

Description

"The S4T miniature optical shaft encoder is a non-contacting rotary to digital converter. The S4T contains an LED light source, monolithic photo detector and mylar disk. The S4T encoder is available with a shaft bushing or ball bearings for motion control applications, or with shaft torque designed to feel like a potentiometer for front-panel manual interfaces. The encoder converts real-time shaft angle, speed, and direction into TTL-compatible quadrature outputs without index. It operates from a single +5VDC supply.

The S4T uses a high retention, 4 conductor snap-in polarized 1.25mm pitch connector. Mating cables and connectors (See the Cables / Connectors web page) are not included, and are available separately.

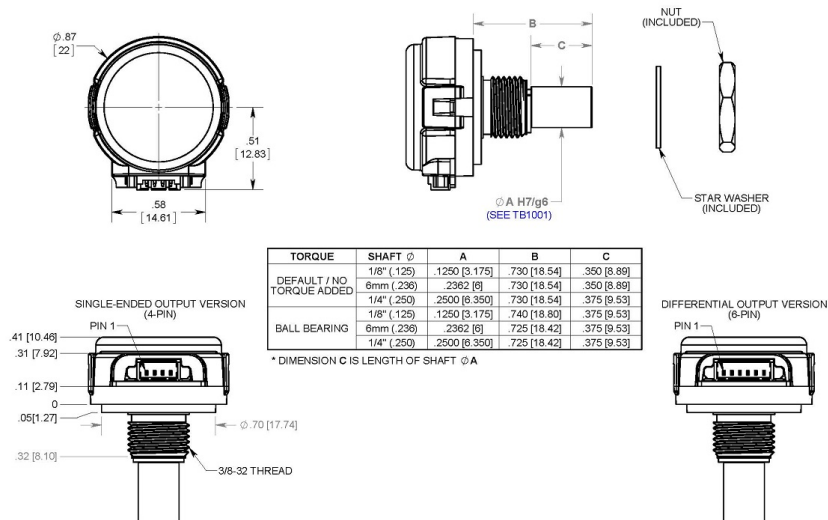


Features

- Small size
- Low cost
- High retention snap-in polarized connector
- -20C to 100C operating temperature
- 100 to 1000 cycles per revolution (CPR)
- 400 to 4000 pulses per revolution (PPR)
- 2 channel quadrature TTL square wave outputs

Mechanical Drawing

S4T Miniature Optical Shaft Encoder



RELEASE DATE 01/20/2015

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www.usdigital.comLocal: 360.260.2468
Toll-free: 800.736.0194UNITS: INCHES (MM)
METRIC SHOWN FOR REFERENCE ONLY**Environmental**

Parameter	Value	Units
Operating Temperature	-20 to 100	C
Electrostatic Discharge, IEC 61000-4-2		
Single-ended (-S version)	± 12	kV
Differential (-D version)	± 7	
Shock, 6 millisecond, half-sine	75	G
Vibration (20Hz to 2kHz, sinusoidal)	20	G

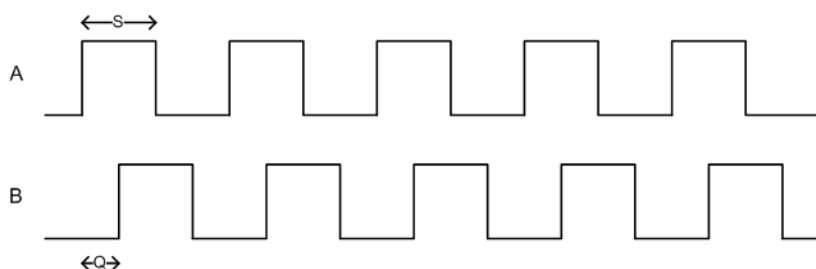
**Mechanical**

Specification	Sleeve Bushing	Ball Bearing
Max. Acceleration	10000 rad/sec ²	250000 rad/sec ²
Max. Shaft Speed	100 rpm	15000 rpm for CPR < 500 12000 rpm for CPR = 500
Max. Shaft Torque	0.5 ±0.2 in-oz (D-option) 0.3 in-oz (N-option)	0.05 in-oz
Max. Shaft Loading	2 lbs. dynamic 20 lbs. static	1 lb.

Specification	Sleeve Bushing	Ball Bearing
Bearing Life	> 1000000 revolutions	$L_{10} = (22/F_r)^3 *$ Where L_{10} = bearing life in millions of revs, and F_r = radial shaft loading in pounds
Weight	0.48 oz.	0.43 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

* only valid with negligible axial shaft loading.

Phase Relationship



Parameter	Min.	Typ.	Max.	Units
Symmetry, S	105	180	255	electrical degrees
Quadrature Delay, Q	30	90	150	electrical degrees

(1) B leads A for clockwise rotation, A leads B for counter clockwise rotation viewed from the shaft side of the encoder.

Single-ended Electrical

Specifications	Min.	Typ.	Max.	Units	Notes
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		25	30	mA	CPR \leq 500, no load
		34	42	mA	CPR > 500, no load
Low-level Output			0.4	V	CPR \leq 500, IOL= 8 mA
					CPR > 500, IOL= 5 mA
High-level Output		0.035		V	no load
	2.4			V	CPR \leq 500, IOH= -8 mA

Specifications	Min.	Typ.	Max.	Units	Notes
CPR > 500, IOH= -5 mA	4.0		V	no load	
Output Rise Time		100		ns	no load
Output Fall Time		50		ns	no load

Differential Electrical

Specifications	Min.	Typ.	Max.	Units	Notes
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		27	32	mA	CPR ≤ 500, no load
		36	44	mA	CPR > 500, no load
Single-Ended Output Voltage High	4.75	5.0		V	Min. @ 25mA load, Typ. @ no load
Single-Ended Output Voltage Low		0.25	0.60	V	Typ. @ no load, Max. @ 4.5mA load
Differential Output Voltage	3.0	3.8		V	RL = 100 ohm
Differential Output Rise/Fall Time		20		ns	

Pin-out

4-pin Single-ended (1)

6-pin Differential (2)

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

(1) 4-pin single-ended mating connector is CON-MIC4

(2) 6-pin differential mating connector is CON-MIC6

Ordering Information

S4T - - - -

CPR	Shaft	Output	Torque
100	125 = 1/8" diameter	S =Single Ended	D =Default
108	236 =6mm diameter	D =Differential	B =Ball Bearing
120	250 = 1/4" diameter		N =Light Static Drag
125			
128			
200			
250			
256			
300			
360			
400 =			
500 =			
512 =			
720 =			
800 =			
1000 =			

Notes

- 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.
- View Shaft and Bore Tolerances - TB1001