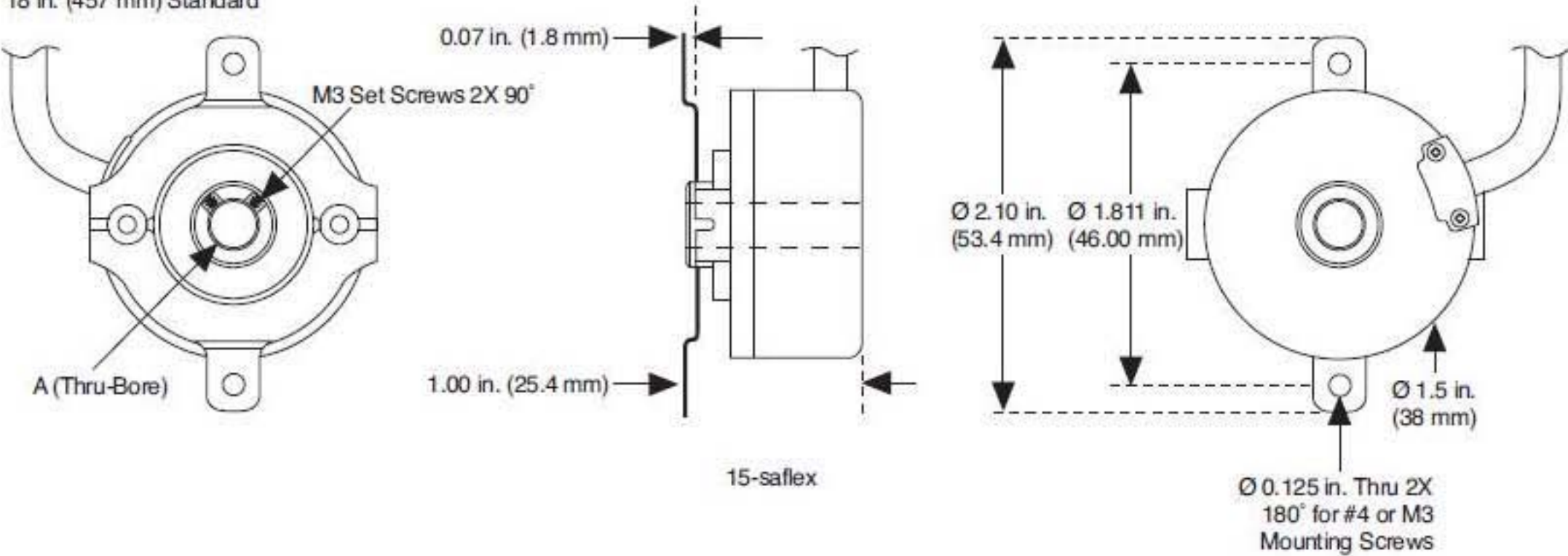


Encoders for NEMA 23 and NEMA 34 Motors		<a href="#">Back to Detailed Specs</a>
Electrical		
Resolution	1000 counts/revolution	
Input voltage	5 V ±10%	
Input current	100 mA max (65 mA typical) with no output load	
Channel configuration	Quadrature A, B, and Index	
Output type	Differential line driver	
Noise immunity	Tested to BS EN61000-6-2; BS EN50081-02; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6; BS EN500811	
Symmetry	180 deg (±18 deg) electrical	
Quadrature phasing	90 deg (±22.5 deg) electrical	
Minimum edge separation	67.5 deg electrical	
Accuracy	Within 0.017 deg mechanical or 1 arc-minute from true position	
Industry Standards		
Industrial standards	CE	
Sealing standards	IP40	
RoHS Compliance	Yes	
Physical		
Operating temperature	-20 to 85 °C	
Model type	Thru-bore	
Bore size	1/4 in. (780251-01), 8 mm (780252-01)	
Mounting	1.812 in. (46 mm) two-hole flex mount	
Maximum frequency	200 kHz	
Operating temperature	20 to 85 °C	
Max shaft speed	8000 rpm	
Bore tolerance	-0.0000 in./+0.0006 in.	
User shaft tolerances		
Radial runout	0.008 in. max	
Axial endplay	±0.030 in. max	
Starting torque	0.300 oz-in. (0.212 N . m)	
Moment of inertia	6.7 x 10-5 oz-in.-sec2 (4.8 gm-cm2)	
Max acceleration	1 x 105 rad/sec2	
Weight	3 oz typical	
Storage temperature	-25 to 85 °C	
Humidity	98% RH noncondensing	
Vibration	10 g @ 58 to 500 Hz	

