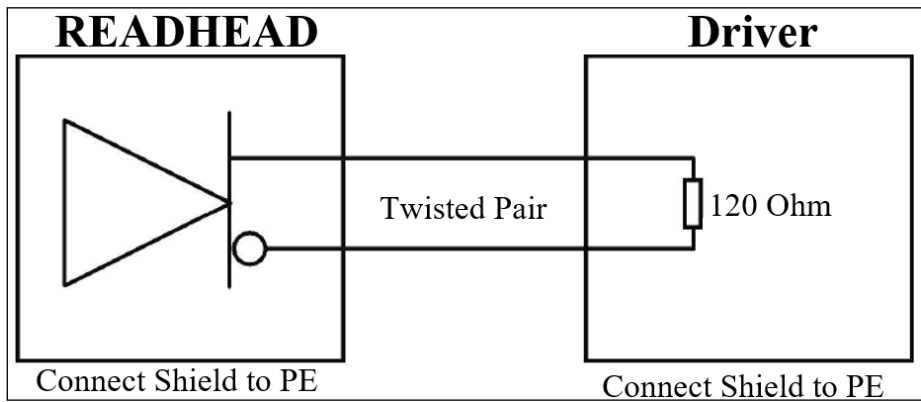
#### 5.2 Stainless Steel Disc without Adhesive (RI80-SSN)



**Note:**

1. All dimensions are in mm.
2. (T) = Datum T
3. Δ = Index mark

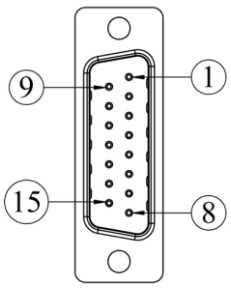
### 6. Electrical Connection



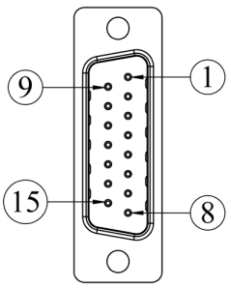
**IMPORTANT:** Readhead shield must be connected to the driver earth (Field ground).  
**Maximum readhead cable length:** 3 m

## 7. Pinout

### 7.1 SinCos 1Vpp Output Signal

Connector	Pinout	Signal	Function
 <p>Type: DSUB 15 Male Jack Screws: UNC 4-40</p> <p><b>Mating Recommendation</b> Type: DSUB 15 Female Hex Extender: UNC 4-40, 6 mm</p>	Pin 1	A+	Sin+ signal
	Pin 2	0 V	Encoder supply (0 V)
	Pin 3	B+	Cos+ signal
	Pin 4	VCC	Encoder supply (5 V)
	Pin 5	TX	Transmitter
	Pin 6	NC	Not connected
	Pin 7	I-	Index- signal
	Pin 8	NC	Not connected
	Pin 9	A-	Sin- signal
	Pin 10	0 V Sensor	Encoder supply (0 V) Shorted with Pin 2
	Pin 11	B-	Cos- signal
	Pin 12	VCC Sensor	Encoder supply (5 V) Shorted with Pin 4
	Pin 13	RX	Receiver
	Pin 14	I+	Index+ signal
	Pin 15	TEST	Testing
Case	Outer Shield	Outer Shield	

### 7.2 TTL Output Signal

Connector	Pinout	Signal	Function
 <p>Type: DSUB 15 Male Jack Screws: UNC 4-40</p> <p><b>Mating Recommendation</b> Type: DSUB 15 Female Hex Extender: UNC 4-40, 6 mm</p>	Pin 1	A+	TTL A+ signal
	Pin 2	0 V	Encoder supply (0 V)
	Pin 3	B+	TTL B+ signal
	Pin 4	VCC	Encoder supply (5 V)
	Pin 5	Modbus A	Modbus A
	Pin 6	NC	Not connected
	Pin 7	I-	Index- signal
	Pin 8	NC	Not connected
	Pin 9	A-	TTL A- signal
	Pin 10	0 V Sensor	Encoder supply (0 V) Shorted with Pin 2
	Pin 11	B-	TTL B- signal
	Pin 12	VCC Sensor	Encoder supply (5 V) Shorted with Pin 4
	Pin 13	Modbus B	Modbus B
	Pin 14	I+	Index+ signal
	Pin 15	TEST	Testing
Case	Outer Shield	Outer Shield	

