

Series 21/22



- **Up to 1270 PPR with marker**
- **Compact 2.25" cube shape**
- **Economical design**

The Series 21/22 QUBE encoder is designed for operation in industrial environments, and is stable in temperatures from 0° to 70°C.

The Series 21/22 QUBE generates digital incremental position data proportional to shaft rotation. Through higher mechanical and electronic operating speeds, the Series 21/22 QUBE can boost system speeds, cycle times, and productivity.

Its general-purpose design makes the Series 21/22 QUBE compatible with most programmable controllers, electronic counters, motion controllers, and motor drives. The Series 21/22 QUBE is electrically and physically interchangeable with most cube-style encoders on the market. It can easily be applied with belts and pulleys, leadscrews, rack and pinions, lineshafts, etc..

Applications

- Measuring, cut-to-length or size for textile, metal, lumber and rubber industries
- Tracking, storage & retrieval, pick & place, conveying, and elevating for material handling applications
- Winding, including films, foils, wire and extrusions
- Measuring mechanical motion for processing, labeling, filling, mixing, batching, and packaging
- Position control, for flexible and automatic assembly equipment
- Speed feedback, for precise drive and machine monitoring and control

Mechanical and Environmental Features

- Environmentally sealed enclosure
- Large 3/8", 1/4" or 6 mm diameter stainless steel shafts
- Durable anodized aluminum housing with 5/16" thick housing walls
- Extra-wide bearing span with heavy-duty sealed bearings front and rear
- 6000 RPM capability

Electrical Features

- Wide selection of resolutions up to 1270 PPR
- Wide input voltage range eliminates the need for multiple models
- Unidirectional or quadrature outputs
- Optional complementary (differential) outputs

SPECIFICATIONS

Electrical

Code: Incremental

Resolution: 1 to 1270 PPR (pulses/revolution)

Accuracy: (Worst case any edge to any other edge) ± 2.5 arc-min.

Format: Two channel quadrature (AB) with optional Index (Z) and complementary outputs

Phase Sense: A leads B for CW shaft rotation as viewed from the shaft end of the encoder farthest from the connector or cable

Quadrature Phasing: $90^\circ \pm 18^\circ$ electrical

Symmetry: $180^\circ \pm 18^\circ$ electrical

Index: $225^\circ \pm 90^\circ$ electrical (active high)

Waveforms: Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

Input Power:

4.5 min. to 26 VDC max. at 110 mA max., not including output loads

Outputs:

7273 Open Collector: 30 VDC max., 40 mA sink max.

7272 Push-Pull and Differential Line Driver: 40 mA sink or source

Frequency Response: 120 kHz min. data, 50 kHz min. Index

Electrical Protection: Overvoltage, reverse voltage and output short circuit protected

Noise Immunity: Tested to EN50082-2 (Heavy Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

Mating Connector:

6 pin, style MS3106A-14S-6S (MCN-N4)

7 pin, style MS3106A-16S-1S (MCN-N5)

Cable Termination: PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

Mechanical

Shaft Loading: 40 lbs. radial, 30 lbs. axial

Shaft Speed: 6,000 RPM max.

Shaft Tolerance: Nominal $-0.0003"/-0.0007"$

Starting Torque: 2.5 oz-in max.

Moment of Inertia: 1.3×10^{-4} oz-in-sec²

Weight: 14 oz. max.

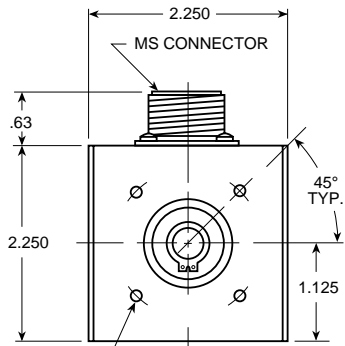
Environmental

Operating Temperature: 0 to +70 °C;

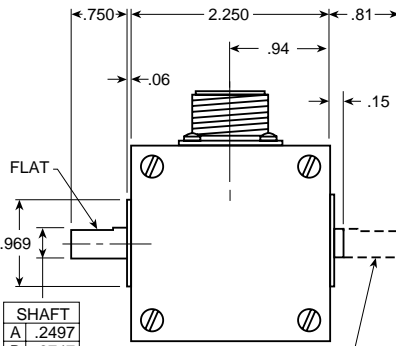
Storage Temperature: -40 to +90 °C

Enclosure: Environmentally sealed

Approximate Dimensions (in inches)

