NexGen SERIES 22

"QUBE" Encoder

Key Features

- Up to 20,000 Pulses Per Revolution
- IP67 Sealing Options for Shaft & Cable Exit Designs
- Wide Temperature Range for Challenging Environments
- Robust Bearing Design for Superb Shaft Loading
- Dual Shaft Option for Mechanical Redundancy

IND Industrial Duty

CE RoHS

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental, Optical

Resolution: 1 to 20,000 PPR (pulses/revolution)

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

Phase Sense: A leads B for CW shaft rotation when viewing the shaft farthest from connector or cable

Quadrature Phasing: 90° ± 30° electrical

Symmetry: 180° ± 25° electrical

Index: 180° default gated to B low

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

ELECTRICAL

Input Power: 5-26VDC; 75 mA max., not including output loads.

Outputs:
7272 Push-Pull: 40mA, sink or source
7272 Differential Line Driver: 40 mA, sink or source
7273 Open Collector: 40mA, sink max

Frequency Response: 200 kHz (data and index)

Noise Immunity: Tested to EN61326-1

Electrical Immunity: Reverse polarity and short circuit protected

Mating Connector:
6 pin, style MS3106A-14S-6S (MCN-N4)
7 pin, style MS3106A-16S-1S (MCN-N5)
5 pin, style M12: Cable with connector available
8 pin, style M12: Cable with connector available

Termination: MS Connector, M12 Connector or Cable Exit

MECHANICAL

Shaft Sizes: 6mm, 1/4" or 3/8"

Shaft Loading: 80 lbs. radial, 80 lbs. axial

Shaft Speed: 6,000 RPM max.

Shaft Tolerance: Nominal –.0003"/-.0006"

Starting Torque: 2.5 oz-in max.; w/shaft seals 4.0 oz-in max.; w/double shaft seal 6.0 oz-in max.

Housing and Cover: Aluminum

Shaft Material: Stainless Steel

Disc Material: Aluminum

Weight: 14 oz. max.

ENVIRONMENTAL

Operating Temperature: –40 to +100 °C

Storage Temperature: –40 to +100 °C

Shock: 100Gs for 11 milliseconds duration

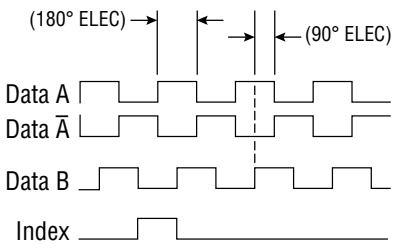
Vibration: 5 to 2000 Hz at 20Gs

Humidity: Up to 98% (non-condensing)

Enclosure Rating: IP67 with shaft seals

STANDARD DATA AND INDEX

Not all complements shown
A shown for reference



Index Width: 180° Default
A leads B, CW (from shaft end)

