S2 Optical Kit Encoder

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Description

The S2 series high resolution optical shaft encoder is a non-contacting rotary to digital converter. Useful for position feedback or manual interface, the encoder converts real-time shaft angle, speed, and direction into TTL-compatible quadrature outputs with or without index. The encoder utilizes an unbreakable mylar disk, metal shaft and bushing, LED light source, and monolithic electronics. It operates from a single +5VDC supply.

The S2 is our first generation ball bearing optical shaft encoder and is available for those customers who have designed it into their products; however, the S6 is recommended for new designs in place of the S2.

The S2 is normally designed for applications of 10 feet or less. For longer cable lengths, adding a PC4 / PC5 differential line driver is recommended.

Three shaft torque versions are available. The standard torque version has a sleeve bushing lubricated with a viscous motion control gel to provide torque and feel that is ideal for front panel human interface applications.

The no torque added option has a sleeve bushing and a low viscosity lubricant (that does not intentionally add torque) for low RPM applications where a small amount of torque is acceptable.

The ball bearing version uses miniature precision ball bearings that are suitable for high speed and ultra low torque applications.

Connection to the S2 series encoder is made through a 5-pin standard connector (sold separately). The mating connectors are available from US Digital with several cable options and lengths.

Features

- Small size
- Low cost
- 2-channel quadrature, TTL square wave outputs
- 3rd channel index option
- Tracks from 0 to 300000 cycles/sec
- Ball bearing option tracks to 10,000 RPM
- -40 to +100C operating temperature
- Single +5V supply

Mechanical Drawing

US DIGITAL
1400 NE 136th Avenue
Vancouver, Washington 98684, USA
info@usdigital.com
www.usdigital.com
Local: 360.260.2468
Toll-free: 800.736.0194

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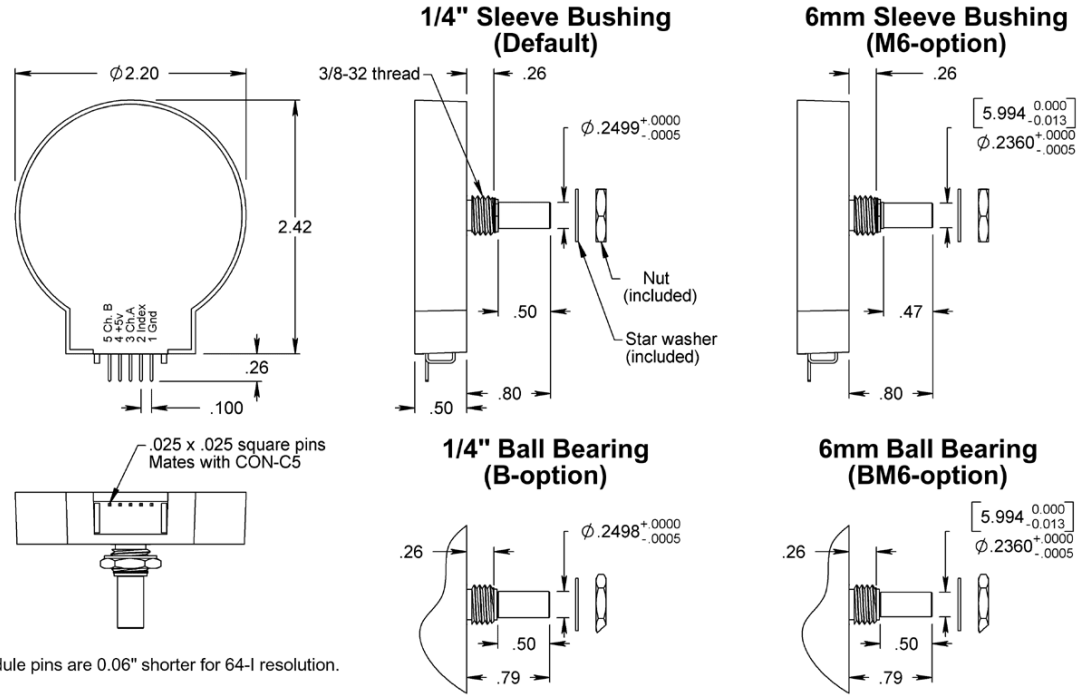

➢ Module pins are 0.06" shorter for 64-I resolution.

