

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.



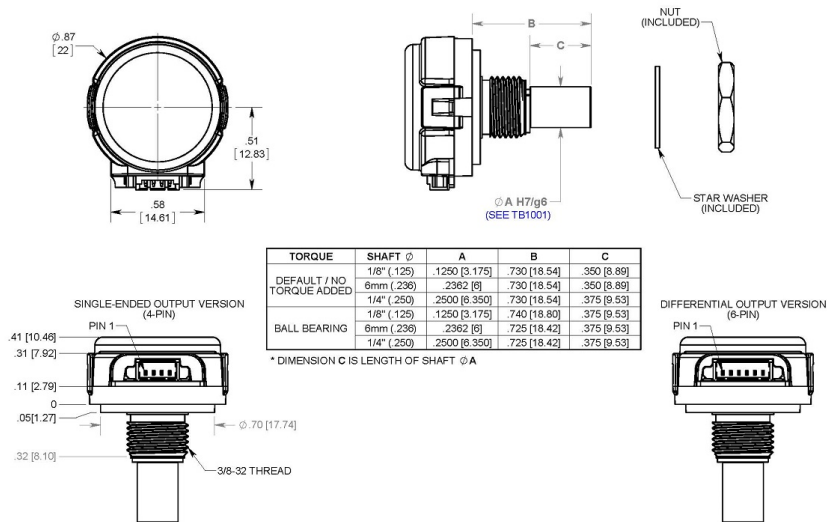
Features

- 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

1400 NE 136th Avenue
Vancouver, Washington 98684, USAinfo@usdigital.com
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



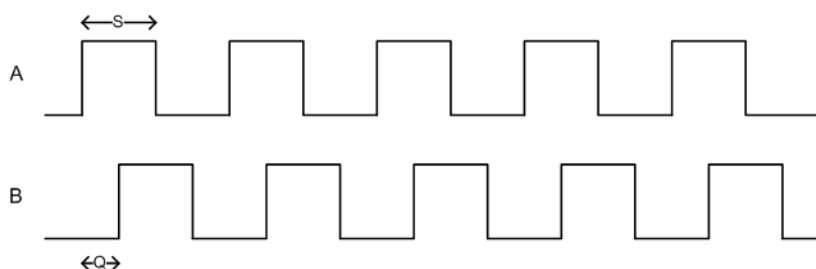
Mechanical

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 ≤ 500, no load
		34	42	mA	CPR > 500, no load
Low-level Output			0.4	V	IOL = 8 mA
		0.035		V	no load
High-level Output	2.4			V	IOH = -8 mA
		4.0		V	no load
Output Rise Time		100		ns	no load

Specifications	Min.	Typ.	Max.	Units	Notes
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 =			
1000 =			

Notes

- For ordering information please see the Compatible Cables / Connectors section above.
- US Digital® warrants its products against d effects in materials and workmanship for two years. See complete warranty for details.