



Dynamic Motor Motion
Technology Corporation

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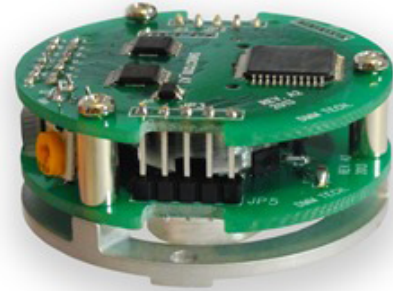
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DSN05 SERIES INCREMENTAL ENCODER

The DSN Series Rotary Encoders offers the highest level of performance to cost ratio.

Angular positioning is calculated using multiple hall effect sensors mounted radially around a magnetic rotor component. Changes in the angular position of the rotor translates to a change in output from the sensor, then the central microcontroller uses a dedicated algorithm to calculate the position. The sensors are arrayed in a circular configuration so the measured angle is very uniform and reliable within the full 360° window. The speciality of the dedicated calculation algorithm attributes the measurement with high accuracy.

Featuring industry first auto synchronization tuning, this virtually eliminates the strict mounting requirements of conventional rotary encoders. The control processor actively calibrates the algorithm parameters to perfectly compliment the reading of each hall sensor IC induced by the rotor magnetic field. Data from each sensor is interpolated to generate a best-point reading. Each encoder is always guaranteed to have the perfect mount and optimized performance.



Features

- Non-Contact Shaft-Sensor Coupling
- 256 ~ 4096 P/T Resolution [1024 ~ 16,384 C/T]
- 2,4,6,8,10 Pole Option
- Internal Supply Voltage Filter
- Active Sensor Optimization
- Patent Pending Hall Effect Sensor Array Technology
- Differential TTL Line Driver Interface- RS422 Compliant
- 30 °C ~ +100 °C Operating Temperature
- High Mounting Tolerance
- High Rigidity Package - No Fragile Components

Industry Application

- Small to Medium Capacity Servo Motor
- Robotics
- Machine Tools
- Industrial Instrumentation

Specification

Encoder Type	Incremental	Frequency Response	300 kHz
Resolution	256 ~ 4096 P/T	Output Circuit	Line Driver
Accuracy *1	0.1 ° MAX. [6 arc-min]	Supply Voltage	+5 VDC ± 10 %
Max. Permissible Speed *2	30,000 min-1	Supply Current	150 mA MAX.
Rotor Inertia	0.01 kg·cm ²	Output Voltage	1 +2.4 VDC MIN.
Operating Temperature	-30 °C ~ +100 °C		0 +0.5VDC MAX.
Storage Temperature	-40 °C ~ +100 °C	Output Current	+0.5 mA MAX.
Relative Humidity	< 85% *3	Pulse Rise/Fall Time	50 ns MAX.
Weight	0.03 kg	Insulation Voltage *4	800V
Protection	IP00	Sensor Type	InAs Hall Effect
Mount Tolerance *5	0.1mm	Magnetic Source	Neodymium [NdFeB]
Shaft Axial Movement	± 0.5 ° MAX.		

*1 Accuracy is the maximum error between the measured position and the actual position. Measured as the non-linearity difference between the actual and ideal curves. Fig. 1

*2 Max. 512 P/T resolution scale at 30,000 min-1. Fig. 2 shows the relation between model output resolution and max permissible speed at full scale.

*3 Free from condensation.

*4 From base frame to sensor electronics.

*5 The mounting tolerance applies to eccentricity (XY) as well as depth (Z).

