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Find the *US Digital S1-500-IB* at our website: ***Click HERE***

RoHS COMPLIANT

Description

The S1 series 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. It operates from a single +5VDC supply.

The S1 is designed to drive cables up to 10 feet long. 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 designed to provide torque and feel that is ideal for front panel human interface applications.

The no torque added option has a sleeve bushing 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 S1 series encoder is made through a 5-pin standard connector. The mating connectors are available from US Digital with several cable options and lengths.



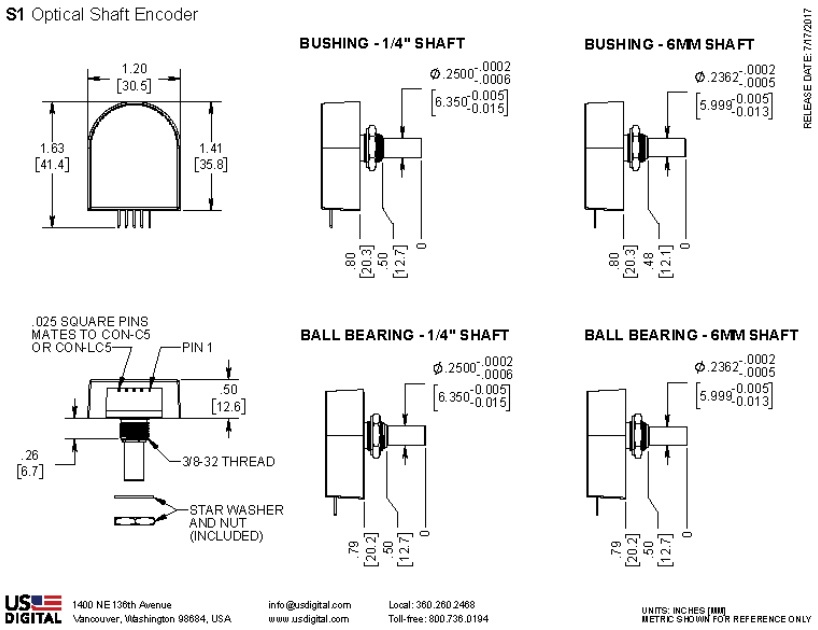
Features

- Ball bearing option tracks to 10,000 RPM
- 2-channel quadrature, TTL squarewave outputs
- 3rd channel index option available on some resolutions
- 32 to 5,000 cycles per revolution (CPR)
- 128 to 20,000 pulses per revolution (PPR)
- Wide operating temperature
- Single +5VDC supply

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Mechanical Drawing



Environmental

Parameter	Value	Units
Operating Temperature, CPR < 2000	-40 to 100	C
Operating Temperature, CPR ≥ 2000	-25 to 100	C
Vibration (5Hz to 2kHz)	20	G
Electrostatic Discharge, IEC 61000-4-2	± 4	kV

Mechanical

Parameter	Sleeve Bushing	Ball Bearing
Max. Acceleration	250000 rad/sec²	250000 rad/sec²
Max. Shaft Speed (mechanical)	100 rpm (1)	10000 rpm (1)
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	0.70 oz.	0.70 oz.

Parameter	Sleeve Bushing	Ball Bearing
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

* only valid with negligible axial shaft loading.

(1) The maximum speed due to electrical considerations is dependent on the CPR. See the EM1 or EM2 product pages.

Phase Relationship

B leads A for clockwise shaft rotation, and A leads B for counterclockwise rotation when viewed from the shaft side of the encoder.

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 or EM2 product pages.

Parameter	Min.	Typ.	Max.	Units	Conditions
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		27	33	mA	CPR < 500, no load
		54	62	mA	CPR ≥ 500 and <2000, no load
		72	85	mA	CPR ≥ 2000, no load
Low-level Output			0.5	V	I_{OL} = 8mA max., CPR < 2000
			0.5	V	I_{OL} = 5mA max., CPR ≥ 2000
		0.25		V	no load, CPR ≥ 2000
High-level Output	2.0			V	I_{OH} = -8mA max. and CPR < 2000
	2.0			V	I_{OH} = -5mA max. and CPR ≥ 2000
		4.8		V	no load and CPR < 2000
		3.5		V	no load and CPR ≥ 2000
Output Current Per Channel	-8		8	mA	CPR < 2000
	-5		5	mA	CPR ≥ 2000
Output Rise Time		110		nS	CPR < 2000
		50		nS	CPR ≥ 2000, ± 5mA load
Output Fall Time		100		nS	CPR < 2000
		50		nS	CPR ≥ 2000, ± 5mA load

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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

Ordering Information

S1 - [ ] - [ ] - [ ] - [ ] - [ ]

CPR	Shaft	Index	Torque	Housing
32 =	236 =*6mm diameter*	NE =*No Index*	D =*Standard*	D =*Default*
50 =	250 =*1/4" diameter*	IE =*Index*	B =*Ball Bearing*	
96 =			N =*No Torque Added*	
100 =				
192 =				
200 =				
250 =				
256 =				
360 =				
400 =				
500 =				
512 =				
540 =				
720 =				
800 =				
900 =				
1000 =				
1024 =				
1250 =				
2000 =				
2048 =				
2500 =				
4000 =				
4096 =				
5000 =				

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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 completewarranty for details.

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