NexGen SERIES 22

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
☐☐☐	☐☐☐☐	☐	☐	☐	☐
22 Qube Encoder, Bidirectional **22M** Metric Qube Encoder, Bidirectional	Enter Custom Quadrature PPR from 1 to 20,000 Examples: **0001**= 1 PPR **0256** = 256 PPR **1000** = 1000 PPR **9999** = 9999 PPR **A000** = 10,000 PPR **B000** = 11,000 PPR **C999** = 12,999 PPR . . . **G000** = 16,000 PPR **G384** = 16,384 PPR **H000** = 17,000 PPR **J000** = 18,000 PPR **K000** = 19,000 PPR **L000** = 20,000 PPR **Note:** Letter "I" is skipped and not used	Available only when Code 1 is 22 **0** 3/8" Double ended shaft **1** 3/8" Single ended shaft **2** 1/4" Double ended shaft **3** 1/4" Single ended shaft **A** Same as "0" with shaft seal **B** Same as "1" with shaft seal **C** Same as "2" with shaft seal **D** Same as "3" with shaft seal Available only when Code 1 is 22M **4** 6mm Double ended shaft **5** 6mm Single ended shaft **E** Same as "4" with shaft seal **F** Same as "5" with shaft seal	Available for all Code 6 options **0** Single Ended, Table 1 **1** Single Ended, with Index, Table 3 **2** Differential, Table 2 Available only when Code 6 is 1 to 5 or A to E: **3** Differential, with Index, Table 5 Available only when code 6 is 0: 4 Differential, Table 4 Available only when Code 6 is 6: **5** 5 pin M12 connector, single ended, no index, Table 6 **6** 5 pin M12 connector, single ended, with index, Table 6 **7** 8 pin M12 connector, single ended, no index, Table 7 **8** 8 pin M12 connector, single ended, with index, Table 7 **9** 8 pin M12 connector, differential, no index, Table 8 **A** 8 pin M12 connector, differential, with index, Table 8	Available when Code 4 = 0, 1, 5, 6, 7 or 8: **0** 5-26 VDC in, 5-26 VDC Open Collector w/2.2k pull-ups out **1** 5-26 VDC in, 5-26 VDC Open Collector w/o pull-up out **2** 5-26 VDC in, 5V Totem Pole out Available when Code 4 = 2, 3, 4, 9 or A: **3** 5-26 VDC in, 5V Line Driver out **4** 5-26 VDC in, 5-26 VDC CMOS Line Driver	Available for all Code 3 and Code 4 Options **0** MS Connector Available when Code 3 is 0, 1, 2, 3, 4 or 5 **1** 18" Cable **2** 3' Cable **3** 6' Cable **4** 10' Cable **5** 15' Cable Available when Code 4 is 5, 6, 7, 8, 9 or A **6** M12 Connector Available when Code 3 is A,B,C,D,E or F **A** 18" Sealed Cable **B** 3' Sealed Cable **C** 6' Sealed Cable **D** 10' Sealed Cable **E** 15' Sealed Cable

Please see page 5 for compatible accessories.

NexGen SERIES 22

ELECTRICAL CONNECTIONS

MS CONNECTOR ACCESSORY CABLES - WHEN CODE 4 = 0 TO 4

Connector and mate/accessory cable assembly pin numbers and wire color information is provided here for reference.

Table 1 - Current Sink Output

Encoder Function	Cable # 1400607XXXX 6 Pin Single Ended	
	Pin	Wire Color Code
Common	A	BLK
Power Source	B	RED
Case	C	GRN
Signal A	D	BRN
Signal B	E	ORG
Common	F	BLK

Table 2 - 7 Pin Line Driver Output

Encoder Function	Cable # 1400431XXXX 7 Pin Differential Line Driver	
	Pin	Wire Color Code
Signal A	A	RED
Signal B	B	BLU
Signal $\bar{A}$	C	YEL
Power Source	D	WHT
Signal $\bar{B}$	E	GRN
Common	F	BLK
Case	G	—

Table 3 - Current Sink Output w/ Marker

Encoder Function	Cable # 108241-XXXX 6 Pin Single Ended w/Index Outputs	
	Pin	Wire Color Code
Common	A	BLK
Power Source	B	RED
Signal $\bar{Z}$*	C	GRN
Signal A	D	BRN
Signal B	E	ORG
Common	F	BLK

Table 4 - 6 Pin Line Driver

Encoder Function	Cable # 1400664XXXX 6 Pin Differential	
	Pin	Wire Color Code
Common	A	BLK
Power Source	B	RED
Signal A	C	BRN
Signal $\bar{A}$	D	BRN/WHT
Signal B	E	ORG
Signal $\bar{B}$	F	ORG/WHT

Table 5 - Cable Termination Line Driver Output with Marker

Encoder Function	Wire Color Code
Signal A	BRN
Signal B	ORG
Signal Z*	YEL
Power Source	RED
Com	BLK
Case	GRN
Signal $\bar{A}$	BRN/WHT
Signal $\bar{B}$	ORG/WHT
Signal $\bar{Z}$*	YEL/WHT

5 & 8 PIN M12 ACCESSORY CABLES - WHEN CODE 4 = 5 TO 9 AND A

Connector pin numbers and cable assembly wire color information is provided here for reference.