Cable Length  
18 in. (457 mm) Standard



**Note:** All dimensions have a tolerance of  $\pm 0.005$  in. or  $\pm 0.01$  in. unless otherwise specified.

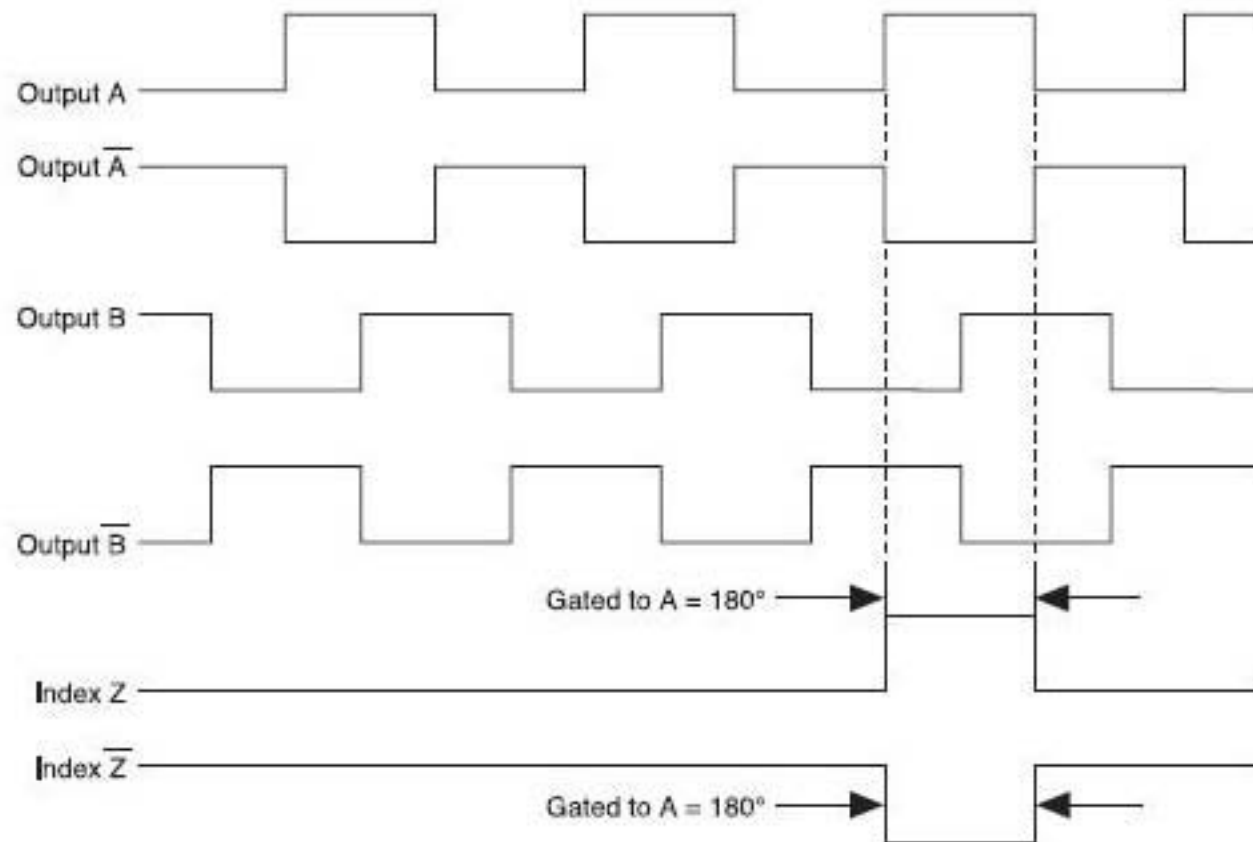
NI Part Number	Manufacturer Part Number	A (Thru-Bore Diameter)
780251-01	15T-01SA-1000-N5RHV-F00-CE	1/4 in., 0.250 in.
780252-02	15T-14SA-1000-N5RHV-F00-CE	8 mm

Wire Description

Pin #	Wire Color	Function
1	Brown	A
2	White	+VDC
3	Yellow	$\overline{A}$
4	Red	B
5	Green	$\overline{B}$
6	Orange	Z
7	Black	COM
8	Blue	$\overline{Z}$

Quadrature Waveform

## Quadrature Waveform



<b>amps/phase</b>	The maximum amount of current allowed through a phase of the stepper motor. Holding torque, the speed versus torque curve, and so on are determined when the motor is excited by this value. The specifications listed in this data sheet are adjusted for the winding configuration.
<b>angular accuracy</b>	A percentage of the step angle that defines the accuracy of each full step.
<b>detent torque (cogging torque)</b>	The amount of torque necessary to rotate the stepper motor one full step when the motor is deenergized.
<b>differential line driver</b>	A type of electrical digital output that can transmit digital data over a long distance. It consists of a complementary pair of digital lines.
<b>electrical symmetry</b>	How close each quadrature channel is to a 50 percent duty cycle when at a constant speed.
<b>holding torque</b>	The amount of torque necessary to rotate the stepper motor one full step (microstepping turned off) when the motor is energized at the rated amps/phase of that motor.
<b>minimum edge separation</b>	Defines in degrees how close (electrically) an edge on channel A can be to an edge on channel B.
<b>NEMA</b>	National Electrical Manufacturers Association (NEMA). NEMA is a U.S.-based association that creates standards for mountings. The NEMA size of a motor defines its shaft size and mounting configuration.
<b>phase inductance</b>	The inductance of each phase of the stepper motor. The specifications listed in this data sheet are already adjusted for the winding configuration.
<b>phases</b>	A wound wire in the stepper motor that is excited with current to produce electromagnetic force. Two or more phases work together by alternating between positively energized, deenergized, and negatively energized states to rotate the stepper motor.
<b>quadrature phasing</b>	The electrical phase shift between channels A and B in a quadrature encoder.
<b>step angle</b>	The distance the motor rotates each full step of the stepper motor. Also defined as 360 degrees divided by the steps per revolution.