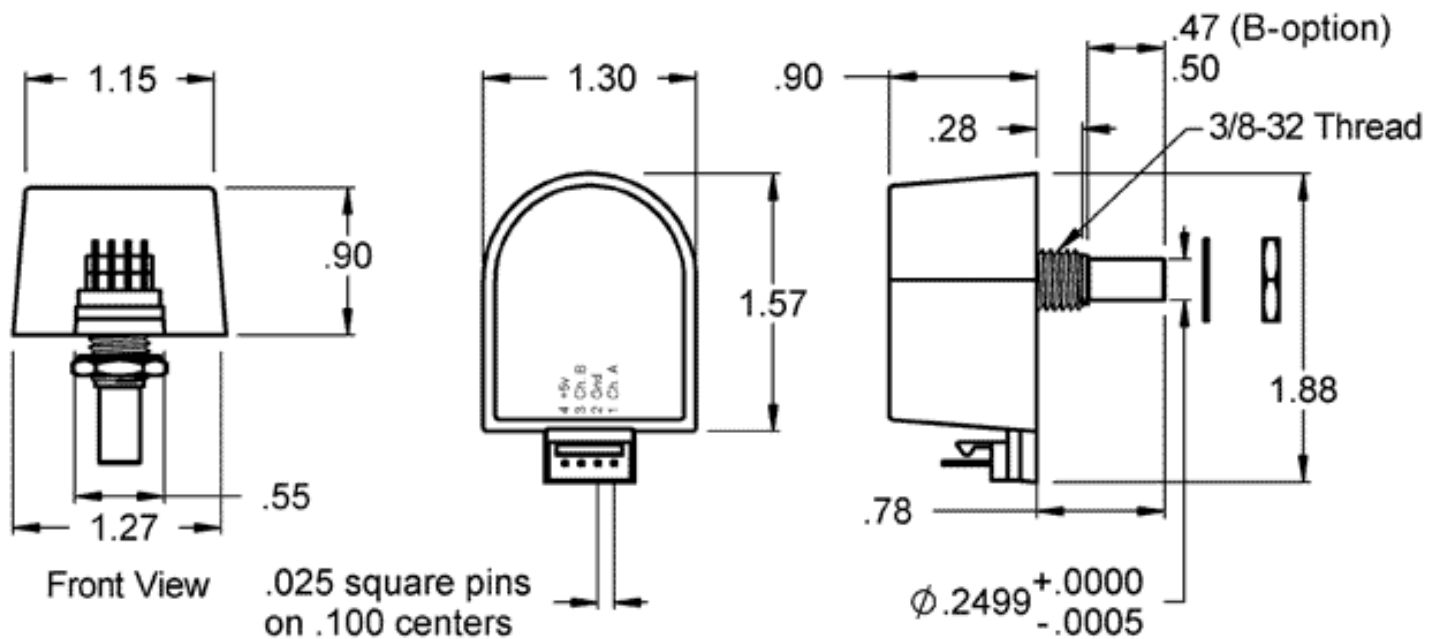


### Description

The **SP-16** is a rugged, reliable, low cost optical incremental encoder that converts shaft angle, speed, and direction into real-time digital information. The shaft is torque-loaded to feel like a potentiometer. Two quadrature outputs provide 64 quadrature states per revolution (16 CPR x 4). The internal electronics and LEDs draw less than 27 mA from a single +5 V supply. Placed behind a knob on a front panel, the SP-16 offers these advantages over other types of man-to-machine interfaces: direct rotary to digital conversion with no digit bobble, no contact wear and no mechanical stops. Limits can be defined by the system designer. No gearing is required for multi-turn operation. Non-torque loaded and ball bearing versions of the **SP-16** are available for motion control applications.



### Mechanical Drawing



### Environmental

Parameter	Value	Units
Operating Temperature	-20 to 85	C
Storage Temperature	-40 to 85	C
Vibration (5Hz to 60Hz)	20	G

### Mechanical

Parameter	Sleeve Bushing	Ball Bearing
Max. Shaft Speed	100 rpm 100 rpm ( <b>N</b> -option)	10000 rpm
Max. Shaft Torque	0.7 ± 0.3 in-oz 0.3 in-oz ( <b>N</b> -option)	0.05 in-oz
Max. Shaft Loading	1 lbs. dynamic 10 lbs. static	1 lb.
Weight	1.0 oz.	1.0 oz.
Max. Shaft Total Indicated Runout	0.0015 in.	0.0015 in.
Max. Panel Nut Tightening Torque	20 in-lbs	20 in-lbs
Technical Bulletin TB1001 - Shaft and Bore Tolerances		Download

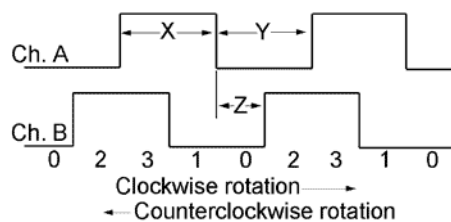
### Electrical

Parameter	Min.	Typ.	Max.	Units	Notes
Supply Voltage	4.5	5.0	5.5	V	
Supply Current	-	22	27	mA	
Low-level Output		0.15	0.4	V	no load
High-level Output	3.5			V	no load
Output Current - High (IOH)			0.6	mA	Vout = 2V@0.6mA
Output Current - Low (IOL)	-	8	18	mA	Vout = 0.4V@18mA
Symmetry	150	180	210	deg.	See note
Quadrature Delay	60	90	120	deg.	See note

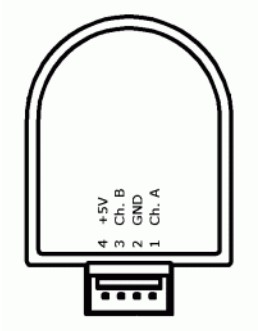
Note:

Symmetry is a measure of the relationship between the high and low times of the A/B outputs in electrical degrees. Quadrature Delay is the phase lag or lead between channels A and B in electrical degrees. See "Output Waveform" for an illustration.

### Output Waveform



### Pinout



**Note:**The SP-16 uses the CON-C4 mating connector.

### Product Change Notifications

Title	Date	Description	Download
EOL SP-16 - PCN 1030	6/17/2013	This PCN is a formal notification that US Digital is discontinuing the SP-16.	<a href="#">Download</a>

### Ordering Information

SP-16 -

**Torque**

D =Default (D)

B =Ball Bearing (B)

N =No-torque (N)

**Notes**

- Cables and connectors are not included and must be ordered separately.
- For ordering information please see the Compatible Cables / Connectors section above.
- US Digital warrants its products against defects in materials and workmanship for two years. See complete warranty for details.

### Base Pricing

Quantity	Price
1	\$54.25
10	\$46.28

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

- Add \$5.80 per unit for **Torque** of Ball Bearing (B)
- Add \$3.00 per unit for **Torque** of No-torque (N)