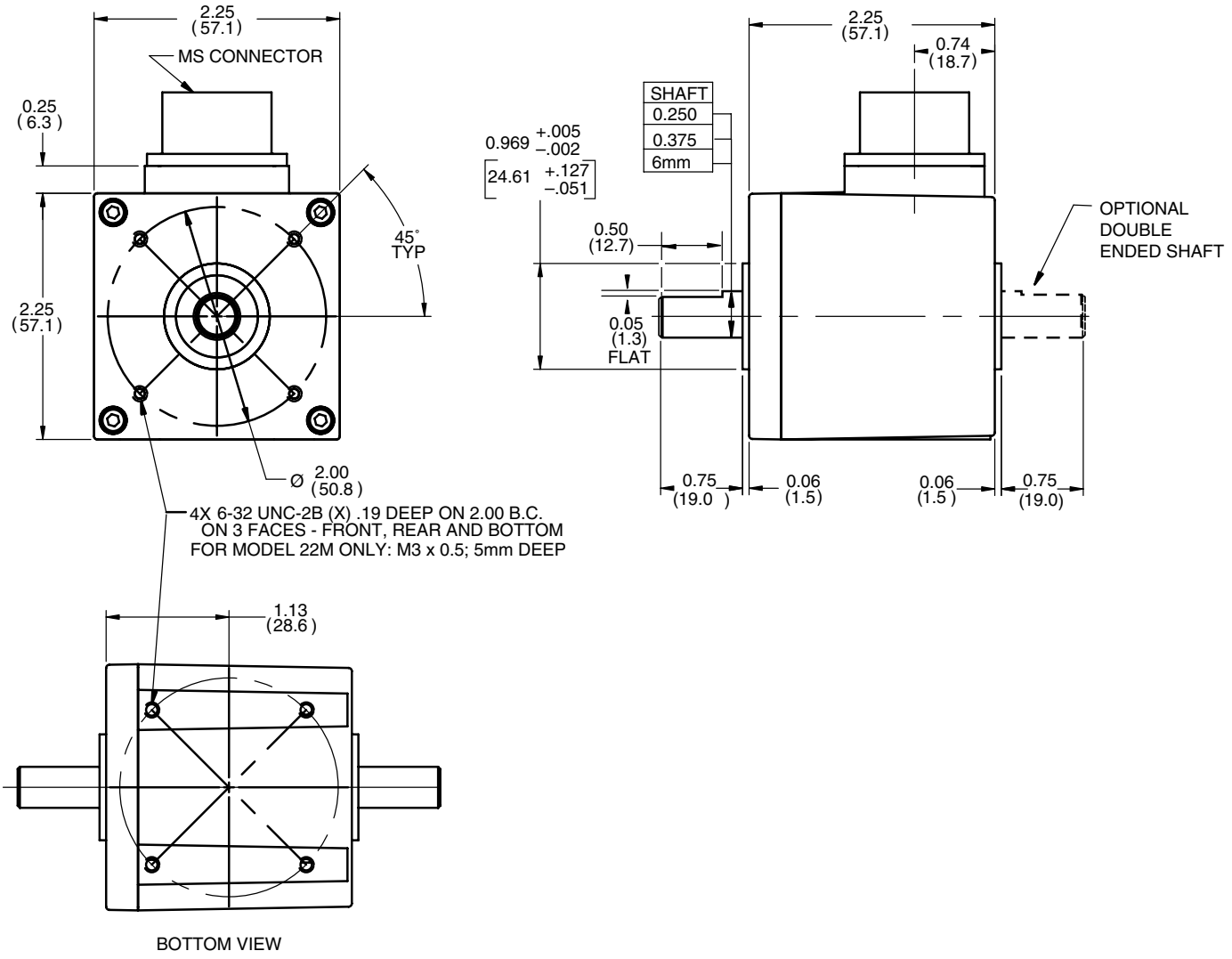
Encoder Function	Cable #112859-XXXX 5 Pin Single Ended		Cable #112860-XXXX 8 Pin Single Ended		Cable #112860-XXXX 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Signal A	4	BLK	1	BRN	1	BRN
Signal B	2	WHT	4	ORG	4	ORG
Signal Z*	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
COM	3	BLU	7	BLK	7	BLK
Signal $\bar{A}$	—	—	—	—	3	BRN/WHT
Signal $\bar{B}$	—	—	—	—	5	ORG/WHT
Signal $\bar{Z}$*	—	—	—	—	8	YEL/WHT

NOTES:

1) Cable Configuration (Tables 1 and 3 - 5): PVC jacket, 105° C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)
2) Cable Configuration (Table 2): PVC jacket, 105°C rated, overall foil shield; 22 AWG conductors, minimum
3) Cable Configuration (Tables 6 - 8): PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum
4) Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace -XXXX with -0020
5) * Index not provided on all models. See ordering information.
6) "MS" Type mating connectors and pre-build cables are rated NEMA 12
7) "M12" Cable assemblies are rated IP67