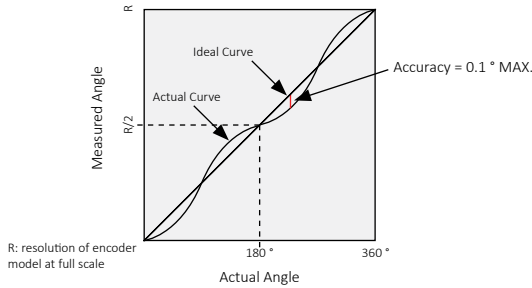


Fig. 1

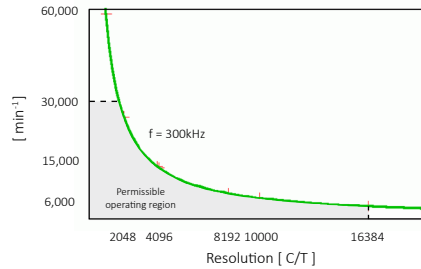


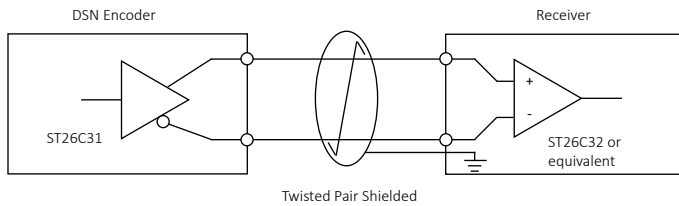
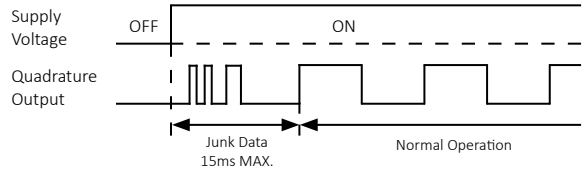
Fig. 2

Maximum rotational speed of rotor while at full scale resolution. Response frequency = 300kHz. Resolution calculated as counts per turn.

Interface

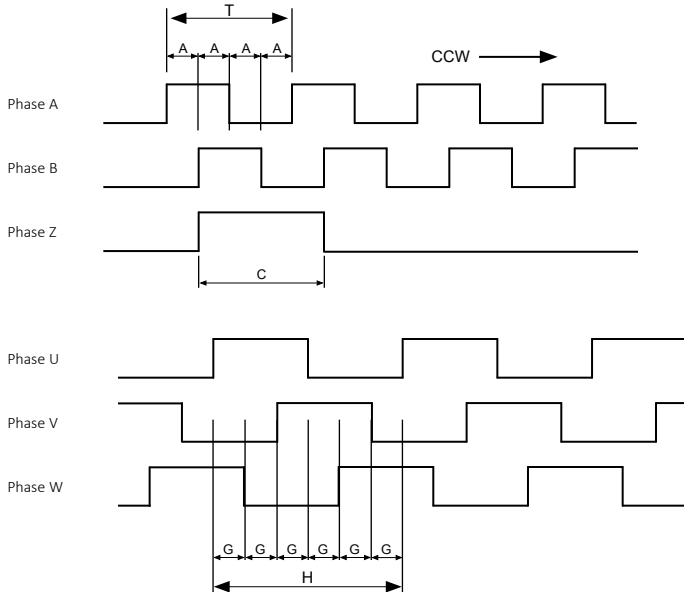
- Line Driver Output
- Differential- RS422
- Max. Cable Distance = 100m

Start-Up Sequence



- Example receiver circuit shown. Contact DMM Technology Corp. for additional design specifications.
 - Cable lengths greater than 100m can be achieved- terminal resistor circuit should be connected between complimentary pairs.

- A leads B for CCW rotation- viewed from encoder shaft/mounting side



$$T = 360^\circ / R$$

$$A = T / 4 \pm T / 8$$

$$C = T \pm T / 2$$

$$G = 60 / P \quad (\text{mechanical})$$

$$H = 360^\circ / P \quad (\text{mechanical})$$

$$R = \text{model resolution}$$

$$P = \text{motor pole pair number}$$

Supply voltage input should be as stable as possible. DSN encoder has integrated voltage regulator, but DC ripple should be minimized to minimize transition noise.