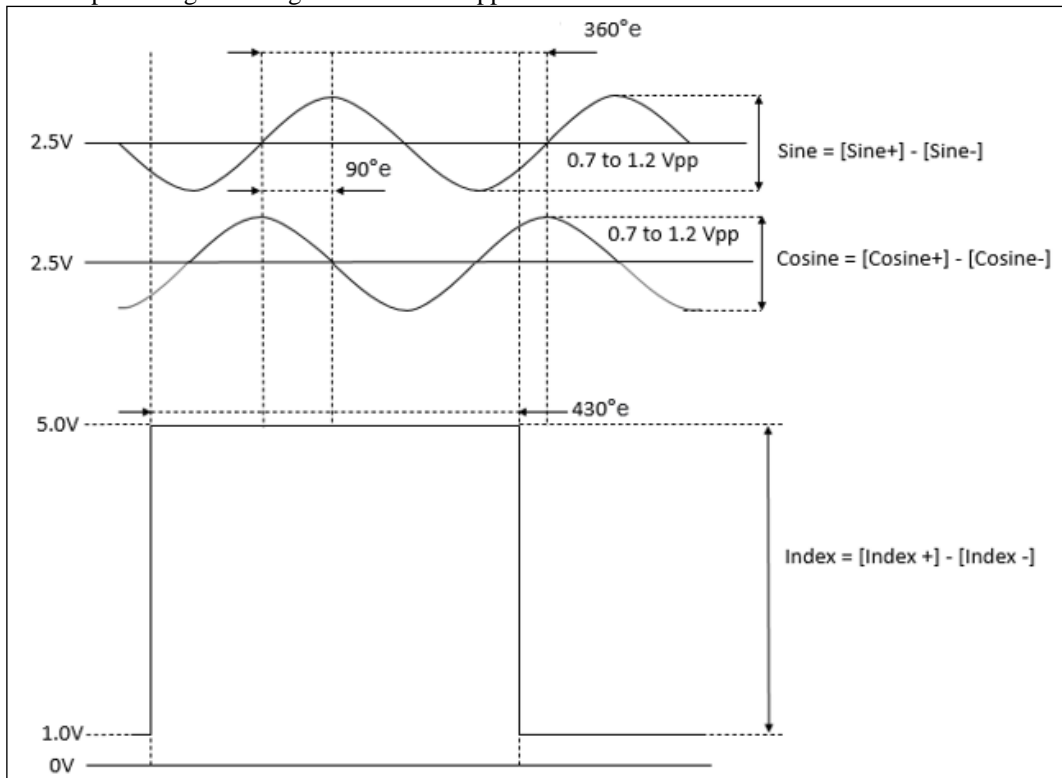


## 8. Output Specifications

### 8.1 SinCos 1Vpp Output Signal

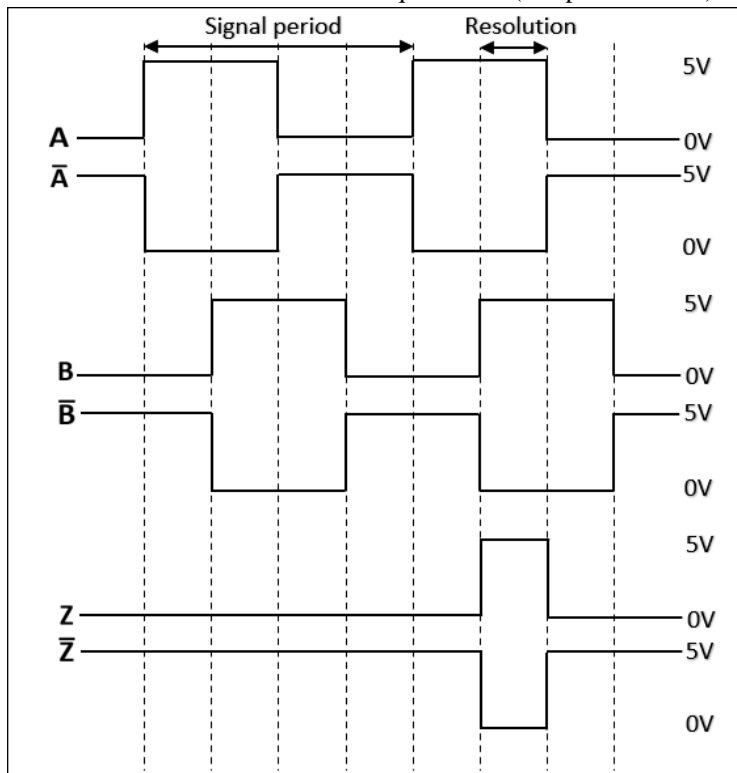
Incremental 2 channels differential Sin & Cos signal (90° phase shifted)

Note: Optimal signal strength = 0.7 to 1.2 Vpp



### 8.2 TTL Output Signal

Incremental 2 channels A and B in quadrature (90° phase shifted)



### 9. Model Name

<b>ABI80-1VPP-05C1</b>	
	<p><b>Cable Termination:</b> C1: DSUB 15 Male</p> <p><b>Cable Length:</b> 05: 0.5 m 10: 1.0 m 30: 3.0 m</p> <p><b>Output Signal:</b> 1VPP: SinCos 1Vpp (80 μm) output signal 80X: TTL output signal, resolution 1.0 μm (80X angle steps per period) 160X: TTL output signal, resolution 0.5 μm (160X angle steps per period) 400X: TTL output signal, resolution 0.2 μm (400X angle steps per period)</p> <p style="text-align: right;"><b>Series:</b> ABI80: Miniature, supports short-stroke linear and angular motion for 80 μm signal period</p>

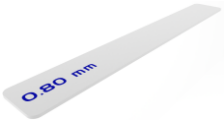
**Note:**

- For customization, please contact our sales team for more information.


### 10. Compatible Scale/Disc

Type	Model	Description
Scale	SI80-NI	Linear incremental 80 μm grating period, nickel with adhesive
Disc	RI80-SSN	Rotary incremental 80 μm grating period, stainless steel without adhesive

### 11. Accessories List

Part Number	Image	Description
N/A (Included in every readhead)		<b>0.80 mm Shim Kit</b> is used during readhead assembly to precisely adjust the rideheight between the readhead and the scale, ensuring optimal signal quality. By using the appropriate shims, the required rideheight can be accurately achieved, preventing signal degradation and enhancing the overall performance of the readhead.

### 12. Introduction to Similar Products

Model	Image	Description
<b>ABI801</b>		Recommended for long-stroke linear motion, equipped with a Hall sensor for multiple indexing selection