NexGen SERIES 22

Dimensions: inch [mm]



NexGen SERIES 22

Mating Cables

Part Number	Pins		Compatiabilty
112859-XXXX	5 Pin M12	Connector, Cable Assembly	Code 4: Option 5 or 6; Single Ended Outputs
1400607XXXX	6 Pin MS		Code 4: Option 0; Single Ended outputs, (w/o Markers), 6 Wires
108241XXXX	6 Pin MS		Code 4: Option 1; Single Ended w/Index Outputs
1400664XXXX	6 Pin MS		Code 4: Option 4; Differential Line Driver Outputs, 6 Wires
1400431XXXX	7 Pin MS		Code 4: Option 2; Differential Line Driver Outputs, 7 Wires
112860-XXXX	8 Pin M12		Code 4: Option 7, 8 ,9 or A; Single Ended or Differential Line Drive Outputs

***Note:** Standard cable length is 10 feet but may be ordered in any length in 5 foot increments. For example, for a 20 foot cable, replace XXXX with -0020.

See page 2 for code descriptions

Measuring Wheels

Part Number	Description	Compatiabilty
112919-0001	White rubber measuring wheel, 3/8" Bore, 12" circumference	Code 3: Option 0, 1, A, or B
16002070177	Phenolic measuring wheel, 3/8" Bore, 12" circumference	
16002070284	Measuring wheel, 2 rubber O-Rings around circumference, 3/8" bore, 12" circumference	
16002070046	Replaceable o-rings for measuring wheel part number 16002070284	

Flexible Couplings

Part Number	Bore size		Diameter	Length	Compatiabilty
	Primary	Secondary			
FCPL00750250	1/4"	1/4"	0.750"	0.875"	Code 3: Option 2, 3, C or D
FCPL01000250	1/4"	1/4", 3/8"	1.000"	1.250"	Code 3: Option 0, 1, 2, 3, A, B, C or D
FCPL01250250	1/4"	1/4", 3/8"	1.000"	1.250"	
FCPL01000375	3/8"	3/16", 3/8"	1.250"	1.250"	Code 3: Option 0, 1, A, or B
FCPL01250375	3/8"	3/8", 1/2"	1.250"	1.250"	
FCPL01500375	3/8"	3/8", 1/2"	1.500"	1.500"	
FCPL01250500	1/2"	1/4", 1/2"	1.250"	1.250"	Code 3: Option 2, 3, C or D
FCPL01500625	5/8"	3/8", 5/8"	1.500"	1.500"	Code 3: Option 0, 1, A, or B
FCPL02000875	7/8"	3/8", 5/8"	2.000"	2.000"	
FCPL02001000	1"	3/8", 5/8"	2.000"	2.000"	
FCPL02001125	1-1/8"	3/8", 5/8"	2.000"	2.000"	
FCPLM1000250	1/4"	4, 5, 6 mm	1.000"	1.250"	Code 3: Option 2, 3, 4, 5, C, D, E or F
FCPLM1250375	3/8"	6, 8, 10 mm	1.250"	1.250"	Code 3: Option 0, 1, A, or B
FCPLM1500500	1/2"	6, 8, 10 mm	1.500"	1.500"	Code 3: Option 4, 5, E or F
FCPLM12506MM	6 mm	4, 5, 6 mm	1.250"	1.500"	
FCPLM100010MM	10 mm	6, 8, 10 mm	1.000"	1.000"	

Encoder Single Splitter

Part Number	Description	Compatiabilty
RIMSS2	RIMSS2 Signal splitter for all incremental encoders operating between 5-26VDC	All

Adapters and Brackets

Part Number	Description	Compatiabilty
108680-0001	L Mounting bracket	Code 1: Option 22
111328-0001	Qube pivot mounting base	All

Connectors

Part Number	Description	Compatiabilty
MCN-N4	6 pin MS Mating connector and clamp, style MS3106A-14S-6S	Code 4: Option 0, 1 or 4
MCN-N5	7 pin MS Mating connector and clamp, style MS3106A-16S-1S	Code 4: Option 4

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