Environmental

Parameter	Value	Units
Operating Temperature	-40 to 100	C
Vibration (5Hz to 2kHz)	20	G
Electrostatic Discharge, Human Body Model	± 4	kV

Mechanical

Parameter	Sleeve Bushing	Ball Bearing
Max. Acceleration	250000 rad/sec²	250000 rad/sec²
Max. Shaft Speed	100 rpm	10000 rpm
Max. Shaft Torque	0.5 ±0.2 in-oz 0.3 in-oz (**N**-option)	0.05 in-oz
Max. Shaft Loading	2 lbs. dynamic 20 lbs. static	1 lb.
Bearing Life	> 1000000 revolutions	$L10 = (19.3/Fr)^3$ * Where $L10$ = bearing life in millions of revs, and Fr = radial shaft loading in pounds
Weight	1.28 oz.	1.28 oz.
Max. Shaft Total Indicated Runout	0.0015 in.	0.0015 in.

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Parameter	Sleeve Bushing	Ball Bearing
Max. Panel Nut Tightening Torque	20 in-lbs	20 in-lbs
Technical Bulletin TB1001 - Shaft and Bore Tolerances		Download

* only valid with negligible axial shaft loading.

Phase Relationship

B leads A for clockwise shaft rotation, and A leads B for counterclockwise rotation viewed from the shaft side of the encoder (*see the EM1 page*).

Electrical

- Specifications apply over entire operating temperature range.
- Typical values are specified at Vcc = 5.0Vdc and 25 ° C.
- For complete details, see the EM1 product page.

Parameter	Min.	Typ.	Max.	Units	Conditions
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		27	33	mA	CPR < 1000, no load
		50	62	mA	CPR ≥ 1000, no load
Low-level Output			0.5	V	I_{OL} = 8mA max.
High-level Output	2.0			V	I_{OH} = -8mA max.
	4.2	4.8		V	no load
Output Current Per Channel	-8		8	mA	
Output Rise Time		110		nS	
Output Fall Time		35		nS	

Pin-out

Pin	Description
1	Ground
2	Index
3	A channel
4	+5VDC power
5	B channel

Note: 5-pin single ended mating connector isCON-C5 orCON-LC5

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Product Change Notifications

Title	Date	Description	Download
EM1 LED Die - PCN 1016	2/7/2013	As part of US Digital's continual assurance of supply strategy, we have qualified additional sources for our LED die used in our EM1 encoder module, which in turn impacts all of the following products: EM1, E2, E3, E5, E6, H1, H15, H3, H5, H6, HB5M, HB6M, HD25, PE, S1, S2, S5, S6, T5 and T6 The device specification will remain the same, i.e. there will be no change to form, fit or function of the product(s) as specified by US Digital. The appropriate quality and reliability testing has been performed on representative products to ensure normal parametric distribution, consistent with US Digital's quality and reliability standards.	Download
EOL Sealed Housing Option - PCN 1021	4/11/2013	This PCN is a formal notification that US Digital is discontinuing the Sealed Housing option for the following products: ‣ A2 Absolute Optical Encoder ‣ A2T Absolute Optical Inclinometer ‣ H1 Ball Bearing Optical Shaft Encoder ‣ H3 Ball Bearing Optical Shaft Encoder ‣ S1 Optical Shaft Encoder ‣ S2 Optical Kit Encoder The Sealed Housing option provides the encoder with low level capability of surviving in moisture environments, however the encoder is NOT water proof or intended to be used in applications where this is required.	Download

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Ordering Information

S2 - [ ] - [ ] - [ ] - [ ] - [ ]

CPR	Shaft	Index	Torque	Housing
64 =	236 =*6mm dia. sleeve bushing (standard torque)*	NE =*No Index*	D =*Default*	D =*Default*
1000 =	250 =*1/4"*	IE =*Index*	B =*Ball Bearing*	
1024 =			N =*No Torque Added*	
2000 =				
2048 =				
2500 =				

Rules

- Index must be equal to NE when CPR is equal to 64

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	$88.50
5	$65.85
10	$56.87

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

- Add $1.00 per unit for **Shaft** of 6mm dia. sleeve bushing (standard torque)
- Add $5.80 per unit for **Torque** of Ball Bearing
- Add 17% per unit for **Index** of IE or **CPR** greater than or equal to 2000.

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