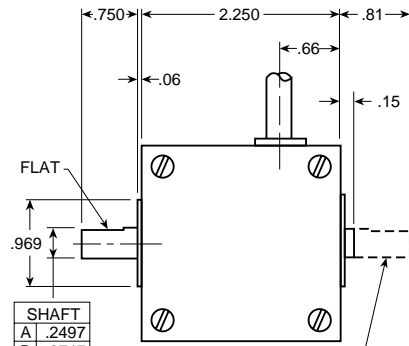


6-32 UNC-2B THREADS x .187 DEEP ON 2.00 DIA. B.C., 4 HOLES ON 3 FACES (FRONT, REAR & BOTTOM).
FOR MODELS 22M ONLY: M3 x 0.5^{PH} THREADS x 5mm DEEP ON A 50.8mm DIA. B.C. ON (3) FACES



SHAFT	
A	.2497
B	.3747
C	6 mm

OPTIONAL DOUBLE-ENDED SHAFT



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B	.3747
C	6 mm

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Table 1 – Current Sink Output

Pin	Function	Wire Color Code	Cable Acc'y #14006070010 Color Code
A	Common	BLK	BLK
B	Power Source	RED	RED
C	Case (Ground)	GRN/BLK	GRN
D	Signal A	GRN	BRN
E	Signal B	ORN	ORN
F	Supply Common	BLK	BLK

Table 2 – 7 Pin Line Driver Output

Pin	Function	Wire Color Code	Cable Acc'y #14004310010 Color Code
A	Signal A	GRN	RED
B	Signal B	ORN	BLU
C	Signal A	RED/BLK	YEL
D	Power Source	RED	WHT
E	Signal B	WHT/BLK	GRN
F	Common	BLK	BLK
G	Case (Ground)	GRN/BLK	SHIELD

Table 5 – Cable termination Line Driver Output with Marker

Function	Wire Color Code
Signal A	GRN
Signal B	ORN
Signal Z	WHT
Power Source	RED
Supply Common	BLK
Case (Ground)	GRN/BLK
Signal A	RED/BLK
Signal B	WHT/BLK
Signal Z	BLU

Table 3 – Current Sink Output w/Marker

Pin	Function	Wire Color Code	Cable Acc'y #108241-0010 Color Code
A	Common	BLK	BLK
B	Power Source	RED	RED
C	Signal Z	WHT	GRN
D	Signal A	GRN	BRN
E	Signal B	ORN	ORN
F	Common	BLK	BLK

Table 4 – 6-Pin Line Driver

Pin	Function	Wire Color Code	Cable Acc'y #14006640010 Color Code
A	Common	BLK	BLK
B	Power Source	RED	RED
C	Signal A	GRN	BRN
D	Signal A	RED/BLK	BRN/WHT
E	Signal B	ORN	ORN
F	Signal B	WHT/BLK	ORN/WHT

Ordering Information

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: Pulses/Rev	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21 Qube Encoder, Unidirectional 22 Qube Encoder, Bidirectional 22M Metric Qube Encoder, Bidirectional	0001 0360 0010 0400 0012 0480 0050 0500 0060 0512 0100 0600 0120 0720 0125 0800 0150 0900 0180 1000 0192 1024 0200 1200 0250 1250 0256 1270 0300	0 3/8" Double Ended Shaft 1 3/8" Single Ended Shaft 2 1/4" Double Ended Shaft 3 1/4" Single Ended Shaft available when Code 1 = 22M: 4 6mm Double Ended Shaft 5 6mm Single Ended Shaft	0 Single Ended, Table 1 2 Differential, Table 2 available only when Code 6 = 0: 4 Differential, Table 4 available only when Code 1 = 22 or 22M: 1 Single Ended, with Index, Table 3 available only when Code 6 = 1 to 5 3 Differential, with Index, Table 5	available only when Code 4 = 0 or 1: 0 5-26V in, 5-26V Open Collector w/2.2k pull-up out 1 5-26V in, 5-26V Open Collector w/o pull-up out available when Code 4 = 2, 3, or 4: 4 5-26V in, 5-26V Line Driver out	0 MS Connector 1 18' Cable 2 3' Cable 3 6' Cable 4 10' Cable 5 15' Cable