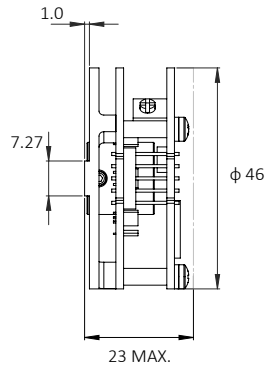
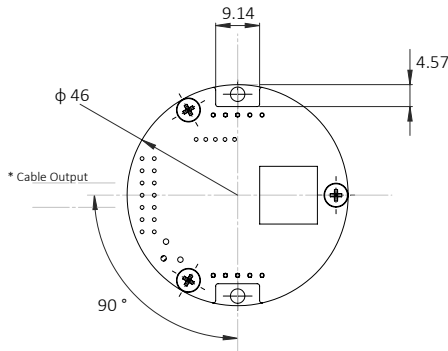
Pole	G	H
2	60° ± 1°	360°
4	30° ± 1°	180°
6	20° ± 1°	120°
8	15° ± 1°	90°
10	12° ± 1°	72°

*Mechanical Angle

Model Nomenclature

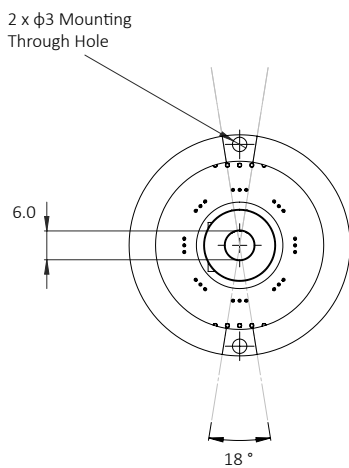
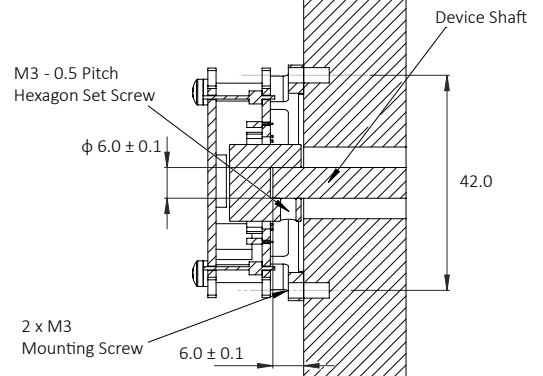
Series	Resolution	Feedback	Pole	Interface	Special Requirement
DSN05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	D	01
	04 : 256 P/T 08 : 512 P/T 10 : 1,000 P/T 12 : 1,024 P/T 24 : 2,048 P/T 25 : 2,500 P/T 48 : 4,096 P/T	P : With commutation R : Without commutation	02 : 2 pole 04 : 4 pole 06 : 6 pole 08 : 8 pole 10 : 10 pole	D: +5VDC Differential Line Drive (RS422) Quadrature	01 : Standard Model

Dimensions

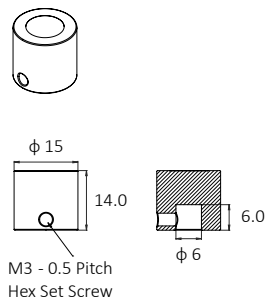


Mounting Dimensions- Driving Device

* See DSN mounting manual for detailed mounting instructions



Aluminum Rotary



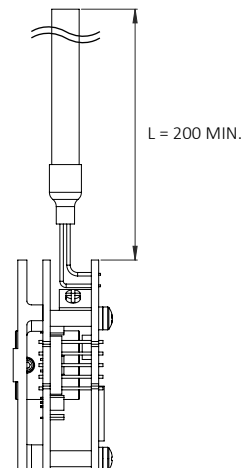
- All units in [mm]
- Tolerance : ± 0.5mm. Unless otherwise noted
- Mounting screws not included
- M3 set screw attached to rotary

Custom rotary bore diameters available.

Connection Cable

- Shielded
- Heat-resistant pvc sheath
- 14-position, 0.4mm O.D. copper conductor

Pin	Color	Data	Pin	Color	Data
1	Red	+5 VDC	7	Yellow	Z +
2	Black	GND	8	Yellow/Black	Z-
3	Blue	A +	9	Brown	U +
4	Blue/Black	A-	10	Brown/Black	U-
5	Green	B +	11	Gray	V +
6	Green/Black	B-	12	Gray/Black	V-
7	Yellow	Z +	13	White	W +
8	Yellow/Black	Z-	14	White/Black	W-
9	Brown	U +	Shield		



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