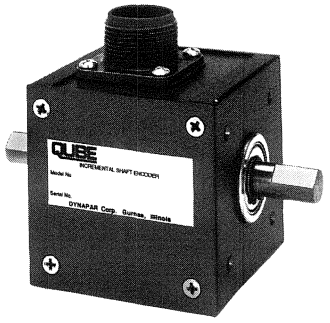
Dynapar brand Encoder Series 21/22



Technical Bulletin

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Manufactured by:
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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 measuring wheels, 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

Mechanical

Bearings: ABEC precision bearings
Sealed Bearings: Standard
Shaft Loading: 30 lbs. axial; 40 lbs. radial
Starting Torque: 2.5 oz-in
Shaft Diameters: 3/8", 1/4" or 6 mm (-0.0003"/-0.0005") single or double
Moment of Inertia: 1.3 x 10^{-4} oz-in sec^2 max.
Weight: 14 ounces
Slew Speed: 6000 RPM, 120 kHz max.

Environmental

Enclosure: Environmentally sealed
Operating Temperature Range: 0° to +70°C
Storage Temperature Range: -40° to +90°C

Electrical

Quadrature Phasing: 90° ±18° @ 10 kHz rate
Symmetry: 180° ± 18° @ 10 kHz rate
Index: 225° ±90°
Phase Sense: A leads B for CW rotation (as viewed from the shaft end of the encoder that is farthest from the connector).
Waveforms: Squarewaves with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf
Frequency Response: 120 kHz data; 50 kHz with index
Power Requirements: current sink: 5 to 26 VDC at 100 mA max. plus load; line driver: 5 to 15 VDC at 200 mA max plus load
Output Current: open collector: 40 mA sink at 0.5V; line driver: 40 mA source/sink
Connector: 6 pin: style MS3102E-14S-6P
7 pin: style MS3102E-16S-1P
Mating Connector: 6 pin: style MS3106A-14S-6S; 7 pin: style MS3106A-16S-1S

IMPORTANT ENCODER INSTALLATION INFORMATION

Mounting the Encoder: The encoder should be mounted such that its shaft is in close as possible alignment with the axis of the driving machine or motor shaft. The two shafts should then be joined using a suitable, instrument grade, flexible shaft coupling.

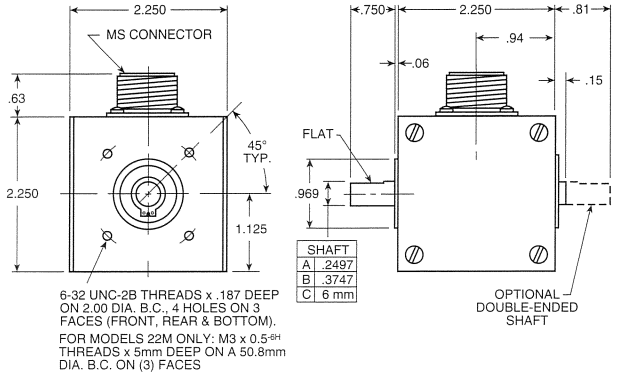
CAUTION: Rigidly coupling the encoder shaft to the driving shaft will cause failure of the encoder's or driving shaft's bearings.

Important Wiring Instructions: Use of shielded cable is recommended for all encoder installations. The shield should be connected to signal-ground at the receiving device only. ***Connecting the shield at both ends can cause grounding problems that degrade system performance.*** If possible, run the encoder cable through a dedicated conduit (not shared with other wiring). Use of conduit will protect the cable from physical damage and provide a degree of electrical isolation. Do not run the cable in close proximity to other conductors that carry current to heavy loads such as motors, motor starters, contactors, solenoids, etc. This practice can induce electrical transients in the encoder cable, potentially interfering with reliable data transmission.

Refer to Electrical Connections table for wiring information. To avoid possible damage, do not connect or disconnect the encoder connector or wiring while power is applied to the system.

CAUTION: Unused encoder signal wires must be individually insulated and under no circumstances be in contact with ground, voltage sources, or other signal lines.

Approximate Dimensions (in inches)



Prewired Cable Models

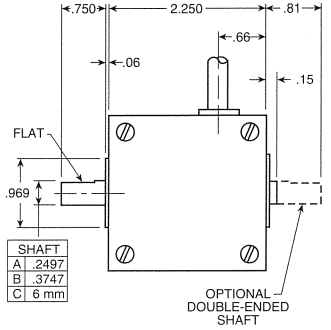


Table 1 – Current Sink Output

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 $\overline{A}$	RED/BLK	YEL
D	Power Source	RED	WHT
E	Signal $\overline{B}$	WHT/BLK	GRN
F	Common	BLK	BLK
G	Case (Ground)	GRN/BLK	SHIELD

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 $\overline{A}$	RED/BLK	BRN/WHT
E	Signal B	ORN	ORN
F	Signal $\overline{B}$	WHT/BLK	ORN/WHT

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 $\overline{A}$	RED/BLK
Signal $\overline{B}$	WHT/BLK
Signal $\overline{Z}$	BLU

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
☐☐■	☐☐☐☐	☐	☐	☐	☐
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 when code 6 = 0 **4** Differential, Table 4 available only when Code1 = 22 or 22M: **1** Single Ended, with Index, Table 3 **3** Differential, with Index, Table 5	available when Code 4 = 0 or 1: **0** 7406 Open Collector w/ 2.2k pull-ups **1** 7406 Open Collector w/o pull-up available when Code 4 = 2, 3 or 4: **4** 1428 CMOS Line Driver	**0** MS Connector **1** 18" Cable **2** 3' Cable **3** 6' Cable **4** 10' Cable **5** 15' Cable